**Abstract**

Utilization of tea plant stems *Camellia sinensis*, discarded as litter, collected from Ooty was employed for phosphate removal. The material was broken into small pieces, washed, dried, pulverized into different mesh sizes using Scientific Test Molecular Sieves, labelled as Raw CSS Dust (RCSSD). Sorption efficiency of the categorized sizes was tested by applying batch verification technique, where 85 BSS exhibits better sorptive nature. Particle size of 85 BSS was determined (0.18mm) using Binocular Microscope (Optika Make), treated with 0.1N H2SO4,washed, dried, named as TCSSD. Characterization studies are supported by FTIR, SEM and EDAX methods. Sorption efficiency of TCSSD was experimentally verified under varying adsorption parameters. Absorbance values were recorded using UV/Vis spectrophotometer (LABINDIA®-UV3000+) by molybdenum blue complexation method for phosphate ions. Maximum removal was registered as 48.3% and 99.7% for RCSSD and TCSSD respectively under optimized conditions: 0.18mm particle size, 10mg/L initial concentration, 9 mins agitation time interval, 0.25g dose, pH 5 at room temperature. Experimental data were validated using Langmuir and Freundlich isotherms wherein Freundlich plots recorded a better linear fit. Results imply that the selected material possess excellent anion removal capability from aqueous media.