Ye.V.Yakubenko,
A.G. Koschayev,
A.I.Petenko,
G.P. Gudz'
Kuban State Agrarian University

BACELL IN POULTRY RESISTANCE AND PRODUCTIVITY IMPROVEMENT

Probiotics – products of living organisms - are becoming more popular in veterinary practice. Their role in the poultry industry is well known. Earlier probiotic preparations were mainly used in veterinary medicine for the prevention and treatment of diseases of the gastrointestinal tract of infectious nature, for stimulation of nonspecific immunity, dysbacterioses correction caused by sudden changes in feed composition, disorders of feeding and content mode, use of antibiotics and other antibacterial chemotherapeutic agents (Sh. Immanuilov et al., 2004).

In the process of raising chickens in an industrial environment there always is a risk of outbreaks of a disease in the flock. Poultry gastrointestinal diseases are second only to viral infections and are the leading cause of chicken death at enterprises with a high birds concentration. According to experts, the number of birds killed by dysbacterioses at poultry farms of the Russian Federation is reaching 55% of total losses (B. Tarakanov, V.V. Nikulin, T. Palagina, 2005).

The normal micro flora colonizing the skin and the gastrointestinal tract of chickens plays an important role in maintaining their health. The functions of micro-organisms are extremely diverse: regulation of intestine functions, involvement in proteins, fats, carbohydrates metabolism, generation of biologically active substances (vitamins, amino acids and enzymes), neutralization of toxins, stimulation of the immune system etc. (Yu. Alyamkin, 2005).

The use of certain animal protein sources (originating from meat and milk by-products) can often lead to the development of some pathologies of the gastrointestinal tract in poultry, declining productivity and increasing production costs. The use of fishmeal in the poultry diet results in a particular flavor in the egg or meat. Almost all foods of animal origin (fish, meat and bone meal), as a rule, have higher level of bacterial contamination than grain. In addition, some strains that populate these feeds are unhealthy to humans.

For these and other reasons poultry feed formulations have changed dramatically in recent years. Many farms have replaced animal protein with soybean and other vegetal proteins. The most valuable of their sources are cakes and meals. However, being rich in protein, as a rule, they have high content of fiber which is poorly digested and affects the quality of feed. The use of exogenous enzymes can increase feed value.

In this context, the aim of this study was to test Bacell, a multicomponent bacterial preparation, combining a probiotic and enzyme activity, in poultry production.

Materials and Methods. Probiotics-enzymatic preparation Bacell was tested under production conditions in the experiments on broiler chickens, rearing chickens and laying hens.

Bacell contains an association of bacteria *Bacillus subtilis*, *Ruminococcus* Kg. and *Lactobacillus acidophilus* isolated from the gastrointestinal tract of animals. The preparation has expressed probiotic properties, in addition to its characteristic cellulosolytic and gluconaze activity (V. Ryadchikov et al., 2004).

The finished product has a titer of at least $1x10^8$ CFU/g and is a dry free flowing powder with a specific smell. An industrial technology for both liquid and solid forms of the preparation has been developed. Technical specifications for their production have been issued and approved as well as patent protection of the technology has been provided.

Results and discussion. As shown by experiments carried out on broiler chickens in the Federal State Unitary Enterprise "Rus" using cheap vegetal rations, Bacell has a stimulating effect on poultry growth. Thus, the average gain of chickens at 36 days in the experimental group receiving the preparation was 39,8g, i.e. 5,3% higher than in the control group. Feed consumption per 1kg gain was 1647,5g, which is 16% lower than in control group, and flock preservation in the group treated with enzyme probiotic product was 2,5% higher.

The number of blood cells, hemoglobin concentration and erythrocyte sedimentation rate are important indicators of the overall condition of the organism. In our experiments, they were within the physiological norms, but the level of hemoglobin and red blood cell count was higher in the experimental group receiving Bacell. Thus, in the control group, erythrocyte sedimentation rate of broiler chickens was 2,10mm/h, the color index – 2,3, hemoglobin - 104 g/l, erythrocyte count – $2,34 \times 10^{12}$/l, platelets – 66×10^9/l, white blood cells – $21,3 \times 10^9$/l, in the test group the values were respectively $2,56 \pm 0,06$ ($P < 0,05$), 2,4, 120 g/l, $2,47 \times 10^{12}$/l, 68×10^9/l and $25,6 \times 10^9$/l.

