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NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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THE CHOICE OF PROTECTION STRATEGIES DURING THE BILINEAR QUALITY GAME ON CYBER SECURITY FINANCING

Abstract. There is developed a model for the module of an intellectualized system for decision-making support on the cyber security means financing of the information object. The model is based on the toolkit use of the theory of multi-step games in which the steps are made alternately by the sides of cyber security and attacker. There was obtained a solution that enables interested parties to evaluate financial strategies for effective cyber security systems construction in the condition of not complete information about the financial state of the attacking party (hackers). The model differs from existing approaches by solving a bilinear multi-step quality game with several terminal surfaces.

In work, there is performed a computational experiment and is given the corresponding results. Confirmed during the simulation experiment solution takes into account the financial components of cyber security strategies at any ratio of parameters describing the process of cyber security financing in the condition of information lack about the financial condition of hackers.

Keywords: objects of informatization, cyber security, multi-step quality game, optimal financing strategies, decision-making support system.

Introduction. The researches of authors [1] have the information that managers of many organizations and companies do not have a deep understanding of the need to solve the permanent task of financing cyber security means (CSM) of their information systems and technologies (IST). As a result, in the condition of increasing amount of cyber threats [2] in combination with the lack of an appropriate funding strategy in CSM there are appeared situations in which there is a high degree of risk associated with the loss of important information or its discrediting. In the coming years, successful cyber attacks will unlikely be the result of one or two technological tools of hacking. Now there is formed a trend according to which hackers will use many different steps and elements to hack into IST.

Most small and medium-sized companies and organizations are limited to the standard procedure of IST protection, which in practice are focused on the deployment of antivirus systems and on the configuration of firewalls. However, we will note that such a strategy of cyber security (CS) (in some cases caused by limited financial resources from the protection side) may subsequently have a significant impact on the prospects of being attacked by computer intruders. And even in a situation where the

allocated budget for CSM is sufficiently large, the problem of evaluating the effectiveness of investment strategies in cyber security is a difficult task. This, in particular, is due to the ever-changing landscape of cyber threats and new IST vulnerabilities, and uncertainties in assessing the risks of CSM financing.

According to [3, 4] the main problems faced by companies and organizations at assessing and selecting rational strategies for investing in CSM of the informatization objects (IO) remain: the lack of a methodology for determining the exact values for risk assessment related to CSM financing; the complexity of the proposed models and methods, in particular their algorithmization and subsequent implementation, for example, in decision-making support systems (DMSS) for the selection of funding strategies for CSM; the lack of methodology, for evaluation the strategies of the attacking party, for example, when its financial resource is not limited, etc.

For example, massive DDoS attacks can last several days long [3, 4]. This is an atypical situation for a protected resource. As it was noted in [3] not each hacker can deal with such massive attacks. In works [1, 2] there was given the information that daily DDoS attacks of mixed type (UDP-amplification and SYN-flood) could cost the customer several tens of thousands of dollars.

All this in combination makes the task of continuing the researches in the direction of developing new methods and models for the selection of rational strategies for CSM financing, particularly for situations where new cyber threats cause a change in the level of risks for organizations and companies, and, therefore, lead to the necessity revision of its own financing strategies in the CSM.

The purpose of the article is to develop a model for financing the cyber security system in the condition of not complete information about the financial state of the attacking party (hackers). It is also necessary to find sets of preference and optimal financial strategies for protection the information object in a risk environment.

Literature review. In works [5, 6] it was shown that the current stage of the development of information systems and technologies is accompanied by a trend of funding increase for hacker attacks. In particular, the US secret services [7] for several months sought for hackers funding sources who manipulated the election campaign in the United States. In work [8] it is noted that investing in hacker groups is one of the priority projects of the DPRK government. At the same time, there are developed the works in the segment of developing new methods and models for decision-making support on the choice of strategies for investing in cyber security of various information objects. In work [9] there was shown that the decision-making on cyber security financing is a constant task. However, the lack of many works and, in particular of [10, 11], is the lack of realistic recommendations for the development of financing strategies for the cyber security of IO. In particular, there are no researches suggesting models that take into account strategies of active financial counteraction to hackers who can attack various IO. A new direction are the researches devoted to the application of various expert [12] and decision-making support systems [13, 14] for the selection of financing strategies for cyber security of the IST. The disadvantage of these researches [15, 16] is the lack of unambiguous modeling results. Most of the models considered in [13-16] do not allow to find effective recommendations and financing strategies for CSM of complex information objects. The models proposed in [17, 18] also do not allow to assess the risk of losing financial resources by the cyber protection side. In work [19] there are proposed the models based on the theory of games for evaluating the effectiveness of financing in CSM. The authors, however, did not take into account many factors, for example, the change in the financial components of the attacking party. The elimination of this disadvantage in previous researches of various authors is possible due to the application of methods of the theory of differential and multi-step quality games with several terminal surfaces [20-22]. This will improve the effectiveness of the forecast calculations from the IO protection side on the risk assessment of financial losses in the CSM.

Therefore, as the analysis of the performed researches has shown the problem of the further development of models for DMSS in the tasks of cyber security means financing remains relevant. In particular, it is necessary to consider situations with incomplete information about the financial state of the attacking party in the process of finding sets of preference and optimal financial strategies for protection the information object.

Models and methods. The article continues the research of authors [14, 20, 21], in which the apparatus of the game theory is used, there are considered two sides: player #1 – an information system defender (ISD); player #2 is a hacker. Both players use financial resources to achieve their goals [21]. We

assume that for a given period of time $\{0,1,\dots,T\}$ (T is a natural number) the players 1 and 2 have, respectively, $x(0)$ and $y(0)$ financial resources. There is an interaction of players. This interaction will be described as a bilinear multi-step game with alternately steps with incomplete information. Unlike the game with complete information, the first player does not know exactly the initial state of the second player, but the distribution function of its initial states $F_0(\cdot)$ is known. The steps in such a game are made alternately. At even moments of time, the first player makes the step, at uneven moments of time the second player makes the step.

Let $t = 2n, x(t), x(t+1)$ – the state of the first player at time $t, t+1$. $x_2^\xi(t), x_2^\xi(t+1)$ – random states of the second player at time $t, t+1$. Then the states of the players at time $t+1, t+2$ are determined from the relations:

$$x(t+1) = \alpha(t) \cdot x(t) - u(t) \cdot \alpha(t) \cdot x(t); \quad (1)$$

$$y^\xi(t+1) = y^\xi(t) - s_1 \cdot u(t) \cdot \alpha(t) \cdot x(t); \quad (2)$$

$$y^\xi(t+2) = \beta(t) \cdot y^\xi(t+1) - v(t) \cdot \beta(t) \cdot y^\xi(t+1); \quad (3)$$

$$x(t+2) = x(t+1) - s_2(t) \cdot v(t) \cdot \beta(t) \cdot y^\xi(t+1); \quad (4)$$

Here $u(t), v(t): u(t) \in [0,1], v(t) \in [0,1], s_1 > 0, s_2 > 0$.

Let describe the game process.

At time $t \in \{0,2,4,\dots,2 \cdot n\}$ the first player multiplies the value $x(t)$ on the coefficient (rate of change, growth rate) $\alpha(t)$ and choose the value $u(t)$ ($u(t) \in [0,1]$), which determines the amount of the resource of the first player $\alpha(t) \cdot x(t)$, allocated to the cyber security of IST at time t . Then the states of the players at the moment of time $t+1$ are determined by the relations (1) and (2). Consequently, the hacker is forced to allocate for IST hacking the value $s_1 \cdot u(t) \cdot \alpha(t) \cdot x(t)$ of financial resources. Coefficient s_1 determines the "effectiveness" of second player investment for the development or purchase of IST hacking tools of the first player's.

If the condition $P(y^\xi(t+1) < 0) \geq p_o, (0 \leq p_o \leq 1)$ is satisfied, then the first player, using his financial resources, guarantees the protection of IST with a probability p_o . We assume that from the side of the first player the procedure of CSM financing is completed. Otherwise, the first player continues to finance CSM.

The hacker makes his step. He acts just like the first player. And then the states of the players are determined by the relations (3) and (4). If it turns that after hacker's step the condition $P(x(t+2) > 0) < p_1, (0 \leq p_1 \leq 1)$, will be satisfied, then the attacker damaged the IS with a probability more than $(1 - p_1)$ and the procedure of CSM financing is completed.

The first player tries to find a lot of his initial states, which have the following property. *Property*: if the game starts from the initial states, then the first player can ensure the cyber security of his IST by the selection the control actions $u(0), \dots, u(t) (t = 2n)$ with a probability more than p_o . In this case, the strategy chosen by player 1 prevents the hacker's damage to the IST with a probability more than $(1 - p_1)$. The set of such states will be called **the set of preferences** of the first player.

Let denote by Φ - the set of distribution functions of one-dimensional random variables, by $2n$ - the closest natural even number to T , $T^* = \{0,2,\dots,2n\}$ - the set of natural numbers.

Definition. A pure strategy $u(\dots)$ of the first player is a function: $u(\dots): T^* \times R_+ \times \Phi \rightarrow [0,1]$, such that $u(t, x, F) \in [0,1], (F \in \Phi)$.

That is, the strategy of the first player is a rule that allows the first player on the basis of available information to determine the value of the financial resource that player 1 allocates for the development or modernization of CSM. Player 2 chooses his strategy $v(\cdot)$ on the basis of any information.

The aim of the first player is to find a set of preferences, as well as finding his strategies, by applying of which he will meet the conditions that allow the protection side to finish the financing procedure in CSM. The strategies of the first player with these properties will be called his optimal strategies. The formulated game model corresponds according to the classification of the decision-making theory to the decision-making task under risk conditions. In addition, such a model is a bilinear multi-step quality game with several terminal surfaces with alternate steps. Finding the sets of preference of the first player and his optimal strategies depend on a set of parameters.

In order to describe the sets of preference of the first player, you must use two values:

$$c(0) = \inf \{c'\}, \quad d(0) = \inf \{d'\},$$

$$F_0(c') \geq p_0, \quad F_0(d') \geq p_1.$$

The first player's sets of preference and his optimal strategies are found for $T = 1, 3, \dots$. We will use the notation for sets of preference:

$V_1^T(p_0, p_1)$ – the set of preferences of the first player from which he successfully completes the CSM financing procedure by the T steps.

At $T = 1$ we have $V_1^1(p_0) = \{x(0) : s_1 \cdot \alpha \cdot x(0) \geq c(0)\}$.

Optimal strategy:

$$u_*(1, x, c) = \begin{cases} 1, & \text{for } s_1 \cdot \alpha \cdot x \geq c; \\ 0, & \text{otherwise.} \end{cases} \quad (5)$$

Let consider various cases of the game parameters ratio.

Case 1. $p_0 = p_1$.

1.1. $\alpha > \beta$.

Let $k_0 \in N$ (the set of natural numbers):

$$s_1 \cdot \alpha \cdot s_2 \leq \left(\frac{\alpha}{\beta}\right)^{k_0}, \quad s_1 \cdot \alpha \cdot s_2 > \left(\frac{\alpha}{\beta}\right)^{k_0+1} \quad \text{then}$$

$$V_1^T(p_0, p_0) = \left\{ x(0) : c(0) \leq s_1 \cdot \alpha \cdot \left(\frac{\alpha}{\beta}\right)^k x(0); c(0) > s_1 \cdot \alpha \cdot \left(\frac{\alpha}{\beta}\right)^{k-1} x(0) \right\},$$

where $T = 2k + 1 \leq 2k_0 + 3$.

The set

$$V_1^{2k_0+s}(p_0, p_0) = \left\{ x(0) : c(0) > s_1 \cdot \alpha \cdot \left(\frac{\alpha}{\beta}\right)^{k_0+1} x(0); c(0) \leq \left(\frac{\alpha}{s_2 \cdot \beta}\right) x(0) \right\}, \quad V_1^T(p_0, p_0) = \emptyset.$$

For $T = 2k + 1 \geq 2k_0 + 7$.

Optimal strategy

$$u_*(n, x, c) = \begin{cases} 1, & \text{for } s_1 \cdot \alpha \cdot x \geq c; \\ 0, & \text{otherwise.} \end{cases} \quad (6)$$

The beam $\left\{ x(0) : x(0) \in R_+, c(0) \in R_+, c(0) = \left(\frac{\alpha}{s_2 \cdot \beta}\right) x(0) \right\}$ will be a barrier [22]. It means that

from the states $x(0) : c(0) > \left(\frac{\alpha}{s_2 \cdot \beta}\right) x(0)$ it is impossible for the first player to reach the goal with probability $p \geq p_0$. This beam can be called a stochastic beam of balance for the procedure of CSM IS financing.

1.2. $\alpha \leq \beta$.

1.2.1. $s_1 \cdot \alpha \cdot s_2 \leq 1$.

In this case, we will receive $V_1^T(p_0, p_0) = \emptyset$ for $T = 2k + 1 \geq 3$.

1.2.2. $s_1 \cdot \alpha \cdot s_2 > 1$.

1.2.2.1. $s_1 \cdot \beta \cdot s_2 > 1$.

In this case, we will receive $V_1^T(p_0, p_0) = \emptyset$ for $T = 2k + 1 \geq 3$.

1.2.2.2. $s_1 \cdot \beta \cdot s_2 \leq 1$.

In this case, we will receive $V_1^3(p_0, p_0) = \left\{ x(0) : c(0) \leq \left(\frac{\alpha}{s_2 \cdot \beta} \right) x(0), c(0) > s_1 \cdot \alpha \cdot x(0) \right\}$.

Optimal strategy

$$u_*(n, x, c) = \begin{cases} 1, & \text{for } s_1 \cdot \alpha \cdot x \geq c; \\ 0, & \text{otherwise.} \end{cases} \quad (7)$$

$V_1^T(p_0, p_0) = \emptyset$ for $T = 2k + 1 \geq 5$.

Case 2. $p_0 > p_1$.

In this case, we will receive $V_1^T(p_0, p_1) = V_1^T(p_0, p_0)$.

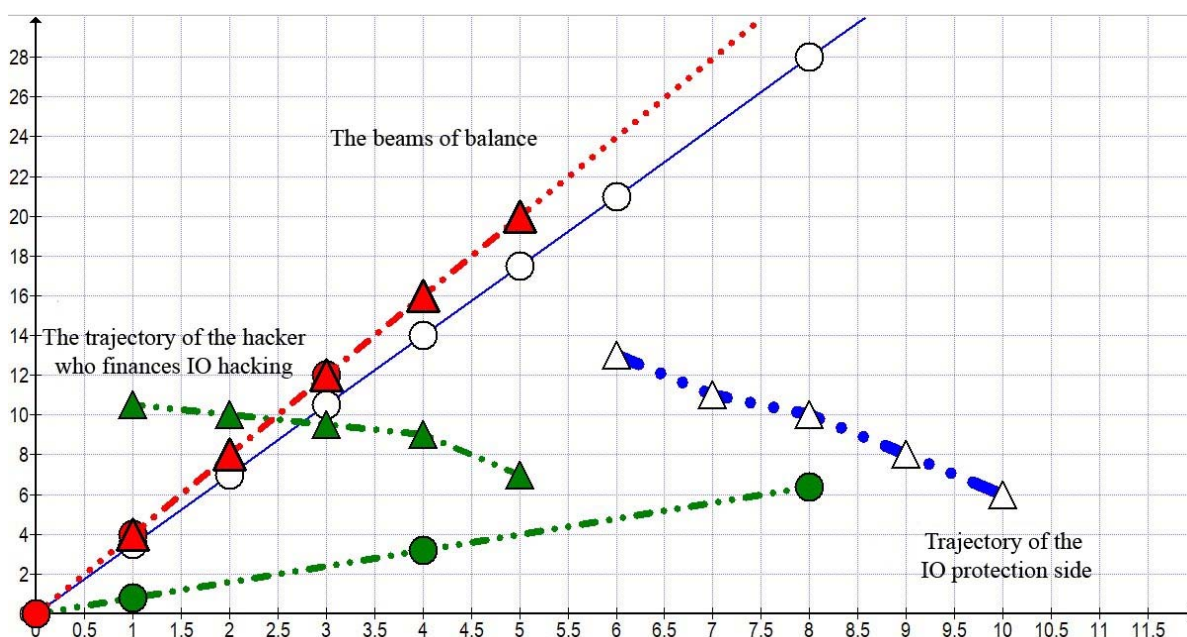
Case 3. $p_0 < p_1$.

In this case we will receive $V_1^T(p_0, p_1) = V_1^T(p_0, p_0) \cap \left\{ x(0) : d(0) \leq \left(\frac{\alpha}{s_2 \cdot \beta} \right) x(0) \right\}$.

The model proposed in the article was applied in the MathCad environment.

Computational experiment. The aims of the computational experiment: to determine the sets of strategies of players 1 and 2; to assess the risks that are associated with the loss by the players their financial resources for IO protection and hacking the cyber security perimeter; to check the adequacy of the proposed model.

The results of three computational experiments are shown on figure.



The results of computational experiments on the choice of rational financial strategies of the informatization object defender

The designations adopted on the figure:

1) the beams of balance are shown in the figure by the lines with round markers;

2) under the beams of balance and above them there are the so-called zones of players' preference. It is accepted that under the corresponding beams there is a zone of "preference" for IO defender. Above the beams there is shown the zone of "preference" of the hacker's financial strategies, who tries to overcome the boundaries (perimeters) of the IO cyber security;

3) the trajectories of the defender's and hacker's steps are represented by lines with triangular markers (for the defender the dotted blue line with triangular markers without shading, for the hacker - dotted green line with triangular markers with a solid color). Accordingly, the trajectories are in the area of preference of the defender and the hacker.

4) solid lines with square markers show the restrictions imposed on the financial resources of the defender and the hacker (for the defender square markers without shading, for the hacker - with solid color).

The solution of the game is given for all cases of the game parameters ratio. Using the game results we find the optimal behavior of the IO defender in the case when he does not know exactly the state of the financial resource of the hacker, but only the distribution function of his states is known. Note that such a situation could arise if the hacker uses his mixed strategy in order to complicate the IO cyber protection.

The discussion of the modeling results.

Computational experiment for the protection side. The game results are shown in blue lines (trajectory and balance beam). A positive orthant on the plane $(x(0), c(0))$ is considered. Next, in this orthant, we consider the set of beams from the point $(0,0)$. These beams are given by the ratio:

$c = \left(3.5 - \frac{1}{n}\right) \cdot x$. These beams specify the set of preferences of the first player (IO defender) for n steps

with the probability p_0 , i.e. it is assumed that $p_0 = p_1$.

For example, the set $V_1^T(p_0, p_0)$ is the set

$$\left\{ (x(0), c(0)) : x(0), c(0) \in R_+, \left(3.5 - \frac{1}{(n-1)}\right)x(0) \leq c(0) < \left(3.5 - \frac{1}{(n)}\right)x(0) \right\}.$$

At $n = 1$ there will be $V_1^1(p_0) = \{(x(0), y(0)) : x(0), c(0) \in R_+, 0 \leq c(0) < (2.5)x(0)\}$.

The beam: $c(0) = (3.5) \cdot x(0)$ will be a beam of the stochastic balance.

Computational experiment for the hacker's side. The game results are shown in green lines (trajectory and balance beam). Test calculation 2, for the second player's (hacker's) sets of preference there is considered the symmetric task for the second player. At the positive orthant, we consider the set of

beams from the point $(0,0)$. These beams are given by the ratio: $y = \left(0.8 + \frac{1}{n}\right) \cdot c$. These beams specify

the set of preferences of the second player for n steps. For example, the set $V_2^n(p_0, p_0)$ is the set

$$\left\{ (c(0), y(0)) : c(0), y(0) \in R_+, \left(0.8 + \frac{1}{(n-1)}\right)c(0) \leq y(0) < \left(0.8 + \frac{1}{(n)}\right)c(0) \right\}.$$

At $n = 1$ there will be $V_2^1(p_0) = \{(c(0), y(0)) : c(0), y(0) \in R_+, 0 \leq y(0) < (1.8)c(0)\}$.

The beam: $y(0) = (0.8) \cdot c(0)$ will be a beam of the stochastic balance.

Computational experiment for equal financial strategies of players. The third test calculation will correspond to the "movement" along the beam of balance: $y(0) = (3.5) \cdot c(0)$. Here the original task for the first player is considered.

In the course of the computational experiment, it is shown that our model is capable to provide effective decision-making support in the sphere of CSM financing. This work continues a number of our publications [14, 21], in which the theoretical and methodological foundations of DSS design were

described using a bilinear multi-step quality game with several terminal surfaces. The approach proposed in the work allowed to eliminate the disadvantages of the earlier versions of the model, since the complete information on the financial state of the attacking party (hackers) is not taken into account. This distinguishes our research from the works of other authors [9-12].

The disadvantage of the model revealed during the computational experiment is the fact that the obtained data of the predictive estimation at choosing financing strategies in the CSM IO did not always coincide with the actual data. The maximum deviation of the results of the simulation experiment from practical data was 8-12%.

Prospects for the development of this research are the further development of the computer model for the DSS "SSDMI" [14, 21].

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Conclusions. The following results were obtained in the article:

– developed a model for financing the informatization object of cyber security system in the absence of complete information on the financial state of the attacking party. The model differs from the known ones by the dynamic programming method that was used to solve the problem with incomplete information, which allows to effectively solve problems in which the information content requires the players' resources, both financial and material;

– conducted a computational experiment. In the course of which it is shown that the proposed model is capable to provide effective decision-making support in the field of cyber security systems financing of various informatization objects. The adequacy of the model was confirmed, the maximum deviation of the results of the computational experiment from practical data was 8-12%.

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КИБЕРҚАУІПСІЗДІКТІ ҚАРЖЫЛАНДЫРУ БОЙЫНША САПАНЫҢ БИСЫЗЫҚТЫ ОЙЫНЫ БАРЫСЫНДА ҚОРҒАУ СТРАТЕГИЯЛАРЫН ТАҢДАУ

Аннотация. Ақпараттандыру объект үшін киберқауіпсіздік құралдарын қаржыландыру бойынша интеллектуалды шешімдерді қолдау жүйесінің модулі үшін модель әзірленді. Модель киберқауіпсіздік және шабуылшылар тараптарының кезек-кезек қабылданатын көп сатылы ойындар теориясының құралдарын пайдалануына негізделген. Шабуыл жасайтын тараптың (хакерлердің) қаржылық жай-күйі туралы толық ақпарат болмаған жағдайда тиімді киберқауіпсіздік жүйесін құру үшін мүдделі тараптарға қаржылық стратегияларды бағалауға мүмкіндік беретін шешім қабылданды. Модель бірнеше терминал беттерімен сапалы бисызықты көпжүрісті ойындарды шешу арқылы қолданыстағы тәсілдерден ерекшеленеді.

Есептеу эксперименті орындалды және тиісті нәтижелер жұмыста көрсетілген., Имитациялау эксперименті барысында расталған, хакерлердің қаржылық жағдайы туралы ақпарат болмаған жағдайда, киберқауіпсіздік құралдарын қаржыландыру үдерісін сипаттайтын, параметрлердің кез-келген қатынасында киберқауіпсіздік стратегиясының қаржылық компоненттерінің шешімін есепке алуды қамтиды.

Түйін сөздер: ақпараттандыру объектілері, киберқауіпсіздік, сапалы көпжүрісті ойын, оңтайлы қаржыландыру стратегиясы, шешімдерді қолдау жүйесі.

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ВЫБОР СТРАТЕГИЙ ЗАЩИТЫ В ХОДЕ БИЛИНЕЙНОЙ ИГРЫ КАЧЕСТВА ПО ФИНАНСИРОВАНИЮ КИБЕРБЕЗОПАСНОСТИ

Аннотация. Статья содержит результаты сравнительного анализа предшествующих исследований в области кибербезопасности информационно-коммуникационных систем транспорта. Анализ выполнен в контексте решаемой проблемы дальнейшего развития методов и моделей распознавания киберугроз, аномалий и атак, направленных против информационно-коммуникационных систем транспорта, а также оценивания рисков для информационной безопасности транспортной отрасли как одной из составляющих критически важной инфраструктуры Республики Казахстан. Актуальность задачи также вызвана формированием единой информационно-коммуникационной среды транспортной отрасли Казахстана, внедрением новых и модернизацией существующих информационных систем на транспорте в условиях увеличения количества дестабилизирующих воздействий на доступность, конфиденциальность и целостность информации.

Ключевые слова: информационно-коммуникационные системы, информационная безопасность, критически важные компьютерные системы, система защиты информации, системы обнаружения кибератак.

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THE USE «Call-TRACKING» TECHNOLOGY IN THE MODERN WORLD

Abstract. The world becomes more and more developed and with the advent of the Internet, mobile communication, applications, the call-tracking develop and gains momentum. In this article, the concept of call-tracking, and also its great popularity, a role and application are considered in detail.

In the modern world, companies use a large number of channels to attract customers: contextual advertising, banner advertising, advertising on radio or TV, outdoor advertising and etc. Therefore, all types of call-tracking are considered which exist at the moment and the principles of their work are described in the article.

As a result, using call tracking solutions for measurement of performance digital and offline - advertising, marketer can now better optimize their strategy to attract potential customers and increase revenue. Data and call tracking ideas - also called call analytics, call attribution and call intelligence - allow marketers to generate best conversion calls, to reduce their cost for leadership, to personalize the customer experience and to stimulate growth. The work considers the main advantages of using this technology among companies. The real example of the application of call-tracking by the company in Russia is described. The detailed description is provided.

Keywords: technology, call-tracking, tracking, advertising, website, calls.

Introduction. The relevance of this topic is determined by the fact that calls with variable success have been trying to track for a long time. But with the increase in the number of customers, as well as the massive transition of buyers to the Internet, it became necessary to automatically track each call, which led to the emergence of the concept of call-tracking.

Before developing and implementing this technology in the company, we considered the concept of "call-tracking".

Call-tracking - is a method of tracking offline conversions (calls) from the site. Today, call-tracking is included in the gentleman's set of marketers, because up to 70% of applications are received by phone. The main task of service - the analysis of payback of advertising investments.

Call-tracking is a technology for tracking call sources, and also collecting additional information about calls. It allows you to evaluate the effectiveness of the advertising campaign and the quality of the call center specialists [1].

Methods of research. The history of call-tracking begins with a traditional, "lamp" way to find out the source of the call - just ask the customers where they found out about us. The method is still in demand in some places, although it is unlikely that in such a labor-intensive way it has ever been possible to track every call. Tracking in manual mode has the lowest efficiency. However, if you have a piece of goods or a very expensive B2B service, you can easily talk to each customer and find out the source of the call. In the mass market, people come from hundreds of Internet sources and few say for sure where he/she took the phone. The most frequent and logical answer - the number I saw in advertising somewhere on the Internet.

Then the marketing went to promo codes, which were applied and are now used as an analogue of call-tracking. A unique promo code is displayed on the site next to the phone for a unique visitor. Then the buyer makes a call and says the manager his "code word". According to the promo code, the manager understands from what advertising a call is made and can add this fact to the statistics. In general, the

method of tracking calls on promo codes is not reliable, has a rather high error. In connection with the quick development of advertising, there was a static call-tracking, which is ideal for offline advertising. It suits those who do not strive for high detail and just want to monitor the effectiveness of advertising channels. When you place an ad on sites, then a virtual phone number is determined (leased) for each source. Each incoming call is recorded in the corresponding section of the report. In general, the use of the call-tracking service in the static version - inexpensive and convenient, but for full-fledged analytics is not enough.

We found out that the call-tracking service is needed to "count" calls from each advertising channel. A person visits a site from an advertisement, from a particular source and sees the phone number assigned to that source or visitor. After the call, the system determines the source by a unique phone number and "puts a plus" on a specific channel - "the leader came from here" [2].

With this conversion tracking method, you can easily measure how many requests a particular traffic channel actually receives and optimize your ad campaigns more effectively.

In essence, call-tracking works according to the similar scheme with tracking of online conversion by the systems of analytics (Google Analytics, Yandex. Metrics).

According to various statistics, a large number of applications (about 70%) in B2C (business for people) segment occurs through the phone, and in B2B (business to business) as much as 10% more. Thus, it turns out that setting up goals in Metrics or Google Analytics, Internet marketers do not get a complete picture of what is happening. Therefore, the optimization of advertising campaigns is not entirely complete.

Because the huge share of applications goes via phone, special services have developed which would help us to trace calls. One of them is call-tracking, which we will develop and implement in Kazakhstan.

Call-tracking has become a substitute for managers forced to record the sources of the call to the database with the words of the buyers. Modern dynamic call-tracking itself will record each call, determine the source right up to the keyword, and also bring the user's device, operating system and other data into the database, and will know exactly whether the person has called before [3].

Results of a research. We have considered why call-tracking is necessary according to theory. Let's say that you have a website the main purpose of which is to receive calls from a visitor interested in buying a product or service. You start advertising on this site from different sources (Yandex Direct, targeted advertising, a banner on the site, advertising in the popular Vkontakte group, etc.) and start to get a lot of calls. Do you want to know which of the sources of advertising brings the most calls, and which one and none at all? Then you need static call-tracking. And now we will complicate a task. Let's say that you want to know which specific announcement the person who called you has transferred to. Or, if you use contextual advertising, which keyword the caller came from. Yes, it is possible to make it too, and dynamic call-tracking will help. For you, this call will not be different from the usual one, but you will know exactly what traffic channel it came from [7].

We have considered why call-tracking is necessary in practice. "What do I need from what I know from what specifically the customer called," you ask. Everything is simple, knowing this - you can save a lot of money on advertising. This is especially nice when you are an advertiser, but it is very necessary if you are a director or any other specialist in advertising on the Internet. After all, you can increase the effectiveness of the advertising campaign and reduce the cost of 1 client from advertising.

An example of dynamic call-tracking in practice. And now we will show a real example from our practice in figures. As for 1 month to get the advertising budget savings of almost 6,000 rubles. We found a man who shared data on saving money with call-tracking on his personal experience.

He spent on advertising in Yandex Direct the amount of not more than 45 thousand rubles with VAT per month. The main goal of advertising is to get calls from interested users in purchasing, with whom sales managers continue to work. In this example, we show only the numbers from Yandex Direct, we will not take other sources of advertising into account. Data on received unique calls from Yandex Direct in May are shown in figure 1.

№	Имя кампании	Ключевое слово	Средняя стоимость за клик	Среднее время разговора	Процент успешных звонков	Средняя стоимость за звонок
1	yandex / cpc	cpc	4	206	03:33	100.00 % 85.47 %
2	google / cpc	cpc	1	112	02:41	100.00 % 85.47 %
3	direct / cpc	cpc	34	990	02:42	70.59 % 85.47 %

Figure 1 – Data on received unique calls from Yandex Direct in May 2017

The amount he spent on advertising with VAT is shown in figure 2.

Дата	Размер бонуса всего, руб.	Показы	Клики	CTR (%)	Расход всего, руб.	Ср. цена клика, руб.	Ср. расход за день, руб.
с 01.05.15 по 31.05.15	0.00	333007	1626	0.46	43 785.31	26.69	1 421.68

Figure 2 – Advertising costs in May 2017

If to make a simple calculation, then we will receive that 1 call of the unique user has cost 1152,25 rub. for him. In late May-early June, he has carried out the deep analysis of the received calls. Knowing which particular ad and keyword the buyer called, he disabled ineffective ads. In addition, at the end of May, he increased traffic from the RSA quite well due to low-frequency requests, began to receive cheaper clicks, and, in addition, increased their number. So, the result was not long in coming. The number of unique calls from Yandex Direct in June is shown in figure 3.

direct / cpc	cpc	26	1407
yandex / cpc	cpc	15	483

Figure 3 – Data on received unique calls from Yandex Direct in June 2017

The cost of advertising in June is shown in figure 4.

Дата	Размер бонуса всего, руб.	Показы	Клики	CTR (%)	Расход всего, руб.	Ср. цена клика, руб.	Ср. расход за день, руб.
с 01.06.15 по 30.06.15	0.00	210168	1721	0.82	35 757.30	20.78	1 428.33

Figure 4 – Advertising costs in June 2017

The cost of call-tracking for June was 2400 rubles. Total net savings of 5628.01 rubles. And this is with a fairly small budget for advertising. But that's not all. Due to the increase in the coverage of the RSA for low-frequency requests, it began to receive more calls from this source. And the price of a click on the RSA is much lower than on the search. Total, 1 unique call from advertising in June costs 872.13 rubles. Believe - it is very good price of a lead for the b2b segment in Moscow.

In the business environment, from 30 to 100% of sales are done by phone - it all depends on the specifics. Many managers (about 66%) are confident in the effectiveness of incoming calls, especially compared to other types of contacts with potential customers. Internal statistics show that firms that make sales on the Internet miss about 30% of calls, but quite often they do not even know about it.

Call-tracking is a special technology, through which it is possible to associate incoming phone calls with the source of advertising, detailing information to the keyword.

Call-tracking is a technology that allows you to track, analyze and process phone calls. Tracking and processing can be done in different ways: manually and automatically. There is a logical question: what is the purpose of call-tracking, what does this system provide? Firstly, thanks to it, setting up your advertising campaign can be very effective. Call-tracking begins to evolve with the setting of the advertising campaign and its binding to the tracker. What is call-tracking used for? One large marketing agency has conducted a research. The Agency examined 100 organizations operating in eight different business sectors. It is revealed that about 70% of all orders are carried out by phone and, certainly, businessmen should consider it not to miss profit. Thanks to call-tracking you can make your business truly efficient and profitable. In table 1, the systems of call-tracking, taken from Internet sources are considered [11].

The discussion of the results

Based on the reviewed all types of call-tracking system, we will develop our system in the Republic of Kazakhstan. What will our technology consist of? Each user on the site is allocated a unique virtual phone number from the prepared pool. The script in the system automatically determines the advertising source from which the visitor came, as shown in figure 5. What is a pool of numbers? This is a set of virtual numbers leased from the service call-tracking or own. The number of rooms must be enough to cover all the people who are present at the same time on the site.

Systems of call-tracking

№	Name	About the service	Cost	Features
1	2	3	4	5
1	"Target Call" from Yandex. Metrics	In Yandex. Metrics, you can activate the service "Target Call". The service allows you to assign a number to any of the traffic sources. The amount of numbers is unlimited. Service counts the number of calls and gives detailed statistics	One "number-day" of Yandex costs 11 rubles. Pay for the service one month in advance, that is, the minimum cost is 330 rubles.	The "target call" works only with the Yandex. Metrica counter. If you do not want to put it for some personal reasons, then you will not be able to connect the service. So far, the service is available only for Moscow, St. Petersburg, Nizhny Novgorod and the region, Samara and the region. Calls from banners installed on other sites cannot be tracked either - "Target Call" works only according to the code assigned to the website, tied to the number
2	Track calls with Google	AdWords has the ability to track phone calls (conversions) for your ads with the extension "Phone Numbers." In setting up the conversion account, you can set the minimum talk time so that useless short calls are not considered. The tool allows you to detail the statistics for queries or campaigns. You can track calls for advertisements, for numbers on the site, for conversions imported from AdWords from other systems	The service is free	The feature works only for AdWords advertising. You can track calls from more than 20 countries, including Russia, Poland, Germany, USA, etc.
3	CallTracking.ru	Quite a powerful analyzer with good functionality. Allows you to track conversions both offline and online. Calls from each advertising system are distributed as standard in channels with separate numbers. Allows to trace and analyze the efficiency of inquiries, that is the used keys. There is a free demo version for testing	Connection is free. The package can be selected depending on the required number of channels: Basic (3 channels) - 1500 rubles per month. Advanced (8 channels) - 3990 rubles per month. Expert (20 channels) - 9990 rubles per month. Separate tariffs for analytics of calls to a keyword	Technical support of the service promises accuracy of counting with an error of up to 10%. If you do not pay the package, then keep access to the personal cabinet and the accumulated statistics, it is stored in the service indefinitely. Call records are stored for 1 year. Dedicated phone numbers remain with the customer for two weeks after the last paid period ends. The service connects to many CRM-systems (Salesforce, BPM online, amoCRM, SugarCRM, Microsoft Dynamics CRM and Bitrix 24) and integrates with popular analytics systems and contextual advertising automation services
4	Calltouch	One of the first services with a dynamic system of call tracking (tracking calls to sessions). A solid geography of services (40 countries and 60 cities). Technical support declares an error of counting no more than 7% and promises to increase the number of allocated numbers in case of default	Standard packages are not available, but you can calculate the cost of services on an online calculator. For example, for mobile and regional numbers, when you connect 5 static phones with an average session duration of 3 minutes, 500 sessions per day will cost you 11,000 rubles per month.	The numbers do not connect themselves to the interface of the account, you need to make a request to the technical support. A lot of settings, which you can not easily figure out yourself. There is a demo version for testing

<i>Продолжение таблицы</i>				
1	2	3	4	5
5	Comagic	The system of call tracking works with all major Russian cities (37 regions). Immediately need to pay for connecting numbers (450 rubles per room + monthly fee per room for 250-450 rubles depending on the package), so the first month will be more expensive than the next. The error in counting is about 10%. It integrates with third-party amo CRM and has its own CRM	There are three basic standard packages: Lite — 1000 rub/month. Optimum — 3000 rub/month. Enterprise — 20000 rub/month. It is possible to connect to any package in addition functions at additional expense.	When purchasing any package, provided a personal manager. In the Lite package, besides functionality, there is only integration with CRM. Optimum already has a dedicated API, integration with Yandex.Direct and Yandex.Metrics, Google AdWords, Google Analytics, contextual advertising automation systems
6	Lptracker.ru	In the market recently. The service analyzes each advertising channel, connects to an external CRM, "captures" the visitor immediately when entering their site-fixes his profile vk.com Oh. That is, even if the visitor did not call you and did not leave a number, you get his contacts for the base of cold calls.	There are three packages: Freelancer - 900 rubles per month. (up to 100 customers per day and only 1 site). Startup - 2000 rubles per month. (up to 500 visitors a day from a single site, in total you can connect 3 sites).	More than 10 different products (call records, virtual numbers, customer geolocation, order collection, etc.). There is a Callback widget for accessing visitors who have decided to leave the site. You can analyze your offline advertising, for example, ads on transport.
7	Our technology	Is in development	The free period is 14 days. The paid version, depending on customer requirements	It does not depend on the country, has a box solution, which includes a service for tracking, CRM, API for third-party developers and the ability to integrate into the most popular CMS. It allows analyzing traffic sources and thus optimizing them. In the future, it is planned to include in the box solution mine PBX[17]

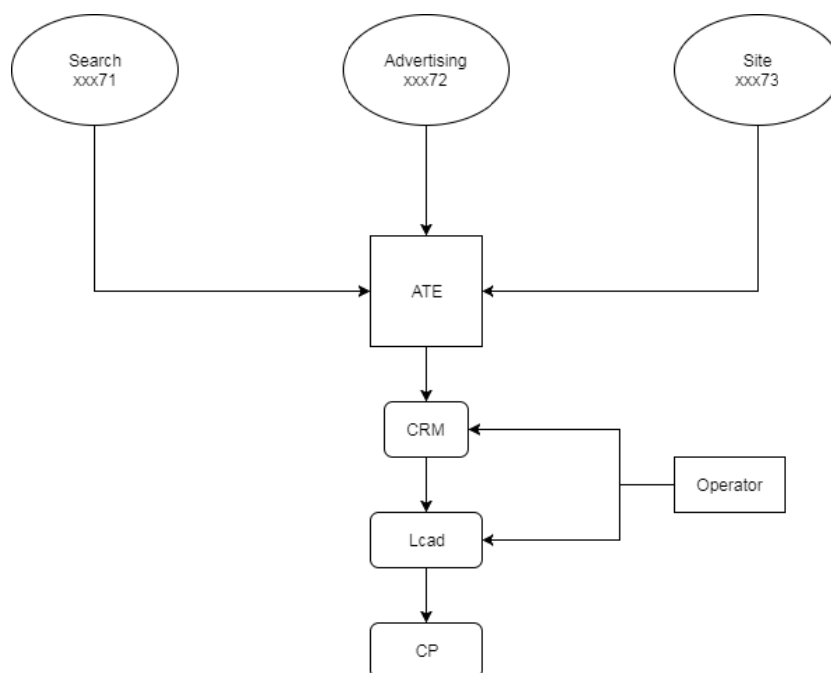


Figure 5 – Call-tracking structure

Each advertisement will be assigned its own number. Accordingly, we will immediately understand from which source the customer is calling. An example is shown in figure 6.

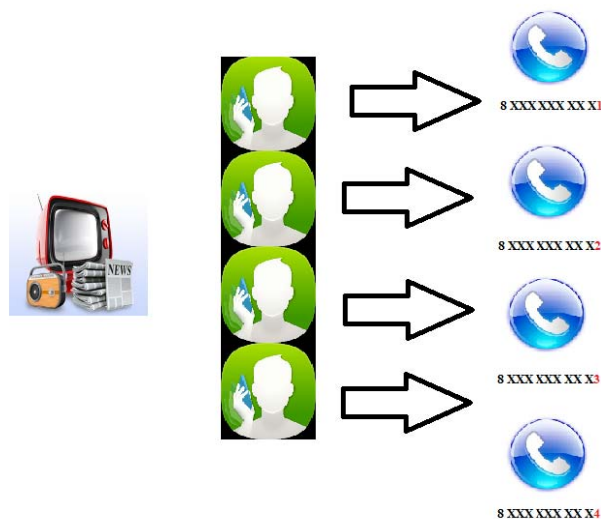


Figure 6 – Analyzing sources of incoming call traffic

Conclusions.

Based on the above, we can note why we need call-tracking:

- Defines the sources of calls by phone - which advertising brings calls and sales, and which uses the advertising budget for nothing.
- Allows you to monitor managers and improve the quality of service.
- Reduces the number of missed calls - and therefore, customers that could go to your competitors.
- Submit statistics about calls to GoogleAnalytics or other analytical platforms.
- In the case of integration with CRM, automatically creates transactions, tasks and contact cards upon the fact of the call.

First of all, the service is relevant for companies that have a more or less significant advertising budget.

Call-tracking in any form carries certain costs. And saving on ineffective advertising should cover them. Also, it is necessary to take into account the peculiarities of the business sector. It should be connected to telephone calls. For example, a modern online store, this service may not be useful, because most of the purchases are made online, without using the phone. But a service store, for example, a travel agency, call-tracking can be very useful - the primary treatment often happens by phone. The same goes for insurance companies, real estate sales, furniture, windows, etc. For example, according to polls, about 55% of car dealers have used or continue to use the call-tracking service to track effective advertising channels. Using call tracking systems in your advertising campaigns, you will receive various reports on calls and, most importantly, you will be able to really evaluate the work of the Call-center and, as a result, optimize it [26].

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ИСПОЛЬЗОВАНИЕ ТЕХНОЛОГИИ Call-TRACKING В СОВРЕМЕННОМ МИРЕ

Аннотация. Мир становится все более развитым и с появлением Интернета, мобильной связи, приложений набирает обороты и развивается call-tracking. В данной статье подробно рассмотрено понятие call-tracking, а также его большая популярность, роль и применение.

В современном мире компании используют большое количество каналов привлечения клиентов: контекстная реклама, баннерная реклама, реклама на радио или ТВ, наружная реклама и так далее. Поэтому в статье рассмотрены все виды call-tracking, которые существуют на данный момент и описаны принципы их работы.

В результате этого, используя решения отслеживания звонков для измерения производительности цифровой и офлайн-рекламы, маркетологи теперь могут лучше оптимизировать свою стратегию для привлечения потенциальных клиентов и роста доходов. Данные и идеи отслеживания звонков - также называемые аналитикой звонков, атрибуцией звонков и интеллектом вызова - позволяют маркетологам рынка генерировать лучшие конверсионные звонки, снижать их стоимость за лидерство, персонализировать клиентский опыт и стимулировать рост.

В работе рассмотрены главные преимущества использования данной технологии среди компаний. Описан реальный пример применения call-tracking компанией в России. Приведено подробное описание.

Ключевые слова: технология, call-tracking, отслеживание, реклама, сайт, звонки.

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CALL-TRACKING ТЕХНОЛОГИЯСЫН ҚАЗІРГІ КЕЗДЕ ПАЙДАЛАНУ

Аннотация. Әлем интернеттің, мобильді байланыстың, қосымшалардың пайда болуынан серпінді дамуда және call-tracking қарқынды дамып келе жатыр. Бұл мақалада call-tracking ұғымы және сонымен қатар оның үлкен атағы мен ролі, қолданылуы жан-жақты қарастырылады.

Қазіргі заманда компаниялар клиенттерді тартудың көптеген жолдарын қолданады: контексті жарнама, баннерлі жарнама, радио немесе ТД жарнама, сыртқы жарнама және т.б. Сондықтан мақалада қазіргі кезде бар call-tracking қызметінің барлық түрлері және жұмыс істеу принциптері қарастырылған.

Осының нәтижесінде сандық және офлайн-жарнаманың өнімділігін өлшеу үшін қоңырауларды қадағалау шешімін қабылдау арқылы маркетингтік потенциалды клиенттерді тарту және кірісті өсіру үшін өз стратегияларын оңтайландыра алады. Деректер мен қоңырауды қадағалау идеялары - қоңырауларды талдаулар деп аталады, қоңырауды аттестациялау және қоңырау шалу - маркетингтік жақсы конверсия қоңырауларын жасауға, көшбасшылық үшін шығындарды төмендетуге, клиенттердің тәжірибесін жеке-лендіруге және өсуді ынталандыруға мүмкіндік береді.

Жұмыста берілген технологияның компаниялар арасында қолданудың басты артықшылықтары қарастырылған. Ресейдегі бір компанияның Call-tracking қызметін қолдануының нақты мысалы сипатталған. Толық сипаттамасы келтірілген.

Түйін сөздер: технология, call-tracking, қадағалау, жарнама, сайт, қоңыраулар.

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DEVELOPMENT OF EYE OINMENTS COMPOSITION FROM SAFFLOWER EXTRACT

Abstract. In recent years, the growth of self-medication with the help of antibiotics, water and air pollution has led to increasing in the number of allergic and fungal diseases. Synthetic drugs exacerbate pathological processes, in addition, the side effects of these drugs exceed the expected therapeutic effect. Therefore, in recent years, there has been a significant increase in demand for herbal products. The results of the search for promising sources of antimycotic activity among representatives of plant flora also confirm the real possibilities of creating on their basis the effective antifungal agents in ophthalmic practice.

Key words: fungicidal and antibacterial actions, safflower, eye ointments.

At present, the main attention in pharmaceutical activity in the Republic of Kazakhstan is aimed at ensuring an annual increase in the nomenclature and volumes of production of high-quality pharmaceutical products by domestic producers. The drug policy of the Republic of Kazakhstan is based on the principles of providing medical institutions and the population of the republic with effective, high-quality, safe and affordable medicines.

Today, plants are one of the most important sources of medicines (LP) used in various areas of medical practice. This is explained by the fact that herbal preparations have a wide range of pharmacological activity and, as a rule, do not cause side effects with rational application. The most optimal dosage form for the treatment of eye diseases is ointment, since the effect of eye drops and solutions is short-lived, and the ointment forms a film on the eye mucosa and gives a long-term therapeutic effect [2, 6, 24]. The purpose of this study was to study the antibacterial and antifungal activity of the extracts provided and to determine their minimum bactericidal and fungicidal concentrations against museum strains of microorganisms, and to determine the optimal composition of ocular ointment bases.

Cathamus tinctoris (Safflower *C. tinctorius*) belongs to Asteraceae family in the order of Asterales which contains about 22,750 genera and more than 1,620 species. The *Carthamus* species probably originated from Southern Asia and is known to have been cultivated in China, India, Iran and Egypt, almost from prehistoric times. During the Middle Ages it was cultivated in Italy, France, and Spain, and was introduced into the United States in 1925 from the Mediterranean region. *C. tinctorius* has been known as ‘Golrang’ in Iran. It is grown for the red/orange pigment in the flower petals which is used for colouring rice and bread, and for dyeing cloth. The flowers of *C. tinctorius* are an important medicinal material in prescriptions used for cardiovascular, cerebrovascular and gynecological diseases. In China, the water extract of *C. tinctorius* has been developed as an intravenous injection, which is extensively applied to treat cardiovascular diseases clinically [5]. Its dye is mainly used as a colouring agent [6].

The objects of the study were samples of CO₂-extracts obtained from flowers of safflower (*Carthamus tinctorius* L.), collected during the flowering phase.

Determination of antimicrobial and fungicidal activity of extracts was carried out by disco-diffusion method (DDM). This method was realized by applying the discs processed with the test drug to Petri dish, using sterile tweezers at a distance of 15-20 mm both from the edge of the cup and from each other. The

results of DDM were taken into account by counting the diameter of the delay / growth inhibition zones with an accuracy of 1 mm.

The test samples were CO₂-extracts No 1 and No 2. Sample No 1 was an oily liquid of limpid color. Sample No 2 was a bright orange liquid. Due to the lack of data concerning the concentration of the active substance, the stock solution was the initial concentration. The method of serial dilution was carried out.

As test microorganisms, the following groups of strains were used: 1. for the research of antibacterial activity: *Staphylococcus aureus* ATCC 6538-P (museum sensitive strain); *Staphylococcus aureus* ATCC BAA-39; *Staphylococcus epidermidis* ATCC 12228; *Escherichia coli* ATCC BAA-196. 2. for the research of antifungal activity: *Candida albicans* ATCC 10231 (museum sensitive strain).

Testing was carried out on liquid nutrient media: Mueller-Hinton broth (standard antibiotic sensitivity medium) and RPMI 1640 medium (medium recommended by CLSI M27-A2: «Reference Method for Broth Dilution Antifungal Susceptibility Testing of Yeast» for testing fungicides).

To determine the antimicrobial activity, 10 tubes of the Eppendorf type were used. In all test tubes, except for the 1st (from 2 to 10), the nutritious broth of MHB was dispensed in the amount of 0.5 ml. The working solution (sample No 1 and sample No 2) was added in pure form (in a volume of 0.5 ml) to the first tube, with the MXB (0.5 ml) already present in it. Next, serial dilutions were made, which were carried out by taking the mixture (MXB (0.5 ml) + test preparation (0.5 ml)) from the 2nd tube in the amount of 0.5 ml into the 3rd tube already containing 0,5 ml of broth. 0.5 ml of the test sample in the broth was thoroughly mixed and transferred from the 3rd tube to the 4th also containing initially 0.5 ml of broth. This procedure has being repeated until the required amount of dilution was achieved. 0.5 ml of the mixture from the last tube was removed. Thus, the following dilutions were obtained: 1: 1; 1: 2; 1: 4; 1: 8; 1:16; 1:32; 1:64; 1: 128; 1: 256, which corresponds to the tubes from the 1st to the 10th. After conducting a series of dilutions, 0.05 ml of test strains of microorganisms at a concentration of 1.5×10^6 COE / ml were added to all the tubes. The procedure was repeated for all test samples.

All samples have being incubated for 18-24 hours at 37°C. On the expiry of incubation the sowings were carried out onto Petri dishes to determine the living cells. After seeding, the dishes were placed in a thermostat for 18-24 hours at 37° C for bacteria.

The results were taken into account by the presence of visible growth of microorganisms on the surface of a dense nutrient medium. The minimum bactericidal concentration (MBC) was the smallest dilution in a test tube that suppressed the growth of microorganisms.

The results of the research of antibacterial and fungicidal activity of extracts in respect of five strains of pathogenic microorganisms *S. aureus* ATCC 6538-P, *S. aureus* ATCC BAA-39, *S. epidermidis* ATCC 12228, *E. coli* ATCC BAA-196 and *C. albicans* ATCC 10231 are presented in tables 1, 2 and figures 1, 2.

From the data presented in Table 1 for the serial dilution method, it can be seen that the test sample No 1 exhibits an expected bactericidal activity against the susceptible strain of *S. aureus* ATCC 6538-P at 1: 128 dilution, as well as fungicidal activity against *C. albicans* ATCC 10231 in 1:1 dilution (MBC at this dilution).

From the data presented in Table 5 for the serial dilution method, it can be seen that the test sample No 2 exhibits bactericidal activity against sensitive and resistant strains. For instance, for multidrug resistant *S. aureus* strain ATCC BAA-39, sample No 2 is active at a dilution of 1: 4, for *S. aureus* sensitive *S. aureus* ATCC 6538-P in a ratio of 1:128, for epidermal staphylococcus *S. epidermidis* ATCC 12228 - in the dilution 1: 2, and for *E. coli* ATCC BAA-196 - 1: 4. Sample No 2 was not active against fungi of the genus *Candida*.

To make ointments, you need to go to marketing analysis. In the next study, the data obtained from plant substances for ophthalmic ointments from the State Register of medicines of 2018 are indicated. The collected results were included in computer forecasts and market share analysis models.

Tables 1 – The results of the research of antibacterial and fungicidal activity

Test sample	<i>S. aureus</i> ATCC 6538-P	<i>S. aureus</i> ATCC BAA-39	<i>S. epidermidis</i> ATCC 12228	<i>E. coli</i> ATCC BAA-196	<i>C. albicans</i> ATCC 10231
Sample No 1	1:128	Not active	Not active	Not active	1:1

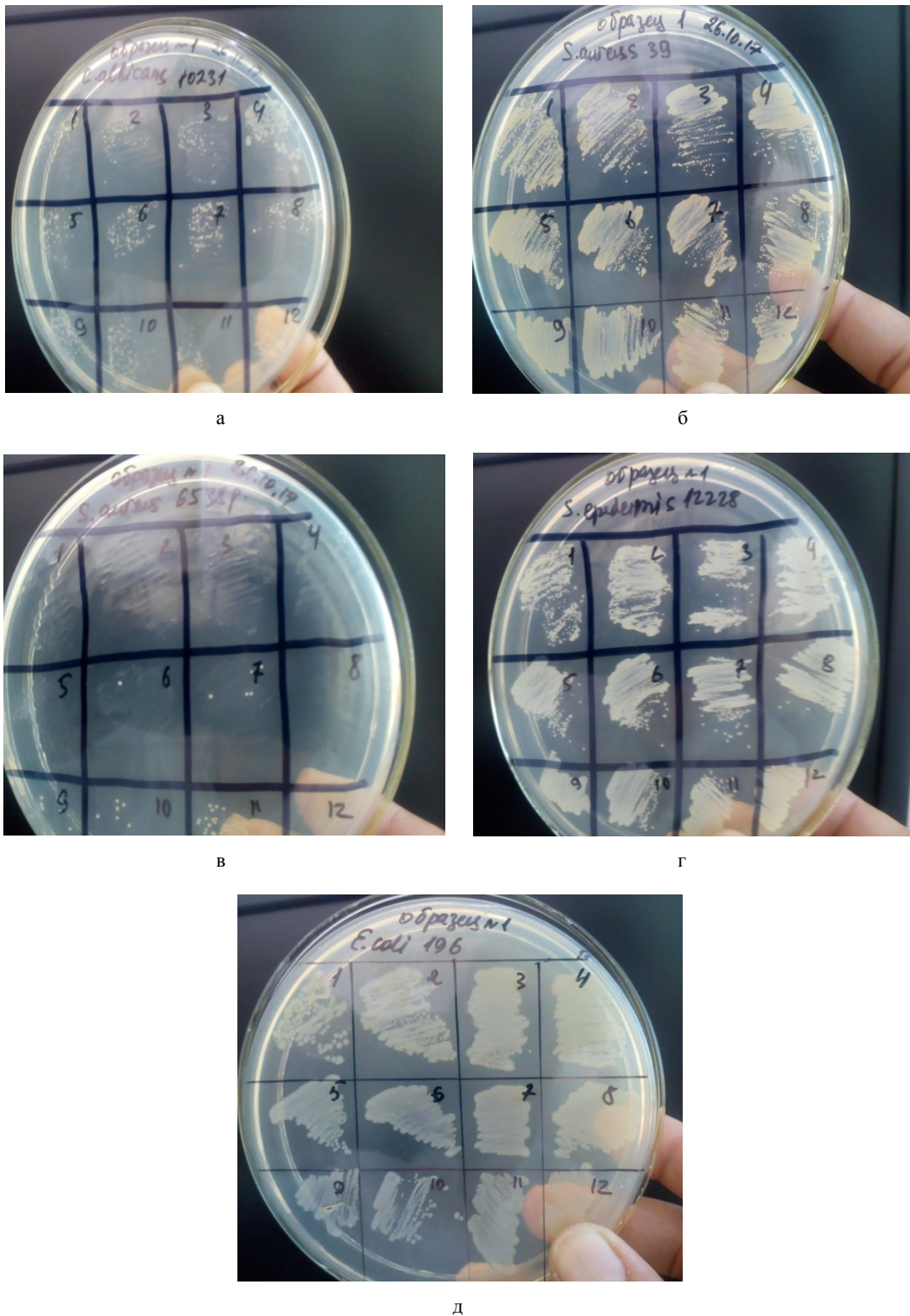


Figure 1 – The results of the antimicrobial activity of sample No. 1 in relation to museum test strains:
 а – *C. albicans* ATCC 10231, б – *S. aureus* ATCC BAA-39, в – *S. aureus* ATCC 6538-P,
 г – *S. epidermidis* ATCC 12228, д – *E. coli* ATCC BAA-196

Table 2 – Results of the antimicrobial activity of sample No. 2 obtained by the serial dilution methods

Test sample	<i>S. aureus</i> ATCC 6538-P	<i>S. aureus</i> ATCC BAA-39	<i>S. epidermidis</i> ATCC 12228	<i>E. coli</i> ATCC BAA-196	<i>C. albicans</i> ATCC 10231
Sample No 2	1:128	1:4	1:2	1:4	Not active

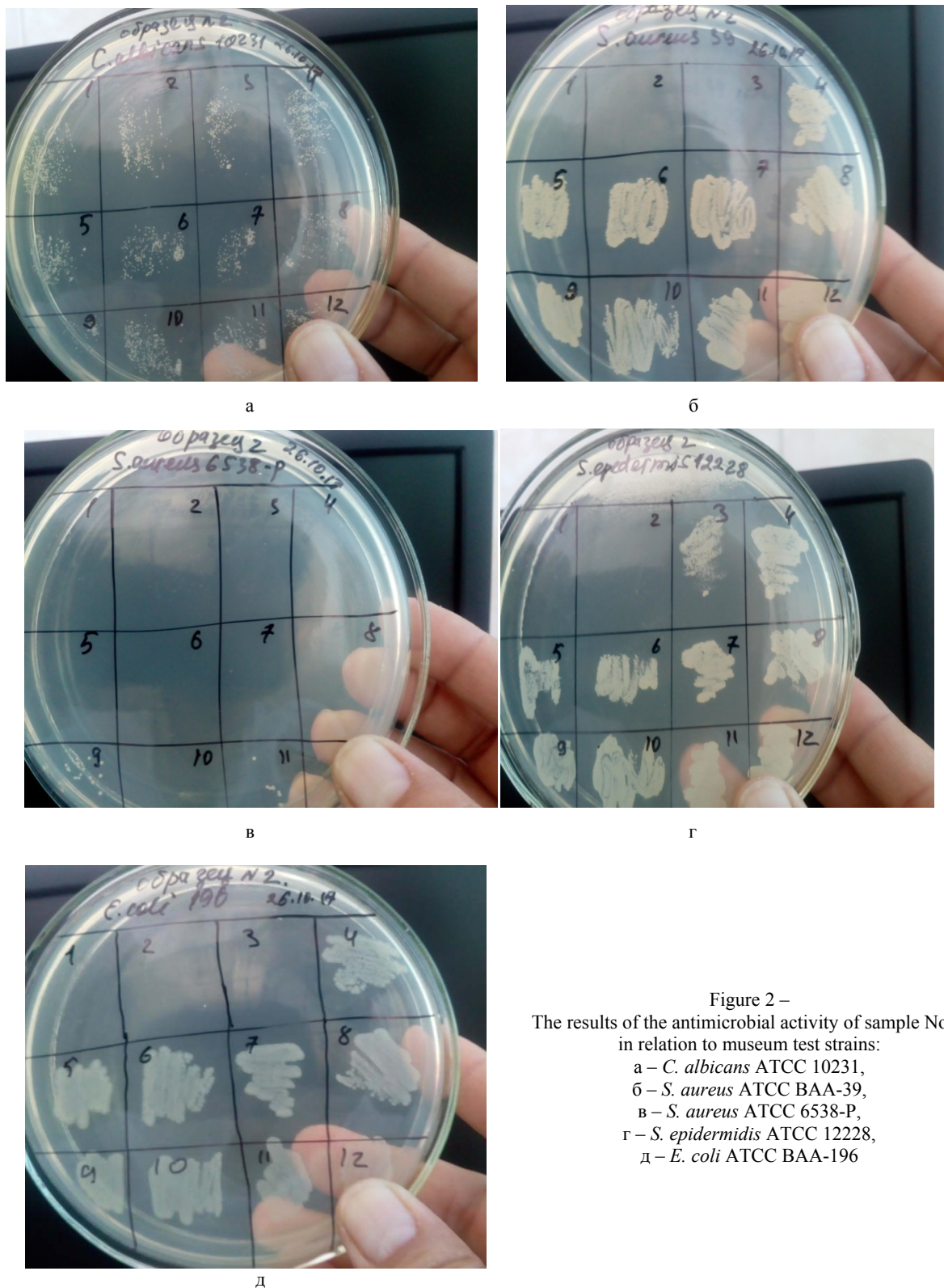


Figure 2 –
The results of the antimicrobial activity of sample No. 2
in relation to museum test strains:
а – *C. albicans* ATCC 10231,
б – *S. aureus* ATCC BAA-39,
в – *S. aureus* ATCC 6538-P,
г – *S. epidermidis* ATCC 12228,
д – *E. coli* ATCC BAA-196

17 types of ophthalmic ointments have been registered in the state register, of which 35% are produced by Russia, 18% by Belgium, 17% by Germany, 12% by Egypt and 18% by other countries. As you can see, according to the results of the study there are no ophthalmic ointments of domestic production. Analysis of the studies suggests that it is extremely relevant now to search for new antimycotic agents of plant origin in ophthalmology in the Republic of Kazakhstan. Given these marketing studies, we must produce a domestic ophthalmic ointment, but first we need to choose the optimal composition of ophthalmic ointments.

Ointments are manufactured on the basis specified in private articles. For the preparation of a soft dosage form, the bases permitted for medical use are used. Obtaining ophthalmic ointments, we developed 5 models using various auxiliary substances that form hydrophilic and hydrophobic bases (table 3).

Table 3 – Selection of the model

Basics	№1	№2	№3	№4	№5
Oil vaseline	2-3	2-3			
Lanolin anhydrous	1,0	1,0	1,0		
Vaseline grade (for eye ointments)	Before 10,0		9,0	Before 10,0	9,0
Paraffin liquid				2,0	1,0
<i>Vegetable oil</i>				2,0	

The optimal composition of the ointment of the following composition was chosen: lanolin anhydrous-1.0, vaseline oil-2-3 drops, vaseline grade (for ophthalmic ointments) -to 10.0.

Test sample No 1 exhibits an estimated bactericidal activity against a susceptible strain of *S. aureus* ATCC 6538-P at 1:128 dilution, as well as fungicidal activity against *C. albicans* ATCC 10231 in a 1:1 dilution (MBC at this dilution).

Test sample No 2 shows bactericidal activity against sensitive and resistant strains. For instance, for multidrug resistant *S. aureus* strain ATCC BAA-39, sample No 2 is active at a dilution of 1:4, for *S. aureus* sensitive ATCC 6538-P in a ratio of 1:128, for *S. epidermidis* ATCC epidermal staphylococcus 12228 - in the dilution 1: 2, and for *E. coli* ATCC BAA-196 - 1: 4.

For optimal composition, model No 1 was chosen. Often the base for eye ointments is Vaseline grade (for eye ointments) that does not contain reducing substances, and also mixes in all proportions with fats, fatty oils (except castor) and waxes. Vaseline is not absorbed by the skin and mucous membranes, slowly and not completely releases the active substances. Therefore, it is advisable to use it in ointments acting superficially. Pure petrolatum has a local effect, as it is hydrophobic and poorly distributed in the conjunctiva. Lanolin is chemically inert enough, neutral and stable when stored. It has a high emulsifying ability.

The test samples show the expected biological activity with respect to opportunistic bacteria and fungi of the genus *Candida*.

The obtained results of the antimicrobial and fungicidal activity of the safflower extract testify to the prospect of its further study and application as an active substance for the development of ophthalmic ointment used in ophthalmic practice.

The composition and technology of the ointment that meet the requirements of the State Pharmacopoeia of the Republic of Kazakhstan have been theoretically substantiated and experimentally developed. The composition of the ointment is represented by the following ingredients; Vaseline varieties (for ophthalmic ointments), lanolin anhydrous and vaseline oil. It is planned to study and standardize the quality of the ointment.

According to the results of market research revealed that the Kazakhstan pharmaceutical market there is no eye ointments Kazakhstan production and plant origin. This gives the right direction to pharmacists and clinicians who could solve this problem.

Practical use of plant raw materials, from which medicinal preparations are prepared, occupies a special place in medicine, because they are cheaper and can compete successfully with costly synthetic ones, [5, 8, 10].

The advantage of medicinal plants in front of many synthetic drugs is that the plants contain alkaloids, vitamins, microelements and other biologically active substances that are in certain proportions and are less toxic, respectively, adverse adverse reactions are less frequent [7, 9].

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САФЛОРА СЫҒЫНДЫСЫНАН КӨЗГЕ АРНАЛҒАН ЖАҚПАМАЙ ҚҰРАМЫН ДАЙЫНДАУ

Аннотация. Соңғы жылдары дәрігердің нұсқауынсыз антибиотиктерді қолдану кеңінен таралуда, сонымен қатар судың және ауаның ластануы аллергиялық аурулардың көбеюіне әкелуде. Синтетикалық препараттар патологиялық әсерлерді күшейтеді, осы препараттардың фармакологиялық әсері төмен. Сол себепті дәрілік өсімдік шикізаты негізінде жасалынған препараттарға сұраныс ұлғаюда. Антимикробты белсендігі жоғары және қолжетімді дәрілік өсімдіктердің негізінде саңырауқұлаққа қарсы офтальмология тәдирбиесінде кең сұранысқа ие, отандық өнімді шығару маңызды мәселелердің бірі.

Түйін сөздер: фунгицидті және и антибактериальды әсер, сафлора, көзге арналған жақпамай.

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РАЗРАБОТКА СОСТАВА ГЛАЗНЫХ МАЗЕЙ ИЗ ЭКСТРАКТА САФЛОРА

Аннотация. В последние годы нарастающие самолечение с помощью антибиотиков, загрязнения воды и воздуха привело к увеличению числа аллергических и грибковых заболеваний. Синтетические препараты усугубляют патологические процессы, кроме того, побочные эффекты этих препаратов превышают ожидаемого лечебного действия. Поэтому в последнее время значительно возрос спрос на препараты растительного происхождения. Результаты поиска перспективных источников антимикотической активности среди представителей растительной флоры также подтверждают реальные возможности создания на их основе эффективных противогрибковых препаратов в офтальмологической практике.

Ключевые слова: фунгицидные и антибактериальные действия, сафлор, глазные мази.

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INFLUENCE OF SULFUR CONTENT AS A PART OF A COMPOSITE ELECTRODE ON ITS ELECTROCHEMICAL SOLUBILIZING AT ELECTROLYSIS BY ALTERNATING CURRENT

Abstract. The studies at polarization of alternating current of the electroconductive sulfur-graphite electrode with various ratio of sulfur 30÷70% (masses) and graphite in a composite electrode are presented. The influence of main parameters of electrolysis: densities of current, concentration, temperature of electrolyte, electrolysis duration on sulfur electro dissolution are considered. The method of production of the electroconductive composite sulfur-graphite electrode is developed. The maximum electrochemical activity of sulfur is reached at a ratio of sulfur and graphite in an electrode of 50-65% and 35-50% respectively.

Key words: sulfur, sulfur-graphite electrode, electroconductive, electrooxidation-reduction, electrodisolution.

Introduction. Recently, due to the development of the oil processing industry and the intensifying ecological situation, it is grown a matter of utilization of sulfur-containing waste of the refineries and demand for the study of a possibility of effective oil waste recycling for the purpose of obtaining of the sulfur compounds. In this regard, the problem of technogenic sulfur application is very relevant as the amount of the stored sulfur annually increases in our country [1, 2]. As the main solution of this problem, it will be a study of electrochemical properties of elementary sulfur in water solutions under the action of alternating current and application of electrochemical methods of processing of sulfur-containing waste along with traditional approaches.

The purpose of this work is the establishment of the influence of content of sulfur as a part of a composite electrode on its electrochemical solubilizing at electrolysis by alternating current, regularities and optimum conditions of electrochemical solubilizing of sulfur at polarization by alternating current depending on various factors.

Methods. For the purpose of studying of the electrochemical behavior of sulfur, the method of production of an operational electroconductive sulfur and graphite electrode were developed [3]. Production of a composite sulfur and graphite electrode provide to the sulfur that is poorly carrying electric current, electrochemical activity where sulfur is as the main reagent and cementing material for coupling of disperse particles of powder of graphite, and graphite attaches to the electrode high electroconductive properties [4].

The porosity and conductivity of a sulfur and graphite electrode depend on a percentage ratio of sulfur and graphite. Due to this fact, we have conducted researches at the polarization of alternating current of the electroconductive sulfur--graphite electrode with various ratio of sulfur and graphite in a composite electrode.

Experiments were provided in the alkaline medium at a room temperature with a titanic wire electrode with a working surface $2 \cdot 10^{-6} \text{ m}^2$ and a sulfur and graphite composite electrode, the content of sulfur

in which changed 30 ÷ 70 %. The optimum density of current on a titanic electrode investigated by us before [5] was 60 kA/m².

Results and discussions. Results on application of admissible density of current at various content of sulfur in the sulfur - graphite electrode are shown in table 1. For comparison, as well as values of admissible density of current at the polarization of an electrode by a direct current are presented.

Table 1 – Admissible densities of current at the electrode polarization by various sulfur content

Ratio of sulfur and graphite, mass, %	30:70	40:60	45:55	50:50	60:40	65:35	70:30
$i_{\text{admissible}}$, A/m ² (alternating current)	100 – 700	100 – 1100	100 – 1000	100 – 900	100 – 800	100 – 600	40 – 125
$i_{\text{admissible}}$, A/m ² (direct current)	50 – 400	50 – 500	50 – 400	50 – 300	50 – 250	50 – 150	50 – 100

It should be noted that electrochemical solubilization of sulfur at polarization by direct current proceeds at a voltage of 12-15 V and above, and at polarization by alternating current – at 6,0-8,0 V. These data demonstrate that at solubilization of sulfur under the influence of alternating current the expense of the electric energy decreases about twice.

As a result of electrolysis, it is established that sulfur has electrochemical activity, there is involved its oxidation with the formation of sulfite ions and reduction with formation polysulfide ions on the following reactions respectively:



The study of influence of densities of current on the sulfur - graphite electrode (table 2) containing various amount of sulfur has shown that at the content of sulfur in an electrode from 30 to 65% the interval of optimum density of current equal to 250-350 A/m² as further increase the density of current leads to noticeable reduction formation of sulfite ions which make oneself understood by decrease in a share of reaction of oxygen precipitation. In research area of densities of current, the maximum current output on formation sulfite ions equals to 142-256%.

High content of sulfur in an electrode (70%) does not allow for the carrying out electrolysis at rather high values of current density. At that the working interval of current density of electrolysis much taper away (table 2) which was 40-125 A/m² that is possible to explain by the decreasing of electric conductance of an electrode, at the same time the current output size of sulfite ions formation relative to the lowly and doesn't exceed 83,3%.

Table 2 – Values of current output of formation sulfite ions in dependence from current density on a sulfur-graphite electrode ($i_{Ti} = 60 \text{ kA/m}^2$, $C_{NaOH} = 2 \text{ mol/l}$, $t = 30 \text{ }^\circ\text{C}$, $\tau = 0,5 \text{ h}$)

Sulfur content in electrode (S:C), %	Current density, A/m ²						
	100	150	200	250	300	350	400
30:70	20,8	32,5	63,8	90,1	105,7	101,9	75,3
40:60	31,4	50,0	92,5	142,8	180,0	160,5	101,2
45:55	30,5	100,8	145,7	201,3	213,2	183,4	95,5
50:50	50,2	175,1	240,4	250,1	256,2	225,6	145,4
60:40	92,5	127,3	165,2	192,3	207,5	187,4	150,0
65:35	15,1	60,0	115,0	145,2	156,3	142,5	85,3
Sulfur content in electrode (S:C), %	Current density, A/m ²						
	40	60	80	100	115	120	125
70:30	29,8	37,5	51,1	56,5	76,2	81,4	83,3

At the densities of current more than 125 A/m², the electrode containing 70% of sulfur completely is passivated. This electrochemical behavior of sulfur would be expected, based on physicochemical properties of sulfur, in particular, the fact that elementary sulfur is very bad conductor of electric current.

Results of researches of the influence of concentration of sodium hydroxide on current output of current sulfite ions formation are shown in Table 3. At the content of sulfur in the electrode 30÷70% current output of sulfite ions formation by increasing in the concentration of NaOH from 1 to 6 mol/l is decreased that likely, make oneself understood by reduction in the rate of electrochemical process because of increase in an excess voltage of the main electrochemical reaction.

Table 3 – Current outputs of sulfite ions formation in dependence from concentration of sodium hydroxide (i_{Ti} = 60 κA/m², i_{s-c} = 300 A/m², t = 30°C)

Sulfur content in electrode (S:C), %	Concentration of NaOH, mol/l					
	1	2	3	4	5	6
30:70	150,0	105,7	90,0	75,2	62,5	55,0
40:60	225,3	180,0	152,5	128,9	105,4	80,7
45:55	240,2	213,2	180,0	165,0	139,5	115,7
50:50	255,1	256,2	250,8	230,4	205,9	160,5
60:40	210,4	207,5	200,0	180,8	160,2	152,5
65:35	166,7	156,3	135,4	125,0	102,3	86,7
70:30*	155,9	56,5	30,7	25,4	19,7	14,3

*Electrolysis were carried out at current density i_{s-c} = 100 A/m², other conditions are analogous.

Special interest had the electrolyte temperature research on sulfur electrosolubilizing as from literature it is known that with temperature increase its reactionary ability should increase.

Influence of temperature on a current output of a product formation in dependence on the sulfur content an electrode is presented in table 4.

Table 4 – Values of current output on sulfite ions formation in depending on temperature (i_{Ti} = 60 κA/m², i_{s-c} = 300 A/m², C_{NaOH} = 2 mol/l)

Sulfur content in electrode (S:C),%	Temperature, °C					
	20	30	40	50	60	70
30:70	125,0	105,7	82,5	63,9	38,7	25,0
40:60	212,5	180,0	165,0	137,3	118,7	90,2
45:55	174,8	213,2	198,7	148,9	115,3	75,0
50:50	250,1	256,2	224,9	185,6	150,0	120,4
60:40	237,5	207,5	175,0	140,2	112,5	77,5
65:35	190,8	156,3	132,5	110,0	83,9	63,1
70:30*	25,4	56,5	115,0	170,3	225,0	280,7

By analyzing experimental data it is assumed, that at the sulfur content in an electrode of 30-65% with growth of temperature is observed a decrease in current output on sulfite ions formation. At concentration of sodium hydroxide more than 4 M and temperatures over 60°C obtained values the current output on sulfite ions formation is decreased that is explained by the formation of polysulfide sulfur in solution due to solubilizing on the mechanism of disproportionation (3):



At the content of 70% of sulfur with current output on sulfite ions formation rectilinearly increases in an electrode. It is established that with the increase in duration of electrolysis from 10 to 60 minutes, a current output on sulfite ions formation decreases irrespective of the content of sulfur in electroconductive sulfur-graphite electrode, that is explained by course of the course secondary process proceeding on it (table 5).

Table 5 – Current output on sulfite ions formation depending on electrolysis duration
 ($i_{Ti} = 60 \text{ kA/m}^2$, $i_{s-c} = 300 \text{ A/m}^2$, $C_{NaOH} = 2 \text{ mol/l}$)

Sulfur content in electrode (S:C), %	Electrolysis duration, min					
	10	20	30	40	50	60
30:70	49,8	82,5	105,7	90,3	75,0	52,1
40:60	100,0	167,5	180,0	169,8	140,2	110,0
45:55	151,0	201,1	213,2	198,7	160,4	115,3
50:50	325,3	265,3	256,2	215,3	175,0	135,6
60:40	462,5	301,2	207,5	110,7	90,3	40,7
65:35	225,2	194,0	156,3	125,0	80,7	50,0
70:30*	190,7	79,6	56,5	44,5	28,1	24,3

Based on the obtained results, it is established that the optimum sulfur content in the electrode is located in the range of 30-70%, since at a sulfur content of less than 30%, the electrode has a low strength, and when the sulfur exceeds 70%, a sharp increase in the electrical resistivity of the electrode occurs.

Conclusion. Thus, experimentally, it was established that the maximum electrochemical activity of sulfur is achieved by a ratio of sulfur and graphite of 50-65% and 35-50%, respectively [6]. This ratio of sulfur and graphite in the electrode allows for its use in electrolysis for the synthesis of sodium sulfite. The effect of the main electrolysis parameters on the electrical dissolution of sulfur was studied. It is established that by increasing of the sulfur content in the electrode, the mechanism of the processes course changes. When sulfur is used as the active material of the electrode, difficulties arise because of the low electronic conductivity of sulfur. Tests of various materials showed that graphite is the most resistant, good electronic conductivity and the ability to form conductive frames. When introducing graphite powder into the composition of the active mass, a good current supply and uniformity of current distribution throughout the electrode are provided due to the large contact surface of the sulfur with graphite. Due to the high specific surface area of the phases, the use of a composite electroconductive sulfur-graphite electrode allows obtaining high speeds of the processes taking place on it. The above mentioned results indicate a high activity of sulfur-containing electrodes and the prospects of their application in the electrolysis at polarization with alternating current for the synthesis of various sulfur compounds.

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АЙНЫМАЛЫ ТОҚПЕН ЭЛЕКТРОЛИЗІ КЕЗІНДЕГІ ЭЛЕКТРОХИМИЯЛЫҚ ЕРУІНЕ КОМПОЗИЦИОНДЫ ЭЛЕКТРОДТЫҢ ҚҰРАМЫНДАҒЫ КҮКІРТ МӨЛШЕРІНІҢ ӘСЕРІ

Аннотация. Жұмыста сілтілі ортада өндірістік айнымалы токпен поляризациялау кездегі арнайы конструкциялы электродының құрамындағы күкірт мөлшерінің (30-70 %) әсерін оның электрохимиялық еруіне зерттеудің нәтижелері берілген. Күкірттің еру үрдісіне ток тығыздығы, электролиттің температурасы, электролиз ұзақтығының әсерлері қарастырылған. Күкірт-графит электродының жасау тәсілі ұсынылды және арнайы конструкциялы электродының құрамындағы күкірт пен графит мөлшерінің 50-65 % және 35-50 % сәйкесінше болғанда күкірттің максималды электрохимиялық активтілікке ие болатыны анықталды.

Түйін сөздер: күкірт, күкірт-графитті электрод, электрототығы-тотықсыздану, электрохимиялық еру.

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ВЛИЯНИЕ СОДЕРЖАНИЯ СЕРЫ В СОСТАВЕ КОМПОЗИЦИОННОГО ЭЛЕКТРОДА НА ЕЕ ЭЛЕКТРОХИМИЧЕСКОЕ РАСТВОРЕНИЕ ПРИ ЭЛЕКТРОЛИЗЕ ПЕРЕМЕННЫМ ТОКОМ

Аннотация. В работе проведены исследования при поляризации переменного тока электропроводного сера-графитового электрода с различным соотношением серы 30 до 70 % (масс.) и графита в композиционном электроде. Рассмотрено влияние основных параметров электролиза: плотности тока, концентрации, температуры электролита, продолжительности электролиза на электрорастворение серы. Разработан способ изготовления электропроводного композиционного сера-графитового электрода. Установлено, что максимальная электрохимическая активность серы достигается при соотношении серы и графита в электроде 50-65 % и 35-50 % соответственно.

Ключевые слова: сера, серо-графитовый электрод, электропроводность, электроокисление-восстановление, электрорастворение.

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**METHODOLOGICAL ASPECTS OF ORGANIZATION OF ACCOUNTING
IN THE STATE SECTOR OF THE REPUBLIC OF KAZAKHSTAN:
ON CASH BASIS AND ACCRUAL BASIS METHOD OF ACCOUNTING**

Abstract. The article is devoted to methodical aspects of recognition and accounting of incomes and expenditures of state institutions in the conditions of reforming the accounting system in the public sector of the Republic of Kazakhstan. The article presents the results of the conducted study on the transition from the cash method to the accrual method in accordance with international standards of financial reporting of the public sector. In the course of the research, methods of critical analysis and comparison of the methodological foundations of historically developed accounting practices and a new evolving accounting system were used.

Keywords: public sector, accounting, cash method, accrual method, international public sector financial reporting standards (IPSAS).

As part of the transition program on reforming the accounting system in public institutions to the accrual basis method, there were identified tasks for the formation and implementation of new accounting rules and other regulatory legal acts on the organization of accounting and the formation of financial statements in accordance with a new methodological basis.

The traditional methodological basis of accounting in public institutions on a cash basis allowed to fulfill the primary tasks of providing accounting information on the implementation of financing plans and control over the targeted use of budget resources.

In the article "Transition to Accrual Accounting. Technical notes and manuals", prepared by employees of Fiscal Affairs Department IMF Abdul Khan and Stephen Mayes stressed the importance of switching to the accrual basis: "At the macrofiscal level, the importance of accrual accounting for macroeconomic policy arises from the fact that it measures assets and liabilities that are relevant to the overall stance of fiscal policy and fiscal sustainability, but which are not measured by cash accounting. An accrual accounting framework is essential to systematically determine the full costs of a government's activities. Full cost information (including noncash costs such as depreciation, and accrued civil service pensions) is essential for assessing the efficiency of government services and thus is a key element of any public sector performance management framework".

In the conditions of accounting organization in public institutions which act in accordance with a cash basis method the classification by the source of financing was adopted as a methodological foundation for the record expenditures.

This methodological approach allowed to realize accounting and operational control of the targeted use of allocated budget funds, so far as the accounting records for each type of expenditure corresponded directly with the appropriate accounts of allocated funding.

For the accounting of budget financing processes by public institutions, the following accounts of the "Financing" section were set aside: expenditure financing of the public institution and other activities from the budget; financing of capital investments from the budget; financing from other budgets; transfers

financing; other funds for the maintenance of a public institution; financing of projects from external loans and related grants [1].

For expenditure record purposes of budget funds by public institutions, the accounts were set aside to reflect the process of using budget funds on a cash basis in order to compare the amounts of received financing and their intended use.

For the purposes of expenditure records by the government agencies, the following accounts were provided, which were combined into a single group, called "Expenditures on the Budget" [1]:

At the end of the accounting period, the expense accounts were closed to the corresponding accounts of the received financing, which allowed to estimate their intended use.

Thus, the distinctive feature of the pre-existing accounting system on the cash basis method was the recognition and subsequent closing of the accounting expenditure records to the accounts of the relevant type of financing, which was not aimed to determine the financial results for the accounting periods.

The accrual method is aimed to recognize and correctly correlate income and expenses for reporting periods in order to assess the effectiveness of resource use.

In the article of Yuri Biondi and Michela Soverchia "Accounting Rules for the European Communities: A Theoretical Analysis" pointed out the following: "The accounting system shall first establish expenses that correspond to the period of reference and then match revenues that accrued to that period, covering those expenses over time. This period – based matching avoids difficulties related to determining the imputation of expenses to the activities accomplished during the period, in order to match all the corresponding contributions to the same activities (Anthony, 1978). In our framework, contributions and expenses can be matched by taking the occurrence period as a reference. In this way, expenses are considered to be independent of contributions. Contributions are then matched not only with expenses and corresponding activities but also with the period of reference (this is usually done for taxes and assimilated inflows)" [3].

In the conditions of transition to the accrual basis method in accordance with the new methodological fundamental, the expenditure records in public institutions is organized by separate accounts in order to account for costs by item, by type of expenditure.

Thus, within the framework of the new methodological fundamental, the expenditure record of the public institution is organized according to the types of expenses and the records for the accounting of expenses are intended for the separate expense bookkeeping: wages (salaries), depreciation of long-term assets, social tax, rent, municipal payments, etc.

In accordance with the new methodological fundamental the accounts for the expenditure record of public institutions do not have no direct relationship with the accounts of the relevant types of financing, and accordingly do not directly correspond with the financing accounts, and allow to determine the financial result at the end of the reporting period on an accrual basis method by closing the accounts of expenses and incomes to the final account for recording the financial result of the reporting year.

To disclose the full information, straightforwardly in the profit and loss statement or in the footnote each entity must provide with the expense breakdown into the subclasses using the classification which is based on the nature of expenses or by its functional purpose.

Items of expenses are divided into subclasses in order to highlight costs and reimbursement of costs for specific programs, activities or other segments.

To record for expenses, the accounts are assigned to the classification groups: operating expenses, budgetary payments, asset management costs, and other expenses.

Subsection "*Operating expenses*" includes separate articles by types of expenses: labor costs; expenses for the payment of scholarships; the cost of additional pension contributions; expenses for social tax; expenses for compulsory insurance; expenses for reserves; travel expenses; expenses for utility payments and other services; expenses for current repairs; expenses for depreciation of long-term assets; expenses for settlements with the budget; expenses on rent; other operating expenses.

Subsection "*Expenses on budget payments*" contains the following items: Transfers costs; Expenses for the payment of pensions and benefits; subsidy costs; expenses related to the payment of subventions.

Subsection "*Expenses on asset management*" includes the following articles: expenses on remuneration; other expenses for asset management.

The sub-section "*Other expenses*" consists of items for recording expenses from changes in fair value; expenses on retirement of long-term assets; foreign exchange losses; costs from impairment of assets; expenses for creation of reserves and other expenses.

The transition to the accrual basis method allows to include in the content of profit part of the profit and loss statement income from asset management, including the receipt of a part of the net income of the investment object, dividends on state shareholdings and income on equity interests in legal entities, income from property leases that are income of the budget [2].

The structure of the report about the financial activity of the public institution is also constructed by types of costs, which makes it possible to substantially simplify the preparation of the report, and to increase transparency in order to implement the principles of completeness, clarity, control and accountability. So sections "Expenses of the public institution" and "Expenses on budgetary payments" contain an itemized classification of expenses, allowing to implement the principle of reporting the results of financial activity by type of expenditure [2].

Subsection "*Expenditures of a public institution*" includes the following itemized breakdown: wages; scholarships; taxes and payments to the budget; expenses for reserves; travel expenses; utility expenses; lease payments; the content of long-term assets; communication services; depreciation of assets; impairment of assets; other operating expenses.

Subsection "*Expenses on budgetary payments*" contains information in the context of the following articles: pensions and benefits; subsidies; transfers.

Income in the profit and loss statement is presented in three sections: income from exchange transactions, income from non-exchange transactions and income from asset management.

Subsection "*Revenues from non-exchange transactions*" contains the following items: financing of current activities; financing of capital investments; transfers; sponsorship and charitable help and others.

Subsection "*Revenues from exchange transactions*" includes: income from the sale of goods, works, services; incomes on remuneration; other revenues from asset management [2].

For the accounting records of income of public institutions the following account are set aside which allow to distinguish income from non-exchange transactions and income from exchange transactions. To record income from non-exchange transactions, the separate accounts by types of income are provided: income from financing current activities; income from financing of capital investments; income from transfers; income from financing for the payment of subsidies; income from sponsorship and charity; income on grants; income from financing from external loans; other income from non-exchange transactions. And separately there is an account for adjusting the recognized income if there is a return of budget balances.

To account income from exchange transactions, there are accounts for the accounting of income from the sale of goods, works and services; income on remuneration; other income from asset management. And for the separate accounting record of other income, which is related mainly to the need to adjust the value of articles in accordance with the requirements of international standards and with non-monetary items of income, including: income from changes in fair value; income on disposal of long-term assets; income from gratuitous receipt of assets; income from exchange rate differences; income from compensation for losses and other income [3].

Accounting of income and expenses on non-exchange transactions. Financing of public institutions is classified by the following types: financing of operating activities and financing of capital investments.

Financing of operating activities is aimed for the spending of allocated funds at the amount of planned purposes for payment of obligations of a government agency in accordance with the plan. Monthly for the amount of allocated financing of operating activities, the public institution recognizes income in the current period, with the correspondence on the debit of the accounting records of planned purposes(cash) and on the credit side accounts income from financing of operating activities.

In accounting of the income from financing of capital investments, the following accounting problem was identified: the reporting period in which funding is allocated does not coincide with the reporting period in which services will be rendered or work performed.

Thus, the established order of accounting of income from financing of capital investments is not directed to get solution of the correct recognition and income and expense assignment tasks for reporting periods.

In the process of reformation of the accounting system for the purpose of gradual transition to the accrual basis method, two alternatives of recognition and accounting of operations for financing of capital investments were consistently applied.

At the first stage of the accounting system reform from January 1, 2013 to January 1, 2016, the first version of the transitional rules for accounting for financing of capital investments was developed to ensure a smooth, gradual transition from the cash basis method to the accrual basis method in the public sector of the economy [3, 4].

In accordance with the original version of the accounting, the amount of financing received for capital investments was recognized on the credit side 5011 "Financing of capital investments", which is a balance sheet item "Net assets/equity", followed by write-off to the income account (account 6020 "investments") in the amount equal to accrued depreciation expense [3, 4].

At the first stage of the reform this allowed to balance (equalize) the recognition of expenses for depreciation of long-term assets and amounts of recognized income for reporting periods.

This approach is close to the modified accrual basis method.

The initial version of accounting for financing of capital investments was almost borrowed from the practice of accounting for government subsidies in the private sector, which also indicates possible situations for the convergence of the methodological provisions of international standards for private (IFRS) and public sectors (IPSAS).

Accounting of income and expenses for of exchange operations, accounting for settlements with the budget for amounts that are budget revenues. The particularity of the accounting organization by a public institution of the settlements with the budget for revenues which is subject to the transfer to the budget is the adoption of a methodological approach for the simultaneous recognition of accrued income from exchange transactions and accrued expenses for corresponding revenues subject to transfer to the budget.

This methodological approach allows not only to simultaneously recognize accounts receivable on accrued income, but also accounts payable for settlements with the budget. The content of this methodological approach can be illustrated by the following example.

This methodological approach has several advantages.

First, it allows us to take into account not only the incomes and expenditures of a separate public institution in the context of relative isolation of accounting subjects with allocated separate resources, but also incomes from exchange operations administered by public institutions, but which are budget revenues.

Secondly, the simultaneous recognition of accrued income and expenses will allow, at consolidation, at the same time to exclude mutual settlements between the "Resource Provider" and the "Recipient of Resources", as well as the relevant financial authorities.

When calculating income from exchange operations, an accounting entry is made on the debit side by accounts receivable account 1231 "Short-term accounts receivable of buyers and customers" and on the credit side by the income from exchange operations account. At the same time, the public institution's obligation to the budget for funds received from the sale of assets is recognized as reflected in the entry: the debit side by 7120 "Costs for settlements with the budget" account and the credit side by 3131 "Short-term payables to the budget for income from sale of assets" sub account.

When paying accounts payable to the budget, an entry is made on the debit side by 3131 "Short-term accounts payable to the budget for income from sale of assets" sub-account and a credit side by 1231 "Short-term accounts receivable of buyers and customers" sub-account, corresponding subaccount / cash account of the Chart of Accounts [5, 6].

The methodological approach applied at the first stage of the reform made it possible to compare incomes and expenditures by periods in equal amounts, i.e. to counterbalance them, which for the compilers of financial statements of public institutions that used the cash basis method of recognizing income and expenses before the reform, it was more familiar and understandable.

At the second stage of the reform, the changes were introduced to recognize operations to finance capital investments.

Taking into account the amendments made to the Accounting Rules, the amount of allocated funding for capital investments in the budget account of a public institution is subject to recognition as part of income: on the debit side by the planned appointment, under the credit side by the income account 6020 "Incomes from financing of capital investments" [3, 4].

Based on the results of the study, the following methodological aspects of the developing accounting system in the public sector of the Republic of Kazakhstan should be determined:

– firstly, in the transition from the cash basis method to the accrual basis method, the changes was implemented to the classification approach that accounts incomes and expenditures, from the classification that allows the record of expenditures to be carried out in close coordination by sources of financing, to a detailed classification of expenditures by type of expenditure;

– secondly, from the intermediate version of the organization of accounting of incomes and expenditures on capital investments, which reflects the modified accrual basis method, proceed to full compliance with the accrual method requirements;

– thirdly, the opportunity to apply methodological approaches to recognize non-monetary items of income and expenses, including such as depreciation of long-term assets, impairment of assets, income and expenses from adjustments to the value of assets at fair value, exchange rate differences and others.

– fourthly, a lot of work is being done to create a single balance holder, which is based on a new methodological basis for transferring and recognizing assets on the balance sheet of a single authorized state body.

Thus, the financial statements prepared on the accrual basis method allow to implement the conceptual principles with respect to the accounting of public resources, as well as assessing the effectiveness of activities, and assessments not only from the point of view of their target, but also their effective use.

Reforming the accounting system is aimed at solving urgent problems in assessing the effectiveness of using budget funds, and will later allow the introduction of a results-based budgeting system, which is the basis for improving the level of governance, accountability and control in the public sector of the economy.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫ МЕМЛЕКЕТТІК СЕКТОРЫНДАҒЫ БУХГАЛТЕРЛІК ЕСЕПТІҢ ӘДІСТЕМЕЛІК АСПЕКТІЛЕРІ: КАССАЛЫҚ ӘДІСІ ЖӘНЕ ЕСЕПТЕУ ӘДІСІ

Аннотация. Мақалада Қазақстан Республикасының мемлекеттік секторында бухгалтерлік есеп жүйесін реформалау жағдайында мемлекеттік институттардың кірістер мен шығыстарды есепке алудың әдістемелік аспектілеріне арналған. Мақала мемлекеттік сектордың халықаралық қаржылық есеп стандарттарына сәйкес қассалық әдістен есептеу әдісіне көшу бойынша зерттеу нәтижелерін ұсынады. Зерттеу барысында жаңа дамып жатқан бухгалтерлік есеп жүйесін және тарихи тәжірибесінің әдістемелік негіздерін салыстыру әдістері және сыни талдау қолданылды.

Түйін сөздер: мемлекеттік сектор, есепке алу, қассалық әдісі, есептеу әдісі, мемлекеттік сектор халықаралық қаржылық есеп стандарттары (ҚСХҚЕС).

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**МЕТОДОЛОГИЧЕСКИЕ АСПЕКТЫ ОРГАНИЗАЦИИ БУХГАЛТЕРСКОГО УЧЕТА
В ГОСУДАРСТВЕННОМ СЕКТОРЕ РЕСПУБЛИКИ КАЗАХСТАН:
ПО КАССОВОМУ МЕТОДУ И МЕТОДУ НАЧИСЛЕНИЯ**

Аннотация. Статья посвящена методическим аспектам признания и учета доходов и расходов государственных учреждений в условиях реформирования системы бухгалтерского учета в государственном секторе Республики Казахстан. В статье представлены результаты проведенного исследования по переходу с кассового метода на метод начисления в соответствии с международными стандартами финансовой отчетности общественного сектора. В ходе исследования использованы методы критического анализа и сравнения методологических основ исторически сложившейся практики учета и новой развивающейся системы учета.

Ключевые слова: государственный сектор, бухгалтерский учет, кассовый метод, метод начисления, международные стандарты финансовой отчетности общественного сектора (МСФООС).

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E-mail: a.k.zhanabaeva@mail.ru**THE ELECTRODEPOSITION OF GALLIUM SELENIDE**

Abstract. The electrochemical deposition of gallium selenide on a glassy carbon electrode from sulphate electrolytes at a constant potential was carried out. The cyclic voltammetric curves of the glassy carbon electrode in two different electrolytes were studied: sulfuric acid and citrate buffer solution containing gallium and selenium ions. The influence of change in the concentration of gallium ions and the deposition potential on the composition of the resulting precipitate is studied. Increasing of the gallium ions concentration from $6 \cdot 10^{-3}$ to $1 \cdot 10^{-1}$ M at a constant concentration of selenium ions $2 \cdot 10^{-3}$ M in the electrolyte leads to an increase in the gallium content in the deposit composition. It is established that in order to obtain the stoichiometric composition of the film, the content of gallium (III) ions in the electrolyte must be many times higher than the content of selenium (IV) ions. The results of elemental analysis of the precipitate confirmed that a film of gallium selenide with a content of 26.7 at% gallium was obtained at a ratio of the concentration of gallium ions and selenium of 50: 1 in the sulphate electrolyte at a potential of -0.8 V. Investigation of the morphology of the surface showed that a uniform coating of the surface of the glassy carbon electrode is achieved at potentials of -0.8 and -0.9 V. X-ray phase analysis confirmed the presence of the Ga_2Se_3 phase in the resulting films.

Keywords: gallium selenide, electrodeposition, voltamperometry.

Introduction. Semiconductor compounds of the III-VI group have attracted great attention of researchers thanks to their suitable structural and optical properties for the application in photoelectronic converters [1]. This group includes gallium monoselenide, GaSe which has hexagonal structure with an optical width of band gap of 2.1 eV and contains Se-Ga-Ga-Se layers and gallium diselenide, Ga_2Se_3 , which has a cubic structure with 1.8-2.6 eV width of band gap [2, 3] and crystallizes in α - and β -structural modifications. In Ga_2Se_3 structure, one third of cationic centers is free and the structure of compound is, therefore, defective. In turn, the defective compound is used in optoelectronic devices for the passivation of heterogeneous compounds, for switching of the memory of light-emitting diodes [4], in combination with GaP substrate [5]. There is a set of methods to obtain gallium selenide. They are the chemical deposition from a vapor phase (CVD) [6], chemical transfer of vapor in vacuum [7], vapor-phase epitaxy [8], heterovalent reaction of V-VI exchange [9], thermal evaporation [10] and molecular beam epitaxy [11, 12]. The most well-known Stokbarger-Bridgmen method [13] of obtaining gallium selenide monocrystals, Ga_2Se_3 is the synthesis at the directed crystallization when a quartz ampoule with the material is stretched in a special furnace and heated to 1473 K with the subsequent slow decrease in temperature. This method requires high purity of materials, and high vacuum and temperature.

Thin Ga_2Se_3 films can be obtained by the zol-gel technique at a crystal formation temperature [14]. Compared to the above-described method, the electrodeposition method from aqueous solutions to obtain thin films on conductive substrates has a number of advantages and is an inexpensive method making it possible to control thickness, morphology and structure of film during deposition [15-17]. In this work, the conditions of gallium selenide electrodeposition on a glassy carbon electrode at a constant potential have been studied.

Methods of study. Voltammetric measurements on a disk glassy carbon electrode with 0.07 cm^2 surface and gallium selenide electrodeposition on flat glassy carbon plates of 1.0 cm^2 area were carried out in a three-electrode thermostatted glassy cell using a silver-chlorine reference electrode and a platinum counter electrode.

Before the experiment, the electrodes were treated with fine abrasive 2000 paper, washed with distilled water and dried in the open air. The sulfate electrolyte with pH = 2.2 (0.45 M Na₂SO₄ + 0.05 M H₂SO₄) and the citrate buffer electrolyte with electrolyte pH = 2.92 were used as background electrolytes. The latter was prepared from 39.3 ml 0.1 M sodium citrate and 60.7 ml 0.1 M HCl. The solutions of gallium and selenium salts (analytically pure), 0.1 M Ga₂(SO₄)₃, 0.1 M NaHSeO₃ and 1 M GaCl₃ were used. The concentration of gallium ions in these electrolytes was changed from 6·10⁻³ to 1.2·10⁻¹ M and the concentration of selenium ions was maintained constant (2·10⁻³ M).

The deposition of gallium selenide was carried out at a constant potential maintained by GillAC potentiostat with Version 5 ACM Instruments software, and at a temperature of 70° C that was maintained by using the LOIP thermostat. The electrolyte mixing was carried out using MM3M magnetic stirrer.

After deposition, the films were washed with distilled water and dried in the open air. Elemental analysis of the contents of components and micrographs of the surface of gallium selenide films were made using the JEOL (Japan "JSM6610 LV") electronic scanning microscope with the capabilities of microanalysis. The phase composition of the films was determined using the DRONE-4/07 instrument with a Co-tube.

Results and Discussion

Voltammetric measurements on a disk glassy carbon electrode. To determine the effect of the concentration of components in the electrolyte on the electrochemical process to reduce the ions, the cyclic voltamperometric dependencies (CVA) of a glassy carbon electrode in a sulfate electrolyte and citrate buffer solution were recorded. The scanning speed of potential was 20 mV/s in the 0 to -1.0 V range and in -1.0 to +1.2 V range in case of inverse scanning. Electrolytes with varying concentrations of gallium ions (6·10⁻³ M, 1.2·10⁻² M, 6·10⁻² M, 8·10⁻² M, 1·10⁻¹ M and 1.2·10⁻¹ M) at a constant concentration of selenium ions (2·10⁻³ M) were investigated.

Figure 1 shows the CVA of a glassy carbon electrode for the reduction of Se(IV) и Ga(III) ions recorded in the sulfate electrolyte. Apparently, the cathode current increases already at 0 V potential indicating the reduction of Se (IV), which starts at more positive potentials. The figure 1 sidebar shows the CVA of Se(IV) (2·10⁻³ M) reduction against the background of sulfate electrolyte taken at a cathode potential scan of +0.3 to -1.0 V. The reduction of Se (IV) is accompanied by the emergence of two peaks at potentials around zero V and at -0.5 V potential. The reduction processes and standard potentials of reactions are described by the equations:

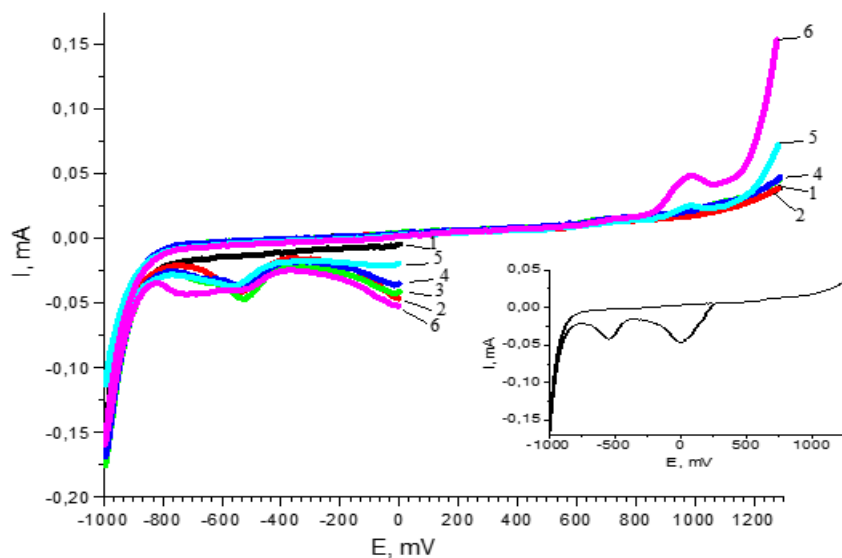


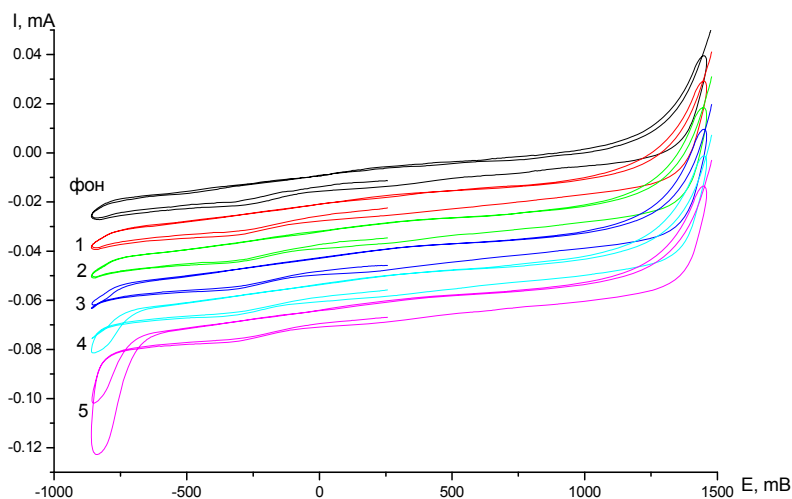
Figure 1 – The CVA of glassy carbon electrode in a sulfate electrolyte at various concentrations of selenium and gallium ions.
 1 – support electrolyte; 2–6 – Se(IV) – 2·10⁻³ M; Ga(III): 3 – 6·10⁻³; 4 – 1.2·10⁻²; 5 – 8·10⁻²; 6 – 1·10⁻¹ M.
 Side bar: Se(IV) – 2·10⁻³ M



In -0.5 V range of potentials, Se (IV) can be reduced according to equation (3) to form selenide ions.

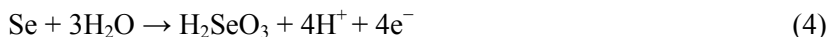
Gallium ions are not reduced on a glassy carbon electrode in the studied range of potentials (figure 2). The CVD of a glassy carbon electrode in a sulfate electrolyte demonstrates the absence of current peaks as the concentration of gallium ions changes from $5 \cdot 10^{-4}$ to $1 \cdot 10^{-2}$ M.

Figure 2 –
The CVA of glassy carbon electrode
in a sulfate electrolyte at a various
content of gallium Ga(III) ions:
1 – $5 \cdot 10^{-4}$; 2 – $1 \cdot 10^{-3}$; 3 – $2 \cdot 10^{-3}$;
4 – $5 \cdot 10^{-3}$; 5 – $1 \cdot 10^{-2}$ M



On adding gallium ions in the electrolyte (figure 1, curves 3-6), the current of the first peak changes, the current peak shape at -0.5 V becomes smooth, and the reduction current lasts until -0.85 V and reaches the hydrogen reduction range.

Analysis of the anode part of CVA testifies that at the maximum content of gallium in the electrolyte equal to $1 \cdot 10^{-3}$ M, a maximum amount of selenium is deposited over the electrode as a compound with gallium. Selenium is oxidized from the compound at potentials close to + 1.0 V.



The results show the formation of a compound to proceed at -0.8 and -0.9 V potentials involving selenide ions due to the chemical reaction of positively charged gallium ions with negatively charged selenium ions.

The CVA in citrate buffer solution shows that in case of joint presence of selenium and gallium ions in the electrolyte the reduction currents increase with an increase in the concentration of gallium. When the content of Ga (III) is from $6 \cdot 10^{-3}$ to $1.2 \cdot 10^{-2}$ M, profile curves coincide with those shown in figure 1 for the sulfate electrolyte. As the concentration of gallium increases (figure 3, curve 3.4) to $8 \cdot 10^{-2}$ M, the reduction currents at $E = -0.5$ V increase and at $E = -0.85$ V there appears an additional distinct current peak that can characterize the reduction of gallium ions on a glassy carbon electrode covered with selenium. Analysis of the anode branch of CVA also indicates that in the process of reduction on the electrode there forms a deposit of selenium compound with gallium, the oxidation potential of which lies within +1.0 V (figure 3).

Based on the results, the -0.8; -0.9 V range of potentials was selected to conduct the potentiostatic deposition of gallium compounds with selenium on a glassy carbon electrode.

Electrodeposition of gallium selenide in sulfate electrolyte. The electrodeposition of gallium ions was carried out at $6 \cdot 10^{-3}$ M concentrations of gallium ions and $2 \cdot 10^{-3}$ M concentrations of selenium ions at -0.8 V potential and 70° C temperature. The resulting film was investigated by electron scanning microscope with the capabilities of microanalysis that showed 0.03 at% content of gallium. Further, the concentration of gallium ions was increased to $1.2 \cdot 10^{-2}$ M, and electrodeposition was carried out at -0.8 and -1.2 V potentials. The elemental composition was studied and micrographs of the surface of resulting films were made (table 1).

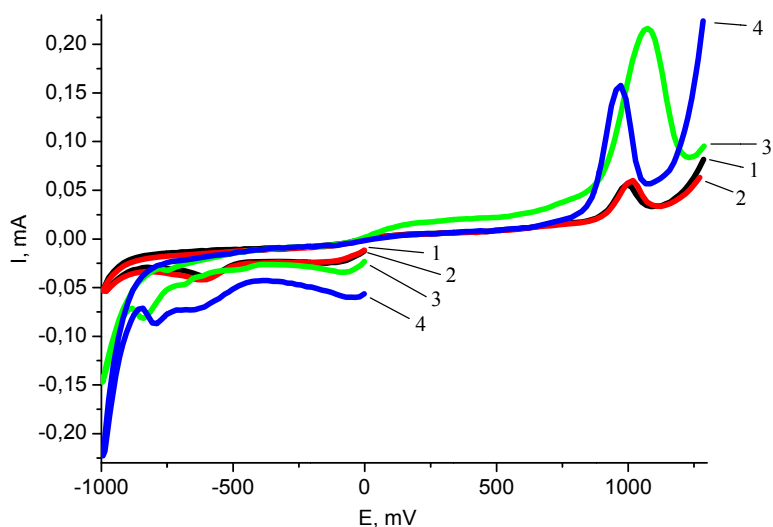


Figure 3 – The CVA of glassy carbon electrode in a citrate buffer solution at a constant concentration of selenium ions and various concentrations of gallium. 1–4 – $\text{Se(IV)}=2 \cdot 10^{-3} \text{ M}$; Ga(III) : 1 – $6 \cdot 10^{-3}$; 2 – $1.2 \cdot 10^{-3}$; 3 – $6 \cdot 10^{-2}$; 4 – $8 \cdot 10^{-2} \text{ M}$

Table 1 – The elemental composition of as-deposited gallium selenide film on glassy carbon at various potentials (at%)

Substrate	Electrodeposition conditions	Electrolyte composition
GC-93	E=-0.8 V T=70°C t = 30 minute	Ga - 0.51% Se - 99.49%
GC-94	E=-1.2 V T=70°C t = 30 minutes	Ga - 0.54% Se - 99.41%

Table 1 shows that the content of gallium in the deposit has increased to ~ 0.5 at%. The shift of reduction potential to the negative side has affected weakly the increase of gallium.

The micrograph of resulting sample surface in figure 4a shows the formation of separate large grains with 4.2- 3.3 μm diameter. The reduction at -1.2 V potential when there starts the parallel reduction of hydrogen, has resulted in disturbance of deposit uniformity due to the formation of filamentary fibers (figure 4b).

In the subsequent experiments, the content of gallium ions in the electrolyte was increased, maintaining a constant concentration of selenium ions equal to $2 \cdot 10^{-3} \text{ M}$. Table 2 shows the results of analysis of the deposited films at -0.8V, -0.9 V and -1.0 V potentials. The best result on the content of gallium, 7.2% is shown by the experiment conducted at -0.8 V potential.

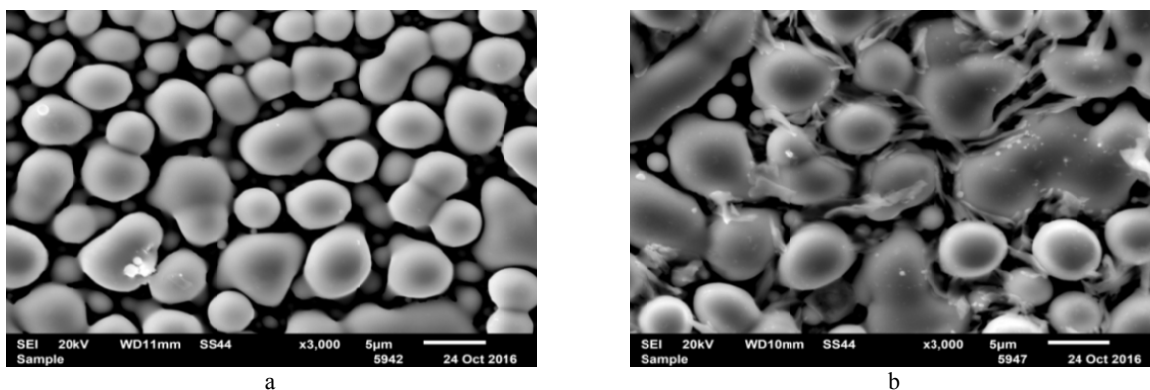
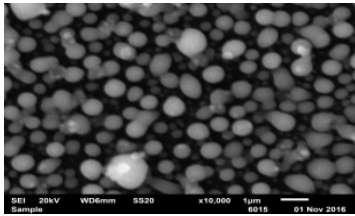
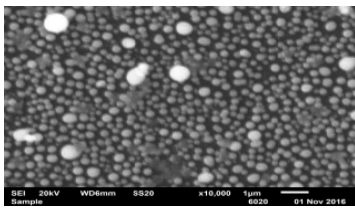
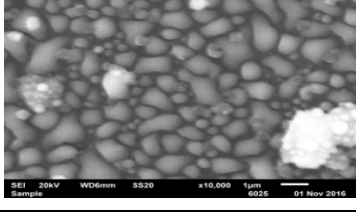


Figure 4 – The micrograph of the surface of films (at 3000 magnification): a – at -0.8V potential; b – at -1.2V potential

Table 2 – The elemental composition of as-deposited gallium selenide film on glassy carbon at various potentials, and the surface micrograph.

Substrate	Electrodeposition conditions	Electrolyte composition	Content in the deposit, at%	Micrographs
GC-95	E=-1.0 V T=70°C t=30 minutes	6·10 ⁻² M Ga ₂ (SO ₄) ₃ 2·10 ⁻³ M NaHSeO ₃	Ga -6.7; Se -93.3	
GC-96	E=-0.9 V T=70°C t=30 minutes	6·10 ⁻² M Ga ₂ (SO ₄) ₃ 2·10 ⁻³ M NaHSeO ₃	Ga - 4.5 Se - 95.5	
GC-97	E=-0.8 V T=70°C t=30 minutes	6·10 ⁻² M Ga ₂ (SO ₄) ₃ 2·10 ⁻³ M NaHSeO ₃	Ga - 7.2 Se - 92.8	

The micrographs in table 2 show that the size grain of the resulting deposit depends on the deposition potential and the content of gallium in the deposited film of gallium selenide.

For further experiments, 1 M GaCl₃ solution was used as a source of gallium ions and their concentration in the electrolyte was increased to 1.0·10⁻¹ M at a constant concentration of selenium ions, 2·10⁻³ M. Electrochemical deposition of gallium selenide was carried out at -0.8 and -0.9V potentials. Cleaned and polished glassy carbon substrates were used. Upon electrodeposition, uniform and thick films of red-brown color were obtained and their composition and surface were studied by the scanning electron microscopy method.

Table 3 – The elemental composition of as-deposited gallium selenide film over glassy carbon at E=-0.8 V and E=-0.9 V potentials within 30 minutes

Substrate	Electrodeposition conditions	Electrolyte composition	Contents of components in the film, at. %
GC-110	E=-0.9 V T=70°C	1·10 ⁻¹ M GaCl ₃ 2·10 ⁻³ M NaHSeO ₃	Ga 15.1 Se 84.9
GC-111	E=-0.9 V T=70°C	1·10 ⁻¹ M GaCl ₃ 2·10 ⁻³ M NaHSeO ₃	Ga 15.9 Se 84.1
GC-112	E=-0.8 V T=70°C	1·10 ⁻¹ M GaCl ₃ 2·10 ⁻³ M NaHSeO ₃	Ga 26.7 Se 73.3

As shown in the table, at -0.8 V potential, within 30 minutes, at a concentration of 1.0·10⁻¹ M GaCl₃ and 2·10⁻³ M NaHSeO₃ on a glassy carbon electrode there forms a film with a maximum content of gallium (26.7 at%). Figure 5 shows a micrograph of the surface of gallium selenide films deposited under the conditions of table 3. One can see that the even distribution of globules is disturbed by the accumulation of coarse crystals consisting of smaller particles. Figure 5b shows the emergence of dendrites in the form of flowers, which is typical for the deposited films of gallium with selenium.

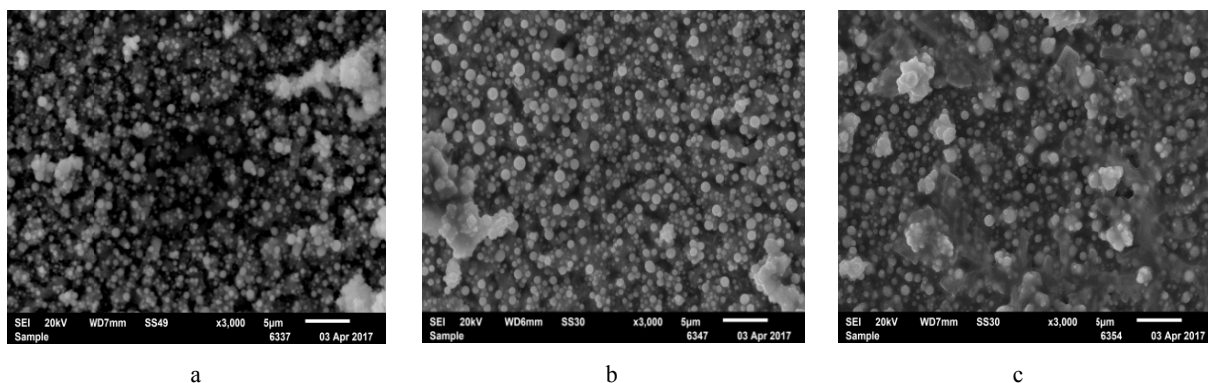


Figure 5 – The micrographs of the surface of films:
 a – $E_{oc} = -0.9V$ on GC-110; b – $E_{oc} = -0.9V$ on GC-111; c – $E_{oc} = -0.8V$ on GC-112

The homogenous formation of spheres with 0.5, 1.1 μm diameter is most typical for the deposits produced by electrodeposition at $E_{oc} = -0.9 V$.

In figure 6, one can see an increase in the content of gallium in the composition of Ga_2Se_3 film at $1 \cdot 10^{-1} M$ $GaCl_3$ concentration in the supporting electrolyte.

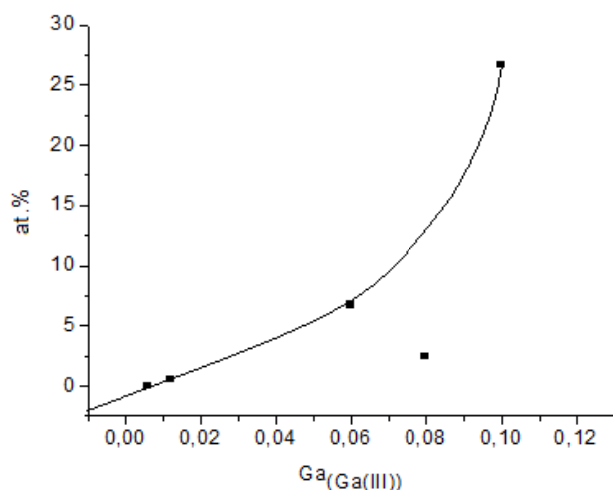


Figure 6 – The dependence of the content of gallium in the deposited film on the concentration of gallium ions in the electrolyte at a constant potential of $-0.8 V$ and $Se=2 \cdot 10^{-3} M$ concentration

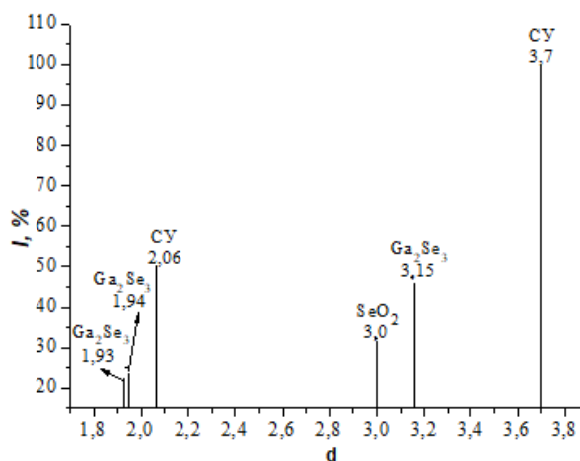


Figure 7 – The dependence of the intensity on the interplanar spacing for GC-112 (glassy carbon sample) (table 3)

Thermal treatment of electrodeposited films. To confirm the phase composition and carry out X-ray phase analysis, the deposited films of gallium selenide were annealed in a muffle furnace in atmospheric air by a two-stage process: first, at $200 \text{ }^\circ C$ during 10 minutes, and the second time at $500 \text{ }^\circ C$ during 15 minutes. After annealing, the film acquired a grey color, the adhesion to substrate was dense, and the surface was homogeneous.

