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THE IMPACT OF BIOLOGICAL AND CHEMICAL WASTE GENERATED AT POULTRY FARMS ON THE ENVIRONMENT.

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Summary: Poultry farms and large poultry farms are engaged in the production of edible eggs and chicken meat at their enterprises.. The health and environmental system has a primary task - to protect and strengthen the health of the population around poultry farms and plants. In modern society, the problem of responsible destruction of poultry and livestock products is very relevant. Agriculture generates more than 250 million tons of waste annually, of which 150 million tons come from livestock and poultry farming. And improper disposal of this kind of waste can endanger human and animal health, lead to air pollution and ecosystems. Pathogenic microorganisms contained in waste can transmit diseases affecting both farm animals and humans through contaminated food and water. The level of mechanization of production processes in poultry farms is high. Egg-based poultry farms are considered more efficient and economical. When implementing such measures, this situation is achieved through the improvement of production technologies, the impact of environmental factors and the implementation of a set of hygiene measures.

Keywords: ecology, biological, chemical factors, technological processes.

ВОЗДЕЙСТВИЕ БИОЛОГИЧЕСКИХ И ХИМИЧЕСКИХ ОТХОДОВ, ОБРАЗУЮЩИХСЯ НА ПТИЦЕВОДЧЕСКИХ КОМПЛЕКСАХ, НА ЭКОЛОГИЧЕСКУЮ СРЕДУ.

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Аннотация. Птицефабрики и крупные птицефабрики на своих предприятиях занимаются производством пищевых яиц и куриного мяса. Перед

системой здравоохранения и экологии стоит первоочередная задача - защитить и укрепить здоровье населения вокруг птицефабрик и заводов. В современном обществе проблема ответственного уничтожения продуктов птицеводства и животноводческой продукции очень актуальна. В сельском хозяйстве ежегодно образуется более 250 миллионов тонн отходов, из которых 150 миллионов тонн приходится на домашний скот и птицеводство. А неправильная утилизация такого рода отходов может угрожать здоровью людей и животных, привести к загрязнению воздуха и экосистемам. Патогенные микроорганизмы, содержащиеся в отходах, могут передавать болезни, поражающие как сельскохозяйственных животных, так и людей, через загрязненные продукты питания и воду. Уровень механизации производственных процессов на птицефабриках высок. Птицефабрики, работающие на основе яиц, считаются более эффективными и экономичными. При реализации подобных мероприятий такое положение достигается за счет совершенствования технологий производства, воздействия факторов окружающей среды и проведения комплекса гигиенических мероприятий.

Ключевые слова: экология, биологические, химические факторы, технологические процессы.

Introduction. Poultry farming is a profitable, highly productive, and rapidly developing branch of animal husbandry. It plays an important role in providing the population with high-quality dietary products — eggs and poultry meat. Particularly important areas include the breeding of chickens, ducks, geese, and turkeys — these are the main and mature branches of rural poultry farming. In a short period, these birds can produce a large amount of tasty meat. Poultry meat is easier to digest compared to the meat of other animals and is rich in various chemical elements. For example, the meat of a two-month-old chicken contains about 20% protein and 10–12% fat. An egg contains 13% protein, 11% fat, 1% minerals and vitamins. In terms of nutritional value, the caloric content of 10 chicken eggs is equivalent to 0.8 kg of beef. An egg is composed of about 85% water, with the remainder being proteins, vitamins, and enzymes. The yolk consists of 52% water, 32% fat, and about 16% protein.

Environmental issues in poultry farming are primarily associated with the following types of pollution:

– Feed waste;

– Animal waste;

– Bird carcasses;

– Wastewater;

– Air emissions.

To reduce the impact of these factors on the environment, it is necessary to establish a sanitary protection zone. Poultry farms are usually located outside cities or on their outskirts. According to the sanitary classification of industrial facilities and enterprises, poultry farms may fall into hazard classes 1–3 depending on the number of chickens. The size of the sanitary zone may be 2000, 1500, 1000, or 500 meters accordingly.

Bird droppings contain nitrogen, phosphorus, as well as hormones, antibiotics, and heavy metals received from feed. They may also carry bacteria and pathogenic microorganisms that contaminate soil, water, and food resources. Straw, wood shavings, husks, or other materials are used as bedding. The chemical waste of poultry farms includes wastewater containing feed residues, feathers, bedding materials, bird excrement, blood, horn fragments, skin and meat, sand, and other mineral impurities, nitrogen, phosphorus, and surfactants. In terms of environmental impact, poultry manure is classified as hazardous waste (according to the Federal Waste Classification Catalogue - FWCC), ranging from class 1 to 3.

