

عنوان مقاله:

Green synthesis of iron nanoparticles using bioflocculant extracted from okra (*Abelmoschus esculentus* (L) Moench) and its application towards elimination of toxic metals from wastewater: A statistical approach

محل انتشار:

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خلاصه مقاله:

In recent years, the development in the field of nanotechnology is due to the fascinating properties of nanoparticles. In the present study, plant based bioflocculant extracted from the fruits of Okra (*Abelmoschus esculentus*) was purified, characterized and used for the biosynthesis of iron nanoparticles. Fourier transform infra-red (FT-IR) spectral analysis revealed the presence of hydroxyl, carboxyl and sugar derivatives in the bioflocculant. The biosynthesized Fe nanoparticles were characterized using UV-vis spectroscopy, X-ray diffraction (XRD), Fourier transform infra-red (FT-IR), Scanning electron microscopy (SEM) and Atomic force microscopy (AFM). TEM analysis was performed and the size of synthesized Fe nanoparticles was found to be 50 nm which was assessed by dynamic light scattering (DLS) analysis. Flocculation activity of bioflocculant mediated Fe nanoparticles (BFFeNPs) was tested. The effects of various parameters on Pb(II)removal using BFFeNPs were evaluated using response surface methodology (RSM) based on Box Behnken Design (BBD).The BFFeNPs exhibited high Pb (II) removal efficiency (91.45%) under optimized parameters viz. pH 6, BFFeNPs dosage 0.2 g/L, contact time 30 min and temperature 30°C. A quadratic polynomial model was fit with the actual data of R² 0.99 for metal removal. To the best of our knowledge, this is the first report on the potential use of Okra bioflocculant mediated Fe nanoparticles synthesis for the cost effective and eco-friendly .removal of lead from wastewater

کلمات کلیدی:

Bioflocculant mediated Fe nanoparticles, Box Behnken Design (BBD), Flocculation Activity, Heavy metal removal, Response surface methodology

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