X-ray phase analysis of thin films of gallium selenide electrodeposited on glassy carbon plates was made according to the conditions of table 3. Figure 7 shows the bar radiograph indicating the dependence of the intensity of X-ray reflexes on the interplanar spacings. One can see that graph 7 contains Ga_2Se_3 phase reflexes corresponding to the interplanar spacings 1.93, 1.94, 3.15 according to the ASTM tables. It is noted that the intensity of reflexes increases with an increase in the content of gallium in the deposit. The radiographs also show strong reflexes from the glassy carbon (GC) substrate, since the resulting films do not exceed the thickness of 5 microns. The selenium oxide impurity may indicate the oxidation of a part of selenium on the surface during annealing.

Study on the morphology of the surface of films after thermal treatment was performed using an optical microscope and an atomic-force microscope, JSPM 5200 (JEOL Japan).

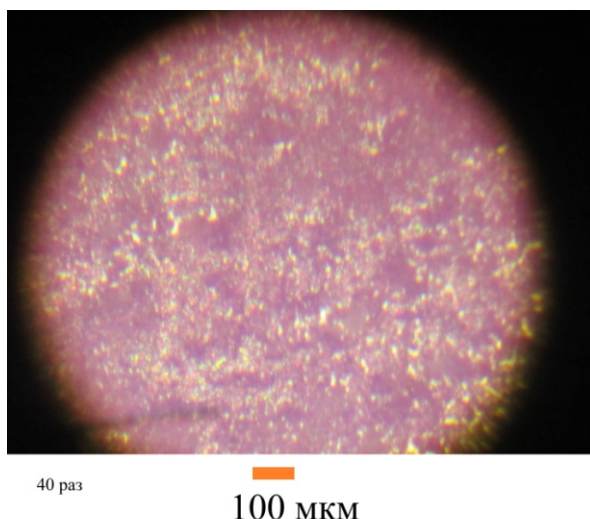


Figure 8 – The pattern of gallium selenide film surface (sample GC-112)

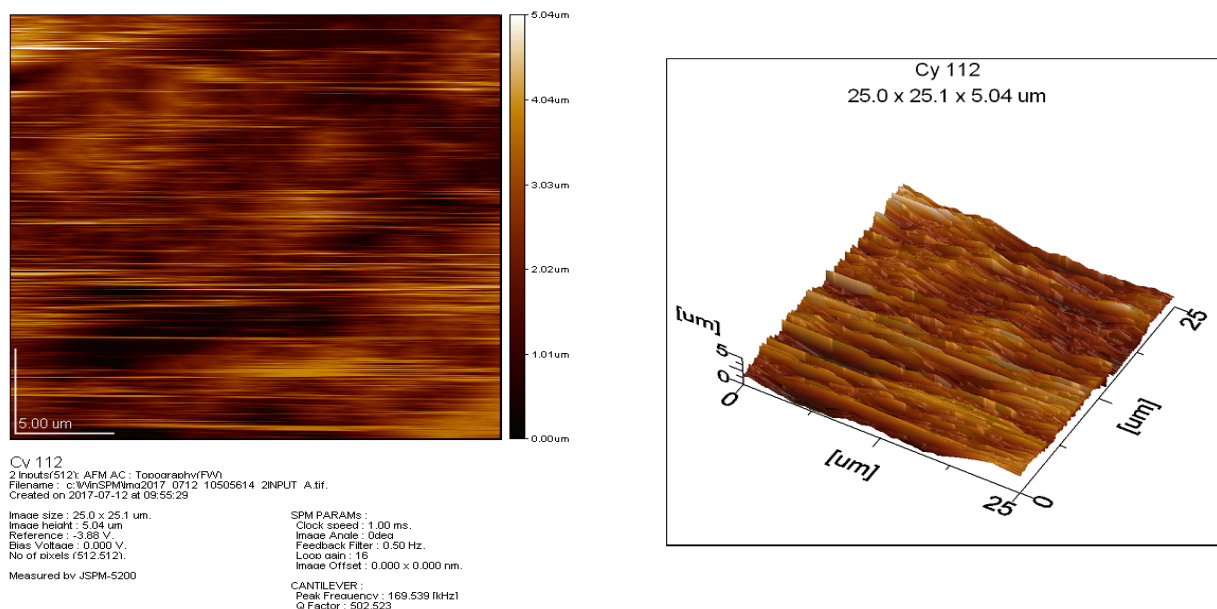


Figure 9 – The pattern of GC-112 sample surface obtained by atomic-force microscopy

The pattern produced by the optical microscope is an evenly coated surface of the deposit (figure 8). The results of atomic-force microscopy (AFM) show that the coat height reaches 5 microns after annealing. The film surface grows in one direction and on the 25x25 μm stretch represents planes growing in parallel.

Conclusions. The electrochemical deposition of gallium selenide on a glassy carbon electrode from sulfate electrolytes at a constant potential has been carried out. Gallium selenide films of up to 5-micron thickness, with the content of 26.7 at% gallium and 73.3 at% selenium have been produced. The composition is close to the stoichiometric composition of Ga_2Se_3 compound. X-ray phase analysis has confirmed the presence of Ga_2Se_3 phase in the resulting films. Study of the surface morphology has shown that uniform coating of the glassy carbon electrode potentials can be achieved at -0.8 and -0.9 V potentials.

Agreement 214-23 with CPCMRA on the topic: «Electrochemical processes fundamentals in electrodeposition of multicomponent semiconductor».

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ГАЛИЙ СЕЛЕНИДІН ЭЛЕКТРОТҰНДЫРУ

Аннотация. Тұрақты потенциалда күкірт қышқылды электролиттен галлий селенидін шыны көміртекті электродта электрохимиялық тұндыру жүргізілді. Шыны көміртекті электродтың циклдік вольтамперлі қисықтары галлий және селен иондары бар екі түрлі электролитте: күкірт қышқылды және цитратты буферлі ертінді де зерттелді. Қабат құрамына галлий ионының концентрациясының өзгерісі мен тұндыру потенциалының әсері зерттелді. Галлий ионының концентрациясын $6 \cdot 10^{-3}$ М-ден $1 \cdot 10^{-1}$ М-ге дейін үлкейткенде тұнба құрамында галлийдың максималды құрамына алып келеді, өз кезегінде селен ионының концентрациясы тұрақты $2 \cdot 10^{-3}$ М болып қалады. Стехиометриялыққа құрамдағы қабат алу үшін электролитте галлий ионы (III) селен ионына (IV) қарағанда артығырақ болуы керек. Тұнбаның элементтік анализ нәтижесі күкірт қышқылды электролитте галлий ионының селен ионына қарағанда концентрациясының қатынасы 50:1 болғанда, -0,8В потенциалында құрамында 26,7 ат % галлий бар алынатындығын анықтады. Беттің мор-

фологиясының зерттеулері шыны көміртегі электроды бетінде -0,8 және -0,9 В потенциалдарында біркелкі жабынды түзілетіндігін көрсетті. Рентгенофазалық анализ нәтижесі алынған қабаттарда Ga_2Se_3 фазасының бар екендігін растады.

Түйін сөздер: галлий селениді, электротұндыру, вольтметрметрия.

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ЭЛЕКТРООСАЖДЕНИЕ СЕЛЕНИДА ГАЛЛИЯ

Аннотация. Проведено электрохимическое осаждение селенида галлия на стеклоуглеродном электроде из сернокислых электролитов при постоянном потенциале. Исследованы циклические вольтамперные кривые стеклоуглеродного электрода в двух различных электролитах: сернокислом и цитратном буферном растворе, содержащих ионы галлия и селена. Исследовано влияние изменения концентрации ионов галлия и потенциала осаждения на состав получаемого осадка. Увеличение концентрации ионов галлия от $6 \cdot 10^{-3}$ до $1 \cdot 10^{-1}$ М при постоянной концентрации ионов селена $2 \cdot 10^{-3}$ М в электролите приводит кувеличению содержания галлия в составе осадка. Установлено, что для получения стехиометрического состава пленки содержания ионов галлия (III) в электролите должно во много раз превышать содержание ионов селена (IV). Результаты элементного анализаосадка подтвердили, что при соотношении концентраций ионов галлия и селена 50:1 в сернокислом электролите, при потенциале -0,8В получили пленку селенида галлия с содержанием 26,7 ат% галлия. Исследование морфологии поверхности показало, что однородное покрытие поверхности стеклоуглеродного электрода достигается при потенциалах -0,8 и -0,9В. Рентгенофазовый анализ подтвердил наличие фазы Ga_2Se_3 в полученных пленках.

Ключевые слова: селенид галлия, электроосаждение, вольтметрметрия, тонкие пленки.

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EXPERIMENTAL METHOD OF STUDYING THE LIMIT STATE OF THE HEAT EXCHANGE SURFACE COVERED BY A CAPILLARY-POROUS MEDIUM

Abstract. Capillary-porous systems have high intensity, high heat transfer ability, reliability, compactness. The results of calculations and experiments showed that the maximum thickness of the particles that break off under the action of compression forces for coatings from granite is $(0,25\div 0,3)\cdot 10^{-2}$ m. Sections of compression curves that determine the separation of particles with dimensions of more than $0,3\cdot 10^{-2}$ m for large heat fluxes and short feed times, are screened by the melting curve, and in the case of small heat fluxes and time intervals, the expansion curve. The research is aimed at creating porous coatings in cooling systems from well – and poorly conductive materials.

Keywords: heat transfer crisis; capillary-porous structure; heat and power installations, cooling systems.

Introduction. Successful use of capillary-porous materials in engineering attracted many researchers and inventors to create different devices on their basis. The intensity of heat-eliminating systems and the forcing of processes taking place therein increased [1-3]. In addition to cooling systems, the use of porous materials allowed the creation of units which addressed the problems of explosion safety, labor protection and durability [4, 6]. This was facilitated by the ability to control evaporation processes due to excess fluid in pores and capillary structures, formed by the combined action of capillary and mass forces [7-9].

In thermal power plants (TPPs), capillary-porous materials are used to cool highly-forced detonation burner units [3], to create steam coolers in steam boilers [9], oil coolers that prevent oil from entering cooling water and water from entering the bearing system [10] and labyrinth seals [11], and are used in other devices [10]. The main areas of practical application of capillary-porous systems are presented in [3, 5, 8-11].

Equipment and technological processes in the energy sector should be introduced from the ecological and economic positions primarily. The proposed development of capillary-porous systems will facilitate the implementation of processes, significantly improving and preserving the natural environment.

The main advantages of capillary-porous systems include high intensity, high heat transport ability, reliability, compactness, simplicity in manufacture and operation. These systems improve operational and technological performance and have low capital and operating costs. Based on the study of capillary-porous systems, new technical solutions have been developed to improve the performance characteristics of the thermal power plant in relation to the powerful power units of combined heat and power plants.

The authors of [12] carry out a comparative analysis of methods for calculating the heat transfer, based on the water boiling with underheating in vertical channels, and they consider that the hot spot corrosion of fuel element claddings of nuclear reactor fuel elements is similar to the capillary-porous structure [13, 14]. However, no studies of heat transfer through a regular structured surface have been carried out.

According to the authors' opinion [15,16], surface boiling on porous surfaces can influence the development of corrosion due to the erosive action on the heat exchange surface, when the bubbles of steam fall in an underheated liquid. Therefore, it is required to investigate the evaporation of liquid in

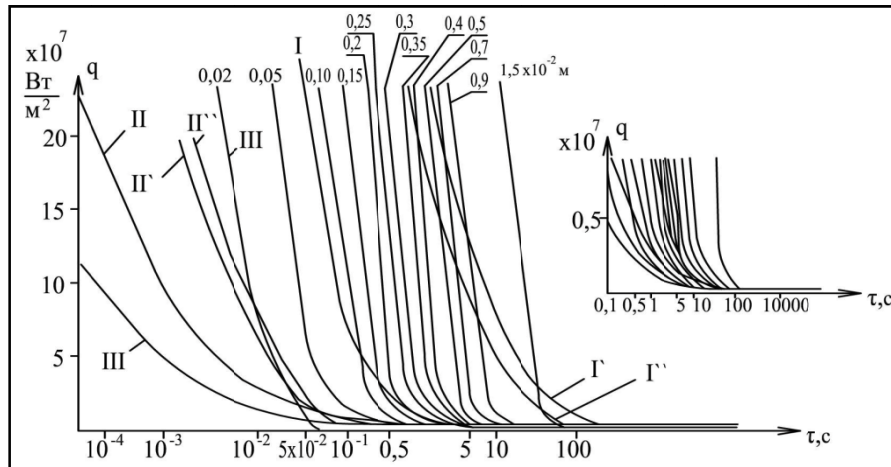


Figure 2 – Dependence of thermal flows causing compression stresses III of a granite coating according to the time of action τ for different thickness δ of the breaking-off particles:

I – tension stresses sufficient for destruction (Γ' , Γ'' – copper and stainless steel, $h = 0,1 \cdot 10^{-3}$ m);
 II – surface fusion (II' , II'' – copper and stainless steel, $h = 0,1 \cdot 10^{-3}$ m)

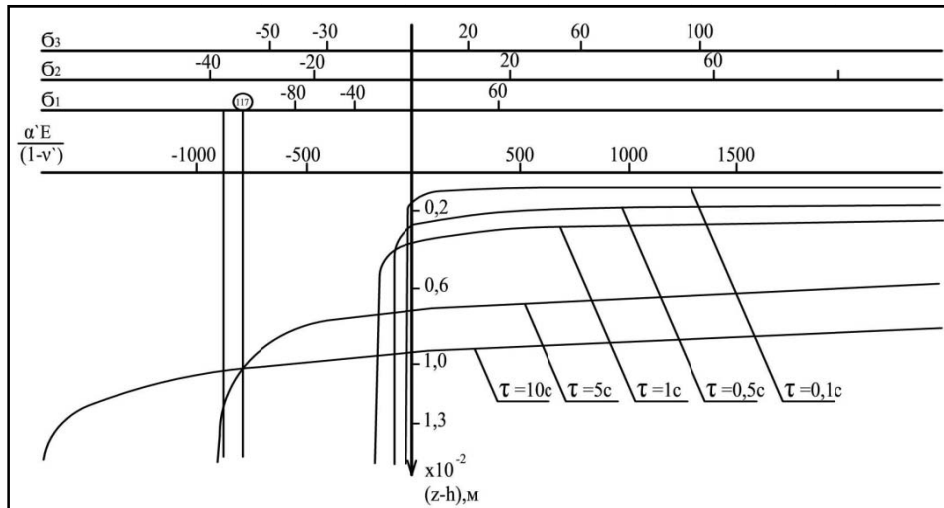


Figure 3 – Stress diagrams for the thickness of the limiting plate for different thermal flows and time of their action: $q_1 = 0,142 \cdot 10^7$ W/m²; $q_2 = 0,042 \cdot 10^7$ W/m²; $q_3 = 0,075 \cdot 10^7$ W/m²; II_7 – ultimate tension strength: σ , $\cdot 10^5$ H/m², E , $\cdot 10^5$ H/m²

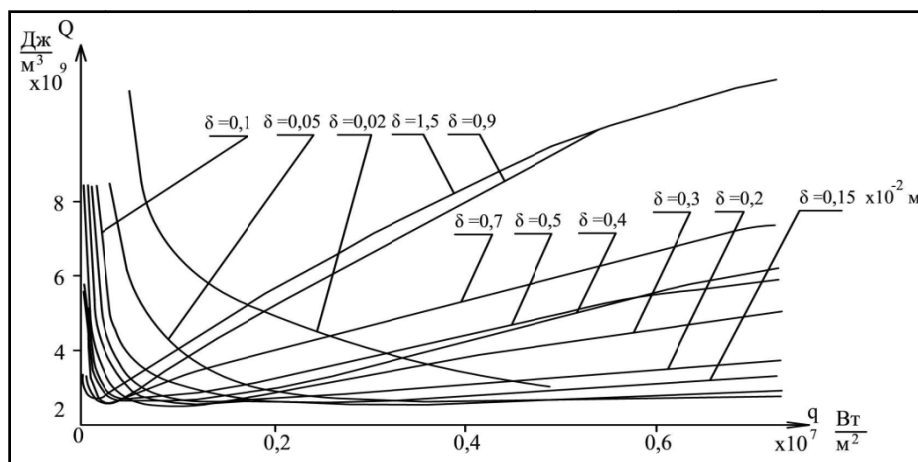


Figure 4 – Change in the ultimate destruction energy Q of the granite coating depending of q for various δ . $Q = q \tau / \delta$

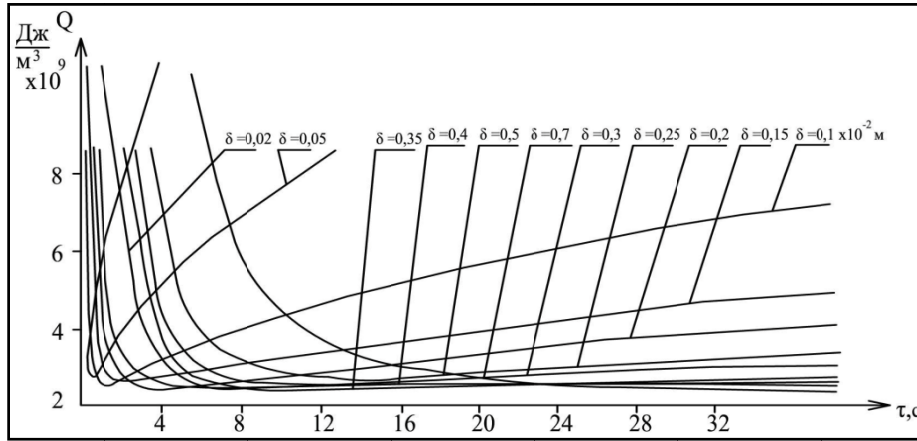
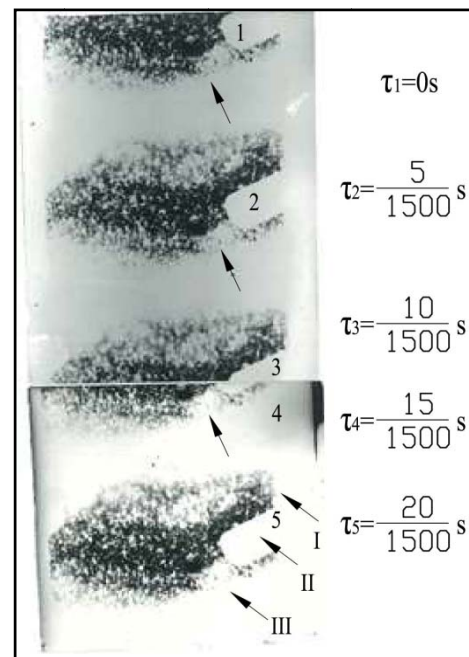


Figure 5 – Change in the ultimate destruction energy Q of the granite coating depending of τ for various δ

Figure 6 – A record of flight of husks with the size $\delta = 2,5 \cdot 10^{-3}$ m when a granite coating particle is destroyed by a rocket-type burner ($q = 1,2 \cdot 10^6$ W/m²):
 I – capillary-porous coating; II – burner axe, from which supersonic high-temperature, pulsating detonation gas flow flows out;
 III – a particle broken off from the coating



The relationship between tension and compression stresses is stress diagrams within the plate for various time intervals from the beginning of the process under consideration. At small τ , in the region of 10^{-1} s, only compressive stresses arise. Starting from $\tau \approx 1$ s, in some region $\Delta(h-z_i)$ up to $0,3 \cdot 10^{-2}$ m, the compression stresses turn into tension stresses in a very short period of time, and for different time intervals, they are at different depth from the plate surface.

The upper limit of the stable destruction of the quartz coating is 10^7 W/m², and that from granite is up to $0,5 \cdot 10^7$ W/m², and the lower limits, when there is still a detachment of particles under the influence of thermal stresses of compression are $0,25 \cdot 10^7$ and $0,05 \cdot 10^7$ W/m², respectively.

The destruction of an anisotropic medium under the action of directional heating is based on the uneven expansion of its components (crystals). When increasing in volume, the heated layer of the coating rock starts to press adjacent less heated layers. Since the expansion in all other directions is hampered by the reaction of the unheated layers, the rock starts to expand freely from the open side and, due to its overextension, it separates and splits off.

If vacancy cavities can be transformed into dislocations, the investigated coating obtain plastic properties and is not destroyed by the action of the torch. All metals are the same. Some rocks also have such property. The testing was conducted with steam generating metal heating surfaces at the time of the boiling crisis [2]. For metals, crystals are destroyed in directions up to 10^{-5} V. The process of destruction

consists of steps of initiation of fissures and their development. As a result of the thermal action, microcracks are initiated in the region of stress concentrators (inclusions, inhomogeneities, fissures). High internal stresses can also arise due to the inhomogeneous flow of plastic deformation, after which brittle failure occurs. In this regard, plastic deformation is considered as the primary cause of destruction, although it can delay the growth of fissures. On the one hand, bond discontinuities due to thermal fluctuations are at the heart of the destruction, and on the other hand, destruction is a kinetic thermoactivation process, which is based on the displacement of vacancies to fissures, the growth of which determines the kinetics of destruction.

Conclusion. Based on the conducted studies in case of exposure with a torch of a kerosene-oxygen burner of the porous coating within working area, we have up to $4 \cdot 10^7$ W/m² corresponded to q of coatings of $\approx 0,4 \cdot 10^7$ W/m². The metals destruction mechanism is fundamentally different from the rocks coatings destruction mechanism. Despite this, thermal flow dependences on time of their action and depth of penetration of temperature perturbations were identified on the basis of analogy, which help to avoid the boiling crisis in the cooling system and ensure an optimal selection of porous coatings of low porosity and thermal conductivity. In the future, the studies of other porous natural materials are required.

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ҚЫЛТҮТІКТІ-КЕУЕКТІ ОРТАМЕН ЖАБЫЛҒАН ЖЫЛУАЛМАСУ БЕТІНІҢ ШЕКТІК КҮЙІН ЗЕРТТЕУДІҢ ТӘЖРИБЕЛІК ӘДІСІ

Аннотация. Қылтүтікті-кеуекті жүйелер жоғары қарқындылыққа, жоғары жылуберу қабілеті мен сенімділік және ықшамдылық қасиеттеріне ие. Тәжірибе мен есептеулер нәтижелері көрсеткендей, граниттен жасалған жабындылар үшін сығу күштері әсерінен жұлынып алынатын бөлшектердің максималды қалыңдығы $(0,25 \div 0,3) \cdot 10^{-2}$ м. Үлкен жылу ағындары мен берістің аз уақыты үшін өлшемдері $0,3 \cdot 10^{-2}$ м артық бөлшектердің жұлынып алынуын анықтайтын сығу қисықтарының аумағы балку қисығымен, ал кіші жылу ағындары мен уақыт интервалдары үшін – созылу қисықтарымен экрандалады. Зерттеулер өткізгіштігі нашар және өткізгіштігі жақсы материалдардан суыту жүйелерінде кеуекті жабындыларды жасауға бағытталған.

Түйін сөздер: жылуберу кризисі; капиллярлы-кеуекті құрылым, жылулық энергоқондырғылар, суыту жүйелері.

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ЭКСПЕРИМЕНТАЛЬНЫЙ МЕТОД ИССЛЕДОВАНИЯ ПРЕДЕЛЬНОГО СОСТОЯНИЯ ТЕПЛООБМЕННОЙ ПОВЕРХНОСТИ, ПОКРЫТОЙ КАПИЛЛЯРНО-ПОРИСТОЙ СРЕДОЙ

Аннотация. Капиллярно-пористые системы обладают высокой интенсивностью, большой теплопередающей способностью, надежностью, компактностью. Результаты расчетов и эксперимента показали, что максимальная толщина частиц, отрывающихся под действием сил сжатия для покрытий из гранита составляет $(0,25 \div 0,3) \cdot 10^{-2}$ м. Участки кривых сжатия, определяющие отрыв частиц с размерами более $0,3 \cdot 10^{-2}$ м для больших тепловых потоков и малого времени подачи, экранируются кривой плавления, а в случае малых тепловых потоков и интервалов времени – кривой растяжения. Исследования направлены на создание пористых покрытий в системах охлаждения из хорошо – и плохо проводных материалов.

Ключевые слова: кризис теплопередачи; капиллярно-пористая структура; тепловые энергоустановки, системы охлаждения.

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ISOMERIZATION OF H-HEXANE ON Pd CATALYSTS INFLICTED TO ACID-ACTIVATED MONTMORILLONITE IN Ca-FORM

Abstract. Pd/CaHMM catalysts have got and tested in the isomerization reaction of n-hexane. According to the results, in the palladium content decreased from 0.35% to 0.1% leads to a decrease in activity, but the selectivity of C₄ + remains stable and high enough 99.6-100%. The maximum conversion of n-hexane by 0.35% Pd-catalyst is 45.1% at a temperature of 400°C, and 0.1% Pd-catalyst is 32.4% at the same temperature. One of the most important isomerization products is dimethyl butane; the maximum yield of 0.35% Pd contact is 21.3% at 350°C. At a 0.1% Pd catalyst, the yield of dimethyl butane decreases and is 16.5% at 400°C. The introduction of mordenite significantly increases the activity and selectivity even on a low-percentage catalyst. At 0.35% Pd/CaHMM + HM catalyst, the conversion of n-hexane increases to 54.1% at 400°C, and the yield of 2,2-dimethylbutane is 25.8%. On a 0.1% Pd + HM catalyst, the conversion of n-hexane is 54.3%, and the maximum yield of dimethylbutane is 26.0% at 400°C, which is slightly higher compared to 25.8% for 0.35% Pd.

The maximum yield of iso-hexanes on the non-zeolitic 0.35 and 0.1% Pd catalysts is 37.8 and 27.8%, respectively. Mordenite containing 0.35% Pd/CaHMM +HM catalyst reached 46.4%, at a low-percentage 0.1% Pd + HM catalyst 45.8%.

The increase in the octane number increases with increasing process temperature, as well as on catalysts modified with mordenite. The maximum increase was observed at 0.35% Pd/CaHMM + HM.

Keywords: isomerization, n-hexane, activated montmorillonite, catalyst, palladium.

Introduction. Natural layered silicates (clays) have the ability to ion exchange, high cation exchange capacity, micro-, meso and nanoporous structure, have surface active centers of various types that are widely used as high-performance components for the preparation of catalysts [1-3]. Montmorillonite (MM) is one of the most interesting representatives of layered silicates, the structural features and properties of which determine the wide possibilities of its use as a catalyst carrier are different processes. A characteristic property of montmorillonite clays is a high cation exchange capacity – from 60 to 150 meq / 100 g [4, 5].

It is known that acid treatment of clay minerals leads to a sharp increase in their catalytic and adsorption capacity [6-9]. The results of the study of samples by the method of low-temperature adsorption of nitrogen showed an increase in the specific surface area and a slight increase in the pore diameter. According to the data of the X-ray diffraction study, the crystal structure of the samples activated by solutions of mineral acids of low and medium concentration is preserved, and the results of the chemical analysis of natural clays after acid activation showed complete washing out of sodium ions from the structure of the samples and dissolution of a significant part of the octahedral magnesium, iron and aluminum cations, as a result of which the SiO₂ content in the samples increases [10, 11]. In the case of MM, acid treatment often also causes a rather strong decrease in the first basal reflexes [12].

The determining factor in increasing the adsorption capacity of natural clay minerals after their acid treatment is the non-changing porous characteristics of MM, and the growth of the specific surface and the dissolution and removal of all possible impurity phases leading to the production of a monomineralic

product, the destruction of the secondary structure, the increase in the accessibility of the adsorbed component to the surface of the adsorbent and appearance of silica gel. Natural clays are one of the available types of catalyst carriers for the reaction of isomerization of n-alkanes [13, 14]. In turn, as is known, structural isomerization of n-alkanes is one of the most demanded catalytic processes for obtaining high-octane additives to motor fuels [15-18]. The aim of this work was to study the texture, acid properties of Pd catalysts supported on activated montmorillonite in Ca-form, depending on the content of the active metal from PdCl₂ and the introduction of mordenite.

Experimental part

In the work, carefully used montmorillonite clay of the Tagan deposit without isolation of mono-mineral fraction of montmorillonite. The H-form of Tagansky montmorillonite was obtained by treatment with a solution of H₂SO₄, followed by washing from SO₄²⁻ ions. The activated clay was formed, dried in a thin layer first at room temperature, then at 150°C and then subjected to calcination at 500°C [19, 20]. The prepared H-form of MM was used as a support for Pd catalysts.

The catalysts were prepared by impregnating the support with aqueous solutions of PdCl₂ followed by drying, calcining and reduction of the oxides to the metallic state. The metal content in the samples was 0.1 and 0.35%. The textural characteristics of the samples were determined by the BET method for low-temperature nitrogen adsorption on the ACCUSORB instrument. Elemental analysis of the composites was carried out with the help of energy dispersive X-ray fluorescence spectroscopy on the energy dispersive microanalysis system INCA-Energy 450 mounted on a scanning electron microscope JSM6610LV, JOEL, Japan. The activity of the samples in the isomerization of n-hexane was investigated in a flow reactor with varying the process temperature in the range 250-400 °C. The process was carried out in a hydrogen flow at a feed rate of 0.82 hour⁻¹.

Results and its discussion

In table 1, there is data on the elemental composition of the initial calcium and activated H-form Tagan montmorillonite, catalysts with different Pd content (0.1%, 0.35%) and modified with mordenite.

Table 1 – Element composition of initial and activated montmorillonite and Pd / CaHMM with different content of Pd and modified with mordenite (NM)

№	Example	C	O	Na	Mg	Al	Si	S	Ca	Ti	Fe	Pd	Итор
1	CaMM	14,35	46,40	0,25	2,20	10,53	23,46		1,30	0,13	1,37		100
2	CaHMM	14,27	45,50		2,08	10,78	24,55		0,69	0,18	1,94		100
3	0,1%Pd/ CaHMM	4,29	50,97		1,41	14,35	26,94	0,05	0,29	0,19	1,23	0,27	100
4	0,35%Pd/CaHMM	5,13	49,48		1,47	14,20	27,39	0,06	0,28	0,20	1,23	0,57	100
5	0,1%Pd/ CaHMM+HM	4,70	49,23		1,06	13,56	29,77	0,06	0,24	0,15	0,98	0,24	100
6	0,35%Pd/CaHMM+HM	5,87	51,21	0,07	1,06	12,20	27,90	0,04	0,18	0,13	0,76	0,57	100

From the analysis of the data in table 1, it follows that the acid activation of CaMM leads to the removal of sodium from the clay, only small amounts of sodium are found in the sample (6). After acid activation and Pd supported, the amount of calcium and magnesium is significantly reduced. According to the elemental analysis, several overestimated amounts of palladium are found in comparison with the impregnation method introduced.

In table 2, there is a data on the hydroisomerization of n-hexane by 0.35% and 0.1% Pd / CaHMM catalysts at different temperatures.

Tests of 0.35% and 0.1% of palladium catalysts showed that the activity decreases with decreasing palladium content, and the isomer selectivity practically does not change. As can be seen from table 2, the conversion of n-hexane increases with increasing temperature and reaches 45.1% on 0.35% Pd-catalyst, and on 0.1% Pd-catalyst is 32.4% at 400°C. The selectivity for C₄₊ isomers at 400°C is very high 99.6-99.7%. The maximum yield of dimethylbutane is observed at 350°C on 0.35% Pd-contact and is 21.3%.

Table 2 – Isomerization of n-hexane on Pd / CaHMM-composite catalyst

Kat.	T, °C	α, %	S _{C6} , %	S _{C4+} , %	Yield reaction, %					
					{C ₁ -C ₄ }	i-Б	2М Б	2,2Д МБ	2МП	Amount C ₇
0,35% Pd	250	8,6	69,6	100	–	0,15	0,25	3,60	2,42	2,24
	300	22,4	83,6	100	–	–	0,56	11,2	7,4	3,11
	350	43,3	90,1	99,7	0,15	0,16	0,97	21,3	16,5	3,0
	400	45,1	81,7	99,6	0,18	0,32	0,69	17,8	15,5	7,0
0,1% Pd	250	6,5	74,3	100	–	–	0,2	2,9	1,9	1,5
	300	18,7	84,8	100	–	0,1	0,2	9,4	6,4	2,6
	350	23,5	87,3	99,6	0,1	0,2	0,5	12,6	8,0	2,2
	400	32,4	86,0	99,7	0,1	0,2	0,9	16,5	11,3	3,4

C₇ - 2,2 DMP - 2,2-Dimethylpentane; 2,4 DMP - 2,4-Dimethylpentane; 2,2,3TMB - 2,2,3-Trimethylbutane; 3,3DMP - 3,3-Dimethylpentane; 2MG-2-Methylhexane; 3MG-3-Methylhexane; 3 EP-3-Ethylpentane.

When the palladium content is reduced to 0.1%, the yield of C₆-disubstituted isomers is reduced and is 16.5% at 400 °C. The yield of hydrocracked products does not exceed 0.18%. On a 0.35% Pd catalyst at 350°C, the C₆ isomer content is 37.8%, with a decrease in palladium content of up to 0.1%, the isohexane yield is 27.8% at 400°C.

Data on the yield of isohexanes, selectivity and conversion of the process of isomerization of n-hexane by 0.35% and 0.1% Pd-contacts at different temperatures are illustrated in figure 1.

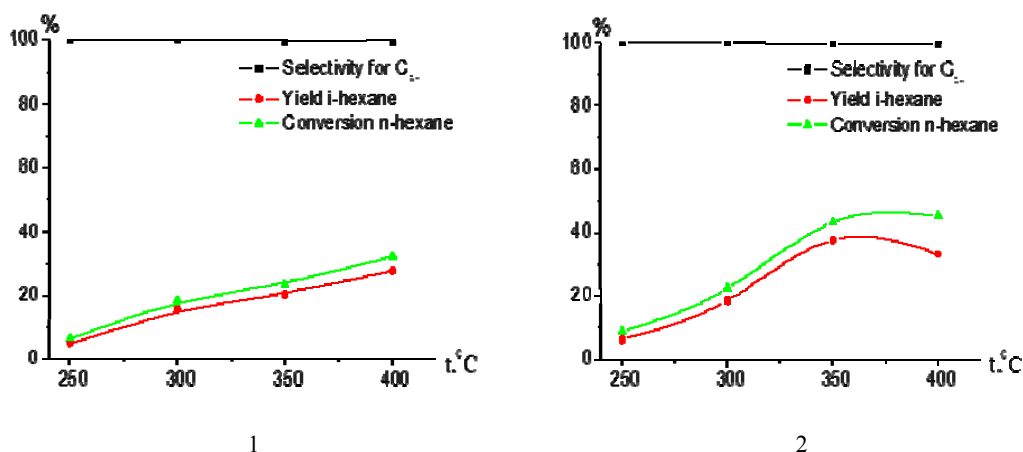


Figure 1 – Isohexane yield, selectivity and conversion of the isomerization of n-hexane by 0.1% Pd / CaHMM (1); 0.35% Pd / CaHMM (2) catalysts depending on the process temperature

The tests of 0.35% and 0.1% palladium catalysts showed that their activity decreased insignificantly with decreasing palladium concentration. The conversion of n-hexane and the yield of isomers increase with increasing temperature on both catalysts and at 350°C reach constant values on 0.35% and 0.1% Pd at 400°C.

The presence of C₇-isomers in reaction products probably indicates side processes in the isomerization of n-hexane.

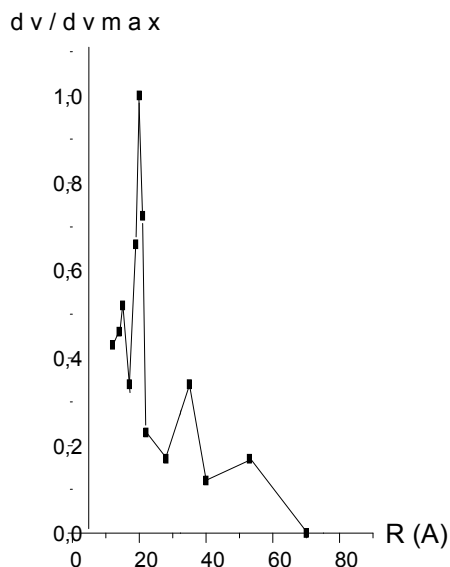
Table 3 and figure 2 show some of the physicochemical characteristics of palladium catalysts based on activated montmorillonite.

As you can see from table 2, when the clay is activated, the specific surface of the sample rises from 89.2 to 99.2 m²/g. With the addition of palladium, the specific surface area and the total pore volume increase, a Pd content reduction of up to 0.1% on Pd/CaHMM leads to an increase in the specific surface area of the sample from 107.8 to 127.6 m²/g. The total pore volume rises from 0.095 to 0.117 cm³/g.

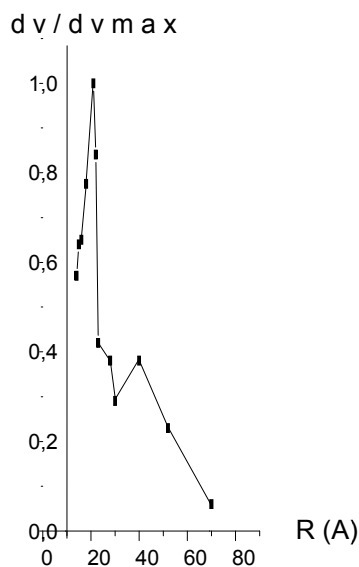
The changing porous structure is clearly illustrated by figure 2.

Table 3 – Specific surface area and effective pore volume and their distribution for Pd / CaHMM-catalyst

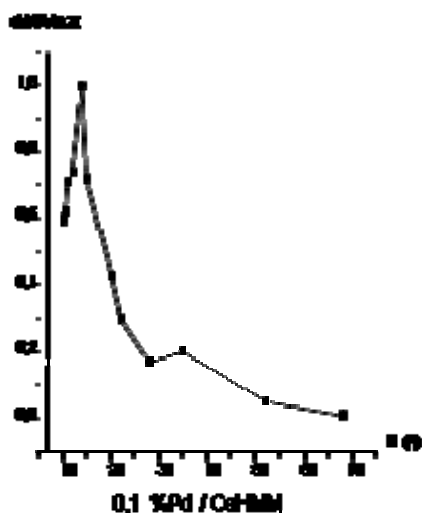
Example	S ₂ , m ² /g	Total pore volume, cm ³ /Γ	R, Å	Relative quantity, %	
				Micropores, (0-20Å)	Mesopores, (20-80Å)
CaMM	89,2	0,075	12,0-70,0	46,1	53,9
CaHMM	99,2	0,086	12,5-70,0	40,7	59,3
0,35%Pd/CaHMM	107,8	0,095	10,0-70,0	47,3	52,7
0,1%Pd/CaHMM	127,6	0,117	10,0-68,0	57,1	42,8



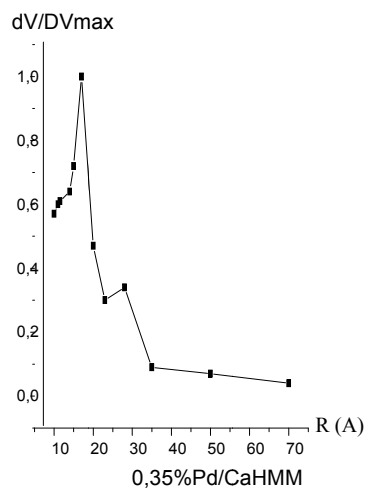
1



2



3



4

Figure 2 – Pore distribution curves for their effective radius in the Pd / CaHMM-composite catalyst depending on the metal content of CaHMM (1).

The signs of the curves: CaMM (1); CaHMM (2); 0.1% Pd / CaHMM (3); 0.35% Pd / CaHMM (4)

Calculation of pore size distribution showed that when Pd content is reduced to 0.1%, the amount of mesopores decreases from 52.7 to 42.8%, and the number of micropores increases from 47.3 to 57.1%, which is reflected in a decrease in activity.

Table 4 and figure 3 show the isomerization activity of Pd / CaHMM + HM, modified with mordenite depending on the metal content.

Table 4 – Isomerization of n-hexane on Pd / CaHMM + HM-composite catalyst

Kat.	T, °C	α, %	S _{C₆} , %	S _{C₄₊} , %	Yield reaction, %					
					{C ₁ -C ₄ }	i-Б	2М Б	2,2Д МБ	2МП	Amount C ₇
0,35% Pd+HM	250	7,9	81,6	100	–	–	0,2	3,9	2,5	1,3
	300	27,0	94,2	100	–	0,2	0,4	15,6	9,8	0,9
	350	41,0	93,3	99,7	0,1	0,3	1,0	22,8	15,4	1,3
	400	54,1	85,7	99,8	0,1	0,2	2,4	25,8	20,6	5,0
0,1% Pd+HM	250	9,2	86,0	100	–	–	0,2	4,8	3,2	1,08
	300	33,3	92,3	99,9	0,04	0,15	0,6	18,0	12,2	1,8
	350	51,1	93,8	99,8	0,1	0,3	0,5	26,3	19,7	2,27
	400	54,3	88,9	99,7	0,16	0,4	0,4	26,0	19,8	5,12

Iso-C₇: 2.2 DMP – 2,2-Dimethylpentane; 2.4 DMP – 2,4-Dimethylpentane; 2,2,3TMB – 2,2,3-Trimethylbutane; 3,3DMP – 3,3-Dimethylpentane; 2MG-2-Methylhexane; 3MG-3-Methylhexane; 3 EP-3-Ethylpentane.

The incorporation of mordenite into Pd / CaHMM significantly increases its isomerizing activity and isomer selectivity. Over 0.35% Pd / CaHMM + HM catalyst, the maximum yield of isohexanes is observed at 400°C, which reaches 46.4%, with the yield of 2,2-dimethylbutane being 25.8%. The conversion of n-hexane increases to 54.1% with a C₄₊- selectivity equal to 99.8%. For comparison, the maximum yield of isohexanes on zeolite-free 0.35 and 0.1% Pd-catalysts is much lower and is 37.8 and 27.8%, respectively (table 2). On 0.1% Pd + HM catalyst, the maximum yield of dimethylbutane from n-hexane is 26.0% at 400°C versus 25.8% for 0.35% Pd. According to the total content of C₆-isomers (45.8%), 0.1% Pd-catalyst is only slightly inferior to 0.35% Pd (46.4%). It was found that in the investigated temperature range the selectivity for the C₄₊ isomers for all catalysts remains quite high 99.7-100%. At the same time, the yield of hydrocracking products does not exceed 0.1% on 0.35% Pd/CaHMM + HM at 400°C.

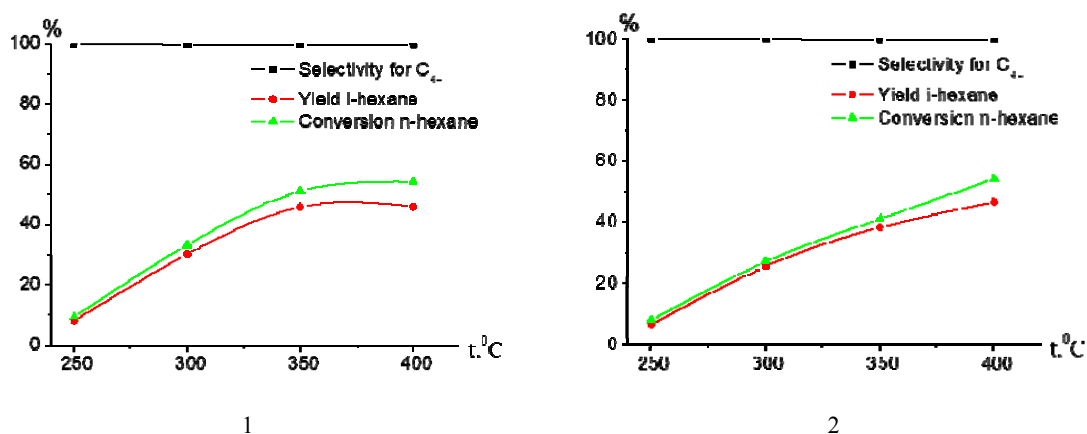


Figure 3 – Isohexane yield, selectivity and conversion of the isomerization process of n-hexane on 0.1% Pd / CaHMM + HM (1); 0.35% Pd / CaHMM + HM (2) catalysts depending on the process temperature.

Based on the data of low-temperature nitrogen adsorption (BET), the texture characteristics of Pd-catalysts modified with mordenite were determined.

As you can see from Table 5, the addition of mordenite to palladium catalysts supported on CaHMM + HM leads to a significant increase in the specific surface area for 0.35% Pd from 107.8 (table 3) to 129.4 m²/g (table 5), the effective pore volume is increased from 0.095 to 0.101 ml/g. In the case of 0.1% Pd, modifying

Table 5 – Comparative structural and adsorption characteristics of Pd-contacts based on CaHMM modified with mordenite

Example	S_p , m^2/g	Total pore volume, sm^3/g	R_p , Å	Relative quantity, %	
				Micropores, (0-20Å)	Mesopores, (20-80Å)
0,35% Pd/CaHMM+HM	129,4	0,101	10,0-68,0	52,0	48,0
0,1% Pd/CaHMM+HM	159,2	0,125	10,0-74,0	51,9	48,1

with mordenite leads to an even more significant growth of the specific surface: from 127.6 to 159.2 m^2/g , and an effective pore volume from 0.111 to 0.125 cm^3/g . The growth of the specific surface and pore volume is accompanied by a small a change in pore size distribution, with the number of micropores slightly higher (52.0-51.9%) than mesopores (48.1-48.0%), regardless of the palladium content.

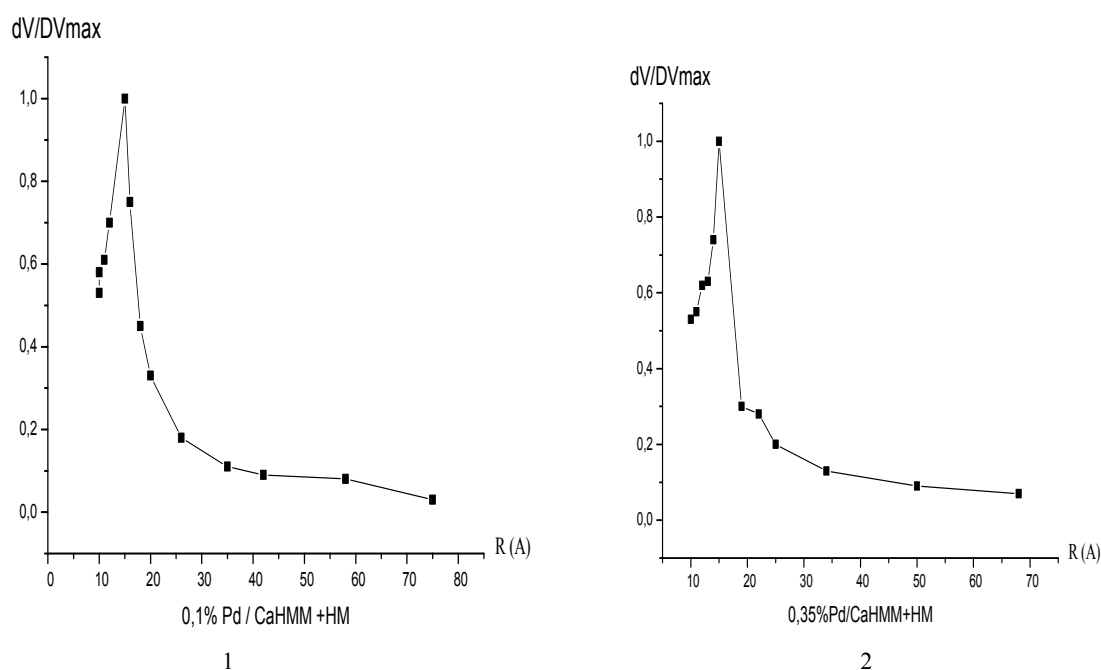


Figure 4 – Pore distribution curves for their effective radii on a Pd / CaHMM +HM composite catalyst, depending on the metal content.

Signs of the curves: 0.1% Pd / CaHMM + HM (1); 0.35% Pd / CaHMM +HM (2)

Thus, the introduction of mordenite into the catalyst results in a change in the texture characteristics of the Pd catalysts. The substantial growth of the isomerizing activity and yield of C_6 and C_7 isomers in the isomerization of n-hexane is probably due to an increase in the specific surface area and the number of mesopores when modifying with mordenite. Thus, on 0.1% Pd/CaHMM + HM, the mesopore number increases from 42.8% to 48.0%. On this catalyst, the maximum conversion of n-hexane is observed, equal to 54.3% at 400° C. There is a correlation between the isomerizing activity and the amount of dimethylbutanes formed on Pd-catalysts with the amount of mesopores.

Figure 5 shows the dependence of the increase in the octane number (o.n.) of isomerization products of n-hexane on palladium catalysts, depending on the Pd content and upon modification with mordenite.

As can be seen from Fig. 5, the increase in the octane number significantly increases with an increase of the process temperature and on the catalysts modified by mordenite, which is due to the growth of yields formed from n-hexane isomers, including disubstituted, with high octane numbers. The maximum increase o.n. was observed on 0.35% Pd/CaHMM + HM.

Based on the results, it is possible to conclude that the Pd catalysts supported on acid-activated montmorillonite in Ca-form are promising, which are characterized by high isomerizing activity and selectivity during the hydroconversion of n-hexane to produce high-octane isomers.

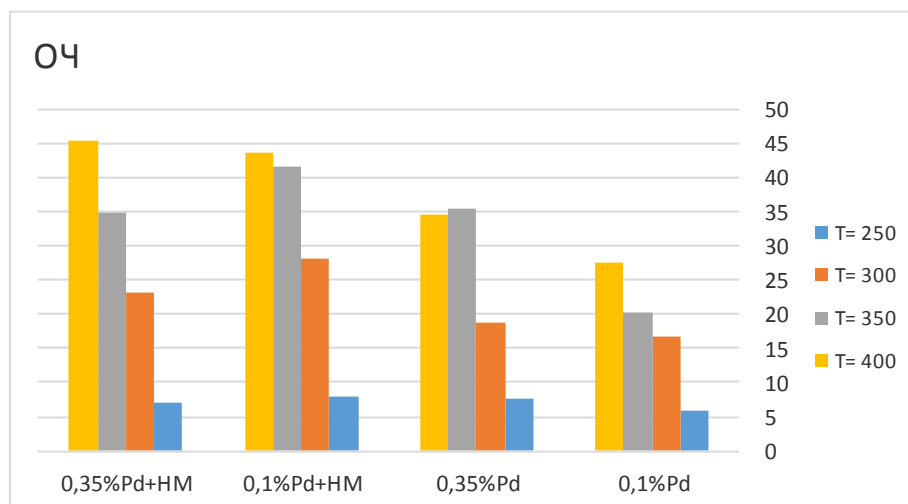


Figure 5 – Temperature dependence of the increase in the octane number of isomerization products of n-hexane on the 0.35% PdCaHMM and Pd/CaHMM +HM catalysts studied by the calculation method

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н-ГЕКСАНДЫ Са-ФОРМАДАҒЫ ҚЫШҚЫЛДЫ-БЕЛСЕНДІРІЛГЕН МОНТМОРИЛЛОНИТКЕ ЖАҒЫЛҒАН Pd-КАТАЛИЗАТОРЛАРДА ИЗОМЕРЛЕУ

Аннотация. Pd/CaНММ катализаторлары алынып және н-гександы изомерлеу реакциясында сыналған болатын. Алынған нәтижелер бойынша анықталғаны: палладийдің мөлшерін 0,35%-дан 0,1%-ға азайту белсенділіктің төмендеуіне әкеледі, алайда C₄₊ бойынша тұрақты және барынша жоғары болып қалады - 99,6-100%. Н-гексанның 0,35% Pd-катализаторындағы ең жоғары конверсиясы 400⁰С температура жағдайында 45,1%, ал 0,1% Pd-катализаторында тура сол температура жағдайында 32,4% құрайды. Измерлеудің аса маңызды өнімдерінің бірі диметилбутан болып табылады, 0,35% Pd-жанасудағы ең көп шығуы 350⁰С жағдайында 21,3% құрайды. 0,1% Pd-катализаторында диметилбутанның шығуы азайып және 400⁰С жағдайында 16,5% құрайды. Морденитті қосу тіпті төмен пайызды катализатордың өзінде белсенділік пен селективтілікті едәуір арттырады. 0,35%Pd/CaНММ+НМ-катализаторында н-гексанның конверсиясы 400⁰С жағдайында 54,1%-ға артады, ал 2,2-диметилбутанның шығуы 25,8% құрайды. 0,1%Pd+НМ-катализаторда н-гексанның конверсиясы 54,3%-ды, ал диметилбутанның ең көп шығуы 400⁰ жағдайында 26,0% құрайды, бұл 0,35% Pd катализаторындағы 25,8% мөлшерімен салыстырғанда аздап жоғары.

Изогександардың цеолитсіз 0,35 және 0,1% Pd-катализаторларда ең көп мөлшерде шығуы соған сәйкес 37,8 және 27,8% құрайды. Құрамында мордениті бар 0,35%Pd/CaНММ+НМ-катализаторда C₆-изомерлердің шығу мөлшері 46,4%, төмен пайызды 0,1%Pd+НМ катализаторда 45,8% құрайды.

Октандық санның өсуі процестің температурасы өскен сайын, сондай-ақ морденитпен түрлендірілген катализаторларда артып отырады. Октандық санның барынша өсуі 0,35% Pd/CaНММ +НМ катализаторында байқалды.

Түйін сөздер: изомерлеу, н-гексан, белсендірілген монтмориллонит, катализатор, палладий.

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ИЗОМЕРИЗАЦИЯ Н-ГЕКСАНА НА Pd-КАТАЛИЗАТОРАХ, НАНЕСЕННЫХ НА КИСЛОТНО-АКТИВИРОВАННЫЙ МОНТМОРИЛЛОНИТ В Са-ФОРМЕ

Аннотация. Были получены и испытаны Pd/CaНММ-катализаторы в реакции изомеризации н-гексана. По полученным результатам было отмечено, что снижение содержания палладия с 0,35% до 0,1% приводит к снижению активности, но селективность по C₄₊ остается стабильной и достаточно высокой 99,6-100%. Максимальная конверсия н-гексана на 0,35% Pd-катализаторе составляет 45,1% при температуре 400⁰С, а на 0,1% Pd-катализаторе составляет 32,4% при этой же температуре. Одним из важнейших продуктов изомеризации является диметилбутан, максимальный выход на 0,35% Pd-контакте составляет 21,3% при 350⁰С. На 0,1% Pd-катализаторе выход диметилбутана снижается и составляет 16,5% при 400⁰С. Введение морденита заметно повышает активность и селективность даже на низкопроцентном катализаторе. На 0,35%Pd/CaНММ+НМ-катализаторе, конверсия н- гексана растет до 54,1% при 400⁰С, а выход 2,2-диметилбутана составляет 25,8%. На 0,1%Pd+НМ-катализаторе конверсия н- гексана составляет 54,3%, а максимальный выход диметилбутана 26,0% при 400⁰, что незначительно выше по сравнению с 25,8% на 0,35% Pd.

Максимальный выход изогексанов на бесцеолитных 0,35 и 0,1% Pd-катализаторах составляет 37,8 и 27,8% соответственно. На морденит, содержащем 0,35%Pd/CaНММ+НМ-катализаторе выход C₆-изомеров достигает 46,4%, на низкопроцентном 0,1%Pd+НМ катализаторе 45,8%.

Прирост октанового числа растет с увеличением температуры процесса, а также на катализаторах, модифицированных морденитом. Максимальный прирост о.ч. наблюдался на 0,35% Pd/CaНММ+НМ.

Ключевые слова: изомеризация, н-гексан, активированный монтмориллонит, катализатор, палладий.

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ACTIVATION OF NONSPECIFIC PROTECTION OF THE ORGANISM WITH NEW IMMUNOTROPIC PREPARATIONS IN THE IMPLEMENTATION OF THE POTENTIAL PRODUCTIVITY OF PIGS

Abstract. In the conditions of a pig-breeding complex, the assessment of the efficiency of the application the PigStim-C and PigStim-M immunotropic preparations in newborn pigs for the purpose of realization of bioresource potential of productivity was carried out. It is established that the PigStim-C and PigStim-M immunotropic drugs do not exert a negative impact on the clinical and physiological state of an organism of pigs, ensure health and safety of the pigs. Against the background of immunocorrection of the organisms of pigs, 1.5-2.9 times of reduction in terms of recovery for 11.4-23.5%, increase in safety of a livestock to 98,0-100,0% are noted a decrease in the quantity of diseases. The use of immunotropic drugs in the early period of postnatal ontogenesis of pigs activates cellular and humoral factors of nonspecific protection of the organism in industrial technology: phagocytic activity of neutrophils - on 3.8-5.8% and 4.2-6.4%, bactericidal activity of blood serum - on 3.6-8.6% and 3.4-9.8%, lysozyme activity of blood plasma - on 4.8-8.6% and 4.0-8.0%. Immunocorrection of the organisms of young pigs in the early period of postnatal ontogenesis with the PigStim-C and PigStim-M immunotropic drugs promotes the realization of the bioresource potential of meat productivity. It was found that the animals of the 1st and 2nd experimental groups predominated their peers in the control in live weight by 7.1 kg or 6.9% and by 8.6 kg or 8.2%, in the average daily gain by 34 and 41 g. Slaughter weight of pigs against the background of immunocorrection was above the control by 6.22 and 7.08 kg. According to the results of the boning and trimming of half pig carcasses of the experimental groups, the increase in the number of trimmed pork by 1.88 and 2.16 kg in the 1st and 2nd experimental groups was found in comparison with the control.

Keywords: Pigs, PigStim-C and PigStim-M immunotropic preparations, immunity, morbidity and safety, productivity.

Introduction. An essential prerequisite for increasing the profitability and competitiveness of the pig husbandry is the development and improvement of the organizational and economic mechanism for the effective functioning of pig-breeding organizations. The key element of this process is the innovative renewal of the capital, which is possible through technical, organizational, economic and managerial innovations in organizations [4, 11, 12, 23-25, 32, 33, 35].

The transition of pig breeding to an industrial base, together with undoubted advantages, contributing to an increase in the profitability of the industry as a whole, provoked the aggravation and the emergence of a number of new problems, the main one being the inadequacy of environmental conditions to the biological needs of the pig's organism. The development and introduction of effective technologies for keeping, feeding and servicing animals in the production process, even if it allows to increase the productivity, improve the quality of the products received and profitability of the industry as a whole, it

often violates the phylogenetic relationships of pigs with the environment and traditional conditions of keeping and feeding. Technological methods of modern large pig breeding complexes, lack of exercise, irrational use of antibacterial drugs cause a metabolic disorder, a decrease in organism resistance of pigs, which ultimately leads to high incidence and low pig livestock [2, 8-10, 13, 15, 18, 20, 22].

In such conditions, the nature of the animal and the physiological characteristics of the organism are not able to change as quickly as the conditions of keeping, feeding and the technology of animal husbandry in general. Often the animal organism cannot avoid the action of stress factors and adapt to changing environmental conditions, which leads to various functional disorders and diseases [1, 5-7, 21, 26, 27, 30, 34].

Seeing that it is not possible to eliminate the effect of many stress factors, priority is the prevention of the negative impact of stressors on the organism, on the other hand, and the increase in adaptive abilities of animals to industrial conditions. Special attention should be paid to newborn pigs, since they are most susceptible to environmental factors, and adaptive mechanisms of their body have not been formed yet. On the other hand, the early period of postnatal ontogenesis is optimal for the directed effect on the process of formation of the protective-adaptive mechanisms of their organism. In the light of the foregoing, the use of immunotropic preparations for newborn piglets is a promising technique for intensifying the pig husbandry [3, 13, 16, 17, 19, 28, 29, 31].

The research was carried out within the framework of international cooperation of scientists from the Russian Federation (headed by Doctor of Biological Sciences, professor Vladimir Grigoriyevich Semenov) and from the Republic of Kazakhstan (headed by the corresponding member of the National Academy of Sciences of the Republic of Kazakhstan, Doctor of Agricultural Sciences Dastanbek Asylbekovich Baimukanov) on priority branches of productive animal husbandry in the period 2015-2017.

The aim of the work – realization of the bioresource potential of the pig organism by activation of nonspecific resistance by new immunotropic preparations: PigStim-C and PigStim-M.

Materials and methods. The scientific research work was carried out in the conditions of the pig breeding complex of the close company "Progress" of the Cheboksary district of the Chuvash Republic. Materials processing was carried out in the laboratory of bio- and nanotechnologies and in the laboratory of the Department of Morphology, Obstetrics and Therapy of the Federal State Budget Educational Institution of Higher Education "Chuvash State Agricultural Academy" in 2014-2017. The work was carried out in accordance with the research plan of the FSBEI HE of the Chuvash State Agricultural Academy.

The objects of research were the prenursery pigs, weaners and youngsters on fattening to slaughter for meat. Three groups of newborn piglets (control, 1st experimental and 2nd experimental) were selected according to the principle of pair- analogues, taking into account the clinical and physiological state and the live weight of 50 animals in each group.

To determine the nature of the effect on the clinical and physiological state, the hematological and biochemical blood profiles, the indices of the nonspecific resistance of the pigs organisms, as well as the growth, morbidity, safety and productive qualities of the store pigs, the newborn piglets of the experimental groups were injected intramuscularly with the immunotropic drugs PigStim-C and PigStim-M in a dose of 0.3 ml per head, three times on the 1-, 4- and 7-day of life. Animals of the control groups did not receive drugs.

PigStim-C – is complex immunotropic preparation for the realization of the biological potential of agricultural animals. The preparation is an aqueous suspension containing 2.5% of the polysaccharide complex of yeast cells immobilized in an agar gel with the addition of 1.5% benzimidazole derivative and 5% antibacterial agent of the cephalosporin group.

PigStim-M – is a complex preparation for stimulation of nonspecific resistance of the organism, prevention of diseases of youngsters of agricultural animals, is an aqueous suspension containing 2.5% of the polysaccharide complex of yeast cells immobilized in agar gel with the addition of 1.5% benzimidazole derivative and 5% antibacterial agent of the macrolide group.

Pig breeding complex "Progress" CJSC is an enterprise with a complete cycle of pork production. The technological process is organized by a three-phase in-line system for growing and fattening pigs, divided into 4 sections (stage): reproduction, farrowing, rearing and fattening. Groups of milking sows are formed in a rhythmicity of 7 days. Retirement is performed at the age of 25-26 days.

Results. The microclimate parameters in the workshops for keeping milking sows with piglets, weaners and store pigs for fattening during the whole observation period were within the limits of zoohygienic norms and corresponded to the needs of the organism, taking into account age and sex groups (table 2).

Table 1 – Microclimate of premises for pigs keeping

Index	Premises for keeping during		
	suckling	weaning	fattening
Temperature, °C	19.12±0.12 28.48±0.10*	18.80±0.17	16.00±0.15
Relative humidity, %	66.80±0.80	65.20±0.49	61.80±1.16
Air velocity, m/s			
winter season	0.10±0.01	0.14±0.01	0.23±0.01
summer season	0.31±0.01	0.44±0.01	0.68±0.03
Concentration:			
carbon dioxide, %	0.16±0.01	0.16±0.00	0.19±0.00
ammonia NH ₃ , mg/m ³	6.40±0.51	13.40±0.75	15.20±0.58
hydrogen sulphide, mg/m ³	3.00±0.32	3.40±0.51	4.20±0.58
Bacterial content, thousand tons/m ³	18.80±0.58	19.60±0.75	26.60±1.03
*Air temperature in the place of rest of pigs (lair) in the first week of life with local heating by infrared lamps.			

Feeding of pigs at the enterprise is carried out by all-in-one feeds on the basis of a grain mixture of own production with the addition of fodder concentrates produced by Premikorm OOO. Prenursery pigs begin to accustom to the independent eating of fodder, starting from the 9th day of life. In the feeding of the prenursery pigs, the SPK-3 START pre-starter feed for piglets aged 9-45 days is used. Preparation of mixed fodders for piglets weighing 12-30 kg is carried out by adding to the grain mixture of 20% KBVM SK-4 fodder concentrate for piglets. Young pigs with the live weight of 30 to 70 kg are fed with balanced feed, adding 15% KBVM SK-5 fodder concentrate, and pigs with the live weight of 70-110 kg - 10% KBVM SK-6 fodder concentrate.

The conditions of keeping and feeding pigs at the pig breeding complex of Progress CLSC in the Cheboksary district correspond to the recommended ones and promote the development of a genetically built-in productivity potential in animals, and compliance with veterinary and sanitary rules and the operating regime of the enterprise ensures its veterinary well-being.

During the experimental period, the piglets of all groups were monitored with fixation of body temperature, heart rate and respiratory movements.

During the whole period of observation, there were no obvious differences in the behavioral responses of animals, except for a short-term stress reaction in the piglets of the experimental groups after intramuscular injection of immunotropic drugs, as well as sporadic cases of diseases in the experimental groups described below.

The results of the hematological test of piglets of experimental groups are presented in table 2.

The dynamics of the number of erythrocytes and leukocytes, as well as the hemoglobin concentration in the blood of the piglets of the control, 1st and 2nd experimental groups for the entire period of observations, corresponded to the patterns of age-related changes in the blood picture and was within physiological norms.

At 14-day-old age, the number of erythrocytes in the blood of pigs of the 1st experimental group was significantly higher by 5.3%, and the 2nd experimental group by 5.8% more than in the control group. At the 30-, 60- and 90-day-old age, the number of erythrocytes also turned out to be higher than the control value in the blood of the animals of the 1st experimental group by 7.5, 7.6 and 5.1%, and the 2nd experimental group - by 8.8, 8.0 and 5.7%, respectively (P<0.05).

The concentration of hemoglobin in the blood of the piglets of the 1st experimental group at 14, 30 and 60-day-old age was higher in comparison with the control by 3.1, 4.4 and 4.7%, respectively, and in the blood of the animals of the 2nd experimental group – by 2.9, 4.1 and 4.9%. At 90-day-old age, the concentration of hemoglobin in the blood of the pigs of the 1st and 2nd groups also turned out to be 5.3 and 4.8%, respectively, but statistically unreliable.

Table 2 – Hematological indicators of young pigs

Index	Age, days				
	1	14	30	60	90
Control group					
Erythrocytes, $\times 10^{12}/l$	4.52 \pm 0.07	4.52 \pm 0.06	4.56 \pm 0.08	6.02 \pm 0.10	6.68 \pm 0.11
Hemoglobin, g/l	98.80 \pm 1.16	96.80 \pm 0.80	91.80 \pm 0.97	93.00 \pm 1.30	95.20 \pm 2.08
Leukocytes, $\times 10^9/l$	7.04 \pm 0.19	13.22 \pm 0.21	12.64 \pm 0.26	12.10 \pm 0.62	11.92 \pm 0.72
1st experimental group					
Erythrocytes, $\times 10^{12}/l$	4.50 \pm 0.07	4.76 \pm 0.05*	4.90 \pm 0.07*	6.48 \pm 0.13*	7.02 \pm 0.08*
Hemoglobin, g/l	99.00 \pm 0.95	99.80 \pm 0.86*	95.80 \pm 1.43*	97.40 \pm 1.21*	100.20 \pm 1.07
Leukocytes, $\times 10^9/l$	7.06 \pm 0.20	14.78 \pm 0.13***	15.84 \pm 0.11***	14.24 \pm 0.29*	13.86 \pm 0.32*
2nd experimental group					
Erythrocytes, $\times 10^{12}/l$	4.52 \pm 0.07	4.78 \pm 0.06*	4.96 \pm 0.09*	6.50 \pm 0.12*	7.06 \pm 0.09*
Hemoglobin, g/l	98.80 \pm 1.07	99.60 \pm 0.81*	95.60 \pm 1.29*	97.60 \pm 1.08*	99.80 \pm 1.16
Leukocytes, $\times 10^9/l$	7.04 \pm 0.18	14.80 \pm 0.10***	15.90 \pm 0.07***	14.32 \pm 0.24*	13.72 \pm 0.24*
* P<0.05; *** P<0.001.					

An increase in the number of erythrocytes and hemoglobin concentrations in the blood of the piglets of the experimental groups testifies to the activation of hemopoiesis against the background of intramuscular injection of the PigStim-C and PigStim-M immunotropic preparations in the early period of postnatal ontogenesis.

The number of leukocytes in the blood of pigs of the 1st experimental group at the age of 14, 30, 60 and 90 days turned out to be higher than the control indicators by 11.8%, 25.3, 17.7 and 16.3%, and the 2nd experimental group - 12.0%, 25.8, 18.3 and 15.1% higher, respectively. It should be noted that the number of leukocytes in the experimental groups did not exceed the limits of physiological norms. Consequently, leukocytosis occurs, not exceeding physiological norms.

The differentiation of blood leukocytes of piglets is presented in table 3.

Basophils on the first day of life were absent in the blood of the pigs of all studied groups. In the blood of the first group of pigs at the 14-, 30-, 60- and 90-day-old age, the basophils were on 0.4%, 0.8, 0.8 and 0.8% more, and the 2nd experimental - on 0.6%, 0.8, 1.0 and 0.8% more respectively, rather than in the control.

The number of eosinophils in the blood of the piglets of the experimental groups was significantly lower than in the control, beginning at the age of 14 days. This fact is more pronounced in piglets of the second experimental group.

There were no significant differences in the proportion of young neutrophils in the experimental groups ($P>0.05$).

The relative number of stab and segmented neutrophils and monocytes was lower in the blood of the piglets of the experimental groups, beginning at the age of 14 days ($P < 0.05-0.001$) than in the control. Moreover, the most pronounced difference was observed in segmented neutrophils. So at the 14-, 30-, 60- and 90-day-old age in the blood of the pigs of the 1st experimental group, the relative number of segmented neutrophils turned out to be below the control indicator by 7.0%, 11.4, 10.2 and 6.4% and the 2nd experimental - by 5.8%, 10.6, 9.6 and 5.8%, respectively. It should also be noted that in the 1st and 2nd experimental groups, despite the apparent decrease in the share of segmented neutrophils from the total number of leukocytes, their number relative to all neutrophils increased in relation to the control group. Thus, there is a decrease in the number of neutrophils with a nuclear shift to the right.

Analysis of the relative number of lymphocytes indicates a significant ($P<0.001$) increase in their number in the first and second experimental groups, beginning at the age of 14 days. This index remained higher than the control group in the animals of the 1st group at 14, 30, 60 and 90-day-old age, respectively, by 11.4%, 13.0, 12.0 and 7.8%, and in animals of the 2nd test group - by 9.8%, 12.4, 10.4 and 7.2%, respectively. Therefore, the immunotropic preparations under test cause lymphocytosis in the blood of pigs.

Table 3 – Leukocyte formula of piglets

Group	age, days				
	1	14	30	60	90
Basophils, %					
Control	–	0.2±0.20	0.2±0.20	0.4±0.24	0.4±0.24
1 st experimental	–	0.6±0.24	1.0±0.32	1.2±0.20*	1.2±0.20*
2 nd experimental	–	0.8±0.20	1.0±0.32	1.4±0.24*	1.2±0.20*
Eosinophils, %					
Control	0.2±0.20	1.0±0.32	1.4±0.24	1.6±0.24	2.0±0.32
1 st experimental	0.2±0.20	0.2±0.20*	1.4±0.24	1.0±0.32*	0.8±0.37**
2 nd experimental	0.2±0.20	0.4±0.24*	1.2±0.20*	1.2±0.20*	1.2±0.37*
Young Neutrophils, %					
Control	0.6±0.24	0.8±0.20	0.6±0.40	0.8±0.37	0.8±0.20
1 st experimental	0.4±0.24	0.8±0.20	0.4±0.24*	0.8±0.37	1.0±0.32
2 nd experimental	0.6±0.24	1.0±0.32	0.6±0.24	1.0±0.32	0.8±0.37
Stub Neutrophils, %					
Control	10.8±0.37	6.8±0.37	3.0±0.45	3.0±0.45	3.0±0.45
1 st experimental	10.6±0.40	3.6±0.40***	1.4±0.24**	1.6±0.24**	2.4±0.24*
2 nd experimental	11.0±0.45	3.8±0.37***	1.6±0.24**	1.8±0.20**	2.2±0.20*
Segmented Neutrophils, %					
Control	37.6±0.40	34.2±0.58	33.8±0.58	37.8±0.37	42.2±0.37
1 st experimental	38.4±0.51	27.2±0.58***	22.4±0.51***	27.6±0.51***	35.8±0.37***
2 nd experimental	37.2±0.37	28.4±0.40***	23.2±0.37***	28.2±0.37***	36.4±0.40***
Lymphocytes, %					
Control	47.0±0.71	53.4±0.51	58.0±0.55	53.0±0.71	47.8±0.37
1 st experimental	46.6±0.51	64.8±0.37***	71.0±0.45***	65.0±0.55***	55.6±0.51***
2 nd experimental	47.2±0.66	63.2±0.37***	70.4±0.51***	63.4±0.51***	55.0±0.45***
Monocytes, %					
Control	3.8±0.37	3.6±0.24	3.0±0.32	3.2±0.37	3.8±0.37
1 st experimental	4.0±0.32	2.8±0.37*	2.4±0.24*	2.8±0.37*	3.2±0.37*
2 nd experimental	3.8±0.37	2.4±0.24***	2.0±0.32*	3.0±0.32*	3.2±0.20*

* P<0.05; ** P<0.01, *** P<0.001.

The results of studies of the nonspecific resistance of the piglets of the experimental groups against the background of the intramuscular injection of the PigStim-C and PigStim-M immunotropic drugs are shown in figures 1-3.

At the age of 14 days, the phagocytic activity of blood neutrophils in piglets of the 1st and 2nd experimental groups was higher than the control index by 4.8 and 5.6%, respectively, at the 30-day age by 5.0 and 5.4% in the 60-day age - by 3.8 and 4.2% and at 90-day age - by 5.8 and 6.4%, respectively.

Bactericidal activity of blood serum of pigs of experimental groups did not have significant differences at 1-day-old age. However, already at the age of 14 days, it was significantly higher than the control index by 3.6 and 3.4% in piglets of the first and second experimental groups, respectively. At the 30-, 60- and 90-day-old age, the bactericidal activity of the blood serum of the first group was above the control value by 6.2, 8.4 and 8.6%, and in piglets of the second test group - by 6.6, 7.8 and 9.2% respectively.

Lysozyme activity of the blood plasma of the piglets from experimental groups had significant differences between the 14-day-old age and the end of the observation period.

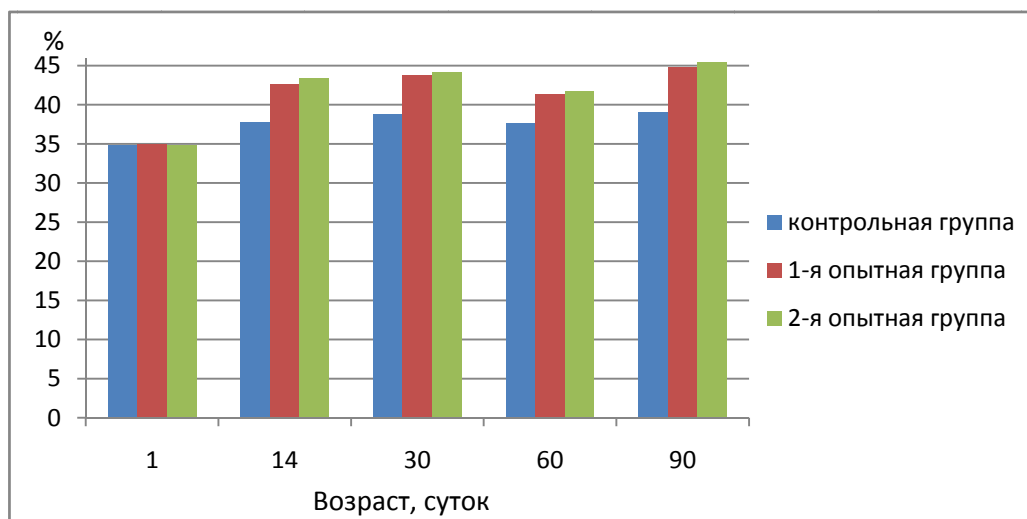


Figure 1 – Phagocytic activity of blood neutrophils in piglets

Thus, at the age of 14 days, the lysozyme activity of the blood plasma of the piglets of the control group was lower than in the first and second experimental groups by 4.8 and 4.0%, respectively, at the 30-day-old age - 6.2 and 5.4%, at 60-day-old age - 7.4 and 7.2%, at the 90-day-old age - by 8.6 and 8.0%. Thus, the results of an immunological study of blood indicate that intramuscular injection of the PigStim-C and PigStim-M immunotropic preparations in pigs in the early period of postnatal ontogenesis promotes activation of cellular and humoral factors of nonspecific resistance of the organism. It should be noted that PigStim-C has a more pronounced stimulating effect on the phagocytic activity of neutrophils and bactericidal activity of serum, and PigStim-M - on lysozyme activity of blood plasma.

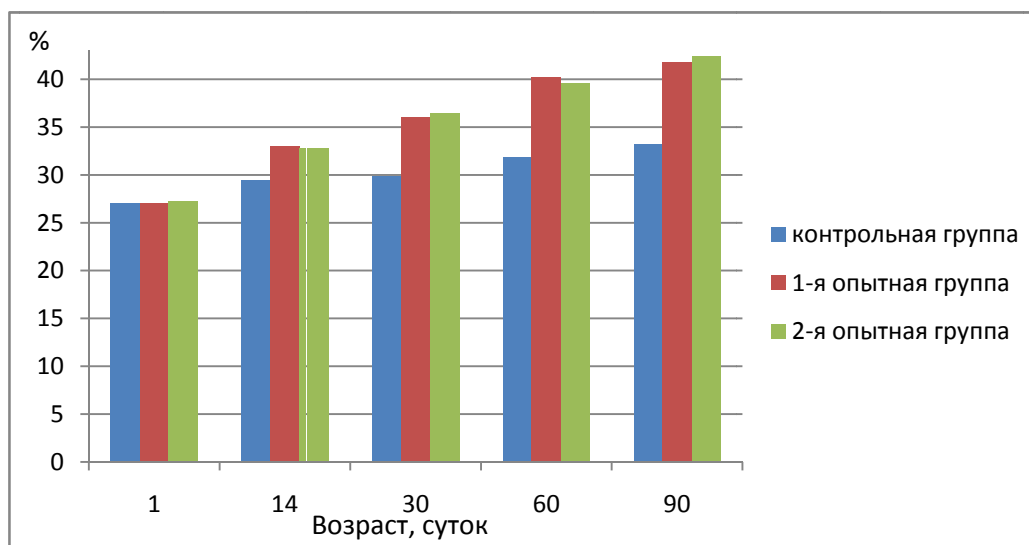


Figure 2 – Bactericidal activity of blood serum of piglets

During the experimental period, cases of diseases occurred in different periods of sowing, weaning and fattening among animals of all groups.

In the periods of newborn and suckling, diseases characterized by diarrhea of non-infectious etiology were predominantly recorded (table 4).

Diseases occurred without an increase in body temperature, pronounced anorexia and hypodynamia. Therapy for emerging diseases was carried out using adopted in the farm complex methods using antibacterial drugs of broad-spectrum.

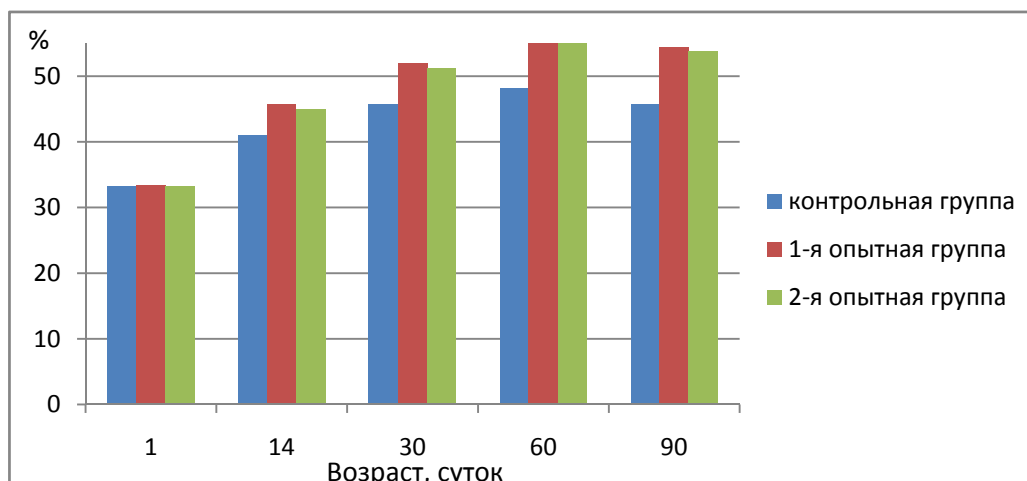


Figure 3 – Lysozyme activity of blood plasma of piglets

As can be seen from table 4, among the piglets of the control group, 26 cases of diseases were recorded during the period of the newbornness and suckling, while therapy at the occurred diseases was successful only in 24 cases, 2 pigs fell from exhaustion and dehydration as a result of diarrhea of non-contagious etiology. In the 1st experimental group, 11 diseases of piglets were recorded, 10 of them were cured and 1 died, and in the 2nd test group - 9 cases of diseases of piglets, all of them were cured. The average duration of diseases of the piglets of the control group was 1.96 days, in the first group - 1.55 days, and in the 2nd group - 1.67 days. The incidence of piglets of the 1st and 2nd test groups was lower by 30 and 34%, respectively, besides, the index of the effectiveness of therapeutic measures and the safety of piglets were significantly improved.

Table 4 – Morbidity and safety of piglets during newbornness and suckling

Index	Group of animals		
	control	1 st experimental	2 nd experimental
Number of piglets	50	50	50
Sicken	26	11	9
Recovered	24	10	9
Fell	2	1	–
Duration of diseases, days	1.96	1.55	1.67
Safety, %	96.00	98.00	100.00

Among the diseases of weaners (table 5), the leading role was occupied by edematous disease, accompanied by symptoms of reddening and edema of the eyelids, conjunctivitis, watery outflow from the eyes, and worsening of the overall clinical condition, manifested by the shakiness of gait, refusal of feed and water. Therapy in the emergence of diseases was performed immediately at the first clinical signs, before the appearance of symptoms of the nervous system, generally accepted in the veterinary treatment regimens. As well as in the suckling period, among the weaners, there were cases of diseases with symptoms of diarrhea of non-contagious etiology. In addition, in the weaning period, in the piglets, there were recorded single cases of other diseases, for example, arthritis.

Among the weaners of the control group, 14 cases of non-infectious etiology were registered, therapy in 13 of them was successful with a total duration of disease of 2.43 days, one weaner fell. In the first experimental group, 7 cases of diseases were recorded, all of them were successful, and the average duration was 1.86 days. In the 2nd experimental group, 5 diseases of piglets were recorded, all of which were cured on average after 2.00 days. Thus, the use of immunotropic drugs contributed to the decrease in the number of diseases of pigs during the weaning period by 2.0-2.8 times, and their duration by 0.43-0.67 days.

Table 5 – Morbidity and safety of weaners

Index	Group of animals		
	control	1 st experimental	2 nd experimental
Number of piglets	48	49	50
Sicken	14	7	5
Recovered	13	7	5
Fell	1	–	–
Duration of diseases, days	2.43	1.86	2.00
Safety, %	97.92 94.00*	100.00 98.00*	100.00 100.00*
* Safety for all previous periods.			

Among the diseases of young pigs of all three groups during the fattening period, the most frequent were bronchitis, which manifested itself as a cough without raising the body temperature and worsening the overall clinical state (table 6). Also, the diseases with signs of joint damage were common. Therapy in the emerged diseases was carried out by conventional methods in veterinary medicine and methods of treatment accepted in this farm.

Table 6 – Incidence and safety of pigs on fattening

Index	Group of animals		
	control	1 st experimental	2 nd experimental
Number of piglets	47	49	50
Sicken	12	7	8
Recovered	12	7	8
Fell	–	–	–
Duration of diseases, days	3.25	2.86	2.88
Safety, %	100.00 94.00*	100.00 98.00*	100.00 100.00*
* Safety for all previous periods.			

During the fattening period, among the pigs of the control group, there were 12 cases of diseases, in the first experimental group - 7, and in the 2nd experimental group - 8. The average duration of the diseases of the young animals was 3.25 days in the control group, 2.86 days in the 1st experimental and 2.88 days - in the 2nd experimental group. In this case, therapy for all cases of disease was effective and mortality was not registered.

Thus, based on the analysis of the incidence and safety of pigs during the periods of newbornness, suckling, weaning and fattening, it is established that intramuscular administration of PigStim-C and PigStim-M immunotropic drugs to piglets in the early period of postnatal ontogenesis reduces the number of diseases, shortens healing time and increases the effectiveness of therapeutic measures, and also increases safety.

During the test period, at the age of 30, 60, 90, 120, 150, 180 and 210 days, the pigs of all three groups were weighed. Individual assessment of the live weight of individuals was not carried out, each group of pigs was subjected to weighing with the subsequent determination of the average weight by mathematical means (table 7).

As can be seen from the presented table, the live weight of pigs of all three groups, having the same values at birth, systematically increased until the end of the experimental period. Thus, the live weight of the pigs of the control group at the age of 210 days was equal to an average of 103.79 kg in the group. The live weight of the pigs of the 1st experimental group at the end of the fattening period was found to be on the average 110.92 kg in the group, which is 7.13 kg or 6.87% more than the control index. The live weight of the pigs of the 2nd group also turned out to be 8.55 kg or 8.24% higher than the control value, and the average for the group was 112.34 kg.

Table 7 – Dynamics of pig growth

Age	Group of animals		
	control	1 st experimental	2 nd experimental
Live weight, kg			
1	1.00	1.00	1.00
30	6.59	7.02	7.09
60	15.23	16.23	16.46
90	26.84	28.65	29.02
120	41.81	44.61	45.22
150	59.32	63.42	64.20
180	79.94	85.50	86.58
210	103.79	110.92	112.34
The average daily gain of live weight, g			
1-30	186	201	203
30-60	288	307	312
60-90	387	414	419
90-120	499	532	540
120-150	584	627	633
150-180	687	736	745
180-210	795	847	859
1-210	489	523	530

The average daily live weight gain of pigs of the 1st and 2nd experimental groups was higher than the control indices. Thus, the indicated index of pigs of the 1st group for the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th months of growth was higher than the control one by 15 g, 19, 27, 33, 43, 49 and 52 g, and in the pigs of the 2nd group, at the same time, by 17 g, 24, 32, 41, 49, 58 and 64 g, respectively. The average daily growth in the pigs of the 1st and 2nd experimental groups on average for all periods of sowing, weaning and fattening were above the control index on 34 and 41 g.

Consequently, the use of PigStim-C and PigStim-M immunotropic preparations in the early postnatal ontogenesis for pigs contributes to their more intensive growth during periods of sowing, weaning and fattening.

At the age of 210 days the control slaughter of five pigs from each group was carried out. Slaughter of animals was made in the slaughterhouse of the meat processing enterprise Shaleeva O.V. SP., 4a, Sovkhoznaya, str., Ishlei village, Cheboksary district, Chuvash Republic, according to the rules of veterinary inspection of slaughter animals and veterinary and sanitary examination of meat and meat products.

According to the results of control pigs slaughter (table 8), it was revealed that the slaughter yield in the pigs of the control group was 67.83%, with an average mass of carcass of 70.4 kg. The slaughter weight of the pigs of the 1st and 2nd test groups averaged 76.62 and 77.48 kg, which is 6.22 and 7.08 kg higher than the control index.

Table 8 – Meat productivity of pigs

Index	Group of animals		
	control	1 st experimental	2 nd experimental
Preslaughter weight, kg	103.79	110.92	112.34
Absolute gain, kg	102.79	109.92	111.34
Average daily gain, g/day	489	523	530
Slaughter weight, kg	70.4±0.28	76.62±0.48	77.48±0.62
Slaughter yield, %	67.83	69.08	68.97

In addition to the absolute increase in the slaughter weight of pigs against the background of the use of immunotropic drugs, they also increased the slaughter yield. Thus, the slaughter yield in the pigs of the 1st and 2nd groups was 69.08 and 68.97%, which is 1.25 and 1.14% higher than the control index.

The muscular tissue of all the examined carcasses was well developed, especially on the dorsal and hip parts, the fat was mostly white, in some carcasses had a pale pink hue. The mass of carcasses of pigs of all groups was in the range from 39 to 98 kg inclusive, and the thickness of the lard over the spinous processes between the 6th and 7th thoracic vertebrae was in the range of 1.5 to 4.0 cm, not counting the thickness of the skin. Therefore, according to GOST 7724-77 "Meat. Pork in carcasses and half carcasses, "pork derived from animals of all study groups should be classified as Category II (young meat).

After separation of the carcasses into halves and cooling in the refrigerator at a temperature of -3...-5 °C and an airspeed of 1 to 3 m/s for 10 to 13 hours, the pork on the bones obtained from all three groups was directed to the boning and lining. The results of boning and pork are presented in table 9.

Table 9 – Debarking and lining of pig half carcasses

Index	Group of animals		
	control	1 st experimental	2 nd experimental
Weight of the chilled half carcasses, kg	34.74±0.13	37.78±0.24	38.22±0.31
trimmed pork, kg	21.65	23.53	23.81
Lard, kg	4.93	5.36	5.43
Skin, kg	2.36	2.57	2.60
Ribs for smoking, kg	3.13	3.40	3.44
Tendons, cartilages, kg	0.66	0.72	0.73
Technical cleaning and losses, kg	0.07	0.08	0.08
Bone, kg	1.95	2.12	2.14

Half-carcasses from all three groups corresponded to the hygienic requirements for safety and nutritional value of slaughter animals meat. So, on all the samples a crust of drying of a pale pink color was well pronounced. The muscles on the incision were wet to the touch, but they did not leave a wet spot on the filter paper, the color corresponded to benign pork and was from light pink to red. The consistency of the meat was elastic, the fossa formed when pressing with a finger, quickly formed up. The smell was specific, peculiar to pork. The fat was mostly white in color, sometimes pale pink. Consistency is soft, elastic. Tendons were dense, elastic, with a smooth, shiny articular surface.

As can be seen from the presented table, the boning and trimming of carcasses did not reveal a significant increase in the yield of individual components, but at the same time, the amount of trimmed pork significantly increased. Thus, the mass of chilled half-carcasses in the skin, with a cut, without pots and without legs of the pigs of the 1st and 2nd experimental groups, was more than the control half-carcass weight by 3.04 and 3.48 kg. In this connection, it is quite understandable that the amount of trimmed pork obtained from the pigs of the experimental groups has also increased. Thus, the amount of trimmed pork obtained from half carcass of the pig of the 1st group was 1.88 kg more than the control index, and the 2nd group by 2.16 kg. In addition, the half carcass of the 1st and 2nd groups increased the amount of lard obtained by 0.43 and 0.50 kg, and the ribs for smoking - by 0.27 and 0.31 kg, respectively. In connection with the increase in the live weight and, correspondingly, the mass of the half carcasses of the pigs of the experimental groups, the amount of skin, tendons and cartilages, bone and technical losses obtained has also increased.

After boning, the content of basic nutrients and the energy value of medium samples of trimmed pork were determined (table 10).

As can be seen from the table, the content of basic nutrients and the energy value of pork of all three groups also corresponded to the category II pork. However, it should be noted that the protein content was significantly higher in the meat in experimental groups. Thus, the protein content in 100 g of pork of the 1st group was higher than the control value by 0.50 g, and the second one by 0.66 g. In addition, in the meat of the pigs of the experimental groups, there was a lower fat content, 1.92 g in the 1st experimental

Table 10 – Content of basic nutrients and energy value of pork

Index	Group of animals		
	control	1 st experimental	2 nd experimental
Water, g in 100 g of pork	52.51±0.11	52.84±0.22	52.62±0.48
Proteins, g in 100 g of pork	14.32±0.08	14.82±0.17*	14.98±0.16**
Fats, g in 100 g of pork	33.32±0.13	31.40±0.10***	31.46±0.46***
Ash, g in 100 g of pork	0.96±0.04	0.94±0.04	0.94±0.05
Energy value, kcal per 100 g of pork	356.40±2.29	360.20±1.24	359.40±2.25
* P<0.05; ** P<0.01, *** P<0.001.			

and 1.86 g in the 2nd experimental group. The difference in the energy value of pork from the three groups was statistically unreliable.

In such a way, it can be concluded that intramuscular injection to piglets in the early period of the postnatal ontogeny of the PigStim-C and PigStim-M immunotropic preparations promoted an increase in their meat productivity. Thus, from the pigs of the experimental groups, a greater amount of meat was obtained, both on bone and trim, in addition, in the meat of the pigs of the experimental groups, the protein content significantly increased and the fat content decreased.

Discussion. Essential influence on the productive qualities of pigs is provided by the conditions of keeping and feeding, and the development of pig production should mean the development and introduction into the production process of effective technologies for keeping, feeding and maintenance of animals that increase productivity, improve the quality of the received products and the profitability of the industry as a whole. But often in practice, new developments and innovations violate the relationships of the pig's organism with the environment and the traditional conditions of keeping and feeding that have developed during phylogenesis. Under such conditions, negative environmental factors are constantly acting on the organism of pigs, which leads to a disruption in metabolism, a decrease in organism resistance and, ultimately, a high incidence and low pork livestock.

In order to ensure the health, safety and increase in the productivity of pigs, modern scientists and practicing veterinarians recommend the use of a variety of biologically active substances. The modern veterinary pharmaceutical market offers a wide range of such products, but based on the analysis of the available literature on this subject, it can be concluded that the effectiveness of the proposed tools is inadequate. The main reasons for this are the lack of comprehensive action, high cost, the availability of restrictions on the use of products against their background, and others. At the same time, the immunotropic preparations such as PigStim-C and PigStim-M, developed by scientists of the Chuvash State Agricultural Academy V.G. Semenov, F.P. Petryankin and others.

This research work is devoted to the scientific and practical substantiation of the expediency of activating the nonspecific resistance of pigs with the PigStim-C and PigStim-M new immunotropic drugs in order to realize the bioresource potential of their organisms.

Against the backdrop of intramuscular injection of PigStim-C and PigStim-M in the early period of the postnatal ontogenesis, the increase in the number of erythrocytes and the increase in the concentration of hemoglobin in the blood of piglets from experimental groups is observed, which indicates the activation of hematopoiesis in their bodies.

Also, on the back of intramuscular injection of immunotropic preparations PigStim-C and PigStim-M, leukocytosis is observed, not exceeding physiological norms, with pronounced lymphocytosis amid a rise in the number of basophils and neutropenia with a nuclear shift to the right, and the analysis of the protein profile established a significant increase in serum piglets concentrations of total protein due to globulin, mainly γ -globulin fraction.

With the use of immunotropic drugs, cellular and humoral factors of the nonspecific resistance of the piglets are activated.

Analysis of the incidence and safety of pigs during periods of sowing, weaning and fattening at the pig breeding complex of Progress CJSC, revealed the effectiveness of PigStim-C and PigStim-M preparations in ensuring the health and safety of pigs. With their use, the number of diseases among piglets

decreased by 2.36-2.89 times during the sowing period, and their duration decreased by 14.8-20.9%. During weaning, the disease was 2.0-2.8 times less, and its duration was shorter by 17.7-23.5%. During the fattening period, the incidence decreased by 1.5-1.7 times, while the duration decreased by 11.4-12.0%. It should be noted that the safety of the pigs of the 1st and 2nd experimental groups was 98.0 and 100.0% with 94.0% of the piglets in the control group.

Live weight of pigs on the back of the use of the immunotropic preparations PigStim-C by the end of the fattening period was equal to the average for the group of 110.92 kg, which is 7.13 kg or 6.87% higher than the control value. Live weight of pigs against the background of PigStim-M also turned out to be larger than the control indicator, but by 8.55 kg or 8.24%, and the average for the group was 112.34 kg. The average daily weight gain of pigs on the background of immunocorrection with PigStim-C was higher than the control values for the 1st, 2nd, 3rd, 4th, 5th, 6th and 7th months of growth by 15 g, 19, 27, 33, 43, 49 and 52 g, and the immunotropic drug PigStim-M at the same time - by 17 g, 24, 32, 41, 49, 58 and 64 g respectively. The average daily gain of pigs on average for the entire period of the experiment increased by 34 and 41 g day. Consequently, the use of PigStim-C and PigStim-M immunotropic preparations in piglets in the early postnatal ontogenesis promotes their growth during periods of sowing, weaning and fattening.

According to the results of control slaughter, the slaughter yield in pigs with immunocorrection was higher than the control one by 6.22 kg with PigStim-C and 7.08 kg with PigStim-M. In addition to the absolute increase in slaughter weight against the background of the use of immunotropic drugs, the slaughter yield also increased by 1.25 and 1.14%, respectively.

The mass of chilled half-carcasses in skin, with a cut, without pots and without legs of pigs after application of the immunotropic preparations PigStim-C and PigStim-M was more than the weight of control half-carcasses by 3.04 and 3.48 kg. The amount of pork obtained from one half of the pig after application of PigStim-C was 1.88 kg more than the control value, and after applying PigStim-M - by 2.16 kg. From half carcasses of the pigs subjected to immunocorrection, the amount of the obtained lard increased by 0.43 and 0.50 kg and the edges for smoking by 0.27 and 0.31 kg. In connection with the increase in the live weight and, correspondingly, the mass of the half-carcasses of the pigs of the experimental groups, the amount of skin, tendons and cartilages, bone and technical losses obtained has also increased.

A significant increase in the protein content and a decrease in the amount of fat in the pigs of experimental groups was detected. Consequently, the protein content in 100 g of pork of the 1st group was higher than the control value by 0.50 g, and the 2nd group - by 0.66 g, and the fat content was less by 1.92 g in the 1st experimental and by 1.86 g in the 2nd experimental group.

In such a way, it can be concluded that intramuscular administration of immunotropic drugs PigStim-C and PigStim-M to piglets in the early period of the postnatal ontogeny promoted an increase in their meat productivity. Thus, from the pigs of the experimental groups, a greater amount of meat was obtained, both on bone and trim, in addition, in the meat of pigs of experimental groups, the protein content significantly increased, and the fat content decreased.

Conclusion. The conducted research work confirms the expediency of immunological correction of the piglets in the early period of postnatal ontogenesis with immunotropic preparations PigStim-C and PigStim-M in order to realize the bioresource potential of their organisms. Against the backdrop of the triple intramuscular injection of immunotropic drugs, with an interval of three days on the 1st, 4th and 7th day of life at a dose of 0.3 ml per head, there is a significant increase in growth rates, and the safety of young animals, the amount of pork obtained increases, in the absence of a negative effect on the clinical and physiological state of the pig's organism and the sanitary quality of the products.

Withdrawal

1. The microclimate parameters in the premises for keeping pigs during the periods of sowing, weaning and fattening were within the limits of zoohygienic norms according to RD-APK 1.10.02.04-12 and satisfied the biological needs of the corresponding age group of animals.

Pigs feeding was carried out by balanced mixed fodders based on a grain mixture of own production and concentrates produced by Premikorm OOO.

2. Developed immunotropic drugs do not have a negative effect on the clinical and physiological state of the pig's organism, ensure the health and safety of pigs.

The use of PigStim-C and PigStim-M contributed to a 1.5-2.9 times decrease in the number of diseases and a reduction in the recovery period by 11.4-23.5%. The increase in the safety of pigs in the 1st and 2nd experimental groups up to 98.0 and 100.0% at 94.0% in the control was established.

3. The immunotropic preparations PigStim-C and PigStim-M activate hemopoiesis, causing a positive dynamics of hematological and biochemical profiles of pigs in ontogeny.

After the application of these immunotropic drugs, there is a significant increase in the number of erythrocytes by 5.1-7.6% and 5.7-8.8% and as well as hemoglobin concentration by 3.1-5.3% and 2.9-4.9%, respectively, and leukocytosis, which does not exceed physiological norms with pronounced lymphocytosis against the background of the increase in the number of basophils and neutropenia with a nuclear shift to the right. The increase in the amount of total protein in the blood serum by 2.3-4.0% and 1.9-4.7% was due to activation of the production of globulins, predominantly the γ -globulin fraction of the protein, against the background of immunocorrection of the body with PigStim-C and PigStim-M preparations.

4. The use of immunotropic drugs in the early period of postnatal ontogenesis of pigs activates cellular and humoral factors of nonspecific defense of the organism in industrial technology: phagocytic activity of neutrophils - by 3.8-5.8% and 4.2-6.4%, bactericidal activity of blood serum - by 3.6-8.6% and 3.4-9.8%, lysozyme activity of blood plasma - by 4.8-8.6% and 4.0-8.0%.

5. Immunocorrection of piglets in the early period of postnatal ontogenesis with the immunotropic drugs promotes the realization of the bioresource potential of meat productivity.

The veterinary and sanitary examination established that the PigStim-C and PigStim-M immunotropic preparations do not adversely affect organoleptic, biochemical and spectrometric parameters of pork, and ensure its good quality.

It was found that the animals of the 1st and 2nd experimental groups outperformed their peers in control in live weight by 7.1 kg or 6.9% and by 8.6 kg or 8.2%, the average daily gain - by 34 and 41 g.

The slaughter yield of pigs against the background of immunocorrection with PigStim-C and PigStim-M was higher by 6.22 kg and 7.08 kg, rather than in the control.

According to the results of boning and trimming of the half-carcasses of pigs in the experimental groups, an increase in the amount of trimmed pork on 1.88 and 2.16 kg in the 1st and 2nd experimental groups was found in comparison with the control.

A significant increase in the protein content by 0.50 and 0.66% was found and a decrease in the amount of fat by 1.92 and 1.86% in the pigs of experimental groups was revealed.

Recommendations. With the aim of realizing the bioresource potential of pigs in industrial pig breeding, we recommend:

1. Newborn piglets intramuscularly, three times on the 1st, 4th and 7th day of life, to inject the immunotropic drug PigStim-C in a dose of 0.3 ml per head.

2. Piglets to intramuscularly inject the immunotropic drug PigStim-M at a dose of 0.3 ml per head three times at intervals of three days on the 1st, 4th and 7th day of postnatal ontogenesis.

The choice of the immunotropic drug should be carried out on the basis of pharmacological features, taking into account the clinical and physiological state of the piglets and the epizootological situation.

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ШОШҚА ӨНІМДІЛІГІНІҢ ПОТЕНЦИАЛЫН ІС ЖҮЗІНЕ АСЫРҒАНДА ЖАҢА ИММУНОТРОПТЫҚ ПРЕПАРАТ ОРГАНИЗМНІҢ ЕРЕКШЕ ҚОРҒАНЫСЫН БЕЛСЕНДЕНДІРЕДІ

Аннотация. Шошқа өсіретін кешенінің жағдайында жаңа туылған торайлардың биоресурстық өнімділік әлеуетін іске асыру мақсатында PigStim-C және PigStim-M иммунотропты препараттардың тиімділігін бағалау жүргізілді. PigStim-C және PigStim-M иммунотропты препараттары ағзаның клиника-физиологиялық жағдайына кері әсер етпейтіні, шошқалардың денсаулығы мен сақталуын қамтамасыз ететіні анықталды. Торайлар организмін иммунокоррекциялау барысында сырқаттардың 1,5-2,9 есе азайғаны, сауығу мерзімінің 11,4-23,5% қысқаруы, сандық сақталуы 98,0-100,0% дейін жоғарлады. Иммунотропты препараттарды қолдану шошқаның ерте онтогенез барысында ағзаның спецификалық емес жасушалық және гуморальдық қорғаныш факторларын активациялайды. Өндірістік технология жағдайларында: нейтрофилдердің фагоцитарлық белсенділігі – 3,8-5,8% және 4,2-6,4%, қан сарысуының бактерицидті белсенділігіне – 3,6-8,6% и 3,4-9,8%, қан плазмасының лизоцимді белсенділігіне – 4,8-8,6% и 4,0-8,0%. Торайлар организмін ерте онтогенез мерзімінде PigStim-C және PigStim-M иммунотропты препараттармен иммунокоррекциялау ет өнімділігіне оң әсер етеді. Бақылау тобымен салыстырғанда, 1 және 2 тәжірибиелі топтың жануарлары тірі салмақ бойынша олардан 7,1 кг немесе 6,9% және 8,6 кг немесе 8,2% басым болды, Орта тәуліктік өсім 34 және 41 г екендігі анықталды. Иммуноактивтеу аясындағы шошқаның салмағы бақылаудан 6,22 және 7,08 кг жоғары болды. Бақылаумен салыстырғанда, 1 және 2 бақылау топтарының сойыс шығымдары жоғары.

Түйін сөздер: шошқа, иммунотроптық препараттар PigStim-C және PigStim-M, иммунитет, ауру және қауіпсіздік, өнімділік.

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АКТИВИЗАЦИЯ НЕСПЕЦИФИЧЕСКОЙ ЗАЩИТЫ ОРГАНИЗМА НОВЫМИ ИММУНОТРОПНЫМИ ПРЕПАРАТАМИ В РЕАЛИЗАЦИИ ПОТЕНЦИАЛА ПРОДУКТИВНОСТИ СВИНЕЙ

Резюме. В условиях свиноводческого комплекса проведена оценка эффективности применения иммунотропных препаратов PigStim-C и PigStim-M новорожденным пороссятам с целью реализации биоресурсного потенциала продуктивности. Установлено, что иммунотропные препараты PigStim-C и PigStim-M не оказывают негативное влияние на клинико-физиологическое состояние организма, обеспечивают здоровье и сохранность свиней. На фоне иммунокоррекции организма поросят отмечено снижение количества заболеваний в 1,5-2,9 раза, сокращение сроков выздоровления на 11,4-23,5%, повышение сохранности поголовья до 98,0-100,0%. Применение иммунотропных препаратов в раннем периоде постнатального онтогенеза свиней активизирует клеточные и гуморальные факторы неспецифической защиты организма в условиях промышленной технологии: фагоцитарной активности нейтрофилов – на 3,8-5,8% и 4,2-6,4%, бактерицидной активности сыворотки крови – на 3,6-8,6% и 3,4-9,8%, лизоцимной активности плазмы крови – на 4,8-8,6% и 4,0-8,0%. Иммунокоррекция организма поросят в раннем периоде постнатального онтогенеза иммунотропными препаратами PigStim-C и PigStim-M способствует реализации биоресурсного потенциала мясной продуктивности. Установлено, что животные 1-й и 2-й опытных групп превосходили сверстников в контроле по живой массе на 7,1 кг или 6,9% и на 8,6 кг или 8,2%, среднесуточному приросту – на 34 и 41 г. Убойная масса свиней на фоне иммунокоррекции оказалась выше контрольного на 6,22 и 7,08 кг. По результатам обвалки и жиловки полутуш свиней подопытных групп установлено увеличение количества жилованной свинины на 1,88 и 2,16 кг в 1-й и 2-й опытных группах по сравнению с контролем.

Ключевые слова: свиньи, иммунотропные препараты PigStim-C и PigStim-M, иммунитет, заболеваемость и сохранность, продуктивность.

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MANAGEMENT IN THE AGRO-INDUSTRIAL COMPLEX

Abstract. In the article, the agro-industrial complex is viewed as a complex socio-economic system. The need for improving management at the macro, meso and micro levels based on the use of marketing management tools that are most adapted to market laws is substantiated. One of the difficult economic tasks in Kazakhstan's modern financial policy is to maintain the pace of economic development in the face of global financial instability. This article deals with the problems of state financial regulation of the agro-industrial complex of the Republic of Kazakhstan in recent years. It is noted that the strategic importance and specific features of agriculture require the development of special approaches to the management of this industry, its investment at the regional level. The main task of state regulation of the economic development of the industry is the investment development of agricultural production, as investment growth is one of the main factors contributing to the rise of agro-industrial production, solving the problems of updating the regional technical and technological base, deterioration of fixed assets in agriculture, ensuring sustainable development of the agricultural sector of the economy. The analysis of the main sources of the primary incomes of the enterprises of agriculture, forestry and fisheries in Kazakhstan for 2010-2015 is carried out. Proposals are given on further improvement of the state financial regulation of the republic's agro-industrial complex.

Keywords: socio-economic system, agroindustrial complex, marketing, management, management methods, marketing-management.

Awareness of the importance of agrarian policy in the modern economy was reflected in the next President Nazarbaev's Message from January 10, 2018 "New Opportunities for Development under the Conditions of the Fourth Industrial Revolution" which noted that agrarian policy should be aimed at dramatically increasing labor productivity and increasing exports of processed agricultural products [1]. All this will require the technical re-equipment of agricultural production, the modernization of modern technologies, the use of advanced technologies, and therefore require significant infusion of financial resources into the industry.

During the period of economic reform in the agrarian and industrial complex of the Republic of Kazakhstan the foundations for the development of a multistructure economy, socio-economic transformations in property relations were laid, the corresponding legislative base was created, as evidenced by numerous studies of Kazakhstani authors: Kaliyev G.A., Khan Yu.A., Alenova K.T., Nurumov A.A., Nitalina, G.K., Utibaeva G.B. and other scholars of agrarians and economists [2-7].

Although in recent years there has been an increase in the production of agricultural products at the same time the level of efficiency of the industry is still insufficient. The agricultural production of the country remains still small-scale and technologically backward. Problems in the agrarian sphere are further aggravated by Kazakhstan's accession to the WTO [8].

Formation of working capital in agro-industrial production also has some features. It is necessary to keep large reserves for a long time since the production cycle here is sufficiently large. The seasonal nature of agricultural production causes sharp fluctuations in the volume of circulating production assets for the periods of the year which calls for borrowing [9]. The problems of financing that arise in agro-formations can be solved by attracting additional financial resources. Financial resources (profits,

subsidies and compensations, investments, insurance, credit resources) in the system of reproduction in the industry and at the enterprise level are beginning to play an increasing role. However, at the present stage of development they do not provide sustainable economic growth [10].

The complex system is the system consisting of many closely connected subsystems, possessing several types of a straight and reverse connections and numerous channels of interaction with environment.

The most common definitions which are found in economic literature: "the system is a set of the structurally and functionally united elements in that way to ensure achievement of some purposes in the given multitude of conditions at limited resources and time"[11]; "the system is a set of the elements which are in relations and communications with each other that forms integrity, unity" [12]. The given definitions emphasize such feature of system as interrelation and interdependence of all its elements. In this research agro-industrial complex (AIC) is considered as such complex system. The agro-industrial complex is complicated, probabilistic, dynamic economic system which is part of higher order socio-economic system covering processes of production, an exchange, distribution and consumption of material benefits. The AIC meets perfectly the criteria characterizing system and can be studied from positions of the systems theory. If AIC is considered from the material and industrial point of view, its entrance are material streams of natural and production resources, an exit - material streams of consumer goods. The special place in agro-industrial complex belongs to agriculture. Modern agricultural production can't be presented segregated, isolated, developing and functioning out of national economy. In real life it is based on the intersectoral production cooperation connecting agriculture and branches, which provide agriculture with means of production; processing agricultural raw materials and carrying the food ready to consumption to the consumer. Formation of AIC is connected with considerable deepening and expansion of technological and functional communications of agriculture with other branches of national economy. The agriculture provides with raw materials the food industry, forms stocks for domestic market and resources for export. Providing population employment, the agriculture carries out also social function, creates preconditions for increase of a standard of living in the village, is responsible for preservation of fertility and quality of lands, ecology of territories on which carries out economic activity, ensures food safety and economic independence of the country.

As a result of carried-out reforms in the Kazakhstan agro-industrial complex there were essential social and economic transformations: considerably managing conditions changed, the food market was created, as a result of processes of privatization and privatization there was a transformation of the relations of property which as a result led to emergence of various forms of managing and creation of multistructure economy, the farmer sector was created, are privatized food and processing industry, wholesale and retail trade, infrastructure branches. However expected efficiency of market transformations in agrarian sector wasn't reached that is connected, first of all, with insufficient development of carried-out reforms from positions of new market realities.

The analysis of the last researches and publications on a considered problem. Questions of improvement of management on the basis of the marketing concept are widely taken up in works of foreign and domestic scientists: F.Kotler, E.Golubkov, G. Bagiyev, B. Solovyev, G. Kaliyev, T.Espolov, etc. The agro-industrial complex represents the difficult system, being characterized instability of development and stochastic (probabilistic) nature of occurring processes. The effective mechanism of management of agrarian and industrial complex demands the accounting of features of development of agrarian sector, first of all, agriculture: dependence from prirodno-climatic factors, high entrance barriers on the market, interfering competition development, backwardness of the competitive environment, unfairly large number of administrative and legal restrictions for development of agrarian business, etc. Meanwhile, researches of market conditions in the domestic and foreign food markets, the administrative decisions based on market researches and the accounting of competitive advantages, accurate definition of the priority directions of development, etc. will allow to gain synergetic effect and will ensure food safety and sustained economic growth.

Essence research marketing management, consideration of its conceptual bases that assumes consideration of the main categories forming the concept marketing management: the main to idea, purposes, tasks.

As a result of the 90th years of reforms spent since the beginning in this strategically important sector of economy, as well as in all agro-industrial complex of the country, there was a sharp decrease in volumes and economic efficiency of production. The livestock of animals was significantly reduced, the genetic and production capacity of branch collapsed, the competition became aggravated from sharply increased import, the gap in productivity and efficiency indicators in comparison not only with the developed countries, but neighbors in the CIS increased.

To restore the broken reproduction processes, to overcome lag from the developed industrial countries to reduce dependence of the country on food import, to provide competitiveness and stability of domestic agrarian and industrial complex probably only having reoriented agrarian and industrial complex branches on a market way of development which will allow to increase production efficiency.

Having analyzed tendencies of development of conceptual bases marketing management on the basis of the created methodical approaches to its studying, tendencies of development of theoretical representations, it should be noted that process of improvement traditional and search of new methods of management by market activity of the agroenterprise took place a number of stages of movement from production, commodity and marketing orientation to orientation to marketing. Now strategy and instruments of marketing develop in several directions adapting them for new reality and modern features of economy. There are additions to the marketing, the new concepts which are overstepping the bounds of axioms of classical marketing. The general tendency of this development consists that the market mechanism is more, than before, forces to pay attention to the consumer. Formation of marketing of relationship is connected with it, from our point of view. As a result of convergence of the concepts "marketing" and "management" there was a category "marketing management".

Any concept is formed on the basis of the main idea. Idea formulation – a fundamental problem of business unit, as idea - a reflection form in thought of the phenomena of objective reality. including consciousness of the purpose of further development of business process and generalizing last experience.

The main idea of marketing management is an idea of human needs and requirements, their maximum satisfaction. So, Bagiyev G. L. marketing management as system of the main ideas, tools and the analysis of business activity and environment, formation of strategy and control, approach to management which allows to reach the organization goals at the expense of full orientation to needs of the consumer and most their full satisfaction defines the concept. In the conditions of the growing competition, globalization of the markets marketing management becomes the activity, capable to provide steady competitive advantages of the enterprise in the market. The firms focused on marketing on a constant basis carry out the environment analysis, market researches, the forecast of the market and enterprise opportunities, development of the purposes and strategy of behavior of firm in the market, planning of marketing activity for specifically current situation, development of a complex of marketing and actions for the organization, management, control and an assessment of results of marketing activity.

The concept of marketing management is based on dialectics of the purpose and means of its achievement. Marketing management is a main objective not simply sale and stimulation of sales, and demand management, i.e. "providing such level, and also time and nature of presentation of demand at which the achievement of the objectives, facing firm" [13], "creation and stimulation of new needs of buyers" [14] is possible. The majority of researchers incline to thought that receiving profit shouldn't be the only purpose of the organization. So, P. Druker considers "maximizing profit by the wrong concept" and suggests to consider as a main objective of the company its survival [15].

The purposes of the various domestic companies far aren't identical: survival, development, gain of a market share, etc. During the different periods they can be corrected by results of the marketing analysis of factors internal and environment and determination of competitiveness of firm, and also ways of its increase.

Studying of the purposes of the foreign companies in Kazakhstan showed that unlike the domestic companies they aspire, first of all, not to increase in profit, and to advance of the brands for the markets of Kazakhstan. Such approach to a goal-setting is represented to us to the most effective since positioning of the brand in the market provides long-term success in the target market and, therefore, steady demand and profit.

Effective management assumes realization, first of all, the corporate purposes of the organization therefore the purposes marketing – management shouldn't contradict the accepted corporate purposes. According to the corporate purposes the target directions of management of marketing are:

- the maximum satisfaction of requirements of the market at the expense of harmonization of outputs, processing and sales of goods and services;
- use of the latest technologies for ensuring growth of labor productivity, decrease in prime cost and increase in outputs;
- achievement of high financial results (decrease in expenses, profitable activity), thanks to marketing tools.

- increase in a market share;

Realization of the main idea marketing management is based on complex use of tools marketing – a mix. They allow to realize advantages of marketing approach, providing, on the one hand, compliance to requirements and opportunities of buyers i.e. satisfaction of solvent demand, with another – having direct impact on overall performance of the organization. Therefore the purposes marketing management can be concretized proceeding from requirements of the target market on elements of a complex of marketing.

Realization of marketing approach to management assumes use of a large number of various rules and procedures (principles). It is necessary to allocate main of them predetermining level of controllability and productivity by chosen firm of strategy.

Modern researchers in area marketing management Evans, E. Golubkov, V. Demidov, P. Zavyalov, B. Solovyev, etc. used the general principles of the management, developed A. Fayolem for formation of system of the specific principles of management by marketing. The main principle of marketing approach to management of the organization is target orientation of all elements of the production and social infrastructure serving this system, to the solution of the problems arising at the potential consumer of goods and services, offered in the market:

- orientation to needs of buyers;
- system approach (harmony) in planning, the organization, the accounting of all operating factors, interrelation of planned actions;
- systematicity (continuous integration process, phasing, coherence of stages);
- reversibility (gradualness, preliminary experimental verification of made decisions);
- market orientation of marketing activity of the enterprise to a changing environment;
- minimization of expenses, self-sufficiency and self-supporting development;
- unity of strategy and tactics for achievement of the planned result;
- the most detailed and objective control of all marketing actions.

It is represented to us that as the major it is necessary to add this list with the principle of harmonization of the corporate and marketing purposes, their hierarchical sopolochinennost. This principle has to dominate in SES management. The called principles are directed on ensuring efficiency of market activity of any company. Thus the exit to positive results of business, its social orientation are caused by formation of the marketing concept of business management.

As a result of research we studied structural elements marketing management: the main ideas, the purposes, realized functions, productivity of introduction. Studying of various approaches to business management allowed us to give the comparative characteristic of traditional and marketing approaches to management, having marked out advantages and shortcomings of each of them with table.

The most common aggregate functions of management inherent in any type of management, marketing management realizes the functions of goal-setting, planning, organization, coordination and control.

Under current conditions, there are different approaches to goal setting. Particular importance to the development of goal-setting gained marketing theory. According to F. Kotler main marketing goal – to provide quality goods and services to consumers [16]. The challenge is to link the economic goals of the company and its capabilities (industrial, intellectual, physical and financial) and the requirements of the market. Goal setting in a market – the process flexible, subject to the influence of various factors. So, if there is a strong dependence on some external factor, the need to develop alternative goals that would transform the external factors in the internal. For example, to not depend on the activities of logistics organizations or large trading network, you can create your own distribution center or network of shops, which will help relieve the tension between the company and the sales organization.

Comparison of activity of the agrarian enterprises with marketing orientation and the enterprises with traditional structure of management*

Traditional structure of management	marketing orientation	Orientation to marketing management
<i>At the top management on the first place</i>		
requirements of an agricultural producer	consumer needs	realization of strategic objectives and tasks of presence expansion in the market, to increase rezultativnost due to fuller satisfaction of needs of buyers
<i>The enterprise makes (sells)</i>		
that can make(sell)	only that is in demand in the market	along with the "old" range the new goods, form demand, and define the target market
<i>It is offered to the buyer</i>		
limited range of agrarian production	wide range of goods	the range created proceeding from systematic studying of demand in the agrarian markets
<i>The goal-setting is focused on the account</i>		
actions of internal factors	influences of the external marketing environment	strong and weaknesses and opportunities of the company and requirements of the market
<i>Management is based on</i>		
on development of short-term plans	on development of mainly long-term plans	on development of multiple development plans of business unit
<i>Market researches</i>		
have no systematic character	are carried out on a constant basis and are directed on studying of behavior of buyers of agricultural products, the analysis of competitors, intermediaries, etc. participants of the agrarian market	are focused more on demand formation, the prevention and prevention of possible risks
<i>Price strategy are developed</i>		
proceeding from expenses of agricultural producers (an expensive method)	depending on competition level	on the basis of integrity of process of pricing on all phases of reproduction and tactical factors
<i>Development of new goods is carried out</i>		
for the purpose of reduction of expenses, often, without requirements of the market of agrarian production	proceeding from requirements of the market and factors of the external and internal environment	for the purpose of achievement of competitive advantages and increase of efficiency of business
<i>In development of ideas of new goods</i>		
the leading part is assigned to technicians	the leading part is assigned to marketing specialists, managers, designers	all divisions of the agrarian enterprise at all levels of management participate
<i>Process of production provides</i>		
orientation, generally on possibility of production	production of best-selling goods (service)	possibility of fast reorientation to changing demand and other factors of the market
<i>Competitiveness is defined</i>		
proceeding from the revenue sum	by comparison of characteristics of similar goods	through a prism of the competition and opinions of consumers
<i>Management is generally focused</i>		
on use of standard schemes known from past experience and methods of response to already taken place events and changes in environment	on realization of strategy on a marketing complex	acceptance of "pro-active" measures on the basis of forecasting of possible changes in the external and internal environment of the enterprise
*Note were developed by authors.		

