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1,2-DICHLOROBENZENE OXIDATION USING INDIVIDUAL AND COMBINED EFFECTS OF OZONE AND ULTRAVIOLET IRRADIATION: CHEMICAL ABATEMENT AND IMPACT ON WATER TOXICITY

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Abstract

Due to its toxicity, persistence in the environment and specific properties, 1,2-dichlorobenzene (DCB) has been listed as a priority pollutant by the European Agency. In this study, the oxidation with ozone alone as well as in combination with ultraviolet irradiation was applied for the degradation of DCB. This article presents the abatements obtained, after the various treatments proposed, in the levels of chemical pollution as monitored by chromatographic techniques (GC/ECD, GC/MS and HPLC/UV-Vis-DAD) and total organic carbon (TOC) measurements. For the same experimental conditions (similar initial DCB concentrations, stirring rate and contact time), the highest levels of degradation and mineralization were attained with the combined use of ozone and UV radiation. The ozone/UV treatment lowered TOC by more than 93%. To evaluate the utility of each proposed treatment, standard bioassays based on lettuce (*Lactuca sativa* L.) seed germination were carried out on the treated solution. Exposure to 50 mg L⁻¹ DCB resulted in a germination rate of zero. However, after chemical oxidation, the decrease in the concentrations of DCB in solution led to a significant reduction of its impact on seed germination.

Key words: 1,2-dichlorobenzene, bioassay, ozone, photooxidation, ultraviolet irradiation

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