

องค์ประกอบทางเคมีและฤทธิ์ทางชีวภาพของกาวเครือแดง *Butea superba* Roxb.

นางสาวเอมอร ฐนไทสง

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITY
OF *Butea superba* Roxb.

Miss Aim-on Loontaisong

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for the Degree of Master of Science Program in Biotechnology

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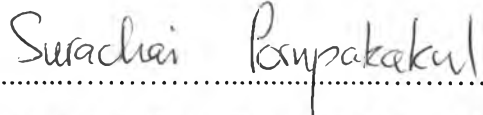
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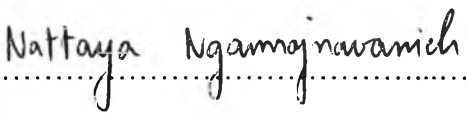
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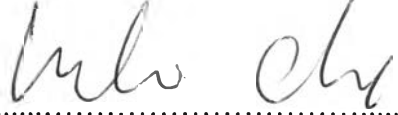
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เอมอร ลุนไทสง: องค์ประกอบทางเคมีและฤทธิ์ทางชีวภาพของกวาวเครือแดง *Butea superba* Roxb. (CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITY OF *Butea superba* Roxb.) อาจารย์ที่ปรึกษา: รศ.ดร. นาดยา งามโรจนวิชัย, อาจารย์ที่ปรึกษาร่วม: รศ.ดร. วิชัย เจ็ดชีวิตศาสตร์ 123 หน้า. ISBN 974-17-3540-5.

การศึกษาองค์ประกอบทางเคมีของรากพืชกวาวเครือแดง (*Butea superba* Roxb.) จากจังหวัดลำปาง สามารถแยกสารบริสุทธิ์ได้ 7 ชนิด จากสิ่งสกัดเมทานอล การหาสูตรโครงสร้างของสารเหล่านี้อาศัยคุณสมบัติทางกายภาพและเทคนิคทางสเปกโทรสโกปี ซึ่งได้แก่ 1D-NMR, 2D-NMR, UV-Vis และ MS สามารถพิสูจน์สูตรโครงสร้างของสารบริสุทธิ์ทั้ง 7 ชนิด ได้แก่ ของผสมสเตอรอยด์ 3 ชนิด คือ campesterol, stigmasterol และ β -sitosterol (1), สารประกอบ medicarpin (2), สารประกอบไอโซฟลาโวนีน 4 ชนิด คือ prunetin (3), formononetin (4), 7-hydroxy-6,4'-dimethoxy-isoflavone (5) และ 7, 4'-dimethoxy-isoflavone (6) และกรดอินทรีย์โซ่ตรง 1 ชนิด คือ hexacosanoic acid 2,3-dihydroxy-propyl ester (7) สารประกอบ (2) และ (3) มีฤทธิ์ต่อเซลล์มะเร็งเต้านมและมะเร็งในช่องปาก โดยสารประกอบ (2) ให้ค่า IC_{50} 12.9 \pm 0.3 และ 19.2 \pm 0.8 μ g/ml สารประกอบ (3) ให้ค่า IC_{50} 8.8 \pm 1.5 และ 10.0 \pm 2.5 μ g/ml และสารประกอบ (2) และ (3) มีฤทธิ์ต่อเซลล์มะเร็งปอดที่ความเข้มข้นมากกว่า 20 μ g/ml สารประกอบ (1), (4), (5) และ (6) มีฤทธิ์ต่อเซลล์มะเร็งเต้านม มะเร็งในช่องปาก และมะเร็งปอดที่ความเข้มข้นมากกว่า 20 μ g/ml ตามลำดับ

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AIM-ON LOONTAISONG: CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITY OF *Butea superba* Roxb. THESIS ADVISOR: ASSOC. PROF. NATTAYA NGAMROJNAVANICH, Ph.D., THESIS CO-ADVISOR: ASSOC. PROF. WICHAI CHERDSHEWASART, Ph.D., 123 pp. ISBN 974-17-3540-5.

