TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	**iii**
ABSTRACT IN ENGLISH	**v**
ABSTRACT IN THAI	**vi**
LIST OF TABLES	**x**
LIST OF FIGURES	**xi**
ABBREVIATIONS AND SYMBOLS	**xiv**
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Research objectives	2
CHAPTER 2 LITERATURE REVIEW	
2.1 Alkaloids	4
2.2 AChE inhibitory activity of alkaloids	11
2.3 Other AChEIs	16
2.4 AChEIs assay	17
2.5 *Dasymaschalon*	19
2.5.1 *D. sootepense*	20
2.5.2 *D. blumei*	21
2.5.3 *D. glaucum*	22

CHAPTER 3 EXPERIMENTAL

3.1 Equipment, materials and chemicals 25

3.1.1 Equipment 25

3.1.2 Materials 25

3.1.2 Chemicals 26

3.2 Extraction and isolation 27

3.2.1 *D. glaucum* extraction 27

3.2.2 *D. glaucum* isolation 29

3.3 Determination of efficiency on acetylcholinesterase inhibitory activity by TLC bioautographic assay 34

CHAPTER 4 RESULTS AND DISCUSSION

4.1 Collection of plant materials 36

4.2 Extraction and isolation 36

4.3 Structure elucidation 38

4.3.1 DG1 (Fraction 5.2.2.5) 38

4.3.2 DG6 (Fraction 6.7.1, the same compound with DG1) 41

4.3.3 DG2 (Fraction 5.3.2) 44

4.3.4 DG3 (Fraction 4.4.1) 47

4.3.5 DG4 (Fraction 4.3.6.1, the same compound with DG3) 50

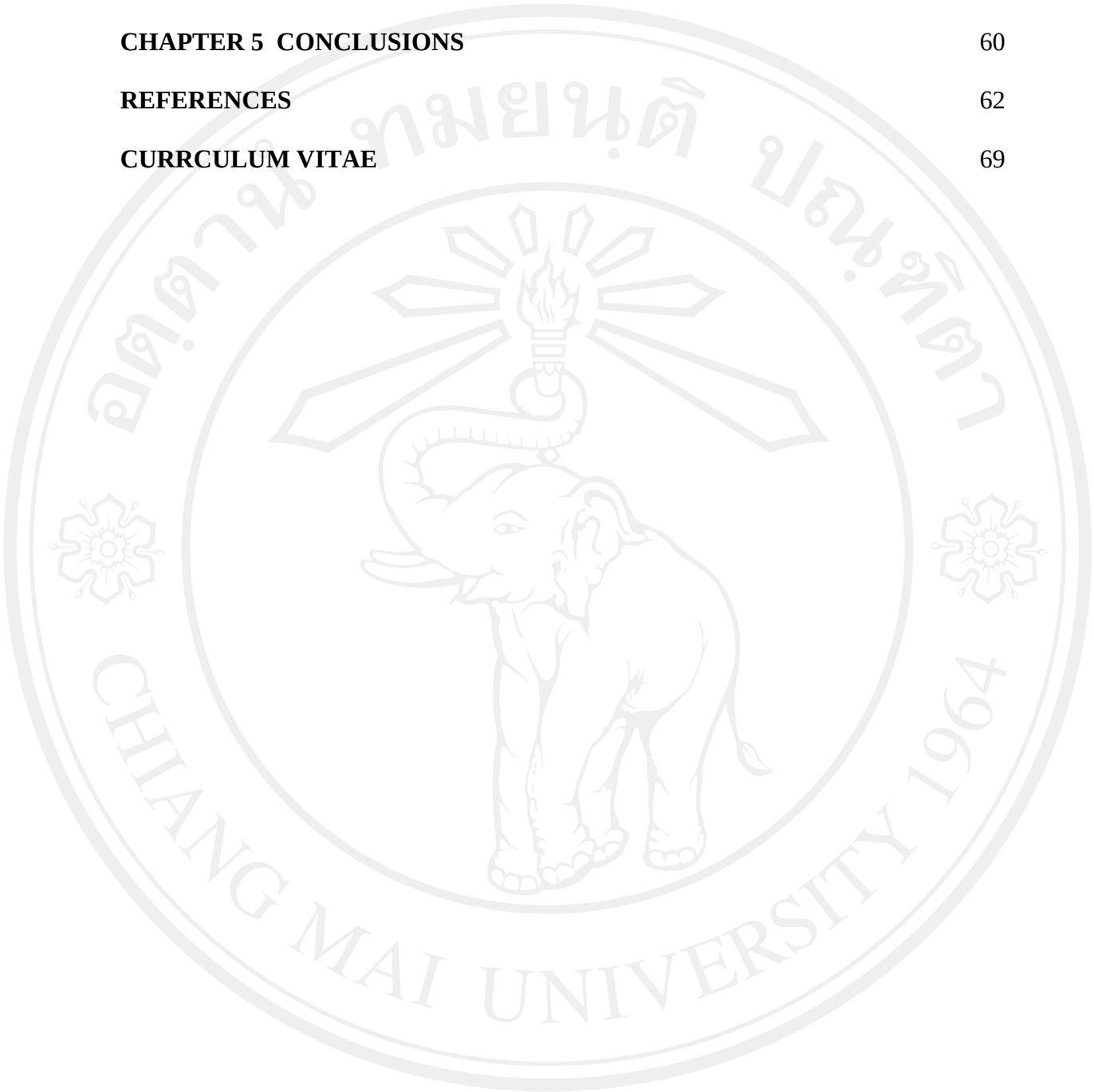
4.3.6 DG5 (Fraction 6.3.1) 53

4.4 Determination of efficiency on acetylcholinesterase inhibitory activity by TLC bioautography 56

CHAPTER 5 CONCLUSIONS 60

REFERENCES 62

CURRCULUM VITAE 69



LIST OF TABLES

Table	Page
2.1 Alkaloids having acetylcholinesterase inhibitory activity	14
4.1 ^{13}C- NMR (*100* MHz) and ^{1}H-NMR (*400* MHz) spectroscopic data of DG1 in $CDCl_3$	40
