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INFLUENCE OF PROBIOTIC PREPARATION BIO-3S AND VITAMIN C ON PRODUCTIVE QUALITY AND HEMATOLOGICAL INDICATORS OF BLOOD IN BROILER CHICKEN

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ANNOTATION:

The article presents the results of studies devoted, to the effect of the probiotic preparation, BIO-3S and vitamin C on the productive qualities and hematological parameters of the blood of broiler chickens.

Keywords: compound feed, concentrate, probiotic, BIO-3S, vitamin C, diet, broiler chickens.

RELEVANCE OF THE TOPIC:

At present, the world and domestic poultry farming is the most dynamically developing branch of the agro-industrial complex, providing the population with high-quality products of animal origin. According to the latest forecasts, by 2050, the world's population will reach 9.1 billion people, and the rate of implementation of scientific and technological progress will slow down. Almost all of this population growth will occur in developing countries. About 70% of the world's population will live in cities (currently 49%). Compared to the current level, people's incomes will increase significantly [1]. To meet the projected demand for food among a large urbanized and, on average, wealthier population, food production would need to increase by about 70% over this period. Despite the enormity of this task, it is quite realistic to ensure the necessary increase in food production and meet the future needs of mankind [2].

In connection with the intensification of poultry production, special attention is paid to complete feeding of broiler chickens. The poultry diet should contain complete proteins, fats, macro- microelements and vitamins.

Currently, in economically developed countries, there is a tendency to an increase in demand and consumption of environmentally friendly agricultural products, including livestock and poultry, which is aimed at maintaining and improving the health of the population.

Poultry farming is one of the leading agricultural sectors in the world. First of all, this is explained by the demand for inexpensive and high-quality food products [1, 2].

Among the poultry meat produced by poultry enterprises, the first place in terms of volume is occupied by the meat of broiler chickens, which are distinguished by high growth rates and large sizes. For a short period of their cultivation, which is 38–42 days, their live weight from day old increases 50–55 times and reaches 1.5–2.5 kg. However, their growth is significantly ahead of development.

Unformed immune and enzymatic systems make them highly sensitive to bacterial and viral agents, as well as to various stresses.

When developing and assessing the effect of new drugs, biological additives and probiotics on the poultry organism, one cannot do without studying the morphological and biochemical parameters of blood, since blood in the body performs many functions aimed at maintaining its vital activity [9, 10]. It ensures the transport of oxygen to the cells and the release of carbon dioxide from them, and also promotes thermoregulation of the body and ensures its nonspecific resistance. A change in the composition of the blood leads to a violation of metabolic processes.

The aim of the research was to study the effect of the probiotic preparation BIO-3S and vitamin C on the productive qualities and hematological parameters of the blood of broiler chickens.

OBJECTS AND RESEARCH METHODS:

The goal was solved in accordance with the general research scheme by setting 2 scientific and production experiments in the period from 2020 to 2021 at the poultry farm of the Dargom-Fayz LLC in the Pastdargam district of the Samarkand region. The objects of research were broiler chickens of the foreign cross "Ross-308". From poultry of the specified cross at one day old according to the method of A.V.Aleksandrova and others formed 4 groups of 100 heads each. At the same time, the duration of broiler rearing lasted 42 days.

The blood was taken from the experimental bird in the morning during the control slaughter at the age of 42 days from 5 typical heads from each group. To assess the effect of probiotic and vitamin C on intermediate metabolism in broiler chickens according to the methods described by I.P.Kondrakhin and I.D.Shpilman (1985), the following morphological and biochemical parameters were studied in the blood: the number of erythrocytes and leukocytes by counting under a microscope in large and small cells of the Goryaev chamber; hemoglobin - according to the Sali method in a standard hemometer; methemoglobin - using an IR spectrometer according to the method of I.F.Boyarchuk, V.A.Lutova modified by E.Y.Mosur (2007); total protein - using an “IRF-4546” refractometer; uric acid concentration - according to the method described by V.Kulhanek (1965), cholesterol, activity of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) - on a semi-automatic photometric analyzer “Stat Fax-1904 Plus” using a standard set of reagents from “Olvex Diagnosticum”; sugar - according to M.Y.Sommoggi; calcium level - according to the De-Vaarda method; inorganic phosphorus by the Yudelevich method.

RESEARCH RESULTS AND THEIR DISCUSSION:

Nitrates enter the body of poultry with food and water, and then these xenobiotics are absorbed into the blood in the small intestine. Nitrates and their metabolites are excreted from the body mainly through the kidneys in the urine. The main reason for the manifestation of negative consequences is not the nitrates themselves, but how much of their metabolites - the reduced form of nitrites, which, interacting with hemoglobin in the blood, form methemoglobin. The latter is unable to carry oxygen in the body. As a result, oxygen capacity in the blood decreases, hypoxia develops. In the blood of poultry, the level of methemoglobin is regulated by the enzyme methemoglobin reductase, which reduces methemoglobin back to hemoglobin. This enzyme begins to be produced in the bird's body only from three weeks of age. In addition, nitrates are reduced to nitrites by various microorganisms that colonize the

gastrointestinal tract. For the successful development of beneficial intestinal microflora, a neutral and slightly alkaline environment is favorable for growing young poultry.

