Degradation of C.I. Acid Blue 25 in water using UV/K$_2$S$_2$O$_8$ process: effect of salts and environmental matrix

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Received 17 September 2016; Accepted 18 February 2017

**ABSTRACT**

The objective of this work was to evaluate the degradation of an anthraquinone dye, C.I. Acid Blue 25 (AB25), in aqueous phase using UV/K$_2$S$_2$O$_8$ (PPS) process. Experiments were conducted in batch mode using a low-pressure mercury lamp emitting mainly at 253.7 nm. The effect of operational conditions such as initial PPS and AB25 concentrations and initial solution pH on the degradation of AB25 was studied. Additionally, the influence of salts addition on the degradation of the dye was examined. Besides, degradation experiments were conducted using a natural mineral water instead of deionized water to check the applicability of UV/PPS oxidation system in a real matrix. It was found that the degradation rate of AB25 was improved significantly by the UV/PPS process compared with UV irradiation alone. The photolytic decay of PPS in water was evidenced spectrophotometrically, showing that SO$_4^{•−}$ is the primarily radical involved in the degradation of AB25. The degradation rate increased considerably with increasing PPS concentration up to 400 mg L$^{-1}$, above which further increase enhanced insignificantly the abatement of the dye. Correspondingly, the degradation rate increased significantly with the increase of the initial dye concentration. Acidic condition (pH 2) offered the best conversion rate and the degradation decreased with pH increase in the interval 2–10. Addition of NaCl and Na$_2$SO$_4$ had practically no significant effect on the elimination of the pollutant. The degradation of AB25 was more effective in natural mineral water in the absence and presence of PPS, making UV/PPS an efficient treatment technique for the elimination of organic pollutants from natural waters.

**Keywords:** Acid Blue 25; UV/K$_2$S$_2$O$_8$ process; Degradation; SO$_4^{•−}$ radical; Real matrix

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