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INNOVATIVE TECHNOLOGIES OF CALVES REARING IN DAIRY CATTLE BREEDING

Abstract. For the first time, the rationale of using polystim in the technology of calf rearing in private subsidiary plots, on small and medium farms has been scientifically substantiated and experimentally proved to activate the protective and adaptive functions of the body to the keeping conditions and to more fully realize the biological potential of resistance and productivity. Thus, live weight, average daily gain and growth rate of young cattle of the experimental group were higher by the end of the observation period (180 days) than in the control group: in the conditions of personal subsidiary plots by 6.6 kg, 33.3 g and 0.28, on small farms - by 5.2 kg, 20.0 g and 0.08, and with the technology of keeping on a medium farm - by 4.8 kg, 13.3 g and 0.23 ($P<0.05$) respectively. The dynamics of exterior measurements of animals of all groups were similar to the nature of changes in their live weight and their average daily gain. At the same time, the incidence of respiratory organs diseases and the gastrointestinal tract in newborn calves was reduced to 25-40%, the duration of the disease was reduced by 2.45; 1.31 and 1.93 days ($P<0.05$-0.001).

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

Introduction. In modern agricultural conditions, in a complex of measures to increase the production of full-fledged livestock products within the framework of the Priority National Project “Development of the agro-industrial complex”, it is important to stimulate the development of small sizes of farming in the agro-industrial complex, taking into account the veterinary and hygienic requirements for the chain "forage-keeping conditions - protection of farms from infections - receipt and preservation of young stock - local quality and processing of products - protection environment - human health" [1].

The relationship between animals and the environment in a production environment is quite complicated. The state of health and productivity of animals is influenced to varying degrees by the technological systems available in enterprises depending on the number of animals. Therefore, of practical interest is the determination of the optimal number of cows at milk production enterprises, in which stress loads on the animal organism would be minimal, and their resistance, productivity, and safety would be great [2].

In Chuvashia, cattle are traditionally kept mainly on small farms. This can be explained by the peculiarities of the climatic conditions: soil erosion, shallow contouring and ploughness of the land, an insignificant proportion of hayfields and pastures in the total area of agricultural land, and low forage crop yield since the region belongs to the zone of unstable moisture. The agriculture, fodder, and livestock systems became dependent on this. On small (with livestock of 50 and 100 cows) and medium (up to 200 cows) farms, the adaptive and reproductive capacity of animals is better realized than on larger ones. The stress state of young cattle was directly dependent on the capacity of milk production enterprises, and

the body's natural resistance was inverse. Also, with the increase in the size of such enterprises, the need for additional veterinary preventive and therapeutic measures increased [3].

The use of the reserve of adaptive qualities of the calf body is of great importance in dairy cattle breeding in the Republic of Kazakhstan and the Russian Federation [4-9].

The aim of this work is to scientifically substantiate the calf rearing in personal subsidiary plots, on small and medium-sized farms using a biostimulator polystim (PS-1).

Materials and methods. The experimental part of the research work was carried out on the Koltsovka Agrofirma OOO dairy farm (medium farm with livestock of 200 cows), training and production farm (small farm for 50 cows) VGO Vurnarsky agricultural technical high school and on personal subsidiary 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 "Vurnarsky District station of anti-animal diseases", as well as in laboratories of the Chuvash State Agricultural Academy.

Three series of scientific and economic experiments have been conducted in the conditions of personal subsidiary plots, small and medium farms using black-motley calves. In all series of experiments, two groups of newborn calves were selected according to the principle of 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, newborn calves were raised in a cowshed with a cow-mother in an isolated section, in the second - in the beginning in the dispensary individually for up to 30 days, then in group sections (starting from 3-5 up to 8-10 animals), and in the third a series of experiments - firstly individually in a shift-section dispensary for up to 21 days, then in a group way in sections of a calf pen (8-10 animals each).

The studies were conducted against the background of balanced feeding according to diets adopted on farms, taking into account the main indicators stipulated by the Norms and diets of feeding farm animals. Analyzing the diet of feeding calves in winter, it should be noted that it provided the animals with EFU of 102.4%, crude protein - 114.1%, digestible protein - 91.2%.

To activate the protective and adaptive functions of the calf body to the keeping conditions in personal 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 stock, we used a polystim biostimulator developed by scientists of the Chuvash State Agricultural academy.

