

Ecological and Economic Justification for Handling of Broiler Production by-Products

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Abstract

The solution of the scientific task is offered, which consists of substantiation of scientific and methodical bases concerning the formation of ecological and economic bases for the handling of broiler production by-products. The introduction of the system of handling by-products is substantiated: picking; removal; transportation; storage; processing, recycling; decontamination; disposal; utilization. Established that the intensive development of broiler poultry production, in particular: the growth of the volume and dynamics of poultry production in the world, leads to the need for an ecological and economic solution to the problem of handling by-products of broiler production. Proved that one of the promising technologies is the processing of chicken manure and the production of organic and organo-mineral fertilizers.

Keywords: broiler poultry production, by-products, system handling, chicken manure, processing, economic efficiency.

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INTRODUCTION

Today broiler poultry production - is part of a global system of food production. Dietary high-protein poultry production meat products are a necessary part of the diet of the majority of the population. However, the intensification and, consequently, the economic efficiency of poultry production is not an indicator of the sustainable development of modern broiler poultry production. After all, by-products formed in the process of production, with their uncontrolled constant accumulation along with production facilities, pose a great threat to the environment and, as a consequence, to human health.

Therefore, the solution of issues related to the treatment of animal by-products is relevant in the field of environmental protection, especially for domestic industrial poultry, which should not only supply biologically complete protein products but also not cause negative environmental consequences in terms of intensification of poultry production. The search for ways to process and dispose of manure in industrial poultry has ecological, economic, veterinary, health, and social significance.

ANALYSIS OF THE LASTS RESEARCH AND PUBLICATIONS

Problems of the impact of industrial poultry production on the ecological state of the environment, prevention of ecological risks and search for rational ways of handling by-products are covered in the scientific works of domestic and foreign scientists V.P. Borodai, V.O. Pinchuk, O.V. Tertychna, D.J. Fisher, K.W. Staver, J. Hartung, J. Schulz and others [1,2]. Special attention is paid to the study of the issues of effective functioning and development trends of modern poultry production in the scientific works of leading scientists: R.I. Buriak, A. Mottet, V.M. Mykytiuk, Yu.H. Vlasenko, S.O. Hryhoriev, V.I. Fisinina, M. Vaarst,

H. Steinfeld, K. Horsted, and others [3,4].

Paying tribute to the value of scientific achievements of these scientists, it should be noted that until now have not been substantiated scientific approaches formation of ecological and economic bases for the handling of broiler production by-products and the introduction of environmental technologies for their processing and utilization.

MATERIALS AND METHODS RESEARCH

The research was conducted using abstract-logical (to generalize the theoretical provisions on the treatment of by-products of broiler production, the establishment of causal relationships); statistical (for statistical data processing); comparative analysis (to compare different technologies for the production of organo-mineral fertilizers from by-products); calculation and design (to select the optimal method of disposal of chicken manure); system (for the development of an algorithm for assessing the ecological state of the environment under the influence of intensive poultry production; identification of factors influencing the state of the environment in areas of industrial poultry production).

RESULTS AND DISCUSSION

The world's tendencies and prospects of the development of modern poultry production are analyzed. The EU is the third-largest regional poultry producer (16.6 million tonnes) in the world, after the United States (around 23.2 million tonnes) and China (19.4 million tonnes) [5,6].

According to the International Poultry Council, the consumption of poultry meat worldwide averages 13.6 kg per person, ranging from 1.77 kg in India to 43.81 kg in the United States [7,8].

Consumption of poultry meat in the EU average increased over the past five

Ecological and Economic Justification for Handling of Broiler Production by-Products years from 22.1 to 25.0 kg per capita. [9] This trend can be explained by the constant demand for chicken in both domestic and foreign markets. Poultry farming is important in ensuring the country's food security.

Increasing poultry production seven times and eggs three and a half times for 40 years [5] is a huge challenge for sustainable development. At the same time, the poultry sector embraces the contrast between the dominant global large corporations and small producers. This can be seen as a great potential, as many different trends and incentives can be explored and used [10]. Poultry production is one of the most economically attractive and competitive types of agribusiness, as evidenced by the annual steady growth of poultry meat production.

Poultry enterprise should be considered as a natural-industrial complex, consisting of the use of natural resources, production, and processing of basic products, disposal of by-products. The increase in broiler production in Ukraine inevitably leads to the formation of by-products of animal origin, which leads to the implementation of processes of rational processing of chicken manure to the production cycle activities of poultry production.

The system of handling animal by-products includes the following components: creation, collection, transportation, storage, manufacturing, processing, disposal, use, removal.

