Removal of reactive magenta-MB from aqueous solution by persulphate-based advanced oxidation process

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ABSTRACT

In this study, the possibility of removing magenta-MB by persulphate (PS)-based advanced oxidation process has been evaluated. PS was activated by chemical means with the use of ferrous ion to produce sulphate radical (SO\(_4^{–}\)). Experiments were conducted in batch mode. The effect of operational parameters such as PS dosage (varied from 40 to 140 mg/L), ferrous ion dosage (varied from 0 to 100 mg/L), pH (both acidic and basic) and contact time were studied. For an initial dye concentration of 100 mg/L, maximum decolourization efficiency of 96.33% was obtained within 30 min with a PS dosage of 100 mg/L and ferrous ion dosage of 60 mg/L. At the optimum conditions, TOC removal efficiencies of 55.23 and 61.2% were obtained in 30 and 60 min, respectively. The effect of inorganic ions (Cl\(^–\), F\(^–\) and SO\(_2^{–}\)) on the treatment efficiency was also evaluated. It was found that the inhibiting effect due to the presence of inorganic ions followed the order as: F\(^–\) >> Cl\(^–\) > SO\(_2^{–}\). Very good removal efficiency obtained with very low chemical dosage (PS and Fe\(^{2+}\)) makes iron-activated PS a good alternative for the removal of dye from aqueous solution.

Keywords: Persulphate; SO\(_4^{–}\); Magenta MB; Mineralization; Dye removal

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