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ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
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ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

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

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

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

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V. G. Semenov[1], D. A. Baimukanov[2], N. I. Kosyaev[1], A. S. Alentayev[3], D. A. Nikitin[1], Kh. A. Aubakirov[4]

[1]Chuvash state agricultural academy, Cheboksary, Chuvash Republic, Russia,
[2]Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan,
[3]Scientific and Innovative Center for Animal Breeding and Veterinary Medicine, Astana, Kazakhstan,
[4]M.H. Dulati Taraz State University, Taraz, Kazakhstan.
E-mail: semenov_v.g@list.ru, dbaimukanov@mail.ru, kocyevni81@mail.ru,
alentaev55@mail.ru, nikitin_d_a@mail.ru, hamit_a57@mail.ru

ACTIVATION OF ADAPTOGENESIS AND BIORESOURCE POTENTIAL OF CALVES UNDER THE CONDITIONS OF TRADITIONAL AND ADAPTIVE TECHNOLOGIES

Abstract. For the first time, the influence of the biological stimulators of the new generation, polystim and PV-1, on the growth and development of calves under the conditions of traditional growth technology and in premises of lighter type of the adaptive technology (individual houses and pavilions on the open area) and on the quality of young stock meat has been studied. The possibility of activating the adaptive processes and increasing the resistance of the organism of such animals under the influence of these biostimulators to low temperatures of the habitat for protein-carbohydrate-vitamin metabolism, the function of the hematopoietic organs and the buffer system is established. The tested preparations activated the growth and development of calves, reduced the incidence of respiratory organs and gastrointestinal tract.

The possibility of correction of cellular and humoral factors of nonspecific resistance of the calf organism with the help of polystim and PV-1 during the winter period when growing according to traditional technology and in premises of light type has been experimentally proved.

Activation of the bioamine spectrum of the blood components was revealed due to manifestations of response reactions from the sympatho-adrenal, serotonergic and histaminergic systems of the calves organism depending on different growing conditions.

The quality of meat of the animals, which were injected with biostimulators, did not differ in organoleptic, biochemical and physicochemical parameters from those obtained without the use of stimulators, which indicates its ecological safety and biological fullness.

Keywords: calves, traditional technology, adaptive technology, biostimulators, adaptation, growth, development, meat quality.

Introduction. In spite of significant advances in modern zootechnical science and practice, the problem of the fulfilment of the EEU countries population with high-quality livestock products, including beef, is topical. More than 95% of beef is produced by slaughter meat of super-repair young animals and the rejected adult livestock of dairy and combined directions of productivity, the slaughter contingent of which and the level of productivity do not provide the necessary production volumes. For beef production, the young stock of the black-motley breed is used mostly, it is more adapted and maximally realizes the bioresource potential under optimal feeding and maintenance conditions. Currently, many farms successfully practice adaptive technology of calf growing [1-4].

The essence of this technology lies in the fact that calves in the first day are kept under mother-cows, then transferred to individual houses-prophylactorium, and 30 days later - to group houses. There are many positive aspects of this technology, but the main thing is the rupture of the epizootic chain, the formation of mechanisms for emergency adaptation and the increase in nonspecific resistance to habitat factors. The lack of scientifically based methods of pharmacological treatment of temperature stress using biostimulants inhibits the realization of the potential capabilities of the technology of calf growing and its widespread introduction into the production process [5-9, 11].

In light of the implementation of the ecological-adaptive theory of health protection and the provision of high productivity, there is a need to move from the existing traditional concept: sick animal - diagnosis - therapy, to a new global problem: animal population - habitat - prevention [1-4, 15, 18].

According to D.A. Baimukanov et al., in order to prevent the immune deficiency, to stimulate the level of nonspecific body protection to the pressure of environmental and technological stress factors and to realize the bioresource potential of the meat qualities of bull-calves, a wide range of feed and bioactive additives, immunocorrectors, antioxidants and Prevention-N-A and Prevention -N-E biologics [1].

The veterinary pharmaceutical market offers a variety of medicines. Most of them are synthetic and often cause complications, including aggravation of immunosuppressive conditions, contaminate raw materials and food products, and environment. Therefore, recently of great interest are medicines made from natural raw materials, which, when introduced into the animal's body, even in small amounts cause a positive effect [10, 12-14, 16, 17, 19, 20]. Such preparations are biostimulants polystim and PV-1, developed by scientists of the Chuvash State Agricultural Academy.

The aim of this study is to scientifically substantiate the growing of calves in the winter period in terms of traditional and adaptive technologies using new generation biological stimulants.

Material and methods. The objects of the research were calves of black-and-motley breed aged 1 to 180 days old bred in JSC "Agro-industrial company "Adal" of Enbekshikazakhsky district of Almaty region, the Republic of Kazakhstan.

The studies were conducted against the background of a balanced feeding according to the rations adopted in the farms, taking into account the main indicators stipulated by the Norms and rations of feeding of farm animals. Due to the extreme conditions in the process of growing calves in light-type rooms, the level of milk feeding was provided for by 20% above the accepted norms.

To activate adaptogenesis and realize the bioresource potential of calves, environmentally safe biological preparations were used – polystim and PV-1.

We have carried out two scientific and economic experience, in terms of traditional and adaptive technologies. In each variant of the experiments, three groups of newborn calves were selected on the basis of pair-analogues (one control and two experimental) taking into account the clinical and physiological state, breed, age, sex, and body weight. Each group consisted of 10 calves.

When setting up the experiments, no biostimulants were administered to the control group of animals; the 1st experimental group was intramuscularly injected with a polystim at a dose of 3 ml for the 1-2nd and 5-6th days of their life, and the 2nd experimental group with PV-1 at the same dose and at the same time.

With traditional technology, newborn calves were kept with mother-cows for one day, then transferred to a replaceable sectional dispensary, where they were kept until 21 days of age, and after the prophylactic period - in a calf house until the end of the observation period (180 days).

When grown in light-type premises, newborn calves were transferred from the maternity ward, where they were kept for 1 day with mother-cows, to individual houses and kept until the age of 30 days. Then they were transferred to pavilions in an open area, where observations continued until the age of 180 days.

In 5 calves from each group on the 1, 30, 60, 90, 120, 150 and 180th days of their lives, indicators of the physiological state, morphological and biochemical blood profiles, non-specific resistance, as well as growth and development were determined.

After the slaughter of young stock (control and experimental groups), meat quality and histomorphology of the internal organs were determined at 180 days of age.

Results. The parameters of the microclimate in the maternity ward, dispensary and calf house for the research period in terms of traditional technology were within the zoohygienic norms (table 1).

In light-type premises, the air temperature was lower than the regulatory data by 15.2-18.3 °C and was -1.2±0.19 °C and -4.3±0.31 °C. The relative humidity and bacterial load of the air environment, the content of ammonia, hydrogen sulfide, carbon dioxide and dust in individual houses and pavilions were lower than in dispensary and calf house (table 2).

