The effect of microelements in the ration of Lohmann Brown cross breed layers at the Shcherbaty poultry farm at the Pavlodar province

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Abstract. It is revealed that the calcium level in the ration has grown up to 2.9-3.1% of the feed ceolites versus the standard ration favoring the number and quality of incubation eggs without damage to the chicken organism promoting the laying productivity, the meat quality and egg shell and covering the full calcium requirement.
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Introduction.

The main factor inhibiting the poultry farming in the country is the feed deficit and feed poor quality. The ministry of agriculture of the Kazakhstan Republic calculated the losses from feeding the poultry with unbalanced feed mixtures amounted to 10-15% of gross egg collection and up to 30% of meat production [8].

One of the main reasons of poultry production losses is the deficiency of vitamins and minerals due to the upset calcium and phosphoric exchange, impaired body strength, hence, the reduced organism productivity [9].

The vitamin and mineral deficiency relates to the most common metabolic disorders. Therefore, it a challenge intensively explored in many countries of the word. The study of the vitamin and mineral deficiency and its influence on the poultry calcium and phosphorus metabolism is described in many publications [10].

Yet, many problems still remain insufficiently studied. The effect of vitamin and mineral deficiency on the organism strength, the acid and alkaline balance, and protein metabolism remain unclear. It is exactly the reason why the relevant study has been undertaken [11;12].

The aim of the accomplished study has been to estimate how the microelements affect the productivity indicators of the parental generation of layers.

Methodology.

The study was carried at the Shcherbakty-Kus poultry farm of the Shcherbakty district of the Pavlodal region. The Shcherbakty-Kus poultry farm has, in 2012, 231 thousand poultry, including 114 thousands of layers. The Shcherbakty-Kus poultry farm, since 2012, is the owner of the Shcherbakty-Kus poultry farm property, which before belonged to the Taer poultry farm joint venture.

The study was conducted y monitoring the poultry breeding and feeding and by clinical, and laboratory poultry examination, the poultry meat, eggs composition. All studies were carried out by standard chemical, biological methods, and zootechnics.

Two groups of Lohmann Brown layers from the parental poultry were studied which received the feed formulas of different compositions. The first poultry group received the feed formula under the standard with the activated mineral additive. The second group received the feed addivtive under the standard with the activated mineral additive of feed ceolite.

Table 1. Scheme of achieved egg production

Poultry group of layers of Dutch selection	Number of poultry laying birds (heads)	Ration
I	9,500	Formula under standard with activated mineral additive. Calcium level 15-18%
II	9,500	Formula under standard with activvated mineral additive of feed ceolite. Calcium level 15-18%

The study was conducted among parental poultry of 6 and 9 month-old clinically healthy Lohmann Brown layers.

Ten layers were studied in each age group. The conditions of breeding, car, and feeding were the same for all poultry groups. At the Shcherbakty-Kus poultry farm the feed formula was prepared under the standard program. The temperature, humidity, light conditions, the air gas composition were within the sanitary and zoohygenic requirements.

Main part.

The mineral breeding as rated by the eggshell quality. In the first place, the quantitative indicators of cracked and broken eggs determined the shell quality. When determining the egg quality with this indicator, the eggs were counted and registered at each farm. In this case, if the quantity of non-standard and unfit eggs for incubation was over 2-3% (per day, per decade, per moth) the quality of obtained eggs was rated poor (unsatisfactory).

The second method is visual (inspection) check of eggshells. When the mineral feeding was abnormal, they revealed roughness, thinning, cracking, or marble pattern.

This method permit to assess the physiological state and the poultry mineral feeding level.

In addition, the egg quality was determined with a special method; one of these methods is to determine the deformation density. According to this method, the whole eggshell strength was determined by the smaller diameter. For this the diameter was measured in millimeters with a special tool (eastometer). A graph image of the indicator was plotted, compare and the conclusion was drawn.

The second special method is graphic.

The shell quality was subjected to prolonged observation; the shell quality was plotted as the indicator graph.

The third special method relates to shell mass variations. The egg mass relates directly to the layer body mass, i.e. the layer with a lager mass lays larger eggs and vice versa.