Neutralization or blocking of nitrite migration makes it possible to inhibit the synthesis of nitroso compounds. The introduction of ionol and ascorbic acid inhibits the formation of nitrosamines in the gastrointestinal tract of the bird. Therefore, for the detoxification of nitrates and nitrites, it is recommended to add ascorbic acid to the diets of poultry, which most often prevents the formation of N-nitrosodimethylamine (A.R.Lokhov, 2002; I.B.Kokoeva, 2006; L.B.Buzoeva, 2013).

Along with this, an important criterion in assessing the denitrifying effect of ascorbic acid (vitamin C), which is more clearly manifested with a wide range of other biologically active compounds, including the tested complex compounds on the body of poultry probiotics, which contain beneficial microorganisms that produce nitrate and nitrite reducing enzymes. This makes it possible to accelerate the processes of elimination of these toxicants in the bird's body, which can be judged by a number of hematological parameters (Table 1).

According to the data of 1 scientific and production experience, it can be seen that the use of different doses of the probiotic BIO-3S in diets with a subtoxic dose of nitrates had a positive effect on the denitrification processes. When feeding the probiotic BIO-3S at a dose of 1250 g/t of feed in the blood of broilers of the experimental group versus control analogs, there was a significant (P <0.05) increase in the number of erythrocytes by 0.54 x 10^{12} / l and hemoglobin by 6.25 g/l, as well as a decrease in methemoglobin - 1.69 times (P <0.05).

Table 1. Morphological and biochemical composition of poultry blood n = 5

Index	Group			
	control	1 experienced	2 experienced	3 experienced
1 scientific and production experience				
Red blood cell count,10^{12} / l	3,29±0,35	3,75±0,27	3,83±0,25	3,78±0,24
Leukocyte count, 10^{9} /l	8,79±0,43	8,83±0,49	8,78±0,39	8,85±0,56
Hemoglobin, g/l	76,51±0,40	81,98±0,36	82,76±0,43	82,46±0,44
Methemoglobin, %	4,39±0,24	3,00±0,32	2,60±0,38	2,78±0,40
2 scientific and production experience				
Erythrocyte count,10^{12} /l	3,32±0,29	3,72±0,37	3,68±0,30	3,84±0,42
Leukocyte count, 10^{9} /l	8,92±0,34	8,87±0,45	8,84±0,48	8,99±0,51
Hemoglobin,, g /l	76,34±0,42	81,44±0,39	81,29±0,40	83,61±0,47
Methemoglobin %	4,22±0,19	3,11±0,23	3,20±0,17	2,44±0,25

When using in the course of experiment 2 joint additions to corn-wheat-sunflower rations of probiotic BIO-3S at a dose of 1250 g / t of feed and vitamin C at a dose of 500 g / t of feed for denitrification, an optimization of the morphological composition of the blood of meat chickens occurred, which provided against the control analogs in the liquid internal environment of broilers of the 3rd experimental group, a significant (P <0.05) increase in the number of erythrocytes by 0.52 x 10^{12} / l, hemoglobin by 7.27 g/l, while reducing the content of methemoglobin - by 42.18% (P <0.05).

When carrying out two experiments, we studied the effect of the tested feed preparations on changes in the blood of some biochemical parameters of the experimental bird during denitrification (Table 2).

The process of successful elimination of nitrates and nitrites in the body of young poultry is accompanied by the optimization of the general metabolism in the body, which is confirmed by positive changes in the biochemical composition of the blood.

table 2. Some biochemical parameters of the blood of broiler chicken's n = 5

Index	Group			
	control	1 experienced	2 experienced	3 experienced
1 scientific and production experience				
Sugar, mmol / l	47,57±0,23	50,67±0,34	51,15±0,37	51,04±0,30
Cholesterol, mmol / l	3,08□0,04	2,49±0,06	2,19±0,05	2,33±0,04
AsAt, ed/l	180,5±0,45	205,6±0,62	212,3±0,58	207,7±0,59
AlAt, ed/l	93,1±0,52	101,1±0,45	102,7±0,37	102,2±0,62
Calcium, mmol / l	12,86±0,41	13,32±0,37	13,57±0,28	13,41±0,38
Phosphorus, mmol / l	5,24±0,28	5,45±0,22	5,73±0,31	5,64±0,27
1 research and production experience				
Sugar, mmol / l	47,69±0,33	50,87±0,28	80,82±0,32	51,48±0,35
Cholesterol, mmol / l	3,03±0,05	2,27±0,06	2,14±0,07	1,79±0,05
AsAt, ed/l	184,4±0,48	207,7±0,42	211,3±0,50	214,5±0,49
AlAt, ed/l	93,5±0,42	101,1±0,55	101,7±0,53	103,5±0,52
Calcium, mmol / l	12,75±0,36	13,73±0,44	13,88±0,48	13,89±0,32
Phosphorus, mmol / l	5,26±0,32	5,77±0,34	5,79±0,40	5,84±0,24

