



Kinetic of degradation of two azo dyes from aqueous solutions by zero iron powder: determination of the optimal conditions

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ABSTRACT

The textile industry induces one of the main environmental pollution, mainly due to the dyes containing in its effluents. There is therefore a need for their treatment prior to discharge to the environment. The removal efficiency of Acid Red 18 and Acid Red 14 dyes by zero-valent iron were investigated in this study. The effect of some parameters such as pH (3–11), contact time (15–120 min), initial dye concentration (25–100 mg l⁻¹) and initial concentration of iron powder (0.5–2 g l⁻¹) were examined. The results showed that dye removal efficiency increased with increasing contact time and initial concentration of iron powder on the one hand, and decreased for increasing pH and initial dye concentration on the other hand. Experimental data were rather accurately fitted onto both first-order and second-order kinetic models, even if the first-order kinetic model led to higher correlation coefficients. Comparison of the kinetic rate constants showed a low impact of the initial dye concentration and that an acidic pH of 3 was optimal for the removal of Acid Red 14 and Acid Red 18.

Keywords: Iron powder; Batch system; Kinetics; pH; Dyes; Optimal condition

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