ION-EXCHANGERS PRODUCTION FROM SOME AGRICULTURAL WASTES

By

Alaa El-Din Mohamed El-Ghamry Hassan

B.Sc. in Chemistry and Physics, Faculty of Education
Ain Shams University, 1984
Master in Environmental Sci., Ain Shams University, 2000

A Thesis Submitted in Partial Fulfillment
of
The Requirement for the Doctor of Philosophy Degree
In
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ABSTRACT

The aim of this work is to decrease the environment pollution which caused by burning the agricultural wastes and utilization of some agricultural residues in the production of a new cellulosic materials. Wastes of banana leaves and reeds are used in our study to produce cellulose.

Cation exchangers were prepared by phosphorylation, sulfonation and phosphosulfonation of the untreated and treated banana leaves raw material or reeds resin (with different concentrations of potassium permanganate). Ion exchange capacity of different heavy metals (copper, nickel, cadmium and lead) by the prepared cation exchangers is investigated. Treated phosphosulfonated bleached banana leaves pulp cation exchanger resin has the higher efficiency towards different metal ions uptake, more than both the phosphorylated and the sulfonated bleached banana leaves pulp. Treatment of banana leaves and its derivatives (resin) with different concentrations of potassium permanganate before phosphorylation, sulfonation and phosphosulfonation processes increases its efficiency towards metal ions up take.

The molecular structure of bleached banana leaves pulp and its derivatives were investigated by the infrared spectroscopy. New bands were seen for the phosphorylated banana leaves at 1200 and 962 cm^{-1}, also, for the sulfonated banana leaves at 1400 and 600 cm^{-1} which can be attributed to the formation of C-O-P and C-O-S bonds for the two derivatives respectively.

Thermal analysis of bleached banana and its derivatives gave some information on the molecular structure of lignocelluloses material.

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