Table 1 – Microclimate with the traditional technology of keeping calves

Parameters	Premises		
	maternity ward	dispensary	calf house
Air temperature, °C	14.6±0.33	15.4±0.27	13.7±0.28
Relative humidity, %	75.7±1.17	74.6±1.01	76.5±0.40
Air velocity, m/s	0.18±0.02	0.19±0.01	0.21±0.01
Light factor	1:15	1:13	1:12
Natural light factor, %	0.6±0.06	0.8±0.02	0.8±0.02
Concentration of pollutants in the air:			
ammonia, mg/m^3	7.1±0.59	5.1±0.23	8.6±0.22
hydrogen sulphide, mg/m^3	4.0±0.29	3.2±0.17	5.5±0.19
carbon dioxide, %	0.19±0.01	0.17±0.01	0.23±0.01
bacterial load, thous/m^3	14.9±1.07	23.5±0.80	33.4±0.85
dust content, mg/m^3	1.5±0.22	1.3±0.09	3.0±0.14

Table 2 – Microclimate with adaptive technology for keeping calves

Parameters	Premises		
	maternity ward	individual houses	pavilions
Air temperature, °C	15.1±0.32	-1.2±0.19	-4.3±0.31
Relative humidity, %	74.8±1.10	80.7±1.07	77.3±1.55
Air velocity, m/s	0.22±0.01	0.41±0.02	0.49±0.01
Light factor	1:15	–	–
Natural light factor, %	0.7±0.05	–	–
Concentration of pollutants in the air:			
ammonia, mg/m^3	8.2±0.53	–	–
hydrogen sulphide, mg/m^3	4.7±0.46	–	–
carbon dioxide, %	0.17±0.01	0.05±0.01	0.05±0.01
bacteria, thous/m^3	22.7±1.08	1.3±0.15	3.5±0.27
dust, mg/m^3	2.6±0.18	0.3±0.06	0.2±0.03

It was established that the data of the clinical and physiological state of the young stock of the control and experimental groups for the entire observation period were within the physiological norms.

With the traditional technology of growing young stock, 6 animals were ill in the control group (4 of them with bronchopneumonia and 2 dyspepsias) for the entire observation period, in the 1st experimental group - 2 bronchopneumonia and 1 dyspepsia, and in the 2nd experimental group - only 1 dyspepsia. Duration of illness averaged 7.66±1.20, 4.33±0.66, and 4.00±0.00 days, respectively. That is, in experimental animals, it was shorter by 3.33 and 3.66 days, respectively.

When grown in light-type rooms, 3 animals became ill in the control group (2 bronchopneumonia and 1 dyspepsia), and in the 1st and 2nd experimental groups - 1 animal with dyspepsia. The duration of disease in animals of the control group was 6.33±0.79 days, while for the others - 5.00±0.00 and 4.00±0.00 days, respectively. Consequently, in the experimental animals it was shorter by 1.33 and 2.33 days, respectively, and proceeded in a milder form than in the control.

Live weight and average daily gain of young stock by the end of the observation period turned out to be higher in animals of the 1st and 2nd experimental groups compared to the control: in terms of the traditional technology by 5.6 and 8.2 kg and by 16.0 and 7.0 g, and when keeping in the light-type premises - by 6.0 and 8.4 kg and 20.0 and 46.0 g ($P<0.05$-0.001), respectively. A similar pattern was found in the dynamics of the growth rate of experimental animals (table 3).

When comparing exterior measurements of calves (table 4), it was found that throughout the entire observation period, animals of the 1st and 2nd experimental groups, grown with the use of biostimulants, had the best performance compared with the control data.

So, in calves grown under the traditional technology, the difference in the values of measurements of the oblique body length, height at withers, chest girth behind the shoulder blades and metacarpus at the age of 180 days was, cm: 5 and 7, 3 and 5, 5 and 7, 0,9 and 1,0, in the light-type premises – 5 and 6, 5 and

Table 3 – Dynamics of calves growing

Group of animals	Age, days	Average daily gain, g	Body mass, kg	Growth rate
With the traditional technology of maintenance				
Control	1 30 60 90 120 150 180	– 580±8.08 633±10.59 640±22.09 700±18.26 700±10.44 773±12.51	29.4±1.08 46.8±1.16 65.8±1.28 85.0±1.14 106.0±1.14 127.0±0.89 150.2±1.16	– 1.59 2.23 2.89 3.60 4.32 5.11
1st experimental	1 30 60 90 120 150 180	– 627±24.6 653±8.33 700±33.30 747±20.03 727±12.51 789±13.20	28.6±0.81 47.4±0.93 67.0±0.77 88.0±0.55* 110.4±0.87* 132.2±0.97** 155.8±1.16**	– 1.65 2.34 3.08 3.86 4.62 5.45
2nd experimental	1 30 60 90 120 150 180	– 633±10.59** 680±13.38* 695±20.57 754±22.57 747±13.43* 780±38.86	30.0±1.10 49.0±1.00 69.4±0.68* 90.0±0.95** 112.6±0.87** 135.0±0.95*** 158.4±1.03***	– 1.63 2.31 3.00 3.75 4.50 5.28
With the adaptive technology of maintenance				
Control	1 30 60 90 120 150 180	– 600±14.91 660±19.44 693±24.49 647±22.61 707±16.33 747±17.00	30.4±1.21 48.4±1.21 68.2±1.11 89.0±1.26 108.4±1.29 129.8±1.46 152.2±1.24	– 1.59 2.24 2.92 3.56 4.27 5.0
1st experimental	1 30 60 90 120 150 180	– 647±13.33* 713±17.00 733±10.54 727±19.44* 707±12.47 767±10.54	29.4±1.03 48.8±0.97 70.2±1.36 92.2±1.16 114.0±1.14* 135.2±1.46* 158.2±1.36*	– 1.66 2.39 3.13 3.88 4.59 5.38
2nd experimental	1 30 60 90 120 150 180	– 653±17.00* 693±16.33 740±19.44 740±12.47** 700±10.54 793±12.47	30.8±1.02 50.4±1.36 71.2±1.36 93.4±1.21* 115.6±1.36** 136.8±1.20** 160.6±1.25**	– 1.64 2.31 3.03 3.75 4.44 5.21
Note: * P ≤ 0.05, ** P ≤ 0.01, *** P ≤ 0.001.				