Management process is not limited to the formation of the main goals and find ways to achieve it, and includes the processes of coordination objectives, resources, control actions. Coordination is given a central place in the system of general management functions. According to Milner, B. Z. Coordination – the distribution of activities over time, providing interaction parts of the organization in order to implement the tasks facing the organization [17].

Hayek F., Schumpeter J. and I. Tahakara define coordination as the choice of ways of interaction between parent and child elements, which are in the process of modification functions or purposes and modification of the relationship between the objectives of [18-20]. From our point of view on issues of reconciling different levels leading role of marketing management. Marketing management as an integrating, the main function of management to coordinate the efforts of all parts of the firm, to make timely adjustments in the activities to the goals based on market research.

Thus, the creation of a competitive agricultural industry, from our point of view, depends on the improvement of management, in particular, implementation of the management of marketing approach. It is a marketing management company will be considered, as well as the entire system of agriculture not in isolation, but as a single system in which the harmonious relationship and interdependence of its elements ensure high performance of the system.

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АГРОӨНЕРКӘСІПТІК КЕШЕНІНДЕГІ МЕНЕДЖМЕНТ

Аннотация. Мақалада агроөнеркәсіп кешені күрделі әлеуметтік-экономикалық жүйе ретінде қарастырылады. Нарықтық заңдарға бейімделген жоғары дәрежеде маркетинг-менеджмент құралдарын пайдалану негізінде макро-, мезо- микродеңгейде басқарудың жетілдіру қажеттілігі негізделеді. Қазақстанның қазіргі қаржылық саясатының күрделі экономикалық міндеттерінің бірі әлемдік қаржылық тұрақсыздық жағдайда экономиканың даму қарқының ұстап тұру болып табылады. Мақалада соңғы жылдардағы Қазақстан Республикасының АӨК мемлекеттік қаржылық реттеу мәселелері айтылған. Аталып өткендей, ауыл шаруашылығының өзіндік ерекшеліктері мен стратегиялық маңыздылығы өңірлік деңгейде оны инвестициялаумен, осы саланы ерекше басқару тәсілдерін жасауды талап етеді. Экономикалық даму саласын мемлекеттік реттеудің басты міндеті ауыл шаруашылық өндірісін инвестициялық дамыту ретінде, өйткені инвестициялардың өсуі агроөнеркәсіптік өндірісті көтеруге ықпал ететін негізгі факторлардың бірі болып табылады, өңірлік техникалық және технологиялық базаны жаңарту мәселелерін шешу, ауыл шаруашылығындағы негізгі қорлардың тозуы, экономиканың агралық секторын тұрақты дамуын қамтамасыз ету. Қазақстанның балық шаруашылығына және орман, ауыл кәсіпорындарының бастапқы кірістерін қалыптастыру негізгі көздеріне талдау жасалған. Республиканың АӨК мемлекеттік қаржылық реттеуге одан әрі жетілдіру бойынша ұсыныстар берілген.

Түйін сөздер: әлеуметтік-экономикалық жүйесі, агроөнеркәсіп кешені, маркетинг, басқару, басқару әдістері, маркетинг-менеджмент.

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МЕНЕДЖМЕНТ В АГРОПРОМЫШЛЕННОМ КОМПЛЕКСЕ

Аннотация. В статье агропромышленный комплекс рассматривается как сложная социально-экономическая система. Обосновывается необходимость совершенствования управления на макро-, мезо- и микроуровне на основе использования инструментов маркетинг-менеджмента, в наибольшей степени адаптированных к рыночным законам. Одной из сложных экономических задач в современной финансовой политике Казахстана является поддержание темпов развития экономики в условиях мировой финансовой нестабильности. В статье говорится о проблемах государственного финансового регулирования АПК Республики Казахстан за последние годы. Отмечается, что стратегическая значимость и специфические особенности сельского хозяйства требуют разработки особых подходов к управлению данной отраслью, её инвестированием на региональном уровне. Главной задачей государственного регулирования экономического развития отрасли выступает инвестиционное развитие сельскохозяйственного производства, так как рост инвестиций является одним из основных факторов, способствующих подъему агропромышленного производства, решению проблем обновления региональной технической и технологической базы, изношенности основных фондов в сельском хозяйстве, обеспечению устойчивого развития аграрного сектора экономики. Проведен анализ основных источников формирования первичных доходов предприятий сельского, лесного и рыбного хозяйства Казахстана. Даны предложения по дальнейшему совершенствованию государственного финансового регулирования АПК республики.

Ключевые слова: социально-экономическая система, агропромышленный комплекс, маркетинг, управление, методы управления, маркетинг-менеджмент.

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THE OSSUARY FROM TEMIRLAN

Abstract. The site of the accidental discovery of the ossuary is located 40 km from Shymkent, on the western outskirts of the village of Temirlan, in the erosion of Naimanaryk, cutting a field north of the river. Arys.

The history of studying ossuaries in Kazakhstan and Central Asia totals more than 115 and 145 years respectively. Their number (several hundred) and a rather wide variety, typology and chronology of existence, has been the subject of many studies, including dissertations.

The ossuaries published here, the subjects of the humid burial, from the necropolis to the ancient settlement of Shymkent expand the geography of such finds (from Chui Valley to Turkmenistan and further ... Iran, Palestine). In addition, the shape of a ceramic funerary vessel, apparently reproducing local structures of primary (temporary) burial, is also unique. The presence of the legs of the ossuary supports it with the Khorezmian.

Keywords: Ossuary funeral rite, Zoroastrians, pre-Islamic traditions, Southern Kazakhstan, the valley of the river. Arys, culture.

The unknown before for the wide area of Southern Kazakhstan the ossuary burial was revealed: bone remains, more than ten fragments of ossuary and accompanying jug Kaptabekov Altai the local inhabitant of the village of Temirlan in the break washout of Naymanaryk located 3 km to the West from the highway road Shymkent-Turkestan in 2016. About unique find it has been reported to the employee of museum of local lore of Temirlan Alimbekova Madina who has told to academician of NAS RK Baitanayev B.A. He made surveying and inspection of the place of a find, situated 40 km from Chimkent. After the carried-out qualified archaeological restoration by the archeologist A. Donets the initial forms to the ossuary have been restored and can be presented in the publication.

Funeral ceremony – one of the main markers of spiritual culture of all historical societies. Wonderfully many lines of ceremonies of burial have something in common through various times, continents and cultures not only on appearance, but also an internal essence of conditionality of a ceremony. Tradition of burial (cleaned) bone remains in ceramic (stone, alabaster) the vessels which are specially made if opportunities allowed, or were carried out by more "budgetary" options of burials in the form of khoums (big ceramic vessels), in particular with loops or holes through which it was possible to tie up of a cover of a bone storage, about which will be write lower in article. Also were carried out in burials – holes, in specially allotted places it is very characteristic of a certain stage of development of spiritual and also material culture and the wide region of Eurasia.

The ossuary ceremony could be correlated with a certain level of development not only the pagan culture, but also social structure of society in general. Forms of this manifestation are known not only in Central Asia and Iran before the spreading of Islam. Burials of previously cleaned bones are known also in other cultures, including, in Christian, especially in Catholic in any possible form. The Judaic ceremony of times of Jesus Christ also provided primary burial in special stone construction or the cave cut in the rock – a tomb. Only in a year, after assignment of a body (in Palestine processes of decomposition of bodies proceed quickly) when flesh decays, collected bones and put them in an ossuary or even in a pole in the tomb. But also at the time of Christ in the Middle East not all families were able to afford to bury finally died relative in an ossuary. Still S.P. Tolstov spoke about communications between ancient

Khwarezm and Sumer. To the connection established including thanks to the profound astral knowledge which is traced on the recorded sacral orientations of cult objects, for example Koi-Krylgan-Kala. On the other hand, there is an opinion, that at a Fedorovsky stage of the Bronze Age in Khakassia there were the Mazdayasna dakhmas [Larichev V.E., et al., 2016, s.147-149].

As it was established by long-term researches approximately from the 4-th century AD the similar burial ceremony began to practice steadily and in the wide territory of Central Asia, few certain regions of Iran though in Khwarezm he is known long before this time. At the same time, features of archaeological studying of ossuaries, often casual character of finds, can demonstrate that the main part of artifacts connected with mass burials of that period preserved "in situ". The pre-monotheist of ceremonial rituals the anthropomorphous statues or sculptures known all over the Ancient world and in early medieval societies can be other example of general prevalence.

Data about the ossuaries and similar ceremony of burial, since the Neolithic, proceed from in all enough developed civilizations of the Ancient World and is related to the most different eras and cultures. It is possible that the ceremony and the mythology causing it are connected with certain pre-knowledge, with perception of the earth as living being who has lived up to distribution of Muslim culture. Many lines of these views remain and, practically, up to now (for example, Chapter VIII of the monograph M.B. Mejtarchiyan: Ethnographic sources about remnants of Zoroastrian ideas of a funeral ceremony in and religious beliefs of the people of Central Asia and Kazakhstan) [Mejtarchiyan M.B., 2001,]. Despite so obvious facts of existing of the similar funeral ceremonies, artifacts from Kazakhstan serving as the proof of their distribution there was slightly.

Short data about the ossuaries of Kazakhstan. Until recently the ancient settlement of the Early Medieval Taraz and its necropolis was the only place in Kazakhstan where in large quantities there were ossuaries of the most different forms, their fragments. In funds of the regional local history museum Taraz a number of ossuaries was collected, mainly, it is casual finds. Walls of these ceramic vessels are richly ornamented; covers of ossuary, some of them have sculptural modeled heads. A full variety of registration and forms of vessels attracts attention: present interest yurt shaped ossuary, another on walls has sculptures of aged men with a paliform beard, superficial paths instead of eyes. And in other ossuary two figures standing on corners reminding Turkic stone sculptures are placed. These burials are dated with the 5-7-th centuries AD.

The first find of an ossuary in the center of Taraz city has happened in 1904 and has been recorded by the chief of the Auliye-Ata County, the member of the Turkestan circle of fans of archeology V.A. Kallaur. M.E. Mason who has found several Zoroastrian and the Nestorian of burials made excavation in Auliye-Ata in 1927 [Senigova T.N., 1972, S. 114].

Great interest for reconstruction of various ceremonies which can be connected with options of Zoroastrian rituals is represented by the burials found and partially investigated in the Mountain massif of Tekturmas that in translation means "the uneasy place" located in 1 kilometer from the city of Taraz, on the right bank of Talas River. On the most top point of the ridge the remains of the fundament of the mausoleum of Tekturmas which has been constructed in the 10-12 th centuries were recorded. This ruins have been sorted in 1933 and mausoleum been reconstructed in recent years. The Zhambyl Archaeological point worked since the 1946 as a filial of the Institute of History, Archaeology and Ethnography of the AS of Kaz.SSR, headed by G.I. Patsevich have carried out excavation of several hollows. Workers of archaeological point have opened two more ancient cemeteries. One is situated on the east slope near the modern Christian cemetery burials belonged to followers of a cult of Zoroastr are found ("fire worshippers"). This cemetery it, judging by results of excavation, existed from 7-th to the 12-th centuries G.I. Patsevich writes that "according to requirements of this cult, corpses of the dead were exposed on the sublime place where bones of a corpse were cleaned from meat, exposed for birds and even for this purpose they hold dogs" [Patsevich G. I., 1948, S. 100]. As we believe, most likely, soon after mass acceptance of Islam at a boundary of the 9-10-th centuries the main part of the population, carrying out open mass ceremonies on necropolises has soon stopped. V.A. Kol'chenko concerning dating of Chuy Valley ossuary noted an obvious tendency to rejuvenation of their age from researchers of these artifacts of the 5-7-th centuries by 8-10-th centuries on the whole complex / set of sources for the Chuy Valley in this regard [Kol'chenko V.A., 1999, S. 93].

T.N. Senigova in the works in detail stops on all known types ossuary from Taraz, provides descriptions of the brightest of them and also reports that "keepers of traditions" of this ceremony I remained till last decades (according to G.A. Kushayev about very elderly inhabitant of Sergeevka village (Besmoynak, Zhambyl district of Almaty region), being considered as "Saint" as soon as being himself cleaned bones of the dead people) [Senigova T.N., 1968, S. 55-56]. T.N. Senigova stops on features the khoum's burials of bones and on the small jugs containing the remains 8,5-12 cm high of the sacrifices accompanying burials in particular [Senigova T.N., 1968, S. 59-60]. Common forms of ossuary were pottery which reproduced a form of yurt; their surfaces are ornamented by the geometrical or vegetable ornament reproducing the real koshma (felts) and also reproduced furniture: kerege, uk, shanyrak (details of yurt). In some cases the centers of a facade the ossuary was a door, and her border was the relief plait decorated with tucks of fingers. Data on reconstruction of a ceremony on new finds, in particular about a huge frying pan, for clarification of bones are provided [Senigova T.N., 1968, S. 54-55].

Probably, it will be more logical to assume the connection of a funeral ceremony of Taraz (Southwest Zhetysu) and the Chuy Valley (Southern Zhetysu) with influence of "Sogdien people", it is indicated by both dating and community of fate of regions on the route of the Great Silk road.

The ossuaries from the Krasnorechensky ancient city site (more widely from sites of the Chuy Valley of Kyrgyzstan where a little more than 30 units were collected early medieval ossuary are considered) [Kol'chenko V.A., 1999, S. 51]. . Some of them on external furniture, symbolics not just repeat became widely known, but surpass ossuary of elite burials of bone remains from the Middle East, sometimes finding the considerable similarity in a twiddle and stylistics of external furniture and also in their typology, design features. It is obvious that there are many parallels between mainly of the sun admirers and admirers of the one God.

Considering questions of chronology V.A. Kolchenko gives several boundaries which types of ossuary from necropolises and casual finds from the Chuy Valley, since the 6-th century (presumably by author directly from Khwarezm can be dated separate (all their four in a mountain part of the Chuy Valley)) till already directly period of Islamization of the region [Kol'chenko V.A., 1999, S. 53-54].

Much more finds connected with funeral ceremonies of Zoroastrians, it is collected by regions of Sughd, Khwarezm, to other cultural historic areas of Central Asia where before strengthening of Islam and Muslim culture there was this ceremony has been widespread in his various local options of Mazdeism/Zoroastrianism. Researches last for several decades longer, finds more mass here, and the typology which was more worked comparisons to the reached sources are carried out. Religious attitudes concerning a ceremony of Zoroastrians contain in particular in the "Videvdat" and being guided by these data similar artifacts and semantic interpretation.

Studying of an ossuary funeral ceremony in Central Asia. For the first time in Central Asia the ossuary have been found in 1871 during the facility works in Tashkent in a garden of the colonel of Rajevski,. In 1885 professor of the St. Petersburg University N.I. Veselovsky at excavation on Afrasiab site had found a large number of clay crocks with images of people and animals [Bartol'd V.V., 1966, S. 155-156], fragments ossuary. Till this time messages about finds ossuary become regular, and publications are filled with the content of reconstruction of a funeral ceremony.

In the Sughd manuscript document originated from the fortress on the mountain Mug it is spoken about sale of a half of a funeral construction with the platform adjoining to him for mourning, besides, V.G. Shkoda with illustrations compares ossuary from Kattasay (Northern Tajikistan) and a section on a facade of the main building of the Temple I in Panjekent [Shkoda V.G., 2009,]. As the recognized researcher of funeral ceremonies of Zoroastrians Yu.A. Rapoport wrote about the main conclusions published in 1907-1909 by K.A. Inostrantsev concern the researches of ossuary they passed into the Soviet and foreign literature and only the very few have demanded revision. Yu.A. Rapoport in detail stops for classifications of ossuary of Khwarezm, history of their origin, differences in ceremonies of Central Asia and Iran, many other questions [Rapoport Yu.A., 1971, S. 11].

Khwarezmi ossuaries finds the biggest variety of types: statuary, in the form of houses-dwellings, temples, funeral constructions and others. Besides, they the most ancient (from known for today in Central Asia): from the 4-th - the beginning of the 3-rd centuries BC till the 750-775 AD as it managed to distinguish it A.V. Gudkova and V.A. Livshchits about inscriptions on ossuary from Tok-Kala [Rapoport Yu.A., 1971, S. 104]. Yu.A. Rapoport traces the most different cults by ossuaries: ancestors, dynastic and

agrarian and also the reviving deity, perhaps key in the ceremony connected with an ossuary ceremony [Rapoport Yu.A., 1971, S. 118]. All of them were brought in the Annex to the monograph of Yu.A. Rapoport at that time available data on the known ossuaries collected investigated in Khwarezm during the period between the 1928-1969 [Rapoport Yu.A., 1971, S. 123-125]. By L.V. Pavchinskaya it has been counted and documented 272 ossuaries from Sughd till 1990-th year [Pavchinskaya L.V., 1990, S. 5]. Few ossuaries in the Tashauz region of Turkmenistan adjacent to Khwarizmi also were found [Vyazigin S.A., 1948, S. 150].

An ossuary ceremony got rather late in one of the closest in cultural and geographical relation historical areas for the Southern Kazakhstan Chach and Sughd as it recorded by science. Types of bone storage in Sughd – household vessels, khoums and ossuaries which were located inside of naus or dug into the soil. Lyavandak, Kuyu Mazar, Turgai-Mazar, Afrasiab and others sites is the earliest sites from it relates to the 4-6-th centuries AD [Pugachenkova G.A., 1950, S. 3-4]. The main ossuary necropolises in Sughd is Bia Naiman, Ishty-Khan, Panjekent as well as separate finds of ossuaries, made Miankala and Kashkadarya, are dated within the 6-8-th centuries AD [Masson V.A., 1953, S. 30]. The earliest and very rare funeral monuments connected with secondary burials belong to the 4-5-th centuries AD, the its majority is dated with the 6-8-th centuries AD in Chach, Ustrushana, Fergana. The majority of finds of ossuaries are connected with casual finds here. In Khwarezm opening of naus happened within the researches, in particular of necropolis of Tokkala site, and other monuments. Between other finds inside the naus ossuaries were the most interesting [Gudkova A.V., 1968, S. 219]. In the typology given by M.B. Meytarchiyan the Khwarizmi ossuaries a Kushan and Sasanid Era it is visible that legs of ossuary and, on the contrary, in the Sughd ossuaries have the vast majority, legs absolutely are absent. Thereby, in the region of Central Asia the most ancient ossuaries were recorded in Khwarezm and, probably from there they have extended in the close ideological environment, during rather long period, more, than in five hundred years. At the same time, hundreds only a small part of these funeral artifacts found ossuaries, presumably, respectively, so far early to do the final conclusions.

Comparisons of the Kazakhstan and Central Asian materials on peculiarities ossuaries have interesting parallels. Yurts with crosses from Taraz which are often compared with burials of local Christian Turks (Karluk) which have accepted Nestorianism are well-known. Also ossuaries in forms of yurts are known from the district of Tashkent with imitation of ropes and others constructive realities synchronous to dwellings [Vajnshtejn S.I., 1974, S. 48]. They are well compared with recent data on Christianity of the Southern Uzbekistan (Nakhshab) which have in turn something in common with materials of the Christian cemetery near Medieval Marv. With only that difference that in Marv ceramic cylinders were burned and found in an underground part of the monastery of Koshtepa Nakhshabian were not burned. According to the author, monks haven't managed to burn and have been forced to leave the monastery. Cylinders with a diameter up to 55 cm and high up to 60 cm [Raimkulov A.A., 2001, S. 148] O.V. Obelchenko are rather in detail described by a burial ceremony in similar ceramic cylinders of Christians of Marv dated with the second half of the 7-th century [Obel'chenko O.V., 1955, S. 97]. Obviously that Christians could go to such type of a ceremony in the conditions of deficiency of a timber and also considering locations of the region in the South of the Middle East where requirements of the doctrine merged with local traditions and realities. These certificates are important for us the fact that "divergences" with a classical ossuary ceremony, weren't casual and fully characterize ceremonial and cult content of pre-Islamic Central Asia, along with yurt – shaped ossuary from Taraz. A preliminary typologization of Christian burials of Marv which genesis is traced from the inhumation till the 4-th century to the ossuary in the 5-6-th centuries was defined [Obel'chenko O.V., 1955, S. 97].

The above-stated short digression to history of studying of distribution of an ossuary ceremony in Central Asia can be finished with the conclusion, that he widely extends among the population sharing the general world view, but so far finds of ossuaries were recorded in Khwarezm, Sughd, Chach and other neighboring lands, for example Fergana [Baratov S.R., 1990, S. 12] and also South Zhetysu where the ceremony got with Sughdiens along the trade ways. Apparently, this ceremony extends from Khwarezm where the earliest (statuary) ossuaries found in the region in Koi-Krylgan-Kala site according to Yu.A. Rapoport's conclusion is dated with the 4-3-rd centuries BC [Rapoport Yu.A., 1971, S. 128]. Besides already mentioned areas where ossuaries have been found, speaking about the distribution of an

ossuary ceremony recorded by then V.V. Bartold gives also the present territory of Turkmenistan (Anau and Ashgabat) [Bartol'd V.V., 1966, S. 156].

To the meaning of the term of ossuary its etymology in different languages and the major compound a funeral ceremony addressed V.G. Shkoda. One of the largest researchers of pre-Islamic religion of Sughd and beliefs of all region, addressing a Zoroastrian funeral ceremony, researchers operate with terms of written sources: Avestian: daxma-, usda-na-, kata-, Mid. Persian: daxmag, aspa-nu-r, asto-da-n, Arab.: naus. The analysis of available to studying ossuaries, for example an Kattasay ossuary from Panjekent demonstrates that he represented not abstract model of the temple, and is directly characteristic of temples of Panjekent. But there are also ossuary which represented "a part instead of whole", usually represented repeat top of a temple construction, scenes of "paradise life" or a scene of a Zoroastrian liturgy were often represented: priests with the burning altars, were sometimes represented also scenes of mourning. Also the Chinese sources remained about funeral ceremonies with ossuaries where bones of the governor were stored have [Gudkova A.V., 1968, S. 223].

Similar finds of ossuaries didn't happen in **Southern Kazakhstan** until recent times in spite of the fact that they have been recorded in the neighboring regions of Central Asia they are known on an extent more than century. Despite of rather large-scale researches of pre-Islamic necropolises with huge number of the nauses destroyed by time, at least become swollen: Borizhary, Shaga and others no one ossuary was founded. Apparently (ossuaries, bones storages) to the period of the first Arab military campaign treated inevitable defilement of graves extremely seriously and ossuaries have been taken out from easy reachable nauses and buried in hidden places.

Thereby, the published artifact is the first example specially made ceramic ossuary originated from the region of Middle Arys River, below of it current from the aul Temirlanovka (Southern Kazakhstan), obviously, also characterizes traditional local funeral and ritual memorial architecture of naus on the one hand. In this sense we see a wide arch aperture entrance where bones and the top subrectangular opening for continuous ventilation which, probably was also in a naus his integral attribute invested. Besides, on mythological ideas it is obvious this aperture a certain spiritual bond of bones with a certain heavenly world was provided. On the other hand, we see four legs here provided-symbolized sterility of the earth and also a possibility of carrying of bones and their participation in ceremonies. Engobe which has covered the ceramist's product, apparently, symbolizes adobe architecture of naus of the pre-Islamic period of the region. The ovate-extended product form perhaps distorted architectural forms of naus a little, but was convenient for containment in it the cleaned bones of the dead together with a skull. Thereby it is possible from experience of a research of a wide set ossuaries the wide region to conclude that production and use of the vessels which are specially made for this purpose the ossuary was in the region of Middle Arys River at rather high level, it was characterized by deep local pre-Islamic tradition.

Description. Ossuary according to standard adopted by researchers in recent years classification has box type, an oval form in a horizontal section. Sizes: length - 56 cm, width - 35 cm, height - 48 cm, from them height of legs is about 10 cm (figures 1-3). It is rather large and massive pottery of a manual molding, a tape way of formation. It has the ovaly extended form on four cylindrical legs. All surface of an ossuary is covered with light brown engobe. It has two openings the large located from a narrow from the front side for an investment there of bones except skull (which can't enter the sizes of this "entrance" and in itself ossuary). There is also a side flush door by which this opening was closed, adjusted to the opening sizes. Besides, the opening has a corrugated ledge, for an investment "covers" and also coinciding openings on a side cover and at an ossuary there. Second opening: top – it is rather, ritual, arranged in "a vaulted roof" (the top vaulted part) an ossuary which wasn't closed and it is obvious, served for invisible communication ("soul and bone remains"). In this regard there are data on the doctrine, on revival of the person assimilated to god in Zoroastrianism. At an opposite end face, narrow from "entrance", there are vertical "plaits" more than 20 cm long, peculiar stiffening ribs.

The ossuary, judging by its fragments has been crushed by layers of soil under which it has been buried in the Early Middle Ages. And has been reconstruct from 12 fragments, one fragment hasn't been found. One of ceramic fragments is an overlay for an entrance opening. It is known that nauses closed with the ceramic doors or made of other material. Thereby, it is possible to conclude that regions of the Southern Kazakhstan and Khwarezm have been more closely connected, than Khwarezm and Sughd and regions in the East and the South from the last. It is quite possible to assume that the ossuary ceremony



Figures 1-2 – Ossuary from Temirlan, general views. Photo A. Donets



Figure 3 – Scaled photo documentation of the ossuary from all sides, by A. Donets

nestles close to the region of Arys River earlier, than in Sughd. At the same time, it is difficult to speak about dating of an ossuary as direct analogies to it isn't found yet, especially well dated artifacts.

The ceramic jug is very typical by form, the engobe surface coating and the sizes has been found together with fragments of an ossuary. The vessel has been made on a circle, covered with light brown engobe and also dark brown drips of "abundance", traditional for that spiritual culture. It height is 23,5 cm, width – 18,5 cm, nimbus width – 8 cm. A vessel with a wide trunk, the small vertical looplike handle departing from a shoulder to implicitly expressed roller under a nimbus. Previously, the jug can be dated the end of the first half – the beginning the second I millennium AD, at the same time, it is necessary to tell that the tradition in pottery considerably prevailed over innovation till 7-8-th centuries AD, practically since the beginning of a new era, thereby, determination of chronology of burial in an ossuary on typology of the vessel accompanying ossuary is complicated.

It is not the only one find of bone storage (in the general understanding) from the Southern Kazakhstan. The find of the ceramic khoum (figures 4, 5) which is specially made for the customer for the last rest of bones of died relatives in close proximity of the Medieval city of Shymkent on the next height which, apparently and was used as a city necropolis in the pre-Islamic time is known. This khoum is an exhibit of museum of local lore. Sizes: height - 56 cm, the maximum width – 42 cm. In the top part of it trunk mouths were lower at once three holes were made to tie up the cup covering from top the khoum which exceeds width of an outer edge of a nimbus with a diameter of 27 cm a little. The khoum bottom – wide 34 cm, is obvious to the capacity and stability. The cup cover which covered khoum, the bone



Figures 4, 5 – Photo of the khoum – bone storage and the cover with hole.

storage from the top has been specially made for this purpose: in the middle there is an opening with a diameter less than 1 cm, but it didn't allow using in on economic requirements and also has been made for the "communication" of bones with the invisible world.

About rather frequent casual finds burials of bones in khoums (big vessels) in the center or necropolis of Taraz which were carried out during the economic works in the 30-th of the 20-th century G.I. Patsevich carefully collected data, at the same time describing circumstances of finds: in a stone the niche in which there were vessels with covers opened, and near a vessel there was a skull [Patsevich G. I., 1948, S. 98-100]. V.V. Bartold speaking about typology of ossuary writes that mainly oval (basket shaped) are from Tashkent to Taraz, and rectangular (box), in Samarkand though there are also finds oval in the last. Besides, all ossuaries or with covers or had to be with covers initially [Bartol'd V.V., 1966, S. 169-170]. Ossuary from Temirlan of an oval form, but at the same time it is constructive without cover and, also on legs. Apparently, it is absolutely separate look ossuaries.

As we see, both finds published in this work, found in extremely limited number so far, but nevertheless, can confirm the developed condition of a funeral ceremony in the Southern Kazakhstan in pre-Islamic time, implementation of the main requirements imposed to funeral vessels. However, so far judging by single finds. The subject connected with ossuary and bone storage of Central Asia has been well investigated even more than 100 years ago. Since then data on about one hundred ossuaries of Khwarezm, dated, practically for the millennium of earlier Sughd were added. It is possible that from this area with ancient culture the ossuary ceremony has extended across all Central Asia. Apparently, ossuary from Tamerlanovka, his type (with high legs) can demonstrate that the ceremony gets into the region of the Southern Kazakhstan from Khwarezm. To this fact there are much more bases, than to the assumption that the ceremony gets into the Chuy Valley directly from Khwarezm. It is obvious that stands at ossuary served for the certain ceremonies connected with calendar cycles, ashes carrying out, participation in processions about strict regulations and the bans, for example.

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ТЕМІРЛАННАН ТАБЫЛҒАН ОССУАРИЙ

Аннотация. Шымкент қаласынан 40 км қашықтықта, Темірлан ауылының батыс бөлігінде, Арыс өзенінің солтүстігіндегі даланы кесіп өтетін Найманарықтан оссуарийлердің кездейсоқ олжалары табылған болатын.

Қазақстан мен Орталық Азияда табылған оссуарий олжаларының зерттелу тарихы тиісінше 115 және 145 жылдан асады. Олардың санына (бірнеше жүз), әр алуандығына, типологиясына және хронологиясына байланысты диссертациялар жазылып, көптеген зерттеулер жүргізілді.

Осында жарияланып отырған оссуарийлік хумдық жерлеу заттары көне Шымкент қалашығының мазарынан табылған, бұл осындай олжалардың географиялық орналасуы өте үлкен аумақты алып отырғанын көрсетеді (Шу аңғарынан бастап Түрікменстанға және одан әрі қарай... Иран, Палестинаға дейін).

Сонымен қатар, керамикалық ыдыс бірегей пішінді, шамасы бастапқы (уақытша) жерлеудің жергілікті құрылымдарының орнатылу болған. Оссуарийлерде тірек аяқтарының болуы оны хорезмдік оссуарийлермен жақындастырады.

Түйін сөздер: оссуарий жерлеу ғұрыптары, зороастрийліктер, исламға дейінгі дәстүр, Оңтүстік Қазақстан, Арыс өзенінің аңғары, мәдениет.

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ОССУАРИЙ ИЗ ТЕМИРЛАНА

Аннотация. Место случайной находки оссуария локализуется в 40 км от г. Шымкента, на западной окраине села Темирлана, в размыве Найманарыка прорезавшего поле к северу от р. Арыси.

История изучения оссуариев в Казахстане и Средней Азии насчитывает более 115 и 145 лет соответственно. Выявленное их количество (несколько сотен) и достаточно большое разнообразие, типология и хронология бытования, явилось предметом многих исследований, в том числе и диссертационных.

Публикуемые здесь оссуарий, предметы хумного захоронения, из некрополя на городище Шымкент расширяют географию подобных находок (от Чуйской долины до Туркменистана и далее... Ирана, Палестины). Кроме того, уникальна и форма керамического погребального сосуда, по-видимому, воспроизводившего местные сооружения первичного (временного) захоронения. Наличие у оссуария ножек-стоек роднит его с хорезмийскими.

Ключевые слова: оссуарный погребальный обряд, зороастрийцы, доисламские традиции, Южный Казахстан, долина р. Арысь, культура.

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THE MORAL IMPACT OF NATIONAL MUSIC DURING GLOBALIZATION ERA

Abstract. The article outlines the moral values of the national music in the global era, the samples of the tradition of traditional music, which form the basis of the spiritual heritage. Their ambiguous treatment during the Soviet period keeping the opportunity to influence outlook of growing up generation is shown and critically estimated. The review of ceremonial and genre arts as fundamentals of traditional music is given, the community of musical heritage of the Turkic-speaking people, including Kazakh and Uzbek is shown.

In the context of educational influence also such important component of national music as works of professional composers is presented. Including – operas “Kyz Zhibek” of E. Brusilovsky, “Abay” A. Zhubanov and L. Hamidi's, “Birzhan – Sara” M. Tulebayeva and others among with traditional values and also “Enlik – Kebek”, “28” G. Zhubanova, “Abylay the khan” E. Rakhmadiyeva in the context of their new and relevant impact on public consciousness.

At the same time, the measure of moral influence on society in the conditions of globalization of modern performers and poets of an aitys clears up. In this regard, the special ideological and educational value of the art of an aitys which is defined, first of all, with the scale of the creative talent competing and, secondly, his opportunities in respect of public relations and abilities to influence the development of society is emphasized.

Keywords: song, kuy, composer, the performer, opera, aitys (contention), ritual, tradition, globalization, moral.

Introduction. The sharp changes and the modern adventures of the outside sometimes make us forget about or neglect our national values. Now, on the contrary, when we refuse today's torture and pay attention to our national music, we begin to see its other aspects. In his article “Course towards the future: modernization of Kazakhstan's identity” the President of the Republic of Kazakhstan N. Nazarbayev points out: “Without national and cultural roots, modernization will be left hanging in the air. And I want it to stand firm. History and national traditions must be taken into account. It is a platform which connects our past, present, and future. I am convinced that the most important mission of spiritual modernization is to reconcile the various strands of our national sense of identity and culture” [2]. This view of the Head of the State contributes to revealing moral and spiritual values that influence the national consciousness of the society in the past and in the present. One of the topical issues at the present stage is to analyze the national heritage on the basis of this question and to find the pragmatic characteristics of folk and composer works in the society. On the basis of this article the educational influence of national music, which forms moral and spiritual values, is determined by the traditions of song and kuy music, professional composer's creative and performing art, and generalization and direction of future research.

Methods. The novel methods of historical-theoretical, expert-practical analysis are used in the study of the topic. At the same time systematical-structural, accumulation, scientific complex systematization, chronological, musical-theoretical analysis are used.

The basis of the subject also the scientific historical and theoretical attitudes of domestic and Russian musicologists – A. Zatayevich [2], A. Zhubanov [3], B. Yerkovich [4], B. Amanov and A. Muhambetova [5] etc. In the implementation of the project the explorations of the philology scientists, who have left valuable information about the worldview, mentality, practices, household lifestyle, rites and art of the Kazakh nation, will also be harnessed. In this regard, the valuable works of A. Baitursynov [6], M. Jumabayev [7], M. Auezov [8], S. Kaskabasov [9], U. Kalizhanov [10] should be pointed out.

In regard to the theme under consideration, as the preceding scientific explorations conducted in the world and relating to the research topic the special attention will be paid to the works of Th.Adorno [11], M.Barret [12], A.Bergesen [13], T.Dowd [14], etc., who considered the musical art from the social point of view and revealed the ways of its impact on the public consciousness. It is noticeable that in the works of foreign scientists their statements relate to the disclosure of the educational function of music as a whole. For example, the Hungarian composer Z.Kodály [15] and the German pedagogue and composer C.Orff [16] have proved in their works that the valuable personal characteristics of a human, such as mannerliness, kindness, responsiveness, have been formed through the music.

In the study the fundamental works of Russian scientists will also be explored, their connection with the project theme will be considered since the problem of morality is being noticed in the investigations on musicology, musical pedagogics and psychology. For example, the works of B.Asafyev [17], R.Sachs [18], D.Kabalevsky [19], M.Kagan [20], V.Medushevsky [21] etc. can serve as the basis for the subject presented for the contest. In exploring the Russian and the classical European music there can be found the following lines: "The classical music is the accumulated wealth of the cultural and spiritual life of the European and Russian society of the XVII-XIX centuries which is connected inseparably with the historical and cultural processes. The important sociocultural aspect of the classical music is its spiritual and moral potential which includes the values of the meaning of life, common to all mankind, personal and developing, liberal, traditional, confessional values..." [22, 8]. Thus, at the world level, there can be found some themes that maybe are not identical but very close to each other.

Results. When analyzing musical genres, the special attention will be paid to such problems as musical features of zhys and dastans, traditional songs and kuys, instrumental and vocal genres of the chamber and major forms (quartets and quintets of string and brass instruments, chamber orchestras).

The following lines are indicative of formation during the Soviet period of the wrong view about the instructive songs: "The content of the instructive songs is based on the matters of moral, social and family life of the Kazakhs. During the pre-revolutionary time in the conditions of almost general illiteracy, the instructive songs strongly influenced the formation of the mental and spiritual identity of the people. The adherents of the predominant at that time feudal and bai ideology had taken advantage of that fact. The singer and akyns of the bais polluted the instructive songs with the religious verses from the Koran, glorification of the customs and traditions that were advantageous for the exploiters, idealized a nomadic life" [15, p.26]. Such remarks shape the negative attitude of the future generation and the society as a whole towards the national moral and spiritual values. In this regard, the given project is significant.

It is possible to find examples of morality from the ritual, home, work songs that have become a national heritage. For example, "Toibastar", "Zhar-zhar", "Synsu", "Aryz olen", "Betashar", "Estirtu", "Zhoktau", "Zhubatu", "Zar", "Dauys", "Konil aitu" the educational aspects of the songs. The content of the "Betashar" is given clearly among the folklore samples. In the text of the Betheshian Empire, a new commandment for a newly married woman is quoted and the future task is taken into account. Here is an example of the "Kazakh Music" anthology:

БЕТАШАР (II)

Асықпай $\text{♩} = 70$

Оу! А - ғы - та - йын са - рын - ды, І - шің - де - гі
 за - рың - ды. Сый - лап а - та, е - нен - ді, Құр - мет - теп күш - ті
 жа - рың - ды. Ту - ган соң қыз - ды ү - зат - кан, Бұ - рын - нан үл - гі
 қа - лын - ды. Ке - лін - шек бо - лып бұр - же - ніп, Ба - сы - на же - лек са - лын - ды.

Here are some of the ethical norms, the aspirations of the young woman, the moral chain, the moral qualities, the virtue of the elder and the young, the special place in the education of the mother. At the same time, the educational meaning of the Turkic-speaking peoples' songs is similar to each other. For example, the moral value of the Kazakh "Betargar" model is similar to the song "Kelin salom" in Uzbek music.



Also due to folklore, belonging to everyday songs "Besik zhyry", "Tusau kesuzhyry", "Sanamak", "Alip-bi", "Zhumbak", "Otirik olen", "Talapker" the specimen points in the specimen are shown. Doctor of Art B. Yerazakovich about the song "Talapker": "The instructive maxim is full of the song "Talapker" ("Rushing forward"). It contains a whole code of everyday ideas about what is needed for a happy life of a person. It has an Epicurean attitude to life, an approving attitude toward the carefree pastime of people of the sulfuric type" [4, p.30].

The moral values of Kazakh music are socially-socially (tiger, younger, poor, rich, poor, nature, love, humanity), ethical (hospitality, hospitality, respect for the elderly, sincerity", "charity", "beauty"), as well as pedagogical (teacher and student), can be seen in artistic and content issues.

The XIX century is a peak of a flowering of the national and professional written works. The sufficient research on this period may be noticed in the works of the first and the only academician in the field of domestic art studies A. Zhubanov. In the project presented for the contest the works of Birzhan sal, Akhan seri, Zhayau Musa, Mukhit, Baluan Sholak, Aset, Madi, Estai, Abai and Shakarim, Abyl, Makhambet, Kurmangazy, Dauletkerei, Tattimbet, Esyr, Kazangap, Dina, Sugur are planned to be considered from their moral and spiritual potencies, the influence of their works on the formation of aesthetic, philosophical and humanitarian and humanistic tendencies in the society. The spirit of the era and the positive impact on the younger generation will be revealed in the specified works. The studying of the new works of the contemporary authors (N. Tlendiev, K. Akhmediyarov, S. Zhampeisova, B. Zhussupov, B. Tleukhan, etc.) will be programmed from these points of view.

In writing the project, the phenomenon under study will include the pieces of music covering the interval from song to opera, from kuy to symphony. As we know, the XX century is characterized by the shift towards the European system of notation and, in this regard, new genres – operas, symphonies, chamber compositions, cantata, and oratorios – emerge and are created in Kazakh music. The creation of the composers and their followers, which in the 1930s started up the Kazakh composer school of professional music of written tradition, was based on the eternal national and moral spiritual values. The reflection of moral and spiritual postulates formulated with the help of national life experience and wisdom becomes the main idea of the operas, symphonies, cantatas, oratorios and other larger compositions of the founders of the written professional music – Y. Brusilovsky, A. Zhubanov, L. Khamidi, M. Tolebaev, Q. Khojamyarov, B. Baikadamov, S. Mukhamedzhanov, G. Zhubanova, Y. Rakhmadiyev. For example, in operas "Kyz Zhibek" of Y. Brusilovsky, "Abai" of A. Zhubanov and L. Khamidi, "Birzhan and Sara" of M. Tolebaev, which have become a pearl of the Kazakh stage, the scenes filled with the peculiar educational meaning are considered in the new way along with the traditional values. The creative direction of the professional composers of written tradition is determined and the instructive function, proving the comprehensiveness of national musical language in the period of the maturity of authors in terms of knowledge and practice, harnessing the techniques of composing, in operas "Enilik-Kebek" and "28", symphony "Zhiger" of G. Zhubanova, operas "Alpamis", "Ablai Khan", of Y. Rakhmadiyev, oratorio "The voice of the centuries" of S. Mukhamedzhanov, symphony "On the zhailau" of K. Musin, opera "Domalak ana" of D. Botbayev are also revealed in many ways. If during the period of getting the independence of Kazakhstan the followers of the older generation composers were M. Sagatov, B. Bayakhunov, M. Kus-

sainuly, B.Kydyrbek, V.Strigotsky-Park, S.Yerkimbekov, A.Raiymkulova, S.Abdinurov, A.Toksanbaev, K.Setekov, then the composers of younger generation T.Andosov, O.Khromova, A.Abdinurov, B.Khasangaliyev, G.Sekeyev in their works managed to develop moral and spiritual values on the new level from a position of contemporary tendencies.

In the implementation of the project the hortative traditions in the kuys of the famous kuys-composers of 1970-1980s N.Tlendiev, K.Akhmediyarov, S.Zhumazhanuly, A.Zhaiymov, M.Kussaiynuly and also the circulated among the people songs of N.Tlendiev, Sh.Kaldayakov, S.Baiterekov, Y.Khassanaliyev, B.Oraluly, T.Sarybayev The educational meaning of patriotic songs that is popular among the people can be called.

The instructive significance of the aitys art which often brings up the social and public matters of the Kazakh spiritual life is being identified by exploring the peculiarities of such aityses as badik, Zhar-zhar, aitys between animals and people, aitys of the dead and the alive, aitys-riddle, aitys between the girl and the boys, aitys of akyns. Aitys as the meaningful phenomenon, which is a verbal competition between akyns, firstly, raises the akyn art, secondly, contributes to the moral and spiritual educating of the society. In the past there lived and created their compositions such famous akyns as Zhanak, Sabyrbai, Shoze, Suyunbai. To date this long tradition is continued with dignity by such akyns as Asiya, Aselkhan, Konynsbai, Bayangali, Alfiya, Abash, Mukhamedzhan, well as poets are part of the art of the global era.

Conclusions. The process of development of national music in the formation of the Kazakh competitive society is in line with the state programs adopted in the country. The head of the state N.Nazarbayev says: “Nowadays, when one talks about the impact of foreign ideological influences, we should keep in mind that these cover certain values, cultural symbols of other nations. Only our own national symbols can oppose them” [2]. The history of the national music development is very rich which contributes to moral upbringing of the young generation allowing to cognize not only the values but the examples of spirituality. We can forever renew the ancestral heritage by absorbing the educational qualities of national values into the consciousness of young people who make the future of Kazakhstan.

As a result, we offer the following conclusions:

– We can transform sociocultural, ethical, aesthetic national heritage into a viable treasure through moral, spiritual, moral, spiritual values in the songs of national heritage;

– The moral and spiritual values are reflected (samples of religious chants, terme, tolgau, zhyr, dastans, blessings (bata), guidance (osiet), nazyms and also of the culture of songs and instrumental educational and persuasive kuys, written works of professional composers of such genres as opera, symphony, oratorio, cantata) as a result of the artistic and societal society, we create a highly competitive.

– To comprehend scientifically such phenomena as koshtasu – farewell, ant – oath, osiet – guidance, kargys – curse, tuszhoru – interpretation of dreams, shashu – throwing of presents that carry out and educational function in larger stage pictures and by establishing a meaningful meaning of aitys in Kazakh spiritual life, we can form a society that can evaluate, develop, deliver and value our national values.

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ЖАҒАНДЫҚ ДӘУІРДЕГІ ҰЛТТЫҚ МУЗЫКАНЫҢ ТӘЛІМДІК ЫҚПАЛЫ

Аннотация. Мақалада жаһандық дәуірдегі ұлттық музыканың өнегелік құндылықтары, рухани мұраның негізін құрайтын дәстүрлі музыканың үлгілері белгіленген. Бұл шығармаларға Кеңес кезеңінде қалыптасқан теріс пікірлер қарастырылып, келешек ұрпақтың санасында кертартпа ой салу тарапы сынға алынған. Дәстүрлі музыканың негізінде ғұрыптық және тұрмыстық үлгілерге шолу жасалып, түркітілдес халықтарындағы музыкалық мұрамен сабақтасатындығы көрсетіледі, ішінара қазақ және өзбек музыкасындағы ұқсастық аңғарылған.

Ұлттық музыканың бір бөлігін құрайтын кәсіби-композиторлардың шығармашылығындағы тәрбиелік мәнге ие туындыларға көңіл бөлінген. Олардың ішінде, қазақ сахнасының жауһарларына айналған Е. Брусиловскийдің «Қыз Жібек», А. Жұбанов пен Л. Хамидидің «Абай», М. Төлебаевтың «Біржан-Сара» операларындағы және т.б. салт-дәстүр құндылықтарымен қатар, Ғ.Жұбанованың «Еңлік-Кебек», «28» опералары, Е. Рахмадиевтің «Абылай-хан» операларының өзіндік тәрбиелік мазмұнға тола көріністері бүгінгі қоғам санасында жанаша қабылдану және жаңаша саралау мәселелері белгіленген. Сонымен қатар, қазіргі кездегі дәстүрлі орындаушылар мен айтыскер ақындардың жаһандық дәуірде қоғамға өнегелік әсері айқындалады. Бұл ретте, айтыс өнеріндегі тәрбиелік тарапы біріншіден ақынның талантын шыңдайтын үлкен өнер жарысының өнегелік тұстарын жатқыза, екіншіден қоғамға үндеу салып, қоғамның санасын қалыптастыруға үлес қосатыны айқындалған.

Түйін сөздер: ән, күй, композитор, орындаушы, опера, айтыс, ғұрып, дәстүр, жаһандану, тәлім.

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МОРАЛЬНО-ЭТИЧЕСКОЕ ВОЗДЕЙСТВИЕ НАЦИОНАЛЬНОЙ МУЗЫКИ В ЭПОХУ ГЛОБАЛИЗАЦИИ

Аннотация. В статье охарактеризован ценностный ранг национальной музыки в эпоху глобализации через образцы традиционной музыки, составляющие основу духовного наследия. Показана и критически оценена их неоднозначная трактовка в советский период, сохраняющая свою возможность воздействовать на

мировоззрение подрастающего поколения. Дан обзор обрядовых и бытовых жанров как основы традиционной музыки, показана общность музыкального наследия тюркоязычных народов, в том числе казахского и узбекского.

В контексте воспитательного воздействия представлена и такая важная составляющая национальной музыки, как творчество профессиональных композиторов. В том числе – оперы «Кыз Жибек» Е. Брусиловского, «Абай» А. Жубанова и Л. Хамиди, «Биржан – Сара» М. Тулебаева и другие в ряду с традиционными ценностями, а также «Еңлік – Кебек», «28» Г. Жубановой, «Абылай хан» Е.Рахмадиева в контексте их нового и актуального воздействия на общественное самосознание.

В то же время проясняется мера морального влияния на общество в условиях глобализации современных исполнителей и поэтов айтыса. В этой связи подчеркивается особое идейно-воспитательное значение искусства айтыса, которое определяется, в первую очередь, масштабом творческого дарования состоящегося и, во-вторых, его возможностями в плане связей с общественностью и способностями влиять на развитие общества.

Ключевые слова: песня, кюй, композитор, исполнитель, опера, айтыс, обряд, традиция, глобализация, мораль.

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THE DISEASE OF WHEAT LEAF RUST

Abstract. Among the main factors of increasing the yield of grain crops due to increased immunity can be creation of resistant varieties based on the study of the world variety assortment, creation of a bank of resistant varieties, study of plant characteristics that contribute to reduce the damage and reduce the negative consequences of affect and increasing resistance to stressful situations. According to modern ideas, the resistance genes of soft wheat to brown leaf rust are subdivided into genes of juvenile and adult resistance.

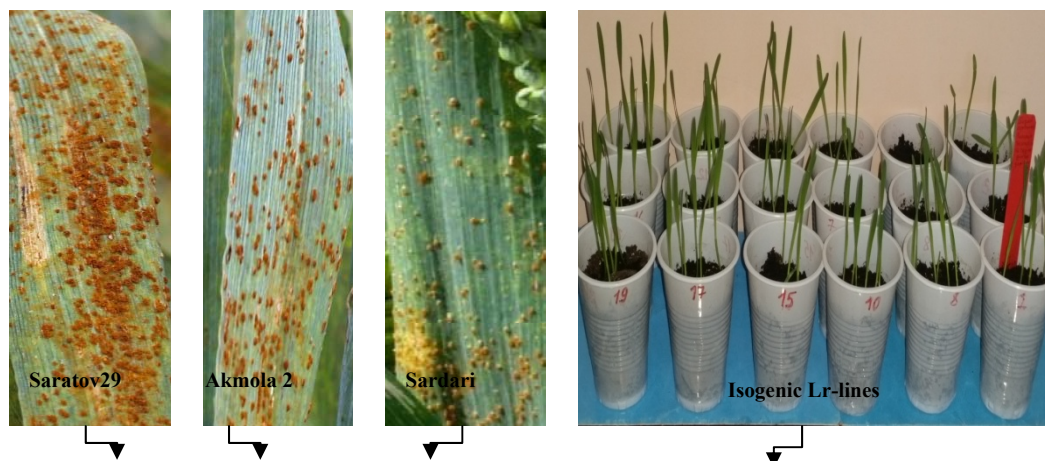
Keywords: Lr-isogenic lines, wheat leaf rust, epiphytotic, crop yield.

Introduction. *Puccinia recondita f. sp. tritici* Rob. ex. Desm—a virulent fungal disease causing epiphytoidism in a favorable condition that is rapidly spreading through several hundreds of distances to the wheat brown rust, aggressive parasite, which generates 6 uredogeneration at vegetative stages [1-4]. The issue to produce the sources of resistance to wheat brown rust, introduction into production is due to the high mutation and adaptability of pathogens. The microevolutionary process of new virulent form (pathotype) in the pathogen population continues uninterrupted. Long-term use of varieties in the production, which leads to the occurrence of new virulent forms, reduces the effectiveness of resistant genes, promotes the spread of disease. Speed of the spread of disease is due to existence of nonresistant varieties of wheat [4-8].

The reliable way to combat the disease of wheat leaf brown rust is effective use of varieties and tolerance types. An effective way of dealing with the most dangerous pathogens of wheat is the production of germoplasm of new varieties providing resistant genes, stopping low level of yield and improving the quality of varieties [9-12]. Resistance of the plant, reduces the spread of disease and reduces the level of pathogenic populations.

Since the phytopathogenic adaptability is endless, the selection of resistant is a complex and continuous process [13-15]. In breeding, phytopathology two types of juvenile and adult plant resistance mechanisms are used to combat pathogen. Long-term survival of the varieties is solved by a large number of resistant genes that can withstand newborn pathogens [16-19]. The use of varieties nonresistant to diseases in the production enables the spread of pathogens, formation of epiphytoidism. It is also important to test the sources of resistance, analyze the virulence of leaf brown rust population continuously.

Study methods. In order to detect the virulence of wheat leaf brown rust, the isogenic Lr-lines, grown in the laboratory conditions, were infected by sprinkling of monophosphate isolates of leaf rust uredospore from the wheat damaged in an experimental site of the Kazakh Research Institute of Agriculture and Plant Cultivation. To ensure high humidity after infection, the experimental plants were covered with polyethylene film, a wet camera was prepared for 24 hours (figure). Pathogen development was determined by point of reaction, damage level by percentage (%). According to Mains E.E., Jackson H.S. [20] tolerant to reactions were 0-2 points, and intolerance was 3-4. According to Peterson R.F., Campbell A.B., Hannah A.E. [21] the leaf palm injury was determined in percent.



Puccinia recondita Rob. ex Desm. f. sp. tritici –damaging of Lr-lines with leaf rust

Study outcomes. Virulence of leaf rust of Thatcher variety to isogenic Lr-lines was analyzed in the laboratory conditions. Immune reaction of isogenic Lr-lines in the inoculum of excitant were different in the leaf samples of varieties Saratov 29, Sardari and Akmola 2 under the field conditions. Single-pustule isolates of Lr1, Lr2A, Lr3, Lr10, Lr15, Lr25, Lr28, Lr30 taken from the varieties Saratov 29, Sardari and Akmola 2, isolates изолляттар Lr1, Lr10, Lr3, Lr10, Lr15, Lr 25 taken from Sardari variety showed virulence to isogenic lines.

Low level of virulence of wheat leaf rust isolates was noticed in lines Lr9, Lr12, Lr13, Lr17, Lr18, Lr20, Lr 21, Lr23, Lr26. These lines, with necrotic spots, were covered by 5 to 30% of the leaf strip. No virulent isolates to Lr 18 and Lr 24 isogenic lines were detected from the pathogenic population, the effectiveness of lines of tolerant genes against diseases lines were high, and no sickness symptoms were observed in the vegetative organs (table).

Virulence of wheat brown rust toLr lines

Isogenic lines	Type and level of damage, point /%								
	Variety name								
	Saratov 29			Sardari			Akmola 2		
	Isolates								
	№1	№2	№3	№1	№2	№3	№1	№2	№3
Lr1	4/40	4/50	4/50	4/20	4/5	4/20	4/40	4/40	4/30
Lr2a	4/30	4/40	4/30	1/5	2/20	2+3/5	4/30	4/40	4/30
Lr2b	3/10	4/30	4/10	3/10	3/5	2/20	4/40	3/30	3/30
Lr3	4/30	4/30	4/50	3/30	3/20	4/5	4/30	4/40	4/20
Lr9	2/5	2/20	2/30	2/5	2/10	1+2/5	2/20	2/5	2/20
Lr10	3/30	4/30	4/40	4/30	3/10	3/20	3/20	4/30	4/20
Lr11	4/5	3/10	3/5	3/5	2+3/5	3/10	3/10	3/5	3/5
Lr12	2/20	2/30	2/30	2/10	2/5	2/20	2/30	2/5	2/30
Lr13	1+2/5	2/30	2/20	2/5	2/10	2/5	2/20	2/5	2/5
Lr15	4/40	4/50	4/40	4/5	2/20	3/40	4/10	4/40	4/20
Lr17	2/20	1+2/5	2/10	2/5	2/5	2/10	1+2/5	2/10	2/10
Lr18	0	0	0	0	0	0	0	0	0
Lr20	2/20	2/20	2/5	2/10	2/5	2/10	2/5	2/20	2/20
Lr21	2/30	2/10	2/5	2/10	2/5	3/10	2/5	2/40	2/20
Lr23	2/20	2/20	2/10	2/10	2/5	2/10	2/5	2/20	2/20
Lr24	0	0	0	0	0	0	0	0	0
Lr25	4/20	4/20	4/10	3/20	4/5	3/30	4/30	4/20	4/10
Lr26	2/10	2/20	2/3	2/10	2/5	2/10	2/5	2/20	2/30
Lr28	4/30	4/30	4/20	3/5	2+3/5	3/20	4/20	4/5	4/10
Lr30	3/30	4/20	4/5	3/5	3/10	2+3/10	4/5	3/40	3/20

Study analysis. Study of leaf brown rust in cereals abroad is conducted by All-Russian Research Institute of Phytopathology (ARRIP), All-Russian Research Institute of Plant Protection (ARRIPP), St. Petersburg c., International Maize and Wheat Improvement Center (CIMMYT) Mexico, International Center for Agricultural Research in the Dry Areas (ICARDA), Syria; cereal disease lab in the USA (CDL USDA/ARS), St. Paul. Private research is conducted by scientists from Australia, Kenya, India and other countries [22-24]. L.G. Tyryshkin, V.G. Zaharov, L.A. Mikhailova (Russia), A.I. Morgunov, Singh R.P., Kolmer J.A., Liu J.Q. (CIMMYT, Mexico, Icarda) and other scientists have studied wheat leaf rust virulence, variability of population composition, immunological reactions of varieties of cereal crops and conducts research on a continuous basis. Depending on the ability of wheat brown rust to mutation, resistant varieties introduced into the production are losing tolerance over time, virulent isolates are formed in the effective sources of resistance.

In this connection, it is necessary to test resistance genes in breeding and resistance of varieties to disease with tolerance genes on a going basis. This enables to control the variability of pathogenic population, prevention of epiphythmia, and use of endurance sources effectively.

In the International Selection Center, SMITT has developed a model of varieties with long resistance. I.V. Iordanskaya, D.A. Solomatin determined the effectiveness of genes Lr9, Lr19, Lr23, Lr24, Lr27 + 31 in the Moscow oblast. Yu.V. Lobachev, S.N. Sibkeev, E.M. Pankova recommended to use isogenic lines in breeding by classifying 3 groups rationally. L.G. Tyryshkin., V.G. Zaharov, V.V. Syukov determined resistance of linear pathogene Lr12, Lr13, Lr34, Lr35, Lr46, Lr48 and Lr49 and resistance during adult plant to some isolates in juvenile period [25-31]. Under conditions of South Kazakhstan the resistance of lines of Lr9, Lr12, Lr13, Lr17, Lr18, Lr20, Lr 21, Lr23, Lr26 was medium. Among the studied isogenic lines, high juvenile resistance to brown rust isolates was noticed in Lr 18 and Lr 24.

Conclusion. The presence of 91,7-100% virulence of leaf brown rust in isogenic Lr1, Lr 2a, Lr3, Lr11, Lr15, Lr28, Lr30 lines indicates the genetic homogeneity of varieties, loss of effectiveness of resistant genes. This will enhance the natural selection in the agro-economic system and create new pathotypes. Although a new race of leaf rust generated, a variety of monogenic resistance is totally intolerant to the excitant. Determination of the endurance sources' effectiveness and their efficient use against disease will prevent the occurrence of leaf brown rust epiphythmia, preserving resistance of varieties long time. Highly effective isogenic Lr 18 and Lr 24 lines can be used for producing the varieties resistant to leaf rust disease in breeding.

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БИДАЙ ҚОҢЫР ТАТЫНЫҢ АУРУЛАРЫ

Аннотация. Астық дақылдарының егін түсімін жоғарлатудың негізгі факторы залалдануын төмендететін, залалданудан болатын зиянды әсерлерді кемітетін және стресстік жағдайларға төзімділігін жоғарлататын өсімдік белгілерін зерттеу, әлемдегі сорттардың құрамын зерттеу арқылы төзімді сорттар қорын жасау. Жұмсақ бидайда (*Triticum aestivum* L.) өскіндік және ересек өсімдік төзімділік гендері бар.

Түін сөздер: изогенді Lg-линиялар, бидай жапырық таты, эпифитотия, егін түсімі.

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БОЛЕЗНИ ЛИСТОВОЙ РЖАВЧИНЫ ПШЕНИЦЫ

Аннотация. Среди основных факторов повышения урожайности зерновых культур за счет повышения иммунитета может стать создание устойчивых сортов на базе изучения мирового сортимента сортов, создания банка устойчивых сортов, изучения признаков растений, способствующих снижению поражаемости и уменьшению отрицательных последствий поражения и повышающих устойчивость к стрессовым ситуациям. Согласно современным представлениям, гены устойчивости мягкой пшеницы к листовой бурой ржавчине подразделяют на гены ювенильной и возрастной резистентности.

Ключевые слова: Lr-изогенные линии, листовая ржавчина пшеницы, эпифитотия, ювенильная устойчивость.

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RECOGNITION OF STAGES OF EMERGENCE AND DEVELOPMENT OF THE ENDOGENOUS FIRE IN COAL MINES

Abstract. The nature and the main stages of emergence and development of the endogenous fires on coal mines are shown. The analysis of the main theoretical methods of researches of chemical process of self-heating and self-ignition of coal is made. It is noted that the main objective of experts of fire-prevention protection of coal mines consists in the most reliable establishment of a stage of oxidation and self-heating of coal. It is offered to accumulate and systematize results of natural data on control of structure of the mine atmosphere of problem sites for justification of signs of development of oxidizing processes in coal congestions.

Keywords: coal mine, oxidizing process, chemical reactions of oxidation of coal, stage of the endogenous fire, signs of self-ignition, carbon oxide, hydrogen, oxygen decrease.

Introduction. The problem of self-ignition of coal exists from emergence of the first coal mines. Self-ignition of coal is observed in mines and in warehouses where it is stored, on external and internal dumps of coal mines. The fires arising for various reasons including and from ignition of coal in the dug-out spaces, are found the special automatic equipment, signals from which arrive to the mountain dispatcher. On the basis of this information timely precautionary measures for an exception of their development and consequences are taken.

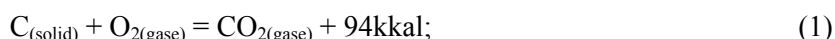
The endogenous fires have the specifics of development and methods of detection of the centers of self-heating and self-ignition of coal [6, 10]. The situation is aggravated with the fact that the underground endogenous fires often arise in hard-to-reach spots, such as the developed space, in the toes, in coal deposits behind insulating crossing points, in layers satellites [1, 16]. Coal layer, as a rule, in such conditions is in the deformed state, and it increases probability of self-ignition of coal. Suppression of the centers of burning in such conditions is complicated, than the highest duration of elimination of this type of underground accidents is caused. Besides, in gas mines to which the majority of coal mines of the coal-mining countries including coal basins of the Republic of Kazakhstan, the endogenous fires can cause explosions of methane-air mix that leads to catastrophic consequences belong.

The efficiency of fight against the endogenous fires arising in the developed space and in other hard-to-reach spots of coal mines, substantially depends on timeliness of detection and completeness of information on coal self-ignition process.

For this reason workers of coal mines very are interested in a question whether it is impossible by results of the analysis of air in certain places in the mine to define the beginning of self-ignition of coal, in particular, carbon monoxide availability is sign of the fire. For the answer to this question theoretical justifications of process of self-heating and self-ignition of coal are necessary.

Now are developed and a number of the theories of self-ignition based on use of kinetics of sorption of oxygen by small fraction classes of coals of different extent of metamorphism and a heat transfer in the destroyed coal [4, 5, 12] have found broad application.

The developed and known theories and methods define the beginning of ignition of coal at rather high temperature when coal has already lit up. Some researchers consider that real process of self-ignition of coal begins in mines already at 12-15 °C [5]. Therefore, the most important direction is the research of an initial stage of process. At the first stage it is necessary to begin studying of a surface of coal for the purpose of definition e è characteristics and their influence on chemical activity of coal at a temperature, usual for the mine. On the second it is necessary to study kinetics of oxidation of coal at low temperatures.



at the second stage carbon dioxide interacts with carbon with formation of carbon oxide and absorption of heat



As both stages (both reactions (1)-(2)) occur at the same time, under Hess's law the total thermal effect of chemical process of oxidation of coal is determined by total reaction



Founders of the theory of self-ignition of coals on the basis of the analysis of nature of influence of separate factors have formulated three conditions necessary for process of origin and development of self-ignition [15]:

coal has to be capable to oxidation at low temperatures, so-called low-temperature oxidation;

the amount of oxygen has to be sufficient for reaction course;

the amount of the warmth which is marked out as a result of oxidation has to prevail over his branch to the environment, i.e. there has to be a positive balance of thermal energy.

In development of the endogenous fire allocate a self-heating stage, an early stage of self-ignition and a stage of burning of coal [7]. Self-heating of coal begins as soon as conditions for warmth accumulation are created. The self-heating stage generally determines duration of the incubatory period of process of self-ignition and proceeds in the range of temperatures, since the values characteristic of conditions of these mining-and-geological conditions, and up to the critical temperature of self-ignition. On reaching critical temperature the early stage of self-ignition of coal begins.

Analytical expression of this dependence in ignition zones in emergency sites for coals of the Donetsk basin is presented by a formula [7]

$$T = 456 \cdot (C_{co}/\Delta C_{O_2})^{0,076}, \quad (4)$$

where C_{co} – the content of carbon oxide in tests of the mine atmosphere, about. %; ΔC_{O_2} – a decrease of content of oxygen in tests of the mine atmosphere, about. %; T – temperature in the self-heating center, K° .

The temperature condition of layer caused by coal oxidation reaction by oxygen and a heat transfer in surrounding breeds and the atmosphere acts as the main condition of process of transition of self-heating to self-ignition and formations of the center of the endogenous fire.

In development of the endogenous fire, except change of temperature in the seat of fire, there are essential changes as a part of air in a coal self-ignition zone: content of oxygen decreases release of carbon oxide, hydrogen, saturated and unsaturated hydrocarbons which content considerably exceeds background values increases. These changes in structure of the mine atmosphere are also a basis for recognition of stages of development of processes of self-heating of coal.

It has practically developed so that miners took existence in the atmosphere of the site of carbon oxide in certain quantities for the main sign of origin of the endogenous fire. The theory explaining self-ignition of coals with fast oxidation of nonlimiting connections did probable that carbon monoxide is emitted only at quite high, characteristic only of the fire, temperatures [1, 4].

On the controlled site steady excess of a volume fraction of SO carbon oxide and H₂ hydrogen over their background contents is accepted by other sign of intensive self-heating of coal: $CO_f \gg (6-10) \cdot 10^{-7}$ vol. %

и $H_{2f} \gg (3-5) \cdot 10^{-7}$ vol.%. Characteristic of a stage of self-heating and an early stage of self-ignition is performance of a condition

$$\frac{CO - CO_f}{H_2 - H_{2f}} < 10. \quad (5)$$

However, as authors [7, 16] by results of definition of excess of carbon oxide and hydrogen over their background values consider and the ratio given above it is impossible to distinguish a self-heating stage from an early stage of self-ignition. At the same time, definition of a stage of development of the endogenous fire is of great importance as the early stage of self-ignition of coal under favorable conditions can last only several hours.

These stages can be determined by coal temperature in the center of the endogenous fire on the basis of data on a ratio of content of C_2H_4 ethylene and C_2H_2 acetylene in tests of air of the site of self-ignition of coal. Up to temperature of ignition of volatiles, growth of a share of ethylene advances growth of a share of acetylene by stages of self-heating and an early stage of self-ignition owing to what the ratio of these components naturally increases.

After achievement of temperature of ignition of the coal, depending on the mass of a coal congestion and an expense arriving to him air there can be a further growth of a ratio of ethylene and acetylene or its sharp reduction to the values characteristic of temperatures is lower than critical.

Thus, on change of volume fractions of ethylene and acetylene and their ratios it is possible to identify stages of development of the endogenous fires and to approximately determine coal temperature until his ignition.

It is a method of definition of a stage and control of development of the endogenous fires it is used in the analysis of fire-dangerous situations in mines of the Karaganda coal basin [7,16]. Use the same method for determination of temperature of the environment in the isolated emergency site, when there is no an opportunity to determine her by tool direct measurements. Need of obtaining data on temperature and dynamics of cooling of the massif and atmosphere of the fired site arises, in such situations, for justification of safety of carrying out investigation by forces of mine rescuers and solutions of a question of a possibility of opening of the fire site.

Except the aforesaid, it should be noted the following in addition. The known methods of assessment of process of self-heating of coal are based on the analysis of products of reaction of oxygen with coal whereas according to the theory coal - an oxygen complex, at an initial stage oxygen is physically occluded by the surface of coal with insignificant allocation of warmth [16]. Then with increase of temperature splitting of unstable oxygen complexes with formation of the final products of oxidation of coal – carbon oxides and water at which allocation of warmth increases by 1,5–2 times [6, 9] begins.

Thus, a conclusion is formulated that control of concentration of oxygen – the most sensitive indicator of early emergence of the center of self-heating of coal as gives the chance to track all process of low-temperature oxidation. Influence of content of oxygen sharply increases in the mine air with temperature increase: the she is higher, the at its smaller concentration oxidation process can proceed. Dependence of self-heating on the content of oxygen in the mine environment – one of the main factors influencing fire danger of mining operations upon their transition to the deep horizons [4, 8, 11].

The authors of work [16] studying tendency to self-ignition of coals of various brands at temperatures of 40 and 80 °C have executed calculations of amount of the carbon oxide which is emitted at low-temperature oxidation of coal. Generalizing these data for various sizes of humidity V^t and temperature of heating, the following settlement dependences of the relation of volume content of carbon oxide and a decrease of oxygen are received:

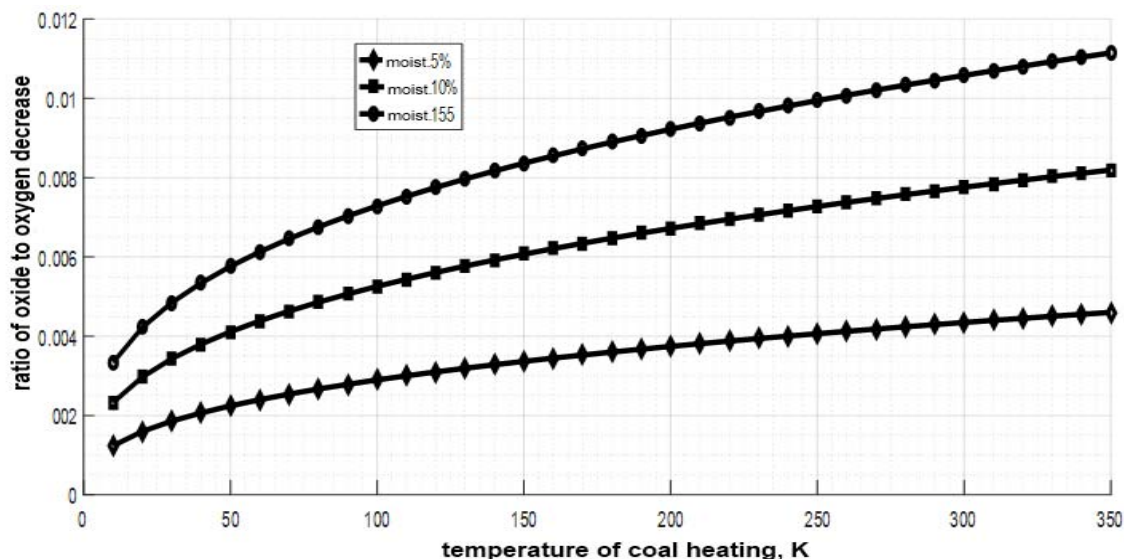
$$C_{co}/\Delta C_{o_2} = (0,0001 \cdot V^2 + 3 \cdot 10^{-5}) \cdot t^{-0,003 \cdot V^2} + 0\delta384 \quad (6)$$

for temperature 380° K

$$C_{co}/\Delta C_{o_2} = 0\delta007 \cdot t^{0,18+0,004 \cdot V^2} \quad (7)$$

In the figure 1 schedules of dependence of attitude $C_{co}/\Delta C_{o_2}$ on a formula (5) are shown at humidity of $V^t = 5, 10$ and 15% for the range of temperature of self-heating of coal within 350° K.

On function graphs it is visible that relation $C_{CO}/\Delta C_{O_2}$ on quite distinguishable value in the range of temperatures up to 70-80 °C accepts that is close to the critical temperature of self-ignition of coals of the Karaganda basin. Therefore, the considered sign can be used in practice of recognition of stages of self-heating and self-ignition of coals for prevention of emergence of the endogenous fires with specification of empirical coefficients for various brands of coal. It is quite solvable task on condition of appropriate data processing, the mines received according to the relevant services at the organization of planned control of problem sites in processes of conducting mining operations.



Schedules of dependences of the relation of content of carbon oxide to an oxygen decrease in the mine atmosphere from temperature of self-heating of coal at humidity of coal of 5% (the lower line), 10% and 15%

The results of the state-of-the-art review of methods of a research of oxidizing processes considered in article, stages of origin and development of the endogenous fires in coal mines show that the problem of development of informative signs of recognition and prevention of self-ignition of coal is relevant and now.

Conclusions:

1. The problem of timely recognition of stages of self-heating and self-ignition of coal on coal mines is still relevant for prevention of emergence of the endogenous fires in view of complexity of oxidizing processes in various conditions.
2. It is quite possible that for each layer and brand of coal it is necessary to develop, prove and accept individual sign for assessment of a condition of fire danger.
3. To systematize and to methodically process results of natural measurements and observations on the analyzed and investigated problem sites of mines for the purpose of creation of basin databases for the subsequent operational decisions in emergencies.

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КӨМІР ШАХТАЛАРЫНДАҒЫ ЭНДОГЕНДІ ӨРТТІҢ ДАМУ МЕН ПАЙДА БОЛУ КЕЗЕҢІ

Аннотация. Көмір шахталарындағы эндогенді өрттердің дамуы мен пайда болуының негізгі табиғи кезеңдері көрсетілді. Көмірдің өздігінен жануы мен өздігінен қызу химиялық үрдісін зерттеудің негізгі теориялық әдісінің сараптамасы жасалды. Көмір шахталарында өртке қарсы әрекет ететін мамандардың негізгі мақсаттарының бірі көмірдің өздігінен қызуын және қышқылдану кезеңін нақты анықтау болып табылады. Көмір үйінділерінде қышқылдану үрдістерінің даму қасиеттерін негіздеу үшін қиын аймақтарда ауа шахтасының құрамын бақылау бойынша табиғи алынған мәліметтер нәтижелерін жүйелеу және жинау ұсынылды.

Түйін сөздер: көмір шахтасы, қышқылдану үрдісі, көмір қышқылдануының химиялық реакциясы, эндогенді өрт кезеңдері, өздігінен жану қасиеттері, көміртегі оксиді, сутегі, оттегі шығыны.

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РАСПОЗНАВАНИЕ СТАДИЙ ВОЗНИКНОВЕНИЯ И РАЗВИТИЯ ЭНДОГЕННОГО ПОЖАРА В УГОЛЬНЫХ ШАХТАХ

Аннотация. Показаны природа и основные стадии возникновения и развития эндогенных пожаров на угольных шахтах. Выполнен анализ основных теоретических методов исследований химического процесса самонагревания и самовозгорания угля. Отмечено, что основная задача специалистов противопожарной защиты угольных шахт заключается в наиболее достоверном установлении стадии окисления и самонагревания угля. Предложено накапливать и систематизировать результаты натурных данных по контролю состава шахтной атмосферы проблемных участков для обоснования признаков развития окислительных процессов в угольных скоплениях.

Ключевые слова: угольная шахта, окислительный процесс, химические реакции окисления угля, стадии эндогенного пожара, признаки самовозгорания, оксид углерода, водород, убыль кислорода.

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EFFECT OF BROWN RUST DISEASE ON PHOTOSYNTHETIC ACTIVITY OF SPRING WHEAT VARIETIES

Abstract. *Ruccinia recondita* Rob.ex Desm. f. sp. tritici is a brown-rust of wheat that represent a wide-spread, harmful biotrophic parasite, which destroys cereal crops and *Triticum aestivum* L. varieties [1]. Disease resistance in plants reflects the presence of physiologically active substances, incompatible interaction in host plant-pathogenic agent metabolism, existence of toxic substances in plant metabolism that weaken pathogenic agent and other adverse conditions for pathogens. The high susceptibility of the summer wheat varieties to brown-rust of wheat is clearly seen in response to the pathogen's penetration into the cell. In a resistant plant cell, the cells immediately produce necrosis in the place of pathogen penetration. The abundance of crop yields depends on the efficiency of photosynthesis. The paper examines the amount of chlorophyll in the tissue of spring wheat varieties. Among the varieties under study, the following ones has demonstrated nonresistance to the disease: Almaken, Kazakhstanskaya 15, Lutescens 92, Kazakhstan early crop, MOVIR 409, D969th Stemrrsn, and Saratovskaya 29. The concentration of chlorophyll in these varieties was in the range of 0.1-41% that is significantly lower compared with its control varieties.

Keywords: brown rust, spring wheat, photosynthesis activity.

Introduction. *Ruccinia recondita* Rob.ex Desm. f. sp. tritici is a brown-rust of wheat, which rapidly spreads to several hundred meters by the air flow and represent a fungus disease excitant that cause epiphytotics in favorable conditions[1].

A comprehensive study of the selected material, the replacement of inefficient ones with the effective ones will reduce the incidence of the disease and prevent epiphytotics, and limit environmental pollution by chemicals [2-4]. Disease resistance in plants is connected with the presence of physiologically active substances, incompatible interaction in host plant-pathogenic agent metabolism, existence of toxic substances in plant metabolism that weaken pathogenic agent and other adverse conditions for pathogens. The high susceptibility of the summer wheat varieties to brown-rust of wheat is clearly seen in response to the pathogen's penetration into the cell. In a resistant plant cell, the cells immediately produce necrosis in the place of pathogen penetration. The abundance of crop yields depends on the efficiency of photosynthesis. The process of photosynthesis slows down due to half-necrosis of cells. The crop infestation by the brown rust of wheat leads to the decrease of chlorophyll amount, and reflects the chlorosis. The effect of brown rust disease on photosynthesis depends on the resistance characteristics of the varieties [5].

Research Materials and Methods. The leaves of the spring wheat varieties deceased by the brown rust of wheat has been used as research material.

Research experiments on the photosynthesis pigment of spring wheat varieties damaged by *Puccinia recondita* f. sp. tritici fungus has been conducted at the Department of Biology of the Kazakh State Women's University under laboratory conditions.

Research methods: The research experiments on the spring wheat varieties damaged by *Puccinia recondita* f. sp. tritici fungus were conducted. The plant leaf alcohol extract has been obtained to determine

the pigments. The obtained extracts were poured into the centrifuge test tubes and placed in the 6-7 thousand circuits for 7 minutes. The fluid from the centrifuge test tubes was brought into the same volume and the pigment amount of this extract was determined by spectrophotometric method. We determined the chlorophyll concentration in the Photometer-KFK-3 by putting the hydrophilic "a" and chlorophyll "b" in the following Vernon formula by spectrophotometric analysis.

$$C_{chlA} = 11,63 * D_{665} - 2.39 * D_{649};$$

$$C_{chlB} = 20.11 * D_{649} - 5.18 * D_{665};$$

$$C_{chl A+chl B} = 6.45 * D_{665} + 17.72 * D_{649},$$

where C represent a, b chlorophyll and carotenoid concentrations mg / l, D-wavelengths 440.5; 665 nm, The amount of carotenoids is calculated by the formula of Holm-Wettstein.

$$C_{car} = 4,695 D_{440.5} - 0.268 C_{(chl.a+chlb)}.$$

After determining the concentration of the pigment extract, the pigments in the tested material was calculated with taking into account the weight and extract amount of the investigated material (mass), by using the following formula:

$$A = C * V / P * 1000,$$

where in the concentration of pigments obtained in C-mg/L is the obtained pigment concentration; V – pigment extract volume is shown in ml; the size of pigments in plant material is shown in A-mg/g; P – weight of plant material is shown in gram.

The results of the research. In practice, the highest levels of pigment amount in different varieties of spring wheat damaged by brown rust of wheat was reflected in D939th Stemrrsn variety, where the amount of chlorophyll a is 0.290 mkg/g, chlorophyll b - 0.117 mkg/g, chlorophyll a + b - 0.409 mkg/g, carotenoid - 0.062 mkg/g; in Raxmon chlorophyll a - 0.282 mkg/g, chlorophyll b - 0.165 mkg/g, chlorophyll a + b - 0.447 mkg/g, the amount of carotenoid is equal to 0.065 mkg/g; in Arai chlorophyll a - 0.270 mkg/g, chlorophyll b - 0.117 mkg/g, chlorophyll a + b is equal to 0.387 mkg/g, carotenoid is 0.198 mkg/g; Lr-line 349 Thatcer chlorophyll a - 0.270 mkg/g, chlorophyll b - 0.069 mkg/g, chlorophyll a + b - 0.240 mkg/g, carotenoid b - 0.053 mkg/g; in Kazakhstanskaya 25 chlorophyll a - 0.225 mkg/g, chlorophyll b - 0.094 mkg/g, chlorophyll a + b - 0.499 mkg/g, carotenoid - 0.001 mkg/g; in Lr-line 341 Thatcer chlorophyll a - 0.192 mkg/g, chlorophyll b - 0.078 mkg/g, chlorophyll a + b - 0.270 mkg/g, carotenoids - 0,052 mkg/g, and in Alem chlorophyll a - 1.151 mkg/g, chlorophyll b - 0.061 mkg/g, chlorophyll a + b - 0.213 mkg/g, carotenoid was equal to 0.044 mkg/g, and the above-mentioned varieties showed a low level of 0.05-2% compared to the control variants. The analysis of all varieties demonstrated that the most high amount of chlorophyll was found in Alem variety that is 1.151 mkg/g. While the lowest level was shown in the Lr line 305 Thatcer varietyis, where chlorophyll a - 0.077 mkg/g, chlorophyll b - 0.025 mkg/g, chlorophyll a + b - 0.10 mkg/g, carotenoid - 0.027 mkg/g; in SR-36 variety, chlorophyll a - 0.081 mkg/g, chlorophyll b - 0.037 mkg/g, chlorophyll a + a - 0.01 mkg/g, carotenoid - 0.174 mkg/g; in Samgau - chlorophyll a - 0.125 mkg/g, chlorophyll b - 0.044 mkg/g, chlorophyll a + b - 0.170 mkg/g, chlorophyll a+b 0.041; in Kazakhstanskaya early crop - chlorophyll a - 0.127 mkg/g, chlorophyll b - 0.050 mkg/g, chlorophyll a + b 0.178 mkg/g, carotenoid was 0.038 mkg/g. The decrease up to 3-36 per cent can be observed in the comparison of the above-mentioned varieties with the control variants (table).

Among the varieties under study, the following ones have demonstrated nonresistance to the disease: Almaken, Kazakhstanskaya 15, Lutescens 92, Kazakhstan early crop, MOVIR 409, D969th Stemrrsn, and Saratovskaya 29. The concentration of chlorophyll in these varieties was in the range of 0.1-41% and significantly lower compared with its control varieties [6, 7]. A decrease in the number of chlorophyll in the plant leaf leads to a lower rate of photosynthesis. According to the literature, despite that the brown rust disease causes the decrease of chlorophyll, it does not lower the rate of photosynthesis [8-10]. Adult plant disease results in a rapid drop in the photosynthesis rate. These varieties have been damaged up to 40-70% in the area under spring crops during the ear stage.

Effect of brown rust wheat disease in summer wheat varieties on pigment composition (Case 2: I - inoculated, II - control)

I-variant						II-variant				
#	Name of varieties	Chl a	Chl b	Chl a+b	Carotenoid	#	Chl a	Chl b	Chl a+b	Carotenoid
1/1	Aray a 25	0,270± 0,0005	0,117± 0,0007	0,387± 0,0006	0,198± 0,0004	2/1	0,318± 0,0008	0,198± 0,0006	0,401± 0,0005	0,201± 0,0003
1/2	Almaken	0,157± 0,0007	0,066± 0,0006	0,224± 0,001	0,056± 0,0005	2/2	0,166± 0,0006	0,057± 0,0008	0,266± 0,0005	0,032± 0,0004
1/3	Kazakhstanskay	0,225± 0,0004	0,094± 0,0001	0,499± 0,0005	0,001± 0,0005	2/3	0,289± 0,0006	0,125± 0,0007	0,414± 0,0009	0,062± 0,0005
1/4	Kazakhstanskaya rannespelaya	0,127± 0,0005	0,050± 0,0008	0,178± 0,0006	0,038± 0,0005	2/4	0,202± 0,0004	0,091± 0,0004	0,294± 0,0004	0,052± 0,0005
1/5	Alem	1,151± 0,0001	0,061± 0,0005	0,213± 0,0007	0,044± 0,0001	2/5	0,286± 0,0004	0,111± 0,0007	0,379± 0,0007	0,068± 0,0006
1/6	Kazakhstanskay 15	0,210± 0,0009	0,084± 0,0005	0,294± 0,0008	0,053± 0,0008	2/6	0,233± 0,0008	0,059± 0,0007	0,327± 0,0007	0,059± 0,0007
1/7	Kazakhstanskay 17	0,143± 0,0003	0,043± 0,0006	0,187± 0,0006	0,044± 0,0002	2/7	0,006± 0,0007	0,138± 0,0006	0,445± 0,0004	0,056± 0,0004
1/8	Lyutestsens 90	0,162± 0,0005	0,062± 0,0009	0,224± 0,0006	0,060± 0,0006	2/8	0,274± 0,0007	0,119± 0,0007	0,394± 0,0005	0,050± 0,0005
1/9	Lyutestsens 92	0,172± 0,0005	0,070± 0,0005	0,243± 0,0006	0,193± 0,0002	2/9	0,205± 0,0005	0,176± 0,0004	0,282± 0,0005	0,197± 0,0004
1/10	Raksanom	0,282± 0,0006	0,165± 0,0004	0,447± 0,0004	0,065± 0,0003	2/10	0,379± 0,0005	0,159± 0,0005	0,538± 0,0006	0,052± 0,0006
1/11	Samgau	0,125± 0,0004	0,044± 0,0006	0,170± 0,0005	0,041± 0,0005	2/11	0,266± 0,0005	0,109± 0,0006	0,375± 0,0004	0,052± 0,0007
1/12	Лг-линия 305 Thatcer	0,077± 0,0008	0,025± 0,0003	0,103± 0,0005	0,027± 0,0005	2/12	0,293± 0,0006	0,128± 0,0004	0,421± 0,0004	0,055± 0,0007
1/13	Лг-линия 349 Thatcer	0,270± 0,0007	0,069± 0,0002	0,240± 0,0003	0,053± 0,0007	2/13	0,298± 0,0005	0,103± 0,0007	0,345± 0,0004	0,089± 0,0005
1/14	Лг-линия 341 Thatcer	0,192± 0,0005	0,078± 0,0005	0,270± 0,0006	0,052± 0,0004	2/14	0,233± 0,0007	0,096± 0,0004	0,306± 0,0005	0,079± 0,0005
1/15	MOVIR 409	0,111± 0,0002	0,045± 0,0005	0,107± 0,0005	0,191± 0,0006	2/15	0,231± 0,0008	0,121± 0,0004	0,168± 0,0005	0,222± 0,0004
1/16	Д11705 th Stemrrsn	0,158± 0,0005	0,073± 0,0004	0,231± 0,0007	0,042± 0,0006	2/16	0,201± 0,0007	0,182± 0,0005	0,298± 0,0006	0,086± 0,0005
1/17	SR-36	0,081± 0,0006	0,037± 0,0006	0,011± 0,0008	0,174± 0,0005	2/17	0,189± 0,0005	0,102± 0,0005	0,322± 0,0005	0,183± 0,0004
1/18	Д939 th Stemrrsn	0,290± 0,0003	0,117± 0,0003	0,409± 0,0005	0,062± 0,0004	2/18	0,387± 0,0007	0,168± 0,0007	0,455± 0,0007	0,079± 0,0004
1/19	Д969 th Stemrrsn	0,170± 0,0008	0,068± 0,0004	0,239± 0,0007	0,386± 0,0007	2/19	0,268± 0,0007	0,101± 0,0007	0,299± 0,0001	0,045± 0,0007
1/20	Saratovskaya 29	0,143± 0,0002	0,058± 0,0005	0,202± 0,0004	0,041± 0,0004	2/20	0,201± 0,0006	0,125± 0,0005	0,301± 0,0005	0,098± 0,0006

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ЖАЗҒЫ БИДАЙ СОРТТАРЫНЫҢ ФОТОСИНТЕЗДІК БЕЛСЕНДІЛІГІНЕ ҚОҢЫР ТАТПЕН ЗАЛАДАНУЫНЫҢ ӘСЕРІ

Аннотация. Қоңыр тат қоздырғышы (*Puccinia recondita* f. sp. *tritici* P. *tritici* Erikss.) – астық дақылдарын және *Triticum aestivum* L. жұмсақ бидайды зақымдайтын өте кең таралған, зиянды биотропты паразиттердің бірі болып табылады.

Төзімді сорттарды қалыптастырып өндіріске енгізу бидайды таттан қорғаудың ең тиімді шарасы ретінде қабылданған. Өсімдіктің індетке төзімділігі оның ұлпасында қоздырғышқа қажетті қорек элементтерінің болмауы, не болмаса физиологиялық белсенді заттардың болмауы, қожайын-өсімдік пен патогеннің зат алмасуымен сәйкес келмеуі, патогеннің өсімдік метаболизмінің токсинді өнімдерімен ауырлауы, және басқа да патогенге қолайсыз факторлардың болуына байланысты. Тақта жоғары сезімталдылық редакциясы патогенді енгізу барысында және өсімдіктерді көректенудің биотрофты типімен сипатталатын облигатты паразиттермен зақымдау барысында ерекше анық байқалады. Іріктеу жетістіктеріне қарамастан жазғы бидай сорттарының фотосинтездік белсенділігіне қоңыр таттың әсері әлі күнге дейін айтарлықтай анық емес.

Осы мәселеге қатысты мақалада қоңыр татпен зақымданған жазғы бидай сорттарының ұлпаларындағы хлорофилл мөлшерінің азаюы қарастырылған. Жүргізілген эксперимент нәтижесінде зақымданған Алмакен 15, Қазақстандық 15, Лютеценс 92, ерте пісетін Қазақстандық сорт, МОБИР 409, Саратов 29 сорттарындағы хлорофиллдің мөлшері бақылаудағы нұсқамен салыстырғанда 0,1 ден 41 % азайғаны байқалды.

Түйін сөздер: қоңыр тат, жаздық бидай, фотосинтез белсенділігі.

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ВЛИЯНИЕ ЗАБОЛЕВАНИИ БУРОВОЙ РЖАВЧИНЫ НА ФОТОСИНТЕТИЧЕСКУЮ ДЕЯТЕЛЬНОСТЬ ЯРОВЫХ ПШЕНИЦ

Аннотация. Возбудитель бурой ржавчины *Puccinia triticina* Erikss. –специализированный биотрофный паразит, являющий одним из наиболее распространенных и вредоносных заболеваний зерновых злаков и поражающий мягкую пшеницу *Triticum aestivum* L.

Среди мер защиты пшеницы от ржавчины наиболее эффективным признано создание и внедрение в производство устойчивых сортов. Устойчивость растения к болезни может быть связана с отсутствием в его тканях необходимых для возбудителя элементов питания или физиологически активных веществ, несоответствием обмена веществ растения-хозяина обмену веществ патогена, угнетением патогена токсичными продуктами метаболизма растения, другими неблагоприятными для патогена факторами. Реакция сверхчувствительности к ржавчине наиболее ярко проявляется при внедрении патогена и при заражении растений облигатными паразитами, которые характеризуются биотрофным типом питания. Несмотря на селекционные достижения, мало известно влияние бурой ржавчины на фотосинтетическую активность сортов яровой пшеницы.

В связи с данной проблемой в статье исследовано уменьшение содержания хлорофилла в тканях сортов яровой пшеницы, пораженного бурой ржавчиной. В результате проведенного эксперимента выявлено уменьшение хлорофилла от 0,1 до 41% у пораженных сортов Алмакен, Казахстанская 15, Лютесценс 92, Казахстанская раннеспелая, МОВИР 409, Саратовская 29 по сравнению с контрольным вариантом.

Ключевые слова: бурая ржавчина, яровая пшеница, фотосинтезная активность.

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VULNERABILITY OF FOREIGN VARIETIES OF SPRING WHEAT TO BROWN RUST (*Puccinia recondita* f. sp. *tritici* Rob. ex Desm.) IN THE CONDITIONS OF SOUTHERN KAZAKHSTAN

Abstract. The brown rust agent (*Puccinia recondita* f. sp. *tritici* P. *tritici*Erikss.) is a specialized biotrophic parasite, one of the most widespread and harmful diseases of cereals that affect soft wheat *Triticum aestivum* L. under favorable conditions, and the development of the disease can reduce the harvest up to 45% and more. During the epiphytotic development, it covers an area of up to 1.5-2.0 million hectares and reduces the yield up to 20-80%. The most cost-effective and environmentally safe method of combating diseases is the use of resistant varieties, which requires a constant search for new resistance donors and highly resistant samples. This article presents the results of studies on resistance to brown rust.

Keywords: varieties of spring wheat, brown (leaf) rust, epiphytoty, resistance, susceptibility.

Introduction. Cereals are the most important food and fodder crops in Kazakhstan. Infectious diseases of wheat plants are the main reason for reduction in yields of grain crops and deterioration of its quality [1, 2]. One of the most common and harmful diseases of spring wheat is the brown (leaf) rust caused by the basidiomycota *Puccinia recondita* f. sp. *tritici* Rob. ex Desm. The main area of its distribution and harmfulness is concentrated in the northern regions of Kazakhstan, where the mild or strong development of the fungus is observed every 2-3 years [3-5]. At present, yields of wheat varieties that are unstable to dangerous pathogens reach 60-80% in epiphytotic years [6, 7].

The most cost-effective and environmentally safe method of pest control is the use of resistant varieties, with the constant search for new resistance donors. For reliable protection of the crop, it is necessary to identify sources of resistance to brown rust, to create and use wheat varieties with different resistance genes on immune selection.

Materials and methods. The foreign varieties of spring soft wheat, which was obtained from international catteries CIMMYT and ICARDA has been used as a seed grain. The uredospores of brown leaf rust, which was collected on the experimental sites of collection varieties, as well as from affected wild-growing cereals, served as infectious materials. The experiments were carried out in the field experimental conditions of the Kazakh Scientific Research Institute of Agriculture and Plant Growing. To create an infectious background in the phase of plant tillering, an artificial infectious background was created by using a brown rust uredospore (*P.triticiana*). The infectious load of uredospores composed 20 mg/m². The processes of infection of plants, the creation of a moist chamber were carried out by the method of N.E. Konovalova and others [8]. The type of lesion of plants with leaf rust was determined on a five-point scale by E.E. Mains, H.S. Jackson [9]. At the same time, 0 point refers to the immune type, 1-2 points to the stable type, and 3-4 points to the susceptible type. The intensity of plant damage was determined by a modified Cobb scale (scale by R.F. Peterson, A.B. Campbell, A. E. Hannah) [10].

Results. As a result of research in the conditions of Southern Kazakhstan on an artificial infectious background, the resistance of foreign varieties of spring soft wheat to brown rust was revealed. The

studied varieties showed different responses to disease resistance. Florance Au. variety and control varieties of Morocco, Saratov 29 were strongly affected by leaf rust and the type of reaction has reached 4 points, while the degree of damage was ranged from 70-90%. Varieties of Babaga, Mexipikal, Cham 3, Cham/CA8055 had a moderate resistance rate. Belikh-2, Bohouth 11, Oued Zenati had small pustules with necrotic spots, on the leaf blade of plants the pustules had a scattered development, and the intensity of their development was insignificant (20-30%). Among the varieties studied, Atlas-1, Cham, Karim has been distinguished by resistance. The immunological response was observed in the varieties of Chili, Zenatori Cappeli and Tunsyr-2 (table).

Immune resistance characteristic of foreign summer wheat to brown rust of wheat (*Puccinia recondita* f. sp. tritici)

Sort name	Type and Level of Infection		Eternal resistance (UN1)
	point	%	
Aghram	2+3	30	MR/MS
Atlas-1	0	0	R
Babaga	3	70	MS
Belikh-2	2	20	MR
Bohouth 11	2	40	MR
Florance Au.	4	70	S
Mexipikal	3	60	MS
Cham/CA8055	3	80	MS
Cham	1	5	R
Cham 3	3	60	MS
Chili	0	0	R
Karim	0	0	R
Tunsyr-2	0	0	R
ZenatoriCappeli	0	0	R
OuedZenati	2	40	MR
Morocco (St.)	4	90	S
Saratovskaya 29, (Kazakhstan)	4	95	S

Note: 1 «UN» – a unified scale; 2 «MS» – average sensitivity; 3 «MR» – average resistant; 4 «R» – resistant.

Thus, the studies in the conditions of Southern Kazakhstan showed that foreign varieties of spring wheat are divided into five groups by the immunological types of reaction to brown rust: immune, resistant, moderately resistant, moderately susceptible and susceptible. Immune varieties are as following: Chili, Zenatori Cappeli, Tunsyr-2 and resistant varieties: Atlas-1, Cham, Karim, which are recommended for wheat selection as resistant to leaf rust.

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ОҢТҮСТІК ҚАЗАҚСТАН ЖАҒДАЙЫНДА ШЕТЕЛДІК БИДАЙ СОРТТАРЫНЫҢ ҚОҢЫР ТАТПЕН (*Puccinia recondita* f. sp. *tritici* Rob. ex Desm.) ЗАЛАЛДАНУЫ

Аннотация. Қоңыр тат қоздырғышы (*Puccinia recondita* f. sp. *tritici* P. *triticiana* Erikss.) – астық дақылдарын және *Triticum aestivum* L. жұмсақ бидайды зақымдайтын өте кең таралған, зиянды биотропты паразиттердің бірі болып табылады. Қолайлы жағдайда індеттің дамуы егін өнімін 45%-ға және одан да көп мөлшерде азайту мүмкін. Эпифитотияның даму жылдарында ол 1,5-2,0 млн. гектарға дейінгі аумақты қамтып, егіс өнімін 20-80%-ға дейін төмендетеді. Індетпен күресудің экономикалық және экологиялық тұрғыдан ең тиімді әрі қауыпсіз жолы төзімді сорттарды пайдалану болып табылады, ал ол үшін жаңа төзімді донорлар мен жоғары төзімді үлгілерді іздестіру жұмыстарын үнемі жүргізіп тұру қажет. Мақалада қоңыр тақта төзімділік бойынша алынған зерттеу нәтижелері келтірілген.

Түйін сөздер: жаздық бидай сорттары, қоңыр тат, эпифитотия, төзімді, қабылдағыш.

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ПОРАЖАЕМОСТЬ ЗАРУБЕЖНЫХ СОРТОВ ЯРОВОЙ ПШЕНИЦЫ БУРОЙ РЖАВЧИНОЙ (*Puccinia recondita* f. sp. *tritici* Rob. ex Desm.) В УСЛОВИЯХ ЮЖНОГО КАЗАХСТАНА

Аннотация. Возбудитель бурой ржавчины (*Puccinia recondita* f. sp. *tritici* P. *triticiana* Erikss.) – специализированный биотрофный паразит, одно из наиболее распространенных и вредоносных заболеваний зерновых злаков и поражающий мягкую пшеницу *Triticum aestivum* L. При благоприятных условиях развитие болезни может снизить урожай до 45% и более. В годы развития эпифитотий она охватывает площадь до 1,5-2,0 млн га и снижает урожай до 20-80%. Наиболее экономически выгодным и экологически безопасным методом борьбы с болезнями является использование устойчивых сортов, при этом требуется постоянный поиск новых доноров устойчивости, высокоустойчивых образцов. В статье представлены результаты исследований на устойчивость к бурой ржавчине.

Ключевые слова: сорта яровой пшеницы, бурая (листовая) ржавчина, эпифитотия, устойчивость, восприимчивость.

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PSYCHOLOGICAL AND PEDAGOGICAL ASPECTS OF MORAL EDUCATION IN KAZAKHSTAN

Abstract. The moral education, the formation of the mental integrity of a person is one of the priorities of the education system. However, in connection with globalization, market conditions of the service sector, the role of the teacher as a bearer of moral potential is depreciating. The purpose of this article it's theoretical study of aspects moral education. The new State Program pays a lot of attention to the development of well-integrated individual. The capitalistic market relationships changed a structure and curriculum of education. We did not realize a long time that it can lead to not pleasant consequences. But today it is already impossible, assimilating to an ostrich, to pretend that in a moral condition of society nothing bad occurs. The scandals which even more often are splashing out in media and in a social network demonstrate that the situation can get out of hand.

Keywords: moral education, values, society, moral.

In 1,5 months 2018 in Kazakhstan registered 267 criminal offenses concerning minors, from them 71 heavy and 21 unusually heavy. According to data of the deputy, in Kazakhstan the number of convicts for violence over minors increases. If in 2015 the crime amount made 182, then two years later this figure increased to 395. Besides, Saule Aytpayeva said the facts of unmotivated crimes of minors when they commit violence just for the hell of it. It, according to her, is an indicator of their spiritual falling and moral degradation.

"According to forecasts of Committee of statistics, the annual rate of a population increase will gradually decrease from 2016 to 2026 as the reproductive group will include the small generation which was born in the mid-nineties last century. The total coefficient of birth rate across Kazakhstan will decrease with 2,74 in 2014 to 2,1 by 2050. Restriction of children from drugs, early and chaotic sexual communications is a question not only morality, health, life, but also a question of state security", – the deputy of the Senate said.

So it turned out that from the beginning of a severe era of market reforms all connected with spirituality, ethics at us somehow imperceptibly receded into the background. And we did not realize long time that it can lead to not palatable consequences. But today it is already impossible, assimilating to an ostrich, to pretend that in a moral condition of society nothing bad occurs. The scandals which even more often are splashing out in media and in a social network demonstrate that the situation can get out of hand.

Morality is a system of beliefs about ethics, about what is right and good compared to what is wrong or bad. Moral development refers to the changes in moral beliefs as a person grows older and gains maturity. Moral beliefs are related to, but not identical with, moral behavior: it is possible to know the right thing to do, yet not actually do what is right. Morality is also not the same as knowledge of social conventions, which are arbitrary customs needed for the smooth operation of society. Even though conventions may have a moral element, they have a primarily practical purpose. Conventionally, for

example, motor vehicles all keep to the same side of the street (to the right in the United States, to the left in Great Britain). This convention allows for smooth flow of traffic and prevents accidents. But following the convention also has a moral element, because any individual who chooses to drive on the wrong side of the street can cause injuries or even death. Choosing the wrong side of the street is therefore morally wrong, and choosing the conventional side is morally right.

When it comes to teaching, moral choices are not restricted to occasional dramatic incidents, but are woven into almost every aspect of classroom life. Imagine this simple example. Suppose that you are teaching reading to a small group of second-graders, and the students are taking turns reading a story out loud. Should you give every student the same amount of time to read, even though some might benefit from additional opportunity to read? Or should you give more time to the students that seem to need extra help, even if doing so bores others or deprives them of an equal share of “floor time”? Which option is more fair, and which is more considerate? Parallel dilemmas happen every day at all grade levels simply because students are diverse and class time and a teacher’s energy level are finite.

One of the best-known explanations of how the morality of justice develops was developed by Lawrence Kohlberg and his associates (Kohlberg, Levine, & Hewer, 1983; Power, Higgins, & Kohlberg, 1991). Using a stage model similar to Piaget’s, Kohlberg proposed six stages of development, grouped into three levels, which individuals experience universally and in sequence as they form beliefs about justice. He named the levels simply preconventional, conventional, and (you guessed it) postconventional. The levels and stages are summarized in figure 1.

SOURCE: KOHLBERG, (1963,1981)

Kohlberg's Levels of Moral Development		
LEVEL	STAGE	CHARACTERISTICS OF STAGE/LEVEL
A Preconventional	Stage 1	PUNISHMENT-OBEDIENCE ORIENTATION
	Stage 2	INSTRUMENTAL RELATIVIST ORIENTATION
B Conventional	Stage 3	INTERPERSONAL CONCORDANCE ORIENTATION
	Stage 4	AUTHORITY AND SOCIAL-ORDER MAINTAINING ORIENTATION
C Postconventional Autonomous, or Principled	Stage 5	SOCIAL-CONTRACT LEGALISTIC ORIENTATION
	Stage 6	UNIVERSAL ETHICAL PRINCIPLE ORIENTATION

Figure 1 – Moral Development

The spiritual and moral relations have the two-level structure: the first level – the good ties including the attitude towards morals and the self-relation; the second level – the spiritual relations defining the attitude towards the meaning of life, an ideal, religion. Components of the religious and moral relations are the cognitive component (existence of knowledge of the spiritual essence of the person); a behavioral component (the aspiration to be guided by spiritual norms in any life situations); emotional component (emotional and valuable attitude towards, other people and the world).

The model of development of the spiritual and moral relations in students includes: internal factors of development (needs of the identity of the student for communication, self-knowledge and self-improvement; interest in the inner world and inner world of other people); external factors of development (spiritual and moral atmosphere of educational and educational space of higher education institution in general, activity of the faculty, activity of students); cognitive, cognitive and activity and sensual and activity stages of impact on the spiritual relation of future teachers; the forms and methods starting mechanisms of development of the personality (identification, a reflection, understanding and experience).

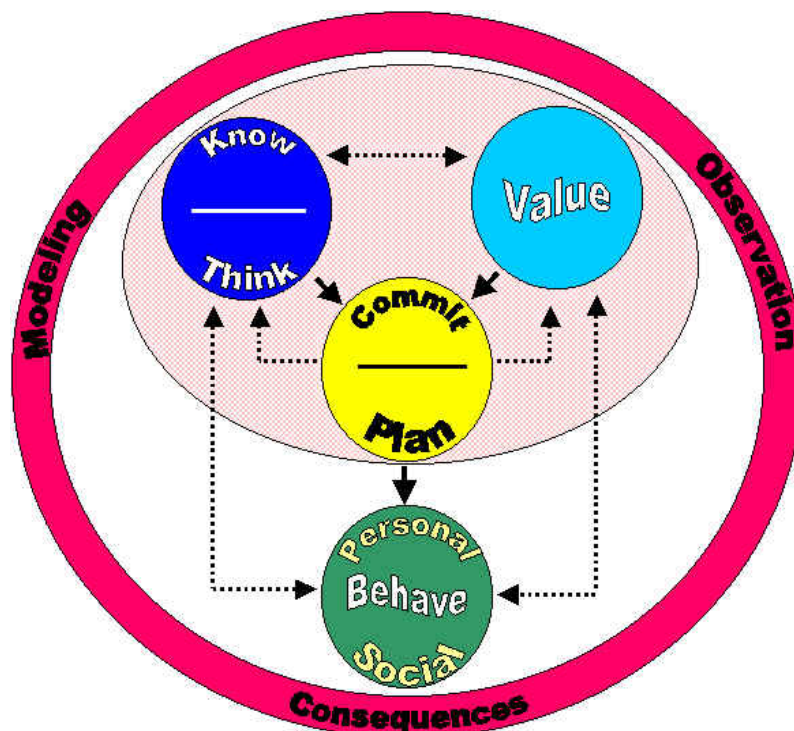


Figure 2 – Moral development in teaching

Thus, the modern national educational ideal is the highest moral, creative, competent citizen of Kazakhstan accepting the fate of the Fatherland as personal, realizing responsibility for the present and the future of the country, implanted in spiritual and cultural traditions of the Kazakh people.

The content of spiritual and moral development and education are the specific values stored in religious, ethnic, cultural, family, social traditions and transferred from generation to generation. The system of fundamental national values is given in the Concept of spiritual and moral education of the Kazakhstan school students.

Traditional sources of morality are:

- patriotism (love to Kazakhstan, to the people, to the small homeland; service to the Fatherland);
- social solidarity (freedom personal and national; trust to people, institutes of the state and civil society; justice, mercy, honor, advantage);
- civic consciousness (constitutional state, civil society, debt to the Fatherland, senior generation and family, law and law and order, interethnic world, freedom of worship and religions);
- family (love and fidelity, health, prosperity, honoring of parents, care about senior and younger, care of reproduction);
- work and creativity (creativity and creation, commitment and persistence, diligence, thrift);
- science (knowledge, truth, scientific picture of the world, ecological consciousness);
- Traditional religions.
- Art and literature (beauty, harmony, the inner world of the person, moral choice, the meaning of life, esthetic development);
- nature (life, home ground, reserved nature, Mother Earth);
- humanity (world peace, variety, and equality of cultures and people, the progress of humanity, international cooperation).

The main reason for the phenomena and tendencies observed today in the spiritual sphere is that the concept "Kazakh society" became the most indistinct. Another not less sad factor – terrible social stratification is the cornerstone of it. It so profoundly divided the Kazakh society that it is not visible anymore, on its what principles it is possible to unite somehow.

If to compare the current situation in the spiritual sphere with former (read, Soviet) from time to time, then such comparison will be visible not in favor of today. Our thoughts it's not nostalgia. However agree:

if then separately taken citizens and society in general, despite its multinational and multi-confessional structure, lived with hope for the future and in it were uniform, then there is no such hope now anymore.

Yes, it is difficult to call the Soviet system as ideal. But it was a time where people had at least a feeling of social justice – what is absent today. Today became fashionable to complain about past era and its customs, to categorically claim that nearly all defects of society, including bribery, it is from there. But we admit honestly: if they and from the past, then not always and not entirely from the Soviet past.

On such conclusion, the opinion beginning to occur more and more widely pushes that at us, not market economy turned out and that as a result, we constructed not quite classical capitalism. It is difficult not to agree with it. And somehow it is entirely hardly trusted in spells that ahead of our society, our nation waits for the real and corrects capitalism – such as in Western Europe, in the States, on the Japanese and the British Isles and other Singapura.

Why? And this, as they say, question of questions. Let's try to answer it very briefly. The construction of civilized market society is impossible without spiritual and moral development. The Capitalism did not arise from anywhere. The ideological base of modern capitalism it's longtime transformed Christianity and philosophy of puritanism. According to Verner Zombart, the thirst for enrichment is old as the world, but only capitalism forms the person wishing to be enriched with regular, everyday work. And we have to pay attention: routine and day-to-day work. As far as does it connects moral and ethical installations of our capitalists? The answer will be straightforward and capacious – NOWAY. Moreover, contrary inertia in this direction gained such strength that, in our opinion, at its preservation with it it will be possible to construct little in general and furthermore the real capitalism.

Reflecting over the nature of moral degradation of our society, you face one more paradox. Why with a noticeable growth of religiousness of our community the level of his spirituality leaves much to be desired? At all seeming complexity of a question, it is possible to answer it instead merely.

First, Kazakhs were never fanatics of religion as Islam, Muslim religion was integrated with traditional cosmogonic views, household ceremonies, and customs.

Secondly, during the Soviet period, many Kazakhs had an opportunity to get full-fledged secondary and higher education that along with the ideology dominating then separated them from religion. The more person is an educative the is more challenging to tighten him in a snare of the same Wahhabi Muslims preachers. Today is receiving the higher education, it seems, is not so problematic. But on the other hand, its quality fell below a plinth. The fact that the domestic education system (not only the highest but also school) endures the severe crisis, including "thanks to" unsystematic and unreasoned reforms. And as a result poorly educated citizens become an easy victim of missionaries of the most different types.

Thirdly, increase in the society of religious moods is in many respects caused by suspense of social and economic problems. Especially it concerns young people. The youth are mainly without work, without a place to live, so they see religion as an exit from a stressful life situation. Especially when emissaries whisper that, on this particular way, they will be able to solve the pressing problems. But it leads not so much to the growth of spirituality how many to a simplification of mass consciousness.

The recent scandal with one of the popular Instagram star in night club “Zakova” shows us an abyss opening between State and society. It happened in nightclub where if we are not mistaken, the striptease is not something outstanding or illegal. The following aggressive responds of normal males was predictable. However, the "fight methods" which was elected by moral – protectors and especially efficiency of it raise a lot of questions.

In this situation, it's immoral the hypocrisy of our allegedly temporal power. If to speak about a striptease and specific pleasure institutions as nightclubs, then, in fact, there is no subject for moralizing. Under the law, they have the right to exist? Have. What was sense to make a fuss?

One of possible explanation that in our mass consciousness the woman is still considered as subject of sexual joys; or the person who has to satisfy all material and household inquiries (requirements) of men. And meanwhile, the world promptly leaves forward. Not only in the European West but even in Latin America with its morals which is based on Catholic values, women even more often come to the first positions, becoming presidents (in Brazil, Argentina, Chile, etc.) and prime ministers. In Kazakhstan rare female ministers, as a rule, are responsible for the most failure spheres of social and economic life. And it is even challenging to present the woman as the mayor of the town or the large city.

About what high morality can there be a speech if a half of society (women's means) actually is in second position? At the same time, the historical paradox consists that in traditional Kazakh society the woman had the higher status, than in other east societies. It is the admitted fact.

It is characteristic that if madam Bayzakova was subjected very disputable, from the right to punishment, then the individual imam propagandizing obligatory corporal punishments for Muslim female remained out of sight of domestic justice. Too quite indicative paradox as it is impossible it is convex reflecting a peculiar mosaicism of our public morals. To undress in a nightclub – it is immoral, and to whip the woman – it, so to speak, is quite decent.

Here truly mysterious are the ways of the Lord ...

So on what paradigm or paradigms moral values in modern conditions have to be based:

- on installations of traditional Kazakh society (read, antiquity)?
- on a synthesis of the liberal philosophy and traditional values (if it is possible in general)?
- on standards of Islamic culture?

It is unlikely someone will be able to give the definite answer to this question. But the general conclusion can be drawn. As we live in the 21st century when we want that or not, the liberal installations get everywhere (with globalization there's nothing to be done), it is necessary to reckon with it. But at the same time we cannot so just take and refuse here the spiritual heritage (otherwise what we are the people?), to which the respect for seniors, hospitality, tolerance, compassion and some other belong. They do not lose the relevance and today. And, perhaps, synthesis of all this also is what has to become a paradigm of spiritual evolution of our society.

The school currently faces the task of training specialists whose professional competence will be able to fundamentally change the scientific, technical, economic and intellectual basis of our society by introducing the latest technologies. These requirements are due to the new concept of higher education in the Republic of Kazakhstan. It is necessary to remember that process of knowledge has to bear to people the joy of finding of new outlook of the meaning of life, the place in it. The changes in society help us to understand and accept the relevant organizational structure of the educational system and its institutions which would provide the transition from the principle "education for the rest of life" to the principle "education through all life".

One of the possible ways to solve this problem is to educate students about the proper attitude to professional knowledge and skills, the formation of their need for self-educational activity. But this is not possible without the internal development of the student's personality. The psychological regularity of this age is the formation of the mechanism of self-development, and self-education. In this regard, the role of the teacher as a mentor loses its relevance. However, recent studies of modern specialists show the following regularity :

1) The transition to a market-based education in higher education has disrupted child-parent relations. The spiritual and moral upbringing and self-education of the individual in the family institute cease to be decisive. The problematic economically unstable situation in the country has caused the increasing employment of parents and as a result the phenomenon of "rejection" of children (Abramenkov).

2) Researchers note a tendency towards the formation of a pragmatic logic of relations; values, ideas and feelings are subjected to a rigid analysis from the standpoint of egocentrism. The "market philosophy" of relations devalues the value of collective labor, empathy, and altruism (Feldstein, Kim).

3) Globalization increase role of mass media and as a result its the propaganda of "unhealthy" values; lack of state control, the system of moral education loses its significance (Sukharev).

We can't teach people without the understanding of their values. The efficient organization of the educational process is inconceivable without an in-depth study of the system of youth moral values, which will guide their life, both in a single concrete act and in life principles.

The modern system of education long time concentrated on knowledge basis, and pedagogical staff didn't work so much with internal values and moral upbringing.

The first condition of modernization of new type is a maintaining the culture, own national code. Without it, upgrading will turn into an empty phrase. But it doesn't mean preservation of all in the national consciousness – and what gives us confidence in the future, and what conducts us back. New modernization shouldn't as before, haughtily to look at historical experience and traditions. On the contrary, it has to make the best traditions a prerequisite, an essential condition of success of modernization. Without

support on national and cultural roots modernization will hang in mid-air. I want that she firmly stood on the earth. And it means that the history and national traditions have to be undoubtedly considered. It is the platform connecting the horizons of last, real and future people.

What values do students prefer? What does motivate them and their behavior? What do they want to reach in future? It is a well-known fact that if young people can answer that questions, they will be successful in social and professional activity. So these answers will act as the driving forces of personal development. In the same cases, when such responses (and hence attitudes and attitudes) go against the moral norms, they demoralize young people, direct their behavior into an antisocial channel, and criminalize them.

In the same cases when such answers (so both views, and installations) go against with ethical standards, they will demoralize young people, their behavior will go to the deviant direction and further criminalization.

The social status of student's youth has the specifics. Unlike the peers included in other activity (military service, work), the studying child is involved in the educational activity. In these social conditions, the relation to educational process has to become the significant moral value which would dominate in requirements, interests and social expectations of young people.

According to Patrikeeva and her research of value orientations of modern student's youth of Arzamas during the period (2002-2007-2013), respondents had to answer the following question: Whether "You realize the following moral concepts: "debt," "justice," "responsibility," "advantage"?. The Longitude research from 1986 to 2013 has allowed drawing interesting conclusions.

– First, the level of knowledge which is a social and world outlook and moral basis of a personal position of young people has decreased. And meanwhile, the concepts based on knowledge, views and, especially, beliefs, define a certain image the purposes and motives of educational activity, the attitude of young people towards her. The lack of moral views, social and moral representations significantly complicates orientation of modern youth in many difficult questions of life of society, in the foreign and domestic policy of the state. Values "debt," "justice," "responsibility," "advantage" directly or indirectly define orientation and degree of effectiveness of the relations of the personality to events or the solution of social tasks.

– Secondly, purposeful education of moral system of values in the conditions of the educational process of a higher education institution is necessary. The primary efforts of psychology and pedagogical, scholarly work with youth have to be directed to the assistance of social and psychological adaptation of young people. It is necessary to help students with the finding of the profession actively, with the determination of the social status, with a restoration of belief in cultural wealth of society.

A useful tool that shapes the moral values of student youth is the continuous development of the value system of an educational institution, where a young person not only receives a profession for several years but also is formed as a person. In the development of the moral values of student youth, a considerable role belongs to teachers, their qualities. The peculiarities of the teacher's value relations permeate the entire educational process and influence the formation of the value-orientation block of students. Positive business, moral, intellectual, political and other qualities of the teacher, his knowledge, the level of life and professional experience, psychological warehouse, etc. cause the authority among students of youth [5].

The quality of the result of vocational training could be described as compliance of professional readiness of the student to modern "calls of time" and is considered through the concept "professional competence." Numerous researchers of different models of professional work can be united in two groups (Rubenstein):

- model of adaptive behavior;
- model of professional development.

The model of adaptive behavior focused on the quick response to external changes. And the model of professional development on account and forecasting of future changes. The model of professional development focused on the formation of abilities "to go beyond" a continuous stream of daily practice, that is to see, realize and estimate various problems, to consider any difficulty as a development incentive.

The Concept of reform of the general education system in the Republic of Kazakhstan describes the importance of the spiritual and moral development of the future generation. The idea of stage-by-stage

modernization of national network of multilevel education by priorities of the Strategic development plan for the Republic of Kazakhstan, for improvement of the quality of preparation of human resources, the satisfaction of needs of the personality and society including spiritual. The transformations in an education system of the Republic of Kazakhstan directed to full integration into world educational space, the problem of spiritual and moral development can't be ignored the states in any way.

The development of vision, character, and competence in our young people is necessary to allow our nation to continue its role of world leader into the 21st century rather than be relegated to history as former world leaders such as Egypt, Iran, Spain, Portugal, and Great Britain. Each of these former world powers failed to keep pace with the changing demands of the world around them. In many cases it was not a failure of the economic or material aspect of society, but rather the human, social, political, or spiritual aspects. The educational system must prepare individuals to progress in each of these arenas of life. Therefore, character development must be seen as an organic process in the development of the material/physical, human/psychological, and spiritual/transcendental aspects of human being.

There is much agreement that educators ought to enable individuals to live a good life; however, there is also a commonly held view that government, and consequently, public schools, ought to be neutral on defining the good life (Rawls, 1971). This neutrality is appropriate only in so far as we lack knowledge or simply disagree about the good

Society and educational institutions pay insufficient attention today to spiritual and moral development of younger generation as generally in all spheres of life material requirements are cultivated. It has led to deformation of valuable orientations, decrease in the importance of spiritual and moral qualities, loss of mental ancestors that, in turn, according to many researchers, has to draw particular attention to the importance of spirituality and morality in the education of future generation.