When setting up the experiments, the control group of animals was not administered with a biostimulator, and the experimental group was intramuscularly injected with polystim at a dose of 3 ml at 1-2- and 5-6-day olds ages.

After the slaughter of young animals (control and experimental groups) at the age of 180 days, histomorphological evaluation of internal organs and veterinary and sanitary examination of beef were performed.

Research results. The parameters of the air basin in the premises for keeping calves in the conditions of small forms of management are presented in table. 1.

The results of these studies show that the parameters of the air basin in the premises for keeping calves in private plots, on small and medium farms for the entire research period were within the limits of hygiene standards.

Analysis of the clinical and physiological state of the experimental animals showed that in the process of conducting the test, the data on body temperature, pulse, and respiratory rates in calves were within the physiological norm.

We studied the effect of polystim on the incidence of calf disease in early postnatal ontogenesis to identify prophylactic efficacy. When rearing animals in private subsidiary plots for the entire observation period, 3 calves fell ill in the control group, including 2 bronchopneumonia and 1 dyspepsia, and the experimental group 1 calf with dyspepsia. On the small farm, over the test period, 5 animals (2 bronchopneumonia and 3 dyspepsias) fell ill in the control group, and 1 calf with dyspepsia in the experimental group. On the middle farm, dyspepsia was found in 4 calves and bronchopneumonia in 2 calves of the control group, as well as dyspepsia in 2 calves of the experimental group. The duration of illness of animals in the control and experimental groups in the first series of the experiment was

Table 1 – The microclimate parameters in the premises for keeping calves

Parameter	Keeping animals					
	In the private subsidiary plot		On small farm		On medium farm	
	cowshed		dispensary	calf pen	dispensary	calf pen
	rearing periods, days					
	1-30	31-180	1-30	31-180	1-21	22-180
Air temperature, °C	17.2±0.43	15.4±0.25	15.8±0.28	14.7±0.19	15.4±0.38	13.3±0.23
Relative humidity, %	69.0±1.15	72.7±1.34	73.0±1.43	74.8±1.59	75.0±1.75	77.5±1.80
Air velocity, m/s	0.15±0.01	0.17±0.02	0.20±0.02	0.23±0.01	0.18±0.01	0.23±0.02
Light coefficient	1:10	1:10	1:13	1:13	1:15	1:14
Coefficient of natural illumination, %	0.50±0.03	0.60±0.02	0.63±0.04	0.75±0.03	0.73±0.06	0.78±0.05
Air Pollutant Concentration:						
ammonia, mg/m^3	5.3±0.26	7.6±0.28	6.2±0.35	8.4±0.45	7.1±0.41	9.3±0.55
hydrogen sulfide, mg/m^3	3.2±0.19	5.5±0.20	3.4±0.23	5.9±0.25	3.6±0.47	6.8±0.36
carbon dioxide, %	0.15±0.01	0.17±0.02	0.16±0.02	0.18±0.01	0.18±0.01	0.20±0.02
bacterial count, thousand/m^3	21.1±0.78	30.3±0.99	25.6±1.15	33.7±1.01	29.8±1.23	35.3±1.25
dust content, mg/m^3	1.3±0.06	2.2±0.10	1.6±0.09	2.6±0.12	2.0±0.12	3.3±0.13

7.45±1.16 and 5.00±0.00 days, in the second series - 8.31±1.16 and 7.00±0.00 and in the third series - 8.43±1.24 and 6.50±0.93 days, that is, in experimental animals it was shorter by 2.45; 1.31 and 1.93 days, respectively, and proceeded more benign than in the control. The Möllenberg coefficient, which expresses the therapeutic and prophylactic efficacy of using a biostimulator, in control animals exceeded the data of the experimental young in 4.1; 5.9 and 3.9 times.

From the obtained data, it follows that intramuscular injection of polystim to calves prevented the respiratory and digestive disease incidence, reduced the duration of the disease and the Mellenberg coefficient.

It was found that the live weight, average daily gain and growth coefficient of calves of the experimental group were higher at the end of the observation period than in the control: in the conditions of private subsidiary plots by 6.6 kg, 33.3 g and 0.28, of the small farm - by 5.2 kg, 20.0 g and 0.08, and with keeping technology on the medium farm - by 4.8 kg, 13.3 g and 0.23 ($P<0.05$), respectively. At the same time, the exterior measurements of the calves of the tested group exceeded the control data in the conditions of private subsidiary plots, in cm: oblique body length - 4.0 cm, height at the withers - 4.2 cm, chest girth behind the shoulder blades - 4.8 cm and metacarpal girth - 0.2 cm; on a small farm - by 4.2 cm; 4.6; 4.6 and 0.1 cm and in medium farm conditions - by 4.0 cm; 3.8; 3.6 and 0.2 cm, respectively ($P<0.05$).

