OPTIMIZATION OF SYNTHESIS CONDITIONS FOR ACTIVATED CARBON FROM AVOCADO STONES FOR ADSORPTION OF LEAD FROM WATER

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ABSTRACT

Activated carbons (AC) are predominantly amorphous solids with large internal surface areas and pore volumes. Carbon in dense as well as porous solid form is used in a variety of applications like in liquid and gas phase purifications. Activated porous carbons are made through pyrolysis and activation of carbonaceous natural as well as synthetic precursors. Pyrolysed woods replicate the structure of original wood but as such possess very low surface areas and poor adsorption capacities. On activation, these exhibits increased adsorption volumes of 0.5-0.8 cm$^3$/gm and surface areas of 700-1800 cm$^2$/gm depending on the activation conditions whether physical or chemical. Former carbons possess mixed pore size distribution while chemically activated carbons predominantly possess micro pores. Thus, these carbons can be used for adsorption of wide distributions of molecules from gas to liquid. The molecular adsorption within the pores is due to single layer or multilayer molecule deposition at the pore walls and hence results in different types of adsorption isotherm. On the other hand, activated carbon fibres with controlled micro porous structure and surface area in the range of 2500 m$^2$/gm can be developed by controlled pyrolysis and physical or chemical activation of amorphous carbon fibres. Active carbon fibres with unmatchable pore structure and surface characteristics are present and futuristic porous materials for a number of applications from pollution control to energy storage. Commercial AC is a preferred sorbent though its use is restricted due to high cost. As such, cheaper AC from agricultural wastes is being investigated. The aim of this study is to investigate the best conditions for generating AC from avocado stones for optimum adsorption of Pb$^{2+}$ ions from water. The conditions to be varied are the concentration of the activating agent, activating time and temperature. To characterize the carbon produced using infrared (IR) technique. Also to compare the adsorptivity of the AC produced and the inactivated carbon. Absorption studies will be done using water containing Pb$^{2+}$ ions and analysis done using Atomic Absorption Spectroscopy (AAS).