Table 4 – Dynamics of exterior measurements of calves

Group of animals	Age, days	Oblique body length	Height at withers	Chest girth	Metacarpus girth
With the traditional technology of maintenance					
Control	1 30 60 90 120 150 180	69±0.87 80±0.89 89±1.14 102±0.75 106±0.80 111±1.07 117±0.89	68±0.97 76±1.14 84±0.75 86±0.51 89±0.97 93±0.84 97±0.66	73±0.98 85±1.34 95±1.05 104±0.68 109±0.86 115±0.77 120±0.98	9.8±0.08 10.4±0.10 12.4±0.11 13.1±0.16 13.5±0.18 14.1±0.32 14.6±0.28
1st experimental	1 30 60 90 120 150 180	72±1.03 82±0.93 92±0.73 105±0.55* 111±0.73** 118±1.03** 122±1.00**	70±0.71 79±0.86 86±0.40* 89±0.80* 93±0.93* 97±0.71** 100±0.58**	74±1.00 88±0.86 98±1.00 108±1.33* 115±1.16** 120±1.07** 125±1.14*	9.7±0.11 10.6±0.13 12.7±0.14 13.6±0.20 14.5±0.22** 15.0±0.23 15.5±0.22*
2nd experimental	1 30 60 90 120 150 180	70±0.89 82±0.68 93±0.63* 107±0.63** 113±0.84*** 119±0.87*** 124±1.18**	69±0.60 79±1.02 87±0.73* 90±0.73** 96±1.11** 99±0.95** 102±0.87**	72±1.17 86±0.93 97±0.68 107±1.07 115±1.21** 121±1.33** 127±0.86**	9.7±0.12 10.6±0.09 12.6±0.07 13.7±0.15* 14.5±0.21** 15.1±0.29* 15.6±0.30*
With the adaptive technology of maintenance					
Control	1 30 60 90 120 150 180	71±0.93 81±1.08 90±1.07 104±0.89 106±0.63 110±1.30 119±1.61	69±0.73 78±1.24 84±0.87 86±0.97 90±1.34 94±1.07 97±1.44	74±0.68 84±0.98 94±1.33 103±1.44 110±1.38 116±1.28 122±1.41	9.9±0.09 10.5±0.12 12.6±0.13 13.0±0.18 13.5±0.23 14.4±0.25 14.7±0.29
1st experimental	1 30 60 90 120 150 180	70±0.97 83±1.03 94±0.80* 106±0.51* 112±0.89*** 119±1.18*** 124±1.36*	69±0.93 80±1.16 87±1.26 90±1.39* 95±0.92* 98±1.10* 102±1.24*	75±0.86 88±1.36 98±1.44 108±1.07* 116±1.24* 120±0.98* 127±1.16*	9.9±0.16 10.7±0.15 12.9±0.17 13.7±0.20* 14.5±0.17** 15.2±0.15* 15.7±0.20*
2nd experimental	1 30 60 90 120 150 180	73±1.20 84±1.05 94±1.14* 109±1.02** 115±1.21*** 118±1.46** 125±1.30*	70±0.84 82±1.33 87±1.14* 91±1.02** 96±1.11** 99±1.39* 103±1.58*	73±0.93 88±1.24 99±1.21* 109±1.30* 117±1.16** 122±1.32** 128±1.22*	9.8±0.15 10.8±0.11 12.9±0.16 13.7±0.17* 14.6±0.21** 15.4±0.24* 15.7±0.27*
Note: * P ≤ 0.05, ** P ≤ 0.01, *** P ≤ 0.001.					

Table 5 – Hematological profile of calves

Group of animals	Age, days	Hemoglobin, g/l	Red blood cells, $\times 10^{12}$/l	White blood cells, $\times 10^{9}$/l
With the traditional technology of maintenance				
Control	1	102±1.63	7.52±0.18	8.26±0.50
	15	97±2.60	7.34±0.21	8.64±0.54
	30	101±2.97	7.50±0.17	9.06±0.49
	60	105±1.11	7.72±0.14	8.54±0.38
	90	103±1.05	7.80±0.19	7.62±0.34
	120	102±2.35	7.16±0.16	7.08±0.44
	150	105±2.22	7.40±0.24	6.74±0.49
	180	106±1.58	7.62±0.22	6.98±0.53
1st experimental	1	100±2.11	7.36±0.19	8.22±0.61
	15	93±1.82	7.42±0.25	8.52±0.63
	30	104±5.78	7.78±0.13	9.36±0.59
	60	109±1.16*	8.22±0.17*	8.76±0.30
	90	112±1.57**	8.54±0.17*	7.84±0.29
	120	115±1.66**	8.42±0.19**	7.32±0.17
	150	117±1.71**	8.70±0.21**	6.88±0.34
	180	115±1.41**	8.88±0.35*	7.12±0.41
2nd experimental	1	103±1.92	7.24±0.20	8.54±0.63
	15	102±1.96	7.58±0.24	8.64±0.69
	30	108±1.05	7.88±0.25	9.70±0.73
	60	113±1.16**	8.28±0.18*	8.78±0.68
	90	118±1.56***	8.72±0.20*	7.86±0.51
	120	122±1.81***	8.44±0.17***	7.46±0.25
	150	122±1.58***	8.84±0.33**	7.02±0.16
	180	121±1.16***	9.06±0.37**	7.14±0.35
With the adaptive technology of maintenance				
Control	1	107±0.81	8.08±0.07	9.20±0.60
	15	104±2.06	8.26±0.18	9.38±0.67
	30	108±2.96	8.28±0.06	8.10±0.56
	60	110±1.93	8.44±0.12	7.70±0.46
	90	111±1.76	8.54±0.19	7.06±0.40
	120	111±2.02	8.06±0.31	6.50±0.18
	150	114±1.94	7.78±0.27	6.28±0.22
	180	117±2.24	7.80±0.21	6.24±0.25
1st experimental	1	105±1.21	7.94±0.13	8.76±0.53
	15	105±2.42	8.00±0.24	7.76±0.70
	30	115±3.03	8.50±0.07*	7.24±0.50
	60	119±2.13*	8.82±0.19	7.02±0.47
	90	122±1.52**	9.16±0.20	6.84±0.62
	120	124±2.44**	9.20±0.30*	6.44±0.37
	150	125±2.30**	9.10±0.37*	6.40±0.35
	180	128±2.39*	9.04±0.38*	6.38±0.37
2nd experimental	1	108±0.91	7.74±0.25	8.90±0.69
	15	110±1.98	8.46±0.14*	7.46±0.70
	30	119±2.40*	8.64±0.14*	7.88±0.43
	60	124±2.03**	8.84±0.12*	7.24±0.39
	90	127±1.87***	9.46±0.27*	6.92±0.59
	120	130±2.77***	9.46±0.30*	6.30±0.30
	150	130±2.07***	9.18±0.34*	6.34±0.31
	180	132±2.56**	9.40±0.43*	6.08±0.29
Note: * $P \le 0.05$, ** $P \le 0.01$, *** $P \le 0.001$.				

6, 5 and 6, 1.0 and 1.0 ($P<0.05$-0.01) respectively. Changes in the morphological composition of blood against the background of intramuscular injection of biologics can be characterized as an increase in the protective-adaptive responses of the animal organism to the action of stress factors.

Consequently, the use of polystim and PV-1 for growing calves under the conditions of traditional and adaptive technologies contributed to the live weight gain of these animals, activating assimilatory processes. At the same time, their forage energy was mainly spent on increasing body weight, while in control (without using biostimulants) it was mainly used to ensure homeostasis of the body temperature under the conditions of low ambient temperatures.

When growing calves under the conditions of traditional technology, the data of hematological parameters (table 5) after injection of polystim and PV-1 were higher than in the control: the number of erythrocytes - by 0.28 - 1.30 and 0.38 - 1.44x1012/l, the concentration of hemoglobin is 3–13 and 7–20 g/l, and in experimental animals grown in light-type premises - by 0.22-1.32 and 0.36-1.60x1012/l, 7–13 and 11 - 19 g/l ($P<0.05$-0.001), respectively. The data obtained indicate that intramuscular injection of polystim and PV-1 stimulated the hematopoietic function of calves.

