

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار





بعض الوثائق الأصلية تالفة





بالرسالة صفحات
لم ترد بالأصل



B1VCE9

**A
THESIS
ENTITLED**

**CHEMICAL STUDIES ON SOME EGYPTIAN
PLANTS BELONGING TO FAMILIES
COMPOSITAE AND LEGUMINOSAE**

Submitted by

AHMED HAMED MOHAMED GAARA

(M. Sc. Cairo University)

National Research Centre

For

The Degree of

PHILOSOPHY DOCTOR

CAIRO UNIVERSITY

Faculty of Science

Giza

ARAB REPUBLIC OF EGYPT

2001

APPROVAL SHEET FOR SUBMISSION

Title of (Ph. D.) thesis: "Chemical Studies Of Some Egyptian Plants
Belonging To Families *Compositae* and *Leguminosae*"

Name of the candidate: Ahmed Hamed Mohamed Gaara

This Thesis has been approved for submission by supervisors:

1- Prof. Dr. Abdel Gawad Ali Fahmi

Prof. of Organic Chemistry,
Department of Chemistry,
Faculty of Science, Cairo University.

Signature:

2- Prof. Dr. Hamed A. Ead

Prof. of Organic Chemistry and Head of Research Centers,
Faculty of Science, Cairo University.

Signature:

3- Prof. Dr. Ezz-El Din A. M. El-Khrisy

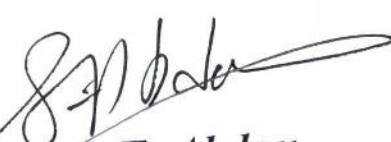
Prof. of Natural Products Chemistry,
National Research Centre, Cairo.

Signature:

4- Dr. Awatif A. Khattab

Associate Prof. of Natural Products Chemistry,
National Research Centre, Cairo.

Signature:


Prof. Dr. Saddek E. Abdou

Chairman of Chemistry Department
Faculty of Science, Cairo University

SUMMARY

ABSTRACT

Name: Ahmed Hamed Mohamed Gaara

Title of Thesis: "Chemical Studies On Some Egyptian Plants
Belonging To Families *Compositae* and
Leguminosae"

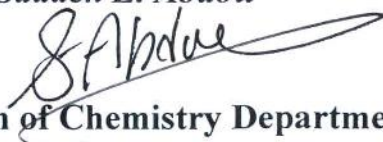
Dgree (Ph. D.): Thesis, Faculty of Science, Cairo University, 2001

This work has been carried out to investigate the chemical constituents of four Egyptian plants namely, *Iphiona scabra*, *Senecio desfontainei* (Fam. *Compositae*), *Erythrina indica* (Fam. *Leguminosae*), and *Jasonia montana* (Fam. *Compositae*).

Key Words: *Iphiona scabra*, *Senecio desfontainei*, *Erythrina indica*, Sterols, Terpenes, Coumarins, and Flavonoids.

Supervisors: -----, -----, -----

Prof. Dr. Saddek E. Abdou



**Chairman of Chemistry Department
Faculty of Science, Cairo University**

ACKNOWLEDGEMENT

The author would like to express his deepest appreciation and sincere gratitude to **Prof. Dr. Abdel Gawad Ali Fahmi**, Prof. of Organic Chemistry and **Prof. Dr. Hamed A. Ead**, Prof. of Organic Chemistry and Head of Research Centres, Faculty of Science, Cairo University, for their encouragement, invaluable advices and their interest in this work.

The author wishes to express his deepest gratitude to **Prof. Dr. Ezz El-Din A. M. El-Khrisy**, Prof. of Natural Products Chemistry, Natural and Microbial Products Chemistry Department, National Research Centre, for his supervision, support, guidance, invaluable advices and constructive criticism.

The author is greatly indebted to **Dr. Awatif M. Khattab**, associate Prof., Natural and Microbial Products Chemistry Department, National Research Centre, for her supervision, guidance and assistance.

