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Effect Of Enzyme Preparations On Hematological Parameters Of Rearing And Laying Hens.

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ABSTRACT

Efficiency of use in feeding of farm animals and poultry of enzymes or other biologically active substances, first of all affects indicators of blood. The article shows the influence of enzyme preparations Canzaim and Canfais 5000 included in the diets of rearing and laying hens at different age periods, on the morphological and biophysical indices of their blood. Physiological research on the study of the blood picture was carried out in the framework of scientific and economic experiments on repair young and laying hens in the sue poultry farm "Urus-Martan" of the Chechen Republic. Scientific and economic experience, at the second stage of research, was started on 4 groups of seven-day chickens of the breed Loman brown, formed on the principle of analogues, 100 heads in each, and completed on laying hens. Thus, the difference in terms of the different feeding groups was to ensure that the numbers 1, 2, 3 experimental groups in addition to the basic diet that consumed the bird of control group received enzyme preparations, respectively Canzaim (100 g/t) separately, Canfais 5000 (80 g/m) separately and Canzaim (100 g/ton) plus Canfais5000 (80 g/m) together. Morphological parameters of blood allow us to conclude that the use of enzyme drug Canzaim provides statistically significant increase of erythrocytes and haemoglobin, as of rearing, and of laying hens ($p \geq 0,95$). The positive effect of the enzyme drug Sansim on the content of total protein and its fractions in the blood, as of rearing and laying hens. Also the increase of glucose content in the blood serum of the experimental birds receiving the diet with the enzyme preparation Sanzaim, both separately and in conjunction with Canfais 5000. **Keywords:** enzyme preparations, Canzaim, Canfais 5000, rearing, laying hens, morphological blood indices, biochemical parameters of blood.

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INTRODUCTION

The production of certain enzymes and enzyme preparations provide for their use in feeding livestock and poultry, with the aim of improving digestibility and utilization of nutrients, improve metabolism in the body, reduce feed consumption per unit of production, which positively affects the quality and quantity of livestock products.

In the feeding of poultry are well established enzyme preparations of Canzaim and Canfais 5000, the use of which contributes to the improvement of productive performance of the experimental population.

However, it should be borne in mind that the high productivity of poultry, in particular egg, provide for the intensification of metabolic processes in the body, which affect the biochemical status of the blood. Having a certain buffering, the blood maintains the constancy of the internal environment of the body by changing hematological parameters in response to various external factors, including feed, which are one of the main external factors affecting the blood picture of animals and birds. The output of the corresponding hematological parameters beyond the physiological framework can serve as an indicator of the negative influence of the feed factor on homeostasis.

MATERIAL AND METHODS

Studies on the effectiveness of the use of enzyme preparations in the feeding of poultry were conducted in the sue poultry farm "Urus – Martan" Chechen Republic and divided into two stages. Scientific and economic experiments at the second stage of research, which studied the presented hematological parameters were carried out according to the scheme shown in table 1.

Table 1: Scheme of scientific and economic experience (stage 2)

Group	Diet Characteristics
Youngster	
Control	Basic diet (PR)
1 experienced	PR + 100 g/MT enzyme drug Canzaim
2 experienced	PR + 100 g/MT enzyme drug Canfais 5000
3 experienced	PRS + 100 g/MT enzyme drug Canzaim+100 g/MT enzyme drug Canfais 5000
Laying hens	
Control	Basic diet (PR)
1 experienced	PR + 100 g/MT enzyme drug Canzaim
2 experienced	PR + 80 g/t enzyme drug Canfais 5000
3 experienced	PRS + 100 g/MT enzyme drug Canzaim +80 g/t enzyme drug Canfais 5000

For experience 4 groups of analogs of seven-day chickens in quantity of 100 heads are created: one control and three skilled. After the end of the experience on repair young growth, research have continued on the same livestock, with use of appropriate diets feed.

All available zoo technical, physiological and economic studies and calculations were carried out during the research.

Twice in the course of scientific and economic experiences (for repair the young and the chickens – laying hens) have studied the basic hematological parameters.

For the study of hematological parameters in 5 heads from each group at the age of 120 days in young animals and 450 days-in laying hens from the axillary vein in the morning, before feeding, took blood and stabilized it with heparin.

To separate the serum the blood was centrifuged at 2000-3000 rpm In the blood was studied by the methods described by I. P. Kondrakhin (1985), the following indicators:

- erythrocytes and leukocytes by counting the camera Goryaeva;
- hemoglobin-by the method of Sali in the hemometer;
- total protein-refractometric device " RLU»;
- fraction of protein by electrophoresis on paper;
- common lipids-by Foch;
- calcium By de Waard;
- phosphorus-by Yudelevich;
- sugar according to the method of M. J. Sommoqqi.

The glucose content in the blood serum was determined glucosidase method, and the content of triglycerides and cholesterol – enzymatic method.

