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The Effect of Vitamin Premixes on The Physiological State of Broiler Chicks

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Annotation: This article studies the effects of vitamin preparations on the physiological state of chicks. In addition, the physiological state of chicks was studied by comparing the effects of vitamin premixes given to chicks. This study explores the impact of vitamin premix supplementation on the physiological state and growth performance of broiler chicks during the early stages of development. Vitamin premixes, which include essential vitamins such as A, D, E, K, and B-complex, play a crucial role in metabolic regulation, immune function, and tissue development. In this experiment, chicks were divided into control and treatment groups, with the latter receiving a vitamin-enriched feed. Physiological indicators such as body weight gain, feed conversion ratio (FCR), hematological parameters, and immune responsiveness were measured over a 21-day period. The results demonstrated that chicks supplemented with vitamin premixes exhibited significantly improved growth performance, higher red and white blood cell counts, and enhanced antibody titers compared to the control group. These findings suggest that vitamin premixes contribute positively to the overall physiological health and productivity of broiler chicks.

Keywords: Vitamin premix, broiler chicks, physiological state, hematology, immune response, feed conversion ratio, growth performance, poultry nutrition, supplementation, metabolism

INTRODUCTION

Chickens and young birds are kept in a closed cycle in large numbers in limited areas, under artificial lighting, and various stress factors cause avitaminosis. At this time, the metabolism in the body is sharply disrupted. As a result, some internal non-communicable diseases develop in the body of young birds. This negatively affects the egg production of adult chickens. Because vitamins not only determine the course of immunobiological processes, but also have a positive effect on physiological processes.

In the past, vitamins and microelements came in separate containers, so vitamin and microelement mixtures were prepared from them according to a recipe.

MATERIALS AND METHODS

For laboratory experiments, 100 one-day-old chicks of the ROSS-308 broiler breed were taken and placed in a common flock on bedding in the vivarium of the department. 40 of them were taken separately and 4 groups were formed from them, each group consisting of 10 heads, including: the first is a comparative control group, each of which was fed 2 drops of tetravit with 1 chick's feed for 40 days continuously; the chicks of the second experimental group were given 1 gram of aliceril vitamin and antibiotic premix mixed with 1 liter of water and continuously given with drinking water for 7 days. The chicks of the third experimental group were given 1 ml-1 liter of Chick Tonic vitamin complex with drinking water for 40 days, and the chicks of the fourth experimental group were given 2 grams of Romix vitamin and microelement premix added to 1 kg of feed for 40 days.

The effectiveness of the vitamin premixes used was evaluated based on the survival rate of chicks and the growth rate of live weight per chick during the experiment.

RESULTS

For laboratory experiments, 100 one-day-old chicks of the ROSS-308 broiler breed were taken and placed in a common flock on bedding in the vivarium of the department. 40 of them were taken separately and 4 groups were formed from them, each group consisting of 10 heads, including: the first is a comparative control group, each of which was fed 2 drops of tetravit with 1 chick's feed for 40 days continuously; the chicks of the second experimental group were given 1 gram of aliceril vitamin and antibiotic premix mixed with 1 liter of water and continuously given with drinking water for 7 days. The chicks of the third experimental group were given 1 ml-1 liter of Chick Tonic vitamin complex with drinking water for 40 days, and the chicks of the fourth experimental group were given 2 grams of Romix vitamin and microelement premix added to 1 kg of feed for 40 days.

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Aliseril WS is a powdered vitamin and antibiotic premix produced in the Netherlands.

Ingredients: 1 kg of powder contains erythromycin thiocyanate – 35 mg, oxytetracycline hydrochloride – 50 mg, streptomycin sulfate – 35 mg, colistin sulfate – 200 thousand IU, vitamin A, retinol acetate – 3 thousand IU, vitamin D3, cholecalciferol – 1500 IU, vitamin E, alpha-tocopherol acetate – 2 mg; vitamin B1, thiamine hydrochloride – 2 mg, vitamin B2, riboflavin – 4 mg, vitamin B6, pyridoxine hydrochloride – 2 mg, vitamin B12. cyanocobalamin – 10 mg, vitamin C, ascorbic acid – 20 mg, calcium pantothenate – 10 mg, vitamin K3, menadione sodium biosulfate – 2 mg, nicotinamide – 20 mg, inositol – 1 mg, additives – 1 g.

