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Brilliant Blue FCF degradation by persulfate/zero valent iron: the effects of influencing parameters and anions

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ABSTRACT

In this study, zero valent iron (ZVI) was applied as an activator for persulfate (PS) to degrade a food dye (Brilliant Blue FCF) from aqueous solutions. The effect of pH, PS concentration, ZVI dosage and initial dye concentration was evaluated. The degradation efficiency was obtained about 98.8% under optimum conditions, i.e., pH of 3, ZVI dosage of 0.5 g/L, PS dosage of 4 mM and initial dye concentration of 20 mg/L. PS had higher decolorization rate compared with H_2O_2 and percarbonate. Chemical oxygen demand and total organic carbon removal efficiencies were about 45.3% and 36.6%, respectively. Among anions, phosphate and bicarbonate showed an inhibitory effect on the decolorization of the dye. Moreover, quenching experiments exhibited that sulfate radical is major agent of oxidizing the dye. According to the results, PS/ZVI process could be an effective approach to pollutant degradation.

Keywords: Brilliant Blue FCF; Zero valent iron; Persulfate; Sulfate radical; Food dye

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