

Treatment of textile dye bath wastewater with ozone, persulfate and peroxymonosulphate oxidation

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ABSTRACT

In this study, the treatment of wastewater of two different reactive dye bath wastewater (WW1, WW2) belonging to a yarn dyeing textile industry was evaluated by ozone, heat-activated persulfate (PS) and heat-activated peroxymonosulfate (PMS) oxidation methods. WW1 and WW2 contains azo group dyes and BOD₅ values are 245 and 105 mg/L, Total Organic Carbon (TOC) values are 793 and 3016 mg/L respectively. TOC and color removal and BOD₅/TOC ratio were investigated in samples taken at specific time intervals (15, 30, 45, 60, 90 and 120 min). For WW1, the TOC and color removal rates for heat-activated PS oxidation were 19% and 100%, respectively, and these removal rates were higher than the oxidation results for ozonation (15% and 76%) and heat-activated PMS (16% and 99%). Although the ozone dose applied to WW1 was about 3 times that of the ozone dose applied to WW2, the color removal rate in WW2 (94%) was higher than WW1 (76%) and the TOC removal rates were almost the same. In the result of oxidation studies, no significant increase in BOD value was observed for both wastewater. However, an increase in BOD₅/TOC was achieved by decreasing the TOC value in heat-activated PS oxidation for WW1.

Keywords: Textile wastewater; Ozone; Persulfate; Peroxymonosulfate; TOC

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