**Abstract**

Biosorption equilibrium and kinetics of Pb(II) and Hg(II) on coconut shell carbon (CSC) were investigated by batch equilibration method. The effects of pH, adsorbent dosage, contact time, temperature and initial concentration of Pb(II) and Hg(II) on the activated carbon of coconut shell wastes were studied. Maximum adsorption of Pb(II) occurred at pH 4.5 and Hg(II) at pH 6. The sorptive mechanism followed the pseudo second order kinetics. The equilibrium data were analyzed by Langmuir, Freundlich and Dubinin- Radushkevich isotherm models. The equilibration data fitted well with both Langmuir and Freundlich isotherm model. The Langmuir adsorption capacity for Pb(II) was greater than Hg(II). The mean free energy of adsorption calculated from Dubinin- Radushkevich (D-R) isotherm model indicated that the adsorption of metal ions was found to be by chemical ion exchange. Thermodynamic parameter showed that the sorption process of Pb(II) onto SDC was feasible, spontaneous and endothermic under studied conditions. A comparison was evaluated for the two metals.