RESULTS AND DISCUSSION

First of all, the morphological parameters of blood were determined: the blood content of erythrocytes, leukocytes and hemoglobin. It should be noted that the use of enzyme preparations to some extent changed the morphological parameters of the blood of repair young and laying hens of experimental groups compared to their counterparts from the control.

Table 2: Morphological parameters of blood

Group	Indicators		
	Erythrocytes, 10 ¹² /l	Leukocytes, 10 ⁹ /l	Hemoglobin, g/l
Repair young growth			
Control	3,43±0,12	38,82±0,52	76,47±0,88
1 experienced	3,83±0,11*	39,46±0,38	79,58±0,94*
2 experimental	3,57±0,17	39,11±0,54	78,08±0,68
3 experienced	3,89±0,10*	39,44±0,37	79,86±0,90*
Laying hens			
Control	3,60±0,10	40,46±0,48	78,41±1,02
1 experienced	3,98±0,10*	40,15±0,32	81,78±1,22*
2 experienced	3,77±0,13	40,53±0,35	80,43±1,16
3 experienced	4,01±0,14*	40,28±0,50	81,98±1,06*

Note: * - p≥0.95

In particular, in the repair young and laying hens feeding enzyme preparation Sanzaim contributed to a significant (p≥0.95) increase in red blood cells by 0.40 and 0.38 x 10¹²/l and hemoglobin – by 3.11 and 3.37 g/l, respectively, compared with the control group. This is probably due to the intensification of metabolic processes in the body of poultry and the need for more intensive transport of oxygen and nutrients.

A certain increase in these indicators was observed in the livestock of the 2 experimental group, but this increase was statistically unreliable.

You can also say that the joint inclusion of enzyme preparations of CanzaimandCanfais5000 in the poultry diet of the experimental groups significantly increases the content of erythrocytes and hemoglobin in their blood. Moreover, the indicators are even higher than in the 1-experimental group, with the separate use of the desired enzyme preparation. Superiority made: at repair young growth of 0,46, and at laying hens of 0,41 x 10¹²/l-on the maintenance of erythrocytes; 3,39 and 3,57 g/l respectively, - on the content of

hemoglobin, in comparison with control group. There were no significant differences in leukocyte content, especially significant differences between the groups.

The main conclusion that we make on the analysis of the studied morphological parameters of blood is that they did not go beyond the physiological norms for young and adult chickens.

The increase in productive indicators is a consequence of the improvement of protein metabolism, which undoubtedly affects the content of protein in the blood of the experimental bird and the distribution of its fractions.

Immediately it should be noted that the greatest influence on the protein content in the blood was the joint inclusion in the diet of poultry of both enzyme preparations in optimal doses. The total protein content in the blood of young animals increased from 54.43 to 57.92 g/l, and in adult chickens - from 53.91 to 56.11 g/l.

Table 3: protein Content in the blood of the experimental bird, n=5

Group	Total protein, g/l	Albumins %	Globulins, %		
			α -	β-	γ -
Repair young growth					
Control	54,43 ± 0,68	35,23 ± 0,30	17,81 ± 0,22	14,73 ± 0,20	32,23 ± 0,26
1 experienced	57,19 ± 0,70*	34,57 ± 0,24	18,19 ± 0,16	14,25 ± 0,16	32,99 ± 0,20
2 experienced	56,59 ± 0,81	34,90 ± 0,28	17,71 ± 0,18	14,34 ± 0,12	33,05 ± 0,33
3 experienced	57,92 ± 0,84*	34,17 ± 0,26*	18,54 ± 0,20*	14,05 ± 0,20*	33,24 ± 0,24*
Laying hens					
Control	53,91 ± 0,60	34,76 ± 0,35	18,03 ± 0,14	14,50 ± 0,22	32,71 ± 0,38
1 experienced	55,85 ± 0,54*	33,55 ± 0,28*	18,33 ± 0,18	13,87 ± 0,18	34,29 ± 0,35*
2 experienced	55,22 ± 0,48	34,02 ± 0,36	18,32 ± 0,14	14,29 ± 0,29	33,37 ± 0,44
3 experienced	56,11 ± 0,56*	33,10 ± 0,42*	18,48 ± 0,10*	13,67 ± 0,20*	34,75 ± 0,48*

Note: * - p≥0.95

A little less than those figures recorded in the blood of birds receiving diets with enzyme preparations separately, but in 1 experimental group, the difference with the control group were significant and in the 2 experimental group no.

Interesting is the distribution of protein fractions in the blood of the experimental population, because even with the same amount of total protein content of albumins and globulins can be significantly different.

In result of our research, it was found that in the repair of young animals, a significant difference with the control group in the distribution of protein fractions was observed only in the 3-experimental group, with the joint use of enzyme preparations. At the same time, there is a decrease in the relative amount of albumin and β - globulins and vice versa an increase in the content of α - and γ - globulins.

