



STUDIES REGARDING ADVANCED PROCESSES USED FOR REACTIVE DYES REMOVAL FROM TEXTILE EFFLUENTS

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Abstract

In the textile finishing and dyeing industries, the total volume of water consumed is around 150 millions tons/year, and thus very large quantities of water are processed and produced as wastewater by textile plants. Quality indicators of textile wastewaters, like BOD and COD, have values which, in some cases, exceed 5 times the maximum concentration value (allowed by the national quality standards). One of the greatest concerns in wastewater treatment of a textile effluent is the colour, not only as an aesthetic problem, but also as a pollution problem. Dyes and pigments from the printing and dyeing operations are the principal sources of colour in this type of effluents. Dyestuffs are usually highly structured polymers with low biodegradability and their concentration in the effluent is around 10 mg/L. Recovery, recycling and reuse must be effective tools in minimizing pollutant releases in the environment. Usually, ultrafiltration is used as a single step in advanced wastewater treatment, either for internal or external recycling. The aim of this study is to obtain higher removal efficiencies of contaminants using a 2 step advanced treatment: ultrasonication, followed by ultrafiltration. The experiments were done on a laboratory scale installation and the dyes used in the experiments are Reactive Red 243 and Reactive Violet 5. Ultrasonication destroys most of the dye molecules and ultrafiltration retains the remaining dye molecules and suspended solids and colloids formed in the previous process. During the experiments it was observed that the suspended solids and colloids interfere with the spectrophotometrical method used to determine dye concentration, if the ultrafiltration membrane is not selected properly. Solids, produced after ultrasonication, were dried and analysed using SEM and XPS techniques. Removal efficiencies of 80% (expressed as colour extinction) were obtained, so as it may be concluded that the combination of ultrasonication-ultrafiltration may be further investigated for the advanced treatment and recycling of textile wastewater.

Key words: reactive dyes, textile wastewater, ultrafiltration, ultrasonication

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