Environmental adaptive features of local dogs and Kalmyk's shepherd dog “Barg”

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Abstract. The article presents the results on the study of the biological characteristics of the Kalmyk's shepherd dog "Barg" and local dogs, as well as indicators of the physiological state of animals (pulse frequency, breathing and body temperature). The indicators of natural immunity in the studied dog breeds and morphological, biochemical blood composition of animals were investigated. Analyzing the above mentioned data, it is possible to conclude that the extrusion of feed for experimental dogs contributes to a more intense metabolic process in the body, which is confirmed by the best biochemical blood indicators.

1. Introduction
Every breed of domestic animals is the result of more or less long development processes. The final result of this historical process, expressed in the aggregate of the known morphological signs and the physiological properties of this breed depends on a number of reasons. The main one should be considered a conscious or unconscious artificial selection, continuously acting natural selection, which accepts this or that direction depending on the physical and geographical conditions, among which this breed is bred and, finally, metisation of a given breed with the other one. This ancient shepherd dog, derived by the method of folk selection by nomadic cattlemen dwelled on extensive expanses of Jungaria. The Kalmyk shepherd dog is an ancient shepherd dog bred by the method of folk selection by nomadic pastoralists in the vast expanses of Dzungaria. This breed belongs to the group of Asian Shepherds. It has the blood of the oldest dogs of Tibet and herding dogs of various nomadic tribes of Mongolia. The bug is closely related to the Mongolian Shepherd Dog and the Tibetan Mastiff. The main purpose of this breed is grazing and animal protection.

In the pre-war years, this breed was the main array of shepherd dogs of Kalmykia, Astrakhan, Rostov and Stalingrad regions. The purpose of this investigation is to study the biological and adaptive features of local dogs and Barg breeds, as well as to identify the efficiency of using various dry food recipes, rate physiological state of dogs depending on the method of feeding on changes in their lively mass, as well as morphological and biochemical blood indicators.

The scientific novelty of research is that the biological and adaptive features of the Kalmyk breed of dogs Barg have been studied for the first time, and a comparative comprehensive assessment of the
impact of extruded and non-dispersed feed for metabolic processes in the body, as well as their effect on the dynamics of live masses, reproductive qualities, morphological and biochemical blood indicators.

According to the phenotype, Kalmyk shepherd dogs have an average height, a rough build and are completely unpretentious. At the withers, the Barg reaches 55 cm, and the weight is about 40 kg. These four-legged animals have a long thick coat, which is lowered by a "brush" on the tail bent slightly upwards and reaches 10 cm. For this group of dogs, the characteristic colors are: black with a white spot on the chest and black and tan with spots above the eyes that have a tan tone. The barg is a versatile breed that is able to perform various tasks. They are used not only in shepherd service, but also as a watchman and guard [1].

2. Results and discussion. Clinical hematological and biochemical indicators
An important indicator of the physiological state of animals is the frequency of the pulse, breathing and body temperature. Clinical indicators of experimental breeds of dogs were within the physiological norm are represented in the table 1.

| Breed  | Body temperature, C | Breathing frequency per minute | Pulse frequency per minute, times |
|--------|---------------------|-------------------------------|----------------------------------|
| Local  | 38.3±0.34           | 17.1±0.29                     | 71.3±0.89                       |
| Kalmyk | 38.1±0.43           | 15.8±0.31                     | 69.9±0.96                       |

However, the dogs of the Kalmyk breed had slightly lower body temperature, breathing frequency and the pulse. So, young Kalmyk breed’s body temperature was lower than their peers from the local breed by 0.20 C (p <0.05), the frequency of respiration, respectively, by 1.3, pulse - by 1.4 times (P <0.01).

V.A. Alikaev (1982) [2] notes that blood performs a number of vital functions in the body: nutritious, respiratory, protective, regulatory, maintaining water equilibrium in tissues, regulation of body temperature and others.

The condition of individual organs and tissues is significantly dependent on the blood composition.

The tests carried out prove that the main blood parameters in the experimental dogs were within the physiological norm (table 2).

| Breed  | Red blood cells 10¹² g/l | White blood cells, obin, g/l | Hemoglobin, g/l | Total protein, g/l | Globulin, g/l | Glucose, mmol/l | Cholesterol, mmol/l | Urea, mmol/l | Phosphorus, mmol/l |
|--------|--------------------------|-----------------------------|-----------------|-------------------|---------------|----------------|-------------------|-------------|-------------------|
|        | 5.90±0.16                | 11.9±0.31                   | 156.6±164       | 66.1±30.3         | 35.8±0.45     | 0.85±4.46      | 4.61±5.11         | 89.9±2.10   | 1.16±0.06         |
| Local  | 0.16                     | 0.31                        | 16.4            | 1.75              | 0.54          | 0.01           | 0.03              | 0.16        | 0.06              |
| Kalmyk | 6.33±0.21                | 13.1±0.40                   | 162.4±211       | 69.0±33.8         | 35.2±0.96     | 4.58±4.92      | 5.26±5.26         | 96.7±3.20   | 2.08±0.04         |
|        | 0.21                     | 0.40                        | 21.1            | 1.33              | 0.62          | 0.01           | 0.04              | 0.21        | 0.04              |
However, the number of indicators studied in the blood of experimental dogs varied depending on their breed affiliation.