Throughout the production cycle, the layer mass varies parallel to the egg mass variations. If the laying intensity affects the layer feeding frequency during last 12-24 hours, then the egg quality reflects the feeding variations during 3-4 days.

Table 3. Zootechnical indicators of layer group receiving feed rations with additions of macro - and microelements

Ser. Nos	Indicators	I group Formula under standard, with activated mineral additive	II group Formula under standard, with activated mineral additive + feed ceolite.
1	Daily fee dose per layer (grams)	118	118
2	Preservation of layer number (%)	100	100
3	Intensity of egg laying (%)	74.0***	75.33***
4	Fed consumption per 10 eggs (kg)	1.59	1.25
5	Egg shell strength	20.95±0.26***	21.49±0.22***

Note: *P < 0.1; **P< 0.01; ***P <0.001.

The table shows that the Zootechnical indicators among group I of egg laying rate are less versus the second group by 1.33%, the eggshells are weaker by 0.54% (P <0001).

Feed consumption per 10 eggs is more by 0.02 kg.

Table 4. Congestion and availability of nutritive mineral substances (%).

Groups	Congestion			Availability		
	Protein	Fat	Hydrocar bon	N	Ca	P
I	91.1	87.0	13.9	41.8	59.1	23.2
II	92.3	91.8	18.5	43.2	60.7	25.8

Table 4 shows the results of congestion and availability of nutritive and mineral substances in the feed in experimental groups.

It is evident from the table that when the Lohmann Brown cross breed layers receives the feed ration with the activated mineral additive containing nutritive ceolite, the congestion and availability are much higher than those of the feed formula containing only the activated mineral additive.

The layers receiving the feed ration with the activated mineral additive containing nutritive ceolite, both calcium and phosphorus are congested well.

Table 5. Level of vitamins in eggs (mg)

Vitamins	I group / mmole\l	II group / mmole\l
A	13.50***	17.80***
E	154.06***	166.96***
B_2	5.45***	4.85***
Д	2.5***	4.5***

Note: *P < 0.1; **P< 0.01; ***P <0.001

Table 5 shows the results of tests of eggs for vitamins. The table shows that the eggs from experimental group II have the accumulation of vitamins A and E higher than that in experimental group I. only experimental group II has lesser vitamin B_2 by 0.6 mg than the first experimental group.

Table 6. Accumulation of calcium and phosphorus (mg) in Lohmann-Brown layer bones.

Indicators	I GROUP	II group
Ca	17.05***	18.02***
P	7.95***	8.2***

Note: *P < 0.1; **P< 0.01; ***P <0.001

The analysis of bone mineral composition has revealed (table 6) that the of group II accumulate more calcium and phosphorus than group I (P<0.001).

Table 7. Results of study of Lohmann—Brown layers that received the feed ration with different calcium concentration.

Experimental poultry groups	Mineral elements		Egg shall thickness (mm)	
	Ca (%)	P (%)	Actual	Standard
I Calcium concentration in ration 1.5%-2.5%	2.5***	5.4	0.29***	0.35-0.36
II Calcium concentration in ration 2.9-3.1%	2.9***	5.4	0.35***	0.34-0.36

Note: *P < 0.1; **P< 0.01; ***P <0.001

Table 7 shows that, when layers of group I received the feed ration, the calcium concentration was within 1.5-2.5% (P<0.001). The laboratory study has revealed that the eggshell was just 0.29 mm thick. When the experimental layers of group II received the feed ration with nutritive ceolite additive, the calcium concentration was 2.9-3.1% influencing favorably the quality of eggs.

Conclusions.

The results of study at the Shcherbakty-Kus poultry farm are gainful for the feed ration with the activated mineral additive containing nutritive ceolite because this ration promoted the egg-laying rate by 1.33% versus the first experimental group. The eggshell was stronger by 0.54 mm (P<0.001) and amounted to 21.49±0.22 mm. the offspring preservation reached 100%.

Thus, the balance feed ration with the nutritive ceolites parent poultry diseases by promoting physiological capabilities saving the veterinarian service. All this is direct factor influencing the poultry farming economics and providing a great economic potential for expansion of poultry and gross egg production.

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