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## **RELIABILITY STUDY OF LABORATORY SCALE WATER TREATMENT BY ADVANCED OXIDATION PROCESSES**

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### **Abstract**

The application of advanced oxidation processes (AOPs) emerged as an interesting topic during the last decade. Many studies have been devoted to the complexity of phenomena imposed by AOPs, and a lot of effort was made to justify the application of AOPs. However, the reliability of AOPs has not been an issue of any extensive work. In this work, failure analysis and comparative reliability study were performed for the chosen AOP system, i.e. a laboratory scale photo- and sono-reactor, during the photocatalytic (UV/TiO<sub>2</sub> process) and sonochemical (US/Fenton process) oxidation of model pollutants (dyes and carboxylic acids) in water. Furthermore, a three-criterion analysis approach for the risk assessment was proposed. The set criteria; (i) probability of failure, (ii) estimated cost for the 10 000 working hours and (iii) residual organic content in the system after the applied treatment, resulted in the calculated risk scores,  $S_{risk}$  that enlighten all the crucial aspects of the investigated systems. In conclusion, the analysis was related to the pilot scale reactors.

*Key words:* failure analysis, reliability, risk assessment, sono-Fenton process, TiO<sub>2</sub> photocatalysis

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