The chemical investigation of the dried tubers of *Butea superba* Roxb. from Lampang province gave seven compounds from methanol crude extract. The structures of seven compounds were established on the basis of physical properties and spectroscopic data including 1D-NMR, 2D-NMR, MS and UV-Vis techniques. A mixture of steroids; including campesterol, stigmasterol and β -sitosterol (1), medicarpin (2), four isoflavones; prunetin (3), formononetin (4), 7-dydroxy-6-4'-dimethoxyisoflavone (5) and 7,4'-dimethoxyisoflavone (6), and hexacosanoic acid 2,3-dihydroxy-propyl ester (7) were identified. Compound (2) and (3) were active against BC and KB cancer. IC_{50} value of compound (2) against BC and KC cancer were 12.9 ± 0.3 and 19.2 ± 0.8 $\mu\text{g/ml}$ and IC_{50} value of compound (3) against BC and KC cancer were 8.8 ± 1.5 and 10.0 ± 2.5 $\mu\text{g/ml}$, respectively. They were active against NCI-H 187 cell line at concentration more than 20 $\mu\text{g/ml}$. Compound (1), (4), (5) and (6) were active against BC cell line, KB cell line and NCI-H 187 cell line at concentration more than 20 $\mu\text{g/ml}$, respectively.

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CONTENTS

	Pages
ABSTRACT IN THAI.....	iv
ABSTRACT IN ENGLISH.....	v
ACKNOWLEDGEMENT.....	vi
CONTENTS.....	vii
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
LIST OF SCHEMES.....	xiii
LIST OF ABBREVIATIONS.....	xiv
 CHAPTER I INTRODUCTION.....	 1
 CHAPTER II LITERATURE REVIEW.....	 3
2. The red Kwao Krua (<i>B. superba</i> Roxb.)	3
2.1 The botanical characteristics of <i>B. superba</i> Roxb.	3
2.2 Hierarchical position of the Genus <i>Butea</i>	5
2.3 Previous works of genus <i>Butea</i>	6
2.4 Previous works of <i>B. superba</i> Roxb.	8
 CHAPTER III EXPERIMENTATION.....	 13
3.1 Plant material.....	13
3.2 Instruments and Equipments.....	13
3.3 Chemical Reagents	14
3.4 Extraction procedures.....	15
3.5 Isolation procedure	17
3.6 Purification and properties of the compounds from <i>B. superba</i> Roxb.	 19

	Pages
3.6.1 Purification and properties of mixture <u>1</u>	19
3.6.2 Purification and properties of compound <u>1</u>	20
3.6.3 Purification and properties of compound <u>2</u>	21
3.6.4 Purification and properties of compound <u>3</u>	22
3.6.5 Purification and properties of compound <u>4</u>	23
3.6.6 Purification and properties of compound <u>5</u>	24
3.6.7 Purification and properties of compound <u>6</u>	25
3.7 Biological assay.....	26
3.7.1 Anti-cancer.....	26
CHAPTER IV RESULTS AND DISCUSSION.....	28
4.1 Results of separation of <i>B. superb</i> Roxb. crude extract.....	28
4.2 Structure elucidation of mixture <u>1</u>	32
4.3 Structure elucidation of compound <u>1</u>	36
4.4 Structure elucidation of compound <u>2</u>	42
4.5 Structure elucidation of compound <u>3</u>	49
4.6 Structure elucidation of compound <u>4</u>	55
4.7 Structure elucidation of compound <u>5</u>	61
4.8 Structure elucidation of compound <u>6</u>	66
4.9 Results of biological assay.....	68
4.9.1 Results of Anti-cancer.....	68
CHAPTER V CONCLUSION.....	69
REFERENCES.....	71
APPENDIX.....	77
BIOGRAPHY.....	123

