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Effectiveness of a physicochemical coagulation/flocculation process for the pretreatment of polluted water containing Hydron Blue Dye

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ABSTRACT

In this work, the effectiveness and applicability of a physicochemical coagulation/flocculation process for the pretreatment of textile industry discharges containing Hydron Blue Dye using $\text{Al}_2(\text{SO}_4)_3$ as destabilizing agent was studied. The coagulation/flocculation performance on the quality of treated water was measured by UV absorbance at different wavelengths, by scanning electron microscopy and Fourier transform infrared spectroscopy. Results showed that the process was effective with a maximum yield of 77% under optimized conditions of pH, coagulant dosage, concentration of initial solutions, and stirring speed. The optimization of this process by a design of experiments allowed us to construct models with an R^2 value of 0.99 for the coagulation/flocculation in the chosen field.

Keywords: Coagulation/flocculation; Hydron Blue; Azoic dye; Experimental design

1. Introduction

The textile industry is one of the most polluting industries, producing high quantities of wastewater containing a large variety of chemicals. In fact, the world production of textile dyes is estimated to be over 10,000 tons per year and approximately 100 tones/year of dyes are discharged into wastewater [1]. The problem is even more serious in the case of

industrial effluents, which have toxic nature. The presence of dyes leads to colored wastewater even at very low concentrations, which produces toxicological and technical problems and environmental pollution. Moreover, anionic dyes are highly soluble in water and have reactive groups which are able to form covalent bonds between dye and fiber [2].

Of late, increased public concern and strict environmental regulation have forced industries to pretreat effluents before discharging and to look for

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