

Photodegradation of Ofloxacin and Amoxicillin using Synthesized TiO_2

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Abstract—Pharmaceuticals have been detected in ground and surface water, drinking water, tap water, ocean water, sediments and soil. Persistence against biological degradation and their biological activity are key properties of these pollutants. The photocatalytic decomposition of amoxicillin (AMX) and ofloxacin (OFX) in an aqueous suspension was investigated using TiO_2 nanoparticles under UV-A light. The sol-gel method was used for the preparation of TiO_2 nanoparticles. Characterization was conducted and kinetic study showed that photocatalytic degradation of AMX and OFX followed pseudo-first order and first order rate law respectively. The catalyst loading effect and pH study was also discussed. The photocatalytic percentage degradation was optimized. Experiments were performed at antibiotic concentrations 20 mgL^{-1} . The optimum values of parameters were found to be TiO_2 dose = 4g/l, pH = 5, $t = 150$ min for AMX and $t = 60$ min for OFX. Experimentally percentage degradation at optimum conditions were found to be 96 % for OFX and 88 % for AMX in slurry mode reactor. The toxicity test showed the growth of microorganisms after 24 hrs. This was concluded that the by-products formed after the photocatalysis of AMX and OFX are not toxic.