It is proposed to include in the principles of functioning of the system of handling animal by-products: compliance with the regulatory framework; implementation of modern world practices; system, the complexity of use of raw materials and energy resources; cyclical material flows, limited impact of production on the environment; rationality and efficiency of handling by-products of broiler production; social significance.

Systematization ensures the implementation of economically sound ways to prevent, reduce, neutralize pollutants at all stages of production: from the prepa-

ration of raw materials to the main products.

By this principle, the system of handling by-products of broiler production should be considered as part of a dynamic socio-economic and ecological system. This approach is consistent with the opinion of Ukrainian scientists to determine the strategy for the development of agricultural production, taking into account environmental, social, and economic factors [11]. In today's complex environmental and economic conditions, this is a requirement of today.

The proposed system covers the production and economic complex of the enterprise for the production of basic poultry products. The proposed system covers the production and economic complex of the enterprise for the production of basic poultry products. Integration of production, economic, organizational, natural, social, managerial, technological, and other resources create a new ecological and economic format of meeting the food needs of consumers, achieving economic efficiency and profitability of economic entities, prevention of the negative impact of poultry production on the environment.

The task of introducing a system of handling by-products is to create closed production cycles with recycling of raw materials, when each end link of one production serves as the initial link of the next, as a result of which unused by-products and waste enter the environment and minimize negative consequences for the environment.

Evaluating the effectiveness of management strategy of handling by-products of production is the basis for making specific management decisions on the choice of areas of development, streamlining the organization, finding ways and methods to achieve the effectiveness of such a strategy and forecasting for the future, creating a system of information and analytical support for the functioning of the system of handling by-products of broiler production (Figure 1).

Effective environmental quality management requires optimization measures

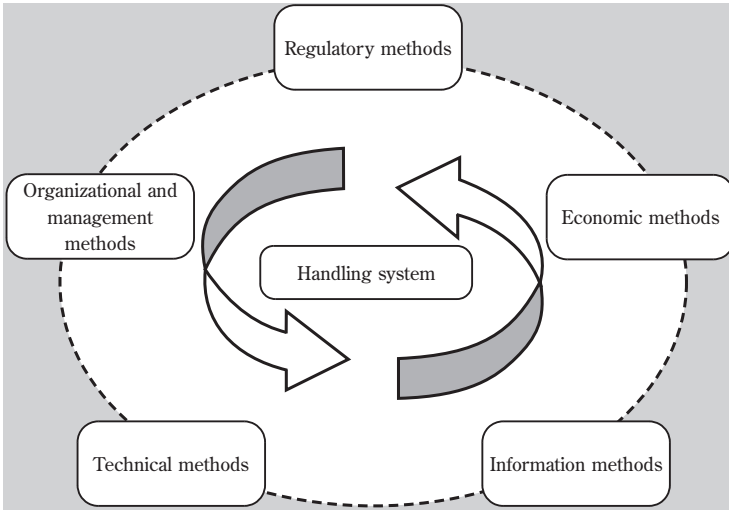


Fig. 1. The methodological basis for regulating the system of handling by-products of industrial broiler poultry production

Source: systematized by the author

and is possible only if a comprehensive assessment of the state of ecosystems, including the study of abiotic and biotic blocks.

With the rational use of nature, economic activity focuses on resource conservation, the feasibility of using natural resource potential, and the use of the latest technologies, which allows to improve the environment and obtain a significant economic and environmental effect.

In the context of the conceptual formation of ecological and economic bases of poultry production, it is proposed to consider poultry production by the Conceptual Model of Quality of Life and Human Health developed at the Institute of Agroecology and Environmental Management, which is supplemented and optimized, taking into account modern realities of production and consumption (Figure 2).

