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ТҮЙІН

Бұл мақалада Батыс Қазақстан облысының су айдындарының балықтарындағы ауыр металл тұздарының құрамын кешенді бағалау және талдау нәтижелері берілген. Біздің еліміз үшін жер үсті және ағынды суларды ауыр металдардан тазарту мәселесі өте өткір және өзекті болып табылады. Ауыр металдар аз мөлшерде болса да улы болып қала береді, су қоймалары мен адам ағзасына кері әсер етеді. Тазартылмаған ағынды сулар су объектілерінің жоғары ластануына әкеледі. Бағырлай өзенінде мекендейтін балықтардың бұлшық ет үлгілерінде ауыр металдар кадмий мен қорғасын 0,018 мг/кг және 0,27 мг/кг мөлшерінде; Березовка өзені – 0,02 мг/кг және 0,33 мг/кг; Шаған өзені – 0,012 мг/кг және 0,21 мг/кг; Деркүл өзені – 0,007 мг/кг және 0,21 мг/кг, Шыңғырлау өзені – 0,009 мг/кг және 1,15 мг/кг, Чижа 2 өзені – 0,001 мг/кг және 0,12 мг/кг, Чижа 1 өзені 1 – 0,01 мг/кг және 0,24. сәйкесінше мг/кг. Батыс Қазақстан облысының су қоймаларынан 241 дана көлемінде балықтардың 8 түрін: шортан, алабұға, қаңбақ, балық, мөңке, қарақұйрық, сазан, сазанды зерттеу нәтижелері бойынша орта есеппен 0,36 мг/кг және кадмий 0,0041 мг/кг қорғасын қосылысының қалдық мөлшерінің болуы анықталды; улы элементтер (мышьяк және сынап) анықталмады. Балықтағы ауыр металдардың құрамын талдау шекті рұқсат етілген концентрациядан аспайды. Бұл нәтижелер зерттелген су қоймаларынан балықты тұтынудың салыстырмалы қауіпсіздігін көрсетеді.

АННОТАЦИЯ

В данной статье представлены результаты комплексной оценки и анализа содержания солей тяжелых металлов в рыбе водоемов Западно-Казахстанской области. Проблема очистки поверхностных и сточных вод от тяжелых металлов стоит достаточно остро и актуальна для нашей страны. Тяжелые металлы, оставаясь токсичными даже в следовых количествах, оказывают негативное воздействие на водоемы и организм человека. Неочищенные сточные воды приводят к высокой степени загрязнения водных объектов. Тяжелые металлы кадмий и свинец в пробах мышц рыб, обитающих в реках Бағырлай, содержались в количествах 0,018 мг/кг и 0,27 мг/кг; река Березовка - 0,02 мг/кг и 0,33 мг/кг; река Чаган - 0,012 мг/кг и 0,21 мг/кг; р. Деркуль - 0,007 мг/кг и 0,21 мг/кг, р. Шыңғырлау - 0,009 мг/кг и 1,15 мг/кг, р. Чижа 2 - 0,001 мг/кг и 0,12 мг/кг, р. Чижи 1 - 0,01 мг/кг и 0,24 мг/кг соответственно. По результатам исследований 8 видов рыб: щука, окунь, красноперка, плотва, карась, лещ, линь, карась в количестве 241 экз. из водоёмов Западно-Казахстанской области (реки Чижа-2, Чижа- 1, Деркул, Чаган, Березовка, Утва, Бағырлай) выявлено наличие остаточного количества соединений свинца в среднем 0,36 мг/кг и кадмия 0,0041 мг/кг; токсичные элементы (мышьяк и ртуть) не обнаружены. Анализ содержания тяжелых металлов в рыбе не превышает предельно допустимых концентраций. Эти результаты свидетельствуют об относительной безопасности потребления рыбы из исследованных водоемов.

