

Age-Related Changes in Blood Plasma Alanine Aminotransferase in Partridges (*Alectoris Chukar*) With the Complex Use of Vitamins and an Antistress Drug

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Abstract

The article presents the results of the influence of vitamins and an anti-stress drug on the biochemical parameters of partridge blood.

In order to identify the dynamics of age-related changes in the activity of alanine aminotransferase in the blood of partridges *Alectoris chukar* with the complex use of vitamins and an antistress drug, we conducted studies on 30 partridges during the period of life from 1, 7, 10, 20, 30, 60 to 90 days.

Determination of the activity of the enzyme alanine amino transferase in the blood of partridges 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 [25].

The object of research was the venous blood of partridges. After the inclusion in the daily diet of partridges of a complex of vitamins (A-20000 IU, D₃ - 1250 IU, E - 50 mg) and an anti-stress drug (succinic acid) at a dose of 0.05 g per 1 kg of body weight per day, a tendency to improve biochemical indicators of the activity of the enzyme alanyl amino transferase. Experimentally revealed a decrease in the activity of the enzyme alanyl aminotransferase in the blood of partridges, which were 1.09, 1.17, 1.13, 1.47, 1.44, 1.37 times greater than the indicators of the latter in the control groups of partridges. The activity value of the alanyl aminotransferase enzyme ranged from 0.02 to 0.06 U/ml, with the maximum value reached at 30 days of age.

Keywords: biochemical index; enzyme; blood serum; alanyl aminotransferase; partridges; vitamins; antistress drug

Introduction

Data on the effect of a complex of vitamins and anti-stress drugs on the biochemical parameters of partridge blood was not found in the scientific literature, so the aim of the work was to find out the effect of a complex of vitamins and an anti-stress drug on age-related changes in the activity of the blood plasma alanine aminotransferase enzyme in partridges. The literature provides data on the role of enzyme systems in the regulation of growth and development, the formation of the productive qualities of poultry, including the content of aspartate aminotransferase and alanine aminotransferase in hepatocytes [1, 3]. The work of A. V. Antipov and co-authors [4] presents the results of a study of the effect of a probiotic feed additive on the body and quality indicators of quail meat. According to research results, the recommended rate of a bioproduct in the diet is 2% daily, compliance

with the daily age for 49 days. An analysis of the biochemical parameters of quail blood found that A of the experimental group was lower than the control by 1.1%, and by the amount of ALT - by 2.9%. Data are given on the effect of probiotic supplements on the body of chickens. The authors state that bio-additives stimulate the growth of birds, increase the safety of the livestock, reduce the cost of feed per unit of production, contribute to the activation and acceleration of the metabolism and energy of birds, not only in comparison with the control group, but also against the background of other probiotics. According to literature data, in a certain period of development, the rational use of biologically active additives in the diets of chickens has a positive effect on metabolic processes in the body and positively affects productivity and increases the profitability of poultry products [5,6,7,8,9, 10].

By the 45th day of the experiment, the indicators of alanine aminotransferase in the blood serum of birds of the I experimental group significantly decreased by an average of 12.4 units/l ($P<0.05$) in comparison with analogues in the control group, and by 16.9 in birds of the II experimental group units/l ($P<0.05$). The level of aspartate aminotransferase against the background of the use of the tested feed additive in quails of the I experimental group decreased by an average of 17.32 units/l compared to the control analogues. ($P<0.05$), and in II – by 15.32 units/l ($P<0.05$). These changes were within the physiological norm. Birds with a low content of immune proteins and an increased level of intracellular enzymes in the blood serum are prone to various diseases. A slight decrease in the intracellular enzymes ALT and AST in the blood serum of experimental birds indicates the absence of a negative effect of the feed additive on the body of quail. [11-15].

