

PHYTOCHEMICAL STUDIES
ON
FERULA MARMARICA

By
ADEL KAMEL YOUSSEF
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Biochemistry Department
Faculty of Science
Ain Shams University

582 13

A.K.

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" This dissertation has not previously been submitted for a degree at this or other universities.

The references in the text will show specifically the extent to which I have availed myself of the work of other authors".

A.K. Youssef
A.K. Youssef

C O N T E N T S

CONTENTS

	Page
ACKNOWLEDGMENT	
SCOPE OF THE THESIS	
REVIEW OF LITERATURE	1

PART I

ECOLOGICAL STUDIES

I. Taxonomy	10
II. Phenology and Seed Output	12
III. Environmental Conditions:	16
A- Climatic factors	16
B- Edaphic factors	18
Methods of soil analysis	20

PART II

PHYTOCHEMICAL STUDIES

Chapter I

Preliminary Investigation

Experimental	23
Source of material	23
General Analysis	23
A- Preliminary Phytochemical Screening	23
Conclusions	28
B- Determination of constants and other constituents	28

	Page
C- Extraction with successive selective organic solvents	30
D- Extraction with Selective solvents	31

Chapter II

Investigation of Carbohydrates in <u>Ferula marmarica</u> Root	32
I. Estimation of total Carbohydrates	32
II. Paper chromatographic identification of the free and comined sugars	32
A- Free sugars	32
B- Comined sugars	36

Chapter III

Investigation of Amino Acids Present in the Root of <u>Ferula marmarica</u>	39
I. Nitrogen Content	39
II. Identification of free amino acids	39
III. Investigation of Hydrolysable Protein	
Preparation of Proteins	42
Preparation of protein-amino acids	44
Identification of the amino acids in the protein hydrolysate	44

	Page
Chapter IV	
Investigation of the Lipid Fraction in the Root of <u>Ferula marmarica</u> .	46
I. Fat Content	46
II. Physical, Chemical and Chromatographic Analysis of Lipid	46
Physical properties of lipid	46
Fundamental Chemical Properties	46
1) Acid Value (A.V.)	47
2) Saponification Value (S.V.)	47
3) Iodine Value (I.V.)	48
III. Determination of the Unsaponifiable Matter and	
Total Fatty Acids	50
A- Unsaponifiable matter	50
B- Total fatty acids	51
A. Fractionation of the unsaponifiable matter	52
Fractionation of the unsaponifiable matter by Thin Layer Chromatography (T.L.C.)	53
Isolation of β -sitosterol from the Unsapo- nifiable Matter of <u>Ferula marmarica</u> Root.	54
Character of the separated crystals	56
B. Identification of Saturated and Unsaturated Fatty Acids	56

	Page
a) Tin Layer Chromatographic investigation of unsaturated fatty acids	57
b) Saturated fatty acids	59

CHAPTER V

Oleo-Gum-Resin

Collection and Preparation	62
Physical Characters	62
Chemical Tests	63
I. Phytochemical Studies of Volatile Oil of Oleo-gum-resin of <u>Ferula marmarica</u> Root	65
Physical and Chemical Studies of Prepared Essential Oil	65
Chromatographic Examination of the Oil	66
Infra red Spectrum of the oil	66
II. Phytochemical Studies of Gum of the Oleo-gum- resin of <u>Ferula marmarica</u> Root	71
A- Isolation of the gum	71
B- Character of precipitate	71
C- Determination of the elements	74
E- Molish's test	75
Investigation of the components of the gum	77
A- Degradation of the gum	77
B- Chromatographic Identification of Sugars of gum Hydrolysate	80

	Page
III. Phytochemical Studies of Resin of <u>Ferula</u> <u>marmarica</u> (Oleo-gum-resin).	84
Physiochemical character of resin	85
Examination of the Ether Soluble Substance in Resin	87
Character of the Crystalline Substance (a)	87
Ultra-violet Spectrum of Compound (a).	88
Infra-red Spectrum of Isolated Compound (a) of Ether Extract Resin	90
Character of the Liquid Filtrate (b)	90
Chromatographic Analysis of Resin of <u>Ferula</u> <u>marmarica</u>	93
GENERAL DISCUSSION	95
SUMMARY	104
REFERENCES	109
Arabic Summary	

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Asafoetida is the oleo-gum-resin obtained by incision of the roots and rhizomes of several Ferula species e.g. F. Asafoetida Linn., F. foetida Regal, F. rubricaulis Boiss., F. brinefulia Linn., F. Linkii Webb. and Berth, F. nodiflora Guss, F. sancta Boiss, F. neopolitana Tenure, F. narthex Boiss, F. communis Linn., F. alliacea Boiss, F. foetida Linn., F. eurbesceas Boiss, F. galbanifolia Boiss, F. gummosa Boiss, F. persica Willd., F. schair Borz., F. scordosma Benth. U. Hook, F. Tingitana Linn. and other species of Ferula, Family Umbelliferae. (Chopra; (1933), Small; (1944), Ramstad; (1959), Wallis; (1960), Edward; (1961), Mohran; (1967)).

