

# Assessment of Degradation of Sulfonylurea Herbicides in Water by Chlorine Dioxide

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**Abstract** The degradation of two sulfonylurea herbicides, nicosulfuron and thifensulfuron methyl in water by chlorine dioxide, was studied for the first time in this paper. In order to examine the optimal parameters for degradation of both herbicides, degradation was investigated under light or dark conditions with different amount of chlorine dioxide, different degradation periods, and at different pH values. Degradation efficiency of herbicides was monitored using high-performance liquid chromatography with photodiode array detection

(HPLC-DAD). The degradation products were analyzed by gas chromatography with triple quadrupole mass detector (GC-QQQ). Three products were identified after degradation of nicosulfuron and two products after degradation of thifensulfuron methyl. Total organic analysis (TOC) gave insight into some differences in degradation mechanisms and degrees of mineralization after degradation of the herbicides using chlorine dioxide. A simple mechanism of herbicide degradation was proposed. Acute toxicity tests were performed on the products produced after degradation with chlorine dioxide, and the results showed that the degradation products were less toxic than the parent compounds. The findings of the present study are very useful for the treatment of wastewaters contaminated with herbicides.

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