

Kinetics of alanine aminotransferase in pheasant blood plasma during the complex use of vitamins and an antistress drug

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Abstract

The article presents the results of experimental studies on the effect of vitamins and an anti-stress drug on the biochemical parameters of the blood of pheasants.

The purpose of the work is to identify the kinetics of age-related changes in blood alanine aminotransferase in pheasants with the complex use of vitamins and an anti-stress drug.

Based on the experimental data obtained, it was found that after the inclusion of a complex of vitamins (A-20000 IU, D3 - 1250 IU, E - 50 mg) and an anti-stress drug (succinic acid) in a dose of 0.05 g per 1 kg of body weight into the diet of pheasants per day, in all experimental groups of pheasants, a change in the biochemical parameters of the activity of the enzyme ALT was detected.

Based on the experimental data, a decrease in the activity of the ALT enzyme was revealed. It was found that the enzyme activity of the experimental groups of partridges was 2, 1.5, 1.0, 1.67, 1.17, 1.5 times less compared to the indicators of the control groups of pheasants. It was experimentally established that the indicators of ALT activity are in the range from 0.01 to 0.08 U/l, reaching a maximum value at 30 days of age.

Key words: enzymatic activity of blood; alanine aminotransferase; emerald pheasant; Phasianus versicolor; Phasianus colchicus vitamins; antistress drug

Introduction

From the literature data, the role of enzyme systems in the regulation of growth, development, and the formation of the productive qualities of farm birds follows. The authors noted that the content of aminotransferases in hepatocytes and the rate of their release from cells into the blood during physiological regeneration have the greatest effect on the content of enzymes in the blood of chickens and, as a result, on the metabolic transformations of amino acids in the bird's body. It is known that the biochemical parameters of blood in birds change with age [1,2].

It should be noted that the rational use of biologically active additives in the diets of birds has a positive effect on metabolic processes in the body. With the positive effect of the drugs used, productivity increases and the profitability of poultry products increases [3].

Literature sources provide insignificant data on biochemical parameters and activity of blood digestive enzymes in chickens in ontogeny [4].

Two experiments were performed to evaluate the hematological and blood biochemistry parameters, biometry of digestive organs, enzyme activities, protein content and absolute weight of the pancreas of broilers fed pre-starter and pre-starter diets supplemented or not with amylase from *Aspergillus awamori* [5].

Feeding micronized yeast to quails led to a significant increase in the activity of ALT (by 1.55 times) and AST (by 1.35 times) [6].

The use of micronized rice husks has an inhibitory effect on all the studied parameters in this experiment, leading to their decrease by the end of the observation compared to the other groups. Feeding micronized yeast to quails led to a significant increase in the activity of ALT (by 1.55 times) and AST (by 1.35 times) [7].

The authors found that the diet for animals is no less important than their genetic origin. Therefore, one should take into account not only the nutritional value of the ration feed, but also the presence of biologically active substances and non-traditional additives in them [8,9].

Despite the fact that plasma biochemistry analyses are significantly important and widely used in the diagnostic of different illnesses in several birds, a very limited amount of information exists for pheasants, partridges and chukars [10, 11]. Some studies have researched the biochemical parameters in pheasants [12, 13] but the values of plasma chemistry parameters in partridges and chukars are still too insufficient [14, 15]. Because of that, precise and useful biochemical analyses are extremely important and needed. The activity of the digestive enzymes in

blood serum was studied in chicken using modern biochemical methods. The enzymatic activities in serum were found to be associated with the respective activities in the intestine. [16, 17].

Considering the above, the purpose of the research was to study the dynamics of age-related changes in the activity of alanine aminotransferase in the blood plasma of pheasants with the complex use of vitamins and an anti-stress drug.

