

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Effect Bio-destructor Of Litter On Broiler Productivity.

Elena Edugartovna Epimahova*, Nikolay Viktorovich Samokish, and Maria Gennadievna Barsukova.

Stavropol State Agrarian University, Zootekhicheskiy lane, 12, Stavropol 355017, Russia.

ABSTRACT

The article presents the results of three experiments on the cultivation of broiler chickens on a bed of shavings and straw, in which a solution of the «Sanvit-K» microbiological preparation was introduced. In experiment 2, «Silica +» was added to the compound feed with probiotic «ProStor». In experiment 3 in the combined feed «Rost» and «Finish» of the series «organic» was lower crude protein content and higher fiber. The vital activity of bacteria from «Sanvit-K» had a positive effect on the condition of the litter and air, as well as on their productivity and meat quality of the broilers. In order to obtain organic meat when growing broiler chickens, it is permissible to add «Sanvit-K» to litter at a dose of 18 g / m² from 21 days and a slight decrease in the nutritional value of compound feeds from 15 days of age.

Keywords: broiler chickens, bedding for poultry, air odor, productivity, meat quality.

**Corresponding author*

INTRODUCTION

In case of floor technology in closed poultry houses, the condition of litter dung (LD) together with ventilation and feeding directly affects the parameters of the air environment and the productivity of the bird. Nitrogen in the litter undergoes ammonification and denitrification with release of ammonia [1, 2]. Ammonia is felt at a concentration of 5 mg / m³, and more than 10 mg / m³ or 10 ppm inhibits the growth and development of birds.

The state of LD substantially depends on the initial moisture and moisture capacity of the litter material, livestock and poultry age, the quality of feed and water, and the productivity of ventilation [3]. Increases the amount and humidity of LD excess in the diet of ingredients with high acid binding and poor quality [4, 5]. The reduction in the diet of chickens and broilers content of crude protein by one percent reduces the excretion of ammonia from LD by 8-10% [6].

In LD management, it is possible to reduce its moisture content by adding desiccants on the basis of aluminosilicates with antifugicidal and antibacterial action, as well as accelerating nitrification with probiotic preparations - "bacterial agriculture" [7].

In this regard, the purpose of the work is to study the effect of directed biodegradation of litter litter on the productivity and quality of broiler chicken meat.

MATERIALS AND METHODS

The studies were conducted in Stavropol State Agrarian University on broilers of the Cobb-500 cross-country, according to the VNITIP method [8] in boxes with forced air extraction (Table 1).

Table 1: Study Design

Group	Number of goals in a group	Factors under study
Experience I (wood chips) - 0-35 days.		
1 (control)	46	General ration (GR) standard + litter + "Sanvit-K" 10 g per 1 m ² of area at 5, 14, 21, 28 days.
2 experienced	46	GR standard + litter + "Sanvit-K" 20 g per 1 m ² area in 5, 14, 21 and 28 days.
3 experienced	46	GR standard + litter + "Sanvit-K" 20 g per 1 m ² of area at 5, 14, 28 days.
Experience II (chopped straw) - 0-38 days.		
4 (control)	35	GR standard + litter + "Sanvit-K" 20 g per 1 m ² of area at 14, 21, 28 days.
5 experienced	35	GR standard + 200 g / t "Silica +" + litter + "Sanvit-K" 20 g per 1 m ² of area at 14, 21, 28 days.
6 experienced	35	GR standard + 200 g / t "Silica +" + litter + "Sanvit-K" 20 g per 1 m ² in 14, 28 days.
Experience III (uncut straw) - 0-42 days.		
7 (control)	45	GR standard + litter + "Sanvit-K" 20 g per 1 m ² area in 21, 28, 35 days.
8 experienced	45	GR standard + litter + "Sanvit-K" 18 g per 1 m ² of area at 21, 28, 35 days.
9 experienced	45	GR "Start" standard, "Rost" (organic), "Finish" (organic) + litter + "Sanvit-K" 20 g per 1 m ² in 21, 28, 35 days.

The density of poultry landing in experiment I is 15 goals / m², in experiment II and III - 12 goals / m², recommended for prolonged and organic rearing of birds, and also taking into account the performance of exhaust ventilation. The litter material was applied at the rate of 3 kg / m².

