STUDY ON THE REMOVAL OF AMMONIUM IONS FROM DRINKING WATER PLANTS USING MODIFIED NATURAL POLYMER

Submitted By

Shalaby Elsayed Bassuony Rezoka

B.Sc. of Science (Chemistry, Oceanography), Faculty of Science, Alexandria University, 2004

A thesis submitted in Partial Fulfillment
Of
The Requirement for the Master Degree
In
Environmental Sciences

Department of Environmental Basic Sciences
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APPROVAL SHEET

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SHALABY ELSAYED REZOKA

Abstract

ABSTRACT

This research discusses the removal of ammonium ions $(NH_4)^+$ from raw water using modified polymers (hydrogel) as an adsorbent. The raw water has been obtained from Fesha water treatment plant which is a traditional treatment plant located in Behera. For this purpose, kappa carrageenan/acrylic acid (KC/AAc) hydrogel and kappa carrageenan/acrylic acid/polyacrylamide (CK/AAc/PAM) hydrogel were prepared via free radical polymerization using gamma irradiation. The effect of irradiation dose, (AAc) concentration and (PAM) concentration on gel content wer studied. The formed hydrogel was characterized by FTIR, SEM and (TGA). The swelling behavior was determined as a function of irradiation dose, (AAc) content and (PAM) content. The developed hydrogel was used for the removal of $(NH_4)^+$ ions. The effects of various operating parameters such as initial pH, contact time, and adsorbent dose on the removal of $(NH_4)^+$ ions have been investigated. It was found that for (CK/AAc) the optimum pH value is 5 and the perfect adsorbent dose is 15 gm/L. A fast adsorption rate was observed the equilibrium was reached within 50 min and the maximum removal percent was (52.7%).and for (CK/AAc/PAM) the optimum pH value is 7 and the perfect adsorbent dose is 5 gm/L. A fast adsorption rate was observed the equilibrium was reached within 30 min and the maximum removal percent was (66.7%).

Keyword: kappa carrageenan, ammonium ion, *hydrogel, irradiation,* adsorption.

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