

ANNOTATION

Dissertation work of Ablayeva Elmira The effectiveness of the use of the anti-stress preparation "Hydro Rex vital" in the cultivation of broiler chickens submitted for the degree of Doctor of Philosophy (PhD) in the educational program 8D08201 Technology of livestock production

Relevance of the research topic. Poultry farming is considered one of the main branches of agriculture and possesses high economic potential. In general, at the present stage, scientists in the field of poultry farming are conducting extensive research aimed at increasing the productivity level of poultry. Due to the increase in productivity, the resistance of poultry to adverse environmental influences decreases, and their sensitivity increases. It is known that the immune, digestive, and reproductive systems are the most sensitive to stress factors, which negatively affects their productivity and hinders the full realization of the genetic potential of the poultry. Scientific data indicate that stress plays a leading role in the development of pathological processes in the poultry organism, and consequently, the economic efficiency of poultry products decreases. "Hydro Rex vital" is a feed supplement maximally enriched with water-soluble amino acids, and its study is relevant due to its ability to reduce the impact of stress factors. Research over the last two decades has proven that most stresses in poultry, taking into account local characteristics, are associated with the formation of free radicals and detoxification processes in the body. Therefore, the need has arisen to deeply study the ways to reduce the impact of these processes and determine their effects, which is one of the pressing problems today.

The use of the water-soluble feed supplement "Hydro Rex vital," consisting of amino acid compositions, during the rearing and intensive fattening of broiler chickens allows normalizing metabolic processes in the body and improving productivity indicators. Data obtained during scientific-economic experiments show that these studies are aimed at improving the technology of growing broiler chickens and have high practical value for broiler factories in the South-Eastern region of Kazakhstan. It has been established that when stress-inducing factors appear, the body's need for amino acids, vitamins, macro- and microelements increases significantly. Accordingly, to achieve the intended product, the requirements for the volume and structure of compound feed in ration norms, designed considering specific sex and age, also increase. In this regard, the use of the water-soluble amino acid feed supplement "Hydro Rex vital" during the intensive fattening period, as well as the need for an in-depth and comprehensive study of its effectiveness and dosage, is an important issue.

Goal and objectives of the research.

The goal of the research is to study the zootechnical and economic efficiency of using the water-soluble anti-stress feed supplement "Hydro Rex vital," as well as to reduce the consequences of stress factors arising during the rearing of broiler chickens.

Research objectives:

1. To determine the rational dosages of the water-soluble anti-stress feed supplement "Hydro Rex vital" when rearing broiler chickens of the "Arbor Acres" cross in different seasons of the year.

2. To study the effect of the water-soluble anti-stress feed supplement "Hydro Rex vital" on the zootechnical indicators (survival rate, productivity, feed costs, meat qualities of carcasses, and meat quality) of broiler chickens of the "Arbor Acres" cross in different seasons of the year.

3. To investigate the effect of the water-soluble anti-stress feed supplement "Hydro Rex vital" on the morphological and biochemical blood parameters of broiler chickens of the "Arbor Acres" cross in different seasons of the year.

4. To determine the economic efficiency of using the water-soluble anti-stress feed supplement "Hydro Rex vital" when rearing broiler chickens of the "Arbor Acres" cross in different seasons of the year, specifically: revenue from product sales, meat cost price, profit, profitability, and economic result.

Scientific novelty.

In the conditions of Kazakhstan, for the first time, the effect of the water-soluble anti-stressogenic feed supplement "Hydro Rex vital" on the viability, productive qualities, feed conversion, as well as on the morphological and biochemical blood parameters of broiler chickens across different seasons of the year has been comprehensively studied. This determines the relevance and scientific novelty of the conducted research.

Research methods. Scientific-economic experiments were conducted on the basis of the peasant farm "Altynbek" (Zhetygen village, Almaty region), JSC "Nauryz Agro," as well as in the laboratory of the Kazakh-Japanese Innovation Center of KazNARU. The experiments were carried out during the autumn, summer, and winter periods. In each experiment, a control group and three experimental groups (30 birds each) were formed. The control group received only the basic ration, while experimental group I additionally received the supplement with water at the rate of 200 ml/ton of water, group II – 300 ml/ton, and group III – 400 ml/ton. The duration of the experiment was 42 days. During the rearing period, the following indicators were studied: survival rate, live weight gain, feed consumption, slaughter indicators of meat, morphological and biochemical composition of blood, natural resistance of the organism (Bactericidal, Lysozyme, and Phagocytic Activity of blood serum), chemical composition of meat (protein, fat, ash, moisture), and weight of internal organs. Statistical data processing was performed using the Microsoft Excel program according to Student's t-test.