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Kosilov V.I., doctor of agricultural sciences, professor, **the main author**, <https://orcid.org/0000-0003-4754-1771>

FSFEIHPE «Orenburg State Agrarian University», 460014, Chelyuskintsev str., 18, Orenburg, Russian Federation, kosilov_vi@bk.ru

Kadralieva B.T., candidate of agricultural sciences, <https://orcid.org/0000-0002-5161-5561>
NJSC «West Kazakhstan Agrarian and Technical University named after Zhangir khan», Uralsk,
st.Zhangir khan 51, 090009, Kazakhstan, bkadralieva@mail.ru

BIOCHEMICAL PARAMETERS OF BLOOD OF FIRST-CALF COWS

Annotation

The article presents the results of studies of morphological parameters of blood, mineral and protein composition in the blood serum of first-calf cows. The effect of the genotype on both the number of red blood cells and the hemoglobin content in the blood has been established. The minimum value of the analyzed indicators was distinguished by the first-calf cows of the black-and-white breed. They were inferior to the Holstein peers of the German selection in terms of the number of red blood cells in the blood in winter by $0.33 \cdot 10^{12}/l$, in summer – by $0.45 \cdot 10^{12}/l$; according to the hemoglobin content – by 2.47 g/l and 2.95 g/l, respectively, Dutch holsteins – by $0.46 \cdot 10^{12}/l$ and $0.68 \cdot 10^{12}/l$, 3.42 g/l and 3.25 g/l, crossbreeds $\frac{1}{2}$ holsteins of German selection $\times \frac{1}{2}$ black-and-white – $0.18 \cdot 10^{12}/l$ and $0.09 \cdot 10^{12}/l$, 1.40 g/l and 1.92 g/l, crossbreeds $\frac{1}{2}$ holstein Dutch selection $\times \frac{1}{2}$ black and mottled – $0.24 \cdot 10^{12}/l$ and $0.32 \cdot 10^{12}/l$, 2.16 g/l and 2.40 g/l. The effect of the genotype on the albumin content in the blood serum of first-calf cows has been established. At the same time, their maximum level was distinguished by animals of the Holstein breed of foreign selection of groups II and III, the purebred first-born cows of the black-and-white breed of group I, crossbreeds of groups IV and V were characterized by intermediate inheritance of the trait.

Keywords: *black-and-white breed, holsteins of German and Dutch breeding, morphological composition of blood, erythrocytes, leukocytes, vitamin A, dairy cattle breeding*

Introduction. The Holstein breed has good acclimatization and adaptive abilities, as evidenced by the preservation of high productivity in various natural and climatic regions of the world. The superiority of Holsteins over their related black-and-white cattle and over other dairy breeds in terms of milk yield and total milk fat yield during lactation was established in comparative tests conducted in many countries of the world. The high genetic potential of the Holstein breed's dairy productivity is used in more than 60 countries around the world not only for purebred breeds, but also when crossing with other dairy breeds. When assessing the state of adaptation of imported Holstein cows, according to a set of clinical and biochemical blood parameters, it was found that winter environmental conditions are less adequate for adaptation, which significantly affect the realization of the hereditary potential of this population of European cattle. It is known that one of the most important interior signs, which largely characterize the physiological state of animals, the direction and level of metabolic processes, are hematological indicators. At the same time, it should be borne in mind that blood, with its certain constancy of composition, is a fairly labile medium. It changes under the influence of various factors, the most important of which are environmental conditions [1-15]. According to the biochemical parameters of the blood, it is possible to judge the intensity of metabolic processes, therefore, the level of dairy productivity of animals. Since blood enzymes, their activity, metabolic rate, and biochemical adaptation are encoded in animal genes, it can be assumed that the biochemical composition of their blood is to some extent related to their breeding and productive qualities [15-20].

The aim of the work was to determine the hematological parameters of the blood of first-calf cows of various genotypes.

Material and methods. For research in the conditions of the farm, five groups of animals with 12 heads each were formed from among the first-born cows according to the principle of groups of analogues, taking into account origin, live weight, and physiological state: I - black and mottled (purebred); II – holsteins of German breeding (purebred); III - holsteins of Dutch breeding (purebred); IV – $\frac{1}{2}$ holstein of German breeding $\times \frac{1}{2}$ black-mottled; V – $\frac{1}{2}$ holstein of Dutch breeding $\times \frac{1}{2}$ black-mottled. The physiological state of the body of the first-calf cows was monitored by taking blood from 3 animals from each group according to the seasons of the year. At the same time, the hemoglobin content, the number of leukocytes, the number of erythrocytes, the content of calcium, phosphorus, and vitamin A were determined according to generally accepted methods.

