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ВЕСТНИК

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

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

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, 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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FACTORS OF NONSPECIFIC RESISTANCE OF CALVES IN DAIRY CATTLE BREEDING

Abstract. Under the influence of the biostimulant, an increase in the morphological and biochemical data of blood in calves grown both on private plots and on small and medium farms, which at the end of the observation period exceeded the control values: the number of red blood cells - by 0.98; 0.81 and 0.79x10^{12}/l, hemoglobin - by 9.8; 7.0 and 6.2 g/l, albumins - by 2.2; 2.8 and 3.5 g/l, γ-globulins - by 5.5; 3.7 and 5.6 g/l (P <0.05-0.001), respectively. The data on the leukocyte phagocytic activity, plasma lysozyme activity, serum bactericidal activity, and immunoglobulins were higher than in the control: when rearing calves in private subsidiary plots - by 5.6%, 4.8%, 5.5% and 4.7 mg/ml, on a small farm - by 5.2; 4.2; 7.8 % and 3.6 mg/ml and on a medium farm - by 5.8%, 3.6%, 4.4% and 4.3 mg/ml, respectively (P<0.05-0.01).

A rising in the technological stress on the calf's organism was revealed depending on the increase in the enterprise capacity, which is confirmed by the bioamine blood spectrum.

Keywords: private subsidiary plots, small and medium-sized farms, calves, polystim, growth and development, hematological and biochemical profiles, meat quality.

Introduction. A survey of private plots, small and medium-sized farms showed that according to many parameters, they do not meet the veterinary-sanitary and zoohygienic requirements. In livestock enterprises as an artificially created ecological system, technological solutions are provided that do not meet the biological requirements of animals. Therefore, in the process of their exploitation, animals are forced to constantly adapt to the changing living conditions, technical and engineering elements of production. As a result, the unresolved problems of the microclimate optimization and many other factors in animals cause stress reactions that reduce natural resistance, productivity and can be the reason of morbidity and withdrawal, especially of young stock. In newborn calves, the most common diseases are of the gastrointestinal tract and respiratory system. Their incidence reaches up to 80%, and the withdrawal - up to 20% [1, 2, 3, 4, 5, 6].

One of the ways to activate the protective and adaptive functions of the calf body to the conditions of keeping on private subsidiary plots, on small and medium-sized farms in winter, reducing stress on the body and more fully realizing the biological potential of resistance and productivity in young stock is the use of biological stimulants with a wide range of positive effects on the body. The use of appropriate preparations during the critical immunological periods of calves allows for a long time to maintain the constancy of the internal environment of the body under the conditions of engineering, technological, zootechnical, veterinary, zoohygienic and environmental stress factors [7, 8, 9, 10, 11, 12, 13, 14].

The aim of this work is to study the biological characteristics of the nonspecific resistance of the calf organism raised in private subsidiary plots, on small and medium farms using a biostimulator polystim (PS-1).

Materials and methods. The experimental part of the research work was carried out on the OOO Koltsovka Agrofirm dairy farm (medium farm for 200 cows), training and production farm (small farm for 50 cows) VGO Vurnarsky agricultural technical high school and in private farms of Vurnarsky district of the Chuvash Republic. The processing of materials was carried out in the State Institution "Chuvash Republican Veterinary Laboratory" of the State Veterinary Service of the Chuvash Republic and in the Vurnarsky District Veterinary Laboratory of the State Institution "Vurnarskaya District station to fight animal diseases", as well as in laboratories of the Chuvash State Agricultural Academy.

Three series of scientific and economic experiments were carried out in the conditions of private subsidiary plots, small and medium farms using black-and-white calves. In all series of experiments, two groups of newborn calves were selected according to the principle of pair-analogs (control and experimental), taking into account the physiological state and live weight of 10 animals in each group.

