نویسندگان:

Hamid Reza Pourzamani - *Environment Research Center, Research Institute for Primordial Prevention of Non-communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran, and Department of Environmental Health Engineering, School of Health, Isfahan University of Medic*

Nezamaddin Mengelīzadeh - *Environment Research Committee, Isfahan University of Medical Sciences, Isfahan, Iran, and Student Research Committee and Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.*

Mohammad Jalil - *Environment Research Committee, Isfahan University of Medical Sciences, Isfahan, Iran, and Student Research Committee and Department of Environmental Health Engineering, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran*

Zahra Moosavian - *Department of Health, Isfahan University of Medical Sciences, Isfahan, Iran*

خلاصه مقاله:

Introduction: Due to causing methemoglobinemia, different cancers, and teratogen effects in human nitrate contamination of water resources has become a critical environmental problem Therefore, the aim of this work was to determine the optimum condition of nitrate sorption onto magnetic nanoparticle. Materials and Methods: The removal of nitrate from aqueous solutions by magnetic nanoparticles has been studied through using batch adsorption method. X-ray diffraction (XRD), Transmission Electron Microscopy (TEM), and Scanning Electron Microscopy (SEM) was applied to characterize the synthesized Fe_3O_4. The effect of pH, nano-magnetic, adsorbent dose, initial concentration of nitrate, and contact time were investigated. Results: According to SEM and TEM images, the adsorbent particles werenanosized and spheroidal; the sizes were about 20–30 nm. The experiments results indicated that the optimum adsorbent dose was 750 mg in 1000 ml of solution, with a contact time of 90 min, while the optimum pH was 9. The kinetic models for nitrate adsorption showed rapid sorption dynamics by both first-order kinetic ($R^2 = 0.97$) and second-order kinetic ($R^2 = 0.96$) models. Nitrate adsorption equilibrium data were fitted well to the Freundlich isotherm than Langmuir isotherm. Conclusion: The results showed that, magnetic nanoparticles can be used as a low cost and efficient adsorbent for removal of nitrate from aqueous solutions

کلمات کلیدی:

Adsorption, Nitrate, Magnetite Nanoparticles, Kinetics