Also, educational institutions didn't perform until recently these functions. Educational processes in higher education institutions and schools have been focused mainly on formation and development of intellectual forces of trainees. And only in the last decades in psychology and pedagogical literature and the press began to speak about the need for a statement the spiritual values in our educational institutions. Knowledge of inner world of the child, of education of his soul more than ever, is today demanded that emphasizes the relevance of research of a problem of personal development of future teachers having spiritual and moral potential. The developing society needs modernly educated, ethical, enterprising people who can independently make crucial decisions in a choice situation, predicting their possible consequences capable to cooperation differing in mobility, dynamism, constructability, possessing the developed sense of responsibility for the fate of the country... An essential problem of education – formation at pupils civil is responsible - state and legal consciousness, spirituality, and culture, initiative, independence, tolerance, ability to successful socialization in society and active adaptation in labor market.

From everything told it is possible to conclude. Spiritual and moral development is the process of change of one forms of compatibility (event) by other ways more difficult and higher level developed in an existential continuum. This development by the identity of the student of high cultural and moral wealth of life, the definition of the spiritual ideal and aspiration to him, awareness of high vital meanings, self-development and self-improvement.

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ҚАЗАҚСТАНДАҒЫ РУХАНИ-АДАМГЕРШІЛІК БІЛІМ БЕРУДІҢ ПСИХОЛОГИЯЛЫҚ ЖӘНЕ ПЕДАГОГИКАЛЫҚ АСПЕКТІЛЕРІ

Аннотация. Рухани-адамгершілік білім беру, үйлесімді дамыған тұлға тәрбиелеу – ұлттық білім беру жүйесінің басымдықтарының бірі болып табылады. Жаһандану білім мен ақпаратқа қол жеткізу сияқты оң үрдістермен бірге, мұғалім рөліне деген қоғамның көзқарасын өзгертеді. Қазіргі уақытта мұғалім қызмет субъектісі болып табылады, шиеленістің жоғары деңгейімен, көптеген білім беру реформалары оның жұмысына айтарлықтай әсер етеді. Екінші жағынан, мұғалім бейнесі құндылығын жоғалтып, кезінде беделді және құрметті кәсібі қоғам алдында құнсызданады. Қазіргі таңда мұғалім үлгі және стандарт ретінде танылмай, соның ішінде, ең бастысы, жоғары деңгейдегі моральдық-адамгершілік қасиеттерін кең таратушы

тұлға ретінде табылмайды. Бұл мақалада рухани және адамгершілік тәрбиенің дамуындағы теориялық мәселелер білім берудің жаңа тұжырымдамасы қарастырамыз.

Түйін сөздер: рухани-адамгершілік білім беру, құндылықтар, әлеумет, мораль.

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ПСИХОЛОГИЧЕСКИЕ И ПЕДАГОГИЧЕСКИЕ АСПЕКТЫ ДУХОВНО-НРАВСТВЕННОГО ОБРАЗОВАНИЯ В КАЗАХСТАНЕ

Аннотация. Духовно-нравственное образование, воспитание гармонично развитой личности является одним из приоритетов национальной системы образования. Глобализация вместе с положительными тенденциями как доступ к образованию и информации меняет отношение общества к роли учителя. В настоящее время педагог становится субъектом деятельности с высокой степенью нагрузки, многочисленные реформы образования существенно влияют на его работу. С другой стороны, происходит определенное обесценивание имиджа педагога, некогда престижная и уважаемая профессия обесценивается в глазах общества. Учитель перестает быть образом и стандартом, а главное – носителем высоких моральных и нравственных черт. В нашей статье мы рассматриваем теоретические проблемы развития духовно-нравственного воспитания в новой концепции образования.

Ключевые слова: духовно-нравственное образование, ценности, социум, мораль.

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METHODS FOR IMPROVING THE SOCIO-ECONOMIC EFFICIENCY OF STATE REGULATION OF INSURANCE ACTIVITIES IN THE DIGITAL ECONOMY

Abstract. The article examines the features of the organization of the country's system and the trend of development of international insurance in the digital economy. The development of the insurance market in Azerbaijan and the factors affecting it are assessed, the analysis with the CIS countries, the EAEC is conducted. Proposals on the main directions of development of the national market are being put forward.

Key words: national economy, insurance market, financial sector, market instruments, cyber risks, cyber insurance, digital economy.

Insurance services, considered one of the leading branches of the economy. The development of the insurance market is estimated by the specific weight of the country's insurance markets in GDP. On the other hand, this indicator also determines the level of development of market institutional systems in different countries, and also expresses their attitude to insurance. The level of development of insurance services in socio-economic life is still not satisfactory. It is extremely important to effectively use the existing potential for the insurance market, increase the insurance premium systematically and consistently strengthen the insurance sector in Azerbaijan.

At present, the insurance market of Azerbaijan is at the very beginning of the development process. That is, despite the fact that today's insurance market and the potential of the country's economy are higher than in the current situation, the insurance market in recent years is experiencing a recession. According to world insurance experts, in countries with a stable economy at least 2% of GDP (gross domestic product) should be insurance premiums. In our case, given the fact that Azerbaijan's GDP in 2016 is 63 billion manat, it is logical that the volume of the insurance market should be at least 1.2 billion manat. Last year, given that the insurance market amounted to 485 million manat, this indicator shows that the GDP is 0.8%.

It should be noted that an important part of measures to improve financial services falls on the insurance market. The insurance segment, which is distinguished by its uniqueness, is based on market freedoms, but state regulation has always been necessary. Practice shows that the problem of the regulatory role of the state in the market system of economic relations has always been in the focus of scientific and public opinion throughout the history of the world economy. Representatives of many leading economic schools (neoclassical, institutional, institutional) expressed different views on the essence, purpose, form of state regulation of the economy and other issues. The search continues for the optimal balance between state regulation and self-regulatory economic instruments.

The insurance market in each country is estimated by the volume and rate of growth of real insurance premiums, that is, the funds that insurance companies receive from the sale of policies. In 2016, the world leaders in this indicator were the US - \$ 1.35 trillion of insurance premiums a year, Japan – \$ 471 billion, and China – \$ 466 billion. Data on the results of 2017 yet, but analysts believe that China is likely to take the second line in the ranking, pushing back Japan. Part of this success is due to the fact that the Chinese government has consistently taken measures to stimulate the purchase of insurance policies.

Another important indicator of the world market is the share of insurance premiums in the GDP of a country or region. In this parameter, Taiwan leads, where insurance premiums provide 19% of GDP, Hong Kong (17-18%), South Africa (14%), South Korea (13%) and Finland (12%).

The data of a major international insurer Swiss Re for the year 2016 revealed the following trends in the insurance market:

Continental China is the leader in the growth rate of the insurance market among developing countries. The growth is mainly due to the life and health insurance market, which has increased by 9.6% over the year.

Among the developing countries, India is considered the second most promising insurance market, largely due to the fact that the economy of the country showed in 2016 the highest growth rate in the world. Due to the active reforms of the Prime Minister of India, growth will slow in the next few years, but the same reforms will have a positive effect on the insurance market in the long term.

The markets of Mexico, Spain, Indonesia, Turkey, Vietnam and Morocco show significant growth. The markets of Russia and Kazakhstan are also growing, but at a slower pace. Growth is provided mainly by life and health insurance, in contrast to Western Europe, where a small increase shows only the property and liability insurance market.

Negative trend, that is, a reduction in the volume of insurance premiums received, is evident in Argentina, Ecuador, Australia, Japan, Peru, Nigeria, Algeria, Sweden, Lithuania and Saudi Arabia. Of the major countries, Nigeria and Argentina are worst off - 11.4% and minus 16.8% of insurance premiums compared to 2015. Sensitive changes occur in Japan, which is traditionally one of the leaders in the insurance market, while at the same time in 2016 showed a decrease in the volume of insurance premiums by 5.1%. In the same year, cases in Australia and Sweden were not very good, minus 5.8% and minus 5%, respectively, but Australia is likely to show growth in 2017.

The market of insurances, not related to life and health, is growing mainly due to the sale of policies for cars. Another notable driver in the developing part of the world is infrastructure investment in Southeast Asia. Nevertheless, the United States remains the leader in property and liability insurance, which occupies 46% of the world market.

A long-term trend in all countries - the transfer of sales policies online and the significant costs of insurance companies to create an IT infrastructure. First of all, the most standardized products are transferred to the Internet: insurance for cars and real estate. In this area, the leader can be called Britain, in which more than 50% of policies for cars and about 25% of insurances for real estate individuals buy online. Mobile services are most rapidly developing in countries of Africa, Asia and South America, where many residents can access the Internet only from the phone.

Nevertheless, in general, the process of digitalizing the insurance market is slow. This is due not only to poverty and limited Internet access in developing countries, but also to legislative restrictions and, for example, the reluctance of small insurance companies in America to bear the costs of providing an IT infrastructure. In addition, direct online sales of policies hamper the existing network of brokers, which creates problems for insurance companies in developed countries. In addition, there is a cultural problem: in the case of complex products, in particular, health insurance, many buyers are easier to discuss the conditions and features of the policy with the broker than to study the issue on the Internet. Perhaps this problem will be resolved through the introduction of bots-assistants: according to the Accenture survey, 71% of people are ready to use the advice of the bot when choosing insurance online.

The global insurance industry is affected by the global macroeconomic and financial environment and thus exposed to weak economic growth, low inflation rates, volatile financial markets and the persistent low interest rate environment. Since the crisis, premium growth has generally remained below pre-crisis levels. Underwriting is under pressure, but remains profitable. The protracted low-yield environment is eroding life insurers' capital positions, particularly for companies offering products with long-term guaranteed rates and big duration mismatches between assets and liabilities. Non-life (re)insurance is subject to soft market conditions, which partly can be regarded as an unintended consequence of the current low interest rate environment, reflecting the convergence of capital and insurance markets.

The study of the systems of state regulation of insurance markets evidently demonstrates that the use of financial regulation tools is based on these systems. The main goal of state financial regulation is to ensure the sustainable development of national insurance markets in order to enhance social and economic stability in society.

The main goals and objectives of the new reforms in the field of sustainable economic development are, first of all, strengthening the national insurance system and improving its financial services in accordance with the requirements of the Strategic Roadmap.

Today, insurance companies must solve new problems in financial markets, since they are the most active elements of the financial system and must acquire new spaces and technologies. Because in our time financial services are becoming more and more digitized, in other words, they are switching from offline to online. Of these processes aimed at digitization, technology, the insurance system can not be abolished.

The main element of income from insurance business are insurance premiums. The insurance premium is the price of the real estate of the insurance company. The collection of insurance premiums by insurance companies is determined by a number of objective factors. These include the level of inflation, the legislative framework, the tax system, the competitiveness of the insurance market, the dynamics of interest rates of banks, the level of development of the social protection system and other factors.

The ideology of the development of international and national insurance systems is based on such a fundamental basis that the larger the insurance market is able to provide quality services, it can attract as much money and financial resources as possible. Since the effective management of cash flows in the modern world largely depends on the development of companies and the insurance market in general. To achieve a harmonious integration of the national insurance market into the global insurance industry, first of all, deep qualitative changes in the country's insurance system must be achieved.

Modernization of the mechanism of the insurance market in this direction determines the activities of both the state and the insurer. As external experts note, the need to increase the role of the state in the insurance industry requires a scientifically based, purposeful new insurance strategy. To implement this strategy, first of all, the principle of the sovereignty of consumers of consumer services should be put forward, in order to achieve the latter in the insurance market, it is necessary to ensure the formation of an appropriate insurance interest. From this point of view, first of all, a real competitive environment should be created between insurance organizations. The insurer considers the insurer's interests an objective reality. To ensure the quality of this interest, a healthy competitive environment should be created between the insurers and the attractiveness of the insurance business.

In 1995, the American computer scientist Nicholas Negroponte (Massachusetts University) introduced the term "digital economy". Now this term is used all over the world, it has become common practice for politicians, entrepreneurs, journalists. Last year, one of the World Bank's main reports contained a report on the state of the digital economy in the world (the report was entitled "Digital dividends").

The share of the digital economy in the GDP of developed countries increased from 4.3% to 5.5% between 2010 and 2016, and in developing countries GDP from 3.6% to 4.9%. In the G20 countries, this indicator has grown over five years from 4.1% to 5.3%. The world leader in the share of the digital economy in GDP is Great Britain - 12.4%.

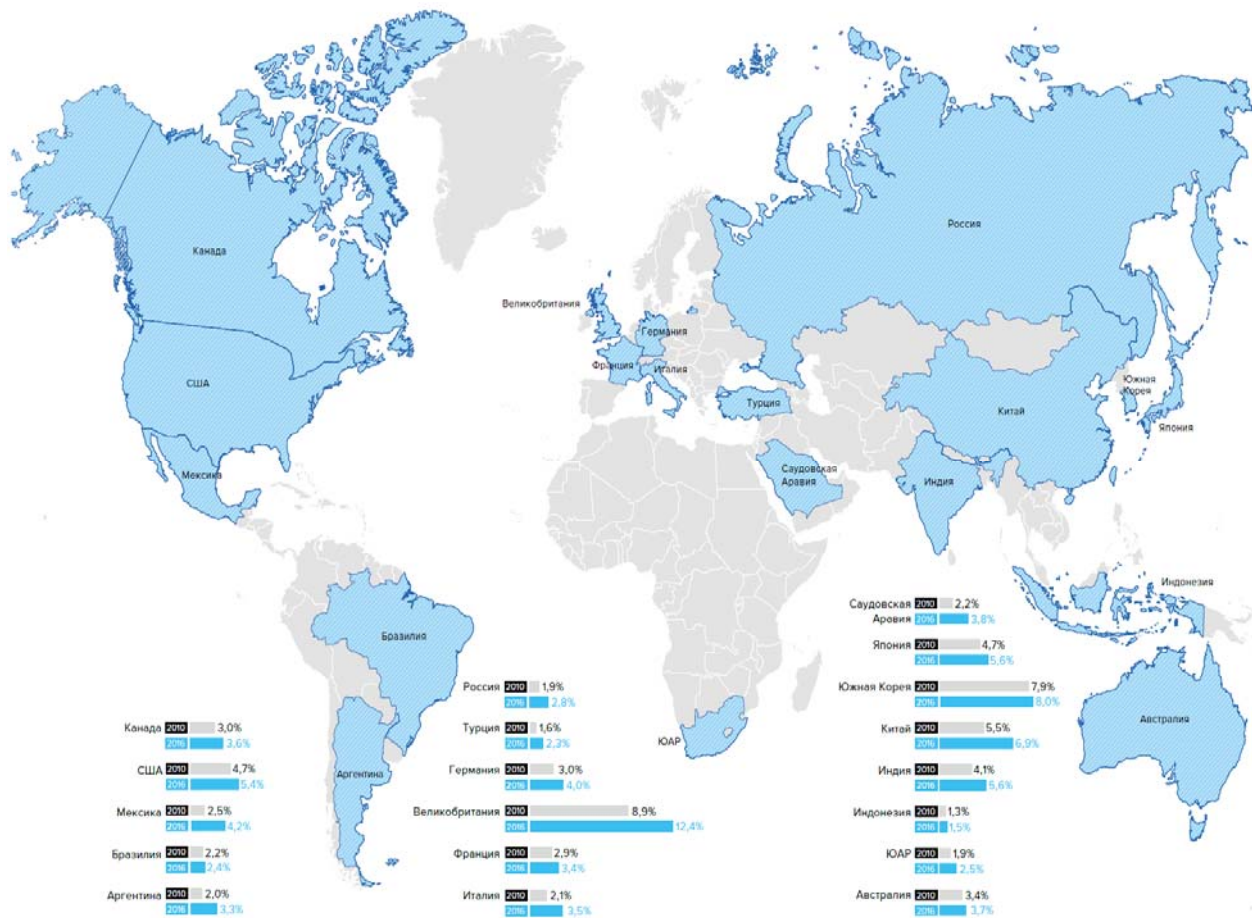
The European Union identifies three supports for the digital market:

- the best access conditions for consumers and businesses in Europe;
- creation of common legal terms and equal competitive opportunities for digital networks and innovative services;
- maximize the potential of the digital economy growth.

According to a study by analysts at International Data Corporation, published in 2016, the total world cost of digital transformation technology will grow by 16.8% annually and reach 2.1 trillion US dollars by 2019.

According to the forecasts of the consulting company Accenture, the use of digital technologies should add 1.36 trillion US dollars in 2020, or 2.3% of GDP in the total GDP of dozens of the world's leading economies. The GDP of developed countries will grow by 1.8% from the digital economy and 3.4% from the GDP of developing countries. The Boston Consulting Group forecasts that the digital economy could reach 16 trillion US dollars by 2035.

The Eurasian Economic Union (EAEU) is actively discussing the common digital agenda. The next step will be an elaboration of strategic initiatives in establishing the digital economy, so it is essential to understand what neighboring countries gained positive and negative experience. At the seminar - presentation "European experience in building a single digital market", the Member (of the Board -



The growth of the share of the digital economy in the GDP of G20 countries from 2010 to 2016

Minister in charge of Domestic Markets, Information Support, Information and Communication Technologies of the EEC, Karine Minasyan, noted the interest of the EAEU in the use of international experience in implementation of the digital agenda, the best practices in this area and digital initiatives.

According to the information of the International Telecommunication Union, in the period from 2000 to 2015, the proportion of Internet users in the world has increased almost sevenfold – from 6.5 up to 43% of the population. According to Internet World Stats Agency, as of June 2016, the number of Internet users in Armenia reached almost 70%, in Belarus - 59%, in Kazakhstan - 54.3%, in Kyrgyzstan - 36.2%, in Russia - 75.5%.

One of the challenges on the way of digital economy development is providing security in cross-border purchases in terms of providing guarantees for the protection of personal data of consumers.

According to Dmitry Medvedev, within the union it is necessary to include three elements in digital integration:

EAEU of Data X – a single subsystem of transfer and data exchange in electronic form. It is the platform which can be used for the exchange of information, and eventually – for the exchange of legally significant protocols between private companies.

EAEU of ID – single space of electronic trust. It includes services for the identification, authentication, authorization, digital archive. It will allow issuing, for example, references to citizens of one country in the territory of another in a digital format.

EAEU of Geo – a geographic information system and services of a cartographical basis which promotes simplification of control of transportation and traceability of goods.

Share of the digital economy in GDP

Country	2010	2016
Great Britain	8,3%	12,4%
South Korea	7,3%	8,0%
China	5,5%	6,9%
India	4,1%	5,6%
Japan	4,7%	5,6%
US	4,7%	5,4%
Mexico	2,5%	4,2%
Germany	3,0%	4,0%
Saudi Arabia	2,2%	3,8%
Australia	3,4%	3,7%
Canada	3,0%	3,6%
Italy	2,1%	3,5%
France	2,9%	3,4%
Argentina	2,0%	3,3%
Russia	1,9%	2,8%
South Africa	1,9%	2,5%
Brazil	2,2%	2,4%
Turkey	1,6%	2,3%
Indonesia	1,3%	1,5%

Cybersecurity risks have become more significant as critical consumer financial and health information is increasingly stored in electronic form. As people become more reliant on electronic communication, and as businesses collect and maintain ever more granular pieces of information on their customers, the opportunity for bad actors to cause difficulties for business and the public is exploding. The demand for insurance has increased significantly in response to sharply heightened risk awareness. The insurance industry has reacted to cyber threats and to the corresponding demand for risk cover by launching specific cyber policies. These relatively new types of policies can be used to insure against IT and cyber risk exposures in private, commercial and industrial environments. The cyber insurance market is only small at present, but expected to grow dramatically over time. Marsh estimates the U.S. cyber insurance market was worth around USD 2 billion in gross written premiums in 2014 (0.3% of the U.S.

non-life market). Currently, the U.S. market dominates the global volume of these type of products, with the majority of the business written being against U.S. risks. The European cyber insurance market is expected to get a boost from expected reform of EU data protection rules that force companies to disclose breaches of customer data. A PwC study reported the global market could grow to USD 5 billion by 2018 and USD 7.5 billion by 2020.

Heads and representatives of central banks of member countries of the Eurasian Economic Union (EAEU) during the meeting in Moscow discussed issues of realization of monetary policy and formation of the general system of cybersecurity, the press service of National bank of Kazakhstan reported.

According to the press service, the head of the National Bank of Kazakhstan Daniar Akishev during the working visit to Moscow participated in the 16th meeting of Consulting council for monetarist policies (KSVP) of state members of EEU. Heads and representatives of central banks of Russia, Armenia, Tajikistan, Kyrgyzstan, and Belarus also participated in a meeting. They discussed problems and solution in entirely new area cybersecurity and cyber threats.

A major challenge facing insurers selling these insurance products is to set risk-adequate premiums. This is in part due to the inherent complexity of the risk, given that the definition of cyber risk is evolving and rapidly expanding. Moreover, although many costly cyber events have occurred, there is still a lack of historical data for cyber risk, making it difficult for insurers to write and price policies appropriately. Finally, expected claims in the commercial and industrial area tend to be low frequency events with possibly highly severe impact, given that cyberattacks have the potential to be massive and wide-ranging. Risk accumulation – in which a single event spans multiple risks affecting companies, countries, industries and lines of business – is a growing concern and creates the potential for catastrophic risk.

Insurers are exposed to cyber underwriting risk directly through prudential risks that emanate from underwriting specific cyber policies (affirmative) and indirectly through insurance policies where cyber risk is not clearly excluded (silent). Affirmative policies include, for example, data breach covers. Silent policies might include casualty, marine, aviation, transport, motor and home contents policies that either cover all risks, or do not clearly exclude cyber risks. In a recent consultation paper, the Bank of England has expressed concern about the loss potential of silent cyber risk and has identified material shortcomings in its management. Cyber insurance products have to be embedded in adequate control structures to prevent potentially incorrect assessments from escalating into a threat to the insurance companies concerned. An IAIS working group has recently published an issues paper on cyber risk, which builds on a 2015 survey of members on their approaches to cyber risk.

Within the framework of the global world "Digital economy" a program is being prepared to create a large-scale market of insurance against cyber risks. The information security policy can become mandatory since 2020 for all strategic industries - from banking to engineering. The plan envisages the introduction of an industry standard for mandatory audit of information security by 2020 - and the requirement of compulsory insurance of such risks by enterprises of certain sectors of the economy.

First of all, the service of cyber insurance is in demand by banks and financial organizations, the second - by providers, the third - by companies engaged in the processing of personal data. In the insurance company "Alliance", insuring customers from cyber nails, noted that after the spread of viruses WannaCry and Petya recorded an increase in demand for insurance services against cyber threats - according to the company, the global turnover of this market is \$ 2.5 billion.

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**МЕТОДЫ УЛУЧШЕНИЯ СОЦИАЛЬНО-ЭКОНОМИЧЕСКОЙ ЭФФЕКТИВНОСТИ
ГОСУДАРСТВЕННОГО РЕГУЛИРОВАНИЯ СТРАХОВОЙ ДЕЯТЕЛЬНОСТИ
В РАМКАХ ЦИФРОВОЙ ЭКОНОМИКИ**

Аннотация. В статье исследуются особенности организации системы страны итенденции развития международного страхования в рамках цифровой экономики. Оценивается развитие страхового рынка в Азербайджане и факторы влияющих на нее, проводится анализ со странами СНГ, ЕАЭС. Выдвигаются предложения по основным направлениям развития национального рынка.

Ключевые слова: национальная экономика, страховой рынок, финансовый сектор, рыночные инструменты, киберриски, киберстрахование, цифровая экономика.

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**ЦИФРЛЫҚ ЭКОНОМИКАНЫ ЖАҚСARTУ ӘДІСТЕРІ
ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ ТИІМДІЛІГІН ЖӘНЕ
МЕМЛЕКЕТТІК САҚТАНДЫРУ ҚЫЗМЕТІН РЕТТЕУ ШЕҢБЕРІНДЕ**

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**COGNITION AND SPEECH DEVELOPMENT
IN A PRESCHOOL AGE**

Abstract. The speech – a historically developed form of communication of people using language. The speech and language of the modern person – a result of prolonged historical development. Speech communication is carried out under laws of this language which represents the system of phonetic, lexical, grammatical and stylistic means and rules of interaction. The speech and language make difficult dialectic unity. Language is the expression of human communication through which ideas, information, emotions, and beliefs can be shared. Typically developing children master the fundamentals of language and speech in the toddler-preschool era. Language and speech skills serve a pivotal role in learning and social relationships. In our study, we compare two groups of toddlers from different kindergarten. The collected data showed us significant differences in speech development of city and rural preschool age children.

Keywords: speech, sensitive age, preschool and school age, thinking.

Speech is a historically established form of people's communication through language. Speech communication is carried out according to the laws of the given language, which is a system of phonetic, lexical, grammatical and stylistic means and rules of interaction. Speech and language constitute a complex dialectical unity. Speech is carried out according to the rules of the language, and at the same time, under the influence of some factors (the requirements of social practice, the development of science, the mutual powers of languages, etc.), it changes and perfects the language. A person all his life develops his speech, mastering the language. Each age stage introduces something new in its speech development. The most critical steps in mastering speech are in children's age - preschool and school periods. Mastering speech at the age of 3 to 7 years is vital because this period is the most sensitive to its assimilation.

Speech and language of modern man is the result of long historical development. The child learns the language in the process of communicating with adults and learns to use it in speech. Thanks to speech (especially in its written form), the historical continuity of people's experience is realized. Out of speech, it is inconceivable to master human's knowledge and form consciousness. Being a means of expressing the thoughts of people in the process of their communication. Speech becomes the central mechanism of their thinking. According to Vygotsky speech activity was as a fundamental activity of man, saw in it great opportunities for the development of the personality, consciousness, all cognitive processes of man.

In order to solve these problems, it is necessary to know about the intellectual development of senior preschool children. It is also necessary to make an analysis of Child Psychology principles and current domestic and foreign psychological research of the intellectual development of the child.

The Soviet Union school of psychology was based on the same methodology which was influenced greatly by Bolshevik revolutions and Lenin's ideas:

1. Stages of cognitive development as a result of the activity. (Leontyev, 1978; Ananyev, 2000; Vygotsky, 1978; Elkonin, 1972)
2. Law of "interiorization" and "zone of proximal development" (Vygotsky, 2000; Elkonin, 1972)
3. The variation of activities and learning strategies (Galperin, 1978; Davydov, 1992; Popov, 2002)
4. The role of individual differences in intellectual development and training activities (Averin, 2000; Ushakova, 2015).

Development can be described as a process of initiation and improvement of these internal means of activities, as the process of overcoming internal obstacles in the implementation of activities, as the process of expansion the borders of zones of actual and proximal development, as the process of assigning the ways of the joint activity by a child (interiorization), as simultaneous movement in different directions, described by multi-vector model of the zone of proximal development, leading to the appearance of new vectors, to the quality changes of the state of vectors and the interrelationships between them (Vygotsky, 2000).

Intellectual development is understood as a continuous dynamic process by most Soviet authors. Different authors identify various aspects of intellectual development, indicating the quantity and quality of its structure, indicating out features of mental activity (operations and mental actions), different forms of thought (Galperin, 1978; Davydov, 1992; Volkov&Volkova, 1998; Zhukova, Mastuyukova, Filicheva, 1998).

The Russian psychologists are guided by the principles of the system and structural-genetic approaches to the study of children's intellectual development (Garber, 2013). They do not oppose education and intellectual development, general and special abilities, biological and social conditions of intellectual development (Kolomna and Panko, 1997).

Currently, it revealed that children's intellectual development depends on brain structures and specially organized challenging activities. Education is a leading factor in the intellectual development of children. There are also some basic directions in the study of children's intellectual development in Western psychological school. One direction is characterized by examining the child's cognitive development as a result of the natural maturation of the nervous system and the whole organism (Hall C., Gesell A. et al.). The other direction of research of child intellectual development process is related to social environment (Hedegaard, 2012; Sannino, 2015).

Leontiev (1978) defined speech activity as "the process of using a language for communication by a person". According to him, speech activity is represented by three parties: motivational, target and executive, highlighting several stages (phases):

- the preliminary orientation phase;
- the planning phase;
- the implementation phase;
- the phase of control.

The development of speech of children of different ages is part of the interests of methodological science, which relates to applied and solving practical tasks of teaching, developing and educating children. Traditionally, language teaching involved studying elements of different levels of the language system, the features of their expression plan and content plan, the patterns of functioning. The current state of the methodology of speech development is characterized not only by the use of data from linguistics and psychology but also by the connection with modern science such as psycholinguistics. Specialists involved in the development of children's speech should know well the general laws of speech ontogeny, the main stages, and features of speech formation. The ontogenetic principle describes the development of verbal expression in ontogeny (Levina, 1968). This principle is especially important in Special Education, which let us use prediagnostic of speech disorders. In this article, we will consider some aspects of the theory of speech development. One of the essential concepts considered in psycholinguistics is the concept of speech activity. By the definition of Zimnya (2001), "speech activity is a process of active, purposeful, mediated by the language and conditioned by the situation of communication between people." Speech as one of the types of human activity in general, however, is an extraordinary activity that is not comparable with any labor or with the game".

Leontiev identifies some distinctive features of speech activity:

- objectivity,
- purposefulness,
- motivation,
- hierarchical ("vertical") organization
- phase ("horizontal") organization.

It is quite obvious that the development of a child's speech is the training of his speech activity, which possesses all the characteristics mentioned.

The concept of "phase structure" is part of the activity (Rubinshteyn, 1940). According to him, human activity consists the following stages: motivation, orienting actions, activity planning, plan implementation and control phase.

Vygotsky paid attention to the phase structure of speech activity. The process of speech generation was considered by the scientist as the process of movement from thought to word, "from the motive that generates thought to the formulation of the thought itself, to its mediation in the inner word, then in the meanings of external words and finally in words". Leontiev applies Rubinstein scheme to speech activity, singling out such links as a link of motivation and formation of speech intentions, a link of orientation, a link of planning, an executive and a loop of control. Zimnya (2001) develops a three-phase model of the structure of speech activity, which, according to Glukhov (1988), is the most acceptable from the technique of speech work.

The motives for the verbal communication is in the natural condition of upbringing. Motivations for writing the speech at the stage of education are created by the teacher, explaining the need for such a form of speech communication and interest the student in it. Particularly relevant is the situation when teaching a student to write creative work (statements, essays). The teacher has to create an environment in which the student feels "vital necessity" in the creation of written text. One of the possible implications of this method is the task where students have to write a story. Vygotsky states cognitive development stems from social interactions from guided learning within the zone of proximal development as children and their partner's co-construct knowledge. In contrast, Piaget maintains that cognitive development stems mainly from independent explorations in which children construct the understanding of their own. For Vygotsky, the environment in which children grow up will influence how they think and what they think about.

According to the cultural-historical theory of Vygotsky (1987), the specificity of a child's development relates to a social and historical basis. The main mechanism of a child's intellectual development is associated with the formation in their mind of verbal meanings (generalizations), the restructuring of which characterizes the direction of the growth of their intellectual capacities.

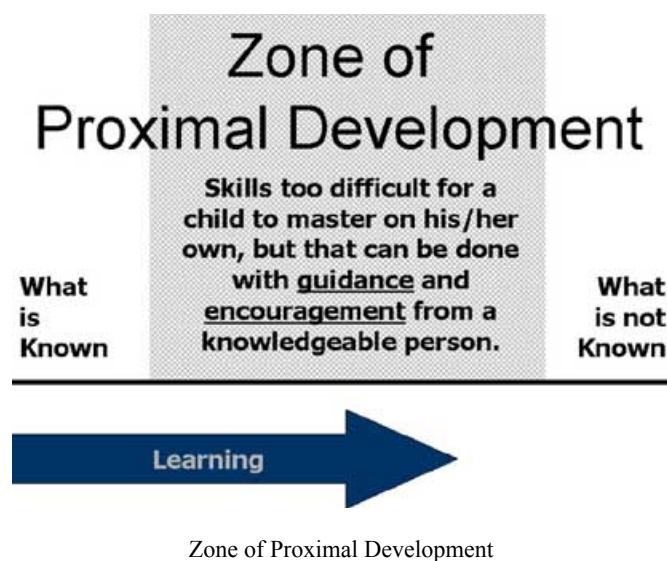
The main way of a child's concepts development depends on changes in the generalization of the word. Vygotsky (1978) believed that intellectual development is characterized by the level individual mental processes development and also by cross-functional relationships and their changes. Each period of intellectual development is inherent in the structure of certain mental processes. According to Vygotsky (2000), higher mental functions such as perception and memory intensively develop during preschool age.

Language is the expression of human communication through which ideas, information, emotions, and beliefs can be shared. Typically developing children master the fundamentals of language and speech in the toddler-preschool era. Language and speech skills serve a pivotal role in learning and social relationships. Delays in the early development of language and speech skills, which are prevalent in the population, may affect several domains of function (Ushakova, 2015; Alexandrov, 2013; Butusova, 2012).

According to Vygotsky (1978), much important learning by the child occurs through social interaction with a skillful tutor. The tutor may model behaviors and provide verbal instructions for the child. Vygotsky refers to this as cooperative or collaborative dialogue. The child seeks to understand the actions or instructions provided by the tutor (often the parent or teacher) then internalizes the information, using it to guide or regulate their performance.

Social interactions define the mechanism of distribution of functions on the one hand and the means or method of mastering those functions on the other hand (Vygotskiy, 1987; Vygotskiy, 1988). Thus, for example, guided social interactions, which initially serve as instruments for social realization of the processes of cognition and communication later, begin to play the role of the cognitive function of self-regulation and mental representation of various kinds of information. These social interactions activate the not yet developed cognitive functions, which allow the child to act on a higher cognitive level. The gap between that which a learner is able to do on his/her own (the actual level of development) and that which he/she is capable of with proper guidance is called "zone of proximal development". Therewith, according to Vygotsky (Cole, 1996; Daniels, 2008; Daniels, 2010), learning is successful only when it goes ahead of development, when it awakens and brings to life those functions, which are yet in the process of maturing or are in the zone of proximal development. This, in his view, is the way how education plays a crucial role in development.

Vygotsky (1978) sees the Zone of Proximal Development as the area where the most sensitive instruction or guidance should be given - allowing the child to develop skills they will then use on their own - forming higher mental functions.



Vygotsky also views interaction with peers as an efficient way of developing skills and strategies. He suggests that teachers use cooperative learning exercises where less competent children improve with help from more skillful peers - within the zone of proximal development.

Vygotsky (1987) differentiates between three forms of language: social speech which is external communication used to talk to others (typical from the age of two); private speech (regular from the age of three) which is directed to the self and serves an intellectual function; and finally private speech goes underground, diminishing inaudibility as it takes on a self-regulating role and is transformed into silent inner speech (typical from the age of seven).

Perhaps the main criticism of Vygotsky's work concerns the assumption that it is relevant to all cultures. Rogoff (1990) dismisses the idea that Vygotsky's ideas are culturally universal and instead states the concept of scaffolding - which is heavily dependent on verbal instruction - may not be equally useful in all cultures for all types of learning. Indeed, in some instances, observation and practice may be more efficient ways of learning particular skills.

Children use private speech most often during intermediate difficulty tasks because they are attempting to self-regulate by verbally planning and organizing their thoughts (Winsler et al., 2007).

The frequency and content of private speech are then correlated with behavior or performance. For example, individual speech appears to be functionally related to cognitive performance: It seems at times of difficulty with a task.

Berk (1986) provided empirical support for the notion of private speech. She found that most private speech exhibited by children serves to describe or guide the child's actions. Berk also discovered that child engaged in private speech more often when working alone on challenging tasks and even when their teacher was not immediately available to help them. Furthermore, Berk also found that individual speech develops similarly in all children regardless of cultural background.

Solitary speech is the most complex form of speech activity. It has the character of a consistent, systematic, detailed presentation.

Ability to coherently convey their thoughts - one of the primary indicators of language proficiency. The creation of a coherent, detailed statement is a process that requires concentration, the concentration of the speaking child, proper preliminary preparation, significant volitional efforts, compositional, logical and verbal skills.

Oral monologic speech is a more complicated form of expression, which, according to Vygotsky, presents a specific compositional complexity. A monologue is a coherent, coherent presentation of thoughts and knowledge by one person without reliance on the interlocutor's speech.

According to Ushakova (2015), "the formation of skills in monologic speech requires the compulsory qualities such as coherence and integrity, which are closely interrelated and characterized by a communicative orientation, the logic of presentation, structure, and also a certain organization of linguistic means."

The monologue is spoken speech addressed to other people. A monologue depends on what tasks the speaker sets himself and what type of specific activity.

Vygotsky says that a monologue is a higher, more complex form of speech than a dialogue. Monologic statement, in addition to linguistic means, also has a number of additional expressive factors that distinguish the new and essential. Various information and facial expressions can give different meanings to the same syntactic constructions.

Its specificity characterizes monologue speech. Relative completeness describes the monologue. At the initial stage, the trainees master the basics of monologic utterances of various kinds: narratives, reasonings, descriptions. Forming the skills and skills of monologue requires the obligatory development of such qualities as connectivity and integrity, which are strictly interrelated and characterized by a communicative focus, the logic of presentation, structure, and also a particular organization of linguistic means.

Let us consider the results of a study on the features of constructing connected speech in the control and experimental groups. We conducted the experimental research with children of 4-5 years of kindergarten No. 9 in Aktobe and kindergarten No. 12 in the Aktobe region, who are trained and brought up according to one standard program of education and upbringing. In total, 50 children participated in the experiment.

- Experimental group - 27 children, age 5-6 years, №9.
- Control group - 23 children, age 5-6 years, № 12.

The experiments were carried out in the first half of the day individually with each child for 30-35 minutes.

Table 1 – Results of the study of speech activity

Group	Indicators			
	Very high	High	Average	Low
Experimental	25	1	–	1
Control	14	–	6	3

As can be seen, from Table 1, the children of the control group have the following indicators:

- very high level - 14 children;
- average level - 6 children;
- low level - 3 children.

In the experimental group, children have the following indicators:

- High and very high level - 26 children;
- low level - 1 child.

Thus, we see the existence of differences in the control and experimental groups, in the parameter of psychological readiness.

In the control group, we found children with specific difficulties in monologic speech activity. It is necessary to form elementary knowledge about the structure of the text (beginning, middle, end) and ideas about the ways (means) of communication between sentences and the structural parts of the statement. It is the methods of connection between phrases that serve as one of the critical conditions for the formation of the coherence of a speech utterance. In any completed sentence, there are the most typical ways of combining phrases. The most common of these is the chain link. The primary means of this connection are pronouns, lexical repetition, synonymous substitution. Chain communication makes speech more flexible and diverse, as, mastering this way, children learn to avoid duplication of the same words and constructions. Sentences can also be connected using parallel communication when they do not adhere but are compared or even opposed.

At the initial stage of learning the construction of coherent monologic texts, it is necessary to develop the ability to disclose the topic and the main idea of the utterance, the ability to title the document.

Table 2 – Results of statistical testing of the hypothesis on differences in the control and experimental groups

Mann-Whitney U	95.000
Wilcoxon W	220.000
Z	-1.182
Asymp . Sig . (2-tailed)	.237
Exact Sig . [2 * (1-tailed Sig .)]	.257 (a)

As can be seen, from the above table 2, $U_{emp} = 117.5 < U_{0,05} = 138$, therefore, we can safely assert about the existence of statistically significant differences between children from the experimental and control groups.

The modern methods of the coherent speech development for the preschool child based on linguistic, communicative, personal approaches. Formation of conscious construction of a cohesive statement is the essential step of progress for preschool age children. It's necessary to use a wide range of methods of development of the coherent speech. In the process of communication and interaction of the child with reality, baby seizes the coherent speech, and the adult creates this condition, organize the material and language environment, involves in joint activity.

The results of our study let us make certain conclusions. The child communication during different type's activity helps to build a basis for further speech development. But daily communication for the formation of language competence is not enough. A lesson is a primary form of education of preschool children as an organized cognitive activity. On lessons, the tutor systematically and consistently forms children speech skills which could be fixed at further communication of children in everyday life.

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ПСИХОЛИНГВИСТИЧЕСКИЕ УСЛОВИЯ РАЗВИТИЯ РЕЧЕВОЙ ДЕЯТЕЛЬНОСТИ У ДОШКОЛЬНИКОВ

Аннотация. Речь – исторически сложившаяся форма общения людей посредством языка. Речь и язык современного человека – результат длительного исторического развития. Речевое общение осуществляется по законам данного языка, который представляет собой систему фонетических, лексических, грамматических и стилистических средств и правил общения. Речь и язык составляют сложное диалектическое единство. Каждый возрастной этап вносит что-то новое в его речевое развитие. Наиболее важные ступени в овладении речью приходятся на детский возраст – дошкольный и школьный периоды. Овладение речью в возрасте от 3 до 7 лет имеет ключевое значение, ведь этот период наиболее сензитивен к ее усвоению. Ребенок усваивает язык в процессе общения с взрослыми и учится пользоваться им в речи. Благодаря речи (особенно в ее письменном виде), осуществляется историческая преемственность опыта людей.

Ключевые слова: речь, сензитивный возраст, дошкольный и школьный возраст, мышление.

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CROSS-CULTURAL ASPECTS OF COMPANY'S GOAL-SETTING SYSTEM AS A FORM OF MOTIVATION

Abstract. The professional motivation in cross-cultural psychology designates activation of professional and communicative skills of the employees determined by the effect of joint actions of cross-cultural interaction. The stimulation of motives in the multinational collective is included by definition of a role of the employee in the companies according to his interests and requirements. Besides, the formation of the favorable and confidential organizational environment can cause the better psychological state of employees and, therefore, increase his professional motivation. The article analyzes features of the influence of cross-cultural psychology on the professional motivation of employees and company's goal-setting.

Keywords: cross-cultural psychology, motivation, behavior, mentality, company's goal-setting system.

Requirements of growth of competitiveness of the companies functioning within the international business cause the necessity to consider personnel as a strategic resource. Cross-cultural interaction, in this case, determines the new level of complexity for motivational tasks. Cross-cultural interaction represents intensive communications and joint activity of representatives of various national cultures. This problem in connection with a multinationality (ethnic, national, cultural diversity) of personnel is considered as multiple-factor and very difficult. But motivation problems in comparative management are defined not only cultural aspect, but also institutional.

Nowadays in the conditions of globalization, the growth of international economic relations is observed, and the number of the companies working in the multinational environment grows. In this regard, there are new ways of communication, new models of the organization of working processes, new requirements to the formation of organizational culture of the enterprise. At international business interaction there is not simply an interaction of cultures, and imposing of a large number of subcultures from which it is possible to distinguish – age, gender, professional, religious, national, individual, etc.

Richard Lewis as the president of the international institute of cross-cultural and language training fairly considers that globalization demands from society not only big knowledge, but also understanding of each other that modern business, in essence, throws down a challenge to those who turn attention to cross-cultural problems. The issue has been arisen because of people differences. When you do not acknowledge specific differences between cultures, it might affect your business and can completely demotivate and even destroy it. Thus, the modern management and overall personnel control technologies shall include cross-cultures characteristics.

As a rule of thumb, the culture's differentiation affects comparison, the establishment of contact and communication between representatives of different types of culture. The firm's management shall recognize cross-culture environment impact and shall create an organizational structure, which can control and coordinate the cross-culture relationship within the firm. Such structure shall supervise firm's internal difference of cultures, develop policies and procedures for personnel control and do not interfere with the culture and traditions of different types of ethnic groups of firm's personnel.

In Kazakhstan, the management system, which has implemented specific approaches for cross-culture environment, now is the subject of discussion and close attention caused by the level of gross product, which has been increased up to 40%.

Basic aspects of management that are resolved mainly in a vertical organizational structure include strategic management, benchmarking and the company's goal-setting system, development of leadership and improvement of the company as a whole.

One of the basic categories of the matter is the category of a cultural context. Cultural context call a configuration of the purposes, values, the behavioral stereotypes predetermining actions of representatives of a certain culture. The cultural context forms behavioral predictability of an individual. The representative of other cultural context acting as the manager, and is more often than a coach (the trainer, the consultant focused on diagnostics and permission of organizational problems), uses, as a rule, own knowledge of questions of psychology, sociology, personnel management for the effective management, the organization and regulation of intensity of work. But aren't limited to the specified directions of his task, and he seeks to operate moods, emotions, impulses and interests of subordinates. There are managers "from god" for which intuitive permission of the above-stated problems quite naturally. At the same time lack of chauvinism, national neglect and following to ideas of humanity act as basic reference points.

The motivation is understood as activization of reserve opportunities of the employee. The motivation in comparative management is the activization of professional and communicative skills of employees determined by synergy effect cross-cultural psychology. Respectively process of management of motivation in multinational collective means positioning of the employee in the international company according to his interests, and not just with requirements of transnational expansion, the formation of the favorable and confidential organizational environment, informing the employee on strategic intentions of the organization (most often branch) and own career prospects.

Very popular belief of both domestic and foreign managers consists that the main reason for which the employee choosing the organization is guided is the level of a salary and possibility of vertical career development. The range of the reasons are much more various: in him both prospects of socialization, and a possibility of realization of powers of authority, and aspiration to show own talents and abilities, and formation of friendly contacts, and finding of own importance, and prestigiousness of the organization, and a territorial arrangement of the organization, both possibilities of training and sending, and opportunity for creation or continuation of a dynasty are presented. In multinational collective interest in contacts with representatives of other cultures, a magnificent possibility of learning of foreign language, an opportunity to study the style of the management, methods of management, the organizations of production of the companies leading in certain branches appear. The considerable role in awareness of complexity and variety of motivational problems by representatives of management is played by theories of motivation.

Theories of motivation divide into three very representative groups today. Theories of a reinforcement place emphasis on means which control the behavior of the person, manipulating consequences. The method is based on supervision over the employee to find out what reinforcements are highly appreciated by the employee most. The reinforcement is a management of a consequence as result of behavior. B. F. Skinner, whose theory is the cornerstone of this approach, has gone further studying of incentive and reaction: he classified reaction of the employee on reciprocal (resulting from incentive) and operant (arising owing to expectation of incentive). In the theory of a reinforcement, the law of effect of E. L. Thorndike is the cornerstone of manipulation with consequences. The law of effect is formed simply, but has big force: the behavior which involves a pleasant outcome repeats with a high probability whereas repetition of the behavior fraught with an unpleasant outcome, is improbable.

Substantial theories are focused generally on needs of the individual – physiological or psychological deficiency which we seek to reduce or of which we want to get rid in general. These theories make an assumption that work of the manager consists in the creation of the conditions making a positive impact on the satisfaction of needs of the individual. They help to explain how bad performance of work, the undesirable behavior, low satisfaction with work can result from unsatisfied requirements. Four most famous substantial theories have been developed by A. Maslow, D. Mack-Klelland, K. Alderfer, F. Gertsberg.

**Maslow's Hierarchy of Needs
(original five-stage model)**

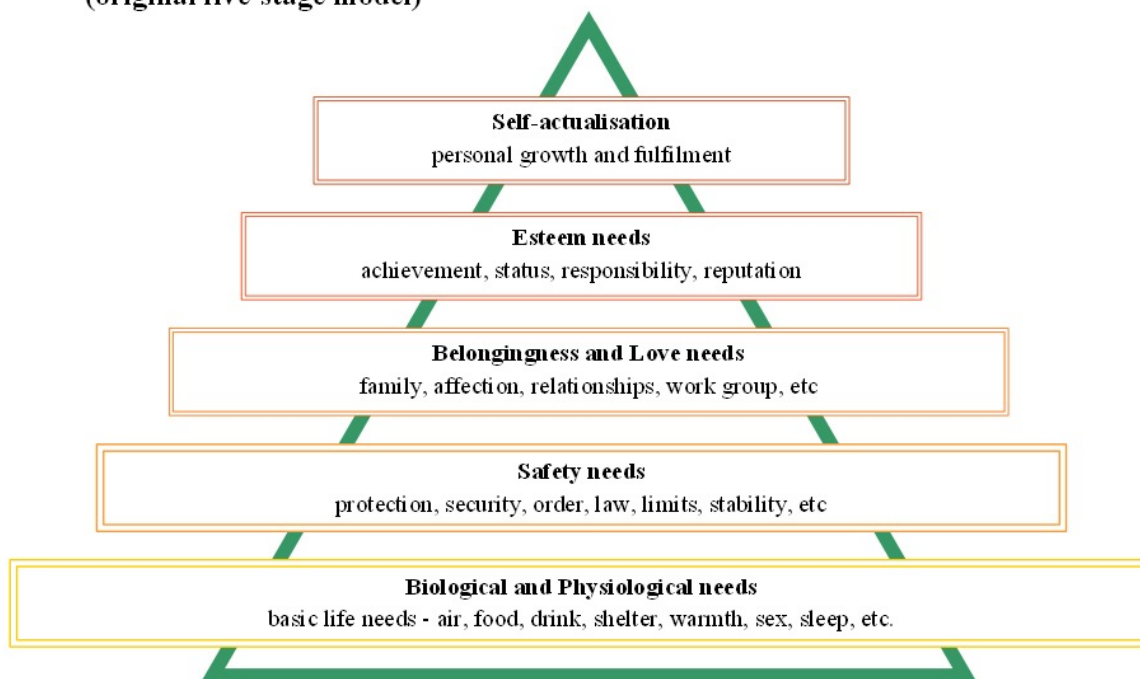


Figure 1 – Maslow's Hierarchy of Needs

As well as A. Maslow, the theory motivations K. Alderfer developed by definition of human wants. The distinctive feature of this theory is the combination of requirements in three groups:

- the needs for existence (on Maslow's classification requirements physiological and in safety);
- the requirements connected with human social nature (the need for social interaction);
- requirements for personal growth and development.

K. Alderfer created two types of motivation from the organized groups of requirements in the form of their emergence. The first type is the constant motivation arising irrespective of the last result and based on continual satisfaction of a particular condition. The second type - an incidental motivation which is characterized by short-term interest from the worker in specific need.

Procedural theories are focused on processes of thinking of the employee (forecasting and comparison, for example) which render both positive, and negative influence on the level of motivation of the employee. There is a significant amount such theories, but the most authoritative and known of them it is J. Adams's theory and V. Vrum's theory. J. Adams's theory which carries the name of the theory of justice, claims that when people estimate justice of results of the work in relation to people around, any perceived injustice is the motivating condition of reason. The perceived injustice takes place when someone considers that the reward earned by him for work concedes to the reward earned by surrounding people for their part of work. Vrum claims that the working motivation is defined by beliefs of the individual concerning interrelation of efforts, overall performance and the final result of work.

Motivations are the cornerstone requirements, interests and even short-term impulsive desires which do not interfere with growth, let temporary, the productivity of the employee. The category of requirements is most studied, but the category of the interest connected with the content of the work is most productive. National contexts are surprisingly solidary in the attitude towards understanding of an essence of motivation. Japanese, for example, speak: "There are no badly working Japanese, just work of the Japanese has not found". At Americans, the following idea was widely adopted: "In this life, it is necessary to learn to do well favorite serious work, and then to find the good guy who it will be good to pay for it". Thus, interest in the performed work is international, but the priority of requirements and impulsiveness of desires of employees have national specifics. The most difficult moment in this regard is that any theory of motivation is probabilistic: what is effective for one can be absolutely not important for others.

The fact that motivation – internal process, today at anybody doesn't raise doubts. However, this process is regulated by the organizational situation initiated by management. The purposes of the employee and the purpose of the company have to be corresponded, and for this purpose, the international manager has to use all possible means.

Leontyev's ideas led directly to ideas about social theory, and he did not shy from taking Activity Theory into that domain, but Leontyev always remained a Psychologist and his contributions to social theory are fatuous. Leontyev genetically reconstructed Vygotsky's concept of an action as follows. He began his analysis by considering an organism whose behaviour is directly controlled and motivated by the object of its activity, the organism's perception of the object being internally linked to the processes driving its activity. In the course of evolution, creatures develop 'portable' forms of behaviour which adapt to conditions, and these he calls 'operations'. Although not completely stereotyped, neither are operations consciously controlled by the organism. Even more elaborate forms of behaviour develop entailing a whole chain of operations to achieve a goal and these are called 'actions'. The motive of an action at this stage is identical to its goal. So, an action is controlled by its goal, which meets some need of the organism. All the operations making up the action are motivated by the same goal which is achieved only by the complete action. So long as everything goes smoothly, the component operations are regulated by the conditions without conscious control.

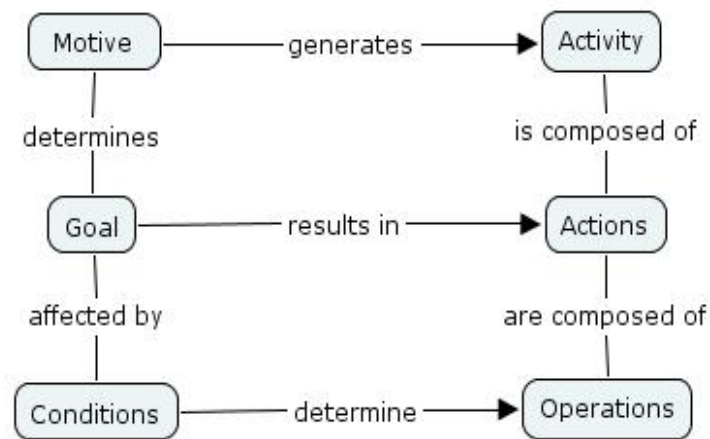


Figure 2 – Leontyev's theory of "an activity"

Considering the importance of the development of adequate conceptual framework, the following terms should be presented. *Organization of work* – organization of works is a variety of the skills demanded for work performance, completeness of the performed tasks, importance and responsibility of work. Granting independence to the worker. Timely feedback about compliance of work to the established requirements. *Material stimulation* - competitiveness of the offered salary as a result of comparison of levels of payment of expatriates and local staff; sent and fixed in headquarters. The ratio of constant and variable component of a salary. Communication of payment and results of work of the international company on condition of implementation of the social Opportunity programs to differentiate payment. *Moral incentive* - the wide set of non-material incentives used as the direct head, couch, and administration of the company in general and branch. *Corporate culture* - the values and priorities realized in practice of interaction of the management of headquarters and branch and personnel. The traditions of the company and the rule defining working behavior and interaction of employees in multinational collective. *Appeal to the most significant values for the worker* - self-esteem. Financial wellbeing. Responsibility to the team (collective). Responsibility to compatriots. Interests of the company. Career prospects. Interests of a family. *Belief* - Impact on opinion, estimates and the worker's views defining his relation to work in situations of interpersonal communication.

The understanding of how the management of the organization can come to optimizing control of the process of motivation and involvement of employees, proceeding from the purposes and tasks of the company is a basis of the concept of the mechanism of management of motivation. It is necessary to

define a ratio of the extent of achievements of the goals of the organization and the interests of employees with costs of personnel depending on the duration of prospects of cooperation of the worker and the employer, namely understanding of whether this cooperation is short-term or long-term. We can classify the purposes at all levels concerning the level of the organization, the management, and the individual employee. For example, at the level of the organization, in general, are public, commercial purposes; at the level of the management of the organization - personal, organizational, labor; at the level of the employee - own, employment, professional. The regulatory and economic mechanism of motivational influence cannot be formed without diagnostics of the corresponding factors. In general, these factors define an organizational component of the mechanism of management of motivation. That concerning an economic element in the mechanism of management, it is based on material stimulation of the activity of collective and individual workers in summation of effects of interests of the organization.

The economic component of the mechanism of management is the most effective way of motivation and includes:

- 1 the system of material encouragement of workers,
- 2 the system of responsibility for quality and overall performance,
- 3 participation in company's profits.

It is worth allocating separately social and psychological components (factors) of the mechanism of management of motivation. These factors represent set of ways of impact on workers through the system of relationship in collective, definition of social requirements. The organizational component consists in the creation of a corporate basis of joint activity in the company by the distribution of functions, duties, responsibility, powers, an order of business relationship between workers. All these organizational methods of management work for the achievement of common goals of the organization.

The key points that Locke and Latham made were that motivational goals needed to have the following dimensions: clarity, challenge, commitment, feedback and complexity. Goals need to be clear and measurable such as: My goal is to reduce maintenance downtime by 15 percent. Secondly, goals must be challenging, with achievement as the final payoff. Thirdly, employees must feel like part of the goal-setting process to be committed to a clearly relevant goal. Next, there must be a program that involves feedback, recognition and progress reports. Lastly, the task must be complex but not overwhelming, with sufficient time and resources available.

There are still some limitations to motivation and goal-setting theory, Latham and Locke admit. For example, they say that the goals of the organization are not always the same as the goals of the individual. Perhaps the company's goal is to get workers trained in new safety protocols. However, the manager's bonus depends upon the company's financial performance, not the employee's grasping of the safety procedures. Therefore, the manager may not be motivated to take employees away from their tasks to complete the training. Another limitation is that learning goals do not always foster interest, and interest goals do not always facilitate learning. There also is the problem that individuals are more tempted to take risky actions in pursuit of their goals, which could potentially lead to failure rather than success.

As it was already told earlier, the most studied variable motivator are requirements. The majority of motivational theories, both substantial, and procedural, are developed taking into account experience of the United States and the appropriate human resource. Despite coincidence of basic needs, priority of requirements and dependence of emergence of certain requirements on realization of the different people and cultures previous at representatives it is formed differently. East cultures are more focused on requirements of society, and western on individual. The hierarchy reflecting needs of Chinese includes, for example, four levels also look as follows: needs for accessory; physiological requirements; needs for safety.

The need for achievement, success according to Mac-Klelland and in growth on Alderfer is also differently perceived by representatives of various cultures. If for the representative of the western culture this requirement is associated with individual achievements, career development and successful socialization, then the Japanese employee, being guided by the basic principle of the harmony of group and corporate interests, will connect this requirement with collective achievements and success of subculture in general. Representatives of the Latin American states connect this requirement with family values, and Hindus – with spiritual improvement.

Representatives of different cultures differently estimate reality of a goal and an own role in this process, and also a role of such factors as destiny and external environment. It is known that the purpose for representatives of the western cultures can be the strongest motivator, for east cultures the importance of this factor considerably decreases.

The given several examples confirm complexity of a problem of effective motivation of representatives of multinational and multicultural collective which solution entirely depends on laborious studying by the international manager of features of representatives of each of the nations and cultures, monitoring of a labor and organizational situation as motivation in such collective, certainly and situationally.

The expatriates (the sent workers, who leave the country for long work abroad) who are often focused on the administrative or training activity have to be initially is motivated. Not without reason the known expression says: "The manager who needs to be motivated not the manager, but the performer anymore". Sending of the expert very often transfers national or corporate motivational problems to foreign office. For this reason, diagnosing of basic motivational problems and their elimination promote creation of productive motivation of the expatriate.

Regularly in the western countries, especially in the USA, surveys by means of which the level of motivation of the employee, first of all, his satisfaction with work is diagnosed are conducted. At the same time, Hekman's technique where parameters of completeness, the importance, autonomies, a variety of work, and also existence of feedback are estimated by the employee on the 7-mark system is used. Results quite often are very unexpected for heads of the companies. So, for example, in the USA work suits, 75% of respondents; 30% were very happy with the work, 35% are simply happy. And only 11% were absolutely dissatisfied with the work. And representatives of the management of the interrogated firms admitted that they have been pleasantly surprised with result: they thought that only 8% of employees will be very happy with the work. At the same time situation in labor market of the USA doesn't inspire optimism: 35% of employees plan to change work this year, 32% are intended to look for diligent and purposefully new work. Are called the most often mentioned reasons of change of the place of work: bad prospects for career development – 59%; discontent with a salary – 58%; insufficient safety of work – 38%. Many admitted that they are forced to work in the conditions of a stress. Search of places of work in the most successfully developing branches: health care and the computer sphere, and also in the sphere of information processing. A large number of employees – 35% of respondents – call the relations with the management of a decisive factor of motivation. High level of satisfaction with own work is a good basis and for formation of motivation to participation in transnational programs at the staff of the American companies.

The process of management of human resources and formation of effective motivation in the conditions of the international management are influenced by a significant amount of factors:

1. Cultural factors. The existing cultural factors and ethnic problems of the different countries leave a mark on actions of personnel of international firms.

2. Economic factors. Distinctions in economic systems in many respects define nature of attraction and use of labor in foreign operations of international firms.

3. Style and practice of management. Different views on management styles in the different countries can lead to the conflicts between personnel of headquarters of firm and its foreign branches. On the other hand, the knowledge of national peculiarities of human resource management allows the management of the international firm to transfer positive experience to other countries.

4. Distinctions of labor markets and factors of labor expenses. Features of the structure of labor and costs of her exist in all countries. Distinctions in labor expenses can become a source of contradictions.

5. Problems of movement of labor. When moving labor to other countries before people there are legal, economic, physical and cultural barriers. International firms should develop own techniques of a set, orientation and stimulation of workers for their overcoming.

6. Factors of the relations in the industry. The relations in the industry (especially the relations between workers, labor unions and businessmen) have essential distinctions in the different countries and exert a huge impact on the practice of management of human resources.

7. National orientation. The personnel of branches or local offices of the international firm can place the main emphasis not on global, and on national interests.

8. Control factors. Territorial remoteness and peculiar features of foreign activity complicate control over personnel of international firm.

Professional motivations are specific, conscious types of a worker's internal motive, his actual need or needs that ensure his striving for effective working in accordance with his work goals, specific features and job conditions in a company. The system of values and value orientations determines one's behavior in the most significant situations of a person's social activity in which a person's attitude towards life activity's goals is manifested, as well as towards means to satisfy those goals and to such circumstances of life that can be determined by the general social conditions, type of society, the system of its economic, political and ideological principles. Social values, seen from the perspective of individual life activities, are a part of a person's psychological structure as personal values which are one of the sources of conscious behavior motivations.

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КОРПОРАТИВТІК МАҚСАТТАРДЫҢ МОТИВАЦИЯ ФАКТОР РЕТІНДЕ КРОСС-МӘДЕНИ ЗЕРТТЕУІ

Аннотация. Мәдениетаралық психология қызметкерлердің кәсіби уәждемесін және коммуникативтік дағдыларын белсендіруді, мәдениетаралық өзара іс-қимылын, іс-әрекетін білдіреді. Уәждемені ынталандыру өз мүдделері мен қажеттіліктеріне сәйкес компаниядағы қызметкерлердің рөлін анықтайды. Сонымен қатар, қолдау, әрі құпия ұйымдастырушылық органы қалыптастырудағы жақсы психологиялық мемлекеттік қызметкерлерді тудырады және кәсіби уәждемесін жоғарлатуға әсер етеді. Мақала қызметкерлердің кәсіби уәждемесін және кросс-мәдени психологияның әсерін және ерекшеліктерін талдайды. Мақалада мәдениетаралық өзара іс-қимыл теориялық тұрғыдан талданады. Теориялық уәждемелік процестер мәдениетке әсер етеді және көмекші қызметкерді ынталандыруда әртүрлі мәдениеттің орнын, түсінігін қарастырады. Мақалада кросс-мәдени психология тұрғысынан көпұлтты мәдениеттердің әсері, қызметкерлерді көтермелеу және ынталандыру жолдары талқыланды.

Түйін сөздер: мәдениетаралық психология, уәждеме, психология, мінез-құлық, ұлттық ерекшелік.

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КРОСС-КУЛЬТУРНОЕ ИССЛЕДОВАНИЕ КОРПОРАТИВНЫХ ЦЕЛЕЙ КАК МОТИВАЦИОННОГО ФАКТОРА

Аннотация. Профессиональная мотивация в межкультурной психологии обозначает активацию профессиональных и коммуникативных навыков сотрудников, определенных эффектом совместных действий межкультурного взаимодействия. Стимулирование мотивации в многонациональном коллективе включает определение роли сотрудника в компании согласно его интересам и потребностям. Кроме того, формирование благоприятной и конфиденциальной организационной среды может вызвать благоприятное психологическое состояние сотрудников и, следовательно, усилить мотивацию сотрудников. Одним из факторов стимулирования сотрудников является их непосредственное участие в формировании корпоративных целей и построение личной иерархии достижения. Таким образом, целеполагание в данном случае выступает способом мотивации сотрудников. Статья анализирует особенности влияния кросс-культурной психологии на профессиональную мотивацию сотрудников. Выделены теоретические взаимодействия кросс-культурной психологии. Приведены примеры влияния многонациональных культур на мотивационные процессы, пути поощрения и стимулирования сотрудников.

Ключевые слова: кросс-культурная психология, мотивация, психология, поведение, менталитет, стратегия целеполагания.

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THE DIGITAL TRANSFORMATION OF AN EDUCATION SYSTEM. THE VIRTUAL REALITY AS NEW EDUCATIONAL SPACE

Abstract. Reforming of the higher education happens in the conditions of rapid development of information, virtual and communication technologies. Not only knowledge and ability of users of the computer and other information sources, but also ability to analyze and apply them to own development in everyday life become essential factors of the modern society. Influence of information technologies especially crucial in youth life is today. The contemporary education, the higher school, in particular, sets as the purpose to provide equal information access, providing the system of the higher education with safe and necessary conditions of its receiving. The virtual model of training as an essential component offers information transfer, in particular, is information to the educational environment (virtual).

Keywords: the virtual space, digital transformation, educational environment, ICT.

The Strategy "Kazakhstan - 2050", the President's Speech "NurlyZhol - The Way to the Future," the national idea " MangilikYel" they all refer to a system of social values, which officially have a national status and guide the movement towards the future".

Intercorrelation of state programs and further development of digital economy will allow gaining multiplicative economic effects. According to experts, the contribution from the joint implementation of the digital agenda to GDP growth of EAEU will be almost twice higher, than a donation from the application of national digital programs by the countries of the Union separately. And the start of joint digital projects can enhance positive effect still considerably.

At the current stage of development of society computer technologies intensively take root into many spheres of action of the person, and it also concerns educational process. Information computer technologies find broad application in middle and high school of comprehensive schools.

Use of computer technologies in educational activity is considered from a position of the creation of the latest training programs and techniques. At the same time forget about specific influence of conditions of training with the use of the computer on the development of mental processes of school students.

The problem of psychology and pedagogical consequences of the use of information technologies in various spheres of action demands expanded the discussion.

Technology affects human cognitive abilities and their lifestyle. This situation is fair for various historical eras, spheres of action of the person, and also types of its thinking. General characteristics of thinking of individuals which belong to different sectors of society, age groups, etc. mean.

Development of the new information environment of society allows creating enormous opportunities for the human progress, for the successful solution of different professional, social and other problems. Those members of the community who will have a necessary set of abilities and knowledge of orientation in new information space will manage to use the present possibilities.

The evidence is clear: We're in the midst of a data boom, driven by the increased ability to gather, store and analyze data with a seemingly endless reduction in the cost to do so. Leaders ready to take advantage of these trends and harness the power of data will be the ones who create the future in 2018 and beyond.

The last year shows a high interest of customers to digital education. The e-learning share in the total amount of corporate training significantly increased. It is easy to predict that in the 2018th more organizations will use electronic forms of education.

There are primary trends on which experts advise to pay attention.

1) Outsourcing. According to the report of the Docebo company "Digital training: market trends and forecasts (2014-2017)" (E-Learning Market Trends & Forecast 2014-2017), only 58% of the educational budgets of the company spend for internal programs and 58% – for initiatives which are implemented by forces of third-party specialized firms.

Self-training – it is excellent, but it is not enough to favor. It is necessary to involve the "narrow" experts owning knowledge in the field of neurosciences, psychology, and media.

2) Training happens during the whole days

Now training happens not only on the operation and an audience, and nearly 24 hours a day. The companies will provide to a staff an opportunity to study at any time and in any place, and for this purpose, it is necessary to take care of the development of the appropriate mobile applications and educational modules.

3) The relation to study changes

Also in the report of Docebo attention to the change of the relation to corporate training is paid, first of all, from employers. 96% agreed that successful educational initiatives positively influence the productivity of employees; 78% – consider an educational factor as an opportunity for staff career and professional development, and 87% of respondents think it as the form of compensation packets.

Many experts consider different types of information technologies as the means contributing to the development of systematic scientific thinking, constructive figurative thought, imagination, spatial and associative thinking, an intuition, variability that is those qualities of the person which provide most development of its creative abilities. Computer skills change social and economic communication in society, a kind of activity of his members, thereby becoming a critical common cultural element.

Higher education has always been fertile ground for the creation of new, boundary-pushing technology. Universities and colleges have always been at the cutting edge of new technologies, driving development and creating the next generation of scientists, developers, and entrepreneurs. Virtual and augmented reality technologies are at the frontier of development right now; the market is forecast to reach \$13.9 billion in 2017 (IDC), and change is happening at a frenetic pace. Professors and students alike are exploring the various disciplines where immersive imagery and audio can be impactful, and the adoption rate is only accelerating.

Distance Education and Learning Technology Applications (DELTA) at NC State University is using virtual reality in Introductory Biology: Ecology, Evolution, and Biodiversity (BIO 181) to immerse students in field-based experiences. Mendel Grammar School in Opava City, Czech Republic is teaching students about the anatomy of the eye in biology classes with the Oculus Rift. St. John's School Boston, Massachusetts is using Minecraft and VR to create immersive experiences. Penn State University in Pennsylvania is training students to do things in the virtual world as a precursor to doing it in the real world, increasing the efficacy of learning. The University of British Columbia in Vancouver is experimenting with virtual lecture halls.

There are also less obvious applications for VR outside the physical sciences, such as in law. The University of Westminster has built a virtual space for criminal law students, in which they hunt for clues to construct a murder case. Rather than merely reading witness statements, they can walk around a building and judge whether someone would have been able to see the crime, explains Markos Mentzelopoulos, senior lecturer in computer science at Westminster.

Regarding VR making things more participatory, that's a win-win for both college students and professors. While lecturing can certainly still be valuable, the multimedia associated with say a virtual field trip to Roman ruins (an actual VR app made on our platform) is more memorable and can lead to more engagement. VR allows for a true "Choose Your Adventure," with students empowered to explore and delve deeper with multimedia hotspots into areas they want to investigate further.

At present such concepts as, "the virtual reality" and "virtual society» need a definition. It is necessary to solve a problem of adaptation to new requirements of life in the virtual society where scientific knowledge will play a paramount role.

Effect of presence – the problematic mental phenomenon, directly observable in case of interaction of the person with reality, excellent from ordinary. In psychological studies, the concept of "mediated reality" is considered.

Besides using VR for teaching or learning, some academics are studying the impact VR will have on society as a whole

Virtual reality technology in the educational process and psychology as a scientific study was studied by Nigel Foreman, a professor at Middlesex University (Great Britain). Foreman in his studies illustrated opportunity of VR technology for children with physical disability. This group of children had difficulties in wayfinding, especially in new places. For some period children had an opportunity to practice in virtual navigation. The author found that after VR training children with a disability felt more comfortable in the new environment.

Leading in the development and implementation of "serious" electronic games and training applications remain the United States, Britain, and then Russia. It should be noted that even a student in the outermost reaches has a phone that allows downloading mobile applications that have access to the Internet. Such technologies enable communicating with the teacher and classmates/classmates at a distance and at the same time fulfill part of the assignment. International studies of PISA, TIMMS, PIRLS also highlight an integral part of functional and informational literacy.

A review of previous studies conducted in the world:

Armed forces: in 1981, a prototype flight simulator for the US Army was created; in 1996 - appeared the game *Marian Doom*, helping the army team to study a specific sequence of attacks, ammunition, tactics of effective communication, the ability to work in a team. The British Army has a license to use it;

Healthcare: In 2010, electronic applications were introduced in Japan, which are intended for medical professionals, often simulators and used for training. The learning process takes place through the acquisition of experience, as well as the analysis of sessions.

Business Administration: IBM conducted a study aimed at revealing the relationship between leadership in online multiplayer games (MMORPG) and leadership in reality. During the game, the following tasks were solved: assessment and selection of personnel, motivation, encouragement, identification, and development of talented employees creating a favorable atmosphere in the team; analysis of the flow of light and often incomplete information that requires quick and correct solutions with various and long-term consequences.

Social sphere: In Great Britain, 10% of young people make up the category of people who are not employed in educational and labor activities. In the process of their training computer training are used on various platforms.

Education: The 4-dimensional model proposed in 2004 (Sara de Freitas, Martin Oliver) includes a structure of interrelated elements. The model consists of 4 aspects: individual and group characteristics of the students, the style of their training, the knowledge acquired, the choice of training methods that correspond to the needs.

According to the statistical data of the site <http://countrymeters.info/en/Kazakhstan>, for 2017 as a whole in the republic, there are 12 820 235 people over 14 and under 65 who form a contingent of real buyers taking into account the above categories.

In its pure form, useful information technologies are based on virtual reality technology, mobile applications intended for the pupil of a small school are not available in Kazakhstan. The Moodle.org system is mainly used by higher education institutions of Kazakhstan, where distance learning is working. The system has not spread to schools, although it has vast potential. These technologies will entirely solve the issue of an alternative to obtaining the necessary information on the subject and developing the academic competence of the pupil of a small school. The potential of VR technologies is impressive. From the psychological and pedagogical point of view, these technologies will actively develop different thinking points aimed at forming a modern young state in the mental literacy of a citizen.

At present, there may be isolated cases of applying effective information technologies of a character nature, but no scientific and applied research has been conducted. It should also be noted that at this stage,

electronic textbooks on subjects in the DVD format of the publishing house "National Information Center" have been developed, and stores are filled with foreign production.

The proposed development will have fundamental differences and competitive advantages:

1. Kazakhstan brand: cultural and historical topics in all subject areas;
2. availability in the state and other languages;
3. a wide range of consumers;
4. Development of mental literacy rural schoolchildren.

The ICT will help the students of a small school to develop practical skills on the subject in conditions convenient for him: place and time, by phone or computer, via an Internet connection or on a disk. At the core of mobile applications and VR-technology lies the principle of the simulator, the which will form a skill aimed at the development of academic competence. Work in the Moodle.org the system will allow you to connect with groups of students from other classes and schools to perform design, creative or research work, to get in touch with the teacher.

The level of technology currently allows Kazakh programmers to develop the proposed product of intellectual property with subsequent commercialization. Since 2007, all secondary schools are connected to the global Internet and are equipped with basic packages of programs for the development of computer literacy and the latest information technologies. The level of knowledge of domestic programmers, their "technical" flair, contacts with colleagues from Russia, far abroad, open access for participation in international projects, the fast possibility of specialized technical equipment serve as a basis for virtualization of education in a small school complex.

Leading groups in the field of research, development are:

- Electronic Arts Inc. NASDAQ: EA - the second most abundant publisher and developer of computer video games for various platforms, known for its sports simulators (FIFA, Madden NFL, NHL), as well as a series of popular franchises (US Need for Speed, The Sims, Battlefield)).

- EA Games includes console games of various genres for a broad audience: Battlefield, Dead Space, Need for Speed, Mass Effect, Dragon Age and Star Wars: The Old Republic, Unites studios: Bio Ware (Canada, USA), Criterion Games (England), DICE (Sweden, USA), Ghost Games (Sweden), Visceral Games (USA).

- EA SPORTS as a license develops sports simulators (Madden NFL, FIFA, NCAA (football), NHL (hockey), NBA LIVE (basketball), Tiger Woods PGA TOUR (golf) and UFC) and a series of sports arcades (Canada, USA)

- Maxis (The Sims and SimCity), PopCap (Bejeweled, Peggle, and Bookworm), All Play (mobile and web devices available on Pogo.com, Monopoly, Scrabble, Game of Life).

Application of technologies of virtual reality in training allows:

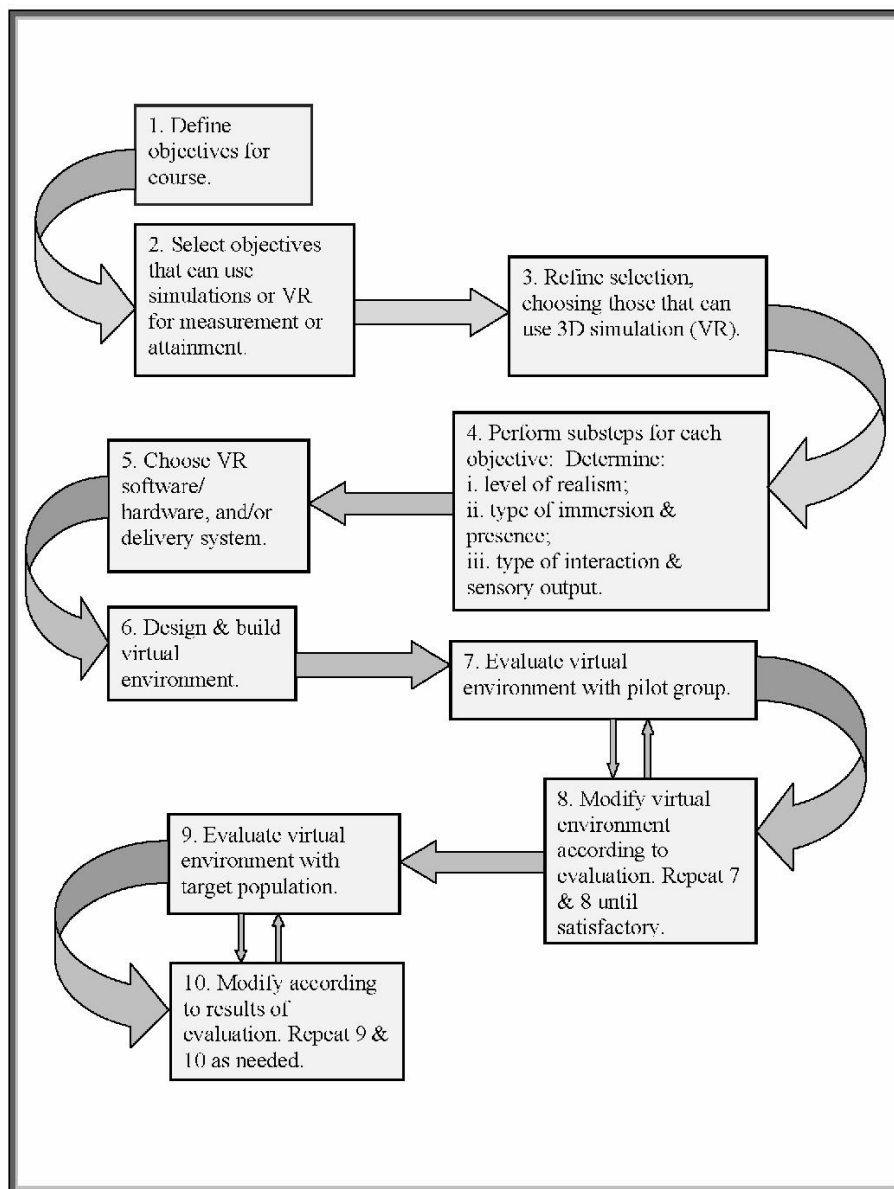
- to make training materials clear and exciting to students;
- to reach complete immersion in training process at the expense of 3D - visualization, and elements of gamification.

Of course, a lot of things depend on features of perception: it is more habitual and simpler to someone to perceive the text "at sight," i.e., from printing carriers. However, for those who easier observe a media format, VR technologies are capable of making training process fascinating. For example, looking in a window, students would see the countries and events about which the teacher says: the history of KievanRus', forming of volcanoes, migration of waterfowl.

VR technologies create the virtual space immersing students in the world of any subject, helping to concentrate on its studying. Studying the chemical equation in the cool room equipped using VR technologies, students get in the chemical reaction, observing connection of particles. Application of technologies of virtual reality in training allows:

- to give to the student directly, but not theoretical, experience;
- to reduce an influence of the distracting factors interfering perception of information;
- to explain the phenomena, difficult for understanding, and subjects.

Scientists support an application of VR technologies for training as promoting understanding and storing of material worldwide. It is easier to master any skills if to train in the interactive, three-dimensional environment



How to create VR technology in education

VR technologies – it not only the screens and points intended for a perception of information by students but it also the multipurpose panel for the teacher. The teacher receives a signal from displays of students, starting materials and controlling the progress of their studying. It can also become part of three-dimensional virtual reality to explain the happening processes or to pay attention of students to any details.

It means formation at such qualities of the personality as initiative, responsibility, a reflection, a self-assessment and self-checking, readiness for self-education, self-development, and self-improvement that is valuable from line items of the modern employer. Thus, we see that the real and virtual space gives to the person who is in it more than advantages. This concept represents the model of the new area of professional education which support happens means of the modern information technologies in a real and virtual environment. The VR technology requires the reorganization of educational space and development of the evidence-based system of integration of scholarly activity.

The lining of the relations in new educational space requires the realization of pedagogical approaches to a coating of pedagogical activities. We attempted judgment of the new modern scientifically – pedagogical research as the real and virtual space. Based on the ideas which are already available in educational literature lines, types, characteristics of the real and virtual space were defined.

Table 1 – Activities of the teacher in real and virtual space

Realspace	Activitiesoftheteacher	Thevirtualspace
Abstract of occupation, textbook, methodical recommendations	Preparation for occupation	The scenario of occupation, representing freedom in a choice of forms, methods and methods of training, Internet resources, materials of colleagues in network interaction
Primary activity of the teacher	Mainstages of occupation	More independent activities of the trained
To be in time, execute the scheduled	Occupation purpose	To organize activities of the trained: on setting of the educational task; on search and information processing; on action methods
Thepreferentiallyfrontal	Form of occupation	Preferentially personal and/or group
It is created by the teacher	Educational environment	It is constructed trained together with the teacher
Object, marks	Results of training	Object, metaobject, personal. Creation of a portfolio

The concept of the real and virtual space specifies opportunity essentially to other pedagogical line items of the changing educational situation. It is considered to be what precisely the teacher causes changes in consciousness of the individual conditions which are trained using the organization and application of educational technology. If we enter concept of the real and virtual space as conditions of construction of the educational environments (real and the virtual), then the traditional pedagogical line item is exposed to severe modification. The teacher stops being a saver of educational reality, becoming the organizer of conditions for the appearance of different educational environments in the real and virtual space.

Table 2 – Ratio of characteristics of the real and virtual space and abilities of the teacher

Characteristic of the real and virtual space	Activities of the teacher in the changing educational space
The space is part of the conditional practice. A subject of constructive activities as teacher, and trained it arises on a joint different the practician.	Ability to project the predicted result, for lining of symbolical construction
The space is dynamic, indefinitely, movably, all the time changes	Ability to select necessary of the possible
The space weakens a static educational situation, showing reality of other situations	Ability to regulate receiving educational result
The space is directed on internal forms of the relations of participants of the educational project - the relation to own "I".	Knowledge of the opportunities and ability to use them in an educational situation
The space is image of probable changes which combines in itself different potentials of educational situations.	Ability to build the strategic line of an educational program
The space is the cogitative intermediary. Construct of joint imagination of the teacher and trained.	Ability to build the strategic line of an educational program together with the trained

Activities of the teacher in permanently the changing educational space are object scientific research, for the formation of a basis in training of future professionals.

Use of the virtual technologies needs thorough training: the software, plans, manuals on program management, manuals, instruction individualization, special training of teachers.

The virtual technologies, the virtual reality as the sociocultural phenomenon, are essential means of cognitive activity which influences the mental world, culture, and spirituality of the identity of the third millennium.

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БІЛІМ БЕРУ ЖҮЙЕСІНІҢ САНДЫҚ ТРАНСФОРМАЦИЯСЫ. ВИРТУАЛДЫ ШЫНДЫҚ ЖАҢА БІЛІМ КЕҢІСТІГІ РЕТІНДЕ

Аннотация. Жоғары білім реформасы ақпараттық, виртуалды және коммуникациялық технологияларды жедел дамыту жағдайында жүріп келеді. Қазіргі заманғы қоғамның маңызды факторлары компьютерлер мен басқа да ақпарат көздерін пайдалануды білу ғана емес, оларды күнделікті өмірде өз дамуына талдау жасау және қолдану мүмкіндіктерін арттыру. Жастардың өмірінде ақпараттық технологиялардың әсері өте маңызды. Қазіргі заманғы білімі, әсіресе, жоғарғы мектеп ақпаратқа тең қол жеткізуді қамтамасыз етуге, жоғары білім беру жүйесін қауіпсіз және қажетті шарттармен қамтамасыз етуге бағытталған. Виртуалды оқыту үлгісі негізгі компонент ретінде ақпараттың арнайы ақпарат пен білім беру ортасына (виртуалды) ауысуын қарастырады.

Түйін сөздер: виртуалды кеңістік, цифрлық трансформация, білім беру ортасы, АКТ.

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ЦИФРОВАЯ ТРАНСФОРМАЦИЯ СИСТЕМЫ ОБРАЗОВАНИЯ. ВИРТУАЛЬНАЯ РЕАЛЬНОСТЬ КАК НОВОЕ ОБРАЗОВАТЕЛЬНОЕ ПРОСТРАНСТВО

Аннотация. Реформирование высшего образования происходит в условиях бурного развития информационных, виртуальных и коммуникационных технологий. Важными факторами современного общества становятся не только знание и умение использования компьютера и других источников информации, но и способность анализировать и применять их для собственного развития в повседневной жизни. Влияние информационных технологий особенно важно в жизни молодежи на сегодняшний день. Современное образование, высшая школа, в частности, ставит целью предоставить равный доступ к информации, обеспечивая систему высшего образования безопасными и необходимыми условиями ее получения. Виртуальная модель обучения как базовая составляющая предусматривает передачу информации в специальной информационно-образовательной среде (виртуальной).

Ключевые слова: виртуальное пространство, цифровая трансформация, образовательная среда, ИКТ.

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PSYCHOLINGUISTIC STUDY OF SUGGESTIVE METHODS IN EDUCATION

Abstract. In this article we reveal our studies of students' hidden unconscious motives by using the neuro-linguistic programming technologies (NLP). The level of hidden purpose intensity enables us to measure implicit expressions of verbal strategies taking into consideration scientific and humanitarian ideas. The methodological basis of this research is Pavlov's idea of reflex. We use NLP methods as part of educational process where linguistic and phonetic structures change student's learning attitudes. One of targeted objectives of our study is to convince that NLP methods are a potential way of achievement of high professionalism in teaching. This perspective is mentioned in the description of the particular professional teacher activity exclusively based on researchers' teaching experience. Studying of speech and other cognitive functions to define those aspects in methods of analyzing of the neuropsychological principles allow us to conduct the qualitative psychological analysis of the hidden verbal influences which is our main research objective. Theoretically, the efficiency of any text or statement depends on the maximum use of suggestive opportunities of language. Experimentally we have revealed the efficiency of usage of Erickson methods in educational process such as Milton's model that allows defining interrelation between features of the development of neuropsychological determinants of students' cognitive structure and NLP impact on their thinking process and abilities.

Keywords: NLP, neurolinguistics, Linkert scale, professional activity, Milton-model.

Introduction. It is possible to look at NLP from different points of view. One can see NLP as a smart technology for successful leadership or use it effectively to enhance yourself as a method which is capable to change entire worldview or to become kind to people or on the contrary to become a manipulative sociopath. It is possible to teach the youth to resist consciously different technologies of brainwashing. It is necessary due to modern society where majority of citizens try to influence each other in an open or hidden way. We assume that in everyday life one hears a lot of criticism towards these people who honestly work to understand the ways to use NLP technologies to improve the living. We do our best to try to make the world a little more freely from all sophisticated and subtle manipulations from cunning and greedy dealers who are successfully selling anything and fooling folks. We aim at citizens of our country to learn how to resist an impact of universal influence that can be reached through a conscious, informative and integral research of NLP technologies structure and their usage. [Utemissova, G.U., Urmurzina, B.G. 2018]. Thus, each person who receives NLP skills at different personality aspects such as personal orientation – worldview, values, beliefs, ideals, experience - habits, abilities, skills, knowledge, mental processes and biochemical properties could differentiate contents of ordinary texts from manipulative ones. In this scenario, the further personality development will be caused by contents of clean texts and type of personal communications and interactions with society. The major problem of NLP implementation into theoretical psychology field is the fact that some scholars narrow the scope of use and

criticize NLP methods. However, let us pay attention to the evolution of Leoniev's "activity theory" where we see its transformation and similarity with both cognitive approach and humanistic psychology [Petrenko, V.F., 2007]. Our task is to provide such conditions of training that differences between spontaneous and purposeful formations of personality are accurately differentiated and accented [Utemisova, G.U., 2015; Utemisova, G.U., Urmurzina, B.G., 2017]. Each mature responsible and highly moral professional teacher possesses such opportunity. The methodology includes classical operations by William James [1902], Pavlov's reflex theory, the theory of activities by A.N. Leontyev, the theory of set by D.N. Uznadze [Uznadze, D.N., 1966], Alfred Korzybski's works [Korzhibski, A., 2013], Milton Eriksson's, Fritz Perls's and Virginia Satir's ideas and works. Considering the achievements in cognitive sciences we suggest that cognitive behavioral therapy (CBT) is the most prospective area of research in the worldwide psychology studies [Hofmann, S.G., 2012]. The central principle of our research is the ability to create a fixed attitude which is the basis of new skill formation process where psychologists'/talented individuals' and happy citizens' successful thinking and behavior patterns are learnt through a set of multiple and original exercises which bring a rise in the vitality level and support students' to improve their cognitive abilities such as productive thinking, memorizing and attention and help them to move forward and become successful later in life.

Problem Statement. In recent researches the premises of cognitive and behavioral theories integration into the general concept of a humanistic model of education which could be a new approach to pedagogical activities and "educational tools" have been created [Barbitova, A.D., 2014]. NLP is one of the most popular directions which appeared at the end of 20th century in the field of modern psychology. As a new trend, NLP has won all titles and ranks in Russia straight away, having found an image of the powerful tool long ago during the reorganization of Soviet period. There is a row of reprinted foreign and Russian NLP manuals [Sitnikov, A.P., 1992; Sitnikov A.P. 1995; Pligin, A.A., Gerasimov, A.V., 2009; Pelekhatyi, M.M., Chekchurin, Iu., 2014; Gordeeva, E.G., 2008; Bandler, R., Grinder, J., 1975, Grinder, J., Bandler, R., Andreas, C. 1981; Kameron-Bandler, L., Gordon, D., Maikl, L., 1997; Dilts, R., 1990; Dilts, R., 1994]. The NLP study in Kazakhstan began at the same period as the growth of competitive affairs in business especially in advertising and promotional sectors. Today NLP is researched in the most various aspects. You can get NLP training in Great Britain, through NLP Association [ANLP].

According to researchers of past years, NLP shows good results in the treatment of allergies and CBT in dealing with chronic pains [Sturt, J are., Ali, S., Robertson, et al., 2012]. Other exciting researches which have been carried out in 24 studies, we can see a successful attempt to prove the efficiency of NLP methods usage which shows considerable influence on educational process and on their results [Carey, J., Churches, R., Hutchinson, G., Jones, J., Tosey, P.C., 2009]. On the one hand NLP methods are applied in Sales, as part of Soft skills training; on the other hand, psychologists use NLP as part of food addiction therapy [Sorensen, L.B., Greve, T., Kreutzer, M., et al. 2011]. According to E.V. Soboleva's, scientific research paper "Analysis of first year students' personal resources studying at psychological faculty" we can see the attempt to combine theoretical study and empiric research into enhancing first-year psychology students' personal resources via using NLP practices [Soboleva, E.V., 2014].

The linguistic approach of NLP implies the involvement of language unique patterns influence. Therefore, a significant importance is given to semantic analysis of texts, analysis of speaking and understanding processes, the usage of characters and metaphors in the speech is crucial that specifies the importance of psycholinguistic approach application comprising elements of speech styles and metaphors representing deep structures.

Research Questions. Neurolinguistics is a part of psycholinguistics which has an entirely specific problem of establishment of communication between "language and cognitive procedures" and brain zones [Chernigovskaia, T.V., 2018]. The connection between psychology and neurolinguistics allows us to create models which work simply and reliably. In addition, it is important to note that maintenance of our thoughts, as a rule, belongs "to the deep level of neurology" [Lurii, A.R., 1979]. This has been named in NLP as "deep structures" which should be taken into consideration during communication process.

In 1957, Chomsky published *Syntactic Structures*, in which he developed the idea that each sentence in a language has two levels of representation — a deep structure and a surface structure. The deep structure represented the core semantic relations of a sentence, and was mapped on to the surface structure via transformations

In our current study we use the information about students' individual, specific and psychological characteristics and their influence on the process of knowledge assimilation and functional asymmetry and hemispheres interaction [Zeigarnik, B.V, 1976; Anan'ev, B.G., 1996]. The further investigation of this topic isn't possible without neurosciences studies [Bernshtein, N.A., 2009; Sokolov, E.N., 2004; Smirnov, V.M., Budylna, S.M., 2009; Bekhtereva, N.P. 2018; Anohin, P.K., 1998].

Purpose of the Study. Our purpose of research is to see the link between students' knowledge formation process and the form of educational materials representation at a course and how information assimilation process happens when NLP method is used through measuring the effectiveness of students' memorizing, representation abilities and solving particular problems. Moreover, the success in achieving our set purposes first of all depends on the efficiency of educational information assimilation process by each student who possesses own conceptual structure.

Research Methods. According to this research design, the study of the structure of the suggestive text based on measurement of various standard models of expression of linguistic categories which are the cornerstone of communicative communication (a submodality, speech predicates). Numerous works on the use of a suggestion in advertising recommend a focus group method. The objective was the determination of the efficiency of text structural components. We chose a technique of the semantic differential of Ch. Osgood [Kozhevnikova O.V., V'iuzhanina S.A., 2016] as our primary research tool but modified it. We determined the choice of this technique by the fact that the semantic differential (Linkert Scale) allows receiving quantitative regularities of the participant' emotional response to objects in numerical scale and we found it very convenient. The study included a standard set of the statements estimated on a 5-Grade scale of answers: 1 - no, 2 - rather no, then yes, 3 - I do not know, 4 - rather yes, than no, 5 - yes.

The examinees marked the number in the table. Statements belonged to the texts used in the educational process and were the following: 1 - The text is convincing; 2 - The text is well made; 3 - The text is interesting; 4 - I like the text; 5 - It is pleasant to read it; 6 - After reading of this text there was a desire to study subject contents further and more deeply.

It should be noted that the choice of questions decided by features of suggestive means in the text in respect of suggestion, belief, drawing attention, the excitement of an emotional response on a definite adjusting dominant, motives to the more profound studying of a subject. The statements were "uncertain," general and between them, there is no distinctive right side (all of them are very vaguely made and identical on sense), that is, statements in itself have implemented suggestions and bypassing consciousness criticism. These type of NLP methods you can find in Milton model. The focused attention to features of the text, but not directs the listener in the necessary course to subject contents to avoid consciousness filters. Besides scaling of the index of values at the measurement of assessment of the quality of the offered texts (excerpts from lectures, metaphors), examinees had to define a text rank.

Ranging was carried out for modeling of reaction by a method of focused - an interview. Time for filling of tables was given from the general calculation – 6 seconds from which 4,5 seconds on the reading of the text (it was defined experimentally) and 1,5 seconds on exposure of estimates. The estimated criteria were shown consistently (examinees for the first time saw the list) for accurate control assessment time.

Texts were lecture material, applied in educational process and also the designed content of practical training. While selecting texts, we tried to a particular specification of receptions to capture as much as possible suggestive means. In the instruction were instructed on what it is necessary to pay attention.

Participants' characteristics. Students of 1-4 courses of K. Zhubanov ARGU (N=80) participated in the experiment. Results of 7 participants aren't represented in data.

Procedure.

I stage. Research of influence of suggestive ways taking into account various touch representations, and first of all kinesthetic representative system which is expressed through motivation of the recipient to specific actions of further studying of material. Kinesthetic predicates are implemented in language through imperative moods of a verb.

1. "Do not reflect! Want to reach the truth! Act!" - a direct sense of an imperative mood of the singular of a verb.

2. "We will direct your subconsciousness to unlock potential!" - the text with a modality of future tense is submitted.

3. "Quickly penetrate!" - Use of an adverb.
4. "Why don't you realize?" - Use Milton model, inducing to understanding.
5. "Read and remember!" - A direct sense of an imperative mood of the plural of a verb.
6. "This is what you need!" - value of incentive need.
7. "I would like to discuss with you an issue, so important to you after you penetrate into sense written" - understanding of sense written is meant here, and the attention is directed to the discussion.
8. "Interestingly, which of you can want to speak the first?" – Presupposition and intention to express as the distracting factor and who will speak the first is self-evident.
9. "Together we will achieve success!" - Lexically the expressed joint action.
10. "Do you realize what something at you turned out perfectly?", "You understand that you somewhere can put the knowledge successfully into practice!" - These formulations use predicates of understanding (to realize, understand) and presupposition after a comma that allows achieving focusing of attention on positive experiences even if there are some failures, all the same something also somewhere deserves your attention.
11. "Did you notice that you just will not be able to arrive in the same way?" - in this example, the attention is directed to lack of the choice.

II stage. The participants didn't know that we boost their mental activity. During of study we hide the learning topic so examinees could choose their own explanation of each statement.

Findings.

Table 1 – Overall estimate of the effectiveness of suggestion in the text and the rating of different ways of expressing a suggestive value

#	Text	1	2	3	4	5	6	Mean	Sum
1	"Do not think so long! Want to reach the truth! Act!"	225	265	241	214	192	191	221	712
2	"We will direct your subconscious mind to unlock potential!"	300	350	342	334	355	328	335	397
3	"Quickly go into!"	201	223	235	186	202	191	206	789
4	"Why do not you realize?"	262	272	274	245	271	251	263	656
5	" Read and remember !"	265	256	253	226	244	236	247	712
6	"This is what you need!"	264	278	268	249	258	251	261	636
7	"I would like to discuss with you an issue, so important to you, but after you think through a text."	300	329	322	313	301	306	312	477
8	"Interesting who would like to speak first?"	354	400	378	370	373	376	375	316
9	" Together we will achieve success ! "	247	238	244	226	226	229	235	696
10	"Did you realize that you make something perfectly?"	368	391	368	370	349	356	367	356
11	"Did you notice that you would not be able to behave in the same way?"	344	329	346	338	321	337	336	468
	Average value							287	565

Note: From the 1st on - the 6th columns are presented – a total score of texts on criteria: 1. The text is convincing. 2. The text is well made. 3. The text is interesting. 4. I like the text. 5. It is pleasant to read it. 6. After reading this text, there was desire more deeply to study subject contents further.

In the analysis of the obtained data, we made a decision that if statements scores is higher than average (Mean = 2.87; Mean rank = 5.65) so this text include the hidden (modified) expression suggestion.

Linguistic patterns of a person, determines what and how he thinks and feels. These patterns reveal a person's selftalk and his mental status. It is there for important to guide the cognition and normal conversation to make it as positive as possible for self enhancement. If a person can replace the mind-reading of another person's thoughts, feelings, intentions, etc. by stating it to oneself as a "guess," as a "possibility". Neuro-linguistic programming (NLP) techniques can help students become successful by increasing their motivation, by decreasing their anxiety leading to learning improvement.

Table 2 – The ratio of positions by the level of suggestion and the rating of various texts with a different way of expressing the suggestive value

*	**	Level of suggestion	Scores			
1	75	"Interesting who would like to speak first?"	375	316	8	712
2	73.4	"Did you realize that you make something perfectly?"	367	356	10	397
3	67.2	"Did you notice that you would not be able to behave in the same way?"	336	397	2	789
4	67.2	"We will direct your subconscious mind to unlock potential!"	335	468	11	656
5	67.2	"I would like to discuss with you an issue, so important to you, but after you think through a text."	312	477	7	712
6	67.2	"Why don't you realize?"	263	636	6	636
7	67.2	"This is what you need!"	261	656	4	477
8	67.2	" Read and remember !"	247	696	9	316
9	67.2	" Together we will achieve success ! "	235	712	1	696
10	67.2	"Do not think so long! Want to reach the truth! Act! "	221	712	5	356
11	67.2	" Quick go into!"	206	789	3	468

Note: (according to figure) * - a relative position of the text. ** - suggestion level as a percentage.

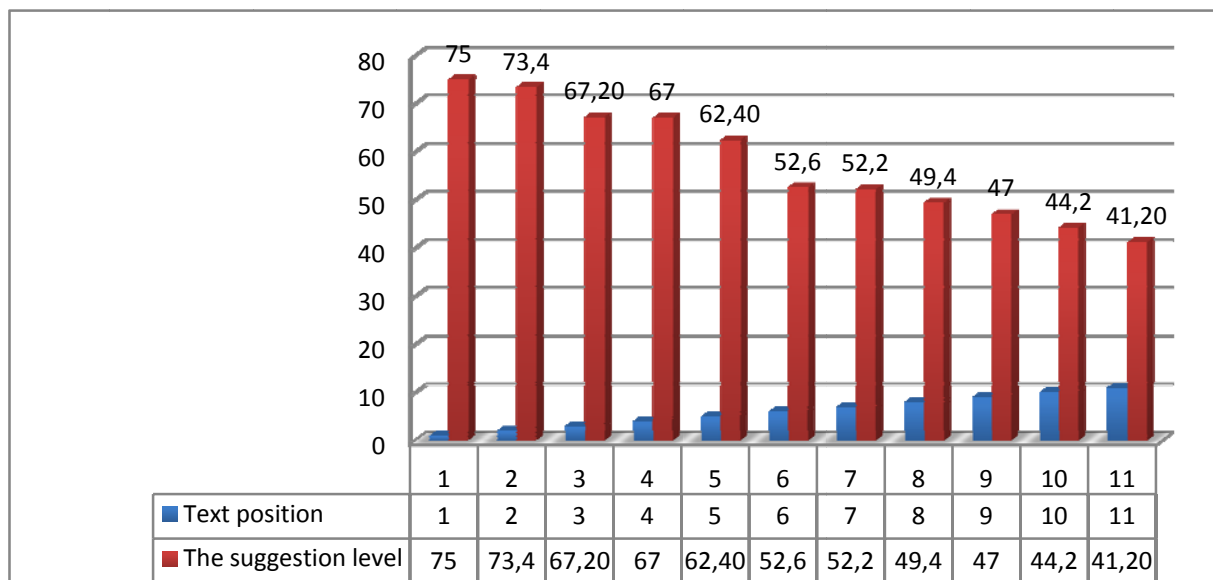


Diagram of the relationship of positions on the level of suggestion and the rating of various texts with a different way of expressing the suggestive value

Conclusion.

1. The statement "Interestingly who would like to speak first?" took the first position on the level of a suggestion. The possible explanation is a fact in this text we are requesting for cooperation, and it softens expression.

2. "Did you realize that you make something perfectly?" This type of statement activates student motivation and asks them to repeat the successful experiment by rational reasoning and illusionary choice.

3. "Did you notice that you would not be able to behave in the same way?". We recommended to compliance with reality and masked flattery.

4. "We will direct your subconscious mind to unlock potential!" The inner impulse of action isn't in the human mind that's why this statement has the lower level of suggestion.

5. "I would like to discuss with you an issue, so important to you, but after you think through a text." This type of suggestion promotes an opposite response cause it sounds more rigidly and interferes with personal borders.

6. "Why don't you realize ". It confirms some listener problem.

7. Further on decreasing from the seventh position on the eleventh imperative constructions which are entirely authoritative follow and deprive of the recipient of choice.

One of the most important things for student who wants to be successful in education is having mastered on his cognitive processes and emotion. In this research we figure out Milton's Model can be a useful tool for increasing student's self-awareness and cognitive controlling that has effect on their confidence. We recommend that Milton's Model can be used in psychology consulting approaches, relationship process between teacher and student. Thus, experimentally we proved the efficiency of use in educational process the Erickson methods (Milton's model). Therefore, based on the findings, it is suggested to consider NLP education along with other educational courses, not only to promote individuals' general health but also to lower depression, anxiety, social function reduction, and physical problems, which will prevent mental and physical disorders.

Limitations of the Study. As primary objectives of our research are the psycholinguistic experiments assuming realization of a particular speech behavior among the student's psychologists "devoted" to specialty elements, our study has some restrictions. The respondents were only Russian-speaking students that do not allow transferring the conclusions to another sample of respondents.

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БІЛІМ БЕРУДЕГІ СУГГЕСТИВТІ ӘДІСТЕРДІ ПСИХОЛИНГВИСТИКАЛЫҚ ЗЕРТТЕУ

Аннотация. Мақалада жаратылыстану-ғылыми және гуманитарлық идеяларды адамның сөйлеу әрекетінің фактілерін эксперименталды тексеру аспектісінде және экстралингвистикадан бастап, фонетикамен аяқтай отырып, НЛБ әдістемелерін пайдалану бойынша мәселелер жиынтығына кіретін сөйлеу стратегияларының жасырын білдірулерін құрастыруға мүмкіндік беретін нейролингвистикалық бағдарламалауды, жасырын, ескерілмейтін мәндердің айқындығын қолдана отырып, студенттердің жасырын, санасыз уәждерін зерттеу мәліметтері келтіріледі. Бұл ретте, НЛБ суггестивті әдістемелерін кәсіпқойлықтың жоғары дәрежесіне жетудің әлеуетті жолдары ретінде пайдалану мақсаты қойылады. Берілген мәселелер жиынтығы, оқытудың тек қана өзіндік тәжірибесіне негізделген, педагогтың нақты кәсіптік әрекетін сипаттау үшін қозғалды. Нейропсихологиялық принциптерді зерттеу әдістемелеріндегі, жасырын вербалды әсерлердің психологиялық сараптамасын жүргізуге мүмкіндік беретін аспектілерді анықтау үшін сөйлеу және басқа да жоғары психикалық функцияларын зерделеу, зерттеу мақсаты болды. Экспериментті жүргізуде Қ.Жұбанов атындағы АӨМУ-дің 19-25 жас санаты аралығындағы 1-4 курс студент-психологтары қатысты. Жалпы алғанда, барлығы 80 респонденттерден мәлімет алынды. Оның ішінде, 70 студент – ер балалар, 10 – қыз балалар. Теориялық тұрғыдан, кез-келген мәтіннің немесе пікірдің нәтижелілігі, тілдің суггестивті мүмкіндіктерін максималды пайдалануға байланысты. Тәжірибелік жолмен, оқу үрдісі барысында эриксондық техникаларды пайдалану тиімділігі расталған (нақты айтса, милтон модельдері), ол студенттердің когнитивті құрылымының нейро-психологиялық детерминанталарының даму ерекшеліктері мен олардың ойлау қабілеттеріне НЛБ техникаларымен әсер ету үрдісі арасында өзара байланысты анықтауға мүмкіндік берді.

Түйін сөздер: нейро-лингвистикалық бағдарламалау, нейролингвистика, семантикалық дифференциал, кәсіптік қызмет, милтон-модель.

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ПСИХОЛИНГВИСТИЧЕСКОЕ ИССЛЕДОВАНИЕ СУГГЕСТИВНЫХ МЕТОДОВ В ОБУЧЕНИИ

Аннотация. В статье приводятся данные исследования скрытых, бессознательных мотивов студентов с применением технологий нейро-лингвистического программирования (НЛП), выраженности скрытых, неосознаваемых смыслов, что позволяет построить имплицитное выражение речевых стратегий с учетом естественно-научных и гуманитарных идей в аспекте экспериментальной проверки фактов речевой деятельности человека и входящих в проблематику использования методик НЛП, начиная экстралингвистикой и завершая фонетикой. Таким образом, ставится задача использования методик НЛП как потенциального пути достижения высокого уровня профессионализма. Данная проблематика затронута для описания конкретной профессиональной деятельности педагога, исключительно основанная на опыте преподавания авторов. Целью исследования является изучение речевых и других высших психических функций, чтобы определить те аспекты в методах изучения нейропсихологических принципов, позволяющих сделать качественный психологический анализ скрытых вербальных воздействий. Теоретически, эффективность любого текста или высказывания зависит от максимального использования суггестивных возможностей языка. Экспериментальным путем были подтверждена эффективность использования в учебном процессе эриксоновских техник (а именно модели Милтона), что позволило определить взаимосвязь между особенностями развития нейропсихологических детерминант когнитивной структуры студентов и процессом воздействия техник НЛП на их мышление.

Ключевые слова: нейро-лингвистическое программирование, нейролингвистика, семантический дифференциал, профессиональная деятельность, милтон-модель.

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BASICS OF FINANCE MANAGEMENT IN CULTURAL AND SOCIAL AND ECONOMIC DEVELOPMENT OF KAZAKHSTAN

Abstract. The management of finances in the development of culture becomes a strategic priority for the modern economy of developed countries, not only because creating the conditions for organizing leisure and providing residents of the urban district with the services of cultural organizations, as well as for mass recreation of the city residents, but also because it managed to generate a powerful sector of creative industries, which ultimately will have a positive impact on social development. Social and cultural development accumulates positive effects in various spheres, allows to turn weak points into strong ones, when cooperation of cultural organizations with other social actors allows improving the urban environment, developing tourism, attracting investments, initiating the creation of new jobs, helping to solve social and economic problems and help resolve conflict situations.

Keywords: management, finance, culture, socio-economic development, museums, parks, theaters, investments, the state.

Introduction. Finance, as an economic phenomenon, arose with the need to expand the scale of social production, the existence of the state [1, p. 414] and the reduction of transaction costs [2, p. 10, 105]. To maintain the state, resources are needed that would serve as an economic base for preserving the country's integrity and development. To this economic basis can be attributed and finance.

Socio-economic and cultural development is a special type of state policy aimed at state regulation of the development of the territory.

In modern conditions of market relations in Kazakhstan, the health of every person, as a component of the health of the entire population, becomes a factor that determines not only the full value of its existence, but also the potential of its capabilities. The level of health of the people, in turn, determines the measure of socio-economic, cultural and industrial development of the country.

Results. In the absence of support in the sphere of culture, the tendency will continue to decline in the quality and quantity of services provided, and the level of people's satisfaction with cultural services will decrease. The deterioration of the material and technical base of cultural institutions will continue.

There will be a significant share of the cultural heritage of the urban district in need of restoration, design of protection zones and the approval of the boundaries of the territories. It will be difficult to use objects of cultural heritage in connection with the lack of them before investment preparation.

The competitiveness of the theater, museum, philharmonic society, etc. will decrease. The pace of improvement of parks will not allow to provide the necessary level of quality of life for the population. The need to develop a subprogram is dictated by new socio-economic and spiritual realities. The museum is a reliable and effective socio-cultural institution, where the monuments of history, culture and art, which play an important role in the spiritual development of man, are preserved. In addition, the museum carries a wide range of social functions: educational, educational, educational, leisure.

The problems accumulated during the economic recession require the introduction of a program approach to the definition of the strategy and tactics of the development of museum activity, the concentration of budgetary funds in the most important areas of preservation of the museum fund, and the creation and development of an infrastructure (material and information) museum to solve the tasks of the cultural development of the museum.

Recently, in the Republic of Kazakhstan, much attention has been paid to improving the financial system of the state, developing new approaches to the financial strategy for the development of society. The current situation in Kazakhstan clearly demonstrates the need to strengthen the regulatory role of the state in the financial sector of the economy. The main problems in the sphere of state and local finance are:

- balance of budgets of all levels and state extra-budgetary funds;
- improvement of the tax system;
- increasing the efficiency of the use of public and private property;
- improving budget planning and forecasting;
- ensuring the unity of monetary and financial policies;
- effective use of public finances;
- strengthening of financial control, etc..

The development of society and a market economy is impossible without culture, education, health, scientific and technological progress. Stimulating the progress in culture, education, health will pay off many times. It can manifest itself in preferential lending, with small payments to the state budget. For legal entities, organizations in these areas, it is desirable to set taxes not more than 10% of incomes, and for individuals engaged in private practice in healthcare, education, culture - up to 5%. Today, the total amount of Islamic Development Bank projects in Kazakhstan is about 670 million US dollars. In addition, the Islamic Bank finances environmental projects to help residents of the regions adjacent to the Aral Sea, Semipalatinsk nuclear test site, provides cooperation with the Islamic Educational, Scientific and Cultural Organization ISESCO. This allowed Kazakhstani scientists to restore the monuments of cultural heritage, study the history of the countries of the Islamic world - everything is quite solid [18, p.23]. The American housing mortgage system is characteristic of civilized capitalist states. At the same time, within the existing modern system, there may exist different models for financing the purchase or construction of housing, which bear the imprint of the history of economic culture, mentality and level of economic development. Characteristic in this respect is the German model, which is based on credit and construction corporations (construction savings banks) Given the considerable natural, economic, cultural, historical and ethnic specifics of the regions of Kazakhstan, there is not and cannot be any unified policy in the field of accumulation [14]. But, it is quite obvious that the benefits for all regions are from the inflow of foreign capital, both foreign and "foreign". They can stimulate the development of local production; promote the introduction of innovations and new technology, help in the formation of new economic discipline, etc. In parallel, it is useful to use and export capital in those regions where it is possible to earn an additional surplus product, or, say, obtain scarce resources and raw materials on a confessional basis. Thus, despite the fact that with the increase in the level of economic development, the integration of individual regions into the single national economic complex of the country increases, the region is immanently inherent in all economies, regardless of the level of development. In each country, distinct regional center are distinguished, differing from other regions in specialization, the ability to attract financial resources based on their geopolitical position or being centers of regional economies due to the historical and cultural traditions of the country. Such brightly pronounced centers in other countries are: in the USA - Chicago, in Germany - Berlin, in Russia - Yekaterinburg as the center of the Ural region, Novosibirsk as the center of Siberia, etc. The regional exchanges located in these centers are not only mechanisms for attracting investments to the region, but also an important factor shaping the investment climate in the region, which affects its investment attractiveness. [20] The possible impact of activities on human health, historical and cultural values and, as a rule, socio-economic conditions. The consequences of implementing the planned activity should be evaluated not only in terms of their magnitude, but also in terms of their significance. Potential impacts should be studied for all alternatives considered in the environmental assessment to ensure that they can be compared and the most appropriate alternative selected. This stage of environ-

mental assessment in most national systems is carried out by the initiator of activities or, on his behalf, by specialized organizations.

With the acquisition of independence, the main priority areas of the state's activities in the cultural sphere were announced:

- ensuring a high level of development of education and science, sports and tourism;
- preservation and development of the national culture and cultures of peoples and ethnic groups inhabiting the Republic of Kazakhstan;
- preservation of historical and cultural heritage;
- conducting large-scale cultural actions aimed at promoting the best achievements and models of cultural and spiritual development of Kazakhstan;
- expansion and deepening of international cultural cooperation;
- formation of the domestic market of cultural products and services.

At the same time, the modern culture of Kazakhstan is experiencing considerable difficulties. The transfer of the planned economy to the rails of market relations, accompanied by a fall in output, caused serious costs in the material and technical and financial support of cultural institutions, public education and science. The humanitarian intelligentsia and specialists of the non-production sphere were socially unprotected, which caused strikes of teachers and doctors of Kazakhstan in 1992. There is a tendency of commercialization of culture. Under the pretext of democratization of society, low-quality iso and film products penetrated the spiritual sphere, propagandizing pornography, violence, brutality. Modern cultural processes in Kazakhstan reflect, on the one hand, the collapse of the totalitarian system, the difficulties of the birth of a new independent state, the abandonment of the former narrow-class principles, and on the other hand, the first steps of affirming pluralism, different forms of ownership, socio-political structures and opinions. В этих городах наблюдаются следующие тенденции:

- social stratification of the population;
- leakage of youth to large cities;
- an attempt to create a favorable environment for the life and work of the urban environment, the construction of art objects of temporary and permanent use;
- activation of the cultural life of the population, including the creation of favorable conditions for the spiritual and cultural development of various social groups of the population.

To achieve effective results of the goals set, a well-considered strategy is needed that takes into account both components of the result—both social, economic, and cultural. Economic efficiency requires an economically rational distribution of production in space and the use of the production potential of each region for the purpose of nationwide welfare; social efficiency is a spatial distribution of economic activity in which residents of all regions have more or less equal opportunities to achieve the desired welfare. It is necessary to clearly understand in each particular case what is given priority and what are the alternatives. If preference is given to economic goals, control over the social results of changes in the economic policy of the region is necessary, if social priorities are given priority, it is necessary to closely monitor economic processes. The system of goals of development of social and economic potential of the region consists of two subsystems.

In analyzing the current socio-cultural situation, it is not necessary to deny the complex interaction of global and local trends that are manifested in all spheres, including in the sphere of culture and science. The processes of differentiation and integration of knowledge proceed with such intensity that, without taking into account the seriousness of this problem, no philosophical, logical-methodological, science-research development of any sphere of knowledge can be constructed in any fruitful way.

Conclusions. The rapid development of natural and exact sciences, the deepening of ideas about the scientific picture of the world, the formation of new areas of humanitarian, social, historical, cultural knowledge, the understanding of the role of technology and information in the modern world, the complexity of social forms of organization of science at all levels, up to the global, the formation of integrated interdisciplinary areas of knowledge, concepts, approaches, disciplines, led to a serious restructuring of the scientific space.

The complexity and dynamism of public life, the increase in the scale of innovative processes in the cultural, educational and information spaces predetermine the need to recognize positive and negative trends in the development of museums and museology. The boundaries of the study are not yet strictly outlined, and many questions cannot be answered unambiguously. One of the spheres of management and management for the city are the objects of social and economic infrastructure, that is, the health care, education, preschool education, culture, managed directly by the city, these areas are usually in the municipal ownership and are supported through budgetary financing.

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ҚАЗАҚСТАННЫҢ МӘДЕНИЕТ ЖӘНЕ ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ ДАМУЫНДАҒЫ ҚАРЖЫЛАНДЫРУДЫ БАСҚАРУ НЕГІЗДЕРІ

Аннотация. Стратегиялық дамыған елдердің қазіргі заманғы экономиканың басым, өйткені демалыс үшін жағдай жасау және қалалық аудан тұрғындары мәдени ұйымдардың қызметтерін қамтамасыз ету ғана емес, сондай-ақ қала тұрғындары жаппай тынығу, сондай-ақ ол қуатты генерациялау қабілетті болғанына бастап мәдениетінің дамуына қаржылық менеджмент сайып келгенде, әлеуметтік дамуына оң әсерін тигізеді, шығармашылық индустрия. Әлеуметтік және мәдени даму, түрлі салаларда оң әсерін жинайды мәдени ұйымдардың ынтымақтастық және басқа да әлеуметтік актерлер, қалалық ортаны жақсарту үшін туризмді дамыту, инвестициялар тарту, жаңа жұмыс орындарын құруға бастамашылық және әлеуметтік-экономикалық мәселелерді шешуге көмектесу береді кезде, күшті ішіне әлсіз жақтарын бұруға мүмкіндік береді және жанжалды жағдайларды шешуге көмектеседі.

Түйін сөздер: басқару, қаржы, мәдениет, әлеуметтік-экономикалық даму, мұражайлар, парктер, театрлар, инвестициялар, мемлекет.

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ОСНОВЫ УПРАВЛЕНИЯ ФИНАНСАМИ В КУЛЬТУРНОМ И СОЦИАЛЬНО-ЭКОНОМИЧЕСКОМ РАЗВИТИИ КАЗАХСТАНА

Аннотация. Управление финансами в развитии культуры становится стратегическим приоритетом современной экономики развитых стран, не только потому, что создание условий для организации досуга и обеспечения жителей городского округа услугами организаций культуры, а также для массового отдыха жителей города, а сколько потому, что сумела генерировать в себе мощный сектор творческих индустрий, что в конечном счете положительно скажется на социальном развитии. Социально-культурное развитие аккумулирует позитивные эффекты в разных сферах, позволяет превратить слабые стороны в сильные, когда кооперация организаций культуры с другими социальными субъектами позволяет улучшать городскую среду, развивать туризм, привлекать инвестиции, инициировать создание новых рабочих мест, помогать решению социально-экономических проблем и способствовать разрешению конфликтных ситуаций.

Ключевые слова: управление, финансы, культура, социально-экономическое развитие, музеи, парки, театры, инвестиции, государство.

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**SOME ASPECTS OF ACTIVITY
OF THE ISLAMIC BANKING SYSTEM
IN THE MARKET OF FINANCIAL SERVICES**

Abstract. Throughout the last twenty-fifth anniversary the financial and banking sector of economy, both the certain countries, and the whole regions periodically experiences the acute crises, which are expressed in the sudden and sharp growth of number of banks, the investment and insurance companies finding the insolvency. In recent years possible ways of replacement of percent attentively were considered by Muslim experts in economy and banking. Muslim economists have developed economic models of interest-free economic system and have analyzed consequences of cancellation of percent on the economic growth, establishment of resources and distribution of income. They have also proved theoretical base for the organization of modern banking on an interest-free basis. The big contribution to practice about interest-free banking was also made by bank staff. The concept of interest-free banking is not purely theoretical category anymore. In the last two decades were created several Islamic banks in the different parts of the world; they work successfully. Three countries of the Islamic world: Pakistan, Iran and Sudan have made useful attempt to abolish percent on the scale in all economy, which led to the significant progress.

Key words: kharadzh, currency system, International bond market, financial shocks, default, financial markets of the world, globalization of financial activity, insolvency virus, financial institutions, banking.

In the market of financial services the young Islamic bank shows the development by involvement of the non-Muslim population in ranks of the regular customers. The number of non-Muslim clients dynamically grows, for example, the Islam Malaysia Berkhard bank during the rather small period (1984-1993) has increased the number of the clients to the 350th thousand from whom 17 thousand. In 2007 the number of clients became more than one million; 10 % of them are not Muslims.

