The use of Vitatonik feed additives and Bio-S3 probiotic on the productivity and resistance of laying hens


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Abstract. The experiments were carried out on chickens of 26-28 weeks of age of the Lohmann Brown-Classic breed. The chickens of the control group were given compound feed used on the farm. Chickens of the 1st experimental group were given an additional 12 g of monocalcium phosphate per 1 kg of compound feed and fed the Vitatonik feed additive with water at a dose of 1 ml per 1 liter of water for 5 days with a break of 10 days. Chickens of the 2nd experimental group were given the probiotic Bio-3S at a dose of 1 g/kg of feed in addition to prophylactic agents of the 1st experimental group. The best results were obtained in chickens of the second experimental group, in which, compared with the control group, an increase in the level of hemoglobin in the blood by 6.8 g/l, glucose by 0.56 mmol/l, in the blood serum of total protein by 1.0 g/l. The content of retinol in the egg yolk of hens of the second experimental group increased by an average of 1.34 µg/g compared to the control group during the experiments, carotenoids by 4.0 µg/g. The proposed method of group prevention had a positive effect on the indicators of the body's resistance. In chickens of the 2nd experimental group, the indicators of BABS increased by 3.18%, LABS by 1.98%, PABN by 1.02% compared with the initial data, and in chickens of the control group, no noticeable changes were observed in terms of natural resistance.

1 Introduction

In the poultry farms of Uzbekistan, among chickens of egg breeds, diseases with a violation of vitamin and mineral metabolism are often noted, which in most cases occur sub clinically and chronically. The normal course of metabolism, characteristic of each physiological state of the body, depends on the level of feeding and maintenance [1-2,13]. Only with the optimal provision of the bird's body with all the necessary nutrients (proteins, carbohydrates and lipids), as well as vitamins and minerals, can we expect high productivity. The development of effective methods for the prevention of metabolic disorders contribute to an increase in the productivity and safety of the chicken population.

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An unbalanced diet of laying hens leads to a decrease in the level of natural resistance of the body, a decrease in egg production, hatchability and a weakening of the viability of chickens. Especially often in the conditions of industrial poultry farming there is a lack of vitamins A, D and E. Therefore, the problem of vitamin and mineral provision of animals and birds is currently very relevant [3-7].

However, the influence of nutritional factors in the etiology of hypovitaminosis in egg-laying hens in poultry farms. Uzbekistan and effective methods of preventive measures for this pathology have not been sufficiently studied. The impact of vitamin-mineral premixes and probiotics by adding to the composition of granular feed for the prevention of hypovitaminosis in chickens has not been sufficiently considered. The purpose of our research was to study the effect of Vitatonik feed additives and Bio-S3 probiotic on the productivity and resistance of the chicken organism.

2 Materials and Methods

Scientific research work was carried out at the poultry farm of the farm "K. Eldor" of the Pastdargam district. Laboratory studies were carried out at the Department of Internal Non-Contagious Diseases of the Samarkand State University of VMLB. The studies were carried out on laying hens of the Lohmann Brown-Classic cross-country according to the principle of analogues, taking into account breed, age and body weight. The conditions of feeding and maintenance of laying hens were analyzed. Scientific and economic experiments were carried out to study the effect of the Vitatonik feed additive and the probiotic Bio-3 S on the body of laying hens in different periods of egg production.

In the farm "K. Eldor" 30 heads of 26 week old hens of the Lohmann Brown Classic breed were selected, followed by their division into 3 groups of 10 hens each. The conditions for keeping the birds were the same. Chickens of the control group were given granulated feed used in the household. The chickens of the first experimental group were given granulated mixed fodder of the household diet with the addition of 12 g of monocalcium phosphate per 1 kg of mixed fodder and were fed Vitatonik feed additive (manufactured by O.L. KAR., Ukraine) with water at a dose of 1 ml per 1 liter of water for 5 days with a break of 10 days. Chickens of the second experimental group were given granulated compound feed of the household diet with the addition of 12 g of monocalcium phosphate, 1 g of the probiotic Bio-3S per 1 kg of compound feed, and the Vitatonik feed additive was fed with water at the rate of 1 ml per 1 liter of water for 5 days with a break of 10 days. The duration of the experiments was 60 days.