4.2 ^{1}H-NMR (*400* MHz) spectroscopic data of DG6 in $CDCl_3$	43
4.3 ^{1}H-NMR (*400* MHz) spectroscopic data of DG2 in $CDCl_3$	46
4.4 ^{1}H-NMR (*400* MHz) spectroscopic data of DG3 in $CDCl_3$	49
4.5 ^{1}H-NMR (*400* MHz) spectroscopic data of DG4 in $CDCl_3$	52
4.6 ^{1}H-NMR (*400* MHz) spectroscopic data of DG5 in $CDCl_3$	55
4.7 Minimum inhibitory concentration of DG1- DG6 required to inhibit AChE	57
4.8 Minimum inhibitory concentration of *Stemona* alkaloids required to inhibit AChE	58

LIST OF FIGURES

Figure		Page
2.1	A summary of acetylcholine synthesis and degradation	3
2.2	Structures of true alkaloids	5
2.3	Structures of protoalkaloids	5
2.4	Structures of pseudo alkaloids	6
2.5	Some core structures of alkaloids	7
2.6	Structures of some piperidine alkaloids	8
2.7	Structures of some pyrrolidine alkaloids	8
2.8	Structures of some pyrrolizidine alkaloids	9
2.9	Structures of some pyridine alkaloids	9
2.10	Structures of some quinoline alkaloids	10
2.11	Structures of some indole alkaloids	11
2.12	Structures of some acetylcholinesterase inhibitors obtained from plants	15
2.13	The reaction of Ellman's method	18
2.14	Reaction of AChE with naphthyl acetate and subsequent formation of a purple dye.	19
2.15	Some alkaloids structure from the leaves and twigs of *D. sootepense*	21
2.16	Alkaloids structures from the stems of *D. blumei*	22
2.17	Flower and fruits of *D. glaucum* and geographical distributions of *D.glaucum* in Thailand and neighboring regions	23
2.18	Structures of alkaloids from the leaves and twigs of *D.glaucum*	24

