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Pinchuk V., PhD, Senior researcher,
Head of laboratory, Laboratory of Livestock Ecology
Tertychna O., Doc. Biol. Sci, Senior researcher,
Leading Researcher, Laboratory of Livestock Ecology
Podoba Y., PhD, Senior researcher,
Laboratory of Livestock Ecology
Institute of Agroecology and Environmental Management of NAAS (Kyiv, Ukraine)

ENVIRONMENTAL RISKS OF CONTAMINATION OF LIVESTOCK BY-PRODUCTS WITH MICROORGANISMS AND ANTIBIOTICS

Abstract. Intensive livestock farming poses significant risks of contamination of by-products with dangerous biological agents, including pathogenic and opportunistic microorganisms. Today, the number of antibiotic-resistant strains of microorganisms in livestock production is growing, which is another environmental risk. This problem is medical, economic, veterinary, environmental, and social. Unfortunately, the monitoring of antibiotic resistance formation is not currently effective enough. In the future, the introduction of omnibus monitoring would reduce negative environmental impacts.

Key words: animal husbandry, by-products, environment, pollution, microorganisms, antibiotics

The growth rate of the livestock sector in the world is the highest among other sectors of agriculture. Researchers have confirmed that livestock facilities are a source of many chemicals that can be a source of odors, cause negative effects on the environment by disturbing the comfortable living conditions of people, animals, vegetation, and create a greenhouse effect. In addition, emit other exgalates, such as dust, endotoxins. Ecological inconsistency of intensive technologies in agriculture, including livestock, causes a number of environmental problems: degradation of agrobioresources, ecological imbalance of functional connections in agroecosystems, energy crisis and deterioration of agricultural products.

The by-products of livestock production are contaminated with pathogens of coli-paratyphoid infections and other pathogenic bacteria, micromycetes, and viruses in significant quantities. Pathogenic microflora can remain viable in organic waste for a long time. For example, pathogens of salmonellosis and colibacillosis remain viable in litter for 12 months, and the pathogen of tuberculosis for 18 months.

The nature of the epizootic process under conditions of intensive livestock farming is characterized by the fact that even weakly virulent and opportunistic microflora, due to recirculation, can increase virulence and pose not only a serious epizootic and epidemiological threat, but also lead to negative environmental consequences. For example, long-term storage of manure on ground sites contaminates soil, groundwater, and surface water. Such a 0.4-meter-deep soil layer contains up to 4,950 kg/ha of mineral nitrogen, including 2,500 kg/ha of nitrate, which is 17 times higher than in uncontaminated soil. The excess of nitrates in the soil is 3.8-5.3 times higher, and the inconsistency of *E. coli* content with sanitary standards was detected during the storage of manure [1]. Inadequate storage and irrational use of manure not only causes significant damage to the environment, bringing the areas adjacent to livestock farms into a catastrophic environmental condition, but also causes the loss of huge amounts of high-quality organic fertilizer Investing significant funds not only to maintain proper sanitary conditions in intensive livestock farming areas, but also to create conditions for reliable environmental protection against pollution by organic waste, which is produced in large quantities Therefore, when developing and implementing effective technologies for the utilization of by-products, special attention is paid to the conditions for meeting veterinary and sanitary requirements; ensuring reliable protection of the environment from pollution by waste by-products.

The microbiological analysis of the soil microbiocenosis contaminated with poultry by-products and waste shows that it has been significantly transformed by toxicants. Oligotrophs and microorganisms that assimilate mineral forms of nitrogen proved to be the most resistant population. This fact is confirmed by a significant nitrate load. Streptomycetes and spore bacteria can be considered the least resistant [2].

As a result of daily disinfection at a pig farm with a capacity of 108,000 animals per year, 20-25 kg of alkaline elements and 8-10 liters of formaldehyde are released into the environment along with wastewater for every^2 1000 meters of space. A significant amount of microorganisms, including pathogens, also enter the soil. Pathogenic bacteria remain in the soil under irrigation for 4-6 months. Contaminated soil and crops grown on such soil can cause public health problems.

