Single and Binary sorption of lead(II) and zinc(II) ions onto *Eichhornia Crassipes* (water hyacinth) ash

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Abstract

Eichhornia crassipes ash was used for the removal of Pb(II) and Zn(II) ions from mono and binary systems. Batch equilibrium studies were carried out under optimum conditions and the results were analysed by the Langmuir and Freundlich adsorption isotherms for single metal systems and by Langmuir competitive model for binary metal systems. The equilibrium data fitted well to both mono sorption isotherm models with $R2 \geq 0.99$. The ash had greater affinity for Pb(II) ions (qm = 50 mg g-1 and n = 1.05) than Zn(II) ions (qm = 16.67 mg g-1 and n = 1.04) in mono sorption systems. There existed competition between Pb(II) and Zn(II) ions during their simultaneous removal by the ash ($R2 \geq 0.97$). The ash showed preference for Pb (II) ion sorption (qm* = 50 mg g-1 and qm*/qm = 1) than Zn(II) ions (qm* = -2.94 mg g-1 and qm*/ qm = -1.53) that was attributed to physicochemical properties of the cations. Pb (II) and Zn (II) ions can be significantly sorbed onto Eichhornia crassipes ash from single metal systems. However, in multi-metal systems, the removal of Zn (II) ions is inhibited by Pb (II)ions, while Pb(II) ions removal is not affected by the presence of Zn(II) ions.