**Abstract**

Nanohydroxy apatite – *Azaridachtaindica* nutshell composite material was prepared via co-precipitation method. The product was characterized by FT-IR and Atomic force microscopy. The Ni(II) removal capacity of the synthesized novel material is investigated by employing batch mode to verify the sorption efficiency under optimized conditions viz.,11 mg/L initial concentration of Ni(II), 21 minutes agitation time between sorbent/sorbate molecules and 50mg dosage of the nanocomposite. The results of the experiment registered a significant increase in the sorption nature of nanohydroxy apatite composite of the chosen nutshell against the chemically modified *Azaridachtaindica* nutshell where 450 mg dosage is employed under similar operating conditions. The successfulness of the nanomaterial in trapping Ni(II) ions is extended to field levels through the assessment of effluents collected from electroplating industry suggesting that nano composited biomass of *Azaridachtaindica* nutshell is an efficient bioaccumulant.