The development of poultry farming should be based on solving a threefold

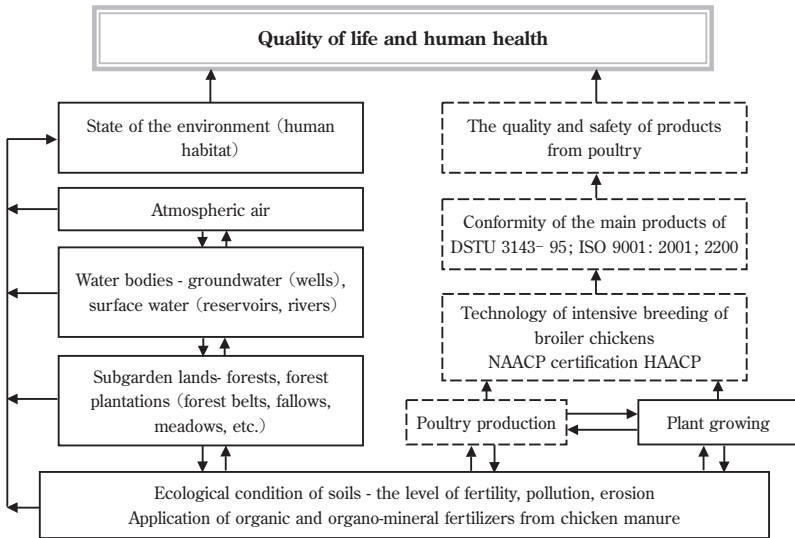


Figure 2. Conceptual model of quality of life and human health in the context of production and consumption of poultry products

Source: supplemented by the author [12.13].

task: achieving appropriate organizational, technological, environmental, and social conditions of enterprises and the industry as a whole, aimed at saving full production costs and increasing production, and improving the financial and economic condition of enterprises.

Solving the problem of preventing pollution by air pollutants, greenhouse gases, bird droppings, wastewater is relevant for all poultry farms in Ukraine. Lack of sufficient capacity for disposal of animal by-products, unsatisfactory technical equipment of existing capacities, and uneven placement in the country in the absence of systematic logistics of by-products increase the risks of deterioration of ecological, epidemiological, epizootic, social situation.

The processing of by-products, in particular chicken manure, will prevent significant environmental risks in areas of intensive poultry production and will con-

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tribute to additional income. It is now important and relevant to find cost-effective and environmentally friendly ways to further use the by-products of poultry production. One of the promising areas of the greening of domestic broiler poultry is the production of organo-mineral fertilizers, the use of which preserves soil fertility and increases the economic efficiency of the production entity's broiler direction.

It is proposed that one way to reduce environmental stress in areas of meat production and given the prospect of greening broiler poultry, optimization and improvement of by-products utilization technologies in the direction of full use of physical mass and nutrients of manure, which allows reducing pollution of water sources, soil, as well as to reduce the release of ammonia and greenhouse gases into the environment.

The introduction of new methods in the form of modern energy-saving technologies, production management helps reduce the eco-destructive impact of industrial production of poultry products on the environment is promising in solving environmental problems that arise in the process of finding cost-effective strategies for the handling of by-products.

Trends in the greening of agriculture, which are based on maintaining natural soil fertility, reducing the anthropogenic load on natural resources, and increasing prices for mineral fertilizers necessitate the production and use of organo-mineral fertilizers.

The level of profitability from 27% to 45% was determined by the results of the analysis of the economic efficiency of the production of organo-mineral granular fertilizer based on chicken manure. Achieving the planned level of profitability is possible under the following conditions: automation of production processes, control of employee productivity, price monitoring of input resources, optimization of energy costs, and sales of finished products with maximum profitability.

Checked of the use of organo-mineral fertilizer in the experiment of growing spring barley, spring wheat, and oats were tested. Based on the use of organo-mineral fertilizers in the cultivation of spring barley, spring wheat, oats in 2019, an increase in yield and profit of these crops was found in comparison with the control, namely, respectively: 9.9% (profit 1637 UAH / ha); 9.8% (2124 UAH / ha); 8.7% (912 UAH / ha). These data confirm both economically and environmentally promising use of by-products of broiler production in agriculture.

Theoretically proven and practically confirmed the economic feasibility of using organo-mineral fertilizers. This is a promising area of handling by-products of broiler production and takes into account modern ecologically oriented requirements for agricultural production.

CONCLUSIONS

Thus, it is substantiated that the integrative combination of methods, techniques, and principles allows the formation of a system of handling by-products taking into account the ecological and economic features of modern intensive broiler poultry production and in the context of forming the conceptual foundations of sustainable development and by the Conceptual model of quality of life and human health. The principles of functioning of the system of treatment of animal by-products are offered: compliance with the regulatory framework; implementation of modern world practices; systematicity; the complexity of use of raw materials and energy resources; cyclicity of material flows; the limited impact of production on the environment; rationality and efficiency of handling by-products of broiler production; social significance.

Established that the intensive development of broiler poultry, in particular: the growth of the volume and dynamics of poultry production in the world, leads to the need for an environmental and economic solution to the problem of handling

Ecological and Economic Justification for Handling of Broiler Production by-Products by-products of broiler production. It is proved that one of the promising technologies is the processing of chicken manure and the production of organic and organo-mineral fertilizers, the use of which is the cultivation of crops will contribute to the accumulation of nutrients and preserve soil fertility.

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