



ENVIRONMENTAL POLLUTION FROM FARM ANIMAL WASTE

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Summary: The article presents a digital material illustrating the sanitary and hygienic problem that has arisen as a result of environmental pollution (atmospheric air, water, soil) by livestock and poultry waste due to imperfect technology for keeping farm animals (ventilation system, microclimate optimization and disposal of solid and liquid production waste). It is shown how many and what kind of waste products an agricultural animal (poultry, pigs, cattle) releases during different periods of ontogenesis and what volumes of them, not disposed of, are stored, polluting the habitat of animals and humans with substances harmful to their health (ammonia, hydrogen sulfide, urea, protein decomposition products and others). Numerous pathogenic organisms enter the soil, groundwater and surface waters with manure, droppings, and sewage, which retain their viability and virulence for a long time, maintaining the circulation of pathogens of dangerous diseases of farm animals and humans (salmonellosis, brucellosis, tuberculosis, helminthiasis, coccidiosis and others). The abundance of animals in agricultural complexes with suboptimal cultivation technology contributes to the spread and maintenance of various dangerous diseases that reduce the productivity and vitality of animals.

Key words: environment, pathogens, farm animal waste, soil fertility preservation, environmental and food security.

Analysis of the results.

The concentration of large livestock in livestock farms and the transfer of animal husbandry to an industrial basis are global in nature, there are complexes for fattening pigs and cattle with a capacity of 20-30 thousand to 250 thousand heads. About 70% of the meat entering the market is produced at large

industrial livestock complexes with a population of 1,000 cattle [1-4].

The program for the development of the agricultural sector of the Bukhara region for 2021-2025 includes 61 new facilities for 25,320 livestock and the reconstruction of 17 facilities. In the Bukhara region, the number of cattle is more than 54,740 thousand heads.

Industrial methods of animal husbandry are economically efficient and allow solving the problem of supplying meat and dairy products to the population in a short time. However, the operation of existing livestock complexes has raised a number of serious issues related to environmental protection. This problem is complex and requires a joint solution by specialists in hygiene, technology, agriculture and construction. The main sources of environmental pollution (air, soil, water) are air emissions and liquid effluents from livestock complexes and farms. The condition of the microclimate of livestock premises depends on the conditions of manure removal from livestock premises and the device of local ventilation of polluted air from manure collection channels, which has a significant impact on the health and productivity of animals [18].

The analysis of diseases of farm animals shows that diseases such as coccidiosis, colibacteriosis, salmonellosis and others largely depend on the manure removal system and the state of the indoor microclimate. Air pollution with ammonia and microorganisms is the cause of respiratory diseases of young animals. Bronchopneumonic and infectious rhinotracheitis of young animals occur mainly due to the imperfect operation of ventilation systems. The method of manure cleaning and ventilation of premises has an impact on the state of the indoor air environment. Liquid manure pollutes the environment much more than solid manure due to its physical characteristics: high fluidity, survival of pathogens in it. Obtaining solid manure in the livestock facilities themselves significantly reduces its negative impact on the environment. It is shown that with natural ventilation and hydraulic methods of manure harvesting, the concentration of ammonia in pigsty feedlots reached 52 mg/cubic meter, and with forced removal of polluted air in similar rooms, the ammonia content was only 14 mg/cubic meter. In modern ventilation systems, an increase in air exchange is inevitably associated with an increase in environmental pollution. Thus, in

air samples at a distance of 100 m from the pigsty, ammonia was found in concentrations up to 3-4 mg/cubic meter, hydrogen sulfide- 0.112 mg/cubic meter, mercaptan- 16.7mg/cubic meter, the number of microorganisms in a cubic meter of air up to 8263 [5,7].

With dense development of territories with livestock premises, the degree of pollution of the surrounding atmosphere increases significantly compared to the area of operation of small livestock farms. The degree of influence of livestock waste depends on many factors: the concentration of pollutants in air emissions, the strength and direction of wind, vegetation surrounding the complex, etc. Pollutants are found in open reservoirs and soil within a radius of up to 15 km from the livestock facility. With the pavilion arrangement of pig breeding buildings on complexes with livestock from 10 to 40 thousand. pigs with an exhaust ventilation system emit up to 6.05 kg of dust and up to 83.4 billion microbial bodies within an hour [10]. In winter, 8.7 billion microbial bodies and 0.75 kg of dust enter the atmosphere per one hour from the feedlot complex for 2 thousand heads of cattle (cattle), 103.9 billion microbial bodies and 6.2 kg of dust per 10 thousand heads [11,13].

From 1.5–104 to 8-107 microbial bodies per m³ were detected in the air of poultry farms, up to 8.3-103 microbial bodies per m³ at a distance of 100 m from the buildings [13], at a distance of 400 m this indicator is only two times less [13,]. According to other researchers, at a distance of 250 m from the production buildings of livestock complexes, there are up to 1000 or more microorganisms (including pathogenic ones) in one cubic meter of atmospheric air [12].

The soil of agricultural lands in the areas of livestock and poultry complexes is contaminated with pathogenic microorganisms and helminths.

