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Original Research Article

The Effect of External Environmental Variables on Blood Protein Indications of Rabbits

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ABSTRACT:
In this article, the natural resistance of chinchilla (localized) and New Zealand (newly introduced) rabbit breeds were studied in different regions of the Samarkand region, which differ from each other in terms of outdoor temperature and air pollution indicators. The endurance and flexibility of the body of rabbits were determined. Some proteins in the blood of rabbits were analyzed in the summer and winter seasons, in regions with different levels of atmospheric pollution (due to emissions from stationary sources and mobile sources).

Keywords: Rabbits, Body Adaptation, Blood, Protein, Albumin, Globulin, Ecology, Temperature, Atmosphere, Average, Speed.

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INTRODUCTION

Today, due to the rapid increase in the population all over the world, the large-scale use of available meat reserves (cattle, sheep, goats, etc.) as food leads to a sharp decrease in the number of animals. Poultry farming, fishing and rabbit breeding are the main sources of supply for the stable supply of quality meat and meat products to the population. Therefore, it is one of the urgent problems of today to achieve a positive solution to the problem of meat shortage by determining the favorable conditions for the care and feeding of rabbits in extreme conditions, developing practical recommendations for increasing their productivity and introducing them into production.

Certain results are being achieved in terms of providing the population of our republic with high-quality ecologically clean meat products, improving the poultry and rabbit breeding sectors for the development of the livestock sector, and developing innovative methods that increase their productivity.

In this regard, it is of scientific and practical importance to determine the effect on the physiological and biochemical parameters and productivity of the rabbit breeds adapting to the extreme climate and environment of our country and to biologically substantiate the changes occurring in their organism.

In order to satisfy the population's need for animal protein, it is possible to provide productive sectors of animal husbandry, such as rabbit farming.

One of the main problems in the development of rabbit breeding is the influence of stress factors. As a result of them: 1) loss of meat productivity; 2) occurrence of diseases as a result of damage to various organs and tissues (an increase of radicals and increase of lipid peroxidation in cell membranes); 3) deterioration of reproductive abilities. Stress factors can be caused by: violation of care regulations, non-compliance with sanitary rules, nutritional factors and external environmental factors (Vasilevich et al., 2017).

The analysis of blood composition provides information not only about the condition of animals but also about their adaptation to the environment. Through blood analysis, it is possible to observe various indicators that occur under the influence of feeding and care of animals. This allows assessing the general physiological condition of animals. (Petrova et al,. 2007; Sautkin, 2010).

The analysis of the morphological and biochemical parameters of the blood of rabbits bred with the help of different technologies showed an increase in the number of erythrocytes and hemoglobin, and a tendency to decrease in the number of leukocytes depending on age.There is a significant difference between the albumin and globulin fractions, enzymes and macroelements in the blood of rabbits raised using eco-technologies and rabbits raised using other technologies.

Kotsyubenko A.A. according to information, the ecotechnology of breeding rabbits is the most convenient for the manifestation of the genetic growth potential of the organism (Kotsyubenko, 2013).

Air temperature is one of the most important microclimate factors, and its change can cause serious changes in the adaptation mechanisms of animals. Thus, a change in the microclimate in the storage room leads to the accumulation of dust and harmful gases in the air, which also contributes to the development of stress. All this leads to the death of animals (Pyanov et al., 2004; Sein and Aksenov, 2007).

According to researchers, the concentration of serum albumin in Karakul sheep in winter and summer depends on the level of activity of protein synthesis and metabolism in the body. It was determined that the amount of albumin in the experimental sheep changed up to 2.15 compared to the control (Rajamuradov et al., 2021).

Purpose of the study

Comparative assessment of the effects of critical temperature and atmospheric pollution on blood plasma protein parameters of rabbits adapted (Chinchilla) and acclimatized (New Zealand) to the extreme climatic conditions of Zarafshan oasis.

MATERIALS AND METHODS

Experiments of the research work were carried out in the vivarium and laboratory of the Department of "Human and Animal Physiology and Biochemistry" of the Faculty of Biology of SamSU, "Dargom Agrovelikan" LLC, "Ro'ziev Khomid" farm, and in the laboratories of the "INNOVA" diagnostic center.

For experiments, 10.3-month-old male homologous chinchillas (control) and imported New Zealand (experimental) rabbits were selected.