The content of total protein (table 6) in the blood serum of calves of the 1st and 2nd experimental groups during the observation period was significantly higher than in the control (with the traditional technology) by 3.6 - 7.6 and 4.2 - 8.1 g/l ($P<0.05$-0.01). In light-type premises, they were higher by 3.1 - 3.4 and 2.4 - 4.1 g/l ($P>0.05$), respectively, than with traditional technology. The use of biologics smoothes negative changes in protein metabolism, with a slight decrease in the level of total protein and an increase in the globulin fraction of the protein.

The level of albumins in the blood serum of young stock of the 1st and 2nd experimental groups was also significantly higher than in the control group: with the traditional technology of maintenance, starting from the age of 60 days and until the end of the observation period - by 2.4 - 4.9 and 2.9 - 6.0 g/l, and when grown in light-type premises from 30 to 180 days old - by 2.9 - 5.6 and 3.0 - 7.1 g/l ($P<0.05$ - 0.001), respectively.

The concentration of α- and β-globulin protein fractions in the blood serum of calves from the control and experimental groups varied throughout the observation period, i.e. these changes did not have a definite pattern, and the difference between the obtained data was unreliable.

The most variable fraction of total protein is γ-globulin, the significant fluctuations of which in experimental animals can be explained as follows: the relatively high level of γ-globulins at the beginning of the experiments is the result of their entry into the body with colostrum; the decrease in γ-globulins at 150 days of age is due to the onset of a transition period, when calves were completely transferred from milk to vegetable feeding. The transition was accompanied by some inhibition of the immunobiological reactivity of the growing organism. The increase in the content of γ-globulins was subsequently the result of the developing immunobiological activity of the organism.

The content of the γ-globulin protein fraction in the serum of the experimental animals during the entire observation period was higher than in the control. In animals of the 1st and 2nd experimental groups grown under the conditions of traditional technology, the concentration of the γ-globulin protein fraction exceeded the control data by 2.2 - 4.2 and 3.1 - 5.7 g/l, and in the rooms of light type - by 4.2 - 8.4 and 4.2 - 10.0 g/l, respectively ($P<0.05$-0.001).

The data of biochemical studies of the blood of calves indicate that intramuscular injection of polystim and PV-1 activated the production of albumin as a plastic material and γ-globulin - the humoral link of the organism's non-specific resistance.

Biostimulants activated in the body buffer systems, the exchange of glucose, total calcium and inorganic phosphorus (table 7). Although the level of carotene in the blood serum increased under the influence of these drugs, there was no significant change in the metabolism of provitamin A. The difference in the stimulating effect between polystim and PV-1 has not been established.

In calves grown under conditions of traditional technology with the use of biostimulants, there were significantly higher: the phagocytic activity of white blood cells by 3.4 - 6.4 and 4.2 - 9.6%, lysozyme plasma activity - 1.6 - 4.6 and 1.8 - 5.4%, bactericidal activity of blood serum - 2.2 - 5.4 and 3.2 - 7.2% and the number of immunoglobulins - by 1.7 - 3.9 and 2.9 - 5.8 mg/ml ($P<0.05$-0.001), respectively. When keeping animals in light-type premises, the data of the same parameters were higher - by 3.8 - 9.8 and 4.8 - 11.8%, 2 - 4.7 and 1.9 - 6.1%, 1.2 - 9.1 and 3.3 - 8.5% and by 3.0 - 5.1 and 5.1 - 9.1 mg/ml ($P<0.05$-0.001), respectively (table 8).

Table 6 – Dynamics of total protein and its fractions

Group of animals	Age, days	Total protein, g/l	Protein fraction, g/l			
			albumins	α-globulins	β-globulins	γ-globulins
With the traditional technology of maintenance						
Control	1	61.9±0.96	25.2±1.48	14.9±1.07	11.7±0.93	10.1±0.74
	15	62.3±1.34	24.3±1.05	10.4±1.65	10.5±1.82	17.1±0.62
	30	63.6±0.41	25.9±0.72	11.4±1.25	6.8±0.77	19.5±0.82
	60	63.1±0.40	22.9±0.84	9.4±1.08	10.9±0.35	19.8±0.85
	90	64.3±0.45	23.4±0.90	9.9±1.08	9.7±0.76	21.3±0.94
	120	68.9±0.63	24.2±0.99	9.6±0.82	12.9±0.93	22.1±0.86
	150	68.8±0.89	25.5±1.09	10.2±0.74	11.8±0.81	21.3±0.86
	180	69.7±0.98	26.3±0.95	9.4±0.98	12.9±0.93	21.1±0.73
1st experimental	1	60.8±1.65	24.7±0.74	13.9±1.41	10.1±1.06	12.0±1.00
	15	64.2±1.42	26.1±0.88	7.5±0.96	9.3±1.13	21.3±0.89**
	30	65.7±0.82	28.4±0.53*	6.0±0.31	6.0±0.62	25.3±0.94**
	60	64.9±0.64*	26.1±0.56*	5.2±0.36	5.3±0.49	28.2±0.98***
	90	68.5±1.61*	27.5±0.69**	4.5±0.53	7.4±0.83	29.1±1.68**
	120	69.4±1.00	28.9±0.57**	5.9±0.66	6.7±0.68	27.9±0.92**
	150	69.4±0.78	30.7±0.80**	6.3±0.79	5.8±0.65	26.7±0.94**
	180	70.4±0.92	31.9±0.70**	5.8±0.71	5.7±0.68	26.9±0.99**
2nd experimental	1	62.1±0.90	26.2±1.01	15.3±1.30	9.3±1.03	11.3±0.99
	15	65.3±0.97	26.9±0.71	7.8±0.94	9.5±0.95	21.3±0.52***
	30	66.5±1.04*	28.9±0.86*	6.6±0.56	5.2±0.75	25.8±0.65***
	60	67.1±0.80**	28.1±0.59**	4.3±0.52	4.9±0.85	29.8±0.51***
	90	67.4±0.84*	29.0±0.57***	5.9±0.61	5.1±0.75	27.4±0.67***
	120	71.0±0.55*	31.3±0.28***	7.8±0.66	4.4±0.81	27.5±0.75**
	150	70.6±0.84	31.8±0.69**	8.2±0.69	3.8±0.67	26.8±0.84**
	180	71.6±1.99	32.4±0.91**	7.7±0.91	4.4±0.81	27.0±0.97**
With the adaptive technology of maintenance						
Control	1	61.9±0.96	25.2±1.48	14.9±1.07	11.7±0.93	10.1±0.74
	15	62.3±1.34	24.3±1.05	10.4±1.65	10.5±1.82	17.1±0.62
	30	63.6±0.41	25.9±0.72	11.4±1.25	6.8±0.77	19.5±0.82
	60	63.1±0.40	22.9±0.84	9.4±1.08	10.9±0.35	19.8±0.85
	90	64.3±0.45	23.4±0.90	9.9±1.08	9.7±0.76	21.3±0.94
	120	68.9±0.63	24.2±0.99	9.6±0.82	12.9±0.93	22.1±0.86
	150	68.8±0.89	25.5±1.09	10.2±0.74	11.8±0.81	21.3±0.86
	180	69.7±0.98	26.3±0.95	9.4±0.98	12.9±0.93	21.1±0.73
1st experimental	1	60.8±1.65	24.7±0.74	13.9±1.41	10.1±1.06	12.0±1.00
	15	64.2±1.42	26.1±0.88	7.5±0.96	9.3±1.13	21.3±0.89**
	30	65.7±0.82	28.4±0.53*	6.0±0.31	6.0±0.62	25.3±0.94**
	60	64.9±0.64*	26.1±0.56*	5.2±0.36	5.3±0.49	28.2±0.98***
	90	68.5±1.61*	27.5±0.69**	4.5±0.53	7.4±0.83	29.1±1.68**
	120	69.4±1.00	28.9±0.57**	5.9±0.66	6.7±0.68	27.9±0.92**
	150	69.4±0.78	30.7±0.80**	6.3±0.79	5.8±0.65	26.7±0.94**
	180	70.4±0.92	31.9±0.70**	5.8±0.71	5.7±0.68	26.9±0.99**
2nd experimental	1	62.1±0.90	26.2±1.01	15.3±1.30	9.3±1.03	11.3±0.99
	15	65.3±0.97	26.9±0.71	7.8±0.94	9.5±0.95	21.3±0.52***
	30	66.5±1.04*	28.9±0.86*	6.6±0.56	5.2±0.75	25.8±0.65***
	60	67.1±0.80**	28.1±0.59**	4.3±0.52	4.9±0.85	29.8±0.51***
	90	67.4±0.84*	29.0±0.57***	5.9±0.61	5.1±0.75	27.4±0.67***
	120	71.0±0.55*	31.3±0.28***	7.8±0.66	4.4±0.81	27.5±0.75**
	150	70.6±0.84	31.8±0.69**	8.2±0.69	3.8±0.67	26.8±0.84**
	180	71.6±1.99	32.4±0.91**	7.7±0.91	4.4±0.81	27.0±0.97**

