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## **INTEGRATED ULTRASONICATION-ULTRAFILTRATION PROCESS FOR THE TREATMENT OF TEXTILE EFFLUENTS: ASSESSMENT OF OPERATIONAL PARAMETERS**

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### **Abstract**

Nowadays, advanced wastewater treatment has become a stringent step for the removal of priority organic pollutants and many technologies have been proposed in order to achieve effluents with a superior quality for recycling or reuse purposes. This research is focused on the possibilities of using an integrated process, comprising 2 stages: the advanced oxidation process of ultrasonication and a membrane separation process, ultrafiltration. The main objective of the study is to assess the efficiency of the ultrafiltration stage on an aqueous dye effluent containing Reactive Blue 19 that has been previously sonicated under optimum conditions. The performances are analyzed from the point of view of effluent quality by determining the removal efficiencies expressed as dye rejection (%) and as Total Organic Carbon (TOC) reduction, under the influence of different ultrafiltration parameters such as: membrane type, operating mode (dead-end/cross-flow), pressure, time and cleaning operations, and also from the point of view of process productivity.

The ultrasonication process has the role of degrading the Reactive Dye to an extent depending on the ultrasonic conditions. The ultrafiltration stage separates the rest of the remaining dye molecules, the reaction products and other impurities left from the chemical oxidation process or produced due to the cavity erosion phenomena, with the scope of polishing the resulted effluent. The ultrafiltration process is able to achieve removal efficiencies of up to 99% expressed as dye rejection and up to 60% as Total Organic Carbon (TOC) reduction, using suitable operational parameters and can be recommended for application for the treatment of textile effluents.

*Key words:* advanced wastewater treatment, Reactive Blue 19, ultrafiltration, ultrasonication

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