

TECHNOLOGICAL AND TOXICOLOGICAL ASPECTS OF THE COAGULATION OF LEACHATES FROM MUNICIPAL SOLID WASTE LANDFILL

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Summary

Leachates from municipal solid waste landfills should be included in the group of strongly contaminated industrial wastewaters. This results from the presence of highly concentrated various organic and inorganic compounds, which frequently have toxic properties. Therefore, the proper purification of the leachates prior to their discharging to the environment is of great importance. One of the chemical methods that can be used for the purification of leachates is coagulation. The main objective of the experiments presented in the current study was to determine the effect of coagulation, combined with sedimentation, on the physico-chemical and toxicological characteristics of leachates from a municipal solid waste landfill in Poland. Standard „jar-test” experiments were employed for coagulation. Polyaluminum chloride and ferric chloride were used as coagulants. Raw leachates as well as those after coagulation were tested for toxicity using a battery of tests embracing algal growth inhibition test, microbioassays and IQ Toxicity Tests with crustaceans and bacterial luminescence inhibition test (LUMISTox). The studies carried out demonstrated that ferric chloride (0.92 g Fe³⁺/CODCr removed) is more effective technologically in the removal of organic compounds from leachates than polyaluminum chloride (1.22 g Al³⁺/CODCr removed). For optimal doses of coagulants the most advantageous coagulation effects were achieved at pH 6.5–6.6, adjusted with the use of NaOH. Coagulation conducted under optimal conditions allows for reducing the content of organic compounds, as expressed by CODCr values, from 40 to 84%. This effect of organic compound removal from leachates in the process of coagulation did not result in significant decrease of their toxicity. For the above reasons the coagulation process can be useful only as one of the elements of a technological setup for the purification of leachates from municipal solid waste landfills. The battery of tests used in the studies proved usefulness for the evaluation of the toxicity of leachates with varied degree of contamination as well as at various stages of their purification