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Applications of Waste Biosorbent based Hydrated Composite Beads (HCB) for the Potential Removal of Metal Ions from Aqueous Streams: A Clean Development Mechanism

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In present investigation potential of Arachis hypogea shells, Dalbergia sissoo pods and Acacia saligna pods have been explored for removal of toxic heavy metal ion Pb (II) from aqueous solutions. Comparison of removal efficiency of these leguminous-cellulosic waste materials has been carried out in nature as well as in the form of waste impregnated Hydrated Composite Beads (HCB) in batch as well as continuous fixed bed column studies. The effect of various operational parameters has been observed such as pH, adsorbent dose, contact time, initial metal ion concentration, feed flow rate and bed height. Further studies were carried out by fitting, pseudo-second order equations, intraparticle diffusions studies and Freundlich isotherms. Under optimized conditions in batch as well as column studies the maximum removal efficiency has been obtained by waste impregnated hydrated composite beads in comparison to the natural powdered form. The maximum adsorption of Lead was 95 % with Arachis hypogea shells composite beads (AHSCB), 92 % with Dalbergia sissoo pods composite beads (DSPCB) and 84 % with Acacia saligna pods composite beads (ASPCB) respectively at pH 6.0.

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