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ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
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2

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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.

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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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CIRCULATION OF INFLUENZA VIRUSES AMONG HUMANS AND SWINE IN THE TERRITORY OF KAZAKHSTAN DURING 2017–2018

Abstract. 251 biosamples (191 nasopharyngeal swabs and 60 blood serums) were obtained from humans at healthcare institutions located in various regions of the Republic of Kazakhstan. 369 biosamples (330 nasopharyngeal swabs and 39 blood serums) were collected from swine farms.

In the polymerase chain reaction performed on 191 samples collected from humans, the genetic material of influenza A virus was detected in 14.14% of cases, that of influenza B virus in 5.24%. When carrying out subtyping, influenza A/H1N1 virus RNA was identified in 4.71% of samples, A/H3N2 virus RNA in 4.19%. In 330 samples obtained from swine, the genetic material of influenza virus was found in 3.33% of cases, of which influenza A/H1N1 virus RNA was detected in 2.12%, and A/H3N2 virus RNA in 1.21%.

The results obtained in the polymerase chain reaction, as well as data from serological studies in the hemagglutination inhibition assay and enzyme immunoassay, indicate co-circulation of influenza A/H1N1 and A/H3N2 and B viruses among humans and influenza A/H1N1 and A/H3N2 viruses among swine in various regions of Kazakhstan during 2017-2018.

When carrying out virological study of biosamples collected from humans and swine, 10 hemagglutinating agents were isolated in chicken embryos and identified as influenza viruses with antigenic formulae A/H1N1, A/H3N2, and B.

The results of virological and serological studies underline the importance of conducting continuous monitoring of the circulation of influenza viruses among humans and swine in Kazakhstan to identify the possibility of interspecies transmission of the infectious agent.

Keywords: influenza virus, circulation, isolate, PCR diagnostics, hemagglutinin, neuraminidase, blood serum.

Introduction. A high variability of influenza A viruses due to the enormous mutation rate and rapid replication leads to the appearance of viruses with new antigenic properties, which allows it to overcome strain-specific immunity in the population and reach epidemic spread [1].

The presence of a segmented genome facilitates gene recombination between different influenza A viruses [2]. Genetic reassortment between human and avian influenza viruses in swine can play a

significant role in the emergence of pandemic strains, since swine are equally susceptible to both human and avian influenza viruses [3-6].

The viruses such as influenza A/California/04/09 (H1N1)pdm09, containing a complex combination of gene segments of swine, avian, and human influenza viruses that caused the first influenza pandemic in XXI century [7] provided an example of such reassortment. These viruses completely replaced A(H1N1) viruses circulating before and were widely distributed throughout the world along with seasonal influenza A(H3N2) and type B viruses [2, 8].

Due to the fact that reassortment leads to the emergence of viruses with new biological and antigenic properties capable of wide epidemic spread, the infection surveillance and timely pathogen diagnosis, both in humans and in swine, are extremely important areas for combating influenza [9, 10].

The purpose of this study was to examine the characteristics of the circulation of influenza viruses among humans and swine in the territory of Kazakhstan during the 2017-2018 epidemic seasons.

Materials and methods. Nasopharyngeal swabs from humans and swine were collected in vials containing 2 mL of Medium 199 with 0.5% bovine serum albumin and antibiotic complex (50000 U/mL of penicillin, 50 μg/mL of streptomycin, 3000 μg/mL of gentamicin, 5000 U/mL of nystatin). The samples were kept for 4 days at 4 °C and stored in liquid nitrogen (-196 °C).

RIBO-prep and REVERTA-L reagent kits were used to isolate RNA from the samples under study and perform reverse transcription reaction to obtain c-DNA. Primary screening was carried out in real-time polymerase chain reaction (RT-PCR) with hybridization-fluorescence detection using the reagent kits for detection of influenza virus RNA AmpliSens Influenza virus A/B-FL and AmpliSense Influenza virus A-type-FL (FSBI Rospotrebnadzor Central Research Institute for Epidemiology, Russia) on the Rotor-Gene Q6plex (QIAGEN, Germany).

Hemagglutinating agents (HAA) were isolated in 9-10 day old developing chicken embryos. 0.75% suspension of cock and human erythrocytes of 0 (1) blood group was used to indicate virus in the hemagglutination assay (HA) [11].

Identification of viruses was performed in the hemagglutination inhibition (HAI) and neuraminidase activity inhibition (NAI) assays with the kits of polyclonal diagnostic serums, according to WHO recommendations [12].

Serological studies of blood serums were carried out in the HAI assay and enzyme-linked immunosorbent assay (ELISA). The HAI assay was performed using the influenza A/HINI and A/H3N2 virus antigen detection kits (Enterprise for the Production of Diagnostic Preparations LLC, St. Petersburg, Russia). ELISA was performed using a test system for influenza A viruses (subtypes H1N1 and H3N2) (FSBI Rospotrebnadzor Central Research Institute for Epidemiology, Russia).

Results. Biomaterials were obtained from humans and swine in the Kostanay, Karaganda, Almaty, and Aktobe oblasts in 2017-2018. A total of 620 biosamples were collected (521 nasopharyngeal swabs and 99 blood serums).

To study the circulation of influenza viruses among the population, 251 biosamples (191 nasopharyngeal swabs and 60 serums) were obtained from patients with primary diagnoses of ARVI, influenza, bronchitis, and pneumonia at healthcare institutions. 330 nasopharyngeal swabs and 39 serums were obtained from 4-6-month-old swine at the livestock farms.

The characteristics of collected material and results of RT-PCR screening are presented in table 1.

As presented in Table 1, during primary screening of 191 nasopharyngeal swabs collected from humans, the genetic material of influenza virus was found in 27 samples (14.14% of the total number of samples examined). Influenza A virus RNA was detected in 17 biosamples (8.9%), and influenza B virus RNA in 10 biosamples (5.24%). Subtyping of influenza A positive samples revealed influenza A/H1N1 virus RNA in 9 samples (4.71%) and A/H3N2 virus RNA in 8 samples (4.19%).

Primary screening of 330 nasopharyngeal swabs collected from swine, resulted in detection of influenza virus RNA in 11 samples (3.33% of the total number of samples), A/H1N1 influenza virus RNA was found in 7 samples (2.12%), A/H3N2 virus RNA in 4 samples (1.21%).

Primary screening of nasopharyngeal swabs in RT-PCR therefore showed that influenza A/H1N1, A/H3N2, and B viruses circulate among humans and A/H1N1, A/H3N2 viruses among swine in the territory of Republic of Kazakhstan.

Table 1 – Characteristics of biosamples and RT-PCR screening of nasopharyngeal swabs collected from humans and swine in different regions of Kazakhstan during 2017-2018

Sampling point	Nasopharyngeal swab	Serum	Number of PCR-positive samples for				
			influenza viruses	influenza type A virus	virus sybtypes		influenza type B virus
					A/H1N1	A/H3N2	
Human biosamples							
Kostanay oblast	52	14	2	0	0	0	2
Karaganda oblast	10	10	4	4	2	2	0
Almaty oblast	116	30	18	11	6	5	7
Aktobe oblast	13	6	3	2	1	1	1
Total	191	60	27	17	9	8	10
Swine biosamples							
Kostanay oblast	85	39	3	3	1	2	*
Karaganda oblast	10	0	4	4	2	2	*
Almaty oblast	137	0	2	2	2	0	*
Aktobe oblast	98	0	2	2	2	0	*
Total	330	39	11	11	7	4	*
*A study was not conducted.							

During primary infection of 9-10-day-old chicken embryos with the samples collected from humans in different regions of Kazakhstan, eight HAAs were isolated: three from patients living in Karaganda and five from Almaty, hemagglutination titers were of 1:4 - 1:16. Two HAAs with hemagglutination titers of 1:2 - 1:4 were isolated from the swine samples collected in the Kostanay oblast.

The results of determining hemagglutinin subtypes of new influenza virus in the HAI assay are presented in table 2.

As seen from table 2, hemagglutinating activity of four isolates from humans (04/18, 05/18, 14/18, and 15/18) was inhibited by immune serums against A/H1N1 and A/H1N1pdm viruses (from 1/4 to homologous titer), that of three viruses (06/18, 07/18, and 08/18) by serum against influenza type B virus (from 1/2 to homologous titer). Hemagglutinating activity of Karaganda/16/18 isolate was inhibited to 1/2 of homologous titer by serum against A/H3N2 virus.

Table 2 – Identification of hemagglutinin subtypes in influenza virus isolates obtained from humans and swine during 2017-2018 in the HAI assay

Isolate	Antihemagglutinin titer with diagnostic serums against reference strains			
	A/H1N1	A/H1N1pdm	A/H3N2	type B
Almaty/04/18	40	80	< 20	< 20
Almaty /05/18	80	< 20	< 20	< 20
Almaty /06/18	< 20	< 20	< 20	160
Almaty /07/18	< 20	< 20	< 20	80
Almaty /08/18	< 20	< 20	< 20	80
Karaganda/14/18	40	160	< 20	< 20
Karaganda/15/18	40	80	< 20	< 20
Karaganda/16/18	< 20	< 20	80	< 20
swine/Kostanay/471/18	40	20	< 20	< 20
swine/Kostanay/522/18	80	20	< 20	< 20
Homologous titer of serums against reference viruses	160	160	160	160
Note. The reciprocals of antibody titers are presented here and in table 3.				

Hemagglutination of two swine isolates from the Kostanay oblast (471/18 and 522/18) was inhibited from 1/2 to 1/8 of homologous titers by immune serum against a reference virus with antigenic formula A/H1N1.

Identification of the neuraminidase subtype of influenza A virus isolates in the NAI assay is presented in table 3.

Table 3 – Identification of neuraminidase subtype of Kazakhstan influenza A virus isolates of 2017-2018 in neuraminidase activity inhibition assay

Isolate	Anti-neuraminidase antibody titer with immune serums against viruses	
	H1N1	H3N2
Almaty/04/18	100	< 20
Almaty/05/18	100	< 20
Karaganda/14/18	100	< 20
Karaganda /15/18	100	< 20
Karaganda /16/18	< 20	100
swine/Kostanay/471/18	100	< 20
swine/Kostanay/522/18	100	< 20

As seen from table 3, enzymatic activity of isolates with hemagglutinin A/H1 was inhibited by polyclonal diagnostic serum against A/H1N1 virus, with hemagglutinin A/H3 by serum against A/H3N2 virus.

Identification carried out in the HAI and NAI assays showed that human isolates belong to influenza viruses with the antigenic formula A/H1N1 (Almaty/04/18, Almaty/05/18, Karaganda /14/18, Karaganda/15/18), A/H3N2 (Karaganda/16/18) and to influenza type B viruses (Almaty/06/18, Almaty/07/18 and Almaty/08/18). Two HAAs isolated from swine (swine/Kostanay/471/18, swine/Kostanay/522/18) were classified as A/H1N1 influenza viruses.

The results of serological testing of 60 serums in ELISA and HAI assay collected from humans in different regions of Kazakhstan are presented in figure 1.

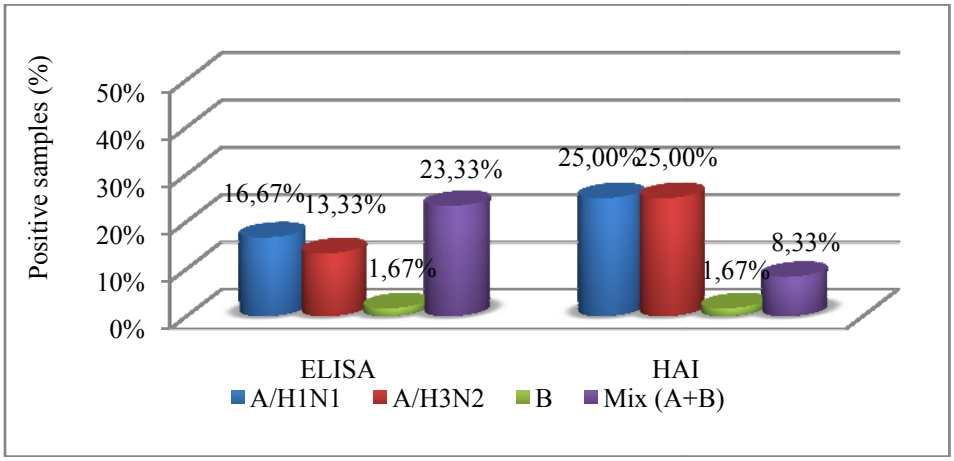

Figure 1 – Detection of antibodies against influenza viruses in human serums in ELISA and HAI assay

As seen in figure 1, in ELISA antibodies against A/H1N1 influenza virus were detected in 16.67% of cases (10 samples), against A/H3N2 virus in 13.33% (8 samples), against influenza B virus in 1.67% (1 serum). In 23.33% of cases (14 samples), antibodies simultaneously against two influenza viruses (A+B) were found in serums.

In the HAI assay antihemagglutinins against influenza A/H1N1 virus, as well as A/H3N2 virus, were detected in 25.00% of the total number of samples (15 samples each), and in 1.67% (1 sample) against influenza B type virus. The antibody titers were of 1:40 - 1:160. Seropositive serums simultaneously

against influenza A and B viruses were detected in 8.33% of cases (5 samples) with antibody titers of 1:80 - 1:160.

The results of serological testing for influenza of 39 serums collected from swine in the Kostanay oblast are presented in figure 2.

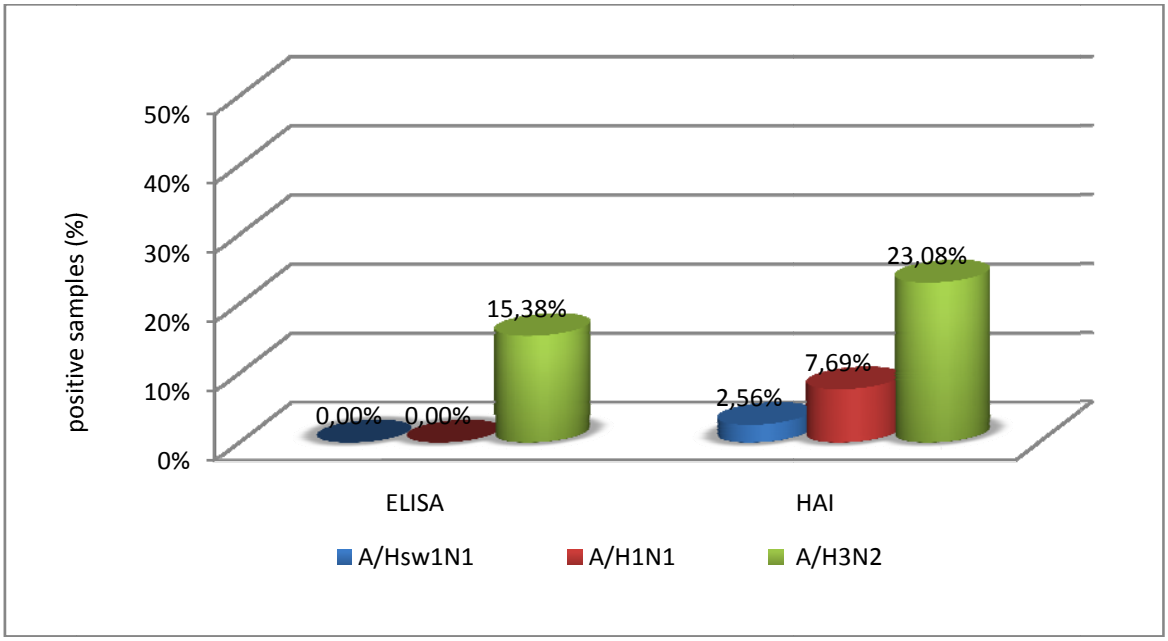

Figure 2 – Detection of antibodies against influenza viruses in swine serums in ELISA and HAI assay

As seen in figure 2, in ELISA antibodies only against influenza A/H3N2 virus were detected in swine serums in 15.38% (6 samples).

In the HAI assay antihemagglutinins against A/Hsw1N1 virus were detected in 2.56% (1 sample) of the total number of examined serums, against A/H1N1 in 7.69% (3 samples), and against A/H3N2 in 23.08% (9 samples). The antibody titers were of 1:20 - 1:40.

The results of primary screening of nasopharyngeal swabs in RT-PCR and serological studies of blood serums therefore indicate co-circulation of influenza A/H1N1 and A/H3N2 and B viruses among humans, influenza A/H1N1 and A/H3N2 viruses among swine in different regions of Kazakhstan during 2017–2018.

Discussion. Literature data suggests that interspecies transmission of human and swine influenza A (H1N1) viruses is an important factor in studying the evolution, ecology, and epidemiology of pathogens. There are theoretical substantiations of the possibility of interspecific transmission of influenza A virus between birds and marine animals, birds and swine, seals and humans, swine and humans [13, 14]. The appearance of reassortants with new qualities and the mechanisms that cause the adaptation of animal and avian influenza viruses to the human body are still largely unknown.

Today, the most acute problem is influenza caused by the new virus A/H1N1 (the so-called swine influenza). This virus is a typical emergent infection (from English “emergency” which means a sudden, unpredictable case), with the possibility of transmitting a known pathogen to a new host. Swine influenza can acquire pandemic proportions [15].

The unpredictable variability of influenza A viruses does not allow any prognosis regarding “swine” influenza virus, since analysis of its pathogenic properties has shown that the evolution of this virus can follow the path of recovering some signs of pathogenicity, and this, in turn, can lead to transition of this virus to the category of highly pathogenic [9].

In this regard, the most important areas in the fight against influenza are the obtainment of new data on the evolution of influenza pathogens that contribute to the effective infection surveillance, as well as timely diagnosis of the pathogen and disease prevention.

Conclusions. Primary screening of 521 nasopharyngeal swabs in RT-PCR and serological studies of 99 blood serums in the haemagglutination inhibition assay and enzyme immunoassay indicate co-circulation of influenza A/H1N1 and A/H3N2 and B viruses among humans, influenza A/H1N1 and A/H3N2 viruses among swine in different regions of Kazakhstan during 2017-2018.

The results of virological and serological studies highlight the need for continuous monitoring of the circulation of influenza viruses among humans and swine in Kazakhstan to identify interspecies transmission of the infectious agent.

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2017–2018 Ж. ҚАЗАҚСТАН АУМАҒЫНДАҒЫ АДАМ ЖӘНЕ ШОШҚА АРАСЫНДА ТҰМАУ ВИРУСЫНЫҢ АЙНАЛЫМЫ

Аннотация. 2017-2018 ж. індет аралығында Қазақстан Республикасының әр түрлі аймақтарындағы емдік мекемелерінен 251 биосынама (191 мұрын-жұтқыншақ сынамасы және 60 қан сарысуы) алынды. Шошқа шаруашылықтарынан 369 материал (330 танау-жұтқыншақ және 39 қан сарысуы) жиналды.

Полимеразды тізбекті реакциясында адамдардан жиналған 191 сынамада А вирусының генетикалық материалы 14,14 % анықталды, В тұмау вирусы 5,24 % құрады. Субтиптеу кезінде A/H1N1 тұмау вирусының РНҚ 4,71% сынамада анықталды, A/H3N2 – 4,19%. Шошқалардан жиналған 330 сынамадан тұмау вирусының генетикалық материалы 3,33% анықталды, солардың ішінде A/H1N1 тұмау вирусының РНҚ - 2,12%, құраса, A/H3N2 тұмау вирусы – 1,21%.

Полимеразды тізбекті реакциясында алынған нәтиже, сонымен қоса иммуноферментті талдау және гемагглютинин тежеу реакциясында серологиялық зерттеу нәтижелері, 2017-2018 жылдары Қазақстан Республикасының әр түрлі аймақтарындағы адамдар арасында A/H1N1, A/H3N2 және В тұмау вирустарының айналымын көрсетеді, ал шошқалар арасында A/H1N1 және A/H3N2 тұмау вирустарын көрсетеді.

Адам және шошқалардан жиналған биосынамаларды тауық эмбриондарында вирусологиялық зерттеу нәтижесінде антигендік формуласы A/H1N1, A/H3N2 және В болып табылатын 10 гемагглютининдеуші агент бөлініп алынды.

Вирусологиялық және серологиялық зерттеу нәтижелері, Қазақстан аумағындағы адам және шошқа арасында инфекция қоздырғышның түр аралық берілу мүмкіндігін айқындау үшін, тұмау вирусының айналымына үнемі мониторинг жасаудың маңыздылығын көрсетеді.

Түйін сөздер: тұмау вирусы, айналым, изолят, ПТР-диагностикасы, гемагглютинин, нейраминидаза, қан сарысуы.

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ЦИРКУЛЯЦИЯ ВИРУСОВ ГРИППА СРЕДИ ЛЮДЕЙ И СВИНЕЙ НА ТЕРРИТОРИИ КАЗАХСТАНА В 2017–2018 ГГ.

Аннотация. В эпидемические сезоны 2017–2018 гг. в различных регионах Республики Казахстан от людей в лечебных учреждениях получена 251 биопроба (191 носоглоточный смыв и 60 сывороток крови). В свиноводческих хозяйствах собрано 369 материалов (330 носоглоточных смывов и 39 сывороток крови).

В полимеразной цепной реакции в 191 образце, собранном от людей, генетический материал вируса гриппа А был обнаружен в 14,14% случаев, вируса гриппа В – в 5,24%. При субтипировании РНК вируса гриппа A/H1N1 идентифицирована в 4,71% проб, A/H3N2 – в 4,19%. В 330 образцах, полученных от свиней, генетический материал вируса гриппа был обнаружен в 3,33% случаев, из них РНК вируса гриппа A/H1N1 выявлена в 2,12%, вируса гриппа A/H3N2 – в 1,21%.

Результаты полученные в полимеразной цепной реакции, также как и данные серологических исследований в реакции торможения гемагглютинации и иммуноферментном анализе, указывают на социркуляцию среди людей в 2017–2018 гг. в различных регионах Казахстана вирусов гриппа A/H1N1 и A/H3N2 и В, среди свиней – вирусов гриппа A/H1N1 и A/H3N2.

При вирусологическом исследовании биопроб, полученных от людей и свиней, на куриных эмбрионах выделено 10 гемагглютинирующих агентов, идентифицированных как вирусы гриппа с антигенными формулами A/H1N1, A/H3N2 и В.

Результаты вирусологических и серологических исследований свидетельствуют о важности проведения постоянного мониторинга циркуляции вирусов гриппа среди людей и свиней на территории Казахстана для выявления возможности межвидовой передачи возбудителя инфекции.

Ключевые слова: вирус гриппа, циркуляция, изолят, ПЦР-диагностика, гемагглютинин, нейраминидаза, сыворотка крови.

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PRODUCTIVITY AND ESTIMATED BREEDING VALUE OF THE DAIRY CATTLE GENE POOL IN THE REPUBLIC OF KAZAKHSTAN

Abstract. With a linear estimation of the physique of first-calf heifers, it is established that in cows of domestic breeds, the parameters correspond to the optimal points of the species and the indicators of the extremities, but the parameters of the udder differ sharply. All the data on productive and exteriors were entered into the program of the Information and Analytical System (IAS), where the estimated breeding value of the studied cows was automatically calculated. The average estimated breeding value (EBV) for all breeds was 81.4. Among all breeds, the highest EBV level was determined in Holstein cows (84.3) of imported selection.

The average milk yield of the studied herds per 1 cow was 5300± 30 kg of milk, with a mass fraction of fat of 3.74±0.02%, the mass fraction of protein of 3.16±0.01%, with a content of 324.7±23.8 thous. of somatic cells. The most productive were the cows of the Holstein breed, their productivity over the Alatau breed was 694 kg (P>0.99), over the black-and-motley breed it was1446 kg (P>0.999), over the Simmental breed it was 1982 kg (P>0.999), over the red steppe - 2038 kg (P>0.999), no significant difference was found in the content of fat and protein of cow. Somatic cells were within normal limits. When studying the dynamics of milk yields according to lactation, it is established that the milk productivity of the Alatau breed is characterized by growth (4844... 5679... 5458 kg) by the second-third lactation and gradual decrease (4716... 4017 kg) by the fifth. On average, for all lactations, cows of this breed brought 5123±275.4 kg. The dairy productivity of Holstein cows is increased by the fifth lactation, without recessions. On average, for cows of black and motley breed for all lactations, the milk yield was 4671±190 kg. Dynamics of milk yield of the Simmental breed increases from the first to the second lactation (3917... 4035 kg), in the third it decreases (4035... 3334 kg), from the fourth to the sixth lactation the sequence increases.

Keywords: selection, selection, assortment, breeding value of cows, linear estimation of the exterior, milk yield, milk composition.

Introduction. In the domestic dairy cattle industry, the actual problem remains monitoring of traditional management systems of breeding processes in production. In modern dairy cattle breeding in our country, the main task of zootechnical science and practice is further intensification of the industry, aimed at increasing the genetic potential of the productive qualities of domestic animals and the extent of its implementation. The advancement of molecular biology, population genetics, biotechnology, the development and implementation of large-scale breeding, the use of computer programs for the analysis of breeding information enriched the arsenal of tools for studying biological patterns and management of animals heredity, and breed formation processes

The use of marker genes is especially important for the evaluation of traits, the phenotypic manifestation of which occurs relatively late or is limited to the sex, as well as for traits that are strongly influenced by non-genetic factors (for example, environmental factors) [1].

Because of the considerable variability of environmental conditions and nonadditive inheritance of dairy productivity, according to some researchers, the productivity of ancestors is not a reliable criterion for the value of their offspring. One of the ways to improve the accuracy of cows' estimation is to take into account many environmental factors if possible, fluctuations in the dairy production by lactation, heritability, standard deviations, repeatability, etc. [2, 3].

In the world practice, an index estimate is used with the use of information systems, which allow to obtain an objective idea of individual animals and herds as a whole [4].

When determining the breeding (genetic) value of cows, the following phenotypic and genotypic characteristics are taken into account: productivity, exterior, udder health, reproductive qualities and duration of economic use [5].

The duration of economic use of cows is an important economic trait, since the quantity of products obtained depends on it, the volume and intensity of herd repair, as well as the level of recoupment of costs in dairy cattle breeding [6].

With the annual introduction of more valuable animals into the herd, the value of the selection differential increases, as a result of which the genetic improvement of the herd and the increase in its productivity are more successful. Long-term economic use of cows makes it possible to conduct breeding and selective work on farms at a higher level [7].

The development of domestic dairy cattle breeding is impossible without the diversity of the domestic gene pool of breeds, the solution of the problem of using valuable genetic resources on the basis of its own breeding base and the imported gene pool. In this connection, one of the most important factors in accelerating selection work is the widespread introduction of world and domestic achievements in the field of genetics and breeding into production.

At present, the process of approbation of the method of linear estimation of the exteriors and the determination of genetically determined interrelationships between the exterior characteristics with indicators such as the duration of economic use are underway. The appearance of the best genotypes of animals in the shortest possible time and their subsequent use for selective and breeding work with the herd is the basis of genetic progress in modern cattle breeding. It is important to take into account the data on the exteriors, lifelong productivity and the health status of the estimated livestock. The cornerstone of achieving the identified breeding priorities is the accuracy of the evaluation of genetically determined economic traits of animals. In this regard, there is a need to accumulate the information obtained by creating electronic databases and their corresponding software. The use of linear statistical models using computer modeling of the breeding process in dairy herds in the accelerated mode will help to provide an objective estimation of the breeding value of dairy cattle and the selection of animals with a high genetic potential of productivity. The use of pedigree servicing bulls with high estimated breeding value in generations will allow to increase the productivity of dairy cattle [8, 9].

With the annual introduction of more valuable animals into the herd, the value of the selection differential increases, as a result of which the genetic improvement of the herd and the increase in its productivity are more successful. Long-term economic use of cows makes it possible to conduct breeding and selection work on farms at a higher level (повторяется абзац) [6].

Thus, the new methods for estimation of the breeding value, taking into account the linear profile and genetic analysis data of cows will contribute to the intensification of selective and breeding work with dairy herds.

The aim of the research. Conducting a linear estimation of the productivity of the domestic dairy cattle gene pool.

Material and methods. Objects of the research were broodstocks, as well as servicing bulls. Materials of the research were the documents of primary zootechnical and pedigree accounting (from the IAS system), as well as the results of experimental studies, visual assessment, weighing, measurements, control milking of animals. In addition, biochemical studies of milk were carried out. For the analysis of dairy productivity, live weight and genealogy, the data of pedigree and zootechnical accounting of the economy were used. All animals were in the same conditions of feeding and maintenance. Cows were fed the fodder from the farm.

The calculation of the estimated breeding value was carried out according to the methodology developed by the researcher of Kazakh Scientific Research Institute of Animal Breeding and Fodder Production LLP [10].

To study the effect of the level of indices of breeding value on dairy productivity, the class intervals of indices were calculated according to the formula proposed by G. F. Lakin:

$$\lambda = \frac{x_{max} - x_{\min}}{\mathrm{K}},$$

where λ – class interval value; x_{max} and x_{min} – maximum and minimum populations; K – number of classes.

The number of classes was determined by the Sturges formula:

$$K = 1 + 3.32 \lg_n$$ [11].

The reliability of the difference in the indicators (P) was determined according to Student. The results of the studies were processed on a PC by statistical programs "Excel" according to the generally accepted methodology of variational statistics [12].

Results of the research. After processing the data of the IAS program (taking into account the exclusion of cows with incomplete data), the data for lactation of cows were analyzed (table 1).

Table 1 – Productivity of cows of domestic dairy cattle gene pool

Breed	Productivity for finished lactation							
	Milk yield, l		Fat, %		Protein,%		Somatic cells. thous.	
	X±m	Cv	X±m	Cv	X±m	Cv	X±m	Cv
Alatau (n=534)	5259±71	28	3.84±0.02	12	3.28±0.01	10	756.0±67	207.7
Simmental (n=796)	5654±60	32	3.96±0.01	10	3.37±0.01	7	356.9±20	156.8
Black-and-motley (n=812)	5548±63	32	3.74±0.01	9	3.24±0.01	7	240.6±15	173.2
Holstein b/m (n=505)	6380±67	36	3.80±0.01	11	3.24±0.01	8	217.6±11	176.1
For 305 days of lactation	5712±97		3.83±0.02		3.28±0.01		339.6±54	

It was found that the average milk yield per cow amounted to 5987±97 kg of milk, with an average fat content of 3.83±0.02%, protein content of 3.28±0.01%, with a content of 339.6±54 thousand somatic cells. The highest yield, as expected, was in the cows of the Holstein breed (6380±67 kg). The difference between the yield of Holstein cows and Alatau cows was 1121 kg (P>0.999), with black-and-motley cows 832 kg (P>0.999), Simmental - 726 kg (P>0.999), the highest content of fat was in the Simmental breed (3.96±0,01%), exceeding the Alatau by 0.12% (P>0.999), black-an-motley by 0.22% (P>0.999), Holstein - by 0.16% (P>0.999). In terms of protein content, the Simmental cows were superior to Alatau by 0.09% (P>0.999), black-and-motley and Holstein - by 0.16% (P>0.999). Somatic cells are within normal limits.

Since 2016, monthly trips have been organized to the basic farms to conduct control milking of cows, with the sampling of milk, and the determination of its quality in laboratory conditions. All data on the productivity and quality of milk (yield, fat and protein content, the number of somatic cells) were then added to the IAS program. The reliability of the results of these studies is ensured by the fact that the milk quality analysis was carried out in independent dairy laboratories, the productive data were selected monthly by researchers in the process of control milking, the control of the work was carried out by the Republican Chamber of Dairy Cattle.

The productive indicators of dairy cows in the context of breeds are presented in Table 2.

Table 2 – Dairy productivity of cows in the context of breeds

Breed	n	Milk yield, l		Fat, %		Protein, %		Somatic cells, thous.	
		$X±m_x$	C_v	$X±m_x$	C_v	$X±m_x$	C_v	X±m	C_v
Alatau	220	5100±273	33.4	3.78±0.05	8.4	3.22±0.05	8.6	648.0±93.8	87.1
Holstein	2671	5794±93.0	37.0	3.72±0.02	15.6	3.17±0.02	14.7	285.2±8.9	75.1
Black-and-motley	674	4348±166	43.8	3.72±0.04	12.9	3.05±0.05	20.4	336.5±45.6	131
Simmental	403	3812±207	47.6	3.91±0.05	9.2	3.23±0.05	14.7	378.5±37.8	70.9
Red steppe	23	3756±571	40.9	3.53±0.13	9.6	2.84±0.11	10.9	530.7±195	72.6
Total/average	3991	5300±130	40.7	3.74±0.03	14.1	3.16±0.03	15.3	324.7±23.8	84.8

It was found that in the program of the information analytical system (IAS), on average, the dairy productivity of cows was 5300±129.6 kg. The most productive cows were, as expected, cows of the Holstein breed, the excess of their productivity over the Alatau cows was 694 kg (P>0.99), over the black-and-motley cows - 1446 kg (P>0.999), over the Simmental cows - 1982 kg (P>0.999), over the red steppe - 2038 kg (P>0.999).

Domestic and world experience proves that the decisive conditions for solving the problem of providing the population with products are the presence of breeds and herds of animals with a high genetic potential of productivity. In the solution of the tasks in hand, it is of great importance to improve the productive qualities of the animals of herds of the basic farms. The tendency, productivity of cows of Holstein breed prevails over the productivity of domestic breeds, but this difference is insignificant and unreliable (table 3).

Table 3 – Indicators of dairy productivity of first-calf heifers of the basic farms

Breeds	Number of cows, heads	Milk yield, kg		Fat, %		Protein, %		Somatic cells thous.	
		$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv
Alatau	37	4301±206.0	29	3.89±0.03	4.3	3.27±0.03	6.0	625.7±77.4	75
Holstein	480	5214±61.6	25	3.78±0.03	14	3.20±0.02	13	288.4±7.6	57
Black-and motley	49	4463±135.2	21	3.85±0.04	7.3	3.29±0.03	5.8	282.6±13.1	32
Simmental	68	4624±161.2	28	3.95±0.02	3.7	3.39±0.02	3.7	421.5±29.4	57
On average	634	4739±86.4	26	3.81±0.03	12	3.23±0.02	11	321.9±14.4	56

Thus, the domestic breeds of dairy cattle of the basic farms, where three intra-breed types are predominantly bred: "Ak-Yrys" of Alatau, "Sairam" of black-and-motley and "Ertis" of Simmental breeds - are already approaching to productivity of the dairy breed of import selection - Holstein, which predetermines the effectiveness of breeding work carried out by researchers of the department of breeding and selection of dairy cattle of the Kazakh Scientific Research Institute of Animal Breeding and Fodder Production LLP.

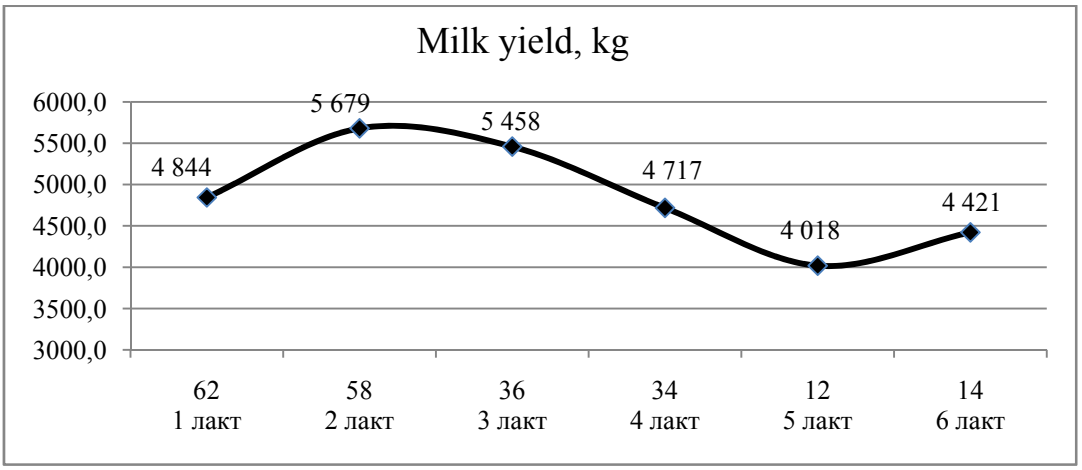
The duration of economic use of cows is one of the important indicators in the system of reproduction of the herd - a complex production process, including a set of organizational, economic, veterinary, and technological measures. Productivity and reproductive abilities of animals are the most important components of economic екфшеs, according to which breeding should be carried out. The works of scientists are dedicated to this [13, 14].

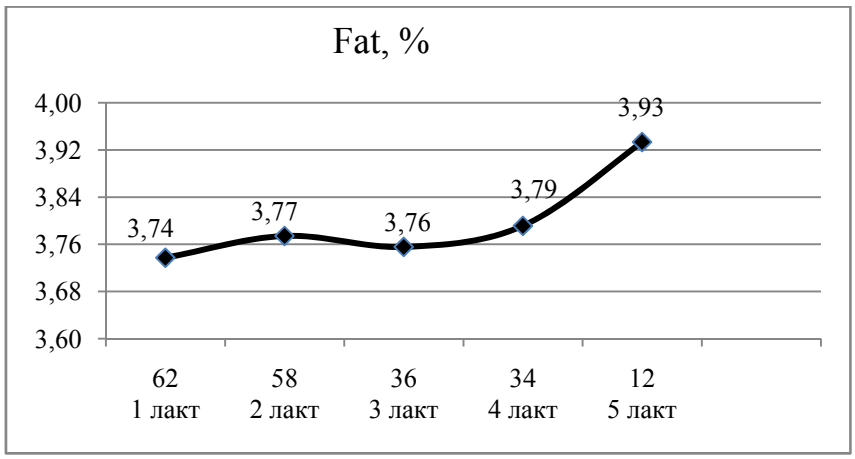
On average, for all lactations, cows of the Alatau breed milked 5123±275.4 kg (table 4).

Table 4 – Indicators of dairy productivity and milk composition of the Alatau breed

Age, in lactation	Number of cows, heads	Milk yield, kg		Fat, %		Protein, %		Somatic cells thous./cm^3	
		$X \pm m_x$	C_v	$X \pm m_x$	C_v	$X \pm m_x$	C_v	$X \pm m_x$	C_v
1 lactation	62	4844±189	30.8	3.74±0.04	8.6	3.19±0.03	8.6	542.2 ± 57	83.1
2 lactation	58	5679±221	29.7	3.77±0.04	8.5	3.22±0.03	8.1	490.6 ± 57	89.3
3 lactation	36	5458±313	34.4	3.76±0.04	6.8	3.22±0.04	7.3	802.0±155	116.2
4 lactation	34	4716±275	34.0	3.79±0.05	8.3	3.23±0.05	8.6	785.3±89	66.2
5 lactation	12	4017±641	55.3	3.93±0.11	10.0	3.29±0.10	10.3	673.6±181	93.2
6 lactation	14	4421±468	39.7	3.92±0.12	11.8	3.20±0.11	12.8	1045 ± 206	74.0
Total / on average	216	5077±275,4	33.6	3.78±0.05	8.5	3.21±0.05	8.6	649.8 ± 95	87.6

The dairy productivity of the Alatau breed is characterized by growth (4844... 5679... 5458 kg) by the second-third lactations and gradual decrease (4716 ... 4017 kg) by the fifth, i.e. for this breed, it is characterized by a constant level of milk yields, which confirms its high stress resistance. The uniformity of the lactation flow of the Alatau breed by age is clearly confirmed in the diagram (figure 1). As can be





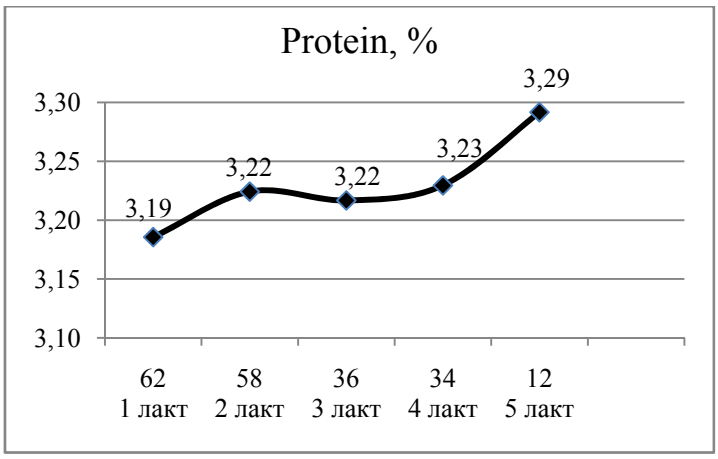


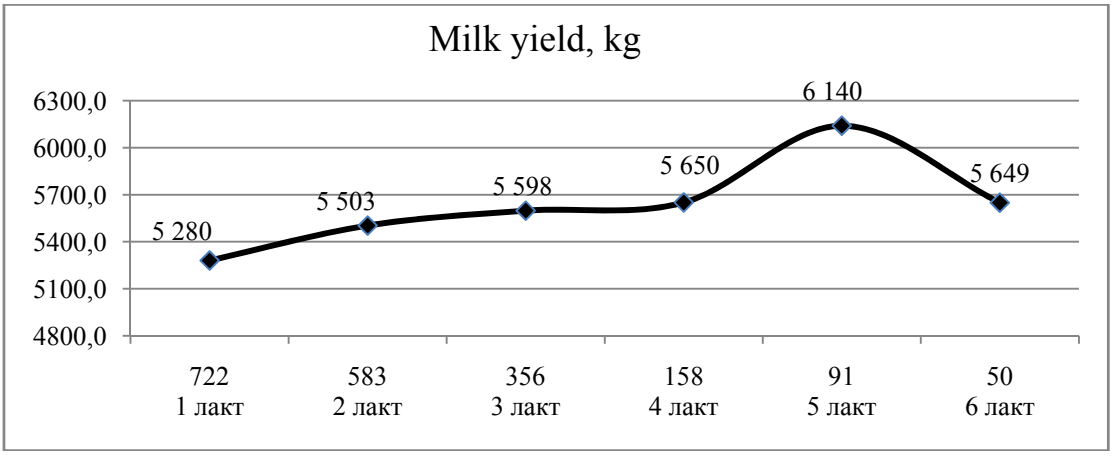
Figure 1 – Diagram of the productivity of the Alatau cows in the context of calving

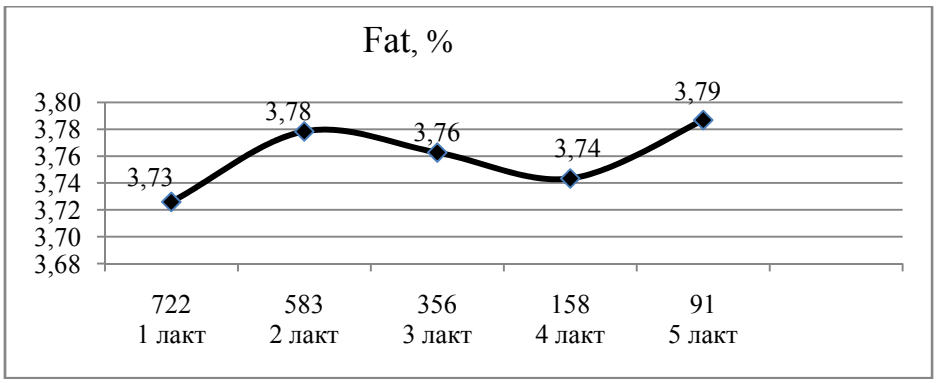
seen from the graph, the milk yield of Alatau cows from the second lactation is gradually decreasing, while the decline in dairy productivity is gradual. According to the chemical composition, the milk of the Alatau cows does not have any noticeable differences. It has been established that the number of somatic cells increases with cows of the Alatau breed with age.

It has been established that the dairy productivity of Holstein cows increases by the fifth lactation (table 5), without recessions, which is typical for this, the youngest breed, as can be clearly seen from the diagram (figure 2). The chemical composition by age is stable.

Table 5 – Indicators of dairy productivity and milk composition of the Holstein breed

Age, in lactation	Number of cows, heads	Milk yield, kg		Fat, %		Protein, %		Somatic cells thous./cm^3	
		X ±m_x	C_v	X±m_x	C_v	X±m_x	C_v	X±m_x	C_v
1 lactation	722	5280±67.6	34	3.73±0.02	14	3.18±0.02	13	302.2±7.3	65
2 lactation	583	5502±85.4	37	3.78±0.02	11	3.22±0.02	12	274.2±5.3	47
3 lactation	356	5598±98.1	33	3.76±0.02	9	3.21±0.01	8	313.4±14.9	89
4 lactation	158	5650±159.3	35	3.74±0.04	12	3.21±0.03	11	297.2±16.4	69
5 lactation	91	6139±213.1	33	3.79±0.03	8	3.25±0.03	7	256.7±15.4	57
6 lactation	50	5648 ± 281.6	35	3.73±0.05	9	3.25 ±0.03	8	287.3 ±18.3	44
Total	1960	5479±93.3	35	3.75±0.02	12	3.20±0.02	11	293.0±9.5	63





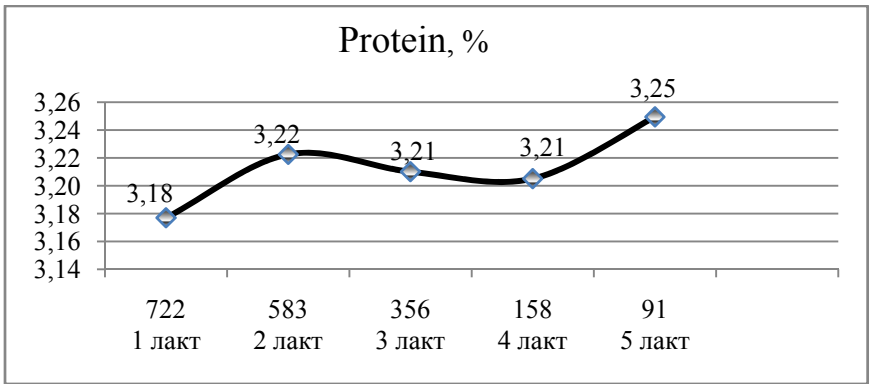


Figure 2 – Diagram of the productivity of the Holstein cows in the context of calving

It is known that the high lifetime productivity of cows is a consequence of the good development and functioning of all organs and systems of vital activity of the animal body during the whole period of its use [15].

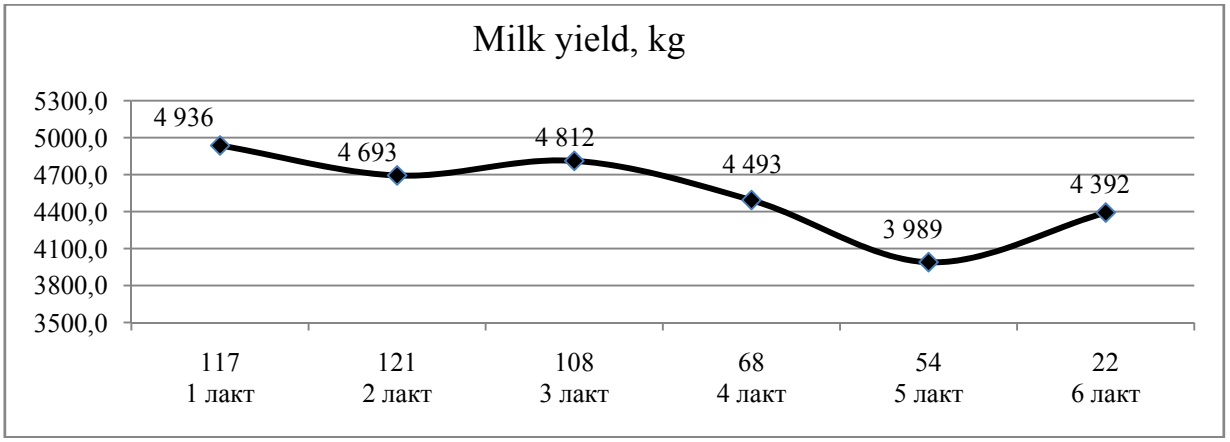
It has been established that in black-and-motley cattle from the first lactation, when the maximum milk yield is observed (4936±231 kg), a gradual decrease by the fifth lactation occurs, which confirms the increased reaction of this breed to stress factors of the external environment (table 6).

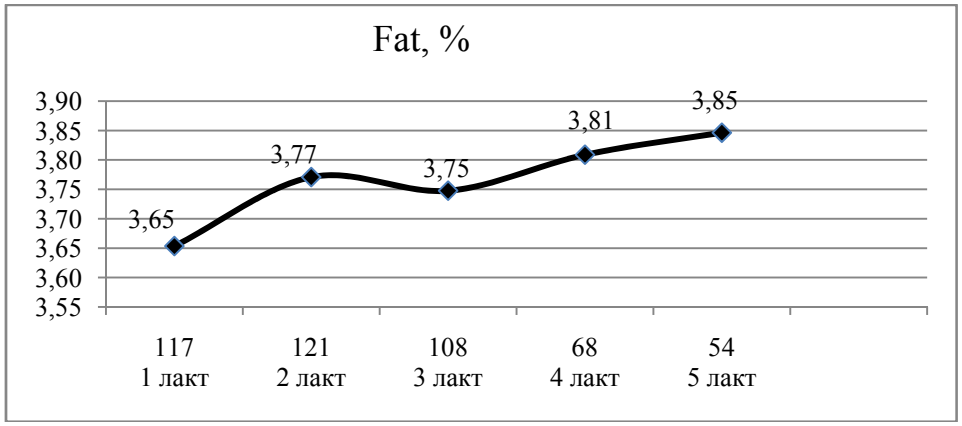
When working with the black-and-motley breed, it is necessary to strengthen the selection by dairy productivity and milk composition.

Table 6 – Indicators of dairy productivity and milk composition of the black-and-motley breed

Age, in lactation	Number of cows, heads	Milk yield, kg		Fat, %		Protein, %		Somatic cells thous./cm^3	
		$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv
1 lactation	117	4936±231	50	3.65±0.05	15	3.05 ± 0.05	19	444.1 ± 101.7	247
2 lactation	121	4692±191	44	3.77±0.03	9	2.97 ± 0.06	23	293.5 ± 26.6	99
3 lactation	108	4811±157	34	3.75±0.04	10	3.14 ± 0.05	18	408.1 ± 64.5	164
4 lactation	68	4493±174	32	3.81±0.03	6	2.97 ± 0.10	26	289.1 ± 27.2	77
5 lactation	54	3989±180	33	3.85±0.03	5	3.23 ± 0.04	8	241.7 ± 8.9	26
6 lactation	22	4391±243	26	3.84±0.07	7	3.21 ± 0.05	6	722.3 ± 273.0	177
Total	490	4658±192	40	3.75±0.04	10	3.07 ± 0.06	19	367.7 ± 62.1	141

On average, for all lactations, the yield of the black-and-motley cattle was 4671±190 kg, i.e. the potential of this breed is available, as evidenced by the variability of this selective feature (32.0... 50.7%), which is clearly visible in the diagram (figure 3).





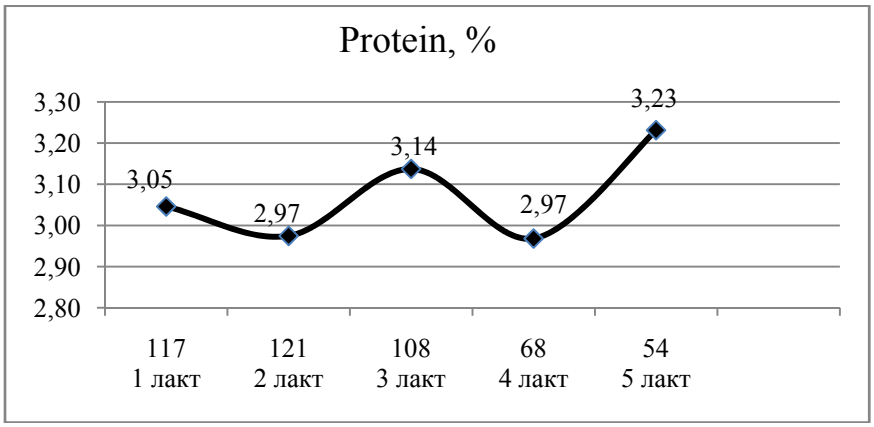


Figure 3 – Diagram of the productivity of the black-and-motley cows in the context of calving

The average productivity of the Simmental cows was only 3809 kg (table 7).

Table 7 – Indicators of dairy productivity and milk composition of the Simmental breed

Age, in lactation	Number of cows, heads	Milk yield, kg		Fat, %		Protein, %		Somatic cells thous./cm^3	
		$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv
1 lactation	134	3917±138.0	40	3.96± 0.02	5.4	3.30±0.03	9.9	387 ± 17.1	50
2 lactation	100	4035±220.1	54	3.88± 0.03	7.8	3.18±0.05	16.2	352 ± 18.2	51
3 lactation	68	3334±200.5	49	3.80± 0.07	15.7	3.22±0.08	20.3	329 ± 17.1	42
4 lactation	56	4391±301.9	51	3.91± 0.04	7.6	2.97±0.09	21.4	418 ± 82.7	148
5 lactation	21	3058±328.8	49	3.81± 0.12	14.2	3.31±0.06	8.6	513 ± 197.4	176
6 lactation	23	2879±246.4	41.0	4.23± 0.16	17.7	3.64±0.06	8.4	365.4± 51.5	67
Total	402	3809±208.0	47.6	3.91± 0.05	9.2	3.23±0.05	14.7	378.7± 37.9	70

Dynamics of milk yields of the Simmental breed of cattle is of a curvilinear nature.

In particular, with the increase in productivity by the second lactation (3917... 4035 kg), in the third, on the contrary, it decreases (4035... 3334 kg), then this sequence is repeated. Therefore, the average productivity of cows of this breed is only 3809 kg, which is clearly visible from the graph (figure 4). According to the milk composition, a relative stability is set, which is clearly visible in the diagrams.

For the effective management of the selection process, complete, qualitative and reliable information is needed, both about the individual animal and the breed as a whole. In countries with developed livestock breeding, the selection process is closely related to management. One of the tasks of modern animal husbandry is to improve the selection management system, both in general and in individual sectors.

The selective-genetic approach to stock breeding was also undertaken not in many works. In the selection of animals, the need arose to strengthen the mathematical apparatus and to introduce more precise, modern methods of genetics in stock breeding, including DNA analysis and polymorphic protein systems, the analysis of hidden genetic defects. Until now, an exhaustive management system of biological and genetic-statistical parameters of selection has not been created. The situation is complicated by the low organization of stock breeding with herds of dairy cattle. It should be noted that the farms do not give much attention to the conduction of a linear estimation of the exteriors of cows.

One of the most acute problems in the cattle breeding is the lack of servicing bulls of their own selection. Modern selection needs a detailed study of all breeding genetic processes in populations and a consideration of populations as complex biological systems, which in the future, undoubtedly, will make both theoretical and practical significances in cattle breeding and biology [13-16].

At present, the research institutions based on the experience of countries with developed dairy cattle breeding have developed a methodology for index estimation of the breeding value of milking cows. This technique is embedded in the program of the information and analytical system (IAS), which, in the

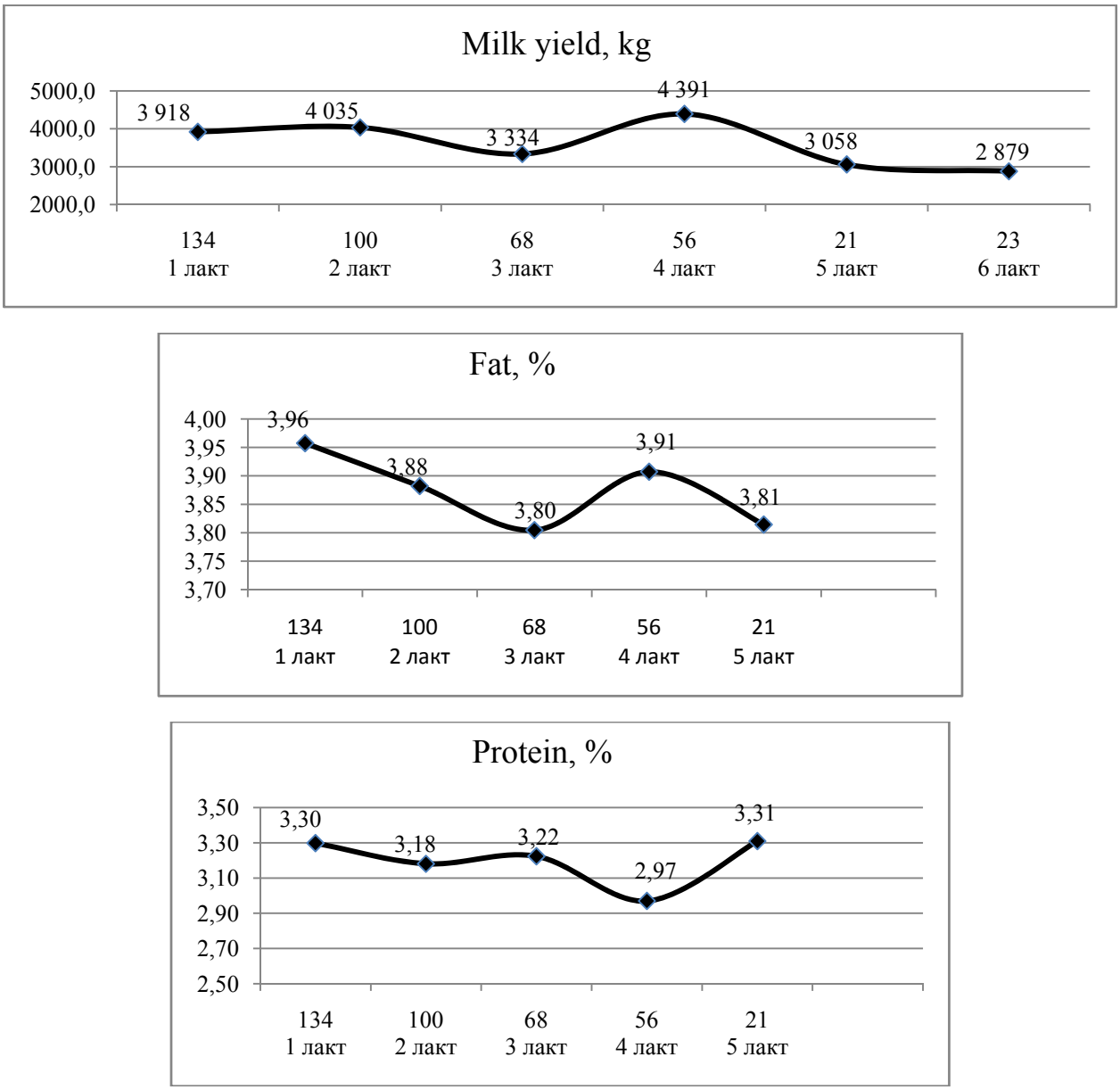


Figure 4 – Diagram of the productivity of the Simmental cows in the context of calving

presence of data on productivity (milk yield, fat and protein content in milk, the number of somatic cells) and the exterior, calculates the estimated breeding value of the animal in terms of productivity.

During 2016-2017 and now monthly we carry out control milking of cows with sampling of milk. Then samples are transferred to the dairy laboratory of KazSRIAB&FP LLP for carrying out its biochemical composition, especially interested in the content of fat, protein and the number of somatic cells. These indicators, together with the results of the linear estimation of the exteriors of cows, are entered into the IAS program, which automatically calculates the estimated breeding value of cows by the method developed by the employees of KazSRIAB&FP LLP. The results of the calculations are given in table 8.

It was found that the aggregate figure of the total estimated breeding value (EBV) for all breeds was 81.4. Among all breeds, the highest EBV level was determined in the Holstein cows (84.3) of imported selection. The EBV level of cows of other breeds does not have a significant difference.

The main task for the selection of the necessary genotypes is to estimate the breeding value of animals that can contribute to the enhancement of the genetic potential of the next generation. Determination of the breeding value of dairy cattle is the main criterion for increasing the genetic potential of animals and their productive indicators.

Table 8 – Results of calculation of the estimated breeding value of cows in a cut of breeds

Breed	Number of cows, heads	EBV of milk yield for 305 days, kg		EBV of fat for 305 days, %		EBV of protein for 305 days, %	
		$X \pm m_x$	C_v	$X \pm m_x$	C_v	$X \pm m_x$	C_v
Holstein	1960	100±0.3	12	99.9±0.1	4.1	99.9±0.1	3.9
Black-and-motley	490	100±0.6	14	99.4±0.4	8.1	91±1.3	31.3
Alatau	216	100±0.9	13	100±0.1	1.6	100±0.1	1.3
Simmental	402	100±0.8	16	100±0.1	2.6	100±0.1	2.8
Total/on average	3091	100±0.5	13	99.8±0.1	4.3	98±0.3	7.9

Continuation of table 8

Breed	Number of cows, heads	Dairy productivity index		Udder health index		The total estimated breeding value	
		$X \pm m_x$	C_v	$X \pm m_x$	C_v	$X \pm m_x$	C_v
Holstein	1960	100±0.2	7.6	100±0.01	0.4	84±0.3	15.7
Black-and-motley	490	98±0.5	11.0	99.4±0.3	7.9	77±0.5	14.1
Alatau	216	100±0.5	7.7	100±0.04	0.6	75±0.4	7.8
Simmental	402	100±0.5	9.6	100±0.02	0.5	75±0.3	7.7
Total/on average	3091	99.7±0.3	8.4	99.9±0.1	1.6	81±0.3	13.8

One of the reasons for the low efficiency of selection work with dairy cattle in Kazakhstan is the use of low-quality pedigree material. Very rarely farmers use high-quality breeding material from leading manufacturers. The regulatory acts adopted in Kazakhstan in the field of cattle breeding have created real prerequisites for the conservation and expansion of the livestock gene pool [13].

Currently, a lot of data have been accumulated that allow to carry out effective selective and breeding work with animals of dairy breeds of cattle. Studies should be conducted taking into account genetically isolated populations, adapted to the climatic conditions of their breeding [14, 15]. At the same time, it is necessary to trace the indicators of economic traits in pedigrees [16-20].

The individual indices of the studied dairy cattle gene pool are in the limit of 100, so we studied the EBV (estimated breeding value), previously dividing them into classes according to the generally accepted methodology.

The dependence of the indices and the level of dairy productivity is determined depending on the class distribution according to the dairy productivity index (table 9).

Table 9 – Distribution of total estimated breeding value by class gap

Total estimated breeding value (lim)	n	Milk yield for 305 days, kg		EBV of milk yield for 305 days, kg		EBV of fat for 305 days, %	
		$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv
413 – 47.4	3	1799.3 ± 358.1	34.5	76.8 ± 2.13	4.8		
47.5 – 53.6	2	1796.0 ± 505.0	39.8	77.9 ± 3.79	6.9	94.0 ± 3.6	5.4
53.7 – 59.8	15	1406.9 ± 105.0	28.9	75.3 ± 1.05	5.4	100.5 ± 0.4	1.4
59.9 – 66.0	56	2368.3 ± 178.0	56.2	81.7 ± 1.39	12.7	98.4 ± 0.7	4.9
66.1 – 72.2	501	2855.9 ± 39.9	31.2	85.7 ± 0.23	6.1	99.6 ± 0.2	5.6
72.3 – 78.4	1345	5188.3 ± 25.5	18.0	100.5 ± 0.12	4.5	100.2 ± 0.1	3.3
78.5 – 84.6	300	6951.8 ± 67.6	16.8	116.2 ± 0.27	4.1	99.4 ± 0.1	1.9
84.7 – 90.8	85	6944.2 ± 407.4	54.1	116.5 ± 2.89	22.9	99.0 ± 0.3	2.3
90.9 – 97.0	227	3179.3 ± 101.1	47.9	86.5 ± 0.87	15.1	100.0 ± 0.2	2.7
97.1 – 103.2	341	5621.7 ± 48.7	16.0	101.2 ± 0.28	5.2	100.3 ± 0.1	2.3
103.3 – 109.4	172	8041.6 ± 70.1	11.4	116.5 ± 0.39	4.4	100.0 ± 0.1	1.8
109.5 <	48	10255.0 ± 140.5	9.5	132.2 ± 0.73	3.8	99.8 ± 0.1	0.8

Continuation of table 9

Total EBV (lim)	n	EBV of protein for 305 days, %		Dairy Productivity Index		Udder health index	
		$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv
41.3 – 47.4	3			46.1 ± 1.28	4.8	99.6 ± 0.33	0.6
47.5 – 53.6	2	97.7 ± 2.68	3.9	84.9 ± 3.58	6.0		
53.7 – 59.8	15	6.8 ± 6.77	387.3	71.3 ± 1.58	8.6	93.3 ± 6.67	277
59.9 – 66.0		63.1 ± 6.36	75.4	83.1 ± 0.25	2.2	100.2 ±0.11	0.8
66.1 – 72.2	501	98.2 ± 0.58	13.2	91.0 ± 0.15	3.7	100.0 ±0.02	0.5
72.3 – 78.4	1345	100.1 ± 0.05	2.0	100.4 ± 0.08	2.8	100.0 ±0.01	0.4
78,5 – 84.6	300	99.5 ± 0.16	2.7	109.5 ± 0.16	2.5	99.9 ± 0.03	0.6
84.7 – 90.8	85	99.3 ± 0.31	2.9	109.5 ± 1.75	14.7	99.9 ± 0.07	0.6
90.9 – 97.0	227	100.4 ± 0.18	2.6	91.9 ± 0.51	8.3	100.0 ±0.03	0.5
97.1 – 103.2	341	100.3 ± 0.10	1.8	100.8 ± 0.16	2.9	99.9 ± 0.03	0.5
103.3–109.4	172	100.2 ± 0.12	1.6	109.9 ± 0.23	2.7	100.0 ±0.04	0.6
109.5 <	48	100.1 ± 0.12	0.9	119.3 ± 0.43	2.5	100.0 ±0.07	0.5

It has been established that as the indices increase, the level of dairy productivity also increases, with the exception of the range of 90.9 - 97.0, when there is a decline in milk yields, which is quite explicable, since in this gradation the lowest dairy productivity index (91.9±0.51), i.e. now, in Kazakhstan, there is the most reliable quantitative trait of selection.

On the basis of complex investigations, groups of the desired type were formed by annual selection of the highly productive black-and-motley Holstein cows (table 10).

Table 10 – Productivity of the black-and-motley Holstein cows of the desired type of experimental farms

Name of the farm	n	Milk yield for 305 days of lactation, kg		Fat, %		Protein, %		Live weight, kg	
		$X \pm m_x$	C_v	$X \pm m_x$	C_v	$X \pm m_x$	C_v	$X \pm m_x$	C_v
Pervomaisky LLP	9	5817±62	3.2	3.67±0.04	2.9	3.31±0.05	4.9	496±5.7	3.4
Ice LLP	99	10116±80	7.9	3.69±0.01	3.5	3.30±0.01	3.1	679±5.3	7.9
Aidarbayev E.S. Farm	15	8048±214	10.3	3.83±0.02	2.3	3.22±0.01	1.3	595±8.9	5.8
Total/on average	123	9549±95	7.8	3.70±0.01	3.3	3.27±0.01	3.0	656±5.7	7.3

As can be seen from the data in Table 10, in three experimental farms of different regions of Kazakhstan, out of 2,800 heads of total livestock, 123 heads of highly productive cows were formed by carrying out a complex of modern biotechnological, biochemical and molecular genetic studies. Their average dairy productivity was 9549±95 kg of milk, with a fat content of 3.70±0.01%, protein content of 3.27±0.01%. The breeding effect of using the offspring of these cows will be 96 kg of milk per year from each head, taking into account that the heritability coefficient for daily productivity is not more than 0.2 and the generation interval is 5 years, and the economic efficiency from the additional production will be more than 7500 tenges per 1 head of cattle.

Conclusion. In cows of the Alatau breed, the type parameters and parameters of the limbs correspond to the optimal indicators, but the parameters of the udder differ sharply. The same trend is observed in cows of the black-and-motley breed, which determines the direction of further selection work with the domestic breed of cows: it is necessary to conduct a corrective selection of servicing bulls, taking into account these shortcomings.

A methodology for assessing the physique of the Holstein cows and the algorithm for calculating the indices of the estimated breeding value of the Holstein cows in the content of somatic cells in milk, providing a logarithmic scale for estimating the number of somatic cells, were unified.

Approaches have been developed to determine the index of the duration of economic use and to determine the index of the reproductive ability of the Holstein cows in accordance with modern international requirements.

It was found that the average index of the total estimated breeding value (EBV) for all breeds was 81.4. Among all breeds, the highest EBV level was identified in the Holstein cows (84.3) of imported selection. The EBV level of cows of other breeds does not have a significant difference. When studying the EBV, previously divided into classes, it was found that with an increase in indices, the level of dairy productivity also increases, with the exception of the interval of 90.9 - 97.0, when there is a decline in milk yields, which is quite understandable, since in this gradation it is the lowest dairy productivity index (91.9 ± 0.51).

123 heads of the black-and-motley Holstein cows were formed. Their average dairy production was 9549±95 kg of milk, with a fat content of 3.70±0.01%, protein content of 3.27±0.01%. The breeding effect of using the offspring of these cows will amount to 96 kg of milk per year from each head, taking into account that the heritability estimate in dairy productivity is not more than 0.2 and the generation interval is 5 years, and the economic efficiency from the additional production will be more than 7500 tenges per head.

The research was carried out within the framework of the target scientific and technical program of the Ministry of Agriculture of the Republic of Kazakhstan in the Kazakh Scientific Research Institute of Animal Breeding and Fodder Production LLP in the period 2016-2018.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ СҮТТІ ІРІ ҚАРА МАЛДЫ ӨСІРЕТІН ТЕКТІК ҚОРЫНЫҢ АСЫЛТҰҚЫМДЫҚ ҚҰНДЫЛЫҒЫНЫҢ ИНДЕКСІ МЕН СҮТІНІҢ ӨНІМДІЛІГІ

Аннотация. Бірінші тума сиырларының дене пішімін сызықтық бағалауда, отандық тұқым сиырларын оңтайлы баллы сыртқы түрлердің көрсеткіштері мен аяқтың көрсеткіштеріне сәйкес келетіндігі анықталды, бірақ желіннің параметрлері күрт ерекшеленеді. Өнімділік пен сыртқы пішінінің көрсеткіштері бойынша барлық деректер ақпараттық-талдау жүйесі (АТЖ) бағдарламасына енгізіледі және сиырдың асыл тұқымды құнының индексі автоматты түрде есептелініп анықталады. Асыл тұқымдық құндылықтарының орташа көрсеткіші (АТҚИ) 81,4 болды. Импорттық асылдандыруда голштин сиырларының асыл тұқымдық құндылықтарының индексінің (84,3) деңгейі барлық тұқымдардың арасында ең жоғарысы.

Табындағы бір сиырдың орташа сүт өнімділігі 5300 ± 130 кг сүтті құрады, майдың массалық үлесі 3,74 ± 0,02%, ақуыздың массалық үлесі 3,16 ± 0,01%, құрамында 324,7 ± 23,8 мың соматикалық клеткалар бар. Ең көп өнімді голштин тұқымды сиырлар болды, олардың өнімділігі алатау сиырынан 694 кг (P> 0.99), қара ала сиырынан - 1446 кг (P> 0.999), Симментал сиырынан - 1982 кг (P> 0.999), қырдың қызыл сиырынан - 2038 кг (P> 0.999) жоғары, сиыр майының және ақуыздың құрамы бойынша айтарлықтай айырмашылықтар жоқ. Соматикалық клеткалар қалыпты деңгейде. Сүт өнімділігінің динамикасын лактация бойынша зерттегенде, алатау тұқымының сүт өнімділігінің өсуі (4844 ... 5679 ... 5458 кг) екінші немесе үшінші лактация кезеңінде жоғарлап және бірте-бірте (4716 ... 4017 кг) бесіншіге лактация кезеңіне қарай төмендегені анықталды. Осы тұқымды сиырлардың барлық лактация кезеңінде, орташа алғанда, 5123 ± 275,4 кг-ға дейін жеткізілді. Гольштиндік сиырдың сүт өнімділігі бесінші лактацияға дейін құлдыраусыз өседі. Орташа алғанда, қара ала сиырлары барлық лактацияда 4671 ± 190 кг сүт өнімі құрады. Симментал тұқымының сүт өнімділігінің динамикасы бірінші лактациядан екінші лактацияда (3917 ... 4035 кг) артып, үшінші лактациялық кезеңде (4035 ... 3334 кг) төмендеп, төртінші лактациядан алтыншы лактациялық кезең бойынша дәйектілік артады.

Түйін сөздер: асылдандыру,сиырларды іріктеу, сұрыптау, сиырдың асыл тұқымдық құндылығы, сыртқы пішінін сызықты бағалау, сүт өнімділігі, сүт құрамы.

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ПРОДУКТИВНОСТЬ И ИНДЕКС ПЛЕМЕННОЙ ЦЕННОСТИ РАЗВОДИМОГО ГЕНОФОНДА МОЛОЧНОГО СКОТА В РЕСПУБЛИКЕ КАЗАХСТАН

Аннотация. При линейной оценке телосложения коров-первотелок установлено, что у коров отечественных пород оптимальным баллам соответствуют параметры вида и показатели конечностей, но резко отличаются параметры вымени. Все данные по продуктивным и экстерьерным показателям были занесены в программу информационно-аналитической системы (ИАС), где автоматически был рассчитан индекс племенной ценности изученных коров. Средний индекс племенной ценности (ИПЦ) по всем породам составил 81,4. Среди всех пород наивысший уровень ИПЦ определен у коров голштинской породы (84,3) импортной селекции.

Средний удой изученных стад на 1 корову составил 5300±130 кг молока, с массовой долей жира 3,74±0,02%, массовой долей белка 3,16±0,01%, с содержанием 324,7±23,8 тысяч соматических клеток. Наиболее продуктивными оказались коровы голштинской породы, превышение их продуктивности над алатауской составило 694 кг (P>0,99), над черно-пестрой – 1446 кг (P>0,999), над симментальской – 1982 кг (P>0,999), над красной степной – 2038 кг (P>0,999), по содержанию жира и белка коровы достоверной разницы не обнаружено. Соматические клетки в пределах нормы. При изучении динамики удоев по лактациям установлено, что, молочная продуктивность алатауской породы характеризуется ростом (4844…5679…5458 кг) до второй-третьей лактациям и постепенным снижением (4716…4017 кг) к пятой. В среднем за все лактации коровы этой породы надоили 5123±275,4 кг. Молочная продуктивность коров голштинской породы увеличивается до пятой лактации, без спадов. В среднем у коров черно – пестрой породы за все лактации удой составил 4671±190 кг. Динамика удоев симментальской породы возрастает с первой ко второй лактации (3917…4035 кг), в третьей происходит ее снижение (4035…3334 кг), с четвертой по шестую лактации последовательность увеличивается.

Ключевые слова: селекция, отбор, подбор, племенная ценность коров, линейная оценка экстерьера, удой, состав молока.

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ACTUAL PROBLEMS OF ACCOUNTING OF CONCESSION ASSETS AND LIABILITIES IN THE REPUBLIC OF KAZAKHSTAN

Abstract. This research considers issues of accounting update in public sector of the economy of the Republic of Kazakhstan under the conditions of the development of public-private partnership in form of concessionary agreement. The accounting procedures of concessionary objects, concessionary commitments, profits and losses in accordance with International public sector accounting standards (IPSAS) and International financial reporting standards (IFRS) are reviewed and recommendations on problems of concessionary contract recording are provided.

Keywords: concessionary assets, concessionary liabilities, model of financial liability, model of empowerment, concession grantor, concession owner (operator), accounting due to concession agreements, acknowledgement of assets and liabilities, profits and losses, IPSAS 32, IFRS.

1. Introduction. The development of Public-private partnership in the Republic of Kazakhstan is focused on the improvement of public infrastructure and objects of life sustainment by the way of sphere enlargement and improvement of quality of public meaningful services.The main focus ofthe annual official Message of President of the Republic of Kazakhstan with effect of 31st of January 2017 «The third modernization of Kazakhstan: global competitive advantage» is described as follows: «the Big potential for the development of entrepreneurial sphere is due to enlargement of public-private partnership. To attract private capital it is necessary to use all possible types of and form of public-private partnership: beneficial ownership of public property, service contract and others. In addition to the above it is necessary to simplify and speed up all the coordination procedures as much as possible, especially with regard to small projects. Public-private partnership should be the main mechanism for the development of infrastructure, including social infrastructure» [1, 14].

As a part of the study, the methods of comparative analysis of conceptual and methodological aspects of the accounting and financial reporting organization were applied in public and private sector of the economy on the accounting of the concession agreements, main provisions of the IPSAS and IFRS on the accounting of concessionary assets and liabilities from government side which is acting as a concessor (in accordance to IPSAS), and concessionaire (in accordance with IFRS).

In the course of the study of the practical and methodological aspects of accounting operations within Public-private partnership from government side (concessor) and private partner (concessionaire) the methods of systematization and experience generalization in organizing of concession agreement accounting and analysis of regulatory basis for the development of the various forms of public and private partnership in the Republic of Kazakhstan were used.

Since the processes of introduction and development of new forms of public-private partnership are faced with the problems of the insufficiently developed methodological basis for organizing accounting in the subjects of the public sector of the economy and business entities, studies on the problems of accounting and assessment of concession assets and concession liabilities are currently very relevant and timely.

The relationship between public and private partners in the Republic of Kazakhstan is regulated by the Public-private partnership Act of 31st of October 2015 No. 379-V and the Concession Act of 7th of July 2006.

The main goal of public-private partnership is the infrastructure development to the public ends by merging of recourses and experience of the government and business, implementation of important social projects with least cost and risks provided for submittal of the high quality services by economic entities [14].

The recourses of public-private partnership entity's reimbursement of expenses and income generation are:

1) Realization of goods and services in the operational process of the public-private partnership object;
2) Subsidies from the government in circumstances stablished in accordance with legislation of the Republic of Kazakhstan;
3) Reimbursement of investment expenses upon the project of public-private partnership;
4) Reimbursement of operational expenses upon the project of public-private partnership;
5) Income generation for the realization of object management of public-private partnership, which is in public ownership and rental fees for the use of public-private partnership object;
6) Availability payment. the Public-private partnership Act of 31st of October 2015 No. 379-V.

Currently the usage of mechanisms of public-private partnership get widespread use in the Republic of Kazakhstan and it is conducted in all of the sectors of economy (tables 1–3).

Table 1 – The quantity of public private partnership objects (as of February 2018)*

Total public private partnership objects (2018)	Objects	Put into service	At the stage of project construction
Quantity	200	129	71
Balance (billion KZT)	765.5	91.3	672.2
*Provided according to data of the Ministry of National Economy of the Republic of Kazakhstan, from economy.gov.kz web-site.			

Upon the results of analysis of current situation on the development in respect of public-private partnership in the Republic of Kazakhstan (year 2018):

Total 696 projects, out of which: 263 – signed contracts (112.6 billion KZT), 433 – on different preparation stages (1.06 trillion KZT) including: 105 – on stage of tender (398.1 billion KZT), 328 – on the stage of developing documentation (662.6 billion KZT).

Table 2 – Current situation upon the regional projects (as of February 2018)*

Region	Signed contracts	On the stage of tender/signing contracts	Developing documentation	Total
Aktobe region	73	31	25	129
West Kazakhstan Region	71	2	19	92
Karaganda Region	21	0	9	30
Kostanay Region	20	11	23	54
South Kazakhstan Region	14	14	26	54
Almaty Region	12	5	24	41
Pavlodar Region	11	2	39	52
Kyzylorda Region	10	1	48	59
Akmola region	8	3	28	39
Mangystau Region	7	4	23	34
Almaty	5	0	10	15
Astana	4	0	6	10
North KazakhstanRegion	3	1	8	12
Zhambyl Region	2	21	3	26
Atyrau Region	2	2	31	35
East Kazakhstan Region	0	8	6	14
Total	263	105	328	696
*Provided according to data of theJSC «Kazakhstan Public-private Partnership Center» from kzppp.kz web-site.				

Table 3 – Examples of projects upon development and exploitation of public-private partnership objects in the Republic of Kazakhstan*

Directions of Public-private partnership	Projects
Development and exploitation of projects of waterworks facility, waterworks disposal and clearing of water resources	Projects: development of demineralization water factory in Kenderly, Mangystau Region
Development and exploitation of penitentiary system	Projects: penitentiary facility for 1500 places in Shymkent city
Construction and Exploitation of Airports in regions	Projects: Construction of the new airport in Shymkent city
Construction and Exploitation of health care facility	Projects: multi-special hospital for 300 places in Aktau city, multi-special hospital for 300 places in Ust-Kamenagorsk city, children's municipal hospital in Semei city
Construction and provision of kindergarten services (childcare center) and other projects in social sphere	Kindergarten and other projects on social sphere
Transportation infrastructure	BAKAD (Big Almaty auto road circle), Free railway line round about railway junction of the Almaty station, Auto-road round about Shymkent city. Construction of bridge crossing through the Bukhtarma water storage reservoir in Kurchum region of the East-Kazakhstan. Other infrastructure projects.
*Provided according to data of the JSC «Kazakhstan public-private partnership center»from kzppp.kz web-site.	

Table 4 – Samples of realized construction and exploitation projects of public-private partnership objects in the Republic of Kazakhstan*

Project	Description
Construction and exploitation of passenger terminal in international airport of Aktau city	Project: «Construction and exploitation of passenger terminal in international airport of Aktau city» Term of the contract: 2007-2037 Concedent: Local administration of Mangystau region Cost of project: 4 092 752,0 thousands of KZT Stage of realization: in exploitation
Energetics	PL (Power Line) 500 qt North Kazakhstan – Aktobe region Realization of project – construction of 487 km of power line with 220 and 500 kW voltage to cover shortage of Aktobe region Cost of project - 190 millions of USD Length of line - 487 km Term of the construct: 2005-2022
Transport	Construction and exploitation of new railway line «Shar Station – Ust-kamenagors» Realization of the project – creation of new transportation direction which shortens the distance in southward and westward direction, and expediting delivery for 12-14 hours. Cost of project: 97,92 millions of USD Term of the construct - 2005-2028.
*Provided according to data of the JSC «Kazakhstan public-private partnership center» from kzppp.kz web-site.	

2. The accounting of concession contracts. The most difficult are the issues of recognition and subsequent accounting of concession assets and concession liabilities, recognition and accounting of profit and losses under concession contracts, i.e., how the concession object should be accounted for, who should have concession assets and concession liabilities.

In according with paragraph 5 of the Law of the Republic of Kazakhstan «On Concessions»:

- state-owned immovable and movable property, exclusive rights associated with the performance of activities for concession objects, are granted for temporary possession and use to the concessionaire in the manner provided for in the concession agreement;

- improvements made at the concession objects, as well as objects of unfinished construction and property rights to the results of intellectual creative activity that arose when the conditions of the concession contract are being exercised, are transferred to state ownership, unless otherwise stipulated by the concession agreement;

- the concession objects that arose as a result of the execution of the conditions of the concession contract are transferred after their creation into state ownership, unless otherwise provided by the concession agreement;

- when the concessioner co-finances the concession project and (or) the concessionaire pays the compensation to the concessionaire, the concession object is transferred to state ownership;

- the products and other revenues received by the concessionaire as a result of the operation of the concession facilities are its property, unless otherwise provided by the concession agreement [2].

The concession objects constructed by the concessionaire as a result of the performance of the contract condition are transferred to the state ownership from the moment of creation of the concession object with the subsequent use of these facilities by the concessionaire. The objects of unfinished construction and intellectual property rights that arose when the conditions of the concession agreement were implemented, improvements made on existing state property objects transferred to concession are state property.

On already existing objects of state property, which are transferred to the temporary possession and use of the concessionaire, the costs of maintaining them in working order and effective use are borne by the concessionaire. Products and other revenues received by the concessionaire as a result of the use of concession objects are his property.

Under the concession agreements, the problem is the recognition of the asset on the balance sheet and the procedure for submitting the concession objects in the financial statements based on the conceptual provisions.

According to the requirements of international financial reporting standards for the purpose of recognizing a concession object on the balance sheet is based on an assessment of the transfer of all risks and rewards of ownership of the asset.

Virtually all significant benefits and risks associated with owning the asset, including the risk of accidental loss or accidental damage to the object of the concession agreement since the transfer of the object to it, have been transferred to the concessionaire.

To resolve the issue of recognizing an asset on the balance sheet of a concessionaire or concessor, it is necessary to determine: who controls the concession object, concessionaire or concessor?

When an asset is recognized by concessor, it should be taken into account the compliance of the signer with the presence of control over the concession asset.

In cases where the binding agreement gives the concessor the right to control the use of the concessionary asset, the asset meets the conditions for control.

Confirmation of control over the asset on the part of the concessor is the concessor's rights under concession agreements for determining the types of activities (works, services provided under the terms of the contract); On the establishment of prices (tariffs) for goods (work, services) and the procedure for determining prices; On the establishment of quality standards provided by the concessionaire under the concession agreement for goods (works, services), etc.

The grantor is not required to have full control over prices: it is sufficient that prices are regulated by the grantor, binding agreement or an independent body that regulates other entities operating in the same industry or in the same concession sector (e.g. hospitals, schools or universities), as the concessor (for example, by means of the mechanism for establishing the upper limit).

Also, the grantor controls ownership of any remaining stake in the concession objects at the end of the term of the agreement.

The control of the concessor over any significant residual share should both limit the actual ability of the operator (the concessionaire) to sell or pledge the asset, and grant the concessor the permanent right to use throughout the duration of the concession agreement for the provision of services.

Therefore, in determining whether a concession asset should be recognized on the balance sheet of the concessor during the construction or development period of the asset, it should be checked for compliance with the criteria for recognizing the asset in terms of the likelihood of future economic benefits or service potential and, consequently, the reliability of the cost estimate or fair value.

And if during the construction or development period the recognition criteria for both fixed assets and intangible assets are met, the grantor recognizes the concession asset during the construction period.

Subject to all provisions of the IFRS and IPSAS for determining the asset, the concession object should be recognized on the balance sheet of the grantor, not the concessionaire. According to IFRS (IFRIC 12 «Service Concession Arrangements»), «the infrastructure ... should not be recognized as part of the fixed assets of the concessionaire (operator), because the contractual service agreement does not transfer to the operator the right to control the use of the public service infrastructure.

The operator has access to infrastructure management for the provision of public services on behalf of the concession provider in accordance with the conditions specified in the contract» [3].

Compensation of the costs of the concessionaire for the erection or improvement of the concession object is carried out in the form of compensation for investment costs or in the form of cost recovery through the sale of goods (works, services) produced and income in the process of operation of the concession object.

From the point of view of the concessionaire, the accounting for assets and liabilities under concession agreements is determined by the international standard for public sector financial reporting - IPSAS 32 «Service Concession Arrangements: Grantor» [4].

For the purposes of the financial reporting of the concessionaire, the accounting for assets and liabilities under concession agreements is determined by International Financial Reporting Standard - IFRIC 12 «Service Concession Arrangements» [5].

3. Recognition of income from the provision of services by the concessionaire. In accordance with the concession agreement, the concessionaire (operator) builds or purchases infrastructure facilities for the provision of public services, or the concessionaire is granted access to the existing infrastructure for the purpose of an agreement for the provision of services.

The concessionaire (operator) acts as a provider of several types of services: the construction of new or improvement of existing facilities, as well as their management. The concessionaire (operator) must separately recognize the revenues from the provision of construction or infrastructure improvements in accordance with IAS 11 «Construction Contracts» [6] and beginning from 2018 in accordance with IFRS 15 «Revenue from Contracts with Customers» [8] and the revenue from the provision of services as a result of the management of infrastructure facilities in accordance with IAS 18 «Revenue» [7] and beginning from 2018 in accordance with IFRS 15 «Revenue from Contracts with Customers» [8].

A concessionaire (operator) must recognize a financial asset to the extent that it has an unconditional contractual right to receive cash or another financial asset from the concession provider or at its direction for the performance of construction services in accordance with IAS 11 and beginning from 2018 in accordance with IFRS 15 «Revenue from Contracts with Customers» [8].

Alternatively the concessionaire (operator) must recognize the intangible asset to the extent that it obtains the right (license) to charge users of public services.

4. Two models of concession accounting. In accordance with international financial reporting standards, two models of concession accounting are defined: a financial obligation and the grant of a right.

Under the first model, the grantor recognizes a financial liability when it is required to make payments to the operator for providing services for the construction or improvement of the concession asset. The concessionaire (operator) recognizes the income for the services it provides for the construction, development, acquisition or improvement of the concession facility. According to the second model, the grantor recognizes the obligation when it grants the operator the right to receive revenues from third-party users of the concession asset. In this case, according to IFRIC 12, paragraph 26, the operator recognizes an intangible asset [5].

The procedure for the recognition and accounting of income and expenses of the concessionaire for the provision of services for the construction or improvement of concession facilities based on the financial liability model using the accounts of the Model Plan is presented in table 5.

The procedure for the recognition and accounting of incomes and expenses of a concessionaire for the provision of services for the construction or improvement of infrastructure facilities by the model of granting rights to the concessionaire (operator) using the accounts of the Model Plan is presented in table 6.

Recognition of income and expenses of the concessionaire for the provision of services for the management of the concessionary asset is reflected as follows (in table 7).

Table 5 – Correspondence of accounts of accounting of concessionary assets and liabilities with the concessionaire by the model of a financial liability

#	Contents of operation	Correspondence of accounts	
		Debit	Credit
The concessionaire (operator): accounting of assets and liabilities under concession agreements on the model of a financial liability			
1	For the amount of completed repair or construction work	«Work in process», sub-account «Under concession agreements»	«Accounts payables», sub-account «Under concession agreements» and etc.
2	In the presence of previously issued advances, a record is made for advance payment	«Accounts payables», sub-account «Under concession agreements»	«Advances paid» sub-account «Under the concession agreements»
3	Recognition of expenses for completed objects of concession agreements or works performed for their modernization and reconstruction that are the subject of state ownership	«Cost of goods sold (completed works and services)», sub-account «Under the concession agreements»	«Work in process», sub-account «Under concession agreements»
4	Recognition of expenses on the stages of completion of works performed for the construction of objects of concession agreements or works on their modernization and reconstruction that are the subject of state ownership	«Cost of goods sold(completed works and services)», sub-account «Under the concession agreements»	«Work in process», sub-account «Under concession agreements»
5	At the same time, recognition of revenues from the provision of services for the construction of concession agreement facilities	«Accounts receivable», sub-account «Under concession agreements»	«Income from the sale of goods (completed works and services)», sub-account «Under the concession agreements»
*Prepared by the author.			

Table 6 – Correspondence of accounts of accounting of concessionary assets and liabilities by the model of right provision to concessionary (operator)

#	Contents of operation	Correspondence of accounts	
		Debit	Credit
Concessionary (operator): accounting of concessionary assets and liabilities by the model of right provision to concessionary (operator)			
1	For the amount of completed repair or construction work	«Work in process», sub-account «Under concession agreements»	«Accounts payables», sub-account «Under concession agreements» and etc.
2	In the presence of previously issued advances, a record is made for advance payment	«Accounts payables», sub-account «Under concession agreements»	«Advances paid», sub-account «Under the concession agreements»
3	Recognition of expenses for completed objects of concession agreements or works performed for their modernization and reconstruction that are the subject of state ownership	«Cost of goods sold (completed works and services)», sub-account «Under the concession agreements»	«Work in process», sub-account «Under concession agreements»
4	Recognition of expenses on the stages of completion of works performed for the construction of objects of concession agreements or works on their modernization and reconstruction that are the subject of state ownership	«Cost of goods sold (completed works and services)», sub-account «Under the concession agreements»	«Work in process», sub-account «Under concession agreements»
5	At the same time, recognition of intangible asset on theprovided right to concessionary (operator)	«Other intangible assets», sub-account «Under concessionary agreement»	«Income from the sale of goods (completed works and services)», sub-account «Under the concession agreements»
*Prepared by the author.			

Table 7 – Correspondence of accounts of accounting for the recognition of income from the provision of services for the management of the object of concession agreements

#	Contents of operation	Correspondence of accounts	
		Debit	Credit
1	Recognition of income from the provision of services for managing the object of concession agreements	«Accounts receivable», sub-account «Under concession agreements»	«Income from the sale of goods (completed works and services)», sub-account «Under the concession agreements»
*Prepared by the author.			

Table 8 – Correspondence of accounts of assets and liabilities accounting under concession agreements with the concessor

#	Contents of operation	Correspondence of accounts	
		Debit	Credit
Grantor: accounting of assets and liabilities under concession agreements by model of financial liabilities			
1	The receipt of long-term assets from the concessionaire (operator)	«Fixed assets», sub-account «Under concession assets» «Construction in progress», sub-account «Underconcession assets»	«Accounts payables», sub-account «Under concession agreements»
2	Acceptance of services for overhaul, modernization and reconstruction of fixed assets	«Construction in progress»,sub-account «Under concession agreements»	«Accounts payables»,sub-account «Under concession agreements»
3	Simultaneously, the second record is made for an increase in the cost of fixed assets for the cost of overhaul, modernization and reconstruction	«Fixed assets», sub-account «Underconcession assets»	«Construction in progress», sub-account «Underconcession assets»
4	Repayment of debts to the concessionaire (operator)	«Accounts payables»,sub-account «Under concession agreements»	«Accounts of planned appointments of payments under an individual financing plan for the obligations of public entities funded from the Republican budget», «Accounts of planned appointments of payments under an individual financing plan for the obligations of public entities funded from the Local budget»
Depreciation on long-term assets received from the concessionaire (operator) under concession agreements			
5	Depreciation of long-term assets	«Expenses for depreciation of long-term assets», sub-account «For concession assets»	«Accumulated amortization of fixed assets», sub-account «For concession assets»
Grantor: accounting of assets and liabilities under concession agreements on the basis of a model for granting rights to a concessionaire (operator)			
6	The receipt of long-term assets from the concessionaire (operator)	«Fixed assets», sub-account «Under concession assets», «Construction in progress», sub-account «Under concession agreements»	«Other revenues»
7	Acceptance of services for overhaul, modernization and reconstruction of fixed assets	«Construction in progress», sub-account «Under concession agreements»	«Other revenues», sub-account «Under concession agreements»
8	Simultaneously, the second record is made for an increase in the cost of fixed assets for the cost of overhaul, modernization and reconstruction	«Fixed assets», sub-account «Under concession agreements»	«Construction in progress», sub-account «Under concession agreements»
Depreciation of long-term assets purchased under concession agreements based on a model for granting rights to a concessionaire (operator)			
9	Depreciation of long-term assets	«Expenses for depreciation of long-term assets», sub-account «For concession assets»	«Accumulated amortization of fixed assets», sub-account «On concession assets»
*Prepared by the author.			

The accounting procedure for concessionary objects and liabilities with the concessor is presented using the Chart of Accounts of State Institutions in the table below. The Grantor recognizes a financial liability when it is required to make payments to the operator for services provided for the construction or improvement of a concessionary asset (i.e. constructed, developed, acquired or improved).

The concessionaire (operator) recognizes the income for the services provided for it in construction, development, acquisition, improvement and operation (table 8).

