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CLEANING WASTEWATER OF ANIMAL COMPLEXES

The intensification of animal husbandry requires the proper use of waste, which is accumulated in large quantities in activity zones of the complexes. These enterprises are not only powerful consumers of fresh water, but also suppliers of a large amount of runoffs with high level of pollution.

Sows have a capacity of 8 to 110 thousand heads per year, which creates a high animal density. Their concentration in relatively small areas causes a real threat to the environment.

In livestock complex areas the main problems that have ecological significance are the eutrophication of reservoirs, the possible accumulation of pathogenic organisms, air pollution by hydrogen sulfide, ammonia, molecular nitrogen [1].

Livestock effluents contain a large amount of pathogens, such as pathogens of leptospirosis, salmonellosis and the like. About 50 % of the identified microflora are conditionally pathogenic and pathogenic, capable of causing serious infectious diseases with animals and humans.

The main stage of technology proposed is methane fermentation (basic stage) and aerobic oxidation (to clean and neutralize wastewater technologies should be implemented that not only remove the bulk of pollutants but also reduce the cost of introducing new cleaning technologies through the use of end products) [2].

Fermentation was carried out in laboratory methane tanks at 45 °C. Process control was carried out according to the following indicators: COD, pH, amount of biogas released, methane content, amino acids content, proteins, trace elements, etc. COD for this waste fluid is 20 g O_2/dm^3, the content of suspended solids is 38 g/dm^3, pH 6,8.

In this fermentation process, the content of contaminants in COD decreased to 1,4 g O_2/dm^3, ie the purification effect reached 90 %. The calculations of the heat balance of the methane tank have shown that the amount of biogas produced is sufficient not only to fully provide the methane tank with the necessary energy, but also to partially provide the main production.

Active sludge was characterized by the following vitamin composition: B vitamins, mg/g: thiamine – 1–2,9; riboflavin – 12–13; nicotinic acid – 102;

pyridoxine – 0,61–0,62; biotin – 0,17–0,33, cyancobalamin – 38,18. Biomass contains in terms of solids, %: crude protein – 45–47; fat – 2–4. Each gram of dry biomass contains about 220 mg of amino acids, including all essential. Studies have shown that ash contains phosphorus, potassium, sodium, calcium, iron, etc.

The proposed technology for the treatment of concentrated sewage of pig farms makes it possible not only to remove pollutants almost completely, but also to significantly improve the economic performance of the process through the use of biogas energy and excess anaerobic sludge containing valuable biological compounds. The use of such technology is a cost – effective solution to a specific environmental problem.

References

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