The importance of processing poultry and livestock waste. Proper disposal of livestock and poultry waste is vital for the environment, economy, and ecology.

Firstly, processing such waste helps conserve resources, as it is rich in useful substances (nitrogen, phosphorus) and can be used as organic fertilizers, reducing the need for synthetic ones.

Secondly, methods like anaerobic digestion and composting reduce greenhouse gas emissions such as methane, a powerful climate change factor.

Thirdly, effective waste processing methods can provide economic benefits to agricultural enterprises by reducing fertilizer costs.

Fourthly, the country has strict regulations for the disposal and processing of livestock and poultry waste. Compliance with these standards requires proper waste management.

In general, the processing of poultry and livestock products plays an important role in preserving nature, protecting human and animal health and managing resources properly.

Types of poultry and livestock waste:

- Manure is the product of livestock, horses, pigs and sheep.
- Droppings is the waste produced during the care of birds (chickens, ducks and so on).
- Straw, sawdust and gravel used as litter for these animals
- Poultry feathers and by-products of chicken and turkey processing
- Slaughter meat and products arising during the slaughter: blood, bones and other by-products.
- Food waste-spoiled animal foods such as hay or silage.

Methods of disposal of manure and bird droppings:

Manure, when used in the right quantity and at the right time, can be used as fertilizer in rural areas. It promotes the return of nutrients back to the soil. Since ancient times this method of sterilization is used everywhere, but excessive use of manure can lead to nutrient imbalance, leakage and water pollution. In addition, there may be weed seeds in the manure, which can lead to increased weed growth in the fields when rotting or composting is not used properly.

Composting involves the creation of conditions for the natural decomposition of bird and animal waste with oxygen. This process is used to decompose organic matter with the help of microorganisms and reduce the number of pathogens and unpleasant odor. Composting takes place in trained locations using special equipment. This method produces a vermicusic fertilizer rich in nutrients.However, with this manipulation, 30-40% of all nutrients go into a gaseous state and evaporate.

Anaerobic digestion involves the splitting of waste in an oxygen-free environment with the release of biogas (methane). Biogas (mixture of methane and anhydride carbonate) can be used for energy production, decomposition - as fertilizer. Anaerobic digestion also reduces the amount of odor and waste pathogens.

Thermal methods (combustion, gasification and pyrolysis) convert manure, food residues and other wastes into heat, electricity or biofuels. These processes help to reduce waste and eliminate pathogens (there can be up to 100 pathogens causing dangerous diseases in the waste). Animal products such as manure, droppings, bones, fat can be

used as feed for livestock, biodiesel and industrial materials.Manure, for example, can be processed into phosphorus and then used as a nutrient to make fertilizer. Through the processing of bones (their grinding, drying and deposition) obtain protein used in bread making.

On the premises of the enterprise are usually located: poultry, butchery, meat and bone processing workshop, egg warehouse, feed warehouse, storage place for waste, laboratory, laundry, compressor, grain storage. As a rule, there should also be: a car park, carpentry workshop, boiler room, coal and slag warehouses, gas station, car wash and canteen. The project should include waste management standards and limits on their disposal.

Poultry farms are required to follow environmental protection measures concerning waste. The primary type of waste is bird droppings, classified as hazardous waste of class 3–4. Poultry feed mainly consists of corn and soybeans, but may also include other legumes, root crops, and animal-based products (dairy, fish meal, etc.). Feed is enriched with amino acids, enzymes, vitamins, and mineral additives, which may contain hormones, antibiotics, and heavy metals. Birds are often kept indoors but can also be kept outdoors. Feeding can be done manually or using automatic feeders on a permanent basis or at a specified time. Food can be spoiled when stored, transported or dispersed while feeding birds. Food waste along with additives, due to the organic substances in their composition, can contribute to pollution of nature.

The poultry production process generates a large amount of waste, primarily droopings and other types of waste, full of organic compounds.

The waste contains phosphorus nitrogen and other substances found in the body of birds, such as hormones, antibiotics and heavy metals. Compounds such as ammonia and harmful gases, due to volatilization or dissolution in water, can lead to the pollution of water reservoir and groundwater. In addition, the presence of bacteria and pathogenic micro-organisms in droppings can affect soil, water and food resources, especially if the manure is used as fertilizer for untreated soil.