5. Conclusion. The present article considers the actual questions of improving accounting in the public sector of the Republic of Kazakhstan in terms of public-private partnerships in the form of concession agreements. It considers the accounting treatment of concession facilities, concession liabilities, income and expenses in accordance with IPSAS and IFRS, and provides guidance on accounting issues of concession contracts.

The main goal of the article was to interlink the current issues of accounting for assets and liabilities under concession agreements in the financial statements of the concessionaire and grantor, taking into account the provisions of IFRS and the public sector financial reporting standard (IPSAS 32).

The presented recommendations on the recognition and accounting of assets and liabilities under concession agreements with correspondence have been developed taking into account the requirements for reflecting concession objects in accordance with the provisions of IFRS and IPSAS.

In the course of the research, in accordance with the requirements of the IPSAS and private sector IFRS and requirements of the regulatory basis for the development of Public-private entrepreneurship in the Republic of Kazakhstan the topical issues of accounting organization were analyzed. Taking into account that there are no developed national rules for the organization of accounting of concession agreements at the present stage of development of new forms of cooperation between the state and private entrepreneurship in the Republic of Kazakhstan, the recommendations on the accounting of concession assets and concession liabilities were developed, both from public sector entities and from the private sector entities (concessionaires).

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДАҒЫ КОНЦЕССИЯ АКТИВТЕР МЕН МІНДЕТТЕРІНІҢ БУХГАЛТЕРЛІК ЕСЕБІНІҢ АҒЫМДАҒЫ ПРОБЛЕМАЛАР

Аннотация. Мақалада Қазақстан Республика экономикасының мемлекеттік секторында мемлекет-жеке серіктестікті концессиялық келісімдер нысанын дамыту шартында бухгалтерлік есепті жетілдіру сұрақтары қарастырылған. Концессия объектерінің, концессиялық міндеттердің, ҚЕХС (IFRS) және «ҚСХҚЕС» (IPSAS) сәйкес кіріс пен шығыстың есеп тәртібі және концессиялық келісімдерді есепке алу мәселелері бойынша ұсыныстар берілген.

Түйін сөздер: концессиялық актив, концессиялық міндеттеме, қаржылық міндеттеме моделі, құқықтыұсыну моделі, концедент, концессионер (оператор), концессиялық келісімдер бойынша бухгалтерлік есеп, активтер мен міндеттемелерді, кірістер мен шығыстарды мойындау, 32 «ҚСХҚЕС» (IPSAS), ҚЕХС (IFRS).

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АКТУАЛЬНЫЕ ПРОБЛЕМЫ БУХГАЛТЕРСКОГО УЧЕТА КОНЦЕССИОННЫХ АКТИВОВ И ОБЯЗАТЕЛЬСТВ В РЕСПУБЛИКЕ КАЗАХСТАН

Аннотация. В статье рассмотрены вопросы совершенствования бухгалтерского учета в государственном секторе экономики Республики Казахстан в условиях развития государственно-частного партнерства в форме концессионных соглашений. Рассмотрен порядок учета объектов концессии, концессионных обязательств, доходов и расходов в соответствии с МСФООС (IPSAS) и МСФО (IFRS), представлены рекомендации по проблемам учета договоров концессии.

Ключевые слова: концессионный актив, концессионное обязательство, модель финансового обязательства, модель предоставления права, концедент, концессионер (оператор), бухгалтерский учет по договорам концессии, признание активов и обязательств, доходов и расходов, МСФООС (IPSAS) 32, МСФО (IFRS).

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IDEOLOGICAL BASES OF RUSSIA AND TURKEY POLICIES

Abstract. This article examines the issues of national archetypes in the formation of foreign policy, the image of the ruler and the mission of the state. Russia and Turkey position themselves today as countries seeking to challenge the US championship in the world. Both countries have a rich history and ideologically justify their right to lead. In the study of the statehood of Turkey and Russia, an important role was played by the political ideologies that formed the mental image.

Russia's desire to dominate the Balkans, the Middle East, comes from the idea of "Moscow-Third Rome", and the modern ideology of Turkey "Neo-Ottomanism" is a bright continuation of the policy of the Ottoman Empire.

Keywords: ideology, archetypes, Russia, Turkey, ambitions, statehood.

The foreign policy of any state since its formation inevitably passes through the stages of formation, and then enters a phase of permanent development and further improvement. All states with a deep historical past have passed this way. Therefore, their foreign policy resembles a knot of tightly bound knots, each of which is a reflection of a certain diplomatic empiricism. And each of these “nodes” is directly related to political archetypes, which are a set of features of ethnic consciousness that determine the “basis” of thinking, basic values, behavioral stereotypes, traditions, character traits, temperament, etc., which forms the state mentality.

The concept of archetypes was also known to the ancient philosophers, but it was introduced into the active scientific circulation by C. Jung, in whom they appear as images-symbols, carriers of the collective unconscious, acting as an impulse for the emergence of culture. He wrote: “He who speaks with archetypes speaks like a thousand voices. he lifts the portrayed by him from the world of the one-time and transient into the sphere of the eternal” [1].

Scientists explain that an archetype is “a prototype, a primary form, a sample, these are structural elements, so-called. the collective unconscious, the embryonic possibilities of all mental processes and experiences. "

According to some researchers, the archetypes play an important role in the issue of interethnic relations and questions of the perception of "friend or foe" in the countries and our region. In this case, they would not have an “archetypical” character. But they have it, because the problem of land and water has existed in the region for centuries. History knows a lot of examples of conflicts between nomads over land (pastures) and water (watering places). For example, Turkmen permanently fought for the priorities of owning them with the Kazakhs in Mangyshlak. The Kyrgyz reflected the intrigues of the Kazakh tribes who claimed their grazing lands. The Central Asian Khanates constantly waged wars among themselves over land and water as the basis of the well-being of their people. Therefore, it is impossible to deny the “archetypical” nature of the land-water problems in the international relations of the post-Soviet states of Central Asia. In the future, these claims, claims, etc. political actors in the region will continue as long as they do not really recognize the status quo, the existing borders within it, otherwise the region will always be conflict-prone [2, 12].

In this regard, the desire of modern Kazakhstan to build new relations in the region, based on the principles of mutual respect, is fully justified, and the aspirations to form a “new concept of identity” as a legal person are quite understandable. That a legal person is a person disciplined by law, politics, moral

and stable law and order, legal consciousness, a high legal culture, endowed with all rights and freedoms, and freely used by them [3, 136].

National archetypes play a crucial role in the foreign policy of the United States, France, Britain and several other countries. Modern Russia is no exception in this context. For several centuries Russia has been presenting itself as an “exclusive” and “elected” state, along with the USA, European countries, first of all, Great Britain and France. Moscow declares its right to play a role in resolving most international issues and in global governance in general. The conviction that Russia should be an integral part of the new world order reflects the historical understanding of Russia's “chosenness” - its inherent “statehood” - as well as the revival of its self-confidence [4, 32].

To understand the modern politics of Russia, it is necessary to consider the historical and ideological foundations of its policy. The central archetype of Russian politics was formulated in the 16th century. Philotheos: "Two Rome fell, the third stands, and the fourth does not happen." In general, the question of the formation of the image of “Moscow-Third Rome” exists in scientific debates, but many are prone to the fact that the fall of Constantinople in 1453 and the loss of the Christian world, primarily the Orthodoxy of their spiritual center, contributed to the rise of Russia as the center of Orthodoxy. But here the question arises: if Russia began to be considered holy after the spread of Constantinople, then why the image of “Holy Russia” is often used in events of an earlier period. Some scholars tend to argue that the rulers of Russia considered themselves to be the successors of Rome, and not of Constantinople.

But the main interest in the theory of Philotheos arose in the middle of the XVI century, during the reign of Ivan the Terrible. Ivan the Terrible developed the idea of the special role of Russia as the sole and last Orthodox power; in fact, the philosophy of Philotheos “Moscow is the third Rome” thus became part of the official ideology.

The foreign policy of modern Turkey, characterized by most scholars as neo-Ottomanism, is a peculiar continuation of not only Ottomanism of the 19th century, but also of the whole of Turkey’s imperial past. “Ottomanism” as a protective doctrine emerged in the middle of the nineteenth century, when the secret political organization “Society of New Ottomans” arose in the Ottoman Empire, which aimed to strengthen power by adopting constitutional principles and forming a single community of Ottoman citizens. But the main thing in the semantic similarity: both then and now these two concepts reflected the same goal - the consolidation of the imperial power.

True, in the first case, it was already evident, and it was only about its preservation, and in the second, at the end of the 20th – beginning of the 21st century, it was about the desire, if not territorially, to revive the imperial “greatness of the Ottomans”, then at least maximum influence of the "Ottoman spirit" on regional and international events. The similarity in the views on the role of religion is also important: both the “old” and the “new Ottomans” believed that the principles of Islam not only did not contradict democratic reforms, but also largely contributed to their implementation.

However, today in the minds of the Turkish population, Ottomanism is associated with the struggle for their own greatness, for their "imperial" and can be used as an integral part of the renewed consciousness of the new Turkish man, for the formation of which many Turkish ideologists and politicians advocate.

Like Pan-Turkism, neo-Ottomanism is presented by Turkish and other authors as a kind of socio-cultural doctrine, designed to introduce or reanimate certain fundamental values that prevailed during the Ottoman Empire in the spaces where people of completely different cultures and worldview live.

The history of neo-Ottomanism is rooted in the past - in the days of the Ottoman Empire, with which, obviously, modern leaders of Turkey associate themselves. However, the founder of the Republic Mustafa Kemal Ataturk, who believed that new Turkey should be built on completely different principles, broke with all of it [2, 120].

As a foreign policy doctrine, Pan-Turkism took shape in the program of the Young Turk Party “Unity and Progress”, which came to power in Turkey in 1908. Its ideologue was the Turkish sociologist, cultural scientist, linguist, jurist, writer ZiyaGok Alps (Mohammed Ziya) (1876-1924). His ideas largely influenced both during the reign of the Young Turks on the eve and during the First World War, and during the Kemalist reforms of the 1920s and 30s. In the works of Gok Alp, and especially in the book "The Basics of Turkism", the main principles of the ideology and policies of the initial stage of development of the Turkish Republic were formulated - nationalism, westernization, etatism.

Today, a characteristic feature of both states is a pronounced foreign policy, its ideological component and the strong role of the ruler. In national archetypes the most important role is assigned to the ruler, without disclosing its essence, it is almost impossible to understand the modern political processes in these countries.

Russian sovereigns fully perceived themselves as the heirs of the Byzantine emperors as leaders of the entire Orthodox world. The new dynastic right of Ivan III and his descendants to claim the Tsargrad legacy was strengthened by virtue of its external recognition.

Ivan III takes the title of "autocrat" on the model of the Byzantine emperor. He also assimilates to his state the Byzantine coat of arms - the double-headed eagle, believing that through marriage with Sophia Palaeologus received the full right to this. Ivan III, and then Vasili III begin to be called "the kings of all Russia." Basil gradually increasingly uses this new title in foreign policy documents. And finally, the famous formula “Moscow is the third Rome” appears, which finally focused on the idea of Moscow about its succession from Constantinople.

According to historian Zhumatay G. Modern Russia is a symbiosis of Orthodoxy and communism, but this view can be partially challenged, in particular, communism in Russian history, in particular, the interpretation of power and a strong ruler is part of the idea of an "universal state", "sovereign savior" and "fighter for justice." The idea of "Moscow is the third Rome", not only contributed to the unification of the Russian lands around Moscow, but also determined the role of the sovereign in its subsequent history.

Another important archetype of Russian political history is the sacred binary opposition “the king is a holy fool”. The sacredness of the supreme power in Russia is balanced by the sacredness of the national foolishness: it is not by chance that St. Basil's Cathedral is located opposite the Spasskaya Tower of the Kremlin. It is the phenomenon of foolishness that helps to penetrate deeper into the archetypal essence of the Orthodox personality in politics. The Orthodox Russian people, inspired by the ideal of Russia - the “wandering Kingdom”, saw in these “wanderings” first of all the search for earthly truth, which the holy fools expressed with particular force.

The moral traits of the ideal Christian emperor were based on general Christian morality and were not significantly different. For this reason, the perception of the image of the Christian emperor in the mass consciousness took place at the end of the 4th century. relatively easy, especially since the Christian understanding of the image of the emperor was based on the ancient tradition. The church possessed the richest arsenal of propaganda and effective methods of influencing the masses, which made it possible to introduce into the mass consciousness the idea of a virtuous Christian emperor in a historically short time.

Like Russia, Turkey is a country with a predominant majority of the titular nation and religion. Turkish sultans considered themselves patrons of all Muslims, although based on the principle of Fatimism, they could not call themselves caliphs. By creating their own empire, they, in the spirit of the Muslim rulers, tried to form a stereotype of a just ruler.

Despite the discrepancies between Sunnis, Shiites and Kharijites, sacred ruler status supports almost all Islamic medieval dynasty - the Umayyads and the Abbasids of the Arab Caliphate, the Turkish sultans of the Ottoman Empire, the Mughals of India, associated with different branches of Shia Safavids of Iran and the Fatimids of Egypt, and many others. The loyalty of the secular authorities, even unjust, was based on certain theologians of the Islamic Middle Ages, for example, at-Tartushi, who said: "Forty years of tyranny are better than one hour of anarchy." This sacred status, which assumed the ruler’s perception of the subjects as “the shadow of Allah on earth,” was maintained even in the era of colonialism, when the majority of Muslim countries found themselves in a humiliating dependence on European powers.

Rethinking the traditional concepts of power and the image of an ideal ruler in Islamic intellectual culture falls on the second half of the 19th century. Thus, the largest representative of Muslim modernism, enlightener and social activist Jemal Al-Din al Afghani, offered his vision of this problem, whose social and political activity falls on the last third of the 19th century, that is, on the eve of the “awakening of Asia” era. Jemal al-Din al-Afghani saw the ability to resist the expansion of the colonial powers in the political and ideological unification of the Muslim powers under the banner of Islam.

Sultan Abdul-Hamid II claimed the recognition of his unlimited spiritual power not only in the Ottoman Empire, but throughout the Muslim world [6, 227]. Russia and Turkey, as successors of empires,

pursue a policy aimed at dominating in certain regions of the world, pursue a policy aimed at expanding and maintaining their political weight, which lead to clashes of interests with other actors of international relations. The policy of dominance in international processes can be explained from the point of view of the "election" of these states to decide the fate of the world.

The image of Russia - the "traveling kingdom". Moscow - The Third Rome does not replace, does not repeat its predecessors, this new kingdom instead of two fallen ones. The goal is not to preserve and continue the political tradition - the tradition is torn and re-created. Hence splits and catastrophic breaks in Russian political history.

In the image of Russia - the "traveling kingdom" there is a serious political claim to the imperial tradition of world power: Moscow is the Third Rome. Every major statesman in Russia used this image to justify his imperial political ambitions.

In the archetype of the "wandering kingdom," the theme of the sacredness of political power is closely linked to the theme of the apocalyptic of political time: "there should be no fourth Rome." The Russian political time invariably experiences the tension of the impending "end of history", it is extremely brief, the historical perspective is shortened; such time requires the utmost responsibility, composure. The fate of history depends on the Third Rome - on Moscow - therefore, in the Russian political consciousness the destinies of Russia and the destinies of the world are inextricably linked: The Russian soul is sick of world problems. Already in the XVI century. the doctrine of "holy Russia", of the universal, universal significance of Russia is being advanced. V. Zenkovsky rightly notes that "it is from here and only from here" that all late political concepts should be derived, justifying the "universal human vocation of Russia" [7, 47].

This is how the phenomenon of the integrity of the perception of the world is formed, which has received special significance in Russian culture. Christianity, by its very nature, is addressed to all humanity, it wants to enlighten and sanctify its entire soul. This motive undoubtedly plays an important role in Western Christianity, but in Orthodoxy the topic of integrity is brought to the Absolute, acquiring a tinge of radicalism. The antithesis of "all or nothing", not restrained by everyday prudence, uncontrolled by attention to practical results, leaves the Russian soul to be alien to everyday sobriety. In the political sphere, this led to the formation of a famous archetype of political radicalism.

Thus, the ideals of righteousness, value attitude to the world, "the universal human vocation of Russia," "holy Russia," are the archetypical ideas that have shaped Russian national identity throughout political history.

The value attitude to the world today is largely explained by the fact that the question of sociocultural identity is viewed by the majority of Russians in a cultural and civil sense. According to the Institute of Sociology of the Russian Academy of Sciences, at present, the practice of using the concept of "nation" in the sense of a state, civil community – a political nation – is becoming increasingly widespread. This is reflected in the use of such definitions as "Russian nation", "citizens of Russia", "we as a nation", "we are the people of Russia". The idea of Russia as a unique civilization, combining European and Asian principles, one of the characteristics of which is the peaceful community of many nationalities and religions, where none of them are infringed upon and introduced into the standardized cultural and civilizational framework, the understanding of the Russian people as historical whole and civic nation has repeatedly expressed themselves, including by the President of the Russian Federation Vladimir Putin. This formula was positively perceived by many intellectuals and politicians as the only possible one for Russia and fully responding to the experience of large international ethnic states accumulated by the world community.

The "new look" on Turkish foreign policy horizons in many ways reveals the essence of the work title Davutoglu, where the very linkage of the international policy of this state with such concepts as "strategy" and "depth" speaks about the ambitiousness and long-term nature of the project he conceived. The definition of "strategic" aims foreign policy for the future, a qualitatively new perspective. The term "depth" is a reassessment of the perception of the past, a retrospective view of the history of the Ottoman Empire as a legacy, which, in ideological terms, you should be proud of, and in practical terms - to take advantage of. The goal of foreign policy, according to Davutoglu, is to "revitalize the Ottoman roots" by means of their active purposeful international activities [8].

He emphasizes the importance of the geostrategic position of Turkey, its historical "depth" and unique place in the Muslim world. “Countries speaking the same language, professing one religion and common values,” Davutoglu noted, “must develop a common policy ... There is a legacy left by the Ottoman Empire. We are called neo-ottomans. Yes, we are the "new Ottomans."

Of course, the renaissance of the ideas of Pan-Turkism did not mean that this ideological and political doctrine became indisputably dominant. Neo-Ottomanism (or renewed Ottomanism), which is gaining popularity, is a serious competitor to Neo-Panturkism. That is why it seems appropriate to consider Neo-Panturkism in comparison with Neo-Ottomanism and analyze the degree of influence of both doctrines on the foreign policy course of the Republic of Turkey.

Both ideological platforms were formed under the influence of nostalgia about the great imperial past (the Great Turan, the Turkic Khaganate, the Ottoman Empire, etc.).

Summing up this study, we can note the following, that today Russia and Turkey are pursuing a policy actively aimed at strengthening their positions on the world stage, which is often perceived as an attempt to restore imperial power. Archetypes played a moist role not only in foreign policy, but in the process of forming a national mentality and perception of its role in world history.

Today, two presidents Erdogan and Putin position themselves as strong leaders, and are trying to form an opinion about "fighters for justice", "defenders of the state and the oppressed." Erdogan and Putin are perceived as dictators, arranging for themselves the constitutions of their countries. Both leaders are talented speakers and know how to position themselves in their countries as fair rulers.

Failures in domestic politics and economics, compensated by populist foreign policy, both leaders use tactics of using foreign policy as an instrument of internal consolidation, but the emphasis on expansionism and exaggerated ambitions in foreign policy, the desire to modernize society and the state only by “top” measures, as a rule, led to a very modest results of the reforms, not commensurate with the forces and means spent on their implementation.

The geopolitical interests of the two states collide in the international arena, a zone of particular interest of both states, as in the imperial past is the region of the Middle East, the Black Sea, the Balkans and Central Asia.

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РЕСЕЙ МЕН ТҮРКИЯНЫҢ САЯСАТЫНЫҢ ИДЕОЛОГИЯЛЫҚ НЕГІЗІ

Аннотация. Аталмыш мақалада мемлекеттің миссиясы, басшы образы және мемлекеттің қалыптасуындағы ұлттық архетиптер мәселесі қарастырылған. Бүгінгі таңда Ресей мен Түркия өздерін АҚШ жетекші позициясына таласытық білдіруге тырысуда. Ресей мен Түркияның мемлекеттілігін зерттеу мәселелерінде ментальды образын қалыптасытырушы саяси идеологиялардың ықпалы аз болмады.

Ресейдің Балқан түбегі мен Таяу Шығыстағы үстемділікке ұмтылысы, «Мәскеу-Үшінші Рим» идеясынан туындаса, Түркияның қазіргі таңдағы Жаңа Османизм идеологиясы Осман империясының саясатының жарқын жалғасы.

Түйін сөздер: идеология, архетип, Ресей, Түркия, амбиция, мемлекеттілік.

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ИДЕОЛОГИЧЕСКИЕ ОСНОВЫ ПОЛИТИКИ РОССИИ И ТУРЦИИ

Аннотация. В статье рассматриваются вопросы национальных архетипов в формирование внешней политики, образа правителя и миссии государства. Россия и Турция сегодня позиционируют себя как страны стремящиеся к оспариванию первенства США в мире. Обе страны имеют богатую историю, и идеологически обосновывают свое право на лидерство. В вопросах изучения государственности Турции и России немаловажную роль играли политические идеологии, которые сформировали ментальный образ.

Стремление России к доминированию на Балканах, Ближнем Востоке, исходит от идеи «Москва-Третий Рим», а современная идеология Турции «Нео-Османизм» является ярким продолжением политики Османской Империи.

Ключевые слова: идеология, архетипы, Россия, Турция, амбиции, государственность.

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BILINGUAL EDUCATION IN FORMER SOVIET COUNTRY: PERSPECTIVE AND PROBLEMS

Abstract. This article describes the sociocultural phenomenon development of bilingualism in Kazakhstan. The language pluralism in Kazakhstan is considered as a result of the past social and political and economic reforms. Kazakhstan society is more open today compare with Soviet time. The globalization promotes that foreign languages are necessary for nations. Foreign language skills expand the professional competence of the expert, open access to the world, and make the expert competitive not only in national but also on a global scale. According to Nazarbayev, the relevance of polylingual education is "one of the important values and the main advantage of our country." The program of bilingual training provides the creation of the new model of education. The fluency in Kazakh, English and Russian languages will help youth adjusting to world labor markets, science, and new technologies will create conditions for social attitudes which based on the collaboration of Kazakh, Russian and Western cultures. Currently, modern economic space distinguishes the importance of multilingualism. The article reflects the authors' opinion within the social research in secondary school Aktobe city, Aktobe region.

Keywords: bilingual education, multi-ethnic society.

Introduction. History, the political ideology of the former Soviet Union shaped Kazakhstan as a multinational country. Thousands of people found the new home in Central Asian Oasis, Kazakhstan. The history clearly shows us that the prosperity of any society which depends not only on the level of economics and technology and even not on the level of culture, but mostly it depends on the culture of words. In fact, the establishment of a top professional who possess a high own cultural level along with a high level of word culture is the main purpose of whole education process these days.

The present situation in Kazakhstan is unique. Kazakhstan has got a multinational culture and background raised up from ancient times but still with independent existence of each ethnic group and language with incredibly high rate of tolerance, indulgence and flexibility. Therefore, there is an obvious need for more researches in psycholinguistics in order to develop the basics for teaching methods which would result in formation of a truly multilinguistic person. However for most people in Kazakhstan and other former Soviet countries, the question of bilingual children in urban families never rose sharply and was not considered by parents from a scientific point of view. At the same time, Kazakh-speaking students from rural areas often mastered the Russian language at a later age due to broadcasting and move to the city and many other factors. But the issues of domestic simple possession of several languages and training in multiple languages must be separated and regarded accordingly.

The program of polylingual education implemented in Kazakhstan is unique and means, unlike the western analogs, parallel and simultaneous training at three languages. According to Nazarbayev: "... Kazakhstan is unique and strong the multi-national country… The multiculturalism of Kazakhstan is a growth factor of social development".

The globalization processes, active integration processes happening in the modern world affected not only social and economic, socio-political but also welfare spheres of action of the person. Globalization of the world in the field of culture and education, now, is characterized by intensive rapprochement of the

countries and the people, strengthening of their interaction and interference. In these conditions, the problem of modernization of education, including an issue of language education is updated.

About 75% of the world's population speaks, in one level or another, two or more languages (multilingualism, bilingualism). About one-quarter of the countries on Earth officially recognize two languages as state languages, and only a few countries - three or more languages, the actual number of coexisting languages in many countries is much more significant. Currently, there is an increase in the number of children born in inter-ethnic marriages. Bilingualism became an essential area of the education system where society changes require fluency in two or more languages. The socio-cultural phenomenon of multilingualism is that the operation of several languages is a necessary condition for the successful functioning of a person, spiritually and morally bringing people of different nationalities together.

The main instrument of multilingualism language policy European Union (EU) is educational policy, through which it is possible to implement the basic principles of multilingualism among the inhabitants of the EU. In March 2002, the heads of state and government of all EU member states agreed that all European citizens should learn two languages besides their mother tongue. It turned out that in elementary school foreign languages are beginning to be taught in Malta, Cyprus, Austria, Spain, Italy and Luxembourg, and in Poland, France, and Croatia, nine out of ten schoolchildren of this age meet each other. In the rest of the European Union countries, except for Belgium and Portugal, from 40% to 85% of schoolchildren begin to learn a foreign language in primary school. As we can see, in the EU there is still no consensus at what age it is better to start learning a foreign language. We can observe a different picture in junior high schools, which in most EU countries start from about 12 years old, but there are EU countries where this period may come in 10 years. At this age, almost all students are actively studying foreign languages (Smirnova, 2012, pp. 153-156).

According to a study by the European Statistical Service «Eurostat» (https://ec.europa.eu, 2015), 98% of pupils in this category are taught at least one language other than their mother, from this number every second student in the EU learn two or more foreign languages. "About 17 million students of junior high school (or 98.6% of all students at this level), studied in 2015, at least one foreign language. Among this number, about 10 million (58.8%) of schoolchildren studied two or more foreign languages. Curiously, in such countries as Luxembourg, Finland, Italy, Estonia, and Romania, schoolchildren learn two or more foreign languages. In 2015, all or almost all junior high school students studied at least two foreign languages in Luxembourg (100%), Finland (98.4%), Italy (95.8%), Estonia (95.4%) and Romania (95.2).

In contrast, in Hungary, Austria, and Ireland, two or more foreign languages on average were taught by only one out of ten students at this level. The most popular foreign language to learn is still English. More than 17 million schoolchildren or 97.3% of the total number of pupils in primary classes of EU high schools studied English. French is in second place in popularity (5 million or 33.8%), German is on the third line (3 million or 23.1%), followed by Spanish (2 million or 13.6%). In conclusion, we add that today the knowledge of foreign languages in Europe is one of the core competencies, as well as the ability to read, read and count.

Moreover, it is hard not to agree. It is easier for Europeans who speak foreign languages to get used to living in another EU state; they have more opportunities to take advantage of all the benefits of free movement in the EU. Knowledge of foreign languages helps to analyze events and predict the behavior of business partners accurately. We should not forget about the health benefits of learning foreign languages. Learning of foreign languages during aging prevents mental health problems including Alzheimer's disease. Ultimately, language competence is one of the essential conditions for successful job placement and career in Europe (Prokhorova, 2015, 253, Mizin, Petrov, 2017, 221).

Kazakhstan is a multilingual, multicultural country. In a multi-ethnic society, language contacts inevitably occur. The most important of these is considered bilingualism. Scientific researches of sociolinguists make it possible to form a clear picture of the language situation in Kazakhstan at various periods in the development of Kazakhstani society. Often, the functional purpose of a language is made dependent on the degree of its prevalence, the number of carriers, and other factors.

E.D. Suleimenova considers the Russian language in Kazakhstan to be the most critical component, on the one hand, of Kazakh-Russian, Uygur-Russian, German-Russian, and so on its bilingualism, on the other, - Russian-Kazakh, Russian, Uigur, Russian, German, and so its bilingualism. Of interest are the types and nature of mass bilingualism, the ratio of Kazakh-Russian and Russian-Kazakh bilingualism. The

scientist speaks about the emerging trend of forming Kazakh-Russian and Russian-Kazakh bilingualism among young people: 69.7% of Russian respondents are bilinguals with the second Kazakh language and 72.6% of Kazakh respondents are bilinguals with the second Russian language (Suleimenova E.D. 2007, 300 p.).

According to Altynbekova (2006), in the Aktobe region firstly the Kazakh-Russian and national-Russian bilingualism developed, and secondly was national-Kazakh bilingualism. In general, in the Aktyubinsk region, 67.9% of Kazakhs spoke Russian, including 77.7% among urban Kazakhs and 58.2% among the rural population. Almost 100% of the representatives of all ethnic groups spoke Russian. The composition of students in Kazakh schools is mostly mono-ethnic. Students of other ethnicities prefer Russian as the language of instruction in school (AltynbekovaO. B. 2006, 415).

Kazakhstan has formed many types of bilingualism as a private manifestation of multilingualism, which differ in the regions of distribution, the coverage of different areas of language functioning, the specifics of the influence of the first language on the second, etc. These problems were a prerequisite for selection.

According to Robert B. Kaplan, international students are not perceived adequately in the second language classes, as these students use rhetorical and stylistic techniques that violate the expectations of the native speakers of the specified language. International students who have mastered syntactic patterns, despite this, have shown an inability to present detailed discussions on specific topics, as well as to submit term papers, projects and dissertations written in the quality language (Kaplan R. 2009, 77).

Robert B. Kaplan described two key factors when learning a second language:

- logic - preferably in the spoken than in the scientific sense of the word; an essential component of the culture on which rhetoric is based; logic is not universal.

- rhetoric It is also not universal but differs from culture to culture, as well as in different periods in the same culture.

The psychological term «theory of mind "which on was translated Russian as "The theory of intentions" or "understanding of another's consciousness." This term means that a person can live with other people only if he is capable of at least broadly understand what they feel and what they think.

According to Furman Joseph (Theoryandpractice.ru), the results of a neuropsychologist SISSA Institute (Italy) Agnes Kovach (Furman I. 2016), who investigated about 30 Romanian-Hungarian bilinguals and 32 monolinguals in age about three years old. She described the story about two puppets, where one was able to understand only one language and the second knew two languages. The puppets decided to buy ice cream. While both of them was walking to shop, the seller shouted to one doll on unknown language that ice cream is gone, but they could buy it in the Sandwich shop. Kovacs translated this phrase for monolingual participants and then she asked everyone: “Where is the doll (“ monolingual ”) going to buy ice cream?”.

Kovacs found that task was more manageable for bilingual children, they figure out that this doll was not able to understand what the ice cream vendor told her, and she finally went to his shop. Thanks to daily exercises in switching from language on the language bilingual kids got enough experience of understanding someone else's consciousness. The inhibition process is a brain function which is responsible for the selection of the right information and making the correct decision. This feature makes it easier for bilinguals to give up their not correct beliefs and start to consider other possibilities.

According to Kull, the white matter of brain determines the relationship between different parts of the brain. She studied how white matter characteristics difference bilinguals and monolinguals. Kull used a metaphor that the skull is a cup, and the brain is water, then the white matter is a straw in this cup: it compresses the flow of water and moves her to a specific direction. Brain adaptation to a changing environment, known as plasticity (Mechelli et al., 2004), is altered by bilingualism both in the gray matter volumes (Pascual-Leone et al.,2011), the microstructure of white-matter pathways, and the cross-sectional area of sub-regions of the corpus callosum (Cummine, Boliek, 2013).

Diffusion tensor imaging (DTI) has been used as a non-invasive tool to characterize white-matter microstructure in vivo. It provides quantitative information about the integrity and maturation of the brain through quantities like fractional anisotropy (FA), apparent diffusion coefficient (ADC) (Madden et al. 2009; Bava et al. 2010; Barnea-Goraly et al., 2005).

Anderson (2017) designed a study to investigate conflicting findings regarding white matter integrity in older adult monolinguals and bilinguals. They found that monolinguals displayed greater fractional anisotropy (FA) than bilinguals, and bilinguals displayed greater radial (RD) and axial (AD) diffusivity than monolinguals.

Another study shows that bilingual participants who lived in States at least four years have similar white matter structure of the brain with monolinguals. The significant difference was found between bilingual participants who moved to States approximately two years ago and Americans. The limitations of that study were that almost all bilingual subjects were immigrants, and monolinguals were born in the USA. The active use of a second language ensures that the white matter will be healthier.

Findings. The present study was designed to identify psychological factors of successful bilingual education. Participants were students of the 10th-grade school of Aktobe. Before our assessment and interview we received permission from parents on examination of their kids.

Results of psychological examination (state of health, activity, mood) (author: Doskin V.A.)

Participants	Wellbeing *Me = 4	Activity *Me = 4	Mood *Me = 4
1	3.3	5.2	3.4
2	5.5	4.7	4.8
3	4.8	4.6	4.7
4	5.4	6.6	4.9

During our experiment, we interviewed 4 participants from multi-ethnic and mono-ethnic families who were exposed by two languages from birth.

Participant number 1

Parents's nationality:

Mother - Korean Father - Russian

Native Language: Russian

Second language: English Level: Upper-Intermediate

Third language: Korean Level: beginner

The family of participant #1 often moves from city to city, in general, after the birth of the first child (the subject himself), the family changed four cities, and the child himself –4 schools. The participant was born in Kostanay, and went pre-school class in Karaganda, from 1 to 7 class family lived in Kandagach, in the village of Daskenay, and in the 8th grade, he moved with his family in Aktobe. 8 and 9 class - graduated from school number 35, and in grade 10 child went to school number 1. The reason for such frequent travels was the father job as a priest.

Researcher: Do you like this whole process of moving from city to city and changing schools? Tell me, please, in more detail, how do you feel about this?

Participant # 1: In general, I have a positive attitude to this, because new friends appear and I am always socially active. However, this also has disadvantages: I do not want to leave old friends, I do not want to leave the old school, because you are already familiar with the teachers, they know what you are capable of, and you do not need to push yourself so hard all the time. Moreover, with new teachers, you need to promote yourself. I do not like to do it many times. For example, once you changed school, worked, and people already know what you are and what you have talents and here again. While you are moving and you need to introduce yourself again. It is exhausting. However, I have mostly positive emotions from new people, new places. The new pattern of communication with people, because everyone has different concepts in each city. It is exciting. In general, the nature of people depending on the region, and even the area in one city is very different. For example, I see a big difference between the residents of Kostanay, Karaganda, and Aktobe. Yes, when I studied in the 35th school, which is on the 12th micro district, I see the difference between the 8th micro district, where I am most often now. My present class is not like the previous school. My classmates now are open people, and I love it. I am very open, probably, therefore.

Researcher: Perhaps you are right. It is always more comfortable for a person to be in the company of people like him.

Person # 1: Well, not exactly similar, I like to be among those who are different. Such diversity helps to develop, to understand people better and of course, it helps me.

Researcher: Could you tell me about the disadvantages, what else do you dislike when moving?

Participant # 1: I do not like many things, but I like some things more. I try not to think about what I do not like in life; it seems that I cannot handle it away, it can lead to unhealthy depression.

Researcher: Did you have a period when you did not want to move to another city and change school?

Participant # 1: Yes, I did. It was a moment when I studied in pre-school we were leaving Kostanay. I liked that school, gymnasium №1. The teachers knew me although I was carrying the "Golden Key" of school (prize). Everyone there knew what my strengths and weaknesses were, they treated as a Person, and I liked it very much. It will difficult to imagine, but then I had friends with fifth or 6th graders. We found a common interest. Even know I still remember our time which we spend together.

Researcher: Did you ever think that it would be more interesting for you to communicate with those who are older than you and your peers?

Participant # 1: Yes, I thought about it. Maybe it is true. I feel comfortable with my peers.

Researcher: Ok can you imagine please, such a situation. Your family would never need to move, mom and dad would work full time, and you would live in the same city, for example, in the same Kostanay, and you would study at gymnasium №1.

Participant # 1: What a tricky question!

Researcher: What would you choose your present life or "Golden key" at Kostanay?

Participant # 1: I do not regret about everything, what happened in my life. I believe our parents wish us the best. It's true that I did not have such a success in school anywhere, as in Kostanay. However, I got to experience, and I would not trade it. Do you know what else I want to say?

Researcher: What do you want to say?

Participant # 1: I had the rule to make a close friend in every city where I lived. After a while, I realized that all people are the same everywhere. No matter where they were born and grew up, how old they are and what their nationality. Of course, there is something that distinguishes them from each other, but, in general, we are all the same. For example, I communicate with high school students and those who are almost twice as old as me. Especially, communication with adults turned my world. Do you know what else is interesting? Everything that adults told me, after a while, was performed, like something else in my life. I did not believe in it but then begin to understand what they told me.

Researcher: Probably, everyone faced such a situation, when at first you do not listen to the older generation, considering that you know enough, and then you realize that they were right. This fact probably makes the experience so vital.

Participant # 1: Yes, it is the experience.

Researcher: Your mother is Korean, do you know Korean?

Participant # 1: I used to know I studied and even went to the courses. Later everything mixed up, Russian, Kazakh, and Korean and also English. I made my decision, I have focused on English, and I attend courses three times a week.

Researcher: I see. What language do you speak at home?

Participant # 1: In Russian. However, my mother is trying to speak in English, and it does not work well. (Laughing)

Researcher: Do your Mom speak in English?

Participant # 1: Yes, she attended courses. She had to know it to get another qualification degree.

Researcher: Do your parents support your intention to learn languages?

Person # 1: Yes.

Researcher: Can you call your parents liberal? Are they tough?

Participant # 1: Well, they understand me. I love it. They do not put labels on me, and I am very grateful to them for that.

Researcher: What do you think are you still open to new people or do you prefer peace and stability?

Participant # 1: I somehow do not care. The behavior depends on the circumstances. I cannot say that I do not like the fact that I am an open person. So again, communication with other people is the primary source of information in the kid's life. Also, it will be not right to say that I do not like peace and stability, sometimes I need it. So, I periodically change my lifestyle. Moreover, I did not decide what my priorities are.

Researcher: Well, besides English and Korean, is there any more - the languages that you would like to learn?

Participant # 1:: I do not want to study. I would like to know. (Laughing)

Researcher: But it is impossible one without another.

Participant # 1: Yes, I know. If seriously, of course, I would like to study languages. I see only advantages in it. The world view expands.

Researcher: And how do you feel about traveling?

Participant # 1: Love! Moreover, I want to travel. So who does not want today, it seems now everyone wants to go somewhere.

Researcher: What do you think why?

Participant # 1: I do not know. Probably, they think that they will leave their problems or everyday life. So I cannot blame them. I want to leave the country.

Researcher: Do you feel any emotional connection to a particular city?

Participant # 1: No.

Participant number 2

Parent's nationality:

Mother is Kazakh. Father is Kazakh

Native Language: Kazakh (primary family language)

Second language: Russian

The family of Participant #2 changed six cities. The reason for this is the profession of the father of the family; he is a military man. Person # 2 was born in the South Kazakhstan region, in the Zhibek region, in the village of Miras. He and his family lived in Taraz for five years. During pre-school participant # 2 went to Kokshetau School, and from grades 1 to 3, he studied in Semipalatinsk. From 4th to 8th grade he studied in Shymkent, 9th grade was already in Aktobe, at school number 23. From September 1, 2017, he is studying at school number 1, where he plans to finish his studies.

Researcher: Tell me, please, how do you feel about this whole process, changing cities and schools?

Participant# 2: On the one hand, it is terrible, but on the other hand – new people, new acquaintances, new life. (Laughs)

Researcher: That is, in general, do you like it?

Participant# 2: I cannot say that every time I have to work hard. Everything is new: people, the city, school. However, I am used to it.

Researcher: Did you have a period when you did not want to move to another school or move to another city?

Participant# 2: Yes, I did, it happened recently. My parents planned to enroll me in School#3, but something went wrong. They asked me to change school after the new year. However I did not want to do it, I like my classmates.

Researcher: That sounds fantastic. I witnessed how well your classmates accept you. Now you have a good connection with each other.

Participant# 2: Yes, I have cool classmates!

Researcher: Well, with transfers from school to school, everything is clear, but how do you feel about moving from city to city? This change is a more significant event than a school change, another city; in your case even a different region of our country.

Participant# 2: At first it is strange, but then you get used to it. Moving to other cities, I met a lot of new people; saw beautiful places in different cities. You know, I like it rather than not like it.

Researcher: And now, imagine a situation where your family would never have to move. What will be different?

Participant# 2: I would choose what I have now. Everything suits me.

Researcher: Well, look at Sayat (name changed), you lived in the south, and in the east, and the north of our country, and now you are in the west. Where do you like the most?

Participant# 2: I like South, the weather is better. (Laugh)

Researcher: I cannot disagree. What did this experience of changing cities and schools teach you?

Participant# 2: I learned to communicate with people, and I know what people are.

Researcher: Good. Are there any other languages you would like to learn?

Participant# 2: I want to learn French and Spanish.

Researcher: I wonder why you want to know these languages.

Participant# 2: French is the language of love. I am just kidding. It is pleasant to my ears. I love to listen to songs on French and Spanish.

Researcher: I do understand what you mean. I also like the sound of some languages, for no particular reason. Do you think you are a person open to new things or prefer stability?

Participant# 2: I think I am open to new. However, there are problems - I am not assiduous.

Researcher: Is it difficult for you to switch from one language to another?

Participant# 2: No, I am used to it. At home we speak only Kazakh; sometimes I cannot even believe that I go to Russian class. However, at school, on the contrary, I cannot believe that Russian is not my native language. I quickly switch that's part of me: from language to language, from one business to another. This is probably good.

Researcher: I do not think this is bad. What language do you like more? Which is more comfortable to talk?

Participant# 2: In Kazakh. Yes, exactly, in Kazakh.

Researcher: You know scientists still have this opinion: language is, after all, a part of the culture of a people, and every nation has its characteristics. So, scientists believe that when a person switches from one language to another, it can also change. It can be said, in a different way begins to look at things. Do you agree with that?

Participant# 2: I do not know, probably, yes. When I speak Kazakh, I feel calmer, probably because my father brought me up strictly, and he speaks only on Kazakh. I have this association with the Kazakh language.

Researcher: That is, when you speak Kazakh, you automatically become calmer and, if I may say so, more obedient?

Participant# 2: (Laughs). Yes. It turns out so.

Participant number 3

Parent's nationality:

Father - Ukrainian Mother - Ukrainian

Native Language: Russian

Second language: English Level: Advanced

Participant# 3 was born in the Orenburg region, in the city of Sol-Iletsk. Both mom and dad of Persona No. 3 are Ukrainians, and they moved from Russia to Aktobe when Artem (name changed) was an infant. Grandpa was born in Ukraine, but his grandmother had Polish roots. Participant does not know Ukrainian, his parents also forgot it, but Artem is fluent in English. From the 1st to the 8th grade, participant #3 studied at the "Shanyrak" boarding school, after which he transferred to Secondary School No. 1. As he says, it was the school where he found his interest in English.

Researcher: Please tell come at what level do you speak English?

Participant# 3:d I never went to any courses, I did not go to courses, so I cannot say precisely the level, there are no certificates, but I speak fluently.

Researcher: Great! With whom do you speak in English? There are not so many foreigners, and the chance to make a friend or girlfriend with a foreigner is not that big. For example, for me, it was difficult to find native English speaking person Aktobe.

Participant# 3: So I could not find him too. (laugh) I try to speak daily with native speakers on the Internet.

Researcher: Is this some application?

Participant#3: Yes, something like that. After all, I said that I tried programming, and so I found this application quickly, and I liked it. There are real people.

Researcher: What are you talking about most often?

Participant# 3: Yes, we speak about everything. I am trying to tighten my conversational English, so I am talking about everything. What happened in a day, what news and so on. Well, in general, just chatting. Sometimes you can get lucky and come across an interlocutor with similar interests. Then we are already discussing football.

Researcher: You told me that you never attended an English language course. Did you learn the language at school?

Participant# 3: Yes, only at school. I went to school number 1 in the 8th grade, and before that, I studied at the "Shanyrak" private school. They taught English four times a week. I learned my English in that school. Whenever I have free time, I expand my vocabulary, nothing more. So I participated in the school competition this year and wrote the project.

Researcher: I see. In general, what language do you like to speak, in Russian or English?

Participant#3: I like to speak precisely in English. Well, what, Russian is probably nothing special; I do not pay attention to how I speak it.

Researcher: Yes, the Russian language is also something automatic. You know, even Kazakh is less familiar to me than Russian. Among scientists, there is an opinion that people who know more than one language or several differ from monolinguals - those who own only one language. They may be more open to new experiences, sometimes even the intellectual abilities of such people are higher. Do you agree with this opinion?

Participant#3: I agree. My dad used to tell me that if a person knows several languages, I immediately respect him.

Researcher: And you personally, what other languages would you like to learn?

Participant#3: Yes. I assume that my future profession will be directly related to languages, I may need to learn German and French.

Researcher: If it is not a secret, what profession are you talking about?

Participant# 3: International Lawyer.

Researcher: Interesting profession. How do you feel about traveling?

Participant#3: Positive. I love to travel. I believe that any journey is a new experience, and any experience is necessary and useful for personal development.

Researcher: How do you think how knowledge of a foreign language affects the life of a simple student?

Participant#3: This opens up new opportunities, new horizons. I have friends and acquaintances who know Spanish, Chinese, even a girl who knows Japanese. They participated in different programs, traveled around the world, sometimes even free. I believe. There are no disadvantages and a million advantages. Of course, this takes time and effort, but any work is always justified. Although not probably everyone (laughs), but you should not be afraid of languages. Now everything is in order to develop. Moreover, intelligent young people will not miss the opportunity.

Person number 4

Parent's nationality:

Father - Armenian Mother - Armenian

Native Language: Armenian (family language)

Second language: Russian

Participant# 4 was born in the city of Aktobe, but her father and grandfather had moved to Kazakhstan from Armenia. After some time, the family returned to Armenia again, planning to settle there, but family members could not get used to the life of Armenia again. After that, they returned to Aktobe and stayed here. Already there Persona 4 number went to the secondary school № 1, where she studied at present.

Researcher: Tell me, please, how you adapted and smiling after moving to another country and go to another school?

Participant# 4: Adapted easily, because I transferred to the elementary school. If it was in 4-5 grades, I think it would be more difficult. I would not be so used to another school.

Researcher: Well, of course. Moving between Armenia and Kazakhstan it's challenging. Was it difficult?

Participant#4: Well, when I studied in the pre-school, before moving to Armenia, I spoke excellent Russian. When we moved to Armenia, all the eight months I have spoken only in Armenian language and unaccustomed to the Russian language. That was the difficulty when I returned to Kazakhstan. Later in second grade I became an excellent student. Parents remember and say that I quickly adapted.

Researcher: Great, Edita. That is how you are affected by the knowledge of several languages and is interesting to me. Can you tell something else about this?

Participant#4: Good! I could speak as fluently in Armenian as early as in childhood as in Russian. However, I learned to read and write when I studied there, but I lost all my skills after Armenia. Then I started learning the letters myself. My parents supported me in this. I think the knowledge of an extra language will never hurt, in my case, a native one.

Researcher: In this, I wholeheartedly agree with you. Did I understand correctly, you were born in Kazakhstan and already, then you and your family moved to Armenia for a while?

Participant#4: Yeah, right. However, we did not plan a trip for a while but wanted to stay there to live. However, my parents, and I, too, could not get used to life in Armenia, and after eight months we returned to Aktobe. Then I went to the first class.

Researcher: Why do you think you could not stay there?

Participant#4: Well, first of all, my grandfather with my dad and uncle had left Armenia before I was born. We lived in Kazakhstan for a long time, got used to people and traditions, made family friends, and I have friends. In general, we settled in Kazakhstan; we like it here.

Researcher: People in Kazakhstan are proud of their hospitality.

Participant#4: Yes, I agree.

Researcher: Edita, are there any other languages you would like to learn? Alternatively, you do not have a particular craving for languages?

Participant#4: I want to know English. I want to get a qualification degree as a translator. So later, I will learn more foreign languages and will be to travel around the world.

Researcher: Is it difficult for you to switch from one language to another?

Participant#4: Not at all. The only thing, sometimes it seems to me that my voice is changing.

Researcher: You know scientists still have this opinion: language is, after all, a part of the culture of a people, and every nation has its characteristics. So, scientists believe that when a person switches from one language to another, it can also change. You can say it starts to look at things differently.

Participant#4: Perhaps it is.

Researcher: Do you agree with that? Did you notice that in yourself?

Participant#4: Honestly, it is sporadic.

Researcher: What languages do you like the most? Russian or native Armenian?

Participant#4: I think Russian. Although the sound of words in English I also like.

Researcher: And what is Armenian?

Participant#4: Well, the learning of Armenian was much harder, but this language is closer to me than any other language!

Conclusions. Correctional work was based on the complete intelligent activity of the child which is integrally fitting in the system of his vital daily relations. At school age, the most effective method of correctional work is in a unique way organized an educational activity, for example using a method to methods of social constructivism according to Janet Alleman and Dzhir Brofi (Jere Brophy, Janet Alleman. 2006, river 466). This method is suitable for pupils of high school where social and adaptation roles in society are already instead created. Social constructivists emphasize that the process of training is the most effective in such a social environment where individuals communicate, discuss the offered subject. Participants of a discussion stimulate their thought process, correlating it to views and the ideas of companions. Need to state their own beliefs and representations forces them to formulate these ideas more harmoniously that in turn perfects thoughts and often helps students to establish a new logical connection (Summers et al, 2018; Maydangalieva et al, 2018; Karabalina et al 2018, Maydanagaliyeva et al 2019).

Thus, the definitions of multilingualism – a subject of the same hot debate, as well as a definition of free language proficiency. "Multilingualism" can be defined, on the one hand, as full ownership other or other languages along with them to the family. At the same time, it is supposed that speaking "completely" knows the language in such measure that can use it as to the family or "almost like a native." By our definition, the pupil-multilingual is the person owning more than one language: through the speech, reading, the letter, gestures, or otherwise perceiving information.

Multicultural education in the Republic of Kazakhstan is one of the priority directions in an education system including higher education; is the critical part of modern education promoting the acquisition of knowledge of cultural and cultural values, traditions of other people. Education is the dominant stage in the course of formation and development of the multicultural, tolerant personality respecting not only himself but also the culture of other people; a stage when valuable reference points, the vital principles, and priorities of the younger generation are consciously and purposefully formed (Utemissova et al, 2018).

Formation of "multilingualism" - process difficult and long, significant from a position developed political and economic present realities. The multilingualism promotes consolidation of society, helps to keep endangered languages and cultures, Ch. Aitmatov wrote the following about multilingualism": "immortality of the people – in its language. Each language is big for people. Each of us has a filial duty before the people which generated us, gave us the biggest wealth – the language: to keep purity it, to increase wealth it. However, here we face new dialectics of history. Modern human society is in a constantly ever-increasing engagement that more and more becomes the general vital and cultural necessity. In these conditions, each person should know several languages".

The training in languages connected with an acquaintance with cultural, historical, social values of each language has to serve as a means of mutual understanding between the people. Formation of language competence is of value in the enrichment of its own culture in general.

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ПОСТКЕҢЕСТІК ӘЛЕМДЕГІ ЕКІТІЛДІЛІК БІЛІМ БЕРУІ: МӘСЕЛЕЛЕРІ МЕН КЕЛЕШЕКТЕРІ

Аннотация. Мақала Қазақстан аумағында күрделі әлеуметтік-мәдени сала бойынша билингвалды феноменді қалыптастыруға арналған. Тарихи алғышарттар кеңес дәуірімен байланысты, ол кезде көптеген ұлттар мен халықтар өз екінші үйін Ұлы даламыздың бейбітшілік пен үйлесімділіктің қонақжай аралы Орта Азиядан тапты.Осындай тілдік плюрализмді әлеуметтік және саяси, экономикалық реформалар өткенінен ажыратып қарау мүмкін емес. Қазақстан қоғамы әрдайым ашықтықпен, ұонақжайлылық және төзімділікпен сипатталды. Алғашқы посткеңестіктің бірінде Қазақстан басты назар аударылатын үш тұғырлы тіл саясатын жүзеге асыруда бірдей маңызы бар үш қазақ, орыс және ағылшын тілдерінде тіл реформасын бастады.

Түйін сөздер: билингвальді білім беру, мультиэтникалық қоғам, этносаралық неке, тілдік плюрализм.

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БИЛИНГВАЛЬНОЕ ОБРАЗОВАНИЕ НА ПОСТ-СОВЕТСКОМ ПРОСТРАНСТВЕ: ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ

Аннотация. Статья посвящена сложному социо-культурному феномену формирования билингвальности на территории Казахстана. Исторические предпосылки связаны с советским прошлым, когда многие

народы и народности нашли свой второй дом на просторах величественного и гостеприимного островка мира и гармонии в Средней Азии. Таким образом, рассмотрение языкового плюрализма невозможно в отрыве от прошлых социальных и политических, и экономических реформ. Казахстанское общество всегда характеризовалась открытостью, гостеприимностью и толерантностью. Одним из первых на пост-Советском Казахстан начал языковые реформы основной упор, которых был сделан на формирование политики трехязычия, где одинаковую значимость играют Казахский, Русский и Английский языки.

Ключевые слова: билингвальное образование, мультиэтническое общество, межэтнические браки, языковой плюрализм.

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THE DIGITAL AGENDA OF EAUE

Abstract. The Eurasian Economic Union (EEU), created in 2015 by Russia, Kazakhstan, Kyrgyzstan, Belarus and Armenia, claims to be the first successful post-Soviet initiative to overcome trade barriers and promote integration in a fragmented, under-developed region. Supporters argue that it could be a mechanism for dialogue with the European Union (EU) and other international partners. Critics portray a destabilizing project that increases Russia's domination of the region and limits its other members' relations with the West. The EU views the project as a challenge to sovereign choices in its Eastern neighborhood. The purpose of the Eurasian Economic Union is comprehensive modernization, mutually beneficial cooperation, achievement of global competitiveness, economic growth and the quality life population improvement. One of the challenges on the way of digital economy development is providing security in cross-border purchases regarding giving guarantees for the protection of personal data of consumers. The EAEU plans to take the most successful experience of the history of the European Union and other integration associations in the formulation and implementation of the digital agenda, and then in building the digital economy. 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.

Keywords: digital agenda, growth, and productivity, EAUE.

Introduction. The Eurasian Economic Union (EEU), created in 2015 by Russia, Kazakhstan, Kyrgyzstan, Belarus and Armenia, claims to be the first successful post-Soviet initiative to overcome trade barriers and promote integration in a fragmented, under-developed region. Supporters argue that it could be a mechanism for dialogue with the European Union (EU) and other international partners. Critics portray a destabilizing project that increases Russia's domination of the region and limits its other members' relations with the West. The EU views the project as a challenge to sovereign choices in its Eastern neighborhood.

The purpose of the Eurasian Economic Union is comprehensive modernization, mutually beneficial cooperation, achievement of global competitiveness, economic growth and the quality life population improvement.

Modernization of the economy based on digital communications will allow reaching long-term technological advantage. Considering the insufficient economic saturation and Eurasian space coherence, the formation of unified information infrastructure is becoming one of the key directions of the EEU countries cooperation. The issues of creation and management of an electronic data exchange unified system, creation, and development of information and marketing centers and institutions of digital market management, the formation of an electronic services market among the EEU member countries are strategically important.

Problem Statement. A distinctive feature of the modern international business is the network principle of information dissemination. E-Commerce, as the most important component of the global network economy, includes e-Commerce, e-capital flows, electronic data exchange, e-money, e-marketing, and banking. The modernization process of the economy on a digital basis assumes not only the introduction of information and communication technologies, the creation of infrastructure but also a favorable environment for an electronic market formation.

To assess the development of the digital economy, the indices development of an information and communication technologies (ICT), electronic trading (ET) and Net-Ready (NR) used in work.

The Information and Communication Technologies Development Index (ICT Development Index) is a combined indicator characterizing the countries achievements in terms of the development of information and communication technologies (ICT). Calculated by the International Telecommunication Union methodology (International Telecommunication Union), a specialized UN unit that defines the world standards in the field of ICT. The index developed in 2007 by 11 indicators by which the International Telecommunication Union operates in its assessments of the ICT development. The index reduces these indicators into a uniform criterion that is designed to compare the countries achievements of the world in the ICT development and can use as a tool for carrying out the comparative analysis at the global, regional and national levels. These indicators relate to access to ICT, use of ICT and also skills, that is practical knowledge of these technologies by the countries population captured by research. Authors of research emphasize that the level of ICT development today is one of the most important indicators of the economic and social well-being of the state. The organization publishes the Index on a regular basis that allows the countries to monitor changes in a temporal dynamics.

Results and Findings. At considerable lag from the European Union, the countries of EEU managed to reduce the gap in the ICT level from 32% in 2010 to 20% in 2016. Due to the outstripping growth of the indicator across Russia (with coefficient 1,1), to Kazakhstan (1,14), Armenia (1,15), Belarus (1,2) and Kyrgyzstan (1,36).

The development of the global Internet is a driving force and a fundamental factor in the growth of e-trading. According to the number of Internet users, the growth rate of the global network in EEU for 2000-2016 (3614,7%) considerably outnumbered a similar indicator in the EU (418,2%).

According to statistical data, EEU countries' rating scale is plural. Belarus and Russia have the highest rates, which puts them in the category of developed countries ranking, while the rest of countries included in the quartile of developing countries.

Table 1 – IDI rankings and values, 2015-2017

Country	Rank 2017	ICT Development Index	Rank 2016	2016	Rank 2015	2015
Belarus	32	7.55	31	7,26	33	7,02
Russian Federation	45	7.07	43	6,95	42	6,79
Kazakhstan	52	6.79	52	5,57	52	5,42
Armenia	75	5.76	71	5,60	71	5,34
Kyrgyzstan	109	4.37	113	3,99	108	3,85

The leader of the region is Belarus with the 32 rank in the global top list. Besides, in comparison with 2016, the index has increased to 7.55 units. The Russian Federation, Kazakhstan, and Armenia take up appropriate position - 45, 52, 75. IDI index for these countries is in the range 7.07- 5.76 units. Kyrgyzstan is last with 4.37 units (IDI). A significant increase in the index compared to 2016 is not observed.

Table 2 – The Data of Internet users

Country	Percentage of Individuals using the Internet						
	2010	2011	2012	2013	2014	2015	2016
Armenia	25,00	32,00	37,50	41,90	54,62	64,35	67,00
Belarus	31,80	39,65	46,91	54,17	59,02	67,30	71,11
Kazakhstan	31,60	50,60	61,91	63,30	66,00	70,83	74,59
Kyrgyzstan	16,30	17,50	19,80	23,00	28,30	30,25	34,50
Russian Federation	43,00	49,00	63,80	67,97	70,52	73,41	73,09

As can be seen from the table above, by parameter, Kazakhstan has the highest “population percentage using the Internet. According to Dauren Abayev's interview within the forum "Eurasian Week" "The penetration rate of the Internet exceeds 70%, but its quality is different. In cities and settlements, more than 2 thousand people, we have a perfect Internet. However, we do not forget that in Kazakhstan, 47% of the population lives in village settlements, so if we do not build the infrastructure now

Table 3 – Qualificative indicators of information technology sphere, by countries, 2016

Country	Mobile-cellular telephone subscriptionslular subscribing (per hundred people)	Fixed line telephone (%)	Households with a computer (%)	Households with Internet access (%)
Armenia	117,43	62.1	73.7	74.7
Belarus	120,673	94.9	67.0	62.5
Kazakhstan	141,956	76.5	75.5	84.4
Kyrgyzstan	127,835	25.4	17.6	7.2
Russian Federation	159,154	...	74.3	74.8

We would like to focus on the dynamics mobile Internet development. Thus, we see a decrease in user activity in Kazakhstan from 148.22 to 141.96. In the Russian Federation, we see steady growth. However a number of researches, in contrast, pays our attention to the growing use of mobile Internet. 83% of all mobile phone subscribers use the Internet on their smartphones. At the same time, most of them (44%) consume more than 6 Gb of Internet monthly, the share of such users has grown by 14%, compared to last year. Other data also confirm the trend of traffic consumption growth. Thus, the subscriber's number downloading from 3 to 6 GB has grown by 5%. Accordingly, the share of subscribers using less than 3 GB reduced by 19%. The research conducted by the company 4Service has also shown that average monthly expenses of the vast majority of mobile communication users (47%) keep ranging from 30 c.u. up to 60 c.u. At the same time, there was a trend an even greater reduction in communication expenses. Compared with the same period of 2016, the share of those users who spend no more than 30 c.u. has grown by 4%. c.u. Total such users – 30%.

International Internet bandwidth capacity increased dramatically between 2014 and 2015, almost doubling to 850,000 Mb/s. The market is predicted to continue to grow strongly over the next five years to 2022.

All of Kazakhstan's cellular operators had 4G LTE networks live in all regional capitals and most cities by 2017.Kazakhstan's mobile market remains highly competitive, but rather than a focus only on growth in subscribers the market is shifting to value-added. Further flat growth also predicted over the next five years to 2022.

According to TNS Web Index, the Internet – the only one growing media channel in Kazakhstan which coverage twice more than the press. In July 2015 the number of Internet users in RK had reached 3,47 million. That is 71% of the population of the country aged from 12 up to 54 years come into the network at least at least once a month.

However, a number of researchers note the following: Kazakhstan, Turkey, Belarus, and Georgia belong to the developed countries of the Eurasian space. They contain most or all elements of the independent and growing ICT ecosystem.

Besides, at the same time in the Eurasian ICT ecosystem, some problems hamper growth and development. It is a weak regulation, because of which investors do not hurry to invest in the economy of the countries, high prices and low population incomes, restrictions in the international communications field and the need to develop new services and infrastructure of data centers. Besides, the development index of broadband networks, according to Ovum, Kazakhstan is on the 65th (Russia - 54th, Mongolia – 76th). However, the capacity of international communication channels per Internet user in Kazakhstan is 69.6 kbit/s, while in Mongolia this indicator is 159.6 kbit/s. In Belarus, on the average capacity reaches 139.4 kbit / s.

According to Ovum analysts, in such countries as Kazakhstan, the most current problem is an acceleration of developments of new services, improvement of regulation for the creation of the digital future

and also an attraction of investments into the creation of data centers and applications. Thus, Kazakhstan needs to eliminate digital gaps between the price and income using expanding network coverage in areas with poor service. Also, according to experts, the country needs to accelerate issue of licenses for the provision of communication services and use of a frequency range and also improve rules of mass access to ICT.

Table 4 – Availability of legislation in key areas of cyber laws

EEU member states	Electronic transactions	Consumer protection	Privacy and data protection	Cybercrime
Armenia	Yes	-	Yes	Yes
Belarus	Yes	No	Yes	Yes
Russian Federation	Yes	-	Yes	Yes
Kazakhstan	Yes	-	Yes	Yes
Kyrgyzstan	Yes	-	Yes	-
Source: data compiled by authors by references.				

The digital world is not static and continues to experience very rapid development. The widespread changes brought about by today's digital environment have significantly broadened the scale of digital security and privacy challenges, signaling the need for an evolution in how these risks are managed. Effective management of digital security and privacy risk is essential if countries are to realize the full economic and social benefits of the digital economy. Establishing higher levels of trust with users and customers may enable digital services to become more widely accepted and used by individuals and organizations. Governments play a key role in supporting conditions to build trust and complement private sector initiatives.

Table 5 – The Gender Information about Internet Users in EAUE

Country	Latest year	All Individuals	Males	Females
Armenia	2016	64.3	65.5	63.4
Belarus	2016	71.1	71.4	70.9
Kazakhstan	2016	74.6	76.0	73.3
Russian Federation	2016	73.1	73.6	72.6

As can be seen from the table above, men are more active Internet users. Establishing the EEU was a major achievement for its members after they had repeatedly endured two integration "false starts" in the 1990s and 2000s (namely, the 1995 Customs Union and the 2003 Common Economic Space idea; see below), but they still have many obstacles to clear.

The Union is already a functioning entity. This statement does not raise any particular objections unless the bar is set too high, and when compared to the European Union, the regional integration benchmark, expectations are set too high. However, if the bar is set lower, with the EEU placed alongside other regional integration projects with varying levels of depth and success - NAFTA, MERCOSUR, ASEAN, Cooperation Council for the Arab States of the Gulf (GCC), South African Customs Union (SACU) – then an adequate framework for analyzing the relative standing of the EAEU becomes feasible.

On the one hand, the Eurasian Economic Union is not a perfect “success story” worthy of being quoted in textbooks. After an initial phase of rapid growth, it may have hit a short-term ceiling by 2016.

The top priority is to complete the Digital Agenda of EAUE which will boost economic growth in regions and continue Digital Transformation of country-members.

So, the first digital initiative of the Union, which the parties began to discuss, was the digital traceability of the movement of products, goods, services, assets in the EAEU area. In addition, the priority projects are the creation of digital transit corridors, the expansion of the "Single window" system in the

territory of the Union, the electronic interaction of business with state bodies. In conclusion, an expert noted that the share of breakthrough digital projects in the GDP of the Eurasian Union should be 11%.

In today's world, digital technology plays an increasingly important role in the development of countries economy. Even today, more than 40% of the world population has access to the Internet, and almost every 7 out of 10 households have a mobile phone. Digital technologies have some advantages – simplification of the public and business access to public services, the acceleration of the information exchange, the emergence of new business opportunities, the creation of new digital products, and so on.

It is symptomatic that Kazakhstan is one of the tops among the EEU countries in the World Bank's digital adoption rating. This index is the highest when it comes to government agencies and organizations (table 2).

Table 6 – World Bank's digital adoption index

Component	Armenia	Belarus	Kyrgyzstan	Kazakhstan	Russia
Digital adoption Index, total Points, *including*	0.67	0.52	0.49	0.63	0.71
Business	0.48	0.43	0.37	0.32	0.37
Individuals	0.82	0.76	0.60	0.73	0.62
Government	0.72	**0.36**	0.50	0.83	0.52

As for the Republic of Belarus, the issues of the information technologies development in it included in the system of the most critical economic and strategic priorities, which associated with the formation of a modern "information economy." Today in Belarus e-trading is considered as a way to the creation of the refined, transparent, highly organized market products, services, and technologies and gradually turns from theory into an almost tangible reality.

Conclusions. The business community is also striving for the removal of barriers to national and cross-border electronic commerce, particularly the harmonization of the digital market with the European Union and creation of a unified digital space of the Eurasian Economic Union. The first initiative implemented within the framework of the Eastern Partnership (HDM panel, EU4Digital) and the second one based on the declaration on the formation of the digital space of the Eurasian Economic Union adopted in November 2016.

Strategic orientations of the formation and development of the EAEU digital space are systematic digital transformation of the economies of the Union countries; increase seamless economic processes and service environment as a result of their digitization; creation and launch of collaborative digital tools for expansion into global markets (digital assets); reducing the economic risks; qualitative growth in the number of jobs in the digital economy; significant growth in the digital inclusion of the population.

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ЕЭО САНДЫҚ ЖОЛДАМА

Аннотация. ЕЭО-тың пайда болу тарихы қатысушылардың ынтымақтастығы мен ұйымшылдығына байланысты, ең маңыздысы 1990-2000 жылдар аралығында екінші сәтсіз интеграция кезінде болды. РФ президенті Владимир Путин 2012 жылы бірнеше рет атап өткен болатын: яғни ЕЭО саясаттың ең басты басымдығы болып табылады деді. Осылайша Кремль өзінің дипломатиялық күшін қолдана отырып, ЕО-та, Ресейде және бұрынғы Кеңес одағы мемлекеттерінде алдыңғы қатарлы орынға шығу үшін, сөз берді. Евразиялық экономикалық одақтың - ресми келісім бойынша 2014 жылдың мамыр айында Беларусь, Қазақстан және Ресей мемлекеті қабылданды. ЕЭО тарихтағы ең ұтымды тәжірибені Еуропалық одақта және тағы басқа қауымдастық тұжырымдамасын және сандық жолдама жүйесін енгізуді жоспарлайды. Келесі қадам стратегиялық

бастамаға сандық экономиканы кіріктіре отырып, осылайша өзге мемлекеттерге оның дұрыс бұрыстығын түсіндіру маңызды тәжірибе болды.

Түйін сөздер: сандық жолдама, өсім және өнім, Еуразиялық Экономикалық Одақ.

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ЦИФРОВАЯ ПОВЕСТКА ЕАЭС

Аннотация. Целью создания Евразийского экономического союза является всесторонняя модернизация, взаимовыгодное сотрудничество, достижение глобальной конкурентоспособности, экономический рост и повышение качества жизни населения. Модернизация экономики на основе цифровых коммуникаций позволит достичь долгосрочного технологического преимущества. Учитывая недостаточную экономическую насыщенность и связанность евразийского пространства, формирование единой информационной инфраструктуры становится одним из ключевых направлений сотрудничества стран ЕАЭС. Стратегически важными являются вопросы создания и управления единой системой электронного обмена данными, создания и развития информационно-маркетинговых центров и институтов управления цифровым рынком, формирования электронного рынка услуг среди стран-участниц ЕАЭС. Отличительной особенностью современного международного бизнеса является сетевой принцип распространения информации. Электронная коммерция, как наиболее важная составляющая глобальной сетевой экономики, включает электронную торговлю, электронное движение капитала, электронный обмен данными, электронные деньги, электронный маркетинг и банкинг. Процесс модернизации экономики на цифровой основе предполагает не только внедрение информационно-коммуникационных технологий, создание объектов инфраструктуры, но и благоприятной среды для формирования электронного рынка. Для оценки развития цифровой экономики в работе использованы индексы развития информационно-коммуникационных технологий (ИИКТ), электронной торговли (ИРЭТ) и сетевой готовности (ИСГ).

Ключевые слова: цифровая повестка, рост и производительность, ЕАЭС.

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THE RISING VIOLENCE AMONG ADOLESCENTS IN KAZAKHSTAN. CONTENT-ANALYSIS OF MEDIA "BOY FROM ABAY VILLAGE" AND "ABUSE IN TURKESTAN"

Abstract. When we speak about bullying, we speak about violence, we as adults are doing our best to make this world, school, and family safe for our kids. The recent study showed that bystanders of bullying in their adult life faced severe mental issues. What is going with the victim of bullying? Each child who suffered from any violence or abuse needs to get medical, public, psychological and legal aid – consequences of violence can become irreversible. The integrated approach and involvement of several professionals is important: social worker, psychologist, and lawyers. The content analysis is the technology of the collection of information made by systematic detection of the characteristics of texts answering the purpose and research problems (concepts, verbs, a phrase and so forth). During our study, we investigated how media and people react in two significant cases. The first case happened in Abay village where in March of seven years old boy claimed he was multiply raped by other kids. This situation caused a colossal resonance in media, social networks.

Keywords: violence, cruelty, adolescents, bullying, content analysis, social network.

Introduction. According to UNICEF (Saliyeva, 2019), about 75% of adults support physical punishments to control the behavior of children in the family, and 67% of parents use violent forms in children's upbringing. The study (Sahova, 2019) showed that nearly one-third of children of one-year-old children faced some forms of abusive behavior. In general, across Kazakhstan, 62-79% of children suffer from violence in the family, most often from parents and trustees.

In an attempt to change the settled social norms of UNICEF conducts communication campaigns in many regions of Kazakhstan. Recently Unicef announced a new campaign «The positive parenthood."

According to Elzhas Ertayuly (Mustaphina, 2019), the main reasons for adolescent's violent behavior is the distance between parents and kids, when adults do not want to spend time with their children. That is why teenagers prefer to spend all their time in virtual reality with their smartphones and computer games.

The dissonant surname and rare name, unusual appearance, and strange hobby, the intelligence developed not matching with age, being skinny or fat – all these minor's features can be a reason for bullying. Bullying is a primary reason for teenage suicides and mass-shouting. These are visible results of group attacks to the person, but there are also hidden consequences in the form of mental issues which remain with the person for the rest of life.

The research revealed typical characteristics of families, where kids become of bullying victims. These are families with a low level of financial income, a family where the only mother works and where parents have no higher education (Mazzone et al, 2018). Statistically, it turned out that suffering from attacks of peers worse get on well at mathematics and Russian (Kabanov, 2016).

Researchers revealed communication between grades of the object of bullying and a microclimate at school. The more peers scoff at the person, the more he is dissatisfied … with the teacher's attitude

towards pupils. It is possible that they connect the uncomfortable and unsafe situation including with a defect of teachers.

The deputy of Mazhilis Irina Smirnova made a deputy inquiry to the prime minister where she suggested to find reserves and to increase the availability of mass sport and physical culture for kids. In her interview with Time.kz she mentioned that problems with violence among teenagers are the result of the lack in moral education. The responsibility of child spiritual and mental development is part of school and parents duties where they should work together (Akulova, 2019).

Svetlana Bogatyreva is the founder of "Teens" NGO which works in suicide prevention area. According to Bogatyreva (2018), the fights between teenagers are ferocious, and aggression which thus arises is often causeless and has no borders. The school in many aspects lost educational functions which were assigned to it earlier. Therefore now it is necessary to develop the general document, a particular protocol of actions, accurate algorithm, and leaning on which it will be possible to work. Bogatyreva created a Facebook group "Stop Bullying" where parents and kids could get some recommendations if they faced bullying.

In 2018 the number of juveniles' was 5102 according to the children's ombudsman Saule Aytpayeva. Three thousand one hundred fifty-six minors committed serious and most serious crimes.

The number of crimes among teenagers increased Almaty by 33.5%, in the Kyzylorda, Mangystau regions and Astana for 18%, the Akmola and Aktyubinsk regions for 11%, the Turkestan region for 7.8%. In 2018 the crime amount concerning children made over two thousand. Growth in the Aktyubinsk, Turkestan, North Kazakhstan regions and the cities of Shymkent and Astana is observed (Mamyrhanova, 2019).

Among school students at the age of 13-15 years daily smoke 14,8 percent, 18,1 percent of teenagers of 12-15 years, 15-17 years - 37 percent consume alcohol. About 90 percent of youth do not know or do not understand the detrimental consequences of drug addiction, smoking, and alcohol intake (children's ombudsman S. Aytpayeva).

According to results of the research "Index of Wellbeing of Children" conducted last year by request of Nursultan Nazarbayev, most dangerous for children became - Kostanay (0.60%), Akmola (0.65%) and Almaty (0.68%). In general, the Index on safety across Kazakhstan is only 0.7%.

Research Questions. Society shapes a growing personality. The social reaction tell us is that appropriate behavior or not. Digital Technologies (Kushzhan, 2018) have a great influence on development of information. Social Networks became a new platform of communication between people; they also help us to identify Social Trends and Worries. The main purpose of our study is to understand how people react on Violent cases in Kazakhstan.

Findings. The content analysis is the technology of the collection of information made by systematic detection of the characteristics of texts answering the purpose and research problems (concepts, verbs, a phrase and so forth). The content analysis assumes use of the certain standardized procedures providing formalization and measurement of the studied signs that allows doing the professional conclusions about the character and features of the studied object. Especially effective use of the content analysis as research of programs of political parties and movements when on critical concepts and phrases it is possible to make the idea of distinctive features of each of them. For example, use of the content analysis allows by calculation of words, photos or newspaper columns whether devoted to volume to another candidate to define his rating in mass media.

The content analysis can be substantial and structural. The substantial content analysis focuses on the attention of the researcher on contents of the message whereas structural – on quantity and features of a mention of the control terminal or a name in the text of the message.

During our study, we investigated how media and people react in two significant cases.

The first case happened in Abay village (Bekbolayeva, 2019) where the local newspaper in March of 2018 published a report from the grandmother of 7 years old boy who claimed he was multiply raped by other kids. This situation caused a colossal resonance in media, social networks.

The boy's grandmother told that police, teachers, and the principle of schools repeatedly tried to stop her and promised to control the behavior of pupils cause victim and offender studied in the same school. At the beginning of 2018 two rural lawyers of Kurmangaza Musir and Dinmukhamed Artykov volunteered to help the woman. With their help, the media and public learned about this story.

The grandmother and her grandson planned to throw independent medical expertise in Almaty. The woman told what occurred on March 14, 2018, when she together with the grandson and the sister in Shymkent was removed from the train and took away in the unknown direction. According to her, police

officers who stopped them told that she has no right to carry the boy to another city. Police officers tried to take away the victim a child, the grandmother and the aunt had to go together with them. At first, the woman tells, they were brought to DVD of South Kazakhstan District (SKD), and then transported to the unfamiliar house. An hour later they met Zagipa Baliyeva Ombudsman for Children. The video, where the grandmother thanks the children's ombudsman and the mayor of South District of Kazakhstan Zhanseit Tuymebayev, was made in the same house.

It's became an interesting for us how people reacted on this situation so used Google Trend program. Google Trends is the public web application of Google Corporation based on a search of Google which shows how often a specific term is looked for about the total amount of search queries in various regions of the world and various languages.

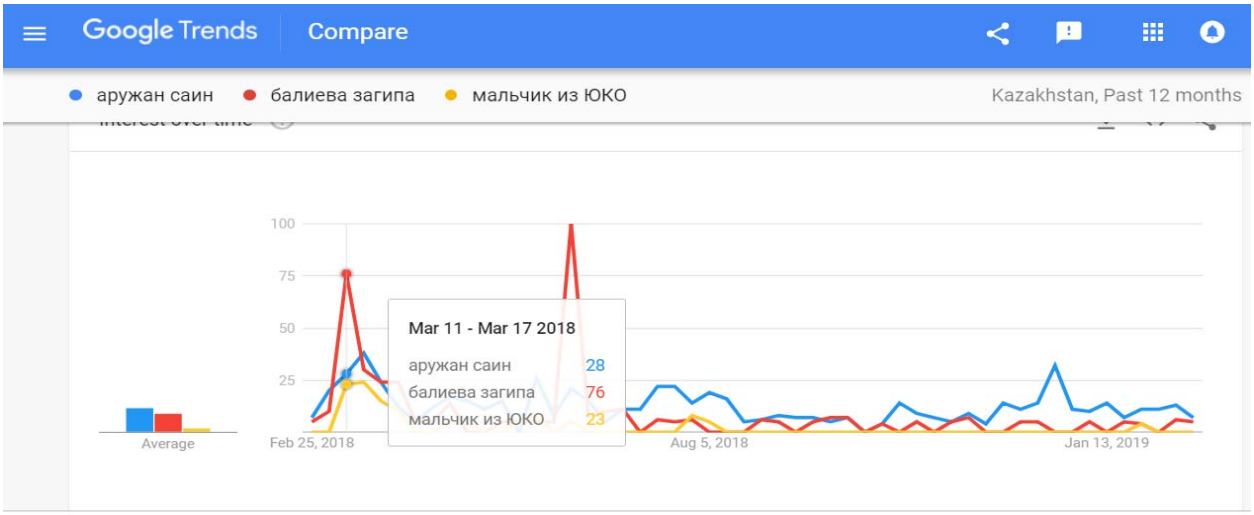


Figure 1 – The results of Google Trends study comparison: "aruzhan sain", "zagipa baliyeva", "the boy from SKD"

As you in Figure the first peak on chart was between 11 and 17 March of 2018 where people made a lot of inquiries about this particular case.

For detailed study we used a QDA Miner. We created a Word cloud which describes most often ideas in Facebook users' comments. QDA Miner is an easy-to-use qualitative data analysis software package for coding, annotating, retrieving and analyzing small and large collections of documents and images. **QDA Miner** qualitative data analysis tool may be used to analyze interview or focus group transcripts, legal documents, journal articles, speeches, even entire books, as well as drawings, photographs, paintings, and other types of visual documents.

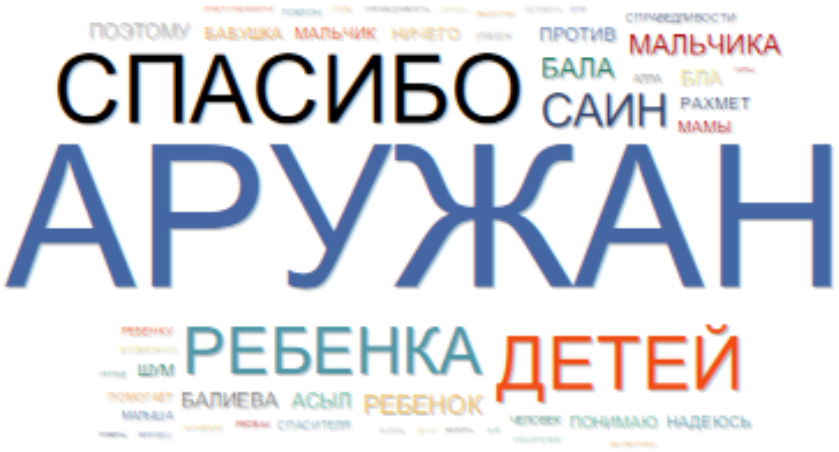


Figure 2 – WordCloud made in QDA Miner

As you see in WordClous the most often word was “Aruzhan”. Aruzhan Sain (Kyzylorda, Kazakhstan was born on August 10, 1976) is a public figure, the TV host, the actress, the producer, the director of charity foundation (Wikipedia).

Sain made a post in March 18 of 2018 which she called “Information about Situation with kid from Abay village SKD”. Her post in hours reached around 2.200 likes and thousands comments.

Table 1 – The frequency Analysis of Facebook comments made between 11 and 17 March of 2018.

TOPIC	FREQUENCY	NO. CASES	% CASES	LENGTH
Aruzhan Sain	18	1	100,00%	2
Precious Child	7	1	100,00%	2
Thanks to Aruzhan	3	1	100,00%	2
The Image of Kids' Saviour	3	1	100,00%	3
Against Kids	3	1	100,00%	2
Humanistic Thank You	3	1	100,00%	2

Another interesting finding was a post of Aigul Kokai who blamed Aruzhan Sain in political games and emotional blackmail; her post reached 34 like and around hundreds of comments.

Table 2 – The comparative study of two post made on 18th of March 2018

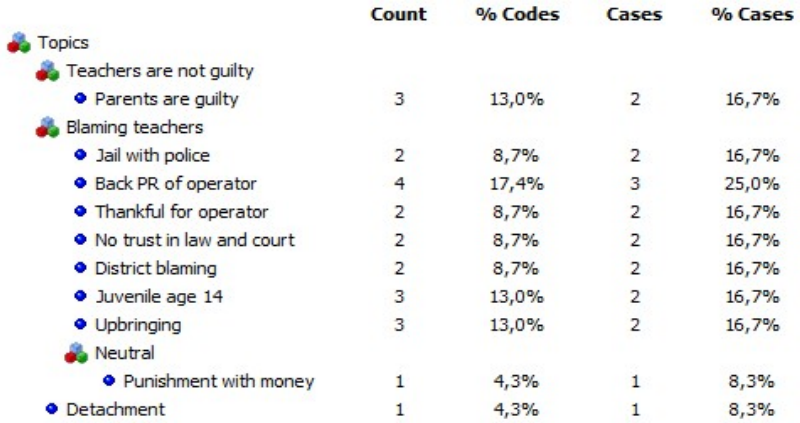
Type of the Post	Main Ideas	Number of Posts	Frequency
Comments made after Post of Aruzhan Sain	Aruzhan is kids protector	2243	36,70%
Comments made after Post of Aruzhan Sain	Worry about child	1186	19,40%
Comments made after Post of Aruzhan Sain	Anxiety about Grandma	60	1,00%
Comments made after Post of Aigul Kokai	Get advantage on grieving	278	4,50%
Comments made after Post of Aigul Kokai	HIPE zombie subscribes	389	6,40%

The majority of commentators paid attention to Aruzhan Sain activity and she is a person who cares and protects children. Her position in this question is also the result of her NGO activity as a founder of “DOM” which collects money for children’ treatment.

In January of 2019 in SKR (Turkestan district) the hearing about sexual assault against 7 years old child was finished. The investigation of this case was almost one year long. Sixteen years offender was incriminated and jailed for seven years. The criminal investigation was canceled against four other suspects because they did not reach the age of legal liability. Zagipa Baliyeva left her position as Child Ombudsman.

The Kazakhstan society was shocked on the 20th of January when someone published a video of school students beating. Unknown teenagers kicked boys and jumped on them. The Ministry of Internal Affairs found out that it was on January 18 in Turkestan. There promised to understand the event in details. It turned out that all participants of a fight are ninth-graders.

Three victims of this criminal case attend the school of Talgat Bigeldinov. The suspects are pupils of three different schools.



	Count	% Codes	Cases	% Cases
Topics				
Teachers are not guilty				
Parents are guilty	3	13,0%	2	16,7%
Blaming teachers				
Jail with police	2	8,7%	2	16,7%
Back PR of operator	4	17,4%	3	25,0%
Thankful for operator	2	8,7%	2	16,7%
No trust in law and court	2	8,7%	2	16,7%
District blaming	2	8,7%	2	16,7%
Juvenile age 14	3	13,0%	2	16,7%
Upbringing	3	13,0%	2	16,7%
Neutral				
Punishment with money	1	4,3%	1	8,3%
Detachment	1	4,3%	1	8,3%

Figure 3 – QDA Miner analysis of Turkestan Region Violence among Adolescents

Most of commentators were surprised and shocked observing how teenagers were violently abusing younger kids. The Kazakh Media raised a question who is responsible in this situation. School District Department of education immediately announced that accidents happened outside of a school. That's type of answer in Kazakhstan usually means only one: "School will not take responsibility".

The majority mentioned fact that video –operator was probably looking for "HYPE".

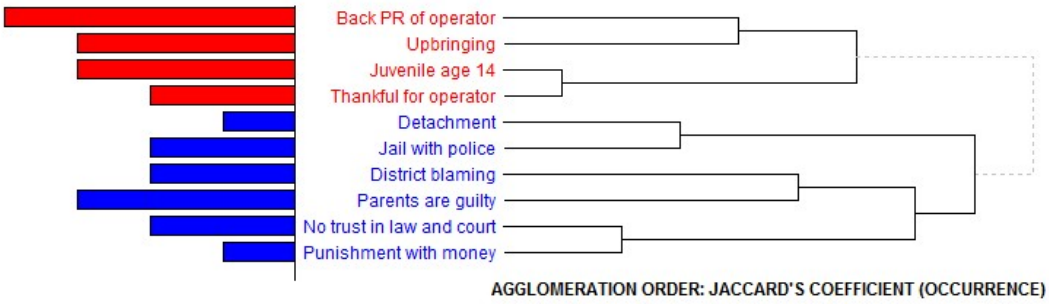


Figure 4 – QDA Miner Visual analysis of data

Video with the beating of school students in Turkestan threw Internet users in shock. Most of all public struck cruelty with which seniors scoffed at teenagers. Psychologists sound the alarm now: school students need the correct leisure, otherwise aggressions from their party not to avoid.

Civic activists consider that inefficient work of state agencies is guilty of teenage violence. Officials claim that they honestly work raids at schools for which of the budget tens of millions of tenges are allocated.

Google Trends showed that in January of 2019 most popular request was a "pupils", "Turkestan Region" and "Physical Abuse".

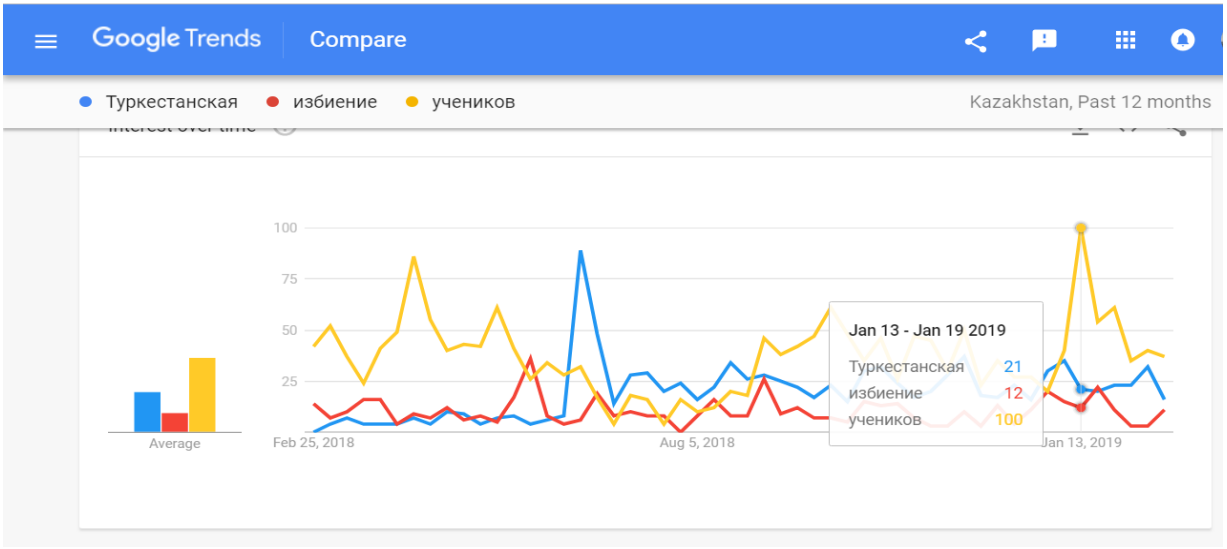


Figure 5 – The results of Google Trends study

Unlike adults ("200 billion of KZT will fund on Youth Policy", 2019), children apprehended story with the beating of teenagers in Turkestan more quietly. According to them, such conflicts not a rarity but get to the Internet only a few cases. Nevertheless, nobody is insured from mockeries from peers or more senior children – school students admit.

Most of all in history with the Turkestan school students their parents suffered. Mother of one the offender posted a video in social network and asked to forgive her son. All heroes of a scandalous video continue to go to school. After this incident, the issue of teenage violence is discussed at the republican level. From high offices appeals to raise children better sounds too often but unfortunately we do not observe any further actions.

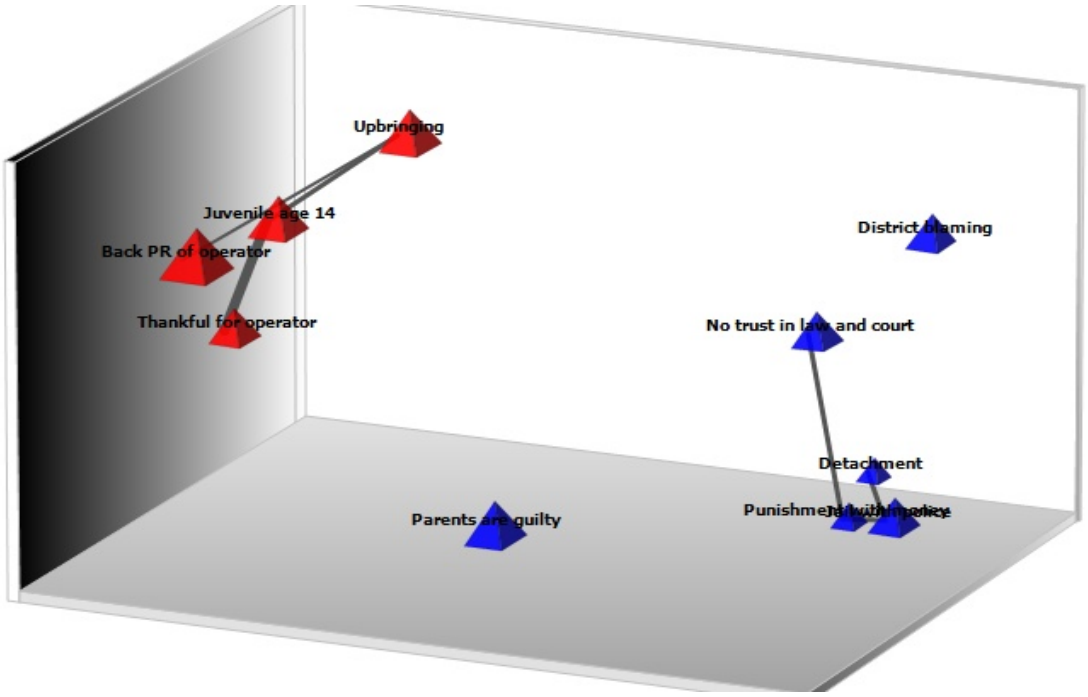


Figure 6 – 3D Map in QDA Miner

Another interesting trend in comments is "Low trust in Court, Legal System and Government". 2019 in Kazakhstan is announced Year of youth, and so coincided that since the beginning of year society the violence facts among youth one by one excite. The incident which took place between school students of Turkestan is investigated now by law enforcement agencies. Under the criminal article which is incriminated to participants of a fight threatens them up to 5 years of imprisonment.

In Kazakhstan (eadaily.com 2019), several years taking the leading positions in the world by the number of suicides among children, the number of teenage suicides in 2018 grew in comparison with 2017 by 6.6%.

Conclusions. Each child who suffered from any violence or abuse needs to get medical, public, psychological and legal aid – consequences of violence can become irreversible. The integrated approach and involvement of several professionals is important: social worker, psychologist, and lawyers. At the same time, it is necessary to remember the family who also needs support that they understood the consequences of injuries and could help the child to cope with them (Naurzalina et al, 2015).

Often adults do not know that such violence and what consequences for the child. We researched (Summers, 2018) how people treat violence at us in the country, and it is many people – more than 50 percent – do not consider a slap or slap violence though it presents to develop to the child and humiliates human dignity. The basis of development and prosperity of any society is the development of children, the possibility of each child to reach the potential. Unfortunately, even such, so-called secure forms of violence, do not allow the child to develop fully. If the child is beaten and humiliated, then the probability that he will apply violence too grows. Therefore violence accepts the cyclic character, and it passes from father to son. It is confirmed with our research in Kazakhstan and also global researches of UNICEF around the world.

Another problem is a current conflict of positions between "Schools" and "Parents". Whenever any accident happened department of education evaluates school and principle knows that result of this estimation could cause a termination of contract. During nurture, it is vital to teach kids how to communicate peacefully and robustly. An essential role in the increase in awareness of children is played by kindergarten and school, and their children spend most of the time. Therefore in each educational institution, there has to be an entrusted expert whom the child can address in case of violence (Almurzayeva, 2019). All experts working with children have to be trained in how to define signs of violence, often children hide that they endured violence.

Unfortunately, for today in the country, there are not enough centers and the trained experts who can render similar services. It is necessary to be able to establish a trusting relationship that the child could report openly about cases of inappropriate behavior from adults. Adults need to remember that silence is unacceptable. If you became the witness of violence over the child and do nothing, then it you show to the child that violence – the normal phenomenon. It also concerns domestic and sexual violence. Each person plays a part in the termination of violence over children. It is necessary to put an end to a taboo and to begin to discuss these things, including sexual violence openly.

Danna Summers (2019) knows very well what it means to be an object of bullying. She never asked her bullies why they did it to her. That experience changed her personality; it makes clear her mission. As a psychologist, and a mother she wants to protect children from any form of bullying.

Svetlana Balpeisova (2019) is professional mediator who suffered from the death of her child. Her beautiful daughter committed suicide, for a long time child was suffering from bullying and physical abuse.