Intensive livestock farming is impossible without the use of medicines and disinfectants, which are mainly xenobiotics. Antibiotics are used on large livestock farms, where there is an increased risk of spreading infectious diseases due to the dense housing of animals and birds. Pigs in intensive closed systems may receive antibiotics throughout their lives. Piglets are often given antibiotics prophylactically as a result of diarrhea after weaning. Organic pig farms wean piglets later and use significantly lower levels of antibiotics. In dairy farming, antibiotics are commonly used for "dry cow therapy" to prevent mastitis during the "dry" period. This therapy is given to all cows as a preventive measure - even when there are no signs of disease. In the poultry industry, antibiotics are used to treat and prevent respiratory diseases and other bacterial infections. In industrial egg production technologies, antibiotics of the tetracycline and fluoroquinolone series are used to treat chickens. This is evidenced by the residual content of doxycycline, enrofloxacin, or their mixture in chicken droppings [3].

Antibiotics save the lives of animals, but at the same time have a detrimental effect on the environment and humans. Therefore, in order to regulate the use of antibiotics on livestock farms, the state must establish clear requirements and ensure control over their use, as well as reduce their use. The global community needs to develop and adopt a list of antibiotics that are essential for human treatment and ban their use in agriculture. Without strict regulation and control, antibiotic residues and resistant bacteria and microorganisms not only end up on store shelves with meat, but also in the soil and groundwater with animal manure and droppings. According to the U.S. Expert Commission on Antibiotic Resistant Bacteria, about 73 billion single doses or 300 thousand tons of antibiotics are used annually worldwide [4]. The World Health Organization (WHO) has recognized the problem of antibiotic resistance as one of the 10 global threats to public health. At the same time, in times of war, the risks of its formation and spread at the global level are increasing and could have catastrophic consequences in the near future [5, 6].

Thus, there are significant risks of contamination of livestock by-products with dangerous biological agents, including pathogenic and opportunistic microorganisms. Currently, the number of antibiotic-resistant strains of microorganisms in livestock is growing, which is another risk. Unfortunately, the monitoring of antibiotic resistance formation is not currently conducted effectively enough to reduce the risks. This problem is medical, economic, veterinary, environmental, and social. The prospects for further environmental studies in animal husbandry are to solve the problems of biosecurity in the conditions of martial law in Ukraine, to find ways of remediation of contaminated by side products of soil in areas of intensive cultivation of farm animals, to develop measures to contain antibiotic resistance in animal husbandry, to optimize the methods of livestock.

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Гусак О.Б., аспірант
Вінницький національний аграрний університет

ВПЛИВ РІВНЯ ЗВОЛОЖЕННЯ ҐРУНТІВ НА ІНТЕНСИВНІСТЬ НАКОПИЧЕННЯ У ЗЕРНІ ОЗИМИХ ЗЕРНОВИХ КУЛЬТУР Zn ТА Cu

Анотація. У тезах наведені результати вивчення впливу рівня зволоження ґрунтів на транслокацію Zn і Cu у зерно озимих зернових культур. Встановлено, що підвищення коефіцієнта накопичення Zn і зниження коефіцієнта накопичення Cu у зерні зернових культур сприяло збільшенню концентрації Zn та зниження Cu. За такої умови ця особливість встановлена як у озимого ячменю сорту Луран, так і у пшениці озимій сорту Акратос.

Ключові слова: ячмінь, пшениця, важкі метали, опади, штучний полив.

Зерно є основним джерелом енергії для життєдіяльності людини. Україна виступає одним із гарантів продовольчої безпеки в світі та є одним з головних постачальників зернових культур посідаючи друге місце після США. Тому, крім поставлених завдань щодо збільшення виробництва зерна, важливим є також питання покращення його якості.

Зерновим культурам характерний широкий спектр використання, зокрема, їх застосовують у практичній і народній медицині. Існує постійна потреба зернової продукції у фармакологічній, косметичній та спиртовій сферах. Високого рівня вживання зернових культур набуває у тваринництві в якості високопоживних кормів [8]. Залишки соломи зернових культур використовують за різними напрямками: на корм худобі, птиці; підстилка для тварин; перероблення на органічне добриво; вирощування грибів. Останнім часом практикують використання залишків вегетативної маси зернових культур на енергетичні потреби (виробництво брикетів і гранул для спалювання в котлах, як сировини для виробництва біопалива).