

Electrocoagulation of municipal wastewater – a pilot-scale test

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ABSTRACT

In this study, a pilot test of electrocoagulation (EC with aluminium electrodes) of natural municipal wastewater was performed. In view of the obtained results and the unique and innovative nature of the proposed procedures and solutions, EC can be regarded not only as a preliminary purification step, but also as a comprehensive alternative to other wastewater treatment methods. Electrocoagulation was conducted at constant current, and changes in voltage were registered continuously to control and calculate energy consumption. After 2 h (7200 s of EC + 1800 s of additional sludge settling), initial colour (2140–2570 mg/L) was removed in 86–99.5%, turbidity (87.5–149 mg/L) – in 100%, suspended solids (250–340 mg/L) – in 88.5–91%, COD (609–737 mg/L) – in 60.8–63.5%, and phosphorus (10.0–10.7 mg/L) – in 94.5–96%. As expected, a higher electrocoagulant dose at higher energy consumption improved the efficiency of wastewater treatment, but energy consumption was not directly proportional to the treatment efficiencies of electrocoagulated municipal wastewater. The obtained results of sewage purification seem to be promising both economically and technologically. They fulfil Polish standards of effluent quality, except for COD where higher efficiency is required. EC poses a viable alternative to other wastewater treatment methods and should be considered as an initial step in municipal wastewater treatment.

Keywords: Electrocoagulation EC; Al-electrodes; Energy consumption; Sewage

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