

Decolorization of reactive azo dye from aqueous solutions with Fenton oxidation process: effect of system parameters and kinetic study

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ABSTRACT

The decolorization of Drimaren Orange HF 2GL (DOHF) reactive azo dye from aqueous solutions with the Fenton oxidation process was researched. With the aim of determining optimum conditions, the effects of different operating parameters such as H_2O_2 , Fe(II), chloride ion and initial DOHF concentration, initial pH and solution temperature on the decolorization were investigated. Optimum conditions were determined as 30°C temperature, pH 3, 300 mg/L DOHF, 15 mg/L Fe(II) and 100 mg/L H_2O_2 . The presence of chloride ion had a negative effect on the decolorization, while the increase in reaction temperature caused an increase in the decolorization. Using experimental data, the decolorization kinetics for dye molecules was investigated and the best kinetic model representing experimental data was found to be the Behnajady–Modirshahla–Ghanbary (BMG) kinetic model. Additionally, Fourier transform infrared spectroscopy analysis was performed before and after Fenton oxidation to show degradation of dye molecules.

Keywords: Oxidation; Kinetics; Decolorization; IR spectroscopy

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