REMOVAL OF HEAVY METAL IONS FROM WASTEWATER SLUDGE FOR FURTHER USE AS FERTILIZERS

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ABSTRACT

Soil contamination with heavy metals is a serious problem that can negatively impact the environment and human health. To solve this problem, it is necessary to take comprehensive measures aimed at reducing sources of pollution, cleaning the soil and monitoring its condition.

Heavy metals are naturally occurring elements with high density and toxic properties. They can enter the soil from various sources, such as pesticides and fertilizers, industrial wastewater, and municipal waste, and their accumulation leads to a decrease in soil fertility, contamination of agricultural products, and negative impact on human and animal health.

Therefore, the most important measures to reduce soil contamination with heavy metals are

- control over the use of pesticides and fertilizers: the use of pesticides and fertilizers that do not contain heavy metals, as well as compliance with recommendations for their use;
- Wastewater treatment: construction and operation of treatment facilities for industrial and municipal wastewater;
- Waste recycling: processing of waste containing heavy metals to prevent them from entering the soil;
- use of biological methods of soil treatment: the use of plants or microorganisms to remove heavy metals from the soil.

This paper investigates the problem of removing heavy metals from domestic and municipal wastewater sludge for their further use as fertilizers for agricultural purposes. Thus, it is important to develop the latest technologies and methods for the effective removal of heavy metals from municipal wastewater sludge. Successful solution of this problem will significantly reduce the negative impact of sediments on the environment.

To achieve this goal, theoretical and experimental studies were conducted in laboratory and pilot conditions. The efficiency of the sludge dewatering equipment was evaluated by the amount of solid matter removed from a unit of the filtering surface and the presence of heavy metals in the sludge. It was found that humic substances have a high sorption capacity for heavy metals. It is proposed to use the product of lignite and peat processing as a reagent for the removal of heavy metals from municipal wastewater sludge. A

new method for the removal of heavy metals from municipal wastewater sludge using humic substances has been developed and a scheme for the removal of heavy metals from domestic wastewater sludge has been proposed.

The analysis of experimental data shows that the treatment of domestic wastewater sludge allows for the effective removal of heavy metals with subsequent utilization of the sludge as fertilizer.

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