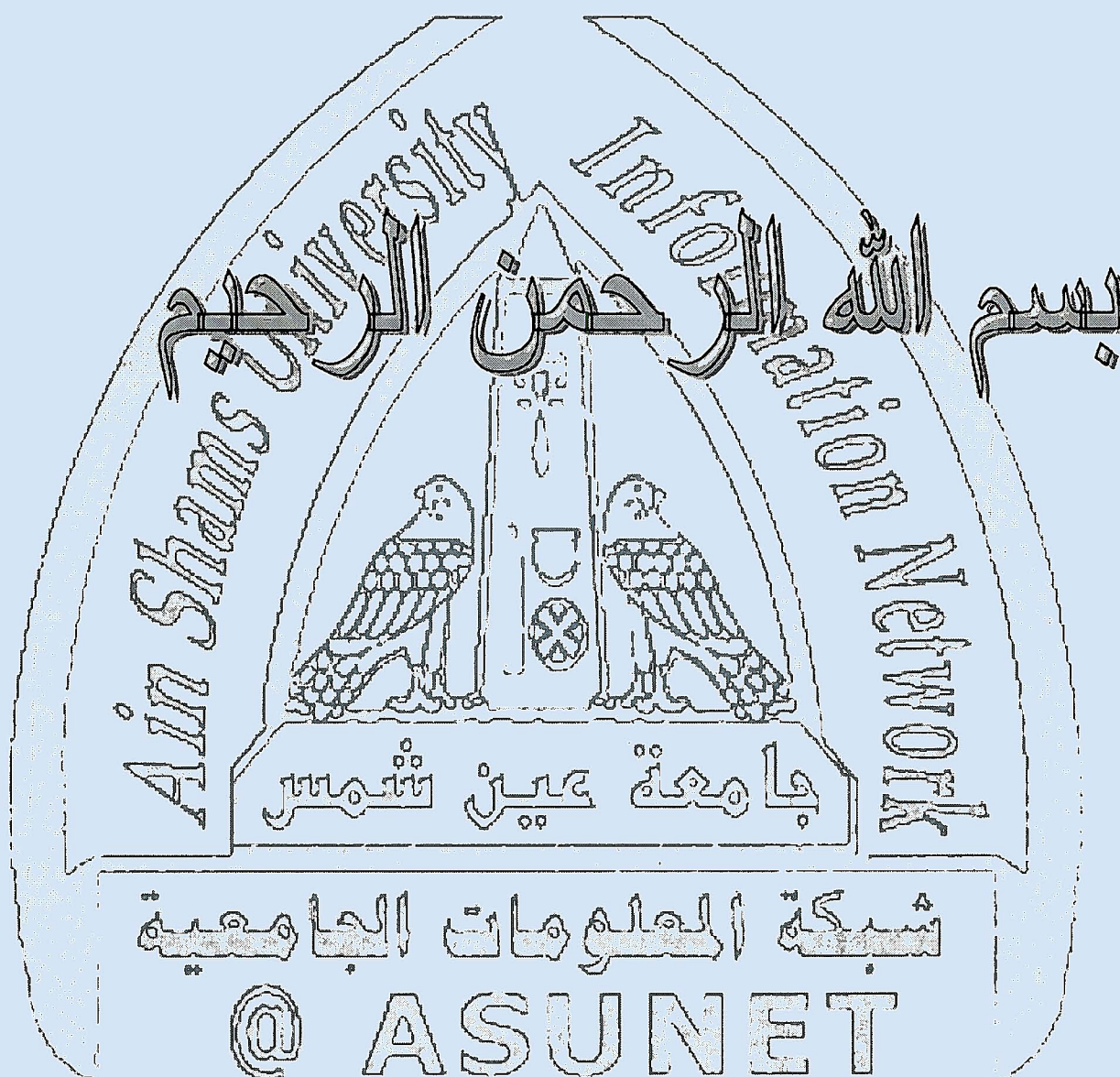




شبكة المعلومات الجامعية





شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

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%



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم

بعض الوثائق الأصلية تالفة

**Ecological and Phytochemical Studies on the
medicinal desert plant *Limonium angustifolium* Turr.
growing in the western mediterranean coastal region**

By

Omaima Mohamed Ali Moftah

B.Sc. Faculty of Agriculture, Alexandria University (1969)

A Thesis Submitted in Partial Fulfillment

of

The Requirement for the Master Degree

In

Environmental Science

Department of Agricultural Science

Institute of Environmental Studies & Research

Ain Shams University

2001

1/2 06

بسم الله الرحمن الرحيم

آنا فتحنا لك فتحا مبينا

صدق الله العظيم

الله

SUPERVISION COMMITTEE

Title of Thesis : Ecological and Phytochemical Studies on the Medicinal
Desert Plant *Limonium angustifolium* Turr. Growing
in Western Mediterranean Coastal region

Thesis Supervisors:

Prof. Dr. Hussein Ali Tawfik

Prof. Of Botany Faculty of Agriculture
Ain Shams University

Prof. Dr. Adel Kamel Youssef

Prof. Of Ecology and Phytochemistry
Of Medicinal plants Unit Desert Research Center

