

Synthesis and characterization of biochar from peel and seed of jackfruit plant waste for the adsorption of copper metal ion from water

ABSTRACT

In this work, jackfruit peel and seeds are utilized to synthesize the biochar for the removal of copper metal ions from water. The synthesized jackfruit peel and seeds were carbonized at 500°C for 2 h under air atmosphere flow. The JPB and JSB were characterized by the use of different characterization techniques such as XRD, BET, FTIR, SEM and CHNS to study its physico-chemical properties. The synthesized biochar samples were tested for the removal of Cu metal ion from water and recorded excellent adsorption capacity of 99.84% by JPB adsorbent at optimized adsorption conditions of 45 °C adsorption temperature, 7 pH, 24 hours contact time and 100 ppm of metal solution concentration. The lowest adsorption capacity of 79.60% was recorded by JSB adsorbent under the optimized parameters of 25 °C temperature, 7 pH, 24 hours contact time and 40 ppm metal ion concentration. The results demonstrated that, jackfruit based biochar would be an excellent adsorbent for heavy metals from water.

Keyword: Adsorption; Heavy metals; Jackfruit peel; Jackfruit seed; Characterization