Several pharmaceutical preparations of asafoetida were used in ancient centuries, still have their reputation in modern therapy.

Asafoetida is official since 1841 in pharmacopoeas, e.g. Pharmacopea Dublin Ireland (1807), Pharmacopea Portugueza; (1876), British pharmacopoea; (1885) & (1914), Pharmacopoea Japan, (1907), British Pharmacopoea Codex; (1923, 34 & 49); Pharmacopoea Mexican (1925), Pharmacopoea Bilge, (1930), Pharmacopoea Espaneola; (1930), Pharmacopoea Helvetica, (1934), Pharmacopoea Estonica, (1937), National

Formularity Part IV, (1949), Egyptian Pharmacopoea, (1953) & Pharmacopoea Haudard "Pakistan", (1961).

Asafoetida is an old drug. It was mentioned under the name "Hongu" in Sanskrit work (Gild-Meister & Hoffman (1910) and Trease, G.E. (1962)), of old Indians.

It has been imported from the East by the Arabian Physicians (Gathorcooal & Wirth, (1949) and Trease; (1962)), after whom it was named as "ALHALTIT" and "ABUKABER".

Asafoetida was used in Europe during the middle ages as a curative agent for Wound-ulcers, burns, whooping, Cough and in Hysteria (Trease, 1962).

It was used also by old Persians & Sicilian for some purposes Goery (1898), Peach & Tracey (1955)).

In Afghanistan, the drug is called "Hingu" and "Anghuza" (Ibn Sina (1037)) and is used as purgative expectorant, antitussive and in some cases of Hysteria.

Semmler (1891)(Peach & Tracey (1955)) was the first who analysed the drug & reported on the presence of α -pinene & a secondary butyl-propenyl-disulphide.

Later on, Harrison (1912) reported on the presence of the following constants for volatile oil of asafoetida:

Specific gravity 25°C = 0.915;

Optical rotation : 10°58' to 17°3'

Refractive index at 20°C: 1.4942;

Sulphur content : 31.4%.

Glevenster, (1932) obtained a yield of volatile oil ranging from 7.5 to 12 ml/100 gm from oleo-gum-resin with sulphur content 32%.

Igolen & Fresenius (1936) analysed **asafoetida** drug and found that it contained 20% volatile oil which might be extracted by water or separated by steam distillation, 25% gum and from 40-60% resin.

The resin consisted of asaresinotannol (A) and asaresinotannol (B), either free or combined **umbelliferone** with ferulic acid.

The same authors, when fractionated the volatile oil had obtained a high boiling point fraction, consisting mainly of organic disulphide e.g. secondary butyl-propanol disulphide & secondary butyl propyl disulphide to which the disagreeable odour of the oil was attributed.

Fresenius (1936) also reported on the presence of a trisulphide $C_6H_{10}O_3$ which might be diallyl trisulphide

in addition to another unknown oxygenated compound ($C_{10}H_{16}O$) which gave cadenine when treated with sodium metal.

Koffler (1934), obtained vanillin by fractional microsublimation of the ether extract of the drug in the first fraction and ferulic acid in the second fraction and the lactone Umbelliferone in the third fraction.

Igolen (1936), determined the acid value; 3.08 and the ester value; 173.95, of the drug. Mannich; (1936), carried further study on the disulphide constituent of the oil and postulated the structure formula $(CH_3-CH_2-\underset{\substack{| \\ CH_3}}{CH}-S-S-CH_2-CH=CH_2)$ for the disulphide present.

This compound on distillation with Zn dust gave butyl mercaptan having the structure $CH_3-CH_2-CH_2-SH$.

Also the same mercaptan might be obtained by reduction of disulphide with Al/Hg moistened with ether.

On the rectification of the produced mixture 2ry butyl mercaptan B.p. $83-4^\circ C$ was obtained having the structure $CH_3-CH_2-\underset{\substack{| \\ CH_3}}{CH}-SH$ ($C_4H_{10}OS$).