



A comparative study on the degradation of textile dyes with UV-activated peroxide and peroxydisulfate

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The development of industry and technology has led to the increasing water pollution, causing many hidden dangers to human health and lives.¹ Wastewater from the textile industry is classified as the most polluting of all industrial sectors in terms of effluent volume and chemical content. Advanced oxidation processes (AOPs), based on the generation of highly active species, such as hydroxyl radicals (HO[•]), sulfate radicals (SO₄^{•-}), and superoxide anion radicals (O₂^{•-}), have been identified as efficient technologies for the degradation of wide range of organic pollutants in aqueous matrices.

The aim of this study was to compare the degradation behaviours of two textile dyes from different classes, azo dye Reactive Orange 4 (RO 4) and anthraquinone dye Reactive Blue 19 (RB 19), with UV/H₂O₂ and UV/S₂O₈²⁻ process. Both processes are suitable for complete decolorisation of the investigated dyes under optimal operational conditions. The removal of textile dye RO 4 was faster with the UV-activated peroxide compared to UV/S₂O₈²⁻ process, while on the contrary faster decolorisation of textile dye RB 19 was achieved with UV/S₂O₈²⁻ process. The obtained results are probably related to different pathways of the oxidation of the investigated dyes by hydroxyl and sulfate radicals.²

Keywords: sulfate radicals, hydroxyl radicals, azo dye, anthraquinone dye

References

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Acknowledgements: The authors are grateful to the Ministry of Science, Technological Development, and Innovation of the Republic of Serbia for financial support (Agreement No 451-03-47/2023-01/ 200124)