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EFFECT OF WHEY POWDER ON THE PHYSIOLOGICAL-BIOCHEMICAL STABILITY IN BROILER CHICKEN

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Abstract
This article studies the effect of adding whey powder (WPP) to the diet of broiler chickens during the growth period on physiological and biochemical parameters. The results of the study showed that the diet with WPP increases the total protein content in the blood of broiler chickens and activates metabolic processes, which ensures the physiological stability of the body.

Keywords: Whey powder, broiler chickens, physiological stability, biochemical parameters, protein metabolism, liver enzymes, metabolic balance, growth rate, stress resistance.

Introduction

Аннотация
В данной статье изучается влияние добавления сухого молочного порошка (СМП) в рацион бройлерных цыплят в период роста на физиологические и биохимические показатели. Результаты исследования показали, что рацион с СМП увеличивает общее содержание белка в крови бройлерных цыплят и активизирует обменные процессы, что обеспечивает физиологическую стабильность организма.

Ключевые слова: сухой молочный порошок, бройлерные цыплята, физиологическая стабильность, биохимические показатели, белковый обмен, ферменты печени, метаболический баланс, темпы роста, стрессоустойчивость.

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Annotatsiya

Ushbu maqolada broyler jo‘jalarining o‘sish davrida ratsionga sut zardobi kukuni (SZK) qo‘shilishining fiziologik-biokimyoviy ko‘rsatkichlarga ta’siri o‘rganilgan. Tadqiqot natijalari shuni ko‘rsatdiki, SZK qo‘shilgan parhez broyler jo‘jalari qonidagi umumiy oqsil miqdorini oshirib, almashinuv jarayonlarini faollashtiradi, bu esa organizmning fiziologik barqarorligini ta’minlaydi.

Kalit so‘zlar: sut zardobi kukuni, broyler jo‘jalari, fiziologik barqarorlik, biokimyoviy ko‘rsatkichlar, oqsil almashinuvi, jigar fermentlari, metabolik muvozanat, o‘sish sur’ati, stressga chidamlilik.

Introduction

In recent years, the use of natural sources of high biological value in the poultry industry has been the focus of global scientific research. In particular, the trend of using biologically active additives to increase the growth rate of broiler chickens, ensure their physiological stability and increase their resistance to stress is increasing [1].

Whey powder (WPP) is a high biological value, protein-rich component obtained during the processing of natural dairy products. It contains a balanced complex of lactalbumin, lactoferrin, immunoglobulins, amino acids, B vitamins and minerals, which activate metabolic processes in the animal's body. WPP, through its rapidly absorbed protein properties and bioactive peptides, stimulates anabolic processes in the body, which is an important factor in increasing the growth rate of broiler chickens [2].

In recent years, the Republic of Uzbekistan has been carrying out extensive scientific and practical work to make poultry products export-oriented, provide the domestic consumer market with high-quality animal protein, and develop import-substituting food sources. This process is also reflected in the “New Uzbekistan – 2030” strategy, which sets the task of introducing innovative technologies in agriculture, including expanding the use of biologically active substances in livestock [7]. In this regard, studying the effect of whey powder on the physiological and biochemical stability of broiler chickens will not only increase the efficiency of poultry farming, but also form the scientific basis for the production of environmentally friendly, healthy and high-quality poultry meat. The relevance of this study is that whey powder, when added to the diet,

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improves the metabolic balance of chicks, optimizes blood biochemical parameters, and activates natural defense mechanisms against physiological stress conditions [4].

Main part

The physiological and biochemical balance of the body during the growth of broiler chicks is directly dependent on the quality of their feed, especially protein sources. Proteins are the main plastic material in the animal's body that ensures the growth and repair of tissues. Therefore, the use of additives that improve the quality of protein in the diet of broilers has a significant impact on their overall health and production efficiency.

Whey powder has a high digestibility coefficient compared to other protein sources. It contains such rapidly absorbed proteins as lactalbumin and β-lactoglobulin, which ensure the rapid entry of amino acids into the blood plasma and their delivery to muscle tissue. In addition, lactoferrin contained in SZK activates the immune system, has antioxidant and antibacterial properties, and reduces the negative effects of stress factors [5].

