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THE EFFECT OF INNOVATIVE HYDROPONIC FEED TECHNOLOGY ON POULTRY PERFORMANCE IN PRIVATE FARMS

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ВЛИЯНИЕ ИННОВАЦИОННОЙ ТЕХНОЛОГИИ ГИДРОПОННЫХ КОРМОВ НА ПРОДУКТИВНОСТЬ ПТИЦ В ЧАСТНЫХ ХОЗЯЙСТВАХ

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Abstract. The research was carried out at the Scientific Research Veterinary Institute and in the subsidiary farms of the Khachmaz district (Azerbaijan). The article presents data on the development of poultry farming and food production. To develop a rational and proper feeding of poultry, the addition of antibiotic-effective plants with high nutritional qualities, to the feeding of chickens was used. This led to an increase in meat productivity, a reduction in feeding costs, and an improvement in productivity. Thus, an experiment was conducted by adding the antibiotic-effective plants of sorghum, licorice root, amaranth grain and hydroponically germinated corn, barley, amaranth and sorghum grain to the feed share of young birds to study the effect on meat productivity.

Аннотация. Исследования проводились в научно-исследовательском ветеринарном институте и в фермерских подсобных хозяйствах Хачмазского района Азербайджана. В статье представлены данные о развитии птицеводства и производства продуктов питания. Для разработки рационального и правильного кормления птицы использовали добавление в кормление цыплят антибиотикоэффективных растений с высокими питательными качествами. Это привело к увеличению мясной продуктивности, снижению затрат на кормление и повышению продуктивности. Таким образом, был проведен эксперимент по введению в корм молодняка птиц антибиотикоэффективных растений сорго, корня солодки, зерна амаранта и гидропонно пророщенного зерна кукурузы, ячменя, амаранта и сорго для изучения влияния на мясную продуктивность.

Keywords: hydroponic, *Glycyrrhiza*, *Amaranthus*, chicken meat, calcium.

Ключевые слова: гидропоника, солодка, амарант, курятина, кальций.

In order to sustainably ensure innovative development in the improvement of feeding strategies within the framework of the project "Creating a value chain for sustainable development of poultry and food production" funded by the government of Azerbaijan and implemented within the framework of the FAO-Azerbaijan Partnership Program, the use of antibiotic effective plants prepared

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with hydroponic innovative feed technology is one of the main factors of increasing meat productivity and affecting the reduction of feed costs. Since poultry farming is a fast-growing, widespread and profitable branch of animal husbandry, the state's concern for the effective use of this field has increased significantly. Thus, new farmers and private farms were created in the field of poultry farming, appropriate work was done in the direction of increasing poultry production by using hydroponic and other innovative technologies. Increasing the volume of financial support related to the development of poultry every year, putting into operation and organizing the sale of production areas engaged in the production and packaging of poultry meat played an invaluable role in the development of this area.

The development of poultry farming, as well as increasing the production of poultry products, depends primarily on the health, flexibility, well-developed and uniform weight of the chicks selected for raising the mother hen flock. That is, if the mass of the eggs placed in the incubator is 55-60 g, the mass of one-day-old chicks is 35-40 g. Healthy chicks hatch on time and in mass, grow quickly and have a reduced mortality rate. Healthy chicks are selected 6-8 hours after hatching, and those left behind are hatched.

For the rational proper feeding of healthy chickens, the addition of amaranth and sable grain made from antibiotic-effective plants with high nutritional quality germinated by the application of hydroponic innovative feed technology to the feed portion of birds has a positive effect on meat productivity, reduction of feed costs, and improvement of the morphological composition of poultry meat. This is because the presence of a high-calorie protein (crude protein), as well as amino acids, and a small amount of cellulose, carotene, calcium and phosphorus in the feed portion has a positive effect on the meat productivity of young birds. The research was conducted on young birds raised in the Khachmaz district farmer's poultry farm and the Veterinary Scientific Research Institute. Thus, an experiment was conducted by adding the antibiotic-effective plants of sorghum, licorice root, amaranth grain and hydroponically germinated corn, barley, amaranth and sorghum grain to the feed share of young birds to study the effect on meat productivity.