Mechanisms of natural resistance are formed and appear under the influence of a variety of external factors, some of which are components of feed. Although the level of natural resistance can be indirectly judged by our studies of such parameters as blood cells, hemoglobin, total protein concentration, for more objective judgment lysozyme and bactericidal activity of blood were determined. Thus, lysozyme activity in broiler chickens in the control group was $26,34 \pm 2,82\%$, bactericidal - $43,71 \pm 2,04\%$, while in the experimental group it was $35,89 \pm 2,67$ and $51,03 \pm 1,76$, respectively ($P < 0,05$).

Production testing of the preparation on the rearing egg laying chickens was carried out in the FSO FSUE "Labinsky." Feeds used in the experiment were 99% of vegetal origin; they were fed to chickens starting from their first day. The level of fiber in the feed for the period of growing during the 1-st month was 4%, during the 2-nd month it was 4,4%, during the third - from 5,4 to 6,3%. Tests were carried out in two buildings: one where test flock of 24,110

chickens was kept and the other with experimental flock of 20,430 chickens. Chickens in the control group received feed with import complex enzyme preparation added at the rate of 0,05% (0,5 kg / ton of feed), and the experimental group had Bacell added to feed at the rate of 0,2%.

Poultry receiving Bacell were active and fed well. The content of total protein, calcium and phosphorus in the blood serum, as well as the acid capacity of the blood did not change significantly throughout the experiment. In the first half of the experiment the number of leukocytes in the blood of chickens having Bacell added to feed was significantly decreased (P <0,01), then although it was slightly lower, it remained within the physiological norm. In addition, in the experimental group dynamics of live weight was higher than in the control and normal, and the flock preservation was above 99% with flock homogeneity of 94% (Table 1).

Table 1

The main results of production tests on the rearing chickens

Indicators	Live weight, g		
	Standard	Control	Test
At the age of 1 weeks	75	71	75
At the age of 4 weeks	280	290	298
At the age of 8 weeks	690	706	711
At the age of 13 weeks	1 150	1 166	1 178
Initial flock		24 110	20 430
Mortality over a period of raising		255	164
Survival, %		98,9	99,2
Feed consumption per 1 kg of gain, kg		3,5	3,5
Flock homogeneity, %		94,0	94,0

Table 2

Some veterinary and zootechnical test indicators

Indicators	Group		
	1 Control	Test (Bacell)	2 Control
Average test flock	9 820	21 321	44 108
Gross eggs collection during test, pcs.	542,3	1 195,9	2 512,0
Egg-laying, %	89,8	96,0	93,0
Survival, %	99,3	99,7	99,6
Feed consumption per 1 000 chickens, centner (100 kg)	1,275	1,19	1,12
Medical expenses for veterinary preparations (other than routine vaccinations): per 1 chicken / test, rubles; per 1 000 eggs, rubles	 1,5 27,2	 0,46 8,2	 0,9 15,8
Cost of the used enzymes per one ton of feed, rubles	89,21	80,76	80,88

At the same farm Bacell was tested on egg-laying hens. Hens of the experimental group received Bacell, of the first control group - a comprehensive imported enzyme preparation, of the second - a complex enzyme preparation with high cellulosolytic activity. As shown by the production test, the hens of the group receiving Bacell had higher flock survival and the egg-laying percentage than in the control group and the costs of medical veterinary preparations were more than twice lower than in other groups, due to lower cost of the used enzymes (Table 2).

The scientific and economic test with the egg-laying hens (cross UK-Kuban123) was set at the poultry farm "Novomyshastovskaya". Rations of the control and experimental groups consisted only of vegetal feeds (wheat, barley, maize, sunflower meal, rice meal, mineral and vitamin supplements). The experimental group had the preparation administered at the rate of 2 kg per 1 ton of feed mixes and as a result the survival rate was 100%, egg production reached 90.7%, i.e. 8.5% higher than in control group. The use of the preparation made it possible to reduce the cost of feed by 13.8%. The egg production during the test period was 1694 eggs, that is 183 eggs more than in the group that did not receive the tested preparation.

Conclusion. Enzyme probiotic product Bacell is an effective means of increasing poultry resistance as well as survival and productivity. Its use as a prophylactic agent in veterinary practice and animal production is economically feasible.