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ҚАЗАҚСТАН ҚОҒАМЫНДАҒЫ ЗОРЛЫҚ-ЗОМБЫЛЫҚТЫҢ ӨСУІ. БҰНЫ ҚАЛАЙ ТОҚТАТУҒА БОЛАДЫ? РЕЗОНАНСТЫҚ ЖАҒДАЙЛАРДЫ КОНТЕНТ-ТАЛДАУЫ: "АБАЙ АУЫЛЫНДАҒЫ БАЛАНЫҢ ІСІ", " ТҮРКІСТАН ОБЛЫСЫНДАҒЫ ҰРЫП-СОҒУ

Аннотация. Соңғы жылдардағы зерттеулер қоғамдағы зорлық-зомбылықтың өсуіне әсер ететін бірқатар факторларды анықтау. Осындай факторлардың бірі күрделі әлеуметтік жағдай, толық емес отбасы және қоғамның балаларға қатысты зорлық-зомбылықты қабылдауы болып табылады. Сіз мұның қалай мүмкін екенін айта аласызба? Юнисеф зерттеулері қазақстандық ересектердің 70%-ы балаларға қатысты физикалық жазаларды қолдайтынын растайды. Контент-талдау рәсімі БАҚ-та да, әлеуметтік желілер кеңістігінде де негізгі идеялар мен ойларды қадағалауға мүмкіндік береді.

Түйін сөздер: зорлық-зомбылық, қатыгездік, жасөспірімдер, буллинг, контент-талдау, әлеуметтік желі.

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РОСТ НАСИЛИЯ В КАЗАХСТАНСКОМ ОБЩЕСТВЕ. КАК ЭТО ОСТАНОВИТЬ? КОНТЕНТ-АНАЛИЗ РЕЗОНАНСНЫХ СЛУЧАЕВ: "ДЕЛО МАЛЬЧИКА ИЗ СЕЛА АБАЙ", "ИЗБИЕНИЯ В ТУРКЕСТАНСКОЙ ОБЛАСТИ

Аннотация. Исследования последних лет выявить ряд факторов влияющих на рост насилия в обществе. Одним из таких факторов является сложная социальная ситуация, неполная семья и принятия обществом насилия в отношении детей. Вы скажите как это возможно? Исследования Unicef подтверждают, что 70% казахстанских взрослых поддерживают физические наказания в отношении детей. Процедура контент-анализа позволяет отследить основные идеи и мысли как в СМИ, так и в пространстве социальных сетей.

Ключевые слова: насилие, жестокость, подростки, буллинг, контент-анализ, социальная сеть.

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BANK LENDING TO SMALL AND MEDIUM-SIZED ENTERPRISES: THE EXPERIENCE OF UKRAINE AND POLAND

Abstract. In the conditions of implementation of the European integration strategy of Ukraine, the issues of forming competitive environment, creating additional jobs and reducing unemployment, increasing social and economic protection of the population are of particular importance. That is why the promotion of small and medium-sized enterprises remains one of the priority directions of national and regional economic policy. SMEs are a form of organization of activities that takes into account the interests of an individual, and forms conditions for improving his (her) own well-being. The main criteria for assigning an enterprise to small and medium-sized businesses are the number of employees for the reporting period and annual income. In addition, other (additional) criteria, such as the balance sheet amount in Poland, may be used. The comparative analysis of the criteria for assigning enterprises to small and medium-sized businesses indicates that the current Ukrainian legislation complies with the legal norms and requirements of the legislation of European countries. The main sources of SME financing include the own funds of business entities, loans from banking and non-banking institutions, as well as budget funds and resources from international funds, organizations, etc. Summarizing and systematizing the experience of lending to small and medium-sized enterprises in Ukraine and Poland shows that the following problems can be attributed to the main ones that restrain banks: a high level of riskiness of SMEs (especially projects "from ground zero"), a low level of transparency of economic activity of SMEs; lack of reliable collateral; low level of state support. The main problems of SME-borrowers are the high cost of credit resources; complicated loan procedures; high requirements of banks for providing loans, etc. That is why creating a supportive business environment for SMEs requires effective partnerships between government, community and business, in particular, development and implementation of state support programs for SMEs, stimulating SMEs lending, attracting external investors, and using international SMEs support experience. Complex implementation of these measures will promote socio-economic development and increase the standard of living of the population.

The purpose of the article is to study the experience of lending to SMEs in Ukraine and Poland and to determine the possibilities of using foreign experience in the development of state and regional programs for support of small and medium-sized enterprises in Ukraine.

Keywords: small and medium-sized enterprises, bank lending, cooperative bank, macroeconomic indicators, lending conditions.

Introduction. The most common and accessible organizational forms of economic activity in international practice are small and medium-sized enterprises (SMEs). The support of small and medium-sized enterprises remains one of the priority directions of economic policy of European countries in recent years. SMEs perform important functions in forming a competitive environment, creating significant competition for large enterprises and monopoly entities, activating innovation processes through the introduction of innovative industries, creating additional jobs and reducing unemployment, rapid saturation of the market with goods and services, operative response to changes in demand and consumer requirements. In these circumstances, there is a growing need to create a supportive business environment and intensify state programs and support mechanisms for SMEs, in particular, to alleviate administrative

pressure on entrepreneurs by controlling bodies. At the same time, the strengthening of economic integration between Eastern and Western Europe necessitates studying the European experience of stimulating development of SMEs in order to determine the possibilities for its use in Ukraine.

Today, one of the main obstacles to the development of SMEs in Ukraine is the lack of financial resources to support and introduce own business, which prompts entrepreneurs to find alternative sources of financing their own business. In view of the above, there is a need to study the features of financing small and medium-sized businesses at the expense of bank loans. That is why the study of the theoretical and practical principles of bank lending to small and medium-sized enterprises in Ukraine and Poland, the search for the main problems hindering the financing of SMEs development by banking institutions, offers of using Polish experience for the development of small and medium-sized business in Ukraine are becoming especially relevant.

The information base of the study is the current legislation and regulations of Ukraine and Poland, official statistics of the National Bank of Ukraine (NBU), the State Statistics Service of Ukraine, the European Commission, Organization for Economic Cooperation and Development (OECD), Narodowy Bank Polski, European Investment Bank, official forms of reports of banking institutions of Ukraine, Bank Gospodarstwa Krajowego, monographic studies and scientific publications.

Results. Forming a competitive system and evolving SMEs influence price levels and, according to the methodology proposed by well-known economist J. M. Keynes, directly affect employment. The European Commission defines an SME as any organization engaged in economic activity, regardless of its organizational and legal form [1]. The practical aspect of this definition lies in the fact that self-employed, family firms, partnerships and associations or any subjects that regularly engage in economic activity can be considered as a business.

An SME is a form of organization that takes into account the interests of the individual, which allows him (her) to realize his (her) intentions to increase his (her) own profits and improve living standards. An important feature of SMEs is the ability to create (compared with large enterprises) a larger number of jobs at lower cost of capital.

In most countries of the world, the number of employees for the reporting period and annual income are the determining criteria for assigning enterprises to small and medium-sized enterprises. In the Ukrainian legislation, the definition and distribution of economic entities are regulated by the Commercial Code of Ukraine. Thus, in Article 42 of the Economic Code of Ukraine the following definition is given: "Entrepreneurship, to be understood as a separate, initiative, systematic, own-risk economic activity, carried out by business entities (entrepreneurs) with the purpose of achieving economic and social results, and generating profit" [2].

The division of economic entities, depending on the number of employees and the annual income from any activity, into subjects of large, medium-sized and small business, including micro-entities, is regulated by Part 3 of Article 55 of the Economic Code of Ukraine. Herewith, the entities of SMEs, depending on the organizational and legal form of management can be both private entrepreneurs and legal entities, and subjects of large business may be only legal entities. The main criteria for the division of business entities by size in Ukraine and Poland are presented in figure 1.

In Poland, the main criterion for assigning enterprises to SMEs is also the number of employees and the annual income for the reporting period. Besides, EU recommendation 2003/361 states that the additional criterion for assigning enterprises to SMEs is the balance sum. An enterprise is defined as a legal entity possessing the right to conduct business on its own, for example to enter into contracts, own property, incur liabilities and establish bank accounts. An enterprise may be a corporation, a quasi- corporation, a non-profit institution, or an unincorporated enterprise. Enterprises can be classified in different categories according to their size; for this purpose, different criteria may be used, but the most common is number of people employed. In SMEs employ fewer than 250 people. SMEs are further subdivided into micro enterprises, small enterprises, medium-sized enterprises. Large enterprises employ 250 or more people. This indicator is measured as the number of employees in manufacturing [3].

Thus, the existing criteria for the classification of economic entities in Ukraine, depending on their size, almost fully comply with European practice, and therefore Ukrainian representatives of SMEs can act as potential applicants for financial resources from international financial donors and organizations, such as European Investment bank, ESIFs and participate in international innovation projects [4].

		Micro enterprise	Small enterprise	Medium-sized enterprise	Large enterprise	
Ukraine	*Organizational and legal form of management*	Private entrepreneurs, legal entities			Legal entities	*Poland*
	Annual income	≤2 mln EUR	≤10 mln EUR	≤50 mln EUR	>50 mln EUR	
	The number of employees	<10 people	10-49 people	50-249 people	≥250 people	
	The balance sum	≤2 mln EUR	≤10 mln EUR	≤43 mln EUR	>43 mln EUR	

Figure 1 – The criteria applied for classifying enterprises as «micro», «small», «medium-sized» and «large» in Ukraine and Poland.

Source: compiled by the authors based on [2, 3].

As of January 1, 2018, SMEs represented the majority of enterprises in Ukraine and Poland (99.9% and 98.8% of the total number of enterprises respectively), providing work to 73% and 52.4% of the employed population. At the same time, SMEs produced 60.1% and 51.1% of value added respectively (table 1). For comparison, in such countries as Japan, Germany, Belgium, Italy, SMEs make up more than 90% of the total number of enterprises, and in many developed countries they give more than 50% of GDP [5].

Table 1 – Indicators of the activity of enterprises in Ukraine and Poland as of January 1, 2018

The size of enterprises	Number of enterprises, units		Percentage of total number of enterprises		Percentage of employed workers		Added value, per cent	
	Poland	Ukraine	Poland	Ukraine	Poland	Ukraine	Poland	Ukraine
Large enterprises	1637	399	0.8	0.1	47.6	27.0	48.9	39.9
SMEs, including	194 430	337 855	99.2	99.9	52.4	73.0	51.1	60.1
micro enterprises	172 907	278 114	88.2	82.2	9.1	12.4	15.8	5.4
small enterprises	15 183	44 807	7.8	13.3	13.8	16.2	13.9	11.3
medium-sized enterprises	6340	14 934	3.2	4.4	29.5	44.4	21.5	43.4
Source: compiled by the authors based on [3, 6].								

However, the structure of Polish SMEs by size and type of activity is different from that of the Ukrainian one. In the structure of Polish enterprises, there are more micro enterprises (88.2% vs. 82.2% in Ukraine), less small enterprises (7.8% vs. 13.3%) and medium-sized ones (3.2% vs. 4.4%). The largest number of SMEs operates in services, trade, construction and industry. In Poland, the activities of SMEs are export oriented, and in Ukraine they are oriented to the domestic needs of the population. The reasons for this are the lack of foreign partners and limited access to financial resources.

The number of subjects of large business decreases each year, both in Ukraine and in Poland, and the number of small and medium-sized enterprises, on the contrary, grows. This is because, unlike other SMEs, they are more mobile and able to adapt to new economic and geographical conditions.

Undoubtedly, on the one hand, they adjust quicker to the changing conditions, however, on the other hand, they are closed to the absorption of new knowledge and employing new labour from outside [7].

SMEs do not suffer significant losses, because their size is insignificant compared to large enterprises. According to the State Statistics Service of Ukraine, the profit of large enterprises in 2017 in absolute terms (in million Euro) is higher than the profit of SMEs. However, if you look at the percentage of profitable enterprises from the total, then it turns out that in SMEs it is higher. The sectors of economy in which SMEs are leading in terms of profitability are rural, forestry, fish farming; wholesale and retail trade; repair of motor vehicles and motorcycles; real estate transactions; arts; sport; entertainment and recreation.

SMEs have many advantages, but at the same time there are certain disadvantages. On the one hand, they are more flexible and, therefore, adapt quickly to changes in business conditions, on the other hand, they are more sensitive to negative effects of the external environment, which holds back their deve-

lopment. Therefore, the subjects involved in this area require comprehensive support both at the state level (government programs approved by regulatory acts) and at the level of banks (micro lending).

International practice shows that financial support for SMEs can be done at the expense of entrepreneurs' own funds, loans from banking and non-banking institutions and budget funds. Own funds (65% of the total amount of funding), bank loans (25%), budget funds (10%) belonged to the sources of financing for SMEs in Ukraine in 2017. Whereas in the EU countries the largest share is bank loans (at least 60%) [8].

The current stage of development of the banking system of Ukraine is characterized by significant influence of political and economic factors, which led to significant structural changes. The period from 2014 to 2016 is marked by a sharp decline in the number of banking institutions. As of January 1, 2014, the number of banks having a license was 180 units and by the end of 2016 it was reduced by 84 units or by 53.3%. During 2017, the decrease in the number of banks slowed somewhat and the difference with the previous years was 14 banking institutions. As of January 1, 2018, 82 banks were licensed by the National Bank of Ukraine (including 38 banks with foreign capital).

For the period from 2014 to 2017, mainly private banks with domestic commercial capital became insolvent and their number decreased by 89 units during the indicated period. The number of state-owned banks remained stable. At the same time, the volume of banks with foreign capital declined quantitatively during this period, however, in percentage terms, the volume of banks with foreign capital in the banking system of Ukraine increased (due to rapid rates of reduction of the number of domestic banks) and amounted to 35% at the beginning of 2016, 39% at the beginning of 2017 and 46% at the beginning of 2018.

During 2014-2017, the amount of loans given to customers by banks of Ukraine increased from UAH 1006 billion up to UAH 1036 billion or declined in foreign currency from EUR 53.5 billion to EUR 31.23 billion as a result of devaluation of the hryvnia. At the same time, as of January 1, 2018, the share of loans to enterprises in foreign currency in Poland is 36.6%, and in Ukraine it is 48.9%. This indicates a high level of dollarization of the Ukrainian economy. The number of non-performing loans of Ukrainian banks in 2017 rose to 54.5% or EUR 17 763 million [9]. This was due to the high problem of foreign currency loan portfolios and the rapid devaluation of the national currency.

The main problem of analyzing and managing the volumes of SME lending in Ukraine in the current conditions is the availability of public financial reporting by the NBU regarding bank lending to business entities by size only for a short period of time (from November 1, 2017 to September 1, 2018). In recent years this information has not been published.

According to the information shown in table 2 in the overall structure of loans, loan amounts granted by SMEs for the period from November 1, 2017 to September 1, 2018 were 51-53%. Of these, the largest amount of loans, in percentage terms 24-25%, was granted to medium-sized enterprises. During this period, the volume of loans granted to medium-sized enterprises increased by EUR 131 million or by 2%, and by EUR 628 million (or by 18.45%) for micro enterprises, while loans granted to small business entities decreased by EUR 287 million. Thus, the largest volumes of growth in Ukraine are typical for micro enterprise subjects.

Table 2 – Dynamics of bank lending to business entities by size in Ukraine for the period from November 1, 2017 to September 1, 2018

Date	Total loans	Loans granted to large business entities		Loans granted to medium-sized businesses		Loans granted to small business entities (except for micro enterprises)		Loans granted to micro enterprise subjects		Size not specified
		mln EUR	% of total loans	mln EUR	% of total loans	mln EUR	% of total loans	mln EUR	% of total loans	mln EUR
01/11/2017	26 289	9808	37.31	6625	25.20	3547	13.49	3404	12.95	2904
01/01/2018	25 702	9324	36.28	6294	24.49	3397	13.22	4012	15.61	2675
01/09/2018	26 917	9818	36.48	6756	25.10	3260	12.11	4032	14.98	3051

Source: compiled by the authors based on [9].

An important characteristic of bank loans granted to SMEs is a predominantly short-term lending and directing of funds to industry (42%), wholesale and retail trade (almost 35%). The short term of lending is due to the lack of long-term resources in domestic banks, limited access to borrowing on international markets, an increase in reserves as a result of high problematic loan portfolios, the deterioration of solvency of borrowers due to the recession in the economy [8].

UKRSIBBANK, KredoBank, ProCredit Bank, FUIB, PRAVEXBANK, UKRGASBANK, Ukrsotsbank, Oschadbank, PrivatBank, OTPbank are the TOP-10 of the most active banks in Ukraine in terms of lending to SMEs in the "SME Support" nomination, the Financial Oscar 2017 rating, according to Business magazine [10]. In particular, UKRSIBBANK BNP Paribas Group, ranked first, is one of the largest foreign banks in Ukraine that participates in the German-Ukrainian SME Support Program and implements it, granting loans at 13.9% per annum for up to 10 years [11].

Despite the fact that the banking sector in Poland has 621 banks (including 558 cooperative banks, 61 commercial banks, 2 associated banks), SMEs are funded mainly by small cooperative banks, land banks, and mutual credit banks.

The dynamics of bank lending to SMEs in Poland from January 1, 2016 to January 1, 2018 is presented in table 2. The share of SME loans in loans to non-financial corporations is 19.73% as of January 1, 2018. Banks provided loans mainly in the national currency, their share in loans granted to SMEs is 77.95%. Loan funds were directed primarily to operating activities (34.11%), investment needs (32.55%) and real estate (21.64%). Herewith, most loans are mortgage loans, and the impairment of loans is less than 5%.

Table 3 – Dynamics of bank lending to SMEs in Poland for the period from January 1, 2016 to January 1, 2018

Indexes	01/01/2016		01/01/2017		01/01/2018	
	mln EUR	%	mln EUR	%	mln EUR	%
Total loans, including those:	44 071	100.0	43 924	100.0	49 230	100.0
in national currency	32 375	73.46	32 630	74.29	38 373	77.95
in foreign currency	11 696	26.54	11 294	25.71	10 857	22.05
Operating loans, including those:	15 548	35.28	15 306	34.85	16 791	34.11
in national currency	13 052	40.32	13 123	40.22	15 004	39.10
in foreign currency	2496	21.34	2183	19.33	1787	16.46
Investment loans	13 887	31.51	14 016	31.91	16 022	32.55
Real estate loans	10 435	23.68	9433	21.48	10 654	21.64
in national currency	5893	18.20	5390	16.52	6216	16.20
in foreign currency	4542	38.83	4043	35.80	4438	40.88
Mortgage loans, including those:	23 103	52.42	21 846	49.74	23 528	47.79
in national currency	16 556	51.14	15 612	47.85	17 259	44.98
in foreign currency	6547	55.98	6234	55.20	6269	57.74
Impairment of loans, including those:	2289	5.19	2049	4.66	2384	4.84
in national currency	1934	5.97	1777	5.45	2129	5.55
in foreign currency	355	3.04	272	2.41	255	2.35
Source: Compiled by the authors based on [12].						

Bank Gospodarstwa Krajowego (hereinafter referred to as BGK) is the only government bank in Poland that implements SME financial support measures, recommended by the European Commission, including the JEREMIE (Joint European Resources for Micro-to-Medium Enterprises) initiative.

The Gwarancje de minimis program is implemented by BGK within the framework of the state program "Supporting entrepreneurship using bail and guarantees". The program was introduced by the Law "On Amendments to the Law on Bail and Guarantees Provided by the State Treasury and Individual Legal Entities" dated January 25, 2013, in order to improve the access of SMEs to financing and provide

publicly available guarantees that promote the development of enterprises. The value of loans provided during 2013-2016 and secured by BGK amounted to approximately EUR 14 040 million [13].

Besides, the European Investment Bank was involved in financing SMEs. During 2012-2016, loans granted to Polish enterprises amounted to EUR 25 600 million, of which 20% were invested in SMEs [14].

In Ukraine, traditionally, the most favorable lending conditions are offered by state banks, mainly due to participation in state-owned SME lending programs. To provide funds for financing (lending) of small and medium-sized businesses in Ukraine, there are programs that make it possible to reduce the cost of bank loans. These are programs of financial institutions in cooperation with various foreign funds and structures (German-Ukrainian Fund, Western NIS Fund, European Investment Fund etc). However, loans for SMEs remain more expensive than for large enterprises, that complicates their access to financial resources. The effective interest rate on loans from Polish banks for large enterprises is 3.4%, the margin is 1.53%, and for SMEs they are 4.07% and 1.88% respectively [11]. The cost of credit resources in Ukraine is 5.5 times higher and amounts to 13.5% per annum for large enterprises, 15.5% for medium-sized enterprises, 16.4% for small enterprises and 16.9% for micro enterprises [15]. In developed countries, SME lending rates vary considerably from 0.1% to 4% per annum (Japan - 0.1%, US 2.75%, Canada - 2%, UK - 2%). This contributes significantly to the development of SMEs, creating a positive image of the country and ensuring the efficiency of a market economy. Therefore, most political and economic programs resist the principle of "Think first small" [16]. The situation in Ukraine is explained by high lending risks associated with high inflation, devaluation of the national currency, difficult political situation and instability of the market situation, etc.

Discussion. The low interest of banks in lending to SMEs is due to difficulties in identifying borrowers who work in the shadow and have double accounting, as well as lack of collateral for such loans. This implies high risks and the need to generate significant amounts of provisions for such loans. As a result, profitability of banking activity is reduced. The main problems hampering the development of lending to SMEs in Ukraine can be conditionally divided into two groups: the main problems faced by lenders in the face of banking institutions in the issuance of loans to SMEs and the main problems of borrowers, that is, directly SMEs.

In the results of the analysis, it is determined that the main problems of creditors - banking institutions - include high risks of non-repayment of loans to SMEs; a low level of transparency of economic activity of SMEs; lack of reliable collateral; a low level of government support when lending to SMEs; low profitability of SMEs; high risks of bankruptcy of the enterprise.

The main problems of SME borrowers are a high interest rate, and the high cost of a commission for servicing the loan; complicated loan procedure; high requirements of banks for providing loans; the difficulty of getting a business loan from ground zero; insufficient state support for small and medium-sized business development.

Thus, there are obvious differences in the views of SME borrowers and bankers on the low lending volumes. It is also indisputable that enterprises function as one of the elements of a real economic system, and therefore respond to all changes and dynamics of key macroeconomic indicators and directions of state support for SME development. According to the Law of Ukraine "On the National Program for the Promotion of Small Entrepreneurship Development in Ukraine" of the Cabinet of Ministers of Ukraine (CMU), it is necessary to develop measures to implement such a program in Ukraine annually and provide for the allocation of appropriate funds for their implementation during the drafting of the law on the State Budget of Ukraine [17]. According to the CMU Resolution "On Approval of the Concept of the National Program for the Development of Small and Medium-sized Enterprise for 2014-2024", the State Service for Regulatory Policy and Entrepreneurship Development is the state customer of this program, which is financed from state and local budgets, and other sources not prohibited by legislation [18].

In general, ways of solving problems and stimulating the further development of bank lending to SMEs can be divided into conditional groups, in particular, proposals for changes in the macroeconomic environment through effective measures by the state and the NBU, the administrative and legal environment and the microeconomic environment of banks and SMEs. Figure 2 presents the main directions for solving the problems of bank lending to SMEs in Ukraine.

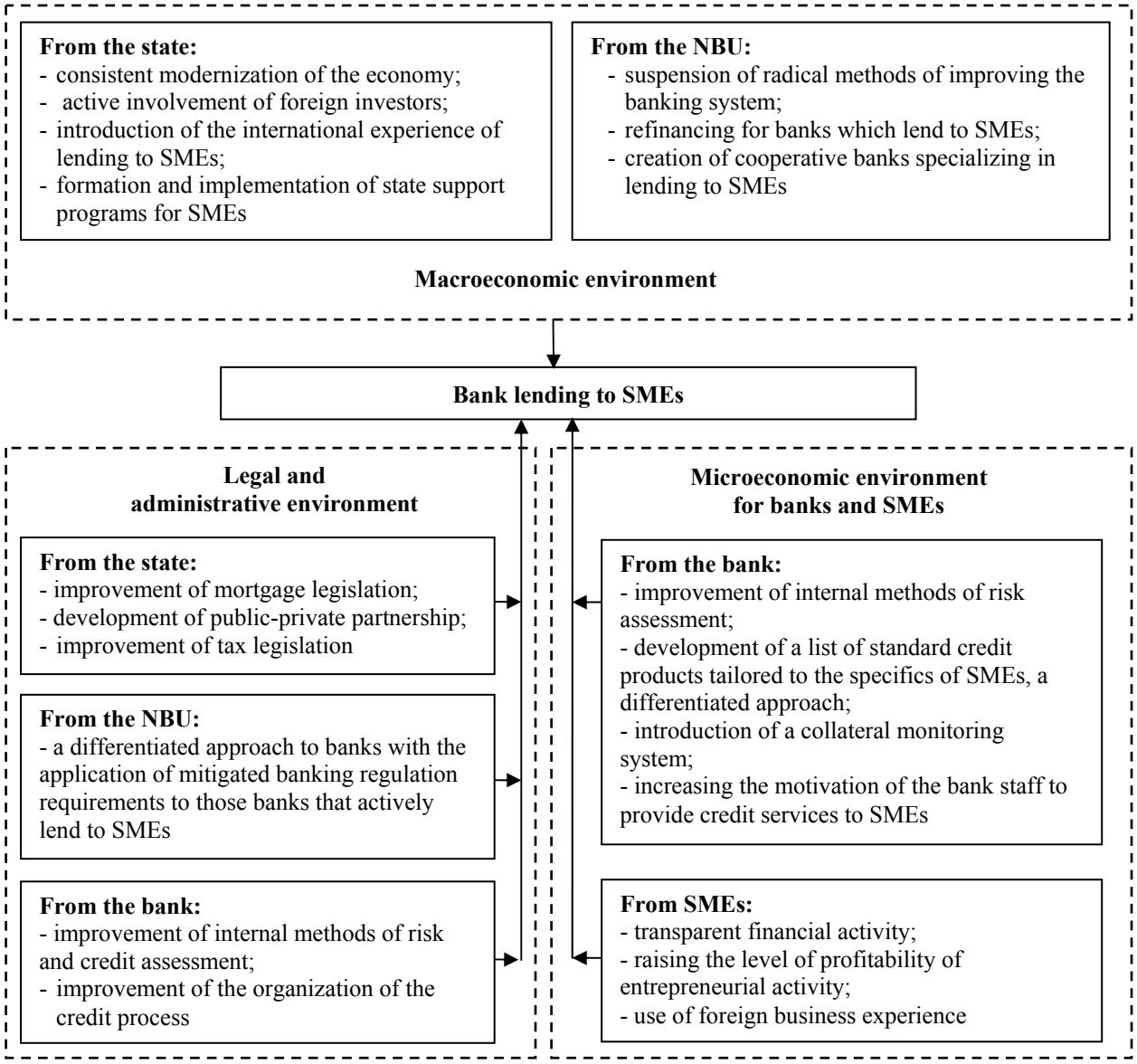

Figure 2 – Directions of development of bank lending to SMEs in Ukraine
Source: Compiled by the author.

Active development of bank lending to SMEs is impossible without improving the macroeconomic indicators of the country's economy. The government should actively pursue the consistent modernization of the economy, engage in the implementation of state support programs for SMEs, attract foreign investors and use the international experience of SME lending. In modern conditions, there is a need to provide banks with the possibility of cheaper refinancing from the NBU, to participate in the development of national and regional SME lending programs, as well as to create programs for repaying or subsidizing interest rates on SME loans. Besides, it is important to create cooperative banks specializing in SME lending, on the example of Poland.

The legal and administrative direction involves changes in the legal and regulatory environment, which entails improvement of tax and mortgage legislation; from the NBU, a differentiated approach to banks with the application of mitigated banking regulation requirements to those banks that actively lend to SMEs; improvement of internal administrative provisions of banking institutions.

The microeconomic environment of banking institutions requires improvement of the product line, adapted to the needs of SMEs; introduction of collateral monitoring system; improvement of internal risk assessment methods; increasing motivation of bank staff.

Support measures for SMEs include:

1) activities conducted within the social and economic governance: activities conducted with a view to improving the framework conditions for SMEs (legal regulations, improving infrastructure, overcoming bureaucratic obstacles encountered by SMEs), supporting SMEs in public tenders;

2) intervention in the course of economic processes: activities targeted at improving the financial condition of enterprises (tax reliefs, credit/loans, credit collaterals, direct financial support), increasing knowledge and qualifications (training courses, advising) [19].

Conclusions. Thus, according to the results of the study, it can be concluded that SMEs are one of the leading factors in the development of the state's economy, which involves the employment of the vast majority of employees and provides more than half of production in the country's economy. Credit support is the economic foundation for successful SME development. The investigation of the specifics of SME functioning, the volumes and peculiarities of bank lending to SMEs in Ukraine and Poland, has revealed the main problems hampering the development of bank lending to SMEs in Ukraine, and namely: high credit risks, unstable economic situation, high interest rates, insufficient state support. Overcoming these problems and introducing new approaches to SME lending by means of effective measures by the state and the NBU, improving the administrative and legal environment and microeconomic environment of banks and SMEs will facilitate increased production restoration and structural transformation of entrepreneurial activity.

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КӘСІПКЕРЛІК ЖӘНЕ ОРТАЛЫҚ КӘСІПОРЫНДАРДЫҢ БАНКТІК НЕСИЕЛЕРІ: УКРАИНА ЖӘНЕ ПОЛЬША ТӘЖІРИБЕСІНЕН

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БАНКОВСКОЕ КРЕДИТОВАНИЕ МАЛЫХ И СРЕДНИХ ПРЕДПРИЯТИЙ: ОПЫТ УКРАИНЫ И ПОЛЬШИ

Аннотация. В условиях реализации стратегии европейской интеграции Украины особую актуальность приобретают вопросы формирования конкурентной среды, создание дополнительных рабочих мест и сокращение безработицы, повышение социально-экономической защиты населения. Именно поэтому стимулирование малого и среднего предпринимательства остается одним из приоритетных направлений общегосударственной и региональной экономической политики. МСП является формой организации деятельности, при которой учитываются интересы индивида, а также формируются условия для повышения его собственного благосостояния. Основным критерием отнесения предприятия к субъектам МСП является численность работников за отчетный период и годовой доход. Кроме того, могут использоваться другие (дополнительные) критерии, как, например, сумма баланса в Польше. Сравнительный анализ критериев отнесения предприятий к субъектам МСП свидетельствует об соответствии украинского действующего законодательства правовым нормам и требованиям законодательства европейских стран. К основным источникам финансирования МСП можно отнести собственные средства субъектов предпринимательской деятельности, кредиты банковских и небанковских учреждений, а также бюджетные средства, средства международных фондов, организаций и др. Обобщение и систематизация опыта кредитования МСП в Украине и Польше свидетельствует, что к основным проблемам, которые сдерживают кредитную активность банков следует отнести: высокий уровень рискованности МСП (особенно проектов с «нуля»); низкий уровень прозрачности экономической деятельности МСП; отсутствие надежного залога; низкий уровень поддержки со стороны государства. Основными проблемами МСП-заемщиков являются: высокая стоимость кредитных ресурсов; сложная процедуру получения займа; высокие требования банков к обеспечению кредитов и др. Именно поэтому формирование

благоприятной бизнес-среды для развития МСП требует эффективного партнерства власти, общества и бизнеса, в частности, разработки и реализации государственных программ поддержки МСП, стимулирования банковского кредитования МСП, привлечение внешних инвесторов и использования международного опыта поддержки МСП. Комплексная реализация указанных мер будет способствовать социально-экономическому развитию и повышению уровня жизни населения.

Целью статьи является исследование опыта банковского кредитования МСП в Украине и Польше и определения возможностей использования зарубежного опыта при разработке государственных и региональных программ поддержки МСП в Украине.

Ключевые слова: малые и средние предприятия, банковское кредитование, кооперативный банк, макроэкономические показатели, условия кредитования.

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REPRESENTATIVE MODELS OF MILITARY CODES IN THE KAZAKH HISTORICAL NOVELS

Abstract. The article deals with representative modeling of the military code in the Kazakh historical novel. The categories of narrative convention, plausibility, generalization, proposed by S. Chatman, with reference to modern Kazakh prose are identified and explored. Military codes make up a significant amount of all cultural codes embedded in the narrative. The referential and phenomenological aspects of the semantics of military code are implemented through a system of implicit and explicit images, motives, and informative descriptions. Military codes are also interpreted in the article as variants within a culturally more extensive nomadic code. The authors claim that the modeling of military codes is a result of a complex process of interactive networking of the marked concepts, from a detailed description of weapons, uniforms and types of military units to fictional military events corresponding to the historical epoch recreated in the narrative. The military codes of specific subject-matter content are accompanied by hidden, intentionally significant mythologems, philosophems, and ideologems. For the documentary and quasi-documentary narratives, the effect of credibility and viability of the presented events, participants and situations is caused by the immersion into the historical context of the work the recipient is supposed to be familiar or unfamiliar with. Establishing associative-allusive connections causes a particular kind of evocation, namely that of "awakening" of the reader's historical memory and of his awareness of the deep continuity with the past. A typology of the military codes of modern Kazakh historical fiction is proposed. It embraces historiosophemes, historical ethnonyms and toponyms, historical realities, philosophems and ideologemes, mythologems, rituals, naming titles of the military, political and priestly hierarchy. The article was written as part of the grant project AP05133019 funded by the CS of the MES RK.

Keywords: Kazakh historical fiction novel, military cultural code, narrative, convention, plausibility, construct, modeling, reference.

Introduction. Narrative strategies of the historical prose of Kazakhstan are distinguished by a great variety and novelty of the subjects, images, spatial-temporal and structural authenticity. The potential referential multiplicity of a historical and / or quasi-historical narrative in an artistic text allows to model an unlimited number of narrative situations, plot twists, to combine descriptive elements and narrative elements in various proportions. Recreating a true picture of the past poses a challenge for the writer to preserve the necessary balance between the likelihood and the fictionality, "narrative convention" and "life-likeness" [1]. Seymur Chatman considering the nature of *convention*, its organic connection with likelihood (*verisimilitude*) and *narrative coherence*, notes:

The convention of "filling in" by verisimilitude is singled out first for discussion because it is so basic to narrative coherence. Its discussion may serve as a suggestive prototype for later discussions of other narrative conventions. Audiences come to recognize and interpret conventions by "naturalizing" them ("nature" as one half of the anthropological dichotomy *nature/culture* established by Lévi-Strauss). To naturalize a narrative convention means not only to understand it, but to "forget" its conventional character, to absorb it into reading-out process, to incorporate it into one's interpretive net, giving to it no more thought than to the manifestational medium, say the English language or the proscenium stage.

The notion of "naturalization" is very close to that of verisimilitude, the ancient appeal to the probable, rather than the actual. Structuralists have recovered this concept with zest, for it explains the technique by which the reader

"fills in" gaps in the text, adjusts events and existents to a coherent whole, even when ordinary life expectations are called into question [1, 49].

He emphasizes that the discussion of the connection between conditionality and likelihood is important precisely for a narrative text that constructs "reality" or "vitality" as purely cultural phenomena:

What constitutes "reality" or "likelihood" is a strictly cultural phenomenon, though authors of narrative fiction make it "natural." But of course the "natural" changes from one society to another, and from one era to another in the same society [ibid].

According to the structuralists, the norm for verisimilitude is established by previous texts – not only actual discourses, but the "texts" of appropriate behavior in the society at large. Verisimilitude is an "effect of corpus" or of "intertextuality" (hence intersubjectivity). It is form of explication, pointing from effect to cause, and even reducible to a maxim. Further, because maxims are public, that is, "tend go without saying," they may be implicit or backgrounded [1, 50-51].

In classical narratives, overt explanation only becomes urgent for acts that are improbable by prevailing (public and generic) standards for behavior, but then it is *de rigueur*. It takes form of narrative commentary I call "generalization" [1, 51].

Making a narrative and its events plausibile is related to the category of generalization identified by Chatman. For the genre of the historical novel such generalization of the events described becomes the main factor for creating the appropriate mood of the reader to help him recognize and decode the meanings of the events described with the help of its associative memory, previous experience and direct text links. In this sense, according to Chatman, the military code, among other cultural codes embedded in the text structure, constitutes a "generalized narrative comment", including an open and hidden reference, constituting the "logical framework of the phenomenon of sensual actualization of historical time in literary narration" [2].

Methods. The aim of the research has called for the combination of narrative, motivational, semiotic, structural, and hermeneutical methods of analysis. Such a versatility of approach is dictated by the complex nature the phenomenon under investigation, namely cultural codes and their functioning within the Kazakh historical novels.

Results. ***Cultural code as a sign structure.*** From the semiotic point of view, the cultural code is a specific artistic reproduction of a particular (cultural) tradition, the specifics of philosophy, worldview or the world order. Like any sign (in the sense of F. Saussure), a cultural code in an artistic text has two indivisible sides – external and internal. The important qualities of a cultural code in the context of literature are its functional durability, length in time, variability, implicit and explicit embeddedness in the narrative and the plot. In this regard, military codes illustrate exceptional semantic bulk, representative scale.

Hence, the appearance of many associative cultural links of the code with other concepts, subjects, ideas, etc in the reader's (listener's, viewer's) mind. Mental bridges between the verbal object of description or narration and the associative and referential levels are investigated in detail by Allan Paivio [3] and James M. Clark. This theory explains the reasons, the cognitive mechanism of the emergence and subsequent processing of a set of referential and associative connections between the named subject and its mental, visual, tactile and other characteristics.

According to Clark and Paivio, "DCT's *(Dual coding theory)* other structural assumptions concern the connections that link verbal and nonverbal representations into a complex associative network. Links between two systems are called referential connections. They join corresponding verbal and imaginal codes and potentially allow such operations as imaging to words and naming to pictures" [4, 153].

Visual codes fix "a one-time space-time plan", and "verbal code provides a solution to problems of abstract symbolism unfolding in time". If the text is hypothetically attributed to a certain verbal code, then the associative-referential level "activating similar memory traces" (Paivio) makes the text space more resilient, energetically compressed and maximally semantically and synesthesia capacious. The given remark to a certain extent, for example, reflects the specifics of the historical narrative in fiction. The representative models of the military code in the structure of the historical novel reflect the obvious and hidden mechanisms of various associative and mental generalized coordinates of the narrated story.

One of the most relevant and permanent types of cultural codes in historical novels is that of traditionally military codes. This is due to the specifics of artistic understanding of national and world history as a voluminous meta-narrative, replete with events, facts, personalities, one way or another connected with universal codes – philosophers of war and peace.

According to the phenomenological logic of the development of civilization, great history is replete with examples of various wars. In fact, the history of mankind, recorded by historians, is the history of various wars, liberation and conquest. War, in a figurative and direct sense, becomes the background for the creation of meta-narrative structures of a modern historical novel.

When considering any cultural code, including the military one, its informative-communicative nature of the military cultural code as a phenomenon of artistic and social consciousness, involving the design of broad associative fields. Incidentally, it is the military and, perhaps, the religious cultural code that is currently quite frequent and variable in various discourses (literature, art, mass media), which brings it closer to the conceptual metaphor [5]. Here we should take into account the semiotic nature of the code, as indicated by Seymour Chatman:

"The latter (*discourse*) is clearly the substance of narrative expression, even where the manifestation is independently a semiotic code. But commonly *codes serve other codes*" [1, 24].

Seymur's idea may be revealed by the analysis of military codes in historical prose, related to a large group of historical and cultural codes.

The military code serves to disclose and comprehend the culturally more significant historical-cultural aspect, the cultural code extended in time, namely, the nomadic cultural code. In other words, starting from the idea of Seymour Chatman, the military codes serve the disclosure of a nomadic cultural code. In other words, the military codes that are embedded in the text structure primarily perform an informative, communicative and axiological functions. They reflect the specificity of the described historical epoch, the distant time of creation and development of powerful superpowers, military nomadic societies – these are large associations of *Sacae* tribes under the leadership of *Queen Tomiris* (or *Tumar*; in *Sacae* (1997) [6] by B.Zhandarbekov), and the association of *Hunnu* in the book "Dassaria" (2008) [7] by Abay Tynibekov, and, of course, the unification of the Mongols into the mighty empire of *Chinghis Khan* (1939) [8] by Vasili Yan and "Gibel' Otrara. Poslednie gody Chinghis Khana" (1993) [9] by Hasen Adibayev. We use the book of the Soviet Russian writer V. Yan as a comparative illustration of books that are thematically close, but published at different times.

It can be said that in an aggregated sense, military codes in historical works are a kind of compressed reflection of the era. As a rule, an event or a chain of events important for understanding the specifics of the formation and development of ancient nomadic states is placed in the center of the narration. This article uses the results of a comprehensive narrative analysis of historical novels created at different times. They are united by a common theme - a reflection of the ancient (VI century BC) and early medieval (X-XIII centuries) Proto-Turkic epochal history. All of these books, except for the book of H. Adibayev, are written in Russian. We worked with an authorized translation of the latter into Russian.

Military code in the structure of historical narrative. The military code in the artistic text is understood as an extensive historical and cultural construct that most fully reflects the specificity of the described epoch and society, constituting a significant amount of descriptive elements embedded in the narration. Analysis of Kazakhstan's historical novels of recent years has shown a high frequency of military codes, more than 30% of the text space is occupied by direct and indirect references to a particular code. Their informative and axiological content increases as the plot conflict unfolds in the direction of the narrative about the actual military events.

The modeling of military codes takes place due to the inclusion in the narration of the corresponding marked concepts, a wide representation recorded in historiography and fictional military events, including a detailed description of weapons, uniforms, the nature of military units corresponding to the described historical time. The military codes of specific subject-matter content are accompanied by hidden, intentionally significant myths, philosophies, and ideologies.

Military cultural code (in the aggregate sense - as an informative-communicative sign structure) in historical works is realized through:

• historiosystems (historical facts and events, interpreted from the point of view of a military, imperial doctrine, the dominant ideology);

• historical ethnonyms and toponyms (Ishguz, Sakae, Persians, Hunnu, Mongols, Medes, Assyria, Media, Lydia, Urartu, and Mongols, Kerulen, Onon);

• historical realems (names of weapons, homes, musical instruments; measures of length (farsangs, daily calculus of the journey - three days' journey); military communications - fire telegraph, trade

caravans, messengers, spies, ambassadors, intelligence officers, letters; special passes - a golden plate with the image of a falcon, a leopard, clay tablets);

- philosophems and ideologems (binary oppositions war - peace, beginning - end, life -death, freedom - slavery, good - evil, justice - injustice, law - lawlessness; Steppe - East, Steppe - West; as well as a national idea, unity) ;

• mythologems (ancient sacred Jurassic, Ancient Iranian. Ancient Indian pantheon - Tengri, Ahura Mazda, Nergal, Zabab, Teysheba and others);

• ritualems (rituals of the beginning and end of the war - consecration of the sword with fire and milk, the blood of sacrificial animals; feasts; wedding, funeral rituals);

• names of titles of the military, political and priestly hierarchy (Khan, Tsar, Tsaritsa, priests, centurions, foremen).

Military cultural codes in the narrative play an important role in creating the impression of the likelihood of the events being narrated. Therefore, they are given in the text not only in a static description, but also in the dynamics of battles.

Philosophems. History is unthinkable without philosophy, without a deep understanding of its beginning and end, in general, the phenomenon of war. The basis of an action, especially as large-scale as war, is always a certain idea. These can be ideas of domination, liberation, justice, and others. Binary opposition war-peace is the most frequently articulated concepts in modern literature. World and local wars, economic wars, battles, armed clashes become a reality of fact, forming together with the artistic and publicistic component of the global meta-narrative.

The philosophy of war is directly dependent on its nature and goal setting. Aggressive war aims to expand the boundaries, seize foreign territories, establish the rule of their people and state over the conquered. The war of liberation sets as its goal the liberation of its territory from foreign troops, the preservation of state and national identity. This is clearly shown in the novel “ Sacae” by Bulat Zhandarbekov. The all-powerful king of the Persian empire Cyrus, "Lord of the World," one of his titles, waged wars of conquest for twenty years, but, having met with the Sacae troops of Queen Tomiris, was stopped and executed. The psychology of war is interesting. The cult of force (both physical and moral) is one of the most frequent codes in historical novels. Philosopheme, understood as the binary opposition *war – peace,* is in the novels considered the central code, the key to the conceptual metaphor of war is an absolute evil.

In the Kazakh historical novels narrating the events of the times of the creation of the powerful nomadic and sedentary states of Asia and the East (III – VI centuries BC, early medieval Xth and XIIIth centuresy), the military code reflects the state of the military-nomadic society with its tribal structure, written and unwritten laws, tactical and strategic features of warfare. Thus, in the “ Sacae” dilogy, not limited to the description of “steppe civilization” (term by Kazakh historian M. Kozybayev), “steppe knowledge” (term by Kazakh philosopher A. Kodar), the narrator “behind the scenes” tells about the beginning, flourishing and death of such shrouded in mystical mystery, legendary cities and states like Assyria, Babylon, Media, Libya and others. Extensive descriptive inclusions precede the actual plot collisions, replete with a mass of events, personalities of historical and fictional, causing associative chains in the minds of the reader.

The noted detailed, often metaphorical, representation of ethno-cultural, religious, religious, ceremonial, mental features of both Sacae tribes and the peoples around them is a characteristic feature of the poetics of the analyzed novel. Inclusion in the unified personal sphere of the dilogy of well-known world images-symbols, mythological and folklore scenes, a description of the specificity of the military strategy of various nations, its artistic "approbation" through the introduction of a significant number of battle scenes allowed the writer to create an original full-scale epic work possessing internal unity, great plot-event dynamism . A fragmentary narrative, for example, of only one event - a battle, would hardly have solved such a task.

The documentary narrative of the dilogy is also created through direct intertextual inclusions: the famous *Behistun* inscription of Darius I is cited as epigraphs to parts of the second book of the feat of Chirac, with a detailed description of the acts and events from the life of the last Assyrian inscriptions of the 9th century BC. In the novel “Sacae” one can note the presence of a voluminous historical documentary narrative plan reflecting historical and cultural facts of ancient nomads recorded in world

historiography. He plays the role of an important but additional means in the novel's storyline. In creating the impression of a multidimensional artistic space, in the plot movement, the main meaning, of course, is of saturated fictional material, fictional events.

Historical genre, of course, one of the most complex genres, if not the most complex, literature. It is necessary to keep the necessary balance between fiction, the artistic component of the text, and historical authenticity. Reflected and fixed in historiographical works, many (but not all) historical events, organized into a special "semantic line" [10, p. 29], become embossed, significant and even convincing in a work of art, because, besides the informative function, it is true a work of art has a great "power of aesthetic impact" [11].

Through historical (historical and cultural), documentary or quasi-documentary narratives embedded in the artistic text, a kind of "information condensation" occurs [ibid], its compression by means of a system of cultural codes, ethnic concepts and universals. After all, the denser a certain substance, especially historical information, the stronger the effect of exposure, incl. aesthetic, on the recipient. It is appropriate to quote the words of Yu. Lotman that "the historian is doomed to deal with texts. Between the event "how it happened" and the historian is the text, and this radically changes the scientific situation. The text is always created by someone and for some purpose, the event appears in it in encrypted form. The historian will, first of all, play the role of a decoder. The fact for him is not the starting point, but the result of hard work. He himself creates the facts, seeking to extract extra-textual reality from the text, from the story of an event – an event" [ibid].

Therefore, for a writer working in a historical genre, the field of narration, by and large, can be limited only by the measure of his competence, awareness, erudition, talent. Historical, cultural, ethnological informational content of such a narrative is equal, as well as its communicative possibilities are rather voluminous.

Despite significant differences in style, the choice of the subject matter itself (different fragments of the ancient and early medieval history of the Steppe) unites these authors in their desire for a deep philosophical understanding of the thousand-year national history and its iconic, including military, events. The history of the people is directly related to the formation of statehood and ethnic identity. For example, in the novel "Sacae" [6] the author faced a very difficult task - to show the sources of Kazakh statehood, the formation of a national mentality, culture and spirituality through artistic means in as wide as possible boundaries. A multidimensional novel narration as a conceptual solution of the above-mentioned supercomplex aesthetic-ideological task in a special way structures the text space. It becomes multidimensional, multi-event, connected with the "author's system of modeling the world" [11].

Military codes widely represented in the literature (names of various types of weapons, military units, structure of the armed forces, description of tactics and strategy of warfare, military command, hierarchy of the army structure, number and calculation of military formations (by the hundreds - fifty hundred - 5000 soldiers), battle cries and tribal banners (uranium), uniforms, and others) generally reflect the specifics of the world order of the ancient and early medieval nomadic tribal society. A large place in the worldview and peace-building of the ancient nomads was occupied by the preparation and conduct of local battles and major military actions. As noted by Zh. N. Shaygozova, R. R. Muzafarov, M. E. Sultanova: "Nomadic tribes have laid the foundation of the first Eurasian empire in the VI century of Christian era, but also it impacted greatly on the Great Steppe's culture. Traditional nomads' world perception considered a human being as a solid part of the environment" [12, 104].

The abundance of volumetric descriptive elements in the above texts makes it possible to recreate a special world of ancient history, to accomplish, in the words of W. Schmid, "extension in time and space". In general, for the historical genre in fiction, reliability or, more precisely, maximum approximation to authenticity and truthfulness is an important, if not the main, categorical feature of the genre. Otherwise, we are dealing with a quasi-history or a variation on this or that topic.

At the same time, it is also a question of historical memory, its fullness and objectivity. The distinction between artistic truthfulness and historical authenticity is subtle, the violation of which can cause "the loss of any sense of history, both as hope and memory" (according to British scientist Perry Anderson, the book The Origins of Postmodern). Then talk about any aesthetic, ideological or other value of the work does not have to. N. Znamenskaya arguing about the specifics of the modern historical novel, notes that "a historical novel in realistic literature is a work created on the basis of the principle of historicism and

having clear signs - time distance (the action takes place in the past), historical flavor, the image of a historical conflict or event, historical and artistic issues proper" [13, p. 156]. All of these signs, of course, are present in the books in question.

In historical works, it is military codes in all their textual volume that contribute to the creation of a documentary and /or quasi-documentary narrative, most often their synthesis within the same artistic text. However, if the documentary narrative prevails, then it makes sense to talk about documentary prose with a minimal fiction component.

Note that, of course, the inclusion in the text of these narratives cannot and should not replace the fictional material proper, their functions have an additional meaning. A documentary narrative as a narrative of a real event that occurred in history, directly or indirectly confirmed by some factual material, can form an eventuality in a large spatial-temporal range. Events unfold on an incremental basis (for example, dates, times of famous battles, preparation and conduct of other military operations), layered on one another. These events are aligned to a specific narrative line. The quasi-documentary narrative fits in clearly with the fictional content of the novel itself, its "molecules" – quasi-documents are surreal, fictional, and often fantastic. Documentary and quasi-documentary narratives can be graphically designed (page-by-page explanations, notes, references to sources). The inclusion of documentary and quasi-documentary narratives is intended to create the impression of maximum credibility, likelihood of events, which are described in the work, ultimately, immersion of the reader into the complex, ambiguously interpreted, often taboo world of national and world history.

It is also worth saying that for a quasi-documentary narrative, the effect of achieving apparent credibility, *likelihood* [1] of the presented events, persons, situations through the recipient's immersion element in the supposedly known or unfamiliar historical context of the work is important. Such a technique of establishing associative-allusive connections causes a kind of "awakening" of the historical memory of the reader / recipient, his awareness of the deep continuity with the past. And in the formation of these types of narratives, various, especially historical and ethnic and cultural ones, especially military codes, play a significant role. Historical time, epoch, space finds a peculiar reflection in them. This is the moment of verbalization of the visual code, about which Allan Paivio speaks.

It is interesting that in the novels of the Soviet period on the historical perspective (ancient and early medieval history of Asia) V. Yan, I. Kalashnikov, I. Yesenberlin and others the artistic component prevailed over the historical component itself. Story collisions, the characterization of characters, the unfolding of internal and external conflict, a description of the state of the hero and characters against the background of the described historical events came to the fore. This is the aesthetics of the Soviet novel, in the origins of which, probably, of course, the basic concept of the "dialectics of the soul" of L. N. Tolstoy, brilliantly unfolded in the iconic epic War and Peace.

In the novel, Sacae already introduces a sufficiently large amount of various descriptive elements (a detailed almost ethnographic description of not only Sakae tribes, but also neighboring countries, the countries of Western Asia and the ancient East - Persia, Babylon, Egypt, Media, Lydia and other countries), although aesthetic part prevails. Story collisions, artistic intrigue are still in the foreground.

However, in the newest novel, the *Giants* [7], the corpus of descriptive elements of armaments, tactics of military operations, the army hierarchy, descriptions of the actual military actions occupies a dominant place, unfortunately, because of which the perception of these fragments is hampered, the artistic mode of the narration itself decreases. In addition, there are practically no necessary explanations of individual military codes, for example, the locations of various troops, battles, and other significant points in the structure of the narrative. The abundance of historical toponyms, unknown to the general public, makes the reader literally become the decoder of such information. And the opposite effect occurs: not actualization, but suppression of reader's reflection and intuition. Spatial code becomes here, figuratively speaking, a spatial curse of text. Unfounded from the point of view of the aesthetics of the genre, the stretching of time and space, the descriptive congestion of the text ultimately reduces the necessary "narrative tension" [14]. The latter is understood as "a flexible multilayered cognitive-affective sign construct built into the text addressing / interpretation program" [14, p.8]. In other words, according to the theory of Paivio, in this text, the informative layer in view of its hyper-volume "drowned out" the levels of decoding the information received, without activating any traces of memory, if it is not just the memory of a professional historian of ancient times. The pursuit of credibility through the inclusion of many details of

the description of the terrain that do not carry a serious functional load seriously damaged the conventional attitude to the viability of the narrative of this novel, its aesthetic value.

Let us also dwell on another abstract military code: the concept of military prowess, courage. To convey the atmosphere of the events described and in support of Paivio's idea of 4-level coding, we'll quote from Sakae's novel (episode of returning home of Rustam, king of *Sakā tigraxaudā*, husband of the Queen of Massagets Tomiris, through the only possible mountain transition of the Caucasus):

Five hundred horsemen rode a step into a step. The Caspian was rustling to the right, the cliffs to the left.

Maskuts (the name of one of the Caucasian tribes) appeared at once, as if they had grown out of the rocks. Slowly, they adjusted the arrows, pulled the string, and ... froze. It was incomprehensible. The chertzians (sakas) continued to move as evenly as if without noticing the archers bringing death to them. Maskuts looked inquiringly at their leader, but he, stunned by this contempt of strangers for death, hesitated. The bowstrings loosened, bows lowered, and the newcomers continued on their way. Accidentally or deliberately, but she screamed an arrow and quivered at the withers at Zhel'. Zhel' started, but Rustam firmly squeezed his side with his legs, jerked the reins briefly, loosening them immediately, and Zel', as if he understood his master, did not stumble, took the same step. Only a slight shiver of withers showed the burning pain of a horse. Maskuts lowered bows. They stood to their full height, watching the unusual warriors gaze.

Maskuts respected courage. [6, p. 244] *(Ttranslated into English by S.Altybayeva)*

The given episode illustrates the reverse transition of a verbal code into a visual one, thereby generating a mass of symbols, associations and references, greatly enhancing the semantic, emotive and cognitive levels of the narrative. Such verbal fragments also actualize its pictorial component, *imagery value* (the term of A. Paivio). This explains the possibility of artistic conversion of the historical novel in the format of cinema, theater, painting and other visual arts.

The broadband military code as an integral construct can also be expressed in poetic inserts, for example, in *Sakae*, fragments from the *Clay book* by Olzhas Suleimenov are used:

We mounted the *blazing* horses,
Hands pressed to the stomachs
And the *horde* prayed
Before her
Pierced the *banners*, the *banners*,
In the center is a *white flag*
Wolfhead and *Sunshine*,
Flags swam *red*.
To *sunset* countries brought the *color of the sunrise*.
They learned that the sunsets of the *Sumerian* land
There were *color*s of the *eastern* banner
The wives of the Sumerian watered themselves,
We return old
Our fights will be fights
Mountain rivers – *aryks* [6, p. 286]. *(Translated into English by S. Altybayeva)*

In this passage, detailed *italicized* epithets, indirect historical and ethnographic details attract attention: they give the novel an additional rhythm, intentional and referential volume. Visualization of the allegory of the nomadic horde as a powerful element of nature allows you to deepen the story, give it a corresponding associative and emotive impulse.

In addition, such poetic inserts, in addition to telling the text of the necessary rhythm, narrative elasticity, carry a large informative and cognitive load. In fact, earlier, in the ancient Steppe, it was the oral traditions that originally reflected the history of the epochal movement of nomadic tribes. In historiography, the direction of studying such materials, as well as legends, parables, and epics, is actively developing. For example, the famous common for all Turkic peoples epic XIV–XVII centuries. "*Kyrymnyn kyryk batyry*" (in Kazakh), describing in a bright poetic form the life and deeds of forty Crimean batyrs during the Golden Horde period. They describe the real historical events, fights, battles. Such oral sources primarily convey the specifics of the nomadic (nomadic) mentality, the psychological dominants of the ancient nomad. Of course, the poetic intext built into the artistic text are copyright. In the books under review, these are the poem by Olzhas Suleimenov, the poetic treatment of the folklore source of A. Shapiro (the novel of V. Yan).

Conclusion. Historical and cultural codes, the military ones in particular, play an important role in the formation of a wide-format multidimensional historical narration. In the literary discourse, the pursuit of depth of generalizations, the search for voluminous universal means and techniques in the development of a historical plot, images, time and space leads the artists naturally to the idea of encoding or "conceptualizing" the data that can establish "a connection between specific text fragments (units of analysis) and more abstract categories" [15, 333]. Actualization and "conceptualization of data" (general coding theory) [ibid], for literary, media, and other types of humanist discourse, is becoming a key to the mental platform for finding original aesthetic tools.

This is due to the nature of artistic consciousness, which operates, in addition to specific subject-real, abstract, often metaphysical categories and concepts. Hence, its exceptional opportunity to actualize, conceptualize and broadcast a significant *epistemological*, cognitive plan with a considerable amount of information, to expand and deepen the paradigm relations between textual units and the resulting associative series. In this regard, the military cultural code serves to uncover a more voluminous code: the nomadic one. And in a broad sense, along with the other codes, it serves to recreate individual pages of national and world history, reviving the national spirit and its cultural and educational role.

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ҚАЗАҚСТАННЫҢ ТАРИХИ РОМАНДАҒЫ ӘСКЕРИ КОДТЫҢ РЕПРЕЗЕНТАТИВТІК МОДЕЛЬДЕРІ

Аннотация. Мақалада Қазақстанның тарихи романтанудағы әскери кодтың репрезентативтік модельдерінің өзекті мәселелері қарастырылады. Қазіргі қазақ прозасына қатысты С. Чатман ұсынған шартты әңгімелік, шындықты сипаттайтын, генерализация сияқты нарратив теориясының маңызды категориялары анықталып, зерттеледі. Әскери кодтар баяндауға енгізілген барлық мәдени кодтардың санынан айтарлықтай көлемді құрайды. Әскери код семантикасының референциалды және феноменологиялық аспектілері имплицитті және эксплицитті бейнелер, уәждер, ақпараттық дескрипциялар жүйесі арқылы іске асырылады. Әскери кодтар, сондай – ақ көлемді мәдени код-номадтық кодтың ашылуына қызмет етеді. Әскери кодтарды модельдеу баяндауға тиісті таңбаланған тұжырымдамаларды енгізу арқылы, тарихнамада тіркелген және ойдан шығарылған әскери оқиғаларды кең репрезентациялауға сипатталатын тарихи уақытқа сәйкес келетін қаружарақты, киім-кешекті, әскери бөлімшелердің сипатын егжей-тегжейлі сипаттауды қоса алғанда жүргізіледі. Нақты пәндік-заттық мазмұнның әскери кодтарына жасырын, интенционалды маңызды мифологемалар, философемалар, идеологемалар жатады. Құжаттық және квазидқұжаттық нарративтерді қалыптастыру үшін ұсынылатын оқиғалардың, тұлғалардың, жағдайлардың өмірге қол жеткізу әсері реципиенттің оған белгілі немесе бейтаныс шығарманың тарихи контекстіне батыру элементі арқылы маңызды болып табылады. Мұндай әдіс оқырман немесе реципиенттің бұрынғы өткен тарихи жадысындағы «ояту» арқылы ассоциативаллюзивті байланысты қалыптастырады. Қазақстанның қазіргі романтанудағы әскери кодтарының типологиясы: тарихнамалар, тарихи этнонимдер мен топонимдер, тарихи реалемалар, философтар мен идеологемалар, мифологемалар, ритуалемалар, әскери, саяси және жорық иерархиясы титулдарының атауы ұсынылды. Мақала AP05133019 жобасы бойынша ҚР БҒМ ҒК гранттық қаржыландыру аясында орындалды.

Түйін сөздер: тарихи роман, әскери мәдени код, шартты, шындыққа сәйкес, конструктивтік, модельдеу, референция.

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РЕПРЕЗЕНТАТИВНЫЕ МОДЕЛИ ВОЕННОГО КОДА В ИСТОРИЧЕСКОЙ РОМАНИСТИКЕ КАЗАХСТАНА

Аннотация. В статье рассматривается актуальная проблема репрезентативного моделирования военного кода в исторической романистике Казахстана. Выделяются и исследуются такие важные категории теории нарратива, как повествовательная условность, правдоподобие, генерализация, предложенные С. Чатманом, применительно современной казахской прозе. Военные коды составляют значительный объем от

количества всех культурных кодов, встроенных в повествование. Референциальный и феноменологический аспекты семантики военного кода реализуется через систему имплицитных и эксплицитных образов, мотивов, информативных дескрипций. Военные коды служат также раскрытию более объемного культурного кода – номадическому коду. Моделирование военных кодов происходит за счет включения в повествование соответствующих маркированных концептов, широкую репрезентацию зафиксированных в историографии и вымышленных военных событий, включая детальное описание вооружения, обмундирования, характера воинских подразделений, соответствующее описываемому историческому времени. Военным кодам конкретного предметно-вещного содержания сопутствуют скрытые, интенционально значимые мифологемы, философемы, идеологемы. Для формирования документального и квазидокументального нарративов важен эффект достижения видимой достоверности, жизнеподобия представляемых событий, лиц, ситуаций через элемент погружения реципиента в предположительно известный ему или незнакомый исторический контекст произведения. Подобная техника установления ассоциативно-аллюзивных связей вызывает своеобразное «пробуждение» исторической памяти читателя/реципиента, осознание им глубинной преемственной связи с прошлым. Предложена типология военных кодов современной романистики Казахстана: Историософемы, исторические этнонимы и топонимы, исторические реалемы, философемы и идеологемы, мифологемы, ритуалемы, наименование титулов военной, политической и жреческой иерархии. Статья выполнена в рамках грантового финансирования КН МОН РК по проекту AP05133019.

Ключевые слова: историческая романистика, военный культурный код, нарратив, условность, правдоподобие, конструкт, моделирование, референция.

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OPTIMIZATION OF GOVERNMENT EXPENDITURES STRUCTURE IN CONDITIONS OF IMPLEMENTATION OF SOCIAL AND ECONOMIC REFORMS IN UKRAINE

Abstract. The article considers the concept of the optimal distribution of government expenditures. It also proves the fact that the structure of budget expenditures is determined by such factors as: the socioeconomic structure of the country, the level of economic development, the established property relations, the specifics of the historical path of the country and the mentality of the population. The types and groups of public expenditures were systematized on the basis of theoretical studies, namely: government expenditures spent to perform general national functions of the state and to provide its security support; government expenditures spent to support the entrepreneurial activity of the state; government expenditures spent to perform education and social functions. Also there was made an analysis of the composition and the structure of the state expenditures of the European Union and Ukraine. The article considers the reasons of ineffective planning and use of expenditures of the Ukrainian budget. There has been established a priority of the government expenditures in the way of realization of the tasks of financial policy. It has been also determined that the priority of government expenditures in the EU and Ukraine coincide, but there are, anyway, some divergences in some shares of their expenditures. According to that, there has been proposed an optimization model of the structure of government expenditures of the Ukrainian budget. The proposed structure of government expenditures, which is being carried out in Ukraine at the present stage, meets the common European requirements and is aimed at realization of socio-economic reforms.

Keywords: government expenditures, types of public expenditures, structure of the government expenditures, optimization of government expenditures.

Introduction. One of the main priorities of Ukrainian government at the current stage, is the development and implementation of economic reforms aimed at further preserving the country's economic and financial potential and ensuring the implementation of an adequate level of social standards for citizens. The current economic situation in the country makes it possible to state that the efficiency of the functioning of the budget system is determined not only by the increase in the volumes of revenues and expenditures of budgets of different levels, but it largely depends on the efficiency of the principles and directions of budget financing.

The economic essence of budget expenditures is that they are an instrument for the distribution and redistribution of the centralized monetary fund of the state (state budget) and funds of financial resources of local governments and their use for their intended purposes. The budget expenditures are also aimed at ensuring financial stability in the country and growing of public welfare of its citizens.

Literature review and the problem statement. The role of public expenditure as a key source of meeting public needs has been traced since the beginning of the development of financial science in the works of such scientists as: Smith A., Petty U., Ricardo D., Yusti F. [1] It has been also actively discussed by the Nobel laureates in economics as: J. J. Stiglitz [2], R. M. Solow [3], A. S. Blinder, G. F. Break [4] and others.

S. Lin [5], R. Kneller [6] paid a special attention to the structure of government expenditures as they investigated the interaction of fiscal and monetary policies. It should be noted that with the help of studying the structure of government expenditures it will be possible to achieve an optimal classification

of expenditures. Japanese scientist T. Sakamoto [7] pointed on the need to separate the government expenditures into three main groups: state consumption, social transfers, state investments. This, in turn, will allow us to assess the impact of government expenditures on the country's economic development and to determine the way and the effect of these groups of government expenditures on the rate of economic growth.

An important area of the study of the government expenditures system is the determination of the efficiency and productivity of using the state funds, which make it possible to justify the correspondence to the needs of society for the functions that government bodies must perform at the level of each state. Therefore, the authors of L. Cossa [8], and later B.M. Sabanti [1] suggested to separate the expenditures on productive and unproductive.

Consequently, the diversity of views and approaches how to structure and to group government expenditures is explained by the need to make the relationship between the elements of the system, the way they interact, the nature of the relationship between them.

The results of the research. The composition and structure of public expenditures is determined by the degree of state influence on socio-economic processes. It should be noted that the content and nature of budget expenditures are determined by the Constitution of the country and depend on the functions entrusted and delegated to state and local authorities to satisfy various territorial needs. The basis for determining this influence are the constitutional guarantees according to which public and social standards are formed.

Speaking about optimal distribution of expenditures we suggest to make such distribution which allows us to achieve the maximum socio-economic development of the country and the welfare of the society using limited resources. M. V. Livdar notes that the features of the structure of budget expenditures are determined by such factors as: socio-economic structure of the country, the level of economic development, relations of property, the specificity of historical development of the country, the mentality of population [9]. That is why the search for optimal budget expenditures, as well as their structure, should be carried out for each country separately, taking into account historical, national, socio-economic and other conditions of their development.

Most European countries use a unified approach which is implemented to determine the priority of financial provision of the appropriate government functions and tasks. According to European scientists, the deviation from the established structure of state expenditures is primarily caused by the implementation of state control over the functioning of those areas and directions that are unacceptable in a market economy.

State expenditures are the basis for providing financing for social programs, regulating the economy, carrying out reforms in various fields of activity, creating general conditions for the development of market relations, increasing the volume of lending to legal and natural persons, developing international relations and other important areas of activity. The implementation of priorities determined by the state budget policy depends on the construction and efficiency of the organization of the mechanism for the formation of the optimal composition and structure of government expenditures.

The comparative analysis of the structure of government expenditures of the EU countries as a whole, individual European countries and Ukraine is shown in the table 1.

Table 1 – The structure of government expenditures of EU countries, %

Index	Year						
	2009	2010	2011	2012	2013	2014	2015
State expenditures spent to perform general national functions of the state and to provide its security support	21,96	21,94	22,59	22,48	22,39	21,98	21,42
State expenditures spent to support the business activity of the state	11,71	11,89	10,76	10,90	10,19	10,18	10,26
State expenditures spent to support the sphere of education	10,55	10,56	10,51	10,26	10,22	10,31	10,30
State expenditures spent on social functions	55,78	55,61	56,14	56,37	57,21	57,53	58,02
Source: Developed by authors on the basis of [**Ошибка! Источник ссылки не найден.**].							

The data shown in the table above confirms that the main focus of EU member states is aimed at providing financial support to the proper level of social standards. According to the data there were on average 56,66% of government expenditures spent on social functions. The growth of the relative and absolute characteristics of social expenditures in the EU countries is caused by the implementation of a number of some measures. The most important of them are: convergence of social policies of European countries, rising of activity mostly in all the spheres of social protection, formation of market relations in the system of social insurance; implementation of the private pension insurance; taking into account some innovative measures in the sphere of social policy; supporting the active employment and creation of conditions which will allow to realize the economic initiatives of the citizens.

The state expenditures spent to perform general national functions of the state and to provide its security support take the 2nd place in the structure of government expenditures of the EU countries, their share on average amounts to 22,11%. There were also taken some calculations that have shown its reduction, at the level of 0,05% of the share in the overall structure of these expenditures. This has been the result of a reduction of government expenditures in the sphere of national defense by the EU member states after the global crisis.

The 3rd place in the distribution of government expenditures takes the education expenditures, which at the end of 2015 amounted to 10,3% of total expenditures. In our opinion, a decline in the share of education expenditures at the level of 0,24% could be a consequence of European tendencies in order to reduce state funding for higher education, due to lack of financial resources in some European countries, by attracting private sector finances.

It should also be noted that during the period of review, the EU countries significantly reduced the costs (by 1,46%) that were given to support economic activities.

The structure of the budget expenditures of Ukraine for the period of 2009-2016 years is shown in the table 2.

Table 2 – The structure of the budget expenditures of Ukraine, %

Index	Year							
	2009	2010	2011	2012	2013	2014	2015	2016
State expenditures spent to perform general national functions of the state and to provide its security support	22,68	23,28	23,90	22,55	24,03	29,16	33,85	32,53
State expenditures spent to support the business activity of the state	15,37	13,04	15,79	16,74	11,56	11,75	10,58	10,02
State expenditures spent to support the sphere of education	21,72	21,13	20,69	20,62	20,86	19,14	16,80	15,49
State expenditures spent on social functions	40,23	42,56	39,62	40,09	43,55	39,95	38,77	41,96
Source: Developed by authors on the basis of [**Ошибка! Источник ссылки не найден.**].								

According to the data shown in the table, the structure of the budget expenditures of Ukraine meets the common European requirements, since one of the main priorities of the state policy is to provide the financing of social standards at the proper level. Taking into account the general orientation of the fiscal policy of Ukraine, the average share of expenditures spent to support the social sphere is more than 40%.

The state expenditures spent to perform general national functions of the state and to provide its security support take the 2nd place in the structure of Ukraine's budget financing.

During the period of analysis, the share of this group of expenses increased by 9,12% and by the end of 2016 it was 32,53%. There has been a significant increase in the share of expenditures (nearly quadrupled compared to 2013) spent to support the defense of the country. The growth in the share of financing to perform general national functions of the state is primarily due to an increase in the share of expenditures spent on servicing the public debt. It's increase in 2016 was 10 times bigger compared to 2009 or more than 86 billion UAH in comparison with 2015. The share of expenditures to serve the public debt is about 10 billion UAH (it increased 1,12 times).

The 3rd place take the expenditures spent to support the sphere of education. It's share is about 20% of the volume of overall Ukrainian budget. But by the end of 2016 there was a decrease in their share by 4,23% compared to 2009. It should be noted that a significant share of these expenditures is spent on giving the salary for employees of the budget sphere, while financing for the improvement and strengthening of the material base of this sector is practically not performed by the state.

As in European practice, the financial support of entrepreneurial activity of the state takes the 4th place in the priority rank of fiscal policy of Ukraine. As the research study has shown, the share of government expenditures spent to support this area is, on average, about 14% of the total expenditures of overall Ukrainian budget. According to the data of 2016, their share was only about 10% against 15,37% as in 2009.

The main reasons as a change of state support with a reorientation of the transition from direct budget financing to the establishment of individual tax benefits and an increase in the share of other expenditures, in particular, for fulfilling the social functions of the state, servicing the public debt and resolving the military conflict in the territory of Ukraine.

The main reasons for reduction of expenditures to support the entrepreneurial activity of the state are: change in the aspects of government support that concern the transition from direct budget financing to setting the individual tax benefits and also an increase in the share of other expenditures, namely, to fulfill the social functions of the state, to serve the public debt and to resolve a military conflict in Ukraine.

In our opinion, the financial policy in the sphere of state expenditures should be aimed primarily at the formation of their optimal structure, which would contribute to the implementation of the strategic objectives of socio-economic development and the implementation of general national functions of the state. It should be noted that the implementation of structural reforms in the national economy involves making an optimal model for the formation and distribution of financial resources of the state in order to provide «high-quality state». In order to form the optimized model of the structure of government expenditures, it's necessary to set certain restrictions. All these expenditures have to be 100% of overall Ukrainian budget. Thus, according to the Basic Directions of Budget Policy, the share of government expenditures to implement the social functions of the state should be at least 45% and the total share of the remaining state expenditures should not exceed 55%. So, in this context, the inequation of well-structured system of government financial resources should look like this:

$$GEs > GEgnf > GEe > GEba > 0, \quad (1)$$

where GEs – the share of government expenditures spent on social functions; GEgnf – the share of state expenditures spent to perform general national functions of the state and to provide its security support; GEe – the share of government expenditures spent to support the sphere of education; GEba – the share of government expenditures spent to support the business (entrepreneurial) activity of the state.

State expenditures spent to perform general national functions of the state and to provide its security support take the 2nd place in the overall Ukrainian budget. The share of these expenditures should not exceed 27,5% of the total government expenditures because according to the Fishburn's rule their significance "en masse" is 0,5.

Taking into account Ukraine's Euro-integration goals, which are being implemented into the process of redistribution of state funds, the share of government expenditures spent to support the sphere of education takes the 3rd place in the overall Ukrainian budget. The significance level of these expenditures is 33% and their share in the overall structure is 18,15%.

The government expenditures spent to support the business (entrepreneurial) activity of the state, in its turn, are not ranked among the top 3 tasks of the state. That's why, the level of significance of these expenditures is 17 % which is in accordance with 9,35% of the total state financing.

Conclusions. According to analysis of the compliance of the expenditures of the Ukrainian Budget and European countries, it's necessary to revise the structure of government expenditures, taking into account the implementation of strategic reforms in the sphere of education, health care, pension fund scheme and in the other areas. Therefore, the proposed optimal structure of government expenditures, in our opinion, will provide an opportunity to strengthen the financial possibilities of introducing these reforms and ensure a stable socio-economic development of the country in accordance with European initiatives.

The increase in the share of expenditures spent on social protection and social security of the population will allow us to implement a new mechanism to finance and to provide the high-quality public health services; to strengthen the targeting of social assistance and payment of subsidies to the citizens; it will facilitate the move from a PAYG pension system to financial defined contributions. The growth in the share of government expenditures in the sphere of education will, first of all, ensure the creation of a new system of management and financing of education and science of Ukraine, it will also increase the volume of grant financing to support the scientific research and the financing of different educational institutions in accordance with the quality indicators of educational services.

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УКРАИНАДА ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ РЕФОРМАЛАРДЫ ЖҮЗЕГЕ АСЫРУ ТҰРҒЫСЫНДА МЕМЛЕКЕТТІК ШЫҒЫНДАР ҚҰРЫЛЫМЫН ОҢТАЙЛАНДЫРУ

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ОПТИМИЗАЦИЯ СТРУКТУРЫ ГОСУДАРСТВЕННЫХ РАСХОДОВ В УСЛОВИЯХ РЕАЛИЗАЦИИ СОЦИАЛЬНО-ЭКОНОМИЧЕСКИХ РЕФОРМ В УКРАИНЕ

Аннотация. Определена сущность понятия оптимальное распределение расходов. На основе теоретических исследований были систематизированы виды и группы государственных расходов. Проанализировано состав и структуру государственных расходов Европейского Союза и Украины. Установлено приоритетность государственных расходов в реализации задач финансовой политики. Предложено оптимизационную модель структуры государственных расходов Сводного бюджета Украины. Доказано, что предложенная структура государственных расходов соответствует общеевропейским требованиям и направлена на реализацию социально-экономических реформ, осуществляемых в Украине на современном этапе.

Ключевые слова: государственные расходы, виды государственных расходов; структура государственных расходов, оптимизация государственных расходов.

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KAZAKH SOURCES ON THE HISTORY OF RELATIONS BETWEEN THE KAZAKHS AND THE CENTRAL ASIAN KHANATES IN THE 18TH –THE FIRST HALF OF THE 19TH CENTURIES

Abstract. The article is devoted to the study of Kazakh sources on the history of relations between the Kazakhs and Bukhara, Kokand and Khiva khanates in the 18th - the first half of the 19th centuries. The source study review includes works of Kazakh poetic folklore containing original material on the studied problem. The authors pay special attention to the study of literary works *Zar Zaman*, which have survived to this day in written and oral form. The article made an attempt to objectively assess the information about the works of Kazakh akyns and zhyrau on the history of Kazakhs of the 18th - the first half of the 19th centuries, based on a historical analysis of the material identified. The authors concluded that the works of akyns and zhyrau are valuable and reliable sources for studying the history of relations between the Kazakhs and the Central Asian khanates and reflect the attitude of ordinary people to the events taking place in the Kazakh steppe. This article was prepared within the framework of a grant of the Ministry of Education and Science of the Republic of Kazakhstan aimed at funding basic and applied scientific research.

Key words: Kazakh sources, zhyrau, akyns, relationships, Kazakh steppe, Khiva, Bukhara, Kokand.

Introduction. The relations of the Kazakhs with the Central Asian khanates (Bukhara, Kokand and Khiva) in the 18th - the first half of the 19th century were mainly studied on the basis of Russian sources: diary records, reports of leaders and participants of various expeditions sent by the tsarist administration to study the Kazakh Steppe [1-4]. In recent years, works have appeared on this topic involving Central Asian sources [5-7]. However, there are numerous sources in the Kazakh language, which are still little studied. The relations of the Kazakhs with the neighbouring nations were reflected in the works of poets (akyns) and narrators (zhyrau) of that time, but little attention was paid to this in historical studies.

The traditions of creating works by akyns and zhyrau were formed during the formation and development of the Kazakh Khanate and became the basis of Kazakh literature. Features of zhyrau's creativity were studied by researchers of Kazakh literature. Zhyrau were not just singers-narrators, but as noted by the eminent Kazakh writer and scientist, Mukhtar Auezov, "they are critics of their era, they create works only for topical problems of their time, they can analyze events of a given era and give a forecast for the future" [8, 201].

Zhyrau singers created poetic works on acute socio-political and military topics. They often used such types of genre as Tolgau, Arnau and Zhoktau. Akyns and zhyrau were the spokesmen of their people, speaking for views and sufferings of, played the role of protector and intermediary between a ruler and people. Traditionally they were advisers at the court of the rulers of the Kazakh Khanate, participated in military campaigns, in negotiations with neighbouring states, carried out special assignments of the khans.

In the poetic works of akyns and zhyrau, events and phenomena that were characteristic of the historical periods in which they lived are described. Akyns and zhyrau not only created poetic works, they passed on the historical and literary heritage of the Kazakh people from century to century, from generation to generation. They can be called as chroniclers of their people, so their literary works are

important for studying some lacunae of the history of Kazakhstan. One of such questions in the history of Kazakhstan is the relationship of the Kazakhs with the Central Asian khanates in the 18th century - in the first half of the 19th century.

The works of akyns and zhyrau are the main group of oral literary works. Due to the fact that the Kazakhs' tradition of bequeathing the historical heritage in oral form has been preserved until the 19th century, they can be considered as historical sources. The works of akyns and zhyrau contain factual information about the diverse relations of the Kazakhs with neighbouring nations and states.

The study of the history of relations between the Kazakhs and the Central Asian khanates in the period of the 18th - the first half of the 19th century based on the study of works of akyns and zhyrau has not yet been conducted. In the history of Kazakhstan, this issue has been studied on the basis of Russian sources, the historical value of which is indisputable, but the parallel use of Kazakh sources in the form of works of akyns and zhyrau, allows for a more versatile and comprehensive study. The materials of the Kazakh sources clearly reflected the popular perception of the ongoing historical events. For example, we have the opportunity to learn about the relations of the Kazakhs with Khiva, Kokand and Bukhara during the Dzungarian invasion from the poem by Qozhabergen zhyrau and from the works of akyns and zhyrau of the literary movement *Zar Zaman* (*Epoch of Sorrow*), about the domination of the Kokand rulers from the poems Zhankisy zhyrau.

Materials and methods. Sources for this study are the poetic works of Kazakh akyns and zhyrau 18th–19th centuries. As noted by Kazakh literary critics, akyns and zhyrau were spokesmen of their era and created works based on real events. Akyns and zhyrau were not only witnesses of historical events that took place in those times, but also were often their participants, spokesmen expressing social thoughts and chroniclers. They composed their works orally, had improvisational abilities and their creations were distributed among the people and passed down from generation to generation until the beginning of the 20th century.

Works of akyns and zhyrau began to be collected and studied at the beginning of the 20th century. In 1940, an anthology of Kazakh poetry *Songs of the Steppes* was published in Moscow, compiled by L. Sobolev. It included the number of poetry samples *Zar Zaman* [9]. In 1978, in Leningrad, a collection of works *Zar Zaman*, which was made by representatives of poetry Dulat, Shortanbay, Murat, was published in Russian under the title *Poets of Kazakhstan*. The compiler of the book was M. Magauin [10]. After the publication in 1984 of an anthology of Kazakh literature in three volumes entitled *Poets of Five Centuries*, composed by Kazakh writers M. Magauin and M. Baidildayev, the works of akyns and zhyrau became available to a wide circle of readers [11]. The book was a great success and was republished in 1989 in two volumes [12]. In 2004, the two-volume book *The Poets of the Seven Ages* was published, compiled by E. Duissenbayuly [13]. We have began to collect, research and publish the works of akyns and zhyrau separately [14-16].

The main sources for writing the article were the works of Qozhabergen zhyrau *Aktaban Shubyryndy, Alkakol Sulama* [17], the historical dastan *Zhanqozha Batyr* [18], zhyr of Zhankis zhyrau *Qoqan Khanyna Aitkany* [13], and the works of akyns and zhyrau of the *Zar Zaman* era Murat Monkeuly [16], Dulat Babatayuly [14], Shortanbai Kanayuly [14], Kerdery Aubakir [15].

In the process of research, the authors of the article used the methods of critical selection, source analysis and source synthesis. The use of source study methods made it possible to objectively reflect the diverse relations of the Kazakhs with the neighbouring peoples.

Literature review. The first scientific studies on the history of relations between the Kazakhs and neighbouring nations appeared in the 19th century. Materials of the Kazakh folklore heritage were mentioned in 1838 by A.I. Levshin in his work [19, 136-137]. Among the Russian orientalists, V.V. Radlov made a significant contribution to the study of Kazakh folklore. In his writings, he wrote about the Kazakh zhyrau and defined it as "akyn-songwriter, olden times singer" [20]. In 1893, the Russian scientist N.I. Veselovsky wrote down *Zhanqozha Batyrdyn Tolgauy* (*Reflections of Zhanqozha Batyr*) and the following year, his work *The Kirghiz Story About the Russian Conquests in the Turkestan Region* was published in Petersburg [21]. In the same year, I.V. Anichkov recorded the same zhyr from Musabay zhyrau and in 1895 published a book in St. Petersburg entitled *Song About the Kyrgyz Batyr Zhanqodzha Nurmukhamedov* [22].

Chokan Valikhanov wrote in his work about the Kazakh poetry that by the end of the first half of the 19th century, zhyrau were replaced with akyns. He pointed out the varieties of poetic works of Kazakh zhyrau: epics, odes, and memorial verses. The researcher compared the Kazakh zhyr with ancient Greek rhapsodies, praised the improvisational art of the Kazakhs and noted the work of some zhyrau [23, 336-342].

In the first half of the 20th century, the work of akyns and zhyrau was studied by Kazakh researchers, such as M. Auezov, H. Dosmukhamedov, S. Mukanov. In 1927, the Kazakh writer M. Auezov wrote the famous work in the history of Kazakh literary criticism *Adebiet Tarikhy*. In this book, he gave a full description of the folk literature of the Kazakhs and the name *Zar Zaman* was first used as a literary term. The writer in his work devoted a special chapter to the akyn of the literary movement *Zar Zaman*, analyzed their works, named the names of the akyns of this literary direction, determined the period of existence of the direction [8, 192-222].

The very next year after the publication of the book by M. Auezov, a public figure and scholar H. Dosmukhameduly in his work on Kazakh folk literature gave a classification to the works of Kazakh folklore. He attributed the literary movement *Zar Zaman* to Kazakh folk poetry and for the first time collected and published works of, the representative of this trend, Murat Monkeuly [24].

The Kazakh poet and literary critic Saken Seifullin in 1932 published his study, where the history of Kazakh literature was divided into two periods: 1) the period of the biys; 2) the period of the tsarist government. He systematized the Kazakh literary heritage for the first time in chronology and distributed works by types and genres. Saken Seifullin included works of Kazakh zhyrau in his book, such as Bukhar, Balky Bazar, Shortanbay and others. Seifullin's work was reissued in 2014 within the framework of the *Gylymi Qazyna* project [25, 17-59].

In 1942 the work of writer and researcher Sabit Mukanov on the history of Kazakh literature was published. He devoted the second chapter of his book to the literary movement *Zar Zaman* and considered Kazakh akyn Shortanbay as its founder. In his work, Sabit Mukanov expounded his thoughts about Musabai's zhyr about Zhanqozha Batyr and considered Anichkov's version incomplete [26, 122].

Exploring the work of zhyrau, it is impossible not to note the significant contribution of the Kazakh literary critic M. Magauin. First, he collected works of akyns and zhyrau, was the main compiler of the anthology of Kazakh literature in the Russian and Kazakh languages. Secondly, in the 60s of the twentieth century, he published several scientific articles on zhyrau and made a significant contribution to the study of the art of akyns and zhyrau in the period of the Kazakh Khanate, published several scientific papers on this topic, including such as *Gasyrlar* [27], *Kobyz Saryny* [28]. In the opening remarks of M. Magauin to the collection *Poets of Kazakhstan* it is said that the poetic works describe phenomena that was distinctive feature of the era in which these akyns lived, about their anxiety over the rapid change of the historical situation, about the idealization of the life of the Kazakh people in past centuries. [10].

Among the general historical works, we note the work of E. Bekmakhanov. He is one of the first Kazakh historians who described zhyrau as historical sources, and noted the importance of Kazakh oral folk literature. According to the scientist, "The folklore, as the most important source in studying the history of Kazakhstan, has exceptionally great value" [29, 42]. Indeed, important historical events in the memory of the Kazakh people were preserved through oral folk art: poems, songs, epics, legends that were preserved and passed down from generation to generation. The folklore materials well reflect the life and customs of the Kazakhs, all the most important events in the history of the Kazakh people. It was the people themselves who authored the works and participated in the described historical events.

Kazakh historian M. Qoygeldiev shows *Zar Zaman* as a socio-political movement and explores the historical and social reasons for the emergence of this trend. The scientist believes that the time of occurrence of the *Zar Zaman* literary movement coincided with a transitional period in the history of Kazakhstan, the first half of the 19th century is a historical epoch for Kazakhstan, when the country finally lost its independence and was in a state of colonization, political dependence. And the core of the creativity of the akyns of the *Zar Zaman* trend was the crisis state of national self-consciousness, which suffered a historic defeat [30].

In modern Kazakhstan science there is a lot of research devoted to the creative heritage of akyns and zhyrau, however, they focus on the linguistic and literary aspects, stylistic features of Kazakh works. The value of the works of akyns and zhyrau in the source study, historiography has not been studied enough.

Results and discussion. The relations of the Kazakhs with Kokand, Khiva and Bukhara in the 18th century were reflected in the poetic works of Qozhabergen zhyrau Tolibayuly (1663-1763). Famous akyn lived during the time of the Dzungarian invasions, was adviser to Khan Tauke, took part in the presentation of the Kazakh law code *Zheti Zhargy*. He survived the years of great disaster that went down in the history of the Kazakhs under the name *Aktaban Shubyryndy, Alkakol Sulama*. Qozhabergen zhyrau composed a poem describing these dramatic events under the same name. His dastans and kissas were devoted to certain historical events and were distributed among the people in handwritten and oral form through narrators and akyn-zhyrau from generation to generation. At the beginning of the poetic work, he speaks a little about himself, and we learn that he received education in Samarkand and Bukhara [17, 50]. In general, the work describes the years of great disasters in the Kazakh steppe during the Dzungarian invasions. Qozhabergen zhyrau wrote quite a few lines about the relations of the Kazakhs with the Bashkirs, the Turkmen, and the Uzbeks. The information presented in *Aktaban Shubyryndy, Alkakol Sulama* is confirmed by data from historical works of Bukhara and Kokand authors [7, 29].

The lines of his poem show that the Kazakhs, Kokands and Khivans maintained the good-neighbourly relations. But when the Kazakhs were in trouble, some rulers of neighbouring countries, taking advantage of the opportunity, tried to subjugate the Kazakhs [17, 52]. The poem notes that before these times there were trade relations between the Kazakhs and the Central Asian states, and they sold weapons to the Kazakhs, and during the great disasters the rulers of Bukhara, Khiva and Kokand did not want to sell those weapons [17, 53].

When the Dzungars began to move deeper into the Kazakh land, the Kazakhs hoped for the support of their neighbours, and sent their envoys with gifts to the Khanate of Khiva and the Bukhara emirate [17, 65]. The following lines say that the Kazakhs of the three zhuzes, taken by surprise, had to leave their homelands, livestock and property, and, retreating, urgently migrated to Bukhara: “The people moved to Bukhara and drove their cattle” [17, 66]. Qozhabergen zhyrau’s poetry is priceless, an important source on the history of relations between the Kazakhs and the Central Asian khanates during the Dzungarian invasions.

Zhankisi zhyrau is one of the most prominent representatives of zhyrau of the end of the 18th - beginning of the 19th century. He was born in Saryarka and was a notable biy, but at the beginning of the 19th century he moved to the lands in the middle course of the Syrdarya, which were part of the Kokand Khanate. At the beginning of the 19th century, one of the main directions of foreign policy of the rulers of the Kokand Khanate was the establishment of its rule in the lower reaches of the Syrdarya. In his work *Appeal to the Qoqand Khan*, Zhankisi-zhyrau tries to bring the difficult situation of the Kazakhs to the Kokand Khan, he complains about tax policy and tax collectors. In his address, he calls several types of crop taxes [13, 125]. It follows from the work of Zhankisi zhyrau that some Kazakh tribes and a part of the Kazakh land on which they were engaged in agriculture, came under the rule of the Kokand Khanate. A certain part of the Kazakhs migrated from Saryarka in the hope of receiving support from the Kokands.

Information on the Kazakhs relations with the Khivans can be found in historical dastans about Zhanqozha Batyr Nurmuhammeduly (1774-1860). More than ten poetic works (12,000 lines) dedicated to him were preserved and were widely distributed among the Kazakhs. The one of the best works is the composition of Musabay zhyrau, which describes life of the Kazakhs of the lower reaches of the Syrdarya. The chronology of events covers the years 1840-1862 [18]. There is every reason to believe that zhyr is historical, because all the characters represented in it are real people. Musabay zhyrau especially respected Zhanqozha Batyr and after his death he composed these verses, completing his work with these words: “We lost a bright person untimely, now it will be difficult to find a batyr as Zhanqozha” [18, 16].

The work *Reflections of Zhanqozha Batyr* describes three historical events: 1) the uprising of Syrdarya agriculturists headed by Zhanqozha Batyr against the Khiva rulers; 2) the uprising of the Syrdarya agriculturists against the tsarist power; 3) the death of Zhanqozha Batyr. The story about the struggle of the Kazakhs against the Khivan rulers tells about the Syrdarya fortress of the Khivan rulers and its ruler Babadzhan, who pursued a strict policy towards the nomadic population of the Khanate, including the Kazakhs. Khivans were subject to numerous taxes by the local population. In addition to official taxes, they took fast horses, valuables, beautiful girls - all this caused the anger of the common people, who rebelled against the Khivan rulers, led by Zhanqozha’s younger brother Akmyrza Batyr. But the rebels failed [18, 11-16]. In one of the versions of zhyr about Zhanqozha Batyr in the presentation of Luqpan

Kenzheuly, you can find information about the relations of Kokand rulers with Zhanqozha Batyr [18, 22].

The next generation of Kazakh akyns and zhyrau are representatives of the era of *Zar Zaman*. Dulat Babatayuly (1802-1871) was born in Ayaguz district of the East Kazakhstan region. He studied the basics of writing at aul's mullah. While reading his works, one can notice that he was an inquisitive person [13, 388]. In the poems of Dulat, *Auelgi Qazaq Degen Zhurt* (*Previous Generation of Qazaqs*), there is a longing for the past life of the Kazakhs [13, 159]. The author recalls with nostalgia the time after the Dzungarian invasion, when the Kazakhs lived quietly in neighbouring countries.

Information about the biography of akyn Shortanbay Kanayuly (1818-1881) is very scarce, only fragments have come down to us. He lived and became akyn in Central Kazakhstan, in the area of Besata [13, 390]. In the 80s of the 19th century in Kazan, the Collection of Works of Shortanbay was published under the title *Bala Za*ry (*Grief of a Child*). In his poem *Mina Zaman qai Zaman* (*What Times Have Come*), Shortanbai akyn, hoping to save his country from colonial politics, sought support from neighbouring Central Asian countries [14, 111].

Another akyn, Murat Monkeuly (1843-1906) created historical dastans, where he described the social status of his people. In Murat's work *Ush Qiyan* (*Three Epochs*), there is a noticeable longing for past times, including longing for friendly, trade relations with Bukhara and Urgench [16, 139]. And in the 24th line of this work it is said that the Kazakhs with nostalgia remembered freedom, wandering, looking for a peaceful refuge in neighboring states [16, 146].

Kerdery Aubakir Shokanuly (1861-1905) is one of the later representatives of the literary movement *Zar Zaman*. Aubakir studied in the madrasa of Orenburg and Troitsk. He worked as a mullah and taught children in Uralsk, Orenburg, Orsk, Aktobe. His poems entitled *Adebiet of the Qazaqs* were twice published in Kazan. He was widely known not only in the Kazakh steppe, but also among the Kyrgyz, Karakalpaks, Turkmen, Uzbeks, Uigurs, Tatars and Bashkirs [15, 15]. Kerderi Aubakir also grieves about past times and in his poem *Otken Imanshylyq Zamandi Zhoqtap Aytkany* (*About Past Good Times*) recalls Khorezm and Urgench with anguish about those times [15, 46-47]. In the poem *Qazagym* he told about calm times, friendly, trade relations of the Kazakhs with the Central Asian khanates in the past [15, 71]. This work also says that for the Kazakhs, Urgench and Bukhara were the centres of trade, but with the advent of the tsarist power, trade fortresses appeared on Kazakh Steppe [15, 75].

