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Electrochemical decolorization of the dye Acid orange 10

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ABSTRACT

In the present study experiments were carried out to decolorize the dye Acid orange 10 using an electrochemical technique. A square packed-bed electrochemical reactor was constructed with a graphite rod as anode and stainless steel as cathode material. Effect of parameters including pH (1.7–7.5) and current intensity (0.1–0.6 A) was investigated. The complete removal of color was achieved within a short period of electrolysis for different concentrations of Acid orange 10. Studies were also made for the removal of chemical oxygen demand (COD) and total organic carbon (TOC). It was found that the electrochemical treatment reduced COD and TOC to 85% and 56% respectively, for 200 mg/L Acid orange and 1.5 g/L sodium chloride concentration. Maximum decolorization was achieved at a current intensity of 0.4 A at a pH of 1.7. Effect of current intensity on color removal was also investigated as a function of electrolysis time (30–210 min) and it showed that maximum removal efficiency (98%) was reached within 60 min at a maximum current intensity of 0.4 A. Studies were made to study the effect of pH on decolorization, COD and electrochemical activity.

Keywords: Current intensity; Electrochemical oxidation; Electrolysis time; Hydroxyl radicals; Acid orange 10; Decolorization

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