In the first series of the experiments, the newborn calves were raised in a cowshed with a cow-mother in the isolated section, in the second sergers - firstly, in dispensary individually for up to 30 days, then in sections in a group way (starting from 3-5 to 8-10 animals), and in the third series of the experiments - in the beginning individually in a shift-section dispensary for up to 21 days, then - in a group way in calf pen sections (8-10 animals each).

To activate the protective and adaptive functions of the calf body under the keeping conditions in private subsidiary plots, on small and medium farms in winter, to reduce the stress load on the body and to more fully realize the biological potential of the resistance and productivity of young animals, we used a polystim biostimulator developed by scientists from the Chuvash State Agricultural Academy.

When setting up the experiments, the control group of calves was not injected by a biostimulator, and the experimental group was intramuscularly injected with polystim at a dose of 3 ml at 1-2- and 5-6-days old age.

The research of the clinical and physiological state, morphological and biochemical values of blood, as well as factors of nonspecific resistance and bioamine blood spectrum of calves were studied on the 1st, 15th, 30th, 60th, 90th, 120th, 150th and 180th days of life according to modern common methods in veterinary medicine.

Research results. It was found that in calves raised in the private subsidiary plot using polystim, the data of hematological parameters were higher than in the control: the number of red blood cells - by 0.28-0.98x10^{12}/l, the hemoglobin concentration - by 5.8-13.2 g/l, on a small farm - by 0.27-0.81x10^{12}/l and 2.2-10.0 g/l and on a medium farm - by 0.34-0.79x1012/l and 4.2-9.6 g/l, respectively ($P<0.05$-0.01). At the same time, polystim did not have a significant effect on the production of leukocytes.

An increase in the concentration of hemoglobin and the number of red blood cells in the blood of experimental calves indicates an improvement in their hematopoiesis under the influence of the biological stimulator.

The level of total protein and albumins in the blood serum of calves of the experimental group during the observation period was significantly higher than in the control: with the keeping technology in private plots - by 0.6-4.8 and 1.2-4.5 g/l, on a small farm - by 0.6-4.6 and 0.3-3.8 g/l and with the keeping technology on a medium farm - by 2.2-4.8 and 1.8-3.5 g/l ($P<0.05$-0.01), respectively.

That is, the used preparation activated the albumin synthesis as the main source of plastic material.

The concentration of α- and β-globulin protein fractions in the blood serum of animals of the compared groups varied throughout the observation period, and the difference between the obtained data was unreliable.

In animals of the experimental group, raised in the conditions of private subsidiary plots, the concentration of the γ-globulin protein fraction in the blood serum exceeded the control data by 2.2-5.9 g/l, with the keeping technology on a small farm - by 1.5-3, 8 g/l, and in medium farm conditions - by 1.0-5.6 g/l ($P<0.05$-0.001).

A build-up in the concentration of the γ-globulin protein fraction in the blood serum of animals of the experimental groups in the early period of postnatal ontogenesis indicates the activation of the humoral arm of the nonspecific resistance of the calf's organism under the influence of polystim with small farming conditions.

The dynamics of the main indicators of nonspecific resistance of the calf body are presented in table 1.