3.1	General extraction procedure of *D. glaucum*.	28
3.2	Isolation of the dichloromethane crude extract of *D. glaucum* (fraction 5)	31
3.3	Isolation of the dichloromethane crude extract of *D. glaucum* (fraction 4)	32
3.4	Isolation of the dichloromethane crude extract of *D. glaucum* (fraction 6)	33
3.5	Reaction of acetylcholinesterase with naphthyl acetate and the subsequent formation of the purple dye in the TLC bioassay	35
4.1	The summary of isolation and the possible structure of alkaloids from the leaves of *D. glaucum*	37
4.2	IR spectrum of DG1	39
4.3	^{1}H-NMR spectrum of DG1	39
4.4	The possible structure of DG1 and DG6	40
4.5	IR spectrum of DG6	42
4.6	^{1}H-NMR spectrum of DG6	42
4.7	IR spectrum of DG2	45
4.8	^{1}H-NMR spectrum of DG2	45
4.9	The possible structure of DG2	46
4.10	IR spectrum of DG3	48
4.11	^{1}H-NMR spectrum of DG3	48
4.12	The possible structure of DG3 and DG4	49
4.13	IR spectrum of DG4	51
4.14	^{1}H-NMR spectrum of DG4	51
4.15	IR spectrum of DG5	54
4.16	^{1}H-NMR spectrum of DG5	54
4.17	The possible structure of DG5	55

4.18 Bioautographic thin layer chromatography showing the acetylcholinesterase inhibition of the alkaloid compounds from *D. glaucum* and standard (galanthamine) 57

4.19 The structure of alkaloids had higher effect to acetycholinesterase inhibitory activity. 59

ABBREVIATIONS AND SYMBOLS

δ	Chemical shift
λ	Wavelength
Ø	Diameter
µM	Micrometer
µL	Microlitre
°C	Degree Celsius
1D	One dimension
2D	Two dimensions
^{1}H NMR	Proton nuclear magnetic resonance
^{13}C NMR	Carbon nuclear magnetic resonance
AChE	Acetylcholinesterase
AChEI	Acetylcholinesterase inhibitor
ATCI	Acetylthiocholine
br.s.	Broad singlet
cm	Centimeter
cm^2	Square centimeter
cm^{-1}	Wavenumbers
CC	Column chromatography
$CDCl_3$	Deuterated chloroform
d	Doublet
dd	Doublet of doublets (NMR)
d.b.h.	Diameter at breast height

D. glaucum	*Dasymaschalon glaucum*
DCM/CH_2Cl_2	Dichloromethane
DTNB	5,5'-dithiobis-(2-nitrobenzoic acid)
ESIMS	Electrospray ionization mass spectroscopy
Fig	Figure
g	Gram
HCl	Hydrochloric acid
h/hr	Hours
HMBC	Heteronuclear multiple bond correlation
Hz	Hertz
IC_{50}	Half maximal inhibitory concentration
IR	Infrared
J	Coupling constant (NMR)
kg	Kilogram
KI	Potassium iodide
K_2CO_3	Potassium carbonate
MeOH	Methanol
m	Multiplet (NMR), metre
m/z	Mass number divided by its charge
mg	Milligram
mm	Millimetre
mL	Milliliter
M^+	Molecular ion
Me	Methyl
MHz	Megahertz

MS	Mass spectrospopy
NH_3	Ammonia
NMR	Nuclear Magnetic Resonance
OMe	Methoxy
ppm	Parts per million
PTLC	Preparative Thin Layer Chromatography
q	Quartet (NMR)
RT	Room temperature
s	Singlet (NMR)
t	Triplet (NMR)
TLC	Thin Layer Chromatography
TMS	Tetrametylsilane
V	Volt
(w)	Weak (NMR)