Jordan University of Science and Technology

Decontamination of Cu2+-tainted water through biosorption onto palm tree leaf particles

Authors: Naser Hamdi, Fahmi A. Abu Al-Rub, Munther Kandah, Hussein Allaboun and julie Hamdi

Abstract: In this study the potential use of palm tree leaf (PTL) particles for the removal of copper ions from aqueous solution was investigated. The effects of shaking time, Cu2+ concentration, and equilibrium pH on the biosorption of copper ions from aqueous solution were studied. Batch biosorption experiments proved the technical feasibility of using PTL particles to remove copper ions from aqueous solutions where Cu 2+ uptake of 17.6 mg/g was observed. The biosorption of copper on PTL particles was pH dependent, and maximum copper sorption was found to occur at an equilibrium pH of 5.5. The equilibrium sorption data of copper on PTL particles was described by 2 two-parameter isotherm models: the Freundlich and Langmuir models, as well as by the three-parameter Redlich-Peterson model. While all three models proved a good fit for the equilibrium sorption data, CFEF non-linear regression analysis indicated that the Redlich-Peterson model resulted in the best fit. Dynamic studies revealed that the initial uptake of copper on PTL particles was rapid, where equilibrium was established within 15 minutes, and that the data followed the pseudo second-order reaction.