Table 1 - Factors of nonspecific resistance in calves

Group of animals	Age, days	Phagocytic activity, %	Phagocytic index	Lysozyme activity, %	Bactericidal activity, %
in private subsidiary plots					
Control	1	25.8±1.1	3.6±0.40	6.1±0.37	31.6±1.32
	15	35.2±1.53	4.0±0.45	9.8±0.57	33.6±1.02
	30	46.0±1.14	5.6±0.24	14.1±0.49	40.6±1.19
	60	44.2±1.24	6.2±0.37	16.2±0.82	46.1±0.86
	90	51.6±1.08	6.6±0.24	17.4±0.62	53.2±1.12
	120	52.8±1.36	6.8±0.49	19.8±0.57	58.2±1.48
	150	52.0±1.48	7.4±0.68	20.0±0.65	57.6±1.37
	180	54.8±1.59	8.2±0.58	20.3±0.59	58.9±1.37
Experimental	1	26.2±1.59	3.6±0.24	6.3±0.47	31.4±1.56
	15	39.2±1.50	5.4±0.60	12.2±0.50*	38.2±1.40*
	30	50.2±1.36*	6.4±0.60	16.9±0.57**	48.1±1.40**
	60	52.6±1.63**	7.2±0.58	19.8±0.64**	53.9±1.39**
	90	56.2±1.36*	7.4±0.24	20.9±0.54**	60.7±1.70**
	120	57.0±1.34	7.8±0.37	22.9±0.74*	63.7±1.36*
	150	57.8±1.59*	8.2±0.37	23.2±0.62**	62.4±1.43*
	180	60.4±1.69*	8.8±0.58	25.1±0.77**	64.0±1.50*
on small-sized farms					
Control	1	25.4±1.21	3.4±0.51	5.8±0.64	30.1±1.09
	15	32.2±1.56	4.2±0.58	9.3±0.71	32.7±1.10
	30	44.0±1.52	5.2±0.49	13.0±0.81	39.7±1.05
	60	43.6±1.33	5.8±0.58	15.4±0.83	43.8±1.15
	90	49.6±1.03	6.2±0.66	16.3±0.75	50.9±1.28
	120	51.2±1.46	6.6±0.51	18.6±1.06	54.0±1.03
	150	51.8±1.91	7.0±0.32	18.9±1.03	53.2±1.18
	180	53.4±1.50	7.6±0.51	19.4±0.80	55.3±1.45
Experimental	1	25.6±1.03	3.6±0.40	5.9±0.45	31.4±1.31
	15	36.6±1.21	5.0±0.55	11.9±0.67*	37.1±0.95*
	30	49.2±1.62*	6.0±0.71	15.9±0.69*	45.7±1.55*
	60	51.2±2.08*	6.8±0.58	19.2±0.70**	52.6±1.74**
	90	54.4±1.25*	7.2±0.37	20.1±0.99*	57.7±1.45**
	120	56.2±1.53*	7.4±0.40	21.6±0.76	61.1±1.39**
	150	58.0±1.87*	7.8±0.37	22.2±0.66*	60.2±1.34**
	180	58.6±1.57*	8.4±0.60	23.6±0.76**	63.0±1.51**
on medium-sized farms					
Control	1	22.0±1.70	3.4±0.24	5.4±0.61	27.5±1.46
	15	29.8±1.46	4.0±0.32	8.0±0.75	29.0±1.40
	30	41.8±1.36	4.8±0.58	11.7±0.72	36.4±1.12
	60	41.4±1.21	6.0±0.32	13.7±0.75	41.6±1.13
	90	47.8±1.56	5.8±0.58	15.1±0.89	48.3±1.36
	120	49.6±1.33	6.2±0.80	16.7±0.77	51.9±1.15
	150	50.2±1.85	6.6±0.51	16.6±1.01	50.2±1.14
	180	51.6±1.40	7.8±0.73	18.1±0.69	54.8±1.29
Experimental	1	22.4±1.72	3.4±0.51	5.2±0.33	26.7±1.21
	15	33.8±1.07	4.6±0.24	10.7±0.77*	33.9±1.33*
	30	46.4±1.25*	5.4±0.51	14.5±0.61*	42.1±1.66*
	60	48.6±1.89*	6.6±0.68	17.6±1.10*	48.4±1.12**
	90	52.6±1.36*	6.8±0.49	18.2±0.75*	53.8±1.27*
	120	54.4±1.21*	7.6±0.51	19.5±0.70*	58.1±1.09**
	150	56.8±1.11*	7.2±0.66	20.2±0.90*	55.5±1.28*
	180	57.4±1.75*	8.0±0.32	21.7±1.01*	59.2±1.28*

* P<0.05, ** P<0.01.

