Comparative study on photocatalytic oxidation and photolytic ozonation for the degradation of pesticide wastewaters

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ABSTRACT

Photocatalytic oxidation and photolytic ozonation have been employed to remove carbendazim, a commonly used fungicide. The effect of catalyst dosage, ozone dosage, and initial solution pH on the reaction was investigated. In the photocatalytic oxidation process, the optimum catalyst dosage and pH were found to be 1 g/L and 4, respectively. In the photolytic ozonation process, the optimum ozone dosage was 0.48 g/h and pH was 9. The pseudo first order rate constants achieved were 0.0212 min\(^{-1}\) for photolytic ozonation and 0.0103 min\(^{-1}\) for photocatalytic oxidation. Both treatment processes were compared based on the pesticide removal and mineralization. The results showed that photolytic ozonation performed better with 98% removal and 85.4% mineralization was achieved, whereas only 85% removal and 62.2% mineralization in photocatalytic oxidation after a treatment time of 3 h.

Keywords: Photocatalytic oxidation; Photolytic ozonation; Pesticide; Carbendazim

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