Results and discussion. It was found that the morphological and biochemical composition of the blood of first-calf cows of all groups was within the physiological norm with an increase in the number of red blood cells, blood saturation with hemoglobin, total protein and protein fractions in the summer. The change is confirmed by the results of monitoring the morphological composition of the blood of the first-calf cows of the experimental groups by season (Table 1). At the same time, an increase in the concentration of erythrocytes and hemoglobin in the blood in summer compared with winter in first-calf cows of all genotypes was noted. Thus, in purebred animals of the black-and-white breed I gr. the increase in the content of erythrocytes in the blood in summer compared to the winter season of the year was $0.24 \cdot 10^{12} / l$ (3.44%), hemoglobin - 1.10 g/l (0.95%). In the first-calf cows of the Holstein breed of the German selection of the II gr. the increase in the value of the studied indicators was $0.36 \cdot 10^{12} / l$ (1.93%) and 1.58 g/l (1.36%), respectively, holsteins of the Dutch selection of the III group – $0.46 \cdot 10^{12} / l$ (6.19%) and 0.93 g/l (0.78%, crossbreeds of group IV – $0.15 \cdot 10^{12} / l$ (2.10%) and 1.62 g/l (1.38%), crossbreeds of group V – $0.32 \cdot 10^{12} / l$ (4.44%) and 1.34 g/l (1.14%).

The effect of the genotype on both the number of red blood cells and the hemoglobin content in the blood has been established. At the same time, the first-calf cows of the black-and-white breed of group I differed in the minimum value of the analyzed indicators. So they lost to Holstein crickets of the German selection of group II in terms of the number of red blood cells in the blood in winter by $0.33 \cdot 10^{12} / l$ (4.73% $P < 0.01$), in summer – by $0.45 \cdot 10^{12} / l$ (6.24%, $P < 0.01$), hemoglobin content by 2.47 g/l, respectively (2.13%, $p < 0.05$) and 2.95 g/l (2.52%, $p < 0.05$), holsteins of the Dutch selection of group II – by $0.46 \cdot 10^{12} / l$ (6.60%, $p < 0.01$) and $0.68 \cdot 10^{12} / l$ (9.43%, $p < 0.01$), 3.42 g/l (2.95%, $P < 0.01$) and 3.25 g/l (2.78%, $P < 0.01$), by crossbreeds of group IV – $0.18 \cdot 10^{12} / l$ (2.58%, $P < 0.05$) and $0.09 \cdot 10^{12} / l$ (1.25%, $P > 0.05$), 1.40 g / L (1.21%, $P < 0.05$) and 1.92 g / l (1.64%, $P < 0.05$), by crossbreeds of group V – $0.24 \cdot 10^{12} / l$ (3.44%, $P < 0.05$) and $0.32 \cdot 10^{12} / l$ (4.44%, $P < 0.05$), 2.16 g/l (1.86%, $P < 0.01$) and 2.40 g/l (2.05%, $P < 0.05$) (Fig.1).

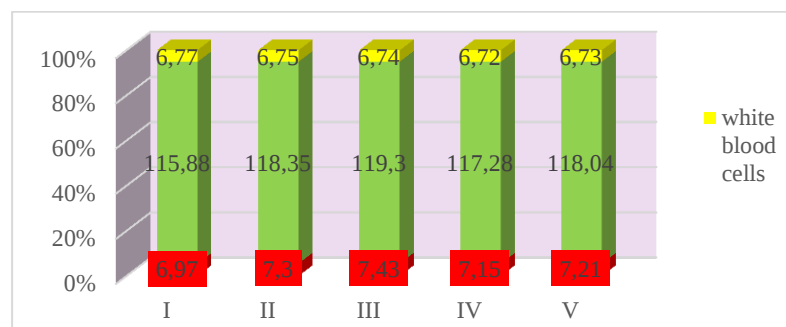


Figure 1 – Results of blood tests

The maximum concentration of erythrocytes and hemoglobin in the blood was distinguished by holsteins of foreign selection of groups III and II, crossbreeds approached them according to these indicators, which indicates the manifestation of the effect of crossing on these signs. When analyzing the seasonal dynamics of the quality of leukocytes in the blood, their decrease in the summer season of the year was noted in first-calf cows of all genotypes without significant intergroup differences. This is understandable: in winter, exposure to adverse environmental factors leads to a strain on the body's defenses, which contributes to an increase in the number of white blood cells. In summer, environmental conditions are favorable and the concentration of white blood cells decreases. At the same time, all fluctuations in the number of leukocytes in the blood of first-calf cows did not go beyond the reference values.

