

Sulfamethaxazole (SMX) Removal by Microwave-Assisted Heterogenous Fenton Reaction Involving Synthetic Clay (LDHS)

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Abstract : Antibiotics are major pollutants of wastewater not only due to their stability in biological systems, but also due to their impact on public health. Their degradation by means of hydroxyl radicals generated through the application of microwave in the presence of hydrogen peroxide and two solid catalysts, iron-based synthetic clay (LDHS) and goethite (FeOOH) have been examined. A drastic reduction of the degradation yield was observed above pH 4, and hence the optimal conditions were found to be a pH of 3, 0.1 g/L of clay, a somewhat low amount of H₂O₂ (1.74 mmol/L) and a microwave intensity of 850 W. It should be observed that to maintain an almost constant temperature, a cooling with cold water was always applied between two microwaves running; and hence the ratio between microwave heating time and cooling time was 1. The obtained SMX degradation was $98.8 \pm 0.2\%$ after 30 minutes of microwave treatment. It should be observed that in the absence of the solid catalyst, LDHS, no SMX degradation was observed. From this, the use of microwave in the presence of a solid source of iron (LDHS) appears to be an efficient solution for the treatment of wastewater containing SMX.

Keywords : microwave, fenton, heterogenous fenton, degradation, oxidation, antibiotics

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