**Abstract**

Recalcitrant anionic Reactive red 120 dye’s removal from waste water was studied by production of activated carbon produced from waste tea. The efficacy and efficiency of this low cost material was investigated to serve as a substitute to the pricey commercial activated carbon. The activated carbon from waste tea (WTC) was prepared through chemical activation in Nitrogen atmosphere and removal of Reactive Red 120 (RR120) was tested through batch adsorption process. Initial dye concentration (50-300 mg/L), temperature (30-50 oC), contact time and initial pH 3-12 were parameters considered during the experiment. Langmuir isotherm and pseudo-second-order kinetic were the best models that the fitted adsorption process compared with Freundlich and Temkin isotherm, and pseudo-first-order kinetic models that were also tested. The thermodynamic studies of the adsorption process revealed that the process was spontaneous, endothermic and intra-particle diffusion was rate controlling mechanism. The WTC prepared had good surface area and was found to be effective for adsorption of RR120