Prof. Said M. Mohamed

Associate Prof. Of Medicinal and Aromatic Plants
Medicinal and Aromatic Plant Department
Horticulture Institute

Head of Agricultural Department

APPROVAL SHEET

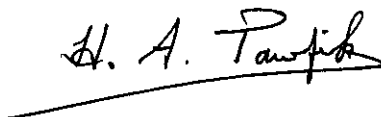
**Ecological and Phytochemical Studies on the Medicinal desert plant
Limonium angustifolium Turr. growing in the western
Mediterranean coastal region**

By

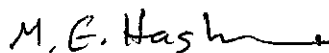
Omaima Mohamed Ali Moftah
B.Sc. Faculty of Agriculture, Alexandria
University (1969)

This thesis for Master Degree has been approved by:

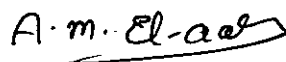
Prof. Dr. Hussein Ali Tawfik
Prof. Of Botany Faculty of Agriculture
Ain Shams University



Prof. Dr. Mahmoud El Sayed Hashem
Prof. Of Horticulture Faculty of Agriculture
Ain Shams University



Prof. Dr. Abd El - Monem El-Aaser
Prof. Of Biochemistry Faculty of Agricultural
Ain Shams University



Date of Registration : 14/7/1997

Date of Examination : 2/5/2001

ABSTRACT

Name : Omaima Mohamed Ali Moftah
Title : Ecological and phytochemical studies on *Limonium angustifolium* L.Turr
Degree : Master of Science.

Submitted to: Agricultural Department, Environmental Studies and Research
Institute, Ain Shams University.

This investigation includes ecological, eco physiological and phytochemical studies on *Limonium angustifolium*. It aimed to clarify the range of environmental conditions within which the plant can grow and adapt itself to the main communities and reflection of these environmental conditions on the chemical constituents of the plant, which was collected from Om - EL - Rakham Km7 west of Marsa Matruh desert.

Key words: Flavonoids - *Limonium*- *Plumbaginaceae* .

Acknowledgement

I feel great pleasure to express my deepest gratitude to **Professor Doctor Hussein Ali Tawfik**, Professor of Botany, faculty of Agriculture, Ain Shams University for suggesting the problem, guidance and encouragement, during the supervision of this study.

Grateful and sincere thanks are due to **Professor Adel Kamel Youssef Prof.** Of Ecology and phytochemistry. Medicinal plants Unit, Desert Research Center, for supervising the work, continuous help and criticism during the whole work.

Deep and sincere thanks are also due to **Dr. Said M.Mohamed**, Associate Prof. Of Medicinal and Aromatic Plants, Medicinal and aromatic plant Department, Horticulture Institute, for his useful help and valuable supports during this investigation.

Great thanks are due to **Professor Dr. Nabil, H. Khamis** of applied organic chemistry National Research Center and **Dr. Sekina M.Morse** lecturer of phytochemistry Medicinal Plant Unit, Desert Research Center, as well as **Dr. Mohamed Sobhi. A. Marzok.** lecturer of Applied organic Chemistry, National Research Center for their kind help and facilities provided to me during the study.

Thanks are due to all the staff members of Medicinal and Aromatic plants Dept., Hort. Inst. Agric. Res. Center. Also, thanks are extended to the staff members of Desert Res. Center, Medicinal plant unit and to the staff members of the Enviromental Inst. Ain Shams Univ. for their kind help and providing facilities throughout this study. The author would like to acknowledge **Mr. Khamis EL- Bakry** journalist in Al Ahram news paper for his valuable help.

CONTENTS

	Page
List of Tables	4
List of Figures	6
List of Plates	8
PART I: INTRODUCTION	9
Systematic Position	11
Aim of the work	16
Review of Literature	17
PART II MATERIALS AND METHODS	27
PART III RESULTS OF ECOLOGICAL AND.....	53
ECO - PHYSIOLOGICAL STUDIES	
A- ECOLOGICAL STUDIES	
Phenology	53
* Environmental conditions	54
a- Climatic factors	
b-Edaphic factors	
1. Physical properties of the soil	
a- Soil texture	58
b-Soil moisture content	
2. Chemical properties of the soil	62
a- Organic matter	
b-Total soluble salts (T.S.S).....	64
c-Anion contents of the soil:	66
i- Sulphates	
ii- Chlorides	
iii- Carbonates and bicarbonates...	
d-Cation contents.....	66
i- Calcium	
ii- Magnesium	
iii- Potassium	
iv- Sodium.....	
e- pH- value and electrical conductivity	68

3- Vegetation (community) analysis	69
B-ECO-PHYSIOLOGICAL STUDIES	72
1- Water content	72
2- Metabolic products	74
i-Ash content .	74
a-Total Ash Content	
b- Acid-insoluble Ash	
c- Water Insoluble Ash	
ii-Nitrogenous compounds	76
iii-Carbohydrates	
a-Total Carbohydrates.....	
b-Soluble carbohydrates...	
c-Insoluble Carbohydrates..	

