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Abstract	:	The increasing demand for pharmaceuticals, essential for promoting human health and maintaining quality of life, is contributing to environmental degradation. Pharmaceuticals are found in various sources, including industrial wastewater, urban agricultural runoff, and hospital effluent. Their improper disposal leads to environmental pollution, posing significant risks to both living and non-target organisms. Photocatalysis using semiconductor nanoparticles is a clean, efficient, and environmentally friendly method for degrading pharmaceuticals, due to the presence of potent oxidizing species. This study investigates the degradation of two pharmaceutical chemicals, aspirin and theophylline, in an aqueous solution using alginate, a naturally occurring polymer derived from brown seaweeds. This research advances the development of efficient photocatalytic technologies for environmental remediation and water treatment, aiming to improve water quality and public health. The Ni nanoparticle bead catalyst was produced using the sol-gel process following established procedures. The photocatalytic activity was evaluated by examining the effects of pH levels (4, 5, 6, 7, and 8), catalyst doses (10, 20, 30, 40, 50, and 60 g/L), and initial concentrations (10, 20, 30, 40, and 50 mg/L) over a one-hour irradiation period. Aspirin concentration was measured using a UV-Vis spectrophotometer at 229 nm, and theophylline concentration at 273 nm. The study identifies the optimal conditions for the removal of aspirin and theophylline as a pH of 5, a catalyst dosage of 40 g/L, and an initial concentration of 10 mg/L…see more.