Microtox® acute toxicity of sulfamethoxazole after ozonation with iron oxide nanocatalysts from industrial waste-recovered.

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Introdução

Sulfametoxazole (SMX) persists in the environment due to its low biodegradability and high bioaccumulation potential[1,2]. Due to the high reactivity of ozone, producing hydroxyl radicals (•OH), organic compounds can be rapidly oxidized, speeding up the biodegradation[3]. Therefore, it is important to assess the efficacy of catalysts produced from different source materials, particularly those recovered from industrial wastes. Thus, the goethite extracted from carboniferous waste used in this study can offer an opportunity for the beneficial use of a residue. In this study, the catalytic efficiency of different iron oxide nanoparticles in the detoxification of SMX solutions by ozonation was evaluated. The hematite nanoparticles used in this study were produced from the calcination of goethite at 600°C (H600), and their performance was compared with commercial hematite (HC). Microtox acute toxicity tests with the bioluminescent bacterium *V. fischeri* were conducted to assess the toxicity of samples treated using H600 and HC nanocatalysts for 60, 120 and 180 min for SMX removal.

Resultados e Discussão

Figure 1 shows the toxic units (TU) for the SMX degradation with and without catalytic ozonation using H600 and HC, after an incubation period of 15 min.

The SMX ozonation led to an increase in the toxicity of the solution relative to untreated SMX for all processes. The samples subjected to ozonation treatments with the H600 and HC nanocatalysts were shown to be slightly less toxic than that subject to treatment without particles. In the final stage, the toxicities of HC and H600 were similar and the processes carried out with these two nanocatalysts showed no significant differences.

These data are consistent with those reported by other authors. Ozonation with other catalysts and also other advanced oxidation processes has been used for the degradation of this antibiotic and acute toxicity after the treatment was higher than before the treatment[4,5].

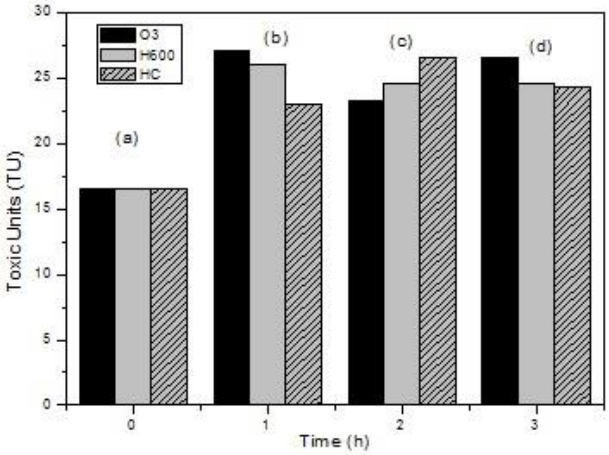

Figure 1. SMX Toxic Units (TU) on diferents ozonation times

Conclusões

The Microtox acute toxicity tests show similar degrees of detoxification for the H600 and HC nanocatalysts.

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