Biosorption of lead contaminated wastewater using cattails (Typha angustifolia) leaves: Kinetic

Abstract

In this work, dried leaves of Typha angustifolia (TA), also known as the common cattail, were used as an adsorbent in kinetic studies of Pb(II) adsorption from synthetic aqueous solutions. Batch adsorption studies with dried TA leaves were conducted and they were able to adsorb Pb(II) from 100 mL of a 25 mg L-1 Pb(II) solution effectively with the optimized dosage of 0.6 g. Adsorption equilibrium was achieved within 8 h with an effective removal of 86.04 %. Adsorption kinetics was further evaluated using four kinetic models, i.e., the pseudo-first order, pseudo-second order, intraparticle diffusion and Elovich model. Fitting of the data was performed based on linear regression analysis. The sorption kinetic data fitted best to the pseudo-second order model with an R2 of 0.9979, followed closely by the Elovich model with an R2 of 0.9952. The obtained results showed the adsorption of Pb(II) by TA leaves, which is an abundant biological material, is feasible, cheap and environmentally friendly.