Conclusion. Literary works of Kazakh akyns and zhyrau, describing historical events, play an important role in the study of the historical consciousness of the Kazakh people. The peculiarity of akyns and zhyrau is that the authors were representatives of ordinary people, and spoke on their behalf. Akyns and zhyrau were eyewitnesses and participants in all historical events of the period described, their works were carefully preserved in handwritten and oral form, passed down from generation to generation.

The works of akyns and zhyrau contain interesting information on the history of relations between the Kazakhs and the Central Asian states in the 18th -the first half of the 19th century. First of all, the description of the trade relations of the Qazaqs with the Central Asian khanates should be noted.

The poems set out in detail the historical events that made the Qazaqs migrate to the territory of the Central Asian khanates. In these poems, the point of view of ordinary people is displayed on the events taking place, often contradicting the opinion of the ruling their elite. The literary works of akyns and zhyrau can be used as original sources in historical research, as they are objective and the events described in them are confirmed by information that can be obtained from Russian and Central Asian sources.

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ҚАЗАҚТАРДЫҢ ОРТАЗИЯЛЫҚ ХАНДЫҚТАРМЕН XVIII Ғ. – XIX Ғ. БІРІНШІ ЖАРТЫСЫНДАҒЫ ҚАРЫМ-ҚАТЫНАСТАРЫНЫҢ ТАРИХЫ БОЙЫНША ҚАЗАҚ ДЕРЕКТЕРІ

Аннотация. Мақала қазақтардың Бұхара, Қоқан, Хиуа хандықтармен XVIII ғ. – XIX ғ. бірінші жартысындағы қарым-қатынастарының тарихы бойынша қазақ деректерін зерттеуге арналған. Дерекнамалық шолуға зерттеліп отырған тақырып бойынша ерекше материалдардан тұратын қазақ поэзиялық фолькло-

рының туындылары алынған. Авторлар тарапынан қазіргі уақытқа дейін жазбаша және ауызша түрде сақталған «Зар-заман» ағымына жататын шығармаларға ерекше көңіл бөлінген. Мақалада он сегізінші-он тоғызыншы ғасырдың бірінші жартысындағы қазақ тарихы бойынша қазақ ақын-жырауларының шығармаларындағы мәліметтерді тарихи талдау негізінде объективті баға беруге қадам жасалды. Авторлар тарапынан ақындар мен жыраулардың шығармалары қазақтардың ортазиялық хандықтармен қарым-қатынастарының тарихын зерттеуде құнды және расталған деректер болып табылады және қарапайым халықтың Қазақ даласында орын алған оқиғаларға көзқарастарын білдіреді деген қорытынды жасалды. Мақала Қазақстан Республикасы Білім және ғылым министрлігінің іргелі және қолданбалы ғылыми зерттеулерді қаржыландыру гранты аясында дайындалды.

Түйін сөздер: қазақ деректері, жырау, ақын, қарым-қатынас, Қазақ даласы, Хиуа, Бұхара, Қоқан.

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КАЗАХСКИЕ ИСТОЧНИКИ ПО ИСТОРИИ ВЗАИМООТНОШЕНИЙ КАЗАХОВ СО СРЕДНЕАЗАИТСКИМИ ХАНСТВАМИ В XVIII – ПЕРВОЙ ПОЛОВИНЕ XIX ВВ.

Аннотация. Статья посвящена изучению казахских источников по истории взаимоотношений казахов с Бухарским, Кокандским и Хивинским ханствами в XVIII – первой половине XIX века. В источниковедческий обзор включены сочинения казахского поэтического фольклора, содержащие оригинальный материал по исследуемой проблеме. Авторами уделяется особое внимание изучению произведений литературного течения «Зар заман», сохранившихся до наших дней в письменной и устной форме. В статье была предпринята попытка объективно оценить сведения произведений казахских акынов и жырау по истории казахов XVIII – первой половины XIX вв., на основе исторического анализа выявленного материала. Авторами сделан вывод о том, что произведения акынов и жырау являются ценными и достоверными источниками для изучения истории взаимоотношений казахов со среднеазиатскими ханствами и отражают отношение простого народа к происходившим событиям в Казахской степи. Статья подготовлена в рамках гранта Министерства образования и науки Республики Казахстан по финансированию фундаментальных и прикладных научных исследований.

Ключевые слова: казахские источники, жырау, акыны, взаимоотношения, Казахская степь, Хива, Бухара, Коканд.

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ABOUT MODERNIZATION TENDENCIES IN THE LEGAL SYSTEM OF THE REPUBLIC OF UZBEKISTAN

Abstract. The legal system of any state should be considered in close connection with other national legal systems and with international law. Such a "legal triangle" serves as a common legal space, in which different normative legal arrays interact, collide, and coexist. And in this relationship there is a lot of sustainable and regular, controversial and random. It is based on common integrative processes, strengthening cooperation of states in the economic, social, cultural and other spheres. The Constitution of Uzbekistan of 1992 has assigned an important place in the legal system to international law. In the modern period, when intensive work is underway to improve Uzbek legislation, the use of methods of both domestic and international legal regulation is required. In state law, these are the constitutional foundations of foreign policy, the competence of the supreme bodies of state power in the sphere of international relations, the regulation of citizenship, the rights and freedoms of the individual. In the civil and family law, civil proceedings are both traditional issues of private international law, legal assistance in civil and family matters, improvement of foreign economic relations, received particular relevance. In the criminal law and criminal proceedings are multidimensional aspects of cooperation in the fight against crimes, providing legal assistance in the criminal matters.

Keywords: rule of law, supreme of law, international law, legal files, legal triangle, integrative processes, international cooperation, interstate treaties, constitutionality, jurisdiction.

Legislation must reflect the folk traditions, customs, and moral norms rooted in the daily life of the population and inherited from centuries of history of interpersonal and inter-nationality communion and profession of faith which are not contrary to universal humanitarian values, rights, and freedoms of people. One can not turn back the River of Time, nor return a civil secular society to the era of the dominance of norms of the Shari'ah. The Shari'ah is an absolutely concrete historical phenomenon. It is hardly necessary in a modern society to elevate it to an absolute, to treat it literally. This would be contrary to the very pragmatic philosophy of the Shari'ah, where the spirit is raised above the letter, the new is not rejected and is agreed with the known. It would be reasonable to take into account the conciliatory experience of the regulation of certain spheres of private law by the Shari'ah when building a rule-of-law society in Uzbekistan [1].

Such approaches already are underway. Take, for example, the priority of the family and social support (in the spirit of *sadak*-a voluntary gift to the needy). From the times of the caliphs of the Abbasides (who first came as al-Mansur) the*kadii* (judge) was removed from the influence of local authorities. Now that tradition, directed towards the independence of judges, in modern form is embodied in Article 93(11) of the Constitution of the Republic Uzbekistan.

The creative application of the commentary traditions of the fakir are of interest when seeking ways of judicial reform. The role of interpretation by the Constitutional and Supreme courts of laws, characteristic for the legal culture of the world of Islam, is growing.

In the Civil Code of the Osman Empire, the Majalla (1869-77), 99 principles of Muslim Law were consolidated, which draw attention for their expression of civility culture. Many norms of Muslim civil and trade law were precisely defined therein: purchase-sale, rental, moveable and immoveable property, worker, suretyship, pledge, commercial and neighboring partnerships, and others. Especially interesting is the legal ethic of trade and labour transactions, commercial relations, that is, not the lack of which so many modern entrepreneurs complain.

A distinctive feature of modern Uzbek society is the perception of the religion of Islam as part of the culture of the people, as the bearer of universal humanitarian values, the custodian of national spiritual traditions. Religious principles and norms serve as an original criterion of the spiritual-moral state of society. Hence the great influence of religion and its norms and principles on the life of society. The mentality of the Uzbek people is determined by them to a significant degree, those values which they share.

A comicalness and paternalism of the State are characteristic of the Uzbek way of life. Of course, the community is a universal form through which all peoples of the world go, but in Uzbekistan the collectivist principles, collective interests, always have prevailed over special interests, individual interests. The weakness of the individualist principle is a specific feature of Uzbek legal being. This should be taken into account when attempts are made to introduce into Uzbek life and to accelerate the development of private entrepreneurship with a global embrace of private ownership in various spheres of life.

Law reform must be based on religious and moral principles and norms traditional for Uzbekistan, for only then do laws acquire their vitality and are accepted by society. Therefore in laws to be adopted the folk traditions, customs, and moral norms rooted in the daily activity of the population and inherited from centuries of history of interpersonal and inter-nationality communion and profession of faith and not contrary to universal humanitarian values, rights, and freedoms of people must obligatorily be taken into account and reflected.

Of course, the traditions of the Shari'ah must be studied above all within the framework of legal education and legal science, and then by legislative policy, obligatorily from the positions of legal progress, humanity, and civilisation.

The need for constitutional reform was evident by the end of the 1980s. After the proclamation of State sovereignty, society could not be content with the Soviet Constitution adopted under the old socio-State system (1978) within the framework of the constitutional system of the former USSR. Attempts to adapt the old Constitution to the new realities were not crowned with success. More than 100 changes and additions made in its text deprived it of internal logic and gave rise to numerous contradictions.

Constitutional reform in Uzbekistan was evolutionary and constant. In March 1990 during the period of existence of the USSR Uzbekistan was the first union republic to introduce the presidential form of rule. This was the beginning of the reorganization and renewal of the politico-legal system in Uzbekistan. In June 1990a Declaration on sovereignty and a Decree of the Supreme Soviet of the republic on the creation of a constitutional commission to work out a new Constitution of Uzbekistan were enacted. In the legal sense these acts were new since in the theory and practice of State-law construction of Uzbekistan they were adopted and implemented for the first time.

The 1992 Constitution became the "visiting card" of sovereign Uzbekistan. It embodied the traditions of many centuries of Uzbek legal history and the principles of world constitutional experience. If the 1992 Uzbek Constitution is considered in connection with world constitutional development, one may say that it has been consistently inserted in a number of the "second generation" constitutions adopted in western European countries after the Second World War [2, p. 21].

World constitutional experience was used in the Constitution of Uzbekistan through:

- the principles of constitutional regulation - human rights, adherence to norms of international law, separation of powers, stability of the Constitution;
- the rejection of ideologicization; that is, the Constitution does not aspire to bind society to a previously determined economic system in accordance with the prevailing ideology;
- constitutional guarantees - supremacy of the Constitution, creation of a Constitutional Court, special procedure for changing the Basic Law;

- presidential republic as one of the form of direct power of the people, since the Constitution determines the legal status of the President as the Head of State and executive power;

- constitutional technique; that is, organisation of the text into a Preamble and by sections, chapters, and articles, as well as the logic of their positioning;

- juridicisation and conciseness of content so as not to create superfluous regulation fettering real State life; reducing to a minimum in the Constitution of so-called *renvoi* norms to future law also is responsive to this task.

Often it is asserted that the 1992 Constitution of Uzbekistan is structured along the French model. This assertion is only partly correct. Of course, the Constitution of Uzbekistan has its distinctive features and differs from the French Constitution. It is sufficient to recall that the Uzbek parliament, unlike the French, is unicameral. However, if we speak of the form of rule provided for by the 1992 Constitution of Uzbekistan, here the proximity to the French model is evident. Uzbekistan, just as France, is a republic of the presidential type, both being distinctive from the presidential republic of the American model. The undoubted proximity of the Uzbek Constitution to the French model is to be discovered: in the procedure for election of the President, in the powers of the President as Head of State, in his role in the forming and the activity of the Government, in the right to dissolve parliament in the procedure provided for by the Constitution.

Unlike the Soviet basic law, there is no dominance in the 1992 Constitution of Uzbekistan of Eurocentric constitutional regulation, but there is a reasonable taking into account of the norms of a civil society, separation of powers, checks and balances inherent to the democratic constitutions of the countries of the West. And here the influence of the spiritual and legal traditions of Islam, communities, the constitutional understanding of the State as a large family where the leader is responsible for the quiet, dignity, and well-being of its members is evident [3, p. 29].

The 1992 Constitution of Uzbekistan is the creative unity of fatherland State-legal, spiritual-cultural requirements in progress and the world experience of stable constitutional self-development.

The criteria for the quality and effectiveness of the Constitution of Uzbekistan are:

- the conformity of the Constitution to the requirements and prospects for the development of a democratic, rule-of-law State in Uzbekistan. Here are taken into account the unity of the requirements of the transition period and prospects for cultivating the autonomous experience of Uzbek statehood and law;

- autonomous creative application of world constitutional experience and taking into account the wealth of fatherland historical and legal traditions in the constitutional law-creation of Uzbekistan;

- the high potential of the application of the Constitution;

- the leading role of the Constitution as the source of law in force and orientates of constitutional and current legislation;

- the significance of the Constitution in achieving stability in the State and society; that is, its pluralistic and consensual possibilities;

- legal technique, metaphorical integrity and systematic nature of the Constitution, which ensures its substantive consistency;

- international legal thesarus (commonality of understanding) of the basic terms in the Constitution, which facilitates its incorporation into worldwide legal space.

The 1992 Constitution of Uzbekistan is the hierarchically major source of Uzbek law. 11 serves not only as the legal base for the adoption of new normative legal acts based on it (the “external” change of the legal system), but also as the criterion for resolving the question of the constitutionality of prevailing legal norms (change of the legal system “from within”).

The legal properties of the Uzbek Constitution as the centre of the legal system are manifested in the following:

(1) Constitutional norms are the highest material criterion of Uzbek law. All this is contained in Uzbek law and is manifest therein must conform to constitutional norms;

(2) The presence in the text of the Constitution of references to the basic principles of the legal system which were formulated in Section One. These are: man, his rights and freedoms as the highest value, power of the people effectuated directly (referendum) and through representative agencies, law-

abiding state, political and ideological pluralism, separation of powers, freedom of economic activity and equality of forms of ownership, and the primacy of international law. No other provisions of the Constitution and branches of law may be contrary to these principles;

(3) The constitutional determination of the sources of law by means of regulating the competence of State agencies. Here it is essential to clarify that the Constitution has differentiated not all types of sources, but only written;

(4) The constitutional norms themselves have direct effect. The purposes and principles of the Constitution have direct effect if they are directly perceived by people and influence their behavior. The contemporary system of legislation of Uzbekistan acts as part of the legal system. The creation of a stable legal system developing by evolutionary means is a priority in the aspect of the legislative consolidation of new social relations and social values.

The creation of a new legislative system is effectuated with regard to several major orientations. The first orientation is the creation of the legal foundations of State construction. The downfall of the former USSR and acquisition of State independence by Uzbekistan advanced State construction to the group of priority tasks. This above all is confirmation of the principles of sovereignty, democracy; power of the people, human rights, in a word, the creation of the rule-of-law State and a civil society. The need arose to form new institutions of State power and the consolidation thereof. Of course, many of these tasks confronted Uzbekistan earlier, but after the demise of the USSR their significance and urgency grew immensely [4, p. 82].

Within the framework of this orientation constitutional law were adopted “On the Foundations of State Independence of the Republic Uzbekistan” (1991) and “On the Olii Mazhlis of the Republic Uzbekistan” (1994), laws on the Cabinet of Ministers of the Republic Uzbekistan (1993), on the courts (1993), on the Constitutional Court (1993), on the Supreme Economic Court (1993), laws on elections to the Olii Mazhlis (1993, 1998-99), on elections of the President (1991,1998),on the referendum (1991), on the Central Electoral Commission (1998), on the Procuracy (1992), on the notariat (1996), on State power in the localities (1993), on agencies of self-government of citizens (1993,1998), and others.

A unique mechanism for self-government of citizens has been formed whose roots lie in the folk traditions and historically-formed community relations - the mahalla. It was recognised that gatherings of citizens of settlements, kishlaks, and mahallas are an agency of self- government facilitating the realisation by citizens of their right to participation in management of the affairs of the State, uniting them to resolve social and economic tasks on their territories.

The *second orientation* is the forming of a system of market legislation laying the foundation for new economic relations, above all relations of ownership and free entrepreneurial activity. The legal regulation of economic activity is becoming the basic form of State pressure on the economy. The transition to a market economy required the adoption of numerous laws and other normative legal acts (edicts of the President, decrees of the Government, and departmental acts). Questions of ownership, the legal status of enterprises, the procedure for the effectuation of foreign investments are regulated in them, and other questions of entrepreneurial activity are resolved.

A Civil Code has been adopted - the Charter of market law. Among market laws there are: laws on ownership (1990), on destatisation and privatisation (1991), on pledge (1992), on lease (1991), on privatisation of the State housing fund (1993), on enterprises (1991), on cooperative societies (1991), on the agricultural cooperative “Shirkat” (1998), on the dekhkan economy (1998), on the farmer economy (1998), on economic societies and partnerships (1992), on banks and banking activity (1996), on entrepreneurship (1991), on insurance (1993), on stock exchanges and stock exchange activity (1992), on securities and the stock exchange (1993), in auditor activity (1992), on competition and limitation of monopolistic activity on the goods markets (1996), on limitation of monopolistic activity (1994), on joint-stock societies and defence of the rights of stockholders (1996), on the mechanism for the functioning of the securities market (1996), on chambers of goods- producers and entrepreneurs (1997), a tax code (1997), and others.

In guaranteeing the equality of all forms of ownership, freedom of economic activity, and free movement of goods and capital, market legislation opens broad opportunities for the free development of a civil

society, the forming of a new market, possibly mixed, but in any event more rational economic structure of society than previously [5, p. 276].

The *third orientation* is the creation of legislation ensuring the constitutional and legal rights of man, social guarantees, and social support of the population. Laws have been adopted which regulate and guarantee the rights and freedoms of man, social organisations, freedom of conscience and profession of faith, and the mass media.

A system of social legislation has formed. The labour code (1995), family code (1998), and laws on employment (1992), protection of labour (1993), social defence of disabled persons (1991), State pension security of citizens (1993), foundations of State youth policy (1991), protection of the health of citizens (1996), quality and safety of food products (1997), and additional privileges for women (1999) defend the interests of the most needy strata of the population under the complex conditions of transition to a market.

No less important than those considered is *the* fourth orientation of law-creation. Without devoting attention to the moral health of society, spiritual development of its members, raising of their legal culture, one will not succeed in resolving those practical tasks which determine the prospects for the development of Uzbekistan; that is, essential legislation directed towards preserving national distinctiveness, language, education, and cultural legacy[6, p. 68].

Uzbekistan has acceded to the principal documents of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), such as the 1954 Hague Convention on the protection of cultural valuables in the event of armed conflict, the 1972 Convention on the protection of world cultural and nature legacy, and the 1970 Convention on measures directed towards the prohibition and prevention of the illegal import, export, and transfer of the right of ownership to cultural valuables.

Laws on the flag (1991), arms (1992), and anthem (1992) demonstrate to the entire world the norms of honour, pride, historical memory, and aspirations of the peoples of Uzbekistan. Laws on the State language (1989, 1995) and citizenship (1992) have important significance for a spiritual renaissance. Laws on education (1997), on the protection of nature (1992), on author's right and mixed rights (1996), on the establishment of titles of honour (1996), and on specially protected territories (1993), on the export and import of cultural valuables (1998) are being realized. Spiritual-cultural legislation is directed towards preserving the valuables for the people, for their spirit, affirmation of self-awareness, love for life, and strengthening of patriotism. Any State is strong with such a spirit.

The fifth orientation is the creation of legal foundations determining Uzbekistan to be an equal subject of international relations - one of the new and virtually unexplored orientations of law-creation activity. Under conditions of a totalitarian unitary system Uzbekistan de facto was deprived of the possibility of direct access to the international arena, did not have its own foreign policy and foreign economic State institutions, and did not have its own legislation.

The ratification by Uzbekistan of the basic international covenants and agreements opened a new page in the history of the development of foreign links of the country. Laws on the procedure for the appointment and recall of heads of diplomatic representations (1992), the establishment of diplomatic classes and ranks for diplomatic workers (1992), on international treaties (1996), on principles of foreign policy activity (1997), and a consular statute (1996) are fundamental in the sphere of foreign policy activity.

In the foreign economic sphere the adoption of laws directed towards the creation of the legal foundations of attracting foreign investments to the economy of Uzbekistan and an expansion of foreign economic activity are of great importance. Laws on guarantees and measures of defence of the rights of foreign investors (1998), on investment activity (1998), and on foreign economic activity (1992) are directed towards the creation of a normal legal “investment climate” for foreign investors. Investment laws of Uzbekistan, just as bilateral agreement on guarantees and defence of foreign investments and multilateral conventions (1964 Washington Convention on the settlement of investment disputes, 1986 Seoul Convention on insurance of investments) contain norms of public law determining the status of foreign private ownership, the legal regime of foreign investments, guarantees of foreign investments against “political” risks (nationalization, taxation, export and import duties, transfer of capital and profit, and so on), and the conditions of legal defence of the rights and interests of foreign investors. Specific private international investment relations are regulated by norms of civil legislation; that is, by private law [7, p. 74].

Thus, the contemporary legislation of Uzbekistan creates a legal foundation for the transition period, the process of a legal replacement of a socio-political system and economic relations which have outlived themselves, and the confirmation of new democratic norms and socio- legal guarantees. Of course, the level of development and quality of the legislative system are determined not by the quantity of laws adopted, but by the execution of these laws at all levels since legal norms live and operate only when they live in man and operate through him, and reflect the historical traditions, customs, and spiritual-moral norms.

Gradually the legal ideology is transformed, a search proceeds for the most effective forms of legal regulation, and a close linkage of law-creation practice and organisation of the law enforcement process with economic and political reforms.

As the research scholars Madina Tasheva, Aigerim Bakhtgalieva and Benjamin Chan Yin-Fah noted: "In last year's Uzbekistan achieved boom in entrepreneurship. Females from urban and rural areas started to establish their private business activities. First Uzbek women NGO, Business Women Association (BWA) has been contributing to the expansion of private sector by supporting new female enterprises" [8, p. 127].

Legal values and ideals of a modern democratic State consolidated in the Constitution of Uzbekistan, and also closer integration of the Uzbekistan legal system with international law, oblige the use of positive international and foreign legal experience in the forming of a unified system of Uzbek legislation.

The legal system of any State can not be considered outside its links with other national legal systems and with international law. Such a "legal triangle" serves common legal space in which various normative legal blocks interact, collide, and coexist. In that interlinkage there is much stable and in accord with the laws of societal development, and much contradictory and incidental. General integrative processes strengthening the cooperation of a State in economic, social, cultural, and other spheres are the foundation.

The 1992 Constitution of Uzbekistan, in relegating to international law an important place in the legal system (Article 17), stipulated a close contiguity of the Constitutional Court of the Republic Uzbekistan with international law. We refer to the fact that, according to Article 109 of the Constitution of Uzbekistan, the Constitutional Court determines the conformity to the Constitution of inter-State treaties. Generally- recognised principles and norms of international law in the practice of the Constitutional Court are important criteria of the constitutionality of laws and other normative acts contested in the Court and falling within its jurisdiction.

In the modern period when intensive work is being conducted with regard to improving Uzbek legislation, the use of both municipal and international legal regulation are required. Today virtually any branch of legislation is linked with international treaties. In State law these are the constitutional foundations of foreign policy, the competence of the highest agencies of State power in the sphere of international relations, the regulation of citizenship, the rights and freedoms of the individual. In civil and family law and in civil procedure there ate traditional questions of private international law and of rendering legal assistance in civil and family cases, as well as questions of improving foreign economic links, and in criminal law and criminal procedure, multi-tiered aspects of cooperation in the struggle against criminality and rendering legal assistance in criminal cases [8, p. 130].

The 1992 Constitution of Uzbekistan accepted a complex of principles and norms of international law from the United Nations Charter, the 1948 Universal Declaration of Human Rights, and other international convenants on human rights, the Helsinki Final Act, and the Paris and Madrid charters. This approach is especially clearly expressed not only in Chapter IV "Foreign Policy", but also in the Preamble, Section Two on the "Basic Rights, Freedoms, and Duties of Man and Citizen", and Section Three "Society and the Individual", Chapter XXIII "Electoral System", Chapter XXII "Judicial Power of the Republic Uzbekistan" and Chapter XXVI "Defense and Security".

In the conclusion we would like to remind, that for the first time in the history of Uzbek law, the priority of generally-recognised norms of international law over municipal has been proclaimed. This completely corresponds to the general trend of resolving the question of the correlation of municipal and international law, reflecting the growing role of the last during the second half of the twentieth century.

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ӨЗБЕКСТАН РЕСПУБЛИКАСЫНЫҢ ҚҰҚЫҚТЫҚ ЖҮЙЕСІНДЕГІ МОДЕРНИЗАЦИЯЛЫҚ ТЕНДЕЦИЯЛАР ЖАЙЛЫ

Аннотация. Өркениеткеұмтылған қандай елдің құқықтық жүйесін қарастырмасақта оларды басқа да ұлттық құқықтық жүйелермен, халықаралық құқықпен салыстыра отырып қараймыз. Осындай құқықтық үшбұрыш жалпы құқықтық кеңістік болып қызмет етеді. Онда әртүрлі нормативті-құқықтық массивтер кездесе отырып бір-біріне әсеретеді. Осы әсерлерде, байланыстарда көптеген қалыптасып қалған және заңдастырылған қайшылықтармен кездейсоқтықтар бар. Олардың негізінде жалпы интегративтік процесстер жатыр, олар мемлекет аралық қатынасты экономикалық, әлеуметтік, мәдени қатынастарды біріктіреді. 1992 жылғы Өзбекістан Конституциясында халықаралық құқықта ерекше орын берілген. Қазіргі кезде Өзбекістан заңнамалары интенсивті түрде жетілдіру үстінде бұл шаралар халықаралық тәжірибелерді қолдануды талап етеді. Мемлекет құқығында ол сыртқы саясаттың конституциялық негізі, мемлекеттік биліктің жоғарғы сатысындағы қызметкерлер құзыретінде және азаматтардың тұлғалардың құқықтары мен еркіндіктерін сақтауға бағытталғын. Азаматтық және жанұя құқығында, азаматтық процессте бұл бағыт халықаралық жеке құқығы мәселесі ретінде дәстүрлі түрде қаралады, азаматтар мен жанұя ісінде және соңғы кезде белсенділік көрсетіп отырған халықаралық экономикалық байланыстарда, қылмыстық құқықта, қылмыстық процессте - байланыстардың жан-жақта аспектілер қарастырылып, әртүрлі қылмыстық істерде құқықтық көмек көрсетілуде.

Түйін сөздер: заң басымдығы, құқықтық негіз, халықаралық құқық, құқықтық массивтер, құқықтық үшбұрыш, интегративті процесстер, халықаралық байланыс, мемлекетаралық келісімдер, конституционалдық, заңгерлік.

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О МОДЕРНИЗАЦИОННЫХ ТЕНДЕНЦИЯХ В ПРАВОВОЙ СИСТЕМЕ РЕСПУБЛИКИ УЗБЕКИСТАН

Аннотация. Правовую систему любого государства нужно рассматривать в тесной связи с другими национальными правовыми системами и с международным правом. Такой «правовой треугольник» служит общим правовым пространством, на котором взаимодействуют, сталкиваются, сосуществуют разные нормативные правовые массивы. Причем в этой взаимосвязи есть немало устойчивого и закономерного, противоречивого и случайного. В основе лежат общие интегративные процессы, укрепляющееся сотрудничество государств в экономической, социальной, культурной и иных сферах. Конституция Узбекистана 1992 г., отвела международному праву важное место в правовой системе. В современный период, когда ведется интенсивная работа по совершенствованию узбекского законодательства, требуется использование методов как внутригосударственного, так и международно-правового регулирования. В государственном праве это конституционные основы внешней политики, компетенция высших органов государственной власти в сфере международных отношений, регламентация гражданства, прав и свобод личности. В гражданском и семейном праве, гражданском процессе это как традиционные вопросы международного частного права, вопросы оказания правовой помощи по гражданским и семейным делам, так и получившие особую актуальность вопросы совершенствования внешнеэкономических связей, в уголовном праве и уголовном процессе – многоплановые аспекты сотрудничества в борьбе с преступностью, оказания правовой помощи по уголовным делам.

Ключевые слова: верховенство закона, господство права, международное право, правовые массивы, правовой треугольник, интегративные процессы, международное сотрудничество, межгосударственные договоры, конституционность, юрисдикция.

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EFFICIENCY OF METHODS OF FIGHTING RESPIRATORY DISEASES OF CALVES IN "BAYSERKE-AGRO" LLP

Abstract. The article presents the results of clinical and epizootological data, bacteriological and serological studies of biological material from sick calves. As a result of bacteriological examination of feces samples from 3 calves (inv. № 7022, inv. № 70420, inv. № 7886) with clinical signs of salmonellosis (bronchopneumonia, increased body temperature, general depression, lack of appetite, characteristic posture with drooping neck), received for research in 2016, calf salmonellosis pathogen was isolated from fecal samples from all calves Salmonella dublin. 3 cultures isolated from calf feces were identical in their cultural-morphological, tinctorial, antigenic and pathogenic properties. Based on the study of the biological properties of the culture identified as S. dublin. Specific Salmonella antibodies were recorded in the serum of sick calves in RA with salmonella antigen. As a result of science-based veterinary-sanitary and preventive measures in the economy, salmonellosis of calves was eliminated. There were no cases of outbreaks of salmonellosis among calves on the farm, which indicates the effectiveness of methods to control salmonellosis of calves at "Bayserke-Agro" LLP.

Relevance. Currently, the epizootic situation of respiratory infections of calves is worsening. Intense burdened livestock buildings is consistent with the concept of microbial "stress" of animals. The proportion of infection of farm animals with salmonellosis has increased. It is noted that the intensification of the epizootic process entails the complication of the state of the epidemiological environment.

Salmonella infections are infections with a global distribution and represent the most important veterinary and biomedical problem in all countries of the world. Salmonella-paratyphoid bacteria pathogens for humans and animals. The genus Salmonella is named after the American explorer Salmon (1885). For the first time, Salmon and Smith isolated the first representative of Salmonella suipestifer, an extensive group of Salmonella, from the body of a pig. Currently, there are more than 1,500 Salmonella serotypes.

It is known that the main reservoir of Salmonella infection are representatives of the animal world. Carriage of Salmonella by clinically healthy animals and birds, the meat of which is most often used in human nutrition, is a significant danger in the occurrence of foodborne diseases. Salmonella is contaminated with sewage of food industry enterprises and livestock farms.

Calves are the main source of salmonella (paratyphoid) infection. There is a growing role of animals as sources of human salmonellosis. The clinical course of salmonellosis is characterized by extreme diversity, the presence of a significant number of light, wiped, and atypical forms that make it difficult to make a diagnosis. Calves have asymptomatic carriage of Salmonella. Salmonella bacteria carriers are infected calves, which, being outwardly healthy, secrete salmonella with feces and urine. In the internal organs of such animals, salmonella is found mainly in the liver (bile, gallbladder mucosa), as well as in the mesenteric lymph nodes. Bacterium carriers are the main reservoir of Salmonella infection and represent a particular danger as a source of infection for young farm animals. Bacterial carriers are also a source of toxic infection for people by eating foods from such animals.

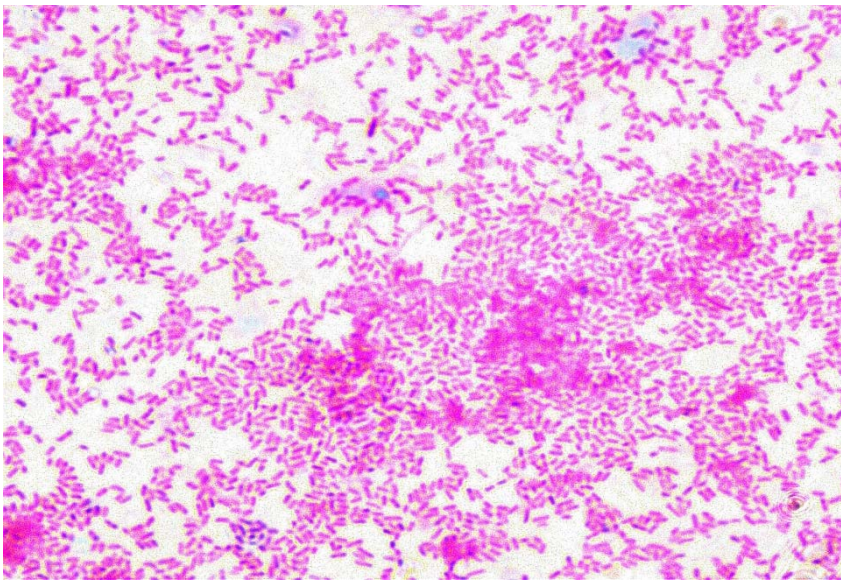
Polypathogenic salmonella is important. Most salmonella pathogens for humans, and for various species of animals and birds. In some cases, salmonella is ubiquitorous (S. typhimurium), although some are peculiar only to specific regions. Young salmonellosis occurs in all countries of the world, regardless

of climatic and geographical conditions. The stationary deprivation of farms is associated with hidden carrier (release) of Salmonella and unfavorable living conditions for animals. The accumulation of the pathogen in the environment contributes to the content with the unsanitary maintenance of farms. The source of the causative agent of salmonellosis are sick and ill animals. Animals are infected by the alimentary route, less often - through the respiratory system, foals and lambs - in utero. Salmonella, once in the intestine, multiply and cause an inflammatory process. When a bacterial cell is destroyed in the body, endotoxins are released. From the intestines, salmonella and their metabolic products, especially endotoxins, can penetrate into the lymphatic system, and then into the blood; the disease in such cases proceeds as a septicemia [1, 2].

Salmonellosis affects calves after a detached age - from 10 to 60 days. Unfavorable factors, poor feeding and maintenance contribute to the development of the disease. Salmonellosis is a seasonal disease. There are acute, subacute, chronic course of the disease, as well as asymptomatic bacteriocarrier [2]. The incidence of young salmonella depends on age. Calves suffer from salmonellosis between the ages of 10 and 30 days or over 1.5 months. In calves, salmonellosis occurs with symptoms of bronchopneumonia and arthritis [3].

Research results. As a result of bacteriological examination of samples of faeces from 3 calves (inv. № 7022, inv. № 70420, inv. № 7886) with clinical signs of salmonellosis (bronchopneumonia, increased body temperature, general depression, lack of appetite, characteristic posture with drooping neck), enrolled in a study in 2016, the salmonellosis calf pathogen Salmonella dublin was isolated from fecal samples from all calves. Specific Salmonella antibodies were recorded in the blood sera of all calves in RA.

A uniform turbidity without a ring and sediment was observed in the seeding of samples from the faeces on the MPB, small convex round bluish translucent colonies with smooth edges in the S-form grew on the MPA. On the Endo medium, colorless round colonies grew, on bismuth sulfite agar - black colonies with metallic luster. In smears prepared from daily agar cultures of Salmonella and Gram-stained, small gram-negative rods with rounded ends, typical of the genus Salmonella, were observed. On picture shows salmonella isolated from calves.



S. dublin in a gram-stained smear

The picture shows small gram-negative rods with rounded ends.

When sowing crops with an injection on SA, the characteristic mobility of Salmonella (mobile sticks) was observed.

Selected cultures agglutinated with polyvalent AVSDE Salmonella and monoreceptor Salmonella serums O-9 and HHC (g, p) [4]. All cultures isolated from calves are identified as Salmonella dublin. White mice infected with salmonella diurnal broth culture subcutaneously in the back area fell on the

following day after infection. An infecting culture of S. dublin, not contaminated by extraneous microflora, was sowed from the heart and liver of biotinous mice. Selected cultures were identical in biological properties. Identification of cultures was carried out in accordance with the determinant of bacteria Burgi [5].

Based on the study of cultural-morphological, antigenic properties, as well as the production of culture bioassays, isolated from the feces of three calves, were identified as Salmonella dublin, the causative agent of salmonellosis of calves. The sensitivity of isolated salmonella cultures to antibiotics has been studied. The results are presented in table.

The results of the study of the sensitivity of cultures isolated from calves to antibiotics

#	Antibiotics	Calf inv. № 7022	Calf inv. № 70420	Calf inv. № 7886
1	Amikacin	20 mm	20 mm	20 mm
2	Gentamicin	25 mm	25 mm	25 mm
3	Tetracycline	31 mm	27 mm	33 mm
4	Doxycycline	–	–	–
5	Lincomycin	–	–	–
6	Erythromycin	20 mm	20 mm	20 mm
7	Enrofloxacin	30 mm	30 mm	30 mm

From table it can be seen that the highest sensitivity of Salmonella cultures isolated from the feces of calves was observed to tetracycline, gentamicin, erythromycin, enrofloxacin.

Patients with symptoms of bronchopneumonia and arthritis were isolated from healthy calves and placed in a warm room. Salmonellosis was administered to calves with antisalmonella antitoxic hyperimmune serum in accordance with the instructions for use (Armavir). Treatment of calves combined with antibiotic therapy. Patients calves were treated with sensitive broad-spectrum antibiotics (gentamicin, tetracycline and enrofloxacin, enrofloxacin). Tetracycline-containing drugs (oxygenating, thread 200, oxytetracycline) and fluoroquinolones (enromic 10%) had a therapeutic effect.

Control measures. Prevention and measures to combat salmonellosis in calves are based on increasing the body's resistance to calves by following the zoohygienic and sanitary rules for the care and maintenance of pregnant cows and calves. In calf houses and in the maternity ward, it is necessary to carry out high-quality mechanical cleaning and routine disinfection of premises, equipment and drinkers. Attention should be paid to vaccination of pregnant cows against salmonellosis and veterinary and sanitary measures [6]. In Bayserke-Agro LLP, the associated vaccine against colibacillosis, salmonellosis and Klebsiella disease in cattle (RF) is successfully used to prevent salmonellosis in calves. You can apply monovaccine against salmonellosis calves, calves vaccinated at 10-20 days of age.

Every day, a thorough mechanical cleaning of calves and the maternity ward is carried out. Farms regularly disinfect premises, calves, walking calves with effective disinfectants and disinfect calves and maternity wards using an effective disinfectant (Glutex, Gan, Salvamed), a solution of caustic soda with 2% formalin, caustic soda solution.

Since rodents and mixed feeds are factors of the spread of salmonellosis pathogens, households are regularly (1 time every 2 months) disinfected and examined for feed used in calves. Animals are fed only feed of high sanitary quality, not inseminated by pathogenic microorganisms.

As a result of veterinary - sanitary and preventive measures taken in “Bayserke-Agro” LLP Cases of salmonellosis of calves are not registered.

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«БАЙСЕРКЕ-АГРО" ЖШС-ГІ БҰЗАУДЫҢ РЕСПИРАТОРЛЫҚ АУРУЛАРЫМЕН КҮРЕСУ ӘДІСТЕРІНІҢ ТИІМДІЛІГІ»

Аннотация. Мақалада ауру бұзаулардан алынған биологиялық материалды клиникалық-эпизоотологиялық, бактериологиялық және серологиялық зерттеу нәтижелері келтіріледі. Ауру бұзаулардың қан сарысуында сальмонеллезді антиген бар РА-да арнайы сальмонеллезді анти-денелер тіркелген. Ғылыми негізделген ветеринарлық-санитарлық және алдын алу іс-шараларын жүргізу нәтижесінде шаруашылықта бұзау сальмонеллез жойылды.

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ЭФФЕКТИВНОСТЬ МЕТОДОВ БОРЬБЫ С РЕСПИРАТОРНЫМИ БОЛЕЗНЯМИ ТЕЛЯТ В ТОО «БАЙСЕРКЕ-АГРО»

Аннотация. В статье приводятся результаты клинико-эпизоотологических данных, бактериологического и серологических исследований биологического материала от больных телят. В сыворотках крови больных телят в РА с сальмонеллезным антигеном регистрировались специфические сальмонеллезные антитела. В результате проведения научно-обоснованных ветеринарно-санитарных и профилактических мероприятий в хозяйстве ликвидирован сальмонеллез телят.

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DIAGNOSTIC VALUE OF CFT/LCFT FOR CATTLE MORAXELLOSIS

Abstract. In our country, moraxellosis has not previously been registered and immunological tests have not been tested (RSK and RDSK).

Timely diagnosis of morax is a major component of antiepizootic measures. Currently, the diagnosis of moraxcellosis is based on the epidemiological data and the clinical picture. Early signs of the disease can only be detected by immunological tests. In this regard, we have tested the serological reactions, in particular the CFT and LCFT and given a comparative diagnostic value.

Keywords: strain, bacteria, moraxella, infectious keratoconjunctivitis, complement fixation test.

Relevance of the topic. Moraxella was first isolated by ophthalmologists V. Moraks and K. Axenfeld in 1896. The Moraxella genus belongs to the Gammaproteobacteria class, the Proteobacteria type [1] is a group of bacteria that are not fermentative of gram-negative microorganisms that live on the mucous membranes of various organs of humans and animals. In cattle, Moraxella bovis and Moraxella bovoculi species parasitize, which have been isolated from the eyes of animals with infectious keratoconjunctivitis [3, 4].

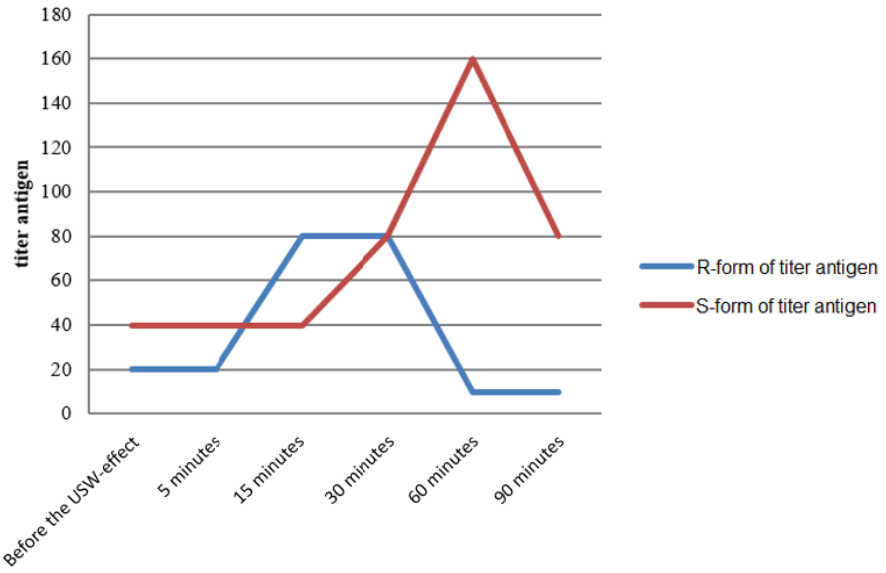
Identification of the pathogen is carried out on the basis of cultural, morphological, tinctorial, hemolytic, proteolytic, enzymatic and pathogenic properties.

The presence of endotoxin and other various waste products of microorganisms should be attributed to the pathogenicity factors of moraxell. With the help of existing fimbria, moraxellae are attached to the mucous membrane of the upper respiratory tract, the conjunctiva and the cornea of the eye [5]. With the defeat of the upper respiratory tract were isolated capsular forms of the pathogen. Conditionally pathogenic forms isolated from the nasopharynx indirectly indicate the presence of a capsular pathogen [6]. There is evidence of the use of monoclonal antibodies to study the proteins of the outer membrane of moracsell [7]. The presence of antibodies in the body is determined by many immunological tests, such as the RDP [8], ELISA Sattarova N.V. [9, 10].

The purpose of the study is a comparative analysis of the indications of CFT and LCFT with cattle morakselleze.

Materials and methods. Antigen for immunological tests was prepared by exposure to ultrasonic waves [11], from a daily culture of moraxcell strain Moraxella bovis B-2017/44 [12], SR form grown on Hottinger's solid nutrient medium with the addition of 5% defibrinated ram blood. Moraxell cultures were washed off the nutrient medium and washed with sterile saline with a pH of 8.0 and adjusted to a concentration of 50 billion microbial cells. A bacteriological mixture was voiced by a low-frequency ultrasonic generator UD (Ukraine) for 5, 15, 30, 45, 60 and 90 minutes at an exposure of 22 Hz, power 70-80 kV/cm^3. The prepared antigen was preserved with 0.5% formalin solution in a ratio of 1:10. Hyperimmune serum was obtained by immunization of rabbits [13].

Results and its discussion. It is revealed that ultrasonic waves had a strong disintegrating effect on microbial cells. The bacterial mass after scoring had unequal transparency. As the exposure extended with



Effect of ultrasonic waves on antigen titer

ultrasonic waves, the suspension of moraksell was gradually clarified. So, after 1 and 1.5 hours of exposure to ultrasound, a test tube with a suspension in the concentration of moraxcell in 50 billion microbial cells was transparent compared to the original. The results of the work are shown in figure.

As can be seen from the figure, the titer of antigens with a 5-minute exposure to ultrasonic waves remained the same as before exposure to ultrasound. With a 15 minute exposure, the antigen R titer rose to 80 and remained so when the ultrasonic waves were applied to the antigen for 30 minutes. Further ultrasonic disintegration reduced the titer of the antigen to 10. The titer S of the antigen at 30 and 60 minute exposition with ultrasonic waves rose from 80 to 160, and further exposure to the ultrasonic wave reduced the titer of the antigen.

With the cross-reaction of R, S antigens with a 30-minute exposure with similar hyperimmune sera, their titer was 1:80.

In the reaction of complement binding, S antigen was used with ultrasound waves exposure of 30 minutes, the titer with hyperimmune serum obtained against S antigen was 80, and with R serum the result was negative.

Conclusion. Thus, for CFT and LCFT with morakselleze, the S form antigen is proposed with an exposure in an ultrasonic disintegrator for 30 minutes at an oscillation frequency of 22 Hz, with a capacity of 70-80 kV/cm^3, since the antigen is concentrated inside the bacterial cell and for its isolation it is necessary to destroy the microorganism.

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ІРІ ҚАРА МАЛ МОРАКСЕЛЛЕЗІ КЕЗІНДЕГІ КБР/КҰБР ДИАГНОСТИКАЛЫҚ ҚҰНДЫЛЫҒЫ

Аннотация. Моракселлез біздің елімізде бұрын тіркелмеген және иммунологиялық тесттер (КБР, КҰБР) зерттелмеген. Ірі қара мал моракселлезін дер кезінде балау - эпизоотияға қарсы іс-шаралардың ең маңызды бөлігі болып саналады. Қазіргі кезде моракселлез ауруының диагностикасы эпизоотиялық деректерге және аурудың клиникалық көрінісіне сүйеніп қойылады. Моракселлез ауруының ерте көріністері иммунологиялық тесттер арқылы анықталады. Осыған байланысты, комплемент байланыстыру және комплементті ұзақ байланыстыру реакцияларының диагностикалық құндылығы салыстырмалы түрде зерттелді.

Түйін сөздер: штамм, бактерия, моракселла, індетті кератоконъюнктивит, комплементті байланыстыру реакциясы.

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ДИАГНОСТИЧЕСКАЯ ЦЕННОСТЬ РСК/РДСК ПРИ МОРАКСЕЛЛЁЗЕ КРС

Аннотация. В нашей стране моракселлез ранее не регистрировалось и не испытывались иммунологические тесты (РСК и РДСК). Своевременная диагностика моракселлёза является одним из главных звеньев противоэпизоотических мероприятий (ПЭМ). В настоящее время диагностика моракселлеза осуществляется на эпизоотологических данных и клинической картине. Ранние признаки болезни могут быть выявлены только иммунологическими тестами. В связи с этим, нами испытаны серологические реакции, в частности РСК и РДСК и даны сравнительная диагностическая ценность.

Ключевые слова: штамм, бактерия, моракселла, инфекционный кератоконъюнктивит, реакция связывания комплемента.

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THE INNOVATIVE POSSIBILITIES IN THE AGRO-INDUSTRIAL COMPLEX IN TERMS OF ECONOMIC SECURITY

Abstract. In terms of integration in the agricultural production of the Republic of Kazakhstan, it is necessary to consider the peculiarities of socio-economic development, natural conditions, seasonality of production and traditions of the regions. Integration processes occurring in the industries aimed at ensuring economic and food security. The formation of the agri-food market requires the use of new forms of integration, which have an effective impact on its development and formation. The article discusses the main factors affecting the effective development of the agricultural sector.

Key words: agribusiness sector, factors, innovation, economic security.

Introduction. In modern conditions of globalization and integration, the development of the agro-industrial sector of Kazakhstan, improvement of product quality, competitiveness and promotion in the international market is becoming important. The formation of the agro-industrial sector of the republic is significantly influenced by factors and characteristics of the development of the country's regions, which are closely related to the improvement of management, marketing and innovation, and the development of entrepreneurship in the countryside and the provision of economic security. Much attention should be paid to the socio-economic development of regions and the formation of human resources. There are many factors that have not only a positive, but also a negative impact on the development of the agro-industrial complex.

Material and research methods. When writing the article, the authors applied various general scientific methods: the analysis of the collected material was carried out using inductive and deductive methods, the accumulated information was analyzed, detailed, generalized. The work used logical and systemic approaches.

Study. The author's vision of modern factors of positive and negative impact on the development of agriculture in the Republic of Kazakhstan is presented in table.

The formation of a new paradigm for the development of the agrarian sector should be based on the existing models of the socio-economic development of the regions and the country. The basis for managing the sustainable development of agricultural production should be based on the principles of state regulation of socio-economic processes, “combinations” of administrative influence and market mechanisms, actively supporting the development of small business and social protection of the poor. The integrated implementation of such principles, along with the correctly chosen management tools, can ensure the effective satisfaction of the economic interests of the population, together with an increase in the efficiency of the economic entities of the agrarian production.

The implementation of the objectives of improving the efficiency of the agricultural sector is impossible without the development and implementation of social measures to adapt to the new realities of the competitive environment of rural society. These tasks require the development of modern conceptual approaches in terms of identifying relevant indicators that allow comparing quantitative and qualitative changes in the level of vital activity of the population, including in such areas as participation in agrarian processes, provision of social services, psychological resistance to change.

The main factors of development of agricultural production in Kazakhstan

Positive factors	Negative factors
Territorial diversity of climatic conditions for the development of agricultural production	The high cost of material and technical resources, electricity and fuel for agricultural producerš
Available organizational and economic prerequisites for the development of agrocomplex	Lack of labor to enable the introduction of new technologies in agricultural production
Innovative openness of agricultural production, the emergence of agricultural technology parks and business incubators	Low technical and technological level of agricultural production, stagnation of rural engineering and the scope of production services of the agricultural complex
State policy to support the socio-economic development of rural areas and direct agricultural producers, restricting the import of agricultural products, raw materials and food	Differentiation of agricultural producers to leaders and outsiders, due to different profitability of economic activity, the continuing trend of liquidation of agricultural enterprises
Availability of potential foreign markets for competitive domestic agricultural products	The growing gap between rural and urban incomes, the provision of social benefits and infrastructure
Integration of agricultural production in the global global markets for raw materials and food	Undeveloped infrastructure of the agrarian market, increasing monopolization of large retail chains
Note: Compiled by the author's.	

Further research into the development of the agrarian sector will form a new economic vision for the organization of agricultural production and determine the directions for improving the management of agricultural development, including in matters of structural transformation and modernization of agricultural management at the regional and local levels.

The main factors contributing to the effective development of agriculture are:

– improving product quality and focusing on international markets;
– government subsidies;
– marketing promotion;
– improvement of veterinary services;
– logistics development;
– improvement of planning the structure of production of agricultural products;
– use of innovative projects;
– ensuring economic security.

The formation of the above factors contributes to the effective development of the agro-industrial sector. Proper use of various forms of integration in the agricultural production will reduce costs, ensure stability, improve the quality of products, increase competitive advantages in the market of agricultural production. Factors affecting the motivation for the development of agro-industrial integration include:

– interaction of agriculture and processing enterprises;
– profitable product promotion;
– highly efficient management;
– competent integrated formation.

In modern conditions, the development of integration processes forms new various integration formations of the agrarian sphere. To deepen integration in economic policy, it becomes important to study these issues. In the agricultural sector, the process of producing raw materials and finished products takes place, entrepreneurial structures are being formed, the potential for integration changes is developing. traditions of national traditions.

It is necessary to consider internal differences of regions, seasonality, dependence on natural features, population density and lack of human resources. The integration policy of the regions of Kazakhstan should consider the peculiarities of the relationship of traditional industries in agriculture. Integration of agricultural production sectors requires ensuring food security, national values, traditions of the population of the regions. At the same time, the main tasks are environmental safety and protection of natural resources.

According to international experience, it is necessary to note the forms of vertical agro-industrial integration, as multinational associations, consisting of enterprises that are located in different countries, but have one leadership. Currently, in the context of globalization and integration, the food agrarian market requires the development of modern forms of integration that affect the development of the world economy.

In the context of integration, the economic development of Kazakhstan is associated with individual problems, among them are the raw materials orientation, outdated production and social infrastructure, low spending on research and a low level of economic integration into the global economy. One feature for post-Soviet innovation systems is a high share of public sector research and development, a low level of small innovative business. In this regard, it is important to create an effective system of innovation management in the agricultural sector.

Innovative development requires a special organizational structure or the creation of centers for technological support of innovation. For the country's economy, it is important to develop innovative entrepreneurship aimed at the development of rural regions. Among the directions of development of the agricultural sector are the creation and introduction of innovations in food security. This requires marketing research, experimental work and results. Also, the objectives of the scientific sector in the agricultural sector include the creation of new types of products, their implementation, promotion of agricultural production in the market and improving the competitiveness of products.

In the agricultural sector, small business development, in our opinion, should play an important role in innovative development. Given the global experience, you can use the dynamism, a relatively small investment in innovative business. About half of all innovations are provided by developed countries through the development of small enterprises. Thus, in small organizations the number of innovations is 4 times higher per unit of costs than on average, and 24 times more than on large ones. They master 2 times more innovations than in large companies. The economic environment in our country is still unfavorable for innovation: the interrelationships of the state and university sectors of science with agrarian associations are underdeveloped, private capital is innovatively inactive, the market for intermediary services for the development of the agrarian business needs improvement. Innovation activity should be based on a perfect tax system, state and market participation in innovation processes, ensuring openness and transparency of development institutions.

To deepen this process, a more thorough study of this issue is required, since certain elements of the integration of the agrarian sector are contained in the regional economic policy. Due to the fact that the basis and potential of integration processes are formed in the regions, therefore, there are processes for the production of raw materials, finished products, are promoted in the market, carrying out and developing business structures in agricultural production.

Conclusion. In order to integrate with agrarian production, the agricultural economy must necessarily consider the peculiarities of the regions, their social and economic development, the use and introduction of innovations, and the development of small business. These features determine the uniqueness of natural and geographical conditions, history, traditions and national values of the population. The pronounced seasonality of production, a strong dependence on natural factors, a large territorial concentration of the population, a shortage of personnel, especially qualified ones, distinguish agriculture from other branches of the national economy – one of the most important derivatives of the agricultural sector.

The integration of traditional economic sectors in the agribusiness sector is a new quality of relations between entities based on the factors of the concept of sustainable development and dynamic growth. This helps to ensure economic food security, the formation of the traditions of the population of the regions, as well as compliance with the requirements of environmental safety and environmental protection for effective agricultural production.

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ЭКОНОМИКАЛЫҚ ҚАУІПСІЗДІК ШАРТЫНДАҒЫ АГРАРАЛЫҚ ӨНЕРКӘСІП КЕШЕНІНІҢ ИННОВАЦИЯЛЫҚ МҮМКІНДІКТЕРІ

Аннотация. Мақалада аграрлық сектордың тиімді дамуына ықпал ететін негізгі факторлар қарастырылған.

Қазақстан Республикасының ауыл шаруашылық өндірісінде, жаһандану және интеграция тұрғысында әлеуметтік-экономикалық дамудың ерекшеліктерін, табиғи жағдайларын, өндірістің маусымдылығын және аймақтардың дәстүрлерін ескеру қажет. Ауыл шаруашылығында болып жатқан интеграциялық үдерістер елдің экономикалық және азық-түлік қауіпсіздігін қамтамасыз етуге бағытталған. Аграрлық азық-түлік нарығының қалыптасуы оның қалыптастыру мен дамытуға тиімді әсер ететін интеграцияның жаңа формаларын пайдалануды талап етеді.

Түйін сөздер: аграрлық өнеркәсіп секторы, факторлар, инновациялар, экономикалық қауіпсіздік.

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ИННОВАЦИОННЫЕ ВОЗМОЖНОСТИ АГРОПРОМЫШЛЕННОГО КОМПЛЕКСА В УСЛОВИЯХ ЭКОНОМИЧЕСКОЙ БЕЗОПАСНОСТИ

Аннотация. В статье рассматриваются основные факторы, влияющие на эффективное развитие аграрного сектора. В условиях глобализации и интеграции в аграрном производстве Республики Казахстан необходимо учитывать особенности социально-экономического развития, природные условия, сезонность производства и традиции регионов. Интеграционные процессы, происходящие в сельском хозяйстве направлены на обеспечение экономической и продовольственной безопасности страны. Формирование агропродовольственного рынка требует использования новых форм интеграции, которые оказывают эффективное влияние на его формирование и развитие.

Ключевые слова: агропромышленный сектор, факторы, инновации, экономическая безопасность.

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FUNDAMENTAL CHARACTERISTICS OF RELIABILITY IN TECHNOLOGICAL PROCESSES IN FERROUS METAL INDUSTRY

Abstract. Problems of reliability in the areas of metal industry are of the most immediate interest. The efficiency of using the different technological schemes is closely connected with ensuring the required accuracy, productivity and operational economy which are mostly defined by the degree of their reliability. The decisive influence on the perfection of technological processes has the level of scientific support, because on the stage of scientific researches the potential of innovations, which is materialized through design and construction work into production, is laid. The purpose of this work – to develop mathematical and computational models for assessment the reliability of fundamental characteristics in technological processes in the areas of non-ferrous and ferrous metal industry with the aim of achieving the required quality of output. The suggested strategy of quantitative and qualitative assessment of reliability on the basis of fundamental conservation laws on maximum entropy will provide the prevention of errors on the stage of scientific elaboration in order to avert the appearance of defect or remove it without bringing it into a final stage of production, which is extremely important in the countries with market-oriented system of controlling the technology level and quality. The application of ruggedness analysis technology in technological output and processes offered in this work will lead to improved production method and considerable reduction in expenditure on production of this output, improvement in quality and competitive capability. The novelty of the thesis consists in that for the forts time to the analysis of the technology of chemical-and-metallurgical processes and schemes there will be applied objective and fundamental information criteria expressed in universal units, i.e. bits. Methods of computer modeling have been developed for calculation of fundamental characteristics of production in a way of refinement the cast iron technological schemes reliability. Methods of computer modeling have been developed for calculation of fundamental characteristics of in production in a way of direct receiving iron technological schemes reliability.

Key words: modeling, ruggedness, technological processes, qualitative and quantitative assessment, entropy, information, hierarchical systems, technological products.

Introduction. Quantitative estimations of sense and value of the information can be made for the information analysis of quality of technological products and processes of their reception only after the preliminary agreement about what precisely in each concrete case has value and sense for the considered phenomena [1-8]. Methods of calculation the information suggested by Shannon allow to reveal a ratio of quantity of the predicted information and quantities of the unexpected information which cannot be predicted beforehand, and thus to enable to define a qualitative and quantitative estimation of the certain technological circuit. As a probability of detection of the main element of technological system it is possible to accept its maintenance in a product, expressed in shares of unit. For example, let's examine the maintenance of a considered chemical element in products of technological repartition. Also for probability of detection it is possible to take the maintenance of suitable fraction (remnants, briquettes) in a corresponding product. The same concerns the process of extraction of an element in this or that product, as in this case a parameter of extraction is equal to a probability of transition of the given element from one condition of system into another. These both parameters - the maintenance and extraction - can be equally used for an estimation of quality of a product or technological repartitions.

The formula allows to estimate the complex indeterminancy of a group of technological operations undergoing analyses, as well as technological schemes as a whole, which will result in determining predictability and technological reliability of these operations [5, 9, 10]. The work suggests a formula for estimating complex indeterminancy of a group of technological operations undergoing analyses before and after their improvement, as well as technological schemes as a whole in the information units.

Methods. Technical and technological modernization of industry is closely connected with the development of new and improvement of known technologies, reduction of the energy expenses on production of the product, increasing of production efficiency. The world industry, having concentrated in itself enormous a great number of enterprise on mining of ore, melting and conversion of black and non-ferrous metals, chemical and machine-building complexes, plants of precise mechanical engineering, appliance-engineering and radio electronics must receive the further development. To study the regularities of the processes of enrichment, extraction, reception, refining of metals, as well as processes, connected with the change in contents, structure and characteristic of alloys and materials in metallurgy physic-chemical and mathematical methods of the research are used. The Improvement of the technological processes with considering of the raw materials complex in structure is impossible on the only base of traditional methods of the opening the causal relationships in processes of the general technological scheme with analysis of their material and heat balances. The additional analysis of these processes is necessary on base of information entropy by Shannon; the reason for it is to integrate disembodied hitherto factors on extraction of valuable components and their contents in final products on redistribution and on technological scheme as a whole with the following use of this method for analysis and comparative estimation at chemist-metallurgical production. In this connection using as a base the information entropy by Shannon we designed a method of integrating disembodied hitherto factors on extraction of valuable components and their contents in final products on redistribution and on technological scheme as a whole with the following using of this method for analysis and comparative estimation of chemist-metallurgical production. As original data we used reference materials on contents and extraction of elements, published in brief guide to metallurgy of the non-ferrous metals by the authors Gudima N. B., Shein I. P. [11] and the most recent reference book under editing by M.E. Dritza [12] on the characteristics of elements in two volumes, where all the latest data from foreign reference book, monograph and scientific articles are taken into account. With the aim to conduct the comparative analysis of the competitive schemes or improving operations taken apart on united generalized criterion of complex completeness, as well as uncertainty, we shall consider usage of the formula by Shannon for determination of the information balance of the production processes by means of factors of the extraction and contents of ferric. For entropy-information analysis of any object the formula by Shannon for expression of the uncertainty of the system is broadly used [13]:

$$H = -\sum_{i=1}^{N} p_i \log_2 p_i \qquad (1)$$

where pi - is a probability of the finding of any uniform system element in their multitude N; $\sum_{i=1}^{N} p_i = 1$, $p_i \geq 0,\ i = 1,2,...,N$.

As a characteristic of probability of finding the main system element it is possible to take its contents expressed in fractions of the unit. For instance, this is the contents of extracted chemical element ferric in corresponding products. The same is true for the process of the extraction of the element into one or another product, since in this case factor of the extraction is identical to probability of the transition of the given element from one state of the system into another. Both these factors - contents and extraction - can be used at equal degree for estimation of the uncertainty in product quality or technological operation. Then for the single controlled system element we use common mathematical calculations for expression of the information uncertainty as follows.

If p - is a probability of finding of the controlled element in product or transition at extraction, then uncertainty or unexpectedness of each of these events is a reciprocal from its determined identification that is 1/p. In our variant of the estimation of uncertainty in the behavior of the only one system element this uncertainty is expressed by following formula:

$$H = \log_2 \frac{1}{p} = -\log_2 p = -\frac{\ln p}{\ln 2} \tag{2}$$

Before the publication of K. Shannon's theory R.Hartly has suggested to define quantity of the information under the formula:

$$H_{n(\max)} = \log N_n = \log N_0^{k^n} = k^n \log N_0, \tag{3}$$

where $N_n = N_0^{k^n}$, n - number of levels, k - length of a code of elements at each level of hierarchical system.

Let N_n - number of elements of n-level. I_0 - capacity of the information of a zero level of technological system. Then the capacity of the information of n-level counting upon one element is expressed by the formula:

$$I_n = k^n I_0 .$$

Results. In the technological circuit considered by us $k = 2$ there is a sample of set of elements - an element and not an element (in our case of ferric and all other elements in aggregate) then the equation (3) will become:

$$H_{n(\max)} = 2^n \log N_0 = 2^n \log_2 2 = 2^n .$$

Essentially important advantage of an information estimation of quality of products or technological operations is that a suggested parameter H_n, as well as any entropy-information sizes, can be added. The given property of additive is immanently inherent to entropy and information and is a basis for expression of the law of preservation of their sum. Hence, technological uncertainty of various operations within the limits of the unified circuit can be expressed by a system parameter of uncertainty:

$$H_{\sum n(\max)} = \sum_{i=0}^{n} H_i = \sum_{i=0}^{n} 2^i \text{ , Bit/el.}$$

Information capacity of hierarchical system and n- level are defined by equality:

$$I_{\sum_n} = \sum_{i=0}^{n} \frac{H_{i(\max)}}{(i+1)!} = \log N \sum_{i=0}^{n} \frac{\prod_{m=0}^{i} k_m}{(i+1)!},$$

$$I_n = \frac{H_{n(\max)}}{(n+1)!} = \frac{\prod_{m=0}^{n} k_m \log N}{(n+1)!}, \tag{4}$$

where $H_{n(\max)}$ - greatest possible entropy of a system.

The system determined component $I_{\sum_n}(d)$ and the determined component of the information $I_n(d)$ is defined by equality:

$$I_{\sum n}(d) = \sum_{i=0}^{n} 2^i \left[1 - \frac{1}{(i+1)!}\right] \text{ Bit/el.},$$

$$I_n(d) = 2^n \left[1 - \frac{1}{(n+1)!}\right] \text{ Bit/el.}$$

Having defined degrees of determination and ineradicable stochasticity at each level of technological system under formulas [3]:

$$d_n = \frac{I_n(d)}{H_{n(\max)}}, \qquad h_n = \frac{I_n(h)}{H_{n(\max)}} = 1 - d ,$$

let's analyze the received results of the carried out calculations which are submitted in table 1.

Table 1 – Settlement information-entropy characteristics of technological repartitions in hierarchical system for $k = 2$, $N_0 = 2$

n	$I_n(d)$	$H_{n(\max)}$	d_n	$I_{\sum_n}(d)$	$H_{\sum_{n(\max)}}$	$d_{\sum_n}$
	$2^n\left[1-\frac{1}{(n+1)!}\right]$	2^n	$\left[1-\frac{1}{(n+1)!}\right]$	$\sum_{i=0}^{n}2^i\left[1-\frac{1}{(i+1)!}\right]$	$\sum_{i=0}^{n}2^i$	$\frac{\sum_{i=0}^{n}2^i\left[1-\frac{1}{(i+1)!}\right]}{\sum_{i=0}^{n}2^i}$
0	0	1,0	0	0	1,0	0
1	1,0000	2,0	0,5000	1,0000	3,0	0,3333
2	3,3333	4,0	0,8333	4,3333	7,0	0,6190
3	7,6667	8,0	0,9583	12,0000	15,0	0,8000
4	15,8667	16,0	0,9917	27,8667	31,0	0,8989
5	31,9556	32,0	0,9986	59,8222	63,0	0,9496
6	63,9873	64,0	0,9998	123,8095	127,0	0,9749
7	127,9968	128,0	1,0	251,8063	255,0	0,9875
8	255,9993	256,0	1,0	507,8056	511,0	0,9937
9	511,9999	512,0	1,0	1019,8055	1023,0	0,9969
10	1024,0000	1024,0	1,0	2043,8055	2047,0	0,9984
11	2048,0000	2048,0	1,0	4091,8055	4095,0	0,9992
12	4096,0000	4096,0	1,0	8187,8055	8191,0	0,9996
13	8192,0000	8192,0	1,0	16379,8055	16383,0	0,9998
14	16384,0000	16384,0	1,0	32763,8055	32767,0	0,9999
15	32768,0000	32768,0	1,0	65531,8055	65535,0	1,0

Let's define the quality of technological redistribution and distributed products on the grounds of comparing analysis of the competitive schemes on united generalized criterion of complex uncertainty and completeness of the technological scheme of steel production by domain process and direct reception ferric. Since the extraction of any component is pro rata to its contents in source material and back pro rata to its contents in product then in the first approximation extraction of ferric from terrestrial cortex in ore resources is possible to estimate on correlation:

$$\beta_0 \cong \frac{\alpha_{з.к.}}{\alpha_{р.м.}} \cdot 100\% \tag{5}$$

where β_0 - a factor of the extraction at zero level of technological scheme, $\alpha_{з.к.}$ - a factor of the contents in terrestrial cortex, $\alpha_{р.м.}$ - a factor of the contents in ore resources.

Since for ferric

$$H_k = \sum_{i=0}^{n} H_i \tag{6}$$

on the grounds of information formula by Shannon (2) we shall conduct entropy-information analysis of each technological redistribution for calculating the complex uncertainty and completeness of the technological scheme as a whole on example of steel production. Having received characteristic of complex uncertainty of the technological scheme it is possible by means of turned formula

$$p_k = \exp\left(-H_k \ln 2\right) = 2^{-H_k} \text{ the parts of the unit (p.u.).} \tag{7}$$

find corresponding to it characteristics of complex certainty of the technological scheme [14] steel production.

The Results of comparative calculations on redistributions and on technological scheme of steel production by domain process as a whole are presented in table 2, by direct reception of ferric in table 3.

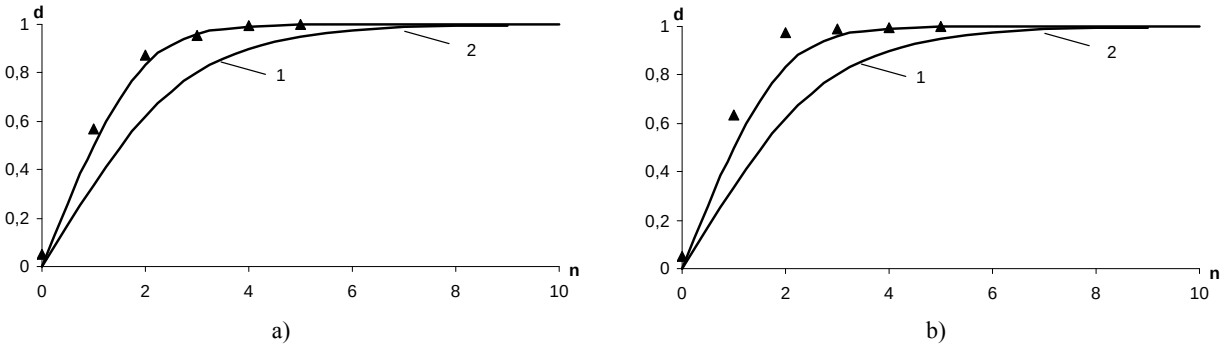
Table 2 – Information estimation on extraction and contents of technological redistribution at steel production by domain process

Technological redistributions	Factors of the contents		Factors of extraction		$H_{\alpha\beta}$	$p_{\alpha\beta}$
	α	H_α bit	β	H_β bit		
Mining	0,5000	1,0000	0,1020	3,2934	4,2934	0,0510
Enrichment	0,6550	0,6104	0,8700	0,2009	0,8113	0,5696
Domain melting	0,8830	0,1795	0,9910	0,0130	0,1925	0,8751
The Smelting	0,9550	0,0664	0,9980	0,0029	0,0693	0,9531
Re-melting	0,9950	0,0072	0,9990	0,0014	0,0086	0,9940
Refining	0,9999	0,0001	0,9999	0,0001	0,0002	0,9998
H_k bi t	–	1,8636	–	3,5117	5,3753	–
p_k p.u	0,2748	–	0,0877	–	–	$2{,}4087 \cdot 10^{-2}$

Table 3 – Information estimation on extraction and contents of technological redistribution of steel production by direct reception of ferric

Technological redistributions	Factors of the contents		Factors of extraction		$H_{\alpha\beta}$	$p_{\alpha\beta}$
	α	H_α bit	β	H_β bit		
Mining	0,5000	1,0000	0,1020	3,2934	4,2934	0,0510
Enrichment	0,7140	0,4860	0,8920	0,1649	0,6509	0,6368
Plating	0,9800	0,0291	0,9950	0,0072	0,0363	0,9751
The Smelting	0,9910	0,0130	0,9980	0,0029	0,0159	0,9890
Re-melting	0,9950	0,0072	0,9990	0,0014	0,0086	0,9940
Refining	0,9999	0,0001	0,9999	0,0001	0,0002	0,9998
H_k bi t	–	1,5354	–	3,4699	5,0053	–
p_k p.u	0,3449	–	0,0902	–	–	$3{,}1131 \cdot 10^{-2}$

The Comparing of calculating data on new model (2), (7) with practical data (the tables 2, 3) let's illustrate graphically in coordinates in accordance with (figure).



Dependency of the information estimation of the factors on extraction and contents from level of the technological scheme of steel production:
a) Domain process; b) direct reception of ferric
n - number of level, d - determination,
1 - System determination, 2 - level determination, points - practical data

At comparison of reference data on extraction and contents of the target component of technological organization of steel production by domain process (the table 2) with new model (2), (7) we revealed adequate correlation (R = 0,847942, t_R = 6,035314 > 2) for system determination, much higher for level determination (R = 0,991408, t_R = 115,8812 > 2). At comparison of reference data on extraction and contents of the target component of technological organization of steel production by direct reception of ferric (the table 3) with new model (2), (7) we revealed identical correlation (R = 0,733544, t_R = = 3,176112 > 2) for system determination and (R = 0,96213, t_R = 25,89641 > 2) for level determination.

Discussion. Calculations offered by us for information analysis of steel quality and metallurgical redistribution of the conversion of ferric already in the first approximation correlate with dynamics of raise of deterministic constituting in abstract hierarchical system. Thereby, intercoupling is set between technological factors on extraction and contents of ferric with probability of its transition and finding on every level and on technological scheme as a whole at steel production by domain process and by direct reception of ferric on the grounds of analysis of entropy-information characteristics.

With the aim to improve steel-melting production specialists from many leading metallurgical companies of the world continue to investigate ecological safe and cheaper technology of steel melting. Last years in the world steel branch they have been actively searching for profitable technology, capable to substitute the traditional process of steel production by means of domain stoves and oxygen convertor. But, as we predict the domain process of steel production will prevail on any other process of steel reception.

Such is information estimation of certainty at realization of the technological schemes which can be used for comparison of their state before and after the improvement alongside with base characteristics of the complex uncertainty.

Conclusion. Use of the measure of certainty and uncertainty of the information allows to analyze the general mechanisms of entropy-information laws of the technological repartitions being a fundamental basis of all spontaneously proceeding processes of accumulation of the information which result in self-organizing technological processes, namely, to hierarchical systems. For multilevel hierarchical system of technological repartition it is important to describe the subordinate level as interaction of the interconnected subsystems, each of which possesses the information properties. Therefore at reception of an information estimation main attention is inverted on into-level and intra-level interactions. The considered approach, in our opinion, fully complies with the basic requirements of the system entropy-information analysis as while modeling hierarchical system of technological processes it provides integrity of its consideration due to the general-theoretical and methodical concepts allowing to keep in sight the system as a whole entirely for the solution of a task at all levels of hierarchical system.

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ФУНДАМЕНТАЛЬНЫЕ ХАРАКТЕРИСТИКИ НАДЕЖНОСТИ ТЕХНОЛОГИЧЕСКИХ ПРОЦЕССОВ В ЧЕРНОЙ МЕТАЛЛУРГИИ

Аннотация. Проблемы обеспечения надежности в области металлургии являются чрезвычайно актуальными. Эффективность использования различных технологических схем связана с обеспечением требуемой точности, производительности и экономичности, которые в значительной степени определяются уровнем их надежности. Решающее влияние на совершенство технологических процессов оказывает уровень научного обеспечения, так как именно на этапе научных исследований закладывается потенциал нововведений, который через проектно-конструкторские работы материализуется в производство. Цель проводимых нами исследований – разработать математические и компьютерные модели для расчета фундаментальных характеристик надежности технологических процессов в области цветной и черной металлургии с целью достижения требуемого качества продукции. Предлагаемый алгоритм качественной и количественной оценки надежности на основе фундаментального закона сохранения максимума энтропии позволит предотвращение ошибок именно на стадии научных проработок, чтобы предотвратить возникновение дефекта или

устранить его, не доводя до окончательной стадии производства изделия, что особенно важно в странах с рыночной экономикой системы управления техническим уровнем и качеством. Применение предложенной нами технологии анализа надежности технологической продукции и процессов приведет к рационализации процессов и значительному снижению затрат на изготовление данной продукции, повышению ее качества и конкурентоспособности. Научная новизна работы состоит в том, что впервые к анализу технологии химико-металлургических процессов и схем производства цветных и черных металлов применены объективные и фундаментальные информационные критерии, выраженные в универсальных единицах информации – битах. Перспектива исследования распространяется на любые металлургические и химические производства. Разработаны методы компьютерного моделирования для расчета фундаментальных характеристик надежности технологической схемы производства стали путем рафинирования чугуна. Разработаны методы компьютерного моделирования для расчета фундаментальных характеристик надежности технологической схемы производства стали прямым получением железа.

Ключевые слова: моделирование, надежность, технологические процессы, качественная и количественная оценка, энтропия, информация, иерархические системы, технологический продукт.

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ҚАРА МЕТАЛЛУРГИЯ САЛАСЫНДА ТЕХНОЛОГИЯЛЫҚ ПРОЦЕСТЕР СЕНІМДІЛІГІНІҢ ФУНДАМЕНТАЛЬДЫ СИПАТТАМАЛАРЫ

Аннотация. Металлургия саласындағы сенімділікті қамтамасыз ету проблемалары өте маңызды болып табылады. Әр түрлі технологиялық сұлбаларды пайдалану тиімділігі талап етілетін дәлдікті, өнімділікті және үнемділікті қамтамасыз етумен байланысты, сұлбалар едәуір дәрежеде олардың сенімділігі деңгейімен анықталады. Технологиялық процестердің жетілгендігіне ғылыми қамтамасыз ету деңгейі шешуші әсер етеді, себебі атап айтқанда ғылыми зерттеулер кезеңінде енгізілген жаңалықтар әлеуеті салынады, ол жобалық-конструкторлық жұмыстар арқылы өндіріске іске асырылады. Жұмыстың мақсаты – өнімнің талап етілетін сапасына қол жеткізу мақсатында түсті және қара металлургия саласындағы технологиялық процестер сенімділігінің маңызды сипаттамаларын есептеу үшін математикалық және компьютерлік модельдерді әзірлеу. Энтропия максимумын сақтаудың фундаментальды заңы негізінде сенімділікті сапалық және сандық бағалаудың ұсынылатын алгоритмі, ақаудың пайда болуын болдырмау үшін және оны бұйымды өндірудің соңғы сатысына дейін жеткізбей жою үшін, атап айтқанда ғылыми зерттеулер сатысында қателерді болдырмауға мүмкіндік береді, бұл әсіресе техникалық деңгей мен сапаны басқару жүйесінің нарықтық экономикасы бар елдерде маңызды. Ұсынылған технологиялық өнім мен процестердің сенімділігін талдауды қолдану процестерді рационалдауға және берілген өнімді жасауға жұмсалатын шығындарды едәуір азайтуға, оның сапасы мен бәсекеге қабілеттілігін арттыруға әкеледі. Тақырыптың жаңашылдығы – химия-металлургиялық процестер мен сұлбалар технологиясын талдауға әмбебап ақпарат бірліктері – биттермен өрнектелген, объективті және маңызды ақпараттық критерийлер алғаш рет қолданылатын болады.

Түйін сөздер: модельдеу, сенімділік, технологиялық процестер, сапалық және сандық бағалау, энтропия, ақпарат, технологиялық өнімдер.

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IMPROVEMENT OF BREEDING AND PRODUCTIVE TRAITS OF KALMYK CATTLE BREED

Abstract. The article analyzes the state of Rostov type of the Kalmyk cattle breed on the main biological and productive features; it was studied the economic and breeding traits of livestock in various production systems. During the research, indicators of the formation of meat productivity of the newly created factory lines with different keeping technologies were established. New data on the index assessment of the genotype of servicing bulls by the phenotype of sons and daughters, as well as by the manifestation of the productive traits of the young stock, new type of Kalmyk cattle, depending on the origin and growing intensity in the preweaning and post-weaning periodswere obtained.

The research results serve as an important theoretical substantiation making a certain contribution to zootechnic science in order to improve the domestic livestock of meat productivity and can be used in practical work in the production of heavy carcasses and high-quality beef. This will increase the efficiency of the industry maintenance in a market economy and provide a more complete use of the productive capacity of the breed.

Key words: Kalmyk breed,intrabreed type, selection index, genealogical structure, growth, meat productivity, amino acid composition.

Introduction. The experience of economically developed countries shows that the independence of any state is largely determined by the ability to satisfy the population's need for food through its own production. In recent years, in Russia, there has been an almost double increase in consumption of poultry meat and pork of domestic productionon average per person per year, but the use of milk, dairy products,and beef has decreased. According to our calculations and the opinion of a number of experts, in order to satisfy the need for milk, dairy products and beef, it is necessary to have at least 12 million cows in the country with a yield of more than 5 thousand kg of milk per year and 50 kg beef production per head. At the same time, at the beginning of 2018, there were 8.2 million cows with productivity of 4.3 thousand kg of milk and a yield of meat products significantly less than 50 kg per head per year [1-4].

In Russia, the consumption of cattle meat per capita has decreased by 29% from the 1990 level and amounts to only 26% of the reasonable norm [5].

The global experience shows that in order to satisfy the population with beef at the expense of its own production, it is necessary to have one meat cow on each dairy cow [6-9]. Our preliminary calculations also showed that from dairy cattle breeding, even with intensive use of the entire super-replacement tock for meat production, it is possible to produce beef no more than 65% of the consumer demand. To meet a deficit of beef is possible only due to the development of the beef cattle industry. At the same time, although the volume of beef production at the expense of beef cattle has increased in recent years, the share of beef in the meat balance of the Russian Federation is still only 8–14%. The increase in the production of high-quality beef to the greatest extent meets both the requirements of organizing nutrition for the population and the rational use of food resources and the economic characteristics of individual zones and regions of Russia [3, 10, 11-14].

Beef cattle breeding is one of the foundations for ensuring the food security of Russia and the EEU countries. At the same time, along with the use of high-intensity breeds of western origin, the Kalmyk and Kazakh white-headed animals well adapted to the severe arid regions of our country are planned to be widely used. Currently, the share of these breeds accounts for more than 63% of the number of meat cattle breeds in Russia. It should also be noted that more than 50% of beef cattle are concentrated in the steppe and mountainous regions of the country, where natural and climatic conditions determine the development of beef cattle breeding as the most promising direction of animal husbandry. In these regions, it is not a competitor to intensive livestock industries that implement industrial production technologies [1, 15-18].

An essential requirement when breeding meat cattle is the use of animals with high energy growth and capable of highly efficiently convert the nutrients of vegetable feed into the development of muscle tissue. Therefore, in the selection and assortment, the focus is on animals with a clear manifestation of these qualities and having an excellent development of the musculature of the lumbosacral part of the body and hips. Unfortunately, these traits of animals have low levels of heritability and the effect of breeding cannot be high without an assessment of the offspring productivity and the combining ability of the lines [19-21].

In order to increase the volume of production of red meat in the Russian Federation, the industry targeted programs of Russia provide for the intensification of young stock breeding and raising the number of livestock of specialized meat breeds [22, 23]. Based on them, a basis will be created for the formation of a highly productive meat cattle breeding industry, capable, by 2022, of raising the share of meat cattle production in the total beef production to 35-40%.

Kalmyk is among the breeds that most effectively adapt to different climatic conditions and with balanced and even unbalanced feeding ensuring high energy growth and productivity. A desirable element of its breeding is the use in reproduction of linear animals. [8].

The aim of the research work was to study the various factors influencing the process of creating the Rostov-type Kalmyk cattle breed and the conditions for the maximum realization of its potential. For this purpose, the objectives were carried out to run a comparative analysis of the meat productivity formation of factory lines animals under the conditions of stalled-pasture and industrial technologies; to use computer technology in determining breeding value and identifying bulls-improvers when creating breeding stock of the desired type; assessment of meat quality indicators at different technology of young stock breeding.

Material and methods of the research. Studies on the breeding and productive qualities of Kalmyk cattle breed and the development of methods for their improvement have been carried out for 15 years in the stud factories of the Rostov region, at the department of private animal science and feeding of farm animals of the Don State Agrarian University, North-Caucasian branch of the Federal State Budgetary Institution of Science "Federal Research Center of Food Systems named after V. M. Gorbatov".

The experimental work was carried out in three stages. At the first stage, the animals' productivity of the newly created factory lines of the Kalmyk breed was assessed. At the second stage, a new method of index evaluation of the breeding value of servicing bulls was proposed and introduced. During the third stage, a comparative analysis of the Kalmyk, Hereford and Aberdeen-Angus breeds was conducted under the conditions of intensive completion of growing from 9 to 18 months of age in the industrial complex at full feeding with coarse and concentrated feeds.

For this, we used the multifunctional complex of computer programs “Breeding records in beef cattle breeding” (BRBCB) and electronic databases for a population of more than 70 thousand heads (registered in the unified register of intellectual property items 12 computer programs and electronic databases). On their basis, the analysis of the genealogical structure of cattle herds of breeding farms, the evaluation of the young animals by their own productivity and the servicing bulls by the quality of the offspring was made. For a more reliable assessment of the breeding value of beef cattle, we have developed and used a variant of the index assessing method of servicing bulls by the quality of offspring. To this end, by using theBRBCB software module, we sampled the productivity of the offspring of the estimated bull from the electronic database and calculated the selection index using the formulas: $СИ = СИ_Б + СИ_Т$,

$$СИ_Б = \sum_{i=1}^{N_{БNТ}} [h^2_i(x_i - M_i)] + h^2_{МБ} * x_{МБ}; \qquad СИ_т = \sum_{J=1} [h^2_J(x_J - M_J)] + h^2_{МТ} * x_{МТ},$$

where, number of traits of sons ($N_Б$) anddaughters ($N_Т$); live weight and average daily gain of sons of the estimated bull at different ages (i) anddaughters (J); trait heritability coefficient of herd (h^2); average assessment of meat forms of sons at the age of 15 months according to 20-point scale ($M_Б$) anddaughters ($M_Т$), etc. Herewith, mean values and biometric indicators of all analyzed traits, as well as selection indices, were determined automatically using the BRBCB computer program.

Depending on the level of manifestation and heritability of the traits taken into account, the selection index proposed by us may have a positive and negative value. The bulls with the index of 15 points and above are assigned the breeding category as "improver", with the index from 1 to 15 points - "neutral", and if it has from 0 points and below index - "deteriorator". The higher the index value, the higher the breeding value of the animal [24, 25, 2].

In the process of research and data analysis, we used monographic, statistical, economic and mathematical methods, as well as comparative analysis and theoretical generalization of the results. Growing calves after calving in the experiments was carried out at full suckling and using supplementary feeding at the rate of 0.7-1.8 kg of dry matter per head per day depending on age. After weaning from mothers, the assessment of the formation of meat productivity of young stock was carried out with a stall-pasture system and at keeping under conditions of a large industrial complex with full feeding for gaining at least 1000 g per day.

To study the meat productivity in the course of control slaughter, about 50 animals of Kalmyk and other meat breeds were used. Three animals from each group were selected on the principle of pair-analogues (by age, origin, and live weight). The slaughter qualities were determined by the pre-slaughter live weight, the hot carcass weight, the mass of the internal fat, the slaughter mass, the slaughter yield and the morphological composition of the carcass. To this end, after daily cooling for 24 h (at t from 0 to +4 °C), the boning of the left half carcass was carried out. Based on boning, the absolute and relative content of the flesh (including muscle and adipose tissue), bones, tendons, and fleshing index (output of the flesh part per 1 kg of bones) in the carcass were determined [21]. Physico-chemical parameters and amino acid composition of the rib eye were determined in the laboratory of Federal Research Center of Food Systems named after V.M. Gorbatov by generally accepted methods (GOST 34132-2017) [7].

Biometric processing of the obtained digital data was carried out according to the algorithms [26].

Research results and discussion. Of 11 beef cattle breeds, which were bred under the arid conditions of the steppe regions of the Rostov region during the period of the planned economy, only the Hereford and Kalmyk ones remain. Experts of stud farms and breeding units for breeding Kalmyk cattle distinguish its excellent adaptability to any climatic and forage conditions as advantages. The animals of this breed have a high reproductive ability, easy calving, good mobility, unpretentiousness to keeping conditions and level of feeding, the significant daily gain in live weight. They have fairly rapid recovery of live weight after a difficult wintering. Animals have the ability to forage from under the snow, deposit fatty tissue under the skin, around the internal organs, and between muscle fibers, providing protective and reserve functions, as well as tenderness, juiciness of beef and other desirable technological qualities [27, 3].

More than 40% of the breeding stock of the Kalmyk breed in the Russian Federation is concentrated in the stud farms and breeding units of the Southern Federal District. In the farms of the Rostov region, the share of Kalmyk cattle, as the most adapted to the conditions of arid steppe regions, accounts for more than 95% of the livestock. On their basis, at the beginning of 2019, seven stud farms and fourteen breeding units for breeding of the Kalmyk cattle breed were registered.

At the first stage of our work, in the process of analyzing an electronic database of the Kalmyk cattle breed of leading stud farms and breeding units of the Rostov region, it has been established that over the past 15 years, bulls of three genealogical groups and nine genealogical lines have been used in the reproduction of the herd of the region. The genealogical group is understood as several factory lines and related groups formed on the basis of the genealogical line. In the process of targeted selection in each genealogical group (GG), 2-3 factory lines (FL) and related groups (RG) were formed. Particularly distinguished is the genealogical group of Block 3218, on the basis of which 3 factory lines and a related group were created. It is the most saturated with highly productive continuators. For 15 analyzed years, 346 servicing bulls of this group have worked in the herd of farms. Its share in the total genealogical structure of the analyzed population accounts for more than 43% of the animals. Continuators of the factory lines of

this group are ranked first in prevalence in the farms of Kalmykia, Stavropol, Kuban and the Rostov region. On its basis and on the basis of the genealogical groups of Leleshko 15 and Simmer 7333, in 2015, the factory lines of the Pirat 6626, Pokhvalniy 8643, Ozhog 6136 were approved and the creation of new factory lines based on the related groups of the Abazhurny0601, Rogalik 0899 and Desert 93084 continues (figure 1, 2). Almost 55% of the animals in the general genealogical structure of the Kalmyk cattle herds of analyzed breeding farms is accounted for the share of continuators of these lines and groups (table 1).

When creating new factory lines, at the initial stage of work, for a servicing bull, valuable similar females were selected. The first generation, derived from the bull, was material for the accumulation and consolidation of valuable features of the ancestor.

At this stage of breeding, it was allowed a moderate degree of inbred mating. In the factory line, we included only those animals that met the requirements of the target standard of the line developed by us, were associated with the ancestor through male and female descendants and corresponded to the tasks of breeding work [27-29].

Figure 1 – Bull of the Kalmyk breed 6951 on pasture (Pokhvalniy line 8643)

Figure 2 – Bull of the Kalmyk breed 7527 (related group of the Abazhurny 0601)

Table 1 – The structure of the livestock of the Kalmyk cattle breed of the Rostov region

Genealogical group (GG), factory line (FL), genealogical line (GL) иrelated group (RG)	Total, heads	Including, heads			Specific gravity, %
		Servicing bulls	cows	Replacemen theifers	
GG of Blok 3218	7061	346	3829	2886	43,23
incl.FL of Moryak12054	1660	69	864	727	10,16
FL of Pirat 6626	1833	103	975	755	11,22
FL of Pokhvalniy 8643	1370	66	769	535	8,39
(RG) Abazhurny 0601	673	28	435	210	4,10
GG of Leleshko 15	2504	118	1512	874	15,33
incl.FL of Duplet 825	1397	63	774	560	8,55
(RG) Rogalik 0899	517	20	356	141	3,16
GG ofSimmer 7333	2404	112	1309	983	14,72
incl.FL of Ozhog 6136	888	31	478	379	5,44
(RG) Desert 93084	522	23	367	132	3,19
GL ofManezh 7113	2099	79	1052	968	12,85
GL of Mushket 5277	354	10	246	98	2,17
GL of Motyga 1260	185	5	120	60	1,13
GL of Borovik7273	353	8	218	127	2,16
GL of Barzer7291	287	10	147	130	1,76
GL of Boyets 108	195	3	137	55	1,19
GL of Buket 7356	417	6	214	197	2,55
GL of Cenniy 6337	472	7	276	189	2,89
Total	16331	704	9060	6567	100

The creation of the Pirat 6626 line was aimed at the formation of animals with the qualities of long-body, high milking capacity and growth energy of the young stock. Sequential selection and assortment within the related group ensured the breeding of its best continuators. So, 3 of its grandsons - Yasenevy 8617, Manezh 61016, Pustyrnik 855 and 9 great-grandchildren surpassed their grandfather in terms of productivity and body build and left 4-5 sons and grandsons, which had expressed desirable qualities for this line.Their descendants are used as major servicing bulls in stud farms, reproducers and commodity farms in the Southern Federal District. The live weight of male descendants at the age of 3 years - 719-748 kg with the exterior assessment of more than 90 points. Their share, in the general genealogical structure of the herd of the analyzed farms, accounts for 11.2%.

The ancestor of the factory line, the Pokhvalniy 8643 bull, for 5 years, has maintained high growth energy, has had an enlarged body build with well-pronounced muscles of both the shoulder and pelvic girdle. Its live weight at 5 years of age was more than 900 kg with the exterior assessment of 95 points. Most of its descendants inherited well the development of the musculature of the shoulder and pelvic girdles and had the ability to maintain high growth energy for a long period even when mating with cows that had low productivity indices.Such prepotency became the basis for the creation of new factory line in order to increase the number of continuators with traits of the ancestor. In the process of selecting and evaluating their descendants by their own productivity and complex of traits, it was revealed that, having high growth energy from the first days of life, having reached live weight at 2 years of age of 535-580 kg, they continue to increase it to 865-920 kg at the age of 6. The continuators of this factory line in the future will contribute to an expansion in the number of heavy animals in the herd. The share of this line livestock accounts for more than 8.3% of the animals in the genealogical structure of the Kalmyk cattle recorded population.

Expansion in the number of animals of this line will have a positive effect on the consolidation of traits in the population of being created Rostov type of the Kalmyk breed.

The ancestor of the factory line, the bull Ozhog 6136 was bred on the basis of breeding in the Progress stud farm of one of the oldest and quite common in the breed, Simmer 7333 ORZH-73 genealogical group. The animals of this factory line are faster and longer-bodied than the mates of other lines. Moreover, the farm uses male and female individuals of the three branches of this line, but no significant differences were found between the bulls of different branches, indicating a consolidation of hereditary qualities. At the same time, according to the milking capacity of the cow, this line is 2-4% higher than the mates of other factory lines, and their further reproduction will make it possible to secure the high milking capacity and early maturity of animals in further generations (table 2).