Note: * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$.

Table 7 – Biochemical profile of blood serum of calves

Group of animals	Age, days	Alkali reserve, V % CO_2	Glucose, mmol/l	Total calcium, mmol/l	Inorganic phosphorus, mmol/l	Carotene, mg/%
With the traditional technology of maintenance						
Control	1	55.8±0.80	4.78±0.37	2.86±0.12	2.26±0.12	0.37±0.07
	15	51.4±0.51	3.68±0.42	2.68±0.15	2.04±0.11	0.32±0.06
	30	51.0±0.32	3.20±0.30	2.30±0.10	1.84±0.15	0.33±0.04
	60	52.2±0.37	2.72±0.23	2.16±0.11	1.90±0.09	0.28±0.06
	90	51.8±0.37	2.78±0.25	2.24±0.16	1.88±0.07	0.31±0.03
	120	53.0±0.63	2.84±0.20	2.32±0.12	1.74±0.12	0.33±0.03
	150	52.6±0.75	2.56±0.22	2.28±0.14	1.66±0.15	0.33±0.03
	180	54.0±0.71	2.38±0.27	2.22±0.12	1.52±0.12	0.35±0.05
1st experimental	1	56.6±0.51	5.08±0.32	2.80±0.15	2.22±0.15	0.35±0.04
	15	53.4±0.60*	4.46±0.40	2.74±0.16	2.16±0.12	0.34±0.07
	30	52.2±0.20*	4.34±0.33*	2.62±0.13	1.90±0.13	0.35±0.06
	60	54.0±0.63*	3.64±0.22*	2.52±0.12	2.06±0.13	0.37±0.08
	90	52.8±0.20*	3.62±0.26*	2.66±0.07*	2.16±0.07*	0.37±0.04
	120	53.8±0.49	3.80±0.14**	2.76±0.10*	2.30±0.09**	0.38±0.05
	150	54.2±0.66	3.30±0.18*	2.76±0.13*	2.06±0.10	0.41±0.04
	180	54.4±0.68	3.36±0.38	2.68±0.16*	1.82±0.09	0.43±0.07
2nd experimental	1	55.2±0.66	4.52±0.26	2.76±0.09	2.30±0.16	0.37±0.06
	15	53.2±0.37*	4.40±0.27	2.74±0.08	2.22±0.14	0.34±0.04
	30	52.4±0.51*	4.30±0.25*	2.66±0.09*	1.96±0.16	0.36±0.05
	60	54.6±0.51**	3.82±0.31*	2.58±0.12*	2.16±0.05*	0.36±0.05
	90	53.4±0.51*	3.32±0.26	2.74±0.12*	2.24±0.10*	0.39±0.04
	120	54.6±0.24*	3.58±0.29	2.78±0.07*	2.38±0.12**	0.41±0.03
	150	55.2±0.97	3.16±0.31	2.86±0.17*	2.12±0.14	0.42±0.03
	180	55.2±0.92	3.34±0.37	2.74±0.10*	1.86±0.13	0.42±0.05
With the adaptive technology of maintenance						
Control	1	55.8±0.80	4.78±0.37	2.86±0.12	2.26±0.12	0.37±0.07
	15	51.4±0.51	3.68±0.42	2.68±0.15	2.04±0.11	0.32±0.06
	30	51.0±0.32	3.20±0.30	2.30±0.10	1.84±0.15	0.33±0.04
	60	52.2±0.37	2.72±0.23	2.16±0.11	1.90±0.09	0.28±0.06
	90	51.8±0.37	2.78±0.25	2.24±0.16	1.88±0.07	0.31±0.03
	120	53.0±0.63	2.84±0.20	2.32±0.12	1.74±0.12	0.33±0.03
	150	52.6±0.75	2.56±0.22	2.28±0.14	1.66±0.15	0.33±0.03
	180	54.0±0.71	2.38±0.27	2.22±0.12	1.52±0.12	0.35±0.05
1st experimental	1	56.6±0.51	5.08±0.32	2.80±0.15	2.22±0.15	0.35±0.04
	15	53.4±0.60*	4.46±0.40	2.74±0.16	2.16±0.12	0.34±0.07
	30	52.2±0.20*	4.34±0.33*	2.62±0.13	1.90±0.13	0.35±0.06
	60	54.0±0.63*	3.64±0.22*	2.52±0.12	2.06±0.13	0.37±0.08
	90	52.8±0.20*	3.62±0.26*	2.66±0.07*	2.16±0.07*	0.37±0.04
	120	53.8±0.49	3.80±0.14**	2.76±0.10*	2.30±0.09**	0.38±0.05
	150	54.2±0.66	3.30±0.18*	2.76±0.13*	2.06±0.10	0.41±0.04
	180	54.4±0.68	3.36±0.38	2.68±0.16*	1.82±0.09	0.43±0.07
2nd experimental	1	55.2±0.66	4.52±0.26	2.76±0.09	2.30±0.16	0.37±0.06
	15	53.2±0.37*	4.40±0.27	2.74±0.08	2.22±0.14	0.34±0.04
	30	52.4±0.51*	4.30±0.25*	2.66±0.09*	1.96±0.16	0.36±0.05
	60	54.6±0.51**	3.82±0.31*	2.58±0.12*	2.16±0.05*	0.36±0.05
	90	53.4±0.51*	3.32±0.26	2.74±0.12*	2.24±0.10*	0.39±0.04
	120	54.6±0.24*	3.58±0.29	2.78±0.07*	2.38±0.12**	0.41±0.03
	150	55.2±0.97	3.16±0.31	2.86±0.17*	2.12±0.14	0.42±0.03
	180	55.2±0.92	3.34±0.37	2.74±0.10*	1.86±0.13	0.42±0.05

Note: * P ≤ 0.05, ** P ≤ 0.01, *** P ≤ 0.001.

