**Abstract**

Presence of toxic heavy metals and synthetic chemicals exceeding their permissible limits in ground, surface and drinking waters has severe impact on human and aquatic life. The present work emphasizes the sorption efficiency of acid treated *Prosopis juliflora* Bark (TPJB) and its derived nano material in the process of Ni(ll) uptake from aqueous solutions. Acid treatment of raw material, subsequent nano sizing through ball-milling method have enhanced the metal retention property correspondingly. The size and the characterization of the material are supported by the optical microscopic, AFM, SEM and EDAX analyses. A twofold increase in the amounts of Ni(ll) adsorbed (mg/g) is registered by the prepared nanomaterial at the dosage of 150 mg against 300 mg required for TPJB under fixed optimized conditions. This collative study confirms the augmentation of active sorption sites in the nano particles, leading to effective adsorption at lower doses itself.