Experimental results show that a diet supplemented with SZK positively changes the growth rate, feed conversion efficiency and blood biochemical parameters of broilers. Such changes ensure metabolic stability and contribute to the harmonious functioning of physiological systems [3]. One of the main advantages of whey powder is that it improves the assimilation of other protein sources present in the diet. At the same time, the optimal ratio of amino acids (lysine, methionine, threonine, valine) contained in SZK stimulates protein synthesis and coordinates energy metabolism in tissues. Therefore, it was scientifically hypothesized that the addition of SZK to the broiler diet in the range of 40–80 mg/kg would give optimal results.

Methodology

The study was conducted in the poultry laboratory of the Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology for 42 days. 100 one-year-old broiler chicks of the “Cobb-500” cross were selected for the experiment. The chicks were divided into 4 equal groups:

Group 1 – control (no SZK added),

Group 2 – 40 mg/kg SZK,

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Group 3 – 60 mg/kg SZK added to the diet,
Group 4 – 80 mg/kg SZK added to the diet.
The chicks were fed a basic compound feed made from soybean meal, corn and fish meal. The necessary vitamin and mineral premixes were also added to the diet. The chicks in each group were given feed and drinking water continuously, that is, without restriction (ad libitum).
For biochemical analyses, 5 chicks from each group were selected and blood samples were taken from the brachial vein. Total protein (biuretic method), albumin (bromcresol-green reagent), glucose (glucooxidase-peroxidase method), cholesterol and triglycerides (enzymatic colorimetric method) were determined in blood plasma, and enzyme activity (AST, ALT) analyses were performed.
As physiological parameters, heart rate, respiratory rate and body temperature were recorded every 14 days using the "VetTest 8008" device. Statistical analysis was performed using the "Statistica 10.0" program, with a reliability criterion of $P \leq 0.05$.

Analysis and discussion

Analysis of the study results showed that significant differences were observed in physiological and biochemical parameters between the groups supplemented with SZK. In particular, in group 3 (60 mg/kg SZK), the total blood protein content increased by 9.3% compared to the control, and the albumin level by 6.5%. This indicates the activation of protein metabolism [8].
The levels of AST and ALT, determined by the activity of liver enzymes, remained within the normal range in the groups supplemented with SZK and were 8–10% lower than the control. This indicates an improvement in detoxification processes in liver cells [9].
The glucose content in the control group was 4.72 mmol/l, while in group 3 it increased to 5.05 mmol/l, which indicates the creation of optimal conditions for energy metabolism. At the same time, the decrease in cholesterol and triglyceride levels indicated that fat metabolism was stable [10].
As a result of the analysis of physiological parameters, it was found that in the groups supplemented with SZK, the heart rate was 3–4 beats/min lower, and the respiratory rate was stable. Body temperature was 41.9°C in the control group, while in group 3 it was 41.6°C. Such small differences indicate the stability of the body's heat exchange system and an increased level of stress resistance [6].

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The overall analysis of the results confirmed that the use of SZK in optimal doses (especially 60 mg/kg) maintained metabolic balance in broiler chickens and stabilized the activity of physiological systems. This also had a positive effect on the growth rate and body mass gain of chickens.

Result

The addition of whey powder in the diet at a dose of 60 mg/kg increases the total protein and albumin levels of broiler chickens, activates protein synthesis and metabolism.

1. The decrease in the activity of liver enzymes (AST, ALT) indicates improved detoxification processes.
2. Glucose and lipid parameters are maintained within the normal range, and energy metabolism is effective.
3. The presence of heart rate, body temperature and respiratory rate within the normal range confirms physiological stability.
4. Optimal doses of SZK (60 mg/kg) provide physiological and biochemical stability in broiler chickens, which serves as a scientific basis for improving productivity and meat quality.

CONCLUSION

Whey powder is of great scientific and practical importance in poultry farming as an environmentally friendly, high biological value protein source. Experiments have shown that adding Whey powder to the diet in an amount of 60 mg/kg strengthens the physiological and biochemical stability of broiler chickens, activates protein metabolism processes, supports the immune system, and improves liver function. This can be recommended as an effective way to increase the growth rate and productivity of broiler chickens.

The results of this study create a scientific basis for the development of environmentally safe biological additives processed from domestic dairy industry waste, which can replace imports in poultry farming.

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