

The effectiveness of using probiotics, their effect on growth and chemical composition of broiler chicken meat

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Abstract. The article illustrates the effect of low-quality feed on growth of broiler chickens, as well as on quality parameters of meat. The production of economical and environmentally quality poultry products has an importance role on ensuring the country's food security. The need for the Development of alternative drugs and their implementation in veterinary practice is increasing because developed countries are abandoning the use of chemicals and antibiotics. The important role plays using of biologically active additives created in recent years, especially new generation probiotics. In our research determined the advantage influence of probiotic consisting of several living bacteria, on physiological processes in the body of broiler chickens, as well as a significant change in quality parameters of meat. Poultry meat differ from other animals' meat with chemical characteristics and easy digestibility on human organism and considers like a best source of important nutrients.

1 Introduction

Active growth of population shows increasing of demand for food products obtained from plant and animal origin. In this regard, the issue of maintaining high quality and safety of the product remains relevant, as well as finding new ways to intensify food production [1]. Experts considers the use of feed additives like a solution of this problem because of positive effect on animal health and at the same time increase the quantity and quality of meat, eggs, milk and fish products [2].

Feeding of poultry has a significant impact on their growth, health and fertility. That means intensive good poultry farming can obtain high-quality products with minimal feed consumption per unit of production. Till this time a lot of experimental data has been collected about effectiveness of using various biologically active and non-traditional methods of feeding in poultry farming [3].

Recent years, biologically active additives have been used in livestock production all over the world to improve the function of the digestive system, increase the percentage of feed digestibility, obtain the positive progress on growth as well as using drugs for

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prevention and treatment of diseases are rapidly developing. The experiments of researchers prove using of biologically additives not only like feed additive but also like substances to activate metabolic processes like probiotics vitamins and so on [4-5].

In some cases, the technologies used develop of poultry farming do not appropriate to optimal keeping and feeding conditions. Adverse effects of external environmental factors and nutritional disbalance lead to decreased immune resistance and development of stressful conditions, which have a negative impact on poultry growth [6].

Currently, one of the most possible areas of scientific research in the field of livestock and poultry farming is development and using of new probiotic supplements and preparations based on symbiotic microorganisms [7].

According to the definition devised by FAO and WHO experts in 2002, “probiotics” are “alive strains of microorganisms that by using in sufficient quantities influence beneficial on the host.” The effectiveness of probiotics depends on many factors that’s why the selection of bacteria and optimal doses are important during the use of them. Currently, probiotics are widely used as feed additives for animals, especially for poultry [8].

Scientific research and the experience of advanced poultry farms prove that the use of biologically active additives increases the organism’s defense reactions in response to negative environmental factors and has a positive effect on the meat productivity of poultry [9-10].

2 Materials and methods

Experiments conducted at poultry farm “Mironkul Agrozoovetservis scientific research center” for determination the effect of probiotic "Activil-3" on growth of broiler chickens and define quality parameters of obtaining meat. All chickens were kept under the same condition compliance with all zoo hygienic requirements. The next stage of experiment was carried out at laboratory of Uzbekistan Scientific research and quality control center.

For experiments, Ross 308 cross broiler chickens were selected and divided into three groups. The chickens of 1st group was control and received a diet without any additives, 2nd and 3rd groups were considered experimental. 1st experimental group received 10 L/1g of probiotic as additive and 2nd experimental group 10 L/1,5 g.

Live weight of chickens determined by weighing on electronic scale “Mercury 313-5”. Chemical research of broiler chicken’s meat carried out according to GOST 31470-2012 and UzDSt 3308-2018.

3 Results and Discussion

Feeding type and specifics effect the growth of broilers. The growth process of animals closely connected with the results of increasing live weight, as well as with formation of individual organs and tissues of the body [11].

Live weight is one of the main parameters of poultry growth reflecting the influence of keeping and feeding conditions. Ross-308 cross broiler chickens are adoptable (genetically) to gain live weight from 50 to 100 g per day in 42-day age which leads to high productivity rates [12].

Based on the above, we researched the effect of this probiotic drug on growth of Ross-308 broiler chickens. The dynamics of live weight of chickens from 1 to 42-day age illustrated in Table 1.

Table 1. Dynamic of live weight of broiler chickens, g (n=25), (M±m).