Table 2 – Live weight and milking capacity of full-grown cows

Factory line	5 years old and older cows, heads	Averagelive weight, kg	Cows of the elite class and higher, %	Milking capacity (weight of calves at the age of 205 days), kg
Pirat 6626	775	514	104.2	188
Pokhvalniy 8643	569	519	106.1	191
Ozhog 6136	378	509	102.8	197

The continuators of the established factory lines and related groups are good breeding materials for the creation of the Rostov factory type of the Kalmyk breed. In recent years this work has increased its intensity by maintaining the tendency to leave the best continuators of the factory lines for the reproduction of the herd on the farms. The animals of the established factory lines in terms of productivity significantly exceed the requirements of the top classes and average indicators of the analyzed lines (table 3).

Table 3 – Average live weight of the different lines servicing bulls, kg

Genealogical group (GG), factory line (FL), genealogical line (GL) иrelated group (RG)	Age, years				
	N	3		5 and older	
		X±Sx	Cv,%	X±Sx	Cv,%
GGof Blok 3218	180	717.3±21.5	6.1	869.3±19.5	11.2
Incl.FL of Pirat 6626	38	729.5±20.2	10.3	875.5±17.2	14.1
FL of Moryak 12054	39	712.3±22.4	12.9	859.3±13.1	16.0
FL of Pokhvalniy 8643	24	725.0±14.0	8.5	871.4±10.2	11.3
(RG) Abazhurny0601	17	721.9±23.9	12.5	868.9±15.1	18.0
GG of Leleshko 15	45	733.3±20.5	20.5	859.9±21.0	14.3
Incl.FL ofDuplet 825	12	728.5±12.2	17.7	872.1±12.3	15.1
RGofRogalik 0899	13	738.3±23.4	19.2	869.7±14.2	16.4
GG of Simmer 7333	37	726.7±26.4	11.8	868.3±14.1	14.7
Incl.FL of Ozhog 6136	17	731.0±20.0	21.0	872.8±16.0	16.2
RG of Desert 93084	11	728.2±18.2	14.0	863.3±12.0	13.1
GL of Mushket 5277	9	714.0±22.0	18.2	853.7±13.0	14.4
GL of Motyga 1260	4	696.0±17.0	10.4	840.4±16.2	13.2
GL of Manezh 7113	7	712.2±21.6	22.0	857.6±13.8	17.0
GL of Barzer 7295	2	716.7±11.4	9.6	854.8±12.0	5.4
Average	274	720.3±20.1	11.3	854.7±13.2	13.2

The Kalmyk breed cows of the analyzed livestock have good milking capacity and their descendants exceed the requirements of the elite class on average for 205 days in live weight (table 4).

Table 4 – Average live weight of Kalmyk cows of different lines, kg

Genealogical group (GG), factory line (FL), genealogical line (GL) ирelated group (RG)	Age, years				
	N	3	5 and older	Calves, days	
		X±Sx	X±Sx	1	205
GGof Blok 3218	973	423.3±21.5	532.0±16.1	22±1.3	189±7.3
Incl.FL of Pirat 6626	212	439.5±12.2	541.2±17.0	24±1.7	191±8.8
FL of Moryak 12054	198	426.3±13.4	522.4±14.3	22±1.4	184±7.7
FL of Pokhvalniy 8643	189	427.5±12.2	532.7±19.0	24±1.1	188±4.9
(RG) Abazhurny0601	174	424±11.2	521.2±12.3	23±2.0	187±3.5
GG of Leleshko 15	379	422.0±11.0	524.1±18.7	22±1.6	184±5.9
Incl.FL ofDuplet 825	129	422.1±20.0	522.7±19.0	23±2.0	186±7.1
RGofRogalik 0899	111	423.3±18.5	527.3±14.6	21±1.6	185±5.2
GG of Simmer 7333	351	421.3±13.4	519.3±17.0	23±1.8	182±8.1
Incl .FL of Ozhog 6136	219	426.7±16.4	522.2±14.3	21±1.5	186±7.2
RG of Desert 93084	105	423.0±18.0	523.4±13.2	19±1.6	185±7.1
GL of Mushket 5277	147	406.0±12.0	505.2±10.2	20±1.8	182±4.4
GL of Motyga 1260	119	404.0±7.0	502.7±11.3	19±1.3	170±5.3
GL of Manezh 7113	194	422.2±11.6	503.3±18.6	21±1.7	176±7.2
GL of Barzer 7295	118	416.7±10.4	510.1±18.7	20±1.4	171±8.0
Average	2281	424.0±8.1	517.2±19.7	22±1.6	181±3.3

This confirms the practicability of further expansion in the number of these animals and other continuators. It should be noted that animals of factory lines and related groups are well adapted to the hot arid climate. Even in arid 2007 and 2015, when there was not a single rain in the territory of the stud farms from April to October and temperatures exceeded 40 degrees in the steppe, young animals belonging to the Pirate 6626, Pokhvalniy 8643 and Ozhog 6136 retained leadership among their mates of other lines in live weight and in most exceeded the requirements of the first class.

To ensure interlinear heterosis, descendants of other lines are used, the livestock of which is kept at a small level. However, taking into account the fact that in recent years work is being done to increase the number of animals of the enlarged type, and their greatest number is recorded in the genealogical groups of Blok 3218 and Leleshko 15, therefore, in the long term, the selection of animals should be preferred to the continuators of these groups.

The descendants of the Musket 5277, Barzera 7295 and Manezh 7113 genealogical lines also have tallness and belong to the enlarged type. For example, the son of the Manezh 7113 bull Zapad 1205 with the live weight of 1035 kg became the champion of the breed at the exhibition. The grandson of Manezh and the son of Zapad, the bull Gordiy 1181 significantly exceeded its famous ancestors in this trait. However, the bulls of these lines due to their small size should be used mainly on commercial animals to obtain high-quality beef, since it is with this selection that they have proven themselves from the best side. In addition, their descendants have high resistance and survival. In addition, in young stock derived from interlinear crosses of the enlarged and compact types, heterosis is manifested in resistance, milking capacity, high growth energy over a long period and in live weight of the cows.

As a part of our research, it was established that the higher the live weight of the cows, the better the growth intensity of their descendants (table 5).

Table 5 – Live weight of cows and their milking capacity, kg

Live weight	n	Average live weight	Live weight of calves at the age of 7 months	Live weight of daughters at the age of 15 months	Live weight of sons at the age of 15 months
Up to 400	55	383	171.1 ± 12.4	306.2 ±12.5	342.0 ±9.6
401-450	80	430	183.0 ±9.6	312.8 ±9.6	369.0 ±12.3
451-500	190	481	194.8 ±9.3	319.7 ±10.4	379.8 ±8.5
501-550	155	533	199.4 ±8.6	334.4 ±9.1	386.1 ± 10.8
551-600	90	570	205.8 ±11.1	341.2 ±10.7	396.1 ±12.9
More than 600	35	610	211.5±7.8	353.1±8.6	413.5 ±9.7

With the intensive level of feeding, from heavy cows, the offspring is 10–20 kg heavier than from mates received from lightweight cows and with further growing, the former show a higher intensity of gain in live weight and form an enlarged body build. Among such animals, individuals that meet the requirements of the enlarged type standard are more common, and with the individual homogeneous selection, they produce highly productive offspring.

In the process of analyzing the electronic database, the coefficients of the relationship between various traits were calculated, which made it possible to reveal some influence of linear belonging on the manifestation of such indicators of interrelation as cow milking capacity and calves development in the suckling and post-weaning periods. Higher rates of the interrelation of traits were established in the groups of continuators of the genealogical groups of Leleshko 15 and Simmer 7333, as well as in the groups of cows of the factory lines of Pirate 6626 and Pokhvalniy 8643.Conspicuous is the fact that in full-grown cows of the analyzed lines, the height at hips is higher than the requirements of the elite-record class, with some advantage in favor of the animals of the genealogical groups and the Manezh 7113 line. However, there is no direct relationship between the height at hips indicators of cows and live weight of their offspring. Therefore, the selection on this basis will not contribute to the increase in live weight and milking capacity of cows, as well as the growth energy of young animals. Although these traits have a positive correlation and high rates of heritability coefficients (table 6, 7).

The continuators of the Ozhog 6136 and Pokhvalniy 8643 factory lines were revealed a significant effect of the live weight of the cows on milking capacity and live weight of offspring against the background of the pedigree factor of small-breeding and ease of calving.

Table 6 – Coefficients of heritability of meat productivity traits

Trait	Lineandpopulation				
	FL of Pirat 6626	FL of Pokhvalniy 8643	FL of Ozhog 6136	GL of Manezh 7113	For population
Liveweightatbirth.	0.64	0.67	0.76	0.58	0.66
Liveweightat 6 months	0.56	0.53	0.58	0.41	0.45
Liveweightat12months	0.41	0.49	0.53	0.44	0.47
Liveweightat18months	0.56	0.52	0.57	0.50	0.53
Live weight of first-calf cows	0.08	0.12	0.11	0.06	0.09
Exteriorassessment	0.63	0.58	0.71	0.67	0.66
Carcass weight of bull calves	0.66	0.54	0.63	0.60	0.61
Carcass weight ofheifers	0.42	0.46	0.40	0.41	0.42
Slaughter yield of bull calves	0.71	0.77	0.81	0.72	0.75
Slaughter yield ofheifers	0.55	0.62	0.68	0.63	0.61
Massofinternalfat	0.69	0.62	0.71	0.66	0.67
Muscletissueoutput	0.44	041	0.47	0.44	0.43

Table 7 – Phenotypic correlations of meat productivity traits

Trait	Line				
	Pirat 6626	Pokhvalniy 8643	Ozhog 6136	GL of Manezh 7113	For population
Live weight of cows and weight of calves at birth	0.12	0.17	0.36	0.28	0.25±0.034
Live weight and exterior assessment	0.24	0.33	0.46	0.39	0.35±0.022
Live weight at birth and at 12 months	0.18	0.19	0.21	0.24	0.27±0.024
Live weight at birth and at 18 months	0.10	0.12	0.11	0.16	0.13±0.039
Live weight of cows and their milking capacity	0.33	0.29	0.40	0.32	0.31±0.027
Height at hips of cows and their milking capacity	0.02	-0.03	0.01	-0.01	0.01±0.14
Live weight at 8 months of age and the average daily gain of bull calves up to 18 months	0.60	0.74	0.73	0.63	0.63±0.02
Live weight at 8 months of age and the average daily gain of heifers up to 18 months	0.48	0.63	0.66	0.61	0.51±0.041
Live weight at 8 months of ageandfeed costs per 1 kg weight gain of bull calves	0.76	0.79	0.82	0.82	0.82±0.033
Live weight at 8 months of age andfeed costs per 1 kg weight gain of heifers	0.70	0.72	0.80	0.83	0.76±0.039

No significant impact of calf weight at birth on the growth energy and the change in live weight during other age periods was noted. At the same time, these indicators have a high positive relationship with the level of feeding and the feed cost per 1 kg of gain.

The general conclusion on further work with the breed should be considered a priority for increasing milking capacity. Its positive result will significantly increase the live weight of young stock when weaned from mothers, that in the future will significantly affect the energy of their growth and increase in live weight at 12 and 18 months of age. This is confirmed by the high positive correlation between these traits, both in bulls and in heifers.

At the second stage of the research, in the course of the breeding experiment using a common data-base and the BRBCB software program, we tested the proposed methodology for assessing bulls in the quality of offspring based on the selection index.

When breeding meat cattle breeds, it is necessary to use animals in reproduction, which inherit high growth energy and the ability to actively convert the nutrients of plant foods to the development of muscle tissue. To identify them we should use the multi-year database of reliable data and the electronic operating system that could quickly analyze a large amount of information. This is connected with the fact that the manifestation of quantitative traits is due to the interaction of genetic and paratypical factors. If at this interaction between relatives there is a similarity in quantitative traits, it indicates a significant genetic influence, and such animals are the most desirable for breeding.

Using a block of a specially developed computer program, we estimated more than 80 servicing bulls in the quality of the offspring, and about 1000 animals of their sons were rated for their own productivity. In the process of comparative analysis, it was noted that the majority of estimated servicing bulls in sons' productivity (according to the current instructions) met the elite-record class by scoring and by complex index with a value of 101-106% - the "improver" breeding category.However, the assessment of bulls in the quality of offspring in terms of productivity of a limited number (10-20) of sons in optimal conditions is not always confirmed when they are used on a large scale for livestock of cows in other conditions of maintenance and growing of their offspring. In our opinion, in the reproduction of the herd the "complex bulls-improvers" of sons and daughters' productive traits should be used, information about which is formed on the results of the coverage of the maximum array of descendants of both sexes.Comparative assessment of the total productivity of sons and daughters with the calculation of the selection index (SI) turned out that the bulls of the Pirat 6626 factory line in group No. 2 (table 8) have a very low heritability index, negatively affect the productivity of sons and neutral for daughters. At the same time, for the majority of their descendants, the counted traits turned out to be below the average indicators of their

Table 8 – Comparative assessment of the bulls in the quality of offspring

Group number, ancestor of the line, Ind. No. of bulls	According to the current instructions			According to the selection index (SI)					
	number of sons	class	complex index, %	sons		daughters		total	
				N	SI	N	SI	n	SI
1. (FL) Pirat 6626, 9565, 0487, 1563	34	Elite-record	105.4	75	32.5	83	21.3	158	53.8
2. (FL) Pirat 6626, 9156, 1047, 3513	32	Elite-record	102.7	68	-3.3	78	1.2	146	-2.6
3. (FL) Pokhvalniy 8643, 2390, 1856, 3412	36	Elite.	99.6	72	31.6	85	27.9	157	59.5
4. (FL) Pokhvalniy 8643, 1393, 1637, 2128	34	Elite-record	101.2	77	21.4	80	-2.6	157	12.2
5. Duplet 825, 2280, 2317, 2309, 1838	45	Elite-record	102.3	86	14.9	93	22.1	179	37.0
6. Duplet 825, 2320, 2347, 2091, 1843	43	Elite-record	103.6	81	21.1	83	-2.6	164	18.5
7. (FL) Ozhog 6136, 3261, 3321, 0593, 2307	44	Elite-record	101.4	86	20.2	85	21.1	171	41.3
8. (FL) Ozhog 6136, 3696, 3318, 0691, 2318	43	Elite-record	102.9	72	18.1	82	-3.3	154	14.8
9. Moryak 12054, 0350, 1203, 2308	33	Elite-record	104.7	51	11.3	62	12.1	113	14.5
10. Moryak 12054, 7213, 1202, 1233, 0367	48	Elite-record	99.8	85	-5.5	109	0.6	194	-1.9
11. Moryak 12054, 7233, 1216, 1254, 0359	51	Elite-record	103.7	92	14.3	97	9.6	189	14.9
12. (RG) Desert 93084, 3944, 1741	24	Elite-record	104.7	29	8.2	21	13.2	50	12.4
13. Manezh 7113, 271	13	Elite-record	98.9	22	18.4	20	19.5	42	27.9

mates. Therefore, these bulls and their descendants have no positive value for breeding in this population and their use is undesirable in the reproduction of even commercial herds.

Another pattern was manifested in bulls of Pokhvalniy 8643 from group No. 3, which received the neutral category according to the current instructions. In this group, the average values of all productivity traits of female and male descendants significantly exceeded the average indicators of their mates, and the selection indices calculated by our method averaged 59.5 points. Therefore, they are “complex improvers” for sons and daughters and are recommended for insemination of the breeding nucleus of cows. A similar pattern was manifested in No.5, No.7 and No.13 groups.In groups No. 4, 6 and 8, the descendants of various factory lines worsen daughters, but improve sons, and bulls from groups 9, 11 and 12, marked as neutral for males and females, and therefore are not effective for selection in the breeding part of the herd, but can be recommended for use in a commercial herd. The bulls from groups No. 2 and 10 (descendants of the factory lines of the Pirat 6626, and Moryak 12054), having a negative value of the total selection index, are identified as “deteriorators” of sons and daughters. They are not recommended for use in farms of any status and are subject to rejection.

At mass analytical assessment of bulls in the quality of offspring in different breeding farms, it was revealed that only 47% of fathers used in reproduction, pass on their traits to the descendants of both sexes. About 40% of producers are “improvers” of only sons, and only 20% are “improvers” of daughters. Therefore, more than 50% of bulls "improvers" which received this breeding category when judging by the quality of offspring according to the current methodology of their assessment by sons, are not eligible for breeding, as they can be "deteriorators" of males or females.

Aconspicuous is the fact that descendants of bulls with the selection index (SI) of more than 20 points had a long body type and average daily gain is 14% higher in bull-calves and 8% higher in heifers compared with mates with SI less than 15 points.

It indicates that they are better adapted to local natural climatic and fodder conditions in comparison with mates from servicing bulls with a lower selection index. Therefore, at 15 months of age, bulls and heifers, obtained from "improvers" with SI more than 20 points, exceeded not only their mates from other bulls, but also the elite-record class requirements (table 9).

With the increase in the selection index above 30 points, in descendants, the average daily gain from 8 to 15 months of age exceeded 1000 g and at the end of this period, their live weight was much higher than the requirements of the elite-record class. Their sons were more extended and tall, with a deeper and wider breast, better developed hams, that is, significantly better pronounced meat forms.

Table 9 – Change in live weight of offspring of bulls with different selection index values

Selection index value (SI)	Sons					Daughters				
	n	Age (months) and live weight (kg)		Gain		n	Age (months) and live weight (kg)		Gain	
				daily, g	absolute, kg				daily, g	absolute, kg
		8	15				8	15		
-2.6	68	195±2.1	382±3.6	882	187	78	177±1.8	317 ±3.9	660	140
-1.9	51	199±1.8	389±3.8	896	190	62	181±1.6	323 ±3.5	670	142
12.2-14.9	402	211±1.4	415±3.3	962	204	425	186±1.7	329±3.2	675	143
18.5-27.9	103	212±1.9	420 ±3.3	981	208	103	188±1.9	336 ±3.4	698	148
37.0	86	213±2.0	425±3.5	1000	212	93	191±2.1	340 ±3.7	702	149
41.3	86	214±2.6	430 ±3.9	1019	216	85	196±2.0	346±3.8	707	150
53.8	75	218±2.1	441 ±3.0	1052	223	83	200±2.2	352 ±3.8	717	152
59.5	72	224±2.6	453 ±3.3	1080	229	85	202±1.9	356 ±3.1	726	154

The detected high-quality continuators of the factory lines comply with the requirements of the created interbreed type of enlarged long-bodied animals of the Kalmyk breed and are recommended for use in the reproduction of the breeding stock of agricultural enterprises and farms.

Evaluation of meat productivity was carried out by comparing the slaughter qualities of young animals of groups 1 and 2. The first group included the sons of bulls with the index below 30 points and the second group - above 30 points. In assessing the formation of meat productivity, the main indicators are the mass of carcass, its morphological composition and slaughter yield. These traits are caused by a complex of morphological features of the organism, which depend on heredity and environmental factors. In our studies, all the bull calves before slaughter had factory fatness and, in live weight at 8 months of age, in the first group, 97.6% met the requirements of the elite-record class, and in the second group - 104.9% (table 10). At the age of 15 months, these figures were respectively 110.0% and 117.2%. The resulting carcasses for slaughter met the requirements of the first category, had well-defined meat forms and, for 15-month-old bulls, were covered with a continuous layer of fat-watering, which prevents the meat from drying out.By pre-slaughter live weight, sons of bulls with the selection index of more than 30 points (group II) exceeded their mates from bulls with SI of less than 30 points (group I) at 8 months of age by 16.5 kg (7.5%), and at 15 months - by 27.7 kg (6.5%, $P<0.09$). Therefore, more heavy carcasses were obtained from the bulls of the II group, and they exceeded the bulls of the I group by almost 1% in the slaughter yield, and by 6-7% in the slaughter mass.

The same difference manifested itself in the morphological composition of the carcass. Bull calves of group I lagged behind their mates of the second group by 11–17 kg in mass of muscle tissue, and only by 2.6–2.8 kg in mass of bones. Therefore, they had a slightly lower fleshing index. The yield of these tissues in the bulls of the analyzed groups relative to the pre-slaughter body weight and chilled carcass revealed significant differences. Indicators of the development of these tissues and internal organs confirm the proportionality of their physique and the formation of meat productivity.

Table 10 – The results of the control slaughter of bull-calves (X±Sx)

Indicator	Group and age, months			
	I		II	
	8	15	8	15
Elite-record class requirements in live weight	225	385	225	385
Removableliveweight, kg	219.7±2.7	423.6±3.6	236.2±3.4	451.3±4.0
Pre-slaughter live weight, kg	206.8±3.2	408.3±3.1	218.7±2.6	433.7±3.8
Hotcarcassweight, kg	114.8±1.0	233.3±1.9	122.3±1.4	250.67±1.8
Carcassyield, %	55.5 ±0.11	57.1 ±0.09	55.9 ± 0.07	57.8±0.21
Mass of internal fat, kg	5.23±0.07	11.39±0.6	5.77±0.2	12.27±0.9
Yield ofinternal fat, %	2.53±0.03	2.79±0.04	2.64±0.08	2.83±0.05
Slaughterweight, kg	120.03±0.9	244.69±1.1	128.07±0.8	262.94±1.2
Slaughteryield, %	58.04±1.2	59.93±0.9	58.56±1.1	60.63±1.3
Carcass muscle tissue yield, %	74.8	75.1	74.9	75.6
Carcass fat tissue yield, %	5.9	6.1	6.0	5.9
Carcass bones yield, %	17.1	16.9	17.1	16.7
Cartilage and tendons of the carcass, %	2.3	1.9	2.0	1.8
Fleshing index	4.38	4.40	4.78	4.82

In beef cattle breeding, in the production of beef in the farms of the Southern Federal District (SFD), industrial and stalled-pasture production technologies are used. During the third stage of our research, a comparative analysis of the influence of intensive technology with elements of innovation on animals of the Kalmyk, Hereford and Aberdeen-Angus breeds in conditions of intensive completion of growing was carried out. In the SFD traditional stalled-pasture system, moderate feeding is used, providing the growth energy of young animals at the level of 700–750 g of daily gain and the attainment of slaughter conditions with the live weight of 410–430 kg at 20 months of age.

To enhance the growth energy and increase the pre-slaughter live weight, we carried out intensive completion of growing of young stock from 8-10 months of age in the industrial complex with plenty of coarse and concentrated feed. In order to identify the responsiveness of bull-calves obtained from animals of the factory lines of the Kalmyk breed, for the intensification of growing from 9 months of age, we conducted a comparative assessment of their meat productivity compared with mates of Aberdeen-Angus and Hereford breeds in the industrial complex (table 11).

Table 11 – Dynamics of live weight of bull-calves for 273 days of completion pf growing, (n =23)

Indicator	Breed		
	Aberdeen-Angus	Hereford	Kalmyk
When setting on the experiment, kg	251.5*± 4.7	248.1± 5.2	240.2± 6.0
When withdrawing from the experiment, kg	668.2**±6.4	661.8**±5.1	625.4±6.6
Absolute gain, kg	416.7**	413.7**	385.2
Average daily gain, g	1526**	1515**	1411
*P ≤ 0.05, **P ≤ 0.01.			

Experimental groups were formed taking into account the average group breed indicators of live weight, established earlier for a number of years. Therefore, when setting on the experiment, 9-month-old Kalmyk calves were inferior in live weight to their mates from other groups by 4.7... 3.3%. During the 9-month intensive completion of growth, the average daily gain was 105-115 g lower than that of their mates of Aberdeen-Angus and Hereford breeds. So, as a result, for the period of the experiment, in the group of Kalmyk bull-calves, the absolute gain was less on 31 kg. The pre-slaughter live weight was also significantly lower (table 12).

Table 12 – Indicators of slaughter of bull-calves at the age of 18 months (n =5)

Indicators	Breed		
	Aberdeen-Angus	Hereford	Kalmyk
Pre-slaughter live weight, kg	648.0±5.2	641.3±5.0	606.6±3.7
Hotcarcassweight, kg	384.97±1.3	380.54±1.3	361.05±1.3
Hotcarcassweight, %	59.41	59.34	59.52
Mass of internal tallow, kg	21.9±0.7	20.7±1.0	19.1±0.8
Mass of internal tallow, %	3.38	3.23	3.15
Slaughterweight, кг	406.87±1.2	401.24±1.6	380.15±1.4
Slaughteryield, %	62.79	62.56	62.67
Muscle tissue yield, %	75.9	75.4	75.7
Fat tissue yield, %	5.9	5.3	5.7
Bones yield, %	16.0	17.0	16.2
Fleshing index	4.74	4.43	4.88
The ratio of edible to inedible part of the carcass	4.49	4.18	4.38

It should be noted that at the age of 18 months, bull-calves of the Kalmyk breed had a pre-slaughter live weight of 606 kg and hot carcass weight of 3161 kg, which were only 19 and 23 kg less than that of imported mates. At the same time, the slaughter yield, the yield of fat tissue, the fleshing index and the ratio of edible to inedible parts of the carcass were slightly higher than that of the Hereford bulls.

When analyzing the physico-chemical parameters of muscle tissue, it was noted that in the subscapularis and the longissimus muscle of the Kalmyk bull-calves, the content of the protein mass fraction was slightly higher. In the muscle flesh of the bull-calves of the new factory lines moisture-binding capacity was 3–13% higher and, almost as much, lower juice loss during cooking (table 13).

Table 13 – Physico-chemical indicators of the subscapularis (1) and the longissimus muscle (2) in the bull-calves of the experimental groups

Indicators	Breed (n = 5)					
	Aberdeen-Angus		Hereford		Kalmyk	
	1	2	1	2	1	2
pH	5.67	5.56	5.61	5.61	5.67	5.97
Moisturecontent, %	73.50	75.46	71.53	75.14	75.62	75.19
Proteinmassfraction, %	17.05	16.7	21.0	16.20	19.0	17.4
Fatmassfraction, %	8.57	6.95	6.67	7.66	4.40	6.51
Moisture binding capacity, % to the meat	46.54	47.87	57.29	56.83	52.44	60.04
Juice loss during cooking, %	31.38	30.92	24.71	20.06	20.30	21.95

This testifies to the superiority of the nutritional value of the muscle tissue of the bull-calves of the Kalmyk breed in comparison with the mates of the Aberdeen-Angus and Hereford breeds. The similar pattern was manifested in the content of total amino acids in the longest back muscle (table 14). In Aberdeen-Angus and Hereford bull-calves, the longissimus muscle contains less aspartic and glutamic acids, which play an important role in nitrogen metabolism.They improve the metabolism of cells of the nervous system, regulate the synthesis of testosterone, transforming the functional status of the endocrine and nervous systems, contribute to the neutralization and evacuation of ammonia from the body. Perhaps that is why Kalmyk bull-calves are more mobile and eat better coarse feed.

In the longest back muscle of the Kalmyk bull-calves, there are some more essential amino acids such as valine, isoleucine, leucine, and lysine, as well as the nonessential ones - arginine, alanine, tyrosine, and proline. Their molecules in the human body become a substrate for the synthesis of adrenaline, norepine-

Table 14 – Common amino acids of the longissimus muscle of bull-calves (g/100 g of product)

Amino acids	Breed (n = 3)		
	Aberdeen-Angus	Hereford	Kalmyk
Asparticacid	1.35±0.04	1.47±0.04	1.50±0.04
Glutamicacid	1.93±0.06	1.86±0.06	2.02±0.06
Serine	0.90±0.03	0.83±0.02	0.89±0.03
Histidine	0.71±0.02	0.68±0.02	0.67±0.02
Glycine	1.00±0.03	0.94±0.03	1.00±0.03
Threonine	0.85±0.03	0.81±0.02	0.83±0.02
Arginine	1.24±0.04	1.16±0.03	1.32±0.04
Alanine	1.02±0.03	0.99±0.03	1.07±0.03
Tyrosine	0.45±0.01	0.44±0.01	0.56±0.02
Cystine	0.29±0.01	0.29±0.01	0.29±0.01
Valine	0.89±0.03	0.88±0.03	1.02±0.03
Methionine	0.34±0.01	0.37±0.01	0.23±0.01
Phenylalanine	0.68±0.02	0.60±0.02	0.64±0.02
Isoleucine	1.15±0.03	1.10±0.03	1.21±0.04
Leucine	1.23±0.04	1.18±0.04	1.28±0.04
Lysine	1.62±0.05	1.55±0.05	1.73±0.05
Proline	0.95±0.03	0.94±0.03	1.04±0.03
Total	16.59±0.50	16.09±0.48	17.27±0.52

phrine, histamine, they are part of the body's structural and enzyme proteins, regulate gastric secretion, participate in immune reactions, synthesize hemoglobin, and form its proteinaceous portions designed to keep the iron atoms in the whole substance. A higher content of these amino acids improves the quality of muscle tissue, as a food product for people.

Some essential amino acids (valine, isoleucine, leucine) stimulate the activity and performance of human mental activity, improve the functional properties of the central nervous system, neuromuscular communication and the human mental state, and in conditions of lack of energy, these amino acids can be used as its source. They respond for the restoration of muscle and bone tissue, and lysine affects the rate of synthesis of muscle and conjunctive organic tissues; accelerates the accumulation of calcium in the body and, stimulating the ATP extraction of from glycogen molecules, regulates energy exchange.

Consequently, the muscular tissue of the bull-calves of the Kalmyk breed, used as a food product, will provide to a large extent the vital functions in the human body with the necessary amino acids.

Conclusions:

1. The genetic resources of cattle of the newly created Rostov type of Kalmyk breed are quite diverse and are characterized by higher productivity indicators. The average live weight of adult servicing bulls in the initial population is about 868 kg, of cows - 515 kg, and in the new factory lines - 873 and 528, that exceeds the elite-record class minimum requirements by 13 and 8 kg (1.5%), respectively.

2. Of three genealogical groups and eight genealogical lines that are common in the Kalmyk breed, the most desirable for breeding to increase meat productivity are animals of the factory lines of Pirat 6626, Pokhvalniy 8643, Ozhog 6136 and the genealogical line of Manezh 7113. According to the exterior assessment and live weight, cows of these lines exceed the peers of other lines in milking capacity and the average indicators of these traits in the population by 9.2 - 11.8%.

3. On the basis of the electronic database created with our participation and the BRBCB software module, the selective-genetic indicators of meat productivity were evaluated for the entire analyzed population. The inheritance and correlation coefficients were determined. The technique of their use in breeding when creating a Rostov-type Kalmyk breed was proposed. The impact of live weight of cows on their milking capacity and live weight of offspring has been established and there was no direct relation-

ship between the indicators of height at hips of cows and the live weight of their offspring. Therefore, the selection on this basis will not work towards the necessary rate of increase in milking capacity of cows and the growth energy of young animals, even against the background of high values of heritability coefficients and a positive correlation between these traits.

4. In assessing the genotype of more than 80 servicing bulls according to the phenotype of their sons and daughters, it was found that only 47% of fathers pass on their high qualities to descendants of both sexes. About 40% of servicing bulls are improvers only for their sons, and only 20% are daughters' improvers. More than 50% of bulls, which, when assessed in the quality of the offspring according to the current instructions, have the category of "improver", are not desirable for use in breeding work. The computer technology for assessment of bulls in the quality of offspring according to the selection index proposed by us increases by 2-3 times the efficiency of identifying bulls-improvers, which descendants have a long body type and at 15 months of age exceed in live weight not only mates from neutral bulls by 20-60 kg, but also the elite-record class requirements.

5. With the intensive growing of 9-month-old bulls of factory lines of the Kalmyk breed and mates of the Aberdeen-Angus and Hereford breeds in the conditions of the industrial complex at full feeding with coarse and concentrated feed, live weight at 18 months of age was 625.4; 668.2 and 661.8 kg, respectively. For the 9-month period of growing, in absolute gain, Kalmyk bull-calves (385.2 kg) were inferior to imported mates (416.7 and 413.7 kg) by 28–31 kg. In slaughter yield, fat tissue yield, fleshing index and the ratio of edible to inedible parts of carcass, Kalmyk bull=calves were somewhat superior to Hereford breed animals.

6. According to the analysis of physico-chemical parameters of muscle tissue, it was noted that in the subscapularis and the longissimus muscles of the Kalmyk calves, the level of the content of the protein mass fraction was slightly higher than that of the Aberdeen-Angus and Herford mates. Their moisture binding capacity was 3–13% higher and almost as much lower in the juice loss during cooking. The protein of the Kalmyk breed animals had a slightly higher level of such essential amino acids asvaline, isoleucine, leucine, and lysine, as well as the nonessential ones - arginine, alanine, tyrosine, and proline. This indicates a higher nutritional value of their muscle tissue than in the mate of the Aberdeen-Angus and Hereford breeds.

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ҚАЛМАҚ ТҰҚЫМЫНЫҢ ІРІ ҚАРА МАЛЫНЫҢ ӨНІМДІЛІГІ МЕН АСЫЛ ТҰҚЫМДЫЛЫҒЫН АРТТЫРУ

Аннотация. Мақалада негізгі биологиялық және өнімділік ерекшеліктері бойынша Қалмақ тұқымдас Ростов ірі қара малының өсірілу жұмысы жағдайы зерттеледі; әр түрлі өндіріс жүйелерінде малдың экономикалық және селекциялық қасиеттерін зерттеді. Зерттеу барысында әртүрлі күту технологиялары бар жаңадан құрылған зауыт линияларының ет өнімділігін қалыптастыру көрсеткіштері анықталды. Еркекпен ұрғашылардың фенотипіне генетика өндірісінің генотипін индексациялау, сондай-ақ сүт және төлді бөлу кезеңдерде өсудің пайда болуына және қарқындылығына байланысты жаңа, калмықтың ірі қара малының өнімділік қасиеттерінің көрінісіне жаңа деректер алынды.

Зерттеу нәтижелері мал шаруашылығының отандық мал шаруашылығын жетілдіру мақсатында зоотехникалық ғылымға белгілі бір үлес қосатын маңызды теориялық негіздеме болып табылады және ауыр тұтас ет пен жоғары сапалы сиыр еті өндірісінде практикалық жұмыстарда пайдаланылуы мүмкін. Бұл нарықтық экономикадағы саланың тиімділігін арттырады және тұқымның өндірістік әлеуетін толық пайдалануды қамтамасыз етеді.

Түйін сөздер: қалмақ тұқымы, тұқым ішкі тип, селекциялық индексі, генеалогиялық құрылымы, өсу, ет өнімділігі, амин қышқылының құрамы.

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СОВЕРШЕНСТВОВАНИЕ ПЛЕМЕННЫХ И ПРОДУКТИВНЫХ КАЧЕСТВ СКОТА КАЛМЫЦКОЙ ПОРОДЫ

Аннотация. В статье проанализировано состояние работы создаваемого ростовского типа крупного рогатого скотакалмыцкой породы по основным биолого-продуктивным особенностям; изучены хозяйственно-полезные и племенные качества скота при различных системах производства. В ходе исследований установлены показатели формирования мясной продуктивности вновь созданных заводских линий при разных технологиях содержания. Получены новые данные по индексной оценке генотипа быков-производителей по фенотипу сыновей и дочерей, а так же по проявлению продуктивных качеств молодняка, нового типа скота калмыцкой породы, в зависимости от происхождения и интенсивности выращивания в молочный и постотъемный периоды.

Результаты исследований служат важным теоретическим обоснованием, вносящим определенный вклад в зоотехническую науку, с целью совершенствования отечественного скота мясного направления продуктивности и могут быть использованы в практической работе при производстве тяжеловесных туш и высококачественной говядины. Это повысит эффективность ведения отрасли в условиях рыночной экономики и обеспечит более полное использование продуктивного потенциала породы.

Ключевые слова: калмыцкая порода, внутрипородный тип, селекционный индекс, генеалогическая структура, рост, мясная продуктивность, аминокислотный состав.

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MEAT PRODUCTIVITY OF YOUNG STOCK OF THE KAZAKH HORSE OF JABE TYPE IN THE CONDITIONS OF THE ALMATY REGION

Abstract. Growth and development indices of the Kazakh horses of Jabe type are expressed in intensive growth with favorable seasons of the year and slowdown in growth during the unfavorable seasons. At the same time, the difference in growth and development between stallions and fillies is insignificant.

Young stock of Kazakh horses of different ages during the period of feeding and intensive fattening is well added in live weight. With spring feeding, 12 months old foals gain 40.6 kg in live weight, 24 months old ones – 35.2 kg. During the autumn feeding period, 6 months old foals increase their live weight on 46.3 kg, 18 months old foals - on 37.2 kg and 30 monthly – 35.1 kg.

During the fattening, the increase in live weight was 47.3 kg in 6-month-old stallions, 45.8 kg in 12-month-old stallions, 40.7 kg in 18-month-olds, 41.6 kg in 24-month-olds and 5 kg in 30 month-olds.

Slaughter yield in 12 and 24 months old horses at feeding was 54.6–53.2%, at fattening, respectively, 55.3–53.8%. In the 6, 18, 30 months old stallions, during the autumn feeding, the slaughter yield was 56.7, 53.6, 52.3%, and during the winter fattening it was 56.9, 53.8 and 52.7%, respectively.

When studying the morphological composition of carcasses in stallions of different ages, it was established that 6-, 12-, and 18-month-old foals have a relative bone content higher than in 24- and 30-month-old foals, the content of pulp in the carcasses of 165.8 and 162.9 kg; the advantage is for 30-month-old colts. The content of connective tissue is higher in younger stallions from 3.3% to 3.8% compared to 24- and 30-month-old animals of 2.5-2.7%.

In terms of the class ratio of carcass parts in stallions of all ages from 43.3 to 46.5% fall on Class I, from 34.3 to 36.4% on Class II, from 15.0 to 28.3% on “out of class” (kazy and zhal) and from 6.1 to 7.4% go to Class III.

According to chemical composition, the meat of 24- and 30-month-old stallions differs from the meat of 6-, 12- and 18-month-old animals with a lower fat content and is more high-caloric. 1 kg of meat contains 2098–2398 kcal. The meat of young colts contains more protein 19.27–19.07% than fat 9.01–10.07% and is an easily digestible dietary product.

Keywords: Kazakh Jabe horse, meat productivity, slaughter yield, stallions, fillies, feeding, fattening, meat quality.

Introduction. The increase of meat production is currently the most crucial task facing domestic livestock breeders in Kazakhstan. In solving this problem, special attention is focused on productive horse breeding.

The growing demand of the population for horse meat causes the dynamic development of herd horse breeding due to the peculiarities of the structure of the feed balance of the republic associated with the vast pastures.

Due to its distinctive taste, horse meat has long been considered as a delicious dish, especially among the Kazakh and Kyrgyz peoples. For example, in Kazakhstan before the revolution, according to Yu.N. Barmintsev [1], from 7 to 17 pounds of horse meat and 50-150 buckets of koumiss were consumed per family per year. In most areas, horse meat ranked first, sometimes losing only to lamb.

L.V. Kashtanov [2], on the basis of his experiments with herd horses, reports that horses of higher and higher average fatness have a meat yield of 50-57%, of an average fatness - 45-50%, of a lower average - 40-45%. Chemical analysis of horse meat and fat shows their high nutritional value, not inferior to beef.

P.A. Fedotov [3] noted that during the slaughter of the Buryat horse, the average slaughter yield is 46.2%, and in the cross breeds obtained from the crossing of the Buryat mares with stallions of Don and roadster breeds, it reaches only 44.4%.

N.V. Anashina [4,5] investigated the morphological composition of primal cuts. According to her, different classes are different in their morphological composition. If the meat of the first and "out of the class" is distinguished by a high content of muscle and adipose tissue, the cut of the second, third classes is high in bone content.

N.V. Anashina, A.D. Malinovskaya [6] write that the bone content in the carcass decreases with age. If in young stock it is 26-31, then in adult horses it is up to 17-21%. The yield of adipose tissue increases from 3.4-6.0 to 8.2-10.8%, the proportion of muscle tissue rises from 62-68% to 70-72%.

A.E. Zhumagulov [7], studying the meat qualities of heavy-Kazakh cross breeds in comparison with purebred Kazakh ones, writes that hybrids' carcasses were 13 kg heavier and the slaughter yield was higher than 2%.

The meat quality of the stallions of the Kazakh breed of the Jabe type at different ages was studied by N.A. Kikebayev [8]. He found that the largest yield of carcass in a 3-day foal, then in colts at the age of 7 months, and the least - in 19-month-old colts.

I.N. Nechaev and N.A. Kikebayev [9] write that Kazakh stallions have an increase in kazy and zhal cuts with age from 9.48 at 7 months up to 14.15% at 31 months. The relative meats of I and II classes from the mass of carcass remain at the same level, but the cutability of the III class decreases.

There are very few scientific studies on the meat productivity of herd horses abroad. However, on the general meat products, separate works of Italian and French researchers can be cited. I.L.Catalano [10] writes that the slaughter yield of horses of good fatness is about 60%, young stock - about 50%, and foal-suckling constantly exceeds 60%.

I.Frigout [11], E.Rossier [12], Marten B-Rosse [13] tell about a good slaughter mass of meat foals. The colt carcasses contain a high percentage of muscles and relatively little fat (from 10 to 14%). Therefore, the authors compare the meat stallions with specialized beef cattle.

I.N.Nechaev [14] found that in horses, the composition of meat changes with age. So, if the fat content in the carcass in 6-month-old foals was 2.3-2.6%, in 1.5-year-olds - 3.2-3.8%, then in 2.5-year-olds due to the increase in the fat content, the quality of meat changes.

According to A.V. Venyarsky, horses of Kazakh breed with increasing fatness and age of horses, the percentage of fat and calorific capacity of meat increases, the percentage of moisture and protein is reduced [15].

P.S.Drugin [16] conducted a comparative study of the chemical composition of meat of the Yakut foals and foals of cross breeds from Russian heavy and Yakut breeds at 6 months of age. According to him, there is less water in the meat of Yakut foals (62% versus 67.1% in cross breeds) and more fat (15.5% versus 11.0%). Their protein content is about 20%.

In Bashkir foals, the pulp contains 75.7% of water, 2.07% of fat, and 20.02% of protein (I.N. Chebotarev [17]).

The high value of horse fat as a food product in comparison with other types of farm animals is noted by A.G. Plemyannikov [18]. Assessing the quality of fats derived from horses, camels, sheep, and cattle, he argues that the fat of horses has the best composition and nutritional qualities.

M.G. Dadebayev [19] studied the chemical and morphological composition of young stock meat of different ages during the fattening. At the same time, the author notes that if in meat of 18-month-old foals the outputs of moisture, fat, protein, and caloric content were 72, 32, 6.8; 19.83% and 1783 kcal, respectively, then in young animals at the age of 2.5 years - 67.83; 11.31; 19.68%, and 2197 kcal (fattening during 45 days).

A.I. Belyaev [20] characterizes the meat of Kushum horses, as having high nutritional qualities. With a slaughter yield of 53–58%, it contains about 18–20% of protein and 10–12% of fat in the carcass. The calorific capacity of the meat of Kushum horses is about 2000 kcal.

Analyzing the meat productivity of various breeds of animals, P.A. Fedotov [21] writes that the meat of farm animals, including horse, is valued for the content of native proteins, fats, and vitamins. The protein content in horse meat, depending on age, gender and fatness, ranges from 18 to 23%.

According to I. Hammond, adipose tissue is ontogenetically younger than other tissues and, in the degree of metabolic processes, is inferior, first of all, to muscle and bone. Therefore, during the period when the amount of nutrients entering the bloodstream is limited, the growth of adipose tissue is suspended and lipids are expended to provide energy to the animal body [22].

F. Popesku [23] notes that meat from a well-fed horse contains 73.16% of water, 21.6% of protein, 4.11% of fat and 1.2% of ash.

Many researchers have studied in detail the meat productivity of local horses and their cross breeds with cultural breeds in various zones of the republic.

At present, the development of horse breeding, especially herding, as an important productive industry, is receiving great attention in the Almaty region of the Republic of Kazakhstan, where there are up to 10 million hectares of steppe semi-desert pastures and about 25 thousand horse heads.

Of particular importance in the conditions of the Almaty region are the Kazakh horses of the Jabe type, which are well adapted to local climatic and feeding conditions, but do not have a sufficiently high live weight. One of the most effective ways to increase the live weight and meat productivity of Kazakh horses is the organization of feeding and fattening.

The aim of the study. To study the meat productivity of young stock of the Kazakh Jabe horses in different seasons of the year. The task of the research was to determine the feeding and fattening qualities of young stock under the conditions of the Almaty region.

Materials and methods of the research. Scientific and business experiments were conducted in 2016-2018 in the "Akboz" farm of the Panfilov district of the Almaty region, which was established in 2006 on the basis of the former Koktal state farm. In the farm, after an individual horse bonitation in 2016, an experimental herd was formed for studying the meat productivity of Kazakh horses of the Jabe type, depending on the different seasons of the year.

The cultivation technology of Kazakh horses of the Jabe type in the farm is typical for areas of herd horse breeding. Keeping animals is year-round pasture, with a seasonal change of pasture.

To study the growth and breeding of young stock, we observed the colts of the 2015 year of birth. All experimental young animals were grown in the same conditions of maintaining and feeding and were on the same type of pastures in all seasons within the experimental herd.

Control over their growth and development was carried out on the basis of periodic weighings, measurements and calculations of indices of body build at the age of 3 days, 3, 6, 12, 18, 24, 30 months.

Spring feeding of young horses was carried out from April to June, as during this period, there was widespread vegetation of ephemera and other herbs in the steppe and semi-desert zones of the Almaty region. Autumn feeding was conducted from September to November at the time of the secondary vegetation of steppe and semi-desert vegetation in this zone.

At setting and at the end of feeding, all experimental animals were subjected to basic measurements. The gains for the feeding period and the capacity to fattening were determined by weighing every 10 days. Experiments on spring and autumn feeding were carried out with two repetitions.

To determine the fattening capacities, the experiments were carried out on intensive fattening of colts in the summer and winter periods. Feeding was conducted on hay - concentrate diet. The diet consisted of steppe hay (Konirbas) and winter rye and crushed barley and was made up of fodder available on the farm. The norms of the All-Union Scientific Research Institute of Horse Breeding (VNIIK) [24] were taken as a basis. Rations were calculated based on the average live weight of horses - analogues, selected in the group.

During the feeding, the experimental foals were with a common herd on a pasture; when they were fed, they were placed in a closed pen, fenced off from a pipe fence. Concrete feed crips are installed along the pens.

Before experimental research on feeding and fattening of horses, individual weighing of the foals on a VSP-1 scale, equipped with a metal grid, marking, age determination and fatness of the foals were

carried out. Fatness was determined in accordance with the requirement of GOST 20079-74. Groups of horses were made up of animals similar in body weight, age and fatness [25].

In order to study the meat qualities and chemical composition of the meat of experimental horses, a control slaughter was conducted at the slaughterhouse of the Akboz farm according to the Federal Science Center of Animal Husbandry (FSCAH) methodology and in accordance with the technological instructions adopted in the meat industry.

Carcass quality was assessed by the development of muscle tissue, the presence of fatty deposits on the surface (watering) and the thickness of fat on the abdominal wall. In addition, we studied: the ratio between the meat mass (pulp) and bones in carcasses and cuts; the ratio of individual cuts in carcasses.

For a more objective assessment of the marketability of meat, a butchering of horse carcasses was carried out according to the scheme adopted for the state trading network of the Republic of Kazakhstan. Each of the cuts has a specific purpose. For the manufacture of zhal using fatty neck comb from the first thoracic vertebra. The carbonate is used to produce kazy. The cutting from the outer back lumbar part is used for the manufacture of the suret products. The upper layer of muscle tissue with fat irrigation from the hip part is used for the manufacture of the zhaya products.The muscle and fatty parts of the remaining cuts after boning and trimming of horse carcasses can go for the production of chuzhuk. Simultaneously with the cutting and boning of the carcass, samples were taken for chemical analysis. For this purpose, the meat content of each class was passed through a meat grinder with a fine grating of 2 mm in diameter, and after thoroughly mixing an average sample weighing 400 g of minced meat was taken. Then each minced meat sample was placed in previously dried porcelain cups and placed in a drying cabinet at 65 °C for determination of initial moisture[25]. Further chemical analysis of the meat was carried out according to generally accepted methods in the laboratory of KazSRIAH&FP LLP. The content of water, protein, fat and ash was determined in the meat of each class. Calorific capacity was established by calculation method in kilocalories.

Biometric processing was conducted according to the common methods [27].

Results of the research.

Growth and development of young stock of the Kazakh Jabe type horses. Studying the growth and development of young stock under conditions of herd keeping is of particular interest. In this regard, we studied the growth and development of foals of Kazakh Jabe horses from birth to 2.5 years of age under the conditions of year-round pasture maintenance (table 1).

In relation to parents 'measurements, the height at the withers and the metacarpus girth in foals at the age of three days is 65.2-64.0%, whereas the oblique body length and the chest girth make up only 50.6%

Table 1 – Age body measurements and live weight of Kazakh horses Jabe type of the 2015 year of birth

Age, months	n	Body measurements, cm				Live weight, kg
		heightatwithers	oblique body length	chest girth	metacarpus girth	
Stallions						
3 days	35	92.4±0.51	72.7±0.60	85.7±0.72	11.2±0.28	42.5±1.98
1	32	101.7±0.62	84.6±0.56	98.5±0.81	12.4±0.32	84.2±2.17
6	30	119.5±0.68	115.8±0.63	121.3±0.84	15.1±0.25	182.1±2.34
12	27	131.3±0.74	131.6±0.84	137.8±0.91	16.5±0.30	232.4±3.95
24	24	136.2±0.43	137.5±0.75	155.1±0.87	17.8±0.28	270.8±3.87
30	20	138.6±0.41	139.9±0.65	159.6±0.77	18.3±0.21	340.2±3.66
Fillies						
3 days	35	91.3±0.48	71.2±0.67	83.6±0.69	10.5±0.18	40.9±1.53
1	33	100.2±0.51	82.3±0.78	96.8±0.75	11.8±0.22	80.5±2.02
6	31	117.4±0.39	112.6±0.69	119.5±0.67	14.6±0.15	180.7±2.25
12	29	129.8±0.36	129.8±0.81	135.9±0.79	16.4±0.17	230.6±3.48
24	27	135.1±0.47	136.5±0.75	152.7±0.85	17.1±0.18	268.9±3.70
30	25	136.7±0.42	138.1±0.66	157.2±0.72	17.7±0.23	335.4±3.02

of the parents' measurements. Foal's high-leggedness at birth has an adaptive meaning, since it largely determines the foal's fast-gaitiness, which allows them to keep up with the herd as they move through pastures.

By two and a half years of age, height measurements of young animals reach 97.7-98.0% of parents' measurements.

In the first six months of life, foals showed the highest rate of growth intensity. During this period, the stallions increased in height at the withers on 27.1 cm, in oblique body length on 43.1 cm, in chest girth on 35.6 cm and metacarpus girth on 3.9 cm, and the fillies, respectively, on 26.1; 41.4; 35.9 and 4.1 cm.

From 6 months to 1 year of age, the growth rate slows down. In stallions, the height at the withers is increased by 11.8 cm, the oblique body length by 15.8 cm, the chest girth by 16.5 and themetacarpus girth by 1.4 cm, and in fillies by 12.4; 17.2; 16.4 and 1.8 cm respectively. From 1 to 2 years of age, in stallions these figures have already reached 4.9; 5.9; 17.3; 1.3 cm and in fillies - 5.3; 6.7; 16.8; 0.7 cm. The growth rate from 2 years to 2.5 years old for stallions was 2.4; 2.4; 4.5 and 0.5 cm, and for fill - 1.6; 1.6; 4.5; 0.6 cm respectively.

In the growth process, there is a change in the exterior of the foals, due to the predominant development of the axial part of the skeleton in comparison with the peripheral [28]. If from 3 days to 2.5 years of age, the height measurements at withers and metacarpus girth, connected with the growth of limbs, increased by 46.2 and 7.1 cm for colts and by 45.4 and 7.2 cm for fillies, whereas measurements of the oblique length of the body and chest girth associated with the growth of the axial part of the body increased in colts by 67.2 and 73.9 cm, in fillies by 66.9 and 73.6 cm.

Thus, foals grow most intensively in the first six months of life, then the growth rate gradually decreases.

Live weight of young animals not only characterizes the overall development of horses, but is a direct indicator of meat productivity. In the first month of life, the live weight of the young is doubled. For 27 days of the postembryonic period, the live weight of the foals increased by 41.7 kg, and the fillies increased by 39.6 kg. The period from birth to 6 months of age is most favorable in the development of the foal, which is associated with dairy nutrition and eating the spring grass. From 1 month to 6 months of age, the stallions gained 97.9 kg in live weight, fillies - 100.2 kg, while the average daily gain was 653 and 668 g.

From 6 to 12 months of age, the increase in live weight is slightly reduced and amounted to 50.3 kg for stallions and 49.9 kg for fillies. The average daily gain at the same time amounted to 279 g and 277 g.

From 12 to 24 months of age, the increase in live weight is reduced and amounted to 38.4 kg for stallions and 38.3 kg for fillies, the average daily gain was 107 and 106 g.

From 24 to 30 months of age, the increase in live weight gradually increased and amounted to 69.4 kg for stallions, for fillies - 66.5 kg, the average daily gain was 385 and 369 g.

For the full characterization of body type, body build indices are calculated, representing the percentage ratio of anatomically interconnected body measurements and live weight (table 2).

As can be seen from table 2, the index of format - as the ratio of the axial and peripheral parts of the skeleton - characterizes the body type of horses with age as in stallions and fillies gradually increases. A gradual increase in the format index is due to the fact that animals grow faster in length and width during life than in height at withers.

The high growth energy of the chest, compared with the growth rate of the chest limbs, causes a gradual rise in the wide body index during the life of the horses.

The massiveness index doubles up to 6 months of age, from 6 to 12 months of age it slightly decreases. The established pattern is due to the entrance to the first wintering of 6-month-old foals up to one-year-old. From 12 months to 30 months of age, the massiveness index rises by 20%.

Feeding qualities of the Kazakh horses of the Jabe type. Feeding of horses is one of the most important economic activities, allowing to increase the production of horse meat and to improve its quality by grazing on natural pastures. When studying the growth and development of young Kazakh horses, a general pattern of inconstancy in the increase in live weight over the seasons of the year has been established. Moreover, there is a high live weight gain in spring, a significant decrease in summer and an increase in growth in autumn, almost stopping in winter (table 3).

Table 2 – Body build indices of the Kazakh Jabe foals

Age, months	n	Body build indices, %			
		Format	Wide body	Bones	Massiveness
Stallions					
3 days	35	78.7	92.7	12.1	53.8
1	32	83.2	96.8	12.2	80.2
6	30	96.9	101.5	12.6	106.5
12	27	100.2	104.9	12.6	102.8
24	24	100.9	113.9	13.1	107.0
30	20	100.9	115.1	13.2	127.9
Fillies					
3 days	35	78.0	91.6	11.5	53.8
1	33	82.1	96.6	11.8	79.7
6	31	95.9	101.8	12.4	111.5
12	29	100.0	104.7	12.6	105.3
24	27	101.0	113.0	12.6	109.3
30	25	101.0	115.0	12.9	131.5

Table 3 – Results of spring feeding of the Kazakh Jabe stallions

Indices	Age, months	
	12	24
Number of heads	20	20
Duration of feeding, days	65	65
Live weight, kg: at the beginning of feeding at the end of feeding	 230.2±3.6 270.8±3.2	 271.8±4.1 307.0±3.5
Live weight gain: gross, kg daily average, g	 40.6±2.5 624.6±28.6	 35.2±2.8 541.5±31.2

The live weight gain in yearling stallions was 40.6 kg, with an average daily gain of 624.6 g, and in the two-year-olds - 35.2 kg and 541.5 g, respectively.

Autumn feeding by us was carried out from September 10 to November 19. During this period, the average daily gain in live weight for 6-month-old foals was 661.4 g, for 1.5 summer stallions - 531.4 g and 2.5-year-old foals - 501.4 g (table 4).

Table 4 – Results of the autumn feeding of young Kazakh Jabe horses

Indicators	Age, months		
	6	18	30
Number of heads	20	20	20
Duration of feeding, days	70	70	70
Live weight, kg: at the beginning of feeding at the end of feeding	 180.6±2.4 226.9±1.9	 260.5±3.2 297.7±2.8	 342.3±4.1 377.4±3.6
Live weight gain: gross, kg daily average, g	 46.3±2.2 661.4±31.5	 37.2±3.1 531.4±42.3	 35.1±3.4 501.4±37.6

It was established that the highest gains in live weight of colts are observed in the first month of feeding (September 10 - October 10). During this month of feeding, 6-month-old foals had an average daily gain of 827 g, 1.5-year-olds - 765 g, 2.5-year-olds - 701 g. In the second month of feeding, the average daily gain of colts was respectively 708; 687 and 643 g. In the final feeding period, the average daily gain in 6-month-old foals was 204 g, in 18-month-old foals - 101 g and in 30-month-olds - 92 grams.

Thus, during the spring and autumn feeding period, the greatest daily gains are observed in the first periods of feeding, when there is an intensive growth of muscle tissue, with the growth of adipose tissue the average daily gains gradually decrease.

Feeding qualities of the Kazakh horses of Jabe type. In summer and winter time, horses reduce their fatness, therefore, for the uninterrupted production of horse meat, in addition to the spring and autumn feeding, horse fattening is practiced regardless of age. Summer fattening was held from July 3 to September 3. Stallions were put on fattening at the age of 1 year and 2 years of age. Winter fattening was held from November 5 to January 5 for foals at the age of 6, 18, 30 months.

Fattening of horses was conducted with regard to their live weight and fatness. The conditions of keeping colts of all ages were the same.

The main diet consisted of fodder available on the farm: steppe hay (konirbas), winter rye of milky-wax ripeness and crushed phenomenon. Their quality was satisfactory. The composition and nutritional value of the rations are given in table 5.

Table 5 – Composition and nutritional value of actually eaten diets during the fattening of young horses

Feed type	Summer fattening		Winter fattening		
	Age, months				
	12	24	6	18	30
Steppehay, kg	2.5	3.0	2.0	3.0	3.0
Winterryehay, kg	3.0	3.0	3.0	3.0	5.0
Crushedbarley, kg	1.5	2.5	1.0	2.0	3.0
The diet includes:					
feed units	3.13	4.20	2.49	3.78	5.12
dry matter,kg	4.43	5.71	3.57	5.28	7.08
digestibleprotein, g	482	674	374	591	828
calcium, g	21.1	19.1	12.2	17.8	22.7
phosphorus, g	10.1	13.5	7.9	12.4	15.4
carotene, mg	113.7	127.2	100.5	127.0	159.5

The nutritional value of the actually eaten ration with summer fattening in 12-month-old-stallions was 3.13 feed units and 482 g of digestible protein, and in 24 monthly foals - 4.20 feed units and 674 g of digestible protein; in winter fattening in 6-month-old foals had a nutritional ration of 2.49 feed units and 374 g of digestible protein, in 18-month-old foals - 3.78 feed units and 591 g of digestible protein, in 30-month-old foals - 5.12 feed units and 828 g of digestible protein. Per 100 kg of live weight there was used 2.44 kg of dry matter of the ration for 12-month-old stallions, 2.09 kg of DM for 24-month-olds during the summer fattening, for 6-month-old foals - 1.97 kg of DM, for 18-month-old stallions - 2.03 kg of DM during the winter fattening. Per 1 kg of the gained live weight, 4.1 feed units were consumed for 12 monthly stallions, 6.06 feed units for 24-month-olds, 6.7 feed units for 6-month-old stallions, 4.7 feed units for 18-month-olds, and 7.8 feed units for 30-month-old stallions.

Stallions of different ages showed different growth rates during the fattening period (table 6).

For 60 days of fattening, the live weight gain per head, on average, in 12 monthly stallions was 45.8 kg or 19.7% to the preliminary weight, in 24 monthly foals - 41.6 kg or 15.2%, and in 6 monthly ones - 47.3 kg. or 26.1; in 18-month-old stallions - 40.7 kg. or 15.5, and in 30-month-olds - 37.5 or 10.8% to the preliminary weight. The greatest average daily gains were in 6 monthly foals - 788.3 g, then in 12 monthly foals - 763.3 g.

Table 6 – Live weight and live weight gain of foals during fattening (duration of experiments - 60 days)

Indicator	Summer fattening		Winter fattening		
	Age, months				
	12	24	6	18	30
Number of heads	20	20	20	20	20
Live weight, kg:					
at the beginning of fattening	232.3±3.7	273.6±4.1	181.3±3.2	263.2±3.8	348.1±5.2
at the end of fattening	278.1±3.5	315.2±3.9	228.6±3.3	303.9±3.5	385.6±4.6
Live weight gain:					
gross, kg	45.8±2.6	41.6±2.9	47.3±2.4	40.7±2.5	37.5±3.3
daily average, g	763.3±40.8	693.3±46.3	788.3±42.1	678.3±50.7	625,0±53,6

Meat productivity of foals after feeding and fattening. The meat qualities of horses are estimated by live weight, body measurements, as well as body build indices, calculated on the basis of measurements. As is known, these indicators do not yet give a complete description of the meat productivity of horses. In this regard, for an objective estimation of the productivity of animals, it is advisable to use indicators of dead weight and slaughter yield.

It has been established that during feeding and fattening, the mass of carcasses of stallions increases with age (table 7).

Table 7 – Meat productivity of stallions in different seasons of the year

Keeping method	Age, months	Number of heads	Pres laughter live weight, kg	Carcass mass, kg	Slaughteryield, %
Spring feeding	12	6	268.4	146.5	54.6
	24	6	306.2	162.9	53.2
Summer feeding	12	6	276.3	152.8	55.3
	24	6	312.1	167.9	53.8
Autumn feeding	6	6	223.6	126.8	56.7
	18	6	296.2	158.8	53.6
	30	6	378.7	198.1	52.3
Winter feeding	6	6	227.5	129.4	56.9
	18	6	301.4	162.1	53.8
	30	6	383.8	202.3	52.7

If the carcasses of the 12-month-old stallions weighed 146.5 kg at the spring feeding, after the autumn feeding in 18-month-old animals they were already 158.8 kg or 8.4% more. For the corresponding period, the mass of carcasses in 30-month-old foals increased by 35.2 kg or 21.6% compared with 24-month-old animals.

The same pattern is observed during summer and winter fattening. With age, the slaughter yield gradually decreases both during feeding and fattening. If the carcass yield at the autumn feeding season in 6-month-old stallions was 56.7%, then in 18-month-old stallions it was 53.6% and in 30-month-olds - 52.3%. At winter fattening the same picture is observed. Thus, these data indicate that spring - autumn feeding and summer-winter fattening of colts contributed to the achievement of a highdead weight of heavy carcasses, with the high slaughter yield.

As it is known, various products made from horse meat are in great demand among the local population. Such products as kazy, karta, zhal, zhaya, chuzhuk, suret and others are considered to be delicacies. They are distinguished by high nutritional value and good taste.

It should be noted that in Kazakhstan there is an increased demand for fat horse meat, as national specialty foods cannot be cooked from lean meat. Therefore, the production of fat horse meat is also stimulated by purchase prices in the trade network of the republic. So, horse meat of the first class is more

expensive than horse meat of the second one - by 29.2% and 2.5 times more than the cost of the third class. According toKazakhstan Regulations of technical specifications No. 82-62, the first class horse meat is carcass, in which kazy should be in the form of solid fatty deposits and have a thickness of at least 15 mm in the section around the white line.

To characterize the quality of carcasses, the thickness of the outer fat was measured. So the thickness of the fat layer "zhaya" on the comb of the neck in 30-month-old foals after feeding and fattening was 125-127 mm; in 24-month-old foals - 112-115 mm; in 18-month-olds - 85-87 mm; in 12-month-olds - 51-54 mm; and in 6-month-olds - 42-43 mm; on the abdominal wall the "kazy" in 30-month-old foals was 39-41 mm, in 24-month-olds - 27-29 mm, in 18-month-olds - 19-21 mm, in 12-month-olds 16-17 mm, and 6-month-olds - 11-13 mm; at tailhead - 15.3; 13.1; 10.1; 7.6; 4.8 mm, respectively.

Currently, the increasing demand for high-quality horse meat from the population and with a view to export necessitates obtaining the carcasses with a large meat yield, an even distribution of fat between the muscles and inside the muscles, with a thick layer of abdominal fat for making kazy, a relatively small specific mass of bones and tendons in the carcass . Therefore, the study of the morphological composition is an important qualitative indicator of the assessment of carcasses. The change in mass of different parts of the carcass is shown in table 8.

Table 8 – The ratio of the mass of different parts of the carcass when butchering

Keeping method	Age, months	Indicators	Parts of the carcass									
			lean	zhal	scapulo-humeral	knuckle	back	hind	kazy	flatbone	shank	the whole carcass
Spring feeding	12	kg	3.8	0.8	46.0	1.9	8.2	58.7	18.6	4.5	4.0	146.5
		%	2.6	0.5	31.4	1.3	5.6	40.1	12.7	3.1	2.7	100.0
	24	kg	4.3	1.5	51.9	2.5	9.6	61.0	22.3	5.0	4.8	162.9
		%	2.6	0.9	31.9	1.5	5.9	37.4	13.7	3.1	3.0	100.0
Summer fattening	12	kg	4.3	1.2	47.8	2.3	9.3	59.3	18.9	5.2	4.5	152.8
		%	2.8	0.8	31.3	1.5	6.1	38.8	12.4	3.4	2.9	100.0
	24	kg	4.2	1.7	52.3	2.8	10.7	62.6	23.4	5.3	4.6	167.9
		%	2.5	1.0	31.1	1.7	6.4	37.3	14.1	3.2	2.7	100.0
Autumn feeding	6	kg	2.4	0.4	42.6	1.7	7.2	51.1	14.6	3.5	3.3	126.8
		%	1.9	0.3	33.6	1.3	5.7	40.3	11.5	2.8	2.6	100.0
	18	kg	4.0	1.2	50.6	2.5	10.9	58.9	21.7	4.8	4.2	158.8
		%	2.5	0.7	31.9	1.6	6.9	37.1	13.7	3.0	2.6	100.0
	30	kg	4.8	2.3	60.9	3.6	12.2	75.1	25.4	7.5	6.3	198.1
		%	2.4	1.2	30.7	1.8	6.2	37.9	12.8	3.8	3.2	100.0
Winter fattening	6	kg	2.5	0.5	42.9	1.9	7.6	52.2	14.7	3.6	3.5	129.4
		%	1.9	0.4	33.1	1.5	5.9	40.3	11.4	2.8	2.7	100.0
	18	kg	3.9	1.4	51.3	2.6	11.0	60.7	22.2	4.9	4.1	162.1
		%	2.4	0.9	31.7	1.6	6.8	37.4	13.7	3.0	2.5	100.0
	30	kg	4.6	2.1	65.2	3.4	11.8	76.4	26.2	6.9	5.7	202.3
		%	2.3	1.0	32.2	1.7	5.8	37.8	13.0	3.4	2.8	100.0

From the data of table 8 it can be seen that the largest mass falls on the hind part of all age groups, then the scapulohumeral part and the cut of kazy and the back part go. The smallest amount falls on cuts like flat bone, lean, knuckles,and shanks.

When studying the morphological composition of horse carcasses, the ratio of trimmed meat, bones and tendons was determined. The research results are summarized in table 9.

It was established that the morphological composition of carcasses of stallions of different ages during feeding and fattening was not the same. The largest pulp yield in carcasses of 82.2 and 81.9% was

Table 9 – Morphological composition of horse carcasses

Keeping method	Age, months	Carcass weight, kg	Composition of the carcass					
			pulp		bones		tendons	
			kg	%	kg	%	kg	%
Spring feeding	12	146.5	115.7	79.0	25.8	17.6	5.0	3.4
	24	162.9	131.0	80.4	27.5	16.9	4.4	2.7
Summer fattening	12	152.8	121.8	79.7	26.0	17.0	5.0	3.3
	24	167.9	135.8	80.9	27.7	16.5	4.4	2.6
Autumn feeding	6	126.8	98.6	77.7	23.4	18.5	4.8	3.8
	18	158.8	127.1	80.0	26.8	16.9	4.9	3.1
	30	198.1	162.9	82.2	30.3	15.3	4.9	2.5
Winter fattening	6	129.4	100.6	77.7	24.2	18.7	4.6	3.6
	18	162.1	130.1	80.2	27.2	16.8	4.8	3.0
	30	202.3	165.8	81.9	31.5	15.6	5.0	2.5

in foals at the age of 30 months. The relative content of bones was higher in 6-month-old stallions of 18.5-18.7% compared with other age groups. The lowest tendon content is observed in 30 monthly foals - 2.5% and in 24 monthly foals - 2.7-2.6%. Per 1 kg of bones, it was obtained 4.2 kg of meat in 6-month-old foals, in 12-month-olds - 4.5-4.9 kg, in 18-month-olds - 4.7-4.8 kg, and in 24-month-olds - 4.8-4.9 kg and 30 months - 5.4-5.3 kg.

Individual parts of the carcass are characterized by different ratios of muscular tissue with other tissues. This is due to the peculiarities of the anatomical structure and the nature of the work performed by one or another part of the body. The best in nutritional terms are the parts of the carcass containing the greatest amount of muscle and adipose tissues, with a low content of bones and tendons [28-31].

The class ratio of horse carcass meat can be judged from the data in table 10. It has been established that, during feeding and fattening, depending on age, there is a change in the yield of individual cuts in the carcass composition. For example, the cut “out of class” has an increasing character with age.

Table 10 – The ratio of the mass of parts of the carcass by classes

Keeping method	Age, months	Total in the carcass		Out of class		I class		II class		III class	
		kg	%	kg	%	kg	%	kg	%	kg	%
Spring feeding	12	146.5	100	19.4	13.2	66.9	45.7	50.5	34.5	9.7	6.6
	24	162.9	100	23.8	14.6	70.6	43.3	56.9	35.0	11.6	7.1
Summer fattening	12	152.8	100	20.1	13.1	68.6	44.9	53.0	34.7	11.1	7.3
	24	167.9	100	25.4	15.1	73.3	43.7	57.6	34.3	11.6	6.9
Autumn feeding	6	126.8	100	15.0	11.8	58.3	46.0	46.1	36.4	7.4	5.8
	18	158.8	100	22.9	14.4	69.8	44.0	55.4	34.9	10.7	6.7
	30	198.1	100	27.7	14.0	87.3	44.1	68.4	34.5	14.7	7.4
Winter fattening	6	129.4	100	15.2	11.7	59.8	46.2	46.5	36.0	7.9	6.1
	18	162.1	100	23.6	14.6	71.7	56.2	56.2	34.7	10.6	6.5
	30	202.3	100	28.3	14.0	88.2	72.1	72.1	35.6	13.7	6.8

If in 12-month-old stallions during spring feeding, the “out of class” cut was 19.4 kg, then in 24-month-old stallions it was already 23.8 kg or 4.4% more. At summer fattening the same picture is observed. During the autumn feeding and winter fattening, the out-of-class cut from 30-month-old stallions was higher by 13.1 kg compared to 6-month-old stallions and 19.9% higher compared to 18-month-old animals. Back and hind parts of carcasses belong to the first-class cut, which ranges from 66.9 to 88.2 kg, depending on the age of foals, class II includes the scapulohumeral (shoulder-blade) part and flat bone (46.1-72.1 kg), Class III includes lean, knuckle and shank (7.4-13.7 kg).

First class meat in carcasses takes up almost half of the mass (43.3-46.2%), depending on the age of animals. Class II takes from 34.3 to 36.4% of the carcasses weight. Class III contains a large number of bones and tendons rather than meat and it ranges from 5.8-7.4%.

Based on research conducted on the study of the morphological composition and the ratio of horse carcass meat by classes, it can be concluded that with the organization of feeding and fattening of horses, the output of the meat content in the carcass increases and the class ratio in favor of higher classes improves.

The chemical composition of the meat of young Kazakh Jabe horses. The chemical composition of meat is one of the important indicators that give an idea of the nutritional value of meat. The nutritional value of horse meat is in direct proportion with the level of feeding and maintenance, age and fatness of the horse [35].

It was found that the chemical composition of meat of various classes in foals of different ages at feeding and fattening is not the same.

The highest fat content in all age groups is observed in the “out of class” cut, and then in descending order - in the I, II and least of all - in Class III. The more fatty meat was in 30 monthly stallions.

With age, a decrease in moisture and protein is observed. If the 6-month-old stallions had 70.59% of moisture in the carcass at feeding, 70.37% at fattening, and the protein content was, respectively, 19.27% and 19.29%, then at the age of 30 months, there were: moisture - 64.43-64.27%, protein 15.95-15.99%. A similar regulation is observed for all classes of carcass cuts.

As the class of meat decreases, a gain in the moisture and protein content is observed. The ratio of moisture to protein regardless of the class of meat and the age of stallions was more or less constant from 3.5 to 3.7. This is due to the fact that the moisture and protein in meat is in a biologically bound state. The content of ash in the meat both with the age of horses and with the difference in class remains without significant changes.

The energy value of horse meat of different ages varies when feeding and fattening. The highest meat calorific capacity of 2385-2398 kilocalories was in 30-month-old stallions in comparison with stallions of other ages. Meat of 6-month-old and 12-month-old foals contains more protein and less fat and it is a dietary food product. For the production of high-value dietary horse meat in the farm, it is necessary to have a large proportion of mares in the herd, which allows the 6- and 12-month-old stallions to be slaughtered;for the production of more fatty and high-calorific horse meat, 30 monthly foals should be slaughtered after feeding and fattening.

Qualitative protein indicator of meat. It is known that muscle tissue includes sarcoplasm proteins and myofibrils, which are full-fledged and contain all the essential amino acids. Proteins of the connective tissue do not contain some essential amino acids, in particular, tryptophan. At the same time, up to 14% of connective tissue proteins account for the oxyproline amino acid, which is absent in full-fledged proteins. Therefore, the content of full-fledged proteins in meat is identified by tryptophan, and the defective ones - by hydroxyproline. The ratio of tryptophan to hydroxyproline is called a protein-based quality indicator and characterizes the full-value of meat proteins, being one of the main criteria for its quality.

The protein full-value of meat obtained from stallions of different ages is not the same, it depends on which muscles the study was conducted. The muscles of different anatomical parts of the body differ dramatically in the quality of proteins [29].

In this respect, the most valuable muscle is the semitendinosus and the longissimus muscle of the back, followed by the semimembranosus, the latissimus, the dentate ventral muscle, and the lowest quality is characterized by biceps of the shoulder.

The highest values of the quality protein indicator were obtained in colts at the age of 6 and 12 months. The value of the indicator of protein usefulness was 5.8, which indicates a very high biological (food) value of meat. With the age of horses, the biological value of meat decreases, and by the age of 30 months, the protein quality index averaged 4.5 on average.

By-products, internal fat, and technical raw materials. Considering the growth dynamics of organs attributable after the horse processing for meat to the 1 category by-products, we see that with the age of horses their relative weight drops noticeably. Thus, the yield of by-products of the first category decreases with age of horses from 4.6% in 3-day-olds to 3.0% in 30-month-old foals.

The greatest mass in the number of organs attributed to the offal of class 1 is for the heart and liver. Their relative weight also declines markedly with the age of the horses - from 1.3% and 1.7%, respectively, in 6-month-olds to 0.8% and 1.5% in 30-month-old stallions. Of the other organs of this category, the relative mass of the tongue decreases sharply, the relative mass of the kidneys remains at the same level, and the output of meat trimming increases slightly.

The change in the output of various organs noted above is a consequence of the unequal growth rate at different periods of life. Thus, among the by-products of the 1st class, the biggest gain in the output by 15.5 times is for the meat trimming and the smallest - the tongue, only 1.5 times during 2.5 years of life. The relative weight of the intestine, spleen, head with the age decreases noticeably, and the stomach, on the contrary, increases. Despite this, the yield of by-products of class II, in general, remains without significant changes.

The intestine in 6-month-old foals is more developed than the stomach. With the age, a decrease in the content of both the small and the large bowel is observed. However, the decrease in the relative mass of the large bowel is stronger. The relative mass of the small and large bowel sections from the pre-slaughter mass was respectively equal to 1.46% and 1.24% at 6 months, 1.40 and 1.16 at 12 months, at 1.28 and 1.01 at 18 months, 1.21 and 1.00 at 24 months, 1.19 and 1.03% in 30 months. From 6 months to 2.5 years of age, the weight of the small and large bowels of horses increased by 6.5 and 5.2 times, respectively.

The intestines are used as envelopes for chuzhuk and kazy. Therefore, its length also has a definite meaning.

The length of the large and small bowels was equal, respectively, at 6 months - 13.0 and 2.6 meters, at 12 months - 14.0 and 3.0 meters, at 18 months - 14.5 and 3.1 meters, at 24 months - 15.3 and 3.1 meters, at 30 months - 16.3 and 3.2 meters.

The full fat segmented intestine of horses is used to produce a karta. At 6, 12, 18, 24 and 30 months of age, its weight averaged 1.42±0.0085 kg, 2.23±0.081 kg, 2.43±0.116 kg, 2.55±0.163 kg, 3.08±0.072 kg, respectively.

During slaughter, in 6-month-old stallions, an internal fat of 0.84 ± 0.08 kg was obtained; at subsequent ages, an increase in the mass of internal fat was observed. At the age of 12, 18 and 24 months of stallions, the mass of internal fat is 1.2±0.01 kg, 1.3±0.05 kg and 1.6±0.03 kg, respectively. Especially intensively increases the content of internal fat in the third year of life. At slaughter at 2.5 years of age, the internal fat of 2.2±0.08 kg was obtained.

In addition to meat and meat products in the processing of horses the raw materials for consumer goods and food industries are received. The most valuable of them are jacket, blood and legs (table 11).

Table 11 – Change in the yield of technical raw materials and slaughter products of the Kazakh horses of Jabe type (n = 6 of each)

Indicators	Age, months				
	6	12	18	24	30
Technical raw materials, kg including:					
blood, kg	9.1±0.23	11.9±0.21	14.1±0.35	15.6±0.27	16.8±0.39
legs, kg	4.3	5.8	7.0	7.5	7.8
jacket, kg	13.1±0.21	14.0±0.43	15.6±0.26	16.42±0.34	21.5±0.31
Jacket length, cm	175±1.87	181±2.83	191±2.17	197±2.76	204±2.51
Jacket width, cm	128±1.59	138±2.21	144±2.03	161±2.45	165±1.92
Jacketarea, m^2	2.24	2.50	2.75	3.17	3.37

It has been established that the growth of jacket in horses is quite high and its weight increases from 13.1 kg in 6-month-old foals to 21.5±0.31 kg, or by 64.1%, by 2.5 years of age. During this period, the area of the jacket increases from 2.24 to 3.37 sq. m or by 50.4%. Consequently, the unit of jacket area with age of horses becomes heavier. So, if 1 sq. m of jacket at 6 months of age had a weight of 5.8 kg on average, then at 2.5 years of age it is equal to 6.4 kg. When comparing the size of the jackets for a 2-year

period, an increase in length by 1.5 times is found, and in width - 2.0 times, that is, the jacket becomes relatively shorter and wider.

It should be noted that the jacket of foals, like fur raw materials, are used completely insufficiently. Positive experience in this regard is available only in the Sakha Republic.

Blood is a valuable raw material for the production of food, medical, feed and technical products. With the age of horses, the amount of blood increases from 9.1 kg in the 6-month-old stallions to 16.8 kg in 2.5 year-olds, or by 84.6%.

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[6]Жоғары білім беру саласындағы федералдық мемлекеттік бюджеттік білім беру саласының мемлекеттік орталығы – К. А. Тимирязев атындағы Мәскеу аграрлық академиясы, Мәскеу, Ресей

АЛМАТЫ ОБЛЫСЫ ЖАҒДАЙЫНДАҒЫ ҚАЗАҚ ЖАБЫ ЖЫЛҚЫ ТИПІНІҢ ЖАС ТӨЛДЕРІНІҢ ЕТ ӨНІМДІЛІГІ

Аннотация. Қазақ жабы жылқылардың өсу мен даму көрсеткіштері жыл маусымдарының қолайлы мерзімінде аңықталады және қолайсыз мерзімде керісінше баяу өсу қарқынымен көрінеді. Сонымен қатар құлындар мен байталдардың арасындағы өсу мен дамудың айырмашылығы шамалы. Азықтандыру кезеңінде және қарқынды бордақылау кезеңінде әр түрлі жастағы қазақ жылқылардың жас төлдерінің тірі салмақты жақсы қосыды. Көктемгі азықпен жайылған 12 айлық жабағылар 40,6 кг тірі салмаққа артады, 24 айда – 35,2 кг. Күзгі жайлым кезеңінде 6 айлық жабағылар 46,3 кг, 18 айда 37,2 кг және 30 ай сайын 35,1 кг салмақ арттырады. Бордақылау кезінде 6 айлық жабағылар 47,3 кг, 12 айлық тайлар 45,8 кг, 18 айлықта 40,7 кг, 24 айлық 41,6 кг және 30 айда 37,5 кг құрады.

Жылқы 12 және 24 айда сойыс ет шығымы 54,6–53,2%, бордақылау кезінде тиісінше 55,3–53,8% құрады. Күзгі жайлымуақытында 6, 18, 30 айлық құнандар 56,7, 53,6, 52,3%, ал қысқы кезеңде тиісінше 56,9, 53,8 және 52,7% құрады.

Әртүрлі жастағы құнандардың ет тушасының морфологиялық құрамын зерттегенде 6, 12, 18 айлықтағыларымен салыстырғанда сүйек мөлшері 24 және 30 айлықтағылардан жоғары екендігі анықталды, 30 айлық құнандардың ұшадағы ет мөлшері 165,8 және 162,9 кг құрады. Ұлпалардың байланыс ерекшелігі 24–30 айлық жануарлармен салыстырғанда 2,5-2,7%-ға, жас құнандарға қарағанда 3,3%-дан 3,8%-ға жоғары болды.

Барлық жас аралығындағы құнандардың ұшасының ет бөліктерінің сорттықғы мынаған сәйкес 43,3%-дан 46,5%-ға дейін I сорт, 34,3%-дан 36,4%-ға дейін II сорт, 15,0%-дан 28,3%-ға дейін «сортқа жатпайтын» (қазы және жал) және III сорт үшін 6,1%-дан 7,4%-ға дейін.

Химиялық құрамы бойынша 24 және 30 айлық жастағықұнандардың еті басқа жастағылардың етінен айырмашылығы бар 6, 12 және 18 айлықтағыларда майы аз және құрамында жоғары калорияда болып табылады. 1 кг ет 2098–2398 ккал болды. Жас құнандардың етінде 9,10–10,07% майға қарағанда 19,27–19,07% артық ақуыз бар және бұл оңай сіңімді диеталық өнім.

Түйін сөздер: қазақтың жабы жылқысы, ет өнімділігі, сойыс шығымдылығы, құнан, байтал, жайып-семірту, бордақылау, ет сапасы.

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МЯСНАЯ ПРОДУКТИВНОСТЬ МОЛОДНЯКА КАЗАХСКОЙ ЛОШАДИ ТИПА ЖАБЕ В УСЛОВИЯХ АЛМАТИНСКОЙ ОБЛАСТИ

Аннотация. Показатели роста и развития казахских лошадей типа жабе выражается в интенсивном росте при благоприятных и снижении темпов роста в неблагоприятные сезоны года. При этом разница в росте и развитии между жеребчиками и кобылками несущественна.

Молодняк казахских лошадей различного возраста в период нагула и интенсивного откорма хорошо прибавляют в живой массе. При весеннем нагуле 12 месячные жеребчики прибавили в живой массе 40,6 кг, 24 месячные – 35,2 кг. При осеннем нагуле 6 месячные жеребята увеличивают живую массу на 46,3 кг, 18 месячные 37,2 кг и 30 месячные 35,1 кг.

При откорме прирост живой массы составил у 6-ти месячных жеребчиков 47,3 кг, у 12-ти месячных – 45,8 кг, у 18-ти месячных 40,7 кг, у 24 месячных 41,6 кг и 30 месячных – 37,5 кг.

Убойный выход у лошадей 12 и 24 месяцев при нагуле составил 54,6–53,2%, при откорме соответственно 55,3–53,8%. У 6 , 18, 30 месячных жеребчиков при осеннем нагуле убойный выход равнялся 56,7, 53,6, 52,3%, а при зимнем откорме соответственно 56,9, 53,8 и 52,7%.

При изучении морфологического состава туш у жеребчиков различного возраста установлено, что у 6, 12, 18 месячных жеребчиков относительное содержание костей выше чем у 24 и 30 месячных жеребчиков, по содержанию мякоти в туше 165,8 и 162,9 кг преимущество было у 30 месячных жеребчиков. Содержание соединительной ткани был выше у более молодых жеребчиков от 3,3 до 3,8% в сравнении с 24 и 30 месячными животными 2,5–2,7%.

По сортовому соотношению частей туши у жеребчиков всех возрастов от 43,3% до 46,5% приходится на I сорт, от 34,3 до 36,4% на II сорт, от 15,0 до 28,3% на “вне сорта” (қазы и жал) и от 6,1 до 7,4% на III сорт.

По химическому составу мясо жеребчиков 24 и 30 месячного возраста отличается от мяса животных 6,12 и 18 месячного возраста меньшим содержанием жира и является более калорийным. В 1 кг мяса содержалось 2098–2398 ккал. В мясе молодых жеребчиков содержится больше белка 19,27–19,07% нежели жира 9,01–10,07% и является легкоусвояемым диетическим продуктом питания.

Ключевые слова: казахская лошадь жабе, мясная продуктивность, убойный выход, жеребчики, кобылки, нагул, откорм, качество мяса.

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DEVELOPMENT OF METHODS FOR STUDIES ON BRUCELLOSIS IN THE MILK OF GOATS AND CAMELS

Abstract. Research of milk of goats and camels on brucellosis is carried out with the help of a diagnostic kit, which consists of the following components:

1. Color antigen 1 vial (ampoule) with a volume of 2.0 cm^3.
2. Positive brucella serum of animals, 1 vial (ampoule) in a volume of 2.0 cm^3.
3. Negative serum of animals, 1 vial (ampoule) in a volume of 2.0 cm^3.
4. Freeze-dried or milk healthy by cow brucellosis, 1 bottle of 20.0 cm^3.
5. distilled water in sterile form 1 vial (ampoule) in the amount of 20.0 cm^3 (for dilution of dried milk lyophilic).

On vials, ampoules of each biocomponent paste the label and pack 1 piece in cardboard boxes with the presence of nests or partitions, ensuring the immobility and integrity of the vial (ampoules).The diagnostic kit is stored indoors in a dark dry place at a temperature of 2 to 14 °C. The shelf life of the set is 12 months from the date of manufacture. In the presence of foreign matter, violation of tightness of bottles (ampoules), the absence of the label of the bottle (ampoule) is rejected and must be destroyed.

The procedure for applying the diagnostic kit. Florinsky test tubes are placed in the appropriate racks and numbered in accordance with the inventory of milk samples. In tubes pour 1.5 cm^3 of milk from the number of samples and add 0.5 cm^3 of cow milk, then add 0.05 cm^3 of antigen. All components of the reaction are thoroughly mixed and the tubes with the contents are placed in a water bath or thermostat at 37-38 °C for 60 minutes, until a blue ring appears in the control tubes.

At each formulation of the reaction, controls are set at the same time as the tested milk samples:

1. Goat milk (camel) with the addition of a positive serum in an amount of 0.05 per 1 cm^3 of milk;
2. Healthy goat (camel) milk with the addition of negative serum in the amount of 0.05 per 1 cm^3 of milk.

Accounting and evaluation of the results of the ring milk sample.

The results of the reaction are taken into account visually immediately after removing the racks from the water bath (thermostat) according to the following scheme (in crosses):

+++ (3 crosses) - a clearly defined blue ring in the upper part of the milk column in the cream layer (the rest of the milk remains white);

++ (2 crosses) - a fairly expressed blue ring in the cream layer (the rest of the milk has a bluish color);

+ (1 cross) - the blue ring in the cream layer is weakly expressed, and the whole column of milk is blue;

"- "(minus sign) - the column of milk remains uniformly colored in the original blue color, which was obtained immediately after the addition of antigen, and a layer of cream-white and slightly yellowish.

All milk samples that gave a ring reaction with a rating of 3 and 2 crosses are considered positive, and with a rating of one cross - doubtful.

Relevance. Diagnosis of brucellosis is one of the main links in the general complex of antiepizootic measures. Currently existing means and methods of combating brucellosis do not fully meet the requirements of practice [1].

Thus, the veterinary-sanitary rules for the control of brucellosis include blood serum (RBS, SBR/RLCF, ELISA), milk (CR and ELISA), biomaterial for bacteriological studies by isolating a pure culture, setting a bioassay, carrying out PCR.

However, the verification of animal products for food safety remains important. In this case, the milk of cows is investigated using a ring reaction [3]. The milk of some other species of animals (goats, camels) is not possible to subject to the study specified diagnostic test, due to the physico-chemical characteristics of the specified product [4].

The aim of our work was to develop a research method for brucellosis of goat and camel milk. To achieve this goal, the resolution has the following tasks:

1. To clarify the epizootic situation on the brucellosis of goats and camels in the Republic of Kazakhstan (determine relevance);

2. To study the possibility of researching milk obtained from goats and camels for brucellosis with the help of color antigen;

3. To give a comparative assessment of the methods of diagnosis of brucellosis in lactating goats and camels;

4. Develop a research methodology for brucellosis of goat and camel milk.

Research results.

Epizootic situation on camel brucellosis in the Republic of Kazakhstan. According to statistics, there are currently about 164,000 camels in Kazakhstan. At the same time, 199318 was subjected to research, taking into account repeated studies. The number of camelheads and the results of production studies for brucellosis are shown in table 1 and 2.

Table 1 – The number of camels in Kazakhstan by region

Name of regions	The number of brutes			
	all categories of farms	agricultural enterprises	peasant (farmer)	households (farmstead)
Akmola	140	112	20	8
Aktobe	14 867	210	7860	6797
Almaty	7 960	5205	2268	487
Atyrau	28 333	1936	10699	15698
West Kazakhstan	2 885	304	1708	873
Jambyl	5 530	153	3375	2002
Karagandy	1 207	4	603	600
Kostanay	177	26	82	69
Kyzylorda	34 471	1872	10253	22346
Mangystay	47 209	2622	16102	28485
South Kazakhstan	20 408	2941	5551	11916
Pavlodar	139	102	28	9
North Kazakhstan	56	3	53	–
East Kazakhstan	569	116	423	30
In total in RK	164 000	15606	59125	89320

As can be seen from table 1, the largest number of camels are concentrated in Mangistau, Kyzylorda, Atyrau, South Kazakhstan, Aktobe, then Almaty, Zhambyl, West Kazakhstan, Karaganda and other regions.The main population of camels is currently concentrated in private business entities, which focuses our attention on the epizootic well-being of camel head, especially in zooanthroponosis, in particular brucellosis. Milk and dairy products from these animals should be food safe. However, there are still no methods for the study of camel's milk for brucellosis and are not used in practical veterinary practice.

In connection with the above, official data on the presence of brucellosis infection among camel head have great interest.

The data of these studies, in the context of the areas presented in table 2.

Table 2 – Results of studies on camel brucellosis by region of Kazakhstan

Name of regions	It is investigational (heads)	Isolated patients	Incidence
Akmola	121	–	0,0
Aktobe	17 979	71	0,4
Almaty	9006	–	0,0
Atyrau	36 202	102	0,3
West Kazakhstan	3513	42	1,2
Jambyl	6544	2	0,03
Karagandy	1429	2	0,1
Kostanay	228	14	6,1
Kyzylorda	39 359	–	0,0
Mangystau	59 584	–	0,0
South Kazakhstan	24 574	–	0,0
Pavlodar	140	–	0,0
North Kazakhstan	40	–	0,0
East Kazakhstan	558	11	2,0
In total in RK	199 318	244	0,12

As can be seen from table 2, the number of positively responding to brucellosis, according to the veterinary reports, is in Kostanay (6.1%) East Kazakhstan (2.0), West Kazakhstan (1.2), Aktobe (0.4), Atyrau (0.3), Karaganda (0.1).

On average in Kazakhstan, the incidence of camel brucellosis in 2014 was 0.12%, in the Kostanay region this figure was 6.1% in East Kazakhstan - 2.0%, West Kazakhstan - 1.2%, Aktyubinsk - 0.4% Atyrau - 0.3%, Karaganda - 0.1%.

However, the data of veterinary reports do not always correspond to the actual position of the epizootic situation on camel brucellosis. Thus, for example, in the study of brucellosis, which is considered to be a successful camelhead in the village of Almaly-bak of the Almaty region, we found sick animals in the amount of 4 out of 22 studied, which is 18%.

Brucellosis infection among camelheads was not found in seven regions of the Republic, namely: Akmola, Almaty, Kyzylorda, Mangistau, South Kazakhstan, Pavlodar, North Kazakhstan.

However, the presence of brucellosis, even in a small number of camels, is a threat to the disease of a large number of people. The above data once again confirms the need for research on brucellosis of milk and dairy products, especially in regions with a significant spread of this infection.

As you can see, there is an urgent need for the timely detection of sick animals and their immediate isolation.

Data from veterinary laboratories show that camels are more likely to become infected with abortus brucella, that is, the infection comes from cattle.

However, in places of compact keeping the sheep head and camels together, which is often observed in human practice, there are risks of camels being infected from sheep by brucella of the type Melitenzis.

Epizootic situation on goat brucellosis in the Republic of Kazakhstan. According to the regional branches of the Committee for Veterinary Control and Supervision in the republic as a whole, there are some increased numbers of animals suffering from brucellosis.

In 2014, there were 114 disadvantaged points on brucellosis in the republic among small cattle, which contained 254,436 sheep and goats. In 2015, 53 new items were registered: in the Akmola region - 7; Aktobe - 5; East kazakhstan- 17; Zhambyl - 8; West Kazakhstan- 6; Karaganda - 9; Kyzylorda - 1.

In 2014, the highest incidence rates of sheep and goat brucellosis occurred in the Semipalatinsk region of the East Kazakhstan region - 1.24%, East Kazakhstan region - 0.83%, Zhambyl region - 0.70%, Almaty region - 0.56%, Taldykorgan region of Almaty region - 0 , 4%.

In 2015 (for the first quarter), fresh outbreaks of brucellosis were registered among small cattle –11, including 1 in the Akmola region; Atyrau - 2; east Kazakhstan - 1; Zhambyl - 4; West kazakhstan - 3.

The highest incidence rates of small cattle brucellosis in the named year were found in East-Kazakhstan region - 2.37%, Atyrau - 1.06%, and Almaty - 0.35%. Among the ill small cattle, there were goat brucellosis patients.

Thus, in particular, in the Almaty region in the period 2014-2015, according to the information of the regional veterinary laboratory, the following serological research data on brucellosis among goats were obtained (table 3).