Table 8 – Nonspecific resistance of calves

Group of animals	Age, days	Phagocytic activity, %	Lysozyme activity, %	bactericidal activity, %
With the traditional technology of maintenance				
Control	1 15 30 60 90 120 150 180	28.0±1.64 35.4±1.50 44.2±1.11 43.8±1.39 50.2±1.59 53.0±1.70 51.8±2.15 56.6±1.57	5.3±0.32 8.2±0.45 12.3±0.49 13.8±0.60 16.2±0.58 18.3±0.72 19.2±0.76 19.3±0.77	26.7±1.14 28.9±1.21 35.2±0.94 45.3±0.78 51.3±0.69 57.0±0.87 53.6±1.03 55.5±0.98
1st experimental	1 15 30 60 90 120 150 180	27.2±1.39 38.8±1.36 48.4±1.33* 50.2±1.46* 53.6±1.29 57.2±1.07 58.2±1.85 61.4±2.04	4.8±0.44 9.8±0.50* 14.0±0.51* 17.2±0.85* 19.5±0.86* 21.0±0.87* 23.4±0.97** 23.9±0.74**	25.9±1.15 33.2±1.22* 39.7±1.41* 50.5±0.96** 56.7±1.03** 60.4±0.84* 56.7±1.04 57.7±1.09
2nd experimental	1 15 30 60 90 120 150 180	26.2±1.24 40.0±1.31* 51.2±1.71** 53.4±2.09** 56.8±2.13* 58.8±1.83* 60.6±1.78* 60.8±1.65	5.0±0.52 10.0±0.45* 14.6±0.66* 18.7±0.83** 20.8±0.59*** 23.1±0.77** 24.4±0.86** 24.7±0.85**	26.1±1.37 33.1±1.36* 40.2±1.34* 51.3±0.99** 58.5±0.71*** 61.7±0.77** 58.1±1.29* 58.7±1.42
With the adaptive technology of maintenance				
Control	1 15 30 60 90 120 150 180	26.2±1.70 36.6±1.03 45.0±1.05 42.6±1.33 51.4±0.81 53.8±1.24 52.6±1.33 57.2±1.24	5.2±0.30 9.1±0.38 14.3±0.45 15.8±0.70 17.4±0.66 19.8±0.47 20.6±0.53 20.1±0.51	27.5±1.00 30.7±1.02 39.5±0.92 47.2±0.66 54.5±1.17 60.9±0.85 56.6±0.59 58.5±0.58
1st experimental	1 15 30 60 90 120 150 180	25.8±1.02 41.8±1.24* 50.2±1.24* 52.4±1.44** 55.2±1.02* 57.8±1.02* 59.0±1.41* 62.2±1.80	5.2±0.42 11.1±0.49** 17.2±0.62** 19.4±0.73** 21.6±0.85** 22.7±0.40** 24.6±0.65** 24.8±0.79**	28.3±1.07 36.1±1.32* 45.4±1.31** 56.3±1.18*** 60.7±1.00** 63.8±0.83* 58.8±0.71* 59.7±0.76
2nd experimental	1 15 30 60 90 120 150 180	25.6±1.21 41.4±0.93** 51.8±1.66** 54.4±2.09** 57.8±1.77* 59.4±1.69* 61.2±1.53** 62.2±1.50*	5.6±0.53 11.0±0.45** 17.4±0.57** 20.6±0.58*** 23.5±0.80*** 24.6±0.78*** 25.6±0.68*** 25.8±0.85***	27.2±1.31 35.6±0.67** 45.1±0.49*** 55.7±1.20*** 63.3±0.98*** 64.8±0.72** 61.2±0.72** 61.8±0.56**
Note: * P ≤ 0.05, ** P ≤ 0.01, *** P ≤ 0.001.				

The dynamics of immunoglobulins in the blood serum of young stock with the indicated content technologies is shown in figures 1 and 2.

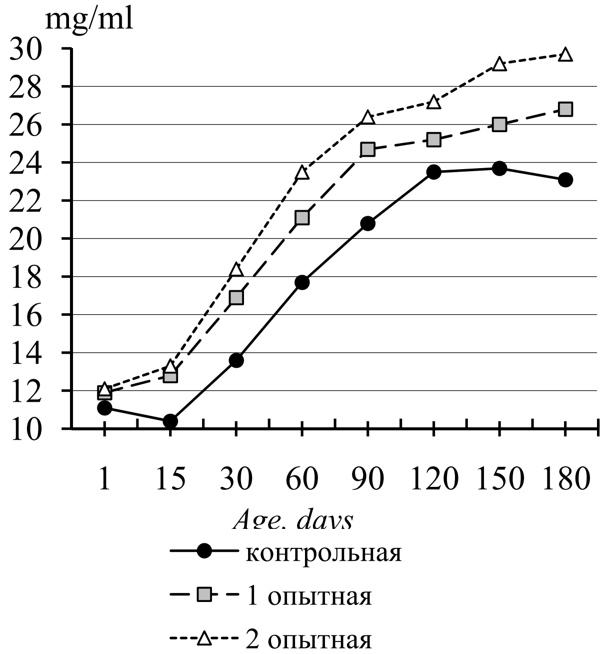

Figure 1 – The content of immunoglobulins in the blood serum of calves with traditional technology

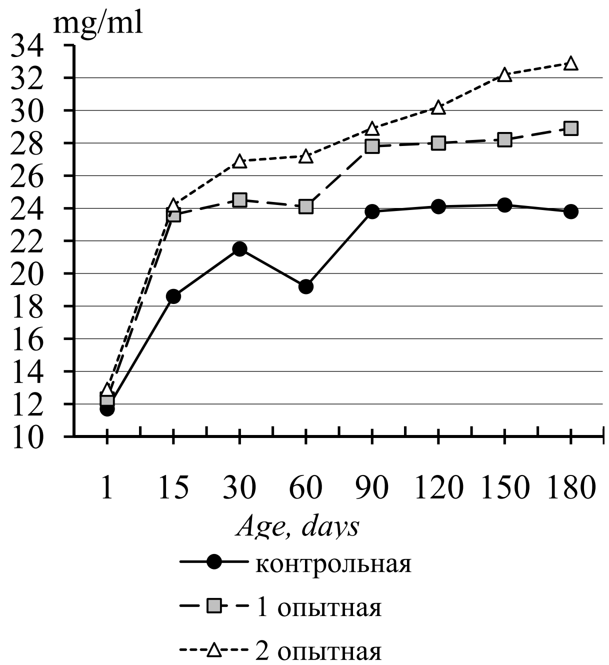

Figure 2 – The content of immunoglobulins in the blood serum of calves with adaptive technology

From these data, it can be seen that the number of immunoglobulins in the serum of calves grown using biostimulants was significantly higher: in the conditions of the traditional technology - by 1.7 - 3.9 and 2.9 - 5.8 mg/ml, and with maintenance in light-type rooms - by 3.0 - 5.1 and 5.1 - 9.1 mg/ml ($P<0.05-0.001$), respectively.