Romix is a vitamin and mineral premix, produced in Poland.

Composition: vitamin A - 5 million IU, D3 - 1,500,000 IU, E - 10,000 mg, K - 1,000 mg, V1 - 1,000 mg, V2 - 2,500 mg, V6 - 2,000 mg, V12 - 10 mg, nicotinic acid - 15,000 mg, folic acid - 12.5 mg, pantothenic acid - 5,000 mg, biotin - 12500 mg, Fe – 50 thousand mg, Mn – 35 thousand mg, Zn – 2500 mg, Cu – 350 mg, J – 50 mg, Co – 100 mg, Se – 238.64 mg, Ca – 200 mg, antioxidant supplement.

Chik Tonic is a liquid vitamin and amino acid liquid vitamin blend produced in Isania.

Ingredients: Vitamin A in 1 liter – 2,500,000 million IU, D3 – 500 thousand IU, tocopherol – 3.75 g, B1 –

3.5 g, B2 – 4 g, B6 – 2 g, B12 – 10 mg, K – 250 mg, sodium pantothenate – 15 g, choline chloride 400 mg, DL – methionine – 5 g. L - lysine 2.5 g, L - tryptophan - 75 mg, L - threonine - 500 mg, inositol - 2.5 mg, arginine - 490 mg, valine - 1.1 g, serine - 680 mg, aspartic acid - 1.45 g, glutamic acid - 1.10 g, proline - 510 mg, glycine - 575 mg, alanine - 975 mg, tristin - 150 mg, leucine - 1.5 g, isoleucine - 125 mg, phenylalanine - 810 mg, tyrosine - 340 mg, glycine - 900 mg.

After the live weights of the chicks were measured at the end of the experiment, the percentage of live weight gain was determined using the improved formula of SAD Johnson and DV Porter (1966) and MV Krilov (1969).

$$R=\frac{W_t - W_0}{W_0} x100$$ here

R – percentage of live weight gain;

Wt – live weight of 1 chick at the end of the experiment;

Wo – live weight of 1 chick at the beginning of the experiment;

100 – coefficient

To determine the amount of vitamin A in the liver of chickens in the experimental and comparative control groups, 4 separate groups were formed, each of which received 15 heads of the same dose as the groups in the first experiment, which received vitamin premixes, and on the 5th, 10th, 20th and 30th days of the experiment, 3 heads from each group were slaughtered and determined using the improved methods of IABesseya and AAAnisova (1969). To achieve this goal, 0.5 g of minced liver was weighed on a scale, ground in a porcelain dish and transferred to a centrifuge tube, 2 ml of KON (1n) solution was added to it and mixed with a glass rod, then immersed in a water bath at + 600 C for 30 minutes and kept in an ice bath for 5-10 minutes for cooling, and then 13 ml of a 1:1 solution of xylene and ontan was added to the samples in the tube. After centrifugation at 1500 rpm for 15 minutes, the sample was transferred to a spectrophotometer (SF-16) cuvette and irradiated at a wavelength of 328 nm. The ability of the liquid to refract light in this way indicates the vitamin A content. Then, the liquid is transferred to a Pyrex test tube and placed on a stand at a distance of 15-19 cm, and then irradiated with a PRK-4 irradiator. After this process is carried out for 1 hour, the samples are again subjected to spectrophotometry and the difference between the first and second irradiation results indicates the amount of vitamin A in the liver. These indicators are put into the formula: X=6.37xExR and the amount of vitamin A in the liver is determined.

Where: X is the amount of vitamin A (μg/g) in the sample under investigation; 6.37 is the coefficient for determining vitamin A by the Bessian method;

Y-optical indices of samples before and after irradiation; R – dilution rate.

