Kinetic Modeling of Continuous Column study for the removal of Cu (II) and Fe (II) using orange peel as an adsorbent

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Abstract : This paper deals with the removal of Cu (II) and Fe (II) in continuous column mode operation which involves the study effect of flow rate and effect of bed height at a fixed metal ion concentration of 100 ppm for the adsorption of Copper and Iron on orange peel adsorbent. The equilibrium adsorption capacity of orange peel for Copper and Iron was examined by various models like isotherm modelling, Kinetic modelling and thermodynamic modelling studies. The results prove that the biosorption capacity of orange peel for Copper and Iron are endothermic, efficient, and very rapid in nature. The overall efficiency of the orange peel was studied and optimized the above parameters on the basis of the results of batch mode experimentation work. Various standard isotherm models like Thomas model, BDST (Bed Depth Service Time) model and Adam-Bohrat models are verified for the column mode study. BDST model equation has been fitted with higher R^2 values of 0.973 and 0.984 for Cu (II) and Fe (II) when compared to Adam-Bohart model and Thomas model.
Key words : Effect of flow rate, Effect of bed height, Biosorpion capacity, Bed Depth Service time model, Adam-Bohart model, Thomas model.

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