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Article

Some Biological Features of Experimental Cows

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Abstract: In this article, the clinical indicators and morphological characteristics of the blood of Holstein-bred black-and-white and Holstein breeds of different selections were studied and analyzed, and the adaptive properties of the organism were determined by the clinical and physiological indicators of the animals: respiratory rate, heart rate and body temperature. It is these indicators that are studied and analyzed, as well as the natural resistance of the organism, the state of metabolism, physiological activity and productivity.

Keywords: erythrocyte, leukocyte, hemoglobin, total protein, respiration, heart rate, body temperature, glucose.

Introduction

Livestock breeding is one of the important sectors of the economy of the Republic of Uzbekistan. This sector is one of the promising sources of strengthening export potential, while satisfying the demand of the population of our country for food products and the processing industry for raw materials. Cattle breeding is one of the leading sectors in ensuring food security of the population and satisfying the demand for high-quality protein. The main reason for this is that 99 percent of milk and dairy products produced for consumption by the population come from milk obtained from cows.[1][2]

Materials and Methods

We conducted this study at the "PURE MILKY PRODUCTS" cattle farm in Jomboy district. Three groups were selected for the experiment: Group I Holsteinized F3 black-and-white (n=12), Group II Holstein of Polish selection (n=12), Group III Holstein cows of Latvian selection. Body temperature was determined with a thermometer, heart rate with a phonendoscope, breathing by counting through the nose, and blood formed elements were counted on a Garyaev counting grid, in addition, we used Sali hemometer in our studies.[3][4]

Results and Discussion

In order to assess the adaptive nature of the organism, we determined the clinical and physiological indicators of the animals: respiratory rate, heart rate and body temperature. It is these indicators that play an important role in determining the natural resistance of the organism, the state of metabolism, physiological activity and productivity.[5][6]

In Table 1, we have provided information on the clinical indicators of cows in the I lactation period.

Analysis of the tabular data showed that the clinical indicators of the cows in the experimental groups were at the normal level. However, this physiological process was slightly accelerated in the summer season. In group II, the heart rate was observed to be 11.2; 7.2; times 12.9; 3.1 times faster than its counterparts in the summer season. Similarly, the respiratory rate and body temperature were also 14.3; 1.7; 0.1 or 28.6; 3.4; 0.25 percent higher.

The tabular data showed that in the winter season, the body temperature, heart rate and respiration rates of cows were lower, but did not fall below the normal range. These indicators were 0.1; 7.2; 2.0; 1.2 and 0.3 higher in group II than in groups I and III. In the summer, there was a significant difference in respiration, heart rate, and body temperature compared to the winter season, with 51.7, 23.1, and 1.8 higher, respectively, at 25.8, 20, and 0.7 percent.[7][8]

Table 1. Clinical indicators of cows in experimental groups (X ± Sx), (n=12)

Groups	Breathing (times / 1 minute)		Heart rate, (beats/minute)		Body temperature, 0C	
	X±Sx	C.v,%	X±Sx	C.v,%	X±Sx	C.v,%
In Spring						
Group 1	25,3±0,089	7,74	68,2±1,23	3,53	38,7±0,073	0,45
Group 2	30,1±0,079	8,1	71,7±1,29	4,38	38,9±0,049	0,39
Group 3	28,3±0,088	7,54	70,1±1,55	4,73	38,8±0,036	0,31
In Summer						
Group 1	35,6±13,1	6,5	75,3±1,44	4,42	39,1±0.042	0,36
Group 2	49,9±20,5	6,34	86,5±1,54	5,6	39,2±0,033	0,41
Group 3	48,2±24,3	6,1	83,8±1,25	4,39	39,1±0,041	0,39
In Autumn						
Group 1	25,6±8,83	4,88	69,3±1,24	2,24	38,7±0,22	0,90
Group 2	32,3±10,2	5,0	73,1±1,89	4,21	38,8±0,06	0,55
Group 3	30,8±10,1	5,1	71,9±1,74	3,79	38,7±0,13	0,91
In Winter						
Group 1	22,9±3,68	5,61	59,3±2,69	5,82	38,5±0,091	0,82
Group 2	24,1±5,24	4,64	66,5±2,38	4,0	38,5±0,1	0,72
Group 3	23,8±2,98	4,37	64,5±2,53	4,1	38,4±0,12	0,84

Note: ** P > 0.99 *** P > 0.999.

