



## Degradation of naphthylazo anionic dye by Fenton and Fenton-like processes: a comparative study with Fast sulphon black-F

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### ABSTRACT

Wastewater effluent from industries using dyes and pigments contains high concentration of organics. This paper presents a method for degradation of Fast sulphon black-F (FSB), a naphthylazo anionic dye, using Fenton and Fenton-like reaction systems. The degradation of the FSB dye using a Fenton reagent varied with the molar ratios of the reactants ( $[\text{Fe(II)}]:[\text{H}_2\text{O}_2]$ ) and pH. Removal of the dye was almost complete within 30 min and a maximum removal of ~99% was achieved with a molar ratio of 1:3.3 at pH 4.0. The degradation of the FSB dye was also carried out by the Fenton-like reaction system. Degradation of the FSB dye in the industrial wastewater sample by the Fenton reaction system was demonstrated by performing Jar tests. Magnetic iron(III) oxide was first prepared, followed by their characterization by X-ray diffraction and scanning electron microscopy techniques. A combination of magnetic iron(III) oxide and  $\text{H}_2\text{O}_2$  (i.e., a Fenton-like reaction system) produced slower degradation of the dye initially than the Fenton reaction system, but was able to degrade the FSB dye completely within 30 min.

*Keywords:* Dye; Fenton reagent; Magnetic iron-oxide; Oxidation; Wastewater treatment

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