Thus, intramuscular injection of polystim at a dose of 3 ml at the age of 1-2- and 5-6 days stimulates calf growth and development. A higher corresponding effect was obtained as a result of the use of the drug in the conditions of private subsidiary plots rather than small and medium farms.

Veterinary-sanitary inspection of beef is presented in table. 2.

The research showed that the organoleptic, biochemical, and physico-chemical indicators of meat from both experimental and control animals raised under conditions of private plots, small and medium farms were almost identical. The meat of the experimental animals had a dry crust and a pale pink color. The place of its cut was uneven, more saturated with blood than in other places of the carcass. Consistency - dense, elastic, when pressing with a finger on the surface of the meat, a dimple formed, which quickly aligned. The muscles in the cut were slightly moisty and did not leave a wet spot on the filter paper; they had a light red color. There was no blood in them or the blood vessels. Small vessels under the pleura and peritoneum were not visible. The cut surface of the lymph nodes was light gray. The broth made from this meat was transparent, aromatic, on its surface, there was a slight accumulation of large fat drops.

The pH value of the meat of the calves of the control groups raised in private subsidiary plots, on small and medium farms, was equal to 5.97±0.02; 6.02±0.01, and 6.03±0.01, respectively, and in experimental

Table 2 – Veterinary-sanitary inspection of beef in the conditions of small forms of management

Indicators	Group of animals	
	control	experimental
Organoleptic:		
appearance and surface color	the surface of the carcass has a dry crust of drying of a pale pink color	
muscles on the cut	slightly moist, do not leave a wet spot on the filter paper; of light red color	
consistency	the cut meat is dense, elastic; the hole formed by pressing with a finger quickly aligns	
smell	specific to fresh beef	
surface fat	yellowish color, solid consistency, crumbles when pressed	
tendon conditions	elastic, dense, the surface of the joints is smooth, shiny	
transparency and smell of broth	transparent, aromatic, large drops of fat on the broth surface	
Biochemical:		
pH	5.97±0.02*	5.89±0.02*
	6.02±0.01**	5.95±0.02**
	6.03±0.01***	5.98±0.01***
amino ammonia nitrogen, mg	1.22±0.02*	1.25±0.01*
	1.18±0.02**	1.15±0.01**
	1.14±0.01***	1.11±0.02***
reaction to peroxydase	positive	
reaction with copper sulfate	negative	
Physico-chemical - concentration of toxic elements, mg/kg:		
lead	0.05*	0.04*
	0.07**	0.06**
	0.05***	0.06***
zinc	21.6*	22.2*
	19.7**	21.2**
	19.1***	18.3***
cadmium	not found	
arcenic	not found	
mercury	not found	
* in the conditions of private subsidiary plots, ** in the conditions of a small farm, *** in the conditions of a medium farm.		

groups - 5.89±0.02; 5.95±0.02 and 5.98±0.01; amino ammonia nitrogen - 1.22±0.02 mg; 1.18±0.02; 1.14±0.01 mg and 1.25±0.01; 1.15±0.01; 1.11±0.02 mg, respectively. In meat samples from animals of the compared groups, the reaction to peroxidase was positive, and with copper sulfate, it was negative. According to the organoleptic and biochemical properties, the meat of the experimental animals did not differ from the control data.

The content of cadmium, arsenic, and mercury in meat samples was not found. The lead level in the meat samples of the control groups of animals was 0.05; 0.07 and 0.05 mg/kg, and in experimental animals - 0.04; 0.06 and 0.06 mg/kg, respectively. The zinc content in samples of meat from animals in the control groups was 21.6; 19.7 and 19.1 mg/kg, and in experimental group - 22.2; 21.2 and 18.3 mg/kg, respectively. Therefore, according to the physico-chemical properties, the meat of the experimental animals did not differ from the control data ($P>0.05$).

