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A comparison of single and catalytic ozonation for decolorization of malachite green

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ABSTRACT

Considering harmful environmental and health effects of malachite green (MG), its removal from dye wastewater is necessary. Accordingly, the aim of this interventional–experimental study is to compare single and alumina-catalytic ozonation processes (COPs) for decolorization of MG in a lab-scale rector for the first time. The full decolorization of 50 mg L^{-1} MG was carried out in single ozonation process (SOP) after 30 min but after 15 min in the case of COP. For 3,000 mg L^{-1} MG, the decolorization efficiency increased from 95.38% to 99.53% after 30 min in optimal conditions by converting the process from SOP to COP. However, the chemical oxygen demand removal increased from 60% to 82.35%, but the total organic carbon (TOC) removal rose from 62.39% to 69.76%. The reaction rate coefficients of COP at the initial MG concentrations of 50 and 3,000 mg L^{-1} are about 3.6 and 14 times, respectively, more than the reaction rate coefficients of SOP.

Keywords: Alumina; Catalytic ozonation; Malachite green; Wastewater

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