Corbicula flour influence on egg production

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Abstract. At present, poultry farming provides the population with such important food products as meat and eggs. The basis for the success of poultry farming is a rational feed base, since protein and mineral deficiency leads to a decrease in profitability. In the Far East, there are opportunities for using inexpensive waste from processing marine shellfish. This article presents the results of using Japanese Corbicula flour in the feeding of laying hens. Additions of marine origin have antioxidant, radioprotective activity, increase the body’s resistance to diseases, increase the immune system, and improve metabolism. So that, the purpose of our research work was to study the possibility of including these additions in poultry rations. Our research work proved that using of Corbicula Japonica had a positive effect on egg mass, egg production and finally economic indicators.

1. Introduction
Corbicula is a bivalve mollusk that lives in the brackish waters of Asia. The people of the East have long valued Corbicula for its medicinal properties. The meat of this clam is considered a delicacy and very nutritious. In terms of protein content, it is 5-6 times higher than all seafood.

The Corbicula contains a full-fledged protein, glycine, taurine and other equally important amino acids. Shellfish is also rich in vitamins a, B, E, D, potassium, selenium, nicotinic and ascorbic acids. As for the medicinal properties of Corbicula, it is also called "sea healer" in another way. The muscle tissue of these shellfish differs significantly from other seafood. So, in comparison with fish, shellfish meat contains 5-8 times more carbohydrates, which with proteins or lipids form compounds that can stimulate the human immune system and have an anti-lipemic effect. The tissues contain natural water-soluble (B1, B2, B6, PP, C, etc.) and fat-soluble (A, E, O, K, etc.) vitamins.

In agriculture, in particular, in livestock and poultry, Japanese Corbicula can be used as a complete protein for the production of feed in poultry. It is well combined with fish and shrimp flour. Corbicula flour is added as bait for animals and birds.

Daily addition of additives to feed contributes to:

- reducing the cost of products enriched with vitamins and minerals,
- increase of the animal’s immune system,
- rapid growth and assimilation,
- providing the diet with concentrated animal protein,
• better feed digestibility,
• increase the activity of unproductive animals,
• improving fertility and egg production (for productive animals, birds, fish). [1-7]

In Primorye region, the using of Japanese Corbicula in the rations of pigs, boars, piglets was studied. It has been proved that the feed concentrate from Japanese Corbicula has a positive effect on growth and development, resistance, meat production, environmental safety of the resulting products, digestibility of nutrients based on these studies.[8,9].

The purpose of our research work is to determine the effectiveness of including Corbicula flour in the diets of hens and determine the optimal doses of its inclusion.

Research work was conducted in Primorsky region on the hens of the Haysex White cross. The purpose of the research work is to study the possibility of including Corbicula flour in the diets of laying hens. Research work consisted of the following tasks: to determine the optimal doses of feeding, to study egg production and economic index.

2. Methods and materials
We formed 4 groups of hens by means the method of pairs of analogs (control and three experimental ones) to study the effect of Corbicula. Laying hens of the control group were fed the main diet adopted in the farm, the rations of the experimental groups included fish feed concentrate in a dose of 3, 5 and 7% as part of the feed. The scientific experience of including a fish feed concentrate lasted 120 days (17 weeks). Hens were kept in cell batteries during the experiment. The research work was conducted according the scheme (table 1). The studied indicators are shown in table 2.

| Feed complex | Group      | Length of research | Amount of poultry | Diet     |
|--------------|------------|--------------------|-------------------|----------|
| Corbicula flour | control   | 120 days           | 50                | BR*      |
|               | I experimental | 120 days           | 50                | BR+3%    |
|               | II experimental | 120 days           | 50                | BR+5%    |
|               | III experimental | 120 days           | 50                | BR+7%    |

*BR – Basic ration (diet).

Table 2. Studied indicators.

| Indicators          | Egg production       |
|---------------------|----------------------|
|                     | Total amount of eggs |
|                     | Amount of egg mass   |
|                     | Economic results     |
|                     | Production experiment|

3. Results
Our research work proved that Corbicula japonica has a positive effect on egg production. We considered and counted amount of egg every month. In our research experiment egg production lasts 4 months (120 days). Egg production for the period of the experiment is shown in table 3.