Thus, the organoleptic, biochemical and physicochemical parameters of beef in experimental groups of animals raised under conditions of private plots, small and medium farms were identical and met the requirements of the Sanitary and Epidemiological Rules and Norms of SanPiN 2.3.2.1078-01, which indicates the environmental safety of the tested biostimulant and the benignity of meat carcasses.

As a result of histomorphological studies, it was found that the polystim did not cause abnormalities in the morphology of the tissues of the lungs, lymph nodes, adrenal glands, liver, kidneys, spleen, and thyroid gland.

Suggestions for production. To activate the protective and adaptive functions of the calf body to the keeping conditions on private subsidiary plots, on small and medium-sized farms in winter, to reduce the stress load on the body and to more fully realize the biological potential of young animals' resistance and productivity, we recommend injecting calves with a 3 ml biostimulant intramuscularly at a dose of 3 ml at the age of 1-2 and 5-6 days.

At the same time, the stimulating effect of reducing the incidence of respiratory organs and the gastrointestinal tract of newborn calves, increasing the gain in live weight was the highest under the influence of polystim in the conditions of private subsidiary plots.

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СҮТТІ ІРІ ҚАРА МАЛ ШАРУАШЫЛЫҒЫНДА БҰЗАУ ӨСІРУДІҢ ИННОВАЦИЯЛЫҚ ТЕХНОЛОГИЯСЫ

Аннотация. Жұмыстың мақсаты биостимулятор полистимін (ПС-1) қолдану арқылы жеке қосалқы учаскелерде, шағын және орта фермаларда бұзау өсіруді ғылыми негіздеу.

Шағын және орта ферманың жеке шаруашылығында үш сериялы ғылыми-шаруашылық тәжірбиесі қараала бұзауларға жүргізілді. Барлық тәжірбиелік серияда жаңадан туған бұзаудан жұп – аналогтар принципі бойынша (бақылау және тәжирбилік) физиологиялық жағдайы және тірі салмағы 10 жануардан тұратын топтар құралды.

Эксперименттің бірінші нұсқасында жаңа туған бұзаулар сиыр-анасымен бірге оқшауланған бөлімде, екіншісінде алдымен профилакторийде жеке 30 күнге дейін, одан кейін секцияларда топ түрінде (3-5-тен 8-10 басқа дейін), ал тәжірибенің үшінші нұсқасында алдымен ауыспалы-секциялық профилакторияда 21 күнге дейін, содан кейін топтық әдіспен бұзау секциясында (әрқайсысы 8-10 бас) өсірілді.

Ауылшаруашылығы жануарларының қарастырылған норма және азықтандыру рационына сәйкес зерттеулер жүргізілді. Жануарлардың коректену рационын талдау барысында қыс мезгілінде КЭБ 102,4 % 114,1 шикі протеин, 91,2 % қорытылған протеин қамтамасыз етті.

Жануарлардың бақылау тобына эксперимент жүргізгенде биостимулятор енгізілмеді, ал тәжірибе тобына 1-2 және 5-6 тәуліктік жастағы бұзаудың 3 мл дозада бұлшық етіне енгізілген.

Жас малды сойғаннан кейін (бақылау және эксперименттік топтар) 180 тәуліктік жасында ішкі мүшелерге гистоморфологиялық бағалау және сиыр етін ветеринариялық-санитариялық сараптау жүргізілді.

Жеке қожалықтардағы бақылау тобында 3 бұзау, 2 бронопневмания және 1 диспепсия, тәжірбиелік топта 1 бұзау диспепсия ауруына ұшырады. Шағын фермада тәжірбие жасау барысында бақылау тобында 5 жануар (2 бронопневманиямен және 3 диспепсиямен), тәжірбие тобында 1 бұзау диспепсиямен ауырды. Орта фермаларда бақылау тобында 4 диспепсия және 2 бронопневманиямен, тәжірбиелі тобында 2 бұзау диспепсияға ұшырады. Бақылау және тәжірбиелі топтарда бірінші нұсқада жануарлардың ауру ұзақтығы 7,45±1,16 және 5,00±0,00 тәулік, екінші топта 8,31±1,16 және 7,00±0,00 және үшіншіде 8,43±1,24 және 6,50±0,93 тәулік, бақылаумен салыстырғанда, тәжірбиелі жануарларда жеңіл формада қысқа мерзімде 2,45; 1,31 және 1,93. Бақылау жануарларындағы биостимуляторды қолданудың емдік-профилактикалық тиімділігін анықтайтын Мелленберг коэффициенті бақылаудағы жас жануарлардың деректерінен 4,1; 5,9 және 3,9 есе асып түсті.

