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PHOTOCATALYTIC OXIDATION OF A HAZARDOUS PHENOLIC COMPOUND OVER TiO_2 IN A BATCH SYSTEM

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Abstract

Recently, environmental scientists have been focused their attention on the occurrence and the elimination of specific organic compounds in water. Among them, chlorophenols are considered to be a public health problem due to their carcinogenic properties. Thus, there is an important need to find new strategies to efficiently transform these compounds to no toxic or inactive by-products. In this work the photocatalytic removal of 2,4-dichlorophenol in water solution was investigated at laboratory scale in a batch photoreactor using a commercial titanium dioxide as catalyst. Effects of different operating parameters such as initial pollutant concentration, catalyst load and UV-light intensities on the photocatalytic elimination efficiency were evaluated in detail for future practical application purposes. Obtained data clearly showed an optimum degradation of the target compound under an initial pollutant concentration of 1.5 mg/L, a titanium dioxide concentration of 1 g/L and for UV-light intensity of 59.6 W/m^2. The total organic carbon removal was also calculated in order to confirm the mineralization of 2,4-dichlorophenol. The obtained data showed a higher mineralization yield under the optimized photocatalytic reaction conditions demonstrating the performance of the photocatalytic oxidation to remove the target molecule at low concentrations from aqueous medium.

Key words: 2,4-dichlorophenol, HPLC-UV, mineralization, photocatalysis, TiO_2

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