Table 1 – Morphological blood parameters of the first-calf cows of the experimental groups

Group	Indicator					
	redbloodcells, $10^{12} / l$		hemoglobin, g/l		whitebloodcells, $10^9 / l$	
	X±Sx	Cv, %	X±Sx	Cv, %	X±Sx	Cv, %
	Winter					

I	6,97±0,31	3,22	115,88±2,28	3,04	6,77±0,43	3,51
II	7,30±0,39	4,11	118,35±2,82	3,16	6,75±0,50	3,69
III	7,43±0,40	3,81	119,30±3,24	4,12	6,74±0,66	4,12
IV	7,15±0,43	4,24	117,28±3,91	3,63	6,72±0,55	4,04
V	7,21±0,50	4,33	118,04±3,43	4,11	6,73±0,59	3,93
Summer						
I	7,21±0,43	3,81	116,98±2,33	3,42	5,98±0,42	3,99
II	7,66±0,51	4,50	119,93±3,42	4,31	5,92±0,38	2,39
III	7,89±0,50	4,33	120,23±2,83	3,52	5,96±0,40	3,14
IV	7,30±0,66	3,92	118,90±3,63	4,12	5,95±0,55	3,94
V	7,53±0,64	3,82	119,38±3,94	4,03	5,94±0,48	2,43

Thus, in animals of the black-and-white breed of group I, the total protein content in blood serum increased by 1.02 g/l (1.31%), first-calf cows of the Holstein breed of the German selection of group II - by 1.14 g/l (1.44%), holsteins of the Dutch selection of group III - by 1.16 g/l (1.45%), crossbreeds of group IV – by 1.07 g/l (1.37%), crossbreeds of group V – by 1.02 g/l (1.29%).

Thus, the concentration of total protein in the blood serum of first-calf cows of the black-and-white breed of group I increased to a lesser extent in the summer than in animals of other genotypes. At the same time, they were inferior to holsteins of the German selection of group II in terms of the analyzed indicator in winter by 1.19 g/l (1.53%), $P<0.01$), in summer – by 1.31 g/l (1.66%, $P<0.01$), holsteins of the Dutch selection of group II, respectively, by 2.16 g/l (2.77%, $P<0.01$) and 2.30 g/l (2.92%, $P<0.01$), crossbreeds of group IV – by 0.35 g/l (0.45%, $P<0.05$) and 0.40 g/l (0.51%, $P<0.05$), crossbreeds of group V – by 1.22 g/l (1.57%, $P<0.05$) and 1.23 g/l (1.56%, $P<0.05$).

The manifestation of the effect of crossing by the concentration of total protein in blood serum in crossbreeds of groups IV and V was established. As a result, animals of these genotypes, inferior to holsteins of foreign breeding of groups II and III in terms of its level, surpassed purebred first-born cows of the black-and-white breed of group I both in winter and in the summer season of the year (Table 2).

The main proteins of the blood serum are albumins. They take part in metabolic processes with proteins of body tissues and, in fact, are their structural elements. The analysis of the experimental materials obtained indicates that the seasonal dynamics of albumin concentration in the blood serum of heifer cows is similar to the concentration of total protein.

Table 2 – Protein composition of blood serum of first-calf cows of experimental groups, g/l

Group	Indicator					
	totalprotein		albumins		globulins	
	X±Sx	Cv, %	X±Sx	Cv, %	X±Sx	Cv, %
Winter						
I	77,88±0,64	1,14	40,38±0,98	1,88	37,08±0,89	1,90
II	79,07±0,60	1,23	41,64±1,12	2,04	37,43±0,74	1,84
III	80,04±0,74	2,04	42,01±1,38	2,14	38,03±0,94	1,73
IV	78,23±0,81	2,13	41,02±1,34	2,24	37,21±0,82	2,01
V	79,10±0,88	2,33	41,78±1,25	2,19	37,32±1,04	2,14
Summer						
I	78,90±0,78	1,93	41,99±1,38	1,97	36,91±0,94	2,10
II	80,21±0,89	2,77	42,99±1,94	2,10	37,22±1,03	2,16