Age, days	Groups		
	Control	1st experimental	2nd experimental
1	42.23±0.36	42.18±0.41	42.20±0.40
7	163.14±0.84	164.66±0.85	165.37±0.80
14	458.74±1.09	475.35±1.12	482.17±1.82
21	908.02±3.11	938.18±2.77	953.68±3.18
28	1456.62±5.05	1497.86±4.35	1516.06±5.75
35	2084.70±7.08	2154.14±5.42	2175.06±6.07
42	2526.42±11.05	2623.52±10.31	2654.82±7.15

The obtaining results indicates that the live weight of all groups' broiler chickens in 1-day age was almost the same and varied from 42.18 to 42.23 g.

Broiler chickens of 1st and 2nd experimental groups had an advantage in live weight by 1.52 g (0.93%) and 2.23 g (1.36%) compared to control group at 7-day age. In 14-day age period these indicators were higher than control group by 16.61 g (3.62%) in 1st experimental group and by 23.43 g (5.10%) in 2nd experimental group.

In 21-day age broiler chickens of 1st and 2nd experimental groups exceeded the control group by 30.16 g (3.32%) and 45.66 g (5.02%).

The same progress observed at 28, 35 and 42-day age. Thus, in the end of experiment the live weight of chickens of 1st experimental group exceeded the control group by 97.1 g (3.84) and 2nd experimental group by 128.4 (5.08%).

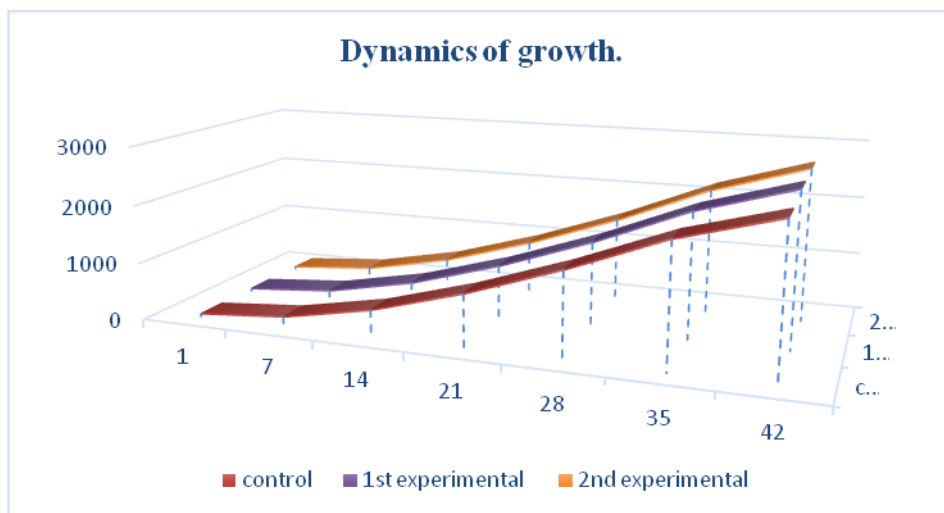


Fig. 1. Dynamics of growth.

An assessment of meat productivity can be completed only after determination the amount of yield meat with defining the quality parameters of meat. The chemical composition is most important parameter that characterizes the quality of poultry meat productivity [13-14].

As a result of biochemical processes in poultry organism forms organic (protein, fat, ferments) and inorganic (mineral salts, water) compounds. The chemical composition of meat is one of the objective indicators of nutrition value [15].

Chemical composition of pectoral and thigh muscles of broiler chickens of all groups illustrated in Tables 2 and 3.

As a result, birds, as a result of biochemical processes, contain organic (proteins, fats, enzymes) and inorganic (mineral salts, water) compounds from simple elements. The chemical composition of meat is one of the objective indicators of its nutritional value [15].

In our experiments the pectoral muscles' moisture content of 1st experimental groups' chickens decreased by 1.13 %, in 2nd experimental group by 1.28%, meanwhile amount of protein increased by 1.14% and 1.22% in these experimental groups. The fat content in these muscles of experimental groups also increased by 0.83 % and 0.87 % compared to control group and ash by 0.19 and 0.22%. These results are given on the table below.

Table 2. Chemical composition of broiler chicken meat (pectoral muscles) n=6, (M±m).

