



Degradation of sulfamethoxazole antibacterial by sono-Fenton process using nano-zero valent iron: influence factors, kinetic and toxicity bioassay

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Received 4 August 2018; Accepted 16 December 2018

ABSTRACT

This study investigated the efficiency of sono-nano Fenton process in the degradation of sulfamethoxazole (SMX) antibacterial in aqueous solution. The effect of ultrasonic frequency, initial pH, the dose of nZVI, SMX concentration and hydrogen peroxide concentration are investigated. The results show that the oxidation power of Fenton system increases by ultrasonic irradiation. The optimum degradation efficiency of SMX was achieved in the condition of 1 mM H₂O₂, 80 kHz frequency, 1 g/L nZVI, and pH: 3 after 60 min contact with US/Fenton (about 95%). Also, the degradation kinetics and toxicity test for effluent of US/ nZVI /H₂O₂ system in optimal condition were studied. It was shown that degradation of SMX could be described by a first-order kinetic model and the toxicity of treated SMX solution decreases with treatment by sono Fenton system. This study shows that US/Fenton can be used as an effective method for the treatment of polluted water and wastewater with SMX.

Keywords: Ultrasound; nZVI; H₂O₂; Fenton; Sulfamethoxazole; Toxicity test

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