The mentioned feeds have antibacterial and antitoxic properties, regulate water-salt exchange, help the normal functioning of the stomach, stimulate the peristalsis of the gastrointestinal tract, strengthen the endocrine and immune system and the body's resistance to disease. As a result of the conducted studies, it was determined that the amount of crude protein in amaranth grain germinated by hydroponic method is 23.1%, 33.9% in sable grain and19.9% in linolenic acid in the mentioned seeds, which is capable of breaking down muscles and increasing the fat layer, strengthen the immune system by reducing the level of the stress hormone cortisol. As a result, the transport of nutrients in the cells improves, which allows for easier absorption of nutrients, improves calcium balance and increases the density of bone tissue. The use of the mentioned feeds in a mixture with fortified feed has a positive effect on meat productivity, the improvement of the morphological composition and quality of the meat and the development of young birds. A control group of 20 heads and three experimental groups were formed in each group. Birds in the control group were fed with poultry feed with a nutritional value similar to the normal recipe. The birds in the experimental group were fed with antibiotic effective bird feed prepared with innovative hydroponic feed technology.

The birds in the first experimental group received a mixed feed of 10.0 kg/ton of "shanbella grain" and 4 kg/ton of "hydroponic shenballe"."Amaranth grain" and 4.0 kg/ton of "hydroponic amaranth" was mixed to feed the birds of the second experimental group. In the feeding of the birds of the third experimental group, the mixed feed was 10.0 kg/ton of "shenballa grain", 4.0 kg/ton of "hydroponic shanbella", 10.0 kg/ton of "amaranth grain" and 4.0 kg/ton of "hydroponic amaranth". Ground sweet licorice root at a rate of 4.0 kg/ton was also added to the ration along with the grain. Studies have shown that the use of antibiotic effective plants has a positive effect on meat

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productivity, morphological composition of young birds, quality and development of birds. These factors lead to an increase in live weight and a decrease in feed costs. In order to raise productive birds in the poultry sector, high requirements are placed on feeding healthy young birds with high potential. Since the need for minerals is very important for young birds, vitamin and mineral supplements are prepared for them. The main criteria for feeding young birds with the use of full-value antibiotic-effective plants: the improvement of the morphological composition of meat, quality and development of birds, live weight, reducing feed costs and efficient use of feed. The aim of this experiment is to study the qualities of the morphological composition of the meat by using "antibiotic-effective plants prepared with hydroponic innovative feed technology" in feeding. Which should encourage the production of high-quality meat.

The place, material and methodology of Scientific farm experimental studies were conducted on young birds in 2020-2022 at the Veterinary Scientific Research Institute and Khudat poultry farm of the Khachmaz region. The experiment was carried out in accordance with the recommendations of the All-Russian Scientific-Research Poultry and Technological Institute (ВНИТИП), for keeping and feeding birds in all groups, as well as the parameters of the microclimate. Four groups of birds (control and three experimental groups) were allocated for the experiment. Birds of all four groups were kept in separate aviaries. The birds of the control group were fed according to the basic ration adopted in the farm. The birds of the experimental group were fed with the addition of antibiotic-effective feed prepared with innovative hydroponic feed technology to their basic rations. The scheme of the experiment is shown in the table below.

Table 1

SCHEME OF THE EXPERIMENT

Groups	*Features of feeding*
Control	Basic ration
I experiment	Basic ration + 10.0 kg/ton of sable + 4.0 kg/ton of hydroponic sable.
II experiment	Basic ration + 10.0 kg/ton of amaranth grain + 4.0 kg/ton of hydroponic amaranth
III experiment	Basic ration + 10.0 kg/ton of sorghum grain+ 4.0 kg/ton of hydroponic sorghum+ 10.0 kg/ton of amaranth grain+4.0 kg/ton of hydroponic amaranth + 4.0 kg/ton of ground sweet licorice root.

The storage conditions in all four groups were the same and corresponded to the adopted technological parameters for keeping young birds. In the course of the research, we studied the meat yield of the birds, the morphological composition of the meat, and also the preservation of the number of heads.