Such situation in the world banking sector shows the nature of Islamic banking system, based on the ethical principles. The statistical analysis of the sector of consumers of Islamic banks proves the viability of Islamic financing, irrespective of race and religion of the consumers of Islamic bank. Advantage of Islamic bank, to our mind, in the ethical and philosophical component, which provides the consumer of Islamic banks with additional factors of insurance. It is the huge potential of instruments of protection, both for the client, and for the bank by itself.

There are well known three main groups of activity of Islamic bank: reception of deposits from the clients of the bank, financing of projects, and other banking services. The principles of Sharia are applied and interpreted by the countries, according to the internal laws, adopted by the government. The structure of banking products of Iran is an example of use of Islamic bank tools (see table 1).

So, in the field of construction and repair such forms of rendering of services as civil partnership, installment sale, cards al Hassan, Dzhoalya and direct investments are applied. The principles of Islamic bank have not only positive characteristics, but promote growth of financing of the industrial sector, in spite of the fact, that many countries are agrarian. Focusing on a certain sector or branch at Islamic financing depends on external and internal factors of development of bank.

Table 1 – Structure of banking products

#	Principles of Sharia	Field of Application	Type of Activity
1	Installment Sale	Production	Industry Agriculture Mining
2	Civil Partnership		
3	Legal Partnership		
4	Payment by Installments		
5	Forward Transaction		
6	Direct Investments		
7	Kard Al Khasan		
8	Dzhoalya		
9	Mozarima		
10	Makasat		
1	Modaraba	Trade	Import Export Domestic Trade
2	Civil Partnership		
3	Legal Partnership		
4	Dzhoalya		
1	Civil Partnership	Service	
2	Legal Partnership		
3	Installment Purchasing		
4	Installment Sale		
5	Dzhoalya		

External factors of development for Islamic bank have four directions: rules of the Central bank, economic situation, competition, and image of reputation of bank. Pakistan, being the main player in the Islamic banking market, is guided by the circulars of National bank of Pakistan, containing the principles of project financing.

In Bangladesh the banks are based on the basic principles of Sharia practices, so-called “bai bisaman”. Further we’ll show the table of coincidence of the principles of Sharia, involved in Islamic banking system (see table 2).

Table 2 – Comparison of the Principles of Sharia over the Countries

#	Principle of Sharia	Malaysia	Bahrain	Bangladesh	Indonesia	Kuwait	Turkey	United Arab Emirates	Jordan	
1	Musharaka	–	+	+	+	–	–	+	+	5
2	Mudaraba	+	+	–	+	–	–	+	+	5
3	Murabacha	+	+	+	–	+	–	+	+	6
4	Bai Bisaman	+	–	–	–	–	–	–	–	1
5	Idzhara	+	+	–	–	–	–	+	+	4
6	Kard Khasan	–	–	+	–	–	–	–	+	2
6	Istisna	+	–	–	–	+	–	+	+	4
		5	4	3	2	2	0	5	6	

As we see from the table, such principles of Sharia as “bay bisaman” and “Kard Khasan” are used less.

The analysis of the instruments of Islamic financing over the countries shows lack of the universal standard between the countries-participants of IBD, which doesn’t prevent the principle in each country in order to develop all branches in own country with the means of Islamic financing. It is provided by the various sources in the different countries (see the chart 1).

The graphic analysis of the structure of Islamic financing shows that the main emphasis was made on the development of the fund forming branches: construction and industry are actively financed by all countries-members of IBD.

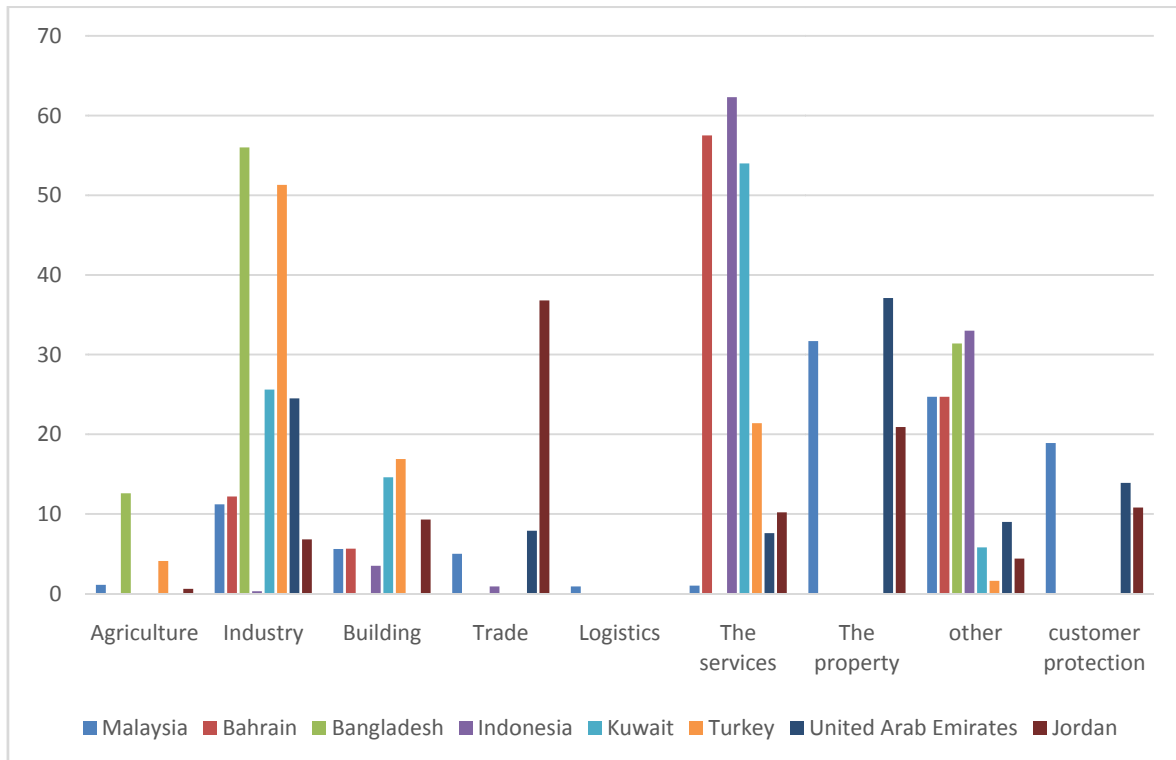


Chart 1 – Graphic Analysis of Structure of Islamic Financing

Internal factors of the development of Islamic bank determine the competitive level by two main aspects: quality of management and the standards of service. Experts of Islamic financing emphasize the fact of use by the clients the products of Islamic banks for the economic reasons. They have no dependence on religious affiliation. Clients of Islamic banking products are attracted by an efficiency factor in relation to regular customers of bank with the minimum quantity of conditions of service. Islamic banks actively promote the international trade and development of globalization processes, provide the letters of credit of mudarab, import the stated goods and protect the client of bank from risks. The algorithm of financing of import of goods by the Islamic banks we would like to show in the figure (see the figure 1).

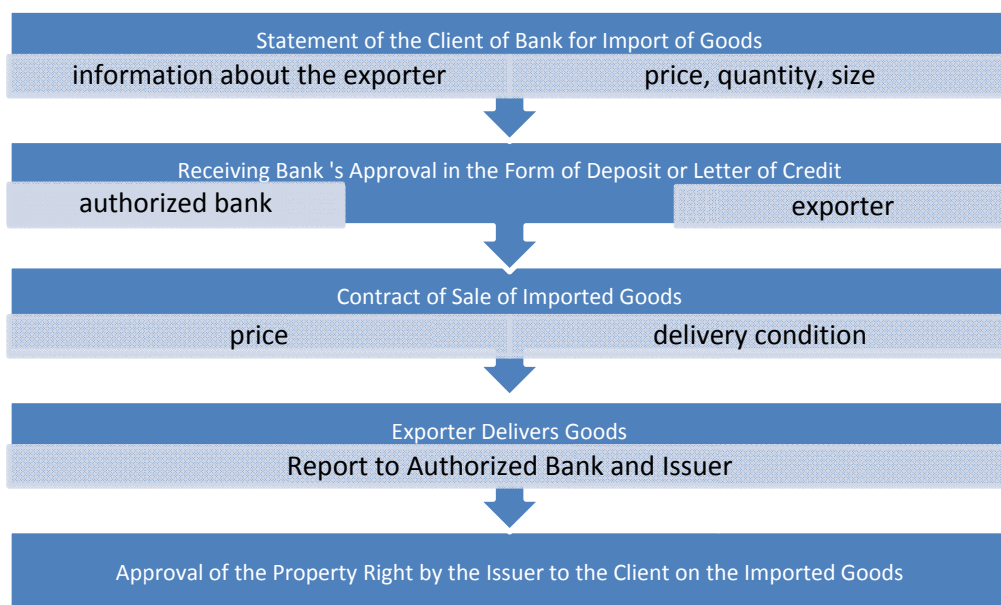


Figure 1 – Algorithm of Financing of Import of Goods

Table 3 – Role of Islamic Bank in Maintaining the International Transactions

#	Agreement Type	Role of Bank	Interest of Bank
1	Vakala	Agent and Client's Representative	Payment for Services
2	Musharaka	Client's Partner From Financing Shares	Commission Charges for Services and Management. Profit Share
3	Murabacha	Islamic Bank Businessmen	Fixed Payment and Expenses on Management. Collecting. Commissions.

Stimulation of international trade in Islamic banks is conducted by three methods or ways: Vakala method, Musharaka method, Murabacha method (see table 3).

Thus, the economic behavior of Islamic bank carrying out the international transactions with the clients of bank, bank active businessmen, bank partner and bank agent (see figure 2).

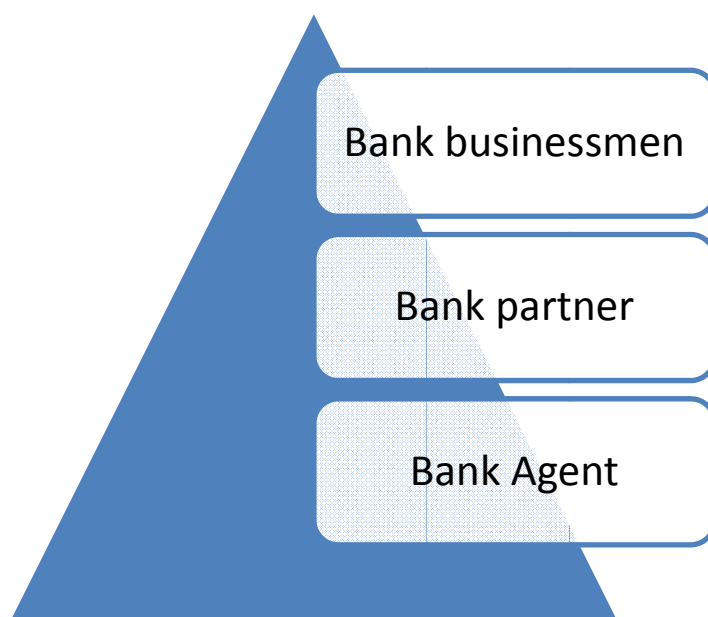


Figure 2 – Role of Islamic Bank in Carrying Out the International Transactions

Structure of rendering services of the international transactions in all countries of IBD is different, but provided of all participants of IBD with the powerful instrument of the development of the international trade between all countries. Only Malaysia provides all types of service in the sphere of international trade. It is known that there are three sources of Islamic banks: deposits, share capital, and other obligations. The paid capital, various reserves, retained earnings enters the share capital. The structure of sources of financing of the countries of participants of IBD is presented in table 4.

Table 4 – Sources of Financing of Islamic Banks over the Countries to Participants of IBD

#	Country-Participant of IBD	Investments	Capital Stock	Other Obligations	Total
1	Malaysia	88,4	5,6	6,0	100
2	Bahrain	72,3	20,5	7,2	100
3	Bangladesh	86,9	6,2	6,9	100
4	Indonesia	87,0	8,0	5,0	100
5	Kuwait	74,4	16,0	9,06	100
6	Turkey	81,2	14,5	4,3	100
7	United Arab Emirates	77,6	12,7	9,7	100
8	Jordan	84,8	12,5	3,1	100
	Average Value	81,6	12,0	6,4	100

The analysis of sources of Islamic banks shows its focus not only on the share capital, but the deposits of investors: in average- 81,2 percent from all sources of financing. Thus, the efficiency of activity of Islamic banks strictly depends on the number and volumes of deposits, the policy and management of Islamic bank. The evident comparative chart of sources of financing of IBD is provided in the chart 2.

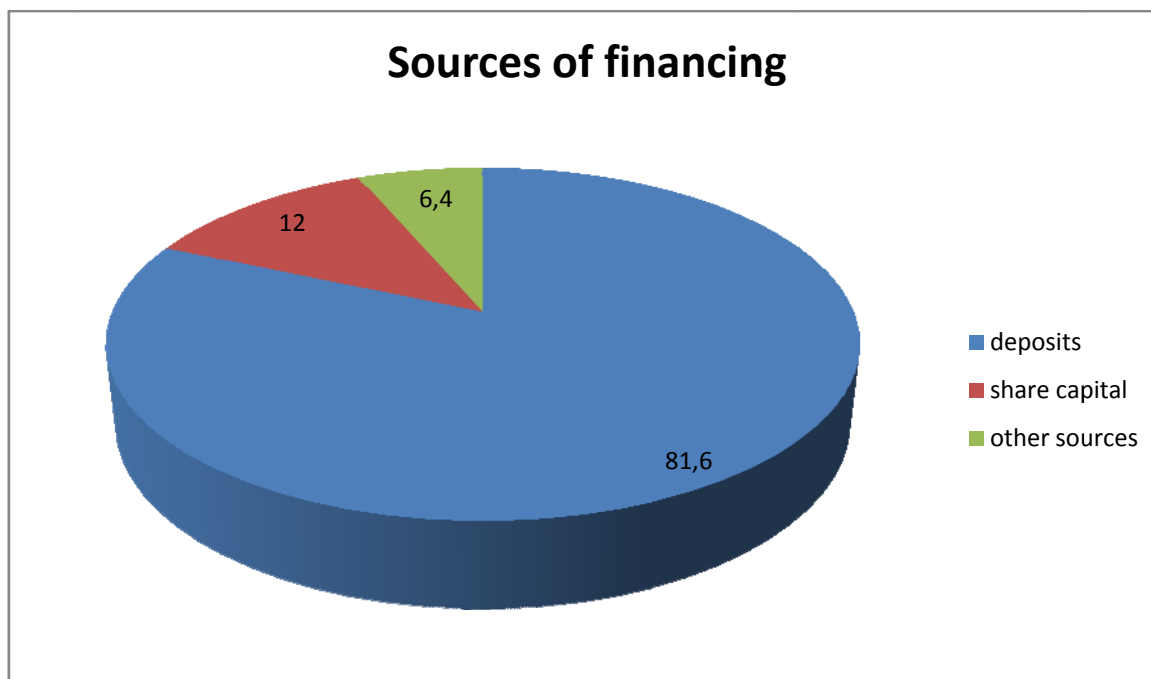


Chart 2 – Sources of Structure Financing of IBD

Activation of deposits in Islamic banks is stimulated with the realization of policy of powerful social programs of Islamic banks in the several directions: educational help, humanitarian help, and charitable help. Strengthening of the social activity provides by the Bank of Bangladesh through “Islamic Bank Foundation” with the types of the next programs:

- formation of income;
- health care;
- education;
- religious education;
- human Resources.

In accordance with the social program the Bank of Bangladesh has constructed six medical institutions, service centers, five educational institutions, including the fund of the improvement of quality of life in the society. Since 1995 in Bangladesh was established the monetary vakuf certificate. Islamic banks give the chance of transparent mobilization and distribution of zakyat. “Such management provides the multilateral analysis of the situation, adoption of extraordinary decisions, effective creativity” [1, p. 64].

The increasing consumer demands from the banking services dynamical changes in the institutional structure of the financial market, for example, auto credit, retail institutions, etc. Existence of free consumer segment of the Muslim population gives strong competitive advantages for the development of Islamic banks in the territory of the Russian Federation. “The banking system is a set of the banking institutions, functioning in the territory of any country” [2].

There are the following factors of the strengthening of competition in the banking services:

- increase the number of competitors in the corresponding market;
- competition grows in the market on consumer demand for banking services;
- insufficient differentiation of banking products also strengthens the competition between the participants of the financial market;
- intensity of the strategic behavior of banks leads to the strengthening of the competition.

Thus, the constructive behavior of IBD in the market is the condition of application of successful economic forecasts in the field of bank's activity.

The analysis of the competitiveness of banking product has been carried out by use of the special technique. K. R. Nurmagambetov has adapted Islamic Bank with important algorithm:

- definition of the list of experts in the field;
- ranging of factors of the cost of the product;
- ranging by experts of the level of service of the client of bank;
- calculation of level of competitiveness of banking product;
- adoption of the strategic decision.

The basic formula for calculation of level of competitiveness of a banking product is offered [3, p.58]:

$$U = \left[\frac{UPS_p}{UPS_k} \right]^\alpha + \left[\frac{C_k}{C_r} \right]^\beta + \left[\frac{UOp}{UOk} \right]^\gamma$$

There are:

- the first composed this relation of the level of consumer cost of a banking product;
- the second composed this relation of the prices of banking products of competitors and the studied bank;
- the third composed this relation of the level of service of the client of bank;
- degrees of fractions have to be equal to 1.

For achievement the convenience of calculations for the formula we would like to offer the following tables (see tables 4, 5).

Table 4 – UPS Banking Product of Two Banks

#	Consumer properties of banking product	Al Khalil RK	Amal competitor	Relative Significance
1	2	3	4	5
1	Availability of Information	5	4	0,20
2	Reputation of Product	4	5	0,30
3	Hedging of Risks	4	5	0,20
4	Effectiveness	5	3	0,20
5	Maintenance by Consulting	5	4	0,050
6	Liquidity	4	3	0,050
				1,00

Absolute value of level of consumer properties of a banking product for the studied bank:

$$UPS_r = 5^{0,2} + 4^{0,3} + 4^{0,2} + 5^{0,2} + 5^{0,05} + 4^{0,05} = 7,793;$$

$$UPS_k = 4^{0,2} + 5^{0,3} + 5^{0,2} + 3^{0,2} + 4^{0,05} + 3^{0,05} = 7,690;$$

Table 5 – Level of Bank Service of Two Banks

#	Factors of Level of Service of the Client of Bank	Al Khalil RK	Amal	Relative Importance Factor
1	Professionalism of the Officer of Bank	5	4	0,5
2	Skill to Communicate of the Manager	4	4	0,3
3	Degree of Empathy of the Manager of Bank	3	3	0,1
4	Feedback from Clients of Bank	5	4	0,05
5	After-sales Service of the Client by Bank	4	3	0,05

Absolute Value of Level of Bank Service for Bank:

$$U_{Or} = 5^{0,5} + 4^{0,3} + 3^{0,1} + 5^{0,05} + 4^{0,05} = 7,018;$$

Absolute Value of Level of Bank Service for Bank of the Competitor:

$$U_{Ok} = 4^{0,5} + 4^{0,3} + 3^{0,1} + 4^{0,05} + 4^{0,05} = 6,820;$$

Absolute value of level of competitiveness of banking product by all criteria:

$$y = \left[\frac{7,793}{7,690} \right]^{0,3} + \left[\frac{15000}{16000} \right]^{0,2} + \left[\frac{7,018}{6,820} \right]^{0,5} = 2,299;$$

In the conclusion we would like to stress, that the competitiveness of banking product of Al Khalil is positive on the relations between the bank and the competitor. The leading strategy of the behavior in the market of the banking services must be chosen carefully and correctly.

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БАНК ЖҮЙЕСІНІҢ КЕЙБІР АСПЕКТІЛЕРІ ИСЛАМ ҚАРЖЫ ҚЫЗМЕТТЕРІН КӨРСЕТУ НАРЫҒЫНДАҒЫ ҚЫЗМЕТІН

Аннотация. Қазақстан Республикасы мемлекеті жалпы алғанда ұлттық экономиканың бәсекеге қабілеттілігін арттыру бағытындағы, нақты алғанда кәсіпкерлікті дамытуда көптеген мәселелер шешу үстінде. Олар экономиканы құрылымдық өзгерістер жүргізу, әртүрлі экономикалық салалардағы технологиялық құрылымдық кемшіліктерді жою, ішкі интеграцияны жетілдіру, сонымен қатар өндіргіш күштердің бәсең дамуын жою, инфраструктураны дамыту және нарық институттарын жетілдіру болып табылады. Осы жағдайлар Қазақстан Республикасында кәсіпкерлікті дамыту мемлекеттің экономикалық саясат бағытындағы басымдыққа ие болып саналады. Қазақстан Республикасында кәсіпкерлікті дамыту әлемнің дамыған елдеріндегіден әлде қайда ерекше болса да, қазіргі Қазақстан экономикасында шағын және орта бизнес белгілі дәрежедегі өзіне тиісті орынға ие болды. Соңғы кездерде шағын және орта бизнес субъектілерінің кәсіпкерлік ортада өсуі байқалса да, ол орта аса көп қаржы құюды қажет етпейді, жабдықтар мен көптеген қызметкерлерінің кооперациясы жоқ бағыттар болып табылады. Шет елдердің тәжірибесіне жүгінсек, кәсіпкерлік Қазақстан экономикасын тұрақтандырудың және дамытудың реалды секторына айналуы мүмкін. Нарықтық ортаға, тиімділігін сипаттайтын экономиканың тұрақтылығын қамтамасыз ету үшін өндіру мен өткізудің, өнімдер мен технологиялар, инновациялар ірі кәсіпорындар қаржылық тұрақтылығын, бәсекелестікке негізделген сыртқы ортаның бәсекелестер жасаған қадамын реактивті жүзеге асырады және стратегиялық түрлендіреді.

Түйін сөздер: инновациялар, нарықтық экономика, кәсіпкерлік, экономикалық дағдарыс, ұлттық заңнама, бәсекеге қабілеттілік, экономикаға ықпалы, ұлттық табыс, еңбек нарығының тиімділігі, бәсекелестік потенциал.

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НЕКОТОРЫЕ АСПЕКТЫ ДЕЯТЕЛЬНОСТИ ИСЛАМСКОЙ БАНКОВСКОЙ СИСТЕМЫ НА РЫНКЕ ФИНАНСОВЫХ УСЛУГ

Аннотация. На протяжении последнего двадцатипятилетия финансовый и банковский сектор экономики, как отдельных стран, так и целых регионов периодически испытывает острые кризисы, выражающиеся во внезапном и резком росте числа банков, инвестиционных и страховых компаний, обнаруживающих свою неплатежеспособность. В последние годы мусульманскими экспертами по экономике и банковскому делу внимательно рассматривались возможные пути замены процента. Мусульманские экономисты разработали экономические модели беспроцентной экономической системы и проанализировали последствия отмены процента на экономический рост, установление ресурсов и распределение дохода. Они также обосновали теоретическую базу для организации современного банковского дела на беспроцентной основе. Большой вклад в практику о беспроцентном банковском деле также внесли банковские работники. Концепция беспроцентного банковского дела уже не является чисто теоретической категорией. В последние два десятилетия было создано и работают на беспроцентной основе несколько исламских банков в разных частях мира. Три страны исламского мира: Пакистан, Иран и Судан предприняли смелую попытку упразднить процент в масштабе всей экономики, что привело к значительному прогрессу в этом.

Ключевые слова: харадж, валютная система, Международный рынок облигаций, финансовые потрясения, дефолт, финансовые рынки мира, глобализация финансовой деятельности, вирус неплатежеспособности, финансовые учреждения, банковское дело.

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CURRENT TENDENCIES OF THE DEVELOPMENT OF SOCIAL INSURANCE IN THE USA

Abstract. The term of social protection in the USA is treated as the state system of social safety, which consists of two main forms: social insurance and the state relief aid. There are differing from each other in financing sources. Payments for social insurance are made from the insurance funds, formed at the expense of tax on social insurance, which is raised from hired workers and businessmen, and also income from state ownership. There are several largest three national funds:

- fund of old-age insurance, disability and in case of loss of the supporter;
- fund of insurance of public servants;
- fund of the help to needed persons.

The system of provision of pensions extending to constantly busy hired workers and self-employed persons has been entered into the USA by the law of 1935 “About social security”, acting till present with numerous changes and additions. For employees on the railroad, federal employees and most of employees of states and local authorities there are special systems of provision of pensions. As the benefits in the USA provide to pensioners free medical care, free drugs, large packages of food, reduce rent to 100 dollars per month.

Keywords: social assignments, insurance, pension, hired workers, social safety, funds, grants, insurance premiums, the combined rate, medical care.

The OASDI program, which for most Americans means Social Security, is the largest income-maintenance program in the United States. Based on social insurance principles, the program provides monthly benefits designed to replace, in part, the loss of income due to retirement, disability, or death. Coverage is nearly universal: about 96% of the jobs in the United States are covered. Workers finance the program through a payroll tax that is levied under the Federal Insurance and Self-Employment Contribution Acts (FICA and SECA). The revenues are deposited in two trust funds (the Federal Old-Age and Survivors Insurance Trust Fund and the Federal Disability Insurance Trust Fund), which pay benefits and the operating expenses of the program. Benefit payments totaled over \$343.2 billion in fiscal year 1996. In 1996, 43.7 million persons received monthly benefits. In December 1996, 43.7 million persons were receiving monthly benefits totaling \$29.4 billion. These beneficiaries included 30.3 million retired workers and their spouses and children, 7.4 million survivors of deceased workers, and 6.1 million disabled workers and their spouses and children.

Social Security is an important source of retirement income for almost everyone; 3 in 5 beneficiaries aged 65 or older rely on it for at least half of their income. Social Security is also an important source of continuing income for young survivors of deceased workers: 98% of young children and their mothers or fathers are eligible for benefits should a working parent die. Four in five workers aged 21-64 and their families have protection in the event of a long-term disability.

The program covers work performed outside the United States by American citizens or resident aliens who are employed by an American employer, employed by a foreign affiliate of an American employer electing coverage for its employees, or (under certain circumstances) the self-employed. Major Exclusions

Federal civilian employees hired before 1/1/84 Agricultural workers and domestic workers whose earnings do not meet certain minimum requirements Persons with very low net earnings from self-employment The majority of workers excluded from coverage are in three major categories: (1) Federal civilian employees hired before January 1, 1984, (2) agricultural workers and domestic workers whose earnings do not meet certain minimum requirements, and (3) persons with very low net earnings from self-employment (generally less than \$400 per year). The remaining few groups excluded from coverage are very small. An example is certain nonresident, nonimmigrant aliens temporarily admitted into the United States to study, teach, or conduct research [1, p. 58].

Certain family employment is also excluded (such as employment of children under age 18 by their parents). Ministers and members of religious orders who have not taken a vow of poverty and Christian Science practitioners have their professional services covered automatically as self-employment unless within a limited period they elect not to be covered on the grounds of conscience or religious principle. Religious orders whose members have taken a vow of poverty may make an irrevocable election to cover their members as employees. Employees of State and local governments are covered under voluntary agreements between the States and the Commissioner of Social Security. Each State decides whether it will negotiate an agreement and, subject to special conditions that apply to retirement system members, what groups of eligible employees will be covered. At present, more than 75% of State and local employees are covered.

Special rules of coverage apply to railroad workers and members of the uniformed services. Railroad workers have their own Federal insurance system that is closely coordinated with the Social Security program. If they have less than 10 years of railroad service, their railroad credits are transferred to the Social Security program. Under certain circumstances, members of the uniformed services may be given noncontributory wage credits in addition to the credits they receive for basic pay. The Social Security Trust Funds are reimbursed from Federal general revenues to finance noncontributory wage credits.

To qualify for Social Security a person must be insured for benefits. Most types of benefits require fully insured status, which is obtained by acquiring a certain number of credits (also called 11 old-age, survivors, and disability insurance In 1997, workers earn one Social Security credit for each \$670 of annual earnings, up to four credits (\$2,680 = 4 credits) per year quarters of coverage) from earnings in covered employment. The number of credits needed depends on the worker's age and type of benefit. Workers can acquire up to four credits per year, depending on their annual covered earnings. In 1997, one credit is acquired for each \$670 in covered earnings. This earnings figure is updated annually, based on increases in average wages.

Persons are fully insured for benefits if they have at least as many credits (acquired at any time after 1936) as the number of full calendar years elapsing after age 21 and before age 62, disability, or death, whichever occurs first. For workers who attained age 21 before 1951, the requirement is one credit for each year after 1950 and before the year of attainment of age 62, disability, or death. Persons reaching age 62 after 1990 need 40 credits to qualify for retirement benefits. For workers who die before acquiring fully insured status, certain survivor benefits are payable if they were currently insured- that is, they acquired 6 credits in the 13-quarter period ending with the quarter in which they died.

Beneficiaries may have some or all benefits withheld, depending on the amount of their annual earnings. Benefits payable to a spouse and/or child may also be reduced or withheld due to the earnings of the retired worker. This provision, known as the earnings test (or retirement test) is in line with the purpose of the program - to replace some of the earnings from work that are lost because of the worker's retirement, disability, or death. 1997 Earnings Test Age 70 No limit Age 65-69 \$1 less for every \$3 over \$13,500 Under age 65 \$1 less for every \$2 over \$8,640 The dollar amount beneficiaries can earn without having their benefits reduced depends on their age. Persons aged 70 or older receive full benefits regardless of their earnings.

In 1997, benefits for persons under age 65 are reduced \$1 for each \$2 of annual earnings in excess of \$8,640; benefits for persons aged 65-69 are reduced \$1 for each \$3 of earnings above \$13,500. The exempt amounts for persons aged 65-69 will increase gradually to \$30,000 in 2002, while amounts for those under age 65 will be indexed to the growth in average wages. After the year 2002, amounts for

persons aged 65-69 will also be indexed to increases in average wages. A “foreign work test” applies to beneficiaries who work outside the United States in noncovered employment. Benefits are withheld for any month in which more than 45 hours of work is performed. Generally, any benefits to family members are also withheld. The test is based on the amount of time the beneficiary is employed rather than on the amount of money the beneficiary earns because it is impractical to convert earnings in a foreign currency into specific dollar amounts [2, p. 64].

To be eligible for disability benefits, workers must be fully insured and must meet a test of substantial recent covered work- that is, they must have credit for work in covered employment for at least 20 quarters of the 40 calendar quarters ending with the quarter the disability began. Young workers disabled before age 31 may qualify for benefits under a special insured status requirement. They must have credits in one-half the calendar quarters after age 21, up to the date of their disability, or, if disabled before age 24, one-half the quarters in the 3 years ending with the quarter of disability. Blind workers need only to be fully insured to qualify for benefits. For purposes of entitlement, disability is defined as “the inability to engage in any substantial gainful activity (SGA) by reason of any medically determinable physical or mental impairment that can be expected to result in death or that has lasted or can be expected to last for a continuous period of not less than 12 months.” A person’s age, education, and work experience are considered along with the medical evidence in making a determination of disability. A less strict rule is provided for blind workers aged 55 or older. Such workers are considered disabled if, because of their blindness, they are unable to engage in SGA requiring skills and abilities comparable to those required in their past occupations.

The impairment must be of a degree of severity that renders the individual unable to engage in any kind of substantial gainful work that exists in the national economy, regardless of whether such work exists in the immediate area in which the individual lives, or if a specific job vacancy exists for that person, or if that person would be hired upon application for the work. The amount of earnings that ordinarily demonstrates SGA is set forth in regulations. For non-blind beneficiaries, earnings averaging more than \$500 a month are presumed to represent SGA, and earnings below \$300 generally indicate the absence of SGA. The SGA level for statutorily blind beneficiaries is \$1,000 a month. Unlike the Retirement and Survivors Insurance program, which is an entirely Federal program, the law mandates Federal State cooperation in carrying out the DI program. Each State’s Disability Determination Services (DDS) develops the medical evidence and makes an initial determination of disability, after SSA determines that the applicant is insured for benefits. DDS costs are reimbursed to the States by the Federal Government. The applicant may appeal an unfavorable decision through a four-step process taken in the following order: a reconsideration of the initial decision; a hearing before an Administrative Law Judge; a review by the Appeals Council; and lastly, filing a civil suit in Federal District Court. A sample of DDS decisions is reviewed by SSA to assure consistency and conformity with national policies. Applicants may be referred to the State vocational rehabilitation agency. If they are offered services and refuse them without good reason, benefits may be withheld. SSA pays for the cost of the rehabilitation services if such services result in a beneficiary’s return to work at the SGA level for at least 9 continuous months. Monthly benefits at a permanently reduced rate are payable to disabled widow(er)s beginning at age 50, based on the same definition of disability that applies to workers. The disability must have occurred within 7 years after the spouse’s death or within 7 years after the last month of previous entitlement to benefits based on the worker’s earnings record. Benefits are also payable to an adult child of a retired, disabled, or deceased worker if the child became disabled before age 22. The child must meet the same definition of disability that applies to workers.

Beneficiaries are allowed a trial work period to test their ability to work without affecting their eligibility for benefits. The trial work period can last up to 9 months (not necessarily consecutive) during which an individual’s entitlement to benefits and benefit payment are unaffected by earnings, so long as the individual’s impairment meets program standards. Months in which earnings a threshold amount, which is currently \$200, do not count as months of trial work. At the end of the trial work period, a decision is made as to the individual’s ability to engage in SGA. If the beneficiary is found to be working at SGA, disability benefits are paid for an additional 3 months (period of readjustment) and then cease;

otherwise, benefits continue. The law also includes other work incentive provisions: (1) A 36-month extended period of eligibility after a successful trial work period [3, p. 18].

This special benefit protection allows benefit payments during any month in the 36-month period in which earnings fall below \$500. (2) The continuation of Medicare coverage for at least 39 months beyond the trial work period and, after that, the opportunity to purchase Medicare coverage when benefits terminate because of work. (3) Deductions from earnings for impairment-related work expenses in determining SGA. Deductible costs include such things as attendant care, medical devices, equipment, and prostheses. Additionally, family benefits payable in disabled-worker cases are subject to a lower cap than the one that prevails for other types of benefits, because of concern that some disabled workers might be discouraged from returning to work because their benefits could exceed their predisability net earnings.

Monthly retirement benefits are payable at age 62 but are permanently reduced if claimed before the normal retirement age (currently, age 65). Benefits may also be payable to the spouse and children of retired-worker beneficiaries. A spouse receives benefits at age 62 or at any age if he/she is caring for a child under age 16 or disabled. A divorced spouse aged 62 or older who had been married to the worker for at least 10 years is also entitled to benefits. If the spouse has been divorced for at least 2 years, the worker who is eligible for benefits need not be receiving benefits for the former spouse to receive benefits. Benefits are payable to unmarried children under age 18, or aged 18-19 if they attend elementary or secondary school full time. A child can be the worker's natural child, adopted child, stepchild, and- under certain circumstances-a grandchild or step grandchild. A person aged 18 or older may also receive benefits under a disability that began before age 22.

Monthly benefits are payable to disabled workers after a waiting period of 5 full calendar months. This rule applies because disability Insurance is not intended to cover short-term disabilities. Benefits terminate if the beneficiary medically improves and returns to work (at a substantial gainful activity level) despite the impairment. At age 65, beneficiaries are transferred to the retirement program. Benefits for family members of a disabled worker are payable under the same conditions as for those of retired workers. Monthly benefits are payable to survivors of a deceased worker. A widow(er) married to the worker for at least 9 months (3 in the case of accidental death) may receive an unreduced benefit if claimed at age 65 (if the spouse never received a retirement benefit reduced for age). It is permanently reduced if claimed at age 60-64, and for disabled survivors at age 50-59. Benefits are payable to a widow(er) or surviving divorced spouse at any age who is caring for a child under age 16 or disabled. A surviving divorced spouse aged 60 or older is entitled to benefits if he or she had been married to the worker for at least 10 years. A deceased worker's dependent parent aged 62 or older may also be entitled to benefits [3, p. 19].

Surviving children of deceased workers may receive benefits if they are under age 18, or are full-time elementary or secondary school students aged 18-19, or were disabled before age 22. A lump sum of \$255 is payable upon an insured worker's death, generally to the surviving spouse. If there is no surviving spouse or entitled child, no lump sum is payable. Benefit Amounts The OASDI benefit amount is based on covered earnings averaged over a period of time equal to the number of years the worker reasonably could have been expected to work in covered employment. Specifically, the number of years in the averaging period equals the number of full calendar years after 1950 (or, if later, after age 21) and up to the year in which the worker attains age 62, becomes disabled, or dies. In survivor claims, earnings in the year of the worker's death may be included. In general, 5 years are excluded. Fewer than 5 years are disregarded in the case of a worker disabled before age 47.

The minimum length of the averaging period is 2 years. For persons who were first eligible (attained age 62, became disabled, or died) after 1978, the actual earnings are indexed- updated to reflect increases in average wage levels in the economy. For persons first eligible before 1979, the actual amount of covered earnings is used in the computations. After a worker's average indexed monthly earnings (AIME) or average monthly earnings (AME) have been determined, a benefit formula is applied to determine the worker's primary insurance amount (PIA), on which all Social Security benefits related to the worker's earnings are based. The benefit formula is weighted to replace a higher portion of lower paid workers' earnings than of higher paid workers' earnings (although higher paid workers will always receive higher benefits).

At the expense of these funds provision of pensions, insurance of health is carried out, doles are paid, to temporary disability, the state help aged is provided, to disabled people and persons in need. The main source of their formation are the insurance premiums paid by businessmen and insured at the identical rates: 6,2% in the form of assignments for social security and 1,45% - on free medical care. Besides, assignments on doles of 0,8% are raised from businessmen. Thus, the combined rate on employers is equal to 8,45% at the maximum assessed income about 45 thousand dollars whereas for insured it makes 7,65% [3, p. 21].

All types of social insurance can be united in the USA under the name “General Federal Program”. Characteristic feature of the state system of social insurance, as well as in the majority of the European countries, is the constant tendency to increase in a social tax that it is caused by both the economic, and demographic reasons. However even continuous increase in a tax isn't able to provide solvency of the general federal program completely.

In the conclusion we would like to note, that the main peculiarity of the North American market is that in its main participant - the USA activity of insurers is controlled in each state separately. On legal form the insurance companies in the USA operating in one of the most developed insurance markets are subdivided into five main groups: joint-stock insurance companies; mutual insurance companies; interinsurance, or “return” exchanges; Lloyd’s syndicates; medical insurance companies.

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АҚШ-ТАҒЫ ӘЛЕУМЕТТІК САҚТАНДЫРУДЫҢ ҚАЗІРГІ ДАМУ ТЕНДЕНЦИЯЛАРЫ

Аннотация. АҚШ-тағы әлеуметтік қорғау термині негізгі екі формалан тұратын әлеуметтік қауіпсіздіктің мемлекеттік жүйесі ретінде түсіндіріледі: бір-бірінен қаржыландыру көздері бойынша ерекшеленетін әлеуметтік сақтандыру және мемлекеттік қайырмалдық. Әлеуметтік сақтандыру төлемдері жалдамалы жұмыскер мен кәсіпкерлерден алынатын әлеуметтік салықтан құралған сақтандыру қорларынан, сондай-ақ мемлекеттік меншіктен түсетін табыстан жасалады. Ең ірі үш жалпыұлттық қор бар:

- кәрілік, мүгедектік және асыраушысынан айырылғанды сақтандыру қоры;
- мемлекеттік қызметкерлерді сақтандыру қоры;
- мұқтаждарға көмек көрсету қоры.

Тұрақты жұмыс істейтін қызметкерлер мен өзін-өзі жұмыспен қамтыған адамдарға таралатын зейнет-ақымен қамтамасыз ету жүйесі АҚШ-та қазіргі уақытқа дейін күші бар көптеген өзгертулер мен толықтырулармен толықтырылған 1935 жылғы «Әлеуметтік қамсыздандыру туралы» заңымен енгізілді. Теміржол, федералды қызметкерлер мен штаттардың көптеген мемлекеттік қызметкерлер мен жергілікті билік органдары үшін зейнетақымен қамтамасыз етудің арнайы жүйесі бар. АҚШ-та қосымша жеңілдіктер ретінде зейнеткерлерге тегін медициналық көмек көрсетіліп, тегін дәрі-дәрмектер, ірі азық-түлік пакеттерін береді және ай сайынғы пәтерақы үшін төлемді 100 долларға дейін азайтады.

Түйін сөздер: әлеуметтік аударымдар, сақтандыру, зейнетақы, жалдамалы жұмыскерлер, әлеуметтік қауіпсіздік, қорлар, жәрдемақы, сақтандыру жарналары, комбинацияланған мөлшерлеме, медициналық көмек.

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СОВРЕМЕННЫЕ ТЕНДЕНЦИИ РАЗВИТИЯ СОЦИАЛЬНОГО СТРАХОВАНИЯ В США

Аннотация. Термин социальной защиты в США трактуется как государственная система социальной безопасности, которая состоит из двух основных форм: социального страхования и государственного вспомоществования, которые отличаются друг от друга источниками финансирования. Выплаты по социальному страхованию производятся из страховых фондов, образуемых за счет налога на социальное страхование, который взимается с наемных работников и предпринимателей, а также доходов от государственной собственности. Наиболее крупными являются три общенациональных фонда:

- фонд страхования по старости, инвалидности и на случай потери кормильца;
- фонд страхования государственных служащих;
- фонд помощи нуждающимся.

Система пенсионного обеспечения, распространяющаяся на постоянно занятых наемных работников и самозанятых лиц, была введена в США законом 1935 г. «О социальном обеспечении», действующим по настоящее время с многочисленными изменениями и дополнениями. Для служащих на железной дороге, федеральных служащих и большинства служащих штатов и местных органов власти существуют специальные системы пенсионного обеспечения. В качестве дополнительных льгот в США пенсионерам оказывают бесплатную медицинскую помощь, выдают бесплатные лекарства, крупные пакеты продовольствия, снижают квартплату до 100 долл. в месяц.

Ключевые слова: социальные отчисления, страховка, пенсия, наемные работники, социальная безопасность, фонды, пособия, страховые взносы, комбинированная ставка, медицинская помощь.

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INNOVATIONS IN AGRARIAN SPHERE AND AGRICULTURE

Abstract. According to the authors, one of the most innovative ways of developing the agrarian sphere is the introduction of agro franchising, as for Kazakhstan it is a fairly new phenomenon and not a well-developed format. Evaluation of the prospects for the development of agro-franchising requires an understanding of the benefits of franchising in general and a specific franchise in particular for all participants. The franchisor gets the opportunity to expand business and promote the brand to new regional markets without the direct costs of creating an enterprise. Franchisee uses a well-known brand, receives technology and business processes "on a turn-key basis," the necessary methodological and information support, which ensures the competitiveness of the enterprise, saving costs of advertising and promotion. This franchise should also touch agro-tourism objects, as a means of creating additional jobs in rural areas.

Keywords: innovation, agro-franchising, agro-tourism, agriculture, sustainable development.

Introduction. To date, the main problem of competitive development of the economy is to ensure the self-sufficiency of the national economic system, its integrity. This is achieved through ensuring the progressive systematization of the basic elements of the economic system, the harmonious interaction of its main subsystems. The main elements of the economic reproductive system are the branches of the national economy. The agro-industrial complex is strategic and focused on ensuring the integrity of the country's economic complex. The national economic AIC is a complex, diversified production and economic system.

One of the main factors of effective functioning of this structure in modern conditions is the forced modernization and development of innovations. President of the Republic of Kazakhstan N. Nazarbayev, defining the strategic priorities of the new stage of modernization of the Kazakhstani society in the long-term development program of the republic - the "Kazakhstan-2050" Strategy, noted the modernization of agriculture as a necessity [1]. Based on the analysis of the current state of the agro industrial complex, identification of the features of the transformation processes and the problems of the functioning of the agricultural sector, this study attempts to identify certain areas and ways of resolving issues relating to the effective implementation of the strategy for innovative development of the agricultural sector of the Republic of Kazakhstan.

Methods of research. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction. The variety of goals, objectives and areas of activity in agriculture predetermines various criteria for assessing the effectiveness of economic entities.

The main staging hypothesis can be put forward the position that the policy of modernization of the agrarian sector must be formed taking into account the specifics of the functioning of this sector,

epistemological roots and impulses of its development. Modernization of the sphere of functioning of the agrarian sector must be carried out in stages and with the right target orientation. It is supposed to use an integrated, systematic approach to innovative modernization of production relations and productive forces of the agricultural sector of the Republic of Kazakhstan. In this case, the innovative trend in the development of the agro-industrial complex will be a real and effective direction for the competitive development of the national economy.

The discussion of the results. In this line of research it should be noted that the practice of implementing the policy of reforming the national economy at one time put the real sector of the national economy of the country of the agrarian and industrial complex in a difficult position, which is one of the most important elements of the system of ensuring the economic security of the country. A strategic error was made in our view of the current model of reforming the national economic system. As a result, the existing regional chain of relations has been unbalanced, production capacities have been degraded, and technical potential has been destroyed. In the most difficult situation during the reform years were agricultural producers. And all this was the result of the policy of the state's refusal to support the agricultural production sector. At the initial stages of reforming, the actively pursued monetary policy came into conflict with the interests of business entities. As a consequence, a reduction in the budgeting of real industries [2, p. 47].

Not the prevalence of agro-franchising in the Republic of Kazakhstan is not related to any specific country, but due to the extreme limited knowledge in this area not only among broad sections of the population, but also among specialists, entrepreneurs, i.e. weak training of entrepreneurs who could organize agrarian franchising systems (agrarian franchisors) and work in these systems as agro franchising. The development of agro-franchising in the RK does not find adequate support at the state level. The first thing that inhibits the development of agro franchising is Russian legislation. The United States alone created about a hundred laws that deal with agro-franchising in one way or another, while Kazakhstan does not even have a law on agro-franchising.

The main problem of domestic potential agricultural franchise is the shortage of initial funds for the purchase of franchises and equipment of the trading premises, and there are also problems in finding the funds themselves. In addition, when obtaining a loan, you must provide a convincing business plan. A potential agro franchising should be ready to invest at least one-third of the total amount of own funds. It turns out that personal financial responsibility is a necessary requirement when choosing agro franchising.

The area of pastures in the republic is 182.0 million hectares, natural and sowing hayfields – 4.8 million hectares, the area of arable land used for the production of feeds is 2.5 million hectares.

Sown areas forage crops in the Republic of Kazakhstan in 2017 amounted to 3 485.2 thousand hectares and decreased by 5.1% compared to 2015. there is a stable tendency of growth of acreage under fodder crops.

1. Shared distribution of acreage under fodder crops, by categories of farms for 2017.

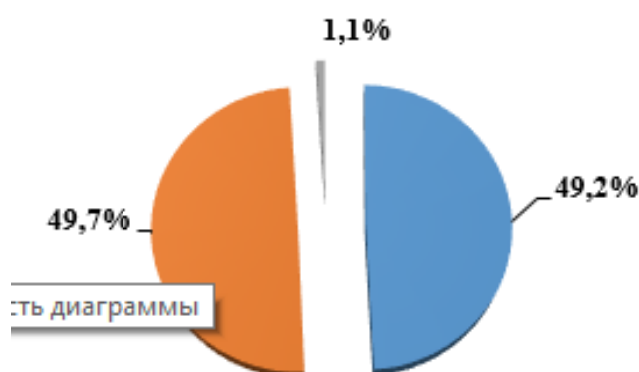


Figure 1 – Share distribution of acreage in the RK.

As can be seen from the figure, the proportion of the share of acreage lands is 49.7% owned by peasant or farmer farms, 49.2% belongs to agricultural firms and only 1.1% of sown areas to households.

2. The share distribution of acreage under the fodder crops in the context of the regions for 2016 is shown in the figure.

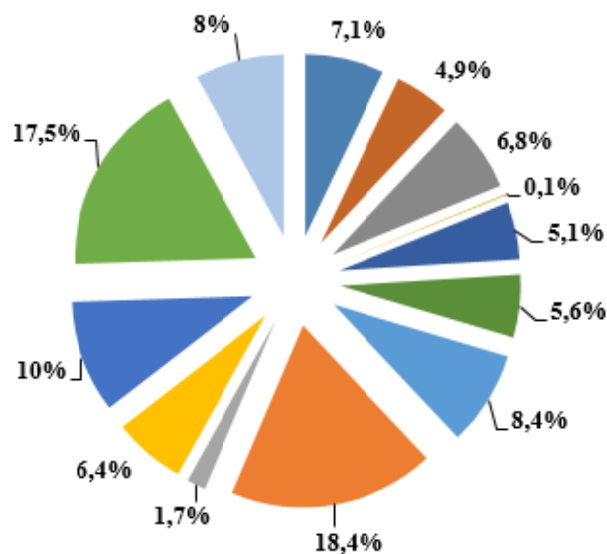


Figure 2 – Fractional distribution of acreage under fodder crops by regions in 2016

Almost half (45.9%) of acreage under fodder crops falls on 3 regions of the country: Kostanai (18.4%), North Kazakhstan (17.5%) and Pavlodar (10%).

There are practically no cultivated areas for this type of culture in Mangistau and Atyrau oblasts, as well as in the cities of Astana and Almaty.

According to the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan, the number of cattle at the beginning of 2017 was 6,247,200 heads, pigs 831,100 heads, sheep and goats - 17,947.2 thousand heads, horses - 2 113.2 thousand heads, camels - 172.5 thousand heads, birds of all kinds - 37.8 million heads. The share distribution of livestock by species at the beginning of 2017 is shown in the figure.

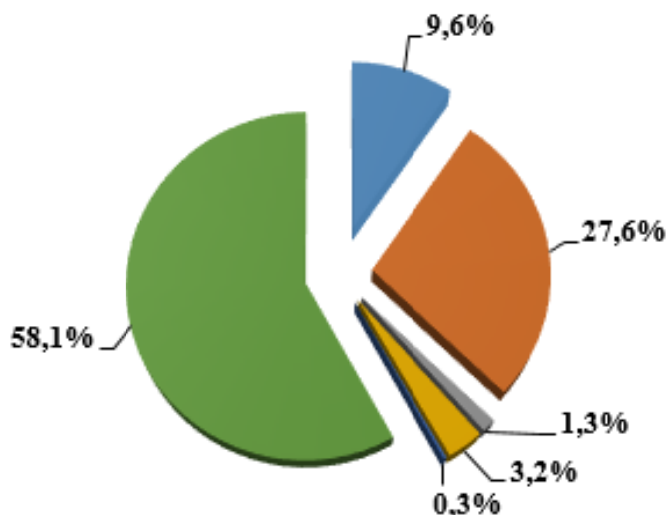


Figure 3 – Share distribution of livestock by species at the beginning of 2017

It should be noted that more than half (58.1%) of the livestock population at the beginning of 2017 accounted for birds. Sheep and goats occupy the second place (27.6%), followed by cattle (9.6%), horses (3.2%), pigs (1.3%) and camels (0.3% %).

As part of the activation of innovative activities of economic entities operating in the sphere of the agro-industrial complex, to work out organizational, economic and legal issues related to the organization and development of public-private entrepreneurship with clarification and specification for the subjects of the innovative activity.

Prospects for the development of agricultural franchising in the Republic of Kazakhstan are the most favorable. Recently there has been a tendency for the accelerated development and spread of the franchise method of doing business.

The first key variable that drives the level of energy consumption is the cost of electricity.

Kazakhstan has a significant potential development of industries based on renewable resources.

Table 1 – Renewable resources the Kazakhstan

#	Resource name
1	agriculture and agro-processing
2	water management
3	fisheries and the fishing industry
4	forestry and wood processing industry
5	energy industry on the basis of renewable biomass fuel (biogas, bioethanol, biodiesel)
6	Hydropower
7	wind power
8	solar power, geothermal energy

It is important to find a solution to the problem of planning permissible load on the environment and safe operation of tourist infrastructure "before" and "during construction", during the operation. Onsite need to install:

- wind turbines for testing contractions and power for lighting and heating devices;
- solar thermal device.

Social effect determines assistance in solving the problem of increasing the quality of life of the population of Kazakhstan: the regulation of unemployment, income levels, improving the provision of engineering and social infrastructure, improvement of sanitary and epidemiological situation, reducing ecological and demographic and other risks of territorial development. The information-analytical database and maps are useful for planning and managing organizations of national and regional levels. Economic impact: produce different-pronged and evidence-based evaluation, recommendation and planning materials for "green" tourism and the problems impeding its development. The development of "green" tourism as an environmentally safe and complexion industry ensure balanced use of all resources and ensures a high level of viability of the population.

World experience shows that environmentally oriented building construction can reduce the cost of energy and water resources by more than 30% for the whole period of operation of the object. Despite this, the design of buildings and transport infrastructure does not take into account potential benefits of using the principles of eco-efficiency. However, the cost of creating a sustainable infrastructure will improve the strategic competitiveness of the country as a whole, while preserving the environment, public health and natural mineral resources. This provision does not mean that Kazakhstan is far from solving the problems of spatial development of "green economy" of the country and its regions world-level developed countries.

One of the main trends of modern urban development is the design and construction of the so-called "smart cities" (smart cities), which can be determined by compliance with the essential parameters effectively connected together: the economy, natural resources, human and social capital, quality of life, as well as participation citizens in the management of cities.

It is necessary to take stringent measures to move to the latest technology both firms and households, for example, to force use of LED lighting, that is, to use renewable technologies. Preferential taxation for all applied in the production and life saving and the latest technology. Since the experience of advanced countries showed that in the initial period cost Wausau Upgradeable sources is high, with time development of very rapidly generate lead to cheaper cost. Over the past ten years, the price of solar electricity has

decreased tenfold. For wind energy decrease was not as significant, but still greater than for conventional technologies. After the end of the payback period of almost any object of renewable energy is a sharp decline in the rate due to the fact that investments have been returned, and no fuel costs.

Conclusions. In the tourist industry clients will prefer to relax in the hotel which does not harm the environment. Use efficiency increase if consumption will be assessed for each person individually, according to the meter readings for electricity, water and other similar resources. Showers and taps should be installed not wasteful, and economical. Those customers whose consumption is less than the average could receive discounts.

Currently, alternative energy exists only because it subsidizes, but it does not mean that it does not need to develop. The main obstacles to the introduction of innovations are administrative barriers, delays and limitations in planning, lack of coordination among different authorities, long waiting period for obtaining permits, as well as access to electricity, the structure of the electricity market, lack of information and training of new technologies and the failure of society.

Thus, consider the impact of current trends "green economy on tourism development in the face of global challenges, approaches to greening management of tourist activity on the basis of the provisions of the policy of" green "economy, investigated the environmental problems and international experience introducing technologies of renewable technologies. In comparison with some countries in the Eurasian region Kazakhstan could use the existing potential is many times more effective. In general, for the development of "green economy" in tourism need to do discovery and development, to align the principles of planning, implement consistent financial incentives, grant programs to increase awareness and learning opportunity. Application of these measures will allow Kazakhstan to embark on a new level of development, to fully implement the policy in the direction of the "Green Economy" and tell the world about the development of "green tourism" in one of the richest tourism destination.

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АГРАРЛЫҚ САЛАДАҒЫ ЖӘНЕ АУЫЛ ШАРУАШЫЛЫҒЫНДАҒЫ ЖАҢАЛЫҚТАР

Аннотация. Авторлардың пікірінше, аграрлық саланы дамытудың инновациялық әдістерінің бірі агро-франчайзге енгізу болып табылады. Себебі Қазақстан үшін – бұл жаңа құбылыс, әрі жеткіліксіз құрастырылғын формат. Агрофранчайзингтің даму келешегінің бағасын беру үшін, ең алдымен франчайзингтің артықшылығы мен нақты франшизаның түсінігін ажырата білу керек. Франчайзер бизнесін кеңейте отырып, жаңа кәсіпорындарды құрмай-ақ, сауда белгісін жаңа аймақтық нарыққа шығару мүмкіндігіне ие болады. Франчайзерлер танымал брендті пайдалана отырып, технология мен бизнес-процестерді «толықтай аяқталған» күйінде алады. Сонымен қатар, методикалық және ақпараттық демеуге, жарнама мен тауарды алға жылжытуға шығындалмай, кәсіпорынның бәсекеге қабілеттілігін арттырады. Аталған франшиза агротуризм объектітерін қамти отырып, ауылдық жерлердегі қосымша жұмыс орындарының пайда болуына көмегін тигізеді.

Түйін сөздер: инновациялық, агро-франчайзинг, агро-туризм, ауыл шаруашылығы, тұрақты даму.

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ИННОВАЦИИ В АГРАРНОЙ СФЕРЕ И АГРОТУРИЗМЕ

Аннотация. По мнению авторов, один из самых инновационных способов развития аграрной сферы это внедрение агрофранчайзинга, так как для Казахстана он является достаточно новым явлением и недостаточно хорошо разработанным форматом. Оценка перспектив развития агрофранчайзинга требует понимания преимуществ франчайзинга в целом и конкретной франшизы в частности для всех участников. Франчайзер получает возможность расширить бизнес и продвинуть бренд на новые региональные рынки без прямых затрат на создание предприятия. Франчайзи пользуется известной маркой, получает технологию и бизнес-процессы «под ключ», необходимую методическую и информационную поддержку, благодаря чему обеспечивается конкурентоспособность предприятия, экономия затрат на рекламу и продвижение. Так же данная франшиза должна коснуться и объекты агротуризма, как средство создания дополнительных рабочих мест в сельской местности.

Ключевые слова: инновации, агрофранчайзинг, агротуризм, сельское хозяйство, устойчивое развитие.

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INTELLECTUAL POTENTIAL AS A BASIS FOR FORMATION OF INNOVATIVE ECONOMY OF THE REPUBLIC OF KAZAKHSTAN

Abstract. Intellectual potential is an aggregate of theoretical knowledge, practical experience and individual abilities of employees who carry out works on creating innovations in industrial enterprises and organizations. To develop an innovative economy, we need an "innovative person" who is able to make full use of the achievements of science and technology, based on their use, to create innovations and introduce them into all spheres of public life. Therefore, the solution of the problem of the formation and development of an innovative economy depends to a large extent on increasing human potential. For the development of an innovative economy, each person, workforce, society as a whole must have new competencies, new professional and social qualities, human capacity, move to a higher stage of human development.

Keywords: innovation, development, intellectual potential, intellectual capital, economy.

Methods of research. The main methods of research are a method of deduction and induction, as well as a comprehensive approach and a method of scientific abstraction. The variety of goals, objectives and areas of activity in agriculture predetermines various criteria for assessing the effectiveness of economic entities.

Results. In accordance with the Strategy of Innovative Development until 2020, developed by the Ministry of Economic Development, one of the important tasks of the country's innovative development is to increase human potential in science, education, technology and innovation. The given task assumes increase of receptiveness of the population of the country to innovations - innovative products and technologies, simultaneously increase in number of innovative (risky) businessmen, development in the society of the positive relation to risk, and also propagation of innovative business and scientific and technical activity.

Innovations become the most essential condition:

- creation of new jobs that require highly qualified specialists;
- effective business, creating new and improved goods and services;
- the use of new technologies that reduce the negative man-made effects of the previous technological base of the industrial economy [5].

In turn, the necessary conditions for innovation are:

- a wide diffusion of scientific knowledge and information;
- formation and development of innovative infrastructure, innovative networks and innovative clusters, both at the regional and sectoral and inter-branch levels;
- the development of human capital, which is receptive to new knowledge, including the creation of conditions for training and professional development of workers throughout their lives;
- public-private partnership based on the use of new knowledge and innovations;

- the development of public and private institutions that contribute to the growth of the innovative receptivity of the economy and society, the most important of which is the institution of intellectual property.

Kazakhstan has now entered the industrial-innovative phase of economic development. This stage is characterized by the adaptation of the sphere of science to the current economic conditions, which should lead to fundamental changes in the structural, organizational, personnel, infrastructure and financial support for the development of science regulated by the relevant regulatory legal framework.

The development of scientific and technological potential should not be seen as a co-factor that is not characteristic of traditional sectors of the economy. The field of science is the same sector of the economy, which has all the features, rules and regulatory mechanisms common to other sectors.

In conditions when more than 80% of the economy of Kazakhstan is in the private sector, the principles of regulation of the sphere of science, inheriting a weak focus on market demands, are outdated and imperfect.

For the implementation of innovative activities in the real sector of the economy, people who are ready for a constant change of technologies are needed, who are able to assume responsibility for determining the goals and programs of action of the work collective and society as a whole. Such specialists, who are ready to deal effectively with social, scientific and industrial construction, should think in a fairly universal way, should be capable of system-holistic vision of the features of interaction of elements of socio-technical systems, their management processes, and the role and place of people in these systems, and accordingly build their professional activity on the basis of a creative approach, never losing behind the details of the general picture of the surrounding reality.

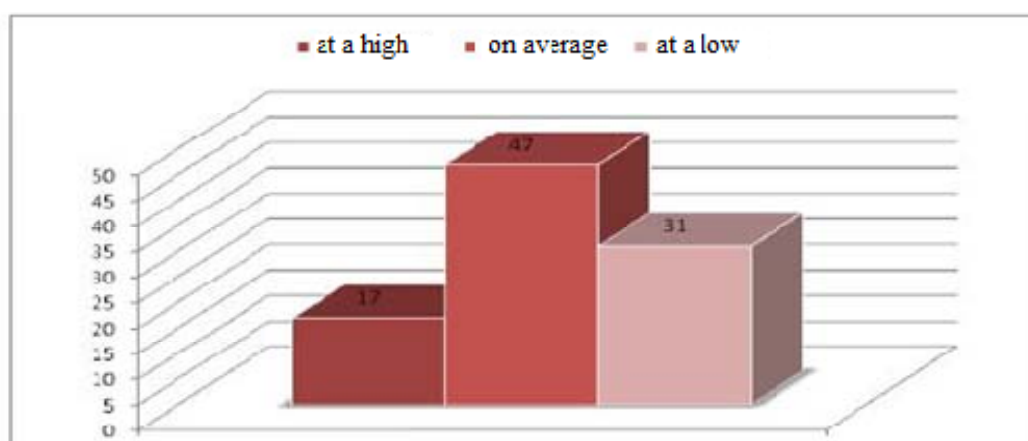
The formation of an intellectual nation is recognized as one of the strategic goals of Kazakhstan's development, while the main vectors are quality education and support for the younger generation. According to reviews of foreign experts in the field of education, as well as indicators of Olympiads, contests, tests, etc., Kazakhstani youth has a high intellectual potential. You just need to be able to use it correctly. Do not just give a good specialist a good education, but also help to reveal talent and opportunities, create conditions for skillful use of acquired knowledge, ensure the formation of competitive employees.

Now intellectual value is considered as the main component of the development of society, economic growth. Issues of the development of intellectual values occupy the main place in the advanced countries. This problem is widely discussed in the studies of the French scientist A. Bounfor and the Swiss scientist L. Edvinsson. They argue that intellectual capital is the basis of state development [7]. Analysis of the Portuguese scientist A. Teixeira, considering ways to increase the potential of human capital, characterize this process from an economic, technological and executive point of view [8]. Swiss scientists B. Carlsson, G. Eloasson believe that economic development is the realization of humanitarian ideas in the light of the implementation of new technology. The study is devoted to the creation of conditions for the emergence of new ideas necessary for effective development. British scientist Ph. Ken views cultural values in his studies as an integral part of intellectual capital. R.D. Putnam characterizes social capital as a connection between people, based on mutual trust. This approach was continued in the works of F. Fukuyama. In his research F. Fukuyama writes that on the basis of cultural mechanisms the main ideas of which are traditions and continuity in history, public trust generates social capital [9].

When polling Kazakhstanis: - "At what level are we now as an intellectual nation?"

According to figure 1 at what level we are now the Republic of Kazakhstan, as an intellectual nation, answered: high - 17%, on average - 47%, at low - 31%. The majority of the respondents - 47% - note the average development of the nation's intellectuality, and the critical view speaks of the bar that Kazakhstanis have taken and are holding, almost a third of those polled spoke in favor of a low level of intellectual development.

The need to understand and comprehend social changes is acutely felt by all social scientists. The most important features of the current stage of social change are intensive globalization, the growth of technogenic, natural and socio-genic risks, impede the implementation of the macro sociological theory of its general function - the establishment of the regularity of social processes. The results of large-scale empirical research will certainly become the basis for constructing the concepts of transformation of multi-layered Kazakhstan society and pragmatic technological regulation of the modern historical process. This is the basis for increasing the prestige of sociological knowledge in power circles and the general public.



Answers of the questionnaires of Kazakhstan

In general, the following forms of youth participation in scientific activities are practiced in higher educational institutions: work in scientific circles and clubs at universities, presentations at scientific theoretical, practical conferences, forums; participation in competitions of scientific works, olympiads, seminars, round tables, television debates on science; as well as participation in research projects.

To stimulate the inflow of young people into science, it is necessary to conduct targeted work in the following areas:

- expansion of participation of schoolchildren and students in international Olympiads, research projects, competitions and scientific and technical tournaments;
- attracting university students to active scientific work as assistants to scientists and teachers;
- attracting promising students to research work and implementation of research projects.

A key element of innovative development is the human resource, since in many respects the degree of implementation of innovative potential depends on the degree of receptivity and staff readiness for the implementation of innovative activities.

At the present stage, the process of forming a social base for innovative small business is largely limited in resources. Small innovative firms, having obtained economic independence and the right to dispose of their own profit, do not receive the appropriate legal state guarantees for the effective development of their own business. They also do not have experience in managing the personnel of an innovative firm, and prefer to look for external development resources without paying enough attention to the development of social management methods that contribute to the formation of motivation to achieve long-term innovative goals.

The meaning of raising the level of efficiency in the implementation of human resources for innovative small business is that in modern conditions, the creation of external (state support for innovative small business) and internal (social methods of innovative management) conditions for the use of human resources must be interconnected and directed to their preservation and increase. This is necessary:

1) Delineation of powers between the central, regional and local level of authority on development of administrative measures of influence on small innovative business. At the upper level, general legislative principles of innovation activity of small firms are determined; at the regional level, conditions for indirect economic and direct financial support are created, its size is determined depending on the needs and specifics of the region, an innovative infrastructure is being formed; at the local level, programs are being developed to support entrepreneurs who open and develop their own business, including information, education, advertising, services, recruitment services, plans are also being developed for the restructuring of large enterprises, with the emphasis on entrepreneurial oriented innovative structures, forming small high-tech firms. It is at the local level that an expansion of the social base of innovative small business takes place due to the involvement of resources of local communities.

2) Involvement of entrepreneurs in the process of creating not only the technical and technological chain of the innovation cycle, but also the formation of the social and organizational context for ensuring the intellectual, professional and creative fullness of the innovative activity of workers of small firms.

Conclusions. Thus, an innovative small firm, whose existence depends on both external and internal factors of influence, is a mechanism for "processing" human resources, which either accumulate their potential for its competent development and use, or depreciate and degrade in the absence of effective conditions implementation. The higher the competitiveness of the firm, the higher the interest of the state, private and foreign investors in providing support, financial support of innovative projects, creating appropriate conditions for the development of a small innovative firm.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ИННОВАЦИЯЛЫҚ ЭКОНОМИКАСЫНЫҢ НЕГІЗІ РЕТІНДЕГІ ЗИЯТКЕРЛІК ӘЛЕУЕТ

Аннотация. Мақалада әлемдегі халықтың зияткерлік әлеуетін дамыту жолдары зерттелді. Әлемнің жетекші елдерінің инновациялық дамуы білімнің, инновациялардың, ғаламдық ақпараттық жүйелердің, зияткерлік еңбектің, ғылымның, жаңа технологиялардың экономикасы есебінен болды. Интеллектуалды әлеует басым рөл атқарса және жаңа экономиканың нәтижесінде қазіргі заманғы қоғамның әлеуметтік-экономикалық дамуының негізгі басымдығы болды. Бүгінде білім беру тек экономика саласы ғана емес, экономиканың дамуының негізгі ресурсы болып табылады. Адам факторы өндірісте, ғылымда, мәдениетте және халық шаруашылығының өзге де салаларында жаңа нәрсені ашатын, жасайтын жеке тұлға ретінде құнды. Осыған орай, отандық білім берудің маңызды миссиясы – зияткерлік тұрғыдан дамыған, шығармашылықпен жұмыс жасайтын кәсіби мамандарды- Қазақстан Республикасының азаматтарын даярлау.

Түйін сөздер: инновация, даму, зияткерлік әлеует, зияткерлік капитал, экономика.

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ИНТЕЛЛЕКТУАЛЬНЫЙ ПОТЕНЦИАЛ КАК ОСНОВА ФОРМИРОВАНИЯ ИННОВАЦИОННОЙ ЭКОНОМИКИ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация. В статье был исследован способ развития интеллектуального потенциала населения в мире. Инновационное развитие ведущих стран мира произошло благодаря экономике знаний, инноваций, глобальных информационных систем, экономики интеллектуального труда, науки, новейших технологий. Где главенствующую роль сыграл интеллектуальный потенциал и как результат новой экономики, стал главной доминантой социально-экономического развития современного общества. Образование на сегодняшний день становится не только отраслью хозяйства, а сколько основным ресурсом развития экономики. Именно человеческий фактор ценится как личность, которая может открыть, создать что-то новое в производстве, науке, культуре и других отраслях народного хозяйства. В связи, с чем важнейшая миссия отечественного образования – это подготовка интеллектуально развитых, творчески работающих профессионалов-граждан Республики Казахстан.

Ключевые слова: инновации, развитие, интеллектуальный потенциал, интеллектуальный капитал, экономика.

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Abstract. Results of global climate change concerned universal world community, the changes of the environment, which strictly influenced on some regions, catastrophic consequences. Around the world, irrespective of recognition of presence of global warming of climate, research scholars have the purpose of timely forecasting of all consequences and peculiarities of climate change; they are conducted (ecological, economic and social aspects) with the concepts and strategy of response between them. The negligent relation of mankind to the natural resources and nature are included; moreover, it led to the fact that at the beginning of the XXI century economic and social situation of mountain territories has worsened, because it was caused to the negative problems (tension interethnic, poverty, degradation of lands and ecosystems, etc.). Change of ecology and all important support systems of mankind (ecological, social, political, economic and cultural), caused by global warming, and allows discovering close interrelation of climate change and growth of national economy. The problem of global warming hasn't lain only among the states of Central Asia. Now many scientists make attempts to explain world crisis, developing various strategies and programs for social and economic development, however, unfortunately, these problems can arise, in case of climate changes subsequently.

Keywords: globalization, climate change, environment, global warming, natural resources, degradation of lands, ecosystem, life support systems, bio resources, ecological safety.

The purpose of this article is carrying out the analysis of economic mechanisms of ensuring sustainable development of economy of the Republic of Kazakhstan in the conditions of global warming. Studying of the stability in social and economic aspect, it is possible to note that this concept is closely connected with category "sustained economic growth". The model of sustainable development assumes coherence of the social, economic and ecological parts of public life as the basis of formulation of approaches to the solution of large-scale problems of territorial educations. Such approach is urgent in modern conditions as all economic reforms occur in regions of the country, their role in implementation of economic policy of the state increases. It is impossible to call the region steadily developing, proceeding from increase in economic indicators. Steady growth of the region has to be aimed at achievement of worthy quality of life and be followed by positive dynamics of a complex of various indicators.

Works of domestic and foreign scientists-economists, and also set legislative, regulatory legal acts, data of statistical bodies of areas and areas formed a theoretical and methodological basis of article. At the same time the following methods were used: monographic, system analysis, complex assessment, method of expert evaluations, abstract and logical, economic-mathematical, etc.

Analyzing fundamental forms of stability of the region, it is possible to allocate the following: unstable development, hyper stability, global stability, sustainable development and steady system.

Summarizing, it is possible to note that the former concept of interaction of the society and nature focused on environmental protection which didn't provided stabilization of ecological-economic situation. The dominating paradigm of "the economic growth" has undergone revision decades. In the Republic of Kazakhstan a number of key strategy, concepts, the action plans directed to the solution of the strategic directions on adaptation and mitigation of the climatic changes.

At the time of global warming of the climate and urgent development, the specification and advance policy of the republic, promoting rising of efficiency in water resources management, is represented by the following:

- declaration of girdles of production of nodal water outflows of the republic by separately guarded natural territories;
- introduction of technologies of water conservation and improvement of irrigating systems;
- expansion of the forests territory around the main and minor arteries of the country;
- restoration and construction of modern irrigational systems for the purpose of improvement of water irrigation in the mountainous areas.

Thus, it is possible to refer improvement of management of water resources to the number of the main ways of use of water management. In our opinion, in the short term it is necessary to take the following measures for the purposes:

1. to carry out decentralization of management due to increase in responsibility of water users;
2. to achieve reduction of risk of deterioration in a condition of physical infrastructure of water management due to government subsidizing of part of expenses.
3. development of the hydro energy sector of the country, which remains the priority direction of the model of sustainable development of economy of the republic. It is necessary for development of hydro-power of the country:

1. energy efficiency and energy saving.
2. use of renewables.
3. Improvement of tariff policy.

Development of agriculture remains the main priority direction of the formation of modern economy of the state, and the organization of the relevant agreements for fast increase of the production, in particular, will render assistance in agriculture to growth of number of plants and reduction of poverty in rural areas. For regions of Kazakhstan from the point of view of investment appeal it is necessary to improve activity of agrarian sector that is connected with a package of measures, including both improvement of market mechanism, and improvement of production and trade appeal [1, p. 238]. For example, it is important to create the civilized market of the earth, effective structures of producers. The main ways of improvement of activity in agrarian sector are: increase in fertility of soils, involvement unused resources, use of new technologies of agriculture and innovative methods of the organization of production. The republic needs strengthening of the available material and technical resources in the development of agriculture, training and retraining of workers of the village in high-performance work, holding various marketing actions. So, for the organization of modern state policy in the field of agriculture of the state it is necessary:

- 1) formation and improvement of the available legislative, standard and legal base of agriculture;
- 2) foundation, advance and the adjusted functioning of the repeated market of the earth and the organization of farmer manufacturing farms of goods;
- 3) improvement of financial, credit and monetary system in the development of agriculture of the republic;
- 4) development of branch by the creation and development of territorial and branch farmer associations;
- 5) substantial and functional reforming of system of the Ministry of Agriculture and its regional departments;
- 6) formation of the civilized, corresponding to the market sequence the producer (farmer) - the purchaser (system of preparation) - the processor – the off taker (trade) - the consumer (population);
- 7) formation of educational advice center, information supply of agricultural branch, training in new knowledge and innovative technologies;
- 8) improvement of scientific supply of branch;
- 9) entry of branch into structure of regional economy and finding of own niche;
- 10) creation and development of fully operating market infrastructure in branch, etc.

For ensuring food security of the state it is necessary to resolve three key issues - the problems connected with production of food, solvency of the population and also the problems connected with conservation [2, p. 17].

In our opinion, there would be rather effective following short-term measures of state regulation of the food market:

1. Increase in the sums of subsidizing of grain crops, cultivation of beet, oil-bearing crops and meat livestock production. Granting credits on favorable terms. It is necessary to enter subsidizing of meat production and production of forages. Supply and preparation about 1 thousand tons of foodgrain on the contract basis and 0,5 thousand tons of root crops of sugar beet require allocation of financing from the budget of the republic.

2. Give the chance of decrease in expenses of the grain processing enterprises and productions which are engaged in release of bakery products by means of the organization for them, reduced rates for payment of electric energy, using stocks of the power enterprises monopolists.

3. Improve the customs and tariff market of food production. Important at the initial stage, generally, to admit the minimum customs duties on import to the state of grain and other agricultural products, at the same time legislatively to accept system of an assessment of quality of the brought production. Introduce export restriction to separate food products by increase in various customs tariffs.

4. Improve the mechanism of purchases of agricultural and food production for satisfaction of the state requirements. Important at the legislative level to take the form of preparations (on a contract basis) with local producers, to open the commodity and raw exchanges, with appropriate trade and purchasing bases. It is necessary to supply inviolability of the state reserve of fuels and lubricants and to legalize this process.

5. It is necessary to stock up at the expense of other republics of not less than 100 thousand with wheat tons, create reserve fund. To organize the realization to flour mills, at rather preferential prices, as required, to produce the condition to sell flour of bakeries at such cost, which will provide their profitability about 6-9%, and will allow to gain income from sale of bread not above maximum prices which will be established by the state for wholesale shops.

6. Every year the state needs to finance from the budget of farmers who have opportunities for expansion of acreage for landing of wheat, obligatory increase of the volume of cultivation of qualitative grain. At the same time, it is important to meet the condition of realization, established by the government procurement, the conclusion of the coordinated contracts, providing stage-by-stage financing of 51-65% prior to field works. The main line in this case has to become a first priority of providing farmers with seeds of grain crops, fuel and lubricants products, the necessary agricultural machinery, etc.

7. Improvement of state regulation on advance of the main food products from the producer to directly consumer in this connection it is necessary to organize clusters, to create the state and private purchasing cooperatives, ensuring safety of products and goods, and their realization for the aid to trade enterprises, retail sellers and productions of public catering at the prices in the % allowing profitability up to 7-9. Certainly, it will allow to destroy the speculation in food products among the dealers, who generally specialize in the wholesale purchase at farmers of meat dairy products, fruit, vegetables, grain, etc. Finally dealers overstate the prices many times, it promotes that retail sellers can take the large income; at the same time farmers are doomed to the forthcoming losses.

Besides, we consider that increase in efficiency of nature protection activity of users of nature will be promoted by financial eases, by introduction of economic tools on stimulation of protection of ecology. To stimulate users of nature and to hold nature protection events for rational use of material and mineral resources with use of various economic mechanisms of environmental management, which provide system of ecological payments.

As it was noted in the Report of the World Bank, "introduction of the form of payment for environmental pollution will allow to provide the economic incentives on decrease in pollution of ecology by means of the mechanism of increase in interest rates for top standard use of resources or the emission exceeding norms and dumping of pollutants" [3].

It is necessary to reconsider percent of rates of payment for pollution of ecology; their size needs must be established, making start from volumes and different types of some substances. The rates of payment for pollution of ecology and the environmental sphere are established in especially protected territories or nearby.

These economic tools will promote determination of strict norms and standards on inaction of economic entities by introduction of innovative and rational methods of use of natural and mineral resources, to the organization and introduction of very effective and low-waste technologies. At the same time, the damage will be caused to ecology as the result of performance of the nature protection legislation and

the subject to compensation in absolute volume. In the Concept of transition of the Republic of Kazakhstan to sustainable development for 2007-2024 was stressed: "It is necessary to reveal extent of pollution and the caused damage, to fill all costs of their restoration, further reproduction and other expenses and losses" [4].

We believe, the introduction of ecological statistics will allow to exercise the control over execution of the state strategy and indicative plans, various programs and actions, the state documents, defining the level of development of the Republic of Kazakhstan, to promote its occupation of the certain place in the world, development of important activities of public authorities and the public. At the same time there is no system basis for formation of the main indicators, and trends of transformations of state of environment and the natural available resources don't allow estimating their small number for certain.

We think that for this purpose it is necessary to develop the program of evidence-based system of indicators and indicators in the field of protection of ecology. This system will be unambiguously involved in the practical activities of productions on realization of indicative socio-economic planning and state policy.

The level of the development of the human capital remains an absolute national priority of the Republic of Kazakhstan. We consider that when developing strategies of our country during formation of the market relations accent will need to develop the cumulative human capital of the creative type, conforming to requirements of innovative production. Also foreign authors hold the same opinion [5, p. 411]. As adaptation of the saved-up human capital to market conditions is much more effective and more real, than its full recreation, and corresponds to the level of expenses, feasible for economy of Kazakhstan. It is quite necessary the following:

- carrying out the policy of the state in the field of the human capital, the retraining promoting all-round development of intellectual potential of labor by the development and implementation of programs of the professional, focused education and by increase and retraining of personnel, at the same time corresponding to the compensating character;

- influence of the state tools by the means of the educational focused taxes of the enterprises for the purpose of increase their activity in the field of preparation, retraining and adaptation to new conditions of labor;

- carrying out active market development, focused on the educational policy of the state, promoting formation of the improved model of the employment of the population, essential decrease in expenses of transition process, easing existing social and psychological to the intense period in the society to suspend disqualification of the cumulative human capital.

Personnel potential remains decisive in fight for competitiveness. First of all, it is necessary to solve the problem of professional retraining of labor. For this reason state policy in the field of training of intellectual labor plays the significant role. Public authorities of management define the product of the market of knowledge (providing it with the standard and legal basis, regulating functioning of educational institutions, enrollment and training, degree of their independence on hand financial and material resources, etc.), influence requirements of labor market and are external main regulators.

The regulating role of the state in this case, in our opinion, is explained by the maximum efforts of rapprochement of demand for the labor (from employers), but also the proposal of able-bodied population not only on the number of workers and their qualitative structure, but also in time and space, on macro- and microlevel.

At the microlevel regulation of the labor market contains legislative and other standard and legal regulation, financial stimulation, tax maintenance of the population and the movement in labor market of the organizations, enterprises, the personal registered and unregistered businessmen and households. Moreover, the labor market is affected also by the private business, the indirect regulator of the market of knowledge. But we know that in many respects the component of branch structure of public sector is similar to private structure, at the same time, without replacing and supplementing activity of the private capital, realizing the functions, social necessary, and number of reasons isn't shown by objects of use of the personal capital.

The households, which were traditionally found in the republic in recent years, consumer cells of the state have nowadays restored the production functions. Economic and separate other enterprise households arise, along with the state enterprises, figures of restoration of jobs. The final offer of work in the country

and regions depends on welfare of families, in our opinion to support the economic activity of households has to become the main direction in labor market regulations.

At the same time we consider, that the state policy has not only capture preparation and big release of highly educated and production of the active labor potential, but also to supply with its high employment in labor market. It is possible the important way of implementation of this approach development of additional jobs.

Thus, the model of the balanced sustainable development of the national economy has to be focused:

- on improvement of the quality of life of citizens of the state by the creation of economic conditions for them of worthy work;

- on effective democratic management;

- on development favorable accommodation and health of the population in the ecological environment;

- on enhancement and preservation of the available cultural and moral values of the population;

- on protection of the civil rights.

In the conclusion we would like to note, that full support by multilateral creditors on sustainable development and adaptation to the climate changes is necessary for decrease the main threats of the sustainable development in the Republic of Kazakhstan. For the purpose of the development of infrastructure of different regions it is quite necessary:

- to improve the normative legal acts and the national legislation, concerning investment and the taxation;

- stimulations of attraction of the foreign and domestic capital, taking into account climate, political and social risks;

- simplification of customs and visa formalities, etc.;

- maintenance and distribution of image of Kazakhstan as the country, favorable for tourism and business;

- training of qualified personnel.

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ЖАҒАНДЫҚ ЖЫЛУ ЖАҒДАЙЫНДАҒЫ ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ ТҰРАҚТЫ ДАМУЫН ЖҮЗЕГЕ АСЫРУДЫҢ ЭКОНОМИКАЛЫҚ МЕХАНИЗМДЕРІ

Аннотация. Климаттың жаһандық өзгеруінің нәтижелері әлемдік қоғамдастықтың арасында кеңінен таралған алаңдаушылыққа әкеліп соқтырады, өйткені қоршаған ортаның өзгеруі бірқатар түбегейлі, ал кейбір аймақтар үшін апатты салдары болуы мүмкін. Бүкіл әлемде, жаһандық жылынудың бар екендігін мойындауға қарамастан, климаттың өзгеруінің барлық әсерлерін (олар: экологиялық, экономикалық және әлеуметтік) уақтылы болжау және оларға жауап беру тұжырымдамалары мен стратегияларын әзірлеу мақсатында зерттеулер жүргізілуде. Адамзаттың табиғи ресурстарға және тауларға немқұрайлы қатынасы, басқалармен қатар, ХХІ ғасырдың басында таулы аудандардың әлеуметтік-экономикалық жағдайының нашарлауына

әкеліп соқтырды, бұл жағымсыз проблемаларға (этносаралық шиеленіс, кедейлік, жер және экожүйенің тозуы және т.б.) әкелді. Ғаламдық жылындан туындаған экологияны және адамзаттың тіршілігін қамтамасыз ететін барлық жүйелерін өзгерту (экологиялық, әлеуметтік, саяси, экономикалық және мәдени) климаттың өзгеруі мен ел экономикасының өсуі арасындағы тығыз байланысты көруге мүмкіндік береді. Жаһандық жылыну мәселесі Орталық Азия мемлекеттерін шетте қалдырмады. Қазіргі уақытта көптеген ғалымдар дағдарысты еңсеруге тырысады, әлеуметтік-экономикалық дамудың түрлі стратегиялары мен бағдарламаларын әзірлейді, бірақ олардың барлығы климаттың өзгеруі салдарынан туындауы мүмкін проблемалардың маңыздылығын ескермейді.

Түйін сөздер: жаһандану, климаттың өзгеруі, қоршаған орта, жаһандық жылыну, табиғи ресурстар, жердің деградациясы, экожүйе, өмірді қолдау жүйесі, биоресурстар, экологиялық қауіпсіздік.

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ЭКОНОМИЧЕСКИЕ МЕХАНИЗМЫ ОБЕСПЕЧЕНИЯ УСТОЙЧИВОГО РАЗВИТИЯ РЕСПУБЛИКИ КАЗАХСТАН В УСЛОВИЯХ ГЛОБАЛЬНОГО ПОТЕПЛЕНИЯ

Аннотация. Результаты глобального изменения климата вызывают повсеместную озабоченность мировой общественности, и это, понятно, поскольку, изменение окружающей среды может повлечь за собой ряд кардинальных, а для некоторых регионов, катастрофические последствия. Во всем мире, независимо от признания присутствия глобального потепления климата, проводятся исследования, с целью, своевременного прогнозирования всех последствий изменения климата (экологических, экономических и социальных) и разрабатываются концепции и стратегии реагирования на них. Небрежное отношение человечества к природным ресурсам и к горам в том числе, привело к тому, что в начале XXI века социально-экономическое положение горных территорий ухудшилось, что повлекло за собой негативные проблемы (напряженность межэтническая, бедность, деградация земель и экосистем и др.). Изменение экологии и всех систем жизнеобеспечения человечества (экологических, социальных, политических, экономических и культурных), вызванных глобальным потеплением, позволяет увидеть тесную взаимосвязь изменения климата и роста экономики страны. Проблема глобального потепления не оставила в стороне и государства Центральной Азии. В настоящее время многие ученые предпринимают попытки выхода из данного кризиса, разрабатывая различные стратегии и программы по социально-экономическому развитию, однако, не все из них учитывают всей серьезности проблем, которые могут возникнуть впоследствии из-за изменения климата.

Ключевые слова: глобализация, изменение климата, окружающая среда, глобальное потепление, природные ресурсы, деградация земель, экосистема, системы жизнеобеспечения, биоресурсы, экологическая безопасность.

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**ABOUT THE MAINTENANCE OF THE KAZAKHSTAN POLICY
OF SPIRITUALITY AND TOLERANCE**

Abstract. After acquisition of the state sovereignty our country has proclaimed itself as the secular state, with the Basic Law of the Republic of Kazakhstan. Our country is multi-religious society, where the religious tolerance acts as priority policy of the state in the field of religion. Promotion of eternal, boundless, invariable value is focused on interior, which defines spirituality of modern Kazakhstan society. During the transition period from one system of public administration to another, the social shocks in any society influenced on religion, minds and consciousness of the people. Therefore attendants of cult try to occupy actively developed vacuum in the spiritual sphere, conduct promotion of religious views. From the moment of appearance of mankind the religion acts as the universal value, the kind of culture. All cult constructions, religious and philosophical works, church rituals and ceremonies have influenced to the internal contents. According to the current legislation in Kazakhstan the religious associations are separated from the state. It is impossible to give some preference to any religion. The situation in the sphere of religion and the interfaith relations for the last two and a half decades has considerably changed.

Key words: globalization, state and religion, religious perspective, religious ethics, religious examination, faiths, polyconfessionalism, interfaith consent, pseudo-religious trends, dialogue platform.

The influence of processes of globalization is felt by Kazakhstanians in all spheres of society: the national economy adapts to the requirements of the global market and its main players, political reforms are carried out not without the influence of international democratic institutions and organizations; the reforms implemented in the system of higher education are aimed at its entry into the world educational space, etc. In the context of the claims of the Islamic fundamentalists to establish a new totalitarian political regime of a religious nature, and to unleash them at the beginning of the 21st century, a special sound is acquired in the religious perspective. the terrorist war not only against the Western civilization, but also moderately-minded Muslims, building their lives on the basis of universal human values.

Religion as a bearer of spiritual and moral ideals and cultural traditions has a high value in the eyes of Kazakhstanians. The power of religious ethics is actively used to form the moral and spiritual world of the rising generation. Islam and Orthodoxy are one of the main cultural components in the life of the Kazakh and Russian peoples and it is no coincidence that the state recognized Kurban-ait and Christmas as official weekends. Each religion in its language carries universal human values, enshrines norms of behavior in society, acts as the guardian of the spiritual values of the people.

Kazakhstan is a natural border between the world's largest religions – Islam, Christianity and Buddhism, which is why our country is rightly called the "crossroads of civilizations." Representatives of different peoples and ethnic groups lived and worked here for centuries. Here there were strong cultural and economic ties that contributed to mutual enrichment and prosperity. And this enormous wealth of the people of the country seeks to preserve and pass on to its descendants.

It should not be forgotten that it was precisely in the religions that the wealth of cultural and valuable material was accumulated and preserved, the centuries-old wisdom of mankind, its dreams and expectations, aspirations and hopes are concentrated. Therefore, the involvement of young people in the cultural

heritage of religious experience will contribute to the expansion of their world-view positions and cultural enlightenment.

Historically, Kazakhstan is a country of religious pluralism. In the structure of its confessional space, the main part in the number of parishioners is the unions of Muslims and Orthodox Christians. Among the population of the republic there is an increase in the prestige of religious organizations, new religious formations have appeared, and there is a tendency towards religion of people who were previously indifferent to it. Today, our compatriots began to pay more attention to true spirituality, and not to reduce their religious interest exclusively to external forms.

If viewed from the point of view of geography, then the most religious regions are the southern and western regions of Kazakhstan. Although in Kazakhstan traditionally strong positions of Protestantism are strong. Despite the mass departure from the country of the German population, the Baptist, Lutheran, Adventist organizations, as well as numerous Protestant associations occupy a definite place among denominations common in the territory of Kazakhstan. Over the past years since independence, there have been a number of different missions and communities, whose doctrine was only recently known to a narrow circle of religious scholars, namely the religious organizations of methodism and neo-protestantism, such communities and cults as Vera Baha'i, Scientology, the Church of the Unification, Krsna consciousness, Church of the last covenant, Church of Jesus Christ of Latter-day Saints (Mormons) and so on [7].

The arrival of religious confessions in Kazakhstan, which had not previously been known to our society, can be attributed to the consequences of globalization, freely or involuntarily eroding to a certain degree the cultural identity of Kazakhstanis. The attitude towards these confessions is ambiguous. The population of Kazakhstan has never been inclined to fanatical faith, it is distinguished by tolerance and tolerance in the inter-confessional sphere.

By adhering to the policy of noninterference in the internal life of denominations, the state stimulates the development of dialogue between them, promoting their full realization of their functions.

At present, Kazakhstan has a rich, historically priceless experience of peaceful coexistence of different religions, cultures and civilizations, which contributed to the formation of similar value orientations of the majority of the country's population, the creation of a tolerant atmosphere of interfaith harmony and mutual respect.

This statement of facts is important because, against the backdrop of interethnic and interconfessional conflicts in the world, the unique Kazakhstan experience in strengthening inter-religious and interreligious dialogue has appeared to be in demand at the global level. The beginning of identity is laid down in the sphere of spirituality, its priorities are found in religious culture. At the same time, religious identification is often a component of cultural identity. A person accepting a certain group attributes himself to the religion accepted within the framework of this culture.

According to the norms of international law, members of the United Nations have a duty to develop and promote respect for human rights and fundamental freedoms for all, without distinction on the basis of race, sex, language, nationality, religion or state of health, and to combat intolerance [1]. But at the same time, we must understand the importance of the issue of national security, which is the foundation of the existence and sovereignty of the country.

On June 30, 2002 in Astana, the Astana Declaration on Tolerance and Non-Discrimination was adopted at the OSCE Conference [2]. This Conference is a confirmation of Kazakhstan's commitment to the development of the dialogue of civilizations and the deepening of mutual understanding between peoples and religions. These rights are enshrined in national laws such as: Article 1 of the Constitution of the Republic of Kazakhstan states that Kazakhstan is a democratic, secular, legal and social state, the highest values of which are man, his life, rights and freedom. [3]. On October 11, 2011, the Law "On Religious Activities and Religious Associations" confirms the right of every person to freedom of conscience, guarantees the equality of everyone regardless of his religious belief, recognizes the historical role of Islam in the Hanafi direction and Orthodox Christianity in the development of the culture and spiritual life of the people, respects other religions, combined with spiritual heritage the people of Kazakhstan, recognizes the importance of interfaith consent, religious tolerance and respect for the religious convictions of citizens [4].

Today, in the Central Asian region, spiritual currents with gazes that can affect a well-established religious situation have spread. Favorable soil for such trends is the lack of faith in religious dogmas, the

lack of a clear life position, as well as the trustfulness of Kazakhstanis. The followers of the aforementioned currents are extremely intolerant towards all who do not share their political views, including cohabitants. Under the guise of teaching Islam, they spread extremist ideas: they organize groups that call for a struggle for "Islamic orders", establish close contacts and unite with other extremist groups. Religious intolerance based on intolerance can cause substantial damage to the spiritual security of any society, while affecting centuries-old foundations of religions that are traditional for one or another state, including Islam.

It should not be forgotten that terrorism is quickly gaining momentum and finds its followers thanks to the development of the Internet. The history of terrorist groups in cyberspace began not quite long ago, it was roughly dated from the beginning of 2000. Now it's a very dynamic phenomenon on the World Wide Web. Web sites with an extreme and terrorist context suddenly appear and often change the format, and then also rapidly disappear. In many cases, this is only the appearance of disappearance, only the address of the site changes, the content remains unchanged.

According to the head of the Center for the Study of the Problems of Terrorism and Extremism in Kazakhstan, the Internet by its nature in many respects is an ideal field for the activities of terrorist organizations. Thanks to free access, a small influence of censorship and other forms of state control, and sometimes even their absence, the anonymity of communication, the rapid movement of information, the multimedia component and much more, the Global Network in "skilled hands" becomes a weapon of mass consciousness.

According to the prosecutor's office, the Internet is the main source of information and channels for spreading the idea of religious extremism. As a result of the inspection, more than 150 Internet resources providing information on the manufacture of self-made explosive devices, as well as propagandizing extremism and terrorism, have been suspended.

As experts-religious scholars point out, extremism and terrorism in Kazakhstan have not a ideological but a criminal basis. Pseudo-religious rhetoric conceals criminal activity that undermines the foundations of society. Nation Leader N. A. Nazarbayev set the task of "severely curbing the activities of non-traditional sects and dubious pseudo-religious movements," to strengthen the prevention of religious extremism in society, especially in the youth environment, to take advantage of the Congress of Leaders of World and Traditional religions and to create a new platform for resolution on the basis of this dialogue platform. conflicts on religious grounds [5].

A state program on countering religious extremism and terrorism for 2013-2017 has been approved in Kazakhstan, Tengrinews.kz correspondent reports. The corresponding decree of the head of state Nursultan Nazarbayev was published in the official press on October 2 [4].

The main objective of the program is to ensure the safety of man, society and the state by preventing manifestations of religious extremism and preventing the threat of terrorism.

Given the fact that religious consciousness often acquires an ethnic color, it is important to use the authority of the leaders of national diasporas, national cultural associations in opposing the propagation of the ideas of religious radicalism. In many respects, due to the active work of the leaders of denominations and national diasporas, there is no religious confrontation and interethnic conflicts in the country. And we should actively use and propagate this huge positive experience and potential.

Today, the main influence of interreligious dialogue on interethnic relations, their humanization can go through its educational impact on the population. Such a dialogue affects the consciousness of people of different nationalities and religions in the spirit of tolerance, non-violence and the culture of peace. In resolving issues of internationalism and ethno-tolerance, the crucial importance is given to the formation, development and implementation of educational concepts that contribute to the consolidation of society.

The unprecedented pressure of cultural globalization reduces the chances of becoming a global culture as a dialogue and contributes to the growing resistance of the "periphery" of the "center" that engenders clashes and conflicts of cultures. Global culture becomes a source of instability, the lines of the breakdown of civilizations, and confessional values turn into samna sharp forms of quasi-religious fanaticism, when a person practically removes responsibility for his actions, shifting the burden of guilt on the values and norms of creed.

It should be noted that the real high level of religiousness of modern youth in many respects can be conditioned by the formation of its world outlook without clear ideological and political orientations, settled moral stereotypes.

Kazakhstan's policy of spirituality and tolerance seeks to initiate new, topical priorities on the humanitarian and moral basis. One of the main prerequisites that our country adheres to in its foreign policy is to say that in order to continue its history, mankind needs to learn how to coordinate not only its own local but also global activity with its own capabilities [6].

Kazakhstan has managed to turn the factor of the vulnerability of a polyethnic society into a source of social and cultural wealth, a dynamic development of interethnic relations. Religion in Kazakhstan does not act as a competing identity that opposes itself to ethnic or political communities, but as an additional element of the spiritual culture of Kazakhstani, giving the society a unique diversity and at the same time a unique identity.

The general historical past and ethno-cultural traditions of the ethnic groups of Kazakhstan have had a decisive influence on the nature and features of religious traditions. Their important distinguishing feature is the mutual gravitation to each other. Good relations have developed in the country between Islam and Orthodoxy, as well as other religions. Under the influence of this factor, the activities of the most numerous denominations acquires unique, unique features. This, in turn, contributes to the effective state development of the country and further consolidation of national unity and tolerance.

In each country, based on the prevailing customs and norms of life, and the laws of historical development, there has been a certain relation to non-traditional religions, which is not definitely positive or negative. Since the personality of religion is a very private, individual problem, then all issues related to religiousness are solved mainly not on the state, public, namely on the individual or family level.

A modern man is faced with the need to independently develop his own individualized multidimensionality in a crisis of the traditional type of worldview identity and the onset of cultural globalism. On the one hand, faith must be a purely personal business of each, on the other hand, religious faith preserves the quality of its practically - true universality and the structure of world-view values of the modern world.

The new generation is new aspirations. They are the future of our country. For in whose hearts there are high feelings of civility, patriotism, industriousness, they live ahead of their time and contribute to the unity of the Kazakh society.

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ҚАЗАҚСТАНДЫҚ РУХАНИЛЫҚ ПЕН ТӨЗІМДІЛІК САЯСАТЫНЫҢ МАЗМҰНЫ ЖАЙЛЫ

Аннотация. Мемлекеттік тәуелсіздік алғаннан кейін біздің еліміз өзін зайырлы мемлекет деп жариялады, ол Қазақстан Республикасының Ата Заңында белгіленген. Біздің еліміз көп конфессионалды қоғам болып есептеледі, онда діни толеранттылық мемлекеттің дін саласындағы саясатының басымдықтағы белгісі болып табылады. Қазіргі қазақстандық қоғамның руханилық құндылығын, адамның ішкі жан дүниесіне мәңгілік, шексіз, өзгермейтін, адам жанының бастауларын дәріптеу негізгі бағыт болып есептеледі. Бір мемлекеттік басқару жүйесінен басқаға өту, әлеуметтік дағдарыстардың күшейуі, қандай қоғамда болмасын адамдардың сана сезіміне діннің әсерлерін күшейтеді. Сондықтан да діни дүниетанымды уағыздаушы діни қызметтегі адамдар, осы рухани өмірдегі пайда болған вакуумды толықтыру үшін өздерінің іс-қимылдарын жандандыра түседі. Адамзат пайда болғаннан бері дін әрқашанда жалпы адамзаттық құндылықтарды уағыздады, сөйте отырып мәдениеттің бір түріне айналды. Барлық діни культке қызмет ететін сәулет ескерткіштеріне айналған ғимараттар, діни-философиялық туындылар, діни дәстүрлер, адамның рухани болмысын жетілдіре отырып, оның ішкі мазмұнына тікелей әсер етеді. Қазіргі Қазақстандағы қолданыстағы заңнамаларына сай діни бірлестіктер мемлекеттен бөлек орналастырылған. Сондықтан да мемлекет ешқандай дінге ерекше көңіл бөле алмайды. Қазіргі қазақстандық қоғамда дін бағытындағы және конфессия аралық қатынастардағы жағдайлар соңғы жиырма бес жылда төбегейлі өзгерген.

Түйін сөздер: жаһандану, мемлекет және дін, дін мәселесі, діни этика, діни экспертиза, конфессиялар, поликонфессионалды, конфессия аралық келісім, псевдодіни ағымдар, пікір таласу алаңы.

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О СОДЕРЖАНИИ КАЗАХСТАНСКОЙ ПОЛИТИКИ ДУХОВНОСТИ И ТОЛЕРАНТНОСТИ

Аннотация. После приобретения государственного суверенитета наша страна провозгласила себя светским государством, что было зафиксировано в Основном Законе Республики Казахстан. Наша страна является многоконфессиональным обществом, в котором религиозная толерантность выступает как приоритетная политика государства в области религии. Пропаганда вечной, безграничной, неизменной ценности ориентирована на внутренний мир человека, который определяет духовность современного казахстанского общества. В переходный период от одной системы государственного управления в другую, когда происходят социальные потрясения в любом обществе усиливается влияние религии на умы и сознание людей. Поэтому служители культа пытаются активно занять сложившийся вакуум в духовной сфере, ведут пропаганду религиозных воззрений. С момента появления человечества религия выступает носителем общечеловеческих ценностей, разнообразностью культуры. Все культурные сооружения, а также религиозно-философские произведения, церковные ритуалы и обряды, милосердие обогащают человечество, влияя на его внутреннее содержание. В соответствии с действующим законодательством в Казахстане религиозные объединения отделены от государства. Оно не может отдавать предпочтение какой-либо религии. Ситуация в сфере религии и межконфессиональных отношений за последние два с половиной десятилетия значительно изменилась.

Ключевые слова: глобализация, государство и религия, религиозная проблематика, религиозная этика, религиозная экспертиза, конфессии, поликонфессионализм, межконфессиональное согласие, псевдорелигиозные течения, диалоговая площадка.

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ECONOMIC ASPECTS OF THE HOUSING FUND MODERNIZATION MECHANISM

Abstract. In contemporary municipal housing service economy extra-budgetary resources acquire an important role in revitalization and reconstruction of housing funds. The housing fund is considered as the main element of the sphere of housing and communal services. The international experience and the Kazakhstan practice of modernization of housing have been studied in the research. The relevance of the subject of the research both from an economic and ecological points of view has been substantiated. It turned out that significant part of researches on the modernization of housing fund is mostly associated with achieving an economic effect. Although the globalization processes taking place in the world emphasize the ecological aspect as well. The review of the state housing reform in Kazakhstan in the format of strategic development and implementation of the sectoral housing and communal program has been conducted. The experience of realizing the mechanism of housing fund modernization is considered on the example of the Communal maintenance of city residential buildings LPC in Atyrau from the beginning of 2011 to the present day. The activity of Communal maintenance of city residential buildings LPC in Atyrau allows us to study the financing mechanism and the stages of multi-storey houses renovation. A statistical analysis of the results of the work done has been carried out. The effectiveness of the target state program has been estimated. The research has identified problematic issues that hamper the more successful development of housing sector renovation.

The research has been executed within the framework of AP05134552 Project.

Keywords: modernization, urban economy, housing and communal services, housing fund.

Introduction. Modernization of the economy considered as a set of measures to achieve the economic growth is carried out through the improvement of all sectors of the economy. I. V. Makarova characterizes the modernization of the economy as a process of forming a modern model of the economy on the basis of innovative transformations, oriented to qualitative changes in society, corresponding to a new system of interests, values and priorities [1].

Over the years of independence, the economy of Kazakhstan has witnessed significant progress in the area of economic modernization through the phased implementation medium of the economic strategy and social targeted programs. The results of modernization are as follows:

- the country has developed a socially-oriented market economy;
- a powerful class of domestic entrepreneurs has formed;
- small and medium sized businesses have been successfully developing;
- the formation of the middle class is actively going on [2, 3].

Among the branches of the national economy and the sphere of services, housing and communal services have acquired a special role in social and economic life. On the one hand, the state of the housing and communal service sector provides parameters for the quality of life of the community; on the other hand, it represents the region's economic potential, which determines its investment attractiveness.

Economic development of housing and communal services is directly connected with the implementation of the housing policy of the country, which is of great importance for the construction industry, the economy and homeowners. English sociologists Tony Byrne and Colin F. Padfield believe that housing is the basic human need. The need for housing policy arises because of the fact that the state is now recognizing its commitment to decent housing for the population [4].

In Kazakhstan, with the development of market relations in the sphere of housing and communal services, the problem of attracting extra-budgetary sources for the renovation of the housing fund is becoming urgent. Modernization of housing fund is characterized by high capital intensity, a long duration of construction and low demand for new buildings because of the insolvency of potential buyers. These factors determine the efficiency of housing fund modernization by carrying out repair work with energy-efficient elements.

Methods. Conducting scientific research in the field of the economic aspect of the housing fund modernization mechanism was based on theoretical methods of cognition: analysis, induction and deduction. Also, a comparative and dialectical-logical approach was used in studying international experience of scientists in the field of housing fund renovation.

Research. According to the Russian scientist S. N. Larin, taking into account the inevitable growth of electricity tariffs in the near future, investing in energy conservation can be considered as one of the most profitable sources of investment from an economic point of view [5].

It should be noted that at present most of the research in the field of housing modernization is aimed at achieving an economic effect, although the growing scale of world production and consumption also emphasize the ecological aspect. In addition to the cost-effectiveness of implementing various technologies for energy-efficient modernization, environmental success is achieved, related to waste management and emissions [6, 7].

Scientists at the University of Leeds (UK) Malcolm Bell and Robert Lowe in their studies note the important role of energy efficiency modernization schemes in reducing CO₂ emissions; so 50% of improvements in the region can be achieved with a minimum cost [8].

Modernization can be carried out in various ways, but from the point of view of investors and apartment owners, special attention should be given to the problem of waste management and initial investment costs. Together with the principles of humanization, it is also necessary to comply with the aesthetic norms of architectural structures, based on the introduction of innovative approaches to increasing the efficiency of housing fund renovation [9, 10].

In fact, the modernization of housing and communal services in Kazakhstan has started with the implementation of the "Strategy 2020" Program, which marked the direction of the country's development to implement the economic breakthrough [11].

Program for Modernization of the Housing and Communal Services of the Republic of Kazakhstan has been developed since 2011 to improve the housing fund during 2011-2020. The priority was made on energy saving in housing and repair works to reduce the consumption of thermal energy [10].

Since 2014 modernization and repair work in the housing and communal services sector has been carried out within the framework of the Program for the Development of Regions until 2020, covering the renovation of the condominium facilities to provide comfortable living conditions, improve the state of the communal infrastructure and provide quality public services to the population [11]. At the same time, today the issues of housing fund modernization are regulated in accordance with the Law of the Republic of Kazakhstan "On Housing Relations", "Kazakhstan-2050" Strategic plan, "NurlyZhol" State Program for Infrastructure Development for 2015-2019 and other normative documents [12-18].

By 01.01.2018 the housing fund of Atyrau aggregate 1054 multi-storey apartment buildings, with a total area of 2,601,300 square meters, and 71 management bodies. There are 62 unfit houses with an area of 37,864 square meters, comprising 1.46% of the total area of the housing fund.

The Program for the Development of the Regions until 2020 in Atyrau is performed by "Communal maintenance of city residential buildings" LPC, established as a specialized organization with 100% state participation. The tasks of "«Communal maintenance of city residential buildings» LPC involve:

- proper maintaining of residential facilities and local area;
 - providing apartment owners with communal and other services;
 - protecting the interests of apartment owners as consumers of communal and other services and organizations;
 - cooperating with state and public organizations to ensure a standard of living
- Since 2013 multi-storey housing financing has been brought about according to the following mechanism (figure 1).

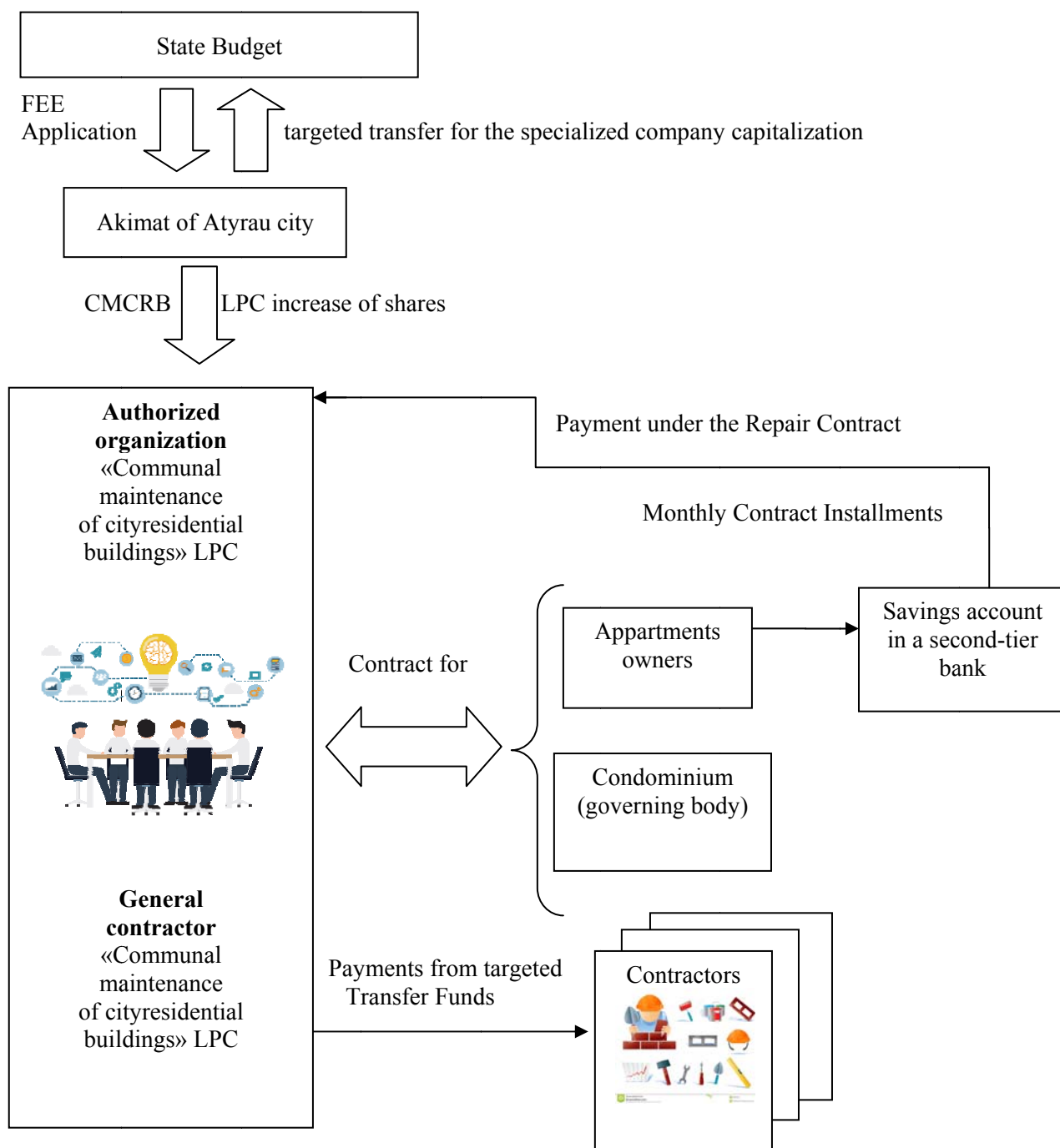


Figure 1 – Multi-storey houses Renovation financing mechanism

The fundamental principle in the successful modernization of multi-storey is to ensure the conscientious participation of all stakeholders: professional management by companies, quality work on the part of contractors and the active participation of apartment owners at each decision-making stage. The final product of the investment is capital repair of the housing fund, carried out in stages.

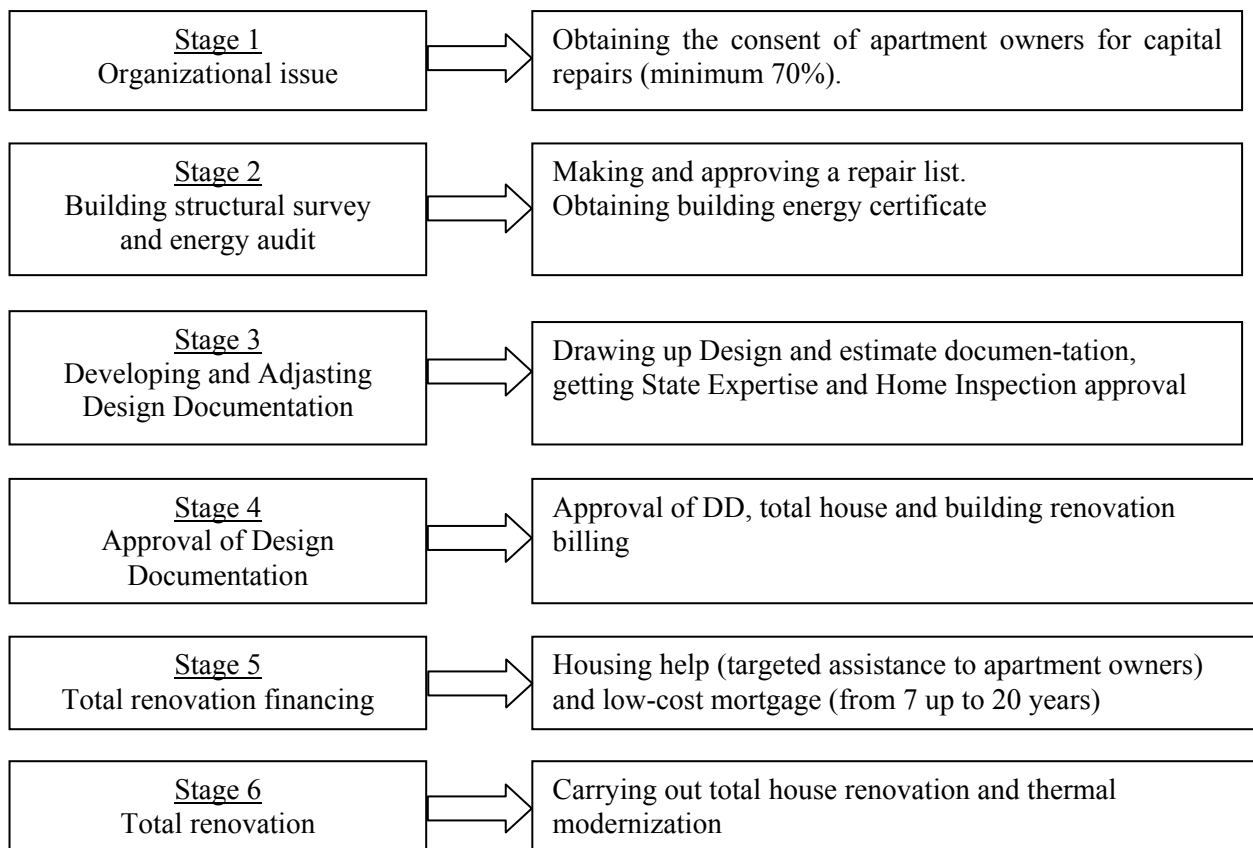


Figure 2 – Multi-storey houses repair and renovation stages

According to the information presented in figure 3, in 2011-2017, CMCRB LLP has implemented 10,306 million USD for repair works of the housing fund of Atyrau, allocated from the Republican budget 63% (2,215 millionUSD) and local budget – 21% (2,176 million USD), and on returnable funds – 16% (1,637 million USD).

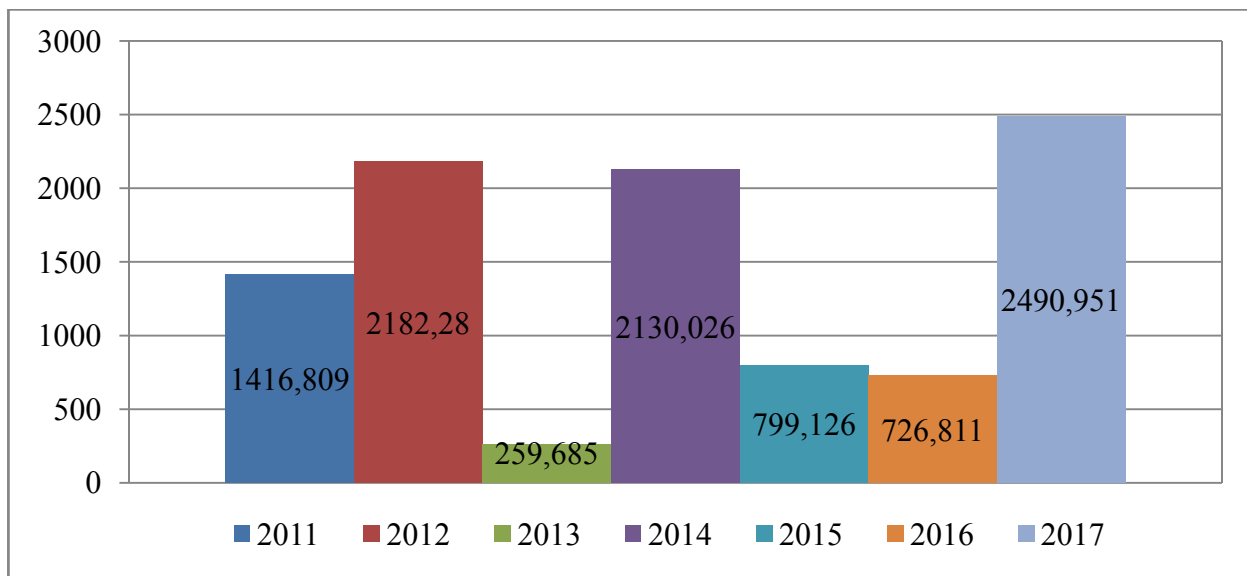


Figure 3 – Expenditures on multi-storeyapartments renovation in Atyrau city within 2011-2017, thousand USD

All investments covered current and capital renovation of houses. Within the period of 6 years (2011-2018) in Atyrau, 102 multi-storey houses have been repaired: 93 houses have totally renovated, 9 lifts have been replaced in 3 houses. 89 houses have undergone modernization on the funds allocated from the republican and local budgets of the region in Atyrau. For return funds in 2014-2017, 13 houses were repaired for the amount of 1,638 million USD (figure 4).

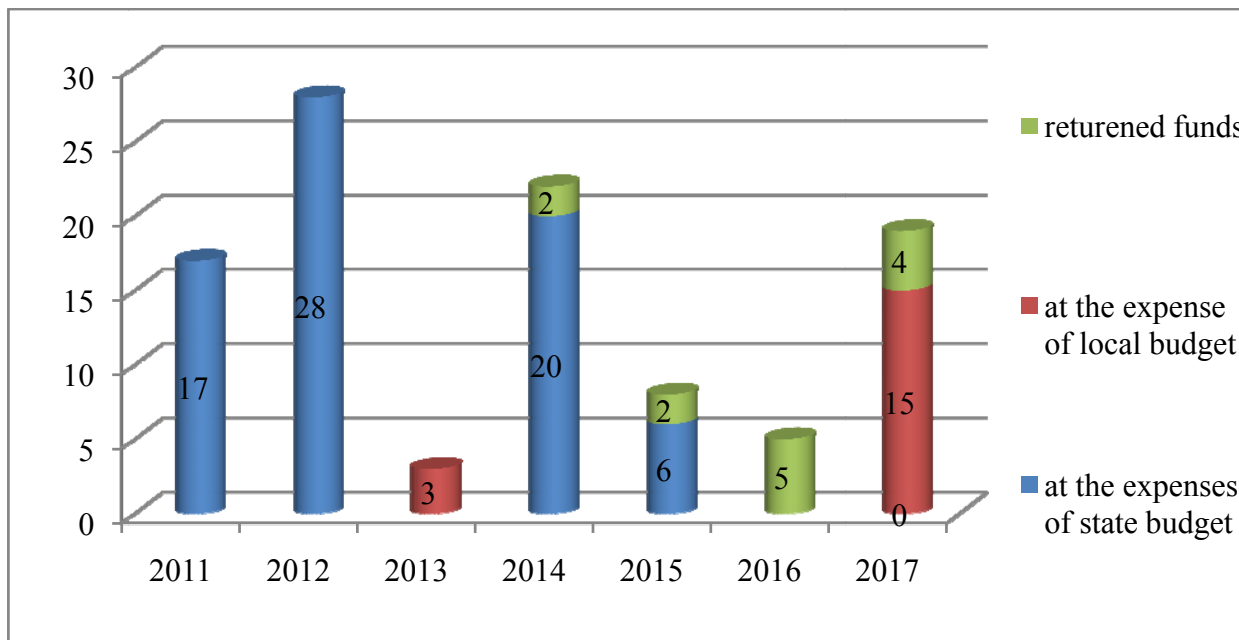


Figure 4 – Number of renovated multi-storey apartment houses in Atyrau city

According to the results of the 1st stage of the Regional Development Program up to 2020, the number of multi-storey houses, requiring repairs decreased from 35.3% in 2011 to 30.6% in 2015. (figure 5).

