**Abstract**

Presence of toxic heavy metals and synthetic solutions exceeding their tolerance limits in ground, surface and drinking water bodies have severe impact on human and aquatic life. The present work is focused on the evaluation of the Nickel sorption efficiency for the chosen *Prosopis juliflora* Bark with appropriate acid modification and the derived nanomaterial being characterized by AFM, SEM and EDAX techniques. A two-fold increase in the adsorbed amounts is recorded for the nanomaterial at a dosage of 150mg against 300 mg of TPJB. A comparative study based on optimized conditions support the above statement, the better efficiency is favored due to higher surface area.