Efficient removal of lanthanum from aqueous solution using chitosan-Fe_3O_4 composite: Optimization by response surface methodology

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In this report, magnetite nanoparticles (Fe3O4) immobilized chitosan (CS) composite was prepared by chemical precipitation method. The CS/Fe3O4 nanocomposite was confirmed by Fourier transform infrared spectroscopy, X-ray diffraction, and thermogravimetric analysis. We demonstrated the recovery of lanthanum from aqueous solution using CS/Fe3O4 nanocomposite with the help of empirical modeling using response surface methodology. Factors influencing the adsorption capacity, such as adsorption time, absorbent dosage, and pH were investigated. The optimum dosage, pH, and contact time at room temperature for the removal of lanthanum were found to be 6.5 mg, pH 11 and 150 min, respectively. The adsorption capacity was around 95%.