III	81,20±0,80	1,88	43,24±2,10	2,71	37,96±1,12	2,15
IV	79,30±0,98	2,82	42,24±2,09	2,33	37,16±1,18	1,99
V	80,13±0,95	2,71	42,79±2,31	2,93	37,23±1,21	2,04

Thus, in animals of the black-and-white breed of group I, the serum albumin level in the summer increased by 1.61 g/l (3.99%) compared to the winter seasons, first-calf cows of the Holstein breed of the German selection of group II - by 1.35 g/l (3.24%), holsteins of the Dutch selection of group III - by 1.23 g/l (2.93%), crossbreeds of group IV - by 1.12 g/l (2.73%), crossbreeds of group V - by 1.11 g/l (2.66%).

The effect of the genotype on the albumin content in the blood serum of first-calf cows has been established. At the same time, their maximum level was distinguished by animals of the Holstein breed of foreign breeding of groups II and III, the purebred first-born cows of the black-and-white breed of group I, crossbreeds of groups IV and V were characterized by intermediate inheritance of the trait.

Suffice it to note that the first-calf cows of the black-and-white breed of group I were inferior to their peers of groups II, III, IV and V in terms of serum albumin concentration in winter, respectively, by 1.26 g/l (3.12%, $P<0.01$), 1.63 g/l (4.04%, $P<0.01$), 0.64 g/l (1.58%, $P<0.05$), 1.40 g/l (3.47%, $P<0.05$), in the summer season - by 1.00 g/l (2.38%, $P<0.05$), 1.25 g/l (2.98%, $P<0.05$), 0.15 g/l (0.36%, $P>0.05$), 0.90 g/l (2.14%, $P<0.05$).

It is known that the transamination enzymes aspartate aminotransferase (AST) and alanine aminotransferase (ALT) play a key role in protein metabolism in the animal body. They are involved in the synthesis and destruction of individual amino acids by the reversible transfer of the amino acid group of amino acids to ketoacids. In addition, being oxidized in the Krebs cycle, they serve as a source of energy in the body.

The influence of the season of the year on the activity of transaminases with an increase in their level in the summer period compared with the winter season of the year has been established (Table 3). Thus, in the first-calf cows of the black-and-white breed of group I, the increase in AST activity was 1.76 units/l (2.74%), ALT activity was 1.10 units/l (2.84%), in animals of the Holstein breed of German breeding of group II, respectively, 2.07 units/l (3.10%) and 2.39 units/l (5.97%), holsteins of Dutch breeding of group II - 2.11 units/l (3.11%) and 3.05 units/l (7.39%), crossbreeds of group IV - 2.65 units/l (4.06%) and 1.60 units/l (4.01%), crossbreeds of group V - 2.67 units/l (4.03%) and 2.15 units/l (5.33%).

Table 3 – Enzymatic activity of blood serum of first-calf cows of experimental groups, units/l

Group	Indicator					
	AST		ALT		LDG	
	X±Sx	Cv, %	X±Sx	Cv, %	X±Sx	Cv, %
Winter						
I	64,12±0,53	2,40	38,88±0,42	1,92	651,52±3,90	5,08
II	66,83±0,38	2,12	40,04±0,51	1,81	688,34±3,82	5,15
III	67,78±0,84	2,49	41,28±0,50	1,88	698,81±4,53	6,13
IV	65,23±0,94	3,14	39,90±0,66	2,04	671,30±4,12	6,17
V	66,25±0,92	3,22	40,36±0,72	2,13	680,43±5,10	6,05
Summer						
I	65,88±0,71	2,55	39,98±0,50	2,70	672,40±4,10	5,09
II	68,90±0,99	2,83	42,43±0,58	1,66	711,33±4,03	5,11
III	69,89±0,84	2,31	44,33±0,48	1,78	734,02±5,10	6,13
IV	67,88±0,91	2,99	41,50±0,66	1,94	700,23±4,94	5,72
V	68,92±0,96	2,73	42,51±0,73	2,03	712,11±5,38	5,19

The established dynamics of transaminase activity indicates the influence of paratypical factors on the oxidative processes of the Krebs cycle and, consequently, on the synthesis of amino acids, which are intermediate products of this cycle.

The influence of the genotype of first-calf cows on these signs has been established, as evidenced by intergroup differences in the activity of aminotransferases.