From the range of preparations for the biodegradation of LD poultry, the preparation Sanvit-K (LLC «SEC BIO», Russia) was chosen, tested in pig breeding (reduction of ammonia in indoor air by 25–70%). "Sanvit-K" contains a consortium of live bacteria *Bacillus subtilis*, *Bacillus licheniformis*, *Bacillus megaterium* and cocci *Lactococcus lactis subsp. Lactis*, *Leuconostoc lactis*, *Lactobacillus plantarum*, *Lactococcus lactis subsp. diacetylactis*, products of their metabolism and fermented beet pulp. Before use, the dose of "Sanvit-K" was introduced into warm water at the rate of 0.3 l / m², kept for 4 hours, and then the slurry was scattered evenly on LD with subsequent loosening.

Poultry was fed with pelleted feed «Start» (1-14 days), «Rost» (15-28 days), «Finish» (29-42 days) with «ProStor» probiotic (LLC «SEC BIO»), on microbiological composition close to «Sanvit-K», which allows to create a biocycle: «microbiological preparations» - «poultry farming (LD)» - «organic fertilizers» - «plant growing» - «fodder production» - «microbiological preparations», etc.

In experiment II, an additive "Silica +" ("Ceresco Nutrition", Canada) based on silica activated with electromagnetic treatment was introduced into the feed. In experiment III in the feeds "Rost" and "Finish" in group 9 of the "organic" series, in contrast to groups 7 and 8, the "standard" series, the content of crude protein is lower by 2.90 and 4.07%, and the fiber content is higher by 1.84 and 1.57% (Table 2).

Table 2: Nutrient content in feed

Indicator	«Rost»		«Finish»	
	standard	organic	standard	organic
Crude protein,%	18,04	15,14	17,02	12,95
Crude fiber,%	5,94	7,78	6,15	7,72
Crude fat,%	4,77	4,13	4,75	4,66
Calcium,%	1,09	1,13	0,96	1,08
Phosphorus,%	0,87	0,55	0,57	0,46

The cost of 1 kg of feed "Rost" ("organic") and "Finish" ("organic") is less by 7.7 and 8.3%.

RESULTS AND DISCUSSION

Granulated feeds of the organic series are developed and sold for organic and prolonged broiler farming, which is popular with the population of the South of Russia.

In the experiments it was established that the vital activity of bacteria from «Sanvit-K» in LD, the quantity and quality of which was interconnected with the different nutritional value of compound feed, had a positive effect on the condition of LD and air when growing broilers. In experiment I, the best LD quality by the end of cultivation was in group 3 with the introduction of «Sanvit-K» in litter on the 5th, 14th and 28th days, in experiment II in group 6 with the introduction of «Sanvit-K». In straw litter on the 14th and 28th day in combination with Silica + feeding, in group 8 when introducing «Sanvit-K» into litter from uncut straw on the 21st, 28th and 35th day on a dose of 18 g / m³.

From an environmental point of view, it is interesting that the output of LD to 1 average head in group 3 compared with the control group 1 decreased by 8.5%, and group 6 compared to the control group 4 - by 4.6%. With a 10% reduction in the consumption of «Sanvit-K» in group 8, LD output per 1 average head compared to groups 7 and 9 increased by 6.2%, while the decrease in compound feed in group 9 compared to groups 7 and 8, the content of raw protein on average by 3.41% and an increase in crude fiber content on average by 1.71% to a lesser extent - by 2.2%. At the same time, the concentration of unpleasant odor in the air was the lowest in groups 3, 6, 8 and 9.

When growing birds in established zoohygienic and forage conditions acceptable for organic poultry standards, in groups 3, 6 and 8, broiler productivity index (EPEF) is higher compared to control groups in experiment I by 66 units, in experiments II and III by 20 units.

Broilers in group 3 compared with control group 1 and experimental group 2 showed the best balance of nutrients - higher digestibility of raw protein by 4.19 and 3.70%, amounts of amino acids - by 0.92 and 1.10%, crude fiber - by 5.12 and 0.29%. This fact can be explained by the fact that the reproduction of microorganisms from «Sanvit-K», in addition to improving the gas composition of air, stimulates microbial digestion in the poultry intestine by pecking the litter and inhaling spores of transient bacteria.

