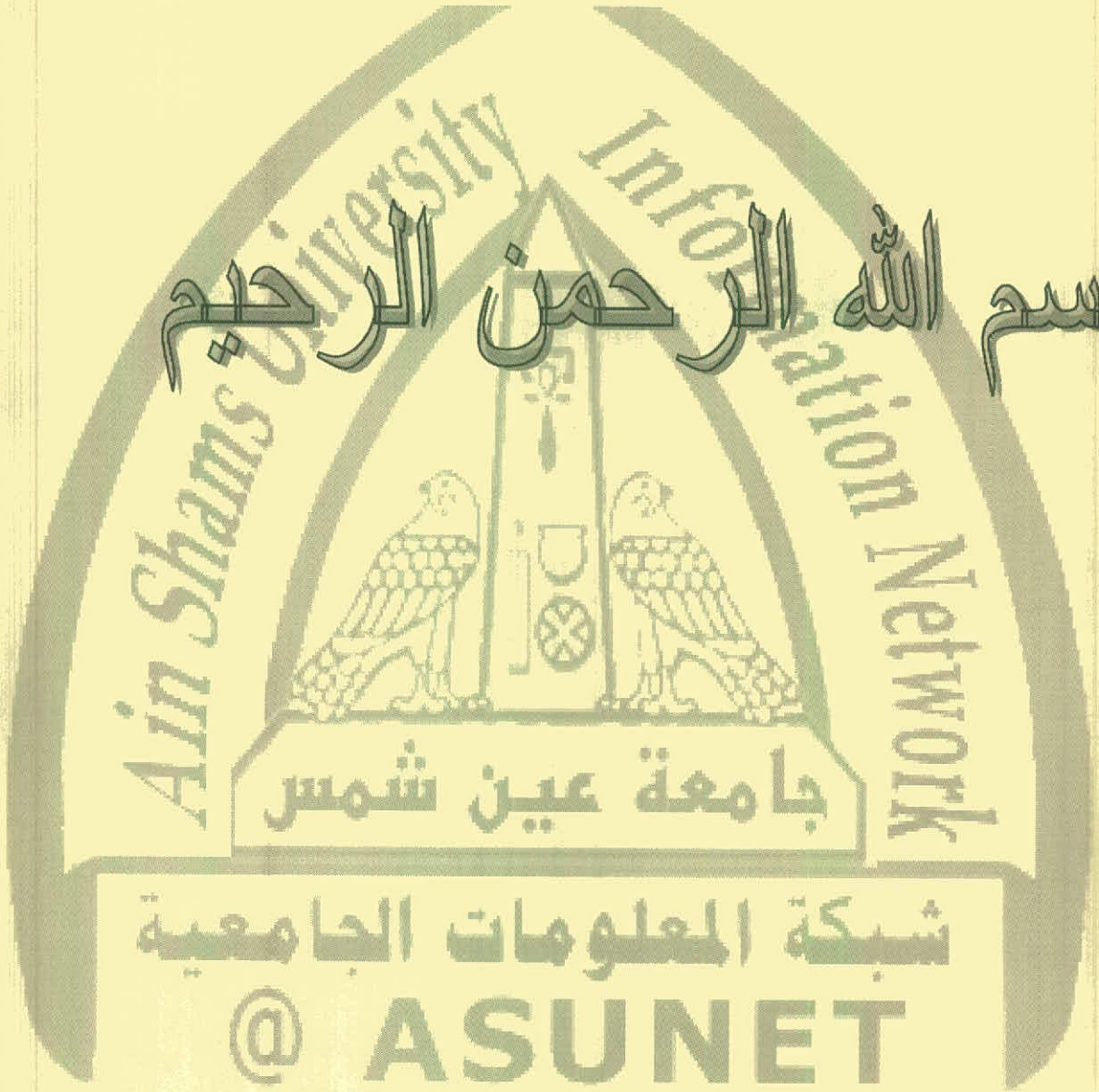
شبكة المعلومات الجامعية



بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائـــــــق الاصليـــــة تالفـــة

بالرسالة صفحات لم ترد بالاصل

THESIS TITLE

Synthesis and evaluation of new surfactants for enhancing simultaneous saccharification and fermentation of natural cellulosic materials to bioethanol.

