شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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التوثيق الإلكتروني والميكروفيلم

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HANAA ALY

Faculty of Women for Arts,
Science and Education
Ain Shams University

Preparation and Characterization of New Hydrogels for Different Applications

A Thesis Submitted for Degree of M.Sc. in
Organic Chemistry

By

Taghreed Hassan Ahmed Abdalla
(B.Sc. 2015)

To

Chemistry Department
Faculty for Women for Arts, Science and Education
Ain Shams University
Cairo, Egypt

Supervisors

Prof. Dr. Nadia G. Kandile
Professor of Applied Organic Chemistry
Faculty of Women for Arts, Science and Education
Ain Shams University

Assis. Prof. Dr. Abir S. Nasr
Assistant Professor of Organic Chemistry
Faculty of Women for Arts, Science and Education
Ain Shams University

Prof. Dr. David R K Harding
Professor of Chemistry
Institute of Fundamental Science, Massey University,
New Zealand

(2021)

Faculty of Women for Arts,
Science and Education
Ain Shams University

Approval Sheet

Preparation and characterization of new hydrogels for different applications

By

Taghreed Hassan Ahmed Abdalla

Thesis Supervisors	**Approved**
Prof. Dr. Nadia G. Kandile	……
Assis. Prof. Dr. Abir S. Nasr	…….
Prof. Dr. David R K Harding	……..

Head of Chemistry of Department

Prof. Dr. Omaima A. Mustafa

…….

(2021)

Faculty of Women for Arts,
Science and Education
Ain Shams University

QUALIFICATION

Student Name	**: Taghreed Hassan Ahmed Abdalla**
Scientific Degree	**: Bachelor Degree**
Department	**: Chemistry**
College	**: Faculty of Women for Arts, Science and Education**
University	**: Ain Shams University**
B. Sc. Graduation Date	**:2015**
M. Sc. Graduation Year	**:2021**

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You have made a great effort for my sake and have all my respect and appreciation. Thank you with all my heart.

DEDICATION

This work was dedicated to my lovely parents.

My sincere thanks and appreciation to my family for supporting me and giving me enough encouragement to reach for my dearms. I have to thank Allah for choosing them to be my family.

وحـدة النشـر العلمـي
مجلة البحث العلمي في العلوم
مجلة علمية محكمة

قبـــول بحـــث للنشـــر

Taghreed H. Abdalla[1,*], Abir S. Nasr[1], Ghada Bassiuni[2], David R. Harding[3], Nadia G. Kandile[1]

1 Chemistry Department, Faculty of Women for Art, Science and Education, Ain Shams University, Héliopolis Post Cod. No. 11757, Cairo, Egypt.

2 Chemistry Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt.

3 Chemistry Institute of Fundamental Science, Chemistry, Massey University.New Zealand.

نحيطكم علماً أن بحثكم المعنون بـ

"New modified chitosan composites and nanocomposites for different applications"

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ORIGINAL ARTICLE

Fabrication of sustainable hydrogels-based chitosan Schiff base and their potential applications

Taghreed H. Abdalla [a], Abir S. Nasr [a], Ghada Bassioni [b], David R. Harding [c], Nadia G. Kandile [a,*]

[a] *Chemistry Department, Faculty of Women for Art, Science and Education, Ain Shams University, Heliopolis Post Cod. No. 11757, Cairo, Egypt*
[b] *Chemistry Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt*
[c] *Chemistry Institute of Fundamental Science, Chemistry, Massey University, New Zealand*

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Chitosan;
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Metal removal;
Ionotropic gelation

Abstract Chemical modifications of chitosan were of interest to scientific researchers for its wide applications. Chitosan has been widely used for synthesis of unique compounds with potential biological activity and also effective for wastewater treatment. In the current study fabrication of new chitosan-based Schiff base hydrogels were fabricated through modification of chitosan with isonicotinic aldehyde to give hydrogel **I** or with epichlorohydrin or sodium tripolyphosphate via ionotropic gelation processes under the same reaction conditions to give hydrogels **Ie**, and nanohydrogels **II, IIe** respectively. FTIR, XRD, TGA, DSC, SEM, and TEM tools were used for characterization of the fabricated hydrogels **I**, **Ie**, **II**, and **IIe** hydrogels. The swelling behavior of the fabricated hydrogels in different solvents were determined. Evaluation of the hydrogels for leaching metal ions and biological activity towards different Gram-positive and Gram-negative of microorganisms were studied. The results showed that the highest efficiency for adsorption of cobalt and mercuric ions was revealed for hydrogels **Ie**, **IIe** (91.3%, 95.9%) and (92.5%, 95.9%) respectively. However, hydrogel **IIe** showed remarkable MIC and MBC towards Gram-positive (*B. subtilis*) (19.5, 38) μg/ml compared to the standard antibiotic Ciprofloxacin (19, 38) μg/ml respectively.

* Corresponding author at: Chemistry Department, Faculty of Women for Art, Science and Education, Ain Shams University, Heliopolis, Post Cod. No. 11757, Cairo, Egypt.
E-mail address: nadiaghk@women.asu.edu.eg (N.G. Kandile).

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1. Introduction

Water is the most important substance to humans and all living organisms. However, some harmful chemical compounds cause water pollution that gives negative effects on species living in water and also on the widely biological community (Guo et al., 2015). There are many industries released metal ions in water (Chen et al., 2010).

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