Good digestibility of poultry meat (93%) is related to its chemical composition, which depends on the type, age, fatness of the bird, nutritional quality of the feed ration, sex and other factors. The fat content of the meat of young birds is less than that of older birds. Due to its melting ability (melting temperature is 23-40°C), poultry fat melts well (93.5%) and is evenly distributed in the muscle tissue during roasting. The nutritional value of young poultry is characterized by an increase in protein digestibility (95.7%) of all proteins. Poultry meat contains methionine, cystine or valine and isoleucine, with a ratio of 75%-85% of amino acids. Young poultry meat contains less fat, more nitrogen extractives and creatine than red meat. Poultry fat contains saturated fatty acids, such as palmitic and stearic, and unsaturated fatty acids, predominantly oleic, linoleic and arachidonic acids.

Poultry meat contains potassium (about 200 mg), sodium (about 100 mg), phosphorus (about 200 mg%), iron (1.5-5 mg%), copper and other vitamins such as B1 (0.07-0.27 mg%), B2 (0.14-0.26 mg%),and PP (2.2-7.6 mg%). Young poultry meat is a very valuable food product suitable for dietary

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food in terms of its nutritional properties. Below is the chart detailing the mass (M±m) indicators of meat productivity in birds in the experimental group (Table 2).

Table 2

INDICATORS OF MEAT PRODUCTIVITY IN BIRDS IN THE EXPERIMENTAL GROUP

Indicators	Group (M ± m)			
	Control	1-d experiment	2-d experiment	3-d experiment
Trimmed body weight (kg)	1,94±0.33	2,33±0.38	2,21±0.37	2,37±0.42
Cleaned live weight (kg)	1,35±0.37	1,64±0.31	1,56±0.31	1,69±0.31
Meat yield in %	69,6±0.13	70,4±0.17	70,5±0.15	71,3±0.14
Total muscle weight, (g)	893,21±1.32	942,21±4.31	949.27±1.32	995.84±4.31
Pectoral muscle section, (g)	398,12±0.5	438,14±2.53	448,13±2.53	458,16±2.53

In the table, the mass (M±m) indicators of the meat productivity of the birds in the experiment are shown in 3 groups: control, experiment 1, experiment 2 and experiment as follow:

Trimmed body weight (kg)1,94±0.33; 2,33±0.38; 2,21±0.37; 2,37±0.42;

Cleaned live weight (kg) 1,35±0.37;1,64±0.31; 1,56±0.31; 1,69±0.31;

Meat yield in % 69.6 ± 0.13 70.4 ± 0, 17; 70,5±0.15; 71,3±0.14;

Total muscle weight, (g) 893±1.32; 942±4.31; 949.27 ± 1.32; 995.84 ± 4.31;

Pectoral muscle section (g) (q) 398±0.5; 438±2.53; 448±2.53; 458±2.53;

Meat yield in experimental birds in %:

Control (basic ration) — 69.6%

1-st experiment (shanbella) — 70.4%

2-nd experiment(amarant) — 70.5%

3-rd experiment (shanbella-amarant) — 71.3%

We determined that the meat yield in the third experimental group was 71.3%, which is 1.7% more than the control. In the first and second groups, the meat yield was 0.8 and 0.9% higher than the control, respectively. Based on this, it can be noted that the use of antibiotic effective plants prepared by hydroponic innovative feed technology in feeding had a significant positive effect on the meat yield and the morphological quality of the meat in the experimental groups.

Below is a table showcasing the chemical composition and energy value of 100 grams of chicken meat from each group in the experiment (Table 3).