Indicators ALT in birds' serum of the I experimental to 45 days of the experience as compared with analogues in the control significantly dropped off by an average of 12,4 IU/L ($P<0,05$), in birds of II group – 16,9 units/l ($P<0,05$). The level of aspartate aminotransferase in the background of the test feed additive quail in the I experimental group, compared to control counterparts dropped by an average of 17,32 U/L ($P<0,05$), and the II experimental group – to 15,32 units/l ($P<0,05$). These changes were within the physiological norm. Key words: feed additive, Basulifor, immunoglobulins, young quail, intracellular enzymes, alanine aminotransferase, aspartate aminotransferase [11-15]. Transaminases belong to the class of transferase enzymes. There are two main transaminases: alanine aminotransferase and aspartate aminotransferase. The coenzymes of these enzymes are such vitamin B6 derivatives as pyridoxal phosphate and pyridox amino phosphate. A change in the activity of these enzymes occurs during pathological processes in the myocardium or liver, which are accompanied by necrosis of the tissues of these organs.

The activity of alanine aminotransferase increases most actively in liver damage. It should be said that the liver is an organ with a very large functional reserve, as well as a high ability to regenerate. Such properties of this organ can be expressed in the latent course of pathological processes in it, since symptoms begin to develop only after a significant part of the death of hepatocytes. Therefore, biochemical tests act

as a method for diagnosing latent and chronic diseases in birds. In this case, the enzymatic activity is especially important, namely, active alanine aminotransferase and aspartate aminotransferase. During the study, it was found that an increase in activity indicated the development of protein dystrophy (which is usually associated with the use of high-calorie feed) in chickens. Determination of the activity of these enzymes in veterinary practice makes it possible to control therapy for the correction of hepatitis in birds. Normalization of the activity of these enzymes can be corrected by the introduction of preparations containing vitamin E, alpha-tocopherol, carnitine [16-17].

Thus, in the literature available to us, we did not find information about age-related changes in blood plasma alanine aminotransferase in partridges with the complex use of vitamins and an anti-stress drug. Given the above, the aim of the research was to identify the dynamics of age-related changes in aspartate aminotransferase in the blood of pheasants with the complex use of vitamins and an anti-stress drug.

Material and Methods

The control and experimental groups of pheasants were selected according to the principle of analogue groups. During the experimental period, the following was taken into account: the safety of the livestock - by daily detection of dead birds with the establishment of the causes of death, the cost of feed per unit of production. All experiments were repeated and ended with a production check. Studies were carried out in the blood of 60 pheasants in the postembryonic period at the age of 1 to 60 days of age. Determination of the activity of the enzyme alanine amino transferase in the blood of partridges 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 [25]. The significance of differences between groups was assessed taking into account Student's t-test in accordance with the generally accepted methodology [26].

Results and Discussion

The studies were carried out on 60 partridges from 1-90 days of age. The birds were divided into 4 groups of 5 animals in each group. The birds were kept in the vivarium and received the main diet, represented

by factory-made compound feed with free access to drinking water. 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 added to the diet of the experimental groups of partridges. The preparations were used with food for 90 days according to the experimental scheme presented in Table. 1.

Table 1: Scheme of experiments on pheasants

Groups	Used drugs	Dose of antistress drug, g/kg of body weight
1 - control	Basic ration (BR)	
2 - experienced	BR+ vitamin + antistress a drug	0.01
3 - experienced	BR+ vitamin + antistress a drug	0,03
4- experienced	BR+ vitamin + antistress a drug	0,05

Table 2 shows the dynamics of the population of partridges of the control and experienced groups. From the data presented in Table 2, it can be seen that when a vitamin complex and an anti-stress drug

are added to the diet of the experimental groups of partridges, there is a slight fluctuation in the number of both the control groups of partridges and the experimental groups.

