

การศึกษาทางพฤกษเคมีของต้นชะเอม

นางสาววิชุดา เวชชาชีวะ



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาเภสัชศาสตรมหาบัณฑิต
ภาควิชาเภสัชเวท
บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย
พ.ศ. ๒๕๓๓

ISBN 974-578-208-4

ลิขสิทธิ์ของบัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย

016904

๒๕๓๓

A PHYTOCHEMICAL STUDY OF *Myriopteron extensum* Schum. STEM

Miss Witchuda Vejjajiva

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Pharmacy

Department of Pharmacognosy

Graduate School

Chulalongkorn University

1990

ISBN 974-578-208-4

Thesis Title A Phytochemical Study of
 Myriopteron extensum Schum. Stem
By Miss Witchuda Vejjajiva
Department Pharmacognosy
Thesis Advisor Associate Professor Chaiyo Chaichantipyuth

Accepted by the Graduate School, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree.

.....*Thavorn Vajrabhaya*..... Dean of Graduate School
(Professor Thavorn Vajrabhaya, Ph.D.)

Thesis Committee:

.....*Kalaya Pharadai*..... Chairman
(Associate Professor Kalaya Pharadai, M.Eng.)
.....*Sunibhond Pummangura*..... Member
(Associate Professor Sunibhond Pummangura, Ph.D.)
.....*Sophon Roengsamran*..... Member
(Associate Professor Sophon Roengsamran, Ph.D.)
.....*Rapepol Bavovada*..... Member
(Assistant Professor Rapepol Bavovada, Ph.D.)
.....*Chaiyo Chaichantipyuth*..... Member
(Associate Professor Chaiyo Chaichantipyuth, M.Sc.in Pharm.)

Copyright of the Graduate School, Chulalongkorn University.



วิชาพฤกษศาสตร์ : การศึกษาทางพฤกษเคมีของต้นชะเอม (A PHYTOCHEMICAL STUDY OF *Myriopteron extensum* SCHUM. STEM) อ.ที่ปรึกษา: รศ.ชัยโย ชัยชาญพิทยุทธ.
108 หน้า. ISBN 974-578-208-4

โดยวิธีทางรังคเลขและการตกผลึก สามารถแยกได้สารฟลาโวนิน ชื่อ lupinifolin จากต้นชะเอม (*Myriopteron extensum* Schum.) การพิสูจน์เอกลักษณ์ของสารทำโดยอาศัยข้อมูลจากวิธีทางสเปกโตรสโคปี สารเคมีดังกล่าวยังไม่เคยมีรายงานว่าพบในพืชชนิดนี้มาก่อน

จากการตรวจหาน้ำตาลอิสระในชั้นน้ำของสารสกัดจากต้นชะเอม พบว่าน้ำตาลซูโครส เป็นสารสำคัญที่ให้รสหวานแก่พืชชนิดนี้

ภาควิชา ..เมสซ์.เวท.....

สาขาวิชา ..เมสซ์.เวท.....

ปีการศึกษา ..๒๕๓๗.....

ลายมือชื่อนิสิต ..ชัยโย ชัยชาญพิทยุทธ.....

ลายมือชื่ออาจารย์ที่ปรึกษา ..ชัยโย ชัยชาญพิทยุทธ.....

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม ..

WITCHUDA VEJAJIVA : A PHYTOCHEMICAL STUDY OF Myriopteron extensum
SCHUM. STEM. THESIS ADVISOR: ASSO. PROF. CHAIYO CHAICHANTIPYUTH, M.Sc.
in Pharm. 108 PP.

By means of chromatographic and crystallization techniques, a flavanone named lupinifolin was isolated from the stem of Myriopteron extensum Schum. The identification of the compound was based on the spectroscopic data. This compound has never been reported to be found in this species before.

The determination of free sugar in the aqueous portion of the Myriopteron extensum Schum. stem's extract revealed the presence of sucrose which was a major sweetener of the plant.

ภาควิชา
สาขาวิชา
ปีการศึกษา

ลายมือชื่อนิสิต *วิชุดา เวจจิวา*

ลายมือชื่ออาจารย์ที่ปรึกษา *ชัยโย ชัยชาญพิสุทธิ์*

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

ACKNOWLEDGEMENTS

The author wishes to express her deep indebtedness and sincere gratitude to her advisor, Associate Professor Chaiyo Chaichantipyuth, the Head of the Department of Pharmacognosy, Faculty of Pharmaceutical Sciences, Chulalongkorn University, for his supervision of the research, helpful guidance, keen interest and continual encouragements throughout the course of this study.

The author would like to acknowledge her grateful thanks to Associate Professor Dr. Sunibhond Pummangura, the former Head of the Department of Pharmaceutical Chemistry, Faculty of Pharmaceutical Science, Chulalongkorn University, for his valuable suggestion on the structure elucidation of the isolated compound.