Considering all these processes, poultry meat must be removed immediately, as they are a source of disease, odor, and infection. The environmental impact assessment of the enterprise should take into account the characteristics of the waste.

The nature of waste is an important criterion in assessing the environmental impact of enterprises.Liquid waste is generated from wastewater, feeding, watering of birds, and from storage and disposal facilities. Waste disposal methods such as using droppings in soil fertilization can lead to water pollution. Liquid waste may contain nutrients, ammonia, waste residues, pesticides, pathogens, hormones, and antibiotics, contaminating water reservoirs and groundwater. Liquid poultry waste incorporates highly concentrated organic substances, standing out for high biochemical and chemical oxygen consumption as well as nutrient compounds. The amount of waste in water, and in general, the amount of water waste emitted by enterprises should be standardized.When water enters the drainage system of the city, a contract is established with the company servicing the sewer and a permit is obtained to get rid of the waste in the water, thus normalizing the composition of the water.

Water from poultry farms in rural areas often enters the watershed. Enterprises located within the city limits discharge their wastewater wastewater into the city sewer system.

Atmospheric pollutants at poultry farms (when fattening poultry) are: ammonia, methane, nitrous oxide, hydrogen sulfide, methylamine, phenol, methanol, propionic aldehyde, caproic acid, dimethyl sulfide, ethyl formate, fur dust and microorganisms.

Nitrogen dioxide, nitrous oxide, activated carbon monoxide, benzapyrene are generated during the operation of the boiler house and incinerator. Sources of dust emission are coal and slag deposits.

Car washing emits pollutants from products such as hydrocarbons, nitrogen dioxide, sulfur dioxide, carbon monoxide. In garbage storage areas, methylamine is a source of phenol, methanol, fur dust and microorganisms.

Ammonia and other odor sources are mainly generated during the denitrification of manure, and manure can be emitted directly to the atmosphere through waste at any stage of the treatment process via building vents and manure storage facilities. Ammonia emissions are also affected by ambient temperature, ventilation intensity, humidity, storage volume, litter quality, and food (crude protein) content.

Dust can interfere with visibility, cause respiratory problems, and contribute to the spread of odors and disease.

Pesticides can be applied directly to birds or buildings and used to control pests (such as parasites and vectors) using anti-parasitic baths, sprayers and aerosol generators. Pesticides can also be used to control predators.Pesticides related to contaminants include active and inert ingredients, diluents, and products that are resistant to decomposition. Pesticides and their degradation products can enter surface water and groundwater as solutions, emulsions, or soil particles. In some cases, pesticides can interfere with the use of surface and groundwater. As a result of increased activity of poultry farms, the problem of environmental conservation arises. The negative impact of poultry farms can lead to environmental problems with negative consequences for the population of settlements, destruction of flora and fauna not only near the enterprises, but also in neighboring regions.

Almost all poultry farms have fallen into a difficult environmental situation, as accumulated poultry manure has become a serious source of environmental pollution, the easiest way to liquidate such volumes, poultry farms today
also lacks a set of equipment.

In conclusion, the following measures should be taken to maximize production efficiency and minimize waste:

- Taking measures to protect the environment.
- Identification of sources of pollution.
- Keep the feed storage, transportation and maintenance system of feed bins in order.
- Consider mixing feed waste with other recyclable materials for later use as fertilizer.
- Apply control measures to minimize the amount of incoming animal waste and minimize the migration of pollutants into surface water bodies, groundwater and the atmosphere. Providing production facilities and manure storage areas with above-ground tanks and structures to prevent manure from contaminating groundwater.
- Installation of mechanical means for industrial wastewater treatment.
- Installation of mechanical means for treatment of dust and gas mixtures to protect atmospheric air.

When identifying sources of pollution, identifying harmful factors, carrying out environmental protection measures and maintaining environmental impact in accordance with established standards, the system of environmental safety of poultry farms can be considered sufficient in the organization of industrial environmental control [19, 20].

Poultry dropping is a habitat for various pathogenic microorganisms, bacteria, staphylococci and salmonellae, the greatest amount of which is observed in fresh dropping. Therefore, this waste belongs to the third class of hazardous substances. In this regard, large accumulation of waste at poultry farms poses an ecological risk to the environment.

It is obvious that with the improvement of poultry and egg production culture, it is necessary to improve the culture of waste management, particularly poultry dropping. It is important to use advanced, environmentally friendly technologies to produce a high quality and competitive product.

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