Table 3 – Results of serological studies on brucellosis among goats

No.	Name of regions	2014 year		2015 year	
		number of samples	reacted positively	number of samples	reacted positively
1	Aksu District	26 873	234/0,87	46 062	263/0,57
2	Alakol District	11 755	58/0,49	21 509	73/0,33
3	Balkhash District	108	67/62	115	67/58
4	Enbekshykaz District	8700	153/1,75	4100	33/0,8
5	Eskeldy District	5751	–	12 951	2/0,01
6	Jambyl region	1521	11/0,72	527	–
7	Ile District	4542	110/2,42	785	33/4,2
8	Karasay District	265	6/2,26	119	11/9,2
9	Karatal District	6315	84/1,33	8424	300/3,56
10	Kerbulak District	12 903	94/0,72	19 859	51/0,25
11	Koksu District	29 045	–	6417	–
12	Panfilov District	338	–	6329	4/0,06
13	Raiymbek District	3040	36/1,18	1294	34/2,62
14	Sarkand District	11 568	99/0,85	14 460	215/1,48
15	Talgar District	2981	24/0,80	132	–
16	Uygur District	5231	60/11,47	529	27/5,1
17	Kapshagay	12 568	73/0,58	3944	43/1,09
18	Taldykorgan	3604	–	158	–
19	Tekeli	976	5/0,51	250	–
	Total	178 084	1114/0,62	147 964	1 157/0,78

Note. Reference designation: in fractional numbers the numerator – the absolute number; the denominator is the percent.

From table 3 it can be seen that in 2014, 178,084 goats were tested for brucellosis, in the first 6 months of 2015 - 147,964. Of the number of animals named in 2014, 1,114 had positive indications of immunological tests for brucellosis, and in 2015 - 1,157. As can be seen, the number of goats infected in the first 6 months of 2015 was higher than in the entire period of 2014.

However, fragmentary data available indicate the presence of brucellosis infection in goats. When studying the epizootic situation for goat brucellosis in the Almaty region, the presence of positively reacting animals in the listed prosperous business entities was noted.

The above data indicates the presence of brucella infection both among camelheads and goats in many territories of the Republic of Kazakhstan, which naturally requires an additional and careful approach to the assessment of the products obtained in terms of its food safety.

Exploring the possibility of researching milk obtained from goats and camels for brucellosis with the help of color antigen. In the literature (Shvartsman Y.S., Khazenson, LB, 1978) [5] there are reports on the development of so-called “local” immunity in animals, i.e. there is a development of protective mechanisms in tissues, where pathogenic microorganisms parasitize. When brucella dwells in the mammary gland, the production of antibodies detected in the secreted secretion is observed. Based on this PP. Trilenko (1956) [3] developed a ring reaction with cow's milk. The essence of this method is that by adding a colored antigen to a sick cow's milk, an immune complex is formed, which, on standing, rises with fat globules up the milk column and the cream layer becomes the color of the colored antigen.

However, the physico-chemical properties of milk, as indicated above, of other animals (camels, goats) do not allow this reaction to be carried out, which requires special studies.

For this purpose, milk was taken from healthy and sick with brucellosis animals (goats and camels), isolated according to indications of serological tests.

At the same time, in healthy animals, as with cows' milk samples, the milk column in test tubes had a bluish color, that is, the colored antigen was distributed evenly throughout the entire volume of the test material. In positive cases, the antigen-antibody complex settled to the bottom of the tube as an agglutinate. In the milk of healthy animals, the milk column remains uniformly colored blue (see figures 1, 2). This test is called a sedimentary reaction.

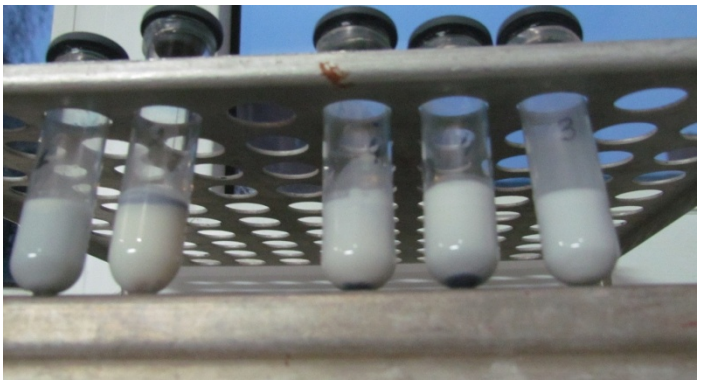

Figure 1 – Indications of the immunological reaction in the study of the brucellosis of the milk of goats and camels.
The two tubes on the left are the reaction with cow's milk (the left one is from a healthy animal; the right one is from a sick cow),
the next two tubes, to the right of those called goat and camel milk (without the addition of cow's milk),
the last right tube is the milk of a healthy animal.

Figure 2 – Sedimentary reaction with goat and camel milk

When taking milk samples for research, it is important to know that it must be fresh and delivered to the laboratory and examined on the day of the sampling. If this is not possible, the milk can be preserved with dry boric acid (0.1 g per 10 cm^3). Canned milk is suitable for research within 10 days.

At the same time, blood was drawn into vacutainers intended for obtaining serum.

A sedimentary reaction with samples of goat and camel milk was set up similarly to a ring reaction with cow's milk. The reading of the results of the sedimentary reaction was carried out according to the precipitate formed and the degree of staining of the milk column, as shown in the figure above. The obtained data of the sedimentary reaction were compared with the results of serological studies of blood

serum. The epizootological data on the welfare of herds of goats and camels for brucellosis was taken into account.

Lactating animals were unfavorable for brucellosis, according to the data of veterinary reporting and the results of our research.

The results of our studies of milk using the sedimentary reaction and blood serum samples of the abovementioned serological tests are reflected in the following table 4.

Table 4 – Comparative results of studies on serum brucellosis and camel whole milk

Number of animals	Indications of the sedimentary reaction		Results	
			AR	CBR
	with whole milk	divided 1:2	with blood serum	
1	#	#	1:400 +++	1:10 +++
2	#	#	1:400 +++	1:10 +++
3	#	–	1:100 +++	1:10 –
4	#	#	1:400 +++	1:10 #
5	+++	–	1:100 ++	1:10 –

Note. Reference designation: AR – agglutination reaction; CBR – complement binding reaction; SR – sedimentary reaction.

Comparing the data in table 4, we can state a definite correlation in the degree of immunological tests among themselves.

In the study of milk from animals No. 3 and 5, where negative results were obtained from studies of the secretion of the mammary gland at a dilution of 1: 2, there was a negative CBR result. As can be seen there are discrepancies in the results of studies of blood serum on various immunological reactions.

The above data clearly indicate the possibility of making a diagnosis of brucellosis by examining the milk of camels with a colored antigen intended for ring reaction.

The data obtained were the basis for the development of a research method for brucellosis of goat and camel milk using cow's milk.

Development of a research method for brucellosis of goat and camel milk based on a ring reaction. It was shown above that in the study of goat and camel milk, the appearance of a blue ring consisting of a colored antigen and antibodies, that is, an immune complex, is often not detected. At the same time, we noted that in milk of cows with the presence of brucella antibodies in it, when the color antigen is added, the immune complex rises with fat globules and a blue ring is formed in the upper part of the milk column. Considering these data, we attempted to study goat and camel milk, where fresh cow's milk was added as a solvent, in a 1: 1 ratio. From other components, positive brucella serum with a titer of 1:80 (+++), negative serum of goats and camels, commercial colored antigen, intended for ring reaction with cow's milk, were taken. The results of these studies are reflected in table 5.

From the data of table 5 it can be seen that the positive result of the ring reaction is marked with camel milk by adding to it positive brucella serum in an amount of 0.003125, which is its dilution of 1: 640. The results of these studies show that the ring reaction is more sensitive than the agglutination reaction.

Table 5 – Results of the ring reaction with camel's milk mixed 1: 1 with cow's

Reaction components	Amount of components, cm^3					
Camel milk Cow's milk	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0
In total	2,0	2,0	2,0	2,0	2,0	2,0
Positive Brucella serum	0,1 (1:20)	0,05 (1:40)	0,025 (1:80)	0,0125 (1:160)	0,00625 (1:320)	0,003125 (1:640)
Color antigen	0,05	0,05	0,05	0,05	0,05	0,05
Results	#	#	#	#	+++	++
Control with negative serum	–	–	–	–	–	–

Thus, positive serum in RA had a titer of 1:80, and at the same time, in a ring reaction, the serum titer reached 320-640 units. The specificity of this reaction is shown by negative results with negative serum.

Similar results were obtained in the study of milk goats.

Next, we set the reaction with the same volume of positive serum, but with different dilutions. The results obtained are shown in table 6.

Table 6 – Data of the ring reaction with a mixture of milk of camels and cows with the addition of positive serum at different dilutions

Reactions components	Amount of components, cm^3					
Camel milk Cow's milk	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0
In total	2,0	2,0	2,0	2,0	2,0	2,0
Positive Brucella serum	0,2 (1:10)	0,2 (1:20)	0,2 (1:40)	0,2 (1:80)	0,2 (1:160)	0,2 (1:320)
Color antigen	0,05	0,05	0,05	0,05	0,05	0,05
Results	#	#	#	#	#	+++
Control with negative serum	–	–	–	–	–	–

As can be seen from the data of table 6, the result was similar to the previous one.

The nature of the manifestation of the ring reaction with camel milk when diluted with cow's milk is shown in figure 3.

At the same time, in positive cases, a blue ring was formed, while without cow's milk a precipitate formed in this sample (figure 3).

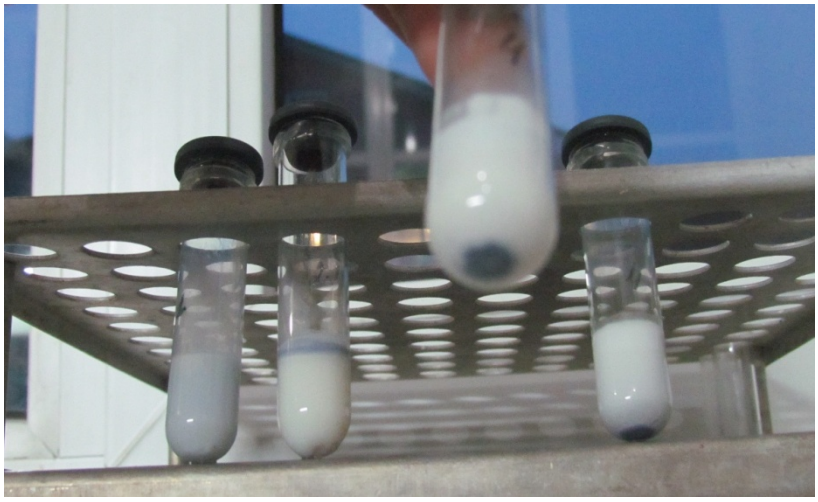

Figure 3 – The manifestation of positive and negative results of the reaction in the study of camel milk in its pure form and mixed with cow's

Note. From left to right: in the first test tube camel milk that does not contain brucella antibodies; in the second test tube camel milk with the addition of cow's milk and the presence of brucella antibodies; in the third and fourth tubes a positive sedimentation response.

As can be seen from figure 3, adding cow's milk to camel's milk with the presence of brucella antibodies in it causes, after 30-45 minutes aging at 37-38 °C, the appearance of a blue ring, which indicates a positive result of the ring reaction.

Next, we conducted studies to determine the amount of cow's milk required for the formulation of the ring reaction. For this purpose, we determined the ratio of cow's milk and camel's milk and carried out the formulation of the ring reaction.

The results obtained are reflected in table 7.

The data of table 7 show that the positive results of the ring reaction are clearly manifested when the content of cow's milk in camel in an amount of 20 percent or more.

Table 7 – The ratio of cow's milk and camel's milk in the ring dairy sample

Components	Quantity / cm^3					
Camel milk Cow's milk	1,0 1,0	1,2 0,8	1,4 0,6	1,6 0,4	1,8 0,2	2,0 –
The percentage of cow's milk in the total mixture	50	40	30	20	10	0
Total	2,0	2,0	2,0	2,0	2,0	2,0
Positive titer brucella serum 1:80 (+++)	0,25	0,25	0,25	0,25	0,25	0,25
Color antigen	0,05	0,05	0,05	0,05	0,05	0,05
Results of RMT/SR	#/0	#/0	#/0	#/0	+++/+	0/#
Note. Reference designation: RMT – ring milk test; SR – sedimentary reaction.						

Similar results were obtained in the study of milk goats.

The above results indicate the possibility of using cow's milk as a dilution liquid.

Considering the mechanism of this reaction, we carried out studies of goat and camel milk using cow's milk of various fat contents as a diluent. The results obtained are reflected in table 8, 9.

Table 8 – Results of the ring reaction in the study of camel milk with a cow's milk content of various fat

Reactions components	Amount of components , cm^3					
Camel milk Cow's milk	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0
The percentage of fat cow's milk	4	2	1	0,5	0,25	0,125
Total	2,0	2,0	2,0	2,0	2,0	2,0
Positive titer brucella serum (1:80)	0,2	0,2	0,2	0,2	0,2	0,2
Color antigen	0,05	0,05	0,05	0,05	0,05	0,05
Results	#	#	#	+++	++	+
Control with negative serum	–	–	–	–	–	–

Table 9 – Results of the ring reaction in the study of goat milk with the content of cow's milk of different fat content

Reaction component	Amount of components , cm^3					
Goat milk Cow's milk	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0	1,0 1,0
The percentage of fat cow's milk	3,6	2,5	1,5	1,0	0,5	0,25
Total	2,0	2,0	2,0	2,0	2,0	2,0
Positive Brucella serum (1:80)	0,2	0,2	0,2	0,2	0,2	0,2
Color antigen	0,05	0,05	0,05	0,05	0,05	0,05
Results	#	#	#	+++	++	-
Control with negative serum	–	–	–	–	–	–

From the data in tables 8 and 9 it can be seen that the fat content in cow's milk for the manifestation of a pronounced ring reaction should be at least 1 percent.

The data we obtained made it possible to call this reaction an annular milk test (AMT) and use it in the study of milk, where the immune complex does not rise with fat globules, but precipitates in the form of agglutinate.AMT, in contrast to the ring reaction, has a complementary additive in the form of cow's milk (3 components), and in the ring reaction, unlike AMT, 2 components participate.

Thus, we have developed a new, previously unknown immunological reaction - an annular milk test, the procedure of which in generalized form is as follows.

In the tubes of Florinsky, goat or camel milk is poured in a volume of 1.5 cm^3. Then add 0.5 cm^3 of cow's milk with fat content of at least 1%. The mixture is thoroughly mixed and 1-2 drops of a colored

commercial antigen are added, after which the tubes with the contents are shaken and kept at 37-38 °C in a refrigerator or in a water bath for 30-45 minutes and the reaction is read. Evaluation of the results is carried out according to the following scheme and is conditionally expressed in crosses:

- the presence of a clearly defined ring in the upper part of the milk column, the rest remains white;

+++ - the presence of a fairly pronounced ring, the lower part of the milk has a slightly bluish color;

++ - the presence of a ring, the lower part of the milk has a blue color;

+ - weakly pronounced ring, and the milk column has a blue color;

– - The color ring is missing, the milk column remains evenly colored blue.

At the same time, controls are set with positive and negative milk samples.

Thus, as a result of our research, 2 methods have been developed to study the milk of goats and camels: a sedimentary reaction with the milk of lactating animals and an annular milk test, which can be used in the study of freshly given milk of goats and camels.

There are several varieties of the camel squad in the world: humpless (alpacas, llamas), single-humped (dromedary) and double-humped (bactrians). In the Republic of Kazakhstan, only single-humped and two-humped camels are engaged in breeding. In this regard, of great scientific and practical interest is the suitability of the methods developed by us for the study of milk from the above varieties of lactating animals.

Milk for research was obtained by placing it into sterile cones of four udder lobes. The study is subjected to a secret of the breast, taken from 22 lactating camels, of which 12 two-humped and 10 one-humped. Reactions were set by the methods described above. The results of these studies are reflected in the following table 10.

Table 10 – Indications of PR and RMT in the study of the brucellosis of milk obtained from dromedars and Bactrians

No	The number of animals and their epidemiological characteristics	Types of animals	Ring milk test (RMT)			Sedimentary reaction (SR)		
			positively	doubtful	negatively	positively	doubtful	negatively
1	12 dysfunctional	baktrians	5/41,7	2/16,7	5/41,7	5/41,7	2/16,7	5/41,7
2	5 successful	baktrians	–	–	5/100,0	–	–	5/100,0
3	10 dysfunctional	dromedary	4/40,0	1/10,0	5/50,0	4/40,0	1/10,0	5/50,0
4	5 successful	dromedary	–	–	5/100,0	–	–	5/100,0

From the data of table 10 it appears that the results of CMP completely coincide with the sedimentary reaction. The negative results of the study of safe livestock indicate the specificity of the tests developed by us.

Thus, our proposed methodology for the study of camel's milk for brucellosis can be applied in the study of both Bactrians and dromedars, which increases their practical significance.

In connection with the above, comparative data from the study of milk and serum of the same animals are of interest. The data obtained are shown in table 11.

Table 11 – Results of studies of milk of camels with different epizootic characteristics of brucellosis and serum

No	The number of animals epizootological characteristic	RMT			RBS+AR+CFT (matches)		
		positively	doubtful	negatively	positively	doubtful	negatively
1	22 dysfunctional	9	3	10	4	–	18
2	10 successful	–	–	10	–	–	10
Note. Reference designation: RMT – Ring milk test; RBS – rose bengal sample; AR – agglutination reaction; CFT – complement fixation test.							

The data in table 11 show that the number of positive indications of the RMT is significantly greater than the number of positive results in the study of blood serum. It is important to note that all animals that reacted positively by serological tests gave positive indications in the study of milk by the ring dairy sample.

Similar results were obtained in the study of milk taken from 180 goats. The resulting data is shown in table 12.

Table 12 – Results of studies of milk and serum taken from goats in Almaty region

Amount of investigated animals	Blood test results						The results of the study of the secret of the breast			
	RBS		AR		CFT		OC		RMT	
	pos.	neg.	pos.	neg.	pos.	neg.	pos.	neg.	pos.	neg.
Karasai district, village Algabas										
2	–	2	–	2	–	2	–	2	–	2
Karasai district, the village of Kemertogan										
5	–	5	–	5	–	5	–	5	–	5
Ilijskij district, village Burundaj										
54	–	54	–	54	–	54	–	54	–	54
Ili district, Eskeldi village										
7	7	–	7	–	7	–	7	–	7	–
Talgarsky district, Belbulak village (otgon)										
6	–	6	–	6	–	6	–	6	–	6
Talgar district, Panfilov village										
6	–	6	–	6	–	6	–	6	–	6
Talgar district, Kerbulak distant section										
28	–	28	–	28	–	28	–	28	–	28
Enbekshikazakh District, Karazhotin rural district										
72	–	72	–		72		–		–	72
Total amount	7	173	7	173	7	173	7	173	7	173

As can be seen from the data of table 12, the study of 180 animals revealed 7 positively responding to all diagnostic tests in the Ili district (p. Eskeldi -7).

These data indicate that in the mammary gland can develop anti-brutselleznyh protective substances, captured ring annular milk sample. These data are consistent with the available reports of special literature (Schwartzman, YS, Hazenson, L. B., 1978).

In connection with the results obtained by us, it is of great scientific and practical interest to study the presence of brucella antibodies in each of the 4 udder lobes. Milk for the study was obtained in sterile tubes separately from each udder portion.

The obtained data were compared with the results of serological studies of blood serum, which is reflected in table 13.

From the data in table 13, it can be seen that the reaction with milk from each udder lobe can have different results.

So, for example, from the first animal, the milk extracted from the left anterior lobe had a negative immunological test result. In the study of biomaterial taken from the second animal, in all cases a positive result was obtained. In the third animal, positive results were obtained in the study of milk only from the posterior shares of the udder. In the fourth animal, a negative result of the study was obtained with milk from the left anterior lobe of the udder.

Comparing these data with the results of serological studies, we can note a certain correlation between the results of the study of milk and serum.

Thus, in the study of milk from animal No. 3, where negative results of studies of secretion from the front parts of the udder were obtained, there was a negative result of the complement fixation reaction.

In addition, we noted a discrepancy between the results of studies of blood serum on various immunological reactions. The CSC readings in animal No. 3 were negative with positive results for RA, sedimentary reaction and ring milk test.

Table 13 – Comparative results of studies on serum brucellosis and camel whole milk

Number of animals	Udder shares from which milk was obtained for research	Milk Reaction Indications	Results	
			AR	CFT
1	1	#	1:400 +++	1:10+++
	2	–		
	3	#		
	4	#		
	5 (combined with all shares)	#		
2	1	#	1:400 #	1:10#
	2	#		
	3	#		
	4	#		
	5 (combined with all shares)	#		
3	1	–	1:100 +++	1:10 –
	2	–		
	3	#		
	4	#		
	5 (combined with all shares)	+++		
4	1	#	1:400 +++	1:10+++
	2	–		
	3	#		
	4	#		
	5 (combined with all shares)	#		
Note. Reference designation: Numbers indicate udder shares: 1 – front left; 2 – front right; 3 – rear left; 4 – back right.				

The above data clearly shows that when making a diagnosis of brucellosis, it is necessary to conduct comprehensive diagnostic studies of blood serum and milk. In addition, when examining milk it is necessary to take samples for research from each part of the udder.

Comparative evaluation of methods for diagnosing brucellosis in lactating camels. The diagnosis of animal brucellosis is carried out on the basis of data from the epizootology, clinical picture, pathoanatomical changes and the results of allergic and laboratory research.

In the laboratories most often carry out serological and bacteriological studies. At the same time, agglutination reactions, binding reactions (long-term) complement are used.

The facts, when at certain periods of the disease some reactions may be negative and others positive, confirm the need for a complex use of various immunological reactions, which greatly complements the possibility of more complete identification of animals with brucellosis.

Subsequent studies of milk taken from positively reacting camels showed a certain correlation in the severity of the results of studies of this product and blood serum.

The results of our research on the blood serum and milk of camels are shown in table 14.

Table 14 – Comparative results of studies of serum and milk of camels

No	Number of animals	Epizootic characteristics	The number of positive testimony			
			RMT	RBS	AR(1:200 and higher)	CFT
1	22	dysfunctional	4	4	3	3
2	10	successful	–	–	–	–
Note. Reference designation: RMT – Ring milk test; RBS – rose bengal sample; AR – agglutination reaction; CFT– complement fixation test.						

From table 14 it appears that all used serological tests for the diagnosis of brucellosis in camels are specific, as evidenced by the negative results of studies of a prosperous group of animals. At the same time, out of the number of unfavorable livestock, 4 animals (18.1%) had positive indications in the study of milk RMT and blood serum according to RBS and 3 animals (13.6%) reacted positively in AR and CFT.

Numerous studies of goat milk samples showed similar results.

Thus, our data confirm the need for comprehensive studies in the control of brucellosis in goats and camels.

Next, we carried out a positive treatment of serum in the agglutination reaction on a solution with a high content of sodium chloride (10%) and in the ring dairy sample.

The scheme of the stated reactions and the results of research are reflected in the following table 15.

Table 15 – Schemes of formulation of the RMT and AR and the results of titration of positive Brucella serum in the indicated reactions

Components	Number of test tubes								
Staging scheme of RMT									
Camel milk	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Cow's milk	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
In total	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Positive Brucella serum	1:5	1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1280
	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
Color antigen	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Results of RMT	#	#	#	#	#	#	#	+++	++
Staging scheme of AR									
Positive Brucella serum	1:5	1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1280
	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
10% sodium chloride solution	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Single Brucella antigen	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Results of AR	#	#	#	#	#	+++	+	–	–
Note. Reference designation: AR – agglutination reaction ; RMT – Ring milk test.									

From the data given in table 15 it is seen that the ring milk sample is more sensitive to the tube agglutination test not only when it is set to a 0.85% solution of sodium chloride, but also to a 10% solution of the specified salt.

Bacteriological studies of the milk of positively reacting goats and camels for the presence of brucella in it.

When studying the specificity of indications of a ring milk test and a sedimentary reaction, it is important to know not only the coincidence of the results obtained with the data of serological studies, but also the results of bacteriological findings.

For this purpose, milk was examined in parallel, taken from each udder lobe, ring serum sample and sedimentary reaction and subjected to bacteriological examination.

Milk from lactating animals was taken either by a catheter, or by issuing from each lobe of the udder to a separate tube. At the same time, camel milk visually did not have any pronounced differences from the milk of these animals, described in the special literature.

Sowing from bacteriological material was carried out on meat-peptone hepatic glucose-glycerol agar, meat-peptone glucose-glycerol broth. Crops were incubated in desiccators with a high content of carbon dioxide for 30 days with periodic viewing after 5-7 days. Colonies with suspicion of brucella were subjected to further study, in particular, carried out the agglutination with specific positive serum, viewed under a microscope smears, gram-stained. At the same time, milk samples in a volume of 1.5 cm^3 were injected subcutaneously to guinea pigs (bioassay), which were examined by serological tests. Upon receipt

of a positive result, it was believed that the presence of Brucella in milk occurred, even with a negative result of direct seeding. Laboratory animals with positive readings of the bioassay were killed and bacteriological sowings were carried out on nutrient media from parenchymal organs and lymph nodes.

Then the selected cultures were studied according to the differential table, the type and individual biovars were determined. According to the data obtained, they made a conclusion and developed appropriate measures.

Bacteriological examination of milk subjected to milk from four positive serological camels and seven goats. In this case, bacteriological seeding of breast secretion was carried out from each udder lobe. The obtained data were compared with the indications of serological reactions. The results of these studies are reflected in table 16.

Table 16 – The results of bacteriological studies of milk samples
with positive indications of the sedimentary reaction and the ring milk test

Number of animals	Indicates of SO and RMT	Results	
		Bacteriological research	biotests
Camel smilk			
1	Milk from the udder with a positive reaction, positive.	Brucella culture is highlighted	Positive
	Milk from udder fractions with a negative. reaction, negative.	Culture not highlighted	Negatiove
2	Milk from all parts of the udder with a positive and negative. Reactions positive.	Culture highlighted	Positive
3	Milk from udder with positive reaction, positive.	Culture highlighted	Positive
	Milk from the udder with the negative reaction, negative.	Culture not highlighted	Negative
4	Milk from udder with positive reaction, positive.	Culture not highlighted	Positive
	Milk from the udder with the negative reaction, negative.	Culture not highlighted	Negative
Goat's milk			
1	milk from the left udder, positive.	Culture not highlighted	Positive
	milk from the right udder, positive		
2	milk from the left udder, positive	Culture not highlighted	Positive
	milk from the right udder, positive		
3	milk from the left udder, positive	Culture not highlighted	Positive
	milk from the right udder, positive		
4	milk from the left udder, positive	Culture not highlighted	Positive
	milk from the right udder, positive		
5	milk from the left udder, positive	Culture not highlighted	Positive
	milk from the right udder, positive		
6	milk from the left udder, positive	Culture not highlighted	Positive
	milk from the right udder, positive		
7	milk from the left udder, positive	Culture highlighted	Positive
	milk from the right udder, positive		

Note. Reference designation: SR – sedimentary reaction; RMT – Ring milk test.

From the data in table 16 it can be seen that the positive results of the bioassay and the culture of brucella are distinguished mainly from those parts of the udder that had positive indications of the sedimentary reaction and the ring dairy sample. It is important to note that with a negative result of direct seeding, in some cases there may be a positive bioassay, which is important in practical terms when testing for brucellosis of biological material.

In this regard, the collected milk, which gave positive testimony from the SR and RMT, must be re-examined with samples taken from each udder fraction and when a positive result is obtained with this

sample, it is necessary to perform a biological test in order to isolate the culture and its subsequent identification and differentiation.

The results of these studies are of great scientific and theoretical and important practical importance.

Biological properties of Brucella cultures isolated from goats and camels. It is known that brucellae belonging to the species B.abortus are more often distinguished from patients with brucellosis of camels. However, camels, without having a typical pathogen of this disease, can become infected with brucella of the species B. melitensis when they are kept together with a livestock of small ruminants that are unfavorable for brucellosis. At the same time, anti-brunch activities are held somewhat differently.

In this connection, it is of interest to study the biological properties of brucella cultures isolated from camels. In the process of work, we isolated 5 cultures from 4 animals. At the same time, two cultures are isolated from bioassic guinea pigs.

The results of the differentiation of grown cultures are shown in table 17.

Table 17 – These differentiations of cultures of brucella isolated from camels

No culture	Necessity of CO_2	Allotment of H_2S	Growth on envirement containing				Agglutinin		Phagesensitivity
			thionin		magenta		A	M	
			1:50 thousand	1:100 thousand	1:50 thousand	1:100 thousand			
1	±	+	–	–	+	±	+	–	+
2	±	+	–	–	+	±	+	–	+
3	±	+	–	–	+	±	+	–	+
4	±	+	–	–	+	±	+	–	+
5	±	+	–	–	+	±	+	–	+
B.abortus 544	–	+	–	–	–	–	+	–	+
B.suis 1330	–	+	+	+	–	–	+	+	+
B.melitensis 567	–	–	+	+	+	+	–	+	–

The data in table 17 show that all isolated cultures of Brucella are of the species B.abortus 4th biotype.

Our data on the study of the biological properties of Brucella suggests that this camel population has been in contact with a dysfunctional herd of cattle.

The above shows that measures to combat brucellosis should be carried out similarly to the measures provided for the rehabilitation of cattle from brucellosis infection.

The results of the study of cultures of Brucella isolated from goats showed that they have typical morphological, tinctorial and biochemical (see figures 4, 5, table 18) properties characteristic of B. melitensis.

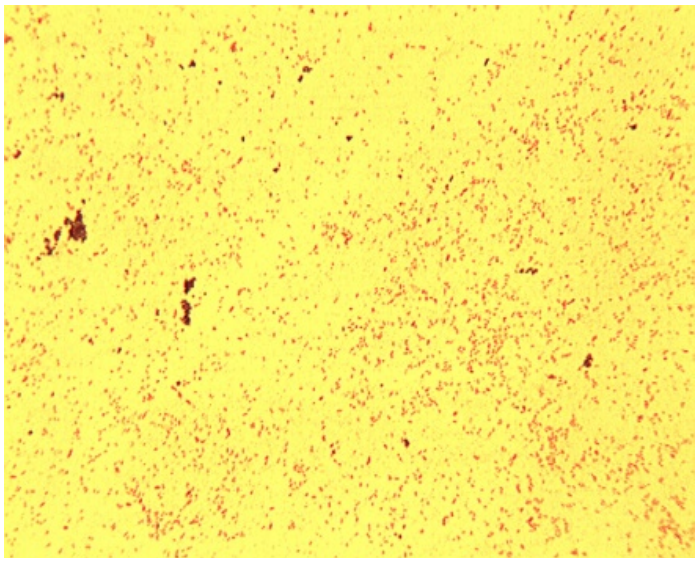

Figure 4 – Brucella melitensis

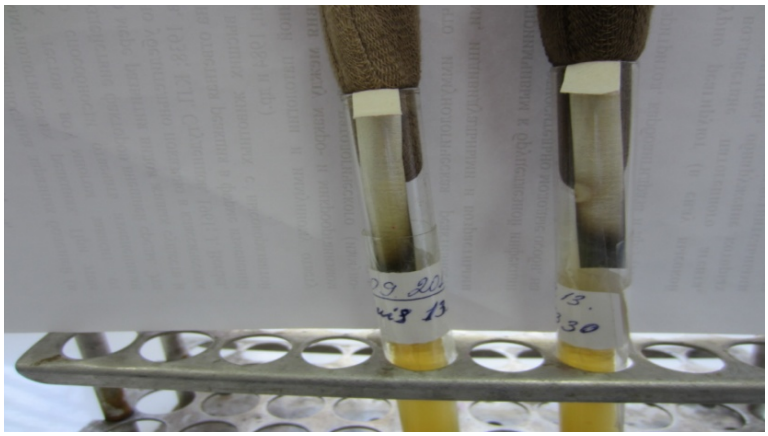

Figure 5 – Darkening of the strips of filter paper

Table 18 – These differentiations of cultures of brucella isolated from goats

No culture	Necessity of CO_2	Allotment of H_2S	Growth on envirement containing			
			thionin		magenta	
			1:50 thousand	1:100 thousand	1:50 thousand	1:100 thousand
1	–	± (3)	+	+	+	+
2	–	± (5)	+	+	+	+
B.abortus. 544	–	+ (7)	–	–	–	–
B.suis 1330	–	+ (13)	+	+	–	–

The data of table 18 show that all selected cultures of Brucella according to the applicable tests belong to the species B.melitensis.

Thus, according to the results of the research, we selected the selected cultures of Brucella to the species B. melitensis.

Given that the culture of the species Melitenzis is distinguished from goats, we have prepared a colored antigen for the study of goat milk from B. melitensis Rev-1.

In a comparative assessment of the effectiveness of commercial diagnosticum for the study of goat's milk (from Brucella abortus 19) and prepared by different methods from Brucella abortus 19 and Rev-1 merups, 18 samples of milk from goats were tested by ring dairy. The results obtained with this are summarized in table 19.

Table 19 – The results of the study of milk goats with colored antigens

Number of samples		Results of RMT with antigen									
		Commercial of brucella strain 19		prototypes of strains							
				19				Rev-1			
				AIEVM		M.J.Corbel (1992)		AIEVM		M.J.Corbel (1992)	
		pos	neg	pos	neg	pos	neg	pos	neg	pos	neg
18	abs	15	3	15	3	15	3	18	–	18	–
	%	83	17	83	17	83	17	100	–	100	–
Control	abs	–	3	–	3	–	3	–	3	–	3
	%	–	100	–	100	–	100	–	100	–	100

From the data presented in table 19, it is clear that prototypes of antigen from strain B. abortus 19 in all cases were not inferior to a commercial preparation. At the same time, diagnostic tests made from the B. melitensis Rev-1 strain confirmed all cases and additionally three samples were detected, which accounted for 17% of the indicated number of the studied material.

Thus, we have proposed a method of setting the reaction for the study of the milk of goats and camels for brucellosis. At the same time, it is more expedient to investigate milk with a colored antigen prepared from B. melitensis Rev-1+ B.abortus 19, which has homology with an antigenic structure with that of Brucella cultures circulating in an epizootic focus.

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ЕШКІ ЖӘНЕ ТҮЙЕ СҮТІН БРУЦЕЛЛЕЗГЕ ЗЕРТТЕУ ӘДІСТЕРІН ӘЗІРЛЕУ

Аннотация. Ешкі және түйе сүтін бруцеллезге зерттеу, диагностикалық жиынтық көмегімен жүзеге асырады, олкелесі компоненттерден тұрады:

1. Түсті антиген 1 флакон (ампула) 2,0 см^3 көлемде.
2. Бруцеллезге оң қан сарысуы, 1 флакон (ампула) 2,0 см^3 көлемде.
3. Бруцеллезге теріс қан сарысуы, 1 флакон (ампула) 2,0 см^3 көлемде.
4. Бруцеллезден сау сиырдың лиофильді кептірілген немесе тұтас сүті, 1 флакон, 20,0 см^3 көлемде.
5. Стерильді дистилденген су 1 флакон (ампула) 20,0 см^3 көлемде, (лиофилді кептірілген сүтті езу үшін).

Әрбір биокомпонеттің флакондарына, ампулаларына этикетка желімдейді және флаконның (ампуланың) қозғалмауы мен тұтастығын қамтамасыз ететін ұяшықтары немесе қалқалары бар картон қораптарға 1 данадан салынады. Диагностикалық жиынтықты қараңғы құрғақ жерде 2 °С-тан 14 °С-қа дейінгі температурада сақталады. Жиынтықтың жарамдылық мерзімі-дайындалған күннен бастап 12 ай. Флакондардың, (ампулалардың) герметикалығы бұзылса, бөгде қоспа болған жағдайда, флакондардың (ампуланың) этикеткасы болмаған кезде жарамсыз болады және жойылуға жатады.

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РАЗРАБОТКА МЕТОДОВ ИССЛЕДОВАНИЯ НА БРУЦЕЛЛЕЗМОЛОКА КОЗ И ВЕРБЛЮДИЦ

Аннотация. Исследования молока коз и верблюдицна бруцеллез осуществляет с помощью диагностического набора, который состоит из следующих компонентов:

1. цветной антиген 1 флакон (ампула) объемом 2,0 см^3;
2. позитивная бруцеллезная сыворотка крови животных, 1 флакон (ампула) в объеме 2,0 см^3;
3. негативная сыворотка крови животных, 1 флакон (ампула) в объеме 2,0 см^3;
4. лиофильно высушенное или цельное молоко здоровой по бруцеллезу коровы, 1 флакон объемом 20,0 см^3;
5. дистиллированная вода в стерильном виде 1 флакон (ампула) в объеме 20,0 см^3, (для разведения лиофильно высушеного молока).

На флаконы, ампулы каждого биокомпонента наклеивают этикетку и упаковывают по 1 штуки в картонные коробки с наличием гнезд или перегородок, обеспечивающих неподвижность и целостность флакона (ампул). Диагностический набор хранят в закрытых помещениях в темном сухом месте при температуре от 2 до 14 °С. Срок годности набора – 12 месяцев со дня изготовления. При наличии посторонней примеси, нарушении герметичности флаконов (ампул), отсутствии этикетки флакона (ампулы) бракуется и подлежит уничтожению.

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"POOR RESPONDERS" – MODERN IDEAS, PRINCIPLES OF MANAGEMENT IN ART PROGRAMS. REVIEW

Ovarian reserve has an important role in the adequate ovarian response to ovarian stimulation and getting mature eggs in vitro fertilization programs (IVF).

Ovarian reserve is a functional reserve of the ovary, which determines its ability to develop a follicle with a mature egg and an adequate response to ovarian stimulation. Ovarian reserve reflects the number of follicles in the ovaries (primordial pool and growing follicles) and depends on physiological and pathophysiological factors [1]. The main problem for patients with low ovarian response is getting enough oocytes. Reducing the follicular reserve of the ovaries does not allow obtaining a sufficient number of embryos and, accordingly, the probability of implantation and pregnancy is reduced. De facto, due to the small number of obtained oocytes, and because of the low number of good quality embryos for transfer, the rate of pregnancy per transfer, as well as the cumulative pregnancy rate of per cycle are significantly reduced compare with patients with a normal ovarian reserve.

By the time of the formation of the menstrual function of the girl, the pool of primordial follicles in the ovaries is normal from 270 000 to 470 000 follicles. During the life of a woman, no more than 400-500 follicles reach to ovulation [2]. It is established that the rate of reduction in the number of primordial follicles with each menstrual cycle increases progressively, this is due to the mechanism of ovulation and atresia of a significant number of follicles. When the number of full-fledged follicles falls below a certain critical limit, menopause occurs, with significant changes in the hormonal background, accompanied by a final loss of the ability to conceive. It was found that the rate of follicle disappearance doubles when the primordial pool is reduced to 25 thousand follicles, which normally corresponds to the age of 37.5 years [3]. It follows that age is the most important physiological factor determining ovarian reserve.

In addition to physiological factors that affect the ovarian reserve, such as age and reduction of the follicle pool in the menstrual cycles for the entire reproductive period of the woman, there are other reasons for the decrease in the ovarian reserve.

In patients with "poor response" - "poor responders" ("PR"," poor"), the mechanisms of premature ovarian insufficiency turns on, which to date have not been fully studied. Some causes of ovarian reserve reduction were determined: ovarian surgery, especially in endometrioma [4-8], genetic defects, chemotherapy, radiation therapy, autoimmune disorders, presence of only one ovary, prolonged intensive smoking, obesity, as well as in cases of idiopathic infertility [9]. In recent years, risk factors for the development of "poor responders" included type I diabetes [10], transfusion-dependent b-thalassemia [11] and uterine artery embolization for the treatment of uterine leiomyoma [12, 13]. It was suggested that the reduced number of oocytes might be associated with the deterioration of their quality, which is clinically transformed into a decrease in the probability of implantation and an increase in the frequency of early miscarriages [14]. Conversely, due to the lack of a clear correlation between "quantity" and "quality", various authors have suggested that "poor responders" "themselves" do not represent a lesser chance of success in IVF, and the age of the woman is the most important factor in the likelihood of pregnancy and childbirth [15, 16]. However, a number of other studies have shown that the group of patients "poor

responders" had reduced pregnancy rates compared to ordinary patients regardless of the used treatment [17] and the age of the patient [18, 19]. Thus, in the group of patients "poor responders" to optimize the clinical results of IVF, it is necessary not only to predict ovarian reserve, but also, in particular, to determine and adapt the most optimal protocol of stimulation of superovulation, in order to make better use of ovarian reserves and optimize the number of oocytes to be fertilized.

Smoking plays a significant role in reducing ovarian reserve. Thus, studies have shown that actively smoking women had a reduced level of AMH and an earlier age of menopause [20]. These patients are 3 times more likely to experience a decrease in ovarian reserve compared to non-smokers (12.3% and 4.3%, respectively) [21].

Contained in tobacco smoke polycyclic aromatic hydrocarbons and metabolites of nicotine such as catenin, accumulate in the nucleus and cytoplasm of granulosa cells of the ovary. In turn, nicotine and cadmium trigger the process of egg death (apoptosis) by activating programmable cell death, which explains the decrease in AMH levels in smoking women [22, 23].

It was established that in diabetes mellitus oxidative stress is the cause of damage to the genetic material of granulosa cells of follicles, which can lead to a decrease in ovarian reserve [24, 25] and to DNA damage of granulosa cells of follicles [25]. In studies on the role of autoimmune disorders in the pathogenesis of gynecological diseases, it was noted that the combination of autoimmune oophoritis, autoimmune thyroiditis, type 1 diabetes and systemic lupus erythematosus leads to a decrease in ovarian reserve [23, 24,26].

Autoimmune oophoritis is an autoimmune organ-specific disease, the main role in the pathogenesis of which belongs to the incidence of autoantibodies steroidspropeciaei cells (theca cells) of the ovaries, which leads to inhibition of folliculogenesis [27].

Inflammatory diseases of the pelvic organs (IDPO) are not less important damage factor of the follicular apparatus of the ovary. IDPO can cause sclerotic changes in blood vessels, connective tissue growth in the stroma, the formation of small cysts. The destructive inflammatory process (purulent tubo-ovarian formation), developing in the uterus, may lower ovarian reserve as a result of purulent fusion of tissues of the ovary [28, 29].

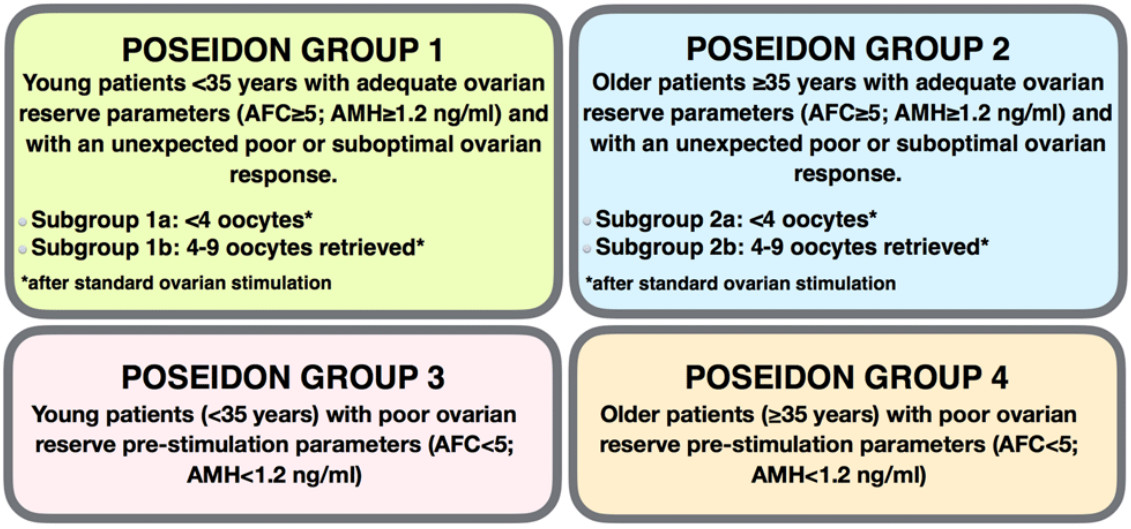
Endometriosis is diagnosed in 7-59% of women of reproductive age [30]. A common form of external genital endometriosis is ovarian endometriosis, which is 64% of the total number of other forms of this nosology [31]. It is shown that endometrioid cysts localized in the ovaries reduce the volume of functional ovarian tissue, while reducing the ovarian reserve of the woman [32]. In the pathogenesis of infertility in endometriosis, a major role is played by violations of the relationship between hormone secretion levels (estradiol, progesterone, LH, FSH, prolactin and testosterone), leading to defective ovulation and/or functional inferiority of the corpus luteum, endometrium. The cause of infertility in endometriosis may be a violation of steroidogenesis in granulosa cells of follicles, dystrophic processes in the granulosa and theca cells of the follicles, changes in the composition of the follicular fluid increased the apoptotic index of granulosa cells, degeneration of oocytes, which consequently disrupts folliculogenesis, and affects ovarian reserve [34-36]. It should be noted that its reduction may also be associated with a significant volume of ovarian resection, damaging its healthy tissue in the surgical treatment of endometrioid cysts [37, 38]. Also, a number of authors note that during electrocoagulation for hemostasis there is a violation of intraovarian blood flow, which leads to irreversible morphological and functional changes in ovarian tissue [39, 40].

Treatment of patients with "poor" ovarian response is the subject of numerous studies over the past twenty years. Despite the significant amount of published data, the definitions of POR are varied. From 1973 to 2018, 2037 randomized trials were published. The first systematic data on the definition of women who do not respond well to the stimulation of superovulation were developed by the European society of human reproduction and embryology (ESHRE) in 2011 and published in the form of the so-called "Bologna criteria». The prevalence of "poor" ovarian response to stimulation of superovulation is very high, and varies according to the literature from 9 to 24%. [41].

According to the ESHRE criteria, the "poor" ovarian response is the maturation of less than 3 follicles with stimulation of superovulation with large doses of gonadotropins (more than 300 ME/day). To diagnose a "poor" ovarian response, you must have at least two of the three criteria listed: 1) the age of the woman more than 40 years or the presence of other risk factors for a "poor" ovarian response; 2) an

indication of a "poor" ovarian response in the history (≤3 oocytes in standard stimulation protocols); tests indicating a decrease in ovarian reserve: the number of antral follicles less than 5-7, the AMH index in the blood less than 0.5-1.1 ng/ml [42].

The POSEIDON group (Patient Oriented Strategies Encompassing IndividualizeD Oocyte Number) proposed a new classification of patients with reduced ovarian reserve or unexpected incorrect ovarian response to exogenous gonadotropins. Four subgroups based on quantitative and qualitative parameters were proposed (figure).



POSEIDON Classification

The new classification introduces a more subtle distribution of "patients with poor ovarian response" into the ART using clinically relevant criteria that can help the physician best manage this group of patients.

POSEIDON group presented new data for the successful treatment of patients with poor response, namely, established a correlation between the age and the required number of oocytes to obtain one euploid embryo and transfer it into the uterine cavity (table 1).

Table 1 – Relationship between age and the required number of oocytes to produce one euploid embryo

Less than 35 years	39 – 40 years	More than 42 – 43 years
6 oocytes	11 oocytes	18 oocytes
5 adults	9 adults	16 adults
4 fertilized	7 fertilized	13 fertilized
2 blastocysts	3 blastocysts	5 blastocysts
1 euploid blastocyst	1 euploid blastocyst	1 euploid blastocyst

This table provides clear guidance on the number of controlled ovarian stimuli (COS) for physicians and allows the development of predictive models aimed at reducing the time to obtain a long-awaited pregnancy [43].

In addition to the long-known relationship between age and decreased ovarian response to gonadotropins, there are a number of other factors that have an important impact on the reproductive reserve.

Among them are premature depletion of ovarian reserve, adverse environmental factors and other conditions that may affect the ovarian response to gonadotropins. The situation may be even more complex, with differences in drug pharmacokinetics in many women and variability in biological activity between urinary gonadotropins up to 45%, while these problems can largely be overcome by new recombinant gonadotropins. In some cases, suboptimal responses remain unexplained, reflecting the complexities and subtleties of ovarian function. POR is often observed in patients with no apparent reason with normal ovarian reserve. Suggested mechanisms for poor ovarian response include a decreased number of FSH receptors in the granulosa cells; defective signal transduction after FSH receptor binding, an inappropriate local vascular network for the distribution of gonadotropins, the presence of autoantibodies against granulosa cells, an excess of VEGF will bind its target growth factor (VEGFR-1), abnormalities in the levels of IGF-I and IGF-II (insulin-like growth factor) and decreased bioactivity of circulating gonadotropic fator (GnSAF). Some numerical and structural abnormalities of the X chromosome and mutation of the FMR1 gene, or autoimmune damage to ovarian tissue, may be suspected pathogenetic factors of POR development in these women.

Nonrandom association of inactivation of the X chromosome, as well as structural changes in the area of its long arm (Xq) with the development of premature ovarian insufficiency was noted [44]. The FMR1 gene located on the long arm of the X chromosome at the xq27 locus.8, can contain different number of trinucleotides CGG repeats [45]. It was found that the number of CGG repeats, equal to 26-34 (average-30), is typical for half of the female population. A higher or lower number of CGG repeats is often associated with the development of premature ovarian depletion, decreased ovarian reserve and correlated with follicle stimulating hormone (FSH) and AMH levels, which affects ovarian function.

FSH exhibits its effects through a specific receptor (FSHR), which is located on the cells of ovarian granulosa. The fshr gene contains 10 exons and 9 introns and is located on chromosome 2p21. It is known that variants of FSHR changes are very rare [46, 47]; however, two polymorphisms: p.Thr307Ala (C.919A>G, rs6165) and p.Asn680Ser (C.2039A>G, rs6166), which were identified in exon 10, affect the ovarian reserve [48].

According to a prospective study of sun-dried key connection between Cumulus cells (CCs) and oocytes, which contributes to the change of gene expression of CCs in women with POR after adding DHEA and maturation of oocytes [49].

Currently, there is a dedicated line of major gene polymorphisms that can affect the outcome of the ART programs for the worse and for the better (table 2).

Table 2 – Association of gene polymorphism with outcomes of the ART programs.

Gene	Chromosome localization	Rs-number	Replacement of protein or coding sequence	The main hypotheses of the research on the association of gene polymorphism with the outcomes of the ART programs
FSHR	2p21	Rs6166	N680S	When carrying allele 680S requires higher doses of FSH in COS
		Rs1394205	-29G/A	Women with genotype-29G>A need higher doses of FSH, they have a lower level of estradiol, they produce fewer follicles and oocytes.
LHB	11p13	Rs1800447	W8R	Women with genotype W8R and I15T require the introduction of increased doses of FSH, marks the aspiration of a smaller number of oocytes
		Rs3439826	I15T	
LHCGR	2p21	Rs4073366	28G>C	Allele C carrier is associated with a threefold increase in the risk of PCOS
ESR1	6q25	Rs2234693	-397T>C	In carriers of genotype C/C notes receive a greater number of follicles, mature oocytes, good quality embryos
		Rs9340799	-351A>G	In carriers of genotype G/G higher chance of obtaining a larger number of oocytes and fertilization
		Rs3138774	(TA)n	Long repeats (TA) are associated with better superovulation stimulation outcomes
AMG	19p13	Rs10407022	I49S	Carriers of alleles AMH 49Ser and AMHR2-482G have increased sensitivity to FSH drugs
AMGR2	12q13	Rs2002555	-482A>G	

Prediction of poor ovarian response is possible with the help of biochemical and biophysical markers. There is a correlation between ovarian stock with biophysical markers (antral follicle count and ovarian volume) and biochemical markers (FSH, Inhibin B and AMH) and it is necessary to use these markers to predict poor ovarian response to stimulation. AMH value ≤1 ng/ml predicts poor ovarian reserve, poor ovarian response to stimulation and IVF results. AMH allows better assessment of the prospects of the art program to get a live child in women of different age groups. AMH level, counting the number of antral follicles together with age assessment together make up the best model for predicting ovarian response to ovulation stimulation.

One of the main steps for the success of the ART programs is still the number and quality of oocytes obtained after hormonal stimulation by gonadotropins in combination with GnRH analogues. The management and treatment of such patients with a suspected poor ovarian response is still an important issue in reproductive medicine. Almost all researchers share the view that the number of oocytes obtained after controlled ovarian stimulation (COS) of the ovaries largely determines the clinical outcome of treatment. For this reason, any COS should be aimed at optimizing the number of oocytes depending on the patient's ovarian reserve.

In the last 20 years, many protocols with different doses and types of gonadotropins for the treatment of patients with "poor responders" have been proposed in the literature, however, to date, a really effective method of treatment has not been chosen that can solve the problem of poor ovarian response to controlled ovulation stimulation [50].

With the aim of strengthening the influence of exogenous gonadotropins on follicular development was proposed a few alternative approaches that we present below.

Addition of estradiol in the luteal phase. In a meta-analysis published in 2013, 1227 studies with or without the addition of estradiol in the luteal phase were selected. It is shown that the addition of estradiol reduces the risk of cancellation of the cycle and increases the likelihood of clinical pregnancy in patients with poor reaction to COS [51]. The biological rationale may be that the priming of the luteal phase with estradiol may improve the synchronization of the pool of follicles available for controlled ovarian stimulation [52]. However, this meta-analysis has been criticized for possible methodological features and the quality of randomized trials [53].

Another meta-analysis published in 2013 [54] indicates that the addition of estradiol in the luteal phase prior to IVF in patients with poor COS response improved IVF results, including an increase in the number of oocytes obtained and a decrease in the cancellation of the cycle for one reason or another.

The addition of recombinant LH. To date, there is no clear answer about the need and feasibility of introducing recombinant LH. A study published in 2012 indicates a positive role of recombinant LH administration during gonadotropin stimulation in patients with poor ovarian response to COS [55]. However, two meta-analyses of 2012-2013 [56, 57] showed that the addition of recombinant LH did not increase the number of obtained oocytes, while the total dose of FSH, withdrawal rates and current pregnancy rates in patients with poor reaction to CBS did not change. On the other hand, a recent meta-analysis of 40 randomized controlled trials [58] found a significantly higher number of oocytes, and observed significantly higher clinical pregnancy rates in the treatment of r-hFSH plus r-hLH compared to r-hFSH in patients with low COS response, indicating a relative increase in clinical pregnancy rates in poor responders. The authors believe that adding r-hLH to r-hFSH may be beneficial for women with poor ovarian response.

The addition of growth hormone. It has been suggested that the use of growth hormone (GH) can modulate the effect of FSH on granulosa cells by enhancing local synthesis of insulin-like growth factor-I (IGF-I) [59-61]. IGF-I enhances FSH action in granulosa and theca cells [62, 63]. Two recent meta-analyses involving 6 randomized trials (a total of 128 patients) [64, 65] suggested that adding GH significantly increases the likelihood of having a child in poor patients. As for the addition of GH, the frequency and dosage varied markedly among the relevant studies. However, due to the small number of patients and the heterogeneity of the frequency and dosage of GH added among the studies, the fact that the addition of GH during ovarian stimulation increases the likelihood of pregnancy must be evaluated in further well-designed trials to prove or disprove this conclusion. In fact, until now there has been very reliable data indicating routine addition of GH to ovarian stimulation protocols for patients with poor COS response [66, 67].

The addition of androgens. Androgens produced mainly by theca cells play an important role for adequate follicular steroidogenesis [68] and for the proper development of early follicular and granulosa cells [69]. They are a substrate for the aromatase activity of granulosa cells, which converts androgens into estrogens. Moreover, androgens can enhance the expression of the FSH receptor in granulosa cells, enhancing the action of FSH, and thus potentially increase ovarian sensitivity to FSH [64, 69, 70]. In addition, inadequate levels of endogenous androgens are associated with decreased ovarian sensitivity to FSH and low pregnancy rate after IVF [64, 71].

Based on these observations, Casson et al. [72] first suggested that oral addition of dehydroepiandrosterone (DHEA) prior to superovulation with gonadotropin may improve ovarian stimulation response in patients with poor response. In the last decade, several uncontrolled studies have published improved clinical results after oral administration of DHEA before ovarian stimulation. A recent meta-analysis of four randomized controlled trials of androgens (DHEA and testosterone) in patients with poor response showed a significantly higher current pregnancy rate in the androgen supplementation group [73]. However, the included studies were too small and presented clinical and methodological heterogeneity to be definitive and guarantee their immediate application in practice. In fact, there is a need for reliable data from randomized controlled trials that could justify widespread use of DHEA before ovarian stimulation in patients with poor response, and it is time to evaluate the clinical cost-effectiveness of DHEA with large randomized controlled trials [74,75,76].

Adding aspirin. Ovarian circulatory disorders can contribute to poor response to ovarian stimulation [77, 78]. Therefore, a well-developed intravascular network improves the delivery of gonadotropins necessary for folliculogenesis [79, 80]. Based on this justification, vasoactive substances such as aspirin are used to strengthen the ovarian vascular system [81].

However, data confirming that the effect of low doses of aspirin in women undergoing IVF are not fully understood [82]. Although some studies have reported some positive effects of aspirin since embryo transfer [83, 84], others have not been able to confirm these results [85-87]. Prospective randomized trials have shown that widespread aspirin and prednisolone therapy did not improve uterine blood flow rate, implantation, and pregnancy rate [88]. The conclusion of the meta-analysis and systematic review [89] was that the clinical rate of pregnancy per embryo transfer did not differ between patients in the control group receiving aspirin at doses of 50-100 mg. Based on the updated data, a low dose of aspirin does not have a positive effect on pregnancy, and it should not be recommended for women undergoing IVF.

Natural IVF cycles. Natural IVF cycles with or without minimal stimulation can be seen as a simple and cheap approach to ovarian stimulation with a poor response. In fact, some authors have suggested that natural IVF cycles were an acceptable option for patients with poor response, as they have the same likelihood of pregnancy and implantation [90]. Some critical problems were noted: only 50% of the initiated cycles produced one embryo ready for transfer to the uterine cavity; the total clinical pregnancy rate was 10% for the initial cycle and 18% for embryo transfer [91]. Schimberni et al. [92] evaluated the IVF outcome in a large group of poor respondents (500 patients) who reported very encouraging results, especially in younger women (<35 years). In this group of patients with poor ovarian response to stimulation, the pregnancy rate was 18% for the initial cycle, 29% for transfer and 31% for one patient. On the contrary, in a recent article analyzed the effect of natural cycles IVF in women defined as poor by the respondents in accordance with the "Bologna criteria": unexpectedly the data showed that the cumulative live birth per patient does not exceed 8% [93]. Conflicting data may be very likely and associated with the diversity of patients selected using the "Bologna criteria".

Cryopreservation of oocytes. The freezing of oocytes has led to the breakthrough in the ART technologies, probably the most important of our decade. Recent evidence suggests that this approach is a highly effective procedure that can be applied in conventional infertility programs [94]. Major societies, including the European society of human reproduction and embryology(ESHRE), the American society of reproductive medicine (ASRM) and the American society of clinical oncologists (ASCO), have confirmed that recently oocyte cryopreservation is a procedure that provides the necessary legal and moral support for widespread use [95]. Different strategies are applicable for poor responders associated with oocyte cryopreservation. Some authors recently suggested obtaining a larger cohort of oocytes in these patients by accumulating frozen oocytes over several stimulation cycles, creating a similar situation as in patients

with normal response. According to the results presented in the study, it would be possible to obtain a higher fertility rate per patient and possibly reduce losses [96].

*Gonadotropins.*Gonadotropins cannot compensate for the lack of follicles in the ovary, so COS in "Poor" patients may be the optimal method of obtaining multiple follicles in a single cycle, for example, by stimulating the luteal phase or by double stimulation (follicular plus luteal) in the same ovarian cycle protocols (DuoStim).

DuoStim double stimulation is the most promising approach to increasing the number of oocytes collected in one ovarian cycle; however, this protocol requires further research and analysis of its economic efficiency. [97].

According to a systematic review of E. Labarta, D. Marin in patients with" Poor", minimal ovarian stimulation (MOS) is an alternative method if COS does not give the desired effect. In some cases, MOS is used as a first-line therapy [98].

Conclusion. A variety of anamnesis and baseline data in patients with poor response leads to a variety of outcomes of the IVF program, even with the use of the same treatment protocols. In patients with poor ovarian response to COS sometimes there are cycles in which it is possible to obtain a better response to braid compared to previous protocols. It is possible that the routine use of POSEIDON classification for "POR", will allow you to choose a more personalized methods of preparation for the COS and the choice of the COS. Despite the fact that in the last 20 years, many different protocols with different dosages and types of gonadotropins have been proposed for the treatment of POR patients, experts have not come to some most effective method of treatment that would solve the problem of poor ovarian response. It seems that the answers to these questions will be found in the near future using new methods of molecular genetics.

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“POORRESPONDERS” – СОВРЕМЕННЫЕ ПРЕДСТАВЛЕНИЯ, ПРИНЦИПЫ ВЕДЕНИЯ В ПРОГРАММАХ ВРТ. ОБЗОР ЛИТЕРАТУРЫ

Аннотация. Состояние овариального резерва в течение жизни женщины претерпевает изменения. Начиная от воздействия физиологических факторов – возрастное уменьшение пула примордиальных фолликулов – до патологических состояний, ведущих к снижению овариального резерва – эндометриоз, операции на яичниках и другие факторы. Лечение пациенток с «бедным» овариальным ответом является предметом многочисленных исследований за последние двадцать лет. Существующие на сегодня классификации и схемы лечения не удовлетворяют в полной мере специалистов, нет какого-либо эффективного метода лечения, позволившего бы решить проблему бедного ответа яичников.

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“POORRESPONDERS” – СОВРЕМЕННЫЕ ПРЕДСТАВЛЕНИЯ, ПРИНЦИПЫ ВЕДЕНИЯ В ПРОГРАММАХ ВРТ. ОБЗОР ЛИТЕРАТУРЫ

Аннотация. Овариалды қордың жағдайы әйел адамның өмірі бойында өзгеріске ұшырап отырады. Поримордиалдық фолликулалардың пуласының жас ерекшелігіне қарай азаюы сияқты физиологиялық факторлардың әсерінен бастап, эндометриоз, аналық бездерге ота жасау және т.б овариалдық қордың азаюына әкелетін патологиялық жағдайлар дейін. «Әлсіз» овариалдық жауапты әйелдерді емдеу соңғы жиырма жылда көптеген зерттеулердің негізі болып табылады. Қазіргі кездегі емдеу схемалары мен жіктеулер мамандарды канағаттандырмайды, аналық бездердің әлсіз жауап мәселесін шешетін эффективті емдеу әдісі жоқ.

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ANALYSIS OF INVESTMENTS ROLE IN THE ECONOMIC DEVELOPMENT

Abstract. The impact of investment on a country's economic growth is obvious. For example, the net investment indicator is one of the indicators of the state's economic development. A decrease or increase in investment leads to changes in the level of production and incomes in the country, which, in turn, stimulate or contribute to a decline in economic growth. On this basis, attracting foreign investment is of interest to all countries, and along with the use of domestic investment contributes to the economic development of the state.

In the economic literature presents a lot of studies on the impact of investment on the economic growth of the country. However, mainly in the works the analysis is presented directly on the author's country and the influence of mostly only direct foreign investments on the state's GDP is considered.

However, the authors did not pay attention to the impact of portfolio investment, as well as the primary investment income on the economic growth of the countries of the world in a comparative aspect. In this article, the authors attempted to conduct a comparative analysis of the effects of direct and portfolio investments, as well as of the initial income from investments and net errors on the GDP of some countries of the world, both in the far and near abroad.

Keywords: economic growth, investment, exponential regression, world practice of investment analysis.

Introduction. The increase in investments, as is known, contributes to bringing the economy to a qualitatively new level of development, since investments lead to the development of innovations, modern technologies, and progress. That is why in the economic literature there is such a great interest in the issues of the impact of investments on the economic growth of the state.

Virtually every state uses both foreign and national investment as a source of development for economic development. Investments are the main factor in the development of the national economy and foreign investments in this context are more preferable. However, it is impossible to exclude the importance of portfolio investment, especially in recent decades, when the significance of the financial market, especially the stock market, is only increasing. Many foreign companies and individuals prefer to invest in shares of local companies. For example, the Chinese oil company China National Petroleum Corporation, which is the largest oil and gas company in China (CNPC), acquired a 50% stake in Mangistaunumagas JSC [1]. 92.44% of the shares of Rakhat JSC were acquired by LOTTE Confectionery (a confectionery company from South Korea). 100% of Karazhanbasmunai JSC shares were acquired by Canadian company CITIC Canada Petroleum Limited. 50% of the shares of JSC "Turgai-Petroleum" were bought by PetroKazakhstan Inc., registered in Canada, one of the owners of which is the Chinese company CNPC (67%) [2]. The remaining shares were purchased by LUKOIL Overseas Kumkol BV, a subsidiary of the oil and gas company in Russia, LUKOIL. There are many such examples. On the one hand, these investments can be viewed as direct, directly to the development of the industry, but, on the other hand, investments in shares may be possible in the future resale of shares in the future [3]. On this basis, it can

be noted that the impact of portfolio investment on a country's GDP becomes more and more significant and requires research.

Literature review. For the first time, representatives of the classical school showed interest in the question of the relationship between investment and economic growth. So, A. Smith in his work "Study on the nature and causes of the wealth of nations" defines investment as an investment in wages for increasing the number of people employed [4]. A clear interdependence of fixed capital investment and GDP growth can be traced. The starting point is the "stockpiling", leading to an increase in the productive power of labor, which leads to an increase in the annual product. However, for the growth of the productive power of labor, according to A. Smith, "additional capital" is required.

Sargent T.J., Sims C.A. [5] conducted research on the links between economic policies and variables such as GDP, inflation, employment and investment. The authors used the methods of non-structural macroeconomic forecasting, vector autoregression

Borensztein E., De Gregorio J., Lee J.W. [6] analyzed the impact of foreign direct investment on economic growth, using the moving average model for 69 developing countries over a period of 20 years.

Yakita A. investigated the effect of monetary expansion on capital accumulation and economic growth through such factors as inflation, consumption, production, government, equilibrium [7].

Lee and Tcha have shown that foreign direct investment is the most effective way to achieve economic growth in a host country [8].

Yang investigated the relationship between public and private investment and economic growth in the United States and Japan [9]. At the same time, a comparative analysis was carried out.

Har Wai Mun et al. Studied the relationship between foreign direct investment and economic growth in Malaysia and concluded that foreign direct investment is a good source of economic growth, as well as other advantages in the host country, such as employment, management resources, modern technologies and competitive goods [10].

Yu. Yu. Ivanova considered the influence of foreign investments on Russia's economic growth in a regional context [11].

Abu Nurudeen analyzed the relationship between foreign direct investment and economic growth and identified a positive relationship between these indicators in Nigeria [12].

D. Mach [13] analyzed the link between foreign direct investment and Korean economic growth using cointegration for time series data.

Taiwo Muritala conducted an empirical study of the effect of investment and inflation on economic growth using the econometric model using the least squares method [14]. D. Herzer [15] analyzed the impact of foreign direct investment on economic growth for 44 developing countries using cointegration methods. I. Ahmed [16] analyzed the impact of foreign direct investment on the growth of GDP through the factors of human capital development, labor force and the potential to absorb physical capital using traditional regression analysis.

A. A. Kozubekov (2012) for the Kyrgyz economy with a time period of 1990-2011, built the Cobb-Douglas production function in the form of a linear model of multiple regression. The author obtained the result that to a significant extent the economic growth of Kyrgyzstan was achieved through the contribution of labor resources, and only since 2007 a positive contribution from the growth of investment has been noted [17].

S. Smagulova, E. Semikina, N. Radko conducted a study of the influence of such factors as the price of oil, investment in fixed capital, refinancing rate, exchange rate, inflation, labor productivity, average wage per employee on Kazakhstan GDP. The results of the analysis showed a low impact or absence of such factors on the economic growth of the Republic of Kazakhstan [18]. E. I. Markovskaya, E. S. Anoshkina analyzed the impact of foreign direct investment on the economic growth of developed and developing countries, although at the same time, the analyzed countries were not specified. The averaged data for developed and developing countries were taken into account [19]. HELL. Elekulova, M. K. Uandykova, A. V. Slivnev analyzed the relationship between the inflow of foreign direct investment and the rate of economic growth in Kazakhstan. However, the authors did not make a correlation estimate [20].

The Department of Research and Statistics of the NBK has evaluated the contribution of domestic and foreign investment in the economic growth of Kazakhstan, as well as an analysis of the mutual influence of foreign and domestic investment on each other [21]. The results of the study showed that

investments are really significant for the economic growth of Kazakhstan, and the contribution of foreign direct investment is slightly higher than the contribution of fixed capital accumulation. In turn, the inflow of foreign direct investment does not crowd out domestic investment and has a stimulating effect on investment in fixed assets.

L. K. Sanalieva, G. B. Kengzhegalieva, A. S. Idelbayeva, Sh. U. Niyazbekova analyzed the innovative development of the economy through the potential of learning, the potential of generating knowledge, the potential of spreading knowledge and the potential demand for knowledge [22]. Stefan Dyrka and Barkhudar Sh. Gussenov analyzed the main factors of development of foreign economic relations and their impact on the economic growth of the regions and Kazakhstan [23, 24].

Despite the large amount of research on the impact of investment on the economic growth of countries, the majority of authors consider foreign direct investment and their relationship to the level of a country's GDP. At the same time, the majority of authors conduct research in their own countries, without covering others, therefore, without conducting comparative research between countries in different regions of the world.

In our opinion, in view of the increasing role of financial markets, including in developing countries, it is advisable to analyze the impact of portfolio investment on a country's economic growth. In addition, it is necessary to use data on net portfolio investment, reflecting the difference between the inflow and outflow of portfolio investment into the country. Also, in our opinion, it is advisable to analyze not only the inflow of foreign direct investment, but also the primary income from these investments. From our point of view, in the analysis of the impact of investments on economic growth, net errors and omissions, which reflect payments omissions for some reasons not recorded in other items of the balance of payments, and errors that are hidden in the records of individual payments, are of great importance. The error occurs due to a number of circumstances. Among them, you can call the gap in time between the transaction and the receipt of payment. Some streams of economic values may generally remain outside of statistical accounting, especially when it comes to illegal transactions. Net errors and omissions characterize the unaccounted amount of exported (imported) currency. The large negative balance under this article indicates the imperfection of the statistical and information bases, the weak state control over the migration of capital. Also, as an indicator of economic growth, we will use GDP in a real per capita survey.

Unfortunately, global statistics do not provide complete data on investments in many countries, which does not allow for a deep study of the dependence of the economic growth of countries on various investment factors.

Research methods. Since economic processes are by their nature diverse and complex, it is impossible to use only linear regression models when analyzing them. This is due to the fact that many economic dependencies are inherently non-linear. For example, analyzing the dependence of total costs on production volumes the most acceptable is considered to be a polynomial regression analysis model. In the analysis of many production functions, the world famous Cobb-Douglas model, which is also non-linear, is used.

In our case, we will apply non-linear models, assuming the possibility of reducing them to linear ones through the transformation of variables. Within this approach, models that are both non-linear in variables and non-linear in parameters can be used for linearization. In this case, we will use nonlinear relative to the explanatory variables included in the analysis, but linear in the estimated parameters. Consequently, an exponential regression analysis will be conducted [25].

Exponential regression best describes a set of data that does not change proportionally with time.

The exponential regression function is as follows:

$$y_x = e^{a_0 + a_1 x}$$

$$a_0 = \frac{1}{n}\sum lny - \frac{1}{n} a_1 \sum x$$

$$a_1 = \frac{n\sum x\, lny - \sum x \sum lny}{n\sum x^2 - \left(\sum x\right)^2}$$

where x – a variable (factor); a – a regression parameter [26].

To bring nonlinear dependencies to linear use the methods of linearization or smoothing. In our case, we use logarithmic linearization $x' = x$; $y' = lny$.

To determine the dependencies were used data from 2000 to 2017.

Results. The exponential approximation was estimated for each country represented between factors and GDP per capita. The variable factors were foreign direct investment in net inflows at current prices, portfolio investments in net inflows at current prices, primary income from foreign direct investments at current prices, and net errors and omissions in current prices. The calculation results are presented in tables 1–4.

Table 1 – Results of an exponential assessment of the impact of foreign direct investment on the economic growth of countries

Country	Foreign direct investment, inflows/GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{4.9012+0.0036x}$	0,7842	4,9	2,4781
Hong Kong	$y=e^{10.4127-0.0000x}$	0,1865	10,41	8,5727
Singapore	$y=e^{9.9942+0.0000x}$	0,9056	9,99	2,5814
Georgia	$y=e^{6.8075+0.0000x}$	0,6458	6,8	13,6812
Azerbaijan	$y=e^{6.7750+0.0000x}$	0,1184	6,8	12,5836
Bulgaria	$y=e^{8.3809+0.0000x}$	0,2938	8,38	23,0187
Ukraine	$y=e^{7.0840+0.0000x}$	0,5999	7,08	4,6464
Belarus	$y=e^{7.9015+0.0000x}$	0,2506	7,9	9,7414
Russia	$y=e^{8.1119+0.0000x}$	0,6074	8,11	6,4666
India	$y=e^{6.1819+0.0000x}$	0,8233	6,18	8,3923
China	$y=e^{8.4581-0.0000x}$	0,7325	8,46	4,3676
Turkey	$y=e^{9.2878+0.0000x}$	0,0798	9,29	4,3766
Kyrgyzstan	$y=e^{6.2529+0.0000x}$	0,4307	6,25	5,1433
Kazakhstan	$y=e^{5.7544+0.0000x}$	0,2872	5,75	2,4208

As a result of the calculations, we obtained data reflecting the dependence and significance of factors by countries: correlation index, elasticity coefficient and average approximation error. Since we used nonlinear regression, we calculated the correlation index, not the correlation coefficient, which shows the degree of interdependence of the values under consideration. In linear regression, the correlation index is equal to the correlation coefficient. In nonlinear models, the value of the correlation index in addition to the closeness of the relationship shows the significance of the model according to the Fisher criterion.

The elasticity coefficients are more significant precisely in exponential equations, which is why exponential regressions are very often used in econometric studies. In such regressions, elasticity coefficients have a clear economic interpretation. It shows how much the resulting variable will change when the factor under consideration changes by 1%.

However, it should be noted that sometimes, despite the obtained results of the correlation index and the coefficient of elasticity, there is no sense of their interpretation. Therefore, an average approximation error should be considered, which reflects the quality of the dependency. The qualitative equations have an average approximation error of 5–8%.

First of all, we make the selection of those dependencies, the average approximation of which is within the normal range of 5-8%. They are marked in tables 1-4 in italics. In those countries for which the average approximation error turned out to be above 8%, there is no sense in assessing the dependence as such between foreign direct investment and the country's GDP: Georgia, Azerbaijan, Hong Kong, Belarus, and India. This does not mean that foreign direct investment has no effect on a country's economic growth. Often the problem lies in the policy of attracting foreign investment, which may be excessively beneficial for foreign investors in the infringement of domestic industries. At the same time, foreign investors often attract the most qualified specialists from national companies, as a result of which the level of the latter

falls and does not allow competing with foreign ones. Given the fact that the goal of foreign investors is far from exporting the country's products, but only to conquer local markets and obtain the greatest benefits, national smaller, but possibly promising companies are often forced out of the markets. In addition, foreign investment, as a rule, is directed not to those sectors that require development (agriculture, industry, etc.), but to the most profitable at the moment, most often extractive.

As a result, it is almost impossible to assess the direct dependence of foreign direct investment on the country's economic growth without taking into account political, social, industrial, and even climatic factors. In this regard, we have shown the possible connections between the inflow of investments and the economic growth of countries. It should also be noted that high approximation errors are characteristic of developing countries, where, among other factors, corruption has a great influence. Consequently, designated countries with a high approximation error should investigate the causes that influence the fact that direct injections into the economy do not have the desired effect or do not allow us to speak of any dependence.

In relation to the remaining countries studied, the highest correlation indices can be noted in such countries as Singapore (0.9056), India (0.8233), Armenia (0.7842), China (0.7325). In these countries, GDP is strongly dependent on foreign direct investment. At the same time, according to elasticity coefficients, with the growth of foreign direct investment by 1%, GDP per capita increases by 9.99% in Singapore, by 6.18% in India, by 4.9% in Armenia and by 8.46% in China.

The least weak dependence of GDP on foreign direct investment is in Turkey (0.0798), Hong Kong (0.18) and Azerbaijan (0.118).

Kazakhstan occupies the middle position. The correlation index is 0.2872, reflecting the weak dependence of GDP on foreign direct investment, with an increase of 1%, GDP per capita increases by 5.75%.

Consider the impact of portfolio investment on economic growth.

Table 2 – Results of an exponential assessment of the impact of portfolio investment on the economic growth of countries

Country	Portfolio investment, inflows / GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{1.2493-0.0000x}$	0,3808	1,25	2,0411
Hong Kong	$y=e^{2.3983-0.0000x}$	0,6231	2,4	2,7984
Singapore	$y=e^{1.7948-0.0000x}$	0,4803	1,8	5,4765
Georgia	$y=e^{3.1813+0.0000x}$	0,3227	3,18	9,529
Azerbaijan	$y=e^{1.4930+0.0000x}$	0,3914	1,49	7,468
Bulgaria	$y=e^{2.8093-0.0000x}$	0,3831	2,8	15,2508
Ukraine	$y=e^{1.5196+0.0000x}$	0,4678	1,52	3,7013
Belarus	$y=e^{1.4645-0.0000x}$	0,3326	1,36	4,51
Russia	$y=e^{2.7963-0.0000x}$	0,4084	2,79	6,22
India	$y=e^{0.2737-0.0000x}$	0,1865	0,27	2,7858
China	$y=e^{1.4237+0.0000x}$	0,3916	1,42	5,1687
Turkey	$y=e^{0.3124+0.0000x}$	0,1539	0,31	4,0746
Kyrgyzstan	$y=e^{2.9634+0.0000x}$	0,1424	2,96	15,1175
Kazakhstan	$y=e^{1.4593-0.0000x}$	0,452	1,46	4,4244

In this case, such countries as Georgia, Bulgaria and Kyrgyzstan fall out, having approximation errors above 8%. If we compare it with the influence of foreign direct investment on the GDP of countries, it can be noted that the degree of influence in this case is lower: both the correlation index and the elasticity coefficients show this. This is mostly due to the short-term nature of most portfolio investments. At the same time, the impact of portfolio investment showed less approximation errors across countries. As a result, portfolio investment has the greatest impact on GDP of such countries as Hong Kong (0.6231),

Singapore (0.4803), Ukraine (0.4678), Kazakhstan, Russia (0.4084), China (0.3916). At the same time, with the growth of portfolio investment inflows by 1%, GDP per capita of Hong Kong grows by an average of 2.4%, Singapore by 1.8%, Ukraine by 1.52%, Russia by 2.79%, China - by 1.42%.

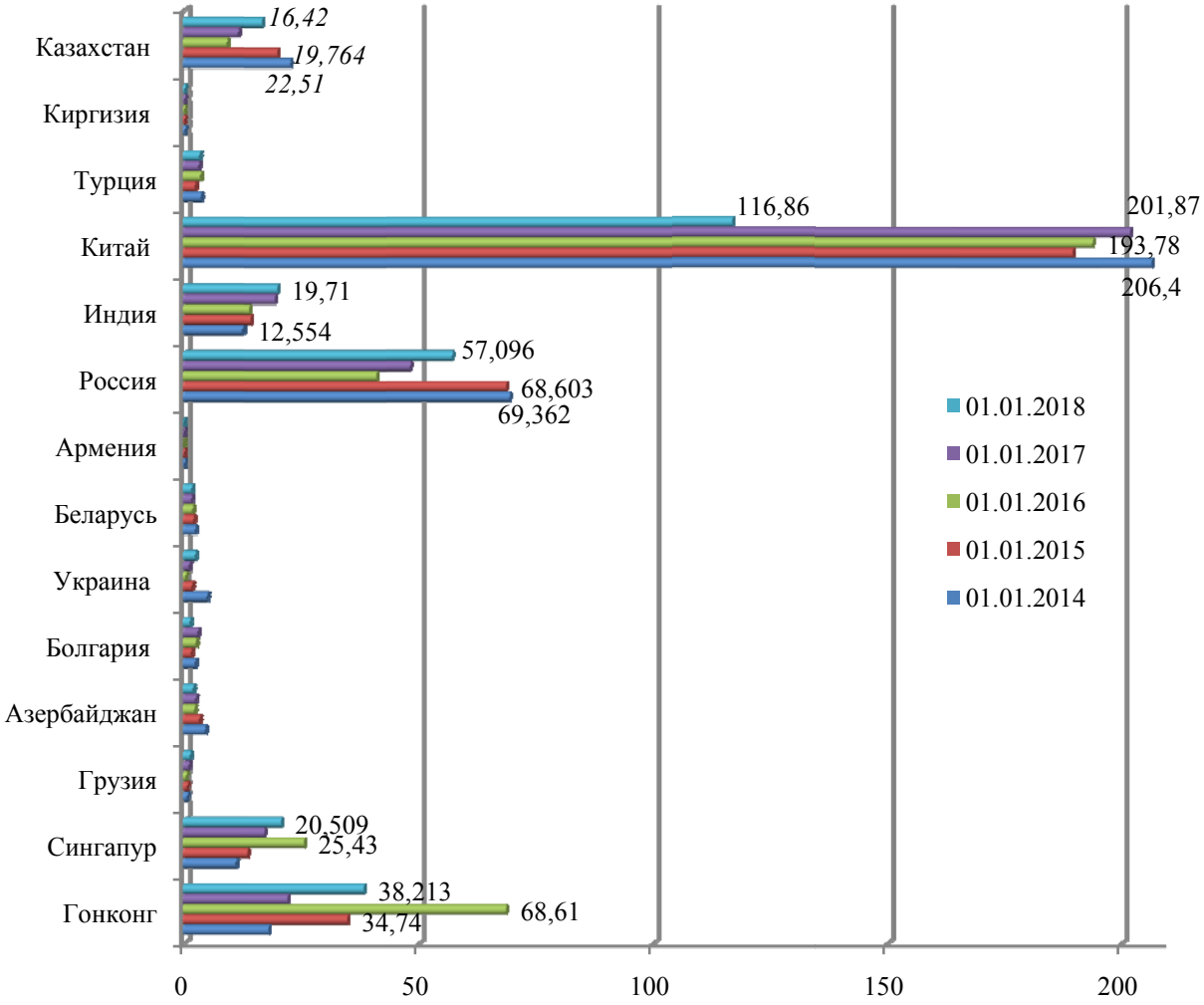
Regarding Kazakhstan, it can be noted that GDP is weakly dependent on the inflow of portfolio investments into the country, although this level is higher than, for example, in Belarus, Russia, and China. However, with the growth of portfolio investment inflows by 1%, GDP per capita in Kazakhstan grows by 1.46%.

Table 3 – Results of an exponential assessment of the impact of primary income from direct investment on the economic growth of countries

Country	Primary income from direct investment / GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{8.2354+0.1245x}$	0,5685	8,23	2,6782
Hong Kong	$y=e^{10.6112+0.0010x}$	0,5681	10,61	5,6668
Singapore	$y=e^{10.9597-0.0013x}$	0,5857	10,96	1,4824
Georgia	$y=e^{8.2759+0.0255x}$	0,5214	8,28	4,9657
Azerbaijan	$y=e^{7.8261+0.2744x}$	0,8195	7,83	5,5464
Bulgaria	$y=e^{9.0837-0.0674x}$	0,8109	9,08	2,8178
Ukraine	$y=e^{7.6009+0.1499x}$	0,6607	7,6	8,7456
Belarus	$y=e^{7.6307+0.6069x}$	0,8679	7,63	6,9314
Russia	$y=e^{8.2343+0.0196x}$	0,9448	8,23	7,6998
India	$y=e^{7.0139+0.0257x}$	0,8676	7,01	3,3982
China	$y=e^{9.2910-0.0017x}$	0,799	9,29	3,813
Turkey	$y=e^{9.6298-0.1015x}$	0,8919	9,63	2,3385
Kyrgyzstan	$y=e^{6.9525+0.5217x}$	0,4716	6,95	4,2322
Kazakhstan	$y=e^{8.7615+0.0316x}$	0,7731	8,76	4,0559

When analyzing the impact of primary incomes from foreign direct investment on economic growth, it can be noted that only one country fell Ukraine, the approximation error for which was 8.74. At the same time, we can note the greatest closeness of communications in such countries as Russia (0.9448), Turkey (0.8919), Belarus (0.8679), India (0.8676), Azerbaijan (0.8195) and Bulgaria (0 , 8109). If you pay attention to previous estimates of the impact of foreign direct investment and portfolio investment on the economic growth of countries, it can be noted that the primary income from foreign direct investment has a much greater impact on GDP per capita. At the same time, the lowest coefficient of elasticity belongs to Kyrgyzstan 6.95. That is, with an increase in primary income from foreign direct investment by 1%, per capita GDP increases by 6.95%. Singapore has the highest figures - 10.96, Hong Kong - 10.61, Turkey - 9.63 and China - 9.29. Kazakhstan again occupies a middle position among the countries in question. In general, the correlation index in the republic is high - 0.7731. At the same time, the growth of primary income from foreign direct investment by 1% contributes to the growth of GDP per capita by 8.76%, rather high rates.

Figure presents data on the volume of primary income from foreign direct investment. As can be seen from the data, the largest volumes of primary income from foreign direct investment, and not comparable with other considered countries, belong to China. These volumes are several times higher than the revenues of Russia, Hong Kong, Singapore, India and Kazakhstan. At the same time, the exponential assessment of the impact of this factor showed that the closeness of the link between the primary income from foreign direct investment from China lags behind Singapore, Hong Kong and even Turkey. This state of affairs can be explained by an indicator of errors and omissions in the balance of payments. Net errors and omissions reflect payments that were not specified for certain reasons, as well as errors in the records of individual payments. One of the reasons may be the fact that some economic values remain generally out of bounds, especially this concerns some illegal actions.



Primary income from foreign direct investment, billion US dollars

Source: https://data.worldbank.org/indicator.

Table 4 – Results of an exponential assessment of the impact of net errors and omissions on countries' economic growth

Country	Net errors and omissions / GDP per capita			
	equation	correlation index	elasticity coefficient	mean approximation error, %
Armenia	$y=e^{-5.2506+0.0433x}$	-0,1111	-5,251	4,0525
Hong Kong	$y=e^{-7.0107-0.0129x}$	-0,4558	-7,012	4,8522
Singapore	$y=e^{-0.9388+0.0110x}$	-0,6068	-0,9388	1,2797
Georgia	$y=e^{0.2852-0.5594x}$	0,6214	0,2852	4,1857
Azerbaijan	$y=e^{-0.5837-0.1121x}$	-0,7965	-0,5837	7,1047
Bulgaria	$y=e^{-0.9416-0.0300x}$	-0,9014	-0,9416	2,0672
Ukraine	$y=e^{-7.8103+0.2864x}$	-0,9058	-7,8103	6,0868
Belarus	$y=e^{-4.8014-0.2773x}$	-0,9332	-4,8014	5,1361
Russia	$y=e^{-6.3488-0.0044x}$	-0,1286	-6,3488	2,4465
India	$y=e^{-7.4684+0.0291x}$	-0,3351	-7,4684	6,2831
China	$y=e^{-8.8531-0.0008x}$	-0,8192	-8,8531	3,9272
Turkey	$y=e^{-2.3355-0.0034x}$	-0,3234	-2,3355	3,6979
Kyrgyzstan	$y=e^{-3.0592+0.1062x}$	-0,1909	-3,0592	5,6558
Kazakhstan	$y=e^{-4.0375-0.0552x}$	-0,6839	-4,0375	1,8194

When analyzing the impact of net errors and omissions, it can be noted that no country has dropped out of our list, all the results obtained are significant. The greatest dependence of these indicators is present in such countries as Belarus (0.9332), Ukraine (0.9058), Bulgaria (0.9014) and China (0.8192). At the same time, the greatest elasticity coefficients in the following countries: China - a 1% increase in net errors contributes to a decrease in GDP per capita by 8.85%, India - by 7.47%, Hong Kong - by 7.012%, Ukraine - by 7.81 %, Russia - by 6.35%.

In the Republic of Kazakhstan, the closeness of the connection between net errors and omissions is quite strong. At the same time, an increase of this factor by 1% leads to a decrease in per capita GDP by 4.04%. It should be noted that the net errors and omissions in Kazakhstan are very large, although insignificant in comparison with China and Japan. At the same time, over the past 5 years, they have negative values. According to many analysts, this is due to the hidden, unregistered export of capital from the republic.

Discussion. As the analysis showed, primary income from foreign direct investment and net errors and omissions have the greatest impact on economic growth. At the same time, it should be noted that the apparent dependence of economic growth on foreign direct investment was found only in some countries, such as Singapore, India, China and Armenia, and in portfolio investment - Hong Kong. At the same time, a serious dependence of economic growth on primary income on foreign direct investment of almost all the countries under consideration was noted.

In Kazakhstan, a positive impact on the economy from foreign direct investment is observed in the early periods of infusion. Subsequently, the positions start to deteriorate: due to the return of debts, interest payments, repatriation of profits, the republic incurs large expenses.

Net errors and omissions that reflect unrecorded operations, including the shadow business, have a significant impact. The increase in the amounts of this factor occurs in periods of crisis and deterioration of the economic situation in the country.

High elasticity coefficients for this factor may indicate unrecorded capital flows over countries or into the shadow economy. Unfortunately, the regression analysis only allows to reflect the closeness of the relationship between economic growth and investment, but is not able to capture the causes of these relations. In addition, the lack of regular statistics for many countries does not allow for greater coverage and grouping countries through cluster analysis.

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ЭКОНОМИКАЛЫҚ ДАМУДАҒЫ ИНВЕСТИЦИЯЛАР РӨЛІН ТАЛДАУ

Аннотация. Инвестициялардың елдің экономикалық өсіміне тиетін әсері зор. Мысалы, таза инвестиция индикаторы мемлекеттің экономикалық даму көрсеткіштерінің бірі болып табылады. Инвестициялардың төмендеуі немесе өсуі елдегі өндіріс деңгейінің және табыстың өзгеруіне әсерін тигізеді, бұл өз кезегінде экономикалық өсуді төмендетуге немесе ынталандыруға ықпал етеді. Онымен байланысты, шетелдік инвестицияларды тарту мәселесі барлық елдер үшін қызығушылық тудырады және олар ішкі инвестициялармен бірге пайдаланыла отырып, мемлекеттің экономикалық дамуына ықпал жасайды.

Экономикалық әдебиетте инвестицияның елдің экономикалық өсуіне әсері туралы көптеген зерттеулер жасалған. Дегенмен, негізінен, жұмыстарда талдау авторлардың тек өз елі тарапынан қарастырылған және жалпы тікелей шетелдік инвестициялардың ЖІӨ-ге әсері қарастырылған.

Сонымен қатар, авторлармен портфельдік инвестициялардың әсеріне, сондай-ақ салыстырмалы тұрғыда әлем елдерінің экономикалық өсуіне инвестициялар бойынша бастапқы кірістердің ықпалына назар аударылмаған. Осы мақалада авторлар тікелей және портфельдік инвестициялардың әсеріне, сондай-ақ әлемнің кейбір алыс және жақын шет елдерінде инвестициялардан түскен бастапқы кірістердің және таза қателіктердің ІЖӨ-ге ықпалына салыстырмалы талдау жасауға әрекет жасалды.

Түйін сөздер: экономикалық өсу, инвестициялар, экспоненциалды регрессия, инвестициялық талдаудың әлемдік тәжірибесі.

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АНАЛИЗ РОЛИ ИНВЕСТИЦИЙ В ЭКОНОМИЧЕСКОМ РАЗВИТИИ

Аннотация. Влияние инвестиций на экономический рост страны является очевидным. Например, показатель чистых инвестиций является одним из индикаторов развития экономики государства. Уменьшение или увеличение объемов инвестиций приводит к изменению уровня производства и доходов в стране, которые, в свою очередь стимулируют или способствуют спаду экономического роста. Исходя из этого, привлечение иностранных инвестиций вызывает интерес у всех стран, а наряду с использованием внутренних инвестиций способствуют экономическому развитию государства.

В экономической литературе представлено множество проведенных исследований, посвященных анализу влияния инвестиций на экономический рост страны. Однако, преимущественно в работах представлен анализ непосредственно по стране автора и рассмотрено влияние большей частью лишь прямых иностранных инвестиций на ВВП государства.

Вместе с тем, авторами не уделено внимания влиянию портфельных инвестиций, а также первичного дохода от инвестиций на экономический рост стран мира в сравнительном аспекте. В данной статье авторами сделана попытка проведения сравнительного анализа влияния прямых и портфельных инвестиций, а также первичного дохода от инвестиций и чистых ошибок на ВВП некоторых стран мира, причем как дальнего, так и ближнего зарубежья.

Ключевые слова: экономический рост, инвестиции, экспоненциальная регрессия, мировая практика анализа инвестиций.

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PROTECTIVE COATINGS FOR WALLS AND ROOF OF TANKS MADE OF GRANULAR FUSED NON-COMBUSTIBLE SUBSTANCES AGAINST FIRE EXTENSION

Abstract. As a result of the research, there has been improved the technology of applying new foaming agents and means of limiting the spread of the flame during fires in storage facilities. The analysis of putting out flammable liquids indicates that if the fire is not eliminated at the initial stage, the fire passes to a prolonged stage, where an additional amount of forces and means will be required. To eliminate this stage, an additional amount of forces and means will be required. There have been developed and experimentally tested protective coatings for the walls and roofs of tanks made of granular fusible non-combustible substances as additional passive protection against fire extension. Besides, in laboratory and semi-industrial conditions, there were studied the possibilities of using internal and external coatings. Protective coatings possess fire-resistant properties. They allow reducing the temperature of the walls of vertical steel tanks. The given protective coatings prevent the occurrence of static electricity charges.

Key words: fire protection, fire protection technology, oil products, tank, combustible mixture, granular materials, heat flow, film thickness, foam destruction, highly inflammable liquid.

The program of industrial and innovative development of the Republic of Kazakhstan implies serious structural changes in economic growth due to the development of various sectors of the economy, including those that may present a potential danger to the population, one of which is fire and explosion hazard of the oil and gas industry of the Republic of Kazakhstan. Damage from fires and explosions at refineries has enormous proportions and a tendency of constant growth. As the level of technical equipment of production increases, its fire risk also increases.

Emergencies at oil and gas facilities are often accompanied by fires that cause economic, environmental, material damage to the state. During fires at these sites, a large amount of thermal energy is released, that by means of radiation affects the objects around the fire and forms new fire areas [1].

Fires of flammable liquids in vertical steel tanks are of complex and prolonged nature. The analysis of putting out flammable liquids indicates that if the fire is not eliminated at the initial stage, the fire passes to a prolonged stage, where an additional amount of forces and means will be required. Putting out flammable liquids in vertical steel tanks is very rarely achieved at the first stage. This is accompanied by many reasons, one of which is the poor efficiency of the physicochemical properties of the foaming agent [2].