It was found that the cellular factors of nonspecific resistance in calves on the first day after birth did not differ significantly. In the subsequent periods of the studies, it was established that in animals raised in the conditions of private subsidiary plots using polystim, they turned out to be significantly higher than in the control: leukocyte phagocytic activity by 4.0-8.4%, the phagocytic index by 0.8 -1.4 units (P<0.05-0.01). When keeping animals in the dispensary and calf pens on a small farm, the data of the same indicators were higher by 4.4-7.6% and 0.8-1.0 units. (P<0.05), and in medium farm conditions - by 4.0-7.2% and 0.2-1.4 units (P<0.05), respectively. The results of these investigations indicate that polystim activated cell factors of nonspecific resistance of calves in small management forms.

The state of the humoral arm of the organism's resistance most fully reflects the lysozyme activity of plasma and the bactericidal activity of blood serum. It was found that in calves of the experimental group raised in the conditions of private subsidiary plots using polystim, the indicated humoral arms of the immune system were higher than in the control by 2.4–4.8 and 4.6–7.8% (P<0.05-0.01), on a small farm - by 2.6-4.2 and 4.4-8.8% (P<0.05-0.01) and on a medium farm - by 2.7- 3.9 and 4.4-6.8% (P<0.05-0.01), respectively.

The level of immunoglobulins in the blood serum of experimental calves was also significantly higher than in the control group, starting from the age of 15 days until the end of the observation period: with the technology of keeping in private plots - by 1.3-5.2 mg/l, in conditions of the small farm - by 1.9-4.8 mg/l and on the medium farm - by 2.2-4.3 mg/l (P<0.05-0.01).

These changes indicate that the use of polystim stimulated the humoral arms of the nonspecific resistance of the organism in conditions of small forms of management. Moreover, the immunogenic effect of the polystim application was more pronounced in the conditions of private subsidiary plots.

One of the significant problems in keeping calves is that the rapid transformation of the technological environment does not correspond to changes in the main specific forms and rhythms of behavior, therefore animals are encouraged to adapt. We have identified a build-up in technological stress on the calf's body, depending on the increase in the capacity of enterprises, which is confirmed by the bioamine blood spectrum.

The concentration of catecholamines in the blood components (in platelets, neutrophils, lymphocytes, and plasma) of calves of the control and experimental groups in conditions of small forms of management is presented in table 2.

The dynamics of catecholamines in the studied blood components of the control and experimental calves show that animals were stressed under growing technology on medium farms, as evidenced by an increase in the number of bioamines in the above-mentioned blood components, which could be a protective reaction to the stress factor. This reaction was most actively manifested 30 and 60 days after the experiments, which was a consequence of the stress reaction in the anxiety stage, which, starting from the age of 90 days, gradually decreased until the end of the observation period and ended with the resistance stage.

Intramuscular administration of biostimulant to calves caused an increase in metabolic processes and additional energy production by the body under the influence of a stress factor. So, in animals of the experimental group, the concentration of these bioamines in the blood was significantly higher at the age of 30 days by 5.5-9.9 conventional units, 60 days - 5.9-7.1, 90 days - 2.8- 6.6 and 120 days - by 2.3-4.8 conventional units (P<0.05-0.001) than in the control.

A similar pattern was noted in the concentration of serotonin in platelets, neutrophils, lymphocytes, and plasma. So, in the young animals of the experimental group, the content of serotonin in the blood components was significantly higher than in the control group after the administration of polystim: after 30 days - by 7.9-14.3%, after 60 days - by 9.1-13.3% and after 90 days - by 7.2-13.1% (P<0.05-0.01). The dynamics of histamine in the blood components were similar to the nature of changes in the level of catecholamines. Moreover, the histamine level in the blood components of the experimental calves was authentically higher than the control data at the age of 30 days - by 6.8-10.6%, in the 60-day-olds - 8.3-14.4%, in the 90-day-olds - 9.6-12.9%, in the 120-day-olds - 13.5-15.9% and in the 150-day-olds - by 12.4-15.8% (P<0.05-0.001), respectively.

