

Application of response surface methodology to optimize elimination of organic pollutants in water using photocatalytic oxidation process

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Abstract. Textile industries discharge large amounts of colored wastewaters due to the unfixed dyes on fibers during the coloring and washing steps. The presence of these pollutants in water streams causes problems related to their carcinogenicity, toxicity to aquatic life and the easily detected and undesirable aesthetic aspect. Dyeing effluents are very difficult to treat, due to their resistance to biodegradability, stability to light, heat and oxidizing agents. A rapid development of industry and other activities and the increment of population in last year's is originating a serious problem of water pollution. Advanced oxidation techniques are proving to be important contributions to the treatment of wastewater to remove harmful and toxic pollutants. In addition, these methods are very important because can degrade emerging organic pollutants to non toxic substances, such as carbon dioxide and water, under moderate conditions. The aim of the study is developing at the present time to laboratory scale, in the first phase of the investigation. Many operational parameters can influence the degradation of BR46 elimination, like the initial concentration of dye, volume of the solution, the catalysis concentration and pH of the solution. In order to optimize the dye removal efficiency, different experimental variables involving pH, catalysis concentration, and initial BR46 concentration were optimized. Moreover, these parameters were analyzed by the response surface methodology. The good recovery of the dye elimination with developed method was 99%.

Keywords: Photocatalysis process, Pollutants, Water pollution, Dye, Wastewater.