



Fe (III) removal by activated carbon produced from Egyptian rice straw by chemical activation

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ABSTRACT

The present work explored the use of Egyptian rice straw, an agricultural waste that leads to global warming problem through brown cloud, as a potential feedstock for the preparation of activated carbon. Chemical activation of this precursor using two different methods was adopted. The produced activated carbon was fully characterized considering its adsorption properties, as well as its chemical structure and morphology. Application of using the produced activated carbon and raw rice straw for removal of the Fe(III) was evaluated in a batch operation system. The results indicated that the rate of uptake of the Fe(III) is rapid in the beginning and 80% adsorption is completed within 50 min, and the time required for equilibrium adsorption is 60 min. The removal efficiency of Fe(III) depends on the pH of the solution. The optimal Fe(III) removal efficiency occurs at pH 5. The adsorption isotherm analysis showed that the Freundlich isotherm provides a good model for the sorption system. The $1/n$ is lower than 1.0, indicating that Fe(III) is favorably adsorbed by activated carbon.

Keywords: Chemical activation; Rice straw; Fe(III); Adsorption; Activated carbon

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