Table 2 - The dynamics of catecholamines, conventional units

Group of animals	Age, in days	Catecholamines in the blood components			
		platelets	neutrophils	lymphocytes	plasma
in private subsidiary plots					
Control	1	26.0±1.14	23.2±0.97	24.9±1.21	20.6±1.03
	30	29.6±1.03	35.0±0.89	38.4±1.08	28.2±0.80
	60	43.2±0.86	51.6±0.81	55.4±1.36	48.0±1.18
	90	67.4±1.21	71.8±1.16	74.6±1.44	62.2±1.32
	120	77.6±1.29	73.6±1.21	81.8±1.32	70.2±1.32
	150	68.4±1.25	74.0±1.05	78.2±1.16	66.4±1.17
	180	63.0±1.14	62.2±1.16	67.6±1.17	54.8±1.16
Experimental	1	25.2±1.02	24.0±1.10	24.6±1.12	24.8±0.86*
	30	35.2±0.92**	41.6±1.03**	46.2±1.24**	32.6±0.98**
	60	50.8±1.16***	58.8±1.16***	61.6±1.03**	57.6±1.21***
	90	70.0±1.10	75.4±0.93*	79.0±1.14*	69.6±1.60**
	120	77.4±1.03	77.2±0.92*	85.8±1.02*	69.6±1.21
	150	72.0±1.58	75.8±1.16	80.4±1.17	70.2±1.02*
	180	66.8±1.07*	64.4±1.44	69.4±0.93	57.4±1.12
on small-sized farms					
Control	1	31.5±1.01	27.0±0.56	29.1±0.87	24.8±0.53
	30	53.8±1.12	55.6±1.06	54.6±0.84	54.2±1.02
	60	44.0±1.33	49.6±0.79	46.1±1.17	38.2±1.30
	90	34.9±1.12	32.5±0.94	31.3±1.16	26.8±1.23
	120	23.9±0.87	24.7±1.09	23.5±1.32	23.2±1.46
	150	21.7±0.76	24.0±0.90	21.4±0.97	24.3±1.22
	180	22.9±0.80	23.9±0.98	24.4±1.36	24.1±1.10
Experimental	1	32.1±0.68	28.5±0.94	27.6±0.65	26.5±0.98
	30	62.7±1.33***	60.2±1.03*	60.3±0.99**	58.5±0.75**
	60	52.7±1.35**	59.8±1.28***	52.9±0.73**	45.9±0.90**
	90	39.9±0.77**	38.5±0.81**	33.4±1.08	28.4±1.02
	120	23.6±0.65	26.1±1.19	26.6±1.10	25.3±1.42
	150	24.2±0.86	25.8±0.94	23.8±1.01	24.9±0.86
	180	25.0±0.76	25.0±1.39	26.9±1.15	25.1±0.92
on medium-sized farms					
Control	1	33.5±1.14	29.6±1.11	31.1±1.32	27.3±1.27
	30	56.0±1.21	57.4±1.81	29.2±1.30	55.6±1.30
	60	62.4±1.32	66.0±1.52	63.5±1.50	61.4±1.48
	90	53.5±1.48	47.3±1.59	43.7±1.64	45.2±1.56
	120	41.2±1.37	31.7±1.40	35.0±1.14	33.2±1.46
	150	32.3±1.43	33.5±1.71	29.9±1.13	29.6±1.25
	180	32.1±1.44	28.3±1.01	24.4±1.36	26.8±1.04
Experimental	1	35.7±1.11	31.5±1.25	29.2±1.17	26.3±1.13
	30	65.9±1.49***	66.2±1.65**	64.7±1.24*	61.1±1.40*
	60	68.8±1.49*	72.9±1.30**	70.6±1.34**	67.3±1.26*
	90	58.6±1.42*	54.0±1.37*	46.5±1.24	51.0±1.38*
	120	43.4±1.45	35.3±1.35	38.0±1.30	38.0±1.46*
	150	33.1±1.23	35.3±1.45	33.6±1.14	31.1±1.12
	180	31.4±1.41	29.1±1.06	26.9±1.15	25.1±1.21