In the study of wastewater from livestock complexes, salmonella was found in 3.3–90%

of samples. *Brucella*, *leptospira*, *yersinia*, *mycobacteria*, *clostridia*, *actinomycetes*, *mycelial fungi* and *yeast*, various viruses (foot-and-mouth disease virus, Auesca disease virus) were found in wastewater samples [14].

Up to 20-25 trichocephalic eggs per 1 kg of soil were found in a layer up to 20 cm in summer. The bacterial contamination of the soil was 2106 microbial bodies/g, and the coli-titer was 0.001. To 9.2% of the studied soil samples from these fields contained *salmonella*. At a rate of 300 M3/h of irrigation water, the *salmonella* stones were found to be viable at a depth of 50 cm of the soil horizon for two years [6].

It was noted that the uninfected effluents contained in 1 liter from several tens to several tens of thousands of viable eggs of helminths (*ascariids*, *strongylates*, *esophagostomes*, *trichocephalians*, *trichinella*, *teniids*, *whipworms*) and cysts of pathogenic protozoa [7].

It has been shown that the terms of preservation of viability of pathogenic microorganisms and helminth eggs are quite long. The causative agent of listeriosis in the autumn-summer months retains viability and virulence for three months, in the autumn-winter period – up to seven months. The causative agent of bovine paratyphoid survives in liquid manure for up to 85 days in summer, up to 158 days in winter and spring.

Brucella died in the liquid manure of cattle and pigs in summer and spring after 3-4 months, in autumn and winter – after 6-8 months. *Mycobacterium tuberculosis* in the same manure remained viable for more than 1.5 years. The foot-and-mouth disease virus retains the ability to cause disease in experimental animals in summer for 42 days, in frozen manure-up to 192 days. *Leptospira*, getting into reservoirs with the effluents of livestock complexes, remain viable for 20-30 days, and remain virulent in moist soil for more than 6 months [1, 2]. The most resistant viruses can persist for a long time in wastewater, as well as in the water of contaminated reservoirs. Enteroviruses retain their infectious properties

at +9 ...+15 ° C for up to 200 days. Helminth eggs can remain viable for a longer time. In uninfected pig manure, ascarid eggs die only after 12-15 months from the beginning of its storage, and eggs of bovine helminths (*fasciol*, *strongylate*, *monesium*) die in liquid manure only after 6-8 months [17]. When storing liquid manure in manure accumulators, helminth eggs remain viable for more than a year [8, 9]. Experimental data from the All-Union Institute of Helminthology show that the liquid fraction of manure entering irrigation fields contains about 30% of helminth eggs that remain invasive for more than two years at the depth of the arable soil layer [3]. Consequently, there is a real danger of accumulation of pathogenic pathogens in the soil, in forage crops, groundwater, atmospheric air and open reservoirs, which can cause diseases of animals and humans. To eliminate epidemiological hazards and negative environmental effects, manure should be pretreated, which would ensure, in addition to deodorization and mineralization of organic compounds, its disinfection. Prolonged exposure of livestock effluents in manure storage does not give the desired effect. It is known that the colitis and titer of enterococcus in a standing liquid after 6 months exceeds 2-4 orders of magnitude, the number of helminth eggs decreases by 2.8 times only after 10 months.

Pollution of surface and groundwater by waste from large livestock complexes and industrial farms is one of the most important environmental pollution problems. Massive emissions of waste from modern livestock production worsen the general sanitary condition of reservoirs; deprive the population of traditional sources of water supply. The consumption of water from such reservoirs causes gastrointestinal and other diseases in humans and animals. Fish die in rivers and ponds where livestock runoff is discharged.

Thus, the information provided on pollution of the habitat of farm animals and humans by pathogens from waste from livestock enterprises determines the development of

methods for interrupting the pathogen cycle "animal – waste – environment – feed– animal"

Modern methods of treating infectious diseases using chemicals such as antibiotics, sulfonamides, nitrofurans and others do not always have a specific effect on pathogens and the duration of prolongation contribute to the adaptation and emergence of more virulent strains of pathogens. Preventive methods do not effectively protect farm animals from pathogens, which is due to imperfect maintenance technology (microclimate, feeding, waste disposal of livestock production) and adaptability of pathogens.

The search for innovative methods of treatment, prevention, maintenance of farm animals and the disposal of their waste are the main problems of animal husbandry, the solution of which will contribute both to the productivity of bred farm animals and to improving the quality of products obtained from them.

To optimize the microclimate of livestock premises, more effective and ecological methods should be intensively implemented: ionization, ozonation, the use of microorganisms that recycle waste products of farm animals and microorganisms with a wide range of antagonistic effects on pathogens

The use of natural herbal remedies with antimicrobial, antiviral and immunomodulatory properties will minimize the degree of morbidity and carrier of pathogens of farm animals, the main sources of maintaining pathogen populations in the environment.

The rational use of agricultural waste as a secondary resource for optimizing soil fertility will ensure the environmental and industrial safety of agricultural production in the Republic of Uzbekistan.

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