عنوان مقاله:

Green Synthesis of Ni@Fe3O4 NPs Using Euphorbia maculata Extract as Photocatalysts for the Degradation of Metronidazole as Antibiotic Under UV-irradiation

محل انتشار:

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خلاصه مقاله:

The application of plant based materials for nanomaterial production is a simple, cheap and environmentally friendly method. Lately, to overcome the stability problems and prevent the accumulation of metal NPs, Fe3O4 has been employed as a support in the separation and recovery of these NPs [1,2]. In addition, it does not require any costly or hazardous chemicals [3]. The extracts of Euphorbia maculata aerial parts were used in a green synthesis method in order to prepare magnetic Ni@Fe3O4 NPs. The synthesized nanoparticles were characterized by various methods. X-Ray Diffraction results confirmed the presence of Ni@Fe3O4 nanoparticles (Fig. 1a). According to the FESEM analysis of Ni@Fe3O4 synthesized from Euphorbia maculata extract, the morphology of the particles was found to be spherical. The particles were are relatively clustered and the average crystallite sizes were about 30 (Fig. 1b). Figure 1. XRD powder patterns of Ni@Fe3O4 NP synthesized using Euphorbia maculata extract (a) FESEM images of the Ni@Fe3O4 (b)The photocatalytic activity of the synthesized NPs was tested in the degradation of different metronidazole in aqueous medium under UV irradiation. The effects of different parameters such as nanoparticle dosage, contact time, pH, and initial antibiotic concentrations on the capacity of the photocatalyst adsorption were also studied. Results showed that the highest removal efficiency of metronidazole antibiotic in the reaction of Ni@Fe3O4 nanoparticles, at the optimal conditions was equal to 91%. Furthermore, good nanocatalytic stability of the NPs in the degradation of antibiotic was observed after the recycling. The photocatalyst efficiency did not considerably .change after five cycles, which indicated excellent photocatalytic stability

کلمات کلیدی:

green synthesis; Ni@Fe3O4 nanoparticle; photocatalyst; antibiotic