A similar trend is observed in laying hens. The combined use of enzyme preparations contributes to a reliable (but within physiological norms) decrease in the number of albumin, and β - globulins, but increase in α - and γ - globulins.

At the same time, it was also established that the separate use of the enzyme preparation Canzaim in the rations of poultry 1 of the experimental group contributes to a significant change in protein fractions. Significantly, the albumin content decreases by 1.21% and, at the same time, the γ -globulin content increases by 1.58%.

For other groups and indicators no significant differences were found.

The course of metabolism in the body of a bird can also be characterized by biochemical blood parameters. Increased metabolism is reflected in the glucose content in the blood, which is the main indicator of carbohydrate metabolism, showing the difference between its formation and use in tissues.

The increased need for energy to ensure metabolic processes requires an increased content and the formation of glucose, as the main energetic material of the cells.

Table 4: The content of glucose in the serum of the experimental birds, mmol / l n = 5

Group	Repair young stock	Laying hens
Control	6,15±0,12	5,14±0,10
1 experienced	6,53±0,10*	5,56±0,14*
2 experienced	6,22±0,09	5,39±0,12
3 experienced	6,77±0,16*	5,75±0,18*

Note: * - $p \geq 0.95$

6.15 mmol / l of glucose was detected in the blood of the repair young of the control group. The use of the enzyme preparation Canfais 5000 in the feeding of poultry did not significantly affect the content of glucose in the blood serum. On the other hand, the inclusion of the enzyme Canzaim preparation in the poultry ration contributed to a significant increase in the amount of glucose to 6.53 mmol / l, and when using two enzyme preparations together, a further increase to 6.77 mmol / l.

After passing the peak of egg-laying, the intensity of metabolic processes is constantly decreasing; therefore, the glucose content in the blood of laying hens in the control group decreased to 5.14 mmol / l.

In the experimental groups, this indicator also decreased in comparison with the maintenance of young stock, however, it was still higher than in the control group.

A significant superiority over the control is noted in 1 and 3 experimental groups: 0.42 and 0.61 mmol / l.

In general, the glucose levels in the serum of the experimental bird corresponded to the reference values of laying hens.

The age of the bird, as well as the intensity of egg-laying, can significantly influence the content of triglycerides and cholesterol in the blood serum. However, we found that during the growth of young animals and during intensive egg-laying, there were no significant differences between the groups in the serum triglycerides and cholesterol levels, as a result of feeding the enzyme preparations were not recorded (Table 5)

Table 5: The content of triglycerides and cholesterol in the blood serum of experimental birds, mmol / l n = 5

Group	Repair young stock	Laying hens
Triglycerides		
Control	1,018±0,06	0,742±0,05
1 experienced	1,037±0,04	0,766±0,05
2 experienced	1,004±0,09	0,729±0,06

3 experienced	0,977±0,06	0,772±0,03
Cholesterol		
Control	2,344±0,13	3,561±0,12
1 experienced	2,298±0,11	3,479±0,13
2 experienced	2,319±0,12	3,540±0,16
3 experienced	2,305±0,10	3,494±0,11

The content of calcium and phosphorus in the blood serum reflects the level and course of mineral metabolism in the body of the bird. The results obtained by us in the course of research are reflected in table 6.

Table 6: The content of calcium and phosphorus in the blood serum of experimental birds, mmol / l n = 5

Group	Repair young stock	Laying hens
Total Calcium		
control	4,24±0,09	4,20±0,07
1 experienced	4,26±0,06	4,29±0,11
2 experienced	4,32±0,03	4,35±0,08
3 experienced	4,41±0,06	4,38±0,06
Inorganic Phosphorus		
control	1,53±0,07	1,69±0,06
1 experienced	1,54±0,06	1,74±0,04
2 experienced	1,83±0,08*	1,95±0,07*
3 experienced	1,86±0,09*	1,98±0,08*

Note: * -p≥0.95

The analysis of the data presented suggests that the desired enzyme preparations had a certain positive effect on the serum calcium content, but it turned out to be unreliable in data processing, which cannot be said of phosphorus.

As we know, the enzyme preparation Canfais 5000 is based on phytase, which promotes the absorption of inorganic phosphorus. Due to this, in 2 and 3 experimental groups, where this enzyme preparation was included in the diet, the concentration of inorganic phosphorus in the blood serum of maintenance of young stock significantly increased by 0.30 and 0.33 mmol / l, and laying hens by 0.26 and 0.29 mmol / l, respectively.

CONCLUSION

The use of enzyme preparations Canzaim and Canfais 5000, both separately and jointly, had a positive impact on the overall blood picture of birds, as evidenced by the studied morphological and biochemical blood parameters that were within the physiological norm, but had a steady tendency to increase (red blood cells, hemoglobin, total protein), contributing to the optimization of poultry metabolic processes. In particular, the content of common protein and the ratio of its fractions in the blood serum of the population of the experimental groups improved compared with the control.

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