The level of hemoglobin in the blood of chickens was determined by the hemoglobin-cyanide method (with acetone cyanohydrin), glucose (by color reaction with ortho-toluidine), total protein based on the biuret reaction and the “total protein” reagent on a SYNCHRON CX4 PRO biochemical analyzer from Beckman Coucter (USA). The bactericidal activity of blood serum was determined by P.A. Emelianenko (1980) using a test culture of Staphylococcus aureus. Lysozyme activity of blood serum was determined according to V.G. Dorofeychuk. A daily culture of Micrococcus Lysodeicticus grown on MPA was used as an indicator of lysozyme activity. The phagocytic activity of blood neutrophils was determined by the method of A. I. Ivanov and B. A. Chukhlovin (1967). In blood serum, the content of vitamin A and E was determined using an iMagic-V7 automatic biochemical analyzer.

3 Results

Analysis of the nutritional value of the diet of laying hens where economic experiments were carried out compared with the standard indicators shows a lack of metabolic energy is 28
kcal, calcium -0.6%, phosphorus - 0.1%, retinol - 280 IU, cholecalciferol - 76 IU and tocopherol 0, 26 mg. The results of the diet analysis show that during the period of increased egg production in hens at the age of 26-28 weeks, the body's need is not satisfied by the economic diet for metabolic energy, calcium, phosphorus and vitamins A, D and E.

Clinical and physiological indicators of chickens at the beginning of laying (20 weeks) were closer to the normative indicators. During the period of increased oviposition (26-28 weeks), 20-25% of hens showed blanching of the comb and earrings, a decrease in body weight, a decrease in egg production and ruffled feathers. In 10-15% of chickens, mucus-catarrhal discharge from the nostrils and thickened parts of the limbs was noted. These clinical deviations remained only in the chickens of the control group until the end of the experimental period. Hematological parameters were characterized in the control by a decrease in hemoglobin in the blood by an average of 5.0 g/l, glucose by 0.04 mmol/l and total protein in the blood serum by 0.6 g/l compared with the initial data (Table 1).

In chickens of the first experimental group, during the experimental period, the level of hemoglobin in the blood increased by an average of 0.6 g/l, glucose by 0.34 mmol/l and serum total protein by 0.3 g/l compared with the initial data. In chickens of the second experimental group, during the experimental period, the amount of hemoglobin in the blood increased by 3.6 g/l, glucose - by 0.48 mmol/l of total protein in blood serum by - 0.8 g/l compared with the initial data.

The level of retinol and carotenoids in the yolk of eggs of laying hens is an important indicator of the quality of this product. The level of retinol and carotenoids in the egg yolk of hens of the control group during the experiment period decreased compared to the initial data by an average of 0.36 µg/g and 1.2 µg/g, respectively. The content of retinol and carotenoids in the eggs of hens of the first experimental group during the period of experiments increased compared to the initial data by an average of 0.84 µg/g and 1.6 µg/g, respectively.

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In chickens of the second experimental group, the content of retinol and carotenoids in the yolk of eggs during the period of experiments increased compared with the initial data by an average of 1.0 µg/g and 2.4 µg/g, respectively.

Table 1. Note: A - at the beginning of the experiment; B - in the middle of the experience; C - at the end of the experiment. Indicators of blood and egg yolk in laying hens n=10.

<table>
<thead>
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<th>Groups</th>
<th>Time research</th>
<th>Hemoglobin, g/l</th>
<th>General protein, g/l</th>
<th>Glucose, mmol/l</th>
<th>In the yolk of eggs</th>
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<tr>
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<td>R Retinol, µg/g</td>
<td>Carotenoids, µg/g</td>
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<td>control</td>
<td>A 88,4±2,2</td>
<td>43,2±0,26</td>
<td>4,64±0,28</td>
<td>6,20±0,14</td>
<td>13,4±0,16</td>
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<td>B 86,6±1,8</td>
<td>43,0±0,26</td>
<td>4,62±0,30</td>
<td>5,96±0,16</td>
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<td>C 83,4±1,6</td>
<td>42,6±0,32</td>
<td>4,60±0,34</td>
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<td>A 86,8±2,4</td>
<td>42,8±0,28</td>
<td>4,68±0,34</td>
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The bactericidal activity of blood serum at the beginning of the experiment had no intergroup differences. At 26 weeks of age, in chickens of the first experimental group, this indicator was 41.64 ± 0.34%, which is 2.66% higher than in the control group (Figure 1). At 28 weeks of age, in hens of the first experimental group, BABS was 42.58 ± 0.34%, which is 4.26% higher than in the control.

In chickens of the second experimental group at 26 weeks of age, BASK averaged 42.84 ± 0.42% at 28 weeks of age 44.04 ± 0.38%, which is 5.62% and 7.83% higher, respectively, compared to the control group.

