

Ultrasonic Degradation of Acephate in Aqueous Solution: Effects of Operating Parameters

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Abstract : With the wide production, consumption, and disposal of pesticides in the world, the concerns over their human and environmental health impacts are rapidly growing. Among developing treatment technologies, ultrasonication, as an emerging and promising technology for the removal of pesticides in the aqueous environment, has attracted the attention of many researchers in recent years. The degradation of acephate in aqueous solutions was investigated under the influence of ultrasound irradiation (20 kHz) in the presence of heterogeneous catalysts titanium dioxide (TiO₂) and Zinc oxide (ZnO). The influence of various factors such as amount of catalyst (0.25, 0.5, 0.75, 1.0, 1.25 g/l), initial acephate concentration (100, 200, 300, 400 mg/l), and pH (3, 5, 7, 9, 11) were studied. The optimum catalyst dose was found to be 1 g/l of TiO₂ and 1.25 g/l of ZnO for acephate at 100 mg/l, respectively. The maximum percentage degradation of acephate was observed at pH 11 for catalyst TiO₂ and ZnO, respectively.

Keywords : ultrasonic degradation, acephate, TiO₂, ZnO, heterogeneous catalyst

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