LIST OF TABLES

Figures	Pages
1 The crude extracts of the tuberous roots of <i>B. superb</i> Roxb.....	15
2 Results from separation of methanol crude extract.....	28
3 Results from purified compounds of <i>B. superba</i> Roxb. crude extract.....	31
4 ¹ H-NMR chemical shifts of mixture <u>1</u> and mixture of steroids.....	33
5 ¹³ C-NMR chemical shifts of mixture <u>1</u> and mixture of steroids.....	33
6 ¹ H-NMR and ¹³ C-NMR chemical shifts of compound <u>1</u> and Prunetin... ..	37
7 ¹ H-NMR, ¹³ C-NMR, gHSQC, gHMBC, gCOSY and NOESY spectral data of compound <u>1</u>	38
8 ¹ H-NMR and ¹³ C-NMR chemical shifts of compound <u>2</u> and Medicarpin..	43
9 ¹ H-NMR, ¹³ C-NMR, gHSQC, gHMBC, gCOSY and NOESY spectral data of compound <u>2</u>	44
10 ¹ H-NMR and ¹³ C-NMR chemical shifts of compound <u>3</u> and Formononetin	50
11 ¹ H-NMR, ¹³ C-NMR, gHSQC, gHMBC, gCOSY and NOESY spectral data of compound <u>3</u>	51
12 ¹ H-NMR and ¹³ C-NMR chemical shifts of compound <u>4</u> and 7-hydroxy-6-4'-dimethoxyisoflavone.....	56
13 ¹ H-NMR, ¹³ C-NMR, gHSQC, gHMBC, gCOSY and NOESY spectral data of compound <u>4</u>	57
14 ¹ H-NMR and ¹³ C-NMR chemical shifts of compound <u>5</u> and 7, 4'-dimethoxyisoflavone.....	62
15 ¹ H-NMR, ¹³ C-NMR, gHSQC, gHMBC, and gCOSY spectral data of compound <u>5</u>	63
16 ¹ H-NMR and ¹³ C-NMR chemical shifts of compound <u>6</u>	67
17 Anti-cancer activity against cancer cell lines of isolated compounds of <i>Butea superba</i> Roxb. from Lumpang Province.....	68

LIST OF FIGURES

Figures	Pages
1 red Kwao Krua (<i>B. Superba</i> Roxb.).....	4
2 Structure of Butin from seeds of <i>Butea monosperma</i>	6
3 Structure of Medicarpin from stem barks of <i>Butea monosperma</i>	7
4 Structure of 5,2'-dihydroxy-3,6,7-trimethoxyflavone-5- <i>O</i> - β -D-xylopyranosyl-(\rightarrow 4)- <i>O</i> - β -D-glucopyranoside from stem barks of <i>Butea monosperma</i>	8
5 Structure of the chemical constituents of <i>Butea superba</i> Roxb.....	11
6 Structure of mixture <u>1</u>	35
7 Structure of compound <u>1</u>	40
8 HMBC of compound <u>1</u>	40
9 COSY of compound <u>1</u>	41
10 NOESY of compound <u>1</u>	41
11 Structure of compound <u>2</u>	47
12 HMBC of compound <u>2</u>	47
13 COSY of compound <u>2</u>	48
14 NOESY of compound <u>2</u>	48
15 Structure of compound <u>3</u>	53
16 HMBC of compound <u>3</u>	53
17 COSY of compound <u>3</u>	54
18 NOESY of compound <u>3</u>	54
19 Structure of compound <u>4</u>	59
20 HMBC of compound <u>4</u>	59
21 COSY of compound <u>4</u>	60
22 NOESY of compound <u>4</u>	60
23 Structure of compound <u>5</u>	64