The author would like to express his deepest gratitude to **Dr. Mahmoud Ibrahim Nassar**, associate Prof. Natural and Microbial Products Chemistry Department, National Research Centre, for his invaluable guidance, Assistance and continuous encouragement and his interest in this work

Also the author would like to thank **Dr. Mohamed S. Marzouk**, Researcher, Chemistry of Tannins and Protein Department, National Research Centre, for his unlimited and fruitful help and great effort in the presentation of this work.

Greatful thanks to National Research Centre for all facilities provided, for carrying out this work.

CONTENTS

	page
SUMMARY.....	i
INTRODUCTION.....	
Coumarins.....	1
Types of coumarins.....	2
Biological Properties of Coumarins.....	14
Flavonoids.....	20
Types of Flavonoids.....	21
Isolation of Flavonoids.....	24
Identification of Flavonoids.....	25
THEORETICAL PART.....	
CHAPTER I	
The chemical constituents of the aerial parts of <i>Iphiona scabra</i>	32
CHAPTER II	
The chemical constituents of the aerial parts of <i>Senecio desfontainei</i>	50
CHAPTER III	
The chemical constituents of the aerial parts of <i>Erythrina indica</i>	93
CHAPTER IV	
The chemical constituents of the aerial parts of <i>Jasonia montana</i>	169
Materials Apparatus and Techniques.....	191

EXPERIMENTAL.....

CHAPTER I

The chemical constituents of the aerial parts of <i>Iphiona scabra</i>	200
--	-----

CHAPTER II

The chemical constituents of the aerial parts of <i>Senecio desfontainei</i>	206
--	-----

CHAPTER III

The chemical constituents of the leaves of <i>Erythrina indica</i>	216
--	-----

CHAPTER IV

The chemical constituents of the aerial parts of <i>Jasonia montana</i>	225
---	-----

BIBLIOGRAPHY.....	231
-------------------	-----

ARABIC SUMMARY

SUMMARY

SUMMARY

CHEMICAL STUDIES ON SOME EGYPTIAN PLANTS BELONGING TO FAMILIES COMPOSITAE AND LEGUMINOSAE

The work described in this thesis has been undertaken with the objective of searching for naturally occurring substances of potential biological activities in Egyptian flora. Through this investigation a useful information were derived from the application of the modern techniques of chromatography (column, paper and thin layer chromatography) and spectral measurments including UV, IR, MS, ^1H and ^{13}C -NMR, and also ^1H , ^{13}C - and ^1H , ^1H -COSY.

The introductory part of this thesis comprises a brief account of the coumarins, their commoner structural types encountered in nature and some biological properties. Also, the introductory part comprises a brief account of the flavonoids, their commoner structures, methods of isolation and identification. The theoretical part of the thesis described the original work carried out and is summarized under the following titles:

CHAPTER I

The chemical constituents of the aerial parts of *Iphiona scabra*

This work deals with the chemical constituents of the aerial parts of *Iphiona scabra* (Fam. Compositae) with the object of searching for some

naturally occurring substances with expected biological properties which have been previously found in related compositae plants.

The aerial parts of *Iphiona scabra* were exhaustively extracted with ethanol and the ethanolic extract was fractionated into an unsaponifiable fraction and coumarin fraction.

Investigation and identification of the unsaponifiable fraction

By chromatographic fractionation on silica gel column, the unsaponifiable fraction was eluted with petroleum ether (40-60 °C) and petroleum ether-benzene in ratio (1:1) which afforded waxy hydrocarbons.

Elution of the column with pet. ether (40-60 °C) and benzene in ratio (1:4) and benzene alone afforded colourless crystalline identified to be α -amyrin (**XCLVIII**, Chart 3).

Elution of the column with benzene alone and mixtures of benzene and methanol in different ratios gave two products: the first product was identified as stigmasterol (**CXLIX**, Chart 3) and the second was identified as β -sitosterol (**CL**, Chart 3).

Investigation and identification of the coumarin fraction

The coumarin fraction was also fractionated on a silica gel column. The early fraction eluted from the column with pet. ether (40-60 °C) and pet. ether:benzene in ratio (1:1) gave waxy hydrocarbons.

Further elution in ratios (0.5 %, 1 % and 2%) revealed the presence of three distinct spots with different R_f values and using preparative paper chromatography led to the isolation of three products. The first might be