Table 3. Total egg production (n=50).

| Month of egg laying / age of poultry, month. | control | I experimental | II experimental | III experimental |
|---------------------------------------------|---------|----------------|----------------|-----------------|
| First / 5-6                                 | 532     | 562            | 563            | 581             |
| Second / 6-7                                | 691     | 793            | 799            | 821             |
| Third / 7-8                                 | 725     | 884            | 892            | 906             |
Egg production in the experimental groups was higher than in the control group. The largest total amount of egg was in the III experimental group and amounted to 3347 eggs for the research period. It was higher than control index on 19%. Table showed that on average, the advantage of the experimental groups ranged from 14.3% to 19.0%.

The results of research confirm our conclusions that Corbicula japonica in the compound of combined fodder has a positive effect on the egg production of poultry, as it provides laying hens with minerals, protein, and improves metabolism.

Egg production change and intensity of egg production is showed in figure 1.

Table 4. Amount of egg mass during the experiment period (n=50).

| Index                        | control | I experimental | II experimental | III experimental |
|------------------------------|---------|----------------|-----------------|------------------|
| Total amount of eggs, kg     | 2811    | 3213           | 3251            | 3347             |
| Weight of egg, g             | 57.6    | 59.5           | 59.7            | 65.9             |
| Amount of eggs mass, kg      | 161.9   | 191.2          | 194.1           | 220.6            |
| % to control                 | 100     | 118.3          | 120.1           | 136.3            |
Figure 2. Amount of egg mass, kg.

Based on the data, it can be seen that the amount of egg mass was higher in the experimental groups than in the control group. On average, the egg weight was the highest in the III experimental group, where the bird ate 7% of the Corbicula in the compound feed. Also, the egg weight was higher in all experimental groups. The amount of egg mass was also the highest in the 3 experimental group. The superiority of the egg mass of hens of the experimental groups over the control ranged from 18.3 to 36.3%.

To determine economic efficiency of Corbicula using we conducted research experiment. The production experiment was carried out in the same farm, the number of poultry was 1000 in each group. We formed two groups (control and experimental). The period of the experiment lasts 60 days. The results are shown in table 5.

Table 5. Economic results of Corbicula japonica.

| Index                                           | Group control | experimental |
|-------------------------------------------------|---------------|--------------|
| Amount of poultry, heads.                       | 1000          | 1000         |
| The duration of the experience, days            | 60            | 60           |
| Total amount of eggs                            | 47873         | 52451        |
| Price of 10 eggs, rubles                        | 60            | 60           |
| Price of flour from Corbicula japonica, RUB     | 287238        | 314706       |
| Profits from the sale of eggs, RUB              | -             | 2520         |
| Additional profit of the farm from the inclusion of concentrate, RUB. | -             | 27468        |
| Additional profit of the company from the inclusion of additives, rubles (per head) | -             | 27.5         |
The conducted experiment proved that Corbicula has a positive effect on egg production and egg mass. Also economic effect of Corbicula flours using was higher on 27.5 rubles per 1 head.

4. Conclusion
Our research work confirmed our hypothesis that these feed flour stimulate increase egg production, weight of egg and amount of eggs per laying hen. The research results are reliable and authenticity. During the experiment, all poultry were kept in the same conditions. By the end of research experiments poultry of experimental groups had the higher egg production than control group.

Egg production in the experimental groups for the all period of the experiment was higher than in the control group on average, 14.3-19%. The greatest superiority of the III experimental group over the control was in the third month and amounted to 25%. As for the weight of eggs, it was also higher in the experimental groups by 0.3-14.4%. The amount of egg mass was the highest in the 3 experimental group and amounted to 220.6 kg. The using of Japanese Corbicula in poultry diets will allow to get an economic effect of 27.5 rubles per 1 head.

Thus, using marine feed flour as Corbicula japonica flour allows increase egg production, egg mass and economic profit.

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