Figures	Pages
24 HMBC of compound <u>5</u>	65
25 COSY of compound <u>5</u>	65
26 Structure of compound <u>6</u>	67
26 ¹ H-NMR spectrum of mixture <u>1</u>	78
27 ¹³ C-NMR spectrum of mixture <u>1</u>	79
28 ¹ H-NMR spectrum of compound <u>1</u>	80
29 ¹³ C-NMR spectrum of compound <u>1</u>	81
30 gHSQC spectrum of compound <u>1</u>	82
31 gHMBC spectrum of compound <u>1</u>	83
32 gCOSY spectrum of compound <u>1</u>	84
33 NOESY spectrum of compound <u>1</u>	85
34 TOF-MS spectrum of compound <u>1</u>	86
35 UV spectrum of compound <u>1</u>	87
36 ¹ H-NMR spectrum of compound <u>2</u>	88
37 ¹³ C-NMR spectrum of compound <u>2</u>	89
38 gHSQC spectrum of compound <u>2</u>	90
39 gHMBC spectrum of compound <u>2</u>	91
40 gCOSY spectrum of compound <u>2</u>	92
41 NOESY spectrum of compound <u>2</u>	93
42 TOF-MS spectrum of compound <u>2</u>	94
43 UV spectrum of compound <u>2</u>	95
44 ¹ H-NMR spectrum of compound <u>3</u>	96
45 ¹³ C-NMR spectrum of compound <u>3</u>	97
46 gHSQC spectrum of compound <u>3</u>	98
47 gHMBC spectrum of compound <u>3</u>	99
48 gCOSY spectrum of compound <u>3</u>	100
49 NOESY spectrum of compound <u>3</u>	101

Figures	Pages
50 TOF-MS spectrum of compound <u>3</u>	102
51 UV spectrum of compound <u>3</u>	103
52 ¹ H-NMR spectrum of compound <u>4</u>	104
53 ¹³ C-NMR spectrum of compound <u>4</u>	105
54 gHSQC spectrum of compound <u>4</u>	106
55 gHMBC spectrum of compound <u>4</u>	107
56 gCOSY spectrum of compound <u>4</u>	108
57 NOESY spectrum of compound <u>4</u>	109
58 TOF-MS spectrum of compound <u>4</u>	110
59 UV spectrum of compound <u>4</u>	111
60 ¹ H-NMR spectrum of compound <u>5</u>	112
61 ¹³ C-NMR spectrum of compound <u>5</u>	113
62 gHSQC spectrum of compound <u>5</u>	114
63 gHMBC spectrum of compound <u>5</u>	115
64 gCOSY spectrum of compound <u>5</u>	116
65 TOF-MS spectrum of compound <u>5</u>	117
66 UV spectrum of compound <u>5</u>	118
67 ¹ H-NMR spectrum of compound <u>6</u>	119
68 ¹³ C-NMR spectrum of compound <u>6</u>	120
69 UV spectrum of compound <u>6</u>	121
70 TOF-MS spectrum of compound <u>6</u>	122

LIST OF SCHEMES

Scheme	Pages
1. The procedure of extraction of <i>B. superba</i> Roxb. (5.5 kg).....	16
2. Isolation procedure of MeOH crude extract.....	18

LIST OF ABBREVIATIONS

$[\alpha]_D^{26.5}$	=	Specific optical rotation at 26.5° and Sodium D line (589 nm)
°C	=	degree Celsius
CDCl ₃	=	deuterated chloroform
CHCl ₃	=	chloroform
EtOAc	=	Ethyl acetate
MeOH	=	methanol
¹ H NMR	=	proton nuclear magnetic resonance
¹³ C NMR	=	carbon-13 nuclear magnetic resonance
COSY	=	Correlated Spectroscopy
HMBC	=	Heteronuclear Multiple Bond Correlation
HSQC	=	Heteronuclear Single Quantum Correlation
NOESY	=	Nuclear Overhauser Enhancement Spectroscopy
MS	=	mass spectroscopy
UV	=	ultraviolet
λ_{\max}	=	the wavelength at maximum absorption (UV)
δ	=	Chemical shift
s	=	singlet
d	=	doublet (NMR)
dd	=	double doublet (NMR)
ddd	=	doublet of doublet of doublet (NMR)
t	=	triplet
q	=	quartet
m	=	multiplet (NMR)
Hz	=	Hertz
MHz	=	megahertz
g	=	gravity (NMR)

J	=	coupling constant
$[M+Na]^+$	=	molecular ion add sodium
m/z	=	mass to charge ratio
ppm	=	part per million
L	=	liter
ml	=	milliliter (s)
μ l	=	microliter
μ g	=	microgram
mg	=	milligram
sp.	=	species
TLC	=	thin layer chromatography