

## UV Light-Activated Peroxydisulfate Oxidation of Imidacloprid in Synthetic Wastewater

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**Abstract :** Abstract—Imidacloprid (IMI, a widely used pesticide, imidacloprid (IMI), a widely used pesticide, is known to affect the bee populations. A sulfate radical-based oxidation method was utilized to remove the commercial pesticide consisted of IMI, dimethylacetamide, N-methyl-2-pyrrolidone, and methanol (TOC0 = 497 ppm). The experimental results evidenced that sulfate radicals created by UV activation (254nm, 6.4 mW/cm<sup>2</sup>) of S<sub>2</sub>O<sub>8</sub><sup>2-</sup> could remove 97% of total organic carbon (TOC) from the synthetic wastewater in 4 h using 120 mM of oxidant dosage. The dose of oxidant, temperature and the light flux were the key factors to further improve the mineralization efficiency, while the ferrous ions decreased the efficacy of UV/S<sub>2</sub>O<sub>8</sub><sup>2-</sup> reaction due to the competition of UV-adsorption by complex formation of FeSO<sub>4</sub><sup>+</sup>. A sulfate radical-based oxidation method was utilized to remove the commercial pesticide consisted of IMI, dimethylacetamide, N-methyl-2-pyrrolidone, and methanol (TOC0 = 497 ppm). The experimental results evidenced that sulfate radicals created by UV activation (254nm, 6.4 mW/cm<sup>2</sup>) of S<sub>2</sub>O<sub>8</sub><sup>2-</sup> could remove 97% of total organic carbon (TOC) from the synthetic wastewater in 4 h using 120 mM of oxidant dosage. The dose of oxidant, temperature and the light flux were the key factors to further improve the mineralization efficiency, while the ferrous ions decreased the efficacy of UV/S<sub>2</sub>O<sub>8</sub><sup>2-</sup> reaction due to the competition of UV-adsorption by complex formation of FeSO<sub>4</sub><sup>+</sup>.

**Keywords :** organic nitrogen, photochemical oxidation, imidacloprid, UV-persulfate, mineralization

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