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The enhancer of Antibiotics removal from aqueous media in UV/GO process by magnetic Fe3O4 Coating

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Abstract

Over the past few decades, industrial activities have been progressing and the entry of sewage-contaminated into the water resources has been taken as a major threat to the environment. One of the industries expanding in all countries is the pharmaceutical industry, which produces a significant amount of contaminated wastewater containing Pharmaceutical compounds such as antibiotics. Therefore, in order to carry out this research after library studies and collecting the required information, to evaluate the possibility of measuring and comparing the performance of the photocatalytic process using nanoparticles of magnetic Graphene from synthetic solutions.

In this study, the effects of parameters such as pH of the solution (3-11), the adsorbent quantity (0.2- 4 g /L), contact time (0- 60 minutes), the initial concentration of antibiotics (1- 100 mg /L) and the power of lamp (6 and 18 watts) were evaluated on the removal efficiency. Maximum wavelengths of antibiotics were obtained at 228, 261 and 357 nm for Amoxicillin, Cephalexin, and Tetracycline using spectrophotometric apparatus, respectively.

After conducting the incumbent experiments and studies, it was determined that pH adjustment had no effect on the system efficiency while the optimal contact time for Amoxicillin and Cephalexin was 45 minutes and 15 minutes for Tetracycline. The desired nanoparticle values for Amoxicillin, Cephalexin, and Tetracycline were 4, 4 and 2 g/L, respectively. The optimum initial concentration for the three antibiotics was 15 mg /L and the maximum removal efficiency of 18 watts ultraviolet radiation for Amoxicillin, Cephalexin, and Tetracycline was 87.8%, 60.5%, and 100%, respectively.

It was concluded that the magnetic nanoparticle Graphene Oxide using in a photocatalytic process has had a high efficiency in antibiotics degrading.

Keywords: Photocatalyst, TiO_2, ZnO, Amoxicillin, Cephalexin, Tetracycline