

ABSTRACT

Toxic Cr(III) which poses environmental hazard to flora and fauna was efficiently abstracted by low-cost *Nauclea diderrichii* seed biomass (NDS) with good sequestrational capacity for this metal was investigated in this study. The NDS surface analyses showed that it has a specific surface area of 5.36 m²/g and pH_{pzc} of 4.90. Thermogravimetric analysis of NDS showed three consecutive weight losses from 50–200 °C (ca. 5%), 200–400°C (ca. 35%), >400°C (ca. 10%), corresponding to external water molecules, structural water molecules and heat induced condensation reactions respectively. Differential thermogram of NDS presented a large endothermic peak between 20–510°C suggesting bond breakage and dissociation with the ultimate release of small molecules. The experimental data showed kinetically fast biosorption with increased initial Cr(III) concentrations, indicating the role of external mass transfer mechanism as the rate controlling mechanism in this adsorption process. The Langmuir biosorption capacity of NDS was 483.81 mg/g. The use of the corrected Akaike Information Criterion tool for ranking equilibrium models suggested that the Freundlich model best described the experimental data, which is an indication of the heterogeneous nature of the active sites on the surface of NDS.