Table 2: Dynamics of the number of partridges for the period of the experiment

Age in days	Groups			
	Number of partridges			
	Control I	experimental	II experimental	III experimental
1	10	10	10	10
7	9	10	10	10
20	9	10	10	10
30	8	9	10	10
60	8	9	9	10
90	7	8	9	9
Safety in %	85.0	93.3	96.7	98.3

From the obtained experimental data, it can be seen that after adding 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 body weight per day, in all experimental groups there was a tendency to increase the survival of partridges from 85.0% to 98.3%. An improvement in biochemical parameters, including the activity of the alanyl amino-transferase enzyme, was experimentally revealed. Revealed a decrease in the activity of the enzyme alanyl amino transferase 1.09, 1.17, 1.13, 1.47, 1.44, 1.37 times compared

with the indicators of the control groups of partridges (table 1). Thus, it must be stated that the data obtained from experimental studies indicate 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) are added to the diet of birds per 1 kg of body weight per day, their positive effect is noted both on the productivity of pheasants and on the enzymatic activity of alanyl aminotransferase, and at the same time, the selected doses of vitamins and an antistress drug are optimal.

Table 3: The activity of the enzyme alanyl amino transferase in the blood of partridges, U/ml

Age in days	Index	
	control	experience
1	0.12±0.01	0.11±0.01
5	0.14±0.01	0.12±0.01
10	0.17±0.02	0.15±0.02
20	0.28±0.02	0.19±0.01
30	0.39±0.03	0.27±0.02
60	0.26±0.02	0.19±0.01

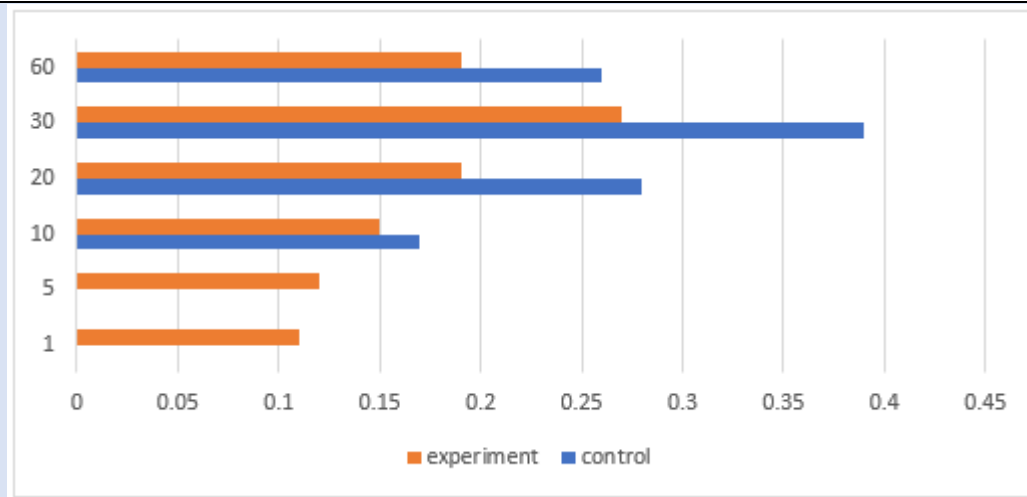


Figure 1: The activity of the enzyme alanyl aminotransferase in the blood of partridges

The above comparative analysis of biochemical parameters indicates a positive effect of a complex of vitamins and an anti-stress drug on the functional activity of the liver. The activity of the alanyl aminotransferase enzyme in the blood of partridges indicates the destruction of tissue cells containing them and an increased release of this enzyme into the blood. An increase in the activity of alanyl aminotransferase in the blood of partridges is possible before the clinical manifestation of the pathological process. It should be noted that 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 partridges, which also affects their survival. Thus, based on the above, according to a comparative analysis of the biochemical parameters of the blood serum of partridges, 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), the latter have a positive effect on survival and on the metabolic rate in all experimental groups of partridges.

Findings

1. Revealed a decrease in the activity of the enzyme alanyl aminotransferase 1.09, 1.17, 1.13, 1.47, 1.44, 1.37 times compared with the indicators of the control groups of partridges
2. The level of alanyl aminotransferase against the background of the use of a complex of vitamins (A-20000 IU, D3 - 1250 IU, E - 50 mg) and the anti-stress preparation of succinic acid at a dose of 0.05 g per 1 kg of body weight per day

decreased by an average of 0.01 u/l in each test group, compared with control groups.

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