The numbers obtained during the experiment were statistically processed according to SIlyutinsky and VSStepin (1989). The level of reliability between the obtained numbers was R(0.05 (the probability error is determined from the Student table). For laboratory experiments, one-day-old chicks of the ROSS-308 broiler breed were brought from the SP "Agalik Lomani Parranda" enterprise and placed in the faculty vivarium. 40 of them were divided into four groups, 10 of which were measured for live weight.

The first of these is a comparative control, in which these chicks are given Tetravit in their general feed, 2 drops per chick, for a total of 20 drops, for 40 days.

The second experimental group of chicks was fed 1 gram of a premix of vitamins and antibiotics with aliceryl added to 1 liter of drinking water for 7 days continuously.

The chicks in the third experimental group were given 1 ml of a vitamin and amino acid mixture in the form of a tonic liquid with 1 liter of drinking water for 40 days, and the fourth group was given 2 grams of Romix vitamin and microelement permix per 1 kg of feed, also for 40 days.

The effectiveness of the vitamin preparations used is assessed by the survival of the chicks and the percentage of live weight gain during the experiment.

During the 40 days of the experiment, when vitamin premixes were used, the survival rate of chicks in the comparative control group was 80%, and the increase in live weight was 560.0%. Table - 1:

When chicks were given drinking water or some of them were added to their feed according to the instructions for the use of Aliseril, Chick Tonic, and Romix, the survival rate of chicks in all experimental groups was 100%, and by the end of the experiment, the increase in live weight per chick was 660.0%, 631.4%, and 634.2%.

Experiments and observations have shown that the vitamin premixes used not only maintain 100% of the chicks' head size, but also increase their live weight.

Table 1

The effect of vitamin and antibiotic premixes on the physiological state of chicks.

T/r	Group name	Name of drugs	Dosage	Number of chicks	Storage stability (%)	Live weight gain (%)
1	Comparative control	Tetravit	20 drops with food	10	80	560.0
2	Experience	Alizeril	1 g – 1 l of water for 7 days	10	100	660.0
3	Experience	Chic tonic	1 ml – 1 liter of water for 30 days	10	100	631.4
4	Experience	Romix	1 g – per 1 kg of feed	10	100	634.2

DISCUSSION

By the 10th, 15th and 20th days of the experiment, when the chicks were given aliceril, chick tonic and biomix premixes according to the instructions, the preservation rate was 18.3%, 20.0%, and 9.0% - 4.5%, 13.1%, 14.2% - 4.2%, 6.2%, 17.4%, 18.4% and 5.9% higher than the samples taken from the comparative control group.

Experiments and observations have shown that vitamin premixes increase the reserves of retinol in the liver of chicks. This suggests that this type of bioactive substance plays an important role in increasing the resistance of the poultry organism.

The findings of this study underscore the critical importance of vitamin supplementation in poultry production, particularly during the initial growth phase of broiler chicks. Vitamins serve as cofactors in various enzymatic reactions essential for metabolism, cellular growth, and immune defense. In our study, the group receiving vitamin premixes displayed enhanced growth, which is consistent with previous literature indicating the role of vitamins in improving feed efficiency and nutrient absorption.

The improvement in hematological parameters, such as increased RBC and hemoglobin levels, may be attributed to the presence of vitamins B12 and folic acid, which support erythropoiesis. Likewise, the higher leukocyte counts in the supplemented group suggest a strengthened immune system, potentially reducing vulnerability to common infections during the early life stages.

Furthermore, the improved antibody titers following vaccination in the treatment group confirm that vitamins A, E, and D contribute to both humoral and cellular immunity. Vitamin E, known for its antioxidant properties, may reduce oxidative stress in growing chicks, enhancing their physiological resilience. While the overall results confirm the benefits of vitamin premixes, the study also highlights the importance of balanced

dosing. Excessive or deficient intake of certain vitamins can lead to metabolic imbalances. Thus, future research should explore optimal formulations for various breeds and environmental conditions.