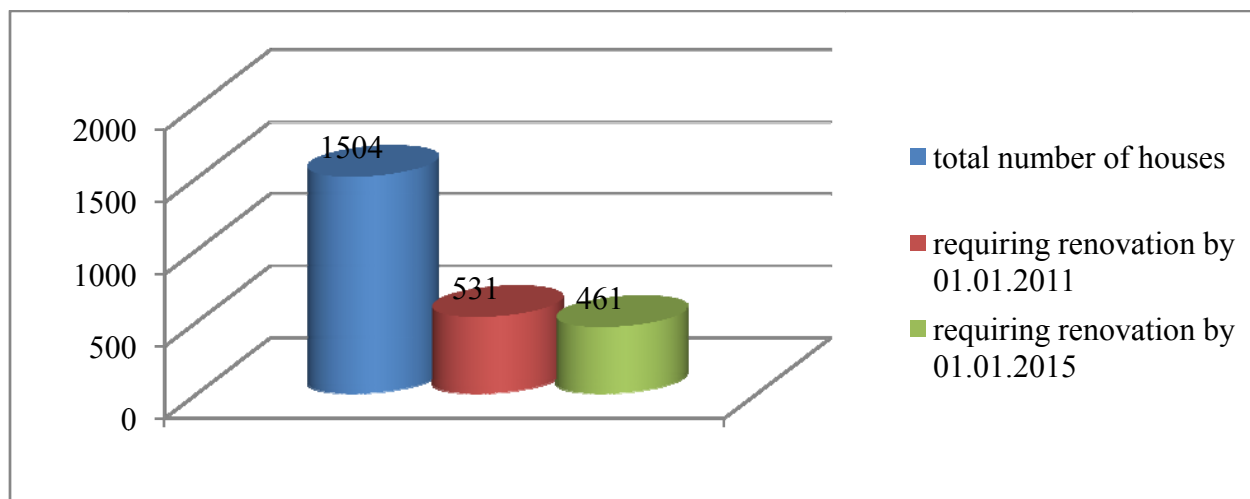


Figure 5 – Number of houses requiring renovation in Atyrau city

After ranking, according to table, you can see that Communal Maintenance of City Residential Building” LPC in the period of 2011-2017 mainly carried out the modernization of the housing fund of 1973-1982 years of construction (46%).

In 2018, 1,310 million USD from the local budget is planned to allocate for the renovation of 8 multi-storey houses, as well as the design and estimate documentation for 18 houses (replacement of elevators for 6 houses, major renovation of 12 houses).

Information about multi-storey houses of Atyrau underwent repairs and modernization within the period of 2011-2017*

Year	Year of Houseconstruction						Total
	1953-1962	1963-1972	1973-1982	1983-1992	1993-2002	2003-2012	
2011	3	5	4	4	1	–	17
2012	1	4	12	5	1	5	28
2013	–	–	–	–	–	3	3
2014	–	2	15	4	1	–	22
2015	–	1	3	2	1	1	8
2016			3	2			5
2017	–	2	10	5	2		19
total	4	14	47	22	6	9	102
*Made by author [7].							

Discussion of results and conclusion. One of the main problems of multi-storey housing fund modernization in Atyrau is a low return on funds at the beginning of the Project implementation. So, in 2013, only 13% of investments made by the state were returned, caused were disagreements on the part of apartment owners on the nature of the work performed. Multi-storey houses owners did not anticipate comments on repairs in making the preparation of a defective act and the adoption of a collective decision on the cost of funds. In connection with this, the akimat of the city held various explanatory and operational measures for the return of public funds. So, as a result of the work done in the period from 2013 to 2017, 1594 suits were filed with the judicial executive bodies, a positive decision was taken against 1,047 claims, 547 lawsuits are in progress. By January 1, 2018, residents of the renovated houses returned 2,172 million USD, that is, 63.5% of the invested 3,27 million USD.

During the research, a number of problems have been identified that can be divided into two groups: economic and non-economic. The economic group includes issues related to economic content:

- lack of a uniform methodology for the economic feasibility of targeted programs for the existing housing fund reconstruction;
- the absence of an insurance field against possible risks for all entities of interaction on housing fund renovation: 1) the state from the non-returned invested subsidies; 2) potential investors on guaranteed return on investment; 3) apartment owners on qualitative repair works;
- lack of a competitive environment.
- the non-economic group of problems includes legal, ecological and aesthetic problems:
- shortcomings in the mechanism of legal regulation;
- the need for mandatory regulation of the environmental characteristics of the technologies used in housing funds renovation;
- expansion of the life cycle, improvement of the functional and spatial characteristics of the project for housing funds renovation

In general, modernization of the multi-storey housing funds in Atyrau together with the thermal modernization of problematic apartment houses have contributed to the urban housing fund aesthetic aspect. Moreover, the duration of their service has been extended, and their commercial attractiveness in the real estate market has increased.

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ТҰРҒЫН ҮЙ ҚОРЫН ЖАҢҒЫРТУ МЕХАНИЗМІНІҢ ЭКОНОМИКАЛЫҚ АСПЕКТІЛЕРІ

Аннотация. Қалалық шаруашылықтың қазіргі заманғы экономикасында тұрғын үй қорын жаңарту және ұдайы жаңғырту үшін бюджеттен тыс көздерді тарту мәселесі маңызды болып табылады. Тұрғын үй қоры тұрғын үй-коммуналдық шаруашылық саласының негізгі элементі ретінде қарастырылады. Тұрғын үй қорының ұдайы жаңғыртылуының халықаралық және қазақстандық тәжірибесі зерттелген. Зерттеу құралының экономикалық және экологиялық тұрғыдан өзектілігі негізделген. Тұрғын үй қорын жаңғырту бойынша маңызды зерттеулердің экономикалық тиімділік жетістіктермен байланыстылығы анықталған. Алайда дүние жүзінде орын алған жаһандану үдерістері экологиялық көріністің де маңыздылығына айрықша көңіл бөледі. Қазақстандағы мемлекеттік тұрғын үй реформасына стратегиялық даму және салалық тұрғын үй-коммуналдық бағдарламасын іске асыру ауқымында шолу жүргізілген. Тұрғын үй қорын жаңғырту тетігін жүзеге асыру тәжірибесі Атырау қаласындағы 2011 жылдың басынан бастап бүгінгі күнге дейінгі «Қаланың тұрғын үй коммуналдық шаруашылығы» ЖШС мамандандырылған уәкілетті ұйым мысалында қарастырылады. «ҚТҮКШ» ЖШС мысалында, Атырау қаласындағы көп пәтерлі тұрғын үйлерді жөндеу сатылары мен оларды қаржыландыру тетігіне зерттеулер жүргізілген. Жүргізілген жұмыстың нәтижелеріне статистикалық талдау жасалынған. Мақсатты мемлекеттік бағдарламаның нәтижелілігіне баға берілген. Зерттеу барысында тұрғын үй секторын жаңғыртудың табысты дамуына кедергі келтіретін күрделі мәселелерді анықтауға болады.

Зерттеу АР05134552 ғылыми жоба шеңберінде өткізілді.

Түйін сөздер: жаңғырту, қалалық шаруашылық, тұрғын-үй шаруашылығы, тұрғын үй қоры.

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ЭКОНОМИЧЕСКИЕ АСПЕКТЫ МЕХАНИЗМА МОДЕРНИЗАЦИИ ЖИЛИЩНОГО ФОНДА

Аннотация. В современной экономике городского хозяйства важное значение приобретает проблема привлечения внебюджетных источников для обновления и воспроизводства жилищного фонда. Жилищный фонд рассматривается как основной элемент сферы жилищно-коммунального хозяйства. Изучен международный опыт и казахстанская практика воспроизводства жилищного фонда. Обоснована актуальность предмета исследования как с экономической, так и с экологической точки зрения. Выяснилось, что значительные исследования по модернизации жилищного фонда, связаны с достижением экономического эффекта. Хотя происходящие в мире глобализационные процессы подчеркивают и экологический аспект. Проведен обзор государственной жилищной реформы в Казахстане в формате стратегического развития и реализации отраслевой жилищно-коммунальной программы. Рассмотрен опыт реализации механизма модернизации жилищного фонда на примере специализированной уполномоченной организации по г. Атырау ТОО «Коммунальное обслуживание жилых домов города» с начала 2011 года по сегодняшний день. На примере ТОО «КОЖДГ» г. Атырау изучен механизм финансирования и этапы проведения ремонтных работ многоквартирных жилых домов. Проведен статистический анализ результатов проделанных работ. Оценена результативность целевой государственной программы. В ходе проведения исследования возможным обозначить проблемные вопросы, сдерживающие более успешное развитие воспроизводства жилищного сектора.

Исследование проведено в рамках научного проекта АР05134552.

Ключевые слова: модернизация, городское хозяйство, жилищно-коммунальное хозяйство, жилищный фонд.

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SETTLEMENT OF THE LATE BRONZE AGE IN KARZHANTAU FOOTHILL

Abstract. The settlement of the Bronze Age – Burgulyuk is located 50 km to the south-east from Shymkent, near homonymic natural landmark of the north-west slopes of Karzhantau range in South Kazakhstan oblast.

According to the settlement excavation materials, there are fixed two large settling periods, matching by their chronological frames with the first stage of Tashkent oasis Burgulyuk culture – IX-VII centuries B.C., that is also synchronous with the monuments of Central Kazakhstan, Zailiysky Alatau and Semirechye of that time.

The peculiarity of the found ceramic material, its distinctive features from synchronous crops, lead to the idea that we are dealing with a new type of pottery of the late bronze age, which we propose to call Karzhantau.

The originality of the found ceramic material, its distinctive features from synchronous in time cultures, lead to the idea that we are dealing with a new type of pottery of the Late Bronze Age, which we propose to call Karzhantau.

Keywords: culture, chronology, ceramics, vessel, settlement, Bronze Age, excavations, stratigraphy.

In due time, V.M. Masson, studying the origins of the urban culture of Central Asia, wrote: “New materials with more and more persuasion show that the origins of the urbanization process in Central Asia, at least in its southern regions, should be searched in the monuments of the Bronze Age. From our viewpoint, we can speak about two epochs in the urbanization of Central Asia – the ancient oriental (the end of III – middle of I millennium BC) and antique (III century BC – IV century AD)”. [Masson V.M., 1974, p. 6].

V.M. Masson determined the chronology of the initial stage of the urbanization, analyzing materials of the monuments of the Bronze Age of southern regions of Central Asia, such as, Namazga-Depe, Altyn-Depe, Yas-Depe, Sapallitepe, etc. and found their ancient oriental roots. Note that the question was about the territory of Amu-Darya basin.

In the studied area of the right bank of Syr-Darya, we have discovered a settlement of the Bronze Age, which, undoubtedly, is the first stage in the urbanization of Ispidzhab historical-cultural district of South Kazakhstan.

The settlement of the Bronze Age was discovered in the course of the exploration of Burgulyuk-2, the burial ground of the Early Iron Age, located 50 km to the south-east from Shymkent, near homonymic natural landmark of the north-west slopes of Karzhantau range in South Kazakhstan oblast. At that time, in 2002, during excavation of the mounds, as well as in the course of overtures in several burial mounds, we found fragments of ceramics characteristic of the Bronze Age. On this basis, we assumed that there was overlaying of the Early Iron Age burial mounds on the earlier one [Baitanayev B.A., 2002, p. 249-251]. However, later during the desk reviews we found out that the burial mounds were constructed on the territory of the Bronze Age settlement, soil taken from this settlement was also used for their mounds.

In 2003, 7 excavations were deliberately laid on the territory of Burgulyuk-2 burial ground to identify occupation layers of the Bronze Age settlement. In the course of the archeological works, we revealed remaining structures of the settlement. Also, an element of a dwelling of the Bronze Age with round planning was revealed on the western edge of the burial ground near 10th burial mound [Baitanayev B.A., et al., 2004].

The excavations conducted on the settlement showed that the southern part of the natural chain with the monument was settled very intensively.

Two large periods of the settlement functioning are clearly fixed. In the first stage, people erected their dwellings using traditional many years' building experience of their ancestors. At first, they excavated foundation pits of corresponding sizes, which walls were stoned in several rows. Then, apparently, walls of framed type, which were covered by roof, were erected.

In the course of the excavations, we defined the character of the blockwork, remained on some sections at a height of four stone rows (about 60 cm). They were lined with the observation of certain regularities. Thus, in the southern part, the blockwork looked as follows: the row of rolled stones (boulders) was on the underside, they were covered by large flattened stones. Then there was again the row of boulders, which, in its turn, covered the flattened stones.

Judging by remains of the walls, we revealed sizeable house, where outlined four rooms.

Second dwelling, revealed under the 10th burial mound, as against the described above, had round planning. In the course of the opening, we determined that the revealed sangar is spread by the north-south line and consists of 4 rows of large river boulders. The boulders from the sangar have various sizes. The overall length of the revealed wall remains is about 1.5 m, width – 0.5 m, height – 0.5 m. The last one is a part of the dwelling by 1.42 m width, however, the northern wall of the dwelling was lost. The floor level is lowered in the western direction. Near the wall, we cleared bones of animals and small fragments of ceramics. Also, a fragmented boat-shaped grain bruiser of a small size was found on the floor level. The floor surface was covered by separate accumulations of coals and globs of iron clay. Possibly one more dwelling was joint to this structure in the south.

Explorers of kulusay culture of the Late Bronze Age, separated on the territory of mountainous areas of Northern Tien Shan, note certain regularity in the selection of the habitation place, characterized by the arrangement of settlements on the verge of forest area and Alpine meadows [Mar'yashev A.N., Goryachev A.A., 2001, p. 121]. In this context, settling of piedmont slopes of Karzhantau with rich timber reserves in the Late Bronze Age is entirely regular. To a certain degree, selection of the habitation place for this settlement is similar to settlements of kulusay type.

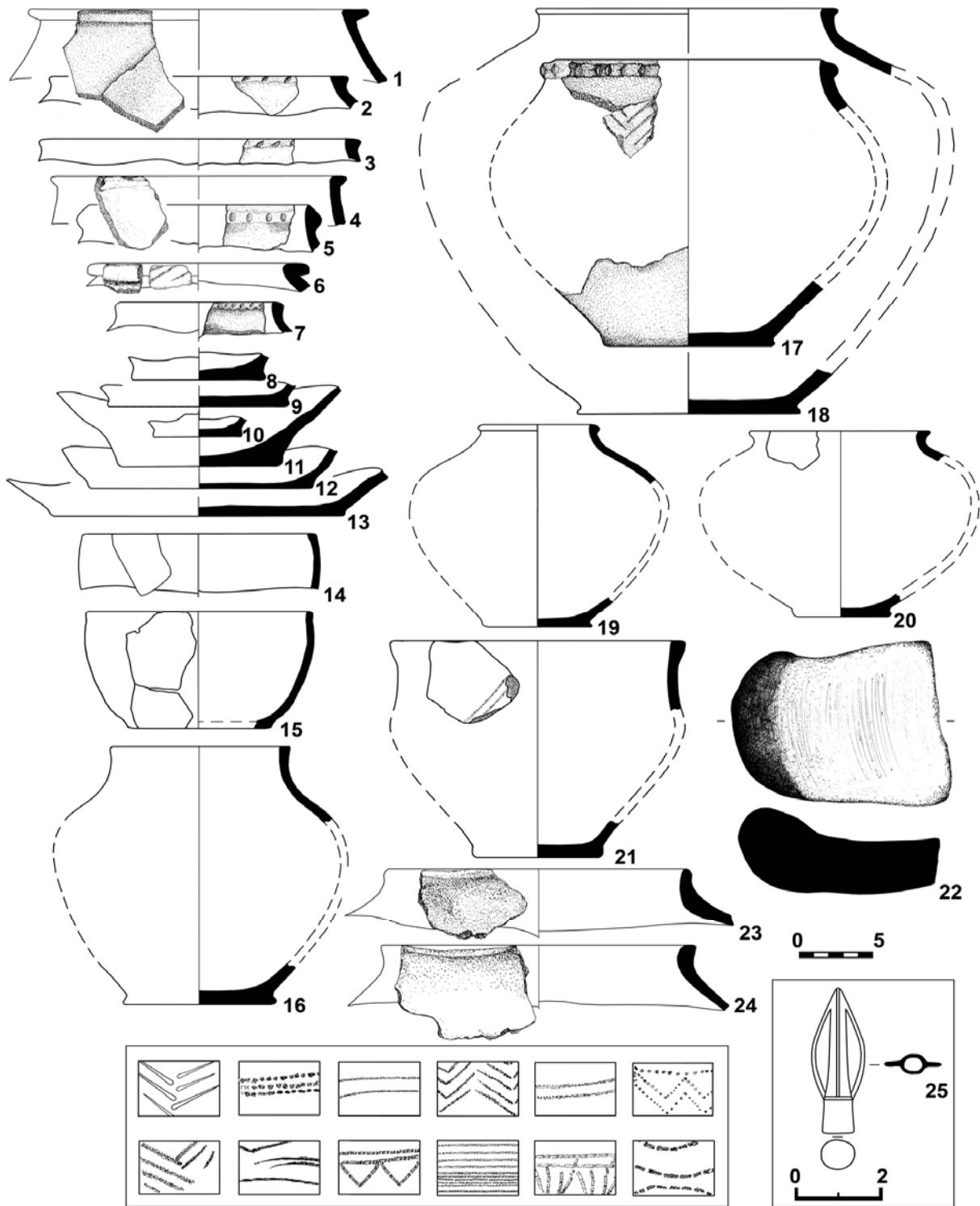
Our settlement is located so, that it is surrounded by mountain offshoots from three sides, protecting it from the northern-eastern winds prevailing in winter. Availability of water sources and heavy grass stand, allowing graze cattle from the middle of spring to the middle of autumn, made it convenient for cattle breeding, which apparently formed the basis of household. Cattle, judging by findings of bones, consisted of small and great cattle. However, crop farming also had specified value. Findings of the grain bruisers' pieces (figure 22) give evidence of cereal cropping, most likely, by boharic method. At the same time, only limited areas, irrigated at the expense of small canals, can be used under the crop farming. The crop farming, probably, had secondary character, but not general one. The settlers were also engaged in weaving and used for that spindle whorls, turned from walls of vessels.

Ceramics, obtained in the place of settlement, was found only in fragments. It was formed without use of a potter's wheel by the ribbon method or by clay extrusion, heap firing. The paste was well washed and mixed. Broken shell rock, gypsum, and sometimes fine sand, were used as a thinning agent. Collars of all kinds of vessels were often decorated by crossed riffling (nail ornament) or lines, and surface – by comb-shaped, linear and pressed ornament, covered on the water-logged paste in the form of herringbone, rarely – zigzag. Surface of the most vessels was carefully polished and expressly glossed. By available forms, all the crockery can be divided into the following types:

Caldrons: the surface is usually smoked. Judging by available fragments, vessels had spherical or close to it form. Collar of a simple configuration is marked by a round, sometimes pulled out. Sometimes, the upper base of collars has a flat surface. Neck is short, bottom is flat, with a characteristic ledge in the near-bottom part. Vessels greatly vary by sizes: edge diameters consist from 13-14 cm to 33 cm and more.

Pots: by the quality of manufacture, sizes and forms hardly differ from caldrons, only surface has no traces of smoke.

Bowls: least of all meeting type of crockery. Strongly vary by sizes from 16-18 cm to 30 cm and more. A form of the collar is simple, it is like a simple continuation of the vessel wall. The thickness of fragments of large bowls achieves 1.2 cm.



Complex of findings of Karzhantau foothills Burgulyuk settlement

Spindle whorls: prepared from the vessel walls. Found in the main settlement of place of the settlement, existed under the 10th burial mound. Small by size spindle whorl, carefully dressed and decorated by rim by vertical lines, is of interest. Center of the circle was only traced by some sharp instrument, however, the hole was not drilled. It is not improbable that in this case, there was a prepared button, but not the spindle whorl, it was widely used by the tribes of the Late Bronze Age.

Similar crockery was found during construction of Tashkent channel, where it is defined by the Early Iron Age [Drevnyaya i srednevekovaya kul'tura Chacha, 1979, p. 10-16]. Related forms, ornament motives and methods of its application refer to the kulusay culture and presented in settlements Assy and Turgen in Zailiysky Alatau [Mar'yashev A.N., Goryachev A.A., 2001, figures 5, 28, 29, 47]. Very close resemblance has ceramics of our settlement with ceramics of Fergana kairakum culture, found in its time by B.A. Litvinskiy [Litvinskiy B.A., et al., 1962].

Ornamentation technique of the vessels consists of plain and comb-shaped stamp, scribed lines and cavities. The most of the vessels are formed by a tablet, which traces observed on the surface of ceramics. Some forms has flat upper base of the collars.

Some pots have strongly blown body and pass to the body from the straight neck (Figures 11, 16, 18- 20). Vessels of similar form were also found among complexes Assy and Turgen in Zailiysky Alatau, where such structure is explained by scientists by influence of Central Asia complexes [Mar'yashev A.N., Goryachev A.A., 2001, p. 118]. At the same time, some forms and ornament motives of ceramics found by us (especially decoration of the collar's ledge) have similarity with ceramics from Terenkara settlement, found in the northern edge of Almaty city, where it is dated by IX-VIII centuries BC [Grigor'yev F.P. *Arkhologicheskiye pamyatniki v raione g. Alma-Ata*. 1989, p. 218; Grigor'yev F.P., 1998, p. 261, 268; Samashev Z., et al., 2005, p. 19, 30-35]. From all of these complexes, ceramics from our settlement by its external characteristics more closely corresponds to the ceramics of kairakum culture. This, to our opinion, is confirmed by similar forms of crockery and absence of rounds under the collars, that cannot be said about other analyzed complexes. However, kairakum culture has less ceramics with riffling, which can be met in burgulyuk culture everywhere, that cannot be said about ceramics from Terenkara settlement, where there are similar riffling along the collar.

Ceramics of Burgulyuk settlement in Karzhantau foothill is synchronous with monuments of Zailiysky Alatau, lower reaches of Syr-Darya, Khoresm of the Late Bronze age, where it is dated by XI-VIII centuries BC and presented by Kulusay, Terenkara, Tagisken, Tazabagyab, Amirabad, Suyargan, Kairakum complexes.

Meanwhile, ceramics of dongal type, found on the territory of Central Kazakhstan* has amazing similarity with our ceramics. V.G. Loman, had studied it, noted similarity of this ceramics with materials of sargarinsky and alexeyevskaya culture and settlement of Obitochnaya 12 type. However, existing differences and specific characteristics of the dongal ceramics didn't allow the author refer it to the last one, this gave the researcher the opportunity to specify it as a separate culture [Loman V.G., 1987].

V.G. Loman dated the dongal ceramics as of VIII century BC, may be as the later one, relating with the transition time from the Late Bronze to the Early Iron Age. As the evidence, the author presented convincing conclusions, made on the basis of excavations of Kent settlement, where two dwellings with the dongal material, cut alexeyevsky-sergansky ash hole, were studied [Loman V.G., 1987, p.128].

Burgulyuk settlement ceramics studied by us, by its external characteristics is close to the dongal type ceramics, and at the same time has its own distinctive features, such as absence of diagraphic band in the bottom of neck, stuck horizontal and obliquely placed collar, pearly ornament. At that, in separate cases, collar of large vessels is pulled out, having the form of a triangle in section, which is almost always ornamented by cuts, lateral lines or nail pressing.

The dating, offered by V.G. Loman, on the dongal ceramics, in general matches with the dates of our settlement, by which we consider the time of its functioning IX-VIII centuries BC or IX-VII centuries BC. This proves, in our opinion, found under the 10th burial mound and stratigraphically connected with our settlement bronze arrow head (figure 23). The arrow head is solid, with a longitudinal joint on a nervure. It has flaring sleeving with hole, apparently from missing thorn (?).

Similar bronze arrow heads have analogues and wide geography among monuments of the Late Bronze Age. K.A. Akishev dates them as of IX-VIII centuries BC and connects with dandybay-begazinsky period [Akishev K.A., Kushayev G.A., 1963, p. 117-118]. B.A. Litvinskiy notes their spread in XII-VII centuries BC from Caspian Sea region to the borders of China and to the south to India including [Litvinskiy B.A., 1972, p. 91-92]. In more detail, similar arrow heads were studied by N.A. Avanesova.

*Taking the opportunity, I express appreciation to V.G. Loman, consulted us by the question of chronology and classification of the dongal type ceramics.

Studying bronze arrow heads on a large factual material, the scientist refers solid sleeve arrow heads to the third group and fairly notes that this type differs by "... amazing variety of forms and sizes of sheet and filling". Comparing this type of the arrow head with accompanying items from bronze, dated by XII-VIII centuries BC, she notes that these arrow heads generally originate from monuments of the Late Bronze Age with roller ceramics [Avanesova N.A., 1991, p. 40-43]. At the same time, we should note that similar bronze arrow heads with long sleeving lived to see the Early Scythian Age. S.V. Kuz'minykh, for instance, studying metallurgy of Volga-Kama, noted them in complexes of VII-VI centuries BC [Kuz'minykh S.V., 1983, p. 104, 204]. In Central Kazakhstan, among materials of tasmolinsky culture, they are also dated by VII-VI centuries BC [Vishnevskaya O.A., 1992, p. 133-134, 402]. Similar arrow heads, dated by the Early Saka period, meet among complexes of South Tagisken, Uigarak [Itina M.A., 1992, p. 41, 354].

In our opinion, it is pertinent to note here about features of the roller ceramics of the Bronze Age, which was actively studied in other historical-cultural areas.

Ye.N. Chernykh separated integrated cultural-historical similarity of the roller ceramics. Its origins he sees in the cultures of "Thracian" area. This similarity, in his opinion, involves in the late stage Central Asian monuments Yaz-1, Tillya-tepe of Afganistan and Amirabad monuments of Aral Sea region [Itina M.A., 1998, p. 87].

M.A. Itina spoke out against this opinion. She thinks that in terms only of the roller presence, we cannot unite in the integrated similarity different cultures, which are not correlated in general by other features. In her opinion, rollers under collars were more developed in the cultures of developed bronze (XIII-XII centuries BC) and connected with the Fedorov component. In Amirabad complexes, it is transformed, merging with the collar and becoming the neckband [Itina M.A., 1998, p. 87].

In earlier works, M.A. Itina, analyzing materials of Amu-Darya lowers, spoke that the roller directly under the collar and the roller as a diagraphic band in the bottom of a vessel neck appeared out of step. She thinks that the diagraphic band in the bottom of a vessel neck appeared later, close to the end of the Bronze Age culture [Itina M.A., 1977, p. 143-144].

Summarizing her conclusions, M.A. Itina comes to the point that roller in ceramics, probably, is an epochal phenomenon, connected with "trend", but not with the integrated cultural-historical similarity [Itina M.A., 1998, p. 88].

Researchers of steppe zone monument think that activity of Andronovo tribes in the second half of II millennium BC generally passed in a dry xerothermic period [Sal'nikov K.V., 1967, p. 326-327]. This forced them to look for new forms of farm management and seizure of new territories.

As for this, M.A. Itina, studying culture of South Aral sea region steppe tribes, noted that infiltration process of Andronovo (Alakul) and cut down tribes from different habitation districts into the environment of Central Asian people happened daily during all second half of II millennium BC and reflected on their culture variously [Itina M.A., 1977, p. 232]. Namely Andronovo tribes, overlapping the local Central Asian cultures, transformed into tazabagyat culture.

By opinion of B.A. Litvinskiy, a part of the cut down-Andronovo tribes, moving in more eastern direction, reaching Tashkent oasis and Fergana, in close relation with south cultures of painted ceramics, mixing with tribes of chust culture in the late stages, composed kairakkum culture [Litvinskiy B.A., 1981, p. 157]. At that, Tashkent oasis was periphery of karakkum culture, after which in the East to Semirechye including, other grouping of the steppe bronze tribes begins [Litvinskiy B.A., et al., 1962].

V.I. Sarianidi thinks that origins of the chust culture of Fergana and culture of its neighboring districts throw back to the archeological complexes as Tillyatepe of Afganistan and Khorasan. He thinks that the southern Central Asian and northern Afghan monuments represent general culture unity, expressed both in material culture, and monumental art of building. The main range of the painted ceramics culture spread is defined by V.I. Sarianidi from the end of the Caspian Sea and Kopetdag foothill to Fergana valley including [Sarianidi V.I., 1989, p. 40-42].

Slightly differently this question is interpreted by Kh. Duke, studied burgulyuk culture of Tashkent oasis, which origins throw back into the similarity of cultures of round-bottomed dyed ceramics of the Bronze Age. To his opinion, change of the steppe civilization tribes to the sedentary life couldn't help implying the culture of local citizens, that resulted in transformation of the steppe tribes' culture and formation of burgulyuk culture [Duke Kh., 1982, p. 89].

Probably, we must admit this assertion, as in the following periods there is everywhere observed absence of materials obviously ponderable to the steppe bronze. This suggests the change in traditions of the ceramic production of the last in the whole.

The complication is also that in the studied district, as well as in Tashkent oasis, where burgulyuk culture was found, burial monuments of the Late and Final Bronze Age both of burgulyuk culture and steppe look have not been found up to this day. Emphasize: the Late and Final period.

Studied burial grounds of South Kazakhstan of the Bronze Age Tautary [Maksimova A.G., 1962.], Sherbay [Smagulov Ye.A., Baratov S.R. 2001, p. 322] are dated by the earlier Fedorov stage. This dating, according to the last calibrated radiocarbon determinations, refers to XVI-XIV centuries BC [Smagulov Ye.A., Baratov S.R., 2004, p. 81]. At the same time, the dating of synchronous monuments of Tien Shan foothill (Assy-1, Turgen-2) using natural scientific methods, determined their chronological scale as XI-VII centuries BC, XII-IX centuries BC [Mar'yashev A.N., Goryachev A.A., 2001, p. 121].

Probably, absence of burial grounds of this period both in Tashkent oasis and Ispidzhab historical-cultural district, is explained, first of all, by the mere burial ceremony of tribes of that epoch, which could significantly differ from the earlier period, having ways of cineration or setting of dead bodies. This was the time of formation of Zoroastrian cultic-ritual practice in Central Asia, when Turanians and Iranians of Avesta everywhere changed to setting of their deceased relatives and cleaning of their bones.

Settlements of Tashkent oasis burgulyuk culture are located in river valleys, lowers, fens, loessial cusps and along-shore. Three types of dwellings are characteristic for this culture: 1) hasty structures of shelter type; 2) oval or round mud huts of small size, to 22 square meters; 3) mud huts of large sizes with divisions with obvious signs of many rooms' house [Buryakov Yu.F., Koshelenko G.A., 1985]. Materials of Burgulyuk-II stage were noted by scientists in bottom layers of such monuments as Shashtepe, Kaunchitepe, Kulakchin tepe, etc.

Chronology of burgulyuk culture in due time was offered by A.I. Terenozhkin. He separated there two stages: first – Burgulyuk-1 of VI-IV centuries BC and second – Burgulyuk-2, overlapped by materials of kaunchi culture of III-II centuries BC [Buryakov Yu.F., 1982, p. 69].

Kh. Duke, studying tuyabuguz settlements of Tashkent oasis burgulyuk culture, using the large factual material, dated IX-VII centuries BC that undoubtedly indicates on neighboring staying of settlers of the studied by us settlement of the Late Bronze Age. The researcher at that noted that there is a chronological gap between burgulyuk and kauchi cultures [Duke Kh., 1982, p. 90-93].

Yu.F. Buryakov admits this chronological scale not completely. In general, sharing the opinion of A.I. Terenozhkin, he thinks that besides chust-eilat component, saka component played substantial role in formation of burgulyuk culture [Buryakov Yu.F., 1982, p. 69].

A.I. Terenozhkin admitted opinion of Yu.F. Buryakov [Drevnyaya i srednevekovaya kul'tura Chacha, 1979, s. 22, 23]. Taking into account all arguments, Yu.F. Buryakov divided Tashkent oasis burgulyuk culture into two stages: first – IX-VII centuries BC and second – VI-III centuries BC [Buryakov Yu.F., 1982, p. 70].

This is the chronology of Tashkent oasis burgulyuk culture from the moment of its origin in IX century BC to its outgrowth in III century BC into kauchin one.

Not accidentally, we quoted above the chronology of Tashkent oasis burgulyuk culture. Culture of the ancient Ispidzhab developed synchronously with the nearest neighboring historical-cultural district of Tashkent. Certainly, trade relations existed between these historical-cultural districts since the ancient time. The evidence of this is some collars (figures 23, 24) of the crockery from our settlement, which find direct analogues in Burgulyuk-1 complex. They, as well as tuyabuguz one, are coated by dark-brown, almost black color. All this is indicative of the fact that habitants of the Bronze Age settlement, studied by us, had long standing ethnic-cultural relations with the tribes of Tashkent oasis burgulyuk culture and existed with them synchronously*. However, for the moment, settlements of Tashkent oasis burgulyuk

*According to archeological materials, the ethnic-cultural relations between tribes of the steppe bronze and round-bottomed dyed ceramics are also observed in other districts of Tien Shan. For example, a complex of Terenkara settlement ceramics, found by F. Grigor'yev in the suburbs of Almaty, besides plane-bottomed pot-type form crockery, characteristic for the final period of the Bronze Age, also contained round-bottomed vessels with painting by red paint in the form of zigzags and triangles, having analogues in the materials of Central Asian painted ceramics. In more details, see: [Grigor'yev F.P. *Arkhelogicheskiye pamyatniki v raione g. Alma-Ata*, 1989, p. 218; Grigor'yev F.P., 1998, p. 261, 268; Samashev Z., et al., 2005, p. 19, 30-35].

culture have not been found on the territory of the studied district, though, such settlements, judging by presence of the material, should exist.

The Late Bronze Age settlement, studied by us in the natural landmark Burgulyuk of Karzhantau foothills, coincides by its chronological frames with the first stage of Tashkent oasis burgulyuk culture. According to the chronological scale of Kh. Duke – IX-VII centuries BC, it is also synchronous with the monuments of dongal type of Central Kazakhstan, kulusay culture and Terenkara settlement of Zailiysky Alatau, etc.

The distinctiveness of the found ceramic material, its differential peculiarities from the synchronous by the time of cultures, result in the fact that we deal with the new type of the Late Bronze Age ceramics, which we offer to name as Karzhantau one.

Continuing thoughts of V.G. Loman that possibly the monuments of obitochensky type in the west and dongal one in the east outlined the boundary of the cultures' similarity of the transition period from the bronze of the iron age [Loman V.G., 1987, p. 128], note the possibility of expansion of these boundaries to the south to Tien Shan including. In our opinion, this is convincingly demonstrated by materials of the studied by us settlement. At that, the question on specific ways of contacting and interaction of cultures of people of Karzhantau foothills with the neighboring districts of the Late Bronze Age, with carriers of the round-bottomed painted ceramics, which similar fragments noted in the complex of ceramics of Ispidzhab's Burgulyuk settlement, remains actual.

The similarity of this relation, population density scales at the northern-western slopes of Tien Shan in the Late Bronze Age, shall be shown by the following research, which shall determine the accuracy of our conclusions.

Archeological research of Karzhantau type ceramics' carriers continues...

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ҚАРЖАНТАУ БӨКТЕРІНДЕГІ КЕЙІНГІ ҚОЛА ДӘУІРІНДЕГІ ҚОНЫС

Аннотация. Қола дәуірінің қонысы – Бүргелік Шымкент қаласынан 50 км. оңтүстік-шығыста, Оңтүстік Қазақстан облысына қарасты Қаржантау жотасының солтүстік-батыс баурайындағы Бүргелік деп аталатын шатқалда орналасқан.

Қонысқа жүргізілген қазба жұмыстарынан табылған материалдар бойынша өмір сүруінің екі ірі кезеңі анықталды. Өзінің хронологиялық шеңбері бойынша Ташкент алқабындағы бүргелік мәдениетінің бірінші кезеңі – б.з.д. IX–VII ғ.ғ., сонымен бірге осы уақытқа жататын Орталық Қазақстан, Іле Алатауы мен Жетісу ескерткіштеріне сәйкес келеді.

Табылған қыш бұйымдар, оның сол уақыттағы басқа да мәдениеттерден өзіндік ерекшеліктері кейінгі қола ғасыры керамикасының жаңа түрі, қаржантаулық деп ұсынуға болатын пікірге алып келді.

Түйін сөздер: мәдениет, хронология, керамика, ыдыс, қоныс, қола ғасыры, қазба, стратиграфия.

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ПОСЕЛЕНИЕ ЭПОХИ ПОЗДНЕЙ БРОНЗЫ ПРЕДГОРЬЕВ КАРЖАНТАУ

Аннотация. Поселение эпохи бронзы – Бургулюк расположено в 50 км к юго-востоку от Шымкента у одноименного урочища северо-западных склонов хребта Каржантау Южно-Казахстанской области.

По материалом раскопок поселения, фиксируются два крупных периода обживания, совпадающих по своим хронологическим рамкам с первым этапом бургулюкской культуры Ташкентского оазиса – IX-VII вв. до н.э., что также синхронно с памятниками Центрального Казахстана, Зайлийского Алатау и Семиречья этого времени.

Своеобразие найденного керамического материала, его отличительные особенности от синхронных по времени культур приводят к мысли, что мы имеем дело с новым типом керамики позднебронзового века, который предлагаем назвать каржантауским.

Ключевые слова: культура, хронология, керамика, сосуд, поселение, бронзовый век, раскопки, стратиграфия.

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INFLUENCE OF INTEGRATION PROCESSES ON THE DEVELOPMENT OF THE LEGAL SYSTEMS OF THE COUNTRIES OF CENTRAL ASIA

Abstract. Development of the modern legal integration expresses in convergence of legal families, both through development of international law, and through processes of regional integrations and interactions. However, it is necessary to mark that an entity of legal processes of the modern legal integration express, eventually, in convergence and integration at the level of specific legal systems of the states. Process of evolutionary development of law at the real stage, in the entity, is process of convergence of legal systems. The most important legal processes of legal integration are, first of all, harmonization of law, which defines the main direction of deformation of legal systems and also unification (assimilation) of law, legal expansion (or absorption), reception of law, etc. In this article the processes of a dimple integration of the legal systems of the countries of Central Asia in the Eurasian economic space are researched. The model of equivalent cooperation of the people, which reached the high level of consciousness and the civilization, and movable by aspiration to approve social and international peace and harmony of the people, is considered. The scale crisis response measures of the state aimed at restoration of sure rates of economic growth and support of strong social warranties to all population are studied.

Keywords: integration processes, the states of Central Asia, internationalization of the legislation, harmonization of law, legal mechanisms of regulation of integration, unification of law, emulation of law, legal expansion, reception of law, legal annihilation.

In the modern world some ideal model of building of the legal system of the states is developed. Each state has its own unique model. 26 - year experience of the Republic of Kazakhstan, since the independence, is based on the public image of sustainable development. An important role in the formation of the legal systems of Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan play mentality, socio-economic and political conditions, cultural factors and integration processes. According to the opinion of the Prof. A.Kh.Saidov, “it is predetermined by the system of values and target orientation, national traditions and historical conditions, socio-economic and political environment, the established way of life and worldview of people, including religious beliefs, psychology, and norms of behavior” [1, p. 39]. Both Kazakh and Uzbek, Kyrgyz, Tajik and Turkmen model of the legal system related to the Romano-Germanic legal family. In Kazakhstan, the Declaration of state sovereignty (independence) was adopted in October 25, 1990; in the Republic of Uzbekistan, in June 1990, and in Kyrgyzstan, in August of the same year. As for the Supreme Laws of the three republics, in Kazakhstan the first sovereign Constitution was adopted in January, 28, 1993, and two years later, in August, 30, 1995, during the national referendum was adopted the current Constitution of the Republic of Kazakhstan. The Constitutional law in October 7, 1998 has been introduced 19 amendments on the presidential term, the term of office of Houses of Parliament, the Senate and the Majilis, etc.

The Constitution of the sovereign Uzbekistan was adopted in 1992. A.Kh. Saidov convinced, that “in contrast to the Soviet basic laws the new Constitution of Uzbekistan does not have the dominance of Eurocentric constitutional regulation, but there is a reasonable account of the rules of civil society, the separation of powers, the system of checks and balances of power inherent in the democratic constitution of the West” [2, p. 7].

The Kyrgyz Republic's Constitution was adopted on May 5, 1993. In all of these constitutions were established the constitutional traditions of the international experience and own national legal history. And the historical fact testimonies, that Uzbekistan was the first, who introduced, in March 1990, the presidential form of government. In Kazakhstan, the Law "On the Establishment of the Position of the President" was adopted in December, 1990. All three independent states are secular, unitary. Doctor of Law, Professor A.Kh. Saidov notes in this aspect: "The secular criteria can be considered as legal, in the fields, covered within the meaning of the Constitution, as a public, civilian-based real consciousness of the society. The phenomenon of the secular state is based on Islamic culture, showing democracy and pluralism in independent Uzbekistan" [1, p. 15].

The Constitution of the sovereign Tajikistan was adopted on November 6, 1994. Historical and legal study of the Constitution of Tajikistan allows us to explore the fundamental political, legal and socio-economic changes in the country and to determine the degree of continuity of legal and other provisions of the preceding 70-year period of the Soviet system and the legitimacy of the use of foreign experience.

In the history of Tajikistan were adopted five Constitutions- in 1929, 1931, 1937, 1978 and 1994. Rigorous analysis of the laws and regulations in the period of adoption of the Declaration of independence and the Constitution of the Republic of Tajikistan, shows the unique independent path of the development of the Tajik people in the creation of law-abiding, democratic and secular state. After adoption in 1994 of the Constitution were appeared the several tasks: design and organization of the activities of new state on the basis of the constitutional principle of separation of powers, with the system of checks and balances, and the development and adoption of new laws on the spirit of national independence and the interests of the people in market economy. On September 26, 1999 the Supreme Law of Tajikistan has been amended.

A huge contribution to the study of this problem was made by the famous Tajik research-scholars A. Imomov [3], F.T. Takhirov [4] and others.

The Constitution of Turkmenistan was adopted on May 18, 1992. Turkmenistan is the most controversial and interesting at the same time. It is an example of research studying of the problems of building of the democratic society in the post-Soviet countries. At the same time, some international and non-governmental organizations of Turkmenistan referred to the successful transition from totalitarianism to democracy. Elections in the country and the establishment of the political institutions were held in accordance with the official ideology. The first step in the country was canceled the next presidential election. In December 1993, Parliament took the initiative to extend the power of the President until 2002, by the referendum. The current Constitution does not provide, as it necessary, the legal procedure. In addition, the law "On Referendum" regulates the popular consultation, which declares, those not less than two months after the decision by Parliament to conduct such procedure. In the Constitution there are number of progressive moments, that are supposed to guide the course of the political events in the civilized society, to create the conditions for the emergence of political pluralism and to guarantee the rights of the citizens to freedom of expression, the election of political leadership, etc. These progressive moments in the Constitution include provisions of law-abiding state, the direct effect of the constitutional norms, pluralism, and the proclamation of the principle of separation of powers, with the system of checks and balances, the right to private ownership on the means of production, land and other material and intellectual values.

In accordance with the Constitution, the Medzhlis is the legislative body and represents the appropriate branch of government. At the same time, in the hierarchy of Supreme Medzhlis of the state structure is as powerless, unable to influence the other branches of government. In addition to the Medzhlis are endowed with the right to make the laws with the President, the People's Council, which diminishes the role of Parliament as a legislative body. The number of the deputies of Medzhlis, anyway, is formalized. In particular, it remains largely declarative provision on the right of Parliament to amend the Constitution (Article 67). The fact, this right of Medzhlis belongs to Halkmaslakhats. The judicial power in the country doesn't not affect to the other branches of government, People's Council and the Medzhlis. According to the Constitution, the judicial power does not have the function of the constitutional review. This situation is completely formalizes the existence of the third branch of government in the country.

In all of these constitutions were established the constitutional traditions of the international experience and ancient legal history. It is well known, that the legal system of any state has been researched in close connection with the national legal system and international law. The Constitutions of sovereign

Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan have established the mechanisms of functioning of all parts of the state apparatus, their competence, fixed the democratic foundations of social life, gave the priority to the individual rights and freedoms of the citizens. The main attention was paid to the role of elected bodies of state power, the system of checks and balances in the relationship of all branches of government, the status of local government, strengthening the independence of the judiciary, strengthening of law enforcement powers. All these points are related to the other Central Asian republics [5, p. 17].

The legal system expresses the legal infrastructure of the society. Therefore, the legal system is flexible, dynamic, and constantly changed. However, the legal system is quite conservative. Another question, some legal traditions should be preserved. The legal system in the narrow sense of regulations, emerging and applied on the basis of general principles. The value of the legal system is provided by the general legal principles and legal procedures of law-making and enforcement. Legislator in establishing a new legal act must clearly understand: how to act in the different cases, within this legal framework, institutions, branches. This position is trivial, but in practice, and in theory, it is very difficult to cover in each case, all the existing legal system [6, p. 58].

Summarizing the different interpretations of the legal system, we can give its most general definition. The legal system, in a broad sense, is the direct reflection of the legal life of the society and the functioning of its institutions: the state bodies, the legal rules by themselves (the core of the legal system), legal institutions, branches of the legislation and other legal phenomena. Law-making is an essential tool in public governance. The legal system, in the narrow sense, is a set of the regulations. The category “legal system” is a consequence of the integration of the positive law, historical and comparative law theory and the sociology of law. The legal system has the following components, elements: the system of legal norms, legal system, legal awareness, and the system entities. “The most impact on Kazakhstan, Tajikistan, Turkmenistan and other Central Asian republics has a political change and the change of power in Georgia. Actions of US politicians to change the political system of other countries of the Central Asian states are forcing management to reconsider closest allies. In this situation, the role of Russia as a regional center rises again, especially in the Central Asian states” [2, p. 31].

The Concept of Legal Policy of the Republic of Kazakhstan states that “as a result of the discussion of the policy of legal reforms in the society appeared the progressive development of the legal system on the basis of the Constitution. The Constitution of the Republic of Kazakhstan has the necessary legal capacity, which concluded not only in its legal norms, but also in its legal ideas and principles. Legal ideas of the Constitution should be implemented in the legislative, institutional and other measures aimed at strengthening democratic institutions in Kazakhstan, secular, legal and social state”.

According to the Kyrgyz research scholar T.B. Aitmatova, “in the first documents of the independent state laid the formal legal basis of the Declaration on sovereignty- the Declaration on the state independence of the Republic of Kyrgyzstan and Law “On the state sovereignty of the Republic of Kyrgyzstan”. They proclaimed the determination of the republic to build a state of law, guaranteed the rights and freedoms of the citizens. The Constitution of Kyrgyz Republic was adopted on May 5, 1993. These rights were fixed in the Supreme Law. These favorable targets remain utopia, if we do not improve and obey the laws, if we do not fight to eradicate crimes, if we do not form at those, who work in government, public administration, political parties, public associations and organizations of the market economy, the citizens, the society, law-abiding state with high level of the legal culture” [5, p. 25].

“The course of the history is irreversible. The historic event, which our ancestors dreamed about, embodied in the life in September 1, 1991, when the Republic of Uzbekistan declared its independence. Peace and stability that prevails in Uzbekistan, progress in the development of market economy, the expansion of the international relations of the country are highly recognized by the world community” [7, p. 18].

It is well known that the legal system of any state must to be studied in close connection with other national legal systems and international law. In some legal space they interact, influence to each other, and there are the variety of legal formations, which are based on the general processes, carried forward cooperation in all spheres of public life. The Constitution of the Republic of Uzbekistan of 1992, in Article 109 has recorded a provision stating that “the Constitutional Court determines the constitutionality of interstate contracts”. The general principles and norms of the international law are the most important criteria of the constitutionality of laws and regulations.

This provision we easily find in the Constitutions of the Republic of Kazakhstan and Republic of Kyrgyzstan. The different is only the name of the government agencies. For example, earlier, according to the Constitution of Kazakhstan of 1993 was really existed and acted the Constitutional Court of the country. It was later abolished. Now, in accordance with the Supreme Law of the Republic of Kazakhstan, the Constitutional Council was created in 1995 and works effectively. In the Republic of Kyrgyzstan, it is called the Constitutional Assembly. In order to conduct due diligence of the draft amendments to the Constitution of the Kyrgyz Republic and the various suggestions and comments, received by the Decree of the President of the Kyrgyz Republic on January 2, 2003 the expert group was formed.

The current Constitution of the sovereign Kyrgyzstan establishes mechanisms of functioning of all parts of the state apparatus, their competence, reinforces the democratic foundations of social life, and gives priority to the individual rights and freedoms of the citizens. Main attention was paid to the role of elected bodies of state power, the system of checks and balances in the relationships of all branches of the government, the status of local government, strengthening the independence of the judiciary, law enforcement powers.

The same provisions fixed the Supreme Laws of Kazakhstan and Uzbekistan, which are legalize the following provisions: the principle of democratic rule of law, citizens have the right to do anything that is not prohibited by law; secured guarantees of the rights and freedoms of the citizens, the right to private property, economic, political and social rights and freedoms of the citizens. In Kyrgyzstan, the adoption of a new Constitution means the move from a presidential to a parliamentary-presidential republic, and in two other independent republics, Kazakhstan and Uzbekistan, this fact marked the transition period from parliamentary-presidential to the super-presidential republic.

We emphasize that the category “legal system” in the scientific literature is relatively new. Its occurrence is related to the development of law. As some legal phenomena (law, legal awareness, regulations, etc.) has been attentively studied, there was the necessity for the concept picture of the entire legal validity. In jurisprudence was marked the diversity in the definition of the legal system. The state is an important, but not the single source of the social development. “The state came under the influence of a number of factors. And their role is not the same for the different people. It should be emphasized that their list is not exhaustive defined by economic factors. All this testifies the complexity of the emergence of statehood”. The society by itself actively participates and has the dialectical relationship with the state. And opposite, weak civil society leads to the strong state. At the same time, they cannot exist independently and complete each other.

The transition period from the Soviet system to the formation of the CIS democratic legal states is characterized by the fact, that currently analytical framework crossed the scientific theories. As for the available analytical data do not fit into the existing patterns of development, the need for synthesis and generalizations lead to a new theory (definition) of the legal system more adequately summarizes the data of the system analysis.

Further development of the modern society is inconceivable without definite legal order, stable system of the legal relationships, translated into practice the basic legal ideals of equality, freedom and justice, law-abiding state, the universality of rights and responsibilities, the rights and freedoms of men and citizen, fixed in our Constitution. For nearly two thousand years in jurisprudence the modern research scholars are interested in the study of the legal system. Its concept, structure, content, role and function in the society, the formation and development, the relationships with other legal phenomena, types of the legal systems have become the subject of studying by S.S. Alekseyev, V.K. Babaev, A.M. Vasilyev, O.A. Gavrilov, Y.P. Eremenko, etc. At various times, they were reflected in the foreign science in the works M.P. Golding, R. David, K. Joffre-Spinosi, J. Carbonie, G. Kelsen, etc.

Cultural aspects of knowledge of the legal phenomena make possible to determine the features of the legislation, the policy of the reforms, the relationships with other cultural phenomena in the legal realities.

The legal system is an institutional concept, the occurrence of which in legal science is not only legal reality of the phenomena, but also certain qualitative institution in the science, development of its methodology and conceptual apparatus are quite important. Therefore the primary importance in the genesis of this notion is given to differentiation and integration of the legal knowledge as prerequisites and conditions for the occurrence and development of the theory of the legal system, its importance in the structure in the general theory of law.

In the conclusion, we emphasize that the further development of the national legal systems of independent Central Asian Republics of Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan is the result of new integration processes, strengthening the state independence of these republics on the basis of fundamental changes in the field of socio-economic development in these states.

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ИНТЕГРАЦИЯЛЫҚ ПРОЦЕССТЕРДІҢ ОРТАЛЫҚ АЗИЯ ЕЛДЕРІНІҢ ҚҰҚЫҚТЫҚ ЖҮЙЕСІНЕ ТИГІЗЕТІН ӘСЕРЛЕРІ

Аннотация. Заманауи құқықтық интеграция құқықтық жанұялардың бір-бірімен жақындау процессі арқылы, халықаралық құқықтың дамып жетілуі барысында, сонымен қатар осы өмірдегі интеграциялық қарым-қатынастардың күшейуі барысында қалыптасуда. Ескертетін бір жағдай, қазіргі кездегі құқықтық интеграциядағы заңнамалық процесстердің мәні, түп негізінде осы елдердің құқықтық жүйесіне тікелей тәуелді. Құқықтың жетілуінің қазіргі бет бейнесі, шын мәнінде, осы елдердің құқықтық жүйелерінің бір-біріне жақындауын талап етеді. Құқықтық интеграцияның басты заңнамалық процесі, ең әуелі, құқықтың гармонизациясын талап етеді, ал оның негізінде құқық жүйелерінің деформациясы жатыр, сонымен қатар құқық унификациясы, құқық ассимиляциясы, заңнамалық экспансия немесе жойылуы, құқық рецепциясы, және т.б. Бұл мақалада Орта Азия елдерінің құқықтық жүйелерінің интеграциясының тереңдеуі көрсетілген, ол қазіргі еуразиялық экономикалық кеңістіктегі қарым-қатынастармен байланысты. Осы қатынастырдың негізінде, өркениетті, өзіндік сананың жоғарғы дәрежесіне қол жеткізген, әлеуметтік және халықаралық бейбітшілікті жүзеге асыруға бағытталған халықтардың теңқұқықтық қарым-қатынасы моделі жатыр. Бұл бағытта мемлекеттердің кең көлемдегі дағдарысқа қарсы іс-шаралары мен экономиканың дамуының және басқа да тұрғын халыққа жасалатын іс-шаралардың бәсеңдемеуін қамтамасыз ететін механизмдер зерттеледі.

Түйін сөздер: интеграциялық процесстер, Орталық Азия мемлекеттері, заңнамаларды интернационализациялау, құқықтың гармонизациясы, интеграцияны құқықтық реттеу механизмдері, құқық унификациясы, құқық эмуляциясы, заңнамалық экспансия, құқық рецепциясы, құқық аннигиляциясы.

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ВЛИЯНИЕ ИНТЕГРАЦИОННЫХ ПРОЦЕССОВ НА РАЗВИТИЕ ПРАВОВЫХ СИСТЕМ СТРАН ЦЕНТРАЛЬНОЙ АЗИИ

Аннотация. Развитие современной правовой интеграции выражается в сближении правовых семей, как через развитие международного права, так и через процессы региональных интеграций и взаимодействий. Однако следует отметить, что сущность юридических процессов современной правовой интеграции выражаются, в конечном счете, в сближении и интеграции на уровне конкретных правовых систем государств. Сам процесс эволюционного развития права на настоящем этапе, в своей сущности, это именно процесс сближения правовых систем. Важнейшими юридическими процессами правовой интеграции являются, в первую очередь, гармонизация права, которая определяет основное направление деформации правовых систем, а также унификация (ассимиляция) права, юридическая экспансия (или поглощение), рецепция права и др. В статье исследуются процессы углубления интеграции правовых систем стран Центральной Азии, происходящие в настоящее время в евразийском экономическом пространстве. Рассматривается модель равноправного сотрудничества народов, достигших высокого уровня самосознания и цивилизованности и движимых стремлением утвердить социальный и межнациональный мир и согласие народов. Изучаются масштабные антикризисные меры государства, нацеленные на восстановление уверенных темпов экономического роста и обеспечение прочных социальных гарантий всему населению.

Ключевые слова: интеграционные процессы, государства Центральной Азии, интернационализация законодательства, гармонизация права, правовые механизмы регулирования интеграции, унификация права, эмуляция права, юридическая экспансия, рецепция права, правовая аннигиляция.

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ENERGY-EFFICIENT FREQUENCY CONVERTER FOR INDUCTION HEATING

Abstract. This article considers an energy-efficient frequency converter for induction heating, which consists of two power transistors, which increases the coefficient of performance and reduces the cost of the frequency converter. This provides a high frequency of current from several kHz to hundreds of kHz. The operating principle of the frequency converter is described.

Keywords: induction heating, frequency converter, transistor, energy efficiency and ECE.

Induction heating is a method of contactless heating of electrically conductive materials (metals) by high-frequency currents of high power with the help of frequency converters, the efficiency of which does not exceed 60-80%.

The purpose of the research is to develop a frequency converter for induction heating with the most efficient use of energy consumed with high efficiency and low cost.

Induction heating is used to heat the technological equipment (oil pipeline, pipeline, tank, etc.), heating the metal, fluids, desiccation of coatings, materials (e.g. wood) [1]. The most important parameter of the induction heating installation is the frequency. For each process, there is an optimal frequency range, which provides the best technological and economic indicators. The frequencies from 50 Hz to 5 MHz are used for induction heating of the metal.

The main device of the induction heater is a frequency converter, which consists of a rectifier and an inverter. Depending on the power and frequency, the inverter is assembled from thyristors or transistors [2, 3].

Currently, frequency converters use power transistors, and inverters perform on four transistors, which, with a high switching frequency of transistors and with large inductive load currents, increases the frequency converter losses. This reduces efficiency and increases the ventilation power, which leads to a significant increase in the mass-size dimensions of the frequency converter and a decrease in power in the inductor.

The frequency converter for induction heating with the smallest number of transistors and high efficiency is developed in the article, when it is connected to three-phase power supplies. Scientific recency is the number of transistors reduction to two, which increases the efficiency, which results in saving energy and reducing the cost of the frequency converter.

Figure 1 shows a scheme of frequency converters for induction heating. Frequency converter for induction heating, contains two three-phase rectifiers, two switches on transistors, a high-frequency transformer with two primary and one secondary winding and inductor (Fig. 1). The input of the frequency converter is supplied with an alternating three-phase voltage, which is converted into two constant-voltage sources by two three-phase rectifiers, one has a direct polarity and the other has a reverse polarity. These two sources of direct voltage are turned on against each other (figure 1).

The three-phase rectifier **1** is connected to the first primary winding W_1 of the high-frequency transformer through the first transistor switch T_1 and the second three-phase rectifier **2** is connected to the second primary winding W_2 of the high-frequency transformer through the second transistor switch T_2 , the

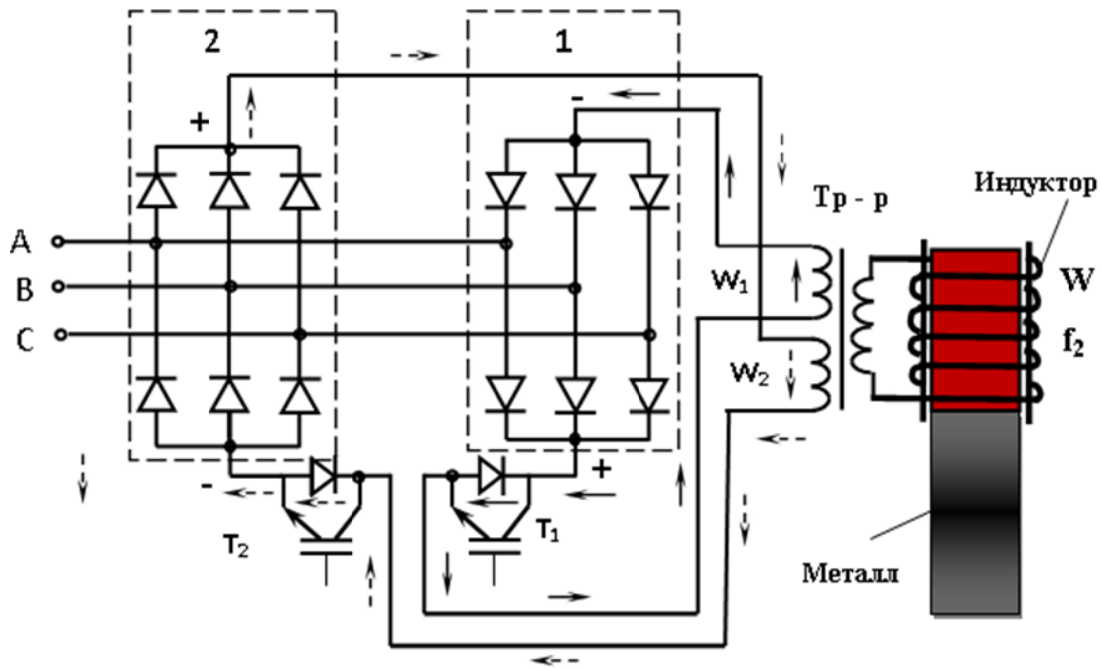


Figure 1 – Diagram of the frequency converter on two JGBT transistors

secondary winding W of the transformer being connected to an inductor with a number of turns W_n and, and three-phase rectifiers are powered by a three-phase power supply.

Three-phase rectifiers convert the three-phase voltage into a constant voltage, and the transistor switches T_1 and T_2 convert the DC voltage into an alternating single-phase voltage of the required frequency f_n . The transformer lowers the alternating voltage of the high frequency to the required value. The secondary winding of the transformer is connected to the inductor.

The frequency converter for induction heating operates in the following way. The three-phase rectifier 1 converts the three-phase voltage into a constant direct polarity voltage (figure 1), and the three-phase rectifier 2 converts the three-phase voltage to a constant reverse polarity voltage, these sources being interdependently connected to one another.

When switching on the transistor switch T_1 , the DC voltage of the three-phase rectifier 1 is connected to the first primary winding W_1 of the high-frequency transformer and the current flows through the winding W_1 to the time t_1 (figure 2). Thus, a positive half-wave of the input voltage of the primary winding W_1 of the high-frequency transformer is formed.

At time t_1 , the transistor switch T_1 is turned off and the transistor switch T_2 is turned on. In this case, the DC voltage of the three-phase rectifier 2 is connected to the second primary winding W_2 of the high-frequency transformer and a reverse polarity current flows through the winding W_2 to the time instant t_2 (figure 2). Thus, a negative half-wave of high-frequency transformer primary W_2 winding input voltage is formed.

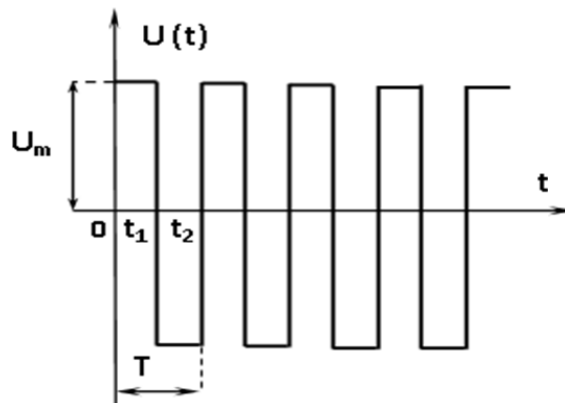


Figure 2 – Graph of the output voltage of the frequency converter

The frequency of the frequency converter voltage for induction heating is determined by the known formula:

$$f_{\text{н}} = \frac{1}{T}, \quad (1)$$

where T is the voltage period of the frequency converter.

It is known that at a high frequency of voltage, the weight and size dimensions of a high-frequency transformer are reduced, so a frequency converter for induction heating of an oil pipeline will have low weight and dimensions. In addition, the frequency converter is made on two transistors and the electrical losses on the transistors will be less accordingly, which will lead to an increase in the efficiency of the frequency converter, in comparison with the analogue and reducing the cost of the entire frequency converter.

The core of the article is that an improved design of the frequency converter on two JGBT transistors is proposed. At the same time, the design is simpler and more technological for the manufacture and can be made for a specific case. In addition, the developed technology and design methods allow creating an individual induction heater for a particular type of heating process [3].

In figure 1, the frequency converter is connected to the windings of the inductor inside, which is a metal round billet. At the same time, high-frequency current flows through these windings of the inductor, which forms a variable magnetic flux. The variable magnetic flux, crossing the metal walls of the metal, according to the law of electromagnetic induction, induces in it an electromotive force, under the influence of which, an alternating electric current will flow. This current will also heat the metal to the desired temperature.

A prototype of a frequency converter was developed and manufactured. Figure 3 shows a prototype of a frequency converter with a power of 6 kW at frequencies from 2 to 20 kHz. In the frequency converter, the source is a three-phase 380 V power system, of industrial frequency. The frequency converter is implemented on IGBT transistors. The control system is implemented on the logical elements of the mathematical apparatus of the software complex. The rectifier was made on the basis of a bridge with a six-pulse rectification circuit. To match the voltage and galvanic isolation, a double-wound high-frequency power transformer was used.



Figure 3 – Process of induction surface heating of metal with a 120 mm diameter at a frequency of 20 kHz

The results of the experimental study showed that the prototype of the frequency converter works stably, produces the specified technical characteristics. Figure 3 shows the process of induction surface heating of a metal with a 120 mm diameter at a frequency of 20 kHz. This is done to show that the frequency converter only heats the metal surface at a frequency of 20 kHz, with the heating temperature reaching 800 degrees. It is not necessary to heat the oil pipeline to such a temperature, it is sufficient to heat the oil to a temperature of 50 degrees.

It should be especially emphasized that the greatest use of electromagnetic energy will be if the power factor of the inductor is close to one. This can be achieved if a compensating capacitor bank is connected in parallel with the inductor. The compensating battery of capacitors and the inductor form a loading oscillatory circuit in which the reactive energy stored in the magnetic field of the inductor is transferred to the capacitors, passing into the energy of the electric field.

Thus, a frequency converter for induction heating must have an output frequency range within 2-20 kHz. The depth of induction field penetration in this frequency range is 2-5 mm, again depending on the frequency. If further heating is required in the depth of the part, the heating time increases.

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ЭНЕРГИЯНЫҢ ИНДУКЦИЯЛЫҚ ҚЫЗДЫРУҒА АРНАЛҒАН ЭНЕРГИЯСЫНЫҢ ТИІМДІ СИПАТТАМАСЫ

Аннотация. Мақалада қуатты транзистордан тұратын индукциялық қыздыру үшін энергияны үнемдейтін жиілікті түрлендіргіш қарастырылады, ол тиімділікті арттырады және жиілікті түрлендіргіштің құнын төмендетеді. Бұл бірнеше кГц - жүздеген кГц-ке дейінгі ток жиілігін қамтамасыз етеді. Жиілік түрлендіргішінің жұмыс принципі сипатталған.

Түйін сөздер: индукциялық жылу, жиілікті түрлендіргіш, транзистор, энергия тиімділігі және ПӘК.

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ЭНЕРГОЭФФЕКТИВНЫЙ ПРЕОБРАЗОВАТЕЛЬ ЧАСТОТЫ ДЛЯ ИНДУКЦИОННОГО НАГРЕВА

Аннотация. В статье рассматривается энергоэффективный преобразователь частоты для индукционного нагрева, который состоит из двух силовых транзисторов, что повышает КПД и снижает стоимость преобразователя частоты. При этом обеспечивается высокая частота тока от нескольких кГц до сотни кГц. Описан принцип работы преобразователя частоты.

Ключевые слова: индукционный нагрев, преобразователь частоты, транзистор, энергоэффективность и КПД.

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STUDYING OF THE PHENOMENON OF PRE-HARVEST SPROUTING OF WHEAT GRAIN

Abstract. Pre-harvest sprouting (PHS) – the widespread phenomenon resulting in inferiority of grain, to decrease in its consumer qualities and respectively the prices. PHS occurs not only during the harvesting, being accompanied rains, but also in maturing of grain of cereals at the last stages of maturing. It is well known that the germination of wheat seeds is largely dependent on the wheat cultivars, the effect of molybdenum-treatment on the germination resistance has not been fully studied. We therefore focused our attention on the role of molybdenum, expecting that one possible factor responsible for the difference in germination resistance of different wheat cultivars is the presence of molybdenum in wheat seeds.

The results of our investigation indicate a direct correlation between the molybdenum content, the endogenous level of ABA and the activity of grain wheat α -amylase. It is shown that when processing wheat with a solution of molybdenum of both varieties, resistance to pre-harvest germination (PHS) was increased. Leaf spraying with a solution of molybdenum, both a resistant and a sensitive wheat cultivars to PHS, showed an increase in the endogenous content of Mo and ABA in wheat grain. However, the stable cultivar of wheat *Lutescens-70* - contained 1.4 times Mo and the level of ABA in 1.8 times higher, compared to the unstable variety of wheat *Novosibirskaya-67*. It has also been shown that, in the treatment of Mo, α -amylase activity decreased in 5 times compared to the control variant. In this paper, we showed how tungsten (W), which competes with Mo, and can be incorporated into the molecule of the aldehyde oxidase enzyme, inactivating it. Therefore, the treatment of wheat with tungsten, led to a decrease in the endogenous content of Mo and ABA.

Key words: wheat, ABA, molybdenum, tungsten, α -amylase, pre-harvest germination.

ABA is a plant growth regulator involved in various processes, including the reaction of plants to environmental stress, seed maturation and seed dormancy [1]. In cereal crops, an optimum balance is most sought after; some dormancy at harvest is favored because it prevents germination of the physiologically mature grain in the head prior to harvest (that is pre-harvest sprouting (PHS), a phenomenon that leads to considerable damage to grain quality and is especially prominent in cool moist environments. ABA regulates key events during seed formation, such as the deposition of storage reserves, prevention of precocious germination, acquisition of desiccation tolerance, and induction of primary dormancy [2].

In nature, the grain germinates when the seed is considerably saturated with moisture and the dormancy process is disrupted. According to Bewley et.al. [3], the PHS appears in the absence of rest in particular, the germination is manifested at a temperature above 12 °C, under these conditions, the grain is in a state of "relative dormancy". The level of "rest" is controlled by environmental factors during the development of grain, especially temperature. Development and maturation of grain at 20-25 °C leads to a low level of "dormancy state" and is therefore considered highly sensitive to germination in the ear of the mother plant.

Embryonic regulators FUS3 and LEC2, which regulate many processes during the maturation of the seed (for example, repression during the 'post' period of seed germination and activation of the reserve protein genes of the grains), also involved in the control of biosynthesis of the GA. In the Arabidopsis mutants, the pathway of the GA that is defective in these genes (*fus3* and *lec2*) becomes unregulated,

which leads to an altered phenotype (for example, to the cellular formation of trichomes regulated by the GA process. FUS3 protein, represses the expression of the gene encoding the enzyme of the biosynthesis of HA. Repression of the AtGAox2 gene, the FUS3 protein, primarily occurs in the epidermal cells of the axis of the embryo, which differs from the expression of this gene during germination [4, 5].

In higher plants ABA is derived from an epoxy-carotenoid precursor that is oxidatively cleaved to produce xanthoxin [6, 7]. Following the cleavage reaction, xanthoxin is converted to ABA by a series of ring modifications to yield abscisic aldehyde, which is oxidized to ABA by aldehyde oxidase – AO (EC 1.2.3.14), a molybdenum containing enzyme [8].

Much attention is recently been focused on plant AO because of its involvement in the biosynthesis of ABA, a phytohormone which plays important roles in adaptation processes of plants to the environmental stresses and more importantly in the prevention of pre-harvest sprouting of seeds, in particular. AO in barely dry seeds is localized almost exclusively in the embryo and is related to ABA production in the dormant embryo [9].

Molybdenum is an essential component of the molybdenum cofactor (Moco), which enters the active center of most Mo-enzymes in plants [10]. Only four molybdenum-containing enzymes are found in plants, it is nitrate reductase (NR), aldehyde oxidase (AO), xanthine dehydrogenase (KDG) and sulfide oxidase (SO). AO catalyzes the oxidation of indole acetate aldehyde to indol-3-acetic acid (IAA) and abscisic aldehyde to ABA [11]. Mutations in either the apoprotein AO or enzymes involved in the biosynthesis of Mo-co and the activation of Mo-co are interrupted by the bioconversion of ABA [12]. A low level of ABA leads to the emergence of weak plants with intensive transpiration, with reduced stomatal control, reduced seed quiescence, weakened protective responses to adverse environmental factors [13].

Not so long ago, the molybdenum transporter MOT1, which plays an important role in the effective uptake of Mo by plants from the soil, was identified. It was shown that MOT1 is localized in cell membranes and exhibits a high affinity for plasma and mitochondrial membranes. Japanese scientists Yoko Ide et al. [14] conducted a study of the global effect of Mo and its deficiency and mutations in molybdate transporter (MOT1) on gene expression and on nitrogen and sulfate metabolism in *Arabidopsis thaliana*. Transcriptive analysis showed that the transcriptional level of nitrate reductase NR1 was highly induced with a deficit of Mo in *mot1-1*. The levels of amino acids, sugars, organic acids and purine metabolites have been significantly altered in plants with deficiency of Mo [15].

One of characteristics of grain germination in an ear, on a mother plant, is activity increase of hydrolyses, especially α -amylase which is often found even before manifestation of external signs of germination. Superfluous α -amylase activity of the sprouting grain leading to change of a carbohydrate complex, is the major damaging factor leading to sharp germination owing to what baking properties of grain decrease. The last researches showed genetic dependence of stability of grain to PHS in the course of its storage [16]. Existence of genetically various forms of α -amylase assumes their various regulation. So, for example, α -amylase late maturing (LMA) it is supervised by certain genes which are available not for all cultivars of wheat. Other forms α -амилазы α -amy 1 and α -amy 2 are characteristic for all genotypes of wheat [17]. Extent of their manifestation and influence on quality of grain depends on a ratio in grain of phytohormones ABA and GA [18].

The Republic of Kazakhstan belongs to the world leaders in the production of grain, while Kazakhstan grain is superior in quality to many world analogues. However, for all produced grain, the effect of germination on the root is inherent. Losses in quality of a crop in separate years reach 30-50% from a total gathering. The available statistics show that from the germination of Canada and Australia almost annually lose about 100 million US dollars for every 2 million tons of grain. Unfortunately, for our republic this kind of statistics is not available, although the losses from this phenomenon in the baking properties of wheat grain in Kazakhstan in different years reached almost 50% of the harvested crop.

It is well known that the germination of wheat seeds is largely dependent on the wheat cultivars, the effect of molybdenum-treatment on the germination resistance has not been fully studied. We therefore focused our attention on the role of molybdenum, expecting that one possible factor responsible for the difference in germination resistance of different wheat cultivars is the presence of molybdenum in wheat seeds.

Soil molybdenum availability to plants is affected by soil pH, becoming less available with decreasing pH. On the other hand, independently of pH, some lands are barren for lack of molybdenum in soil.

Deficiency and suboptimal levels of molybdenum could thus be expected to occur widely [19]. According to the data of the Institute for Soil Research of the Kazakh Academy of Sciences most soils of Kazakhstan contain 8-12 times less molybdenum than the critical concentrations required for vigorous plant development.

Materials and methods

Plant material. Two wheat cultivars, *Lutescence-70* and *Novosibirskaya-67*, differing in dormancy levels were used in our experiments were studied. Wheat seeds of different cultivars were obtained from the A.I. Baraev Kazakh Scientific-Research Institute of Grain Farming in Shortandy (Republic of Kazakhstan) in 2016. Wheat seeds was pre-germinated in incubator at

20 °C and planted in free-draining, 11-cm-diameter pots filled with quartz sand which had been acid washed. Plants were irrigated daily with a modified, molybdenum-deficient, Hoagland nutrient solution as described earlier by Cairns et al [20]. Plants at the flag leaf stage were treated with a 100 µM foliar spray of molybdenum applied as sodium molybdate ($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$).

Individual ears were tagged at anthesis and harvested 60 days thereafter. The moisture content at this stage were approximately 16% and 20% for *Lutescence-70* and *Novosibirskaya-67*, respectively. The seeds were subsequently stored at 5°C for 7 days which brought the moisture content down to approximately 13% and 15%, respectively. The uniform seeds from the central part of each spike were harvested by hand when ripe. Thereafter the seeds were stored at -70°C until needed for the various determinations. This procedure ensures that the dormancy level at harvest is maintained for at least 12 months.

For ABA determination the samples were thawed and the analyses were carried out on the embryo-half of each grain in order to avoid the dilution effect on ABA caused by the endosperm. Samples were milled and 50 mg of dry flour was extracted with water. ABA determination was performed according to [21] and the results were expressed as ng ABA per g of dry weight (DW).

The molybdenum content was determined with an atomic absorption spectrophotometer AAS-IN (Karl Zeiss, Germany). Molybdenum was extracted by the method of dry and humid mineralization from the plant material. Dry and wet mineralization were carried out by the following procedure: (a) Dry mineralization. Seeds were dried at 80°C and then burned at 400°C in an oven. The resulting ashes were suspended in concentrated HNO_3 . The content of molybdenum in the supernatant after centrifugation in glass tubes was determined with a AAS-IN. (b) Humid mineralization. A fresh plant samples were mixed with concentrated HNO_3 and the mixture was heated in ceramic dishes under an air stream. Heating decreases the volume of the extract by evaporation: 50 ml was concentrated to 5 ml. This was then mixed again with concentrated HNO_3 , centrifuged, and the content of molybdenum was determined in supernatant. Both procedures showed comparable results in molybdenum content.

AO activity was assayed monitoring the change of absorbance at 600 nm of the electron donor 2,6-dichloroindophenol (DCIP) [22]. Absorbance of enzyme products were measured using the spectrophotometer «Jenway». Seed parts part extracts were gel-filtered through the Sephadex G-25 enzyme activity determination. In addition, AO activity was detected following native polyacrylamide gels. The gels were immersed after electrophoresis in 100 mM sodium phosphate buffer (pH = 7.5) for 10 min followed by gentle shaking in a reaction mixture containing 0.1 mM phenazine metasulfate, 1 mM 3(4,5-dimethylthiazolyl-2)2,5-diphenyltetrazolium-bromide (MTT) and 1 mM indole-3-aldehyde [23].

Results and discussion

As mentioned above, tungsten as a chemical analog competes with molybdenum for incorporation into the enzyme complex and results in enzyme inactivation, particularly in the inactivation of aldehyde oxidase. The inactivation of nitrate reductase by tungstate was generally correlated with an accumulation of nitrate in plant tissues, implying that in vivo nitrate reduction really is affected. In this work we show that the substitution of tungsten for molybdenum decreases PHS-tolerance in wheat seeds.

In a pilot trial conducted in washed Mo-deficient sand with PHS-tolerant and sensitive wheat cultivars, a 100 µM molybdenum application at the flag leaf stage resulted in a more than 5.5 fold reduction in the number of seeds germinating in *Lutescence-70* and 1.5 fold in *Novosibirskaya-67* over 10 day period (table 1). Application of tungsten to flag leaves sharply increased percent of seed germination in *Lutescence-70* while in *Novosibirskaya-67* application of tungsten increased it only slightly.

Table 1 – The effect of foliar applications of molybdenum and tungsten on germinability of the seeds in Lutescence-70 and Novosibirskaya-67

Treatment	Germination, %
<i>Lutescence-70</i>	
Control*	22-24
– Molybdenum**	36-38
+ Molybdenum***	7-9
+ Tungsten****	52-54
<i>Novosibirskaya-67</i>	
Control	55-60
– Molybdenum	65-67
+ Molybdenum	46-48
+ Tungsten	67-72
*Seeds from plants grown in natural Kazakh soil without foliar application of molybdenum or tungsten. **Seeds from plants grown in Mo-deficient sand and without foliar Mo-application. ***Seeds from plants were grown in Mo-deficient sand and at flowering stage their flag leaves were sprayed with molybdenum. ****Seeds from plants were grown in Mo-deficient sand and at flowering stage their flag leaves were sprayed with tungsten.	

Following this investigation the effect of molybdenum and tungsten on time course changes in seed germination of two wheat cultivars differing in PHS levels was studied. Germination of two cultivars Lutescence-70 and Novosibirskaya-67 over a 10 days period are shown in table 2.

Seeds from the Mo-treated plants of the PHS-tolerant Lutescence-70 cultivar sowed very low germination percent and had to be treated with 100 μ M gibberellic acid (GA_3) before germination occurred. Even with this GA_3 treatment there was a significant difference in the dormancy between the seeds from Mo-deficient and Mo-treated plants (table 2). In the case of PHS-sensitive Novosibirskaya-67 there was also a considerable difference in the germination of seeds from Mo-deficient and the Mo-treated plants during the initial stages of the germination test but the final germination percentages did not differ significantly (table 2).

Table 2 – Time course changes in seed germination (%) of Lutescence-70 and Novosibirskaya-67 after foliar application of molybdenum or tungsten.

Cultivar/Treatment	Days seed germination				
	2	4	6	8	10
<i>Lutescence-70</i>					
– Molybdenum*	9	13	18	25	37
+ Molybdenum**	2	2	3	5	8
+ Molybdenum** + GA_3	55	63	70	83	90
+ Tungsten***	13	18	23	34	36
<i>Novosibirskaya-67</i>					
– Molybdenum	45	52	57	63	66
+ Molybdenum	43	44	46	58	62
+ Molybdenum + GA_3	55	65	70	82	86
+ Tungsten	45	57	62	65	69
*Seeds from plants grown in Mo-deficient sand and without foliar Mo-application. **Seeds from plants were grown in Mo-deficient sand and at flowering stage their flag leaves were sprayed with molybdenum. ***Seeds from plants were grown in Mo-deficient sand and at flowering stage their flag leaves were sprayed with tungsten.					

Seed ABA levels from molybdenum and tungsten sprayed plants and controls were monitored in seeds of both PHS-tolerant and sensitive cultivars (table 3). Foliar application of tungsten (100 μ M) induced a decrease of aldehyde oxidase because of its involvement in the biosynthesis of ABA and to accordingly the endogenous content of ABA in the seeds are sharply decreased in both wheat cultivars. After 15 days of treatment, aldehyde oxidase activity had already decreased to 45% of the control and it continued to decline to low level (15% of the control). The decrease in aldehyde oxidase activity was accompanied by a drop in the amount of ABA.

Table 3 – Effect of foliar molybdenum or tungsten application on the molybdenum and ABA content in the seeds of Lutescence-70 and Novosibirskaya-67

Concentrations of applied Molybdenum or tungsten	Molybdenum content (μ g/L)	ABA content (ng/mg DW)
Lutescence-70		
Mo-deficient	30 \pm 7	0.30 \pm 0.07
+ 25 μ M molybdate	240 \pm 55	0.45 \pm 0.12
+ 50 μ M molybdate	280 \pm 85	0.53 \pm 0.17
+ 100 μ M molybdate	315 \pm 75	0.65 \pm 0.10
+ 100 μ M tungstate	12 \pm 3	0.20 \pm 0.10
+ 200 μ M tungstate	10 \pm 2.5	0.20 \pm 0.07
+ 300 μ M tungstate	10 \pm 2	0.15 \pm 0.05
Novosibirskaya-67		
Mo-deficient	25 \pm 4	0.14 \pm 0.02
+ 100 μ M molybdate	225 \pm 65	0.35 \pm 0.02
+ 200 μ M molybdate	255 \pm 70	0.43 \pm 0.04
+ 300 μ M molybdate	285 \pm 90	0.54 \pm 0.07
+ 100 μ M tungstate	10 \pm 2	0.10 \pm 0.02
+ 200 μ M tungstate	8 \pm 3	0.08 \pm 0.02
+ 300 μ M tungstate	9 \pm 2	0.10 \pm 0.03

Germination and ABA content of the seeds harvested from plants which had been sprayed at flag leaf stage with various concentrations show clearly that increasing molybdenum concentrations to decrease seed germinability. The decrease in seed germinability was linear over the concentration range of molybdenum applied whereas the ABA level was little affected by molybdate concentrations up to 100 μ M. At higher than this concentration (up to 300 μ M) there was a sharp increase in seed ABA level (table 3).

Presented data on figure 1, show the endogenous content ABA and molybdenum in PHS-resistant grain wheat. The molybdenum content of the seeds harvested from plants had been sprayed at flag leaf stage with various concentrations show clearly that increasing the endogenous content ABA. The decrease in seed germinability was linear over the concentrations up to 100 μ M. At higher than this concentration (up to 300 μ M) there was a sharp increase in seed ABA level.

On the figure 2 are presented data of the endogenous content of ABA and Mo in PHS sensitive wheat grain to PHS. In the case of PHS-sensitive Novosibirskaya-67 there was also a considerable difference in the germination of seeds from Mo-deficient and the Mo-treated plants during the initial stages of the germination test but the final germination percentages did not differ significantly (table 2). Our further studies on the regulation of germination processes on two different genotypes of wheat showed a direct correlation between the endogenous contents of phytohormone ABA, the enzyme AO, and the endogenous content of molybdenum. The ABA level was both analyzed in the seeds treated with molybdenum experimental variants and in the control. The presented data (figures 1 and 2) show that the content of endogenous ABA in the Lutescens 70 grains is higher than that of the wheat-sensitive wheat variety Novosibirskaya 67. The processing of plants with different concentrations of Mo led to an increase in the level of endogenous Mo and ABA in the grains of both varieties.

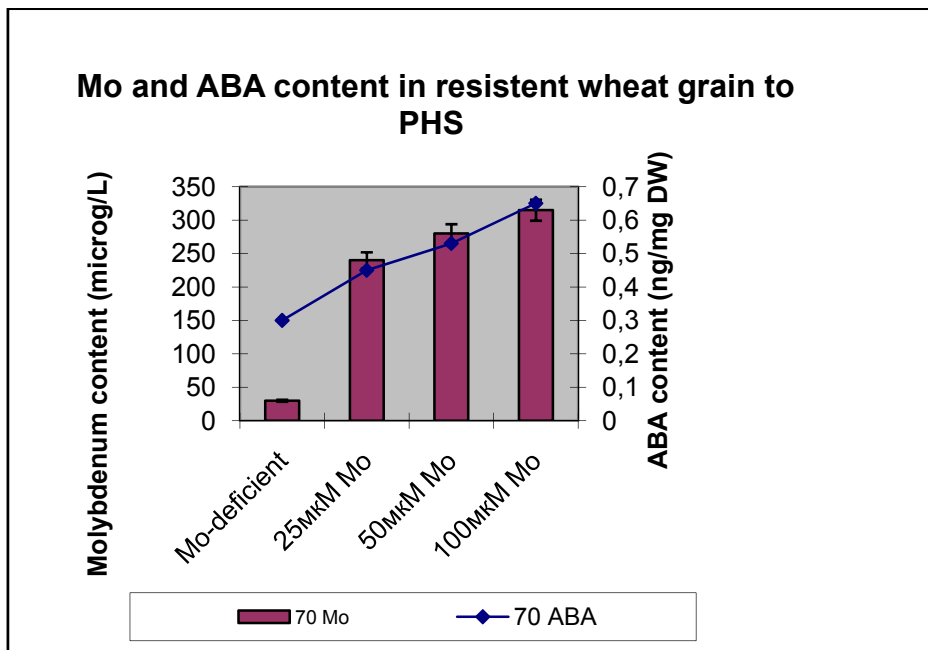


Figure 1 – The content of Mo and ABA in grain of PHS resistant wheat Lutescens-70

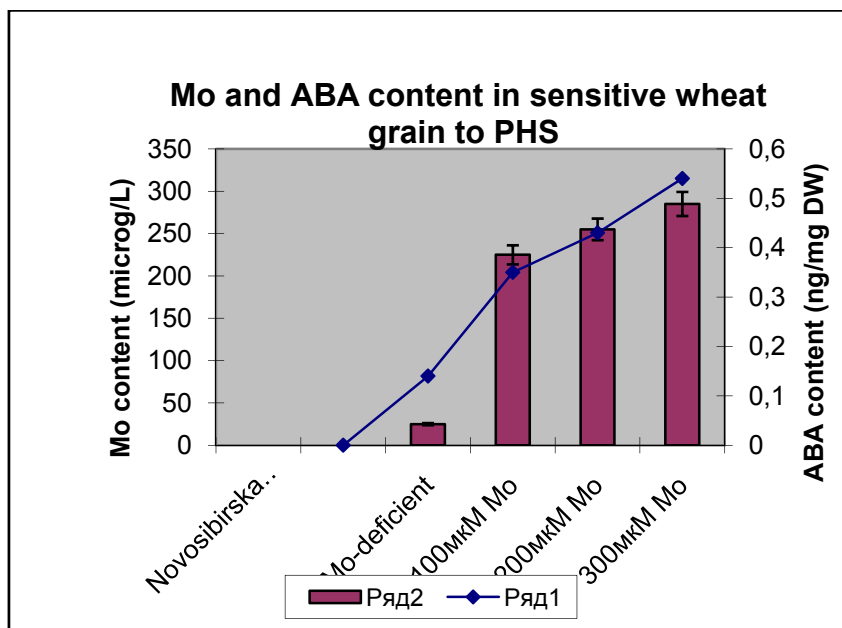


Figure 2 – The endogenous content of Mo and ABA in grain of PHS in sensitive wheat grain Novosibirskaya 67

Wheat seeds directly showed that an increase in Mo concentration leads to increase the endogenous content of ABA in seed Tungsten, a metal classified with Cr and Mo in the Periodic Table, can compete with molybdenum for incorporation into the enzyme complex and results in enzyme inactivation [24] In this work we show that how the substitution of tungsten for molybdenum effects on PHS-tolerance in wheat seeds. On the figure 3 are presented data the effect of tungstate on both endogenous Mo and ABA content in wheat grain. Foliar application of tungsten (100 µM) induced a decrease of aldehyde oxidase and content of ABA in the seeds. After 15 days of treatment, aldehyde oxidase activity had already decreased to 45% of the control and it continued to decline to low level (15% of the control). The decrease in aldehyde oxidase activity was accompanied by a drop in the amount of ABA.

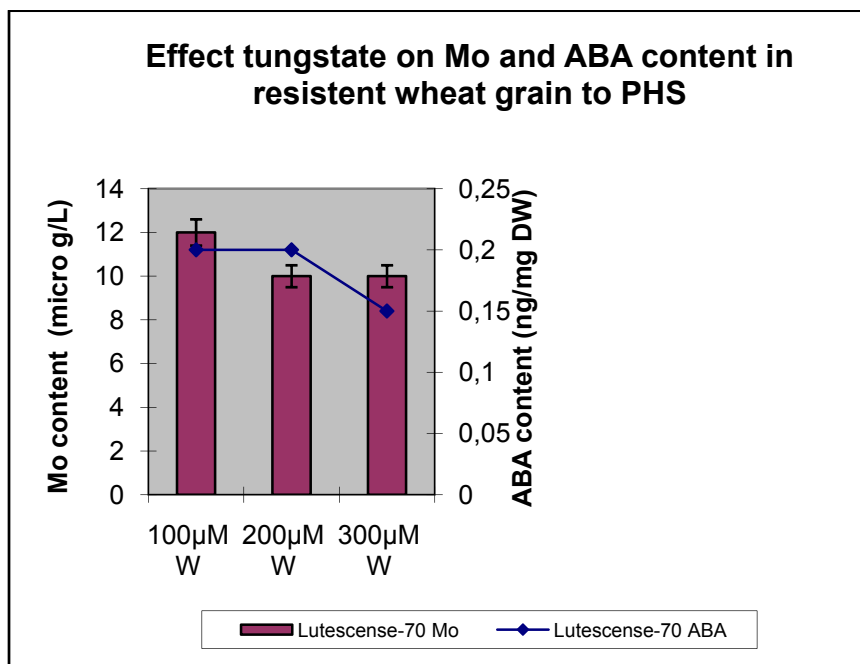


Figure 3 – The effect of tungstate on Mo and ABA content in grain of PHS resistant wheat Lutescens-70

In the process of germination of cereal crops seeds, such as barley, wheat, embryo of wheat synthesizes and secretes another phytohormone - gibberellin (GA), which causes transcription of amylase and protease. The expression of the amylase gene represses ABA during seed ripening or under unfavorable germination conditions.

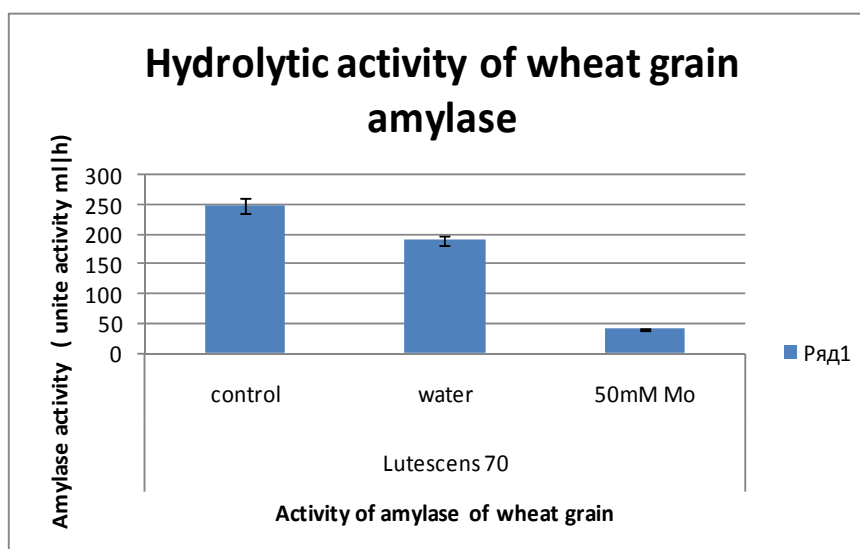


Figure 4 – The effect of Mo on the α -amylase activity

It is well known that the level of amylase activity directly correlates with the rate of germination. Our experiments on the treatment of seeds with a solution of molybdenum showed that the amylase activity decreased almost 5-fold on trial with control in the grain of wheat of the Lutescens 70 variety (figure 4). In a number of studies, it was found that the addition of Mo in physiological concentrations to developing embryos of some cereal species led to the prevention of premature germination through the blocking of the expression of specific germination enzymes [4]. These results showed that the endogenous content of Mo and ABA can play an important role in establishing and maintaining a state of rest in seeds. Mo is an important component of the molybdenum cofactor (MoCo), which is in the active center of most Mo-containing enzymes in plants [8-10].

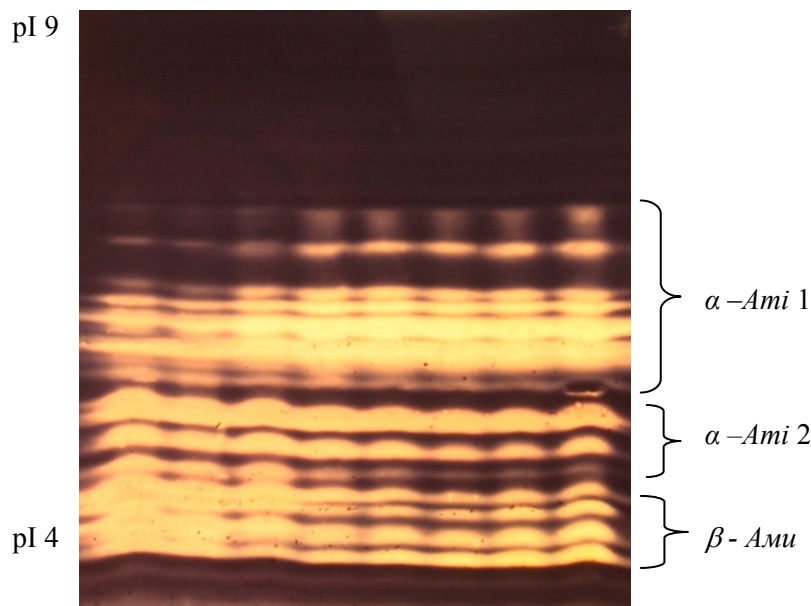


Figure 5 – Isofocusing of amylases from germinating grains of wheat α - Ami 1- α -amilase of germination; α - Ami 1- α -amilase of maturation; β - *Amu* - β -amilase

It is known that premature germination, characteristic of many grain crops, including wheat, leads to a deterioration of the technological quality of the grain. At the biochemical level, this is due to the rapid activation of certain hydrolytic enzymes, primarily amylases, which break down the starch of the endosperm. At the same time among amylolysis enzymes leading role in the hydrolysis of the polysaccharide is given to α -amylase "germination". Figure 5 presents a typical IEF spectrum of amylolytic enzymes of germinating wheat grains

The results of our investigation indicate a direct correlation between the molybdenum content, the endogenous level of ABA and the activity of amylase, the main enzyme of seed germination. The results of this study clearly show that molybdenum applied as a foliar application increased the dormancy of both PHS-tolerant and sensitive wheat varieties. Although the evidence is still somewhat tenuous it would appear that the dormancy induction by molybdenum is mediated by an increase in levels of ABA. These results are in agreement with the findings of Farwell et al. [25] who found that foliar applications of the micronutrient increased dormancy in wheat in both controlled environment and field trials.

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БИДАЙ ДӘННІҢ ЖИНАУ АЛДЫНДАҒЫ ӨНУІҢ ТОҚТАТУДІҢ ЗЕРТТЕУ

Жинау алдындағы өну (ЖАӨ) – дәннің сапасын төмендетіп, оның тұтыну қасиеттері мен соған сәйкес бағасын түсіретін кең тараған құбылыс. ЖАӨ өнімді жауын астында жинау кезінде ғана емес, сонымен қатар, астық тұқымдастардың дәндерінің пісіп-жетілуінің соңғы кезеңдерінде де орын алады. Бидайдың дәнінің өнуі көбінесе бидайдың сортына байланысты болатыны жақсы белгілі, бірақ молибденмен өңдеудің дәндердің өнуге төзімділігіне тигізетін әсері жеткілікті зерттелмеген. Сондықтан, бидай дәндерінде молибденнің болуы – бидайдың әртүрлі сорттарының дәндерінің ЖАӨ-ге төзімділігінің арасындағы айырмашылықтарды анықтайтын факторлардың бірі болуы мүмкін деген болжаммен біз молибденнің роліне назар аудардық.

Зерттеулердің нәтижелері дәндегі молибденнің мөлшері мен эндогенді АБҚ-ның мөлшерінің және а-амилазаның белсенділігінің арасындағы тіке корреляцияны көрсетті. Бидайдың екі сорттарын молибденмен өндегенде олардың жинау алдындағы өнуіне (ЖАӨ) төзімділігі жоғарылайтыны көрсетілді. Бидайдың ЖАӨ-ге төзімді, сол сияқты оған сезімтал сорттарының жапырақтарына молибденнің ерітіндісін бүріккенде дәннің ішіндегі молибденнің және АБҚ-ның мөлшерінің жоғарылайтыны анықталды. Бірақ, бидайдың сезімтал Новосибирская-67 сортымен салыстырғанда төзімді Лютеценс-70 сортында Мо 1.4 есе және АБҚ-ның деңгейі 1.8 есе жоғарылады. Сонымен қатар, бақылау вариантымен салыстырғанда молибденмен өндегенде а-амилазаның белсенділігі 5 есе жоғары болатыны анықталды.

Ұсынылып отырған жұмыста молибденнің химиялық аналогы – вольфрам (W) альдегидоксидазаның құрамына кіріп, оны белсенділігінен айыратынын көрсеттік. Сондықтан, бидайды вольфраммен өңдеу эндогендік Мо мен АБК-ның мөлшері төмендеуіне алып келді.

Түйін сөздер: бидай, АБК, молибден, вольфрам, α -амилаза, жинау алдында өну.

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ИЗУЧЕНИЕ ПРЕДУБОРОЧНОГО ПРОРАСТАНИЯ В ЗЕРНЕ ПШЕНИЦЫ

Предуборочное прорастание (ППР) – широко распространенное явление, приводящее к неполноценности зерна, снижению его потребительских качеств и соответственно цены. ППР происходит не только во время сбора урожая, сопровождающийся дождями, но и в период созревания зерна злаковых на последних стадиях созревания. Хорошо известно, что прорастание семян пшеницы во многом зависит от сорта пшеницы, однако не достаточно изучено как влияет молибден на устойчивость к прорастанию зерна пшеницы. Поэтому мы сосредоточили наше внимание на роли молибдена, что одним из возможных факторов, определяющих разницу в устойчивости к прорастанию различных сортов пшеницы, является присутствие молибдена в семенах пшеницы.

Результаты исследования показали, прямую корреляцию между содержанием молибдена в зерне, эндогенным содержанием АБК и активностью α -амилазы. Показано, что при обработке раствором молибдена пшеницы обоих сортов, повышалась устойчивость к предуборочному прорастанию (ППР). Листовое опрыскивание раствором молибдена как устойчивого сорта пшеницы, так и чувствительного сорта к ППР, показали повышение эндогенного содержания Мо и АБК в зерне пшеницы. Однако устойчивый сорт пшеницы Лютесценс-70 – содержал в 1,4 раза Мо и уровень АБК-в 1,8 раза выше, по сравнению, чем неустойчивый сорт пшеницы – Новосибирская-67. Также было показано, что при обработке Мо активность α -амилазы снизилась в 5 раз по сравнению с контрольным вариантом.

В этой работе мы показали, как вольфрам (W), который конкурирует с Мо и может встраиваться в молекулу фермента альдегидоксидазы, инактивируя ее. Поэтому, обработка пшеницы вольфрамом, привела к снижению эндогенного содержания Мо и АБК.

Ключевые слова : пшеница, АБК, молибден, вольфрам, α -амилаз, предуборочное прорастание

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THE TRADITION OF SOLITUDE AND HISTORICAL SOURCES OF SOVIET POLICY AGAINST THE "KYLUE" MOSQUE

Annotation. Introduction. Underground mosques are of particular historical importance in the spread of Islam in the Kazakh steppe. The underground mosque «Khilvet» and the Sufi tradition of solitude served among the people as a method of spiritual purification and improvement of the individual. The goal of the study is a scientific and historical analysis of the concept of «Khilvet» and the tradition of solitude, which later began to be forgotten. To achieve the goal of the study, the works of medieval travelers, turkish and russian scientists, domestic and foreign researchers who wrote about the «Khilvet» and the tradition of solitude as a source were considered, the «Khilvet» and the tradition of solitude in the sufi teachings of Khoja Ahmet Yasawi described in the premises of the «Gar» (cave) and Shildekhanas of the underground mosques. The scientific results of the article will complement our historical knowledge and show the younger generation the religious and spiritual history of our people. Conclusion. An analysis of the concept of «Khilvet» and the conditions of Sufi seclusion in the tradition of seclusion on the basis of historical and scientific literature made it possible to define this religious tradition.

Key words: underground mosque, sufism, Khilvet, seclusion, Khoja Ahmed Yasawi, «Gar», conditions, tradition.

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ОҚШАУЛАНУ ДӘСТҮРІ ЖӘНЕ «ҚЫЛУЕТ» ЖЕРАСТЫ МЕШІТІНЕ ҚАРСЫ КЕҢЕСТІК САЯСАТ ТАРИХЫНЫҢ ДЕРЕККӨЗДЕРІ

Аннотация. Кіріспе. Ислам дінінің қазақ даласында кеңінен таралуында жерасты мешіттерінің тарихи маңызы ерекше. Жерасты мешіті мағынасында қолданылып жүрген «Қылует» пен сол жерде сопылардың жеке қалып оқшаулану дәстүрі халық арасында жеке адамның рухани тазаруы мен жетілуінде әдіс қызметін атқарды. Зерттеудің мақсаты кейінгі кезде ұмытыла бастаған «қылует» ұғымы мен оқшаулану дәстүрін ғылыми тарихи талдау. Зерттеудің мақсатына жету үшін «қылует» және оқшаулану дәстүрі туралы жазып қалдырған ортағасырлық саяхатшылар мен түрік, орыс ғалымдары және отандық, шетелдік зерттеушілер еңбектерін дереккөз ретінде талдау. Қожа Ахмет Ясауи сопылық іліміндегі «қылует дәстүрін» сараптау, жерасты мешіттеріндегі ғар, шілдекхана бөлмелерінің жазба деректерде сипатталуын тарихи тұжырымдау міндеттерін шешу қарастырылды. Мақаладағы ғылыми нәтижелер тарихи таныммызды толықтырып, өскелең ұрпаққа халқымыздың діни-рухани тарихын танытатын болады. Қорытынды. «Қылует» ұғымы мен сопының оқшау қалу дәстүріндегі шарттарын тарихи, ғылыми әдебиеттер негізінде сараптап талдау аталған діни дәстүрді айқындай түсуімізге мүмкіндік берді.

Кілт сөздер: жерасты мешіті, сопылық, қылует, оқшаулану, Қожа Ахмет Ясауи, ғар, шарттар, дәстүр.

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ТРАДИЦИЯ УЕДИНЕНИЯ И ИСТОРИЧЕСКИЕ ИСТОЧНИКИ СОВЕТСКОЙ ПОЛИТИКИ В ОТНОШЕНИИ МЕЧЕТИ «ХИЛЬВЕТ»

Аннотация. Введение. Особое историческое значение в распространении ислама в казахской степи имеют подземные мечети. Подземная мечеть «Хильвет» и суфийская традиция уединения служила среди народа методом духовного очищения и совершенствования личности. Цель исследования – научно-исторический анализ понятия «хильвет» и традиции уединения, о которой впоследствии стали забывать. Для достижения цели исследования были рассмотрены труды средневековых путешественников, турецких и русских ученых, отечественных и зарубежных исследователей, писавших о «хильвет» и традиции уединения как источника, проанализированы «килуэт» и традиция уединения в суфийских учениях Ходжи Ахмета Ясави описанных в помещениях пещеры и шильдехана подземных мечетях, рассмотрены решение концептуальных задач исторической постановки. Научные результаты статьи дополняют наше историческое познание и покажут подрастающему поколению религиозно-духовную историю нашего народа. Заключение. Анализ понятия «кылуэт» и условия суфийского уединения в традиции затворничества на основе исторической и научной литературы позволил дать определение этой религиозной традиции.

Ключевые слова: подземная мечеть, суфизм, хильвет, уединения, Ходжа Ахмет Ясави, «гар», условия, традиция.

Introduction. With the spread of Islam across the Kazakh steppes, the construction of the first mosques began, and their foundations were laid. Depending on the local nature, the lifestyle, and the way of life of the people, mosques were built both inside and outside the cities, in cliffs, and underground. The oldest underground mosque in Kazakhstan is the Shakpak Ata mosque, which dates back to the 9th century. This list is complemented by mosques such as the Big Khilvet, Little Khilvet, Aulie Kumshyk Ata, Shildekhana, Shamet Ishan, Sultan Üpi, Shopan Ata, Beket Ata, Imam Marguzi, and Karaman Ata, among others.

The term «Khilvet,» used in reference to underground mosques, begins to appear in scholarly literature from the 10th century. «Khilvet» emerged as a branch of Sufism and, from the 10th century onward, became widespread among Turkic-speaking peoples, reaching its peak in the 14th century across the Near East and the entire Muslim world. During this period, Sufi teachings were used to address the spiritual, cultural, and political crises faced by Turkic peoples, and it was also a time when great Sufi masters, who propagated Sufi philosophy, emerged on the historical stage. One such prominent figure is Khoja Ahmed Yasawi, who refined and elevated Sufi teachings to a new level the tariqat stage. He devoted his efforts to returning the faith of the righteous, raised by the Islamic society, to the hearts of Muslims. He successfully harmonized the customs and traditions of different peoples with the Qur'an and the sayings of the Prophet Muhammad. He also transformed the Turkic language into a language of religion, science, education, governance, and culture. Through his disciples, Khoja Ahmed Yasawi spread Sufi teachings throughout the Turkic world. This contributed to the revival of Turkic culture.

Thus, for modern-day Kazakhstan, the study of Sufism becomes increasingly relevant, as it bridges the traditional Turkic worldview and Islamic civilization, providing a path towards self-improvement through ethical wisdom and spiritual thinking. However, despite the fact that many researchers have studied various aspects of Sufism, the concepts of «Sufism,» «Khilvet» and the tradition of seclusion have been largely overlooked during the long period of political opposition to religious and national ideologies.

The variety of interpretations regarding the history, function, and semantic foundations of the concept of «Khilvet» calls for further analysis of the historical and philosophical aspects of the tradition of seclusion practiced in spiritual underground mosques. Exploring the history of «Khilvet» and the tradition of seclusion, as well as the role it played in the spiritual development of the individual, is crucial to fully understanding the function of this tradition.

Materials and Methods. In writing this article, the works of medieval Sufis, philosophers, travelers, and domestic researchers, as well as the writings of Turkish and Russian scholars, were used as primary sources on the tradition of «Khilvet» and seclusion. Overall, the historical written sources and scientific literature examined provided concrete facts on the subject, enabling an exploration of the concept of «Khilvet» and the tradition of seclusion in Sufism, an analysis of the «Khilvet tradition» in the teachings of Khoja Ahmed Yasawi, and a historical interpretation of the descriptions of the Ghār (cave) and Shildekhana (seclusion room) in the underground mosques.

In the article, the research object was analyzed and evaluated using methods corresponding to the content-specific characteristics of the sources. Priority was given to methods such as comparison, hypothesizing,

analysis, and systematization to uncover the content of the data on the functions of underground mosques and the tradition of seclusion. These methods helped in formulating conclusions to qualitatively and descriptively reconstruct the conditions of the tradition of seclusion. Additionally, a hermeneutic approach was employed to interpret the meaning of the concept.

Thus, the selected methods facilitated the understanding of the different historical interpretations of the concept of «Khilvet» and the tradition of seclusion, revealing their characteristics and allowing for a comprehensive analysis.

Discussion. A number of scientific studies have been written that cover various aspects of Sufism and the Khilvet tradition. Published works can be grouped into several categories.

The first group includes the original works of Sufis who lived in the medieval period, along with the earliest historical sources written by philosophers who wrote about Sufism, the dictionaries they compiled, and the written research of Russian Orientalist scholars and travelers. The intricacies of the concept of «Khilvet» and the tradition of seclusion are explained and described in the works of many Sufi figures such as Imam Ghazali, Muhyiddin Arabi, Mevlana Jalaluddin Rumi, Ahmed Yasawi, Sultan Ahmed Hazini, Haji Bektash Veli, and Haji Bayram Veli. Russian Orientalists, such as V.V. Krestkovsky in “In the House of Emir of Bukhara» (Krestkovsky 1986: 65), P.I. Pashino in “Turkestan Region in 1866» (Pashino, 1868), described the construction and religious-spiritual functions of religious underground structures. N.I. Veselovsky provides the first historical data on Khoja Ahmed Yasawi's dwelling and underground rooms.

The next group includes the works of religious scholars who have written about the procedures and conditions for entering «Khilvet» in Sufism, as well as the studies of foreign, including Turkish, scholars who have examined various aspects of seclusion. In their research on the ancient texts of religious scholars regarding the order and rules of entering «Khilvet,» Turkish scholars such as Fuat Köprülü (Köprülü, 1981), U. Süleyman (Uludağ, 1997), M.Özsel (Özsel, 2002), and M. Erkaya (Erkaya, 2019) analyze various data about the «Khilvet» tradition and its spiritual and educational significance.

The third group includes the works of domestic scholars who, after Kazakhstan gained independence, conducted research on «Sufism,» the «Khilvet tradition,» and the functions of underground mosques, such as A. Abuev (Abuev, 1997), D. Kenjetai (Kenjetai, 2008), Z. Almasuly (Almasuly, 1998), G. Kushenova (Kushenova, 2009), and other researchers.

It is important to note that there are works that describe the history, archaeology, and significance of the concept of «Khilvet,» the tradition of seclusion, and the underground mosques in the religious and spiritual development of an individual. These works provide various definitions of «Khilvet,» presenting important and diverse information about the peculiarities, rules, and conditions of seclusion in Sufism. However, in these scientific studies, the «Khilvet» tradition, seclusion, and the functions of the ghār (cave) and shildekhana (seclusion room) in the underground mosques in Kazakhstan, as well as in Central Asia and the teachings of Khoja Ahmed Yasawi, have not been sufficiently explored from a historical worldview perspective. Therefore, this article focuses on aspects that have not been fully examined in this regard.

Results. The term «Khilvet,» which originated from Arabic, means solitude or seclusion in a quiet place (İbn Manzûr, 1990: 42). In Sufism, the tradition of «Khilvet» arises from the need for the Sufi to abstain from bad habits and negative traits, avoiding distractions and seeking inner purification.

In various scientific literature and dictionaries written in Turkish, «Khilvet» refers to seclusion in a dark or solitary place (Asım Efendi, 1304: 506). It is also used in the context of choosing to live in a dim or dark place in order to purify oneself from sin and to perform worship and prayers with full concentration (Uludağ, 1995: 386). In its broader sense, «Khilvet» refers to living in solitude, staying in seclusion, and engaging in worship, dhikr (remembrance of God), and spiritual struggle in a private room against one's lower self (İsmail Rasûhî Ankaravî, 2008: 276).

The concept of «Khilvet» in Sufism, involving living alone, staying in a secluded place, and engaging in worship, dhikr, and spiritual struggle in a private room, has evolved through different historical phases. While the «Halvetiye» order that originated in Crimea often comes to mind when discussing «Khilvet,» the history of seclusion predates the Halvetiye sect. Therefore, the concept of «Khilvet» should not be regarded as a specific element or practice of a certain group, but rather as an essential aspect of Sufism in general, and it should be considered part of the broader Halvetiye tradition.

The term «Khilvet,» as used to describe underground mosques, begins to appear in scientific literature

from the 10th century. The Arabic word «Halwātun» means striving for a solitary life. In Turkmen, «Khilvet», is used to mean «secrecy» (S.M. Davydov, Sufism in Turkmenistan). The concept of «Khilvet» as a branch of Sufism emerged among Turkic-speaking peoples from the 10th century and spread widely across the Near East and the entire Muslim world by the 14th century (Tuyakbayev, 2000: 41). As we observe, despite some minor linguistic differences in the various Turkic languages, the meanings of the term «Khilvet» remain consistent across them.

The researcher D. Kenjetai argues that there are traditional ethical principles for entering «Khilvet» in the Yasawi tariqa. The duration of «Khilvet» is forty days, and this period is referred to as «Shildekhana». According to D. Kenjetai, «Khilvet is not the goal itself, but a means of purifying the soul on the path to the goal» (Kenjetai, 2018: 131-132). He also provides the following definition of the term «Khilvet»: «Khilvet, when translated from Arabic, means 'to remain alone' or 'to hide in a secluded place.' In Sufism, it refers to the process of directing the murid's consciousness towards a specific goal and performing specific ascetic practices through particular dhikr (remembrance of God) by placing the murid in a dark, remote place; typically a dug-out dwelling, for a certain period of spiritual training» (Kenjetai, 2008: 244).

J. Almasuly defines «Khilvet» as «an underground house, a private chamber» (Almasuly, 1998: 21), while A. Abuev writes, «... 'Khilvet' refers to the place where Sufis and dervishes remain in solitude, sometimes observing a forty-day fast» (Abuev, 1997: 96).

The primary aim of Sufism is the spiritual education of the individual and the cultivation of higher moral values within the person. From this perspective, the concept of «Khilvet» is one of the most important tools for this purpose. Therefore, Sufism should be viewed as an ideology focused on both the material and spiritual development of individuals. As a science, it is concerned with guiding individuals to fully develop into perfected human beings.

The act of entering «Khilvet» and engaging in seclusion, accepted as a means of self-improvement and achieving closeness to Allah, is carried out by Sufis based on certain principles. The period of seclusion generally lasts forty days, and upon completion of this period of worship, the individual gains a certain degree of spiritual honor (Uludağ, 1997: 15).

In every Sufi tradition, seclusion is carried out under the supervision of the Sheikh and according to strict rules. The Sheikh enters the «shildekhana» with the dervish, performs prayers there, and leaves the dervish alone for a specific period of time to engage in prayer. During seclusion, the dervish does not leave the secluded space, avoids interacting with others, and spends all of their time in worship and dhikr. The rules of seclusion are learned from the Sheikh before entering the underground space. When the period of worship ends, the Sheikh enters, listens to the dreams the dervish had during the period of seclusion, and interprets them. On the same day, a sacrifice is made, and the dervish is allowed to leave the room. The dervish then bathes, changes clothes, and either on the same day or the next day, eats from the sacrificial meat and participates in a special religious celebration (Uludağ, 1997: 15).

Imam Ghazali, in his writings, highlights the benefits of seclusion and categorizes them carefully. According to Ghazali, the main advantages of seclusion are: having enough time for worship, purifying oneself from sin through interaction with people, distancing oneself from disputes, enmities, persecutions, and accusations, avoiding foolishness and the hardships that arise from it, and feeling responsible for the expectations that both the individual has of the people and the people have of the individual (Gazzâlî, 1992).

Turkish scholar M. Ğirin classifies the conditions for seclusion in the Sufi tradition as follows (Ğirin, 2015: 36):

1. The disciple should not enter «Khilvet» without the permission of the Sheikh (the teacher).
2. When entering the «Khilvet» house, the person should be confident that they are distancing themselves from the evil and harm of their heart and mind, and from causing harm to others.
3. When entering the place of seclusion, the individual should say the kalima (declaration of faith) and enter with full submission to Allah, as if entering a mosque.
4. Before the disciple enters seclusion, the Sheikh must perform two rak'ah prayers, which helps ease the disciple's spiritual success.
5. The place of seclusion (the ghār) must be a dark place where no sunlight enters.
6. The height of the seclusion place should be at the level of a man's stature, its length should be sufficient for prostration, and its width should be enough for a person to sit in.

7. There should be no openings, windows, or gaps allowing light or air to enter from the outside.

8. The door should face the qibla (the direction of Mecca), be low in height, and should not allow external sounds or noises to be heard. The door should be easy to open and close and should have a lock.

9. The place of seclusion may be a room within a larger dwelling.

10. The outer room of the seclusion space may allow for one person to be present, but this person should not disturb the murid's dhikr or their trance state. Similarly, the murid in seclusion should not allow worldly distractions to disturb their focus.

This detailed framework for the practice of seclusion in Sufism ensures that it remains a deeply spiritual and disciplined practice, aimed at achieving both inner purification and closeness to Allah.

The underground worship places known as Khilvets, which are spread across southern and western Kazakhstan, have been continuously functioning until the mid-20th century. This is evidenced by legends, scientific literature, travelogues of world explorers, historical records, and the results of archaeological excavations. Each of the Khilvet underground mosques, which are dedicated to the practice of spiritual seclusion in Sufism, contains a «Ghar» room. In the «Ghar» room, there are no windows or holes in the ceiling, preventing light from entering, in order to avoid external noise and distractions during worship. This isolation is designed to allow the devotee to focus solely on their inner spiritual journey.

The tradition of underground mosques and spiritual seclusion, or Khilvet, which is widespread in Central Asia, is also discussed in the works of Russian scholars. In V.V. Krestkovsky's work «In the Emir of Bukhara's Hospitality», he describes the underground religious worship space and the Sufi practicing their rituals as follows:

«In order to enter the Khan's underground chamber, we must first return to the preceding room, where there is a narrow descending corridor on the right, called 'Shildekhana', which leads to the place of worship. The mutawalli (the manager of the waqf property) lit a lamp and offered me his hand. I bent forward as best I could and followed him down several steep and high stairs. Then we turned right, and descending further down a narrow corridor with no stairs, we arrived at the bottom. The wooden door behind us closed gently with a squeak, reminiscent of a dying man's groans. After walking a few more steps, we found ourselves in a small, low-vaulted room. Across from us, there was a narrow archway leading to another room covered with a white curtain from floor to ceiling. The mutawalli lifted the curtain slightly, and I involuntarily stepped back.

The light of the lamp immediately illuminated the pale, fragile face of an honorable man sitting motionless on the floor in the middle of the dungeon. His face looked deathly pale, and he was not the least bit concerned with the unexpected arrival of guests. Like a corpse, motionless, or more precisely, like a puppet, he sat in a traditional eastern posture, with his feet tucked beneath him, his arms stretched out and resting on his knees. His gaze was very weak, and his overall appearance was mysterious and unclear. He seemed to be about 24 years old. The mutawalli whispered with a hint of respect, explaining, 'He has been sitting in this position for thirteen days in fasting and prayer, and he needs to complete forty days.'

I looked more closely. The first dungeon, as mentioned above, was a low vaulted room, almost square, with walls plastered and brick-lined. The second vault was no more than three steps in length and about two steps wide – a typical tomb. Neither of the rooms had windows, and there was not even a ventilation hole, so it was completely dark. The worshiper, fully absorbed in his religious thoughts, sat on a prayer rug (a reed mat typically used for prayers), which also served as his bed. There was no pillow for his head. This prayer rug and a clay jug were the only items he used in his daily life. Through the interpreter, I could sense their concern that we might disturb the serenity of the prayer, so we decided it would be best to leave.

'No,' he shook his head. 'He no longer hears or sees the external world; he is completely absorbed in his inner world». (Krestkovsky, 1986: 65).

This passage provides a valuable historical account of the «Ghar» or «Shildekhana», a Sufi underground worship space. It not only describes the physical aspects of the space but also offers insights into how practitioners of Sufism fulfill the conditions for spiritual seclusion and isolation during their religious practices.

