

**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
Institute of Environmental Studies and Research
Ain Shams University

2016

APPROVAL SHEET

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This thesis Towards a Master Degree in Environmental
Sciences

Has been Approved by:

Name

Signature

1-Prof. Dr. Ahmed Ismael Hussein Ibrahim

Researcher Prof., Pigments & Polymers Department
National Research Center

2-Prof. Dr. Taha Abd El Azeem Mohamed Abd El Razek

Prof. of Analytical Chemistry and Head of
Department of Environmental Basic Sciences
Institute of Environmental Studies and Research
Ain Shams University

3-Prof. Dr. Mostafa Mohamed Hassan Khalil

Prof. of Inorganic and Analytical Chemistry
Faculty of Science
Ain Shams University

4-Dr. Gamal Abdel Aziz Meligi

Associate Prof. of Organic Chemistry
Faculty of Science
Ain Shams University

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Ain Shams University

2-Dr. Gamal Abdel Aziz Meligi

Associate Prof. of Organic Chemistry
Faculty of Science
Ain Shams University

3- Dr. Ghada Adel Mahmoud

Associate Prof. of Radiation Chemistry
National Center of Radiation Research & Technology
Atomic Energy Authority

2016

ACKNOWLEDGEMENT

All praise and gratitude be to Allah almighty. For giving me the courage and patience to accomplish this work. Acknowledgement is due to basic science department of Institute of Environmental Studies and Research Ain Shams University and the reference laboratory for wastewater at holding company for drinking water and wastewater for the facilities and support provided for the completion of this research. I would like to appreciate and thank my thesis advisors prof. Dr. Mostafa M. H. Khalil and Dr. Gamal Meligi and prof Dr. Ghada Adel Mahmoud for incessant guidance throughout this research work. They are always kind, understanding and sympathetic to me their valuable suggestions and useful discussions made this work interesting for me. Thanks are due to my thesis committee members for their interest. Cooperation and constructive advice.

I would like also my acknowledgment and grateful appreciation my Beloved parents, brothers, sisters, my sincerely wife my daughter (Elena and As eel) and All my friends for their prayers, sacrifices, Love, patience, encouragement And Understanding, without which The completion of this study would not have been possible.

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 were 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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