Бақылау кезеңінің соңында эксперимент тобындағы бұзаудың тірі салмағы, орташа тәуліктік өсімі және өсу коэффициенті бақылауға қарағанда жоғары екені анықталды: жеке қосалқы учаскелерде 6,6 кг, 33,3 г және 0,28, ал ұсақ шаруа қожалығында 5,2 кг, 20,0 г және 0,08, ал орташа фермада технологиялық қызмет көрсетумен сәйкесінше 4,8 кг, 13,3 г және 0,23 (P <0.05). Бақылау топтарында дене өлшемінің көрсеткіші бақылаумен салыстырғанда басым шықты: дененің қиғаш ұзындығы – 4,0 см, шоқтық биіктігі – 4,2 см, көкірек орамы – 4,8 см және жіліншік орамы – 0,2 см; шағын ферма – 4,2 см; 4,6; 4,6 және 0,1 және орта фермада – 4,0 см; 3,8; 3,6 және 0,2 сәйкесінше (P<0,05).

Жеке қосалқы учаскелерде, кіші және орта фермаларда өсірілген бақылау тобындағы бұзау етінің pH мәні сәйкесінше 5,97 ± 0,02 құрады; 6,02 ± 0,01 және 6,03 ± 0,01, ал эксперименттік топтар – 5,89 ± 0,02; 5,95 ± 0,02 және 5,98 ± 0,01; аммиакты азот – 1,22 ± 0,02 мг; 1,18 ± 0,02; 1,14 ± 0,01 мг және 1,25 ± 0,01; 1,15 ± 0,01, тиісінше 1,11 ± 0,02 мг. Салыстырылған топ жануарларынан алынған ет сынамасында пероксидаза реакциясы – оң, ал мыс сульфатында теріс шықты. Органолептикалық және биохимиялық қасиеттері бойынша тәжірибелік топтың еті бақылау деректерінен ерекшеленбеді.

Ет сынамасында кадмий, мышьяк және сынап мөлшері табылмады. Жануарлардың бақылау тобы етіндегі қорғасын деңгейі 0,05, 0,07 және 0,05 мг / кг құрады; ал тәжірибелік – 0,04, тиісінше 0,06 және 0,06 мг / кг.

Бақылау тобындағы жануарлардан алынған етте мырыш концентрациясы 21,6; 19,7 және 19,1 мг / кг, ал тәжірибелік – 22,2, сәйкесінше 21,2 және 18,3 мг / кг. Сондықтан физика-химиялық қасиеттері бойынша жануарлардың эксперименттік тобының еті бақылау үлгілерінен ерекшелігі болмады (P> 0.05).

Гистоморфологиялық зерттеулер нәтижесінде полистимнің өкпе, лимфа түйіні, бүйрек үсті безі, бауыр, бүйрек, көкбауыр және қалқанша безі тінінің морфологиясында ауытқу тудырмайтындығы анықталды.

Түйін сөздер: жеке қожалықтар, шағын және орта фермалар, бұзау, полистим, өсу және даму, гематологиялық және биохимиялық профильдер, ет сапасы

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ИННОВАЦИОННЫЕ ТЕХНОЛОГИИ ВЫРАЩИВАНИЯ ТЕЛЯТ В МОЛОЧНОМ СКОТОВОДСТВЕ

Аннотация. Цель настоящей работы – научно обосновать выращивание телят в личных подсобных хозяйствах, на малых и средних фермах с применением биостимулятора полистим (ПС-1).

Проведены три серии научно-хозяйственных опытов в условиях личных подсобных хозяйств, малой и средней ферм с использованием телят черно-пестрой породы. Во всех сериях опытов было подобрано две группы новорожденных телят по принципу пар-аналогов (контрольная и опытная) с учетом физиологического состояния и живой массы по 10 животных в каждой группе.

В первом варианте опытов новорожденных телят выращивали в хлеву с коровой-матерью в изолированной секции, во втором – сначала в профилактории индивидуально до 30 суток, затем – в секциях групповым способом (начиная с 3-5 до 8-10 голов), а в третьем варианте опытов – сначала индивидуально в сменно-секционном профилактории до 21 суток, затем – групповым способом в секциях телятника (по 8-10 голов).