In the Sufi order founded by Khoja Ahmad Yasawi, the tradition of Khilvet holds a special place, and it has its own unique etiquette. Sultan Ahmed Hazini writes, «According to Ahmad Yasawi, each letter in the word 'Khilvet' contains deep and difficult-to-interpret wisdom» (Hazini, 1995). Khoja Ahmad Yasawi,

in his treatise “Mirat al-Qulub», outlined the seventy stations of Sufi knowledge, and described methods for applying them in life, such as mujahada (struggling with the self), sohbet (spiritual conversation), zikr (remembrance of Allah), tafakkur (deep reflection), and khalwat (seclusion) (Kenjetai, 2008: 235).

This spiritual journey, rooted in the practice of Khilvet, is an essential part of Yasawi’s Sufi methodology, guiding the devotee towards a closer relationship with the divine.

In the hymns of Khoja Ahmad Yasawi, there are references to entering underground spaces for worship as a way of overcoming the self, secluding oneself, and self-improvement. He writes, «In order to eliminate ignorance and ignorance itself, I sought help from the Truth and descended into the earth,» and «Without finding wisdom, I descended into the earth» (Hoca Ahmed Yesevi, 1993: 229). It can be concluded that many of the hymns in Khoja Ahmad Yasawi's work «Divani Hikmet» were composed while performing worship in the underground mosque or the «Shildekhana,» a subterranean place of prayer, and were later transcribed by his followers.

Based on scientific data and conclusions regarding the Khilvet tradition in the path of Khoja Ahmad Yasawi, and analyzing Sultan Ahmad Hazini's work “Djawahir al-Abbar», G.Kushenova presents the following thoughts (Kushenova, 2009: 123-125): «Since the elimination of the self (nafs) forms the core of Sufism, Khilvet (seclusion) in the Sufi tradition provides the opportunity for the murid (spiritual disciple) to reckon with himself, engage in a struggle against his own nafs, and isolate himself from external distractions. Through this practice, the murid severs his sensory connections to the external world, purges his inner world of phenomena and fantasies, and learns to control his imaginative and cognitive faculties, focusing his attention solely on his heart and severing all ties with the outside world. This can only be done with the permission of the Sheikh, as Khilvet brings about a total transformation in the person. Therefore, the Sheikh, through his spiritual maturity, decides the right time for the murid to enter Khilvet.»

Furthermore, G. Kushenova describes the process of performing Khilvet, stating: «After the afternoon prayer on the day a murid is to enter Khilvet, all the openings of the worship and Khilvet rooms are closed to protect the murid from any harm caused by air or cold. After the prayer, the hands are washed for eating; the servant brings hot water to break the fast, and the fast is opened with this water, after which no further water is given. Afterward, the 'Khilvet soup' made from black millet and blessed by the miracles of Ahmad Yasawi is served. The body is cleansed in a separate place. The razor and stone are prepared, and three takbirs are recited. After shaving, in the Khilvet room, the murid remains completely pure and faces all four directions (starting with the Qibla) while reciting three takbirs. In this way, the forty-day Khilvet period ends, with the servants of the kitchen leaving the Khilvet room first and performing the ritual sacrifice according to tradition. No one is allowed to remain in the Khilvet overnight; they return to their homes. The next morning, they gather for the dawn prayer, recite three takbirs, and make supplications. After this, their hearts are filled with peace, and they return to their homes» (Kushenova, 2009: 123-125).

In his work “Tashkent and Turkestan: A Travelogue of 1866» P.I. Pashino writes, «... Hazret Khoja Ahmad Yasawi himself was the founder of a new religious order, and these 'Ghar' rooms served as places of spiritual purification, where the members of the order endured physical hardships».

On the night from Thursday to Friday, religious fanatics of Turkestan gathered at the tomb of Hazret Sultan in Turkestan, where they spent several hours praying and entering into a trance through deep breathing and various incomprehensible actions» (Pashino, 1868: 66). Although the Russian traveler mistakenly labels the Sufis as «religious fanatics,» his description of the «Ghar» room as a place of spiritual purification is a correct characterization.

Thus, it can be concluded that the «Ghar» room in Sufism, particularly in the tradition of Khoja Ahmad Yasawi, served as a profound spiritual retreat, where devotees sought to purify their inner selves and connect more deeply with the divine.

This description of Khoja Ahmad Yasawi's house suggests that there might be another «Ghar» (room) besides the one in the present-day Khilvet underground mosque. This hypothesis arises because archaeological excavations conducted at the Khilvet underground mosque show that the structure was not a residential building. Today, it is believed that the location of Khoja Ahmad Yasawi's house is around 20-25 meters away from the Khilvet underground mosque, near the site of the «Friday Mosque.»

The researcher of Yasawiya culture, Uzbek scholar M. Khashimov, mentions that the «underground Khilvet mosque» tradition became widespread, and many of Yasawi's followers built several underground

mosques. He explains that this concept originated from the desire of the Sufi ascetics to renounce the fleeting life of this world and seek solitude to connect with Allah (Khashimov, 2001: 164). This leads us to believe that, in the historical region where Khoja Ahmad Yasawi lived, there were many underground mosques and «Ghar» or Shildekhanas (places of spiritual retreat) that remain unknown today.

However, in the Yasawi Sufi teachings, descending underground for seclusion does not imply a complete withdrawal from society or a renunciation of human connection. «Yasawi encourages people not to sit in isolation underground, but to walk among others, live with them, and strive for perfection. 'Khilvet'—the so-called Shildekhana—is simply a forty-day method of spiritual purification» (Kenzhetai, 2008: 231). Thus, in Khoja Ahmad Yasawi's teachings, «entering Khilvet» or worshiping in seclusion became one of the key practices of the Yasawi order. This tradition continued for centuries after Khoja Ahmad Yasawi's death.

Fuat Köprülü provides historical evidence, stating, «Every year, on the tenth day of the month of Zul-Qadha, many people enter Khilvet. Until 1914, five to six thousand people participated in various religious ceremonies and visited the tomb of Ahmad Yasawi» (Köprülü, 1984: 85). In this way, his tomb and Shildekhane continued to be a site of constant visitation, where people would gather for spiritual practices and, through entering Khilvet, would isolate themselves to spiritually purify and train themselves as Sufis.

In the documents of the State Archive of the Russian Federation, from the collection R6991 titled «Council on Religious Affairs under the USSR Council of Ministers, 1943-1991,» there are several records about the Khoja Ahmad Yasawi Mausoleum and the nearby «Big Khilvet» underground mosque. It is clear that this area has historically been considered a sacred site by the people. Therefore, it was under constant surveillance by the Soviet authorities. Even historical data regarding the Khoja Ahmad Yasawi Mausoleum and the «Big Khilvet» underground mosque were collected. For example, the documents in this archive state: «In 1868, there were 20 large mosques and 100 families (or communities) following the path of Khoja Ahmad Yasawi around the Yasawi Mausoleum in Turkestan, while by 1912, the number of mosques in Turkestan increased by 40, and the number of families following Khoja Ahmad Yasawi's path significantly decreased from 100 families. They had transformed into the 'Kalyandars' (Kalyandars – as referred to in the archive documents)» (RF SA, R-6991: 129). This is evidence of the historical significance of the site. The preserved records can be considered valuable information regarding the history of sacred sites in our country.

The archive documents provide the following information about the «Khilvet» underground mosque:

«It is clear that the tombs are considered sacred in the South Kazakhstan region. Such places are well-preserved in this area. The well-known Khoja Ahmad Yasawi tomb in Turkestan is located around 150-200 meters away, where a restoration was carried out by the local mullahs on the 'Hilvat-Magara' (now known as the 'Big Khilvet' underground mosque). By 'restoration,' it is meant that, according to the local spiritual administration, the previously damaged 'Hilvat-Magara' was located precisely here. The old Hilvat-Magara was a dome-like building. One of its inner walls had a door leading to a small room. On the floor of this room, there was a hole leading to an underground chamber. According to the spiritual administration, this is the place where Khoja Ahmad Yasawi spent the last years of his life after the age of 63. Before the revolution, no one was allowed into this Magara. However, the tradition of seclusion, of entering the Khilvet, was well-preserved and lasted from seven to forty days. According to the spiritual administration, this voluntary suffering is said to purify from all sins and enhance the importance of the Magara of Khoja Ahmad Yasawi. After the mosques in Turkestan were closed (1932-1933), the Khilvet building was demolished, its bricks were removed, and the Magara was buried under earth. Today, after the mosque was reopened, the mullahs built a semi-underground structure in the mosque courtyard, measuring 10x7 meters, consisting of two rooms. The first (front room) is called Khilvet, and the second (inner room) has an underground chamber, which is referred to as the Magara. The mullahs claim that after the destruction of the Khilvet building, the Magara was buried under rubble. However, they reconstructed both the Khilvet and the Magara in the mosque courtyard in 1945-1946. In any case, the Muslim mullahs rebuilt the 'Khilvet-Magara' to attract more visitors to the mosque. Currently, the Khilvet-Magara is always locked. The key is held by the local spiritual leader, Aytpay Piradar. When asked by me whether many visitors come to see the Khilvet-Magara, Imam Ibrahim Dykhanbayev responded, 'very few.' However, when Aytpay Piradar opens the locked Khilvet-Magara in the absence of the Imam, he said that there are many visitors, especially during the winter, from countries such

as Uzbekistan and Kyrgyzstan» (RF SA, R-6991: 132). This information was provided to the Chairman of the Council on Religious Affairs under the USSR Council of Ministers, Polyansky, and to N. Sabitov, the authorized representative of the Ministry of Religious Affairs of the Kazakh SSR, by the senior inspector of the Religious Affairs Committee under the Council of Ministers of the Kazakh SSR, in a report dated September 20, 1948. This document accurately describes the condition of the «Great Qilvet» underground mosque during this period.

The first information regarding the destruction of the «Khilvet» underground mosque during the Soviet era can be found in an archival document dated September 20, 1948, written by P. Galikhaydarov, Senior Inspector of the Religious Affairs Directorate under the Council of Ministers of the Kazakh SSR. The document states: The 'Khilvet' underground mosque was destroyed in 1932-1933» (Russian State Archive, R-6991: 132). According to available sources, it is further noted that during the war years, the mosque was destroyed, and its bricks were used in the construction of the «Antibiotic» factory in the city of Turkestan.

Understanding the religious, spiritual, and cultural significance of the «Khilvet» mosque among the local population, the Soviet government continuously monitored and took measures to close and control access to the mosque. The following information appears in a report by N. Sabitov, the representative for Religious Affairs in Kazakhstan under the Council of Ministers of the USSR, dated the second quarter of 1947: "It was reported that worshipers were gathering at the 'Khilvet-khana' (the secluded place of Khoja Ahmed Yasawi) in the city of Turkestan, where they were performing 'zikh' (devotional worship), and an inquiry was sent to the Council and the Spiritual Directorate of the Muslims of Central Asia and Kazakhstan to get their opinion on this matter» (Russian State Archive, R-6991: 201). This shows that the authorities were focused on erasing the practices and importance of the Muslim-Sufi rituals performed at the «Khilvet» mosque, reinforcing the point made above.

It is also documented that "believers in Turkestan city (Southern Kazakhstan region) perform worship at a mosque located 150-200 meters from the Khoja Ahmed Yasawi mosque. Near the mosque, within a 20-meter radius, there is a pit 1.5 meters deep known as the 'Khilvet-khana' (place of seclusion) of Khoja Ahmed Yasawi. Currently, a small construction has been built over this pit by the local imam S. Fakhrutdinov. Every Friday, pilgrims gather here to perform 'zikh.' It is known that 'zikh' is not an inseparable part of worship for all Muslims (this has been decided by the Spiritual Directorate of Muslims of Central Asia and Kazakhstan). The purpose of holding such a ritual here was initiated by the local leaders (the Khojas) in the name of Khoja Ahmed Yasawi. We are awaiting your instructions to implement administrative measures to prohibit this practice» (Russian State Archive, R-6991: 76). This letter, dated September 13, 1947, written to the Chairman of the Religious Affairs Council under the Council of Ministers of the USSR, shows that they had received instructions from higher authorities to enforce anti-religious policies, keeping the mosque and its activities under close surveillance.

The «Big Khilvet» underground mosque was restored between 1945 and 1946 and continued to function in secrecy until 1955, with an increasing number of visitors. In a report dated June 9, 1951, from an official sent on a special mission to Kazakhstan and Kyrgyzstan by the Council of Ministers of the USSR, it is noted: "In the vicinity of the Khoja Ahmed Yasawi mosque, there is an underground 'Big Khilvet,' where believers, on their own initiative, isolate themselves for a certain period to read the Quran. It is known that Khoja Ahmed Yasawi himself once lived in this underground space. The tomb is under the supervision of the Architectural Directorate. To this day, not only pilgrims from Turkestan and nearby regions visit the tomb; but also from Uzbekistan. This pilgrimage brings in significant income for the staff of the tomb» (Russian State Archive, R-6991: 282). This report, with a secret classification, highlights the continuing importance of the site and its growing influence on the local economy

The monitoring of the «Big Khilvet» underground mosque did not stop there. It seems that in every report from the above-mentioned representative, providing information about the sacred site in Turkestan became a mandatory task. The proposal made by the special representative, «...in addition to the registered religious communities, the areas around the tombs (sacred sites) should be strictly monitored» (Russian State Archive, R-6991-c, 3rd, 350th case, 283rd item) is evidence of this.

In 1953, the issue of the «Big Khilvet» underground mosque was raised once again in the confidential report on the state of religious movements and the activities of religious leaders in the South Kazakhstan region, issued by A. Pospelov, the representative of the Religious Affairs Council of the South Kazakhstan

Oblast Committee. The report states: “Relocating the mosque near the Khoja Ahmed Yasawi mausoleum (the 'Big Khilvet' underground mosque) to the Borisovka settlement or a more distant area would reduce the number of worshipers visiting the mausoleum, thus leading to the loss of the significance of the pilgrimage tradition» (Russian State Archive, R-6991: 21). This idea was not left unaddressed, and documents calling for the closure of the underground mosque were sent from the highest levels of the government down to the lower levels. The views among the imams of the «Big Khilvet» mosque regarding its relocation were divided, with many opposing it. Despite the resistance, in 1955, land was allocated 4 km from the Khoja Ahmed Yasawi mausoleum for relocating the active «Big Khilvet» mosque in Turkestan, and the only mosque officially registered at the time was moved there (Russian State Archive, R-6991: 41).

The goal of relocating the «Khilvet» mosque was stated as follows: “To relocate the active 'Big Khilvet' mosque in Turkestan, land was allocated 4 km away from the Khoja Ahmed Yasawi mausoleum. In light of this situation, I ask that you carefully study and clarify the following matters: Once the active «Khilvet» mosque is closed, will the building materials from the old mosque be used for the construction of the new mosque, and will the representatives of the religious community simply agree to the mosque's relocation? As you know, 'Big Khilvet' is not just a building, it is a sacred underground space. Believers do not regard the construction of the 'Big Khilvet' mosque itself as sacred but consider the 'Big Khilvet' (the underground room) to be holy. After the festivals of Ramadan and Eid al-Adha, believers will continue to visit the Khoja Ahmed Yasawi mausoleum as they did before. Please clarify what measures can be taken to stop them from doing so» (Russian State Archive, R-6991: 41). This letter, written on July 2, 1955, by B. Jumashv, the representative of the Religious Affairs Council of the Council of Ministers of the Kazakh SSR, to A. Pospelov, the representative of the South Kazakhstan district Religious Affairs Council, clearly demonstrates the government's intention to enforce its anti-religious policies.

As a result, the mosque, which had long been a center of Turkic-Islamic traditions and religious worldview, was closed under the Soviet government's oppressive policies. However, even during the red campaign era, the underground mosques of Kazakhstan played a significant role as centers where Sufism spread widely and successfully among the people, ensuring the preservation of religious traditions.

Conclusion. Sufism is a path of spiritual self-discipline. On this path, an individual purifies their soul, heart, and spirit from various ailments, renounces worldly desires, and turns towards self-improvement. Analyzing the views of scholars mentioned above, it can be concluded that while there are some differences, the concept of «Khilvet» in the teachings of Khoja Ahmed Yasawi and other Sufi orders is essentially similar, and there are similarities in the tradition of seclusion. To enter the Khilvet, a disciple must meet certain conditions, and after completing the 40-day period of seclusion, there are strict rules to follow for exiting the Khilvet.

Based on historical data and scholarly research, the essential conditions for entering and exiting the Khilvet can be summarized as follows:

Every disciple entering the Khilvet must obtain the permission of the Sheikh (spiritual guide). The Sheikh grants permission only to those disciples who stand out among their peers through their knowledge, attentiveness, and true love for Allah. The Sheikh personally leads the disciple into the underground room, where they perform two rakats of prayer, and only after that can the disciple begin their worship. Every disciple entering the Khilvet is required to purify their mind and heart, refraining from causing harm to others through words or actions. When entering the seclusion space (ghar), the disciple must be clean, in a state of full submission to Allah, and recite the shahada (testification of faith). During the 40 days of seclusion, the disciple must fast and use the fast to restrain their lower desires. The food provided for breaking the fast is strictly regulated: hot water, black or red millet soup, followed by watermelon or ayran. The seclusion space (ghar) must be a dimly lit area, with no external light or air coming in. There should be no windows or openings that allow light to enter. The disciple will engage in zikr (remembrance of Allah) from dawn until sunset, asking Allah for forgiveness of their sins.

The dimensions of the ghar also follow a set rule. The height of the room should be the same as the height of a man, the length should be the same as the distance for prostration, and the width should be sufficient for one person to sit comfortably. The door must face the qibla (the direction of the Kaaba in Mecca), and it must not be tall. No outside sounds or voices should be heard from inside. The door should open and close easily and be lockable. It is permitted to create a ghar within a residential building, and one person

is allowed to remain in the outer room of the ghar for the disciple's safety. However, this person must not disturb or distract the disciple. At the end of the 40 days, the Sheikh enters the ghar to listen to the disciple's dreams and interprets them. On that day, an animal sacrifice is made, and the dervish leaves the seclusion room. The disciple then bathes, changes clothes, and participates in a religious feast, either on the same day or the following day. After completing the 40 days of worship, the disciple gains a certain level of respect and honor within the community.

In this study, an analysis of the Qyluet tradition in Khoja Ahmed Yasawi's Sufi teachings, along with the underground mosque and rooms such as the «Shildekhana» and «Ghar» near the mausoleum, has been conducted, and probable conclusions have been drawn.

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METHODOLOGICAL ASPECTS OF ORGANIZATION OF ACCOUNTING IN THE STATE SECTOR OF THE REPUBLIC OF KAZAKHSTAN: ON CASH BASIS AND ACCRUAL BASIS METHOD OF ACCOUNTING

Abstract. The article is devoted to methodical aspects of recognition and accounting of incomes and expenditures of state institutions in the conditions of reforming the accounting system in the public sector of the Republic of Kazakhstan. The article presents the results of the conducted study on the transition from the cash method to the accrual method in accordance with international standards of financial reporting of the public sector. In the course of the research, methods of critical analysis and comparison of the methodological foundations of historically developed accounting practices and a new evolving accounting system were used.

Keywords: public sector, accounting, cash method, accrual method, international public sector financial reporting standards (IPSAS).

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МЕТОДОЛОГИЧЕСКИЕ АСПЕКТЫ ОРГАНИЗАЦИИ БУХГАЛТЕРСКОГО УЧЕТА В ГОСУДАРСТВЕННОМ СЕКТОРЕ РЕСПУБЛИКИ КАЗАХСТАН: ПО КАССОВОМУ МЕТОДУ И МЕТОДУ НАЧИСЛЕНИЯ

Аннотация. Статья посвящена методическим аспектам признания и учета доходов и расходов государственных учреждений в условиях реформирования системы бухгалтерского учета в государственном секторе Республики Казахстан. В статье представлены результаты проведенного исследования по переходу с кассового метода на метод начисления в соответствии с международными стандартами финансовой отчетности общественного сектора. В ходе исследования использованы методы критического анализа и сравнения методологических основ исторически сложившейся практики учета и новой развивающейся системы учета.

Ключевые слова: государственный сектор, бухгалтерский учет, кассовый метод, метод начисления, международные стандарты финансовой отчетности общественного сектора (МСФООС).

В рамках программы по реформированию системы бухгалтерского учета в государственных учреждениях по переходу на метод начисления были определены задачи по формированию и внедрению новых правил ведения бухгалтерского учета и других нормативно-правовых актов по организации бухгалтерского учета и формированию финансовой отчетности в соответствии с новой методологической основой.

Исторически сложившаяся методологическая основа бухгалтерского учета в государственных учреждениях по кассовому методу позволяла выполнять первоочередные задачи по обеспечению отчетной информации о выполнении планов финансирования и контроля за целевым использованием бюджетных ресурсов.

В статье "Transition to Accrual Accounting. Technical notes and manuals", подготовленной сотрудниками Fiscal Affairs Department IMF Abdul Khan и Stephen Mayes, подчеркивается важность перехода на метод начисления: "На макрофискальном уровне важность учета в соответствии с методом начисления обусловлена тем, что активы и обязательства представляют собой общую позицию фискальной политики и характеризуют финансовую устойчивость, которые также не должны учитываться кассовым методом, в связи с необходимостью систематического определения полных затрат, связанных с деятельностью правительства. Полная оценка стоимости (включая не денежные расходы, такие как амортизация и начисление пенсии государственным служащим) имеют большое значение для оценки эффективности государственных услуг".

В условиях организации бухгалтерского учета государственных учреждений по кассовому методу в качестве методологической основы для учета расходов была принята классификация по источникам финансирования.

Данный методологический подход позволял осуществлять учет и оперативный контроль по целевому использованию выделенных бюджетных средств, поскольку счета учета по каждому виду расходов прямо корреспондировали с соответствующими счетами выделенного финансирования.

Для бухгалтерского учета процессов бюджетного финансирования государственными учреждениями были предусмотрены следующие счета раздела "Финансирование": финансирование из бюджета на расходы государственного учреждения и другие мероприятия; финансирование из бюджета на капитальные вложения; финансирование из других бюджетов; финансирование по трансфертам; прочие средства на содержание государственного учреждения; финансирование проектов из средств внешних займов и связанных грантов [1].

Для учета расходования бюджетных средств государственными учреждениями были предусмотрены счета бухгалтерского учета, позволяющих отражать процесс использования бюджетных средств по кассовому методу в целях сопоставления величин полученного финансирования и их целевого использования.

Для целей бухгалтерского учета расходов государственных учреждений были предусмотрены следующие счета, которые были объединены в единую группу, именуемую "Расходы по бюджету" [1]:

В конце отчетного периода счета учета расходов закрывались на соответствующие счета учета полученного финансирования, что позволяло оценить их целевое использование.

Таким образом, отличительной особенностью ранее существовавшей системы бухгалтерского учета по кассовому методу являлось признание и последующее закрытие счетов учета расходов на счета учета соответствующего вида финансирования, что не было направлено на определение финансовых результатов по отчетным периодам.

Метод начисления направлен на признание и правильное соотнесение доходов и расходов по отчетным периодам в целях оценки эффективности использования ресурсов.

В статье Yuri Biondi and Michela Soverchia "Accounting Rules for the European Communities: A Theoretical Analysis" отмечается: Система учета должна сначала устанавливать расходы, которые соответствуют определенному периоду, а затем сопоставлять доходы, полученные за этот период. Это сопоставление на основе периода позволяет избежать трудности, связанные с определением времени признания расходов, понесенных в течение периода с тем, чтобы соответствовать видам деятельности (Anthony, 1978). Доходы и расходы могут быть сопоставлены с учетом периода возникновения в качестве справочной информации. Таким образом, расходы считаются не связанными с доходами. Доходы затем сопоставляются не только с расходами и соответствующими

видами деятельности, но и с периодом их возникновения (обычно это делается для целей налогообложения и ассимилированных поступлений) [3].

В условиях перехода на метод начисления в соответствии с новой методологической основой учет расходов в государственных учреждениях организован по отдельным счетам для учета затрат по статьям, по видам затрат.

Таким образом, в рамках новой методологической основы учет расходов государственного учреждения организован по видам затрат и счета для учета расходов предназначены для учета расходов отдельно на статьях: на оплату труда (заработной плате), по амортизации долгосрочных активов, по социальному налогу, по аренде, по коммунальным платежам и др.

В соответствии с новой методологической основой счета для учета расходов государственных учреждений прямой взаимосвязи со счетами соответствующих видов финансирования не имеют, и соответственно прямо не корреспондируют со счетами финансирования, а позволяют определять финансовый результат в конце отчетного периода по методу начисления путем закрытия счетов учета расходов и доходов на итоговый счет учета финансового результата отчетного года.

Для раскрытия полной информации каждый субъект должен представить непосредственно в самом отчете о результатах финансовой деятельности, либо в пояснительной записке разбивку расходов на подклассы, используя классификацию, основанную на характере затрат, либо по их функциональному назначению.

Статьи расходов разбиваются на подклассы для того, чтобы выделить издержки и возмещение издержек по конкретным программам, видам деятельности или другим сегментам.

Для учета расходов предусмотрены счета, распределенные по классификационным группам: операционные расходы, расходы по бюджетным выплатам, расходы по управлению активами, прочие расходы.

Подраздел "*Операционные расходы*" включает отдельные статьи по видам затрат: расходы на оплату труда; расходы по выплате стипендии; расходы на дополнительно установленные пенсионные взносы; расходы на социальный налог; расходы на обязательное страхование; расходы по запасам; расходы на командировки; расходы по коммунальным платежам и прочим услугам; расходы на текущий ремонт; расходы по амортизации долгосрочных активов; расходы по расчетам с бюджетом; расходы по аренде; прочие операционные расходы.

Подраздел "*Расходы по бюджетным выплатам*" содержит следующие статьи: Расходы по трансфертам; Расходы по выплатам пенсий и пособий; расходы по субсидиям; расходы по выплате субвенций.

Подраздел "*Расходы по управлению активами*" включает статьи: расходы по вознаграждениям; прочие расходы по управлению активами.

Подраздел "*Прочие расходы*" состоит из статей по учету расходов от изменения справедливой стоимости; расходов по выбытию долгосрочных активов; расходов по курсовой разнице; расходов от обесценения активов; расходов по созданию резервов и прочих расходов.

Переход на метод начисления позволяет включать в состав доходов в отчете о результатах финансовой деятельности доходы от управления активами, в том числе поступления части чистого дохода объекта инвестиции, дивиденды на государственные пакеты акций и доходы на доли участия в юридических лицах, доходы от аренды имущества, являющиеся доходами бюджета [2].

Структура отчета о результатах финансовой деятельности государственного учреждения также построена по видам затрат, что позволяет как существенно упростить составление отчета, так и повысить прозрачность в целях реализации принципов полноты, ясности, подконтрольности и подотчетности. Так разделы "Расходы государственного учреждения" и "Расходы по бюджетным выплатам" содержат постатейную классификацию расходов, позволяя осуществить принцип представления отчета о результатах финансовой деятельности по видам затрат [2].

Подраздел "*Расходы государственного учреждения*" включает следующую постатейную разбивку: оплата труда; стипендии; налоги и платежи в бюджет; расходы по запасам; командировочные расходы; коммунальные расходы; арендные платежи; содержание долгосрочных активов; услуги связи; амортизация активов; обесценение активов; прочие операционные расходы.

Подраздел "*Расходы по бюджетным выплатам*" содержит информацию в разрезе следующих статей: пенсии и пособия; субсидии; трансферты.

Доходы в отчете о результатах финансовой деятельности представлены в разрезе трех групп: доходы от обменных операций, доходы от необменных операций и доходы от управления активами.

Подраздел "*Доходы от необменных операций*" содержит следующие статьи: финансирование текущей деятельности; финансирование капитальных вложений; трансферты; спонсорская и благотворительная помощь и другие.

Подраздел "*Доходы от обменных операций*" включает: доходы от реализации товаров, работ, услуг; доходы по вознаграждениям; прочие доходы от управления актива [2].

Для бухгалтерского учета доходов государственных учреждений предусмотрены счета, позволяющие разграничить доходы от необменных операций и доходы от обменных операций. Для учета *доходов от необменных операций* предусмотрены отдельные счета по видам доходов: доходы от финансирования текущей деятельности; доходы от финансирования капитальных вложений; доходы по трансфертам; доходы от финансирования по выплате субсидий; доходы от спонсорской и благотворительной помощи; доходы по грантам; доходы от финансирования за счет внешних займов; прочие доходы от необменных операций. И отдельно предусмотрен счет для корректировки признанного дохода в случае, если имеет место возврат остатков бюджетных средств.

Для учета доходов от обменных операций предусмотрены счета для учета доходов от реализации товаров, работ и услуг; доходов по вознаграждениям; прочим доходам от управления активами. И отдельно для учета прочих доходов, связанных в основном с необходимостью корректировки стоимости статей в соответствии с требованиями международных стандартов и с не денежными статьями доходов, в том числе: доходов от изменения справедливой стоимости; доходов от выбытия долгосрочных активов; доходов от безвозмездного получения активов; доходов от курсовой разницы; доходов от компенсации убытков и прочих доходов [3].

Бухгалтерский учет доходов и расходов по необменным операциям. Финансирование государственных учреждений классифицируется по видам: финансирование операционной деятельности и финансирование капитальных вложений.

Финансирование операционной деятельности направлено на расходование выделенных средств в объеме плановых назначений на оплату обязательств государственного учреждения в соответствии с планом. Ежемесячно на сумму выделенного финансирования операционной деятельности государственным учреждением признается доход в текущем периоде, корреспонденциями по дебету счетов учета плановых назначений (денежных средств) и по кредиту счетов учета доходов от финансирования операционной деятельности.

По учету доходов от финансирования капитальных вложений была определена следующая учетная проблема: отчетный период, в котором выделено финансирование, не совпадает с отчетным периодом, в котором будут оказаны услуги или выполнены работы.

Таким образом, установленный порядок бухгалтерского учета доходов от финансирования на капитальные вложения не направлено на решение задачи по правильному признанию и соотношению доходов и расходов по отчетным периодам.

В процессе реформирования учетной системы в целях постепенного перехода на метод начисления были последовательно применены два варианта признания и учета операций по финансированию капитальных вложений.

На первом этапе реформирования системы бухгалтерского учета с 1 января 2013 года по 1 января 2016 год был разработан первый вариант переходных правил по учету финансирования капитальных вложений с целью обеспечения плавного, постепенного перехода с кассового метода на метод начисления в государственном секторе экономики [3, 4].

В соответствии с первоначально принятым вариантом учета суммы полученного финансирования на капитальные вложения признавались по кредиту счета 5011 "Финансирование капитальных вложений", представляющей собой балансовую статью раздела "Чистые активы/капитал" с последующим списанием на счета учета доходов (счет 6020 "Доходы от финансирования капитальных вложений") в сумме, равной начисленным расходам по амортизации [3, 4].

Это позволило на первом этапе реформы сбалансировать (уравновесить) признание расходов по амортизации долгосрочных активов и сумм признанного дохода по отчетным периодам. Данный подход близок к модифицированному методу начисления.

Первоначальный вариант по бухгалтерскому учету финансирования капитальных вложений практически был заимствован из практики учета государственных субсидий в частном секторе, что также свидетельствует о возможных ситуациях по конвергенции методологических положений международных стандартов для частного (МСФО) и государственного секторов (МСФООС).

Бухгалтерский учет доходов и расходов по обменным операциям, учет расчетов с бюджетом по суммам, являющихся доходами бюджета. Особенностью организации бухгалтерского учета государственным учреждением расчетов с бюджетом по доходам, подлежащим перечислению в бюджет, является принятие методологического подхода по одновременному признанию начисленных доходов от обменных операций и начисленных расходов по соответствующим доходам, подлежащим перечислению в бюджет.

Данный методологический подход позволяет не только одновременно признавать дебиторскую задолженность по начисленным доходам, но и кредиторскую задолженность по расчетам с бюджетом. Содержание данного методологического подхода может быть проиллюстрирована на следующем примере. Этот методологический подход содержит несколько преимуществ.

Во-первых, позволяет учитывать не только доходы и расходы отдельного государственного учреждения с точки зрения относительной обособленности субъектов учета с наделенными обособленными ресурсами, но и доходы от обменных операций, администрируемых государственными учреждениями, но являющихся доходами бюджета.

Во-вторых, одновременное признание начисленных доходов и расходов позволит при консолидации одновременно исключить взаиморасчеты между "Поставщиком ресурсов" и "Получателем ресурсов", а также соответствующими финансовыми органами.

При начислении доходов от обменных операций составляется бухгалтерская запись по дебету счетов учета дебиторской задолженности 1231 "Краткосрочная дебиторская задолженность покупателей и заказчиков" и по кредиту счетов учета доходов от обменных операциям, одновременно производится признания обязательства государственного учреждения перед бюджетом по средствам, поступившим от реализации активов, отражается записью: дебет счета 7120 "Расходы по расчетам с бюджетом" и кредит субсчета 3131 "Краткосрочная кредиторская задолженность перед бюджетом по доходам от реализации активов".

При погашении кредиторской задолженности перед бюджетом составляется запись по дебету субсчета 3131 "Краткосрочная кредиторская задолженность перед бюджетом по доходам от реализации активов" и кредиту субсчета 1231 "Краткосрочная дебиторская задолженность покупателей и заказчиков", соответствующего субсчета/счета денежных средств плана счетов [5, 6].

Применяемый на первом этапе реформы методологический подход позволял сопоставлять доходы и расходы по периодам в равных суммах, т.е. их уравновесить, что для составителей финансовой отчетности государственных учреждений, применявших до реформы кассовый метод признания доходов и расходов, было более привычным и понятным.

На втором этапе реформы были внесены изменения по признанию операций по финансированию капитальных вложений.

С учетом внесенных изменений в Правила ведения бухгалтерского учета суммы выделенного финансирования по капитальным вложениям на бюджетный счет государственного учреждения подлежат признанию в составе доходов: по дебету счетов учета плановых назначений, по кредиту счета учета доходов 6020 "Доходы от финансирования капитальных вложений" [3, 4].

По результатам проведенного исследования следует определить следующие методологические аспекты развивающейся учетной системы в государственном секторе Республики Казахстан:

– во-первых, при переходе от кассового метода на метод начисления был изменен классификационный подход по учету доходов и расходов от классификации, позволяющей учет расходов вести в тесной увязке по источникам финансирования, до подробной классификации расходов в разрезе по видам затрат;

– во-вторых, от промежуточного варианта организации учета доходов и расходов по капитальным вложениям, отражающий модифицированный метод начисления, перейти к полному соответствию требованиям метода начисления;

– в-третьих, возможность применить методологические подходы по признанию неденежных статей доходов и расходов, в том числе таких, как расходов по амортизации долгосрочных активов,

расходов по обесценению активов, доходов и расходов от корректировки стоимости активов по справедливой стоимости, курсовой разницы и других;

– в четвертых, проводится большая работа по созданию Единого балансодержателя, что имеет в основе новую методологическую основу по передаче и признанию активов на балансе у единого уполномоченного государственного органа.

Таким образом, финансовая отчетность, подготовленная на основе метода начисления, позволяет реализовать концептуальные принципы в отношении учета общественных ресурсов, а также оценивать эффективность деятельности, и оценки не только с точки зрения их целевого, но и их эффективного использования.

Реформирование системы бухгалтерского учета направлено на решение актуальных задач по оценке эффективности использования бюджетных средств, и позволит в дальнейшем перейти к внедрению системы бюджетирования, ориентированного на результат, что представляет собой основу для повышения уровня управления, подотчетности и контроля в государственном секторе экономики.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫ МЕМЛЕКЕТТІК СЕКТОРЫНДАҒЫ БУХГАЛТЕРЛІК ЕСЕПТИҢ ӘДІСТЕМЕЛІК АСПЕКТІЛЕРІ: КАССАЛЫҚ ӘДІСІ ЖӘНЕ ЕСЕПТЕУ ӘДІСІ

Аннотация. Мақалада Қазақстан Республикасының мемлекеттік секторында бухгалтерлік есеп жүйесін реформалау жағдайында мемлекеттік институттардың кірістер мен шығыстарды есепке алудың әдістемелік аспектілеріне арналған. Мақала мемлекеттік сектордың халықаралық қаржылық есеп стандарттарына сәйкес қассалық әдістен есептеу әдісіне көшу бойынша зерттеу нәтижелерін ұсынады. Зерттеу барысында жаңа дамып жатқан бухгалтерлік есеп жүйесін және тарихи тәжірибесінің әдістемелік негіздерін салыстыру әдістері және сыни талдау қолданылды.

Түйін сөздер: мемлекеттік сектор, есепке алу, қассалық әдісі, есептеу әдісі, мемлекеттік сектор халықаралық қаржылық есеп стандарттары (ҚСХҚЕС).

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THE ELECTRODEPOSITION OF GALLIUM SELENIDE

Abstract. The electrochemical deposition of gallium selenide on a glassy carbon electrode from sulphate electrolytes at a constant potential was carried out. The cyclic voltammetric curves of the glassy carbon electrode in two different electrolytes were studied: sulfuric acid and citrate buffer solution containing gallium and selenium ions. The influence of change in the concentration of gallium ions and the deposition potential on the composition of the resulting precipitate is studied. Increasing of the gallium ions concentration from $6 \cdot 10^{-3}$ M to $1 \cdot 10^{-1}$ M at a constant concentration of selenium ions $2 \cdot 10^{-3}$ M in the electrolyte leads to an increase in the gallium content in the deposit composition. It is established that in order to obtain the stoichiometric composition of the film, the content of gallium (III) ions in the electrolyte must be many times higher than the content of selenium (IV) ions. The results of elemental analysis of the precipitate confirmed that a film of gallium selenide with a content of 26.7 at% gallium was obtained at a ratio of the concentration of gallium ions and selenium of 50: 1 in the sulphate electrolyte at a potential of -0.8 V. Investigation of the morphology of the surface showed that a uniform coating of the surface of the glassy carbon electrode is achieved at potentials of -0.8 and -0.9 V. X-ray phase analysis confirmed the presence of the Ga_2Se_3 phase in the resulting films.

Keywords: gallium selenide, electrodeposition, voltamperometry.

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ЭЛЕКТРООСАЖДЕНИЕ СЕЛЕНИДА ГАЛЛИЯ

Аннотация. Проведено электрохимическое осаждение селенида галлия на стеклоуглеродном электроде из сернокислых электролитов при постоянном потенциале. Исследованы циклические вольтамперные кривые стеклоуглеродного электрода в двух различных электролитах: сернокислом и цитратном буферном растворе, содержащих ионы галлия и селена. Исследовано влияние изменения концентрации ионов галлия и потенциала осаждения на состав получаемого осадка. Увеличение концентрации ионов галлия от $6 \cdot 10^{-3}$ до $1 \cdot 10^{-1}$ M при постоянной концентрации ионов селена $2 \cdot 10^{-3}$ M в электролите приводит к увеличению содержания галлия в составе осадка. Установлено, что для получения стехиометрического состава пленки содержание ионов галлия (III) в электролите должно во много раз превышать содержание ионов селена (IV). Результаты элементного анализа осадка подтвердили, что при соотношении концентраций ионов галлия и селена 50:1 в сернокислом электролите, при потенциале -0,8В получили пленку селенида галлия с содержанием 26,7 ат% галлия. Исследование морфологии поверхности показало, что однородное покрытие поверхности стеклоуглеродного электрода достигается при потенциалах -0,8 и -0,9 В. Рентгенофазовый анализ подтвердил наличие фазы Ga_2Se_3 в полученных пленках.

Ключевые слова: селенид галлия, электроосаждение, вольтаперметрия.

Введение. Полупроводниковые соединения III-VI группы привлекают большое внимание исследователей благодаря подходящим структурным и оптическим свойствам для применения в фотоэлектронных преобразователях [1]. К этой группе относятся моноселенид галлия GaSe, который имеет гексагональную структуру с оптической шириной запрещенной зоны 2,1 эВ, и

содержит слои Se-Ga-Ga-Se и диселенид галлия Ga_2Se_3 , который имеет кубическую структуру с шириной запрещенной зоны 1,8-2,6 эВ [2, 3] и кристаллизуется в α -и β -структурных модификациях. В структуре Ga_2Se_3 одна треть катионных центров свободна, поэтому структура соединения является дефектной. В свою очередь дефектные соединения используются в оптоэлектронных устройствах для пассивации гетерогенных соединений, для переключения памяти светоизлучающих диодов [4], в сочетании с подложкой GaP [5]. Существует множество методов получения селенида галлия. К таким методам относится химическое осаждение из паровой фазы (CVD) [6], химический перенос пара в вакууме [7], парофазная эпитаксия [8], гетеровалентная реакция обмена V-VI [9], термическое испарение [10], молекулярно-пучковая эпитаксия [11, 12]. Самый известный метод Стокбаргер-Бриджмена [13] получения монокристаллов селенида галлия Ga_2Se_3 представляет собой синтез при направленной кристаллизации, когда в специальной печи протягивается кварцевая ампула с материалом и нагревается до 1473 К с последующим медленным снижением температуры. Этот метод требует высокой чистоты материалов, высокого вакуума и температуры. Тонкие пленки Ga_2Se_3 могут быть получены золь-гель методом при температуре образования кристаллов [14]. По сравнению с выше-описанными, метод электроосаждения из водных растворов для получения тонких пленок на проводящих подложках обладает рядом преимуществ и относится к недорогим методам, позволяя контролировать толщину, морфологию и состав пленки в процессе осаждения [15-17].

В настоящей работе рассмотрены условия электроосаждения селенида галлия на стеклоуглеродном электроде при постоянном потенциале.

Методы исследования. Вольтамперные измерения на дисковом стеклоуглеродном электроде с площадью $0,07 \text{ см}^2$ и электроосаждение селенида галлия на плоских стеклоуглеродных пластинах, площадью $1,0 \text{ см}^2$, выполнялись в трехэлектродной термостатированной стеклянной ячейке с использованием хлорсеребряного электрода сравнения и платинового противоэлектрода. Перед экспериментом электроды обрабатывали тонкой абразивной бумагой 2000, промывали дистиллированной водой и сушили на воздухе. В качестве фоновых электролитов использовали серноокислый электролит с $\text{pH}=2,2$ ($0,45\text{M Na}_2\text{SO}_4 + 0,05\text{M H}_2\text{SO}_4$) и цитратный буферный электролит с $\text{pH}=2,92$. Последний готовили из 39,3 мл 0,1М цитрата натрия и 60,7 мл 0,1н HCl. Использовали растворы солей галлия и селена марки (ч.д.а) 0,1М $\text{Ga}_2(\text{SO}_4)_3$, 0,1М NaHSeO_3 и 1М GaCl_3 . В исследованных электролитах изменяли концентрацию ионов галлия от $6 \cdot 10^{-3}$ до $1,2 \cdot 10^{-1}$ М и поддерживали постоянную концентрацию ионов селена ($2 \cdot 10^{-3}$ М).

Электроосаждение селенида галлия проводилась при постоянном потенциале, который поддерживался с помощью потенциостата GillAC с программным обеспечением ACM Instruments Version 5 и при температуре 70°C , которая поддерживалась с помощью термостата LOIP, перемешивание электролита осуществляли магнитной мешалкой MM3M. После осаждения пленки промывали в дистиллированной воде и сушили на воздухе. Элементный анализ на содержание компонентов и микрофотографии поверхности пленок селенида галлия были получены с помощью электронного сканирующего микроскопа с возможностями микроанализа «JSM6610 LV» фирмы JEOL (Япония). Фазовый состав пленок определяли с помощью прибора ДРОН-4/07 с Co-трубкой.

Результаты и обсуждение

Вольтамперные измерения на дисковом стеклоуглеродном электроде. Для определения влияния концентрации компонентов в электролите на процесс электрохимического восстановления ионов были записаны циклические вольтамперные зависимости (ЦВА) стеклоуглеродного электрода в серноокислом электролите и в цитратном буферном растворе. Скорость сканирования потенциала составляла 20 мВ/с в интервале от 0 до $-1,0\text{В}$, и при обратной развертке потенциала от $-1,0$ до $+1,2\text{В}$. Исследовали электролиты с различной концентрацией ионов галлия ($6 \cdot 10^{-3}$ М, $1,2 \cdot 10^{-2}$ М, $6 \cdot 10^{-2}$ М, $8 \cdot 10^{-2}$ М, $1 \cdot 10^{-1}$ М и $1,2 \cdot 10^{-1}$ М) при постоянной концентрации ионов селена ($2 \cdot 10^{-3}$ М).

На рисунке 1 приведены ЦВА стеклоуглеродного электрода при восстановлении ионов Se(IV) и Ga(III), снятые в серноокислом электролите. Из рисунка видно, что катодный ток возрастает уже при 0В потенциала, что свидетельствует о восстановлении Se(IV), которое начинается при более положительных потенциалах. На врезке рисунка 1 приведена ЦВА восстановления Se(IV) ($2 \cdot 10^{-3}$ М)

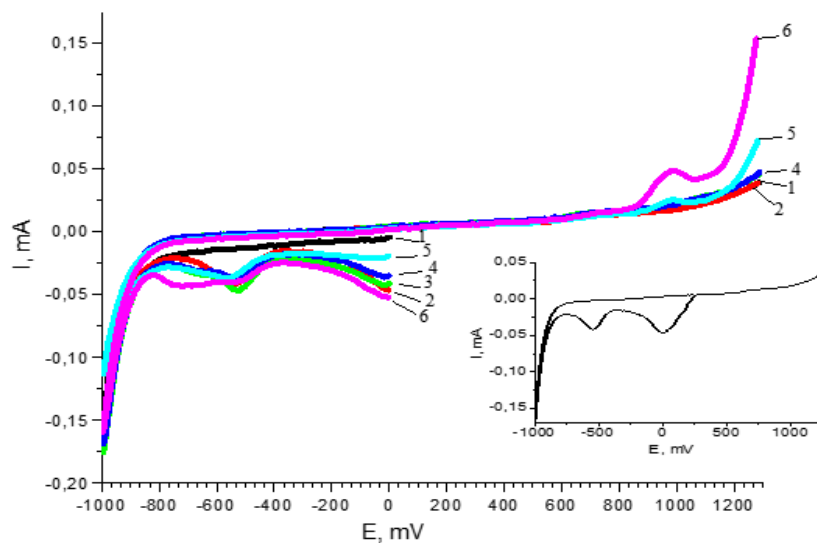


Рисунок 1 – ЦВА стеклоглеродного электрода в сернокислом электролите при различных концентрациях ионов селена и галлия: 1 – фон; 2 – 6 – Se(IV) – $2 \cdot 10^{-3}$ М; Ga(III): 3 – $6 \cdot 10^{-3}$; 4 – $1,2 \cdot 10^{-2}$; 5 – $8 \cdot 10^{-2}$; 6 – $1,0 \cdot 10^{-1}$ М.
Врезка: Se(IV) – $2 \cdot 10^{-3}$ М

на фоне сернокислого электролита, снятая при катодной развертке потенциала от +0,3 до -1,0 В. Восстановление Se(IV) сопровождается также появлением двух пиков тока при потенциалах около нуля В и при потенциале -0,5 В. Процессы восстановления и стандартные потенциалы описываются уравнениями:



В области потенциалов -0,5В возможно восстановление Se(IV) по уравнениям (2 и 3) с образованием селенид ионов.

Ионы галлия не восстанавливаются на стеклоглеродном электроде в изученном интервале потенциалов (рисунок 2). ЦВА стеклоглеродного электрода в сернокислом электролите демонстрируют отсутствие пиков тока при изменении концентрации ионов галлия от $5 \cdot 10^{-4}$ до $1 \cdot 10^{-2}$ М.

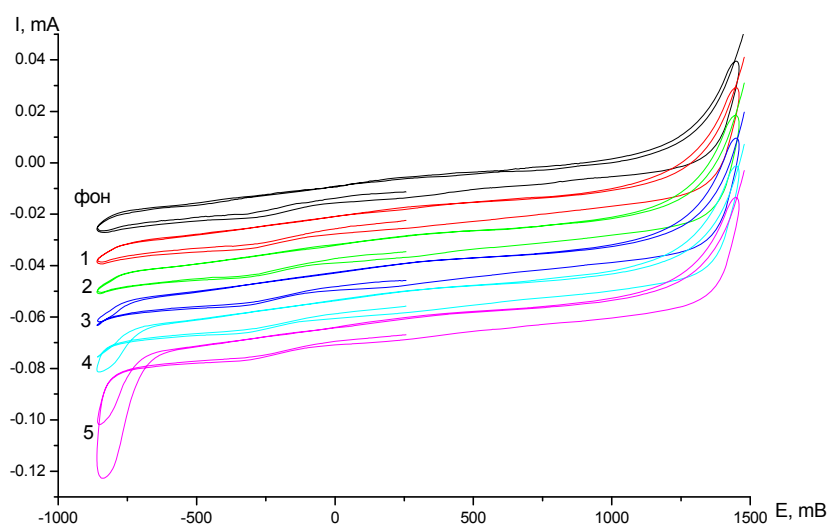
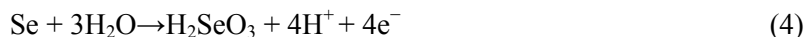


Рисунок 2 – ЦВА стеклоглеродного электрода в сернокислом электролите при различном содержании ионов галлия Ga(III): 1 – $5 \cdot 10^{-4}$; 2 – $1 \cdot 10^{-3}$; 3 – $2 \cdot 10^{-3}$; 4 – $5 \cdot 10^{-3}$; 5 – $1 \cdot 10^{-2}$ М

При добавлении ионов галлия в электролит (рисунок 1, кривые 3-6) меняется ток первого пика, форма пика тока при $-0,5\text{В}$ становится сглаженной, ток восстановления продолжается до $-0,85\text{В}$ и достигает области восстановления водорода.

Анализ анодной части ЦВА свидетельствует, что при максимальном содержании галлия в электролите, равном $1 \cdot 10^{-3}\text{М}$ на электроде осаждается максимальное количество селена в составе соединения с галлием. Селен из соединения окисляется при потенциалах, близких к $+1,0\text{В}$.



Полученные результаты свидетельствуют о том, что образование соединения протекает при потенциалах $-0,8$ и $-0,9\text{В}$ с участием ионов селенида за счет химической реакции положительно заряженных ионов галлия с отрицательно заряженными ионами селена.

ЦВА в цитратном буферном растворе показали, что при совместном присутствии ионов селена и галлия в электролите токи восстановления увеличиваются при увеличении концентрации галлия. При содержании Ga(III) $6 \cdot 10^{-3}$ – $1,2 \cdot 10^{-2}$ профиль кривых совпадает с приведенными на рисунке 1 для сернокислого электролита. При увеличении концентрации галлия (рисунок 3, кр. 3, 4) до $8 \cdot 10^{-2}\text{М}$ токи восстановления при $E = -0,5\text{В}$ увеличиваются, и при $E = -0,85\text{В}$ появляется дополнительный четко выраженный пик тока, который может характеризовать восстановление ионов галлия на стеклоглеродном электроде, покрытом селеном. Анализ анодной ветви ЦВА также показывает, что на электроде в процессе восстановления формируется осадок соединения селена с галлием, потенциал окисления которого лежит в области потенциала $+1,0\text{В}$ (рисунок 3).

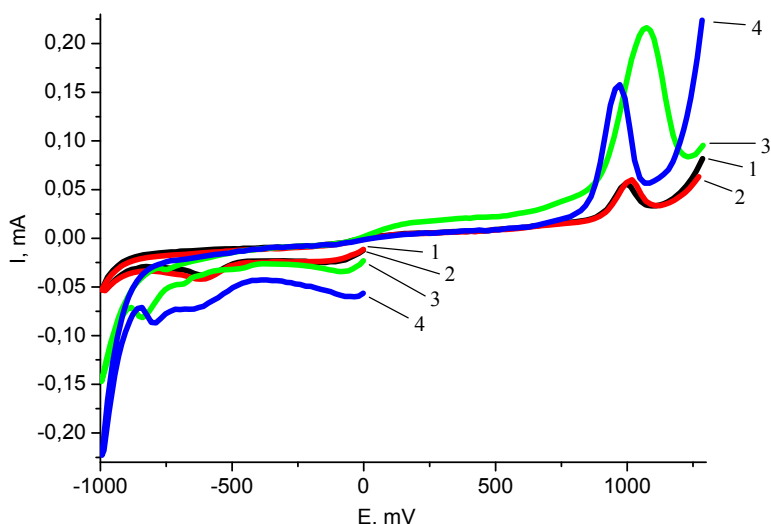


Рисунок 3 – ЦВА стеклоглеродного электрода в цитратном буферном растворе при постоянной концентрации ионов селена и различных концентрациях галлия.
1–4 – $\text{Se(IV)} = 2 \cdot 10^{-3}\text{М}$; Ga(III) : 1 – $6 \cdot 10^{-3}$; 4 – $1,2 \cdot 10^{-2}$; 5 – $6 \cdot 10^{-2}$; 6 – $8 \cdot 10^{-2}\text{М}$

На основе полученных результатов выбрана область потенциалов $-0,8$ – $-0,9\text{В}$ для проведения потенциостатического осаждения соединения галлия с селеном на стеклоглеродном электроде.

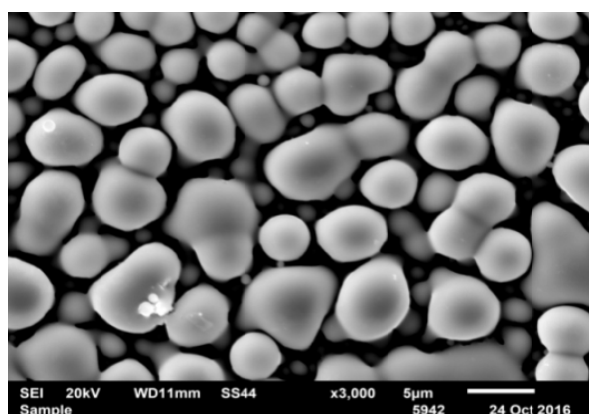
Электроосаждение селенида галлия в сернокислом электролите. Электроосаждение проводили при концентрации ионов галлия $6 \cdot 10^{-3}\text{М}$ и $2 \cdot 10^{-3}\text{М}$ ионов селена, при потенциале $-0,8\text{В}$ и температуре 70°C . Полученную пленку исследовали с помощью электронного сканирующего микроскопа с возможностями микроанализа, который показал $0,03\text{ат}\%$ содержание галлия. В дальнейшем увеличили концентрацию ионов галлия от до $1,2 \cdot 10^{-2}\text{М}$ и выполнили электроосаждение при потенциалах $-0,8$ и $-1,2\text{В}$. Исследованы элементный состав и сделаны микрофотографии поверхности полученных пленок (таблица 1).

Из таблицы 1 видно, что содержание галлия увеличилось в осадке до $\sim 0,5\text{ ат}\%$, сдвиг потенциала восстановления в отрицательную сторону слабо влияет на увеличение содержания галлия.

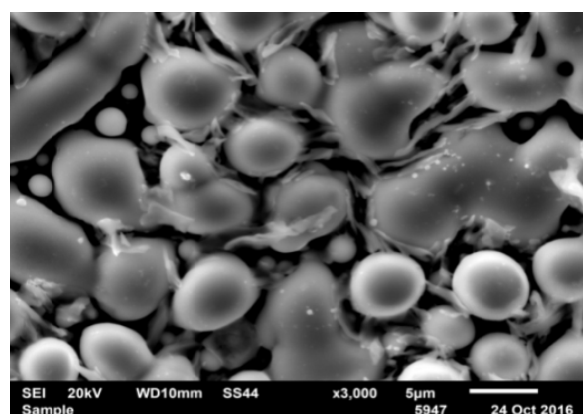
Микрофотография поверхности полученного образца, представленные на рисунке 4а, свидетельствует, что наблюдается образование отдельных, крупных зерен с диаметром $4,2$ – $3,3\text{ мкм}$.

Таблица 1 – Элементный состав свежесажженной пленки селенида галлия на стеклоглереде при различных потенциалах

Подложка	Условия электроосаждения	Состав электролита
СУ-93	E=-0,8В T=70°C t = 30 минут	Ga - 0,51% Se - 99,49%
СУ-94	E=-1,2В T=70°C t = 30 минут	Ga - 0,54% Se - 99,41%



а



б

Рисунок 4 – Микрофотография поверхности пленок (при увеличении в 3000 раз):
а – при потенциале -0,8В; б – при потенциале -1,2В

Восстановление при потенциале -1,2 В, когда начинается параллельное восстановление водорода, приводит к нарушению однородности осадка за счет образования нитевидных волокон (рисунок 4б).

В последующих экспериментах увеличивали содержание ионов галлия в электролите, при сохранении постоянной концентрации ионов селена, равной $2 \cdot 10^{-3}$ М. В таблице 2 приведены результаты анализа состава осажденных пленок при потенциалах -0,8В, -0,9В, -1,0В. Лучший результат по содержанию галлия 7,2% показал эксперимент, проведенный при потенциале -0,8В.

Микрофотографии, приведенные в таблице 2, свидетельствуют о том, что величина зерна полученного осадка зависит от потенциала осаждения и от содержания галлия в осажденной пленке селенида галлия.

В дальнейших экспериментах использовали раствор 1М GaCl₃ в качестве источника ионов галлия, и увеличили их концентрацию в электролите до $1,0 \cdot 10^{-1}$ М при постоянной концентрации ионов селена $2 \cdot 10^{-3}$ М. Электрохимическое осаждение селенида галлия было выполнено при потенциалах -0,8 и -0,9В. Использовали очищенные, отполированные стеклоглереде подложки. После электроосаждения получили однородные, плотные пленки красно-коричневого цвета и исследовали их состав и поверхность методом сканирующей электронной микроскопии.

Из таблицы 3 видно, что при потенциале -0,8В в течение 30 минут при концентрации $1,0 \cdot 10^{-1}$ М GaCl₃ и $2 \cdot 10^{-3}$ М NaHSeO₃ на стеклоглереде электроде получена пленка с максимальным содержанием галлия (26,7ат%). На рисунке 5 приведены микрофотографии поверхности пленок селенида галлия, осажденных по условиям таблицы 3. Из рисунка видно, что равномерное распределение глобул нарушается скоплениями крупных кристаллов, состоящих из более мелких частиц. На рисунке 5в отмечено появление дендритов в виде цветков, что характерно для осажденных пленок галлия с селеном.

Таблица 2 – Элементный состав свежесажженной пленки селенида галлия на стеклоглереде при различных потенциалах и микрофотографии поверхности.

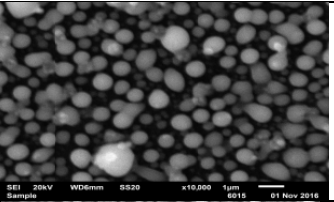
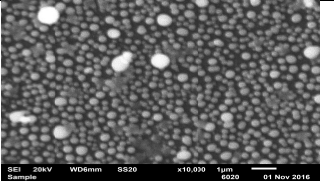
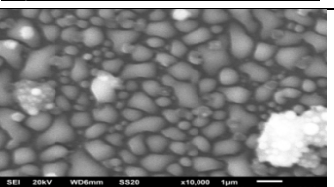
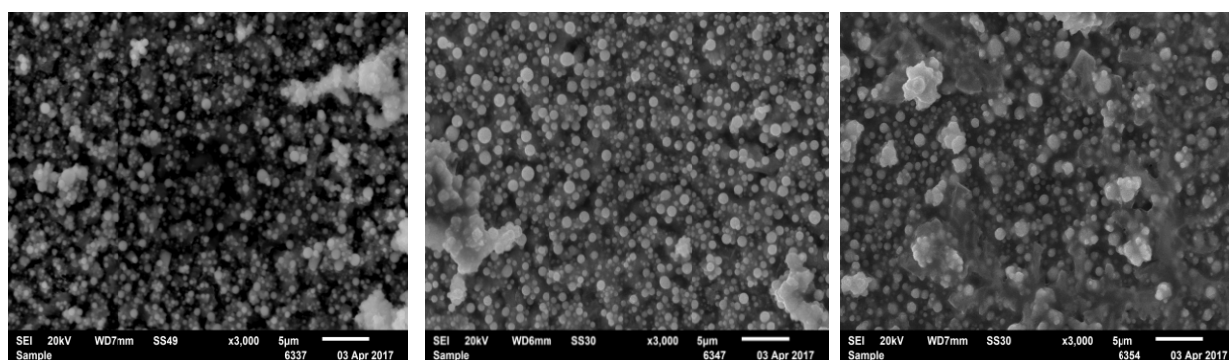
Подложка	Условия электроосаждения	Состав электролита	Содержание в осадке, ат%	Микрофотографии
СУ-95	E=-1,0В T=70°C t=30минут	$6 \cdot 10^{-2}$ М Ga ₂ (SO ₄) ₃ $2 \cdot 10^{-3}$ М NaHSeO ₃	Ga -6,7; Se -93,3	
СУ-96	E=-0,9В T=70°C t=30минут	$6 \cdot 10^{-2}$ М Ga ₂ (SO ₄) ₃ $2 \cdot 10^{-3}$ М NaHSeO ₃	Ga-4,5 Se-95,5	
СУ-97	E=-0,8В T=70°C t=30минут	$6 \cdot 10^{-2}$ М Ga ₂ (SO ₄) ₃ $2 \cdot 10^{-3}$ М NaHSeO ₃	Ga - 7,2 Se - 92,8	

Таблица 3 – Элементный состав свежесажженной пленки селенида галлия на стеклоглереде при потенциалах E=-0,8В, E=-0,9В в течение 30 минут

Подложка	Условия электроосаждения	Состав электролита	Содержание компонентов в пленке, ат%
СУ-110	E=-0,9В T=70°C	$1 \cdot 10^{-1}$ М GaCl ₃ $2 \cdot 10^{-3}$ М NaHSeO ₃	Ga 15,1 Se 84,9
СУ-111	E=-0,9В T=70°C	$1 \cdot 10^{-1}$ М GaCl ₃ $2 \cdot 10^{-3}$ М NaHSeO ₃	Ga 15,9 Se 84,1
СУ-112	E=-0,8В T=70°C	$1 \cdot 10^{-1}$ М GaCl ₃ $2 \cdot 10^{-3}$ М NaHSeO ₃	Ga 26,7 Se 73,3



а

б

в

Рисунок 5 – Микрофотографии поверхности пленок:
а – E_{ос} = -0,9В на СУ-110; б – E_{ос} = -0,9В на СУ-111; в – E_{ос} = -0,8В на СУ-112

Однородное образование сфер с диаметром от 0,5–1,1 мкм, наиболее характерно для осадков, полученных при электроосаждении при E_{ос} = -0,9В.

На рисунке 6 можно увидеть возрастание содержания галлия в составе пленки Ga₂Se₃, при концентрации $1 \cdot 10^{-1}$ М GaCl₃ в фоновом электролите.

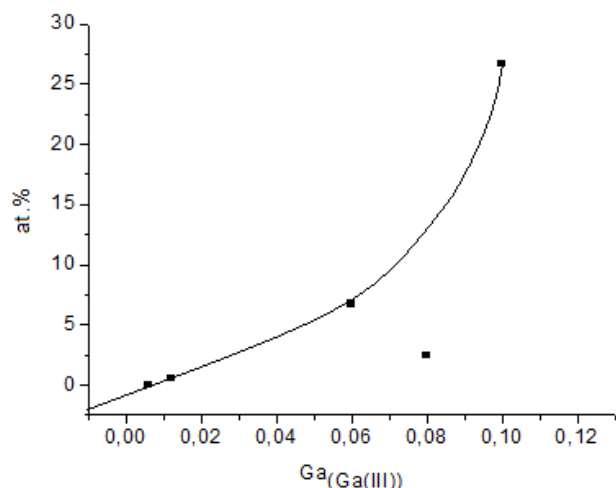


Рисунок 6 – Зависимость содержания галлия в осажденной пленке от концентрации ионов галлия в электролите при постоянном потенциале $-0,8$ и концентрации $Se = 2 \cdot 10^{-3}$ М

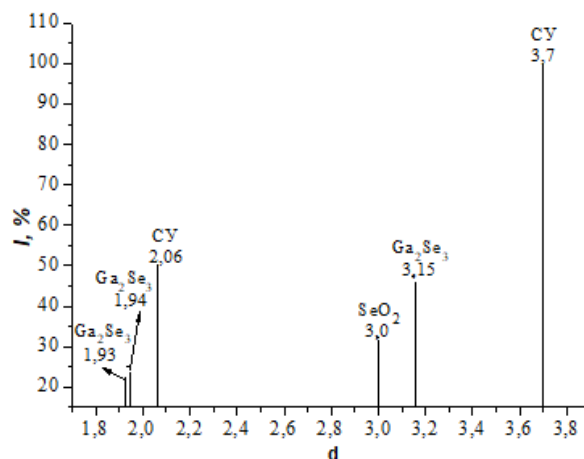


Рисунок 7 – Зависимость интенсивности от межплоскостного расстояния для образца СУ-112

Температурная обработка пленок. Для подтверждения фазового состава и выполнения рентгенофазового анализа осажденные пленки селенида галлия отжигали в муфельной печи в воздушной атмосфере двухступенчатым способом: первый раз отжигали при $200^{\circ}C$ 10 минут, а второй раз при $500^{\circ}C$ 15 минут. После отжига пленка приобрела серый цвет, адгезия к подложке плотная, поверхность однородная.

Был выполнен рентгенофазовый анализ тонких пленок селенида галлия, электроосажденных на стеклоглеродных пластинах по условиям таблицы 3. На рисунке 7 приведена штрих рентгенограмма, отражающая зависимость интенсивности рентгеновских рефлексов от межплоскостных расстояний. Видно, что на графике 7 присутствуют рефлексы фазы Ga_2Se_3 , отвечающие межплоскостным расстояниям 1,93; 1,94; 3,15 согласно таблицам ASTM. Отмечено, что интенсивность рефлексов возрастает с ростом содержания галлия в осадке. На рентгенограммах также отмечены сильные рефлексы от подложки стеклоглерода (СУ), поскольку полученные пленки не превышают толщину 1,5 мкм. Примесь оксида селена может свидетельствовать об окислении части селена на поверхности в процессе отжига.

Исследование морфологии поверхности пленок после термической обработки было выполнено с помощью оптического микроскопа и атомного силового микроскопа JSPM 5200 (JEOL Japan).

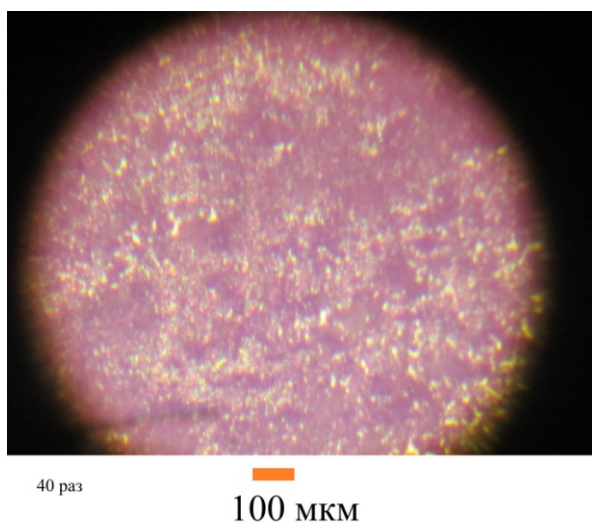


Рисунок 7 – Изображение поверхности пленки селенида галлия (образец СУ-112)

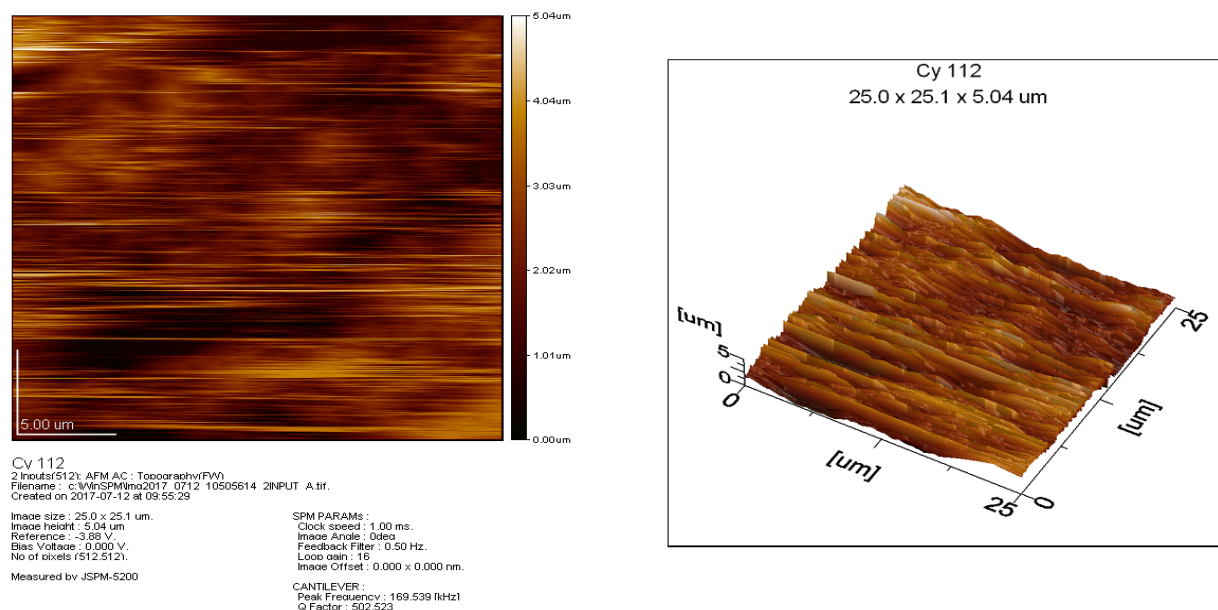


Рисунок 8 – Изображение поверхности образца CY 112, полученное с помощью атомной силовой микроскопии

Изображение, полученное с помощью оптического микроскопа, представляет равномерно покрытую поверхность образца (рисунок 8). Результаты атомной силовой микроскопии (АСМ) свидетельствуют, что высота покрытия достигает 5 мкм после отжига. Поверхность пленки растет в одном направлении и представляет собой на отрезке 25x25 мкм плоскости, растущие параллельно.

Выводы. Выполнено электрохимическое осаждение селенида галлия на стеклоглеродном электроде из сернокислых электролитов при постоянном потенциале. Выбраны оптимальные условия электроосаждения при постоянном потенциале $-0,8$ В(Ag/AgCl) и соотношении концентраций ионов галлия и селена 50:1 в электролите, температура 70°C . Получены пленки селенида галлия толщиной до 1,5 мкм, с содержанием 26,7 ат% галлия и 73,3 ат% селена. Состав близок к стехиометрическому составу соединения Ga_2Se_3 . Рентгенофазовый анализ подтвердил наличие фазы Ga_2Se_3 в полученных пленках. Исследование морфологии поверхности показало, что однородное покрытие поверхности стеклоглеродного электрода достигается при потенциалах $-0,8$ и $-0,9$ В.

Хоздоговор 21ц-23 с ЦФХМА по теме: «Фундаментальные основы электрохимических процессов при электроосаждении многокомпонентных полупроводников».

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ГАЛИЙ СЕЛЕНИДІН ЭЛЕКТРОТҰНДЫРУ

Аннотация. Тұрақты потенциалда күкірт қышқылды электролиттен галлий селенидін шыны көміртекті электродта электрохимиялық тұндыру жүргізілді. Шыны көміртекті электродтың циклдік вольтамперлі қисықтары галлий және селен иондары бар екі түрлі электролитте: күкірт қышқылды және цитратты буферлі ертінді де зерттелді. Қабат құрамына галлий ионының концентрациясының өзгерісі мен тұндыру потенциалының әсері зерттелді. Галлий ионының концентрациясын $6 \cdot 10^{-3}$ М-ден $1 \cdot 10^{-1}$ М-ге дейін үлкейткенде тұнба құрамында галлийдың максималды құрамына алып келеді, өз кезегінде селен ионының концентрациясы тұрақты $2 \cdot 10^{-3}$ М болып қалады. Стехиометриялыққа құрамдағы қабат алу үшін электролитте галлий ионы (III) селен ионына (IV) қарағанда артығырақ болуы керек. Тұнбаның элементтік анализ нәтижесі күкірт қышқылды электролитте галлий ионының селен ионына қарағанда концентрациясының қатынасы 50:1 болғанда, -0,8В потенциалында құрамында 26,7 ат % галлий бар алынатындығын анықтады. Беттің морфологиясының зерттеулері шыны көміртегі электроды бетінде -0,8 және -0,9 В потенциалдарында біркелкі жабынды түзілетіндігін көрсетті. Рентгенофазалық анализ нәтижесі алынған қабаттарда Ga₂Se₃ фазасының бар екендігін растады.

Түйін сөздер: галлий селениді, электротұндыру, вольтамперметрия.

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**EXPERIMENTAL METHOD OF STUDYING
THE LIMIT STATE OF THE HEAT EXCHANGE SURFACE
COVERED BY A CAPILLARY-POROUS MEDIUM**

Abstract. Capillary-porous systems have high intensity, high heat transfer ability, reliability, compactness. The results of calculations and experiments showed that the maximum thickness of the particles that break off under the action of compression forces for coatings from granite is $(0,25\div 0,3)\cdot 10^{-2}$ m. Sections of compression curves that determine the separation of particles with dimensions of more than $0,3\cdot 10^{-2}$ m for large heat fluxes and short feed times, are screened by the melting curve, and in the case of small heat fluxes and time intervals, the expansion curve. The research is aimed at creating porous coatings in cooling systems from well – and poorly conductive materials.

Keywords: heat transfer crisis; capillary-porous structure; heat and power installations, cooling systems.

УДК 536.248.2

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ПРЕДЕЛЬНОГО СОСТОЯНИЯ ТЕПЛОБМЕННОЙ ПОВЕРХНОСТИ,
ПОКРЫТОЙ КАПИЛЛЯРНО-ПОРИСТОЙ СРЕДОЙ**

Аннотация. Капиллярно-пористые системы обладают высокой интенсивностью, большой теплопередающей способностью, надежностью, компактностью. Результаты расчетов и эксперимента показали, что максимальная толщина частиц, отрывающихся под действием сил сжатия для покрытий из гранита составляет $(0,25\div 0,3)\cdot 10^{-2}$ м. Участки кривых сжатия, определяющие отрыв частиц с размерами более $0,3\cdot 10^{-2}$ м для больших тепловых потоков и малого времени подачи, экранируются кривой плавления, а в случае малых тепловых потоков и интервалов времени – кривой растяжения. Исследования направлены на создание пористых покрытий в системах охлаждения из хорошо – и плохо проводных материалов.

Ключевые слова: кризис теплопередачи; капиллярно-пористая структура; тепловые энергоустановки, системы охлаждения.

Введение. Применение капиллярно-пористых материалов в технике привлекало многих исследователей и изобретателей создавать на их основе различные устройства. Повышалась интенсивность теплоотводящих систем и форсировка протекающих в них процессов [1-3]. Использование пористых материалов, помимо систем охлаждения, позволяло создавать агрегаты, в которых решались проблемы взрывобезопасности, охраны труда и долговечности [4, 6]. Этому способствовала возможность управлять процессами парообразования за счет избытка жидкости в порах и капиллярных структурах, создаваемого совместными действиями капиллярных и массовых сил [7-9].

В тепловых энергетических установках (ТЭУ) капиллярно-пористые материалы используются для охлаждения высокофорсированных детонационных горелочных устройств [3], создания пароохладителей в паровых котлах [9], маслоохладителей, исключающие попадания масла в охлаждающую воду и воды в систему подшипников [10], лабиринтных уплотнений [11], и в других устройствах [21]. Основные области практического применения капиллярно-пористых систем представлены в [3, 5, 8-11].

Капиллярно-пористые системы позволяют достигнуть экономии топлива, сырья, воздуха, воды, тепла, повысить надежность охлаждения и взрывопожаробезопасность работы оборудования, способствовать высокоэффективному разрушению горных пород, бетонов, металлов, уменьшить низкотемпературную коррозию поверхностей, сократить загрязнению биосферы ядовитыми газами, пылью, теплом, ускорить решение проблем продовольственной программы, получить большой экономический и социальный эффекты в области экологии и охраны труда.

Авторы [12] проводят сравнительный анализ методов расчета теплоотдачи по кипению воды с недогревом в вертикальных каналах, причем считают очаговую коррозию оболочек твэлов ядерных реакторов аналогом капиллярно-пористой структуры [13, 14]. Однако исследования теплообмена по регулярной структурированной поверхности не проводились.

По мнению авторов [15, 16], поверхностное кипение на пористых поверхностях может влиять на развитие коррозии из-за эрозионного воздействия на поверхность теплообмена при схлопывании пузырей пара в недогретой жидкости. Поэтому требуется исследовать парообразование жидкости в капиллярно-пористых структурах в поле капиллярных и массовых сил с учетом скорости и недогрева, которые создаются избытком жидкости.

Оценка интенсивности теплообмена для кипения жидкости в большом объеме и тонких пленках на гладкой поверхности показала на их равные возможности [12-14] при высоких тепловых потоках и на более высокие показатели теплопередачи, чем у систем с капиллярно-пористым покрытием [15, 16]. Требуется провести исследования теплопередающих возможностей капиллярно-пористых покрытий, работающих в поле капиллярных и массовых сил, и установить величины предельных (критических) нагрузок, приводящих к разрушению поверхностей нагрева.

Проведенные исследования позволяют дать рекомендации по выбору теплохолодоносителя, учесть вид его циркуляции, определить геометрию и материал аппаратов и интенсификаторов теплообмена, с учетом условий и ориентаций работы системы под давлением или разрежением, подводом и видом энергии, ориентации системы. Обобщение экспериментальных результатов и методика расчета тепло- и массообмена в капиллярно-пористых системах представлены в [17-21].

Модель капиллярно-пористой структуры системы охлаждения. Модель капиллярно-пористого покрытия, нанесенного на охлаждаемую поверхность теплонагруженного элемента энергоустановок, показана на рисунке 1. При наступлении кризиса кипения возникает предельное состояние поверхности нагрева и происходит разрушение последней вместе с покрытиями. Такая схема позволяет моделировать трещины хрупких покрытий и пластических пористых структур.

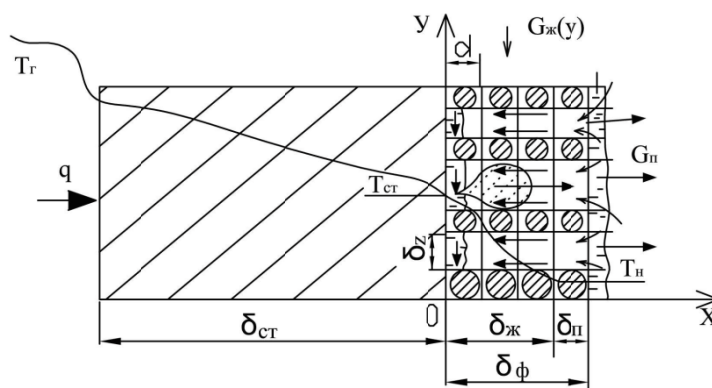


Рисунок 1 – Физическая модель процессов тепломассопереноса в пористой структуре, покрывающей охлаждаемую поверхность: прямые линии – движение жидкости; волнистые линии – движение пара; q – тепловой поток, $T_g, T_{ст}, T_n$ – температура газов, стенки, насыщения; $G_{ж}(y), G_{п}$ – расход жидкости и пара; $\delta_{ст}, \delta_{ф}, \delta_{ж}, \delta_{п}$ – толщина парогенерирующей поверхности, пористого покрытия, жидкости и пара, b_z, d – ширина ячеек пористого покрытия и диаметр зерен

Механизм и расчет предельного состояния поверхности теплообмена. Результат расчетов представлен на рисунках 2–5. Максимальная толщина частиц, отрывающихся под действием сил сжатия для покрытий из гранита, составляет $(0,25-0,3) \cdot 10^{-2}$ м, что согласуется с результатами, полученными скоростной киносъёмкой (рисунок 6). Участки кривых сжатия, определяющие отрыв частиц с размером $\delta > 0,3 \cdot 10^{-2}$ м для больших тепловых потоков и малых τ , экранируются кривой плавления, а в случае малых тепловых потоков и значительных интервалов времени – кривой растяжения.

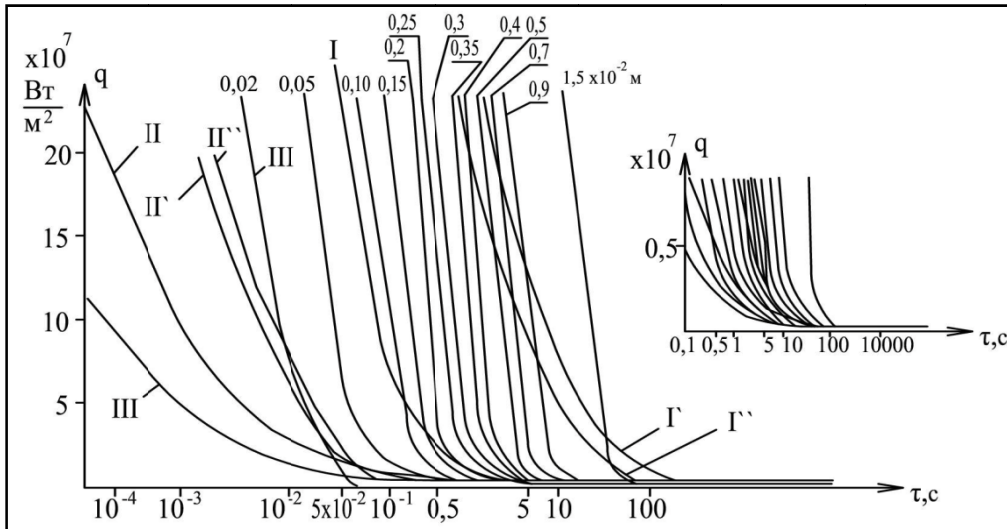


Рисунок 2 – Зависимость тепловых потоков, вызывающих напряжения сжатия III гранитного покрытия в зависимости от времени действия τ для различной толщины δ отрывающихся частиц:
 I – напряжения растяжения, достаточные для разрушения (Γ , Γ' – медь и нержавеющая сталь, $h = 0,1 \cdot 10^{-3}$ м);
 II – оплавление поверхности (Π , Π' – медь и нержавеющая сталь, $h = 0,1 \cdot 10^{-3}$ м)

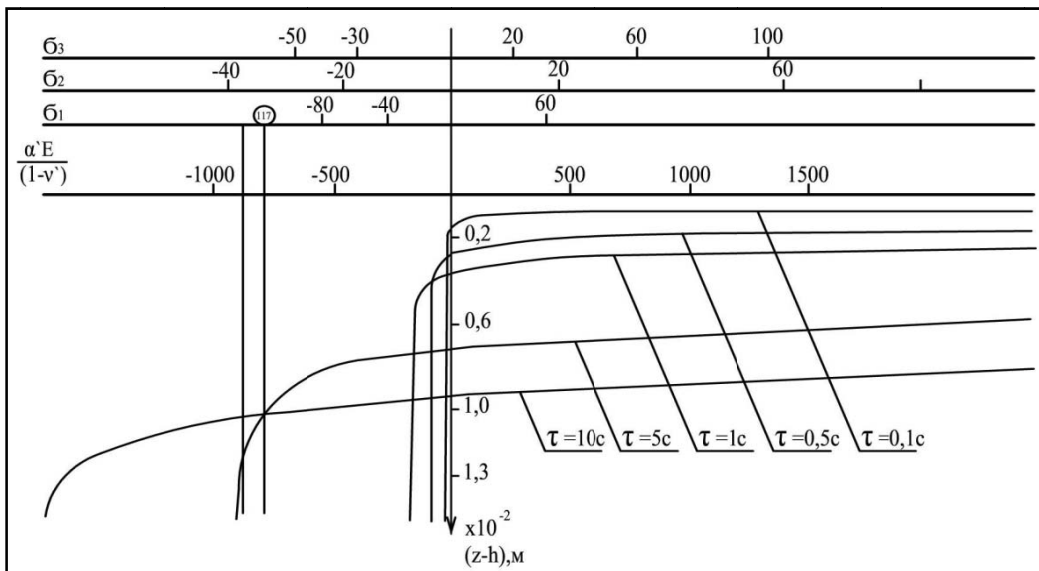


Рисунок 3 – Эпюры напряжений по толщине граничной пластины при различных тепловых потоках и времени их действия: $q_1 = 0,142 \cdot 10^7$ Вт/м²; $q_2 = 0,142 \cdot 10^7$ Вт/м²; $q_3 = 0,075 \cdot 10^7$ Вт/м²;
 II7 – предел прочности на растяжение: σ , $\cdot 10^5$ Н/м², E , $\cdot 10^5$ Н/м²

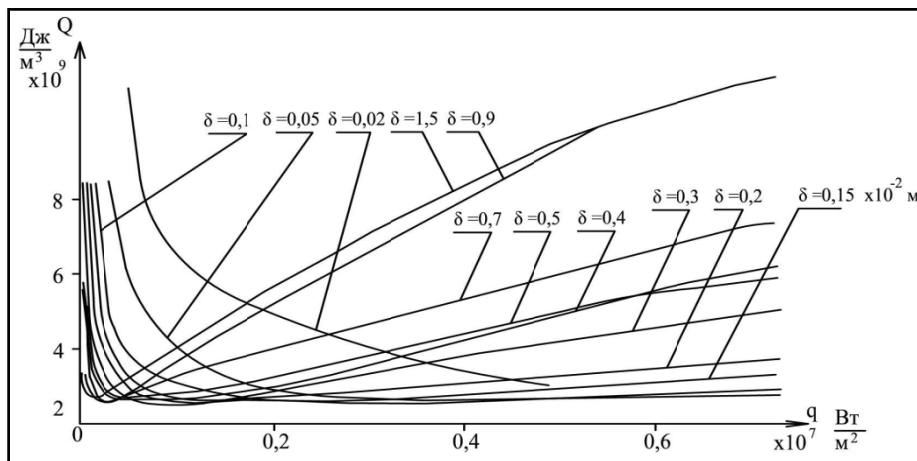


Рисунок 4 – Изменение удельной энергии разрушения Q гранитного покрытия в зависимости от q для различных δ . $Q = q \tau / \delta$

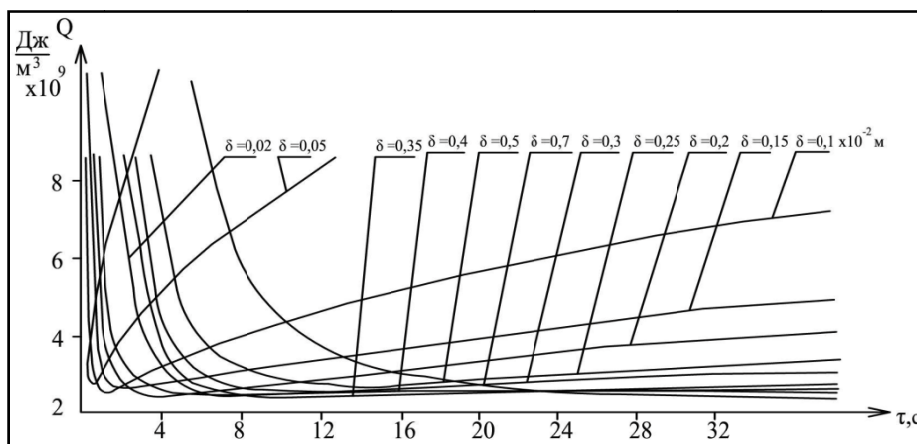


Рисунок 5 – Изменение удельной энергии разрушения Q гранитного покрытия в зависимости от τ для различных δ

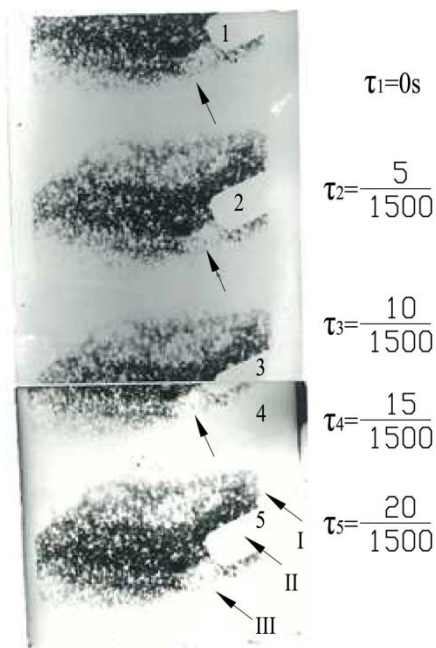


Рисунок 6 – Кинограмма полета (шелухи) размером $\delta = 2,5 \cdot 10^{-3}$ м при разрушении частицы гранитного покрытия горелкой ракетного типа ($q = 1,2 \cdot 10^6$ Вт/м²):

I – капиллярно-пористое покрытие;
 II – ствол горелки, из которого истекает сверхзвуковой высокотемпературный, пульсирующий детонационный поток газов;
 III – частица, оторванная от покрытия

Взаимосвязь напряжений сжатия и растяжения представляют собой эпюры напряжений внутри пластины для различных интервалов времени от начала рассматриваемого процесса. При малых τ , порядка 10^{-1} с возникают только напряжения сжатия. Начиная с $\tau \approx 1$ с, в некоторой области Δ ($h-z_i$) до $0,3 \cdot 10^{-2}$ м, напряжения сжатия переходят в напряжения растяжения за весьма короткий промежуток времени, причем для различных интервалов времени они находятся на различной глубине от поверхности пластины.

Верхним пределом устойчивого разрушения покрытия из кварца является -10^7 Вт/м², а из гранита – до $0,5 \cdot 10^7$ Вт/м², а нижним пределом, когда еще наблюдается отрыв частиц под действием термонапряжений сжатия $-0,25 \cdot 10^7$ и $0,05 \cdot 10^7$ Вт/м² соответственно.

Разрушение анизотропной среды под действием направленного нагрева основано на неравномерном расширении ее составляющих (кристаллов). Нагреваемый слой породы покрытия, увеличиваясь в объеме, начинает оказывать давление на соседние, менее нагретые слои. Так как расширению во всех других направлениях препятствует реакция непрогретых слоев, то порода начинает свободно расширяться с открытой стороны и в силу своей перенапряженности отделяется и откалывается.

Если полости вакансий могут превращаться в дислокации, то обучаемое покрытие приобретает пластические свойства и не разрушается под действием факела. Таковые все металлы. Этим свойством обладают также и некоторые породы. Проведено тестирование с парогенерирующими металлическими поверхностями нагрева в момент кризиса кипения [2]. Для металлов кристаллы разрушаются при направлениях до 10^{-5} В. Процесс разрушения состоит из стадий зарождения трещин и их развития. В результате термического воздействия зарождаются микротрещины в области концентраторов напряжений (включения, неоднородности, трещины). Высокие внутренние напряжения так же могут возникать вследствие неоднородного протекания пластической деформации, после чего возникает хрупкое разрушение. Пластическая деформация при этом рассматривается как первопричина разрушения, хотя она может задерживать рост трещин. В основе разрушения, с одной стороны, лежат разрывы связей, обусловленные тепловыми флуктуациями, а с другой – разрушение есть кинетический термоактивационный процесс, в основе которого лежит перемещение вакансий к трещинам, рост которых определяет кинетику разрушения.

Заключение. На основе проведенных исследований в случае облучения факелом керосино-кислородной горелки пористого покрытия на рабочем участке имеем до $4 \cdot 10^7$ Вт/м², что соответствует q покрытий $0,4 \cdot 10^7$ Вт/м². Механизм разрушения металлов принципиально отличается от механизма разрушения покрытий из горных пород. Несмотря на это, на основе аналогии выявлены зависимости тепловых потоков от времени их действия и глубины проникновения температурных возмущений, что позволяет избежать кризиса кипения в системе охлаждения и обеспечить оптимальный подбор пористых покрытий малой пористости и теплопроводности. В перспективе требуется исследования других пористых природных материалов.

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ҚЫЛТҮТІКТІ-КЕУЕКТІ ОРТАМЕН ЖАБЫЛҒАН ЖЫЛУАЛМАСУ БЕТІНІҢ ШЕКТІК КҮЙІН ЗЕРТТЕУДІҢ ТӘЖРИБЕЛІК ӘДІСІ

Аннотация. Қылтүтікті-кеуекті жүйелер жоғары қарқындылыққа, жоғары жылуберу қабілеті мен сенімділік және ықшамдылық қасиеттеріне ие. Тәжірибе мен есептеулер нәтижелері көрсеткендей, граниттен жасалған жабындылар үшін сығу күштері әсерінен жұлынып алынатын бөлшектердің максималды қалыңдығы $(0,25 \div 0,3) \cdot 10^{-2}$ м. Үлкен жылу ағындары мен берістің аз уақыты үшін өлшемдері $0,3 \cdot 10^{-2}$ м артық бөлшектердің жұлынып алынуын анықтайтын сығу қисықтарының аумағы балку қисығымен, ал кіші жылу ағындары мен уақыт интервалдары үшін – созылу қисықтарымен экрандалады. Зерттеулер өткізгіштігі нашар және өткізгіштігі жақсы материалдардан суыту жүйелерінде кеуекті жабындыларды жасауға бағытталған.

Түйін сөздер: жылуберу кризисі; капиллярлы-кеуекті құрылым, жылулық энергокондырғылар, суыту жүйелері.

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ISOMERIZATION OF n-HEXANE ON Pd CATALYSTS INFLICTED TO ACID-ACTIVATED MONTMORILLONITE IN Ca-FORM

Abstract. Pd/CaHMM catalysts have got and tested in the isomerization reaction of n-hexane. According to the results, in the palladium content decreased from 0.35% to 0.1% leads to a decrease in activity, but the selectivity of C₄₊ remains stable and high enough 99.6-100%. The maximum conversion of n-hexane by 0.35% Pd-catalyst is 45.1% at a temperature of 400°C, and 0.1% Pd-catalyst is 32.4% at the same temperature. One of the most important isomerization products is dimethyl butane; the maximum yield of 0.35% Pd contact is 21.3% at 350°C. At a 0.1% Pd catalyst, the yield of dimethyl butane decreases and is 16.5% at 400°C. The introduction of mordenite significantly increases the activity and selectivity even on a low-percentage catalyst. At 0.35% Pd/CaHMM + HM catalyst, the conversion of n-hexane increases to 54.1% at 400°C, and the yield of 2,2-dimethylbutane is 25.8%. On a 0.1% Pd + HM catalyst, the conversion of n-hexane is 54.3%, and the maximum yield of dimethylbutane is 26.0% at 400°C, which is slightly higher compared to 25.8% for 0.35% Pd.

The maximum yield of iso-hexanes on the non-zeolitic 0.35 and 0.1% Pd catalysts is 37.8 and 27.8%, respectively. Mordenite containing 0.35% Pd/CaHMM +HM catalyst reached 46.4%, at a low-percentage 0.1% Pd + HM catalyst 45.8%.

The increase in the octane number increases with increasing process temperature, as well as on catalysts modified with mordenite. The maximum increase was observed at 0.35% Pd/CaHMM + HM.

Keywords: isomerization, n-hexane, activated montmorillonite, catalyst, palladium.

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ИЗОМЕРИЗАЦИЯ n-ГЕКСАНА НА Pd-КАТАЛИЗАТОРАХ, НАНЕСЕННЫХ НА КИСЛОТНО-АКТИВИРОВАННЫЙ МОНТМОРИЛЛОНИТ В Ca-ФОРМЕ

Аннотация. Были получены и испытаны Pd/CaHMM-катализаторы в реакции изомеризации n-гексана. По полученным результатам было отмечено, что снижение содержания палладия с 0,35% до 0,1% приводит к снижению активности, но селективность по C₄₊ остается стабильной и достаточно высокой 99,6-100%. Максимальная конверсия n-гексана на 0,35% Pd-катализаторе составляет 45,1% при температуре 400°C, а на 0,1% Pd-катализаторе составляет 32,4% при этой же температуре. Одним из важнейших продуктов изомеризации является диметилбутан, максимальный выход на 0,35% Pd-контакте составляет 21,3% при 350°C. На 0,1% Pd-катализаторе выход диметилбутана снижается и составляет 16,5% при 400°C. Введение морденита заметно повышает активность и селективность даже на низкопроцентном катализаторе. На 0,35%Pd/CaHMM+ HM-катализаторе, конверсия n-гексана растет до 54,1% при 400°C, а выход 2,2-диметилбутана составляет

25,8%. На 0,1%Pd+НМ-катализаторе конверсия *n*-гексана составляет 54,3%, а максимальный выход диметилбутана 26,0% при 400⁰, что незначительно выше по сравнению с 25,8% на 0,35% Pd.

Максимальный выход изогексанов на бещеолитных 0,35 и 0,1% Pd-катализаторах составляет 37,8 и 27,8% соответственно. На морденит, содержащем 0,35%Pd/СаНММ+НМ-катализаторе выход С₆-изомеров достигает 46,4%, на низкопроцентном 0,1%Pd+НМ катализаторе 45,8%.

Прирост октанового числа растёт с увеличением температуры процесса, а также на катализаторах, модифицированных морденитом. Максимальный прирост о.ч. наблюдался на 0,35% Pd/СаНММ+НМ.

Ключевые слова: изомеризация, *n*-гексан, активированный монтмориллонит, катализатор, палладий.

Введение. Природные слоистые силикаты (глины) обладают способностью к ионному обмену, высокой катионно-обменной емкостью, микро-, мезо и нанопористой структурой, имеют поверхностные активные центры различной природы, которые широко используются, в качестве высокоэффективных компонентов для приготовления катализаторов [1-3]. Монтмориллонит (ММ) является одним из наиболее интересных представителей слоистых силикатов, особенности структуры и свойств которого определяют широкие возможности его применения в качестве носителя катализаторов различных процессов. Характерной особенностью монтмориллонитовых глин является высокая катионообменная емкость – от 60 до 150 мэкв/100г [4, 5].

Известно, что кислотная обработка глинистых минералов приводит к резкому увеличению их каталитической и адсорбционной способности [6-9]. Результаты исследования образцов методом низкотемпературной адсорбции азота показали рост удельной поверхности и незначительное увеличение диаметра пор. По данным исследования методом рентгеновской дифракции кристаллическая структура образцов, активированных растворами минеральных кислот низкой и средней концентрации, сохраняется, а результаты химического анализа природных глин после кислотной активации показали полное вымывание ионов натрия из структуры образцов и растворение значительной части октаэдрических катионов магния, железа и алюминия, за счет чего содержание SiO₂ в образцах увеличивается [10, 11]. В случае ММ кислотная обработка часто вызывает также довольно сильное уменьшение первых базальных рефлексов [12].

Определяющим фактором в повышении адсорбционной способности природных глинистых минералов после их кислотной обработки является не изменяющиеся пористые характеристики ММ, а рост удельной поверхности, растворение и удаление всевозможных примесных фаз, приводящие к получению мономинерального продукта, разрушение вторичной структуры, увеличение доступа адсорбируемого компонента к поверхности адсорбента и появление силикагеля. Природные глины являются одними из доступных видов носителей катализаторов для реакции изомеризации *n*-алканов [13, 14]. В свою очередь, как известно, структурная изомеризация *n*-алканов является одним из востребованных каталитических процессов получения высокооктановых добавок к моторным топливам [15-18].

Цель настоящей работы состояла в изучении текстурных, кислотных свойств Pd-катализаторов, нанесенных на активированный монтмориллонит в Са-форме, испытание полученных катализаторов в реакции изомеризации *n*-гексана, в зависимости от содержания активного металла из PdCl₂ и введения морденита.

Экспериментальная часть

В работе была использована тщательно измельченная монтмориллонитовая глина Таганского месторождения без выделения мономинеральной фракции монтмориллонита. Н-форму Таганского монтмориллонита получали обработкой раствором H₂SO₄ с последующим отмыванием от ионов SO₄²⁻. Активированную глину формовали, сушили в тонком слое сначала при комнатной температуре, затем при 150⁰С и далее подвергали прокаливанию при 500⁰С [19, 20]. Подготовленную Н-форму ММ использовали как носитель для Pd-катализаторов.

Катализаторы готовили методом пропитки носителя водными растворами PdCl₂ с последующим высушиванием, прокаливанием и восстановлением оксидов до металлического состояния. Содержание металла в образцах составило 0,1 и 0,35 мас.%.

Текстурные характеристики образцов определяли методом БЭТ по низкотемпературной адсорбции азота на приборе ACCUSORB. Элементный анализ композитов проводили с помощью

энергодисперсионной – рентгенофлуоресцентной спектроскопии на энергодисперсионной системе микроанализа INCA – Energy 450, установленной на сканирующий электронный микроскоп JSM6610LV, JOEL, Япония.

Активность образцов в изомеризации н-гексана исследовали в проточном реакторе при варьировании температуры процесса в интервале 250-400⁰С. Процесс проводился в токе водорода при объемной скорости подачи сырья 0,82 ч⁻¹.

Результаты и их обсуждение

В таблице 1 приведены данные по элементному составу исходной кальциевой и активированной Н-формы Таганского монтмориллонита, катализаторов с различным содержанием Pd (0,1%, 0,35%) и модифицированных морденитом.

Таблица 1 – Элементный состав исходного и активированного монтмориллонита и Pd/СаНММ с различным содержанием Pd и модифицированных морденитом(НМ)

№	Образец	С	О	Na	Mg	Al	Si	S	Ca	Ti	Fe	Pd	Итого
1	СаММ	14,35	46,40	0,25	2,20	10,53	23,46		1,30	0,13	1,37		100
2	СаНММ	14,27	45,50		2,08	10,78	24,55		0,69	0,18	1,94		100
3	0,1%Pd/ СаНММ	4,29	50,97		1,41	14,35	26,94	0,05	0,29	0,19	1,23	0,27	100
4	0,35%Pd/СаНММ	5,13	49,48		1,47	14,20	27,39	0,06	0,28	0,20	1,23	0,57	100
5	0,1%Pd/ СаНММ+НМ	4,70	49,23		1,06	13,56	29,77	0,06	0,24	0,15	0,98	0,24	100
6	0,35%Pd/СаНММ+НМ	5,87	51,21	0,07	1,06	12,20	27,90	0,04	0,18	0,13	0,76	0,57	100

Из анализа данных таблицы 1 следует, что кислотная активация СаММ приводит к удалению натрия из глины, только в образце (6) найдены незначительные количества натрия. После кислотной активации и введения Pd значительно снижается количество кальция и магния. По данным элементного анализа найдены несколько завышенные количества палладия по сравнению с введенным методом пропитки.

В таблице 2 приведены данные по гидроизомеризации н-гексана на 0,35% и 0,1% Pd/СаНММ катализаторах при различных температурах.

Таблица 2 – Изомеризация н-гексана на Pd/СаНММ – композитном катализаторе

Кат-р	Т, °С	α, %	S _{C6} , %	S _{C4+} , %	Выход продуктов реакции, %					
					{C ₁ -C ₄ }	i-Б	2М Б	2,2Д МБ	2МП	Сумма С ₇
0,35% Pd	250	8,6	69,6	100	–	0,15	0,25	3,60	2,42	2,24
	300	22,4	83,6	100	–	–	0,56	11,2	7,4	3,11
	350	43,3	90,1	99,7	0,15	0,16	0,97	21,3	16,5	3,0
	400	45,1	81,7	99,6	0,18	0,32	0,69	17,8	15,5	7,0
0,1% Pd	250	6,5	74,3	100	–	–	0,2	2,9	1,9	1,5
	300	18,7	84,8	100	–	0,1	0,2	9,4	6,4	2,6
	350	23,5	87,3	99,6	0,1	0,2	0,5	12,6	8,0	2,2
	400	32,4	86,0	99,7	0,1	0,2	0,9	16,5	11,3	3,4

С₇ - 2,2 ДМП – 2,2-Диметилпентан; 2,4 ДМП – 2,4-Диметилпентан; 2,2,3ТМБ – 2,2,3-Триметилбутан; 3,3ДМП – 3,3-Диметилпентан; 2МГ - 2-Метилгексан; 3МГ – 3-Метилгексан; 3ЭП – 3-Этилпентан.

Испытания 0,35% и 0,1% палладиевых катализаторов показали, что с уменьшением содержания палладия снижается активность, а селективность по изомерам практически не меняется. Как видно, из таблицы 2, конверсия н- гексана растет с повышением температуры и достигает 45,1% на 0,35% Pd-катализаторе, а на 0,1% Pd-катализаторе составляет 32,4% при 400⁰С. Селективность по С₄₊ изомерам при 400⁰С сохраняется очень высокой 99,6-99,7%. Максимальный выход диме-

тилбутана наблюдается при 350⁰С на 0,35% Pd-контакте и составляет 21,3 %. При уменьшении содержания палладия до 0,1% выход C₆-дизамещенных изомеров снижается и составляет 16,5% при 400⁰С. Выход продуктов гидрокрекинга не превышает 0,18%. На 0,35% Pd-катализаторе при 350⁰С содержание C₆-изомеров составляет 37,8%, при уменьшении содержания палладия до 0,1% выход изогексанов составляет 27,8% при 400⁰С.

Наглядно данные по выходу изогексанов, селективности и конверсии процесса изомеризации н-гексана на 0,35% и 0,1% Pd-контактах при различных температурах иллюстрирует рисунок 1.

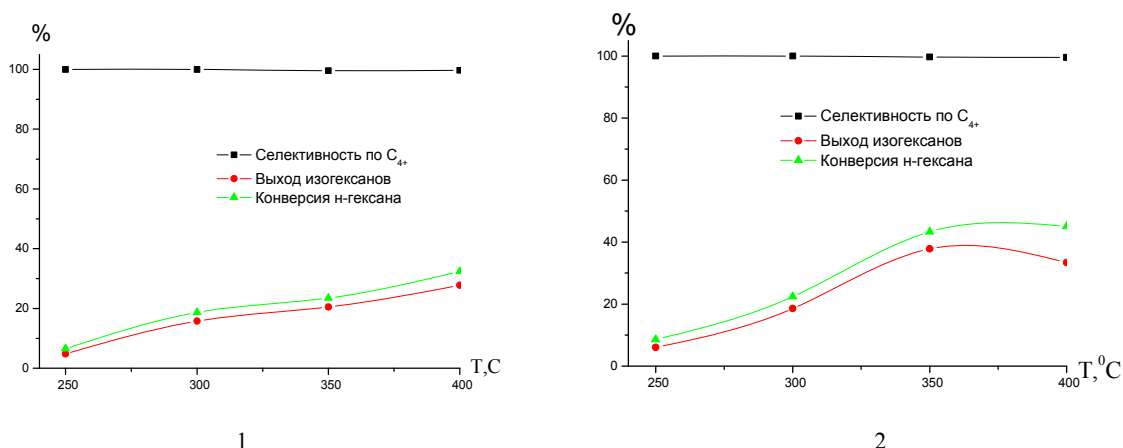


Рисунок 1 – Выход изогексанов, селективности и конверсии процесса изомеризации н-гексана на 0,1%Pd/CaHMM (1); 0,35%Pd/CaHMM (2)- катализаторов в зависимости от температуры процесса

Проведённые испытания 0,35% и 0,1% палладиевых катализаторов показали, что их активность незначительно снижается с уменьшением концентрации палладия. Конверсия н-гексана и выход изомеров растут с повышением температуры на обоих катализаторах и при температуре 350⁰С достигают постоянных значений на 0,35% и при 400⁰С на 0,1% Pd.

Наличие C₇-изомеров в продуктах реакции свидетельствует, вероятно, о побочных процессах при изомеризации н-гексана.

В таблице 3 и на рисунке 2 приведены некоторые физико-химические характеристики палладиевых катализаторов на основе активированного монтмориллонита.

Таблица 3 – Удельная поверхность и эффективный объем пор и их распределение для Pd/CaHMM

Образец	S, м ² /г	Общий объем пор, см ³ /г	R, Å	Относительное количество, %	
				Микропоры, (0-20Å)	Мезопоры, (20-80Å)
CaMM	89,2	0,075	12,0-70,0	46,1	53,9
CaHMM	99,2	0,086	12,5-70,0	40,7	59,3
0,35%Pd/CaHMM	107,8	0,095	10,0-70,0	47,3	52,7
0,1%Pd/CaHMM	127,6	0,117	10,0-68,0	57,1	42,8

Как видно из таблицы 2, при активировании глины удельная поверхность образца растет от 89,2 до 99,2 м²/г. При добавлении палладия растет удельная поверхность и общий объем пор, уменьшение содержания Pd до 0,1% на Pd/CaHMM приводит к увеличению удельной поверхности образца от 107,8 до 127,6 м²/г. Общий объем пор растет от 0,095 до 0,117 см³/г.

Меняющуюся пористую структуру наглядно иллюстрирует, рисунок 2.

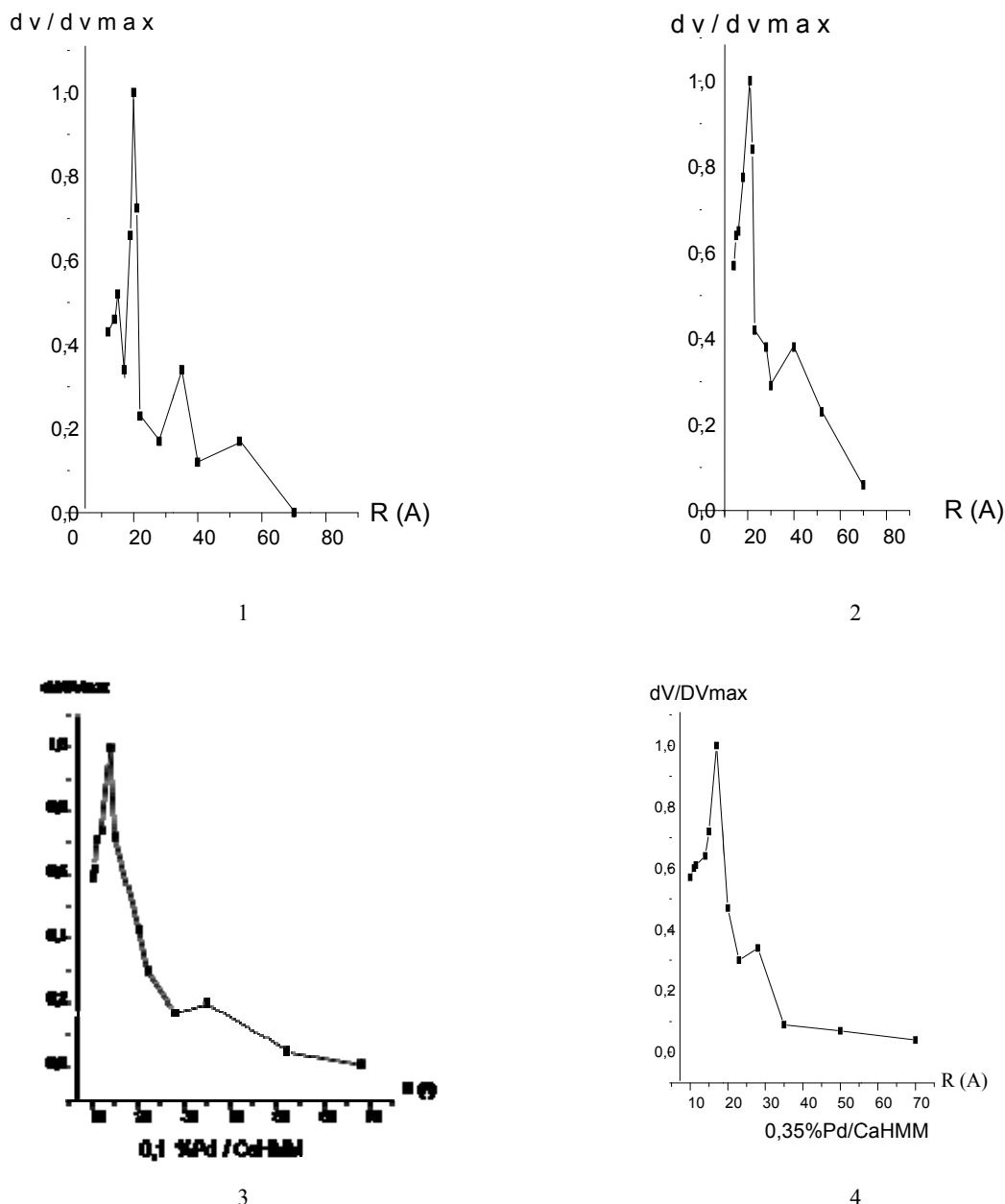


Рисунок 2 – Кривые распределения пор по их эффективным радиусам в Pd/CaHMM – композитном катализаторе в зависимости от содержания металла CaHMM (1). Обозначения кривых: CaMM (1); CaHMM (2); 0,1% Pd/CaHMM (3); 0,35% Pd/CaHMM (4)

Расчет распределения пор по размерам показал, что при уменьшении содержания Pd до 0,1% количество мезопор снижается от 52,7 до 42,8%, а количество микропор растет от 47,3 до 57,1% что отражается на снижении активности.

В таблице 4 и на рисунке 3 приведены данные по изомеризирующей активности Pd/CaHMM+HM, модифицированном морденитом в зависимости от содержания металла.

Введение морденита в состав Pd/CaHMM значительно повышает его изомеризирующую активность и селективность по изомерам. На 0,35%Pd/CaHMM+HM-катализаторе максимальный выход изогексанов, наблюдается при 400⁰С, который достигает 46,4%, при этом выход 2,2-диметилбутана составляет 25,8%. Конверсия н-гексана растет до 54,1% с селективностью по C₄₊ 99,8%. Для сравнения максимальный выход изогексанов на цеолитных 0,35 и 0,1% Pd-катализаторах значительно ниже и составляет 37,8 и 27,8% соответственно (таблица 2). На 0,1%Pd+HM -катализаторе максимальный выход диметилбутана из н-гексана равен 26,0% при 400⁰ С по сравнению с

Таблица 4 – Изомеризация н-гексана на Pd/CaНММ+НМ– композитном катализаторе

Кат-р	Т, °С	α, %	S _{C₆} , %	S _{C₄₊} , %	Выход продуктов реакции, %					
					{C ₁ -C ₄ }	i-Б	2М Б	2,2Д МБ	2МП	Сумма C ₇
0,35% Pd+НМ	250	7,9	81,6	100	–	–	0,2	3,9	2,5	1,3
	300	27,0	94,2	100	–	0,2	0,4	15,6	9,8	0,9
	350	41,0	93,3	99,7	0,1	0,3	1,0	22,8	15,4	1,3
	400	54,1	85,7	99,8	0,1	0,2	2,4	25,8	20,6	5,0
0,1% Pd+НМ	250	9,2	86,0	100	–	–	0,2	4,8	3,2	1,08
	300	33,3	92,3	99,9	0,04	0,15	0,6	18,0	12,2	1,8
	350	51,1	93,8	99,8	0,1	0,3	0,5	26,3	19,7	2,27
	400	54,3	88,9	99,7	0,16	0,4	0,4	26,0	19,8	5,12

C₇ -2,2 ДМП – 2,2-Диметилпентан; 2,4 ДМП – 2,4-Диметилпентан; 2,2,3ТМБ – 2,2,3-Триметилбутан; 3,3ДМП – 3,3-Диметилпентан; 2МГ - 2-Метилгексан; 3МГ – 3-Метилгексан; 3ЭП – 3-Этилпентан.

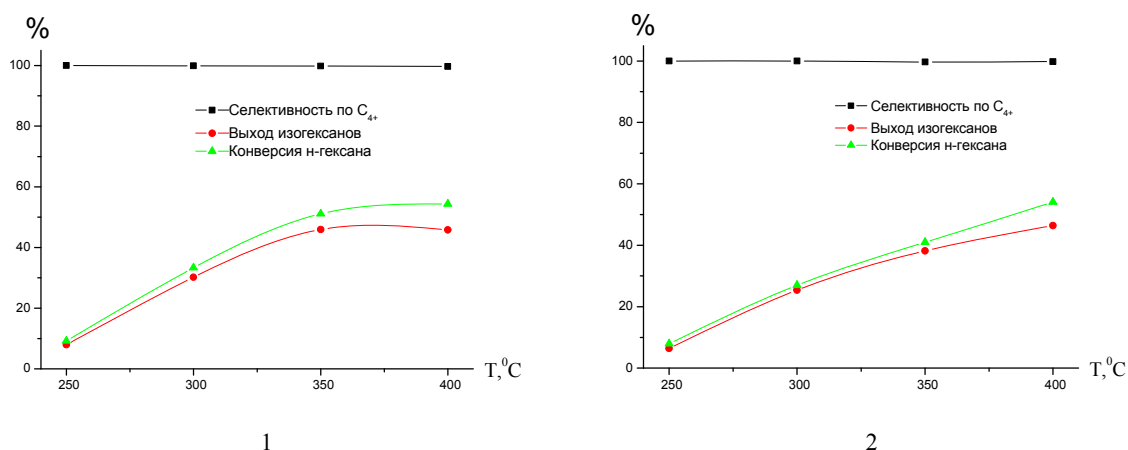


Рисунок 3 – Выход изогексанов, селективности и конверсии процесса изомеризации н-гексана на 0,1% Pd/CaНММ+НМ (1); 0,35%Pd/CaНММ+НМ (2)- катализаторов в зависимости от температуры процесса

25,8% на 0,35%Pd. По суммарному содержанию C₆-изомеров (45,8%) 0,1% Pd-катализатор лишь незначительно уступает 0,35%Pd (46,4%). Найдено, что в исследованном интервале температур селективность по C₄₊ изомерам для всех катализаторов сохраняется достаточно высокой 99,7–100%. При этом выход продуктов гидрокрекинга не превышает 0,1 % на 0,35%Pd/CaНММ+НМ при 400⁰С.

На основании данных низкотемпературной адсорбции азота (БЭТ) определены текстурные характеристики Pd-катализаторов, модифицированных морденитом.

Таблица 5 – Сравнительные структурные и адсорбционные характеристики Pd- контактов на основе CaНММ модифицированных морденитом

Образец	S, м ² /г	Общий объем пор, см ³ /г	R, Å	Относительное количество, %	
				Микропоры, (0-20Å)	Мезопоры, (20-80Å)
0,35% Pd/CaНММ+НМ	129,4	0,101	10,0-68,0	52,0	48,0
0,1% Pd/CaНММ+НМ	159,2	0,125	10,0-74,0	51,9	48,1

Как видно из таблицы 5, добавление морденита в палладиевые катализаторы, нанесенные на CaНММ+НМ приводит к значительному повышению удельной поверхности для 0,35%Pd с 107,8 (таблица 3) до 129,4 м²/г (таблица 5), при этом эффективный объем пор увеличивается с 0,095 до 0,101 мл/г. В случае 0,1% Pd модифицирование морденитом приводит к еще более значитель-

ному росту удельной поверхности: с 127,6 до 159,2 м²/г, а эффективного объема пор с 0,117 до 0,125 см³/г. Рост удельной поверхности и объема пор сопровождается небольшим изменением распределения пор по размерам, причем количество микropop несколько выше (52,0-51,9%), чем мезопop (48,1-48,0%) независимо от содержания палладия.

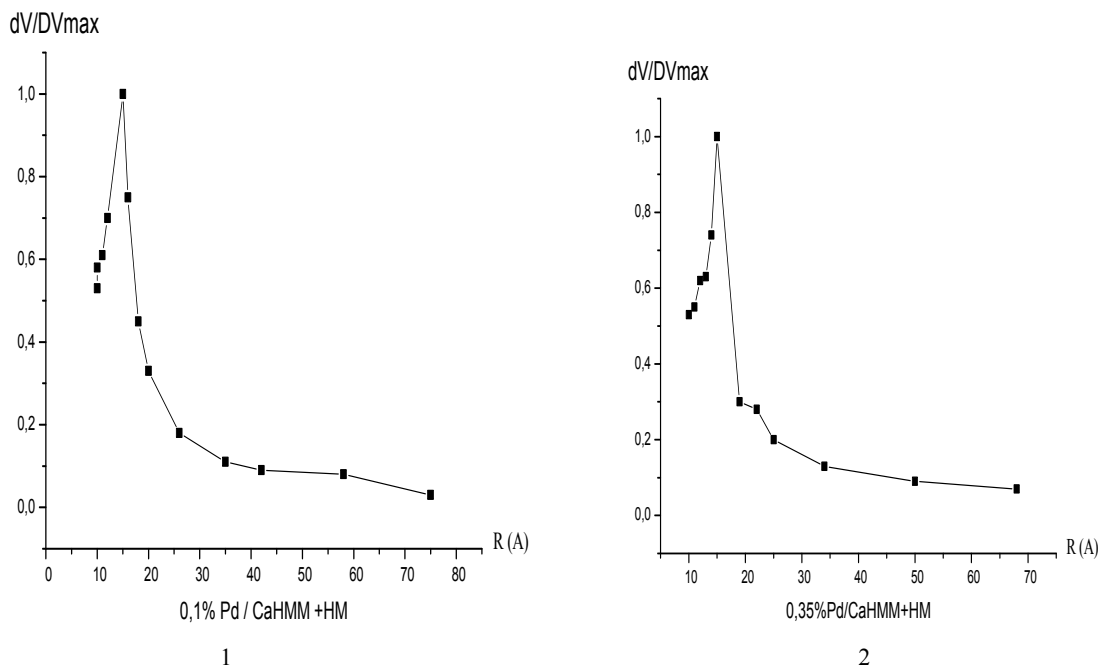


Рисунок 4 – Кривые распределения пор по их эффективным радиусам на Pd/CaHMM+HM-композитном катализаторе в зависимости от содержания металла. Обозначения кривых: 0,1% Pd/CaHMM+HM (1); 0,35% Pd/CaHMM+HM (2)

Таким образом, введение в катализатор морденита приводит к изменению текстурных характеристик Pd-катализаторов. Существенный рост изомеризирующей активности и выхода, C₆- и C₇-изомеров при изомеризации н-гексана обусловлено вероятно увеличением удельной поверхности и числа мезопop при модифицировании морденитом. Так, на 0,1%Pd/CaHMM+HM число мезопop растет с 42,8% до 48,0%. На этом катализаторе наблюдается максимальная конверсия н-гексана, равная 54,3% при 400⁰C. Наблюдается корреляция изомеризирующей активности и количества, образующихся на Pd-катализаторах диметилбутанов, с количеством мезопop.