The author is deeply grateful to Assistant Professor Samphan Wongseripipatana of the Department of Pharmacognosy, Faculty of Pharmaceutical Sciences, Chulalongkorn University, and Dr. Norio Aimi of the Department of Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Chiba University, Chiba, Japan, for their kindness in determining the ultraviolet, infrared, ^1H - and ^{13}C -nuclear magnetic resonance spectra together with the interpretation and identification of the compound.

The author would like to express her appreciation and thanks to all the staff members of the Departments of Pharmacognosy and of Pharmaceutical Botany, Faculty of Pharmaceutical Sciences, Chulalongkorn University, for their kindness and helps.

The author is also gratefully indebted to her family for their love, understanding and financial support.

Finally, the author's thanks are due to Chulalongkorn University Graduate School for granting her partial financial support (of seven thousand and two hundred baht) to conduct this investigation.

CONTENTS

	page
ABSTRACT (THAI)	iv
ABSTRACT (ENGLISH)	v
ACKNOWLEDGEMENTS	vi
CONTENTS	viii
LIST OF TABLES	x
LIST OF FIGURES	xi
ABBREVIATIONS	xii
CHAPTER	
I INTRODUCTION	1
II HISTORICAL	
THE FAMILY PERIPLOCACEAE	
1. Introduction to Periplocaceae	5
2. Periplocaceous Plants in Thailand	9
3. Medicinal Plants in Periplocaceae	12
4. Chemical Constituents of Periplocaceae ..	15
THE FLAVONOIDS	
1. Introduction to Flavonoids	21
2. Classification of Flavonoids	22
3. Biosynthesis of Flavonoids	35
THE FLAVANONES	
1. Introduction to Flavanones	38
2. Chemistry of Flavanones	39
3. Structures of	
Naturally Occuring Flavanones	41

III EXPERIMENTAL	
1. Source of Plants Materials	52
2. General Techniques	
2.1 Thin-Layer Chromatography	52
2.2 Column Chromatography	53
2.3 Physical Constant	54
2.4 Spectroscopy	54
3. Extraction and Isolation of Chemical Substance from the Stems of <i>Myriopteron extensum</i> Schum.	
3.1 Extraction	56
3.2 Isolation of Chemical Substance	56
4. Identification of the Isolated Compound ..	58
5. Identification of the Sugar in Aqueous Portion	65
IV DISCUSSION	66
V CONCLUSION AND RECOMENDATION	73
REFERENCES	74
APPENDIX	86
VITA	108

LIST OF TABLES

TABLE		Page
2.1	Chemical Constituents of Periplocaceae	16
2.2	Types of Major Biflavonoids	34
3.1	Solvent Systems Used in Column Chromatography	57
3.2	¹ H-NMR Assingment of ME-1	60
3.3	¹³ C-NMR Assingment of ME-1	61

LIST OF FIGURES

FIGURE		Page
1.1	<i>Myriopterum extensum</i> Schum.	87
2.1	Biosynthetic Interrelationship of the Flavonoids	37
3.1-3.5	Thin-Layer Chromatograms of ME-1	88-92
3.6	Ultraviolet Absorption Spectrum of ME-1	93
3.7	Infrared Absorption Spectrum of ME-1	94
3.8-3.11	^1H -NMR Spectrum of ME-1	95-98
3.12-3.13	Two Dimension ^1H -NMR Spectrum (COSY) of ME-1	99-100
3.14	Two Dimension ^1H -NMR Spectrum (NOESY) of ME-1	101
3.15	^{13}C -NMR Spectrum of ME-1	102
3.16	^{13}C -NMR Spectrum (INEPT) of ME-1	103
3.17	Two Dimension ^{13}C -H HETCOR Spectrum of ME-1	104
3.18	Mass Spectrum of ME-1	105
3.19	Infrared Absorption Spectrum of Osazone Product of ME-1	106
3.20	Infrared Absorption Spectrum of Osazone Product of Sucrose	107
4.1	Mass Fragmentation of ME-1	68

ABBREVIATIONS

cm	=	centimeter
mm	=	millimeter
nm	=	nanometer
g	=	gram
mg	=	milligram
Hz	=	hertz
MHz	=	megahertz
M	=	molar
ppm	=	part per million
eV	=	electron volt
s	=	singlet
d	=	doublet
t	=	triplet
sh	=	shoulder
COSY	=	correlation spectroscopy
NOESY	=	nuclear overhauser effect spectroscopy
HETCOR	=	heteronuclear chemical shift correlation
INEPT	=	insensitive nuclei enhanced by polarization transfer
EIMS	=	electron impact mass spectroscopy
° C	=	degree celcius
hR_f	=	rate of flow in chromatography multiple by 100
λ_{\max}	=	wavelength at maximum absorption
m/z	=	mass to charge ratio
M^+	=	molecular ion
J	=	coupling constant
Glc	=	glucose