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# REMOVAL OF SODIUM IONS FROM SALINE WATER USING LABORATORY PREPARED ACTIVATED COIR

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This study focusses on investigating the potential of laboratory synthesized activated coir in removal of sodium ions from saline water which can be further extended to desalination applications. Activated coir was prepared by pyrolysis of raw coir obtained from dried coconut coir which was treated with 50% (wt/wt) phosphoric acid. The activated coir was characterized by comparing its properties such as iodine number according to ASTM standards, methylene blue adsorption, FTIR spectra, SEM images and PXRD patterns with commercial activated coir samples. The scanning electron microscopic imaging and the adsorption capacity of the synthesized coir samples displayed nanoporous structure and better adsorption capacity than the commercial samples. FTIR data implies the presence of oxygen and nitrogen containing functional groups in the activated coir sample which are responsible for the adsorption of cations through electrostatic interactions. Sodium ion removal efficiency was studied using standard sodium chloride (NaCl) solutions under dynamic conditions. All experiments were triplicated. A column of 1.5 g of activated coir adsorbed 30-35 % of sodium ions from 0.20 mol $dm^{-3}$ NaCl solution. During repeated filtration through two such columns a removal of 50-55 % was obtained. The maximum removal of sodium ions was obtained when the NaCl solution was passed through the column at a rate of 1.00 $cm^3$ $min^{-1}$. It is also found that the removal of ions depends on the initial concentrations of the standard NaCl solutions. The kinetics and equilibrium studies for the adsorption of sodium ions were carried out. The experimental results fit with pseudo second order kinetic model. The experimental isotherms were fitted with Freundlich, Langmuir, Temkin and Dubinin-Radushkevich equations. The results fit with Freundlich and Langmuir isotherms implying a homogenous, monolayer coverage and chemisorption. The Temkin and Dubinin-Radushkevich isotherms show two correlations in the experimental results implying the presence of two or more types of active sites for adsorption of sodium ions.