Thus, the number of Red blood cells in the Kalmyk breed dogs was higher than that of their peers - by 6.8%, the content of white blood cells - by 10.0% and hemoglobin - by 3.70% (p <0.01).

The difference in the content of erythrocytes and leukocytes in the blood of experimental animals can be explained by higher adaptive abilities of dogs of the Kalmyk breed, as well as their more intensive dynamics of growth and development than their analogues of the other group. A large role in the physiological processes occurring in the organism of animals belongs to the proteins.

Our data show that the smallest content of the general protein in the blood serum was in the local breed dogs. They inferior on this indicator of the dogs of the Kalmyk breed by 4.4 (p <0.05).

The study of the dynamics of protein fractions showed that the advantage in the number of total protein in the Kalmyk breed dogs occurred due to the albumin fraction. The proportion of albumin from the general protein in dogs the above-mentioned rock amounted to 49.0%, and at the local - 45.8%, which is 3.20% higher than their analogues of the local breed.

As is known, the higher there is protein index (A/G coefficient) in the blood of animals, the more intense there are protein biosynthesis processes in their body. In the studied breeds of dogs, the protein index was at a sufficiently high level.

The main source of energy for cells and the ability of their functioning is glucose, which getting into the body with food, is split to molecules in the gastrointestinal tract.

When analyzing the glucose concentration in the blood of both dogs, it was found that this figure was within the physiological norm, but in the Kalmyk breed animals by 2.70% more than that of the local breed.

A.A. Aliev (1976) [1] notes that cholesterol plays great importance for the well-coordinated activity of all organs, which is the most important component of the fat exchange, directly participating in the synthesis of genital hormones and vitamin D.

The advantage of this indicator in comparison with the peers from the local rock in the Kalmyk breed dogs was 6.72% (p <0.05). The level of urea in the blood of the studied breeds of dogs was within the physiological norm.

As for the alkaline reserve, its number in the studied breeds of dogs is within the physiological norm, but somewhat differed. Thus, the Kalmyk breed dogs exceeded the peers from the local rock in the content of an alkaline reserve by 7.56% (p <0.05). In the process of research, we found that the content of calcium and phosphorus in the blood was within the physiological norm.

However, the Kalmyk breed dogs exceeded their peers with their local calcium content group - by 52.3% and phosphorus - by 79.3% (P <0.01).

As is known, the adaptation of animals is largely determined by the natural resistance and protective adaptations of the body to various adverse environmental factors [2-4].

Taking into account these circumstances, we studied the indicators of humoral natural immunity, because they reflect the immunological reactivity of the body of experimental dogs [5-7].

The research results suggest that the indicators of natural immunity in the studied breeds of dogs were at a high level (table 3).

Table 3. Indicators of the natural resistance of the body of experimental dogs.

| Age, months | Local   | Kalmyk  |
|-------------|---------|---------|
|             | Bactericidal activity, % |         |
| At birth    | 31.4±0.85 | 32.9±0.92 |
| 6           | 35.6±0.76 | 41.1±0.83 |
| 12          | 56.7±0.93 | 64.6±1.04 |
| 18          | 50.8±1.05 | 60.2±0.99 |
| Lisozyme activity, % |         |
| At birth    | 8.91±0.26 | 9.89±0.44 |
Analysis of the data obtained shows that with age, and forming immunity, the young of the experimental groups of dogs occurs a dynamic increase in bactericidal and lysozyme activity in serum. This process continues until 12 months of age, after which there is a gradual decrease in BASK to 50.8-60.2%, and LASK, respectively, up to 18.3-20.6%. At the same time, the most intensive increase in LASK occurs in the body in the first 6 hours of life up to 20.8-21.9%.

It should be noted that the greatest bactericidal and lysozyme activity of the serum was observed in the Kalmyk breed dogs, which exceeded their peers from the local rock by 3.4-5.1% (p <0.01).

As a result of the conducted studies, it was found that the morphological parameters of the blood of experimental dogs of the compared groups were within the physiological norm. However, it should be noted that the content of red blood cells and hemoglobin was higher by 5.7-13.2% than that of their counterparts from the control group. This indicates a more intensive course of redox processes in the body.

The biochemical parameters of the blood serum of the experimental dogs were also within the physiological norm, but there is a tendency to increase the total protein in the blood of the dogs of the experimental group by 3.1% compared to the control group.

Alkaline reserve in the serum of animals of the experimental group was 95.0 mmol/l. Extruded feeds increase the alkaline reserve in the blood of experimental animals of the experimental group by 7.5% (P <0.01).

3. Conclusion

Analyzing the above mentioned data, it is possible to conclude that the extrusion of feed for experimental dogs contributes to a more intense metabolic process in the body, which is confirmed by the best biochemical blood indicators.

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