Исследования проведены на фоне сбалансированного кормления по рационам, принятым в хозяйствах с учетом основных показателей, предусмотренных Нормами и рационами кормления сельскохозяйственных животных. Анализируя рацион кормления телят в зимний период, следует отметить, что он обеспечивал потребность животных в ЭКЕ на 102,4 %, сыром протеине – 114,1, переваримом протеине – на 91,2 %.

При постановке опытов контрольной группе животных биостимулятор не вводили, а опытной группе внутримышечно инъецировали полистим в дозе 3 мл в 1-2- и 5-6-суточном возрасте.

После убоя молодняка (контрольных и опытных групп) в 180-суточном возрасте проводили гистоморфологическую оценку внутренних органов и ветеринарно-санитарную экспертизу говядины.

При выращивании животных в личных подсобных хозяйствах за весь период наблюдения в контрольной группе заболело 3 теленка, в том числе бронхопневмонией – 2 и диспепсией – 1, а в опытной – 1 теленок диспепсией. В условиях малой фермы за период опыта в контрольной группе заболело 5 животных (2 бронхопневмонией и 3 диспепсией), в опытной группе – 1 теленок диспепсией. На средней ферме установлена диспепсия у 4 и бронхопневмония у 2 телят контрольной группы, а также диспепсия у 2 телят опытной группы. Продолжительность болезни животных контрольной и опытной групп в первом варианте опыта составляла 7,45±1,16 и 5,00±0,00 сут, во втором – 8,31±1,16 и 7,00±0,00 и в третьем – 8,43±1,24 и 6,50±0,93 сут, то есть у опытных животных она была короче на 2,45; 1,31 и 1,93 сут соответственно, и протекала в более легкой форме, чем у контрольных. Коэффициент Мелленберга, выражающий лечебно-профилактическую эффективность применения биостимулятора, у контрольных животных превышал данные опытного молод-няка в 4,1; 5,9 и 3,9 раза.

Установлено, что живая масса, среднесуточный прирост и коэффициент роста телят опытной группы оказались выше к концу срока наблюдения, чем в контроле: в условиях личных подсобных хозяйств на 6,6 кг, 33,3 г и на 0,28, малой фермы – на 5,2 кг, 20,0 г и на 0,08, а при технологии содержании на средней ферме – на 4,8 кг, 13,3 г и на 0,23 (P<0,05) соответственно. При этом экстерьерные промеры телят опытной группы превосходили контрольные данные в условиях личных подсобных хозяйств, см: косая длина туловища – на 4,0 см, высота в холке – 4,2 см, обхват груди за лопатками – 4,8 см и обхват пясти – на 0,2 см; малой фермы – на 4,2 см; 4,6; 4,6 и 0,1 см и в условиях средней фермы – на 4,0 см; 3,8; 3,6 и 0,2 см соответственно (P<0,05).

Величина pH мяса телят контрольных групп, выращенных в личных подсобных хозяйствах, на малой и средней фермах, равнялась соответственно 5,97±0,02; 6,02±0,01 и 6,03±0,01, а опытных групп – 5,89±0,02; 5,95±0,02 и 5,98±0,01; амино-аммиачного азота – 1,22±0,02 мг; 1,18±0,02; 1,14±0,01 мг и 1,25±0,01; 1,15±0,01; 1,11±0,02 мг соответственно. В пробах мяса животных сравниваемых групп реакция на пероксидазу была положительной, а с сернокислой медью – отрицательной. По органолептическим и биохимическим свойствам мясо опытных групп не отличалось от контрольных данных.

Содержание кадмия, мышьяка и ртути в пробах мяса не обнаружено. Уровень свинца в пробах мяса контрольных групп животных составлял 0,05; 0,07 и 0,05 мг/кг, а опытных – 0,04; 0,06 и 0,06 мг/кг соответственно. Концентрация цинка в пробах мяса животных контрольных групп равнялась 21,6; 19,7 и 19,1 мг/кг, а опытных – 22,2; 21,2 и 18,3 мг/кг соответственно. Следовательно, по физико-химическим свойствам мясо опытных групп животных не отличалось от контрольных данных (P>0,05).

В результате гистоморфологических исследований установлено, что полистим не вызывал отклонений от нормы в морфологии тканей легких, лимфатических узлов, надпочечников, печени, почек, селезенки и щитовидной железы.

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

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