The research areas in 3 regions of the basin of the Middle Zarafshan district have a continental climate with intense solar radiation, diurnal and seasonal variations, a long hot and dry summer season (30-50^{o}C) and a slightly cold winter (-10-0^{o}C). is described. Atmospheric variability was calculated based on the number of emissions from stationary and street sources in the designated areas. The dynamics of atmospheric air pollution were studied in cooperation with the Environmental Protection Committee of the Samarkand region.

Laboratory animals were fed standard rations in vivarium and farm conditions. A volume of 2 ml of blood was collected from the lateral ear vein

of rabbits into heparin-treated test tubes. Total proteins, albumins and globulins of the blood plasma were determined using the COBAS c 311 automated biochemical analyzer based on the photometric method, on the basis of ready-made 2-D barcoded reagents.

The difference between the mean values obtained in the control and experiments was calculated by Student's t-test, and the reliability of the difference in values was expressed at the level of R<0.05. Statistical processing of data was carried out on the basis of modern (OriginPro 7.5, Excel, 2013) programs.

RESULTS AND DISCUSSION

Protein metabolism is one of the most important links of metabolism. Blood serum proteins are one of the components of the internal environment of living organisms. They are in dynamic balance with the proteins of tissues and organs, perform the roles of management, catalytic, transport, and protection, have a significant impact on the processes of protein, fat, carbohydrate, and mineral metabolism. That's probably why it was found by researchers to serve as one of the main criteria in assessing the state of animal health.

The study of serum proteins and its fractions in the blood of rabbits during the study of the influence of different levels of contaminated areas and different levels of critical temperatures allows determining the number of patterns of changes.

The amount of total proteins in the blood plasma is usually closely related to the amount of digestible protein in the diets consumed by animals and the levels of absorption of the digested protein.

In the winter season, the amount of total protein in the blood serum of chinchilla rabbits was 65.0±1.9 and 64.0±1.7 g/l in the winter season and 58.1±2.1 and 57.3 g/l in the summer season. was ±1.4g/l (Figure 1).

In the blood of imported rabbits, it is 58.1±1.8 and 57.0±1.8 g/l in the winter season and 57.3±1.7 and 54.7±1.3 g/l in the summer season. which showed that the amount of total protein in the blood serum of rabbits of the experimental group was 10.9% less in the winter season and 3.0% less in the summer season than in the control group.

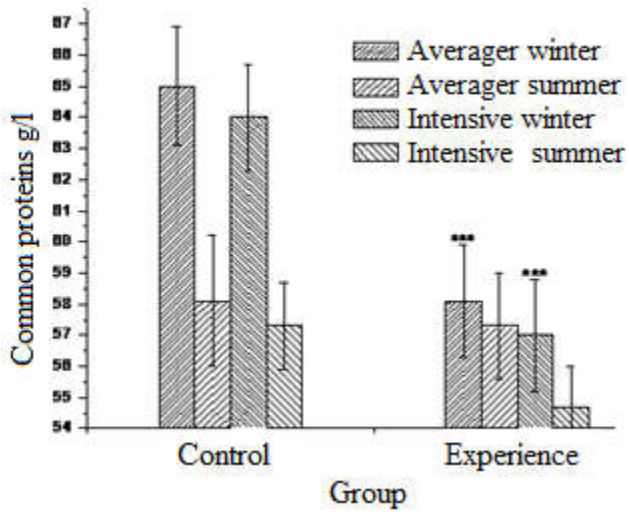

Figure 1: Effects of temperature on the metabolism of total proteins in blood plasma of rabbits in different polluted areas.

The percentage of albumin in the blood of rabbits of the control group was 61.0%, while it was found to be less than 7.0% in the experimental group. The changes in the analogous state were similar to those in the experimental group in the summer season in the moderately disturbed area and in the intensively polluted areas in both conditions. was found to be relatively high from 10.0% to 12.4% (Figure 2).

