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EVALUATION OF MINERAL METABOLISM IN BROILER CHICKS FED WITH CHITOSAN AND WHEY POWDER

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Abstract:

Great attention is paid to the development of poultry farming in our republic. Today, as in all countries, the development of poultry farming is considered an important factor in ensuring food security, and the industry plays an invaluable role in providing the population with poultry meat and egg products rich in protein and vitamins. The dry and warm climate of Uzbekistan is favorable for keeping and raising poultry.

Keywords: Chitosan, chitin, whey powder, calcium, phosphorus, broiler, poultry.

Introduction

The effectiveness of using chitosan in feeding broiler chickens has been studied. At the end of the experiment, an increase of 6.83% in the live weight of chickens compared to the control group was observed. The average daily growth rate improved. To enhance the fattening quality of broiler chickens, the author suggested giving chitosan from day 1 to 5, from day 20 to 25, and from day 35 to 42. Along with the increase in productivity traits, the immunity indicators of broilers also improved [5,6,7,11,12,13].

The possibility of including whey or its processed products in poultry diets has also been widely studied abroad. It is permissible to include 5–20% dairy waste obtained from cheese production, 2–10% concentrated whey, and 2–5% dry whey powder in poultry feed [1,2,3,4,14].

Materials and Methods

For the experiment, four groups of Cobb cross chicks, each consisting of 25 heads, were formed. The keeping and feeding conditions of all experimental groups were identical. The feed additive containing chitosan and whey powder removes mycotoxins and heavy metals from the organism, reduces their content in poultry products, and improves feed digestibility. As a result, poultry productivity increases.

The chemical composition of feed and feces was determined by standard zootechnical analysis methods. The digestibility and utilization of feed were studied during the experiment [8,9,10]. Calcium was determined by the colorimetric method, and phosphorus by the same colorimetric method.

Results and Discussion

Feed formulations and compound feed compositions with high sorption properties were developed to bind mycotoxins and heavy metal salts. During the experiments, the optimal doses of sorbents, including chitosan and whey powder, were correctly selected.

Based on this, the metabolism balance of calcium and phosphorus in the body of broilers was studied.

In broiler meat production, the increase in muscle tissue growth was accompanied by accelerated bone tissue formation. This should be considered, as the achievements of genetics have made it possible to reach rapid growth and development of modern broiler crosses in a short rearing period. The mineral metabolism status in the body of poultry was evaluated by studying the balance of calcium and phosphorus (Table 1).

Table 1. Average daily balance of calcium and phosphorus

Indicator	Groups			
	Control	I Experimental	II Experimental	III Experimental
Calcium				
Feed intake, g	4.15 ± 0.10	4.25 ± 0.12	4.37 ± 0.15	4.48 ± 0.14*
Excreted with feces, g	2.83 ± 0.07	2.72 ± 0.09*	2.73 ± 0.09*	2.66 ± 0.04*
Absorbed, g	1.32 ± 0.06	1.53 ± 0.03**	1.64 ± 0.04***	1.82 ± 0.11**
Calcium utilization, %	39.24 ± 0.99	44.27 ± 0.65***	44.50 ± 0.87***	47.15 ± 0.99**
Phosphorus				
Feed intake, g	2.84 ± 0.53	3.26 ± 0.47	3.29 ± 0.47	3.39 ± 0.45
Excreted with feces, g	1.63 ± 0.42	1.74 ± 0.25	1.77 ± 0.27	1.71 ± 0.25
Absorbed, g	1.01 ± 0.39	1.32 ± 0.49	1.32 ± 0.52	1.48 ± 0.49*
Phosphorus utilization, %	39.62 ± 4.34	42.86 ± 5.64	43.54 ± 7.45	45.96 ± 5.48*

Note: * – $p < 0.05$; ** – $p < 0.01$; *** – $p < 0.001$.

Thus, chitosan and whey powder positively affect calcium and phosphorus metabolism in the body of Cobb broilers.

Conclusion

1. The experimental groups of chickens consumed 4.4–7.56% more calcium. The highest calcium excretion with feces was observed in the control group. The percentage of calcium utilization in the experimental groups was 4.93–7.61% higher than that of the control group ($p<0.01–0.001$).
2. Phosphorus consumption from compound feed was higher in the groups of chicks fed with chitosan and whey powder. Under the influence of the preparations, increased phosphorus absorption by the poultry body was observed, leading to a 3.04–6.54% increase in the rate of phosphorus utilization.

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