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

Thus, the dynamics of catecholamines, serotonin, and histamine in the listed blood components of calves indicate that intramuscular injection of polystim to these animals in the conditions of small forms of management activated the sympathoadrenal, serotonin and histaminergic systems, increasing the adaptogenesis and natural resistance of calves to the conditions of keeping in private subsidiary plots, on small and medium farms.

Conclusion. The analysis of the results of research on the biostimulator polystim application to activate the protective and adaptive functions of the calf's body to the conditions of private plots, small and medium farms in winter, reduce the stress load on the body and more fully realize the biological potential of young animals resistance and productivity indicates that not only hematopoiesis, cellular and humoral factors of nonspecific resistance in experimental animals, but also to promote the growth and development of calves at a relatively low cost of feed per 1 kg of gain, reduces the incidence of the respiratory and gastrointestinal tract. The most pronounced stimulating effect was exerted by polystim when raising calves in private subsidiary plots, rather than on small and medium farms.

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СҮТТІ СИЫР ШАРУАШЫЛЫҒЫНДАҒЫ
СПЕЦИФИКАЛЫҚ ЕМЕС РЕЗИСТЕНЦИЯЛЫҚ ФАКТОРЛАР

Аннотация. Жұмыстың мақсаты – биостимулятор полистимін (*ПС-1*) қолдану арқылы жеке шаруа қожалықтарында, шағын және орта фермаларда өсірілген бұзау организмінің спецификалық емес тұрақтылығының биологиялық сипаттамаларын зерттеу.

Биостимуляторды бұзаудың көктамырына енгізу метаболизм үдерістерінің жоғарылауына және стресс факторының әсерінен организмнің қосымша энергия өндіруіне септеседі. Сонымен, эксперименттік топтағы жануарларда осы биоаминдердің қан құрамындағы компоненттерінің концентрациясы бақылауға қарағанда 30 тәулікте – 5,5-9,9 шартты бірлікке, 60 күнде – 5,9-7,1, 90 күнде – 2,8-ге едәуір жоғары болды. 6,6 және 120 күн – 2,3-4,8 (P <0.05-0.001).

Лейкоциттердің фагоцитарлық белсенділігі, плазманың лизоцимдік белсенділігі, қан сарысуының бактерицидтік белсенділігі және иммуноглобулиндер бойынша деректер бақылауға қарағанда жоғары болды: жеке қосалқы шаруашылықтарда бұзауларды өсіру кезінде - тиісінше 5,6%, 4,8%, 5,5% және 4,7 мг/мл, ұсақ шаруашылықта - 5,2; 4,2; 7,8% және 3,6 мг/мл және орта шаруашылықта - 5,8%, 3,6%, 4,4% және 4,3 мг/мл (p<0,05-0,01).

Кәсіпорын қуатының артуына байланысты бұзау денесіне технологиялық жүктеменің жоғарылауы анықталды, бұл қан биоаминдерінің спектрімен расталады.

Түйін сөздер: жеке шаруа қожалықтары, шағын және орта фермалар, бұзаулар, полистим, өсу мен даму, гематологиялық және биохимиялық профиль, ет сапасы.

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ФАКТОРЫ НЕСПЕЦИФИЧЕСКОЙ РЕЗИСТЕНТНОСТИ ТЕЛЯТ
В МОЛОЧНОМ СКОТОВОДСТВЕ

Аннотация. Цель настоящей работы – изучить биологические особенности неспецифической резистентности организма телят, выращиваемых в личных подсобных хозяйствах, на малых и средних фермах с применением биостимулятора полистим (ПС-1).