Lysozyme activity of blood serum at 20 weeks of age in hens of the experimental and control groups did not have significant differences. At 26 weeks of age in chickens of the first experimental group, this indicator averaged 17.22 ± 0.36%, at 28 weeks of age 17.84 ± 0.38%, which is respectively 2.13% and 4.69% higher than in control.

In chickens of the second experimental group at 26 weeks of age, LABS averaged 18.60 ± 0.40%, at 28 weeks of age 19.0 ± 0.34%, which is respectively 10.3% and 11.5% higher than in control. The phagocytic activity of blood neutrophils in chickens at the beginning of oviposition (20 weeks) between the experimental and control groups did not have a significant difference. In chickens of the first experimental group, PABN at 26 weeks of age averaged 26.98 ± 0.42% and at 28 weeks of age 27.14 ± 0.40%, which is 0.67% and 1.26% more, respectively, according to compared with the control group. In chickens of the second experimental group, PABN at 26 weeks of age averaged 27.0 ± 0.36% and at 28 weeks of age 27.94 ± 0.34%, which is respectively 0.75% and 4.25% more than in control group.

![Fig. 1. Dynamics of indicators of natural resistance of laying hens](image)
Inclusion in the diet of chickens additionally at the rate of 1 kg of compound feed: 12 g of monocalcium phosphate, 1 g of the probiotic Bio-3S and feeding the Vitatonik feed additive (produced by O.L. KAR., Ukraine) at a dose of 1 ml per 1 liter of water for 5 days from a break of 10 days had a positive effect on their body and normalized clinical and hematological parameters, increased the level of resistance of the body of chickens, which ensured an increase in the mass of chicken eggs by an average of 6.8 grams compared to the control group and an increase in the percentage of egg yield by 14-16%.

4 Discussion

The use of new types of feed additives based on vitamins, amino acids and microelements allows, while improving the balance of diets, to increase productivity and reduce their cost. The correct use of such feed additives leads to the normalization of metabolism [8,13]. The second group of feed additives includes derivatives of the microbiological industry - probiotics. Probiotics are living organisms that are added to feed to establish favorable microflora and suppress pathogens in the intestinal tract. The development of the gut-related humoral and cellular immune system is strongly influenced by the development of the intestinal microflora by stimulating the gastrointestinal immune response [3,5,9,13-17].

In the diet of experimental chickens, compared with the feeding norms, it was established that there was a lack of metabolic energy of 28 kcal, calcium - 0.6%, phosphorus - 0.1%, retinol - 280 IU, cholecalciferol - 76 IU and tocopherol - 0.26 mg. From here we can conclude that the diet was unbalanced, especially in terms of vitamin and mineral composition during the highest period of egg production (26-28 weeks), where laying hens showed signs of hypovitaminosis A and D.

A laboratory blood test showed that the use of Vitatonik and Bio-S3 probiotic (experimental group 2) led to an increase in hemoglobin levels by 3.6 g/l, total protein by 0.8 g/l, glucose by 0.48 mmol/l by compared with the original data. The content of retinol in the egg yolk of hens of the 2nd experimental group increased by an average of 1.34 µg/g in comparison with the control group during the experiments, carotenoids by 4.0 µg/g. In our opinion, the introduction of 12 g of monocalcium phosphate, 1 g of the probiotic Bio-3S per 1 kg of feed into the diet of chickens and drinking Vitatonik at a dose of 1 ml / l of water for 5 days with a break of 10 days has a positive effect on protein, vitamin and mineral exchange by increasing the amount of trace elements and vitamins necessary for the formation of enzymes. This is confirmed by the data obtained by scientists [2,13].

In the hens of the 2nd experimental group, which received the Vitatonik feed additive and the Bio-S3 probiotic, the indicators of natural resistance were much higher compared to the control group. Our data is consistent with the data [1,10-11].

5 Conclusions

1. Introduction to the diet of laying hens at the rate of 1 kg of compound feed: 12 g of monocalcium phosphate, 1 g of the probiotic Bio-3S and feeding with water of the Vitatonik feed additive (produced by O.L. KAR., Ukraine) at the rate of 1 ml per 1 liter of water in for 5 days with a break of 10 days, compared with the control group, it increases the amount of hemoglobin in the blood by an average of 8.1%, glucose by 12.1%, total protein in the blood serum by 2.35%, in the yolk of eggs - the level of retinol by 22.9%, the amount of carotenoids by 32.7%.

The proposed method of group prevention had a positive effect on the indicators of natural resistance of the body of laying hens, as BABS increased by 3.18%, LABS by 1.98%, PABN
by 1.02% compared with the initial data, and in chickens of the control group, the indicators of natural resistance did not change significantly.

References

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