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Research Article

METHOD FOR INCREASING FOOD AND ECOLOGICAL VALUE OF BROILER MEAT WITH ADDITIVES TO BIOLOGICAL ACTIVE PRODUCTS

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Abstract:

In recent years, providing balanced feeding at industrial poultry farms for the prevention of aflatoxicosis in meat poultry mold inhibitors and antioxidants of a new generation have become widely used as feed additives in the formulation of the complete feed for poultry. The aim of the research is to find out the effectiveness of the addition of the Tox-Nil mold inhibitor and the Oxi-Nil antioxidant to wheat-barley-sunflower mixed fodders with a tolerant dosage of aflatoxin B₁ for increasing meat productivity and biological value of broiler chicken meat. A scientific and production experiment was conducted on the four groups of broiler chickens of the "Ross-308" cross with 100 heads each, formed according to the principle of analogue groups. It was established that combined addition of preparations of Oxi-Nil in a dose of 600 g / t of feed and Tox-Nil in a dose of 750 g / t of feed to the combined feed with the tolerant level of aflatoxin B₁ provided the best productive effect in broiler chickens. Joint supplements of these preparations to wheat-barley-sunflower mixed fodders with a tolerant dosage of aflatoxin B₁, resulted in a significant (P > 0.95) increase in the weight of the half-dressed carcass by 12.44%, dressed – by 12.85% and slaughter yield - by 1.12% in the chicken broilers of the 3 test group against the control group. Relative to the control analogues in the meat poultry of the 3 test group in the samples of the pectoral and femoral muscles, there was a significant (P > 0.95) increase in the dry matter content by 1.02 and 1.01%, protein by 1.30 and 1.29%, and at the same time, a reduction of the mass fraction of fat – by 0.36 and 0.33%. The combined feeding of preparations Oxi-Nil in a dose of 600 g/t of feed and Tox-Nil in a dose of 1250 g / t of feed resulted in statistically significant (P > 0.95) increase of the protein quality index of meat by 16.45% in broiler chickens of 3 experimental group compared to the control analogues.

Keywords: Broilers, aflatoxins, mold inhibitor, antioxidant, control slaughter results, chemical composition of meat.

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INTRODUCTION:

In meat poultry farming, the most noticeable negative impact is observed from aflatoxins, of which the most toxic is aflatoxin B₁. Aflatoxins are produced by mold fungi *Aspergillus flavus* and *Parasiticus*, they are derivatives of a highly toxic coumarin compound. Aflatoxin B₁ – one of the strongest hepatropic poisons, has a pronounced carcinogenic quality [1, 2].

The main negative manifestation of aflatoxicosis is caused by the factor of DNA binding and inhibition of the synthesis of the RNA polymerase enzyme, which is accompanied by inhibition of protein synthesis in the muscle tissue of farm animals and poultry. A consequence of this is a decrease in the meat production of broiler chickens and the biological value of poultry meat [3, 4].

In connection with this, on the industrial poultry farms while the organization of balanced feeding to prevent aflatoxicosis in meat poultry, in recent years, mold inhibitors and antioxidants of a new generation

have become widely used as feed additives in the formulation of complete feeds for poultry, which, in the course of researches on broiler chickens, proved their high efficiency [5, 6].

The aim of the research is to find out the effectiveness of additives of the Tox-Nil mold inhibitor and the Oxi-Nil antioxidant in wheat-barley-sunflower mixed fodders with tolerant dosage of aflatoxin B₁ for increasing meat productivity and biological value of broiler chicken meat.

MATERIAL AND METHODS OF RESEARCH:

In the conditions of the poultry farm of the agricultural enterprise Polyakov of the Mozdok District of the Republic of North Ossetia-Alania, on the four test groups of broiler chickens of the "Ross-308" cross with 100 heads each, formed according to the principle of analogue groups, for 42 days, a scientific and production experiment was conducted according to the scheme presented in Table 1.

Table 1 – Scheme of scientific and production experiment on meat poultry

Group	Features of feeding
Control	Basal diet (BD) Основной рацион (OP)
1 test	BD + Oxi-Nil preparation in a dose 600g/t of feed
2 test	BD + Tox-Nil preparation in a dose 750 g/t of feed
3 test	BD + Oxi-Nil preparation in a dose 600g/t of feed + Tox-Nil preparation in a dose 750 g/t of feed

Test birds were fed by mixed fodders of the wheat-barley-sunflower type, in the formulation of which the tested preparations were introduced with the help of standard dispensers to uniformly mix them with other ingredients.

When experimental broilers reached the age of 42 days, six typical heads were selected from each group by the live weight for control slaughter according to the standard method.

The obtained digital experimental material was processed statistically by the method of Student using the "Microsoft Excel" software package.

THE RESULTS OF THE RESEARCH AND THEIR DISCUSSION:

There was a two-phase feeding of chickens with mixed fodder based on wheat grain, barley and sunflower meal cultivated by the farms of the Prigorodny District of the Republic of North Ossetia-Alania, the territory of which is characterized by high humidity,

which increases the risk of contamination of these crops by mold fungi.