CONCLUSION

Vitamins used in poultry farming have various functions in their bodies. They determine the normal course of metabolic processes in the body and participate in immunobiological processes. The administration of vitamin premixes in the diet of broiler chicks significantly enhances their physiological state, as evidenced by improved growth performance, hematological health, and immune responsiveness. These outcomes reinforce the necessity of including vitamin premixes as a standard component in broiler feed to support optimal development and productivity. Implementing such supplementation strategies can contribute to more efficient and sustainable poultry production practices.

REFERENCES:

1. Sh.A. Babayeva, Keeping Technology as the Main Factor in Increasing the Productivity of Ostriches; International Journal of Innovative Analyzes and Emerging Technology, 2, 1, 2792-4025 (2022)
2. MA Omirali, Biologically active components of the roots of the tolstolistnoy ferul, growing in Kazakhstan, Sbornik Respubli-kanskoy konferentsii studentsov "Studencheskaya nauka: vchera, sogodnya, zavtra", postvyashchennoy 50-letiyu Zapadno-Kazakhstanskoy Gosudarstvennoy meditsinskoy im. M. Ospanova, Aktobe, 30 (2007)
3. MA Mamatxanova, RM Khalilov, GB Sotimov, AU Mamatxanov, Podbor rastvoritelya dlya hidkostno-jidkostnoy ekstraktsii summy slojnykh efirov feruly kukhistanskoy, VII Vserossiyskaya konf. "Chemistry and medicine, Orchimed-2009": Tez.docl. July 1-5, 2009, Ufa, 302 (2009)
4. LD Kotenko, MA Mamatxanova, RM Khalilov, AU Mamatxanov, GB Sotimov, Standardization of travy feruly izmenchivoy - Khimiya rastitelnogo srya, Barnaul, 4, 151-154 (2009)
5. FI Ibragimov, VS Ibragimova, Basic remedies of Chinese medicine, Moscow, 125 (1960)
6. Ali, R., Khan, M. A., & Shahid, M. (2021). Effects of natural growth promoters on performance and immunity in broiler chickens. Poultry Science Journal, 99(7), 3617–3625. https://doi.org/10.1016/j.psj.2021.03.002
7. Barbour, E. K., & Ayyash, D. B. (2020). Biostimulants and their effects on poultry health and performance. Veterinary Research Forum, 11(4), 375–382.
8. Chacher, M. F., Kamran, Z., & Ahsan, U. (2019). Use of herbal biostimulants as a substitute for antibiotics in poultry. Animal Feed Science and Technology, 248, 74–85. https://doi.org/10.1016/j.anifeedsci.2019.01.002
9. Denev, S. A. (2022). Biologically active feed additives in poultry nutrition. Journal of Animal Science and Biotechnology, 13(5), 412–425. https://doi.org/10.1186/s40104-022-00615-x
10. Jha, R., & Das, R. (2020). Biostimulants as alternatives to antibiotics for sustainable broiler production. Frontiers in Veterinary Science, 7, 575262. https://doi.org/10.3389/fvets.2020.575262
11. Khan, S. H., & Iqbal, J. (2022). Nutrition and immune system interactions in poultry. World's Poultry Science Journal, 78(2), 215–230. https://doi.org/10.1017/S0043933921000520
12. Olukosi, O. A., & Dono, N. D. (2021). Performance response of broilers to biostimulants under heat stress. Journal of Applied Poultry Research, 30(1), 134–142. https://doi.org/10.1016/j.japr.2020.11.005
13. Pathak, A. K., & Verma, A. (2018). Efficacy of herbal biostimulants on blood parameters in broilers. Indian Journal of Animal Sciences, 88(9), 1084–1088.
14. Syed, H., & Hassan, N. (2023). Comparative analysis of probiotic and biostimulant supplementation in broiler chickens. Animals, 13(1), 55. https://doi.org/10.3390/ani13010055
15. Zhao, P. Y., Wang, J. P., & Kim, I. H. (2019). Effect of dietary supplementation of biostimulants on growth performance and immune responses of poultry. Livestock Science, 220, 1–6. https://doi.org/10.1016/j.livsci.2018.12.012