In case of accidental spills of oil products, when risk of fire arises in storage facilities, it is necessary to assess the degree of danger. Oil products are divided into highly flammable liquids and flammable liquids, the vapors of which can form explosive mixtures with air. In case when the flash point of these oil products is higher or equal, a combustible mixture appears above the open surface of the liquid fuel. If this

mixture is set on fire, the flame will spread across the surface of the liquid fuel at a speed of 1.2-1.4 m/s. In a closed container, the flame spreads at a speed of 0.3-0.7 m/s.

The assessment of the fire hazard of spills is characterized by the following main criteria:

– self-ignition temperature;

– flash point;

– flammability potential;

– concentration limits of explosive mixtures.

The flash point is closely related to the boiling point, i.e. with evaporation. The lighter oil product is, the better it evaporates, and its flash point will be lower. For instance, gasoline fractions have negative flash points (up to – 40 °C), kerosene fractions have flash points within 28-62 °C, diesel fuel fractions – 50-80 °C.

Fire extinguishing and fire prevention equipment that currently exists do not fully ensure the safety of tanks. Systems and devices designed to extinguish fire in tanks do not allow them to be quickly extinguished in a short period of time, leading to an explosion and subsequent fire extension [3].

Theoretical and experimental studies using reliable calculation methods aimed at developing and applying constructive and planning solutions, technologies, devices and means of limiting the spread of fires are still in demand in the oil and gas industry [4].

In this regard, the research aimed at developing a set of fire protection and extinguishing agents for highly flammable liquids technologies is relevant and timely

The development of stable foams is formed on the complex use of foaming solutions of polymeric substances that coagulate when contact with organic solvents and surfactant mixtures, where a special role is given to fluorine-containing compounds with high surface activity [5].

For the research, there was used a wide range of substances produced by industry and synthesized in the laboratory. Fluorinated surfactants were synthesized at the Institute of Chemistry of the Ministry of Education and Science of the Republic of Kazakhstan and K.I. Satpayev Kazakh National Technical University. There were conducted the experiments on extinguishing the flame of oil products and determining the fire extinguishing efficiency of the foam with the subsequent verification of the results of extinguishing fires of flammable liquids in various storage tanks and trays at the chair of operational and tactical disciplines of Kokshetau Technical Institute of the Ministry of Emergency Situations of Kazakhstan.

In modern practice, there are used internal and external coatings, which lower the temperature of the walls of the tanks, prevent the occurrence of static electricity, and also have fire-resistant properties. There is also the possibility of using fusible coatings, which in case of temperature increasing inside the tank during combustion will become liquid and spread over the surface of the liquid in the tank. In this case, high temperature will be an important requirement for these coatings. To determine the range of the required melting point, in table 1 there are given oil and oil products ignition temperatures, as well as the temperature of flame combustion.

Table 1 – Flash point, flash ignition and flame combustion temperature of oil and oil products

Type of the product	Temperature, °C				Notes
	Flash point	Flash ignition	Autoignition	Flame combustion	
Oil	130...320	35...121	300...350	1100...1300	
Gasoline AI-95	39	39	255...370	1300...1400	
Gasoline AI-92	32	39	255...370	1300...1400	
Gasoline AI-80	27	39	255...370	1300...1400	

The range of the melting point at the upper limit is determined by the temperature above 1000 °C. The lower melting limit of the material must be higher than the temperature. Currently, there are many non-combustible materials that can be used as coatings for the inner walls and roof of the tank. There were selected the following materials to compare:

– foam glass;

– sodium liquid glass;

– polybutylene terephthalate;
– silica gel.

Since these coatings will be constantly present on the surface of the inner walls and on the roof of the tank, it is necessary that they should meet the following requirements:

1. Chemical resistance to stored products;
2. Work in the temperature range of the tank service treatment;
3. The melting point is lower than the flame combustion temperature of the product, but higher than the operating temperature;
4. The combustion temperature is higher than the flame combustion temperature of the oil product

Thus, all the given materials, with the exception of polybutylene terephthalate, can be used as coatings to protect the tank. There were developed and experimentally tested two coating schemes: on the walls of the tank and on the roof. The properties of the materials are given in table 2.

Table 2 – Characteristics of the materials for internal coating of the walls and roof of the tank

Characteristics	Foam glass	Sodium liquid glass	Polybutylene terephthalate	Silica gel
Melting point, °C	730	1200	225	1610
Combustion temperature, °C	–	–	–	–
Chemical resistance	High	High	High in temperature range from 20 to 60 °C	High

Thus, all the given materials, with the exception of polybutylene terephthalate, can be used as coatings to protect the tank. There were developed and experimentally tested two coating schemes: on the walls of the tank and on the roof. Both variants are optimal for using. The most effective tank extinguishing system is fire subsurface suppression system, but the speed of this system response does not often allow coping with a rapidly spreading flame. To solve this problem, there was offered to use granular materials with high fire resistance and lower melting point. The design of these coatings is shown in figure 1.

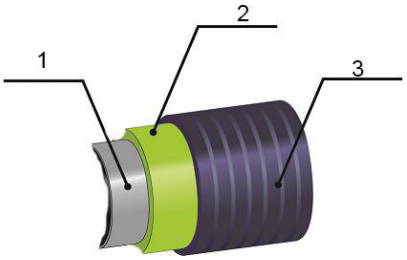

Figure 1 – Multi-layer protective coating:
1 – tank metal; 2 – adhesive layer;
3 – main protective layer

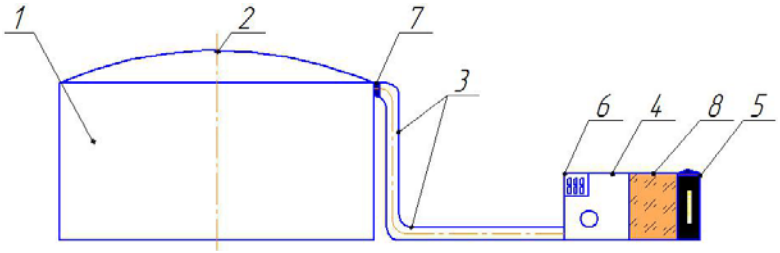

Figure 2 – Scheme of tank fire extinguishing system:
1 – the tank; 2 – tank temperature sensor; 3 – supply pipeline;
4 – injection pump; 5 – nitrogen or carbon dioxide containers;
6 – automatic signal processing system; 7 – valve;
8 – the container with granular material

As it has been noted above, the combustion temperature of oil and oil products exceeds 1000 °C, which enables to choose materials with the required melting point and the missing or sub-missing boundary of combustion. The principle of operation of the given system is as follows: when the temperature in the tank 1 rises, the temperature sensor transmits a signal to the automatic signal processing system 6, which in turn sends a command to start the injection pump 4. The transfer of the granulated substance from the tank 8 is done with the help of using nitrogen or carbon dioxide to prevent oxygen from entering the fire zone. The fire extinguishing system is shown in figure 2.

When the temperature inside the tank rises, the granulated material melts and then spreads over the surface of the burning liquid, thus preventing oxygen from entering the combustion zone. The advantages of fire foam subsurface suppression are the following factors:

– lack of particles catching of burning liquid by granular material;
– the system response speed is much higher than the subsurface suppression extinguishing system due to the absence of need to pass through the volume of burning liquid;

– the possibility of use, both in the presence of an open fire, and in its absence, but with a significant increase in temperature.

Limiting the fire spread in tanks is actual, because when a single tank catches fire, the flame can reach the adjacent tanks, which will lead to an increase in damage to the set of tanks [6].

To limit the spread of the flame in a horizontal position, it is proposed to use horizontal metal grids. Initially, to study the possibility of using this device, it is necessary to determine the heat flux passing through these grids. Since metal grids have a small reflectivity, the decrease in heat flux passing through the grids will be insignificant. The best way the heat flux is shielded by grids with a wire of large diameter and a small grid size. Let us consider the design of the grid as a multilayer wall consisting of two parallel planes located at a short distance from each other. This design is characterized by a change in temperature in the form of a broken line with straight segments, which show the change in temperature in the layers. Thus, the heat flux decreases significantly when passing through several grids [7].

To conduct an experiment to determine the reduction of heat flux, there was offered a construction, as shown in figure 3.

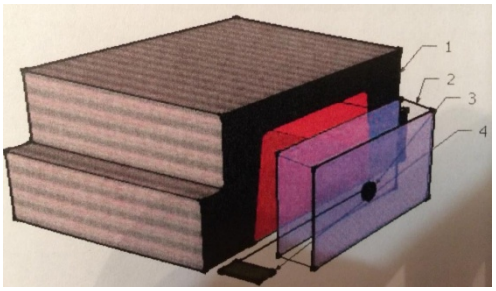

Figure 3 – The construction for determining
the amount of heat flux passing through the metal grids:
1 – muffle furnace 1; 2 – grid;
3 – thermocouple TXA; 4 – sensor

The principle of operation is as follows: muffle furnace 1 produces a constant heat flux of 3.5 kV/m^2, which passes through the grid 2, is fixed by a thermocouple type TXA 3 and sensor 4.

According to the results of the experiment, it was determined that the obstruction of the heat flux by grids located at a distance of 20 cm regarding each other is the most effective, which in turn shows that when the flux passes through a certain medium, its intensity decreases.

There were conducted further studies to determine the dependence of the cell size on the stability of the foam. Studies were conducted to determine the optimal size of the cell structure, so that the foam does not settle inside it and does not go beyond its limits. The tests were carried out for horizontal grid construction with a round shape to install vertical steel grids of various sizes in tanks [8].

To determine the effectiveness of foaming agents, there was chosen an additional foaming agent. «Multipurpose», which is our innovation. In addition to it, there were used the following brands of foaming agents: PO-6SП, PO-6RP, PO-6VAS, « Multipurpose»; as well as the grids of sizes 1,1; 0,9; 0,44; 0,1 and 0,094 mm.

It was determined that the smaller the cell size is, the longer the foam stability in the grid volume and the higher the percentage of filling the volume of the construction. The most optimal cell size – 0,094 mm. See the figure 3.

The next stage in the development of a fire limiting system was a research to establish the optimal foam multiplicity in relation to its stability. Finding the optimal value of the multiplicity at maximum durability depends on the following factors:

– foam agent properties;
– foam agent concentrations;
– method of producing a foaming agent;
– weather conditions;
– other factors.

It has been established that with increasing foam multiplicity, the foam stability time increases, and at the same multiplicity, the foam stability directly depends on the degree of its dispersion. But with increasing degree of dispersion, the film thickness also decreases, which leads to the destruction of the foam. The next research stage of the possibility of using structures limiting the spread of fire was the study of foam stability in a grid structure when exposed to heat flow.

There were carried out the tests to determine the effect of temperature using a tray, and AI-80 gasoline was used as a combustible liquid, poured onto the water cushion with a layer of 10 cm. A grid structure was installed on the top, and free burning was made during 5 minutes, after which there was made filling with mechanical foam, then there was measured time of 50% foam volume destruction. The combustion temperature was 800 °C. The stability time of the average multiplicity foam is higher than that of the high-multiplicity foam; moreover, the resistance time is reduced by 30–35% regarding air tests. However, it should be noted that the "Multipurpose" foam agent has better performance than the widely used foam agents [9, p. 256].

The final stage of the research was the determination of the degree of heat flux retention by the construction filled with air-mechanical foam. Based on the fact that when radiant energy is affected the flammable liquid, there can happen spontaneous combustion, the radiant flux must not exceed the radiation density for this liquid.

The tests consist in measuring the temperature on the outer and inner surfaces of the enclosing structure in conditions close to a real fire. The combustible liquid was AI-80 gasoline that was set on fire and there was allowed open burning. Due to the inhomogeneity of the flame burning, according to the construction area there was defined average temperature on the outer and inner surface of the construction, which was determined using thermocouple TXA at 5 points of the construction in order to achieve reliable results [10, p. 197].

Thus, decrease in temperature is due to the expenditure of heat for heating both the grid construction and the air-mechanical foam. Obviously, with an increase in the amount of combustible material, the maximum temperature and duration of combustion increase.

According to the results of the test, for the effective operation of the enclosing structures, it is necessary to ensure a continuous supply of foam to the grid structure. In addition, to establish the optimal number of sections within the grid structure, there were made tests with round structures of various heights: 450, 500, 550 and 600 mm to establish the time of thermal resistance and the average temperature on the outer surface.

It should be noted that the given horizontal construction for limiting the spread of fire has a high resistance to thermal effects, which allows its use to fight fires in tanks. There was made the analysis of the experiment results using a mathematical model, there was obtained a small discrepancy between mathematical model data and the results of the experiment. But despite this, these results confirm the effectiveness of finding the foam in the protective structure. But despite this, these results confirm the effectiveness of foam presence in the protective structure.

Thus, as the result of the research, there were developed protective coatings for the walls and roofs of tanks made of granular fusible non-combustible substances as an additional passive protection against the fire spread. In the course of the laboratory tests, there was determined that the offered horizontal grid construction for fire extinguishing in a tank, together with the use of the Multi-Purpose foam agent that was developed by us, can prevent fire spreading to the nearest tanks and other structures.

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ӨРТТІҢ ТАРАЛУЫНАН ҚОРҒАУ ҮШІН ТҮЙІРШІКТЕЛГЕН БАЛҚИТЫН ЖАНБАЙТЫН ЗАТТАРДАН ЖАСАЛҒАН РЕЗЕРВУАРЛАРДЫҢ ҚАБЫРҒАЛАРЫ МЕН ШАТЫРЛАРЫНА АРНАЛҒАН ҚОРҒАНЫШ ЖАБЫНДАРЫ

Аннотация. Зерттеу нәтижесінде мұнай-газ өнеркәсібі объектілерінің тік болат резервуарларында өрт туындаған кезде жаңа көбік түзетін құрамдар мен жалынның таралуын шектеу құралдарын қолдану технологиясы жетілдірілді. Тез тұтанатын сұйықтықтарды сөндіруге талдау жүргізілді, егер бастапқы кезеңде

өртті жою жүргізілмесе, өрт ұзаққа созылатын сатыға ауысатынын куәландырады. Резервуарлық парктердегі өрт салдарын жою үшін осы кезеңде қосымша күштер мен құралдар қажет болады. Өрт таралуынан қосымша пассивті қорғаныс ретінде түйіршіктелген балқитын жанбайтын заттардан жасалған резервуарлардың қабырғалары мен шатырларына арналған қорғаныс жабындары әзірленді және эксперименталды сынақтан өткізілді. Сонымен қатар, зертханалық және жартылай өнеркәсіптік жағдайларда ішкі және сыртқы жабындарды пайдалану мүмкіндіктері зерделенді. Тік болат резервуарлардың қабырғалары мен шатырларына арналған қорғаныс жабындары отқа төзімді қасиеттерге ие болады. Олар тік болат резервуарлардың қабырғаларының температурасын төмендетуге мүмкіндік береді. Сонымен қатар түйіршіктелген балқымалы жанбайтын заттардан жасалған тік болат резервуарлардың қабырғалары мен шатырларына арналған ұсынылып отырған Қорғаныс жабындары жалынның таралуын шектеуге және оларды оңтайлы оқшаулауына ықпал етеді, сондай-ақ статикалық электр разрядтарынан өрттердің туындауын болдырмайды.

Түйін сөздер: өртке қарсы қорғаныс, өрттен қорғау технологиясы, мұнай өнімдері, резервуар, жанғыш қоспа, жылу ағыны, көбік тұрақтылығы, пленка қалыңдығы, көбіктің бұзылуы, тез тұтанатын сұйықтық.

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ЗАЩИТНЫЕ ПОКРЫТИЯ ДЛЯ СТЕНОК И КРОВЛИ РЕЗЕРВУАРОВ ИЗ ГРАНУЛИРОВАННЫХ ПЛАВКИХ НЕГОРЮЧИХ ВЕЩЕСТВ ДЛЯ ЗАЩИТЫ ОТ РАСПРОСТРАНЕНИЯ ПОЖАРА

Аннотация. В результате исследования была усовершенствована технология применения новых пенообразующих составов и средств ограничения распространения пламени при возникновении пожаров в вертикальных стальных резервуарах объектов нефтегазовой промышленности. Проведен анализ тушения легковоспламеняющихся жидкостей, который свидетельствует, что, если не произведена ликвидация пожара в начальной стадии, пожар перейдет в затяжную стадию. Для ликвидации последствий пожара в резервуарных парках, этой стадии потребуется дополнительное количество сил и средств. В качестве дополнительной пассивной защиты от распространения пожара разработаны и экспериментально апробированы защитные покрытия для стенок и кровли резервуаров из гранулированных плавких негорючих веществ. Кроме того, в лабораторных и полупромышленных условиях были изучены возможности использования внутренних и внешних покрытии. Защитные покрытия для стенок и кровли вертикальных стальных резервуаров будут обладать огнестойкими свойствами. Они позволяют понижать температуру стенок вертикальных стальных резервуаров. Предлагаемые защитные покрытия для стенок и кровли вертикальных стальных резервуаров из гранулированных плавких негорючих веществ будут способствовать ограничению распространения пламени и их успешной локализации, а также предотвращают возникновение пожаров от разрядов статического электричества.

Ключевые слова: противопожарная защита, технология огнезащиты, нефтепродукты, резервуар, горючая смесь, гранулированные материалы, тепловой поток, толщина пленки, разрушение пены, легковоспламеняющаяся жидкость.

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HUMAN IMPACT ON WATER REGIME OF THE SHARDARA WATER RESERVOIR

Abstract. Under rapid population growth, food demand and other human activities, water availability is predominantly becoming a common problem worldwide. This study considers Shardara water reservoir located on the Syrdarya River within Kazakhstan and investigates changes on its water regimes under human activities. The Mann-Kendall trend test was used to explore the contributions of human activities to changes in inflow and discharge in Shardara water reservoir between 1980 and 2016. The results indicated that human activities, particularly agriculture and power generation activities are the major governing factors of changes on water regimes of the reservoir. The findings also indicated that, at significance level inflow and outflow of reservoir have positive trend. The inflow and discharge fluctuation of water often leads to serious floods in settlements at lower reaches of Syrdarya River accompanied by severe socio-economic damages and losses.

Key words: Shardara water reservoir, Hydrological parameters, Inflow, Outflow, Aydar-Arnasay lakes system.

Introduction. The construction of dams or water reservoirs is important for human beings, since reservoirs provide multipurpose uses which contribute significant value for the development of society [1]. The water reservoirs are among the most efficient tools for water resources development and management [2]. They are very complicated facilities that enable to redistribute river flow in time [3]. The main role of reservoirs is to control water resources in river basins [4], flood prevention and provision of water for different water uses such as industry, agriculture and domestic purposes [5]. Many natural, economic systems and water complexes of Kazakhstan have been operating in a stable mode under production rates, while intensification and anthropogenic impacts have become objects of environmental stress. Some of these systems have been shifted from environmental stable level to environmental crisis and degradation. The Syrdarya River Basin is one of such water management systems in Kazakhstan and Central Asia in general [6, 7].

The Syrdarya River is one of the major irrigation sources in Central Asia [8]. Its regulation permits the use for irrigation. Irrigation development in the Syrdarya River Basin has drastically changed natural conditions within this area [9]. Initially, upstream–downstream issues in the Syrdarya River Basin originated in the beginning of the 1960s [10]. Until that time, natural flow of the River met water needs of users and environmental flow to the Aral Sea. The natural flow regime had high flow in summer and low flow in winter [11]. This regime was suitable for irrigated agriculture; the main historical water user in the region [12]. However, expansion of irrigated land in the basin from the 1960s stimulated the development of large storage facilities for regulation of the River flow [13]. The Toktogul water reservoir was constructed upstream of the Naryn River; others were Andijan water reservoir at the inflow point of Karadarya River to Fergana valley, and Kayrakkum and Shardara reservoirs downstream of Syrdarya River.

By 1988 was expansion of irrigated area to 3.36 mln. hectares [14]. About half of this expansion was made possible by the development of downstream and virgin land where irrigated area increased from 456 to 977 thousand ha. Water withdrawal for irrigation amounted to 85% of the total long-term annual river flow against 40% before 1960 that significantly reduced the river inflow. This was the first manifestation of upstream–downstream conflicts in the basin [15].

In a modern geopolitical situation in Central Asia, the necessity of existing system of river flow regulation revision and safety measures provision of regions exposed to water flooding below Shardara dam have occurred. It is mainly connected with change of regional water requirements in the context of orientation on their own national interests and programs of their development. The centralized flow regulation system and accident prevention system from water flooding while controlling the stream flow using all regulating reservoirs of the basin that pre-existed until 1992 was completely changed. These changes presently are resulting from regular spring emergency conditions on the territory of Kazakhstan and winter difficulties in the context of situation of basic regulating reservoirs on territories of other countries [15, 16]. Therefore, current problems of the Syrdarya River from the Shardara water reservoir to its confluence are associated with floods and ice blocking phenomena mainly resulting from human activities [17] and in order to prevent flooding of the lower reaches of the Syrdarya River, wasteful discharges into the Aydar-Arnasay lakes system were required. Therefore, the purpose of the present study is to analyze human impact on water regime of the Shardara water reservoir.

Study area. The Shardara water reservoir is located at the altitude of 252 m in the middle reaches of the Syrdarya River in south Kazakhstan region and Syrdarya Region of Uzbekistan (figure 1). The reservoir is one of the largest reservoirs in Kazakhstan [18]. The reservoir capacity is 5.2 billion m^3 with a useful capacity of 4.7 billion m^3 and dead water horizon of 244 m [19]. The area of the reservoir's surface at the normal headwater level is 650 km^2 [20].

The Shardara water reservoir serves for multipurpose uses such as hydropower use, storage of irrigation water, municipal and industrial water supply and fishing. The reservoir is formed by two dams; one is in Kyzylkum canal on the Syrdarya River and the other overlaps the Arnasay-Aydarkul depression. Arnasay dam is located on the border of Kazakhstan and Uzbekistan [21]. Unlike the reservoirs of temperate zone of Europe, USA and Canada, it is filled in autumn and winter. From April/May to September/October, water from the reservoir is used for irrigation but reduces by about 12 m. At the maximum drawdown, the reservoir covers only 11,000 hectares versa 90,000 ha of entire one [16].

The climate in this region is continental highly arid. There are typical large seasonal and daily heat temperature variations. The summer is dry, cloudless and very hot. In July, the warmest month, the average monthly temperature is 25-31 °C. From June to the first half of August, the maximum temperature usually reaches 40 °C or higher. Average precipitation is 429 mm, the lowest in August is 2 mm in average. Most precipitation falls in March, 75 mm in average [22]. There are solid masses of irrigated land about 9,400 hectares along the Keles River, upstream the Syrdarya River from the reservoir at the study area. About 136,000 hectares of agricultural land are located at the southern bank of the reservoir passing the Dostyk canal at the territory of Uzbekistan. Water irrigation also occurs directly from the reservoir [22].

Data collection and Methodology. This study employed long-term data on the inflow and outflow of the Shardara water reservoir for the period 1980-2016. The data of the Syrdarya River runoff (1980-2016) and discharge of water from the Shardara into Aydar-Arnasay lakes system (1993-2016).

Then the statistical significance of trend in time series of water regime of the Shardara water reservoir was analyzed by using Mann Kendall (MK) test. The Mann-Kendall test is a widely used test for detecting trends in time series, and is very popular in hydrological studies [23]. The MK test is a non-parametric test for linear trend, based on the idea that a lack of trend should correspond to time series plot fluctuating randomly about a constant mean level, with no visually apparent upward or downward pattern [24].

In MK trend test, each data value is compared to all subsequent data values. Mann Kendall statistic (S) for a time series x_1, x_2, x_3 …, and x_n [25, 26] is calculated as follows:

$$S = \sum sgn(x_j - x_i) \quad (1)$$

Where sgn

$$(x_j - x_i) = 1, if\ (x_j - x_i) > 0$$
$$(x_j - x_i) = 0\ , if\ (x_j - x_i) = 0$$
$$(x_j - x_i) = -1, if\ (x_j - x_i) < 0$$

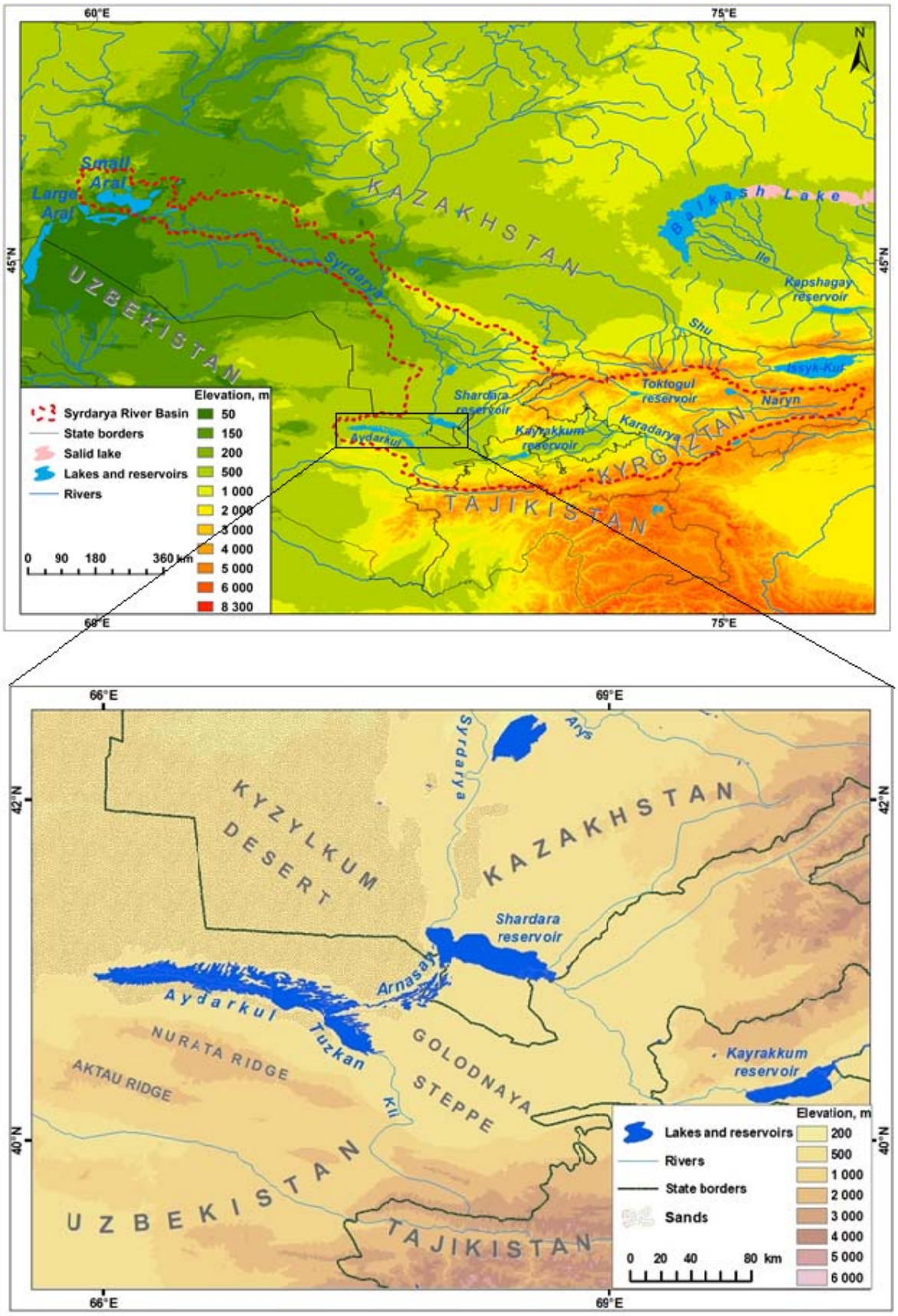

Figure 1 – The Shardara water reservoir and Aydar Arnasay lakes system within Syrdarya River Basin

The probability associated with S and the sample size, n is then computed to statistically quantify the significance of the trend using normalized test statistic, Z is formed using the equation as follows:

$$Z = \begin{cases} \frac{(|S|-1)}{SD|S|}, if\ S > 0 \\ 0, \quad if\ S = 0 \\ \frac{(|S|-1)}{SD|S|}, if\ S < 0 \end{cases}$$

While the standard deviation is computed as:

$$SD\ |S| = \sqrt{\frac{1}{18}(n(n-1)(2n+5)} \quad (2)$$

Where *n* is the number of data points.

Remote sensing. Generated using Normalized Difference Water Index (NDWI) we calculated changes on water area of the Shardara water reservoir. Surface water mapping with multi-spectral remote-sensing images is based on the difference of the absorption and reflection of light between water and other features in different frequency bands. As reflections from water of the visible to infrared bands are gradually weakened, the surface water on an image can be delineated with the (NDWI) by the contrast of the visible wavelength with the near-infrared and short-wave infrared wave lengths [27]. The NDWI was first suggested by to detect surface waters in wetland environments and measure surface water dimensions [28].The NDWI index was calculated with the following equations

$$NDWI = \frac{band_{GREEN} - band_{NIR}}{band_{GREEN} + band_{NIR}}$$

Where GREEN is a band that encompasses reflected green light and NIR represents reflected near-infrared radiation

Results and discussion. *Water regimes of the Shardara water reservoir*. The problems of the Syrdarya water flow release are associated with flood and subsequent material damage and human losses. While the construction of Shardara reservoir enabled to avoid floods in the lower reaches of Syrdarya River almost completely during the seventies and eighties of the last century. But at present, the flow volume entering Shardara reservoir and lower reaches of Syrdarya River is determined by operation regime of higher reservoirs cascade and, mainly the largest ones, designed for long-term and seasonal regulation [29]. The highest inflow rate in Shardara reservoir and outflow from reservoir to river can be observed in the first decade (1980-1989). In this period, inflow is equal to11 892, 3 mln m^3 per year (figure 2), the outflow is equal to 10211, 4 mln.m^3 per year (figure 3).

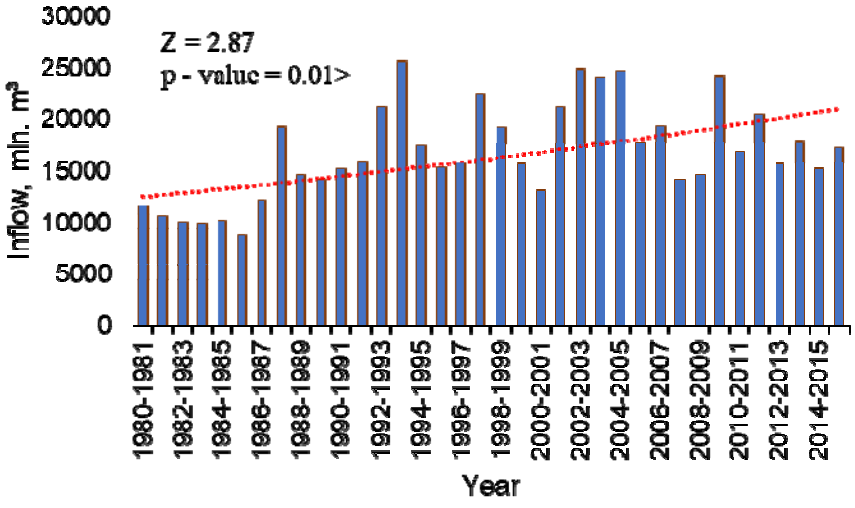

Figure 2 – Dynamics of the inflow to the Shardara water reservoir

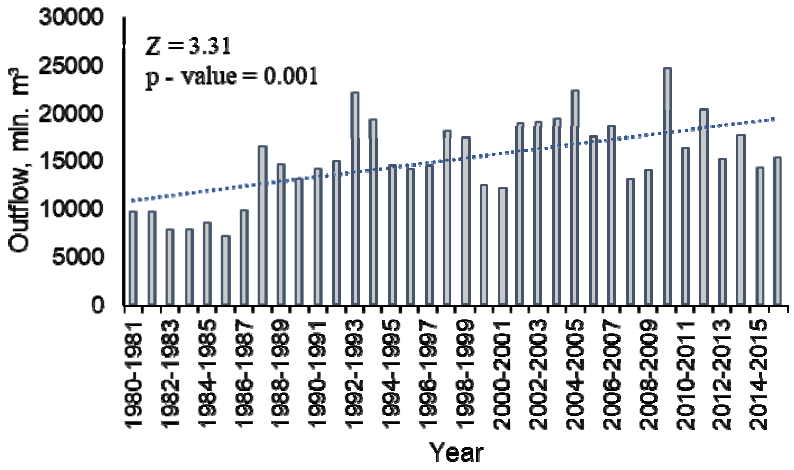

Figure 3 – Outflow dynamics from the Shardara water reservoir

These indicators decreased in the period of 1982-1986. The lowest inflow and release rate was between 1985 and 1986 with inflow equal to 8745, 9 mln.m^3 (figure 2) and outflow of about 7156, 5 mln.m^3 (figure 3).

The indicators worsened within this period (1982-1986) likely due to the facts that, there was shortage of water in the region and that, specific water consumption decreased to 35.1 thousand m^3/ha, then after irrigated land expanded to 199 thousand hectares. While the volume of discharge required for irrigation has reached 7 km^3/year [30]. Accordingly, the runoff of Syrdarya River decreased between 1982 and 1986 (figure 4).

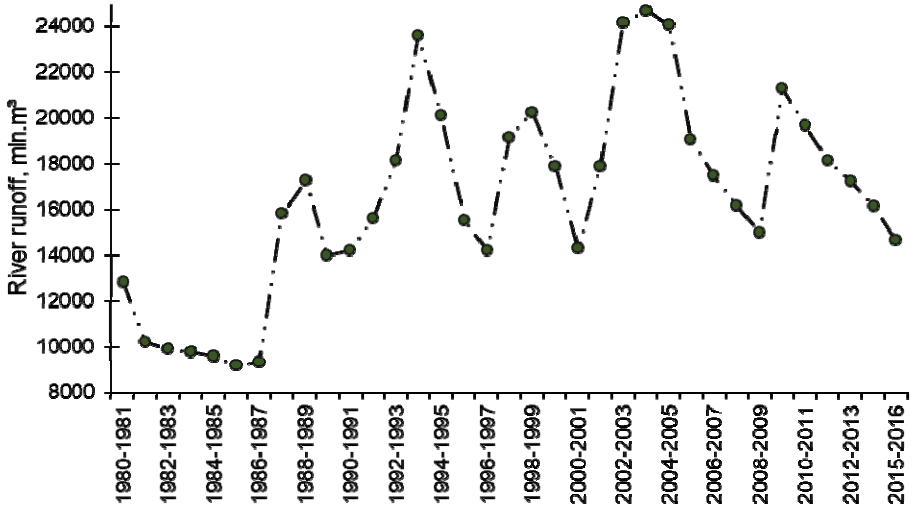

Figure 4 – The runoff of the Syrdarya River (Source:[20]).

The increasing indicators are observed in the period between 1987 and 1989 with higher trends between 1980 and 1989. The inflow to Shardara reservoir in 1987-1989 amounted to 16 917,9 mln.m^3/year (figure 2), and the outflow from reservoir is also high, amounting to 15555 mln.m^3/year (figure 3). In this period, the runoff of Syrdarya River is increasing (figure 4). In the first decade (1980-1989), discharge water from Shardara reservoir was no more than 10508, 6 mln.m^3 per year (figure 3) and the inflow was 12119, 6 mln.m^3/year (figure 2). Then during the second decade of 1990-1999, there are slightly fluctuating inflow to the reservoir (figure 2) and the release from reservoir (figure 3). The highest rates of inflow and discharge are particularly observed within the period 1992-1994 in particular.

The inflow rate within this period is 23411, 4 mln.m^3 (figure 2) and discharge rate is 20744,4 mln.m^3 per/year (figure 3).

Since 1992, for economic reasons, Kyrgyzstan has changed the purpose and mode of the Toktogul reservoir into energy regime. As a result of the transition to the energy regime, winter and summer changed places and this led to floods in winter and, in summer, artificial water scarcity [31]. As electricity needs increase in winter, inflow rate to the reservoir from higher reservoirs increases as well [32]. Intensive use of water resources for power generation, along with changes in the Toktogul operating regime created serious problems in the Syrdarya River in both summer and winter periods. That regime differs significantly from the irrigation regime, although until 1993 its regime was underlined to the irrigation schedule, according to which the reservoir was filled from October to March and discharged from April to September. The simultaneous inflow and discharge is supposed depending on the flow rate in winter regime of Shardara reservoir operating in the energy regime of the upper reservoirs. Water was supplied from January to March. Slightly higher consumption is observed at the beginning and end of the freeze-up, and decreased during vegetation period [33]. We observed that since of changing purpose of Toktogul reservoir the inflow of Shardara reservoir decreased in vegetation period and raised in non-vegetation periods, but outflow raised in the vegetation, non-vegetation periods (figure 5).

During the 1980-2016 period, the discharge rate is equal to 9129, 8 mln.m^3 and inflow rate is 6338 mln.m^3 annually in average in vegetation period (figure 5). But outflow rate is 6060, 7 mln. m^3 and inflow 10 478.9 mln.m^3 annually in average in non- vegetation period (figure 5). The inflow rate higher in non-vegetation period than vegetation period, which explain because for economic reasons, Kyrgyzstan has changed the purpose and mode of the Toktogul reservoir into energy regime. The Toktogul reservoir began intensive use of water in non-vegetation period. The Toktogul reservoir saved water in vegetation period, accordingly the inflow of the Shardara reservoir is low. But outflow of the reservoir lower in non-vegetation period than in vegetation period. Because during vegetative period, demand for irrigation water grows in the lower reaches of the river and discharge rate is quite high accordingly. As well as we can see changes on water area of the Shardara reservoir in vegetation, non-vegetation periods in figure 6.

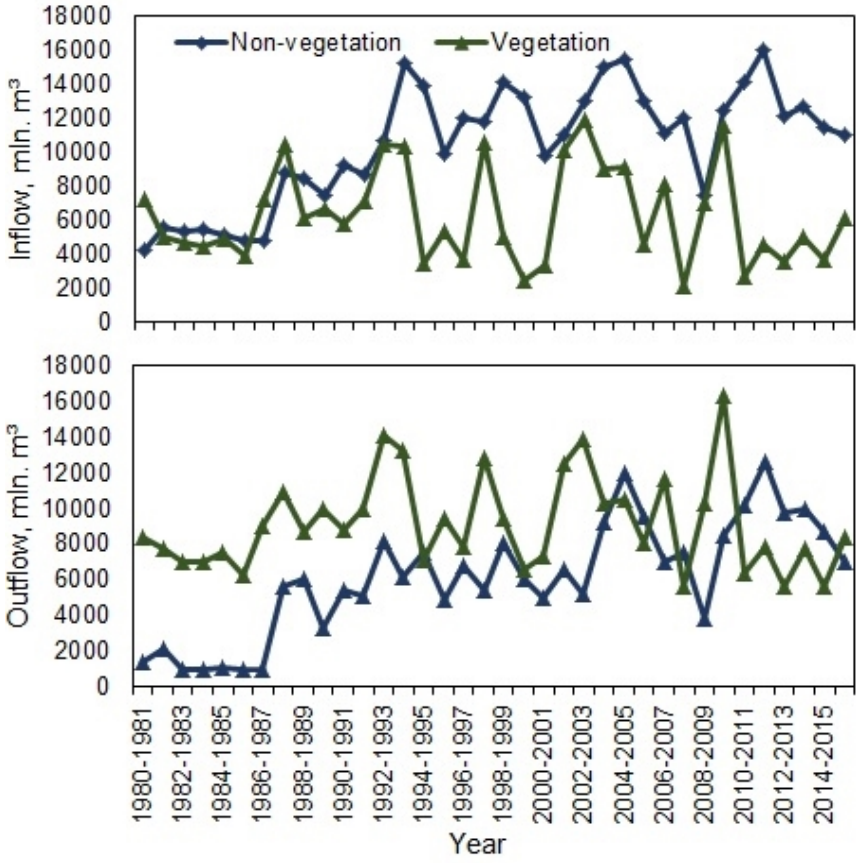

Figure 5 – Dynamics of inflow to the reservoir Shardara outflow from the reservoir in vegetation and non-vegetation periods

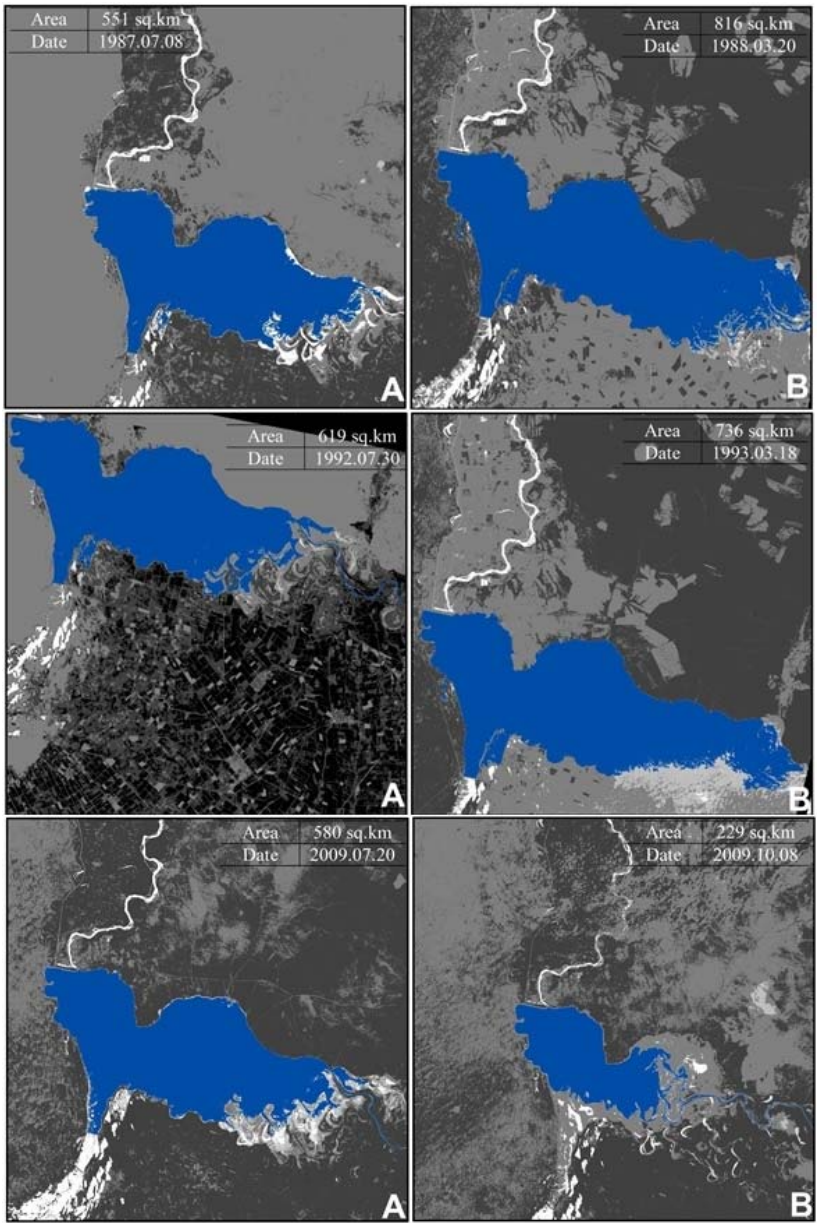

Figure 6 – Changes in the water area of the Shardara reservoir 1987-1988, 1992-1993, 2009 within in vegetation (A) and non-vegetation (B) periods generated using NDWI

In the third decade period 2000-2009, there are slightly fluctuating inflow to the reservoir and the release from the reservoir (figures 2, 3). The largest inflow and release rate was in the period of 2002-2005 where inflow rate to the reservoir is 24540 mln.m^3 (figure 2) and discharge rate from the reservoir is 20330 mln.m^3 per year (figure 3). As a result, Shardara reservoir began to fill up at critical level, and water was discharged to the Syrdarya. That caused flooding in this region [34, 35].

Accordingly, the river flow rose (figure 4). Stable inflow and discharge rates in the reservoir are observed in fourth decade (2010-2016). Only from 2010 to 2014, inflow and outflow parameters showed high level (figures 2, 3).

This can be due to the compensating reservoir constructed in Kazakhstan in early 2011, which took the first 2 bln.m^3 of water. Since flood occurred in South Kazakhstan region in spring of 2008 [36], the compensating reservoir enabled to reduce the forced discharge rate to Aydar-Arnasay lakes system [30]. After that, there is stable decrease of the inflow and outflow (figures 2, 3) and river runoff of the Syrdarya (figure 4). Using statistical tests for estimating Mann-Kendall slope, such a fluctuation in the indices showed that at significance level the inflow and outflow of reservoir have positive trend (figures 2, 3).

Conclusion. The changes on water regimes of Shardara reservoir was investigated in this study, with use of statistical tests of the Mann-Kendall slope estimation. Results revealed that between 1980 and 2016, the trend of inflow to reservoir Shardara and outflow from reservoir to Syrdarya River at significance level have positive trend. The results also indicated strong fluctuation of indicators (inflow and outflow or discharge) for the period (1980-2016). These indicators increased significantly only in the period 1992-1994 and amounted to 23 411, 4 mln.m^3 of inflow and 20 744, 4 mln.m^3 of discharge per year. Accordingly, the river runoff of Syrdarya river, and that occurred because in 1992, the Toktogul reservoir, which located in the upper part of the Syrdarya River was switched to the energy regime. As electricity needs increase in winter, the inflow to the reservoir from the upper reservoirs increases as well. As a result, the ice is formed in the lower reaches of the river in the non-vegetation period that brings the floods in the region. The analysis of Mann-Kendall trends long-term data for the period of 1992-2016 showed that at significance level overall trend release from Shardara to Arnasay lake system is decreasing. During this period, 1899, 5 mln.m^3 of water was discharged from the reservoir to the lakes system. The highest rates (9193, 3 mln.m^3) are noticed between 1993 and 1994 while the lowest rates (0 mln.m^3) are observed in the period 2012-2013.

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ШАРДАРА СУ ҚОЙМАСЫНЫҢ СУ РЕЖИМІНЕ АДАМ ҚЫЗМЕТІНІҢ ӘСЕРІ

Аннотация. Халық санының тез өсуі, азық-түлікке деген сұраныс пен басқа да адами қызмет түрлері әсерінен судың қолжетімділігі бүкіл әлемде кеңінен тараған проблемаға айналуда. Бұл мақала Қазақстандағы Сырдария өзенінде орналасқан Шардара су қоймасындағы адам қызметінің белсенділігінің әсері мен су режимінің өзгеруін қарастырады. Манн-Кендалл трендінің сынағы 1980 жылдан 2016 жылға дейін Шардара су қоймасындағы ағынның өзгеруіне адам қызметінің белсенділігін зерттеу үшін пайдаланылды. Алынған зерттеу нәтижелері, адамның қызметі, әсіресе, ауыл шаруашылығы және электр энергиясын өндіру су қоймасының су режиміндегі өзгерістердің басты факторы болып табылатынын көрсетті. Нәтижелер маңыздылық деңгейінде су қоймаса судың келуі мен шығысы оң үрдіске ие екендігін көрсетті. Жиі су ағынының ауытқуы Сырдария өзенінің төменгі ағысындағы елді мекендерді елеулі әлеуметтік және экономикалық шығындарға әкеп соғуы мүмкін.

Түйін сөздер: Шардара су қоймасы, гидрологиялық параметрлер, ағын, ағыс, Айдар -Арнасай көлдер жүйесі.

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ВЛИЯНИЕ ЧЕЛОВЕЧЕСКОГО ФАКТОРА НА ВОДНЫЙ РЕЖИМ ШАРДАРИНСКОГО ВОДОХРАНИЛИЩА

Аннотация. В условиях быстрого роста населения, спроса на продовольствие и других видов деятельности человека доступность воды становится все более распространенной проблемой во всем мире. В статье рассматриваются изменения водного режима Шардаринского водохранилища в результате деятельности человека, который расположен на реке Сырдария в Республике Казахстан. Тест тренда Манна-Кендалла использовался для изучения влияние человеческой деятельности в изменении притока и оттока в Шардаринское водохранилище в период с 1980 по 2016 год. Результаты исследования показали, что человеческая деятельность, особенно сельское хозяйство и производство электроэнергии, являются основными определяющими факторами изменений в водным режиме водохранилища. Результаты также показали, что на уровне значимости приток и отток водохранилища имеют положительную тенденцию. Колебание воды в притоке и сбросе воды часто приводит к серьезным наводнениям в населенных пунктах в низовьях реки Сырдария, сопровождающимся серьезными социально-экономическими потерями.

Ключевые слова: Шардаринское водохранилище, гидрологические параметры, приток, отток, система озер Айдар-Арнасай.

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PUBLIC OPINION ABOUT THE PERSONALITY AS CRITERION OF DEFINITION OF DISCIPLINARY MEASURES ON COMMON LAW OF THE SIBERIAN NOMADS

Abstract. Practice of activity of the courts of verbal punishment on the basis of norms of common law is studied. The purpose of work is the analysis identification of influence of reputation on the decision of judicial authorities. A subject of article are norms of common law and traditional views of the Siberian nomads.

With application of a historical and legal method and synthesis influence of public opinion and reputation on the judgment of verbal punishment and works of scientists-lawyers is investigated.

The reputation of the person consisted of two components: the attitude of society towards family which part is the personality and reputation of the individual. The reputation of the person was considered by bodies as the proof of guilt or not guilt, truthfulness of indications and other. The author marks out criteria of determination of the status of family and the status of the personality in criminal law. At decision-making the reputation of all participants of process was considered.

Keywords: status of the personality; reputation; status of collective; common law; custom, disciplinary measures; indigenous people of Siberia; nomads; traditional way.

Introduction. Belonging to collective was of great importance as features of housekeeping and a condition of accommodation slowed down allocation of the individual status of the personality. The status of the personality was defined by belonging to a sort and individual characteristics. The reputation of the defendant and other participants of trial was one of the most important factors of determination of guilt.

Methods. By means of historical and legal methods the analysis of influence of public opinion and reputation on the judgment of verbal punishment is carried out.

Discussion. Before the beginning of the 20th century customs remained the main source of the right with the Siberian nomads. The legislation accurately differentiated the interests of the state on the national outskirts and questions of local value. Local customs regulated local questions of the investigation and legal proceedings of separate structures. The offenses committed by aboriginals were considered by traditional vessels (verbal punishment) or the public judicial authorities (district vessels). Treated jurisdiction of district court: indignation; premeditated murder; robbery and violence; counterfeiting; stealing of state and public property. Other offenses were called "claim" and were considered verbal punishment. Verbal punishment at the same time was body of investigation and court. Questions of investigation and legal proceedings were not regulated by the official legislation that led to saving historically developed traditional rules [19].

Features of nomadic economy and severe living conditions assumed a patrimonial unification. Belonging to a sort was the main thing a condition of existence [8]. Features of housekeeping slowed down allocation of the rights and individual's duties. The person was considered as a part of collective. The status of the personality was derivative of the status of collective. The collective provided preservation, action and transfer of life experience to future generations, but also was the main economic unit. Therefore throughout a long time the collective acted as the subject of common law. Functioning of common law is always characterized by a significant role of collective [2, 4, 12, 15], at the same time within

common law the individual status of the personality gradually began to be distinguished [6]. The period of action of common law is the initial stage of formation of the status of the personality, at this stage the importance of collective remains.

Value judgment of acts of the personality is characteristic of common law [14]. In solutions of verbal punishment as justification of use of a coercive measure it is used instructions on reputation of the defendant [11], but not on weight of deeds. As, the family (or a sort) was an economic unit at a nomadic way of life, defining was the social value of collective. The subjectivity has two the being individual status and the status of family which part is the person. The individual status and belonging to collective – a basis for formation of public opinion about the personality, its acts, the importance of its indications and need of public protection of its interests (it is not dependent on in what quality the personality acts: defendant, claimant, witness).

The collective provided action of common law, guaranteed implementation of contractual obligations and decisions of traditional bodies. Therefore the collective beginning interfered with allocation of the rights and individual's duties that allowed to shift duties of the personality to all family members. In process of allocation of the individual status the role of collective decreases. The collective beginning in early sources of the written right remains in the form of institute of mutual responsibility. As criteria of the collective status of family presence of a title at family, a financial position of family, implementation of obligations (payment of debts, taxes, implementation of obligations under marriage agreements, etc.), presence of the family members making before offense, or having "ill fame" acted.

The reputation of family was automatically projected on the personality that formed the relation of society to the individual's acts. In the conditions of maintaining a nomadic way of life of people sought to keep communication with family as the personality economically could not be independent unit. Besides, the personality out of a sort (or families) was in an unprofitable social status as there was no that social group which could undertake providing the arising duties and provide guarantees. It is possible to mark out the following criteria, the individual status:

- presence of a position at the victim and defendant;
- origin and financial position of the victim and defendant;
- behavior and relation of the personality to values of society (way of life, observance of the standard rules of conduct);
- religious affiliation (change of belief was not welcomed by society);
- offense recurrence.

At early stages of development in various people the disciplinary measures were defined with subjective factors [7] that found reflection in early written sources of law.

Reputation of the personality and collective were used as the factor defining the importance of testimony, weight of perfect actions and weight of the caused damage to the claimant [13]. Bringing of the oath (or oaths) was addition to reputation of the personality. Different types of oaths were used:

- the oath of the relative who guarantees execution of the decision (financial compensation) [4];
- the oath of the suspect, for confirmation of innocence [3, 18];
- the oath of the witness, for confirmation of reliability of indications.

Often the oath was the main or only proof of fault of the suspect [3]. The oath or the promise of the defendant was used in case the claimant and the defendant had equivalent reputation, or in case of existence of contradictory proofs. The oath of the witness was not required if the he had positive reputation and high social value in society.

Use of institute of a trial by ordail was considered as the aggravating circumstance or the proof of innocence. Use of ceremonies for receiving accurate information was based on religious beliefs. Ceremonies of bringing of the oath and passing of test used at a lack of proofs. If the ceremony of bringing of the oath was made, then other proofs were not required. The refusal of passing of test or the oath was the proof of guilt of the defendant.

Institute of a trial by ordail and use of the oath it was applied in legal proceedings of many people of the world at early stages of historical development [9, 10, 20]. Adoption of the oath was used as for justification of the defendant (the defendant and/or his relatives swore), and for confirmation of words of the claimant [3]. The collective beginning was reflected also on making decision on use of sanctions, the disciplinary measures could extend not only the defendant and his family members [16] and also to the unfair witness [1].

Results. Bodies of verbal punishment proceeded, first of all, from public opinion and characteristics of the victim and the defendant, and the status of their families. Existence of clear advantage of one of families was the basis of application of softer measure and release from responsibility. At equality of families characteristic directly of participants of trial was the following powerful argument. By offense consideration the reputation not only the defendant, but also the victim and the witness was of great importance. Force of testimonies of the witness had subjective character therefore were not always considered. If the witness had negative reputation, then his indications were not considered. In case witnesses gave opposite evidences, then data of the witness with higher status were considered.

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СІБІР КӨШПЕНДІЛЕРІНІҢ ЖАЛПЫ ҚҰҚЫҒЫ БОЙЫНША ТӘРТІПТІК ШАРАЛАРДЫ АНЫҚТАУ КРИТЕРИЯСЫ РЕТІНДЕ ЖЕКЕ ТҰЛҒА ТУРАЛЫ ҚОҒАМДЫҚ ПІКІР

Аннотация. Жалпы құқық нормалары негізінде ауызша жазалау соттарының қызмет тәжірибесі зерттеледі. Жұмыстың мақсаты сот органдарының шешіміне беделдің әсерін анықтауды талдау болып табылады. Мақаланың тақырыбы – сібір көшпенділерінің жалпы заңдары мен дәстүрлі көзқарастары.

Тарихи-құқықтық әдіс пен синтездеудің қолданылуымен қоғамдық пікірді және ауызша жазаларды және ғалым-адвокаттардың шығармаларын беделіне әсер ету зерттелді.

Адамның беделі екі компоненттен тұрды: қоғамның отбасына деген көзқарасы, оның бір бөлігі жеке тұлғаның және беделінің бірі. Адамның кінәсін дәлелдеу немесе кінәсіздік, дәлелдемелердің шыншылдығы және басқалар сияқты адамның беделін қарастырды. Автор отбасының мәртебесін анықтау критерийлерін және қылмыстық құқықта жеке тұлғаның мәртебесін белгілейді. Шешім қабылдау барысында процеске қатысушылардың барлығының беделін қарастырды.

Түйін сөздер: жеке тұлғаның мәртебесі; беделі; ұжымның мәртебесі; ортақ заң; кедендік, тәртіптік шаралар; байырғы тұрғындары Сібір; көшпенділер; дәстүрлі тәсілі.

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ОБЩЕСТВЕННОЕ МНЕНИЕ О ЛИЧНОСТИ КАК КРИТЕРИЙ ОПРЕДЕЛЕНИЯ ДИСЦИПЛИНАРНЫХ МЕР ПО ОБЩЕМУ ПРАВУ СИБИРСКИХ КОЧЕВНИКОВ

Аннотация. Изучена практика деятельности судов словесной расправы на основе норм обычного права. Целью работы является анализ выявление влияния репутации на решение судебных органов. Предметом статьи являются нормы обычного права и традиционные воззрения сибирских кочевников.

С применением историко-правового метода и синтеза исследовано влияние общественного мнения и репутации на решение суда словесной расправы и труды ученых-юристов.

В статье показано, как репутация лица складывалась из двух составляющих: отношение общества к семье, частью которого является личность; репутация индивида. Репутация лица рассматривалась органами как доказательство виновности или не виновности, правдивости показаний и т.д. Автор выделяет критерии определения статуса семьи и статуса личности в уголовном праве. При принятии решений учитывалась репутация всех участников процесса.

Ключевые слова: статус личности; репутация; статус коллектива; обычное право; обычай, меры взыскания; коренные народы Сибири; кочевники; традиционный уклад.

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METHOD AND DEVICE FOR MODULUS REDUCTION

Abstract. Is considered the possibility of accelerating one of the basic time-critical operations for the asymmetric cryptographic algorithm RSA - modulus reduction. The method for fast determination of residue of number by modulus and its implementation offered. Is used the idea of increased module. Alternative methods of modulus reduction are known, they require large hardware cost. Is developed device for modulus reduction, characterized by high speed with optimal costs hardware. For the calculations used combinational circuits that are characterized by high speed and low cost hardware. Is considered the step by step the work of device and the illustrative examples. Device can be used in cryptoprocessors, in digital computing systems to accelerate the division operation, for formation elements of finite fields, in computing systems using modular arithmetic.

Keywords: hardware encryption, asymmetric cryptoalgorithms, modular reduction.

Introduction. According to the leading world experts, by 2020 a quarter of the world economy will be digital. Social networks and mobile applications are actively used in education and for communication of people in society. The share of Internet users and ICT, and in Kazakhstan, too, is steadily growing [1, 2].

But these new technologies bring not only new opportunities with them, but also new problems of ensuring information security. One of the most reliable ways to ensure the protection of information stored in electronic form is cryptographic protection. Cryptographic algorithms (symmetric and asymmetric) provide transform plaintext into ciphertext by encrypting source text.

Using asymmetric encryption algorithms easier compared with symmetric encryption algorithms, since there is no need to transmit the secret key. However, their use limited by low speed, as the encryption and decryption algorithms of asymmetric cryptographic procedures employ more complex and cumbersome mathematical calculations than symmetric cryptographic algorithms [3].

To increase the speed of cryptographic systems, it is necessary to use a hardware implementation of cryptographic algorithms, which increases the speed of cryptographic algorithms by 60 times compared with the software implementation, and provides better protection. This is not the only advantage of hardware encryption [4]. The keen interest in hardware realization of asymmetric cryptoalgorithms, in particular an algorithm of RSA that used in the majority of international and national standards on protection and safety of information.

For a hardware implementation of RSA encryption and decryption developed special processors. These processors, implemented on ultra-large integrated circuits (VLSI), allows perform RSA operations associated with the exponentiation of large numbers in a very large degree modulo P in a relatively short time.

However, the RSA hardware implementation performs encryption and decryption operations about 1000 times slower than the hardware implementation of the DES - symmetric cryptographic algorithm. Such a significant difference in speed arises from the fact that RSA uses the exponentiation of multi-digit numbers (numbers with the order of 10^{309}) to a very large degree modulo *P*. RSA laboratory recommends to use keys of size 1024 bits for common tasks, and for more important tasks keys 2048 bits and more. For

example, a key with a length of 4000 bits to achieve the 3rd level of security and a key with a length of 8000 bits to achieve the 4th level of security by the standard of the Republic of Kazakhstan ST RK 1073-2007 is prescribed [5].

One approach to improve the performance of public-key cryptosystems is to accelerate the performance of basic operations of asymmetric cryptoalgorithms, such as multiplication, exponentiation and reduction modulo.

Patents and articles offer various circuit solutions of devices for modulus reduction - the most complex basic operation. The devices implement various methods for obtaining modulo residue. Most of the methods are based on the polynomial representation of the reducible number A in binary number system. Various approaches are used to obtain the remainder R_i modulo P: preliminary obtaining multiples of the module P with their subsequent parallel subtraction from the given number A; obtaining residues modulo P from the weights of the digits 2^i, followed by their summation modulo P depending on the corresponding coefficient a_i of the reducible number A; use of preliminary calculations with preservation of results (Montgomery method); Barrett's algorithm; tabular calculators; conveyors for subtracting the module P from the reducible number of A and others [6-18].

The majority of high-speed devices is characterized by large hardware costs that are directly proportional to the quantity of bits of used numbers. Therefore, their use is problematic when applying multi-digit numbers.

Formulation of the problem. The goal of this work is to find ways to increase the speed of the hardware implementation of asymmetric cryptosystems by accelerating the most complex basic operation - reduction modulo using the idea of an increased module P [19].

The task is to accelerate the determination of the remainder of the number for arbitrary modulus with the optimization of hardware costs. Below we propose a method for obtaining a modulo residue for a high-speed device that allows to perform reduction modulo with optimal hardware costs.

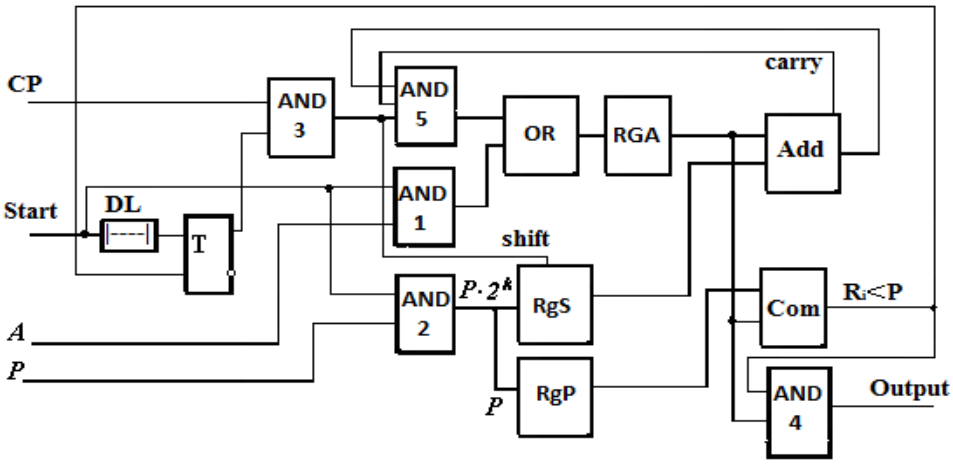
Methods. The proposed method is based on the classical iterative division method with a divider shift characterized by minimal hardware costs and low speed, which was adapted to produce a residue and modified to accelerate the production of a residue.

The method of obtaining the modulo residue, implemented in the device, is based on the fact that when the remainder R is obtained from dividing the initial number A by an arbitrary module P, successive subtraction from the number of the module $R = ((... ((AP) -P) - P) - ...) -P)$, is replaced by subtracting the increased module $P \times 2^k$ (using an additional code), where k is the difference between the digit capacity of the number A (excluding the leading zero bits) and the number P. Then from received partial remainders R_i, the values of $P \times 2^{k-i}$ $(i = 1,2, ... k)$ are subtracted. These values obtained by shifting the increased module to the right by one digit at each iteration (halving) until the next residual R_i will not be less than P. The subtraction of $R_{i+1} = R_i - (P \times 2^{k-i})$ is performed at each iteration. If the remainder R_{i+1} is negative, then it is not used. Otherwise, the previous residue R_i is replaced by the resulting residue R_{i+1}. The analysis of the obtained residue R_{i+1} eliminates negative residues and ends the reduction process modulo at $R_i < P$ on any iteration, which speeds up the generation of the remainder.

Results. Figure shows a structural scheme of a device in which the method proposed above is used to determine the modulo residue. This device is a modification of the device for the formation of a residue by arbitrary module patented in the Republic of Kazakhstan [19]. Description of the device is given below.

The *Start* signal allows the initial number A to be written through the *AND1* circuit group and the *OR* circuit group in the *RgA* register (in the register *RgA* is initially the A number, then the remainder R_i), the module P is written through the *AND2* circuit group in the *RgP* register and in the upper bits of the shift register *RgS* (in the shift register is initially $P \times 2^k$, after the shift $P \times 2^{k-i}$). The same *Start* signal with a delay sets the trigger T to one state via the delay element *DL*. A single potential from the direct output of the trigger T is fed to the circuit *AND3*, allowing further passage of the clock pulses from the *CP* input through the circuit *AND3* for clocking the operation of the device. The initial number A is considered as the zero residue of R_0. The residual R_i codes (initially $R_i = A$) from the *RgA* register and the P module from the *RgP* register are sent to the comparison circuit *Com*. Determined by $R_i < P$ or not.

The *Start* signal allows the initial number A to be written through the *AND1* circuit group and the *OR* circuit group in the *RgA* register (in the register *RgA* is initially the A number, then the remainder R_i), the module P is written through the *AND2* circuit group in the *RgP* register and in the upper bits of the shift



Structure of the device

register *RgS* (in the shift register is initially $P \times 2^k$, after the shift $P \times 2^{k-i}$). The same *Start* signal with a delay sets the trigger *T* to one state via the delay element *DL*. A single potential from the direct output of the trigger *T* is fed to the circuit *AND3*, allowing further passage of the clock pulses from the *CP* input through the circuit *AND3* for clocking the operation of the device. The initial number *A* is considered as the zero residue of R_0. The residual R_i codes (initially $R_i = A$) from the *RgA* register and the *P* module from the *RgP* register are sent to the comparison circuit *Com*. Determined by $R_i < P$ or not.

If $R_i < P$, then at the output of the comparison circuit *Com*, a signal "1" is generated, which, through the group of schemes *AND4*, allows the output of the number R_i from the output of the register *RgA* to the output of the result. The same signal zeroes the trigger *T*, the passage of the clock pulse is prohibited, the formation of the remainder is completed. Otherwise, the process of finding the remainder continues since at the same time, the residual R_{i+1} is formed on the combinational adder *Add* by subtracting $R_i - (P \times 2^{k-i})$. In the first step, the remainder of R_i is equal to *A*, *i* is equal to "0". When subtracting, a carry signal from the most significant bit of the combinational adder, equal to "0" or "1" will be generated.

The value of the carry signal depends on the ratio between R_i and $(P \times 2^{k-i})$.

If $R_i < (P \times 2^{k-i})$, then the remainder R_{i+1} will be negative. In this case, the carry signal from the high-order combinational adder *Add* is “0” and the resulting residue R_{i+1} is not used.

If the remainder R_{i+1} is positive, then the carry signal “1” is generated from the combinational adder *Add* ($R_i \geq (P \times 2^{k-i})$). These signal allows the previous residue R_i in *RgA* to be replaced with the resulting residue R_{i+1}. With the arrival of the clock pulse *CP* from the output of the *AND3* circuit, this carry signal allows transferring the received remainder R_{i+1} from the outputs of the combinational adder *Add* via the *AND5* circuit group and the *OR* circuit group to the *RgA* register. The resulting residue R_{i+1} is written to the *RgA* register. The same clock pulse from the output of the *AND3* circuit is arrive to the shift input of the shift register *RgS*, performing a shift of the increased module $(P \times 2^{k-i})$ in the shift register *RgS* to the right by one bit, reducing at half.

Further operation of the device is carried out similarly. The process continues until the next residue R_i becomes less than *P* ($R_i < P$).

For each clock pulse, if a carry signal “1” is present from the high-order bit of the combinational adder *Add*, it is allowed to write into the *RgA* register the next R_{i+1} residue from the outputs of the combinational adder *Add* instead of the previous R_i and shift the increased module in the shift register *RgS* to the right by one bit. Therefore, the delay time of the *Start* signal on the delay element *DL* to set the trigger *T* to one state, allowing the passage of clock pulses, and the period of clock pulses must exceed the sum of the signal propagation time through the elements *AND1 (AND5), OR*, the write time in the register *RgA*, the subtraction time on the combinational adder *Add*. The shift time in the shift register *RgS* of the $P \times 2^{k-i}$ value is not taken into account, since the shift is performed simultaneously with the signal propagation through the elements *AND1 (AND5)*, *OR*, and with the writing to the *RgA* register. The response time of the comparison circuit *Com* is also not taken into account, since the comparison is performed simultaneously with the subtraction operation on the combinational adder *Add*.

Examples. Example 1. The following is an example of the operation of a modular device for the case when $A=111_{10}=1101111_2$, $P=13_{10}=1101_2$, $k=7-4=3$, $P\times 2^k= P\times 2^3=1101000_2=104_{10}$.

In this case, the capacity of *RgA, RgS* and *Add* is equal 7 bit.

By the *Start* signal, the binary code of the number *A* (1101111) is written into *RgA*, the binary code of the *P* module (number 1101) is written into *RgP, P* × 2^3 (number 1101000) is written into *RgS*. The same Start signal with a delay, since it passes through the delay element *DL*, will set the trigger *T* to the state "1".

In the *Com* comparison circuit, numbers *A* and *P* are compared. Since *A*>*P*, the signal "1" is not generated at the output of the *Com* comparison circuit. There is no permission to issue a code from *RgA* to the output of the device, the process continues.

At the same time, on the combinational adder *Add*, subtraction $R_1 = A- (P \times 2^3)$ is performed using the additional code (a.c.) of the increased module $P \times 2^3$ located in *RgS*:

$$R_1 = 1101111-1101000 = 1101111+0011000_{\text{a.c.}}= (1)\ 0000111.$$

The carry from the higher order bit in this example is presented in parentheses for clarity. The carry signal is equal to "1", since the remainder of R_1 is positive ($0000010_2 = 2_{10}$), and it will be used.

Through the *AND3* circuit, the first clock pulse goes to the third (enable) inputs of the *AND5* circuit group, the first (informational) inputs of the *AND5* circuit group come from the output of the combinational adder *Add* calculated residue R_1. To the second (enable) inputs of the AND5 group of circuits, the signal "1" is received (the carry from the high-order bit of the combination adder Add).. The remainder R_1 is written to *RgA*. The value of *RgA* will change and become equal to 0000111. This same clock pulse shifts the content of *RgS* to the right by one digit: $P \times 2^3$ decreases twice and becomes equal to $P \times 2^2 = 0110100$.

The process is repeated. On comparator circuit compares the obtained residue R_1 and *P*.

Since $R_1<P$, then the output of the comparison circuit generates a signal equal to "1", which through the *AND4* circuit group allows the output of the number R_1 (00000111) from the output of the *RgA* register to the output of the device. The same signal zeroes the trigger *T* (the passage of the *CP* clock signals is prohibited). The formation of the residue is completed; the residue is $00000111_2 = 7_{10}$. To calculate the remainder, one clock pulse was required.

Using the classic fast division method without restoring the remainder, seven clock pulses would be required to calculate the remainder.

Example 2. Below is an example of the operation of the device for determining the remainder of the number for arbitrary modulus for the case when $A=234_{10}=11101010_2$, $P=19_{10}=10011_2$, $k=8-5=3$, $P\times 2^k= P\times 2^3=10011000_2=152_{10}$.

In this case, the capacity of *RgA, RgS* and *Add* is equal 8 bit.

Intermediate results and the final result for each clock pulse are shown in table (for compactness, the results are recorded in the 10th number system).

Calculation Results

Clock pulse	*Start*	1	2
RgA	234	82	6
RgP	19	19	19
RgS	152	76	38
Result at the output of the comparison circuit *Com*	0	0	1
Result at output of Combinational adder *Add*	234-152 = 82 carry = 1	82-76 = 6 carry = 1	6-38 = -32 carry = 0
Result at the device output *Output*	0	0	6

The formation of the residue is complete, the residue is $00000110_2 = 6_{10}$. Calculation of the remainder required two clock pulses. Using the classic fast division method without restoring the remainder, eight clock pulses would be required to calculate the remainder.

Conclusion. When using the classic fast division method without restoring the remainder the obtaining remainder requires *m* clock pulses, where *m* is the digit capacity of *A*. When using the division acceleration method with simultaneous determination of two partial quotients, the obtaining remainder requires *m/2* clock pulses.

When using the proposed algorithm and device to obtain the remainder of dividing the number *A* by the module *P*, one to *k* clock pulses are required (depending on the ratio of the values of the number *A* and the module *P*). Always *m>k* is, then the time benefit will be for any ratios of the values of the number *A* and the module *P*.

In the proposed device for determining the residual from the number for arbitrary modulus combinational circuits are used, which are characterized by high speed and low hardware costs.

The practical application of this device allows you to speed up the reduction modulo in cryptoprocessors. The device can also be used in digital computing systems to accelerate the operation of division, in systems for the formation of elements of finite fields, in computing systems operating in the SRC (system of residual classes).

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ЖЫЛДАМДЫҒЫ ЖОҒАРЫ МОДУЛЬГЕ КЕЛТІРУ ҚҰРЫЛҒЫСЫ

Аннотация. Криптожүйелерді аппартты жолмен іске асыру олардың жылдамдығын арттыруға мүмкіндік береді. Алайда асиммериялық криптоалгортмдердің төмен жылдамдығы олардың қолданылуын шектейді. Көп қолданысқа ие асимметриялық криптоалгоритм RSA шифрлау алгоритмі болып табылады. Модульге келтіру операциялар ішіндегі RSA алгортмін іске асыруды баяулататын уақыт бойынша ең қиыны болып табылады. Қалдықты екі разрядқа солға жылжытатын бөлу әдісінің түрөзгерсі қолданылатын жылдамдығы жоғары модульге келтіру құрылғысының құрылмы ұсынылады. Бұл қалдық алуды екі есеге жылдамдатуға мүмкіндік береді.

Түйін сөздер: аппаратты шифрлау, асимметриялық криптоалгоритмдер, модульге келтіру.

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МЕТОД И УСТРОЙСТВО ДЛЯ ПРИВЕДЕНИЯ ЧИСЕЛ ПО МОДУЛЮ

Аннотация. Рассматривается возможность ускорения критичной по времени одной из базовых операций асимметричного криптоалгоритма RSA - приведения по модулю. Предлагается метод ускоренного определения остатка по произвольному модулю от числа и устройство реализации метода. Используется идея увеличенного модуля. Разрабатывается устройство приведения по модулю, обладающее повышенным быстродействием при оптимальных аппаратных затратах. Для вычислений используются комбинационные схемы, которые характеризуются высоким быстродействием и малыми аппаратными затратами. Приводится пошаговое описание работы устройства и иллюстрационные примеры. Устройство приведения по модулю может применяться в криптопроцессорах, цифровых вычислительных устройствах для ускорения операции деления, в устройствах для формирования элементов конечных полей, в вычислительных устройствах, использующих модулярную арифметику.

Ключевые слова: аппаратное шифрование, асимметричные криптоалгоритмы, приведение по модулю.

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ORGANIZATIONAL ACTIVITIES TO STIMULATE THE ENTREPRENEURIAL ACTIVITY IN TOURISM

Abstract. The purpose of the work is to form an organizational mechanism to stimulate entrepreneurial activity in the tourism sector. For this was determined the role of each subject of the mechanism, in particular, the state and the private sector. The article analyzes the current legislation in the field of tourism and other measures to stimulate tourism entrepreneurship in Kazakhstan and countries with high tourist flow. Moreover, the experience that can be applied in the conditions of development of tourism in Kazakhstan.

The result of the work was the formation of the organizational elements of a mechanism to stimulate entrepreneurship in tourism based on the experience of countries with highly developed tourism. Within the framework of individual organizational elements are determined specific actions (measures) and the final result of their implementation.

The field of application of the research results is the activity of subjects of the tourist industry at all levels: the state, private business, industry organizations, infrastructure support. The research results will help to use the huge tourist and recreational potential of Kazakhstan, by increasing the activity of entrepreneurs in tourism.

Key words: tourism, entrepreneurial activity, stimulation, organizational mechanism.

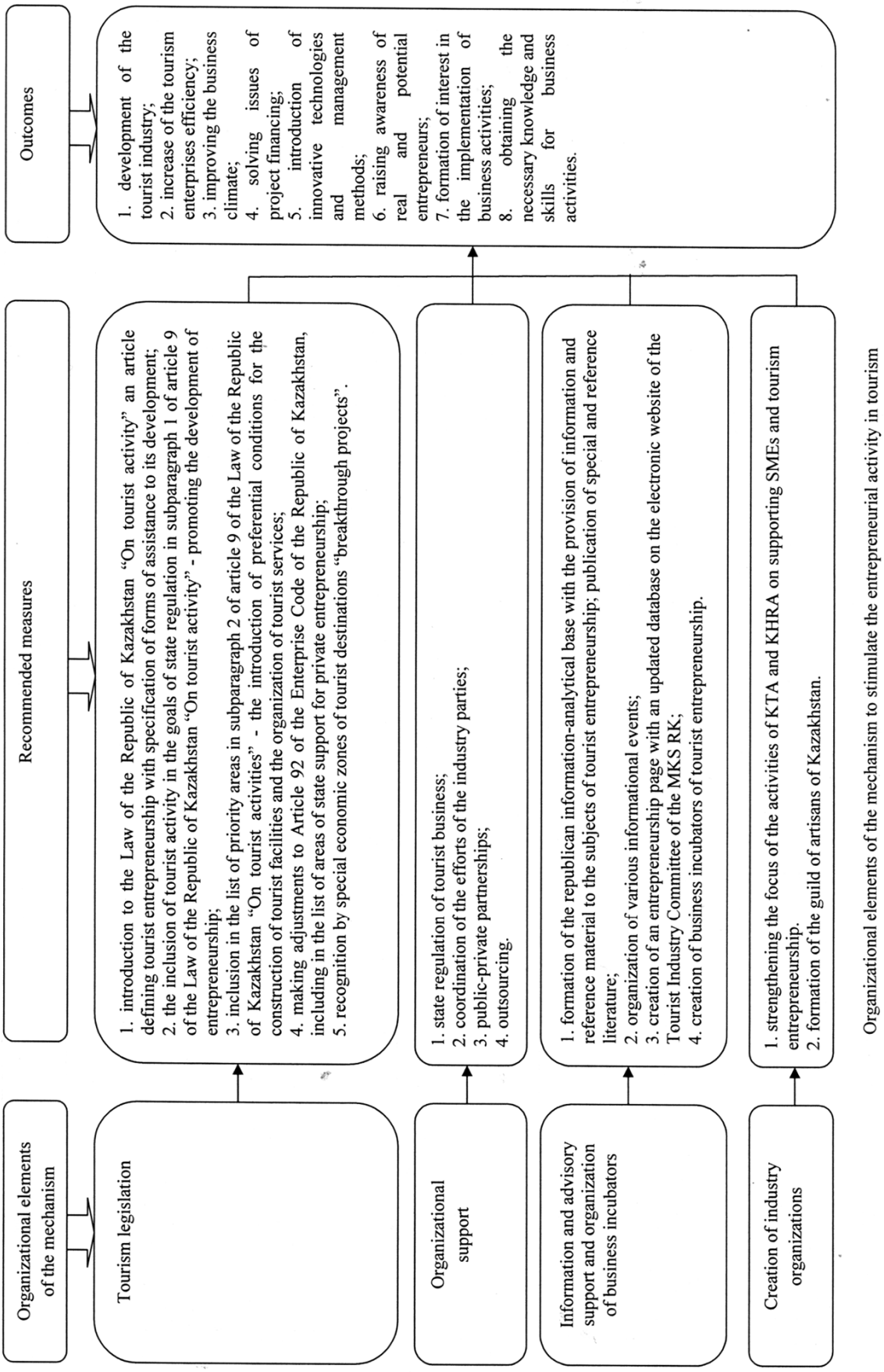
Introduction. The organizational mechanism for stimulating entrepreneurial activity in the tourism industry should be a system and / or a combination of elements, methods, forms, and ways of stimulating entrepreneurship in the tourism industry, which can significantly influence the sustainable development of tourism. The components of this system were determined by analyzing the experience of countries with highly developed tourism and the situation with the development of tourist entrepreneurship in the Republic of Kazakhstan.

Results and discussion. The organizational mechanism should be able to quickly respond to changes in the external environment, preempt the negative impact of negative factors, concentrate and implement the efforts of all measures to stimulate entrepreneurial activity.

Let's look at the activities consisting the organizational mechanism, presented in figure.

The first element to pay special attention to is organizational support. Tourism, as an industry, includes many interrelated entities and agents involved in the production of tourism goods and services. Given this, tourism policy should not be viewed in isolation, but within its broader context [1]. The links between different sectors together create a peculiar mix that promotes the development of tourism in the short and medium term. Under these conditions, government decision-making functions are now particularly important for coordinating efforts aimed at ensuring a steady growth in tourist arrivals and sustainable tourism development. The scattered nature of responsibility for development, distributed over a complex network of participants in the private and public sectors, determines the complexity of managing the tourism industry.

The private sector, which is the main producer and supplier of tourist goods and services, consists mainly of a multitude of economic units, determined depending on their size and scale (micro, small,



Organizational elements of the mechanism to stimulate the entrepreneurial activity in tourism

medium and large enterprises / local, regional, national) that are in different areas activities: from production, trade, transport to a wide range of services, which ultimately determines the somewhat fragmented nature of the hypothetical tourism sector. The public sector, whose fundamental role is to exercise a regulatory function in relation to various spheres of activity and has a decisive influence on the development of tourism in a country or region (infrastructure development, planning, transport policy, financial issues, employment, etc.), is also characterized by diversity parties involved. This variety can be realized in two dimensions: horizontal and vertical. Horizontal measurement is carried out, as a rule, by two or more ministries or departments, agencies, etc. In this case, each of the participants is responsible for different types of tourism in accordance with their level. Vertical measurement takes into account different levels of government (local, regional, national) in accordance with the existing territorial organization of the country [2].

The dynamics of tourism growth, as well as the need to increase its contribution to development, reinforce the need for the participation of various subjects of the public, private and social sectors in the production of services at any level in order to reach agreements and complementarities that relate to opportunities and resources in order to achieve synergism.

International practice proves that public tourism administrations at the national level should play a fundamental role. It is the absence of such leadership that, in the overwhelming majority of cases, makes it difficult for them to play the role of a center of public policy networks capable of formulating and coordinating platforms for discussion, analysis and/or negotiation on issues that affect the outcome.

It is generally recognized that a certain degree of state intervention in the development of tourism is important; however, the extent of such intervention remains the subject of intense debate. Inevitably, much depends on the political and economic framework in which tourism develops. For example, in less developed countries, it is likely that the state will play a more active managerial and entrepreneurial role in the development of tourism [3]. Conversely, in developed countries with a diverse, mature private sector (and where tourism is likely to make a less significant contribution to overall economic activity), the role of government will be focused on support and simplification, rather than direct intervention. In any case, the government is responsible for formulating a tourism development policy and providing appropriate legislative, administrative and planning tools to optimize the benefits of tourism in the country in a global competitive environment.

For example, the intensive growth of tourism and hotel business in Turkey over the past twenty years is directly related to the very active role of public administration. It was the result of government support since 1982 that Turkey entered the top most visited countries in the world. The role of government in the case of Turkey far exceeds the usual practice of most other countries in the world in creating favorable institutional conditions or a suitable investment climate for attracting potential investors through various grants, tax breaks, subsidized financing, financing municipal infrastructure, etc. The Turkish government has the right to intervene directly to existing property rights (nationalization). The law provides for direct public investment in the provision of infrastructure for tourism in order to ensure maximum attractiveness for private capital [4].

According to M. Lerner and S. Haber, the role of state support can influence the economic and non-economic opportunities that are necessary to create the conditions for small business development. Governments provide a common economic framework that actively encourages growth while at the same time eliminating unnecessary restrictions or burdens [5].

A number of foreign researchers define the responsibility of local municipalities in the areas as follows:

1. creation of a directory service for tourist enterprises;
2. identifying opportunities for small businesses in the field of tourism;
3. management and training;
4. networking;
5. providing incentives for tourism enterprises [6].

In addition to Turkey, other successful examples of state support for the tourism industry can be noted. For example, in the Republic of South Africa, there is a program to support access to international markets and a program to improve the quality of SMEs in the field of tourism, which involve reimbursement by the state from 30% to 50% of qualified expenses for participation in exhibitions, roadshows, obtaining quality marks (HACCP, ISO) and others [7].

In addition, it is important to develop forms of interconnection between the government and other institutions (public and private, non-governmental and / or social sector) for the provision of certain public services, either jointly or through a delegation.

In this regard, it should be recalled that none of the state administrations, however large, developed or well-funded, today can independently solve the problems of globalization. Today, government agencies need to adopt or deepen co-management mechanisms, both with other government agencies and with private organizations, as well as with the public, in order to achieve a level of efficiency. In this context, public-private partnerships are particularly important, as defined by the instruments for creating relevant changes in public administration[8].

Government tourism management is a government practice aimed at effectively managing the tourism sector at different levels of government through forms of coordination, cooperation and/or cooperation that are efficient, transparent, helping to achieve the goal of collective interest through agreements based on recognition of interdependencies and shared responsibility. In essence, coordination can be understood as a process aimed at ensuring coherence and structure of public policy, giving preference to the development of comprehensive policies to achieve strategic goals. Coordination is also recognized as a procedure to avoid duplication in public policy; ensure consistency; minimizing political and bureaucratic conflict related to the distribution of functions, and encouraging the development of a concept that affects different sectors to broaden the scope of public policy [9].

The interaction between a wide range of participants and agents, both public and private, is essential and indispensable for the production of consumer goods and services for tourism.

There are various forms of public-private cooperation. The most common are external contracts that entail cooperation with a state-owned enterprise, as well as with outsourcing.

The concept of partnership was defined in the early 1990s, when the British government developed the idea of Public-Private Partnerships, transforming the role of public administration from one service provider to another to work by private organizations. By definition, the United Nations partnership is “a form of cooperation or common effort between the public and private sectors for development, construction, operation and financing, formalized by a series of interrelated agreements between public and private agents defining their respective rights and obligations in accordance with existing legal and regulatory and political framework" (UN, 2000). For the European Commission, partnerships are various forms of cooperation between government agencies and the business world designed to guarantee financing, construction, renovation, management or maintenance of infrastructure or the provision of services [10].

Outsourcing is becoming increasingly common in public administration, especially at the local level, where conditions make this tool particularly useful. This growing prevalence stems from the fact that outsourcing improves specialization and activities that increase the value and use of technology and the potential of the private sector for innovation, helping to increase the efficiency and effectiveness of public administration, as well as the quality of its products and services.

According to Olias de Lima, outsourcing implies previously existing activities in a public organization, which was allocated budgetary resources and personnel, which for various reasons were decided to be placed outside the organization to buy from an external agent. It consists of an exchange or transaction, since the State Administration does not lose ownership and can reorganize it when it deems it appropriate. It also identifies four characteristics of an outsourcing feature: an agreement or contract with the private sector for the production of a good or service in specific quantities and of a certain quality; government funding, since the service continues to be charged to the Administration, the Administration’s responsibility for the quality of the service provided and the supervisory function of the administration, according to which it retains the right to inspect and control the service [10].

As international practice shows, often public administration at the national and especially local levels does not have the necessary critical mass as an institution for managing more complex forms of public-private cooperation, which, like outsourcing, requires a number of complex activities, ranging from thorough disaggregation of functions to creating clear and measurable goals; setting standards to monitor and measure the quality of services.

Public-private cooperation relationships tend to grow with the use of mechanisms established with due regard to the need to facilitate interaction between different state administrations, between them and third parties, in order to achieve a common goal. Such mechanisms are, at a minimum, sectoral in nature,

which can even be developed at the international level to address specific issues in a particular sector with the participation of the parties, as well as cooperation mechanisms that are of an instrumental nature, such as cooperation agreements, joint plans and programs, consultations etc.

One of the successful examples of the use of public-private partnership models is also the Republic of Turkey. The results of this partnership are obvious. For example, through a public-private partnership, a third airport is opened in Istanbul. Private investment in this project amounted to 10.2 billion USD. At the same time, private companies that have invested in the project will operate the airport for 25 years and then be transferred to the state. According to experts, the expected revenues of private companies will be about 22.2 billion USD [11].

The practice of coordinated action takes place and can be taken into account when forming your own tourism development strategy. So, the Council for Tourism Policy was created in the United States (TPC), which includes representatives of more than 18 agencies and departments. The purpose of the council is to develop commitment and policy coordination between federal agencies with the private sector and state, territorial, and local governments. This synchronous approach focuses on identifying and collaborating in areas of common political interest and strengthening the links between policy areas [5]. Similarly, in 2013, an intergovernmental Cabinet on tourism was established in Mexico, whose actions are aimed at better coordinating all levels of government, including actions and budgets of federal agencies, integrating the implementation of the National Tourism Policy. The Tourism Office, chaired by the president, includes the ministers of foreign affairs, finance, environment and natural resources, economics, communications and transport, agriculture, urban and rural development, the federal executive adviser and the head of the presidential office. The Tourism Cabinet serves as a public policy planning tool, where recommendations on planning and institutional coordination are discussed and prepared; infrastructure; registration, quality and accreditation of tourism services; investment; security and others. In 2013, the so-called “contracts of appointments” have been used to unite the efforts of the interested parties to promote the tourist destinations of France. The purpose of the contracts is the joint actions of stakeholders in a common project that demonstrates the tourist potential of specific destinations. Target contracts define the obligations of public and private actors in the tourism industry in accordance with the overall strategy to be achieved by developing and implementing specific actions to update the quality of the destination offer and ensure effective communication with correctly defined target markets [5].

In Kazakhstan, also in accordance with Article 13 of the Law of the Republic of Kazakhstan “On Tourism Activities in the Republic of Kazakhstan”, the Council for Tourism was approved as a consultative and advisory body under the Government of the Republic, consisting of representatives of the authorized body and interested state bodies, as well as representatives of associations and other associations in the field of tourist activities [8]. According to the resolutions of the Government of the Republic of Kazakhstan dated February 22, 2017 No. 85; 22.06.2017 No. 385 The Council, chaired by the Minister of Culture and Sports, includes: the Chairman of the Tourism Industry Committee, First Deputy Minister of Foreign Affairs, Executive Secretary of the Ministry of Finance, Deputy Ministers of Culture and Sports, Energy, National Economy, Investment and Development, Labor and social protection of the population, health, education and science, agriculture, deputy minister of internal affairs, deputy akims of regions, chairman of the board of the National Chamber of Entrepreneurs Republic of Kazakhstan, Deputy Chairman of the Board of the Kazakhstan Institute for the Development of Industry Joint-Stock Company, President of the Kazakhstan Tourist Association, President of the Kazakhstan Association of Hotels and Restaurants, Chairman of the Environmental Union of Kazakhstan’s Associations and Enterprises Tabigat, President of the National Confederation of Tourist Organizations of Kazakhstan and others [12].

In accordance with paragraph 12 of the approved Regulation on the Tourism Council, Council meetings should be held as necessary, but at least once a quarter [11]. However, according to the available data, the specified condition is either not fulfilled or is not covered in official sources, which contributes to a reduction in the level of responsibility of the participants and the translation to the formal character of the Council’s activities. In order to improve the efficiency of the Council’s work, in our opinion, annual summing up of the development of tourism in the country at a meeting of the Tourism Council should be included, followed by the publication of the results in the general press. Such a condition, firstly, will increase the Council’s responsibility, and secondly, it should help stimulate tourism entrepreneurship.

It is necessary to make a number of adjustments to the legislation in the field of tourism. So, despite the fact that the bulk of tourist enterprises are small and medium-sized businesses, the Law of the Republic of Kazakhstan "On tourist activity" does not pay enough attention to the problem of the development of tourist entrepreneurship. In this Law, entrepreneurship is mentioned only once in Article 12 as the competence of local executive bodies (akimats) of oblasts, cities of republican significance, the capital, districts, cities of regional significance. According to this article, the local executive body of a region, a city of republican significance, the capital, develops and supports entrepreneurship in the field of tourist activity as a measure of increasing employment of the population [10]. This wording does not take into account the main purpose of entrepreneurship as an engine for the development of the tourism industry (construction of tourist facilities, tourist infrastructure, organization of types of tourism, increase in tourist arrivals, etc.). Therefore, we consider it necessary to introduce into this Law an article on entrepreneurship in tourism, specifying the forms of promoting its development. In addition, Article 9 of the Law requires the following adjustments:

- to include in the objectives of state regulation of tourist activities in subparagraph 1 - promoting the development of entrepreneurship;
- to include the introduction of preferential conditions for the construction of tourist facilities and the organization of tourist services in the list of priority areas in subparagraph 2.

Currently, issues of state support for business activities in the Republic of Kazakhstan are regulated within the framework of the Entrepreneurial Code of the Republic of Kazakhstan, as well as certain legislative acts, such as the Tax Code of the Republic of Kazakhstan, the Law of the Republic of Kazakhstan "On Special Economic Zones", the Law of the Republic of Kazakhstan "On Public-Private Partnership "[7]. According to Article 91 of the Entrepreneurial Code of the Republic of Kazakhstan, the state support of private entrepreneurship is understood as a set of state measures to stimulate the development of private entrepreneurship, create favorable legal and economic conditions for the implementation of entrepreneurial initiatives in the Republic of Kazakhstan [13].

In accordance with Article 93 of the Entrepreneurial Code of the Republic of Kazakhstan, state support for private entrepreneurship includes the following main types:

1) financial and property support;
2) infrastructure support;
3) institutional support, consisting in the creation and development of financial institutions for the support and development of private entrepreneurship, research institutes under state bodies for studying problems and developing proposals for the development of private entrepreneurship;
4) information support, which consists in information-analytical, educational and methodological, scientific and methodological support of private entrepreneurship.

It should be noted that the tourism industry is not highlighted as a separate direction of state support. Thus, in accordance with Article 92 of the Entrepreneurial Code of the Republic of Kazakhstan, state support for private entrepreneurship is carried out in the following main areas:

1) small and medium enterprises;
2) agro-industrial complex and non-agricultural types of entrepreneurial activity in rural areas;
3) industrial-innovative activity;
4) special economic zones;
5) investment activity;
6) entrepreneurship of domestic producers of goods;
7) housing [13].

