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Desorption of lead (II) from *Azolla pinnata* after biosorption

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Biosorption is a biological technique used for heavy metal removal from contaminated aqueous systems. It utilizes non-living biomaterials such as dead plants, fungal biomasses. One problem of this technique is the disposal of the used biosorbent, since degeneration of the biosorbent would release heavy metals back in to the environment. Our early studies showed that dead *Azolla pinnata* adsorbed Pb(II) from aqueous system more effectively following a pseudo-second order kinetic model and Freundlich isotherm model. The objective of this study was to find a suitable desorbent to remove Pb(II) and regenerate the used *A. pinnata* biosorbent.

Batch desorption processes were conducted to screen a suitable desorbent. For this purpose *A. pinnata* biosorbent was initially loaded with Pb(II) by shaking 0.2 g of *A. pinnata* in 6 mg L^{-1} $Pb(NO_3)_2$. Subsequently, 0.1 g of metal loaded biosorbent was shaken with 100 mL of selected desorbents of different concentrations ($NaNO_3$, Na_2CO_3, $NaNO_3$+EDTA, pH 1-6 HNO_3 and NaOH solutions of pH 8-10) for 1 hour on an orbital shaker at a speed of 100 rpm. Metal concentrations in the desorbent solution were analyzed using atomic absorption spectrophotometry.

Desorption was highest for HNO_3 at pH 1 which decreased with increasing pH up to 4. Among the sodium salts screened, 0.5 mol L^{-1} Na_2CO_3 and 0.5 mol L^{-1} $NaNO_3$ with 0.001 mol L^{-1} EDTA desorbed 12% and 100% of the Pb, after respectively. Equilibrium data of desorption using 0.5 mol $L^{-1}$$NaNO_3$ with 0.001 mol L^{-1} EDTA were analyzed using pseudo first order and pseudo second order kinetic models. The equilibrium data followed a pseudo second order desorption with a rate constant of 6.53 g mg^{-1} min^{-1}. Further studies are carried out to find out a suitable desorbent to desorb metals other than Pb(II) which can be absorbed on to *A. pinnata.* Form this study $NaNO_3$ with EDTA was found to be good desorbent of Pb(II) from *A. pinnata.*

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