The results of the conducted investigations indicate that polystim and PV-1 activated cellular and humoral factors of nonspecific resistance of calves. The stimulating effect was higher in PV-1 compared to polystim, especially in light-type rooms under conditions of low ambient temperature.

Biogenic amines play a significant role in the implementation of emergency adaptation of the organism. At the same time, their ratio in the blood not only reflects, but also determines the state of the vegetative-humoral-hormonal system.

The established dynamics of bioamines in blood structures (platelets, neutrophils, lymphocytes and plasma) indicates that an adequate release of catecholamines from places of deposition occurs in calves under stress.

The level of catecholamines in animals of the experimental groups was higher than in the control group, especially in the first 60 days of life. The results of these studies indicate an increase in metabolic processes with the aim of additional energy production during cold stress. At the age of 120, 150 and 180 days old in calves, relative stabilization of the concentration of catecholamines in the blood structures was noted, which in the control group was 29.5-30.8 c u, in the 1st experimental one - 28.9 - 32.0 and in the 2nd experimental group - 28.9 - 33.8 c. u. of fluorescence.

After injecting biostimulants into calves, we identified a response from the serotonergic system to the activation of the sympathetic nervous system. This was observed at the age of 30 days of animals as a result of cold stress and was accompanied by a decrease in the concentration of serotonin in the blood, aimed at enhancing the processes of assimilation and restoration of energy expenditure in the body. In the 60-day-old animals, an increasing need of the body for serotonin was observed, associated with the prevention of enhanced energy expenditure. At the same time, an increase in serotonin level occurred, which should be evaluated as a compensatory reaction of the body in response to a relatively high concentration of catecholamines in the same period, expressing the possibility of its transition from the anxiety stage to the stress resistance stage. The increased competitiveness of serotonin with respect to catecholamines, which was most characteristic at the end of the experiment, indicates stabilization of the stress reaction, as evidenced by the relative harmony in the functional activity of the sympatho-adrenal and serotonergic systems.

We found that the dynamics of histamine in blood structures mainly reflected the nature of changes in the activity of catecholamines, which probably indicates a synchronous functional activity of the sympatho-adrenal and histaminergic systems of the body under the conditions of cold stress.

As a result of the veterinary and sanitary assessment of carcasses of young stock, it was established that in the experimental animals they were with a dry crust and a pale pink color. The place of their slaughter was uneven, saturated with blood more intensively than in other places of the carcass. The consistency is dense, elastic, with a finger pressing on the surface of the meat, a dimple was formed, which quickly form ed up. The muscles in the slaughter are slightly moist and did not leave a wet spot on the filter paper, had a light red color. There was no blood in them and in the blood vessels. Small vessels under the pleura and peritoneum did not show through. The surface of the incision of the lymph nodes is light gray. The broth prepared from this meat is transparent, fragrant, on its surface, there is an accumulation of large drops of fat.

Biochemical parameters of meat of young stock of the control, 1st and 2nd experimental groups grown in the premises with the traditional technology had the following values: meat pH - 6.16±0.01, 6.08±0.02 and 6.10±0.01, amino-ammonia nitrogen - 1.13±0.00, 1.09±0.02 and 1.16±0.01 mg, respectively. When growing animals in light-type premises, they were: 6.05±0.01, 5.92±0.01 and 5.87±0.00, 1.23±0.01 mg, 1.27±0.02 and 1.16±0.01 mg, respectively. In the meat samples of animals of the compared groups, the reaction to peroxidase was positive, and with blue vitriol - negative.

The content of cadmium, arsenic and mercury in the samples of meat from different groups of animals was not detected. The lead level in the meat samples of the control group of young stock with traditional and adaptive growing technologies was 0.05 and 0.04 mg/kg, of the first experimental one was 0.05 and 0.03 and of the second experimental one was 0.04 and 0.04 mg/kg. At the same time, the concentration of zinc in samples of meat from animals of the control and experimental groups was 17.3 and 18.9 mg/kg, 19.1 and 18.5, 18.6 and 17.9 mg/kg, respectively.

From the results of the abovementioned studies, it can be concluded that the meat of experimental animals did not differ in organoleptic, biochemical, and physicochemical properties, which indicates its biological usefulness and ecological safety.

Histomorphological studies have established that the drugs did not cause abnormalities in the morphology of the tissues of internal organs.

Thus, intramuscular injection of polystim and PV-1 to calves when grown in dispensaries and calves (under traditional technology) and in individual houses and pavilions (according to adaptive technology) under the conditions of low temperatures has activated adaptogenesis, hemopoiesis, cellular and humoral factors of nonspecific resistance, has improved postnatal development and increased the safety of calves, as well as has ensured the biological usefulness of meat.

Based on the veterinary and sanitary assessment of beef, it was established that the organoleptic, biochemical and spectrometric indicators of bull meat, grown against the background of intramuscular injection of polystim PV-biopreparations, did not significantly differ from those in control and corresponded to the requirements of the Technical Regulations of the Customs Union “On food safety” CU TR 021/2011 and Technical Regulations of the Customs Union "On the safety of meat and meat products" CU TR 034/2013, which indicates the safety of the tested preparations and good quality of meat carcasses.

Conclusion. Intramuscular administration of polystim and PV-1 to calves when growing in prophylactorium and calf houses (under traditional technology conditions) and in individual houses and pavilions (with the adaptive technology) under conditions of low temperatures, activated adaptogenesis, hematopoiesis, cellular and humoral factors of nonspecific resistance, improved postnatal development and increased the safety of calves, as well as ensure the biological usefulness of meat. The meat of experimental animals did not differ in organoleptic, biochemical, and physicochemical properties, which indicates its biological usefulness and ecological safety. Histomorphological studies have established that the preparations did not cause abnormalities in the morphology of the tissues of internal organs.

Based on the results of the research work on enhancing adaptogenesis and realizing the bioresource potential of calves with traditional and adaptive growing technologies, we recommend intramuscularly injecting them with polystim and PV-1 at a dose of 3 ml at 1-2- and 5-6-days old. At the same time, the growing of calves with the adaptive technology ensures their more active growth and development and realizes the bioresource potential than in the conditions of the traditional technology.