PART IV PHYTOCHEMICAL STUDIES

1- Phytochemical screening of <i>L. angustifolium</i>	80
2- The Extraction with selective organic solvents	81
3- Extraction with successive selective organic solvents	84
4- Investigation of carbohydrates	84
i-Free sugars	
5- Investigation of amino acids	90
i-Free amino acids	
ii-Protein - amino acids	
6- Investigation of lipids	91
a-Total lipid content	
b-Physical and chemical analysis of lipids	
1-physical properties	
2-Fundamental chemical properties	92
i-Acid value	
ii-Iodine Value	
iii- Ester Value	
c-Contents of unsaponifiable matter fraction	94
by Gas-Liquid Chromatography (GLC)	
d-Contents of saponifiable fraction of lipids	96
by Gas- Liquid Chromatography (GLC)	

7- Investigation of Volatile oil by Gas Liquid Chromatography (GLC)	98
8- Investigation of tannin	101
9- Investigation of flavonoids	101
1-Paper chromatography	
2-Column chromatographic investigation	
* Isolation and identification of compound No. (1)	
* Isolation and identification of compound No. (2)	
* Isolation and identification of compound No. (3)	
* Isolation and identification of compound No. (4)	
* Isolation and identification of compound No. (5)	
* Isolation and identification of compound No. (6)	
 PART:V GENERAL DISCUSSION.....	 126
REFERENCES.....	136
 SUMMARY.....	 153
 ARABIC SUMMARY.....	 156

LIST OF TABLES

Table	Title	Page
1-	Mean values of the average heights of <i>L. angustifolium</i> during the growth season (1996-1997) at Om El Rakham.	55
1-	Mean values of climatic particulars of Om EL-Rakham obtained from the Meteorological Department of Egypt.	57
3-	Granuleometric analysis of the soil supporting <i>L. angustifolium</i> , at Om EL-Rakham.	60
4-	Mean values of soil moisture contents of <i>L. angustifolium</i> during the season (1996-1997) at Om El-Rakham (Km 7 west of Marsa Matruh desert).	60
5-	Mean values of the organic matter content in the soil associated <i>L. angustifolium</i> during the season (1996-1997).	62
6-	Mean values of the total soluble salt (T.S.S) in the soil associated <i>L. angustifolium</i> during the season (1996-1997) at Om El-Rakham.	64
7-	Chemical analysis of the soil associated with <i>L. angustifolium</i> during the season (1996-1997).	67
8-	Floristic composition of four stands of 20 quadrates (10x10m) representing <i>L. angustifolium</i> community studied in Om El-Rakham during the season (1996-1997).	71
9-	Mean values of plant water contents of <i>L. angustifolium</i> during the seasons (1996-1997).	72
10-	Mean values of total, acid insoluble and water insoluble ash during the season (1996-1997) of dry plant weight of <i>Limonium angustifolium</i> .	74
11-	Mean values of total, soluble and insoluble carbohydrates, in of dry plant weight <i>L. angustifolium</i> growing at Om El-Rakham during the period of investigation.	76
12-	Mean values of total nitrogen and total protein of dry plant weight of <i>L. angustifolium</i> of successive seasons (1996-1997).	78
13 -	Preliminary phytochemical screening of <i>L. angustifolium</i> .	80
14 -	Percentages of residues of different extracts from dry plant weight of <i>L. angustifolium</i> using selective organic solvents.	82
15 -	Percentages of residues of different extracts from of dry plant weight of <i>L. angustifolium</i> using successive selective organic solvents.	84
16 -	Retention time and percentages of free sugars of <i>L. angustifolium</i> at Om EL-Rakham.	85
17 -	Distribution of free amino acids of <i>L. angustifolium</i> at Om EL- Rakham.	90
18 -	Protein amino acid of <i>L. angustifolium</i> at Om El-Rakham using Amino Acid Analyzer.	91
19 -	Mean values of total lipid content of dry plant weight of <i>L. angustifolium</i> during the season (1996-1997) at Om El-Rakham.	92

20- Acid, iodine, ester and saponification values of lipid of <i>L. angustifolium</i> .	92
21 - GLC of hydrocarbons of <i>L. angustifolium</i> at Om El-Rakham .	94
- GLC of sterols of <i>L. angustifolium</i> at Om El-Rakham.	
22 - GLC of fatty acids of <i>L. angustifolium</i> at Om EL-Rakham.	98
23 - Retention times and percentages of volatile oils of <i>L. angustifolium</i> at Om EL-Rakham.	98
24 - R_f - values and colour reactions of fraction (1) .	101
25 - R_f - values and colour reactions of fraction (2) .	107
26 - R_f - values and colour reactions of fraction (3) .	112
27 - R_f - values and colour reactions of fraction (4) .	116
28 - R_f - values and colour reactions of fraction (5) .	119
29 - R_f - values and colour reactions of fraction (6) .	123