**Abstract**

The present work was carried out to study the efficiency of acid treated fruit shell of *Aegle marmelos* (L.) *Correa* (TAMC), for the adsorption of Zn(II) from aqueous solutions. TAMC was characterized using Fourier Transform Infrared (FTIR), Scanning Electron Microscopy (SEM), Energy Dispersive X-ray Analysis (EDAX) analyses for the presence of functional groups, surface morphological changes in the chosen material and occurrence of absorption peak in the metal laden TAMC, respectively. Batch equilibration mode of experiments were carried out to assess the impact of the variable parameters viz., particle sizes and doses of the adsorbent material, predetermined time intervals between the sorbent and the sorbate species and pH of the medium. The optimized conditions for the maximum removal of Zn2+ ions (91.1%) from1000 mg L−1 initial concentration were 0.18 mm particle size, 1000 mg adsorbent dose, 10 min agitation time and pH 5.5. The applicability of Langmuir and Freundlich isotherms at various initial concentrations were plotted for Zn(II)-TAMC system wherein the best straight line was well suited for Langmuir model which indicated the monolayer adsorption. The maximum sorption capacity of TAMC was 80.45 mg g−1 as calculated from the equilibrium concentration data, which was observed to be substantially greater than the q (adsorption capacity at equilibrium) values reported employing different sorbent materials. The results revealed the fruit shell of *Aegle marmelos* (L.) *Correa* as a promising material with excellent metal removal capacity when compared to other sorbent materials.