At the same time, the first-calf cows of the black-and-white breed of group I differed in the minimum value of the analyzed indicators. Thus, they were inferior to the Holstein peers of the German selection of group II in terms of AST activity in winter by 2.71 units/l (4.23%, $P<0.01$), in the summer season by 3.02 units/l (4.58%, $P<0.01$), by animals of the Holstein breed of the Dutch selection of group III, respectively, by 3.66 units/l (5.71%, $P<0.01$) and 4.01 units/l (6.09%, $P<0.001$), crossbreeds of group IV – by 1.11 units/l (1.73%, $P<0.05$) and 2.00 units/l (3.04%, $P<0.05$), crossbreeds of group V – by 2.13 units/l (3.32%, $P<0.01$) and 3.04 units/l (4.61%, $P<0.01$). Similar intergroup differences were noted in ALT activity. It is enough to note that first-calf cows of groups II, III, IV and V were superior to their peers of the black-and-white breed of group I in terms of ALT activity in winter by 1.16 units/l, respectively (2.98%, $P<0.05$), 2.40 U/L (6.18%, $P<0.01$), 1.02 U/L (2.63%, $P<0.05$), 1.48 units/l (3.81%, $P<0.05$), and in the summer season - by 2.45 units/l (6.13%, $P<0.01$), 4.35% (10.88%, $P<0.001$), 1.52 units/l (3.80%, $P<0.05$) and 2.53 units/l (6.33%, $P<0.01$). It was found that the maximum activity of transamination enzymes was distinguished by the first-calf cows of the Holstein breed of foreign selection of groups II and III, the crossbreeds of groups IV and V were characterized by intermediate inheritance of the analyzed trait, which is due to the influence of the crossing effect.

Analysis of the dynamics of the glycolytic enzyme lactate dehydrogenase (LDH) indicates an increase in its activity in first-calf cows of all genotypes in the summer compared with the winter season. In animals of the black-and-white breed of group I, this increase was 20.88 units/l (3.20%), holsteins of the German selection of group II – 22.99 units/l (3.34%), holsteins of the Dutch selection of group III – 35.21 units/l (5.04%), crossbreeds of group IV – 28.93 units/l (4.31%), crossbreeds of group V – 31.68 units/l (4.66%).

The minimum level of LDH enzyme in the blood serum of first-calf cows of the black-and-white breed of group I has been established. Thus, in winter, they were inferior to their peers of groups II, III, IV and V in terms of the analyzed indicator, respectively - by 36.82 units/l (5.65%, $P<0.01$), 47.29 units/l (7.26%, $P<0.01$), 19.78% (3.04%), 28.91 units/l (4.44%, $P<0.05$), and in the summer season – by 38.93 units/l (5.79%, $P<0.01$), 61.62 units/l (9.16%, $P<0.001$), 27.83 units/l (4.14%, $P<0.05$), 31.68 units/l (4.71%, $P<0.01$).

It is characteristic that the highest activity of LDH was distinguished by the first-born cows of foreign breeding of groups II and III, the crossbreeds were somewhat inferior to them with superiority over the black-and-white peers of group I. In general, the activity indicators of the analyzed enzymes were within the physiological norm.

Conclusion. The hematological parameters of the first-calf cows of all genotypes were within the physiological norm. Metabolic processes took place more intensively in the body of Holstein cows and their hybrids with black-and-white cattle, which is confirmed by a higher concentration of erythrocytes and hemoglobin in the blood, total protein in the blood serum.

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ТҮЙІН

Мақалада сиырлардың қан сарысуындағы қанның, минералды және ақуыз құрамының морфологиялық көрсеткіштерін зерттеу нәтижелері келтірілген. Генотиптің эритроциттер санына да, қандағы гемоглобин құрамына да әсері анықталды. Талданатын көрсеткіштердің минималды мөлшері қара түсті тұқымды сиырлармен ерекшеленді. Олар қыста қандағы эритроциттер саны бойынша неміс селекциясының голштин құрдастарынан $0,33 \cdot 10^{12}/л$, жазда