В. Г. Семенов[1], Д. А. Баймуканов[2], Н. И. Косяев[1], А. С. Алентаев[3], Д. А. Никитин[1], Х. Ә. Әубәкиров[4]

[1]Чуваш мемлекеттік ауыл шаруашылығы академиясы, Чебоксар, Чуваш Республикасы, Ресей,
[2]Қазақ мал шаруашылығы және азық өндірісі ғылыми-зерттеу институты, Алматы, Қазақстан,
[3]Мал шаруашылығы және ветеринария ғылыми-инновациялық орталығы, Астана, Қазақстан,
[4]Тараз ұлттық университеті М. Х. Дулати атындағы, Тараз, Қазақстан

ДӘСТҮРЛІ ЖӘНЕ БЕЙІМДЕЛУ ТЕХНОЛОГИЯСЫ ЖАҒДАЙЫНДА БҰЗАУЛАРДЫҢ АДАПТОГЕНЕЗ ЖӘНЕ БИОРЕСУРС ӘЛЕУЕТІНІҢ БЕЛСЕНДІЛІГІ

Аннотация. Дәстүрлі технологияда өсіру және жеңіл түрдегі қора-жайда бейімделу технологиясы жағдайында (дербес үйшіктер және ашық алаңдағы дүңгіршектер) полистима и ПВ-1 - замануи биологиялық пәрменді демдеуіштердің бұзаулардың өсуіне және дамуына, жас малдардың ет сапасына әсері алғашқы рет зерттелді. Аталмыш биологиялық пәрменді демдеуіштердің коршаан орта температурасының төмендеуіне, белок-көмірсу-витамин алмасуына, буферлік жүйеге, қан айналым органдарына мал организмінің төзімділігінің артуына және бейімделу жүйесінің белсенділігіне әсері айқындалды. Сыналған препараттар бұзаулардың өсуін және дамуын үдетті, азық қорыту жолдарының және тыныс алу органдарының ауыршаңдығын төмендетті. Қысқы кезеңде жеңіл түрдегі қора-жайда және дәстүрлі технология бойынша бұзауларды полистима и ПВ-1 көмегімен өсіргенде организмнің түрлі ауруларға өзгеше қарсылығының гуморалдық және жасушалық түзету факторларының мүмкіндігі тәжірибе жүзінде дәлелденді. Бұзауды әр түрлі жағдайда өсіруге байланысты организмнің симпато-адреналин, серотонинергия и гистаминергия жүйелерінен болған қарсы реакция қан құрамындағы биоамин жолақтарының белсенділігінің жоғарлағандығын көрсетті. Демдеуіші пәрменді препараттар енгізілген малдардың ет сапасы органолептикалық, биохимиялық и физико-химиялық көрсеткіштері бойынша демдеуіші препараттарды қолданбаған нәтижелермен салыстырғанда өнімнің экологиялық қауіпсіздігі және биологиялық толыққұндылығынан айырмашылық болмағындығы жөнінде деректер куәландырады.

Түйін сөздер: бұзау, дәстүрлі технология, бейімделу технологиясы, демдеуші заттар, бейімделу, өсу, даму, ет сапасы.

В. Г. Семенов[1], Д. А. Баймуканов[2], Н. И. Косяев[1],
А. С. Алентаев[3], Д. А. Никитин[1], Х. А. Аубакиров[4]

[1]Чувашская государственная сельскохозяйственная академия, Чебоксары, Чувашская Республика, Россия,
[2]Казахский научно-исследовательский институт животноводства и кормопроизводства,
Алматы, Казахстан,
[3]Научно-инновационный центр животноводства и ветеринарии, Астана, Казахстан,
[4]Таразский гогосударственный университета им. М. Х. Дулати, Тараз, Казахстан

АКТИВИЗАЦИЯ АДАПТОГЕНЕЗА И БИОРЕСУРСНОГО ПОТЕНЦИАЛА ТЕЛЯТ В УСЛОВИЯХ ТРАДИЦИОННОЙ И АДАПТИВНОЙ ТЕХНОЛОГИЙ

Аннотация. Впервые изучено влияние биологических стимуляторов нового поколения – полистима и ПВ-1 на рост и развитие телят в условиях традиционной технологии выращивания и в помещениях облегченного типа адаптивной технологии (индивидуальные домики и павильоны на открытой площадке), а также на качество мяса молодняка. Установлена возможность активизации адаптивных процессов и повышения устойчивости организма таких животных под влиянием указанных биостимуляторов к пониженным температурам среды обитания по белково-углеводно-витаминному обмену, функции кроветворных органов и буферной системе. Испытанные препараты активизировали рост и развитие телят, снижали заболеваемость респираторных органов и желудочно-кишечного тракта.

Экспериментально доказана возможность коррекции клеточных и гуморальных факторов неспецифической резистентности организма телят с помощью полистима и ПВ-1 в зимний период при выращивании по традиционной технологии и в помещениях облегченного типа.

Выявлена активизация биоаминного спектра компонентов крови вследствие проявления ответных реакций со стороны симпато-адреналовой, серотонинергической и гистаминергической систем организма телят в зависимости от разных условий выращивания.

Качество мяса животных, которым вводили биостимуляторы, не отличалось по органолептическим, биохимическим и физико-химическим показателям от полученных без использования стимулирующих препаратов, что свидетельствует о его экологической безопасности и биологической полноценности.

Ключевые слова: телята, традиционная технология, адаптивная технология, биостимуляторы, адаптация, рост, развитие, качество мяса.

Information about authors:

Semenov Vladimir Grigoryevich, Doctor of Biological Science, professor, honored worker of science of the Chuvash Republic, professor of Department of morphology, obstetrics and therapy of the Chuvash state agricultural academy, Cheboksary, Chuvash Republic, Russia; semenov_v.g@list.ru; https://orcid.org/0000-0002-0349-5825

Baimukanov Dastanbek Asylbekovich, corresponding member of National Academy of Sciences of the Republic of Kazakhstan, doctor of agricultural sciences, professor, chief researcher of department of cultivation and selection of the dairy cattle of the Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan; dbaimukanov@mail.ru; https://orcid.org/0000-0002-4684-7114

Kosyaev Nikolay Ivanovich, Doctor of Veterinary Science, Professor, Professor of the Department of Epizootology, Parasitology and Veterinary-Sanitary Expertise of the Chuvash state agricultural academy, Cheboksary, Chuvash Republic, Russia; kocyevni81@mail.ru; https://orcid.org/0000-0002-4474-4541

Alentayev Aleidar Saldarovich, Doctor of Agricultural Sciences, Chief Researcher of the Department of Animal Husbandry and Veterinary Science of the Scientific and Innovation Center for Animal Breeding and Veterinary Medicine, Astana, Kazakhstan; alentaev55@mail.ru; https://orcid.org/0000-0003-0046-5003

Nikitin Dmitry Anatolyevich, Candidate of Veterinary Sciences, Associate Professor of the Department of Morphology, Obstetrics and Therapy of the Chuvash State Agricultural Academy, Cheboksary, Chuvash Republic, Russia; nikitin_d_a@mail.ru; https://orcid.org/0000-0003-4765-8742

Aubakirov Khamit Abilgaziyevich, Candidate of Agricultural Sciences, Associate Professor of the Department of Biotechnology, M. Kh. Dulati Taraz State University, Taraz, Kazakhstan; hamit_a57@mail.ru; https://orcid.org/0000-0003-2670-4834

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