In the course of experiment 1, the best effect on carbohydrate, fat and mineral metabolism in broilers was provided by enrichment of their diets with a subtoxic dose of nitrates with probiotic BIO-3S at a dose of 1250 g/t of feed. Due to this, meat poultry of the 2nd experimental group relative to the control group had significantly (P <0.05) more sugar in the blood serum by 3.58 mmol/l, calcium - by 0.71 mmol / l and phosphorus - by 0.49 mmol /l. l with a simultaneous decrease in cholesterol concentration - by 0.89 mmol / l (P <0.05). This indicates a positive effect of the probiotic BIO-3S at the indicated dose on metabolic processes in the poultry blood serum during denitrification.

During the 2nd experiment, the most striking stimulating effect on carbohydrate, fat and mineral metabolism of broilers of the 3rd experimental group was provided by the joint feeding of the probiotic preparation and vitamin C. Taking this into account, the meat chickens of the 3rd experimental group significantly (P <0.05) surpassed the control analogs in concentration in blood serum sugar by 3.79 mmol / l, calcium - by 1.14 mmol/l and phosphorus - by 0.58 mmol / l with a simultaneous decrease in cholesterol concentration - by 1.24 mmol / l (P <0.05). All this testifies to the synergism of the action of the tested feed additives during denitrification on the indicated aspects of metabolism in the body of broilers.

As the research results have shown, with the successful elimination of xenobiotics in the blood serum of meat poultry, which is characterized by a high growth rate, there is an activation of transport enzymes - aspartate aminotransferase (AsAt) and alanine aminotransferase (AlAt), which are involved in the delivery of amino acids from the small intestine to organs and tissues., vitamins and other biologically active substances. At the same time, the most favorable effect on the activation of these transport enzymes in the blood of the experimental bird was provided by the joint feeding of the probiotic BIO-3S at a dose of 1250 g / t of feed and vitamin C at a dose of 500 g / t of feed in the composition of mixed feed with a subtoxic level of nitrates. Therefore, during the 2nd experiment in the blood serum of the chickens of the 3rd experimental group relative to the control, there was a significant (P <0.05) increase in the activity of AsAt by 16.32% and AlAt by 39.57%, which indicates an intensification of redox reactions, anabolic processes and catabolism in the body of poultry under the denitrifying effect of probiotic and vitamin C.

During detoxification of various toxic compounds that have a depressive effect on metabolism, under the influence of biologically active additives, a strengthening of natural resistance is observed, as evidenced by the indicators of lysozyme and bactericidal activity of the blood serum of the experimental bird (Table 3). In the course of experiment 1, the

best effect on the state of natural resistance of broiler chickens was the introduction of probiotic BIO-3S into diets with a subtoxic dose of nitrates at a dose of 1250 g / t of feed.

Table 3 Some indicators of natural resistance of experimental birds n = 5

Index	Group			
	control	1 experienced	2 experienced	3 experienced
1 research and production experience				
Bactericidal activity,%	38,96±0,38	48,39±0,35	48,27±0,44	50,55±0,34
Lysozyme activity,%	17,36±0,29	19,88±0,38	19,82±0,25	21,57±0,34
2 scientific and production experience				
Bactericidal activity,%	38,96±0,38	48,39±0,35	48,27±0,44	50,55±0,34
Lysozyme activity,%	17,36±0,29	19,88±0,38	19,82±0,25	21,57±0,34

However, the highest stimulating effect on the denitrification process was exerted by the combined feeding of the probiotic BIO-3S at a dose of 1250 g / t of feed and vitamin C at a dose of 500 g/t functions in the body of broiler chickens of the 3rd experimental group. This in them relative to the birds of the control group was manifested in a significant (P <0.05) increase in the blood serum of bactericidal activity by 11.59% and lysozyme activity by 4.21%.

CONCLUSIONS:

1.To increase the detrifying effect in the body of poultry, in their combined feed of corn-wheat-sunflower type with a subtoxic level of nitrates, the probiotic BIO-3S should be injected at the rate of 1250 g / t and vitamin C at the rate of 500 g / t of feed, accompanied by optimization of the processes intermediate metabolism of broiler chickens.

2.Feeding in a combination of these drugs against control analogs in the internal liquid medium of broilers of the 3rd experimental group provided a significant (P <0.05) increase in the number of erythrocytes by 0.52 x 10^{12} / l, hemoglobin - by 7.27 g/l, while a decrease in the content of methemoglobin - by 42.18% (P <0.05), nitrates - by 41.02% (P <0.05) and nitrites - by 59.60% (P <0.05).

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