

Banana Peels as an Eco-Sorbent for Manganese Ions

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Abstract : This study was conducted to evaluate the manganese removal from aqueous solution using Banana peels activated carbon (BPAC). Batch experiments have been carried out to determine the influence of parameters such as pH, biosorbent dose, initial metal ion concentrations and contact times on the biosorption process. From these investigations, a significant increase in percentage removal of manganese 97.4 % is observed at pH value 5.0, biosorbent dose 0.8 g, initial concentration 20 ppm, temperature 25 ± 2 °C, stirring rate 200 rpm and contact time 2 h. The equilibrium concentration and the adsorption capacity at equilibrium of the experimental results were fitted to the Langmuir and Freundlich isotherm models; the Langmuir isotherm was found to well represent the measured adsorption data implying BPAC had heterogeneous surface. A raw groundwater samples were collected from Baharmos groundwater treatment plant network at Embaba and Manshiet Elkanater City/District-Giza, Egypt, for treatment at the best conditions that reached at first phase by BPAC. The treatment with BPAC could reduce iron and manganese value of raw groundwater by 91.4 % and 97.1 %, respectively and the effect of the treatment process on the microbiological properties of groundwater sample showed decrease of total bacterial count either at 22°C or at 37°C to 85.7 % and 82.4 %, respectively. Also, BPAC was characterized using SEM and FTIR spectroscopy.

Keywords : biosorption, banana peels, isothermal models, manganese

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