Groups	Substance content, %			
	moisture	protein	fat	ash
control	75.46±0.17	21.73±0.19	2.04±0.08	1.04±0.09
1 st experimental	74.33±0.18	22.87±0.19	2.87±0.15	1.23±0.10
2 nd experimental	74.18±0.17	22.95±0.19	2.91±0.10	1.26±0.10

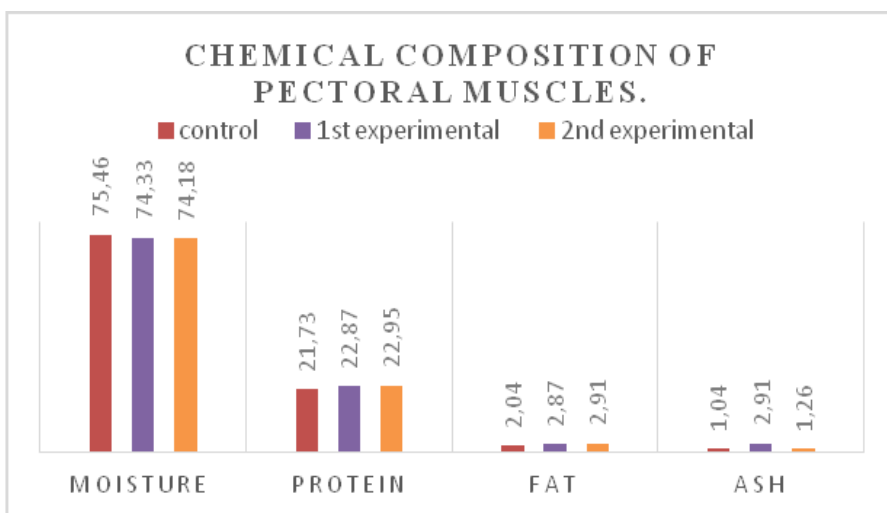


Fig. 2. Chemical composition of pectoral muscles.

In thigh muscles of 1st and 2nd experimental groups chickens also observed a decrease by 0.75% and 0.88%, and an increase of protein by 1.14% and 1.22%. Fat amount of experimental groups expanded by 0.83% and 0.87% compared to control group. Ash content in these muscles of experimental groups increased by 0.13% and 0.15% compared to control group. (Table 3, Figure 2)

Table 3. composition of broiler chicken meat (thigh muscles) n=6, (M±m).

Groups	Substance content, %			
	moisture	protein	fat	Ash
control	74.02±0.18	21.65±0.24	1.98±0.17	1.12±0.12
1 st experimental	73.27±0.16	22.71±0.25	2.61±0.20	1.25±0.10
2 nd experimental	73.14±0.15	22.84±0.22	2.73±0.18	1.27±0.10

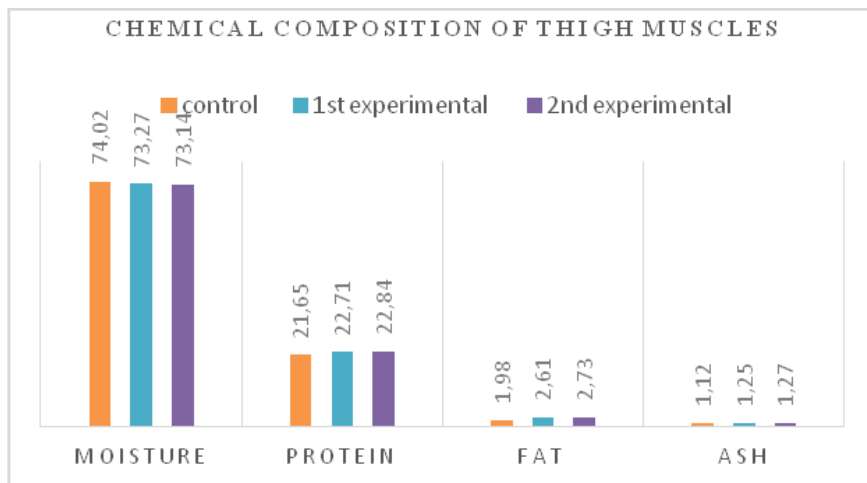


Fig. 3. Chemical composition of thigh muscles.

The above data testifies that using Activil-3 additive influence the meat quality parameters by chemical composition.

4 Conclusion

It was determined that the using of probiotic to broiler chickens' diet of 1st and 2nd experimental groups had a positive effect to quality parameters of pectoral and thigh muscles.

In our experiments established that using probiotic Aktivil-3 beneficially influence on dynamic of growth of broiler chickens. Live weight of 1st and 2nd experimental groups' broiler chickens at 42-day age consisted from 2623.52 to 2654.82 g which higher by 3.84% and 5.08% compared to control group.

Also, determined that Activil-3 has advantage influence on pectoral and thigh muscles.

During the research in 1st and 2nd experimental groups' the pectoral muscles observed an increase of protein from 1.14% to 1.22% and fat from 0.83% to 0.87%, while a decrease in moisture from 1.13% to 1.28%.

Accordingly observed in thigh muscles an increase of protein from 1.14 % to 1.22 %, fat from 0.83 % to 0.87 % meanwhile decreasing of moisture from 0.75 % to 0.88%.

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