

Electrocoagulation in batch mode for the removal of the chemical oxygen demand of an effluent from slaughterhouse wastewater in Lima Peru: Fe and Al electrodes

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ABSTRACT

In order to study the treatment of wastewater from a meat plant in a batch reactor, the electrocoagulation (EC) process with aluminum and iron electrodes was applied. Foams formed with iron electrodes show brown, greenish, and reddish colors, and foams formed with aluminum electrodes mainly show a whitish color. The effects of the applied voltages (6, 8, and 10 V) were analyzed over time on parameters such as current density (A/m^2), pH, temperature, removal percentage of ionic conductivity ($\mu S/cm$), turbidity (nephelometric turbidity units), chemical oxygen demand (COD), thermotolerant coliforms, and oil-grease. The removal efficiencies for turbidity and COD in meat industry wastewater-slaughterhouse wastewater that were obtained were 99%, and 53%–59%, for aluminum, and 81.5%–88.5%, and 59%–60% for iron electrodes and 25 min EC time respectively. At 6 V the energy consumption per unit volume of treated effluent (kg/m^3) and per kg COD removed ($kwh/kg COD$) with Al and Fe electrodes were (3.07 and 0.84) and (2.99 and 0.90), respectively. The EC process with Al and Fe electrodes proved to be a technique that removes contaminants from slaughterhouse wastewater with good yields.

Keywords: Electrocoagulation; Fe/Al electrodes; COD; Slaughterhouse; Esmeralda Corp S.A.C.

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