In order to consider the adaptation of the animal organism to new natural climatic conditions, it is important to study and describe their hematological indicators, which we have presented in Table 2 below.[9][10]

From the table data, we can conclude that the formed elements in the blood of cows were almost at the physiological norm, and there was no significant difference between the groups in this indicator. [11][12] In addition, it was found that there was a significant difference in this indicator between the seasons of the year. In particular, in the blood of all cows in the groups in the summer, compared to the counterparts of group II, the following values were proportionally higher: 1.9; 1.2 percent erythrocytes, 7.3; 2.5 percent, leukocytes, 4.0; 0.8 percent hemoglobin, 2.2; 0.95 percent total protein, 4.9; 0.7 percent.[13] In the winter, group II was significantly higher than other experimental groups: 1.6; 09 percent erythrocytes, 3.8; 3.06 percent, leukocytes, 1.4; 2.3 percent hemoglobin, 1.5; 0.77 percent total protein, 3.6; 1.5 percent more. The difference between winter and summer months was determined as follows, with winter being: 6.98; 13.1; 6.5; 6.4 and 14.7 percent more.[14][15]

Table 2. Morphological parameters of the blood of cows in the experimental groups (X ± Sx), (n=12)

Groups	Indicators studied									
	Erythrocytes, million/μl		Leykotsitlar, ming/ mkl		Leukocytes, thousand/μl		Total protein g/l		Glucose mmol/l	
	X±Sx	C.v,%	X±Sx	C.v,%	X±Sx	C.v,%	X±Sx	C.v,%	X±Sx	C.v,%
In Spring										
Group 1	6,44±0,65	3,18	7,41±0,99	2,75	104,4±10,96	2,14	74,2±0,49	1,48	2,98±0,107	3,94
Group 2	6,55±0,66	2,79	7,62±0,81	1,95	106,9±14,8	2,1	75,9±1,04	3,04	3,11±0,04	3,14
Group 3	6,49±0,38	1,9	7,55±1,17	1,89	105,7±9,5	1,3	75,5±1,57	2,83	3,02±0,05	3,79
In Summer										
Group 1	6,27±0,81	1,53	6,59±1,89	2,75	99,9±6,02	1,1	71,7±0,96	1,45	2,71±0,086	3,35
Group 2	6,39±1,31	2,0	7,11±2,38	4,29	104,1±5,67	1,66	73,3±10,6	2,49	2,85±0,055	3,56
Group 3	6,31±1,03	1,87	6,93±2,03	3,45	103,3±5,76	1,33	72,6±1,0	1,91	2,83±0,07	3,47
In Autumn										
Group 1	6,59±1,96	2,7	7,65±0,69	1,62	106,9±18,9	2,19	75,5±0,84	2,59	3,12±0,046	2,91
Group 2	6,75±1,34	2,01	8,01±0,64	1,1	109,3±17,4	1,39	77,3±1,04	2,1	3,27±0,069	3,38
Group 3	6,68±1,52	2,24	7,84±0,96	1,84	108,7±11,6	1,55	76,9±0,99	2,19	3,19±0,067	3,47
In Winter										
Group 1	6,76±1,43	1,92	7,87±0,84	1,38	109,7±10,8	1,08	77,1±1,23	1,89	3,22±0,02	0,96
Group 2	6,87±0,98	1,57	8,18±0,97	1,28	111,3±10,9	1,02	78,3±0,85	1,23	3,34±0,11	3,26
Group 3	6,81±0,75	1,22	7,93±1,25	1,32	108,7±11,9	1,14	77,7±0,94	1,51	3,29±0,08	2,95

Conclusion: In general, the results demonstrate that improving the saturation of the blood with essential elements has a positive effect on the adaptation of animals to new environmental conditions and contributes to increased productivity. Adequate provision of necessary elements appears to support physiological stability and improve the animals' ability to cope with environmental changes, thereby creating favorable conditions for maintaining productive performance. These findings have practical implications for animal management and nutrition, particularly in situations where animals are exposed to new or changing environmental conditions. However, the study is limited by the range of environmental and physiological factors considered, and further research is needed to determine the specific contribution of individual elements, establish optimal levels of supplementation, and evaluate their effects over longer periods and under different environmental conditions. Future studies involving larger animal groups and more detailed physiological and biochemical assessments could provide a stronger basis for developing effective nutritional and adaptation strategies aimed at improving animal health, adaptation, and productivity.

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