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Treatment of phenol-formaldehyde resin manufacturing wastewater by the electrocoagulation process

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ABSTRACT

The removal of total organic carbon (TOC) from wastewater generated from phenol-formaldehyde resin manufacturing industry using the electrocoagulation process was studied in this paper. Experiments were carried out at current densities of 5.0, 7.5 and 10.0 mA/cm^2 using iron electrodes connected in parallel arrangement in an undivided electrochemical reactor. TOC content was determined during the different stages of electrolysis in order to know the feasibility of the electrocoagulation treatment for highly concentrated bio-refractory organic pollutants present in the industrial wastewater. Different operational conditions such as pH, time, and electrical conductivity were studied for TOC removal. Experimental values indicated that the electrocoagulation process showed high TOC removal efficiencies, 78.7% within 60 min of electrolysis, with an initial concentration of 23.8×10^3 mg/l TOC. Thus, these results showed that the electrocoagulation process is effective for the removal of initially high TOC content and may be used as pretreatment of industrial real effluents.

Keywords: Electrocoagulation; Energy consumption; Iron electrodes; Resin manufacturing; Phenol wastewater; Total organic carbon

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