To assess the meat qualities of poultry, a control slaughter of medium-sized cockerels and chickens from each group was conducted. Slaughter yield of gutted carcasses in the experiment I was the largest in group 2 (72.7%), in experiment II in group 5 (73.5%), in experiment III in group 8 (74.5%). The difference with other groups was respectively 0.7-1%, 0.5-1.0% and 1.8-2.1%.

Anatomical cutting gutted broiler carcasses carried out in experiment II. The output of individual parts of the mass of the gutted carcass on average in groups 4, 5 and 6 was within the limits of the existing standards (Table 3).

Table 3: Output of individual parts of gutted broilers, %

Name	Group 4	Group 5	Group 6
Breast	39,9	43,9	41,6
Breast muscles	32,6	34,6	33,2
Hip	14,4	13,0	13,3
Thigh muscles	11,3	9,9	10,0
Shin	13,6	13,4	13,5
Muscles of the lower leg	9,0	8,6	9,1
Wing	8,0	9,2	10,1
Muscle wing	3,8	4,3	4,5

The average rating of eight indicators is as follows: group 6 - I place (1.6 points), group 4 - II place (2.1 points) and group 5 - III place (2.3 points).

In terms of experience II, the protein content in the pectoral muscles in group 6 is equal to 21.31% and higher than the level of groups 4 and 5 by 0.44 and 0.11%. The protein content in the leg muscles in group 4 is 14.10% and above the levels of groups 5 and 6 by 0.38 and 0.84%. In experiment III, the protein content in the pectoral muscles in group 8 is 22.59% and above the levels of groups 7 and 9 by 0.05 and 0.13%, and in the leg muscles 19.94% and above the level of groups 7 and 8 by 0.09 and 0.67%. In this case, there is a pattern, the lower the nutritional value of the diet, the lower and protein content in broiler meat. That is why, when evaluating broth, boiled pectoral and leg muscles from carcasses, according to all criteria, the average tasting assessment of broiler meat from groups 7 and 8 (4.3 points) is higher than in group 9 (4.1 points) by 4.9% .

CONCLUSION

Thus, the use of the microbiological preparation «Sanvit-K» as a biodestructor of LD has a positive effect on the productivity and meat quality of broiler chickens. To produce organic meat when growing broilers, it is acceptable to add 21 days of «Sanvit-K» in LD at a dose of 18 g / m² and a slight decrease in the nutritional value of compound feeds from 15 days of age.

REFERENCES

- [1] The use of bacteria in the litter material used for the maintenance of farm animals and poultry: scientific recommendations / E.E. Epimahova, V.S. Skripkin, N.A. Ozheredova [et al.]. Stavropol: AGRUS Stavropol State. Agricultural University, 2017. 101 p.
- [2] Saleeva I., Ivanov A., Bakharev A. Composition of air and productivity of broilers // Animal Husbandry of Russia. 2017. №3. P. 19-20.
- [3] Strain N. Qualitative litter - a key factor in achieving high rates of productivity of broilers // ZootechnicalInternational. 2017. №6. P. 32-35.



- [4] Zlydnev N.Z., Trukhachev V.I., Podkolzin A.I. Feeding farm animals in the Stavropol region. Stavropol: 2000. 264 p.
- [5] Esmail, Salah H. Litter management - Part 1: good litter for healthy birds. WorldPoultry.net, 2011, 25 October.
- [6] Bregedal K., Roberts S. Fodder strategies to reduce the release of ammonia from herds of laying hens // Zootechnicainternational. 2013. No. 2. P. 46-54.
- [7] Tran S. T., Bowman M. E., Smith T. K. Effects of a silica-based feed supplement on performance, health, and litter quality of growing turkeys // Poultry Science. 2015. Vol. 94. P. 1902-1908.
- [8] Methods of conducting scientific and industrial research on the feeding of poultry / under ed. V.I. Fisinin. Sergiev Posad, VNITIP, 2013. 51 p.