0,45 · 10¹²/л төмен болды; гемоглобиннің құрамы бойынша – тиісінше 2,47 г/л және 2,95 г/л, голландиялық селекцияның голштиндері – 0,46 · 10¹²/л және 0,68 · 10¹²/л, 3,42 г/л және 3,25 г/л, ½ голштин неміс селекциясының будандары × ½ кара-түсті – 0,18 · 10¹²/л және 0,09 · 10¹²/л, 1,40 г/л және 1,92 г/л, ½ голландиялық селекцияның голштині × ½ кара түсті – 0,24 · 10¹²/л және 0,32 · 10¹²/л, 2,16 г/л және 2,40 г/л. Сиырлардың қан сарысуындағы альбуминдердің құрамына генотиптің әсері анықталды. Сонымен қатар, олардың максималды деңгейі II және III топтардың шетелдік селекциясының голштин тұқымының ерекшеленді, ең азы – I топтағы кара түсті тұқымның таза тұқымды сиырлары, IV және V топтардың будандары белгінің аралық тұқым қуалауымен сипатталды.

АННОТАЦИЯ

В статье представлены результаты исследований морфологических показателей крови, минерального и белкового состава сыворотки крови коров-первотелок. Установлено влияние генотипа как на количество эритроцитов, так и на содержание гемоглобина в крови. Минимальным значением анализируемых показателей отличались коровы-первотелки черно-пестрой породы. Они уступали голштинским сверстникам немецкой селекции по количеству эритроцитов в крови зимой на 0,33 · 10¹²/л, летом – на 0,45 · 10¹²/л.; по содержанию гемоглобина – на 2,47 г/л и 2,95 г/л соответственно, голландских голштинцев – на 0,46 · 10¹²/л и 0,68 · 10¹²/л, 3,42 г/л и 3,25 г/л, помесей ½ голштинцев немецкой селекции × ½ черно-пестрых – на 0,18 · 10¹²/л и 0,09 · 10¹²/л, 1,40 г/л и 1,92 г/л, помеси ½ голштинской голландской селекции × ½ черно-пестрой – 0,24 · 10¹²/л и 0,32 · 10¹²/л, 2,16 г/л и 2,40 г/л. Установлено влияние генотипа на содержание альбумина в сыворотке крови коров-первотелок. При этом их максимальным уровнем отличались животные голштинской породы зарубежной селекции II и III групп, чистопородные коровы-первенцы черно-пестрой породы I группы, помеси IV и V групп характеризовались промежуточным наследованием признака.

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Каюмов Ф.Г., доктор сельскохозяйственных наук, профессор, nazkalms@mail.ru, <https://orcid.org/0000-0001-9241-9228>

Третьякова Р.Ф., кандидат биологических наук, nazkalms@mail.ru, <https://orcid.org/0000-0002-5155-4295>

Kayumov F.G., Doctor of Agricultural Sciences, Professor, nazkalms@mail.ru, <https://orcid.org/0000-0001-9241-9228>

Tretyakova R.F., Candidate of Biological Sciences, nazkalms@mail.ru, <https://orcid.org/0000-0002-5155-4295>

ГЕНЕТИЧЕСКАЯ ХАРАКТЕРИСТИКА ТЁЛОК ТИПА «АДУЧИ» GENETIC CHARACTERISTICS OF «ADUCHI» TYPE HEIFERS

Аннотация

Цель исследования состояла в проведении контроля генетической структуры стада типа «Адучи» по генам-маркерам CAPN1, GH, TG5, LEP. Подопытное поголовье содержалось в ООО «Агрофирма «Адучи» Республика Калмыкия.

Установлено, что при генотипировании поголовья телок по ДНК-маркеру кальпаинпроисходило увеличение особей-носителей «желательного» генотипа CAPN1^{CC} до 6%, то есть на 3% по сравнению с предыдущим поколением. Количество гетерозигот CG оставалось на том же уровне – 20%. В локусе гена гормона роста происходила существенная модификация генофонда у телок создаваемого типа. Количество гомозигот GH^{VV} увеличилось на 20% по сравнению с предыдущим поколением. Помимо этого, отмечалась стабильность в частоте встречаемости гетерозиготного генотипа. В то же время насыщение генофонда изучаемого стада кровью быков абердин-ангусской породы оказало незначительное влияние на распределение поголовья телок (F₂) по ДНК-маркеру TG5, частота «желательных» гомозигот уменьшилась на 3%. Однако отмечается увеличение носителей гетерозиготного