Material and research methods

Experimental studies on the dynamics of age-related changes in the activity of alanine aminotransferase (ALT) in the blood plasma of pheasants with the complex use of vitamins and an anti-stress drug were carried out on pheasants, which were bred in the (incubator) vivarium of the Institute of Zoology of ANAS. In the experiment, industrial compound feed was used, which was enriched with protein and vitamin supplements, bringing the nutritional value of 100 g of dry food to: vitamins A - 15000 IU, D₃ - 1400 IU, E - 50 mg. Dairy products and chopped fish products were used for top dressing. At the same time, the daily dose of succinic acid was taken at the rate of 0.05g per 1 kg of weight, which was mixed into food or diluted in drink for 2-3 weeks in the period before and after the appearance of offspring.

The birds were divided into several groups, while the control and experimental groups of pheasants were selected according to the principle of analogue groups. When conducting experimental studies, the safety of the livestock was taken into account by daily detection of dead birds with the establishment of the causes of death, the cost of feed per unit of production. Experimental studies were carried out on 60 pheasants in the postembryonic period at the age of 1 to 90 days of age.

After taking blood from the jugular vein, the blood was collected in test tubes, centrifuged at 4000 rpm for 15 minutes, and serum was obtained, in which ALT activity. Determination of the activity of the enzyme ALT in the blood of pheasants was carried out on a Specol 1500

spectrophotometer (Analytik Jena) according to the method of R Rej., M Hoder, U.H Bergmeyer at a wavelength of 540 nm [18].

For biochemical analyzes, 0.5 ml of blood plasma was taken and placed in graduated glass tubes, 0.5 ml of substrate-buffer solution was added, placed in a test tube, heated for 5 minutes at 37°C. Next, 0.1 ml of the studied blood serum was added and incubated for 5 minutes at 37°C. Immediately after incubation, 4 ml of hydrochloric acid working solution and 0.3 ml of iodine working solution were added. Spectrophotometry was carried out in a cuvette 10 mm thick at a wavelength of 540 nm against distilled water.

The experimental digital material was subjected to statistical processing. The significance of differences between the groups was assessed using the student's t-test in accordance with the generally accepted methodology [19, 20].

Research results and discussion

To conduct experimental studies, we formed 4 groups of pheasants from 1 day to 90 days of age, 5 heads of pheasants in each group. The birds were in the same conditions of keeping with free access to drinking water and food, received the main diet, represented by factory-made feed.

In addition to the diet of birds, a complex of vitamins (A-20000 IU, D₃ - 1250 IU, E - 50 mg) and an anti-stress drug (succinic acid) at a dose of 0.01, 0.03, 0.05 g per 1 kg of body weight per day were used.

The preparations were used with food for 90 days according to the experimental scheme presented in table 1.

From the obtained experimental data, it can be seen that after adding to the diet of pheasants a complex of vitamins (A-20000 IU, D₃ - 1250 IU, E - 50 mg) and an anti-stress drug (succinic acid) at a dose of 0.01, 0.03, 0.05 g per 1 kg body weight per day, in all experimental groups there was a tendency to reduce the activity of the enzyme ALT. As a result of the experimental studies, a decrease in the activity of the enzyme ALT 2, 1.5, 1.0, 1.67, 1.17, 1.5 times was noted compared with the indicators of the control groups of pheasants (table 1).

Groups	Used drugs	Dose of antistress drug, mg/ml of body weight
1 -control	Basic ration (BR)	
2 - experienced	BR+vitamin+ antistress drug	10
3 - experienced	BR+vitamin+ antistress drug	30
4- experienced	BR+vitamin+ antistress drug	50

Table 1: Scheme of experiments on pheasants

Based on the experimental data obtained, it can be stated that when a complex of vitamins (A-20000 IU, D₃ - 1250 IU, E - 50 mg) and an anti-stress drug (succinic acid 0.05 g per 1 kg of body weight per day) are added in the diets of birds, their positive influence is noted both on the

productivity of pheasants and on the enzymatic activity of ALT. At the same time, the doses of vitamins and anti-stress drug selected by us are optimal.

Age in days	Significative	
	control	experiment
1	0.02±0.01	0.01±0.01
5	0.03±0.01	0.02±0.01
10	0.04±0.02	0.04±0.02
20	0.07±0.02	0.06±0.01
30	0.08±0.03	0.07±0.02
60	0.06±0.02	0.04±0.01

Table 1: Activity of the enzyme ALT in the blood of pheasants U/ml

From the data presented in figure 1, it can be seen that the maximum value of the ALT enzyme activity in the blood of pheasants reaches in the 30 days.