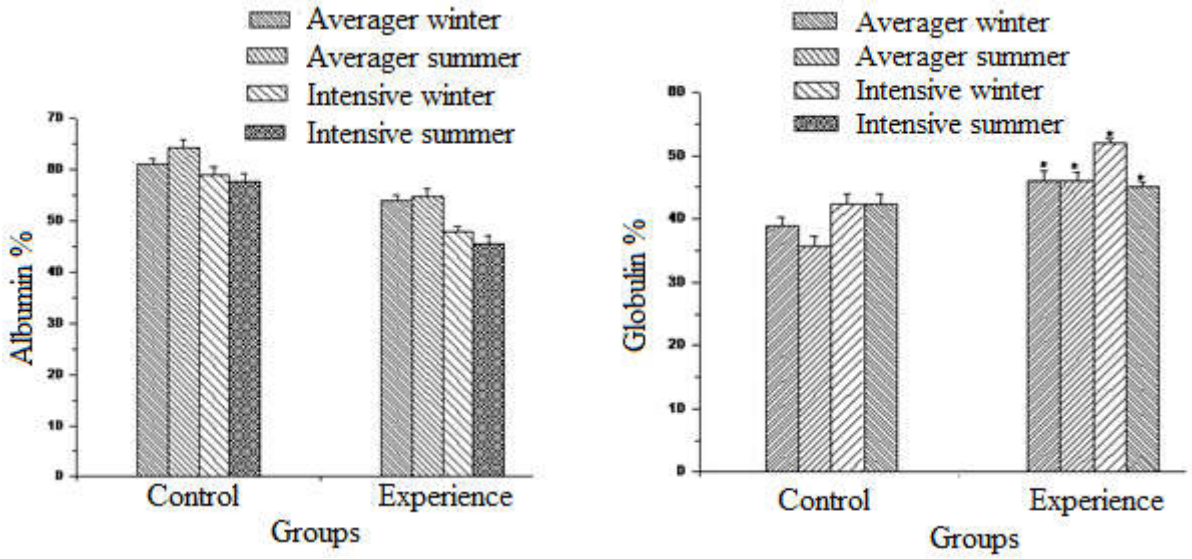

Figure 2: Changes in serum albumin and globulin proteins under the influence of external environmental factors.

Globulin proteins are also important in the structural or qualitative study of total proteins. Because albumin and globulin proteins are complementary to each other.

It was observed that the percentage of globulins in the blood was 3.0% to 12.6% lower in rabbits of the experimental group compared to the control group.

The percentage of both α- and β-globulins in the blood, in our opinion, may have changed depending on the amount of protein consumed in the diet, as well as the number of total proteins, because the amount of digestible protein in the feeds consumed in the winter season, in our opinion, did not cover the daily needs of the rabbits, can be because, during the experiments, it was found that the live weight of New Zealand rabbits is 21.0-27.0% higher than the live weight of chinchilla rabbits (Table 1).

Table 1: Effect of temperature on protein metabolism in rabbits in different polluted areas (n=5) (M±m)

Blood protein content	**Groups**	**Pollution of territories**			
		Average		**Fast**	
		Seasons of the year			
		Winter	Summer	Winter	Summer
Totalprotein, g/l	control	65.0±1.9	58.1±2.1	64 0±1 7	57.3±1.4*
	experience	58.1±1.8***	57.3±1.7*	57 0±1 8***	54.7±1.3
Albumins,%	control	61.0±1.2	64.3±1.6	59 0±1.5	57.6±1.7
	experience	54.0±1.1***	54.8±1.5***	48.0±1.0***	45.2±1.6***
Globulins,%	control	39.0±1.3	35.7±1.6	42.4±1.5	42.4±1.5
	experience	46.0±1.5*	46.0±1.4*	52.0±0 7*	45.0±0.7*

α-globulin,%	control	12.2±0.9	21.4±0.9	10.85±0 7	14.0±0.7
	experience	13.0±1.0*	15.4±0.8***	18.3±0.6*	16.0±0.7*
β-globulin,%	control	10.9±0.6	40.0±1.6	12.7±0.5	33.0±1.2
	experience	12.9±0.3*	38.4±1.3*	14.3±0.3*	33.3±1.0*
γ- globulin,%	control	16.7±1.1	35.6±1.3	18.6±0.9	53.0±1.46
	experience	19.8±1.2*	46.2±1.7*	19.2±0.7*	47.9±1.5**

*Explanation: *-P>0.05; ** - P<0.05; *** - P<0.01;*

It was found that the percentage of γ-globulins in the blood was 18.56% higher in New Zealand rabbits in winter than in chinchilla rabbits, and 29.8% in summer. A similar change was observed in the winter season in the intensively polluted area, and in the summer season, the percentage of γ-globulins in the blood of rabbits of the experimental group decreased dramatically by 53.0±1.46% and 47.9±1.5% in the blood of rabbits in both compared groups.

In our opinion, the high percentage of γ-globulins in both compared groups indicates an increase in the natural resistance of the animal organism in both groups.

CONCLUSIONS

In conclusion, it should be noted that the quantitative level of total protein in the blood does not depend on the area where the rabbits are kept, but the change in the temperature of the external environment to a certain extent leads to the activation of protein fractions.

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