Под влиянием биостимулятора произошло увеличение морфологических и биохимических данных крови у телят, выращенных как на приусадебных участках, так и в малых и средних хозяйствах, которые к концу периода наблюдения превышали контрольные значения: количество эритроцитов - на 0,98; 0,81 и 0,79 х1012/л, гемоглобина - на 9,8; 7,0 и 6,2 г/л, альбуминов - на 2,2; 2,8 и 3,5 г/л, γ-глобулинов - на 5,5; 3,7 и 5,6 г/л (P <0,05-0,001) соответственно.

Данные по фагоцитарной активности лейкоцитов, лизоцимной активности плазмы, бактерицидной активности сыворотки крови и иммуноглобулинам были выше, чем в контроле: при выращивании телят в личных подсобных хозяйствах - на 5,6%, 4,8%, 5,5% и 4,7 мг/мл, в мелком хозяйстве - на 5,2; 4,2; 7,8 % и 3,6 мг/мл и в среднем хозяйстве - на 5,8%, 3,6%, 4,4% и 4,3 мг/мл соответственно (P<0,05-0,01).

Выявлено повышение технологической нагрузки на организм теленка в зависимости от увеличения мощности предприятия, что подтверждается спектром биоаминов крови.

Ключевые слова: личные подсобные хозяйства, малые и средние фермы, телята, полистим, рост и развитие, гематологический и биохимический профили, качество мяса.

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REFERENCES

[1] Belkin B.L. (2000) Veterinary and sanitary welfare of livestock farms as the basis for increasing animal productivity and obtaining environmentally friendly products [*Veterinarno-sanitarnoye blagopoluchiye zhivotnovodcheskikh ferm – osnova povysheniya produktivnosti zhivotnykh i polucheniya ekologicheski chistoy produktsii*]. Proceedings All-Russian scientific production conf. Hygiene of keeping and feeding animals is the basis for maintaining their health and obtaining environmentally friendly products. Oryol. p. 14-15 (in Russ.).

[2] Gushchin V.N. (2000) The main directions of scientific research in zoo hygiene [*Osnovnyye napravleniya nauchnykh issledovaniy v zoogigiyene*]. Proc. Proceedings All-Russian scientific production conf. Hygiene of keeping and feeding animals is the basis for maintaining their health and obtaining environmentally friendly products. Oryol. p. 37-39. (in Russ.).

[3] Inozemtsev V.P., Balkova I.I., Nozdrin G.V. et al. (1998) The effect of microclimate on the physiological functions of calves [*Vliyaniye mikroklimata na fiziologicheskiye funktsii telyat*]. Veterinary Medicine. Moscow. No 7. p.52. (in Russ.).

[4] Kuznetsov A.F. (1994) A modern view of environmental hygiene factors in veterinary medicine [*Sovremennoye predstavleniye o gigiyeno-ekologicheskikh faktorakh v veterinarii*]. Proc. All-Rus. scientific production conf. Hygiene, veterinary sanitation and livestock ecology. Cheboksary. p.232-234. (in Russ.).

[5] Smirnov A.M. (2004) Assessment of veterinary and environmental safety at large livestock production enterprises [*Otsenka veterinarno-sanitarnoy i ekologicheskoy bezopasnosti na krupnykh predpriyatiyakh po proizvodstvu produktsii zhivotnovodstva*]. Proc. Int. scientific-practical conf. State and problems of veterinary sanitation, hygiene and ecology in animal husbandry. Cheboksary.- P.3-15. (in Russ.).

[6] Tyurin V.G. (2004) Problems of zoo hygiene and environmental protection in modern conditions of livestock development [*Problemy zoogigiyeny i okhrany okruzhayushchey sredy v sovremennykh usloviyakh razvitiya zhivotnovodstva*].

Proc. Int. scientific-practical conf. State and problems of veterinary sanitation, hygiene and ecology in animal husbandry. Cheboksary. p. 233-237. (in Russ.).