Submitted by

Marian Riad Mahrous Gerges

B.Sc. (2004)

Ainshams University

Faculty of Science

For

The Partial Fulfillment of the Master Degree in Chemistry

Chemistry Department

Faculty of Science

Cairo University

2010

APPROVAL SHEET FOR SUBMISSION

Thesis Title: **Synthesis and evaluation of new surfactants for enhancing simultaneous saccharification and fermentation of natural cellulosic materials to bioethanol.**

Name of candidate: Marian Riad Mahrous Gerges

This thesis has been approved for submission by the supervisors:

1- Prof. Dr. Abdelgawad Ali Fahmi.

Signature:

2- Prof. Dr. Abdelfatah Mohsen Badawi.

Signature:

Prof. Dr. Mohamed Shokry

Chairman of Chemistry Department

Faculty of Science- Cairo University

13/7/2010

Chairman of Chemistry Department
Faculty of Science, Cairo University

Addendum

Beside the work carried out in this thesis, the candidate **Marian Riad Mahrous Gerges** has attended Post-graduate courses during the academic year 2006-2007 in the following topics:

- Biochemistry
- New Trends in Analytical Chemistry
- Carbohydrate Chemistry
- Chemistry of Natural Products
- Designing in Organic Chemistry
- Applied Organic Chemistry
- Organic Photochemistry
- Polymer Chemistry
- Quantum Chemistry
- Organic Microanalysis
- Heterocyclic Chemistry
- Techniques of Molecular Structure Determination
- German language
- Selected Topics

She has also passed successfully an examination in the above mentioned topics.

Prof. Dr. Mohammed Mohammed Shoukry
Chairman of chemistry department
Faculty of Science
Cairo University

Acknowledgment

I would like to express my deepest thanks and gratitude to my supervisor ***Prof. Dr. AbdElgawad Ali Fahmi*** , Professor of organic chemistry, Faculty of Science ,Cairo University, for his effective supervision, great efforts, faithful encouragement, and constant help throughout the course of this study.

Prof. Dr. Abd Elfatah Mohsen Badawi, Professor of applied organic chemistry in Egyptian Petroleum Research Institute, for his supervision, continuous advice, talented, and valuable criticism during the progress of the work.

Prof. Dr. Karima Abdelhafez Mohamed, Professor of genetics in National Research Center thanks for her interest, support, constructive criticism and fruitful discussion throughout this work.

Also, I would like to express my thanks to all the members of the Applications Department in *E.P.R.I* and to all members in *N.R.C* for their kindness and help.

Marian Riad

ABSTRACT

Student Name: Marian Riad Mahrous.

Title of the thesis: Synthesis and evaluation of new surfactants for enhancing simultaneous saccharification and fermentation of natural cellulosic materials to bioethanol.

Degree: The Master of Science (Chemistry)

Sorbitan monolaurate (Span 20) was ethoxylated by four different molar ratios of ethylene oxide (20, 40, 60, and 80) and named E (20), E (40), E (60), and E (80). The structure of the prepared nonionic surfactants was elucidated using; FT-IR and ^{1}H NMR spectroscopics. The surface tension measurements were recorded. The effect of the prepared nonionic surfactants on the simultaneous saccharification and fermentation (SSF) of microwave/alkali pretreated rice and wheat straws to produce ethanol were investigated. From the obtained data, it was found that the addition of the nonionic surfactants at 2.5 g/l had positive effect on SSF. The maximum ethanol yield (82 and 76 %) was obtained after 72 h at 42 °C using *Kluyveromyces marxianus* for wheat and rice straws , respectively, while *Saccharomyces cerevisiae* exhibited a maximum ethanol yield (61 and 55 %) at 37 °C and 72 h for wheat and rice straws , respectively. The ethanol yield increases with increasing the Hydrophile-Lipophile Balance (HLB) of the prepared nonionic surfactants by increasing ethylene oxide units.

Keywords: Span 20 - ethylene oxide — nonionic surfactants - SSF - rice straw – wheat straw - ethanol - Kluyveromyces marxianus - Saccharomyces cerevisiae - HLB.

Supervisors: **Signature**

1- **Prof. Dr. Abdelgawad Ali Fahmi.** ( )
2- **Prof. Dr. Abdelfatah Mohsen Badawi.** ( )

Prof. Dr. Mohamed M. Shokry
Chairman of Chemistry Department
Faculty of Science- Cairo University

Contents