Removal of isopropyl ethylthionocarbamate from aqueous solution by oxidation

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**ABSTRACT**

To efficiently treat wastewater containing Isopropyl ethylthionocarbamate (also known as Z-200) which proved difficult to be degraded, a novel process of oxidation degradation of Z-200 was studied by sodium hypochlorite oxidation (NaClO). Then, the mechanism of oxidation degradation was further examined by Ultraviolet (UV) spectrometer, Fourier transform-infrared (FT-IR) spectroscopy, and Gas Chromatography coupled with Mass spectrometry (GC-MS). Results showed that the degradation efficiency of Z-200 reached 76% under the optimized conditions with initial pH value of 6.5, NaClO dosage of 1,000 mg/L, and reaction time of 6 min. The degradation efficiency can be significantly improved by adding H₂O₂ to this oxidation system. When the NaClO/H₂O₂ molar ratio was 1:1, the degradation rate could increase to 87%. The measurements of UV, FT-IR, GC-MS confirmed that Z-200 was effectively degraded and small molecules of carbonyl compound with very low concentrations were generated during oxidation. The main degradation pathway that possibly occurred during the whole process was also deduced in this study.

**Keywords:** Hypochlorite oxidation; Hydrogen peroxide; Isopropyl ethylthionocarbamate; Degradation; Infrared spectrum analysis; GC-MS