Main provisions submitted for defense:

1. Justification of rational dosages of the water-soluble anti-stress feed supplement "Hydro Rex vital" when rearing broiler chickens of the "Arbor Acres" cross in different seasons of the year.

2. Survival rate, productivity, feed costs, meat qualities of carcasses, and meat quality of broiler chickens when using the water-soluble anti-stress feed supplement "Hydro Rex vital" in different seasons of the year.

3. The effect of the water-soluble anti-stress feed supplement "Hydro Rex vital" on the morphological and biochemical blood parameters of broiler chickens of the "Arbor Acres" cross in different seasons of the year.

4. Economic efficiency of using the water-soluble anti-stress feed supplement "Hydro Rex vital" when rearing broiler chickens of the "Arbor Acres" cross in different

seasons of the year (costs per kilogram of meat, revenue from product sales, meat cost price, profit, profitability, economic result).

Main research results.

Autumn experiment. The survival rate of broiler chickens in the control group was 90.0%, while in the experimental groups it was 93.3-96.7%. The average daily live weight gain was 58.3 g in the control and 60.0-62.0 g in the experimental groups. Feed costs per 1 kg of live weight gain decreased: in group I – by 5.95%, in group II – by 8.65%, in group III – by 15.14%. Meat slaughter yield increased by 2.7-4.1 percentage points compared to the control. Biochemical blood parameters improved: the levels of erythrocytes, hemoglobin, total protein, albumins, and calcium increased, while the activity of ALT and alkaline phosphatase decreased. The chemical composition of meat showed an increase in protein content and a decrease in fat content. In experimental group II (300 ml/ton), profitability was 32.14%, which is 14.32 percentage points higher than the control. Economic efficiency per initial bird was 241.67 tenge.

Summer experiment. Survival rate in the control group was 86.7%, in the experimental groups – 90.0-96.7%. The average daily live weight gain was 62.2 g in the control and 64.1-66.8 g in the experimental groups. Feed costs per 1 kg of gain decreased by 5.91-12.9% compared to the control. Meat slaughter yield increased by 0.9-2.2 percentage points. Under conditions of summer heat stress, the dose of 400 ml/ton (group III) was effective, where profitability was 35.6%, which is 16.2 percentage points higher than the control. Economic efficiency per bird was 281.09 tenge.

Winter experiment. Survival rate in the control was 86.7%, in the experimental groups – 90.0-96.7%. The average daily live weight gain increased from 60.9 g to 62.55-63.06 g. Feed costs decreased by 4.35-8.70%. Meat slaughter yield increased by 0.6-2.3 percentage points. During this period of the year, the dose of 300 ml/ton (group II) also showed high efficiency: profitability – 33.70%, which is 15.81 percentage points higher than the control. Economic efficiency per bird was 344.33 tenge.

According to the averaged data of three experiments, the use of the anti-stress feed supplement increased absolute live weight gain by 3.35-4.58%, slaughter yield by 1.40-2.57 percentage points, and reduced feed costs by 4.42-9.95%. The cost price of 1 kg of meat decreased by 4.45-9.87%, profitability increased from 19.26% to 24.83-32.33%. On average, economic efficiency per initial bird ranged from 122.67 to 291.67 tenge.

Production testing.

The experiments were conducted at "NAURYZ AGRO" LLP (Almaty region) during the summer, autumn, and winter periods on 25,000-44,000 broiler chickens. Compared to the basic variant, in the new variant, survival rate increased on average by 7.7 percentage points (up to 93.5-94.8%); the cost price of 1 kg of meat decreased by 8.73-10.65%; profitability increased by 11.14-14.19 percentage points (up to 27.4-33.27%). Economic efficiency per initial bird ranged from 248.0 to 318.4 tenge.

Conclusions.

1. The use of the anti-stress feed supplement "Hydro Rex vital" had a positive effect on the survival rate of broiler chickens in all seasons of the year. In the summer period, survival in the experimental groups was 90.0-96.7% versus 86.7% in the

control; in the autumn period – 93.3-96.7% versus 90.0% in the control; in the winter period – 90.0-96.7% versus 86.7% in the control, respectively.