[7] Petryankin F.P., Petrova O.Yu. (2008) The effect of immunostimulants on nonspecific resistance and immunogenesis of animals on the background of immunization [*Vliyaniye immunostimulyatorov na nespetsificheskuyu rezistentnost' i immunogenez zhivotnykh na fone immunizatsii*]. Veterinarian. Kazan. Number 3. p. 22-25. (in Russ.).

[8] Semenov V.G., Nikitin D.A., Petrov N.S., Gerasimova N.I. (2015) Ensuring the health and preservation of calves with domestic biostimulants [*Obespecheniye zdorov'ya i sokhrannosti telyat otechestvennymi biostimulyatorami*]. Russian journal Problems of Veterinary Sanitation, Hygiene and Ecology. Moscow. GNU VNIIVSGE RAAS. No. 4 (16). p.68-70. (in Russ.).

[9] Semenov V.G., Nikitin D.A., Petrov N.S., Gladkikh L.P., Gerasimova N.I. (2015) Realization of the biological potential of calves under different modes of adaptive breeding technology using biostimulants [*Realizatsiya biologicheskogo potentsiala telyat pri raznykh rezhimakh adaptivnoy tekhnologii vyrashchivaniya s primeneniyem biostimulyatorov*]. Agrarian Bulletin of the Urals. Yekaterinburg. No. 9 (139). p.36-40. (in Russ.).

[10] Semenov V.G., Kuznetsov A.F., Nikitin D.A., Vasiliev V.A. (2016) Growing calves under different modes of adaptive technology using domestic biological products [*Vyrashchivaniye telyat pri raznykh rezhimakh adaptivnoy tekhnologii s primeneniyem otechestvennykh biopreparatov*]. Regulatory issues in veterinary medicine. SPb. No. 4. p. 139-141. (in Russ.).

[11] Semenov V.G., Nikitin D.A., Gerasimova N.I., Vasiliev V.A. (2017) Realization of the reproductive qualities of cows and the productive potential of calves with biological products [*Realizatsiya vosproizvoditel'nykh kachestv korov i produktivnogo potentsiala telyat biopreparatami*]. Proceedings of the International Academy of Agrarian Education. - St. Petersburg. Vol. No. 33. p. 172-175. (in Russ.).

[12] Bekenov D.M., Spanov A.A., Chindaliyev A.E., Baimukanov A.D., Sultanbai D.T., Zhaksylykova G.K., Kalimoldinova A.S. (2019). Comparative study of fruitfulness of cow insemination of a milking herd at various levels of productivity in the conditions of Bayserke-AGRO LLP. Reports of the National Academy of Sciences of the Republic of Kazakhstan. Volume 4, Number 326 (2019), 27 – 30. https://doi.org/10.32014/2019.2518-1483.110 ISSN 2518-1483 (Online), ISSN 2224-5227 (Print).

[13] Kalimoldinova A.S., Zhaksylykova G.K., Chindaliyev A.E., Baigabylov K., Baimukanov A.D. Growth and development of calves of Holstein breed in the dairy complex of the Bayserke-Agro LLP. News of the National Academy of Sciences of the Republic of Kazakhstan. Series of agrarian sciences. Volume 5, Number 53 (2019), 54-57. https://doi.org/10.32014/2019.2224-526X.60 ISSN 2224-526X (Online).

[14] Bekenov D.M., Spanov A.A., Chindaliyev A.E., Baimukanov A.D., Sultanbai D.T., Zhaksylykova G.K., Kalimoldinova A.S. (2019). Comparative study of fruitfulness of cow insemination of a milking herd at various levels of productivity in the conditions of Bayserke-Agro LLP. Bulletin of the National Academy of Sciences of the Republic of Kazakhstan. Volume 6, Number 382 (2019), 335–338. https://doi.org/10.32014/2019.2518-1467.178 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

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