In the course of our experiment, the content of a number of mycotoxins in mixed fodders of experimental chickens was studied. It was found that in the mixed fodder formula, prepared according to PK-5 and PK-6 formulas, in no case the increased background of T-2 toxin and ochratoxin A was

found, and the concentration of aflatoxin B₁ was within tolerant levels – up to 0.23- 0.25 mg/kg, which corresponds to a tolerant dose for meat poultry (not more than 0.25 mg/kg) [7].

When the compared groups of chickens reached the age of 42 days, control slaughter was conducted, for which 6 typical heads were selected from each group, taking into account their live weight (Table 2).

Table 2 – Indicators of control slaughter of test birds

Item	Group			
	control	1 test	2 test	3 test
Preslaughter weight of 1 head, g	2231.45±9.7	2389.63±8.8	2390.20±8.6	2475.32±8.5
Weight of half-dressed carcass, g	1841.84 ±4.2	1993.19 ± 4.0	1994.14 ±3.5	2071.10± 4.7
In % to live weight	82.54±0.16	83.41±0.29	83.43±0.20	83.67±0.15
Weight of dressed carcass, g	1439.51 ± 3.4	1560.43 ± 3.2	1561.52 ± 3.9	1624.55± 3.7
Slaughter yield, %	64.51±0.13	65.30±0.19	65.33±0.14	65.63±0.15

n=6

In the course of the experiment it was found that the highest productive effect was obtained with joint addition of preparations of Oxi-Nil at the rate of 600 g/t of feed and Tox-Nil at the rate of 750 g/t of feed to wheat-barley-sunflower mixed fodders with a tolerant dosage of aflatoxin B₁, which provided a significant ($P > 0.95$) increase in the weight of the half-dressed carcass by 12.44% and dressed – by 12.85%, and in addition, the slaughter yield – by

1.12% in broiler chickens of the 3 experimental group against the control group.

If the ecology of feeding is disturbed, the feeding conditions affect the consumer properties of poultry meat, so we studied the effect of the approved feed additives on the chemical composition of the pectoral and femoral muscles of the test chickens (Table 3).

Table 3 – Chemical composition of pectoral and femoral muscles of broilers, %

Item	Group			
	control	1 test	2 test	3 test
Pectoral muscle				
Dry matter, %	24.43±0.17	25.12±0.20	25.17±0.22	25.45±0.28
Protein, %	20.91±0.20	21.79±0.23	21.89±0.20	22.21±0.27
Fat, %	2.61±0.04	2.34±0.05	2.30±0.04	2.25±0.03
Ash, %	0.91±0.05	0.99±0.06	0.98±0.03	0.90±0.04
Femoral muscle				
Dry matter, %	23.43±0.27	24.09±0.25	24.15±0.30	24.44±0.29
Protein, %	19.01±0.19	20.03±0.25	20.07±0.23	20.30±0.22
Fat, %	3.44±0.06	3.06±0.04	3.09±0.04	3.11±0.06
Ash, %	0.98±0.03	1.00±0.04	0.99±0.06	1.03±0.05

n=6

The results of the research showed that when preparations of Oxi-Nil in a dose of 600 g/t of feed and Tox-Nilin a dose of 1250 g/t of feed were fed together, the broilers, fattened on mixed fodders with a tolerant level of aflatoxin B₁, had improved consumer properties of meat. Thus, relative to the control analogues, in meatpoultry of the 3 test group in the samples of the pectoral and femoral muscles, there was a significant (P>0.95) increase in the level of dry matter content by 1.02 and 1.01%, and protein

by 1.30 and 1.29% with a simultaneous decrease in the mass fraction of fat – by 0.36 and 0.33% (P>0.95).

When studying the consumer qualities of broiler meat grown on mixed fodders of wheat-barley-sunflower type with a tolerant dosage of aflatoxin B₁, it is important to study the protein-quality index (PQI) in the samples of the pectoral muscle of the test bird (Table 4).

Table 4 – Biological value of broiler meat

Item	Group			
	control	1 test	2 test	3 test
Tryptophan, %	1.70 ± 0.22	1.79 ± 0.25	1.81 ± 0.20	1.84 ± 0.27
Oxyproline, %	0.43 ± 0.05	0.42 ± 0.04	0.42 ± 0.05	0.40 ± 0.04
PQI	3.95 ± 0.21	4.26 ± 0.32	4.31 ± 0.23	4.60 ± 0.25

n=6

It was established that the combined feeding of preparations of Oxi-Nil at the rate of 600 g/t of feed and Tox-Nil at the rate of 1250 g/t of feed, had a more significant effect on the biological value of the meat of the test poultry grown on mixed fodders with a tolerant level of aflatoxin B₁, which was expressed in a statistically significant (P>0.95) increase of the protein-quality index of meat by 16.45% in broiler chickens of the 3 test groups as compared to the control analogues.

CONCLUSION:

To optimize the meat productivity and consumer qualities of poultry meat to rations of broilers of wheat-barley-sunflower type with a tolerated dosage of aflatoxin B₁, it is necessary to include the joint preparations of Oxi-Nil at a dose of 600 g/t of feed and Tox-Nil at a dose of 1250 g /t of feed.

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