In this regard, the subjects of tourism activities can receive support from the state only in the framework of measures envisaged for small and medium-sized businesses, special economic zones and investment activities. We consider it necessary to include tourism in the list of directions of state support for private entrepreneurship in Article 92 of the Entrepreneurial Code of the Republic of Kazakhstan.

Special attention should be paid to the recognition of a tourist destination by a special economic zone, defined by law, as part of the territory of the Republic of Kazakhstan with precisely defined boundaries, on which a special legal regime of a special economic zone operates to carry out priority activities [14]. Inclusion in the list of free economic zones implies the following benefits and preferences:

- reduction of the amount of calculated corporate income tax by 100%;

- application of the coefficient 0 to land tax rates;
- calculation of property tax at a rate of 0% to the tax base;
- VAT rate for suppliers - 0%;
- payment for use of the land plot - coefficient 0 for the period of work of the SEZ.
- exemption from customs duties on raw materials and equipment imported into the territory of the SEZ;
- simplified procedure for attracting labor.

But again, only "Burabai" SEZ (Akmola region) was determined as a special economic zone in Kazakhstan, which carried out its activities from 2008 to 2017 [10]. At the same time, breakthrough projects in the field of tourism with significant potential were identified such projects as "Astana - the heart of Eurasia", "Almaty - the free cultural zone of Kazakhstan", "Pearl of Altai", "Caspian Gate", "Revival of the Great Silk Road" ways "," Unity of nature and nomadic culture "[15]. Cities and regions included in these clusters, in our opinion, have the right to receive the status of special economic zones, even if this process is carried out in stages.

Stimulation of entrepreneurial activity involves the solution of a number of issues of information and consulting support and organization of business incubators.

The formation and development of tourist entrepreneurship substantially depends on the information support of the system of support of subjects, which is understood to include their inclusion in the information environment, including global and local databases on the development of the tourist market. The purpose of information support of the business support system is to expand the range of information services provided to business entities [16]. In accordance with the Law of the Republic of Kazakhstan "On Private Entrepreneurship", government agencies at all levels are required to create Internet resources and ensure their continuous operation to distribute free of charge information and materials that are not restricted for distribution, and ensure their advertising, including on the development and adoption of regulatory legal acts, as well as updating this information in connection with the amendments and addenda introduced to the regulatory legal acts affecting the interests of private business entities [17]. For educational, methodological, scientific and methodological support of small businesses at the expense of budget funds and other sources not prohibited by the legislation, the following are provided:

- organization of training seminars and scientific conferences on the conduct of private entrepreneurship;
- distribution of methodological manuals, newsletters on the practice of private entrepreneurship, the market for new technologies;
- creation of a network of information and consulting centers in the regions;
- training managers to organize training for small businesses in the regions.

The Damu Entrepreneurship Development Fund JSC provides great assistance in providing consulting services to small businesses in the framework of the programs implemented [18]. However, often the provided measures are not implemented in full measure, either because of the formality of these activities, or because of the lack of opportunities or desires for them to receive by the entrepreneurs themselves. In addition, the specifics of the tourist business determines the need to specify activities for the information support of entrepreneurs in this area. So, it is possible to envisage the formation of a republican information and analytical base with the provision of various types of information and reference material to the subjects of tourist entrepreneurship, statistical data; comparative analyzes and forecasts; publication of special and reference books (dictionaries, handbooks, teaching aids, newsletters, etc.); organization of various informational events (seminars, lectures, meetings, information-bearing, developing); creation of an electronic site with an updated database.

The creation of conditions for the stimulation of entrepreneurship through public intervention is possible by creating the incubators that unite the public, private and academic sectors. The Law of the Republic of Kazakhstan "On Private Entrepreneurship" defines a business incubator as a legal entity created to support small businesses at the stage of their formation by providing industrial premises, equipment, organizational, legal, financial, and consulting/information services [17].

The Association of National Business Incubators (NBIA) provides the following definition of a business incubator: "an economic development tool designed to accelerate the growth and success of entrepreneurial companies through a variety of business support resources and services". The business incubator collaborates with the community in which he works by providing business support programs. Entrepreneurs who place their business in an incubator such as the "consumers" of these results act in an interdependent relationship of co-production with the entity. Business incubators support the successful

development of entrepreneurial companies through a wide range of business support resources and services developed or organized through incubator management and offered both indoors and through a network of contacts. A business incubator is a generic term for any organization that provides access to affordable office space and shared administrative services [19]. According to NBIA, the main purpose of a business incubator is to create successful firms that implement financially viable and sustainable programs to create jobs, commercialize new technologies, or even promote original business models. In the end, the local and national economies greatly benefit from the support offered to individual entrepreneurs.

Despite the fact that the majority of incubators were formed for manufacturing firms, especially technological ones, since the beginning of the 90s the incubator model has become widely used in the foreign tourism industry. Thus, the potential of a business incubator can be used to support rural development or support regional underdeveloped areas. An incubator can be designed to encourage people in rural areas to engage in specific types of business [19].

A suitable form of incubation organization that perfectly matches the characteristics of the tourism industry is the network incubator, which is uniquely suited for growing businesses in the Internet economy. For example, the Rotorua Tourism Network Incubator (New Zealand) is recognized as a thriving tourism operator with a lot of community support through Vision Rotorua, the economic development division of Rotorua County, the Chamber of Commerce, Rotorua Energy, Tourism Rotorua and John Paul College. The purpose of this incubator is to attract specialists and original business ideas related to tourism, a critical analysis by teachers of the Waiariki Institute of Technology and members of the business community [20].

Another example is the Sighnaghi Combined Incubator in Georgia. The International Executive Service Authority (IESC) implemented a SME support project the main goal of which was to provide a nine-month grant to create a small tourist business incubator in Sighnaghi to accelerate the successful development of start-up companies by providing entrepreneurs with a range of resources and services. Tourism incubator incubator Sighnaghi incubated and provided practical assistance to several companies - a tour operator, shops and cafes - with the aim of creating successful small firms. IESC assistance has led to an increase in the number of tourists, an increase in income and an increase in the number of jobs [20].

At the same time, entrepreneurs included in incubators may have some obligations, for example, in relation to the creation and maintenance of jobs. It can be stated that incubators have a positive effect on incubated enterprises, and consulting assistance is the most important asset. Their relevance and value become even more evident when considering the new economic conditions, financial difficulties, very high rates of technology change and various environmental problems. A business incubator can be a very powerful tool for enhancing a clear response to current socioeconomic and demographic changes, a revolution in IT technology, increased competition and public pressure on sustainable forms of tourism that allow a company to respond better to more knowledgeable and demanding tourists.

In 2000, the Kazakhstan Association of Business Incubators and Innovation Centers (KABIC) was established, uniting 14 business incubators and technology parks from different cities of the Republic. In fact, it has not been working since 2008, as most business incubators were closed due to the completion of donor assistance programs and the onset of a financial crisis, and also due to the lack of a comprehensive program for supporting business incubators, lack of preparedness of business incubators managers about the mission incubator, the principles of its operation and management [22].

According to the single business portal for entrepreneurs of Kazakhstan "Business Territory", there are currently more than 40 business incubators operating in Kazakhstan. However, the business incubators existing in Kazakhstan are mainly focused on the launch of mobile applications, the production of video products in 3D format, legal advice, etc. [23].

Today, tourism is related to the activities of the SodBi Business Incubator Corporate Fund in Shymkent. Existing since April 2000, it was created to promote young and emerging innovative projects, with the aim of strengthening them, enhancing competitiveness and adapting to the conditions of the external economic environment. Its functions include:

- creation and rental of space for start-ups at affordable prices;
- support for small and medium-sized businesses with access to financial, material and intellectual resources on preferential terms;
- promoting the development of start-up enterprises and the creation of new jobs through training, consulting and providing information;
- assistance in the implementation of innovative projects [24].

In our opinion, the formation of business incubators to promote the development of tourist entrepreneurship in all regions of Kazakhstan would contribute to the significant realization of tourism and recreation potential and the development of domestic and inbound tourism.

Strengthening the relationship and interaction between the subjects of tourist entrepreneurship, reducing certain administrative barriers and risks can ensure the creation of industry associations.

Sectoral associations of the tourism industry are represented by the Kazakhstan Tourist Association (KTA) and the Kazakhstan Hotel and Restaurant Association (KHRA). KTA is a non-profit, non-governmental organization, the Republican sectoral Association, which includes KHRA, tourist, insurance and airlines, universities and media. The association stands to protect the interests of its members, lobbies and promotes the tourism industry of Kazakhstan [25].

The activities of KTA and KHRA include: promotion of business activities of the members of the Association and its coordination; participation in the formation of a legislative framework for tourism, expert evaluation of legislative projects; the formation of optimally comfortable conditions for the development of tourist services in the field of small and medium businesses. However, a detailed analysis of the forms of agreements on mutual cooperation and joint activities revealed that only the following obligations of these organizations are documented:

- provision of a member of KTA / KHRA with the electronic newspaper "Vestnik KTA and KHRA";
- provision of a member of KTA / KHRA with participation in information tours organized by the hotels-members of KTA and KHRA;
- ensuring the participation of a member of KTA / KHRA in press conferences, round tables organized by KHRA;
- invitation of CTA / KHRA leaders for work meetings with the leaders and representatives of certain departments and organizations [25, 26].

In addition, according to representatives of travel companies, hotels and restaurants, joining these associations is impossible due to high organizational fees. Comparing their level with the resulting value of membership, entrepreneurs choose independence in solving their own problems.

Foreign experience testifies to the real assistance provided by tourist associations to small and medium-sized businesses.

A striking example is the Caribbean Hotel and Tourism Association (CHTA), which allows its members to exchange ideas, information, best practices, make and save money. For members of the association, exclusive rates and special discounts on goods and services are provided.

All members have the opportunity to lend to education through the Caribbean Sustainable Tourism Alliance (CAST), the Foundation for Environmental Education and the Blue Flag program. Thus, through the Foundation for Environmental Education (CHTAEF), which has been active since 1987, educational grants of almost $ 2 million have been received. The Foundation is an independent non-profit organization offering tax-free status for donations. A charitable organization offers scholarships and special assistance to train Caribbean tourism industry personnel and students in tourism and hospitality. As part of its mission, the Education Fund informs the population of the entire Caribbean region about various career opportunities in this industry, as well as technical and professional development. Funds for these scholarships and grants are formed through corporate sponsorship, charity auctions and special events. Co-sponsorship of scholarships is encouraged through businesses doing business with the Caribbean region. More than 2,000 chefs participated in its training and culinary competitions held as part of the annual CHTA Taste of the Caribbean event, and many others took part in national training and competitive programs. Training materials, comparative data on wages are available to members of the association, and promote employment in tourism and hospitality through online registration [27]. Thus, it is obvious that a public organization is able to provide real assistance to the development of entrepreneurship in the region.

Conclusion. It should be borne in mind that formal copying of decisions that have been successful in other countries is not always applicable due to the influence of differences in socio-political and economic conditions, socio-political system, differences in cultures, value systems, and development priorities. Nevertheless, a certain positive experience of countries with a similar competitive environment may be of interest to Kazakhstan.

The introduction of the proposed organizational measures to stimulate entrepreneurial activity in the tourism sector should help increase the attractiveness of the business in the tourism sector; increase the awareness of small and medium-sized enterprises about available support measures and the transparency of their provision; simplify the interaction of tourism enterprises with other entities; promote the active development of the tourism industry.

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ТУРИЗМДЕГІ КӘСІПКЕРЛІК БЕЛСЕНДІЛІКТІ ЫНТАЛАНДЫРУҒА АРНАЛҒАН ҰЙЫМДАСТЫРУШЫЛЫҚ ШАРАЛАР

Аннотация. Жұмыстың мақсаты – туристік саладағы кәсіпкерлік белсенділікті ынталандырудың ұйымдастырушылық тетігін қалыптастыру. Бұл үшін тетіктің әрбір субъектісінің, атап айтқанда мемлекет пен жеке сектордың рөлі айқындалды. Мақалада Қазақстанда және туристік ағыны жоғары елдеріндегі туризм саласындағы қолданыстағы заңнамаға және туристік кәсіпкерлікті ынталандыру жөніндегі басқа да іс-шараларға талдау жүргізілді. Қазақстанда туризмді дамыту жағдайында да қолданылуы мүмкін тәжірибе.

Жұмыс нәтижесі жоғары дамыған туризм елдерінің тәжірибесі негізінде туризмде кәсіпкерлікті ынталандыру жөніндегі тетіктің ұйымдық элементтерін қалыптастыру болды. Жекелеген ұйымдық элементтер шеңберінде нақты іс-әрекеттер (іс-шаралар) және оларды енгізудің соңғы нәтижесі айқындалған.

Зерттеу нәтижелерін қолдану саласы барлық деңгейдегі туристік индустрия субъектілерінің қызметі болып табылады: мемлекет, жеке бизнес, салалық ұйымдар, инфрақұрылымдық қамтамасыз ету. Зерттеу нәтижелері туризмдегі кәсіпкерлердің белсенділігін арттыру арқылы Қазақстанның бай туристік-рекреациялық әлеуетін пайдалануға көмектеседі.

Түйін сөздер: туризм, кәсіпкерлік белсенділік, ынталандыру, ұйымдастырушылық тетік.

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ОРГАНИЗАЦИОННЫЕ МЕРОПРИЯТИЯ СТИМУЛИРОВАНИЯ ПРЕДПРИНИМАТЕЛЬСКОЙ АКТИВНОСТИ В ТУРИЗМЕ

Аннотация. Цель работы – сформировать организационный механизм стимулирования предпринимательской активности в туристской сфере. Для этого была определена роль каждого субъекта механизма, в частности, государства и частного сектора. В статье проведен анализ действующего законодательства в сфере туризма и других мероприятий по стимулированию туристского предпринимательства в Казахстане и странах с высоким туристским потоком. Причем тот опыт, который может быть применен и в условиях развития туризма в Казахстане.

Результатом работы стало формирование организационных элементов механизма по стимулированию предпринимательства в туризме на основе опыта стран с высокоразвитым туризмом. В рамках отдельных организационных элементов определены конкретные действия (мероприятия) и конечный результат их внедрения.

Основные выводы исследования могут быть использованы в деятельности субъектов туристской индустрии всех уровней: государства, частного бизнеса, отраслевых организаций, инфраструктурного обеспечения. Результаты исследования также могут быть применены для использования огромного туристско-рекреационного потенциала Казахстана путем повышения активности предпринимателей в туризме.

Ключевые слова: туризм, предпринимательская активность, стимулирование, организационный механизм.

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ELECTROCHEMICAL OXIDATION OF NITROGEN (II) OXIDE IN THE NEUTRAL MEDIUM

Abstract. Electrochemical oxidation of nitrogen oxide was considered in the work. The study was carried out in the sodium sulphate solution. The effects of current density in the anode, electrolyte concentration, granular electrode layer thickness and volume of dispersed gas on the oxidation rate of nitrogen (II) oxide and the current output of its oxidation were investigated. The experiments were carried out in a thermostated electrolysis cell in galvanostatic conditions. A granular graphite electrode was used as anode and graphite plate as a cathode, the duration of the experiments was 0.5 hours. Nitrogen (II) oxide gas was supplied at a certain speed at the bottom of the electrolysis cell. The study discovered that nitrate ions were formed as the main product. Optimal parameters of the electrochemical oxidation of nitrogen oxide were determined.

Keywords: electrochemistry, electrolysis, nitrogen oxide, granular electrode, current density.

One of the main sources of formation of pollutant emissions into the environment is the chemical and metallurgical industries. Therefore, it is crucial today to process production waste and remove valuable components from them. Due to the development of technology, especially non-ferrous metallurgy and motor transport, a large amount of toxic gases are emitted into the atmosphere. These substances have a great impact on the lives of human beings, plants and animals [1-3]. According to the latest data, 12 million tons of nitrogen oxides (calculated for nitrogen) penetrate air per year [4].

It should be noted that the total nitrogen oxides are emitted from various pollutants – 40% from vehicles and other transport engines, 30% from thermal power plants, 20% from fossil fuels and 10% from other sources [4]. Despite the technological difficulties in processing production wastes containing nitrogen (II) oxide, which is formed as a result of various processes, it is important to deactivate them and obtain the desired products.

One of the most effective and simplest methods of waste deactivation is currently an electrochemical method. Subsequently, granular electrodes are used to intensify electrochemical methods. The peculiarity of these electrodes is that the process takes place in the amount of granular electrodes of the electrolysis cell. We conducted a number of studies to deactivate production waste containing nitrogen (II) oxide in an electrochemical way based on the oxidation [5-9].

In this regard, in our work, we considered the possibility of oxidizing nitrogen oxide gas by electrolysis using graphite electrodes in the anode space in sodium sulphate solution.

The study was carried out in a thermostated electrolysis cell of 100 ml in galvanostatic conditions. The granular graphite electrodes (length - 3 ml, diameter - 1.5 ml) were used as anode and graphite plate as a cathode, the duration of the experiments was 0.5 hours. Nitrogen (II) oxide gas was supplied at a certain speed at the bottom of the electrolysis cell. The effects of current density in the anode, electrolyte concentration, granular electrode layer thickness and volume of dispersed gas on the oxidation rate of nitrogen (II) oxide and the current output of its oxidation were investigated. After the electrolysis, nitrate ions formed in the solution were analyzed [10].

The effect of the current density on the oxidation process of nitrogen (II) oxide was considered in the range of 25-400 A/m^2. As the current density increases, the oxidation rate of nitrogen (II) oxide and the current output of its oxidation decrease (figure 1). Apparently, as the current density increases, alongside with the nitrogen oxide oxidation process in the anode, the proportion of oxygen increases and leaves the reaction zone without interacting with the NO gas.

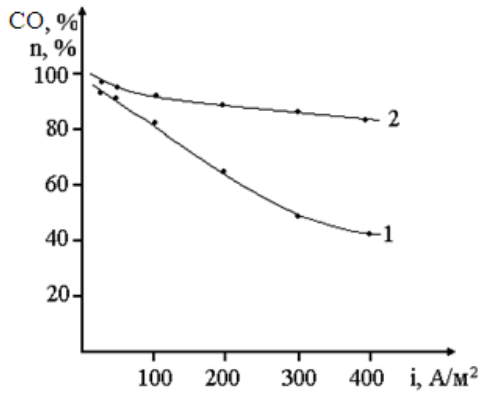

Figure 1 – The effect of current density on the current output of nitrogen (II) oxide oxidation (1) and on the oxidation rate (2): $C_{Na_2SO_4}$ = 1M, τ = 0.5 h, δ = 2 cm, V (NO) = 300 ml

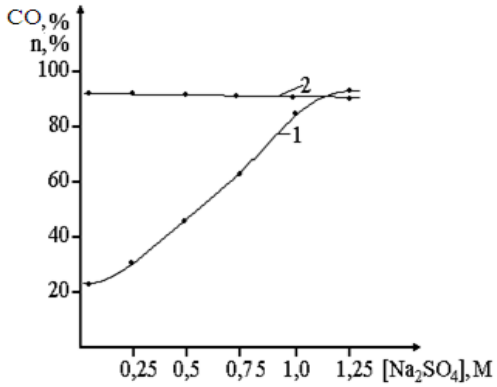

Figure 2 – The effect of the sodium sulphate solution concentration on the current output of nitrogen (II) oxide oxidation (1) and the oxidation rate (2): i = 100 A/m^2, τ = 0.5 h, δ = 2 cm, V(NO) = 300 ml

When we increase the sodium sulphate concentration in the range of 0.1-1.25 mol/l, it is observed that the oxidation rate of nitrogen (II) oxide is slightly reduced (figure 2, curve 2) and the current output increases significantly (figure 2, curve 1). In our view, gas bubbles of nitrogen (II) oxide can be oxidized by interaction with oxygen in the form of atomic and molecules that are formed when they collide with anode or are separated on the electrode surface. As the concentration of the sodium sulphate increases, it is assumed that the small gas bubbles of oxygen gas are formed and the possibility of their participation in the reaction increases.

We believe that the granules we use are charged particles in all volumes, so the height of these electrodes can have a major impact on the oxidation process. Therefore, the effect of the granular electrode layer thickness on the oxidation rate of the nitrogen (II) oxide and the current output of the oxidation in the sodium sulphate solution was studied in the range of 0.5-5 cm, the following result was achieved.

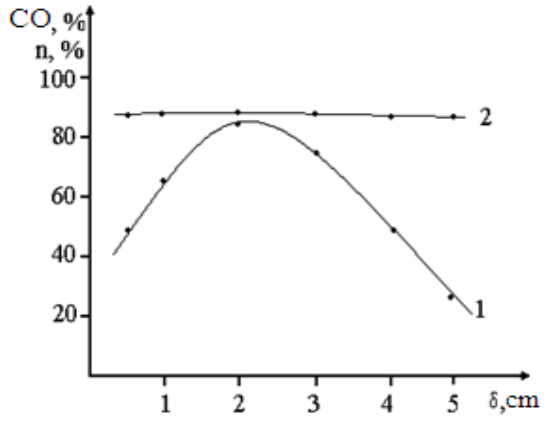

Figure 3 – The effect of the granular electrode layer thickness on the current output of the nitrogen (II) oxide oxidation (1) and the oxidation rate (2): i = 100 A/m^2, C_{Na2SO4} = 1M, τ = 0.5 h, V (NO) = 300 ml

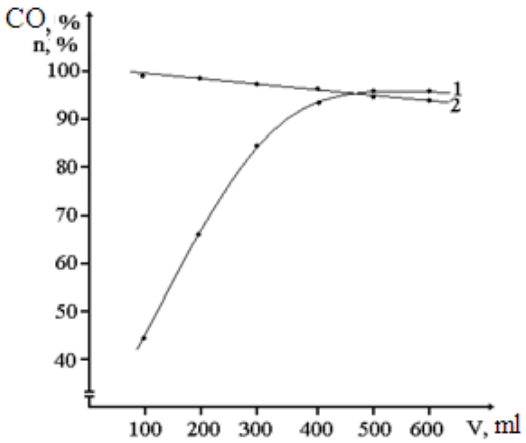

Figure 4 – The effect of gas volume on the current output of nitrogen (II) oxide oxidation (1) and the oxidation rate (2): i = 100 A/m^2, [Na_2SO_4] = 1M, τ = 0.5 h, δ = 2 cm

As the granular electrode layer thickens to a thickness of 2 cm, the oxidation rate of nitrogen (II) oxide is slightly reduced, while the current output increases to 85% (figure 3). The thicker the layer, the less the current output is observed. In our view, as the thickness of the granular electrode layer increases, the contact of the particles weakens and affects the electrode polarization value and the non-inactive zone and bipolar granules emerge in the electrode volume.

Our studies also examined the effects of oxidation reaction and the volume of gas passing through the electrolysis. As can be seen from figure 4, an excessive increase of the gas volume can lead to a reduction in the oxidation rate. In our opinion, the rapidly passing gas, due to the inability to fully oxidize within half an hour, lowers the oxidation rate of the nitrogen oxide. And as the volume of gas is increased, an increase in the current output of the gas oxidation is observed. Because, according to the law of mass action, the higher the volume of the reaction substances, the easier a chemical reaction proceeds. In our case, this is the case.

In conclusion, the anode oxidation of nitrogen (II) oxide gas was investigated using granular electrodes. The peculiarity of these electrodes is that the process takes place in granular electrodes with a developed surface area. During the oxidation, the formation of the nitrates ions was determined. The results of the study can be used for the development of technology for waste decontamination with nitrogen (II) oxide.

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АЗОТ (II) ОКСИДІН ЭЛЕКТРОХИМИЯЛЫҚ ЖОЛМЕН НЕЙТРАЛ ОРТАДА ТОТЫҚТЫРУ

Аннотация. Жұмыста азот оксидін электрохимиялық жолмен тотықтыру мүмкіндігі қарастырылды. Зерттеу жұмыстары натрий сульфаты ерітіндісінде жүргізілді. Азот (II) оксидінің тотығу дәрежесі мен тотығуының ток бойынша шығымына – анодтағы ток тығыздығының, электролит концентрациясының, түйіршікті электродтар қабаты қалыңдығының және жіберілген газ көлемінің әсерлері қарастырылды. Тәжірибелер гальваностатикалық жағдайда термостатталған электролизерде жүргізілді. Анод ретінде – түйіршікті графит электродтары, ал катод ретінде – графит пластинкасы қолданылды, тәжірибелердің ұзақтығы 0,5 сағ. Азот (II) оксиді газы электролизердің төменгі жағынан белгілі бір жылдамдықпен беріліп отырылды. Зерттеу барысында негізгі өнім ретінде нитрат иондары түзілетіні анықталды. Азот оксидінің электрохимиялық жолмен тотықтыруының оңтайлы параметрлері анықталды.

Түйін сөздер: электрохимия, электролиз, азот оксиді, түйіршікті электрод, ток тығыздығы.

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ЭЛЕКТРОХИМИЧЕСКОЕ ОКИСЛЕНИЕ ОКСИДА АЗОТА (II) В НЕЙТРАЛЬНОЙ СРЕДЕ

Аннотация. В работе изучен процесс электрохимического окисления оксида азота. Исследования проводились в растворе сульфата натрия. На выход по току и степень окисления оксида азота (II) изучено влияние плотности тока на аноде, концентрация электролита, толщина слоя кускового электрода и объем газа. Опыты проводились в гальваностатических условиях в термостатированном электролизере. В качестве анода использовали кусковой графитовый электрод, а в качестве катода графитовую пластинку, продолжительность электролиза 0,5 час. Газ оксид азота (II) подавали с нижней части с одинаковой скоростью. Установлено, что основным продуктом окисления являются нитрат-ионы. Определены оптимальные параметры электрохимического окисления оксида азота.

Ключевые слова: электрохимия, электролиз, оксид азота, кусковой электрод, плотность тока.

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STUDY OF ELECTROCHEMICAL PROPERTIES OF COPPER IN SOLUTION OF SULPHURIC ACID WITH COPPER (II) IONS AND TITAN THROUGH POTENTIODYNAMIC POLARIZED CURVE

Abstract. The electrochemical properties of copper, titanium in sulfuric acid and their ions in aqueous solution are investigated in the potentiodynamic mode by the method of polarization curves. Electrochemical properties of copper and titanium electrodes in a solution of sulfuric acid involving copper (II) ions and titanium with variable valency by means of potentiodynamic polarization curves. The recovery of copper (II) ions and the regularity of dissolution of the electrodes are determined. The reduction wave of tetravalent titanium ions in a solution of sulfuric acid with copper and titanium electrodes is registered for the first time in the polarization program, and it is indicated that the reduction wave of trivalent titanium ions in the above electrodes is not registered. It is also determined that when copper (II) ions are present in the electrolyte composition, the reduction wave of tetravalent titanium ions in the polarization curve is not registered. It is known that obtaining the main part of copper powders is performed by electrochemical method [1-12].

Key words: copper, titanium, electrodes, copper powders, sulfuric acid, electrolysis potentiodynamic curves.

Previous studies have shown that when titanium (IV) ions are present in the composition of the copper (II) solution with sulfuric acid, the formation of copper powders in the cathode increases in current and fine metal powders are formed [10, 13-16]. The study of the electrochemical properties of copper, titanium in a solution of sulfuric acid and their ions in an aqueous solution, in order to understand the mechanism of these processes is carried out in the Abtolab potentiostat in the potentiodynamic mode using the polarization curve method.

The main potentiodynamic polarization curves were captured at a 50 mV/s of potential change rate. The reference electrode is a silver-chloride electrode (E = + 0,203B), and platinum or graphite electrodes are used as auxiliary electrodes. The values of the potentials was compared to the silver-chloride electrode. Before the tests, the electrodes were cleaned with emery-paper to remove the oxide film and then washed with alcohol, then with distilled water and wiped with paper filter. The thermostat and a special YaSE-2 electrochemical cell was used to conduct research at constant temperatures.

Literature data [16,17] and the results of our research show passivity of titanium electrode during anode polarizationin solutions of sulfur and hydrochloric acids, and cathodic polarization curves show that only hydrogen is released.

Data on the oxidation-reduction reactions of titanium (IV) and titanium (III) ions in the acidic environment are insignificant in the literature because polarization curves do not show the oxidation and reduction waves before hydrogen and oxygen release potential of these ions. Some articles mention only the standard potential value of the reduction of the tetravalent titanium to thrivalent ions [18-22]:

$$Ti^{4+} + e^{-} \leftrightarrow Ti^{3+} \qquad E^{0} = -0{,}05\ B \qquad (1)$$

Thus, some of the titanium (IV) ions can be reduced by cementing with some negative potential metals. Such negative potential valued metals are - lead, zinc etc. There is also information in the literature that these ions are oxidized by hydrogen-contained, carbon-contained and some other metallo-organic

compounds. However, the reduction of titanium (IV) ions at room temperature is considered to be at low speeds. As per known methods, trivalent titanium ions are obtained by reduction of tetravalent titanium in cathode environment for several hours.

Typically, when obtaining copper powder the titanium electrode is used as a cathode, and in the sulfuric acid solution the cathode potentiodynamic polarization curve of this electrode shows only the hydrogen ions reducing current (figure 1). The results show that as the sulfuric acid concentration increases, cathodic potentiodiodynamic curves show a significant reduction in the hydrogen release current. This phenomenon is associated with the increase in the concentration of hydrogen ions.

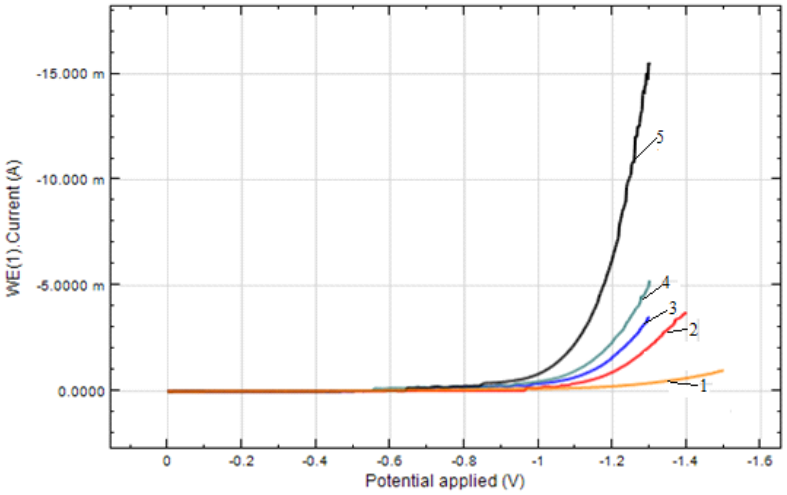

Figure 1 – The cathode polarization curves recorded in the titanium electrode of the sulfuric acid solution at V = 50 mV/s, t = 25 °C, H_2SO_4 g/l: 1 - 10, 2 - 25, 3 - 50, 4 - 75, 5 - 100

When adding copper (II) ions to the sulfuric acid solution, the polarogram captures its maximum reduction at the titanium cathode. With the increase in copper (II) ions, the increase in the maximum current values of reduction is observed (figure 2).

As the concentration of copper (II) ions in the solution grows, it is possible to notice that the hydrogen ions discharge voltage drops significantly. This phenomenon can be explained by the fact that in the copper electrode the hydrogen is released with less volatile than in titanium.

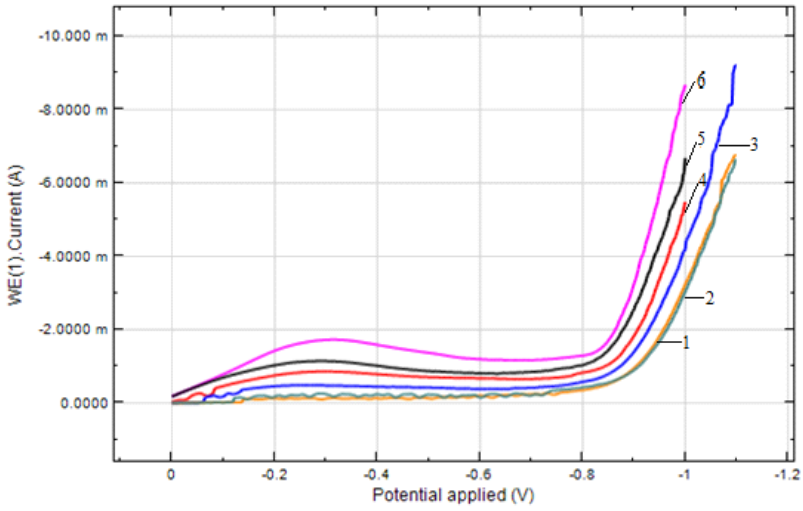

Figure 2 – Cathode polarization curves registered in titanium electrode at concentrations of various copper (II) ions in the sulfuric acid solution, V = 50 mV/s, t = 25 °C, H_2SO_4 - 50 g/L, Cu(II), g/L: 1 - 1,0; 2 - 2,5; 3 - 5,0; 4 - 10; 5 - 15; 6 - 20

When adding tetravalent titanium ions to the copper (II) in sulfuric acid solution, the reduction current of the obtained ions are not observed in the polarogram. And in the pure sulfuric acid solution, the subtly visible reduction wave of the tetravalent titanium ions is recorded in the cathode potentiodynamic curve (figure 3).

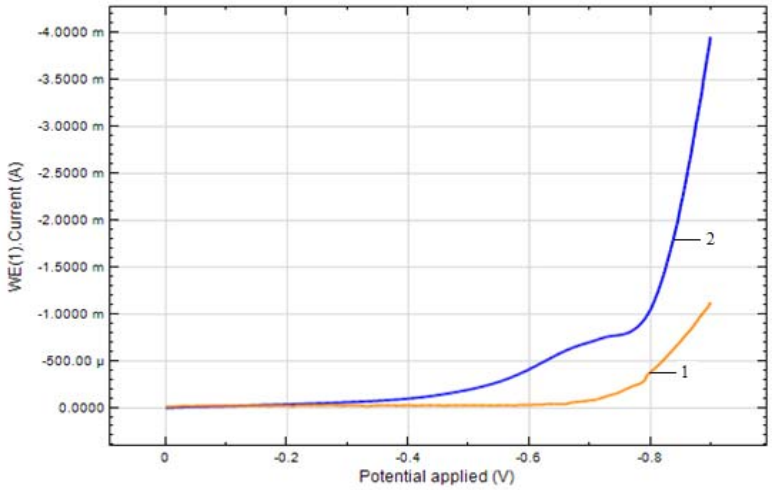

Figure 3 – Cathodic polarization curve recorded on a titanium electrode in a solution of sulfuric acid containing titanium (IV) ions (IV): 1 - 10 g/L H_2SO_4; 2 - 10 H_2SO_4 g/L+ 10 g/L titanium (IV); V = 50 mV/s; t = 25 °C

In the process of electrolysis copper (II) ions are reduced in cathode, then after short time covering the titanium surface, functions as copper electrode. Therefore, in order to fully understand the mechanism of reactions occurring in the electrodes during the formation of copper powders, the following studies were conducted on the copper electrode.

The cathode polarization curves recorded in the copper electrode in the sulfuric acid solution show a decrease in the voltage of the reduction of hydrogen ions due to the increase in electrolyte acidity (figure 4).

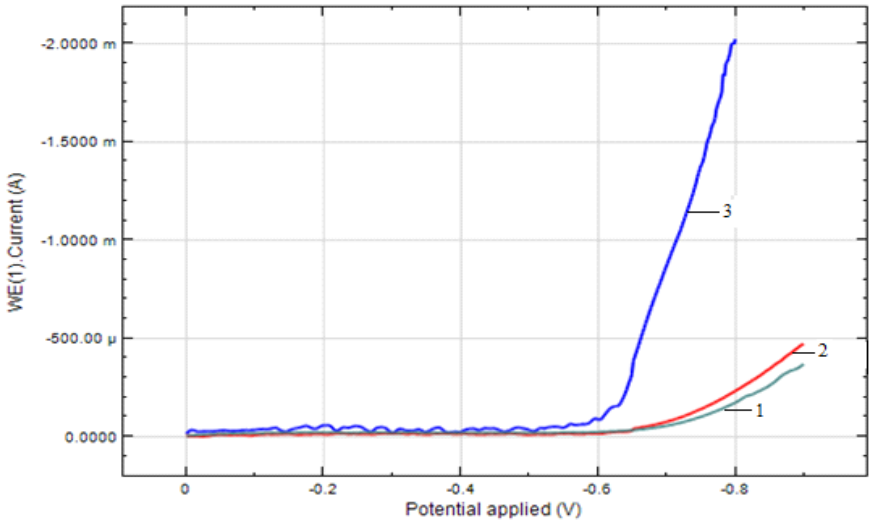

Figure 4 – Cathode polarization curves recorded from copper electrode in sulfuric acid solution, V = 50 mV/s; t = 25 °C; H_2SO_4, g/L: 1 - 50; 2 - 75; 3 - 100

When adding copper (II) ions to the sulfuric acid solution, the cathode reduction maximum rate in the polarogram is recorded and the maximum value increases with straight linearity regularity due to the increase in concentration of copper (II) ions (figure 5).

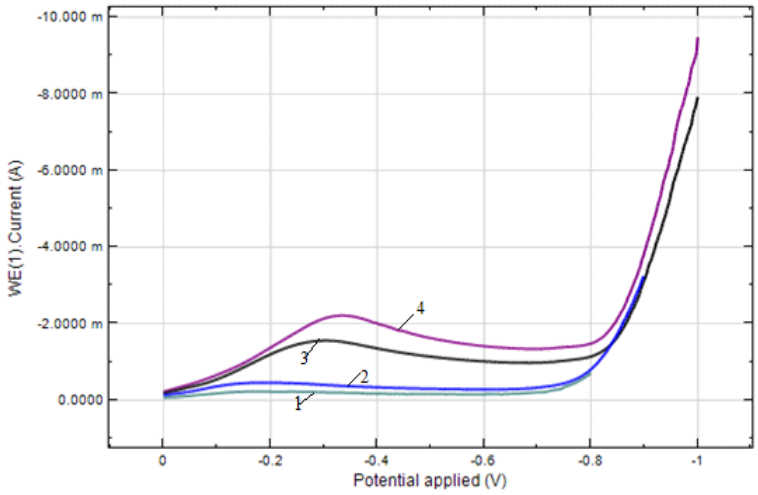

Figure 5 – Cathode polarization curves of copper electrode in sulfuric acid solutions with different concentrations of copper (II) ions, V = 50 mV/s, H_2SO_4 - 50 g/L, $CuSO_4$, g/L: 1 - 5,0; 2 - 10; 3 - 15; 4 - 20

In the above case, the increase in the rate of potential transfer increases the maximum of copper (II) ions reduction (figure 6). It is assumed that the reduction of copper (II) ions occurs in the diffusion mode.

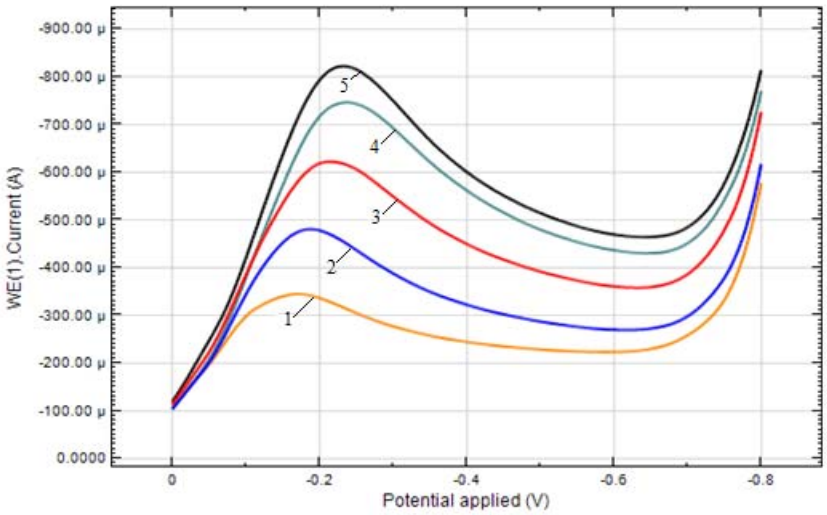

Figure 6 – Cathode polarization curves of copper electrodes in sulfuric acid solution with copper (II) ions, 50 g/L H_2SO_4 + 10 g/L $CuSO_4$, V= 50 mV/s: 1 - 25; 2 - 50; 3 - 100; 4 - 150; 5 - 200

When adding titanium (IV) ions to sulfuric acid solution with copper (II), the reduction wave of subsequent ions in the copper electrode is not observed in the polarogram. In the pure sulfuric acid solution, the reduction wave of the tetra-valent titanium ions is clearly marked on the polarogram (figure 7).

Copper electrodes are used as copper anodes when copper powders are obtained from the sulfuric acid copper (II) solution. Therefore, electrochemical properties of copper electrode in sulfuric acid solution with copper (II) ions were investigated.

Anode, cathode and cyclic polarization curves were recorded for the copper electrode in the sulfuric acid solution. When polarization begins to grow in the direction of the anode, the maximum current in the polarogram is registered. On the surface of the electrode copper oxide is formed, passivated and the value of the current decreases dramatically. Copper potential is further reduced to the right when copper melting occurs at a very low speed under transpassivation (figure 8), and increase in the rate of the potential transfer of copper the copper dissipation maximum rate increases (figure 9).

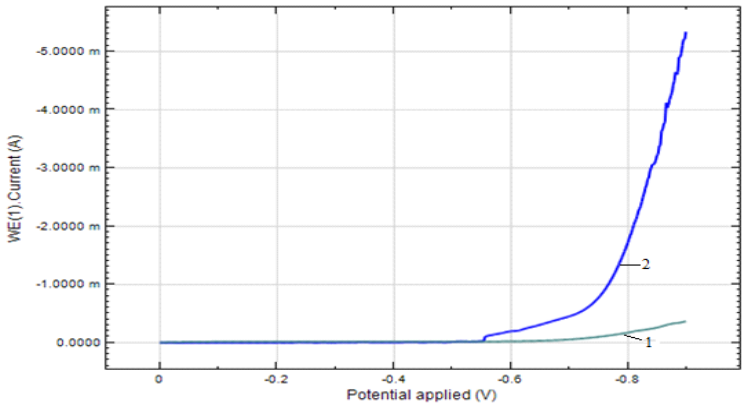

Figure 7 – Cathode polarization curves recorded for copper electrode in sulfuric acid solution with titanium (IV) ions: H_2SO_4 – 20g/L; titanium (IV) – 30 g/L

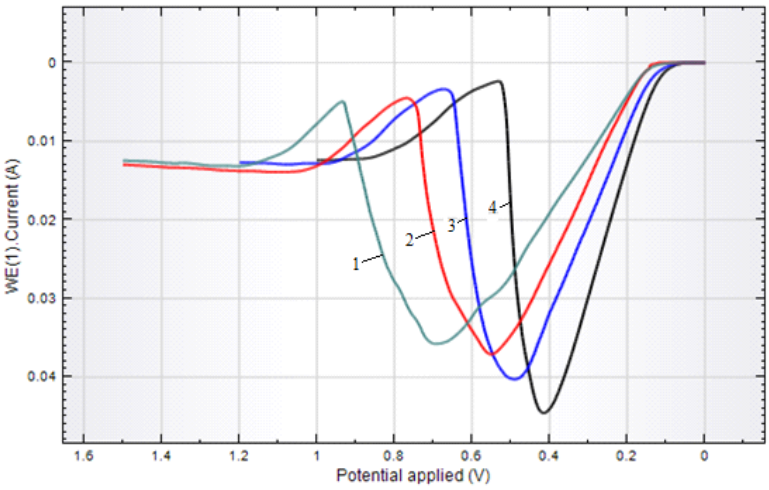

Figure 8 – Anode polarization curves of various copper electrodes in sulfuric acid solutions: V = 50 mV/s; t = 25 °C; H_2SO_4, g/L: 1 - 50; 2 - 75; 3 - 100; 4 - 150

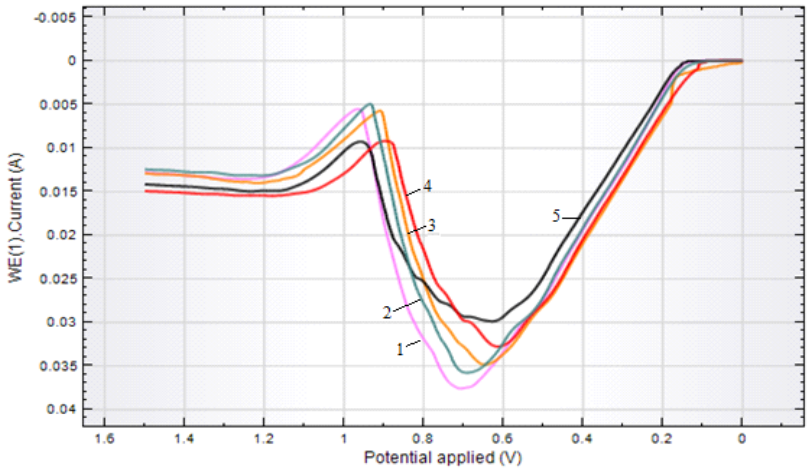

Figure 9 – Copper electrode polarization curves in sulfuric acid solution with different concentrations of the copper (II) ions, H_2SO_4 - 50 g/L, V = 50 mV/s, $CuSO_4$, g/L: 1 - 1,0; 2 - 2,5; 3 - 5,0; 4 - 7,5; 5 - 10,0

The presence of copper ions in the sulfuric acid solution and its concentration increase slightly increase the maximum anode value.

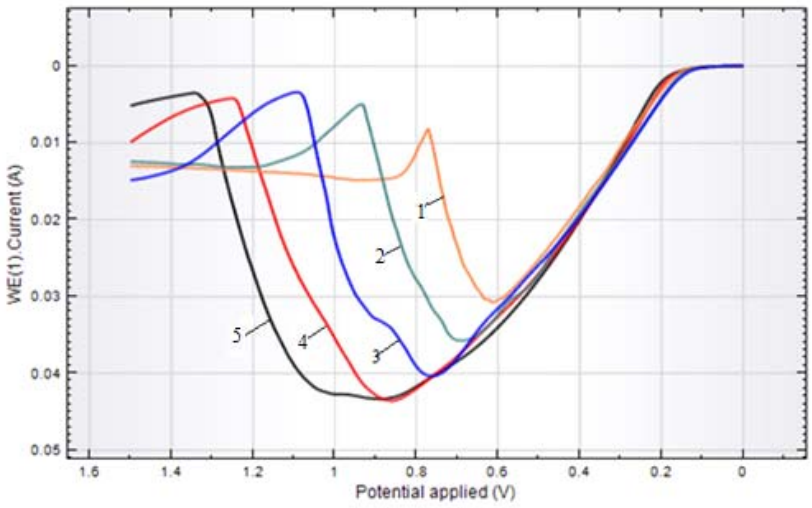

Figure 10 – Anode polarization curves of different potential transfer rates of the copper electrode in the sulfuric acid solution, H_2SO_4 - 50 g/L, V, mV/s: 1 - 20; 2 - 50; 3 - 100; 4 - 150; 5 - 200

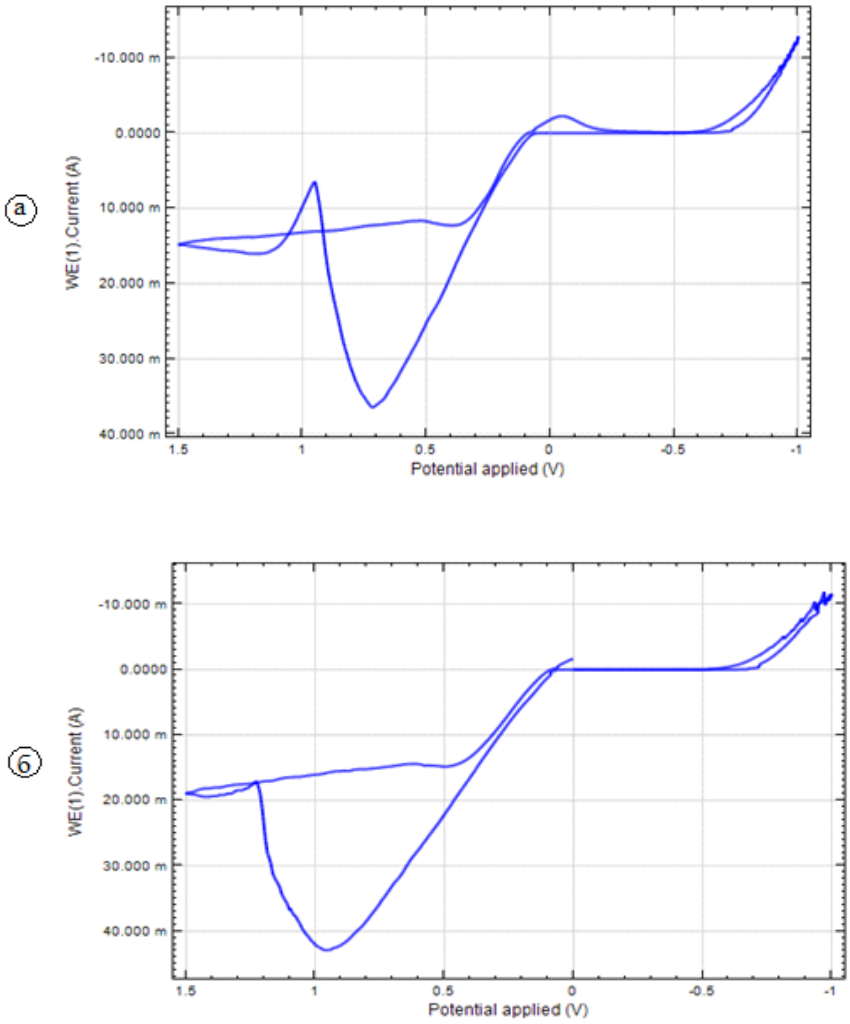

Figure 11 – Potential anodic-cathode (a) and cathodic-anode (b) potentiodynamic polarization curves of copper electrode in the 50 g/L sulfuric acid solution, V = 50 mV/s; t = 25 °C

Electrochemical properties of copper electrode in sulfuric acid solution were also studied by cyclic potentiodynamic curves.

When the copper electrode in the sulfuric acid solution is displaced to the potential anode direction, as it was shown previously, it is melting, followed by an oxidizing film forming, which is then passivated, and then starting from the 10.0V potential area continues to melt at low velocities under transpassivation. Oxygen gas release is not observed (up to "plus" 1.5 V). And when the potential is displaced to negative potentials, the maximum reduction rate of the copper oxide film formed on the surface of the electrode within the area of 0.0V potentials is registered, and at the "minus" 0.7V potential the hydrogen ion discharge current is registered on the polarogram (figure 11a).

And in the cathodic-anode cyclic polarogram, the above reactions take place (figure 11b).

We cannot see the oxidation current of the tri-valent titanium ions on titanium and copper electrodes in anode polarization curves.

Summarizing the above, the electrochemical properties of copper and titanium electrodes in the sulfuric acid solution in relation with copper (II) and mixed-valence titanium ions were investigated by potentiodynamic polarization curves. The regularities of copper (II) ions reductions and copper electrodes melting are determined. The reduction wave of copper and titanium electrodes of the tetravalent titanium ions in the sulfuric acid solution were recorded for the first time on the polarogram, and the oxidation waves of the thrivalent titanium ions were not recorded in the above electrodes. We found that when the electrolyte contains copper (II) ions the reduction wave of tetravalent titanium ions was not registered in polarization curves.

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МЫС (II) ЖӘНЕ ТИТАН ИОНДАРЫ БАР КҮКІРТ ҚЫШҚЫЛЫ ЕРІТІНДІСІНДЕ МЫСТЫҢ ЭЛЕКТРОХИМИЯЛЫҚ ҚАСИЕТІН ПОТЕНЦИОДИНАМИКАЛЫҚ ПОЛЯРИЗАЦИЯЛЫҚ ҚИСЫҚТАР ТҮСІРУ АРҚЫЛЫ ЗЕРТТЕУ

Аннотация. Күкірт қышқылы ерітіндісінде мыстың, титанның және олардың иондарының сулы ерітінділеріндегі электрохимиялық қасиеті потенциодинамикалық режимде, поляризациялық қисықтар түсіру әдісімен зерттелінді. Мыс және титан электродтарының күкірт қышқылы ерітіндісінде, мыс (II) және айнымалы валентті титан иондары қатысында электрохимиялық қасиеттері потенциодинамикалық поляризациялық қисықтар түсіру арқылы зерттелді. Мыс (II) иондарының тотықсыздануы және мыс электродының еру заңдылықтары анықталды. Төрт валентті титан иондарының күкірт қышқылы ерітіндісінде мыс және титан электродтарында тотықсыздану толқыны алғаш рет полярограммада тіркелді, ал үш валентті титан иондарының тотығу толқындарының жоғарыда көрсетілген электродтарда тіркелмейтіндігі көрсетілді. Электролит құрамында мыс (II) иондары бар кезде төрт валентті титан иондарының тотықсыздану толқынының поляризациялық қисықтарда тіркелмейтіндігі анықталды. Мыс ұнтақтарының негізгі бөлігі электрохимиялық тәсілдермен алынатындығы белгілі [1-12].

Түйін сөздер: мыс, титан, электродтар, мыс ұнтақтары, күкірт қышқылы, электролиз, потенциодинамикалық қисықтар.

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ИССЛЕДОВАНИЕ ЭЛЕКТРОХИМИЧЕСКОГО ПОВЕДЕНИЯ МЕДИ В РАСТВОРЕ СЕРНОЙ КИСЛОТЫ, СОДЕРЖАЩИХ ИОНЫ МЕДИ (II) И ТИТАНА МЕТОДОМ СНЯТИЯ ПОТЕНЦИОДИНАМИЧЕСКИХ ПОЛЯРИЗАЦИОННЫХ КРИВЫХ

Аннотация. Электрохимические свойства меди, титана в серной кислоте и их ионов в водном растворе исследуется в потенциодинамичном режиме методом поляризационных кривых. Электрохимические свойства электродов меди и титана в растворе серной кислоты с участием ионов меди (II) и титана с переменной

валентностью путем потенциодинамичных поляризационных кривых. Определяется восстановление ионов меди (II) и закономерность растворения электродов. Волна восстановления ионов четырехвалентного титана в растворе серной кислоты электродами меди и титана зарегистрирована в первый раз в поляропрограмме, а указывается, что волна восстановления ионов трёхвалентного титана в вышеуказанных электродах не зарегистрирована. Также определяется, что при наличии в составе электролита ионов меди (II) волна восстановления ионов четырехвалентного титана в поляризационной кривой не зарегистрирована. Известно, что получение основной части порошков меди производится электрохимическим способом [1-12].

Ключевые слова: медь, титан, электроды, медные порошки, серная кислота, электролиз, потенциодинамические кривые.

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ТӘЛІМ МЕН ТАНЫМ ҚАЙНАРЫ

Құрметті Фатима Надырқызы!
Құрметті әріптестер!

Сіздерді еліміздің ардақты азаматтары, зиялы қауымның ең алдыңғы шебінде тұратын ғалымдар қауымының төл мерекесі – Ғылым қызметкерлері күнімен шын жүректен ҚР ҰҒА-ның мүшелерінің атынан құттықтауға рұқсат етіңіздер!

Биыл әлемге танымал ғұлама ғалым Қаныш Имантайұлы Сәтбаевтың туғанына жүз жиырма жыл толып отыр. Осыған орай еліміздің ғылыми-зерттеу институттары, жоғары және арнайы оқу орындары мен басқа да мекемелер Ұлы тұлғаны ұлықтау науқанын өткізді.

Қаныш Имантайұлы Сәтбаев өзінің бүкіл саналы ғұмырын елінің жарқын болашағы үшін сарп етіп, ұлт мәдениетін әлемдік деңгейге көтерген дарын иесі қандай құрмет, қаншалықты биік мәртебеге лайық екенін әрбір саналы азамат біледі.

Қазақ даласының қиыр түкпіріндегі аядай ауылда туып өскен жас Қаныш, өзінің өршіл талабы, өрелі ойы, қайсар қажырының арқасында алдымен өз ортасын, қайран қалдыра отырып, кейіннен Сібір мектебін мойындатып, орыс ғалымдары үшін қырдан жарқ етіп шыққан құбылыстай әсер етті. Өзі оқып білім алған Семейдің мұғалімдер семинариясы, онда қызмет етіп, оқытушы болған Алаш арыстарының тәлімі мен тәрбиесі жас Қанышқа ерекше әсер етті.Ол алған білімін жоғары оқу орнында дамытып, боданда қалған қайран халқына жоғары деңгейде қызмет ету қағидасын берік ұстанды.

Қ.И. Сәтбаев Томскінің бес жылдық институтын Геологиялық барлау мамандығы бойынша үш жылда үздік белгімен бітіріп шықты. Бүкіл қазақ атынан келіп, жалғыз білім алып жатқанын, сол үшін қалайда өте жақсы оқып, өз ұлтының атына дақ түсірмеуді ойлаған ол өзінің намысшыл да, қайсар қазақ екендігін көрсетті. Ол өзі студент бола тұрып, қазақ тілінде математикадан оқулық жазып шығарды. Сонымен қатар табиғат берген дара таланты мен терең білімі оның өз мақсаттарына қиналмай жетуіне жағдай туғызды. Ол Кеңес Одағының Ғылым академиясының академиктері: М.А. Усов, В.А. Обручевтермен бірге еңбек ете жүріп, үлкен ғылым жолына түсті.

Ол алған білімін сол кезде Кеңес елі деп аталған ұланғайыр елдің жер астында жасырынып жатқан қазба-байлықтарын көптеп ашуға жұмсады. Кейбір геолог-ғалымдардың қарсылығына қарамай геологиядағы металлогения теориясы мен болжамын бірнеше рет ақихатқа айналдырды. Оның«Мүмкін еместен мүмкіндік туғызған Сәтбаев» –деп бас игізген ұлылығы мақтауға да, мақтануға да тұратын ұлы қасиет. Сол ұлы қасиеттің арқасында елсіз, сусыз қазақтың мидай даласында Жезқазған қаласы салынды. Сол үшінде біз, Жезқазғанды Сәтбаевтың төлтумасы деп атаймыз. Бір Жезқазған емес, Қазақстанда одан кейін бой көтерген ондаған қаланы Сәтбаев атымен байланыстыруға болады. Кешегі Ұлы Отан Соғысы жылдары майдан даласына барған он оқтың тоғызы, он танктің жетеуі Қазақстаннан берілген металдардан жасалды. Отан үшін жасалған осы құбылыстардың бәрі Қ.И. Сәтбаев бастаған геолог – ғалымдардың жанкешті, қажырлы еңбегінің арқасында болғанын баса айтуымыз керек. Оның ішінде соғысқа ең басты қажет металл марга-

нецтің тонналаған қоры небәрі 39 күннің ішінде Сәтбаев ашқан Кен орнынан алынып, өңделгені әлемге аян болды. Бұл нағыз ғылыми ерлік еді.

1946 жылы Қазақстанның Ұлттық Ғылым Академиясын ашуы бүкіл Орта Азия мен Қазақстандағы мәдени техникалық құбылыс болды. Оны ұйымдастырып, дамыту жолында Қаныш Имантайұлының қандай қиындықтарды бастан кешіп, небір қатерлі өткелдерден өткені тек айтуға оңай, ал негізінен ол ерлік пен көрегендіктің үлкен жеңісіболатын.

Уважаемые коллеги! Став первым президентом АН КазССР, академик Сатпаев К.И. провел огромную организаторскую деятельность по управлению наукой и заботу об индустриальном развитии Казахстана. По его инициативе проводились выездные сессии Академии наук в крупнейших промышленных регионах республики - Усть-Каменогорске, Атырау, Караганде, Жезказгане, Кустанае. Были открыты новые академические институты: ядерной физики, математики и механики, гидрогеологии и гидрофизики, химии нефти и природных солей, химико-металлургический, горно-металлургический, ихтиологии и рыбного хозяйства, экспериментальной биологии, экономики, философии и права, литературы и искусства, языкознания. Энциклопедическая образованность позволяла ему принимать личное участие в создании этих центров большой казахстанской науки.

В 1958 году за разработку методологической основы и составление прогнозных металлогенических карт Центрального Казахстана, не имевших аналога в мировой геологической практике, группа казахстанских ученых-геологов во главе с академиком К.И. Сатпаевым была удостоена Ленинской премии. Эта работа показала высочайшее достижение казахстанских ученых и школы К.И. Сатпаева всему миру. Много сил и энергии отдавал академик К.И. Сатпаев становлению и раз-витию международных связей Казахстана, укреплению и углублению сотрудничества казахских ученых с учеными России, Украины, Таджикистана, Узбекистана, Грузии, Киргизии. Признанием заслуг К.И. Сатпаева в этой сфере стали избрание его не только академиком, но и членом Президиума АН СССР и почетным членом Академии наук Таджикистана и других союзных республик.

Выдающийся ученый страны, он представлял казахстанскую науку и за рубежом. Так, в 1947 г. он в составе делегации Верховного Совета СССР посетил Англию, где достойно представлял ученых страны. Как член советской парламентской группы был принят Уинстоном Черчиллем, премьер-министром Англии Эттли. В 1958 г. К. И. Сатпаев в составе представительной делегации побывал в Китае, где принял участие в работе геологической конференции КНР. Он был награжден четырьмя орденами Ленина и орденом Великой Отечественной войны, избирался депутатом Верховного Совета СССР и Казахской ССР. Справедливости ради надо сказать и о том, что в становлении АН КазССР и развитии науки и технологий в республике огромную роль сыграл академик Д.А. Кунаев, который, являясь первым руководителем страны, поддерживал научно-технологическое развитие Казахстана. После работы Президентом АН КазССР, став Председателем Совета Министров КазССР, именно он вернул К.Сатпаева вновь на должность президента Академии наук республики.

Надо признать, что наиболее сложным периодом для главной Академии наук все-таки был период становления независимости нашей страны, когда мы оказались на распутье, без средств к существованию, став общественным объединением ученых республики.

Но нам удалось в 2003 году, взяв на вооружение европейскую модель, преобразовать Академию и сохранить лучшие академические традиции.В настоящее время наша Академия объединяет в своем составе 165 действительных члена (академиков), 89 члена-корреспондента (всего 254 постоянных членов*),* около 80 почетных и 16 иностранных членов. Сегодня НАН РК – это авторитетное объединение самой передовой части ученых нашей страны.

Согласно Закону РК «О науке» НАН РК – как главная академия наук Республики принимает участие в определении приоритетных направлений развития науки, в укреплении сотрудничества с академиями наук стран СНГ, в том числе в рамках Международной ассоциации Академий наук (МААН), Межакадемического совета по международным вопросам науки (IAP) и др., международных ассоциаций ШОС, ОИС и Союзу государств НАН тюркского мира, а с 2018 г. самого крупного международного альянса академий наук ANSO (Пекин). С главными академиями многих

стран ближнего и дальнего зарубежья заключены договоры о сотрудничестве, что открывает казахстанским ученым широкие возможности для совместной работы с ведущими зарубежными учеными, участвовать в международных проектах и крупных программах.

Избрание президента НАН РК вице-президентом академической сети стран ОИС, первым президентом союза государственный Национальный академии Тюркского мира, членом Правления самого крупного Альянса АН мира – ANSO(34) указывает на высокий авторитет НАН РК.

Ежегодный Национальный доклад по науке выполняется нашей Академией в соответствии с Правилами подготовки ежегодного Национального доклада по науке, утвержденного Указом Президента Республики Казахстан. В Нацдокладе анализируются научные достижения в мире и в Казахстане, выявляются тенденции развития науки в различных отраслях, разрабатываются предложения и рекомендации для дальнейшего развития научной отрасли республики.

Кроме того, НАН РК выпускает 8 научных журналов с 1996 года,которые направляются в ведущие библиотеки 73-х стран мира.С 2016 года 4 из 8 журналов входят в крупнейшие международные базы ElsevierScopus и WebofSciense (Clarivate Analytics).

Свой доклад я хочу закончить аксиоматическими фразами международного научного мира о том, что только научно-техническое развитие и честное служение высоким идеалам науки приводит человечество к прогрессу и благополучию.

Назарларыңызға рахмет!

70 лет почетному члену Национальной академии наук Республики Казахстан Т. М. ДОСМУХАМБЕТОВУ

Президиум Национальной академии наук Республики Казахстан, коллектив ученых НАО «Национальный аграрный научно-образовательный центр» Агрохолдинг «Байсерке-Агро», НАО «Казахский национальный аграрный университет», факультета зоотехнии и биологии ФГБОУ ВО «Российский государственный аграрный университет – Московская сельскохозяйственная академия им. К. А. Тимирязева», ФГОБУ ВО «Чувашская государственная сельскохозяйственная академия» сердечно поздравляют почетного члена Национальной академии наук Республики Казахстан Досмухамбетова Темирхана Мыңайдаровича с 70-летием.

Досмухамбетов Темирхан Мыңайдарович родился в селе Мениславка Костанайской области 8 марта 1949 года.

Досмухамбетов Темирхан Мыңайдарович видный политический и государственный деятель. Он член политсовета и бюро политсовета Народно-Демократической партии «Нур-Отан», избирался депутатом Верховного совета Республики Казахстан 12-го созыва, депутатом Мажилиса парламента Республики Казахстан V созыва.

Являясь выпускником Казахскогого института физической культуры продолжил педагогическую работу в Казахском государственном университете им. С. М. Кирова (в настоящее время Казахский национальный университет им. аль-Фараби). Педагогическая деятельность и плодотворная тренерская работа юбиляра, умение их совмещать, анализировать организационные основы спорта, высших спортивных достижений позволили защитить кандидатскую диссертацию, в которой были обобщены теоретические основы и организационно-практические положения подготовки будущих многочисленных чемпионов Казахстана, Советского Союза, Европы и Мира. На этом поприще Темирхан Мынайдарович снискал почет и уважение общественности, был удостоен высшего звания в спортивном мире «Заслуженный тренер Советского Союза».

Начиная с 1985 года жизнь и деятельность Темирхана Мынайдаровича связана с Большим спортом страны. Он – Министр по делам молодежи, туризма и спорта, Министр туризма и спорта Республики Казахстан, Президент и член исполкома Национального олимпийского комитета Республики Казахстан. Неоценим вклад Темирхана Мынайдаровича в спортивные достижения

казахстанских спортсменов, когда команда Республики Казахстан на всемирных Олимпийских играх заняла 12-е место среди 200 стран-участников.

Начиная с 2002 года Темирхан Мынайдарович проявлял пристальный интерес к сельскохозяйственному производству. И в этой сфере деятельности он проявил недюжинный организаторский талант.

Сегодня учрежденное им хозяйство «Байсерке-Агро» является многопрофильным формированием с развитым растениеводством и животноводством, в котором широкое распространение получили инновационные технологии мирового прогрессивного уровня.

Ступени развития ТОО «Байсерке-Агро» свидетельствуют о прозорливом уме и дальновидности Темирхана Мынайдаровича. Если в самом начале это было хозформирование успешно производящее молоко и зерно, то через некоторое время оно превратилось в многопрофильного агрохолдинг, занимающийся разведением всех видов сельскохозяйственных животных на племенной основе и переработкой, на промышленной основе, производимых молока и мяса.

Третья ступень прогресса в развитии ТОО «Байсерке-Агро» – это учреждение Учебно-научно-производственного центра на территории Молочного комплекса п. Аркабай, где проходят обучение фермеры, повышают квалификацию специалисты Юго-Востока Казахстана, учатся хозяйствовать по-научному руководители малых и средних сельскохозяйственных предприятий. Студенты, магистранты и PhD-докторанты КазНАУ постигают азы работ на полях и фермах.

ТОО «Байсерке - Агро» завоевало прочную репутацию предприятия, где вся производимая продукция отвечает самым высоким требованиям качества и безопасности для населения многомиллионного города.

Все перечисленное является плодом деятельности нашего уважаемого юбиляра, который досканально знает и осуществляет в жизни правило «золотого треугольника», когда в одну упряжку вовлечены ОБРАЗОВАНИЕ, НАУКА И ПРОИЗВОДСТВО.

Разумеется, такие достижения ТОО «Байсерке-Агро» и лично, неутомимого труженика, находящегося в вечном поиске, Досмухамбетова Темирхана Мыңайдаровича, не остались без внимания со стороны ученых стран ЕАЭС, местных властных структур, МСХ РК, Правительства Республики и Главы Государста – Президента Назарбаева Нурсултана Абишевича.

При ознакомлении с деятельностю ТОО «Байсерке-Агро» Президент Н. А. Назарбаев отметил, что достигнутое хозяйством должно быть примером для подражания всем хозформированиям республики.

Такая оценка всего, что сделано уважаемым Темирханом Мыңайдаровичем самим Главой государства, как признается наш юбиляр: «Обязывает ко многому».

Ваша культура, высокий профессионализм, трепетное отношение к коллегам будет служить примером для каждого, кто Вас знает и работает с Вами. С вершины своего юбилея и весомых достижений в спорте, политике, государственной и хозяйственной деятельности Темирхан Мыңайдарович как прежде устремлен в будущее.

Уважаемый Темирхан Мыңайдарович! В день Вашего юбилея желаем крепкого здоровья, неиссякаемой творческой энергии, счастья и процветания Вашим родным и близким, а также простого человеческого счастья на долгие годы!

Президиум Национальной академии наук Республики Казахстан,
НАО «Национальный аграрный научно-образовательный центр» Агрохолдинг «Байсерке-Агро»,
НАО «Казахский национальный аграрный университет»,
факультет зоотехнии и биологии ФГБОУ ВО «Российский государственный аграрный университет – Московская сельскохозяйственная академия им. К. А. Тимирязева»,
ФГОБУ ВО «Чувашская государственная сельскохозяйственная академия»

К 90-летию со дня рождения
академика К. У. Медеубекова

ОСНОВАТЕЛЬ НАУЧНОЙ ШКОЛЫ ПО СОЗДАНИЮ НОВЫХ ВЫСОКОПРОДУКТИВНЫХ ПОРОД ОВЕЦ КАЗАХСТАНА

Проявление творческого таланта человека
всегда красиво, и ими нельзя не лю,боваться!
П. Л. Капица

(1929-2015)

Имя академика Национальной академии наук Республики Казахстан, академика Российской академии сельскохозяйственных наук, профессора Кийлыбая Усеновича Медеубекова широко известно в стране и далеко за ее пределами.

Формирование его научных взглядов берет начало во всемирно известной Московской сельскохозяйственной Академии им. К. А. Тимирязева. Успешно закончив академию, а затем и аспирантуру К. У. Медеубеков в 1957 году возвращается в Казахстан.

Трудовую деятельность начал на Жамбылской областной опытной станции по тонкорунному овцеводству. В 1962 году К. У. Медеубеков назначается директором Казахского научно-исследовательского института животноводства.

Одним из самых значимых научных достижений академика является созданная в институте овцеводства научная школа его имени «Создание новых высокопродуктивных пород овец Казахстана».

Школа в своей основе имела богатый опыт породообразования в овцеводстве осуществляемого известными учеными-селекционерами страны, такими как: В. А. Бальмонт, М. А. Ермеков, А. Е. Елеманов, Д. Н. Пак, А. И. Петров, Б. М. Мусин, В. А. и др.

Выдающийся физик-экспериментатор П. Л. Капица отмечает, что в оценке творческих качеств молодых ученых проявляется основной талант руководителя научного института. Без этих способностей ученый не может подобрать сильный научный коллектив для своей школы.

К. У. Медеубекову удалось подобрать сильный творческий коллектив, в котором царила подлинно творческая атмосфера. Он целенаправленно поддерживал и направлял молодых исследователей на получение новых научных результатов. И не случайно, а вполне закономерно, что «золотой век» развития овцеводства Казахстана пришелся на семидесятые годы XX века. Были созданы высокопродуктивные стада тонкорунных, полутонкорунных, полугрубошерстных и грубошерстных овец.

Селекцию и разведение овец вели ученики академика К. У. Медеубекова, среди которых Т. К. Касенов, А. Н. Нартбаев (тонкорунное овцеводство), Т. С. Касымов, Ж. А. Карабаев, К. Карымсаков, Б. И. Мусабаев (полутонкорунное овцеводство), К. К. Канапин, Ахатов А., Жумадиллаев К. (полугрубошерстное и грубошерстное мясо-сальное овцеводство).

Народная пословица гласит «Большое видится на расстоянии». При анализе более чем пятидесятилетней истории зарождения, становления, развития научной школы академика К. У. Медеубекова, предстает неординарная личность большого ученого и учителя, обладающего широкой эрудицией, энциклопедическими знаниями, талантом организатора науки, утонченного психолога, интересного обаятельного собеседника в сочетании с удивительной скромностью и работоспособностью.

Академик К. У Медеубеков с учениками провел широкие научные исследования по акклиматизации и использованию ценных полутонкорунных мясо-шерстных английских пород овец: линкольн, ромни-марш, бордер-лейстер, гемпшир, суффолък, оксфорддаун, шевиот, саутдаун.

Результатом этой работы явилось создание уникального стада импортных овец, которое много лет служило репродуктором племенных баранов, реализуемых в различные регионы Казахстана для создания кроссбредного овцеводства.

Академику К. У. Медеубекову было присуще постоянное стремление к новому, передовому в науке. Широта его научных взглядов и пытливость ума, редкое трудолюбие способствовало его ученикам и коллегам развивать новые научные направления, а всесторонняя поддержка учителя, в их начинаниях, как правило, приводила к получению новых конкурентоспособных результатов.

Так было при создании нового стада многоплодных овец (К. М. Касымов, Б. И. Мусабаев), при разработке новой технологии ведения отрасли (М. А. Абдуллаев, А. Дюсембаев), при создании стада пуховых и шерстных коз (С. Ж. Арынгазиев, Б. С. Даулетбаев).

Широкое внедрение в практику получила технология промышленного откорма овец (А. Г. Племянников, Т. И. Сарбасов, Р. Я. Батькаев).

За вклад в интенсификацию сельскохозяйственного производства, разработку и внедрение промышленного откорма овец, коллективу ученых института во главе с академиком К. У. Медеубековым, была присуждена Государственная премия в области науки и техники Республики Казахстан.

Академику К. У. Медеубекову, как известному ученому-селекционеру было оказано высокое доверие возглавлять на протяжении 14 лет (1978-1992 гг.) секцию овцеводства МСХ СССР и ВАСХНИЛ.

Он был Председателем редакционных советов журналов «Вестник сельскохозяйственной науки Казахстана» и «Жарши», членом редакционных советов «Овцеводство» и «Агропромышленный комплекс Казахстана».

В 1979 году был избран Председателем Президиума Восточного отделения ВАСХНИЛ, Вице-президентом ВАСХНИЛ. С 1972 года член-корреспондент, с 1982 года академик ВАСХНИЛ, с 1996 года академик Национальной академии наук Республики Казахстан.

В 1980-1990 гг.депутат Верховного Совета Казахской ССР, в 1989-1992 гг. народный депутат СССР.

В последние годы жизни академик К. У. Медеубеков вел плодотворную научную деятельность по подготовке научных кадров высшей квалификации в качестве Председателя Диссертационного Совета по защите докторских диссертаций Казахского Национального аграрного университета.

За плодотворную научную, государственную и общественную деятельность академик К. У. Медеубеков награжден орденами «Парасат», «Октябрьской революции», «Трудового Красного Знамени», «Дружбы народов», медалями, почетными Грамотами Верховного Совета КазССР, ВАСХНИЛ, Лауреат премии им. академика А. И. Бараева.

В связи с 85-летием со дня рождения был награжден Золотой медалью К. И. Тимирязева.

За большой вклад в развитие аграрной науки Казахстана был удостоен звания «Заслуженный деятель науки и техники Республики Казахстан».

Имя академика Кыйлыбая Усеновича Медеубекова внесено в книгу «Кто есть кто», изданную в США в 1991 году, в которой имеются сведения о наиболее выдающихся ученых, политических и государственных деятелях мира.

В канун 90-летия со дня рождения академика К. У. Медеубекова, внесшего огромный вклад в развитие сельскохозяйственной науки Казахстана хочется пожелать научной школе «Создание новых высокопродуктивных пород овец Казахстана»успешно продолжать, расширять и углублять перспективные научные направления в области селекции овец, что явится лучшим памятником его светлой личности.

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МАЗМҰНЫ

Ғылыми мақалалар

Кливлеева Н.Г., Онгарбаева Н.С., Сактаганов Н.Т., Глебова Т.И., Лукманова Г.В., Шаменова М.Г., Саятов М.Х., Березин В.Э., Нусупбаева Г.Е., Айкимбаев А.М., Вебби Р.Дж. 2017–2018 ж. Қазақстан аумағындағы адам және шошқа арасында тұмау вирусының айналымы.....6

Баймуканов Д.А., Абуғалиев С.Қ., Сейдалиев Н.Б., Чиндалиев А.Е., Далибаев Е.К., Жамалов Б.С., Муқа Ш.Б. Қазақстан Республикасының сүтті ірі қара малды өсіретін тектік қорының асылтұқымдық құндылығының индексі мен сүтінің өнімділігі.....14

Усабаев А.К., Pontoppidan C.A., Усабаев Д.К. Қазақстан Республикасындағы концессия активтер мен міндеттерінің бухгалтерлік есебінің ағымдағы проблемалар.....28

Ермекбаев А.А., Әбсаттаров Ғ.Р., Уильямс Джозеф. Ресей мен Түркияның саясатының идеологиялық негізі.....37

Васич Б.К., Кусанова Б., Саммерс Д.Г., Майдангалиева Ж.А. Посткеңестік әлемдегі екітілділік білім беруі: мәселелері мен келешектері.....43

Кушжанов Н.В., Махаммадли Дашгин. ЕЭО сандық жолдама.....55

Саммерс Д.Г., Балпеисова С.А., Утемисова Г.У., Майдангалиева Ж.А. Қазақстан қоғамындағы зорлық-зомбылықтың өсуі. Бұны қалай тоқтатуға болады? Резонанстық жағдайларды контент-талдауы: "Абай ауылындағы баланың ісі", "Түркістан облысындағы ұрып-соғу".....62

Вовк В.Я., Жежерун Ю.В., Костогрыз В.Г. Кәсіпкерлік және орталық кәсіпорындардың банктік несиелері: Украина және Польша тәжірибесінен.....70

Алтыбаева С.М., Комуцци Л.В. Қазақстанның тарихи романдағы әскери кодтың репрезентативтік модельдері.....79

Дехтярь Н.А., Дейнека О.В., Пигуль Н.Г. Украинада әлеуметтік-экономикалық реформаларды жүзеге асыру тұрғысында мемлекеттік шығындар құрылымын оңтайландыру.....88

Тулибаева Ж.М., Хайрулдаева А.М. Қазақтардың ортазиялық хандықтармен XVIII ғ. – XIX ғ. бірінші жартысындағы қарым-қатынастарының тарихы бойынша қазақ деректері.....93

Аюпова З.К., Құсайынов Д.Ө., Наган Уинстон. Өзбекстан Республикасының құқықтық жүйесіндегі модернизациялық тендециялар жайлы.....100

Егорова Н.Н., Сущих В.Ю., Иванов Н.П., Намет А.М., Алиев М.А. «Байсерке-Агро" ЖШС-гі бұзаудың респираторлық ауруларымен күресу әдістерінің тиімділігі».....108

Иванов Н.П., Саттарова Р.С., Бакиева Ф.А., Шыныбаев К.М., Исакулова Б.Ж. Ірі қара мал моракселлезі кезіндегі КБР/КҰБР диагностикалық құндылығы.....112

Гриднева Е.Е., Калиакпарова Г.Ш., Алпысбаев К.С., Сэвындык Т. Экономикалық қауіпсіздік шартындағы аграралық өнеркәсіп кешенінің инновациялық мүмкіндіктері.....115

Кажикенова С.Ш., Беломестный Д. Қара металлургия саласында технологиялық процестер сенімділігінің фундаментальды сипаттамалары.....120

Баймұқанов Д.А., Приступа В.Н., Колосов Ю.А., Донник И.М., Торосян Д.С., Колосов А.Ю., Орлова О.Н., Юлдашбаев Ю.А., Чылбак-оол С.О. Қалмақ тұқымының ірі қара малының өнімділігі мен асыл тұқымдылығын арттыру.....128

Акимбеков А.Р., Исхан К.Ж., Алданазаров С.С., Аубәкиров Х.А., Карынбаев А. К., Рзабаев Т.С., Гемингули Мухатай, Әсильбеков Ш.Б., Баймуканов Д.А. Алматы облысы жағдайындағы қазақ жабы жылқы типінің жас төлдерінің ет өнімділігі.....148

Иванов Н.П., Саримбекова С.Н., Султанов А.А., Намет А.М., Садиев С.Т., Арысбекова А.Т., Бакиева Ф.А., Саттарова Р.С., Шыныбаев К.М., Акмырзаев Н.Ш., Исакулова Б. Ешкі және түйе сүтін бруцеллезге зерттеу әдістерін әзірлеу.....161

Локшин В.Н., Валиев Р.К., Заиченко К.В. "Poorresponders" – заманауи түсініктер, ҚРТ бағдарламаларында жүргізу қағидалары. Әдебиетке шолу.....177

Рузиева Э.А., Нургалиева А.М., Дуйсенбаева Б.Б., Асанова А.Б., Штиллер М.В. Экономикалық дамудағы инвестициялар рөлін талдау.....189

Александров А.А., Гумеров А.Г., Хафизов Ф.Ш., Шарипов (Аубакиров) Г.А., Козловски Вальдемар. Өрттің таралуынан қорғау үшін түйіршіктелген балқитын жанбайтын заттардан жасалған резервуарлардың қабырғалары мен шатырларына арналған қорғаныш жабындары.....199

Исина Б., Абудувайли Д., Бисенбаева С., Исанова Г.Т., Масакбаева А. Шардара су қоймасының су режиміне адам қызметінің әсері.....206

Наумкина В.В. Сібір көшпенділерінің жалпы құқығы бойынша тәртіптік шараларды анықтау критериясы ретінде жеке тұлға туралы қоғамдық пікір.....216

Айтхожаева Е.Ж., Тынымбаев С.Т., Сейлова Н.А., Терейковская Л.А., Иманбаев А.Ж. Жылдамдығы жоғары модульге келтіру құрылғысы.....220

Тлеубердинова А.Т., Шаекина Ж.М., Салауатова Д.М., Pratt Stephen. Туризмдегі кәсіпкерлік белсенділікті ынталандыруға арналған ұйымдастырушылық шаралар.....226

Баешов А.Б., Айболова Г.Т., Тулешова Э.Ж., Өзлер М.А. Азот (II) оксидін электрохимиялық жолмен нейтрал ортада тотықтыру.....237

Баешов А., Абижанова Д.А., Абдувалиева У.А., Жұрынов М. Мыс (II) және титан иондары бар күкірт қышқылы ерітіндісінде мыстың электрохимиялық қасиетін потенциодинамикалық поляризациялық қисықтар түсіру арқылы зерттеу.....241

Хроника

Жұрынов М. Тәлім мен таным қайнары.....249

Мерейтойлар

Қазақстан Республикасы Ұлттық ғылым академиясының құрметті мүшесі Т. М. Досмұхамбетовке 70 жыл.....252

Журинов М.Ж., Карабаев Ж.А., Бегманов А.С. Қазақстандағы қойлардың жаңа жоғары өнім беретін сұрыптарының ғылыми мектебінің негізін салушы.....254

СОДЕРЖАНИЕ

Научные статьи

Кливлеева Н.Г., Онгарбаева Н.С., Сактаганов Н.Т., Глебова Т.И., Лукманова Г.В., Шаменова М.Г., Саятов М.Х., Березин В.Э., Нусупбаева Г.Е., Айкимбаев А.М., Вебби Р.Дж. Циркуляция вирусов гриппа среди людей и свиней на территории Казахстана в 2017–2018 гг. 6

Баймуканов Д.А., Абугалиев С.К., Сейдалиев Н.Б., Чиндалиев А.Е., Далибаев Е.К., Жамалов Б.С., Муқа Ш.Б. Продуктивность и индекс племенной ценности разводимого генофонда молочного скота в Республике Казахстан..... 14

Усабаев А.К., Pontoppidan C.A., Усабаев Д.К. Актуальные проблемы бухгалтерского учета концессионных активов и обязательств в Республике Казахстан.....28

Ермекбаев А.А., Абсаттаров Г.Р., Уильямс Джозеф. Идеологические основы политики России и Турции.....37

Васич Б.К., Кусанова Б., Саммерс Д.Г., Майдангалиева Ж.А. Билингвальное образование на пост-советском пространстве: проблемы и перспективы.....43

Кушжанов Н.В., Махаммадли Дашгин. Цифровая повестка ЕАЭС.....55

Саммерс Д.Г., Балпеисова С.А., Утемисова Г.У., Майдангалиева Ж.А. Рост насилия в казахстанском обществе. Как это остановить? Контент-анализ резонансных случаев: "Дело мальчика из села Абай", "Избиения в Туркестанской области"..... 62

Вовк В.Я., Жежерун Ю.В., Костогрыз В.Г. Банковское кредитование малых и средних предприятий: опыт Украины и Польши.....70

Алтыбаева С.М., Комуцци Л.В. Репрезентативные модели военного кода в исторической романистике Казахстана.....79

Дехтярь Н.А., Дейнека О.В., Пигуль Н.Г. Оптимизация структуры государственных расходов в условиях реализации социально-экономических реформ в Украине..... 88

Тулибаева Ж.М., Хайрулдаева А.М. Казахские источники по истории взаимоотношений казахов со среднеазаитскими ханствами в XVIII – первой половине XIX вв. 93

Аюпова З.К., Кусаинов Д.У., Наган Уинстон. О модернизационных тенденциях в правовой системе Республики Узбекистан..... 100

Егорова Н.Н., Сущих В.Ю., Иванов Н.П., Намет А.М., Алиев М.А. Эффективность методов борьбы с респираторными болезнями телят в ТОО «Байсерке-Агро».....108

Иванов Н.П., Саттарова Р.С., Бакиева Ф.А., Шыныбаев К.М., Исакулова Б.Ж. Диагностическая ценность РСК/РДСК при моракселлёзе КРС..... 112

Гриднева Е.Е., Калиакпарова Г.Ш., Алпысбаев К.С., Сэвындык Т. Инновационные возможности агропромышленного комплекса в условиях экономической безопасности.....115

Кажикенова С.Ш., Беломестный Д. Фундаментальные характеристики надежности технологических процессов в черной металлургии.....120

Баймуканов Д.А., Приступа В.Н., Колосов Ю.А., Донник И.М., Торосян Д.С., Колосов А.Ю., Орлова О.Н., Юлдашбаев Ю.А., Чылбак-оол С.О. Совершенствование племенных и продуктивных качеств скота калмыцкой породы.....128

Акимбеков А.Р., Исхан К.Ж., Алданазаров С.С., Аубэкиров Х.А., Карынбаев А. К., Рзабаев Т.С., Гемингули Мухатай, Әсильбеков Ш.Б., Баймуканов Д.А. Мясная продуктивность молодняка казахской лошади типа жабе в условиях Алматинской области.....148

Иванов Н.П., Саримбекова С.Н., Султанов А.А., Намет А.М., Садиев С.Т., Арысбекова А.Т., Бакиева Ф.А., Саттарова Р.С., Шыныбаев К.М., Акмырзаев Н.Ш., Исакулова Б. Разработка методов исследования на бруцеллез молока коз и верблюдиц.....161

Локшин В.Н., Валиев Р.К., Заиченко К.В. "Poorresponders" – современные представления, принципы ведения в программах ВРТ. Обзор литературы.....177

Рузиева Э.А., Нургалиева А.М., Дуйсенбаева Б.Б., Асанова А.Б., Штиллер М.В. Анализ роли инвестиций в экономическом развитии.....189

Александров А.А., Гумеров А.Г., Хафизов Ф.Ш., Шарипов (Аубакиров) Г.А., Козловски Вальдемар. Защитные покрытия для стенок и кровли резервуаров из гранулированных плавких негорючих веществ для защиты от распространения пожара.....199

Исина Б., Абудувайли Д., Бисенбаева С., Исанова Г.Т., Масакбаева А. Влияние человеческого фактора на водный режим Шардаринского водохранилища.....206

Наумкина В.В. Общественное мнение о личности как критерий определения дисциплинарных мер по общему праву сибирских кочевников.....216

Айтхожаева Е.Ж., Тынымбаев С.Т., Сейлова Н.А., Терейковская Л.А., Иманбаев А.Ж. Метод и устройство для приведения чисел по модулю.....220

Тлеубердинова А.Т., Шаекина Ж.М., Салауатова Д.М., Pratt Stephen. Организационные мероприятия стимулирования предпринимательской активности в туризме.....226

Баешов А.Б., Айболова Г.Т., Тулешова Э.Ж., Өзлер М.А. Электрохимическое окисление оксида азота (II) в нейтральной среде.....237

Баешов А., Абижанова Д.А., Абдувалиева У.А., Журинов М. Исследование электрохимического поведения меди в растворе серной кислоты, содержащих ионы меди (II) и титана методом снятия потенциодинамических поляризационных кривых.....241

Хроника

Журынов М. Источник познания и обучения.....249

Юбилейные даты

70 лет почетному члену Национальной академии наук Республики Казахстан Т. М. Досмухамбетову.....252

Журинов М.Ж., Карабаев Ж.А., Бегманов А.С. Основатель научной школы по созданию новых высокопродуктивных пород овец Казахстана.....254

CONTENTS

Scientific articles

Klivleyeva N.G., Ongarbayeva N.S., Saktaganov N.T., Glebova T.I., Lukmanova G.V., Shamenova M.G., Sayatov M.Kh., Berezin V.E., Nusupbaeva G.E., Aikimbayev A.M., Webby R.J. Circulation of influenza viruses among humans and swine in the territory of Kazakhstan during 2017–2018..... 6

Baimukanov D.A., Abugaliyev S.K., Seidaliyev N.B., Chindaliyev A.E., Dalibayev E.K., Zhamalov B.S., Muka Sh.B. Productivity and estimated breeding value of the dairy cattle gene pool in the Republic of Kazakhstan..... 14

Ussabayev A.K., Pontoppidan C.A., Ussabayev D.K. Actual problems of accounting of concession assets and liabilities in the Republic of Kazakhstan.....28

Yermekbayev A.A., Absattarov G.R., Williams Joseph. Ideological bases of Russia and Turkey policies..... 37

Vasic B.K., Kussanova B., Summers D.G., Maydangaliyeva Zh.A. Bilingual education in former soviet country: perspective and problems..... 43

Kushzhanov N.V. , Mahammadli Dashqin. The digital agenda of EAUE..... 55

Summers Danna, Balpeissova S.A., Utemissova G.U., Maydangalieva Z.A. The rising violence among adolescents in Kazakhstan. Content-analysis of media “Boy from Abay village” and “Abuse in Turkestan”..... 62

Vovk V.Y., Zhezherun Yu.V., Kostohryz V.G. Bank lending to small and medium-sized enterprises: the experience of Ukraine and Poland.....70

Altybayeva S.M., Comutstsi L.V. Representative models of military codes in the Kazakh historical novels.....79

Dekhtyar N.A., Deyneka O.V., Pihul N.G. Optimization of government expenditures structure in conditions of implementation of social and economic reforms in Ukraine..... 88

Tulibayeva Zh.M., Khairuldaeva A.M. Kazakh sources on the history of relations between the Kazakhs and the Central Asian khanates in the 18th – the first half of the 19th centuries.....93

Ayupova Z.K., Kussainov D.U., Nagan Winston. About modernization tendencies in the legal system of the Republic of Uzbekistan..... 100

Egorova N.N., Ivanov N.P., Sushchikh V.Yu., Namet A.M., Aliev M.A. Efficiency of methods of fighting respiratory diseases of calves in “Bayserke-Agro” LLP..... 108

Ivanov N.P., Sattarova R.S., Bakiyeva F.A., Shynybaev K.M., Issakulova B.Zh. Diagnostic value of CFT/LCFT for cattle moraxellosis..... 112

Gridneva Y.E., Kaliakparova G.Sh., Alpysbayev K.S., Sevindik T. The innovative possibilities in the agro-industrial complex in terms of economic security..... 115

Kazhikenova S.Sh., Belomestny D. Fundamental characteristics of reliability in technological processes in ferrous metal industry.....120

Baimukanov D.A., Pristupa V.N., Kolosov Yu.A., Donnik I.M., Torosyan D.S., Kolosov A.Yu., Orlova O.N., Yuldashbayev Yu.A., Chylbak-ool S.O. Improvement of breeding and productive traits of Kalmyk cattle breed..... 128

Akimbekov A.R., Iskhan K.Zh., Aldanazarov S.S., Aubakirov Kh.A., Karynbayev A.K., Rzabayev T.S., Geminguli Mukhatai, Asylbekov S.B., Baimukanov A.D. Meat productivity of young stock of the Kazakh horse of Jabe type in the conditions of the Almaty region..... 148

Ivanov N.P., Sarimbekova S.N., Sultanov A.A., Namet A.M., Sadiev S.T., Arysbekova A.T., Bakiyeva F.A., Sattarova R.S., Shynybayev K.M., Akmyrzaev H.Sh., Isakulova B. Development of methods for studies on brucellosis in the milk of goats and camels..... 161

Lokshin V., Valiev R., Rybina A., Zaichenko K. "Poor responders" – modern ideas, principles of management in ART programs. Review....177

Ruziyeva E.A., Nurgaliyeva A.M. Duisenbayeva B.B., Assanova A.B., Shtiller M.V. Analysis of investments role in the economic development....189

Aleksandrov A.A., Gumerov A.G., Khafizov P.S., Sharipov (Aubakirov) G.A., Kozlowski Waldemar. Protective coatings for walls and roof of tanks made of granular fused non-combustible substances against fire extension....199

Issina B., Abuduwaili J., Bissenbayeva S., Issanova G.T., Massakbayeva A. Human impact on water regime of the Shardara water reservoir....206

Naumkina V.V. Public opinion about the personality as criterion of definition of disciplinary measures on common law of the Siberian nomads....216

Aitkhozhayeva Y.Zh., Tynymbayev S., Seilova N.A., Tereikovska L.A., Imanbayev A.Zh. Method and device for modulus reduction....220

Tleuberdinova A.T., Shayekina Zh.M., Salauatova D.M., Pratt S. Organizational activities to stimulate the entrepreneurial activity in tourism....226

Baeshov A.B., Aibolova G.K., Tuleshova E.Zh., Ozler M.A. Electrochemical oxidation of nitrogen (II) oxide in the neutral meduim....237

Bayeshov A., Abijanova D.A., Abduvalieva U.A., Zhurinov M. Study of electrochemical properties of copper in solution of sulphuric acid with copper (II) ions and titan through potentiodynamic polarized curve....241

Chronicle

Zhurinov M. Source of cognition and educating....249

Anniversary dates

T. M. Dosmukhambetov, honorary member of the National Academy of Sciences of the Republic of Kazakhstan – 70 years old....252

Zhurinov M.Zh., Karabayev Zh.A., Begmanov A.S. Founder of the scientific school in establishing new high-productive sheep breeds of Kazakhstan....254

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