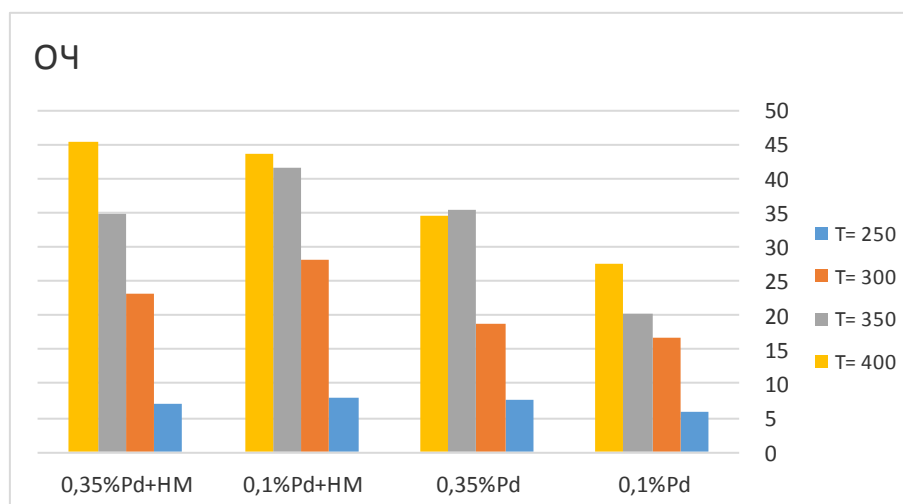


Рисунок 5 – Температурная зависимость прироста октанового числа продуктов изомеризации н-гексана на изученных 0,35%PdCaHMM и Pd/CaHMM + HM катализаторах расчетным методом

На рисунке 5 приведена зависимость прироста октанового числа продуктов изомеризации н-гексана на палладиевых катализаторах в зависимости от содержания Pd и при модифицировании морденитом.

Как видно из рисунка 5, прирост октанового числа значительно возрастает с увеличением температуры процесса и на катализаторах, модифицированных морденитом, что обусловлено ростом выходов, образующихся из н-гексана изомеров, в том числе дизамещенных, с высокими октановыми числами. Максимальный прирост о.ч. наблюдался на 0,35% Pd/CaHMM +HM.

На основании полученных результатов можно сделать заключение о перспективности Pd-катализаторов, нанесенных на кислотно активированный монтмориллонит в Ca-форме, которые характеризуются высокой изомеризирующей активностью и селективностью в процессе гидроконверсии н-гексана с получением высокооктановых изомеров.

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н-ГЕКСАНДЫ Са-ФОРМАДАҒЫ ҚЫШҚЫЛДЫ-БЕЛСЕНДІРІЛГЕН МОНТМОРИЛЛОНИТКЕ ЖАҒЫЛҒАН Pd-КАТАЛИЗАТОРЛАРДА ИЗОМЕРЛЕУ

Аннотация. Pd/CaНММ катализаторлары алынып және н-гександы изомерлеу реакциясында сыналған болатын. Алынған нәтижелер бойынша анықталғаны: палладийдің мөлшерін 0,35%-дан 0,1%-ға азайту белсенділіктің төмендеуіне әкеледі, алайда C₄₊ бойынша тұрақты және барынша жоғары болып қалады - 99,6-100%. Н-гексанның 0,35% Pd-катализаторындағы ең жоғары конверсиясы 400⁰С температура жағдайында 45,1%, ал 0,1% Pd-катализаторында тура сол температура жағдайында 32,4% құрайды. Измерлеудің аса маңызды өнімдерінің бірі диметилбутан болып табылады, 0,35% Pd-жанасудағы ең көп шығуы 350⁰С жағдайында 21,3% құрайды. 0,1% Pd-катализаторында диметилбутанның шығуы азайып және 400⁰С жағдайында 16,5% құрайды. Морденитті қосу тіпті төмен пайызды катализатордың өзінде белсенділік пен селективтілікті едәуір арттырады. 0,35%Pd/CaНММ+НМ-катализаторында н-гексанның конверсиясы 400⁰С жағдайында 54,1%-ға артады, ал 2,2-диметилбутанның шығуы 25,8% құрайды. 0,1%Pd+НМ-катализаторда н-гексанның конверсиясы 54,3%-ды, ал диметилбутанның ең көп шығуы 400⁰ жағдайында 26,0% құрайды, бұл 0,35% Pd катализаторындағы 25,8% мөлшерімен салыстырғанда аздап жоғары.

Изогександардың цеолитсіз 0,35 және 0,1% Pd-катализаторларда ең көп мөлшерде шығуы соған сәйкес 37,8 және 27,8% құрайды. Құрамында мордениті бар 0,35%Pd/CaНММ+НМ-катализаторда C₆-изомерлердің шығу мөлшері 46,4%, төмен пайызды 0,1%Pd+НМ катализаторда 45,8% құрайды.

Октандық санның өсуі процестің температурасы өскен сайын, сондай-ақ морденитпен түрлендірілген катализаторларда артып отырады. Октандық санның барынша өсуі 0,35% Pd/CaНММ +НМ катализаторында байқалды.

Түйін сөздер: изомерлеу, н-гексан, белсендірілген монтмориллонит, катализатор, палладий.

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ACTIVATION OF NONSPECIFIC PROTECTION OF THE ORGANISM WITH NEW IMMUNOTROPIC PREPARATIONS IN THE IMPLEMENTATION OF THE POTENTIAL PRODUCTIVITY OF PIGS

Abstract. In the conditions of a pig-breeding complex, the assessment of the efficiency of the application the PigStim-C and PigStim-M immunotropic preparations in newborn pigs for the purpose of realization of bioresource potential of productivity was carried out. It is established that the PigStim-C and PigStim-M immunotropic drugs do not exert a negative impact on the clinical and physiological state of an organism of pigs, ensure health and safety of the pigs. Against the background of immunocorrection of the organisms of pigs, 1.5 – 2.9 times of reduction in terms of recovery for 11.4 – 23.5%, increase in safety of a livestock to 98,0 – 100,0% are noted a decrease in the quantity of diseases. The use of immunotropic drugs in the early period of postnatal ontogenesis of pigs activates cellular and humoral factors of nonspecific protection of the organism in industrial technology: phagocytic activity of neutrophils - on 3.8-5.8% and 4.2-6.4%, bactericidal activity of blood serum - on 3.6-8.6% and 3.4-9.8%, lysozyme activity of blood plasma - on 4.8-8.6% and 4.0-8.0%. Immunocorrection of the organisms of young pigs in the early period of postnatal ontogenesis with the PigStim-C and PigStim-M immunotropic drugs promotes the realization of the bioresource potential of meat productivity. It was found that the animals of the 1st and 2nd experimental groups predominated their peers in the control in live weight by 7.1 kg or 6.9% and by 8.6 kg or 8.2%, in the average daily gain by 34 and 41 g. Slaughter weight of pigs against the background of immunocorrection was above the control by 6.22 and 7.08 kg. According to the results of the boning and trimming of half pig carcasses of the experimental groups, the increase in the number of trimmed pork by 1.88 and 2.16 kg in the 1st and 2nd experimental groups was found in comparison with the control.

Keywords: Pigs, PigStim-C and PigStim-M immunotropic preparations, immunity, morbidity and safety, productivity.

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АКТИВИЗАЦИЯ НЕСПЕЦИФИЧЕСКОЙ ЗАЩИТЫ ОРГАНИЗМА НОВЫМИ ИММУНОТРОПНЫМИ ПРЕПАРАТАМИ В РЕАЛИЗАЦИИ ПОТЕНЦИАЛА ПРОДУКТИВНОСТИ СВИНЕЙ

Резюме. В условиях свиноводческого комплекса проведена оценка эффективности применения иммуноотропных препаратов PigStim-C и PigStim-M новорожденным пороссятам с целью реализации биоресурсного потенциала продуктивности. Установлено, что иммуноотропные препараты PigStim-C и PigStim-M не оказывают негативное влияние на клинико-физиологическое состояние организма, обеспечивают здоровье и сохранность свиней. На фоне иммунокоррекции организма поросят отмечено снижение количества заболеваний в 1,5-2,9 раза, сокращение сроков выздоровления на 11,4-23,5%, повышение сохранности поголовья до 98,0-100,0%. Применение иммуноотропных препаратов в раннем периоде постнатального онтогенеза свиней активизирует клеточные и гуморальные факторы неспецифической защиты организма в условиях промышленной технологии: фагоцитарной активности нейтрофилов – на 3,8-5,8% и 4,2-6,4%, бактерицидной активности сыворотки крови – на 3,6-8,6% и 3,4-9,8%, лизоцимной активности плазмы крови – на 4,8-8,6% и 4,0-8,0%. Иммунокоррекция организма поросят в раннем периоде постнатального онтогенеза иммуноотропными препаратами PigStim-C и PigStim-M способствует реализации биоресурсного потенциала мясной продуктивности. Установлено, что животные 1-й и 2-й опытных групп превосходили сверстников в контроле по живой массе на 7,1 кг или 6,9% и на 8,6 кг или 8,2%, среднесуточному приросту – на 34 и 41 г. Убойная масса свиней на фоне иммунокоррекции оказалась выше контрольного на 6,22 и 7,08 кг. По результатам обвалки и жиловки полутуш свиней подопытных групп установлено увеличение количества жилованной свинины на 1,88 и 2,16 кг в 1-й и 2-й опытных группах по сравнению с контролем.

Ключевые слова: свиньи, иммуноотропные препараты PigStim-C и PigStim-M, иммунитет, заболеваемость и сохранность, продуктивность.

Введение. Необходимым условием для роста рентабельности и конкурентоспособности отрасли свиноводства является разработка и совершенствование организационно-экономического механизма эффективного функционирования свиноводческих организаций. Ключевым звеном данного процесса является инновационное обновление капитала, которое возможно через технические, организационные, экономические и управленческие нововведения в организациях [4, 11, 12, 23-25, 32, 33, 35].

Переход свиноводства на промышленную основу вместе с несомненными достоинствами, способствующими увеличению рентабельности отрасли в целом, спровоцировал обострение и возникновение ряда новых проблем, основной из которых является несоответствие условий среды обитания биологическим потребностям организма свиней. Разработка и внедрение в производственный процесс эффективных технологий содержания, кормления и обслуживания животных, хотя и позволяет увеличить продуктивность, повысить качество получаемой продукции и рентабельность отрасли в целом, зачастую нарушает сложившиеся в процессе филогенеза взаимоотношения организма свиней с окружающей средой и традиционными условиями содержания и кормления. Технологические приемы современных крупных свиноводческих комплексов, недостаточность рациона, нерациональное использование антибактериальных препаратов вызывают нарушение метаболизма, снижение резистентности организма свиней, что, в конечном итоге, приводит к высокой заболеваемости и низкой продуктивности свиноголовья [2, 8-10, 13, 15, 18, 20, 22].

В таких условиях природа животного и физиологические особенности организма не способны меняться столь же быстро, как условия содержания, кормления и технология животноводства в целом. Зачастую организму животного не удается избежать действия стресс-факторов и адаптироваться к изменяющимся условиям окружающей среды, что приводит к различным функциональным нарушениям и заболеваниям [1, 5-7, 21, 26, 27, 30, 34].

В виду того, что устранить действие многих стресс-факторов не представляется возможным, первоочередное значение приобретает с одной стороны профилактика негативного влияния на организм стрессоров, с другой – повышение адаптивных способностей животных к условиям промышленного содержания. Особого внимания требуют к себе новорожденные поросята, так как они более всего подвержены воздействию факторов среды, а адапционно-приспособительные механизмы их организма еще не сформированы. С другой стороны, ранний период постнатального онтогенеза является оптимальным для направленного воздействия на процесс формирования защитно-приспособительных механизмов их организма. В свете вышесказанного применение иммуностропных препаратов новорожденным пороссятам является перспективным приемом интенсификации отрасли свиноводства [3, 13, 16, 17, 19, 28, 29, 31].

Исследования проведены в рамках международного сотрудничества ученых Российской Федерации (руководитель доктор биологических наук, профессор Владимир Григорьевич Семенов) и Республики Казахстан (руководитель член – корреспондент Национальной академии наук Республики Казахстан, доктор сельскохозяйственных наук Дастанбек Асылбекович Баймуканов) в период 2015–2017 гг. по приоритетным отраслям продуктивного животноводства.

Цель настоящей работы – реализация биоресурсного потенциала организма свиней активизацией неспецифической резистентности новыми иммуностропными препаратами PigStim-C и PigStim-M.

Материал и методы. Научно-исследовательская работа проведена в условиях свиноводческого комплекса закрытого акционерного общества «Прогресс» Чебоксарского района Чувашской Республики. Обработка материалов осуществлялась в лаборатории био- и нанотехнологий и в лаборатории кафедры морфологии, акушерства и терапии федерального государственного бюджетного образовательного учреждения высшего образования «Чувашская государственная сельскохозяйственная академия» в 2014-2017 гг. Работа выполнена в соответствии с планом научных исследований ФГБОУ ВО Чувашская ГСХА.

Объектами исследований были поросята-сосуны, отъемыши и молодняк на откорме до убоя на мясо. Были подобраны три группы новорожденных поросят (контрольная, 1-я опытная и 2-я опытная) по принципу пар-аналогов с учетом клинико-физиологического состояния и живой массы по 50 животных в каждой группе.

Для определения характера воздействия на клинико-физиологическое состояние, гематологический и биохимический профили крови, показатели неспецифической резистентности организма поросят, а так же на рост, заболеваемость, сохранность и продуктивные качества молодняка свиней, новорожденным пороссятам опытных групп внутримышечно вводили иммуностропные препараты PigStim-C и PigStim-M в дозе 0,3 мл на голову, трехкратно на 1-, 4- и 7-е сутки жизни. Животным контрольных групп препараты не вводили.

PigStim-C – комплексный иммуностропный препарат для реализации биологического потенциала сельскохозяйственных животных. Препарат представляет собой водную суспензию, содержащую 2,5% полисахаридного комплекса дрожжевых клеток, иммобилизованных в агаровом геле с добавлением 1,5% производного бензимидазола и 5% антибактериального средства группы цефалоспоринов.

PigStim-M – комплексный препарат для стимуляции неспецифической резистентности организма, профилактики заболеваний молодняка сельскохозяйственных животных, представляет собой водную суспензию, содержащую 2,5% полисахаридного комплекса дрожжевых клеток, иммобилизованных в агаровом геле с добавлением 1,5% производного бензимидазола и 5% антибактериального препарата группы макролидов.

Свиноводческий комплекс ЗАО «Прогресс» является предприятием с законченным циклом производства свинины. Технологический процесс организован трехфазной поточной системой выращивания и откорма свиней, разделенной на 4 участка (этапа): воспроизводства, опороса,

доращивания и откорма. Группы подсосных свиноматок формируются с ритмичностью в 7 суток. Отъем выполняют в возрасте 25–26 суток.

Результаты. Параметры микроклимата в цехах для содержания подсосных свиноматок с поросятами, поросят-отъемышей и молодняка свиней на откорме за весь период наблюдения находились в пределах зоогиgienических норм и соответствовали потребностям организма с учетом половозрастных групп (таблица 1).

Таблица 1 – Микроклимат помещений для содержания свиней

Показатель	Помещение для содержания в период:		
	подсоса	отъема	откорма
Температура, °С	19,12±0,12 28,48±0,10*	18,80±0,17	16,00±0,15
Относительная влажность, %	66,80±0,80	65,20±0,49	61,80±1,16
Скорость движения воздуха, м/с			
зимний период	0,10±0,01	0,14±0,01	0,23±0,01
летний период	0,31±0,01	0,44±0,01	0,68±0,03
Концентрация:			
углекислый газ, %	0,16±0,01	0,16±0,00	0,19±0,00
аммиак, мг/м ³	6,40±0,51	13,40±0,75	15,20±0,58
сероводород, мг/м ³	3,00±0,32	3,40±0,51	4,20±0,58
Микробная обсемененность, тыс. м. т./м ³	18,80±0,58	19,60±0,75	26,60±1,03
*Температура воздуха в месте отдыха поросят (логове) в первую неделю жизни при локальном обогреве инфракрасными лампами.			

Кормление свиней на предприятии осуществляется полнорационными комбикормами на основе зерновой смеси собственной выработки с добавлением концентратов кормовых производства компании ООО «ПремиКорм». Поросят-сосунов начинают приучать к самостоятельному поеданию кормов, начиная с 9-го дня жизни. В кормлении поросят-сосунов используют престартерный комбикорм для поросят в возрасте 9-45 дней СПК-3 СТАРТ. Приготовление комбикормов для поросят массой 12-30 кг осуществляют путем добавления к зерновой смеси 20 % концентрата кормового для поросят КБВМ СК-4. Молодняк свиней живой массой от 30 до 70 кг кормят сбалансированным комбикормом, добавлением 15 % концентрата кормового КБВМ СК-5, а свиней живой массой 70-110 кг – 10 % концентрата кормового КБВМ СК-6.

Условия содержания и кормления свиней на свиноводческом комплексе ЗАО «Прогресс» Чебоксарского района ЧР соответствуют рекомендуемым и способствуют проявлению у животных генетически заложенного потенциала продуктивности, а соблюдение ветеринарно-санитарных правил и режима функционирования предприятия обеспечивает его ветеринарное благополучие.

В течение опытного периода за поросятами всех групп вели наблюдение с фиксацией показателей температуры тела, частоты сердечных сокращений и дыхательных движений.

За все время наблюдения не было выявлено явных различий в поведенческих реакциях животных, за исключением кратковременной стресс-реакции у поросят опытных групп после внутримышечного инъектирования им иммуностропных препаратов, а также спорадически возникавших случаев заболеваний в подопытных группах, описанных в ниже.

Результаты исследования гематологических показателей поросят опытных групп представлены в таблица 2.

Динамика количества эритроцитов и лейкоцитов, а также концентрации гемоглобина в крови поросят контрольной, 1-й и 2-й опытных групп за весь период наблюдений отвечала закономерностям возрастных изменений картины крови и была в пределах физиологических норм.

В 14-суточном возрасте количество эритроцитов в крови поросят 1-й опытной группы было достоверно выше на 5,3%, а 2-й опытной – на 5,8%, чем в контроле. В 30-, 60- и 90-суточном возрасте количество эритроцитов также оказалось выше контрольного показателя в крови животных 1-й опытной группы на 7,5, 7,6 и 5,1%, а 2-й опытной – на 8,8, 8,0 и 5,7% соответственно (P<0,05).

Таблица 2 – Гематологические показатели молодняка свиной

Показатель	Возраст, сут.				
	1	14	30	60	90
Контрольная группа					
Эритроциты, $\times 10^{12}/л$	4,52 \pm 0,07	4,52 \pm 0,06	4,56 \pm 0,08	6,02 \pm 0,10	6,68 \pm 0,11
Гемоглобин, г/л	98,80 \pm 1,16	96,80 \pm 0,80	91,80 \pm 0,97	93,00 \pm 1,30	95,20 \pm 2,08
Лейкоциты, $\times 10^9/л$	7,04 \pm 0,19	13,22 \pm 0,21	12,64 \pm 0,26	12,10 \pm 0,62	11,92 \pm 0,72
1-я опытная группа					
Эритроциты, $\times 10^{12}/л$	4,50 \pm 0,07	4,76 \pm 0,05*	4,90 \pm 0,07*	6,48 \pm 0,13*	7,02 \pm 0,08*
Гемоглобин, г/л	99,00 \pm 0,95	99,80 \pm 0,86*	95,80 \pm 1,43*	97,40 \pm 1,21*	100,20 \pm 1,07
Лейкоциты, $\times 10^9/л$	7,06 \pm 0,20	14,78 \pm 0,13***	15,84 \pm 0,11***	14,24 \pm 0,29*	13,86 \pm 0,32*
2-я опытная группа					
Эритроциты, $\times 10^{12}/л$	4,52 \pm 0,07	4,78 \pm 0,06*	4,96 \pm 0,09*	6,50 \pm 0,12*	7,06 \pm 0,09*
Гемоглобин, г/л	98,80 \pm 1,07	99,60 \pm 0,81*	95,60 \pm 1,29*	97,60 \pm 1,08*	99,80 \pm 1,16
Лейкоциты, $\times 10^9/л$	7,04 \pm 0,18	14,80 \pm 0,10***	15,90 \pm 0,07***	14,32 \pm 0,24*	13,72 \pm 0,24*
* P<0,05; *** P<0,001.					

Концентрация гемоглобина в крови поросят 1-й опытной группы в 14-, 30- и 60-суточном возрасте была выше по сравнению с контролем на 3,1, 4,4 и 4,7% соответственно, а в крови животных 2-й опытной группы – на 2,9, 4,1 и 4,9%. В 90-суточном возрасте концентрация гемоглобина в крови поросят 1-й и 2-й опытных групп также оказалась выше контрольного показателя на 5,3 и 4,8% соответственно, но статистически недостоверно.

Увеличение количества эритроцитов и повышение концентрации гемоглобина в крови поросят опытных групп свидетельствует об активизации гемопоэза на фоне внутримышечного введения иммуностимуляторов PigStim-C и PigStim-M в раннем периоде постнатального онтогенеза.

Количество лейкоцитов в крови поросят 1-й опытной группы в возрасте 14, 30, 60 и 90 суток оказалось выше контрольных показателей на 11,8%, 25,3, 17,7 и 16,3%, а 2-й опытной – на 12,0%, 25,8, 18,3 и 15,1% соответственно. Следует отметить, что число лейкоцитов в опытных группах не выходило за пределы физиологических норм. Следовательно, происходит лейкоцитоз, не превышающий физиологические нормы.

Дифференцировка лейкоцитов крови поросят представлена в таблице 3.

Базофилы на первые сутки жизни отсутствовали в крови свиной всех исследуемых групп. В крови поросят 1-й опытной группы в 14-, 30-, 60- и 90-суточном возрасте базофилов было больше на 0,4 %, 0,8, 0,8 и 0,8%, а 2-й опытной – на 0,6 %, 0,8, 1,0 и 0,8 % соответственно, нежели в контроле.

Количество эозинофилов в крови поросят опытных групп оказалось достоверно ниже, чем в контроле, начиная с 14-суточного возраста. Более ярко данный факт выражен у поросят второй опытной группы.

Достоверных различий доли юных нейтрофилов в разрезе подопытных групп не выявлено ($P>0,05$). Относительное количество палочкоядерных и сегментоядерных нейтрофилов, и моноцитов было ниже в крови поросят опытных групп, начиная с 14-суточного возраста ($P<0,05 - 0,001$), нежели в контроле. Причем, наиболее выраженная разница наблюдалась по сегментоядерным нейтрофилам. Так в 14-, 30-, 60- и 90-суточном возрасте в крови поросят 1-й опытной группы относительное количество сегментоядерных нейтрофилов оказалось ниже контрольного показателя на 7,0%, 11,4, 10,2 и 6,4%, а 2-й опытной – на 5,8%, 10,6, 9,6 и 5,8% соответственно. Следует также отметить, что в 1-й и 2-й опытных группах, несмотря на явное снижение доли сегментоядерных нейтрофилов от общего количества лейкоцитов, их количество относительно всех нейтрофилов возросло по отношению к контрольной группе. Таким образом, происходит снижение количества нейтрофилов с ядерным сдвигом вправо.

Таблица 3 – Лейкоцитарная формула поросят

Группа	Возраст, сут.				
	1	14	30	60	90
Базофилы, %					
Контрольная	–	0,2±0,20	0,2±0,20	0,4±0,24	0,4±0,24
1-я опытная	–	0,6±0,24	1,0±0,32	1,2±0,20*	1,2±0,20*
2-я опытная	–	0,8±0,20	1,0±0,32	1,4±0,24*	1,2±0,20*
Эозинофилы, %					
Контрольная	0,2±0,20	1,0±0,32	1,4±0,24	1,6±0,24	2,0±0,32
1-я опытная	0,2±0,20	0,2±0,20*	1,4±0,24	1,0±0,32*	0,8±0,37**
2-я опытная	0,2±0,20	0,4±0,24*	1,2±0,20*	1,2±0,20*	1,2±0,37*
Нейтрофилы юные, %					
Контрольная	0,6±0,24	0,8±0,20	0,6±0,40	0,8±0,37	0,8±0,20
1-я опытная	0,4±0,24	0,8±0,20	0,4±0,24*	0,8±0,37	1,0±0,32
2-я опытная	0,6±0,24	1,0±0,32	0,6±0,24	1,0±0,32	0,8±0,37
Нейтрофилы палочкоядерные, %					
Контрольная	10,8±0,37	6,8±0,37	3,0±0,45	3,0±0,45	3,0±0,45
1-я опытная	10,6±0,40	3,6±0,40***	1,4±0,24**	1,6±0,24**	2,4±0,24*
2-я опытная	11,0±0,45	3,8±0,37***	1,6±0,24**	1,8±0,20**	2,2±0,20*
Нейтрофилы сегментоядерные, %					
Контрольная	37,6±0,40	34,2±0,58	33,8±0,58	37,8±0,37	42,2±0,37
1-я опытная	38,4±0,51	27,2±0,58***	22,4±0,51***	27,6±0,51***	35,8±0,37***
2-я опытная	37,2±0,37	28,4±0,40***	23,2±0,37***	28,2±0,37***	36,4±0,40***
Лимфоциты, %					
Контрольная	47,0±0,71	53,4±0,51	58,0±0,55	53,0±0,71	47,8±0,37
1-я опытная	46,6±0,51	64,8±0,37***	71,0±0,45***	65,0±0,55***	55,6±0,51***
2-я опытная	47,2±0,66	63,2±0,37***	70,4±0,51***	63,4±0,51***	55,0±0,45***
Моноциты, %					
Контрольная	3,8±0,37	3,6±0,24	3,0±0,32	3,2±0,37	3,8±0,37
1-я опытная	4,0±0,32	2,8±0,37*	2,4±0,24*	2,8±0,37*	3,2±0,37*
2-я опытная	3,8±0,37	2,4±0,24***	2,0±0,32*	3,0±0,32*	3,2±0,20*

* P<0,05; ** P<0,01, *** P<0,001.

Анализ относительного количества лимфоцитов свидетельствует о достоверном (P<0,001) повышении их количества в 1-й и 2-й опытных группах, начиная с 14-суточного возраста. Данный показатель оставался выше аналогичного показателя контрольной группы у животных 1-й опытной группы в 14-, 30-, 60- и 90-суточном возрасте соответственно на 11,4%, 13,0, 12,0 и 7,8%, а у животных 2-й опытной группы – на 9,8%, 12,4, 10,4 и 7,2% соответственно. Следовательно, испытуемые иммуностропные препараты вызывают лимфоцитоз в крови свиней.

Результаты исследований неспецифической резистентности организма поросят подопытных групп на фоне внутримышечного введения иммуностропных препаратов PigStim-C и PigStim-M представлены на рисунках 1–3.

В возрасте 14 суток фагоцитарная активность нейтрофилов крови у поросят 1-й и 2-й опытных групп оказалась выше контрольного показателя на 4,8 и 5,6 % соответственно, в 30-суточном возрасте – на 5,0 и 5,4 %, в 60-суточном – на 3,8 и 4,2 % и в 90-суточном возрасте – на 5,8 и 6,4 % соответственно.

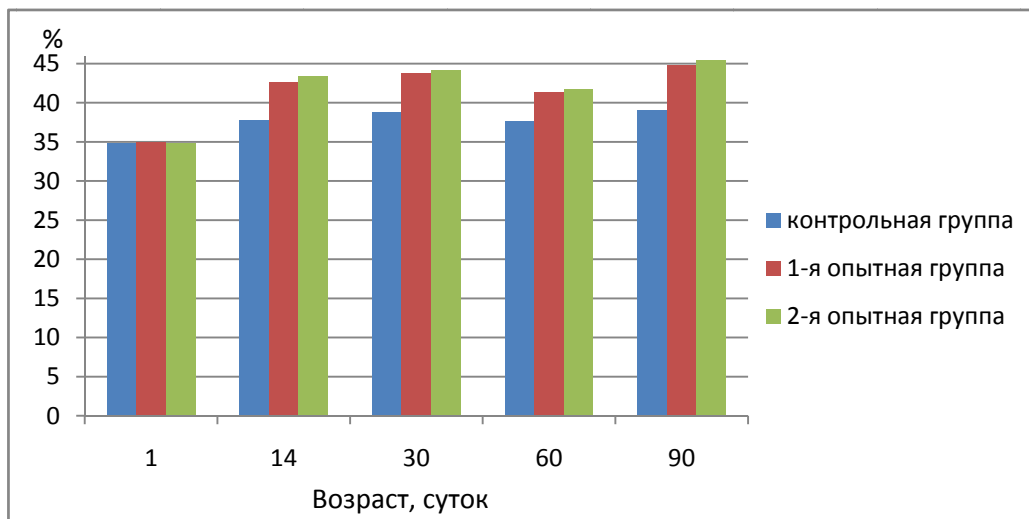


Рисунок 1 – Фагоцитарная активность нейтрофилов крови поросят

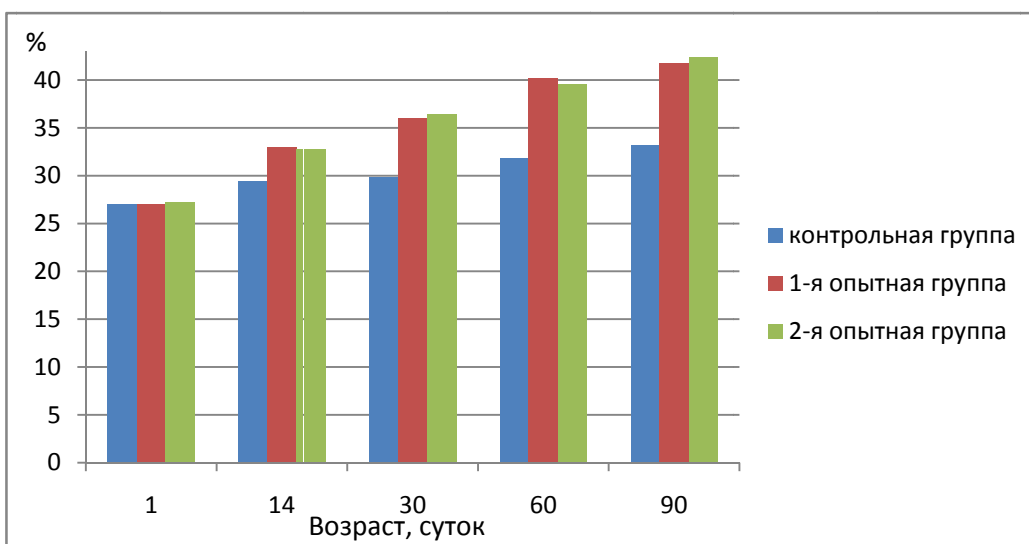


Рисунок 2 – Бактерицидная активность сыворотки крови поросят

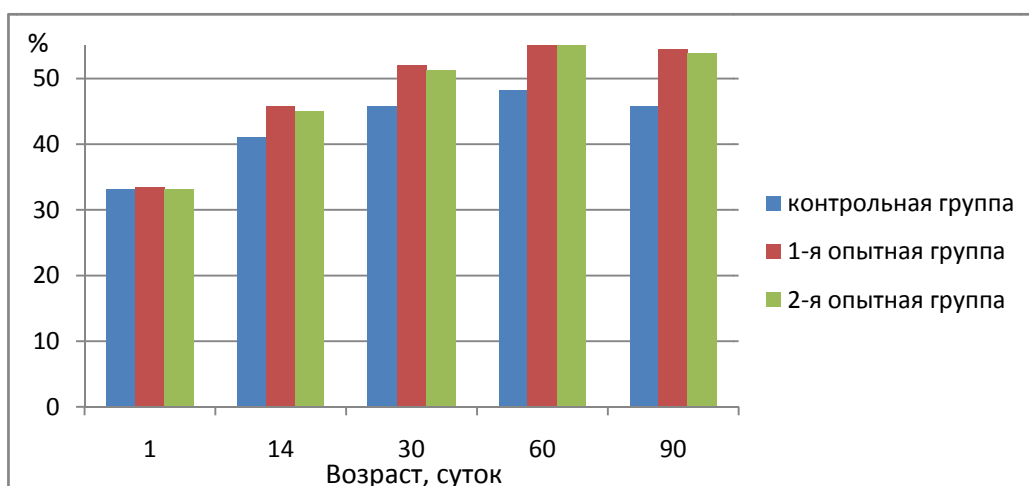


Рисунок 3 – Лизоцимная активность плазмы крови поросят

Бактерицидная активность сыворотки крови поросят подопытных групп не имела достоверных отличий в 1-суточном возрасте. Однако уже в 14-суточном возрасте она была достоверно выше контрольного показателя на 3,6 и 3,4 % у поросят первой и второй опытных групп соответственно. В 30-, 60- и 90-суточном возрасте бактерицидная активность сыворотки крови поросят первой опытной группы оказалась выше контрольного показателя на 6,2, 8,4 и 8,6 %, а у поросят второй опытной группы – на 6,6, 7,8 и 9,2 % соответственно.

Лизоцимная активность плазмы крови поросят опытных групп имела достоверные отличия в период с 14-суточного возраста и до конца срока наблюдения.

Так, в 14-суточном возрасте лизоцимная активность плазмы крови поросят контрольной группы была ниже показателей первой и второй опытных групп на 4,8 и 4,0 % соответственно, в 30-суточном – 6,2 и 5,4 %, в 60-суточном – 7,4 и 7,2 %, в 90-суточном возрасте – на 8,6 и 8,0 %. Таким образом, результаты иммунологического исследования крови свидетельствуют о том, что внутримышечное инъекционное введение поросятам иммуностимуляторов PigStim-C и PigStim-M в раннем периоде постнатального онтогенеза способствует активизации клеточных и гуморальных факторов неспецифической резистентности организма. Следует отметить, что PigStim-C оказывает более выраженный стимулирующий эффект на фагоцитарную активность нейтрофилов и бактерицидную активность сыворотки, а PigStim-M – на лизоцимную активность плазмы крови.

В течение опытного периода в разные сроки подсоса, отъема и откорма среди животных всех групп возникали случаи заболеваний.

В периоды новорожденности и подсоса преимущественно регистрировали заболевания, характеризующиеся поносом неинфекционной этиологии (таблица 4).

Таблица 4 – Заболеваемость и сохранность поросят в периоды новорожденности и подсоса

Показатель	Группа животных		
	контрольная	1-я опытная	2-я опытная
Количество поросят	50	50	50
Заболело	26	11	9
Выздоровело	24	10	9
Пало	2	1	–
Продолжительность болезней, суток	1,96	1,55	1,67
Сохранность, %	96,00	98,00	100,00

Заболевания протекали без повышения температуры тела, выраженной анорексии и гиподинамии. Терапию при возникавших заболеваниях проводили принятыми в хозяйстве комплексными методами, с применением антибактериальных препаратов широкого спектра действия.

Как видно из таблицы 4, среди поросят контрольной группы за период новорожденности и подсоса зафиксировано 26 случаев заболеваний, при этом терапия при возникших заболеваниях была успешной лишь в 24 случаях, 2 поросенка пали от истощения и обезвоживания в результате поноса незаразной этиологии. В 1-й опытной группе зафиксировано 11 заболеваний поросят, из которых 10 излечились и 1 пал, а во 2-й опытной группе – 9 случаев заболеваний поросят, все из которых излечились. Средняя продолжительность заболеваний поросят контрольной группы составила 1,96 суток, 1-й опытной – 1,55 суток, а 2-й опытной – 1,67 суток. Заболеваемость поросят 1-й и 2-й опытных групп оказалась ниже контрольного показателя соответственно на 30 и 34 %, кроме того достоверно улучшился показатель эффективности терапевтических мероприятий и сохранности поросят.

Среди заболеваний поросят-отъемышей (таблица 5) ведущее место занимала отечная болезнь, сопровождающаяся симптомами покраснения и отека век, конъюнктивитами, водянистыми истечениями из глаз, а также ухудшением общего клинического состояния, проявляющегося шаткостью походки, отказом от корма и воды.

Терапию при возникших заболеваниях производили незамедлительно при первых клинических признаках, до появления симптомов поражения нервной системы, общепринятыми в

Таблица 5 – Заболеваемость и сохранность поросят-отъемышей

Показатель	Группа животных		
	контрольная	1-я опытная	2-я опытная
Количество поросят	48	49	50
Заболело	14	7	5
Выздоровело	13	7	5
Пало	1	–	–
Продолжительность болезней, суток	2,43	1,86	2,00
Сохранность, %	97,92 94,00*	100,00 98,00*	100,00 100,00*
* Сохранность за все предыдущие периоды.			

ветеринарии схемами лечения. Так же как и в подсосный период, среди поросят-отъемышей возникали случаи заболеваний с симптомами поноса незаразной этиологии. Кроме того, в отъемный период у поросят фиксировались единичные случаи других заболеваний, например артритов.

Среди поросят-отъемышей контрольной группы зарегистрировали 14 заболеваний незаразной этиологии, терапия 13 из них была успешной с общей продолжительностью болезней 2,43 суток, один поросенок-отъемыш пал. В 1-й опытной группе зафиксировано 7 случаев заболеваний, терапия всех из них была успешной, а средняя продолжительность составила 1,86 суток. Во 2-й опытной группе зафиксировано 5 заболеваний поросят, все из которых излечились в среднем через 2,00 суток. Таким образом, применение иммуностропных препаратов способствовало снижению количества заболеваний поросят в период отъема в 2,0-2,8 раза, а их продолжительности на 0,43-0,67 суток.

Среди заболеваний молодняка свиней всех трех групп в период откорма наиболее частыми были бронхиты, проявляющиеся кашлем без повышения температуры тела и ухудшения общего клинического состояния (таблица 6). Также часто встречались заболевания с признаками поражения суставов. Терапию при возникших заболеваниях осуществляли общепринятыми в ветеринарии и в данном хозяйстве приемами и методами лечения.

Таблица 6 – Заболеваемость и сохранность свиней на откорме

Показатель	Группа животных		
	контрольная	1-я опытная	2-я опытная
Количество поросят	47	49	50
Заболело	12	7	8
Выздоровело	12	7	8
Пало	–	–	–
Продолжительность болезней, суток	3,25	2,86	2,88
Сохранность, %	100,00 94,00*	100,00 98,00*	100,00 100,00*
* Сохранность за все предыдущие периоды.			

В период откорма среди свиней контрольной группы возникло 12 случаев заболеваний, в 1-й опытной – 7, а во 2-й опытной – 8. Средняя продолжительность заболеваний молодняка составила 3,25 суток в контрольной группе, 2,86 суток – в 1-й опытной и 2,88 суток – во 2-й опытной. При этом терапия при всех случаях заболеваний была эффективной и падежа не зафиксировано.

Таким образом, на основе анализа заболеваемости и сохранности свиней в периоды новорожденности, подсоса, отъема и откорма установлено, что внутримышечное введение иммуностропных препаратов PigStim-C и PigStim-M поросятам в раннем периоде постнатального онтогенеза снижает количество заболеваний, сокращает сроки выздоровления и повышает эффективность терапевтических мероприятий, а также повышает сохранность.

За период опыта регулярно в возрасте 30, 60, 90, 120, 150, 180 и 210 суток производили взвешивание свиней всех трех групп. Индивидуальной оценки живой массы особей не проводилось, взвешиванию подвергалась каждая группа свиней с последующим определением среднего веса математическим путем (таблица 7).

Таблица 7 – Динамика роста свиней

Возраст	Группа животных		
	контрольная	1-я опытная	2-я опытная
Живая масса, кг			
1	1,00	1,00	1,00
30	6,59	7,02	7,09
60	15,23	16,23	16,46
90	26,84	28,65	29,02
120	41,81	44,61	45,22
150	59,32	63,42	64,20
180	79,94	85,50	86,58
210	103,79	110,92	112,34
Среднесуточный прирост живой массы, г			
1-30	186	201	203
30-60	288	307	312
60-90	387	414	419
90-120	499	532	540
120-150	584	627	633
150-180	687	736	745
180-210	795	847	859
1-210	489	523	530

Как видно из представленной таблицы живая масса свиней всех трех групп, имея одинаковые значения при рождении, планомерно увеличивалась до конца опытного периода. Так, живая масса свиней контрольной группы в возрасте 210 суток оказалась равной в среднем по группе 103,79 кг. Живая масса свиней 1-й опытной группы к концу периода откорма оказалась равной в среднем по группе 110,92 кг, что на 7,13 кг или 6,87 % больше контрольного показателя. Живая масса свиней 2-й опытной группы, также оказалась больше контрольного показателя на 8,55 кг или 8,24 %, и составила в среднем по группе 112,34 кг.

Среднесуточные приросты живой массы свиней 1-й и 2-й опытных групп оказались выше контрольных показателей. Так, указанный показатель свиней 1-й опытной группы за 1-й, 2-й, 3-й, 4-й, 5-й, 6-й и 7-й месяцы выращивания оказался выше контрольного на 15 г, 19, 27, 33, 43, 49 и 52 г, а у свиней 2-й опытной группы в те же сроки – на 17 г, 24, 32, 41, 49, 58 и 64 г соответственно. Среднесуточные приросты свиней 1-й и 2-й опытной групп в среднем за все периоды подсоса, отъема и откорма оказались выше контрольного показателя на 34 и 41 г.

Следовательно, применение поросятам в раннем периоде постнатального онтогенеза иммуностимулирующих препаратов PigStim-C и PigStim-M способствует более интенсивному их росту в периоды подсоса, отъема и откорма.

В возрасте 210 суток был произведен контрольный убой пяти свиней из каждой группы. Убой животных производился в убойном цехе мясоперерабатывающего предприятия ИП Шалеева О.В. по адресу Чувашская Республика, Чебоксарский район, с. Ишлеи, ул. Совхозная, д. 4а, согласно правилам ветеринарного осмотра убойных животных и ветеринарно-санитарной экспертизы мяса и мясных продуктов.

Таблица 8 – Мясная продуктивность свиней

Показатель	Группа животных		
	контрольная	1-я опытная	2-я опытная
Предубойная масса, кг	103,79	110,92	112,34
Абсолютный прирост, кг	102,79	109,92	111,34
Среднесуточный прирост, г/сутки	489	523	530
Убойная масса, кг	70,4±0,28	76,62±0,48	77,48±0,62
Убойный выход, %	67,83	69,08	68,97

По результатам контрольного убоя свиней (таблица 8) выявлено, что убойный выход у свиней контрольной группы составил 67,83 %, при средней массе туши 70,4 кг. Убойная масса свиней 1-й и 2-й опытных групп в среднем имела значения 76,62 и 77,48 кг, что на 6,22 и 7,08 кг больше контрольного показателя.

Помимо абсолютного увеличения убойной массы свиней на фоне применения иммуностропных препаратов, у них увеличился также и убойный выход. Так, убойный выход у свиней 1-й и 2-й опытных групп имел значение 69,08 и 68,97 %, что на 1,25 и 1,14 % больше контрольного показателя.

Мышечная ткань всех исследованных туш была хорошо развита, особенно на спинной и тазобедренной частях, шпик был в основном белого цвета, на некоторых тушах имел бледно-розовый оттенок. Масса туш свиней всех групп была в пределах от 39 до 98 кг включительно, а толщина шпика над остистыми отростками между 6-м и 7-м грудными позвонками была в пределах от 1,5 до 4,0 см, не считая толщину шкуры. Следовательно, согласно ГОСТ 7724–77 «Мясо. Свинина в тушах и полутушах», свинину, полученную от животных всех исследуемых групп, следует отнести ко II категории (мясная молодняк).

После разделения туш на полутуши и охлаждения в холодильной камере при температуре -3...-5 °С и скорости движения воздуха 1–3 м/с в течение 10–13 часов свинина на костях, полученная от всех трех групп была направлена на обвалку и жиловку. Результаты обвалки и жиловки свинины представлены в таблице 9.

Таблица 9 – Обвалка и жиловка свиных полутуш

Показатель	Группа животных		
	контрольная	1-я опытная	2-я опытная
Масса охлажденной полутуши, кг	34,74±0,13	37,78±0,24	38,22±0,31
Свинина жилованная, кг	21,65	23,53	23,81
Шпик, кг	4,93	5,36	5,43
Шкурка, кг	2,36	2,57	2,60
Ребра для копчения, кг	3,13	3,40	3,44
Сухожилия, хрящи, кг	0,66	0,72	0,73
Технические зачистки и потери, кг	0,07	0,08	0,08
Кость, кг	1,95	2,12	2,14

Полутуши от всех трех групп соответствовали гигиеническим требованиям, предъявляемым к безопасности и пищевой ценности мяса убойных животных. Так, на всех образцах была хорошо выражена корочка подсыхания бледно-розового цвета. Мышцы на разрезе были влажными на ощупь, но не оставляли мокрого пятна на фильтровальной бумаге, цвет соответствовал доброкачественной свинине и был от светло-розового до красного. Консистенция мяса была упругая, ямка, образующаяся при надавливании пальцем, быстро выравнивалась. Запах был специфический, свойственный мясу свиней. Жир был в основном белого цвета, местами бледно-розового. Консистенция мягкая, эластичная. Сухожилия были плотными, упругими, с гладкой, блестящей суставной поверхностью.

Как видно из представленной таблицы, обвалка и жиловка полутуш не выявила достоверного увеличения доли выхода отдельных компонентов, однако вместе с тем существенно увеличилось количество жилованной свинины. Так, масса охлажденных полутуш в шкуре, с вырезкой, без баков и без ножек свиней 1-й и 2-й опытных групп оказалась больше массы контрольных полутуш на 3,04 и 3,48 кг. В этой связи вполне объяснимо то, что увеличилось и количество жилованной свинины, полученной от свиней опытных групп. Так, количество жилованной свинины, полученной от одной полутуши свиньи 1-й опытной группы, оказалось на 1,88 кг больше контрольного показателя, а 2-й опытной группы – на 2,16 кг. Кроме того от полутуш 1-й и 2-й опытных групп увеличилось количество полученного шпика на 0,43 и 0,50 кг, а ребер для копчения – на 0,27 и 0,31 кг соответственно. В связи с увеличением живой массы и соответственно массы полутуш свиней опытных групп, также увеличилось количество полученной шкурки, сухожилий и хрящей, кости и технических потерь.

После обвалки определяли содержание основных пищевых веществ и энергетическую ценность средних проб жилованной свинины (таблица 10).

Таблица 10 – Содержание основных пищевых веществ и энергетическая ценность свинины

Показатель	Группа животных		
	контрольная	1-я опытная	2-я опытная
Вода, г в100 г свинины	52,51±0,11	52,84±0,22	52,62±0,48
Белки, г в100 г свинины	14,32±0,08	14,82±0,17*	14,98±0,16**
Жиры, г в100 г свинины	33,32±0,13	31,40±0,10***	31,46±0,46***
Зола, г в100 г свинины	0,96±0,04	0,94±0,04	0,94±0,05
Энергетическая ценность, ккал в100 г свинины	356,40±2,29	360,20±1,24	359,40±2,25
* P<0,05; ** P<0,01, *** P<0,001.			

Как видно из таблицы, содержание основных питательных веществ и энергетическая ценность мяса свиней всех трех групп, также соответствовало свинине II категории. Однако следует отметить, что содержание белка было достоверно выше в мясе свиней опытных групп. Так, содержание белка в 100 г мяса свиней 1-й опытной группы было выше контрольного показателя на 0,50 г, а 2-й опытной – на 0,66 г. Кроме того, в мясе свиней опытных групп было меньшее содержание жира, на 1,92 г в 1-й опытной и на 1,86 г во 2-й опытной группе. Разница энергетической ценности мяса свиней трех групп была статистически недостоверной.

Таким образом, можно заключить, что внутримышечное введение поросятам в раннем периоде постнатального онтогенеза иммуностимуляторов PigStim-C и PigStim-M способствовало увеличению их мясной продуктивности. Так, от свиней опытных групп получено больше мяса, как на кости, так и жилованного, кроме того, в мясе свиней опытных групп достоверно увеличилось содержание белка и снизилось содержание жира.

Обсуждения. Существенное влияние на продуктивные качества свиней оказывают условия содержания и кормления, и развитие свиноводства должно подразумевать разработку и внедрение в производственный процесс эффективных технологий содержания, кормления и обслуживания животных, позволяющих увеличить продуктивность, повысить качество получаемой продукции и рентабельность отрасли в целом. Но зачастую на практике нововведения и инновации нарушают сложившиеся в процессе филогенеза взаимоотношения организма свиней с окружающей средой и традиционными условиями содержания и кормления. В таких условиях на организм свиней постоянно действуют негативные факторы среды, что приводит к нарушению метаболизма, снижению резистентности организма свиней и, в конечном итоге, к высокой заболеваемости и низкой продуктивности свиноголовья.

С целью обеспечения здоровья, сохранности и повышения продуктивности свиней современные ученые и практикующие ветеринарные врачи рекомендуют применять разного рода биологически активные вещества. Современный ветеринарный фармацевтический рынок предлагает большой ассортимент таких препаратов, но по результатам анализа доступной литературы по

данной тематике, можно заключить, о недостаточной эффективности предлагаемых средств. Основными причинами тому является отсутствие комплексного действия, дороговизна, наличие ограничений по использованию продукции на фоне их применения и другие. В то же время комплексными, эффективными и обеспечивающими высокое санитарное качество продукции животноводства являются иммуностропные препараты PigStim-C и PigStim-M, разработанные учеными Чувашской государственной сельскохозяйственной академии В.Г.Семеновым, Ф.П. Петрянкиным и др.

Данная научно-исследовательская работа посвящена научно-практическому обоснованию целесообразности активизации неспецифической резистентности организма свиней новыми иммуностропными препаратами PigStim-C и PigStim-M с целью реализации биоресурсного потенциала их организма.

На фоне внутримышечного введения иммуностропных препаратов PigStim-C и PigStim-M в раннем периоде постнатального онтогенеза наблюдается увеличение количества эритроцитов и повышение концентрации гемоглобина в крови поросят опытных групп что свидетельствует об активизации в их организме гемопоэза.

Так же, на фоне внутримышечного введения иммуностропных препаратов PigStim-C и PigStim-M наблюдается лейкоцитоз, не превышающий физиологические нормы, с ярко выраженным лимфоцитозом на фоне повышения количества базофилов и нейтропении с ядерным сдвигом вправо, а анализом белкового профиля установлено достоверное увеличение в сыворотке крови поросят концентрации общего белка за счет глобулиновой, преимущественно γ -глобулиновой фракции.

На фоне применения иммуностропных препаратов PigStim-C и PigStim-M происходит активизация клеточных и гуморальных факторов неспецифической резистентности организма поросят.

Анализ заболеваемости и сохранности свиней в периоды подсоса, отъема и откорма на свиноводческом комплексе ЗАО «Прогресс» выявил, эффективность препаратов PigStim-C и PigStim-M в обеспечении здоровья и сохранности поголовья свиней. На фоне применения PigStim-C и PigStim-M количество заболеваний среди поросят в период подсоса снизилось в 2,36-2,89 раза, а их продолжительность сократилась на 14,8-20,9%. В период отъема заболеваний было меньше в 2,0-2,8 раза, а их продолжительность короче на 17,7-23,5 %. В период откорма заболеваемость снизилась в 1,5-1,7 раза при сокращении продолжительности на 11,4-12,0 %. Следует отметить, что сохранность свиней 1-й и 2-й опытных групп составила 98,0 и 100,0 % при 94,0 % сохранности поросят в контрольной группе.

Живая масса свиней на фоне применения иммуностропного препарата PigStim-C к концу периода откорма оказалась равной в среднем по группе 110,92 кг, что на 7,13 кг или 6,87 % больше контрольного показателя. Живая масса свиней на фоне PigStim-M, также оказалась больше контрольного показателя, но на 8,55 кг или 8,24 %, и составила в среднем по группе 112,34 кг. Среднесуточные приросты живой массы свиней на фоне иммунокоррекции препаратом PigStim-C оказались выше контрольных показателей за 1-й, 2-й, 3-й, 4-й, 5-й, 6-й и 7-й месяцы выращивания на 15 г, 19, 27, 33, 43, 49 и 52 г, а иммуностропным препаратом PigStim-M в те же сроки – на 17 г, 24, 32, 41, 49, 58 и 64 г соответственно. Среднесуточные приросты свиней в среднем за весь период опыта увеличились на 34 и 41 г сутки. Следовательно, применение поросятам в раннем периоде постнатального онтогенеза иммуностропных препаратов PigStim-C и PigStim-M способствует их росту в периоды подсоса, отъема и откорма.

По результатам контрольного убоя убойный выход у свиней на фоне иммунокоррекции оказался выше контрольного на 6,22 кг при применении PigStim-C и на 7,08 кг – PigStim-M. Помимо абсолютного увеличения убойной массы на фоне применения иммуностропных препаратов увеличился также и убойный выход на 1,25 и 1,14 % соответственно.

Масса охлажденных полутуш в шкуре, с вырезкой, без баков и без ножек свиней после применения иммуностропных препаратов PigStim-C и PigStim-M оказалась больше массы контрольных полутуш на 3,04 и 3,48 кг. Количество жилованной свинины, полученной от одной полутуши свиньи после применения PigStim-C оказалось на 1,88 кг больше контрольного показателя, а после применения PigStim-M – на 2,16 кг. От полутуш свиней, подвергнутых иммунокоррекции, увеличилось количество полученного шпика на 0,43 и 0,50 кг и ребер для копчения на 0,27 и 0,31 кг.

В связи с увеличением живой массы и соответственно массы полутуш свиней опытных групп, также увеличилось количество полученной шкурки, сухожилий и хрящей, кости и технических потерь.

Выявлено достоверное повышение содержания белка и снижение количества жира в мясе свиней опытных групп. Так, содержание белка в 100 г мяса свиней 1-й опытной группы было выше контрольного показателя на 0,50 г, а 2-й опытной – на 0,66 г, а содержание жира меньше на 1,92 г в 1-й опытной и на 1,86 г во 2-й опытной группе.

Таким образом, можно заключить, что внутримышечное введение пороссятам в раннем периоде постнатального онтогенеза иммуностимулирующих препаратов PigStim-C и PigStim-M способствовало увеличению их мясной продуктивности. Так, от свиней опытных групп получено больше мяса, как на кости, так и жилованного, кроме того, в мясе свиней опытных групп достоверно увеличилось содержание белка, и снизилось содержание жира.

Заключение. Проведенная научно-исследовательская работа подтверждает целесообразность иммунокоррекции организма пороссят в раннем периоде постнатального онтогенеза иммуностимулирующими препаратами PigStim-C и PigStim-M с целью реализации биоресурсного потенциала их организма. На фоне внутримышечного инъекционного введения иммуностимулирующих препаратов PigStim-C и PigStim-M пороссятам трехкратно, с интервалом в три суток на 1-е, 4-е и 7-е сутки жизни в дозе 0,3 мл на голову наблюдается достоверное увеличение показателей роста, обеспечивается здоровье и сохранность молодняка, увеличивается количество получаемой свинины, при отсутствии негативного воздействия на клинико-физиологическое состояние организма свиней и обеспечении санитарного качества продукции.

Выводы.

1. Параметры микроклимата в помещениях для содержания свиней в периоды подсоса, отъема и откорма находились в пределах зоогигиенических норм согласно РД-АПК 1.10.02.04-12 и удовлетворяли биологическим потребностям соответствующей возрастной группы животных.

Кормление свиней осуществлялось сбалансированными комбикормами на основе зерновой смеси собственной выработки и концентратов производства фирмы ООО «ПремиКорм».

2. Разработанные иммуностимулирующие препараты не оказывают негативное влияние на клинико-физиологическое состояние организма свиней, обеспечивают здоровье и сохранность свиного поголовья.

Применение PigStim-C и PigStim-M способствовало снижению количества заболеваний в 1,5-2,9 раза и сокращению сроков выздоровления на 11,4-23,5 %. Установлено повышение сохранности свиней в 1-й и 2-й опытных группах до 98,0 и 100,0 % при 94,0 % в контроле.

3. Иммуностимулирующие препараты PigStim-C и PigStim-M активизируют гемопоэз, вызывая позитивную динамику гематологического и биохимического профилей организма свиней в онтогенезе.

После применения указанных иммуностимулирующих препаратов установлено достоверное повышение количества эритроцитов на 5,1-7,6 % и 5,7-8,8 % и концентрации гемоглобина на 3,1-5,3 % и 2,9-4,9 % соответственно, а также лейкоцитоз, не превышающий физиологические нормы с ярко выраженным лимфоцитозом на фоне повышения количества базофилов и нейтропении с ядерным сдвигом вправо. Повышение количества общего белка в сыворотке крови на 2,3-4,0 % и 1,9-4,7 % было вызвано активизацией выработки глобулинов, преимущественно γ -глобулиновой фракции белка, на фоне иммунокоррекции организма препаратами PigStim-C и PigStim-M.

4. Применение иммуностимулирующих препаратов в раннем периоде постнатального онтогенеза свиней активизирует клеточные и гуморальные факторы неспецифической защиты организма в условиях промышленной технологии: фагоцитарной активности нейтрофилов – на 3,8-5,8 % и 4,2-6,4 %, бактерицидной активности сыворотки крови – на 3,6-8,6 % и 3,4-9,8 %, лизоцимной активности плазмы крови – на 4,8-8,6 % и 4,0-8,0 %.

5. Иммунокоррекция организма пороссят в раннем периоде постнатального онтогенеза иммуностимулирующими препаратами PigStim-C и PigStim-M способствует реализации биоресурсного потенциала мясной продуктивности.

Ветеринарно-санитарной экспертизой установлено, что иммуностимулирующие препараты PigStim-C и PigStim-M не оказывают негативное влияние на органолептические, биохимические и спектрометрические показатели свинины, и обеспечивают ее доброкачественность.

Установлено, что животные 1-й и 2-й опытных групп превосходили сверстников в контроле по живой массе на 7,1 кг или 6,9 % и на 8,6 кг или 8,2 %, среднесуточному приросту – на 34 и 41 г.

Убойный выход свиней на фоне иммунокоррекции препаратами PigStim-C и PigStim-M оказался выше на 6,22 кг и 7,08 кг, нежели в контроле.

По результатам обвали и жиловки полутуш свиней подопытных групп установлено увеличение количества жилованной свинины на 1,88 и 2,16 кг в 1-й и 2-й опытных группах по сравнению с контролем.

Выявлено достоверное повышение содержания белка на 0,50 и 0,66 % и снижение количества жира на 1,92 и 1,86 % в мясе свиней опытных групп.

Рекомендации. С целью реализации биоресурсного потенциала организма свиней в промышленном свиноводстве рекомендуем:

1. Новорожденным пороссятам внутримышечно, трехкратно на 1-е, 4-е и 7-е сутки жизни инъектировать иммуностропный препарат PigStim-C в дозе 0,3 мл на голову.

2. Пороссятам внутримышечно инъектировать иммуностропный препарат PigStim-M в дозе 0,3 мл на голову трехкратно с интервалом в три суток на 1-е, 4-е и 7-е сутки постнатального онтогенеза.

Выбор иммуностропного препарата следует осуществлять на основании фармакологических особенностей с учетом клинко-физиологического состояния пороссят и эпизоотологической обстановки.

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ШОШҚА ӨНІМДІЛІГІНІҢ ПОТЕНЦИАЛЫН ІС ЖҮЗІНЕ АСЫРҒАНДА ЖАҢА ИММУНОТРОПТЫҚ ПРЕПАРАТ ОРГАНИЗМНІҢ ЕРЕКШЕ ҚОРҒАНЫСЫН БЕЛСЕНДЕНДІРЕДІ

Аннотация. Шошқа өсіретін кешенінің жағдайында жаңа туылған торайлардың биоресурстық өнімділік әлеуетін іске асыру мақсатында PigStim-C және PigStim-M иммунотропты препараттардың тиімділігін бағалау жүргізілді. PigStim-C және PigStim-M иммунотропты препараттары ағзаның клиника-физиологиялық жағдайына кері әсер етпейтіні, шошқалардың денсаулығы мен сақталуын қамтамасыз ететіні анықталды. Торайлар организмін иммунокоррекциялау барысында сырқаттардың 1,5-2,9 есе азайғаны, сауығу мерзімінің 11,4-23,5% қысқаруы, сандық сақталуы 98,0- 100,0% дейін жоғарлады. Иммунотропты препараттарды қолдану шошқаның ерте онтогенез барысында ағзаның спецификалық емес жасушалық және гуморальдық қорғаныш факторларын активациялайды. Өндірістік технология жағдайларында: нейтрофилдердің фагоцитарлық белсенділігі – 3,8-5,8% және 4,2-6,4%, қан сарысуының бактерицидті белсенділігіне – 3,6-8,6% и 3,4-9,8%, қан плазмасының лизоцимді белсенділігіне – 4,8-8,6% и 4,0-8,0%. Торайлар организмін ерте онтогенез мерзімінде PigStim-C және PigStim-M иммунотропты препараттармен иммунокоррекциялау ет өнімділігіне оң әсер етеді. Бақылау тобымен салыстырғанда, 1 және 2 тәжірибиелі топтың жануарлары тірі салмақ бойынша олардан 7,1 кг немесе 6,9% және 8,6 кг немесе 8,2% басым болды, Орта тәуліктік өсім 34 және 41 г екендігі анықталды. Иммуноактивтеу аясындағы шошқаның салмағы бақылаудан 6,22 және 7,08 кг жоғары болды. Бақылаумен салыстырғанда, 1 және 2 бақылау топтарының сойыс шығымдары жоғары.

Түйін сөздер: шошқа, иммунотроптық препараттар PigStim-C және PigStim-M, иммунитет, ауру және қауіпсіздік, өнімділік.

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THE MORAL IMPACT OF NATIONAL MUSIC DURING GLOBALIZATION ERA

Abstract. The article outlines the moral values of the national music in the global era, the samples of the tradition of traditional music, which form the basis of the spiritual heritage. Their ambiguous treatment during the Soviet period keeping the opportunity to influence outlook of growing up generation is shown and critically estimated. The review of ceremonial and genre arts as fundamentals of traditional music is given, the community of musical heritage of the Turkic-speaking people, including Kazakh and Uzbek is shown.

In the context of educational influence also such important component of national music as works of professional composers is presented. Including – operas “Kyz Zhibek” of E. Brusilovsky, “Abay” A. Zhubanov and L. Hamidi's, “Birzhan – Sara” M. Tulebayeva and others among with traditional values and also “Enlik – Kebek”, “28” G. Zhubanova, “Abylay the khan” E. Rakhmadiyeva in the context of their new and relevant impact on public consciousness.

At the same time, the measure of moral influence on society in the conditions of globalization of modern performers and poets of an aitys clears up. In this regard, the special ideological and educational value of the art of an aitys which is defined, first of all, with the scale of the creative talent competing and, secondly, his opportunities in respect of public relations and abilities to influence the development of society is emphasized.

Keywords: song, kuy, composer, the performer, opera, aitys (contention), ritual, tradition, globalization, moral.

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ЖАҒАНДЫҚ ДӘУІРДЕГІ ҰЛТТЫҚ МУЗЫКАНЫҢ ТӘЛІМДІК ҰҚПАЛЫ

Аннотация. Мақалада жаһандық дәуірдегі ұлттық музыканың өнегелік құндылықтары, рухани мұраның негізін құрайтын дәстүрлі музыканың үлгілері белгіленген. Бұл шығармаларға Кеңес кезеңінде қалыптасқан теріс пікірлер қарастырылып, келешек ұрпақтың санасында кертартпа ой салу тарапы сынға алынған. Дәстүрлі музыканың негізінде ғұрыптық және тұрмыстық үлгілерге шолу жасалып, түркітілдес халықтарындағы музыкалық мұрамен сабақтасатындығы көрсетіледі, ішінара қазақ және өзбек музыкасындағы ұқсастық аңғарылған.

Ұлттық музыканың бір бөлігін құрайтын кәсіби-композиторлардың шығармашылығындағы тәрбиелік мәнге ие туындыларға көңіл бөлінген. Олардың ішінде, қазақ сахнасының жауһарларына айналған Е. Брусиловскийдің «Қыз Жібек», А. Жұбанов пен Л. Хамидидің «Абай», М. Төлебаевтың «Біржан-Сара» операларындағы және т.б. салт-дәстүр құндылықтарымен қатар, Ф.Жұбанованың «Еңлік-Кебек», «28» опералары, Е. Рахмадиевтің «Абылай-хан» операларының өзіндік тәрбиелік мазмұнға тола көріністері бүгінгі қоғам

санасында жаңаша қабылдану және жаңаша саралау мәселелері белгіленген. Сонымен қатар, қазіргі кездегі дәстүрлі орындаушылар мен айтыскер ақындардың жаһандық дәуірде қоғамға өнегелік әсері айқындалады. Бұл ретте, айтыс өнеріндегі тәрбиелік тарапы біріншіден ақынның талантын шыңдайтын үлкен өнер жарысының өнегелік тұстарын жатқызса, екіншіден қоғамға үндеу салып, қоғамның санасын қалыптастыруға үлес қосатыны айқындалған.

Түйін сөздер: ән, күй, композитор, орындаушы, опера, айтыс, ғұрып, дәстүр, жаһандану, тәлім.

Кіріспе. Уақыттың күрделі күрт өзгерістері мен сырттан келіп жатқан заманауи озық жетістіктері кейде төл ұлттық құндылықтарымызды ұмыттыруға немесе оған көңіл бөлмей, алшақтауға мәжбүрлейді. Енді керісінше бүгінгі қарбаластан бас тартып, өзіміздің ұлттық музыкамызға көңіл аударған кезде, оның басқа да аспектілерін аңғара бастаймыз. Мәселен, ҚР Президенті Н. Назарбаевтың «Болашаққа бағдар: рухани жаңғыру» мақаласында: «Егер жаңғыру елдің ұлттық-рухани тамырынан нәр ала алмаса, ол адасуға бастайды. Сонымен бірге, рухани жаңғыру ұлттық сананың түрлі полюстерін қиыннан қиыстырып, жарастыра алатын құдіретімен маңызды. Бұл – тарлан тарихтың, жасампаз бүгінгі күн мен жарқын болашақтың көкжиектерін үйлесімді сабақтастыратын ұлт жадының тұғырнамасы» [1], – деген пікірі, бізге дейінгі өткен және қазіргі қоғамның ұлттық санасына әсер ететін қазақ музыкасындағы өнегелік құндылықтарды айқындауға жетеледі. Осы мәселенің негізінде ұлттық мұрамызды саралап, халықтық және композиторлық шығармалардың қоғамдағы прагматикалық сипаттарын табу, қазіргі кезеңде **өзекті** мәселелердің бірі болып табылады. Соның негізінде мақалада өнегелік-рухани құндылықтарды құрайтын ұлттық музыканың тәрбиелік ықпалын ән және күй дәстүрлерінен, кәсіби композиторлық шығармашылық пен орындаушылық өнерден айқындалып, оларға жалпылама тоқталып, келешектегі ғылыми ізденістердің бағытын белгілейміз.

Әдістер. Тақырыпты зерттеу барысында тарихи-теориялық, сараптамалық-тәжірибелік талдаудың жаңашыл **әдістері** қолданылады. Сонымен бірге жүйелілік-құрылымдық, жинақтау, ғылыми кешенді жүйелеу, хронологиялық, музыкалық-теориялық талдау әдістері пайдаланылады. Қазақ музыкасы туралы жазылған отандық музыкатанушылары А.Затаевич [2], А.Жұбанов [3], Б.Ерзакович [4], Б.Аманов пен А.Мұхамбетова [5] және т.б. қалыптастырған тарихи-теориялық талдаулары негізге алынады. Ғылыми-зерттеуді жүзеге асыру кезінде қазақтың дүниетанымы, менталитеті, тұрмыс-салты, әдет-ғұрпы және өнері туралы жазған филолог ғалымдардың зерттемелеріне назар аударылады. Соған байланысты А.Байтұрсыновтың [7], М.Жұмабаевтың [7], М.Әуезовтың [8], С.Қасқабасовтың [9], У.Қалижановтың [10] құнды еңбектерін атап өтеміз.

Музыканың тәрбиелік мәнін анықтау мақсатында әлемде жүргізілген алдыңғы ғылыми зерттеулердің негізін салған Т.Адорно [11], М.Баррет [12], А.Бергесен [13], Т.Дауд [14] және т.б. музыканы әлеуметтік тұрғыда қарастырып, қоғамға әсері туралы зерттеулері назарға алынады. Шетел авторларының еңбектерінде жалпы музыканың тәрбиелік мәніне байланысты айтылғандығы аңғарылады. Мәселен, венгр композиторы З.Кодай [15] мен неміс педагог-композитор К.Орфтың [16] адам бойындағы – өнегелік, қайырымдылық, түсіністік деген құндылықтар музыка арқылы қалыптасатынын көрсеткен.

Сондай-ақ, жалпы музыканың тәрбиелік мәнін зерттеу барысында Ресей ғалымдарының іргелі зерттемелері назарға алынып, тақырыппен байланысы қарастырылады. Себебі, оның ішінде музыканың өнегелік қалыптастыру мәселесі музыкатану, музыкалық педагогика және психология тарапындағы зерттемелерде көрінеді. Мысалы, Б.В.Асафьев [17], Р.Л.Закс [18], Д.Б.Кабалевский [19], М.Каган [20], В.В.Медушевский [21] және т.б. еңбектері ұсынылған тақырыпқа негіз бола алады. Мәселен, орыс және классикалық музыканы қарастыру барысында «Классическая музыка представляет собой накопленное богатство культурно-духовной жизни европейского и российского общества XVII-XIX веков в неразрывной связи с историческими и культурными процессами. Важным социокультурным аспектом классической музыки является ее духовно-нравственный потенциал, включающий смысло-жизненные, общечеловеческие, личностно-развивающие, либеральные, традиционные, профессиональные ценности...» [22, 8], – деген жолдар кездеседі. Әрине әлемдік деңгейде музыканың тәрбиелік мәні қазақтың музыкасына дәлме-дәл ұқсас болмағанымен, жақын келетін тұстары кездеседі.

Зерттеме. Қазақ музыка мәдениетіндегі бұрын-соңды арнайы зерттеу нысанына алынбаған өнегелік-рухани құндылықтарды діни мақамдардан, терме, толғау, жыр, дастан, өсиет және т.б. ән

дәстүрі мен аспапты өнердегі тәрбиелік-тәлімдік күйлерден, кәсіби композитор шығармашылығындағы симфониялық, кантаталық, ораториялық, опералық жанрлардан айқындалып, әлеуметтік, қоғамдық, этикалық, рухтық, эстетикалық, гуманистік категориялар тарапынан анықтауға болады.

Гибратты әндер туралы Кеңес кезеңінде кертартпа пікірлердің қалыптасқанын келесі жолдардан көруге болады: «Содержание поучительных песен составляют вопросы морали, общественной и семейной жизни казахов. В дореволюционное время, в условиях почти поголовной неграмотности населения поучительные песни оказывали громадное воздействие на формирование психического и духовного облика людей. Этим широко пользовались приверженцы господствующей тогда феодально-байской идеологии. Байские певцы и акыны засоряли поучительные песни религиозными изречениями корана, восхвалениями выгодных для эксплуататоров обычаев и традиций, идеализировали кочевой образ жизни» [15, 26]. Мұндай пікірлер келешек ұрпақтың және жалпы қоғамның дүниетанымына өнегелік-рухани құндылықтар туралы теріс ой салады.

Ұлттық мұраға айналған ғұрыптық, тұрмыстық, еңбек әндерінен өнегелік үлгілерді кеңінен кездестіруге болады. Мәселен, үйлену сатындағы «Той бастар», «Жар-жар», «Сыңсу», «Арыз өлең», әсіресе «Беташар» әндерінің, жерлеу ғұрпындағы «Естірту», «Жоктау», «Жұбату», «Зар», «Дауыс», «Көңіл айту» әндерінің тәрбиелік қырларын белгілеуге болады. Фольклорлық үлгілердің арасында «Беташарлардың» тәрбиелік мазмұны айқын беріледі. Оны беташарлардың мәтінінде жаңа түскен келінге арналатын өсиет айтылып, келешекте атқаратын міндеті ескерілетіні мазмұндалған. Дәлелдеме ретінде «Қазақ музыкасы» антологиясынан үлгі келтіріп өтейік:

БЕТАШАР (II)

Асықпай $\text{♩} = 70$

Оу! А - ғы - та - йын са - рын - ды, І - шің - де - гі
за - рың - ды. Сый - лап а - та, е - нен - ді, Құр - мет - теп күш - ті
жа - рың - ды. Ту - ған соң қыз - ды ү - зат - қан, Бұ - рын - нан үл - гі
қа - лың - ды. Ке - лін - шек бо - лып бұр - же - ніп, Ба - сы - ңа же - лек са - лың - ды.

Мұнда жас келін қандай болуы керектігі туралы әдептілік нормалары, еңбекқолық талпынысы, өнегелік тізбегі, адамгершілік қасиеттері, үлкен мен кішіге ізеттілігі, аналардың қоғам тәрбиесіндегі айрықша орны көрініс тапқан. Осы ретте түркітілдес халықтарының үйлену ғұрпында кездесетін әндердің тәрбиелік мәні бір-бірімен ұқсастықты танытады. Мәселен, қазақтың «Беташар» үлгісінің өнегелік құндылығы өзбек музыкасындағы «Келин салом» әнімен жанасады.

Келин салом

Мас - ка Ма - ди - на вү - ши - да жой на - мо - зи құ - та - да
са - лом, са - лом ёр - ёр же - лил са - лом ёр - ёр.

Сондай-ақ тұрмыстық әндерге жататын, балалар фольклорына байланысты туындаған «Бесік жыры», «Тұсау кесу жыры», «Санамақ», «Әліп-би», «Жұмбақ», «Өтірік өлең», «Талапкер» үлгілеріндегі ақыл қосатын тұстары көрінеді. Өнертану докторы Б.Ерзакович «Талапкер» әні туралы: «Поучительных сентенций полна песня «Талапкер» («Стремящий вперед»). В ней содержится целый кодекс житейских представлений о том, что нужно для счастливой жизни человека. В ней есть эпикурейское отношение к жизни, одобрительное отношение к беспечному времяпрепровождению людей типа сере» [4, 30 б.] – деген.

Қазақ музыкасындағы өнегелік құндылықтардың әлеуметтік-қоғамдық тараптан (мүшел жас, үлкен-кіші, бай мен кедей, табиғат, махаббат, адамзат), этикалық (әдептілік пен сыпайылық өнегесі көрсетілетін – қонақ асы, үлкенге құрмет, кішіге ізет, туыстық), эстетикалық («шынайылыққа», «қайырымдылыққа», «сұлулыққа»), педагогикалық (ұстаз бен шәкірт) тарапынан қарастырғанда көркемдік-мазмұндық және қарам-қатынас мәселелерден де аңғаруға болады.

Дәстүрлі өнердегі кәсіби-композиторлық шығармашылықтың дамыған кезеңі ХІХ ғасырға келді. Бұл кезеңнің зерттелуін қазақтың өнертану саласындағы тұңғыш әрі жалғыз академигі А.Жұбанов еңбектерінен көруге болады. Көшпенді жұрттың майталман өнерпаздары Біржансал, Ақансері, Жаяу Мұса, Мұхит, Балуан Шолақ, Әсет, Мәди, Естай, Абай мен Шәкәрімнің әндерін, Абыл, Махамбет, Құрманғазы, Дәулеткерей, Тәттімбет, Есір, Қазанғап, Дина, Сүгір күйшілердің өнегелік-рухани құндылықтарының өздері өмір сүрген қоғамға және қазіргі кезеңдегі қоғамға тигізген ықпалын, ұлттық санаға әсері бүгінгі ұрпақтың санасына ой салады. Аспапты музыкада кең таралған ғұрыптық күйлер – «Қыз алып қашқан», «Делдал қыз», «Кербез қыз», «Келіншектің зары», «Хан жұбату», «Жұбату» және т.б., тарихи күйлер – Махамбеттің Исатайға арнаған «Исатайдың Ақтабаны-ай», «Арысымнан айырылдым», «Жорық», «Жұмыр-Қылыш» күйлері, осы кезеңде өмір кешкен даңқты күйші Құрманғазының «Төремұрат», «Ақбай», «Кішкентай» күйлері және т.б. күйшілердің туындылары және тәуелсіздік кезеңдегі тұлғалардың шығармашылығы (Н.Тілендиев, Қ.Ахмедияров, С.Жампейісова, Б.Жүсіпов, Б.Тілеухан және т.б.) өскен ұрпақты танымдық тұрғыдан қалыптастыруда маңызы зор.

Жаһандық дәуірдегі қазақ музыкасына қарапайым әннен бастап операға дейінгі, күйден бастап симфонияға дейінгі аралықты қамтитын музыкалық туындылар кіреді. ХХ ғасыр еліміздің музыка тарихында жаңа болып саналатын опера, симфония, камералы-аспапты және вокалды, кантата, оратория жанрларының жазылуымен ерекшеленді. Отызыншы жылдары еуропа жазба кәсіби музыкасы дәстүрінде қазақтың композиторлық мектебін құрған композиторлар мен олардың шәкірттері творчествосы осы әрдайым маңыздылығын жоғалтпаған өнегелік-рухани құндылықтарға негізделе отырып дамыды. Жазба кәсіби музыкасының негізін салған Е.Брусиловскийдің, А.Жұбановтың, Л.Хамидидің, М.Төлебаевтың, Қ.Қужамьяровтың, Б.Байқадамовтың, С.Мұхамеджановтың, Ғ.Жұбанованың, Е.Рахмадиевтың опералары, симфониялары, кантаталары, ораториялары және т.б. күрделі сахналық жанрларына көне рухани құндылықтар арқау болды. Мәселен, қазақ сахнасының жауһар туындыларына айналған Е.Брусиловскийдің «Қыз Жібек», А.Жұбанов пен Л.Хамидидің «Абай», М.Төлебаевтың «Біржан-Сара» операларындағы және т.б. салт-дәстүр құндылықтарымен қатар, өзіндік тәрбиелік мазмұнға тола көріністерді бүгінгі қоғам жаңаша қабылдайды. Қазақ жазба кәсіби композиторларының шығармашылық бағыты айқындалып, білім мен тәжірибесі, музыка жазудың әдіс-тәсілдерін меңгеруде толысқан кезеңінде ұлттық музыка тілінің байлығын дәлелдей түсетін Ғ.Жұбанованың «Еңлік-Кебек», «28» опералары мен «Жігер» симфониясының, Е.Рахмадиевтің «Алпамыс», «Абылай-хан» операларының, С.Мұхамеджановтың «Ғасырлар үні» ораториясының, Қ.Мусиннің «Жайлауда» симфониясының, Д.Ботбаевтың «Домалақ ана» операсының өнегелік қасиеті айқын аңғарылады. Қазақстан тәуелсіздік алған жылдарынан басталған ағабуын композиторлардың жолын жалғастырған М.Сағатов, Б.Баяхунов, М.Құсайынұлы, Б.Қыдырбек, В.Стригоцкий-Пак, С.Еркімбеков, А.Райымқұлова, С.Әбдінұров, А.Тоқсанбаев, Х.Сетеков болса, ал жас толқын композиторлардың қатарындағы Т.Андосов, О.Хромова, Ә.Әбдінұров, Б.Хасанғалиев, Ғ.Секеев өз туындыларында заман ағымына байланысты өнегелік-рухани құндылықтарды жаңа деңгейде жаңаша қарқынмен дамыта білді. Алдыңғы және соңғы аталған композиторлардың творчествосы мен шығармалары тақырып аясында жаңаша тараптардан қарастыру барысында сахналық көріністерден тәрбиелік мәнге ие – қоштасу, ант, түс жору, сүйінші сұрау, шашу және т.б. дәстүрден де аңғаруға болады. Халықтық және кәсіби авторлар шығарма-

шылығынан рухтық тықырыпта шығарылған «Туған жер», «Отан», «Қазақстан», «Көк байрақ» және т.б. ұлттық санаға әсер ету жолдарын айқындап, тәрбиелік мәні ерекше байқалады. Өткен ғасырдың жетпісінші, сексенінші жылдарынан белгілі күйші-композиторлар Н.Тілендиев, Қ.Ахмедияров, С.Жұмажанұлы, А.Жайымов, М.Құсайынұлы күйлеріндегі тәлімдік дәстүр мен ән өнеріндегі Ш.Қалдаяқов, С.Бәйтереков, Е.Хасанғалиев, Б.Оралұлының халыққа кең тараған отансүйгіш әндерінің тәрбиелік мәні ерекше атауға болады.

Қазақтың рухани өміріндегі әлеуметтік және қоғамдық мәселелерді көтерген айтыс өнерінің ғибраттық маңызы – Бәдік айтыс; Жар-жар айтыс; Жануарлар мен адамның айтысы; Өлі мен тірінің айтысы; Жұмбақ айтысы; Салт айтысы – қыз бен жігіттің айтысы; ақындар айтысынан белгіленді. Айтыс – ақынның талантын шыңдайтын үлкен өнер жарысы біріншіден ақындық өнерге тәрбиелеу жатса, екіншіден қоғамды тәрбиелеуге үлес қосады. Өткен ғасырда Жанак, Сабырбай, Шөже, Сүйінбай сияқты ғажайып айтыс ақындары болған. Бұл үлкен дәстүрді қазір жалғастырып жүрген Әсия, Әселхан, Қонысбай, Баянғали, Әлфия, Абаш, Мұхамеджан сияқты ақындардың сарындары жаһандық дәуірдегі өнердің бір бөлшегі болып тұр.

Қорытынды. Қазақтың бәсекелестікке қабілетті қоғамын қалыптастыруда ұлттық музыканың даму үрдісіелімізде қабылданған мемлекеттік бағдарламалармен үндеседі. Ел басы Н.Назарбаев: «Біз жат идеологиялардың әсері туралы айтқанда, олардың артында басқа халықтардың белгілі бір құндылықтары мен мәдени символдары тұрғанын есте ұстауымыз керек. Тиісінше, оларға өзіміздің ұлттық құндылықтарымыз арқылы ғана төтеп бере аламыз» [1], – деген. Қазақ музыкасының даму тарихының мазмұны бай, сондықтан жас буын ұлттық музыка құндылықтармен қатар, ондағы өнегелік-рухани үлгілерді тану арқылы тәрбиеленеді. Қазақстанның болашағын жасайтын жастардың санасына ұлттық құндылықтардың тәрбиелік қасиеттерін бойына сіңіру арқылы ата-баба мұрасын мәңгі жаңғырта аламыз.

Нәтижесінде келесі тұжырымдарды ұсынамыз:

– Ұлттық мұраға айналған ғұрыптық, тұрмыстық, наным-сенім мен еңбек әндеріндегі өнегелік-рухани құндылықтар арқылы әлеуметтік-қоғамдық, этикалық, эстетикалық ұлттық мұраны өміршең қазынаға айналдырамыз;

– Өнегелік-рухани құндылықтар көрініс тапқан діни мақамдар, терме, толғау, жыр, дастан, бата, өсиет, мұң-қайғы, өкініш, назым және т.б. ән дәстүрі мен аспапты өнердегі тәрбиелік-тәлімдік күйлердегі, кәсіби композитор шығармашылығындағы симфониялық, кантаталық, ораториялық, опералық жанрларкөркемдік-мазмұндық қоғамға әкелген ықпалының нәтижесінде танымы жоғары, бәсекелестікке қабілетті ұрпақ өсіреміз;

– Күрделі сахналық көріністердегі тәрбиелік мәнге ие – қоштасу, ант, өсиет, қарғыс, түс жору, шашу және т.б. қатар, айтыс өнерінің қазақтың рухани өміріндегі ғибраттық маңызын белгілеу арқылы ұлттық құндылықтарымызды бағалайтын, игеріп, жеткізетін және қадірлей білетін қоғамды қалыптасыра аламыз.

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МОРАЛЬНО-ЭТИЧЕСКОЕ ВОЗДЕЙСТВИЕ НАЦИОНАЛЬНОЙ МУЗЫКИ В ЭПОХУ ГЛОБАЛИЗАЦИИ

Аннотация. В статье охарактеризован ценностный ранг национальной музыки в эпоху глобализации через образцы традиционной музыки, составляющие основу духовного наследия. Показана и критически оценена их неоднозначная трактовка в советский период, сохраняющая свою возможность воздействовать на мировоззрение подрастающего поколения. Дан обзор обрядовых и бытовых жанров как основы традиционной музыки, показана общность музыкального наследия тюркоязычных народов, в том числе казахского и узбекского.

В контексте воспитательного воздействия представлена и такая важная составляющая национальной музыки, как творчество профессиональных композиторов. В том числе – оперы «Кыз Жибек» Е. Брусиловского, «Абай» А. Жубанова и Л. Хамиди, «Биржан – Сара» М. Тулебаева и другие в ряду с традиционными ценностями, а также «Еңлік – Кебек», «28» Г. Жубановой, «Абылай хан» Е.Рахмадиева в контексте их нового и актуального воздействия на общественное самосознание.

В то же время проясняется мера морального влияния на общество в условиях глобализации современных исполнителей и поэтов айтыса. В этой связи подчеркивается особое идейно-воспитательное значение искусства айтыса, которое определяется, в первую очередь, масштабом творческого дарования состоящегося и, во-вторых, его возможностями в плане связей с общественностью и способностями влиять на развитие общества.

Ключевые слова: песня, кюй, композитор, исполнитель, опера, айтыс, обряд, традиция, глобализация, мораль.

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ECONOMIC ASPECTS OF THE HOUSING FUND MODERNIZATION MECHANISM

Abstract. In contemporary municipal housing service economy extra-budgetary resources acquire an important role in revitalization and reconstruction of housing funds. The housing fund is considered as the main element of the sphere of housing and communal services. The international experience and the Kazakhstan practice of modernization of housing have been studied in the research. The relevance of the subject of the research both from an economic and ecological points of view has been substantiated. It turned out that significant part of researches on the modernization of housing fund is mostly associated with achieving an economic effect. Although the globalization processes taking place in the world emphasize the ecological aspect as well. The review of the state housing reform in Kazakhstan in the format of strategic development and implementation of the sectoral housing and communal program has been conducted. The experience of realizing the mechanism of housing fund modernization is considered on the example of the Communal maintenance of city residential buildings LPC in Atyrau from the beginning of 2011 to the present day. The activity of Communal maintenance of city residential buildings LPC in Atyrau allows us to study the financing mechanism and the stages of multi-storey houses renovation. A statistical analysis of the results of the work done has been carried out. The effectiveness of the target state program has been estimated. The research has identified problematic issues that hamper the more successful development of housing sector renovation.

The research has been executed within the framework of AP05134552 Project.

Keywords: modernization, urban economy, housing and communal services, housing fund.

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ЭКОНОМИЧЕСКИЕ АСПЕКТЫ МЕХАНИЗМА МОДЕРНИЗАЦИИ ЖИЛИЩНОГО ФОНДА

Аннотация. В современной экономике городского хозяйства важное значение приобретает проблема привлечения внебюджетных источников для обновления и воспроизводства жилищного фонда. Жилищный фонд рассматривается как основной элемент сферы жилищно-коммунального хозяйства. Изучен международный опыт и казахстанская практика воспроизводства жилищного фонда. Обоснована актуальность предмета исследования как с экономической, так и с экологической точки зрения. Выяснилось, что значительные исследования по модернизации жилищного фонда, связаны с достижением экономического эффекта. Хотя происходящие в мире глобализационные процессы подчеркивают и экологический аспект. Проведен обзор государственной жилищной реформы в Казахстане в формате стратегического развития и реализации отраслевой жилищно-коммунальной программы. Рассмотрен опыт реализации механизма модернизации жилищного фонда на примере специализированной уполномоченной организации по г. Атырау ТОО «Коммунальное обслуживание жилых домов города» с начала 2011 года по сегодняшний день. На примере ТОО «КОЖДГ» г. Атырау изучен механизм финансирования и этапы проведения ремонтных работ многоквартирных жилых домов. Проведен статистический анализ результатов проделанных работ. Оценена резуль-

тативность целевой государственной программы. В ходе проведения исследования возможным обозначить проблемные вопросы, сдерживающие более успешное развитие воспроизводства жилищного сектора.

Исследование проведено в рамках научного проекта AP05134552.

Ключевые слова: модернизация, городское хозяйство, жилищно-коммунальное хозяйство, жилищный фонд.

Вступление. Модернизация экономики – комплекс мер по достижению уровня экономического роста развитых стран, осуществляется посредством совершенствования всех отраслей экономики. И. В. Макарова характеризует модернизацию экономики как процесс формирования современной модели экономики на основе инновационных преобразований, ориентированный на качественные изменения в обществе, соответствующие новой системе интересов, ценностей и приоритетов [1].

За годы независимости экономика Казахстана в результате поэтапной реализации экономической стратегии и социально-значимых целевых программ достигла значительного прогресса в сфере экономической модернизации:

- в стране сложилась социально-ориентированная рыночная экономика;
- сформировался мощный класс отечественных предпринимателей;
- успешно развивается малый и средний бизнес;
- активно идет становление среднего класса [2, 3].

Среди отраслей народного хозяйства и сферы услуг жилищно-коммунальное хозяйство (далее ЖКХ) выполняет особую роль по социальной и экономической значимости. С одной стороны, состояние ЖКХ выдает параметры качества жизнедеятельности общества, с другой стороны- ЖКХ представляет собой экономический потенциал региона, определяющий ее инвестиционную привлекательность. Экономическое развитие ЖКХ напрямую связано с реализацией жилищной политики страны, имеющее важное значение для строительной индустрии, экономики и домовладельцев. Английские социологи Тони Бирн и Колин Ф. Падфилд считают, что жилье – это основная потребность человека. Необходимость в жилищной политике возникает из-за того факта, что государство в настоящее время признает свое обязательство по достойному размещению населения [4].

В Казахстане с развитием рыночных отношений в сфере ЖКХ становится актуальной проблема привлечения внебюджетных источников для обновления и воспроизводства основного элемента сферы ЖКХ – жилищного фонда. Воспроизводству жилищного фонда характерны высокая капиталоемкость, длительная продолжительность строительства и невысокий спрос на новостройки по причине неплатежеспособности потенциального покупателя. Эти факторы обуславливают эффективность воспроизводства жилищного фонда путем проведения ремонтных работ с энергоэффективными элементами.

Методы. Проведение научных исследований в области экономического аспекта механизма модернизации жилищного фонда основывалось на теоретических методах познания– анализе, индукция и дедукция. Также были применены сравнительный и диалектико-логический подходы при изучении международного опыта ученых в области воспроизводства жилищного фонда.

Исследования. По мнению российского ученого С. Н. Ларина, учитывая неизбежный рост тарифов на электроэнергию в ближайшем будущем, инвестирование в энергосбережение можно рассматривать как один из наиболее выгодных источников вложений с экономической точки зрения [5].

Следует отметить, что в настоящее время большинство исследований в области модернизации жилищного фонда направлены на достижение экономического эффекта, хотя нарастающие масштабы мирового производства и потребления подчеркивают и экологический аспект. Помимо экономической эффективности от реализации различных технологий энергоэффективной модернизации достигается и экологический успех, связанный с управлением отходами и выбросами [6, 7].

Ученые Университета Лидса (Великобритания) Малькольм Белл и Роберт Лоу в своих исследованиях отмечают очень важную роль схем энергоэффективной модернизации в сокращении выбросов CO₂ и при этом улучшения в регионе на 50% могут быть достигнуты с минимальными затратами [8].

Модернизация может быть выполнена различными способами, но с точки зрения инвесторов и собственников квартир следует уделять особое внимание проблеме управления отходами и первоначальным инвестиционным расходам. Вместе с принципами гуманизации, стоит соблюдать и эстетические нормы архитектурных строений, основываясь на внедрении инновационных подходов в повышении эффективности воспроизводства жилищного фонда [9, 10].

По сути, модернизация жилищно-коммунального хозяйства (далее ЖКХ) в Казахстане берет свои истоки с момента реализации «Стратегии 2020», обозначившее направления развития страны по осуществлению экономического прорыва [11].

С 2011 г. для совершенствования жилищного фонда разработана Программа модернизации жилищно-коммунального хозяйства Республики Казахстан на 2011-2020 годы с приоритетом на

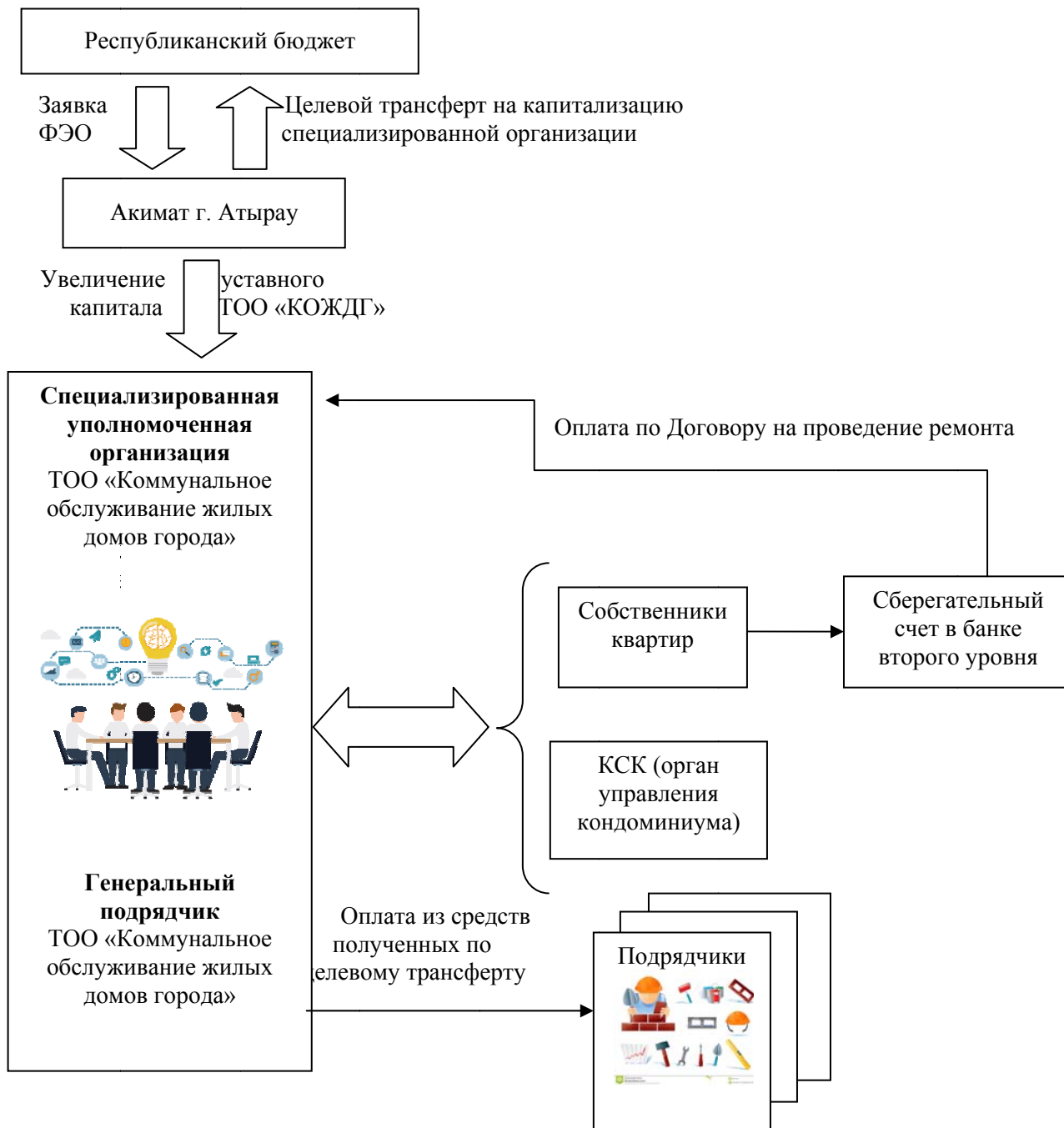


Рисунок 1 – Механизм финансирования ремонтных работ МЖД

энергосбережение в жилищном хозяйстве и проведение ремонта с целью снижения потребления тепловой энергии [10].

С 2014 г. модернизация и ремонтные работы в сфере ЖКХ ведутся в рамках Программы развития регионов до 2020 г., предусматривающее проведение ремонта общего имущества объекта кондоминиума для обеспечения комфортных условий проживания, улучшения состояния коммунальной инфраструктуры и качественного предоставления коммунальных услуг населению [11]. Вместе с тем, на сегодня вопросы модернизации ЖКХ регламентируется Законом Республики Казахстан «О жилищных отношениях», Стратегией «Казахстан-2050», Государственной программой инфраструктурного развития «Нұрлыжол» на 2015-2019 годы и прочих нормативных документов [12-18].

По состоянию на 01.01.2018г. жилищный фонд г.Атырау насчитывает 1054 многоквартирных жилых домов (далее МЖД) общей площадью в 2601,3 тыс.кв.м., а также зарегистрировано 71 органов управления. В городе имеется 62 аварийных домов площадью 37,864 тыс. м², т.е. 1,46% от общей площади жилищного фонда [6].

Оператором реализации Программы развития регионов до 2020 года в г. Атырау выступает ТОО «Коммунальное обслуживание жилых домов города», созданная специализированная уполномоченная организация со 100% участием государства. Задачами ТОО «Коммунальное обслуживание жилых домов города» (далее ТОО «КОЖД») являются:

- надлежащее содержание жилых квартир домов и придомовой территории;
- обеспечение собственников квартир коммунальными и другими услугами;
- предоставление и защита интересов собственников квартир как потребителей коммунальных и иных служб и организаций;
- сотрудничество с государственными и общественными организациями для обеспечения уровня жизни.



Рисунок 2 – Этапы проведения капитального ремонта и модернизации МЖД

С 2013 г. финансирование ремонта МЖД осуществляется по следующему механизму (см. рисунок 1).

Основопологающим принципом в успешном проведении капитального ремонта и модернизации МЖД является обеспечение добросовестного участия всех заинтересованных субъектов: профессиональный менеджмент со стороны управляющих компаний, качественное проведение работ со стороны подрядных организаций и активное участие собственников квартир на каждом этапе принятия решений. Конечным продуктом реализации инвестиций является капитальный ремонт и модернизация МЖД, который проводится поэтапно (см. рисунок 2).

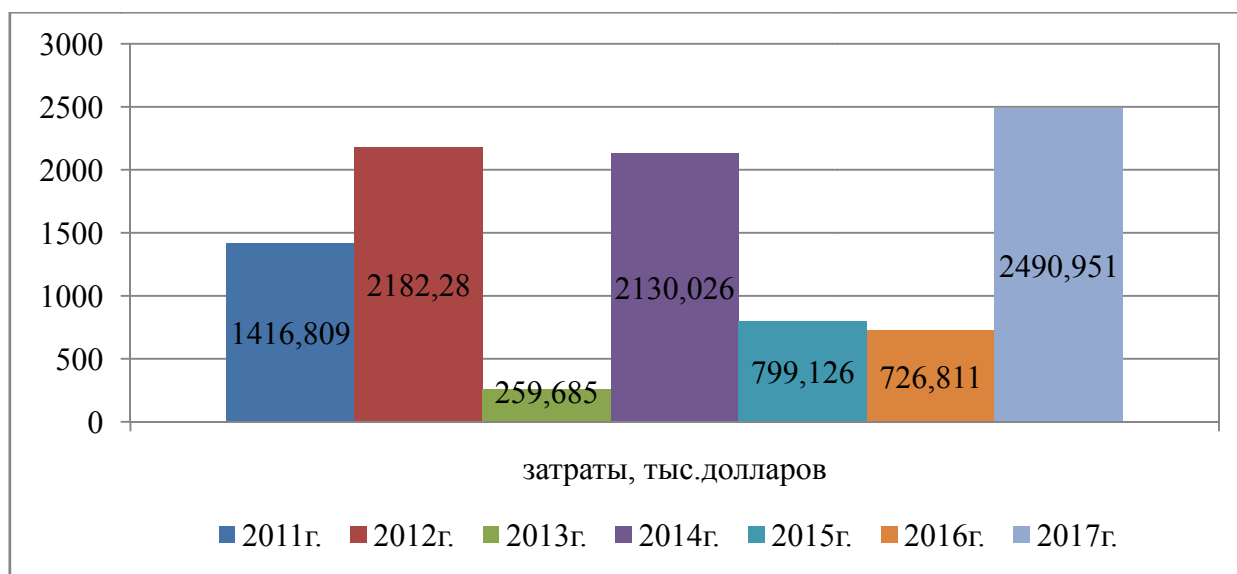


Рисунок 3 – Затраты на проведение ремонта МЖД г.Атырау в 2011-2017 гг., тыс. долларов

Все средства были использованы на текущий и капитальный ремонт домов. В период с 2011 по 2017 годы в г.Атырау отремонтировано 102 МЖД – в 93 домах произведен капитальный ремонт, в 3-х домах заменены 9 лифтов. На средства, выделенные из республиканского и местного бюджета области в г.Атырау, отремонтировано 89 МЖД. На возвратные средства в 2014-2017 годы отремонтировано 13 домов на сумму 1,638 млн.долларов (рисунок 4).

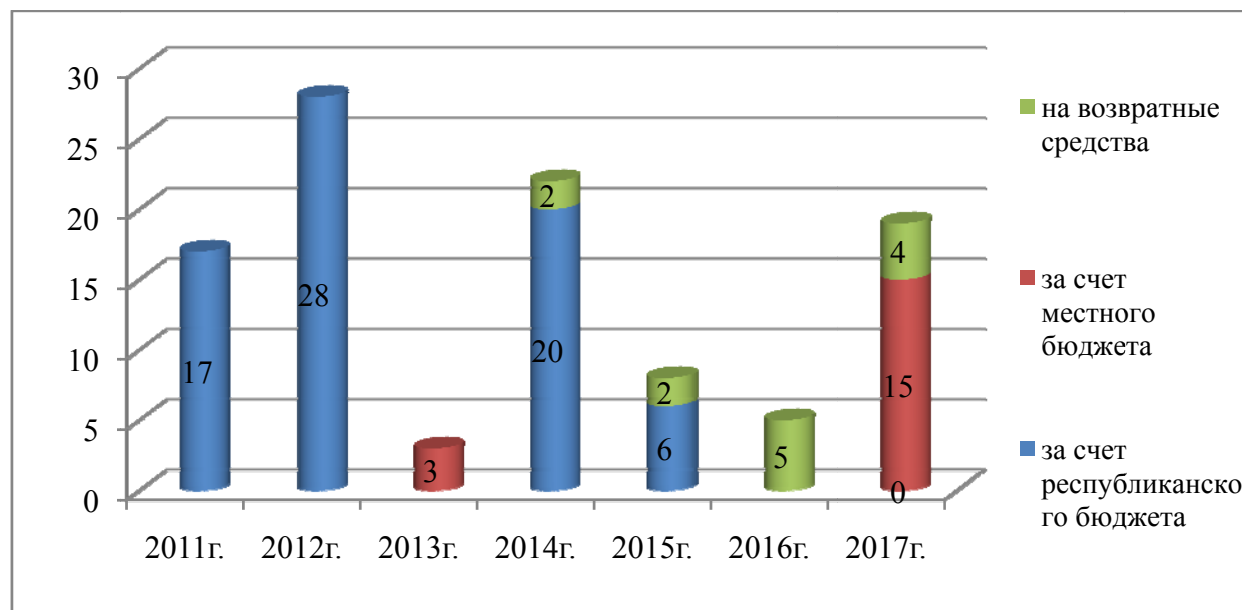


Рисунок 4 – Количество отремонтированных МЖД в г. Атырау

По итогам 1 этапа Программы развития регионов до 2020г. по результатам проведения модернизации МЖД в г.Атырау сократилось количество МЖД, требующих ремонта с 35,3% в 2011 году до 30,6 % в 2015 году (рисунок 5).

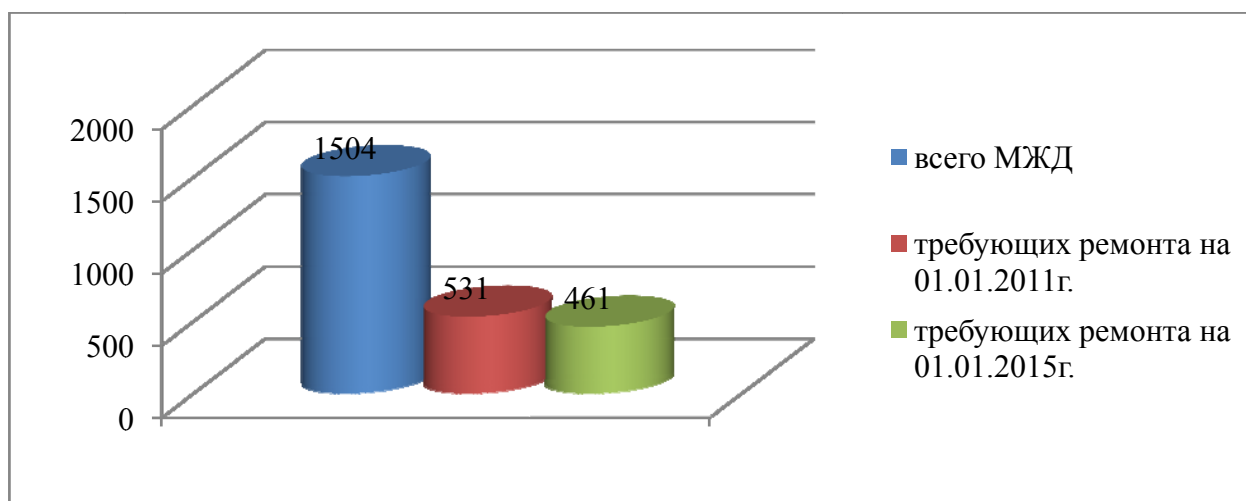


Рисунок 5 – Количество МЖД, требующих ремонта по г. Атырау

Проведя ранжирование, по таблице можно заметить, что ТОО «КОЖД» в период с 2011 по 2017 гг. в основном проводило модернизацию МЖД домов 1973-1982 года постройки (46%), т.е. в домах 36-45 лет.

Сведения о МЖД г.Атырау, в которых проводились капитальный ремонт и модернизация в 2011-2017 гг.*

Год	Год постройки дома						Всего
	1953–1962	1963–1972	1973–1982	1983–1992	1993–2002	2003–2012	
2011	3	5	4	4	1	–	17
2012	1	4	12	5	1	5	28
2013	–	–	–	–	–	3	3
2014	–	2	15	4	1	–	22
2015	–	1	3	2	1	1	8
2016			3	2			5
2017	–	2	10	5	2		19
Всего	4	14	47	22	6	9	102

*Составлено автором [7].

В 2018 г. запланировано выделение средств из местного бюджета 1,310 млн. долларов на капитальный ремонт 8 МЖД, а также рассмотрена проектно-сметная документация на 18 домов (замена лифтов – 6 домов, капитальный ремонт – 12 домов).

Заключение, обсуждение результатов и выводы. Из основных проблем проведения модернизации МЖД г.Атырау выделяется низкий показатель возврата средств в начале реализации Программы. Так, в 2013 г. было возвращено лишь 13% вложенных государством инвестиций, причинами которого явились несогласия со стороны владельцев квартир по характеру выполненных работ. Владельцы МЖД не предусмотрели предъявленные замечания по ремонту при составлении дефектного акта и принятии коллективного решения на затраты средств. В связи с этим акимат города провел различные разъяснительные и оперативные мероприятия по возврату государственных средств. Так, в результате проделанных работ в период с 2013 по 2017 годы в судебные исполнительные органы было подано 1594 исков, положительное решение принято по 1047 искам,

547 исков находятся в процессе. На 1 января 2018 года жителями отремонтированных домов возвращено 2,172 млн. долларов, т.е. 63,5% из вложенных 3,27 млн. долларов.

В ходе проведения исследования были выявлены ряд проблем, которые можно разделить на две группы: экономические и неэкономические. К экономической группе относятся вопросы, касающиеся экономического содержания:

- отсутствие единой методики экономического обоснования целевых программ воспроизводства существующего жилищного фонда;

- отсутствие страхового поля от возможных рисков для всех субъектов взаимодействия по модернизации жилого фонда: 1) государства – от невозврата вложенных субсидий; 2) потенциальных инвесторов – гарантированной окупаемости инвестиций; 3) собственников квартир – от качественного выполнения работ по модернизации и ремонту;

- отсутствие конкурентной среды.

К неэкономической группе проблем относятся проблемы правового, экологического и морально-эстетического характера:

- недостатки в механизме правового регулирования;

- необходимость не добровольного, а обязательного регулирования экологических характеристик применяемых технологий по модернизации и ремонту жилого фонда;

- расширение жизненного цикла, улучшение функциональных и пространственных характеристик проекта по модернизации и ремонту жилого фонда.

В целом, необходимо отметить, что благодаря проводимой модернизации МЖД в г.Атырау вместе с повышением энергоэффективности проблемных жилых домов с элементами термомодернизации, преобразовался и эстетический облик городского жилищного фонда, «продлена» продолжительность срока их службы, повысилась их коммерческая привлекательность на рынке недвижимости.

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ТҰРҒЫН ҮЙ ҚОРЫН JAҢҒЫРТУ МЕХАНИЗМІНІҢ ЭКОНОМИКАЛЫҚ АСПЕКТІЛЕРІ

Аннотация. Қалалық шаруашылықтың қазіргі заманғы экономикасында тұрғын үй қорын жаңарту және ұдайы жаңғырту үшін бюджеттен тыс көздерді тарту мәселесі маңызды болып табылады. Тұрғын үй қоры тұрғын үй-коммуналдық шаруашылық саласының негізгі элементі ретінде қарастырылады. Тұрғын үй қорының ұдайы жаңғыртылуының халықаралық және қазақстандық тәжірибесі зерттелген. Зерттеу құралының экономикалық және экологиялық тұрғыдан өзектілігі негізделген. Тұрғын үй қорын жаңғырту бойынша маңызды зерттеулердің экономикалық тиімділік жетістіктермен байланыстылығы анықталған. Алайда дүние жүзінде орын алған жаһандану үдерістері экологиялық көріністің де маңыздылығына айрықша көңіл бөледі. Қазақстандағы мемлекеттік тұрғын үй реформасына стратегиялық даму және салалық тұрғын үй-коммуналдық бағдарламасын іске асыру ауқымында шолу жүргізілген. Тұрғын үй қорын жаңғырту тетігін жүзеге асыру тәжірибесі Атырау қаласындағы 2011 жылдың басынан бастап бүгінгі күнге дейінгі «Қаланың тұрғын үй коммуналдық шаруашылығы» ЖШС мамандандырылған уәкілетті ұйым мысалында қарастырылады. «ҚТҮКШ» ЖШС мысалында, Атырау қаласындағы көп пәтерлі тұрғын үйлерді жөндеу сатылары мен оларды қаржыландыру тетігіне зерттеулер жүргізілген. Жүргізілген жұмыстың нәтижелерін статистикалық талдау жасалынған. Мақсатты мемлекеттік бағдарламаның нәтижелілігіне баға берілген. Зерттеу барысында тұрғын үй секторын жаңғыртудың табысты дамуына кедергі келтіретін күрделі мәселелерді анықтауға болады.

Зерттеу АР05134552 ғылыми жоба шеңберінде өткізілді.

Түйін сөздер: жаңғырту, қалалық шаруашылық, тұрғын-үй шаруашылығы, тұрғын үй қоры.

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Clarivate Analytics (бұрынғы Thomson Reuters) халықаралық мәліметтер базасында индекстеу бойынша Куәлікті салтанатты тапсыру

2018 жылдың 15 мамырында Қазақстан Республикасының Ұлттық ғылым академиясында «ҚР ҰҒА хабаршысы; ҚР ҰҒА хабарлары. Химия және технология сериясы; ҚР ҰҒА хабарлары. Физика-математика сериясы; ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы» журналдарының Clarivate Analytics (бұрынғы Thomson Reuters) халықаралық мәліметтер базасында индекстеу бойынша Куәлікті ҚР ҰҒА-на салтанатты тапсыру рәсімі болды.

Салтанатты жиын АҚШ-тың Филадельфия қаласында орналасқан халықаралық Clarivate Analytics компаниясының ТМД және Ресей бойынша директоры – Уткин Олег Геннадьевичтың қатысуымен өтті.

Бұл журналдарға халықаралық рейтинг беру және оларды ірі Clarivate Analytics компаниясының деректер базасына енгізу – журналдарды бүкіләлемдік оқырмандар аудиториясына жеткізеді және дәйексөз алу көрсеткіштеріне айтарлықтай пайдалы үлес болып қосылады, сондай-ақ олар қазақстандық ғалымдарды, оқытушыларды, докторанттар мен магистранттарды және студенттерді көптеген материалдармен табыстыруға, аймақтық зерттеу ақпараттары мен пайдалы сілтемелерге жол ашып, әлемдік зерттеулер саласындағы ағымдағы беталыстардың толық бейнесін алуға мүмкіндік береді.

Қазақстанның ғылыми журналдарының деңгейін мерзімдік ғылыми басылымдардың халықаралық стандарттарға дейін арттыру, сөз жоқ, жалпы алғанда, қазақстандық ғылымның дамуына ықпал етеді.

ҚР ҰҒА Төрақасы

Торжественное вручение свидетельств об индексировании в международной базе данных Clarivate Analytics (ранее Thomson Reuters)

15 мая 2018 г. в 11-00 состоялась торжественная церемония вручения Национальной академии наук Республики Казахстан сертификатов об индексировании 4-х академических журналов: «Вестник НАН РК»; «Известия НАН РК. Серия химии и технологий»; «Известия НАН РК. Серия физико-математическая»; «Известия НАН РК. Серия геологии и технических наук», которые вошли в базу данных международной компании Clarivate Analytics.

Вручение состоялось с участием представителя международной компании Clarivate Analytics (США, г. Филадельфия), директора по России и СНГ Уткина Олега Геннадьевича.

Вхождение этих журналов в базу данных крупнейшей компании Clarivate Analytics откроет доступ казахстанским ученым, преподавателям, докторантам, магистрантам и студентам и студентам к многочисленным материалам, региональной исследовательской информации и полезным ссылкам, к получению полной картины текущих тенденций в области мировых исследований.

Повышение уровня научных журналов Казахстана до международных стандартов периодических научных изданий, безусловно, будет способствовать развитию казахстанской науки в целом.

Президиум НАН РК



Юбилейные даты

БУКТУКОВ Николай Садвакасович – 70 лет

Буктуков Николай Садвакасович, Заслуженный изобретатель Республики Казахстан, академик Национальной академии наук РК, академик Казахской академии естественных наук и Национальной академии горных наук, доктор технических наук, профессор.

Буктуков Николай Садвакасович родился 10 июня 1948 г., выпускник 1966 г. Чердынской одиннадцатилетней школы Курчумского района ВКО. В 1971 году с отличием окончил Казахский политехнический институт, горный инженер. Трудовую деятельность начал в Институте горного дела Академии наук КазССР и прошел путь от старшего инженера до заместителя директора института. Начиная с 1994 года, работал начальником отдела Президиума Национальной Академии наук Республики Казахстан (НАН РК), Заместитель Президента НАН РК, Академик-секретарь Отделения наук о Земле НАН РК, заместитель Генерального директора Центра химико-технологических исследований, советник ректора Казахского Национального Технического университета им. К. И. Сатпаева. Все это время оставался заведующим лабораторией Института горного дела им. Д. А. Кунаева, с 2010 года работает директором этого института. Общественная работа – Президент РОО «Союз организаций науки Республики Казахстан».



В 1976 году в Кузбасском политехническом институте Н. С. Буктуков защитил диссертацию по вопросам взаимосвязи экономики и горного производства и обогащения руд на соискание ученой степени кандидата технических наук. В 1986 году в Московском горном институте защитил диссертацию на соискание ученой степени доктора технических наук по проблеме формирования качества углей в потоке и его влияние на технико-экономическую эффективность топливно-энергетического комплекса.

Н. С. Буктуковым решены крупные научные проблемы:

– Разработаны технологии и обоснованы рациональные параметры селективной обработки сложноструктурных месторождений открытым способом.

– Созданы новые технологии открытой и комбинированной разработки угольных и рудных месторождений, рациональные способы и научно-технические решения по концентрации горного производства, разработаны рациональные схемы вскрытия глубоких горизонтов карьеров и циклично-поточные и поточные технологии ведения горных работ.

– Разработаны теория и технология динамического формирования однородности качества минерального сырья в непрерывном потоке.

– Разработан метод определения бортового содержания металла, учитывающий экономические реалии, среднее содержания металла в руде и его колебаний, а также влияния на последующий передел.

– Созданы нетрадиционные энергосберегающие способы добычи и транспортировки высоковязких и парафинированных углеводородов; созданы способы снижения вязкости высокопарафинистых нефтей и битумов, решены задачи минимизации затрат на подготовку нефти к добыче и транспортировке.

– Разработаны ветроэлектростанции эффективностью выше традиционных более чем в 2 раза и солнечные батареи нового поколения с эффективностью 60-70% вместо 18%. При этом стоимость электроэнергии впервые в мире не превышает стоимости энергии от сетей.

Особое внимание уделяется вопросам инновационного развития. Опубликована первая в Казахстане монография, содержащая механизмы реализации индустриально-инновационной стратегии развития экономики. С 1995 г. выступает в печати с предложениями по переходу на инновационный путь развития экономики.

В составе группы из трех человек создал научно-технические разработки, реализация которых при строительстве угольного предприятия "Восточный" позволила снизить капитальные вложения практически на 10 млн долларов США, а эксплуатационные затраты были снижены на 1,5 млн долларов в год.

В качестве консультанта принимал участие в решении вопросов вывода промышленных предприятий на безубыточный уровень: АО "Иртышский химико - металлургический завод", АО "Институт Казгипроцветмет", АО "Целинэнергобанк", АО "Иртышский Полиметаллический комбинат", АО "Павлодарский тракторный завод", АО "Текелийский свинцово-цинковый комбинат", АО «Акмоласельмаш». Являлся экспертом Госплана СССР и Министерства экологии и биоресурсов Казахстана.

Ряд предложений Н. С. Буктуков приняты в Программу формирования и развития национальной инновационной системы; План мероприятий по реализации программы по формированию и развитию национальной инновационной системы РК на 2005–2015 годы; План мероприятий по реализации Стратегии индустриально-инновационного развития РК на 2003–2015 годы; План по созданию и развитию пилотных кластеров в приоритетных секторах экономики. Также приняты предложения в «Закон о науке», Закон «О государственной поддержке инновационной деятельности». Кроме того, Буктуков Н.С. разработал Положение о вводе объектов интеллектуальной собственности в экономический оборот в соответствии с международной практикой и в поле действующего законодательства РК.

Николай Садвакасович Буктуков – автор более 250 научных трудов, в том числе 6 монографий, более 40 изобретений, защищенных Европейскими и Евразийскими патентами, патентами Казахстана, Японии, Германии, Южной Кореи, Китая, Канады и др. Опубликовал ряд статей и докладов, касающихся вопросов участия науки в диверсификации экономики.

Под его научным руководством подготовлено 5 докторов и 9 кандидатов наук. Профессор КазНТУ им. К. Сатпаева в течение 3 лет.

Н. С. Буктуков – Почётный научный сотрудник ИГД им. Д. А. Кунаева, член редакционных коллегий журналов «Промышленность Казахстана», «Комплексное использование минерального сырья», «Горный журнал Казахстана», «Вестник НАГН».

В советское время награжден Почетными грамотами райкомов, обкомов комсомола и ЦК ЛКСМ Казахстана; ЦК ВЛКСМ; Президиума АН КазССР; ЦК КПСС, СМ СССР, ЦК ВЛКСМ; медалью ВДНХ СССР, Знаком изобретатель СССР, Занесен в Летопись комсомольской славы.

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Коллектив Филиала РГП «НЦ КПМС РК» «Институт горного дела им. Д. А. Кунаева» сердечно поздравляет Николая Садвакасовича со знаменательным юбилеем и желает крепкого здоровья, счастья, благополучия, неиссякаемой жизненной энергии, дальнейших успехов и творческих достижений!

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