Table 3

CHEMICAL COMPOSITION AND ENERGY VALUE

Group	*Category*	*Water (q)*	*Fat (q)*	*Cabohydrates (q)*	*Proteins (q)*	*Energy cost (kkal)*
Control	I	51,5	15,9	12,2	14,6	181,5
1st experiment	I	53,7	15,2	13,5	15,7	197,4
2nd experiment	I	52,8	15,3	13,3	15,3	185,9
3rd experiment	I	55,3	15,1	13,9	15,9	199,7

In the table, the chemical composition and energy value indicators of 100 grams of chicken meat in the experimented chickens were as follows in the control, first experiment, second experiment and third experiment groups: in I-category (soruş) group poultry meat — Water 51,5; 53,7; 52,8; 55,3; Fat-15,9; 15,2;15,3; 15,1; Proteins — 14,6; 15,7; 15,3; 15,9; Carbohydrates — 12,2; 13,5; 13,3; 13,9.

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Young poultry is a type of white meat that is used quite a lot. The increase of carbohydrates and protein in the muscle tissue of the meat of the birds in the 3rd experimental group led to the increase in the nutritional value of the meat, but the decrease in the fat level led to the formation of dietary meat. More than half of the fat layer of birds is located under the skin (in the chest, back, abdomen, tail), the rest is located between the muscle ligaments, in the muscular part of the intestine and stomach. With the uniform distribution of fat between the muscle ligaments in the total muscle mass, the poultry meat is tender, has a special taste and is fragrant.

Young poultry is a type of white meat that is used quite a lot. The increase of carbohydrates and protein in the muscle tissue of the meat of the birds in the third experimental group led to the increase in the nutritional value of the meat, but a decrease in the fat level led to the formation of dietary meat. More than half of the fat layer of birds is located under the skin (in the chest, back, abdomen and tail), the rest is located between the muscle ligaments, in the muscular part of the birds' intestines and stomach. With the uniform distribution of fat between the muscle ligaments in the total muscle mass, the poultry meat is tender, has a special taste and is fragrant. The ratio of edible and non-edible parts in a bird depends on their age and degree of fatness. There are more edible parts in the total muscle mass of a Category I than a Category II. When young birds get fat, the weight increases due to the formation of muscle tissue and fat layer, and when fattening an adult bird, the weight increases mainly due to the deposition of fat. Nevertheless, the relative mass of muscle tissue, subcutaneous fat, and visceral fat increases and the percentage of bones decrease. Energy value of 100 grams of poultry meat by experimental groups in kcal: 1stexperiment 197.4 kcal; 2ndexperiment 185.9 kcal; 3rdexperiment 199.7 kcal; Contol 181.5 kcal.

We determined that the energy value of 100 grams of poultry in the third experimental group was 199.7 kcal, which is 18.2 kcal more than the control. In the first and second groups, the energy value of the meat was 15.9 and 4.4 kcal higher than the control, respectively. Young poultry meat contains vitamin B6, many proteins and gluten. For this reason, it is considered an excellent food for cardiovascular and nervous system symptoms. The proteins and glutamine contained in young poultry meat strengthens the nervous system and the body. Niacin in young poultry is considered a medicine for damaged nerve cells. Niacin also improves heart function, controls the amount of cholesterol in the blood and increases gastric juice. Thus, in the birds of the third experimental group, the muscle color is pink and white and the mass of muscles is larger than the control; the breast part by25.5%, the legs by32.85%, the dorsal-back by24.2%, the neck 7.3%, and the wings by10.5%. Compared to the control, these indicators were lower in the leg part 33.6%, the dorsal-back part 24.1%, the neck 8.52%, the wings 12.28%, mainly in the pectoral muscle part 21.5%.

Soruş Broth, boiled and fried breast ("white" meat) and thigh muscles ("red" meat) of birds in the third experimental group had all organoleptic indicators of high quality. To evaluate the quality of meat, the following indicators were considered: - organoleptic characteristics (appearance, texture, smell, fat condition, tendon condition, broth transparency), the presence of primary protein decomposition products in the broth (quality) and the amount of volatile fatty acids.

1. The use of antibiotic effective feed prepared by innovative hydroponic feed technology had a significant positive effect on the meat yield and morphological quality of the birds in the experimental groups.

2. The inclusion of amaranth and sherbane in the mixed feed with high nutritional quality, germinated by the hydroponic method, had a positive effect on the increase in the live weight of young birds and the reduction of feed costs.

The obtained results are recommended to be used in poultry farms.

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