2. The use of the anti-stress feed supplement "Hydro Rex vital" contributed to increasing the meat productivity of poultry. The average daily live weight gain in the experimental groups exceeded control indicators in all experiments: summer period – 64.1-66.8 g versus 62.2 g in the control; autumn period – 60.0-62.0 g versus 58.3 g in the control; winter period – 62.55-63.06 g versus 60.9 g in the control. The absolute live weight gain during the rearing period per bird in the experimental groups was 2702.7-2798.7 g (summer), 2519.7-2604.1 g (autumn), and 2627.3-2648.7 g (winter), which is 3.49-7.16%, 2.92-6.36%, and 2.72-3.56% higher than control values (2611.6 g, 2448.3 g, and 2557.7 g, respectively).

3. The use of the anti-stress feed supplement "Hydro Rex vital" contributed to increasing the slaughter yield of meat. In the best experimental variants, the advantage of this indicator compared to the control was: in the summer period – 2.2, in the autumn period – 4.1, and in the winter period – 2.3 percentage points.

4. The use of the anti-stress feed supplement "Hydro Rex vital" ensured a reduction in feed costs per 1 kg of live weight gain. In the best experimental groups, this indicator was lower than the control level by 12.4% (summer), 15.1% (autumn), and 6.5% (winter).

5. The use of the anti-stress feed supplement "Hydro Rex vital" was accompanied by positive changes in the morphological and biochemical composition of the blood, as well as an increase in the level of natural resistance of the organism of broiler chickens:

- a significant increase in the number of erythrocytes and leukocytes ($P < 0.05 - 0.001$) was established, as well as a tendency towards an increase in hemoglobin level in all seasons of the year;

- an increase in total protein, albumins, and globulins was observed in the blood serum, indicating an intensification of protein metabolism;

- a decrease in alkaline phosphatase activity was recorded in all experimental groups, along with an increase in the content of B vitamins (B₁, B₂, B₆, choline, folic acid) and calcium.

6. The use of the anti-stress feed supplement "Hydro Rex vital" had a positive effect on the chemical composition of meat. In the breast and thigh muscles of the chickens in the experimental groups, the following was observed:

- an increase in total protein content: in the autumn period – by 3.47-4.67 and 0.66-5.94 relative percent, respectively; in the summer period – by 3.77-4.98 and 4.89-5.05 relative percent; in the winter period – by 4.52-5.70 and 6.64-7.11 relative percent;

- a decrease in fat content: in the autumn period – by 1.32-2.63 and 0.56-3.43 relative percent, respectively; in the summer period – by 0.70-2.10% and 2.68-4.91 relative percent; in the winter period – by 1.52-3.03 and 0.91-1.52 relative percent.

7. Production verification confirmed the results of the experiments. The use of the anti-stress feed supplement "Hydro Rex vital" made it possible to reduce the cost price of 1 kg of meat in slaughter weight. In the new variants, the reduction compared to the basic variant was 10.65% (summer), 9.44% (autumn), and 8.73% (winter). The

profitability of meat production thus increased: in the summer period – by 14.19, in the autumn period – by 12.04, in the winter period – by 11.14 percentage points.

8. The economic efficiency per initial bird in the new variants with the optimal dose of the anti-stress feed supplement "Hydro Rex Vital" was 318.38 tenge (summer), 254.19 tenge (autumn), and 247.98 tenge (winter).

Recommendation for production.

In order to increase the productivity of broiler chickens, improve meat quality, increase the survival rate of the stock, and the overall profitability of production, it is recommended to use the water-soluble feed supplement "Hydro Rex vital" from one day of age until the end of rearing in the following dosages: in the summer period – 400 ml/ton of water, in the autumn and winter periods – 300 ml/ton of water.

Description of the doctoral candidate's contribution.

With the participation of scientific supervisors, the author directly developed the entire research plan and methodology. She independently selected and systematized specialized literature on the dissertation topic. She personally conducted the experiments, processed the data obtained from the experiments, and summarized the research results. She prepared the manuscripts of the dissertation and annotations, scientific publications, and presentations.

Scope and structure of the work. The dissertation work consists of an introduction, a literature review, research results and their discussion, production testing, conclusion, findings, recommendations for production, future directions of the topic, a list of used literature, and appendices. The volume of the dissertation work is 101 pages, together with appendices – 108 pages. The work contains 32 tables and 16 figures for a clear presentation of the results. The list of used literature includes 157 sources by domestic and foreign authors.