GEOCHEMICAL ASPECTS OF ESTUARINE SYSTEM IN THE COCHIN PORT TRUST AREA: APPRAISAL OF ADSORPTION PROPERTIES OF Pb(II), (Cd II), Zn(II) AND Cu(II) ONTO THE SEDIMENT-CLAY FRACTION

K. Anoop Krishnan*, Harsha Mahadevan¹, H.S. Aswathy¹,², K. Suranya¹, Vinu V. Dev¹, Sibin Antony¹
¹Hydrological Processes Group (HyP), National Centre for Earth Science Studies (NCESS), Akkulam, Trivandrum, India
²Department of Chemistry, Government Arts College, Thiruvananthapuram, Trivandrum, India
*E-mail: sreeanoo@mail.com, sree.anoo@necs.gov.in

Abstract

The aim of the present work is to explore the effective utilization of natural clay separated by Carver Process from the sediments of Cochin Port Trust area, Kerala, India. Natural clay is found to be a good adsorbent in removing heavy metals such as Pb(II), Cd(II), Zn(II) and Cu(II) from an aqueous phase. Adsorption capacity of the adsorbent towards these four metal ions were determined by batch adsorption studies. The optimum pH obtained was 6.0 and the maximum adsorption capacity of Pb(II), Cd(II), Zn(II) and Cu(II) was found to be 76.9, 78.5, 92.8 and 98.4 % respectively. An optimum contact time of 120 min was observed for the uptake of heavy metal ions onto natural clay at 303 K. Also the kinetics of adsorption towards Pb(II), Cd(II), Zn(II) and Cu(II) were found to be of pseudo-second-order. The present study suggests that natural clay separated from the sediments of Cochin Estuary is highly efficient in removing the toxic heavy metal ions Pb(II), Cd(II), Zn(II) and Cu(II) from aqueous solutions.

Keywords: Cochin Port Trust, sediments, natural clay, kinetics, adsorption