Alanine aminotransferase is mostly found in hepatocytes and is present in small amounts in muscle tissue. The activity of this enzyme in the blood indicates the destruction of tissue cells containing them and an increased release of the enzyme into the blood.

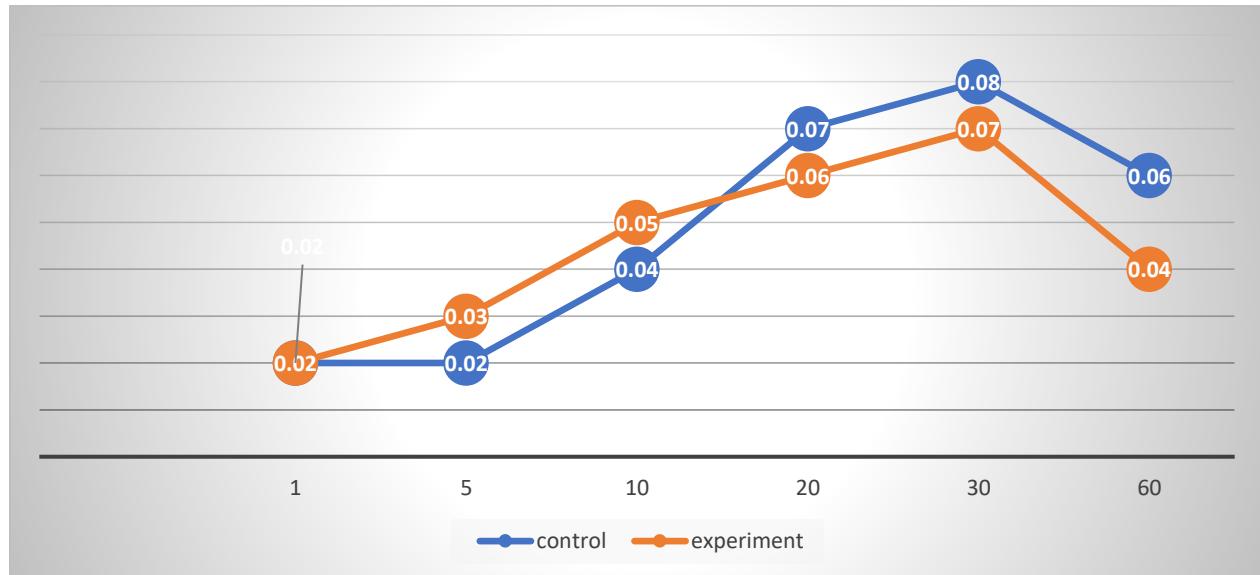


Figure 1: Activity of the enzyme ALT in the blood of pheasants

Their increase in the blood can occur long before the clinical manifestation of the pathological process. In all likelihood, the content of the enzyme in the liver and the rate of their release from cells into the blood most affect the activity of the enzyme in the blood of pheasants, which affects the productivity of birds.

Thus, a comparative analysis of the biochemical parameters of the blood serum of pheasants, identified under the conditions of repeated experimental studies, allows us to conclude that the introduction of a complex of vitamins A-20000 IU, D₃ - 1250 IU, E - 50 mg and an anti-stress drug of amber acid at a dose of 0.05 g per 1 kg of body weight per day, has a positive effect on the metabolic status of experimental groups of pheasants.

Findings

1. It was revealed that the activity of ALT in the blood serum of the experimental groups of pheasants was 2, 1.5, 1.0, 1.67, 1.17, 1.5 times less compared to the enzymatic activity of the control groups of pheasants.
2. The level of ALT activity was experimentally revealed against the background of the use of a complex of vitamins (A, D₃, E) and the anti-stress drug succinic acid, which reached up to 0.10 U/L in day-old pheasants, and the maximum value in 30-day-old pheasants was 0.07 U/L, followed by a decrease in activity to 0.04 units/l the 60-day experimental groups of pheasants.

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