

ห้องสมุดงานวิจัย สำนักงานคณะกรรมการวิจัยแห่งชาติ



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CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITIES
OF *Globba reflexa* RHIZOMES

NITAYA MANOKAM

MASTER OF SCIENCE
IN CHEMISTRY

THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY
OCTOBER 2011

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**A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
MASTER OF SCIENCE
IN CHEMISTRY**

**THE GRADUATE SCHOOL
CHIANG MAI UNIVERSITY**

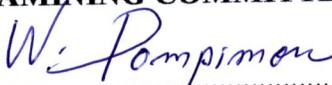
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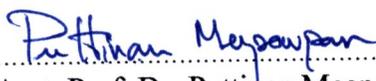
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THIS THESIS HAS BEEN APPROVED
TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
IN CHEMISTRY

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Nitaya Manokam

Thesis Title	Chemical Constituents and Biological Activities of <i>Globba reflexa</i> Rhizomes
Author	Miss Nitaya Manokam
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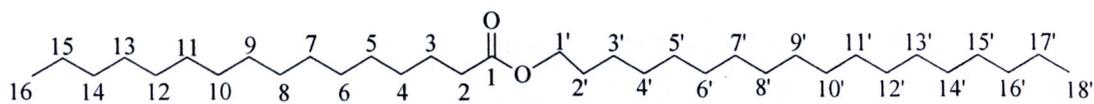
ABSTRACT

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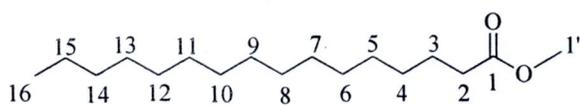
The isolation of the crude hexane, dichloromethane and methanol extracts of dried rhizomes of *Globba reflexa* yielded five pure compounds. They were identified to be stearyl palmitate (**26**), methyl palmitate (**27**), (*E*)-15,16-bisnorlabda-8(17),11-dien-13-one (**28**), villosin (**29**), coronarin D (**32**) and mixture of β -sitosterol (**13**), stigmasterol (**30**) and campesterol (**31**). The structures of all compounds were identified by comparison of spectroscopic and some physical data with those reported in the literatures. All compounds were reported for the first time from *Globba reflexa*.

Compounds **28**, **29** and **32** were tested for antimycobacterial and cytotoxic activities against human oral epidermoid carcinoma (KB), human breast adenocarcinoma cancer (MCF7) and human small cell lung cancer (NCI-H187). All compounds were inactive against *Mycobacterial tuberculosis*. For the cytotoxicity assays, compound **29** showed the strongest activities against NCI-H187 and KB cells with IC₅₀ values of 2.12 and 6.85 $\mu\text{g/mL}$ respectively. Compounds **28** and **32** showed moderate to weak activity against all cell line with IC₅₀ ranging from 16.25-49.22

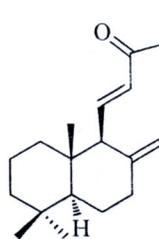
$\mu\text{g/mL}$. Moreover compounds **28** and **29** were inactive against *Plasmodium falciparum*.



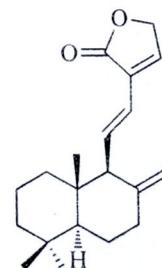
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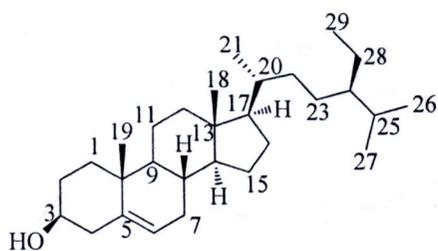
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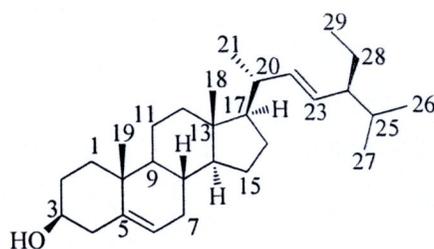
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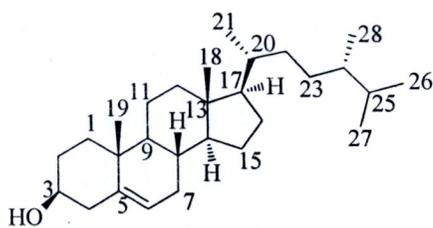
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ชื่อเรื่องวิทยานิพนธ์

องค์ประกอบทางเคมีและฤทธิ์ทางชีวภาพของเหง้า

Globba reflexa

ผู้เขียน

นางสาวนิตยา มะโนคำ

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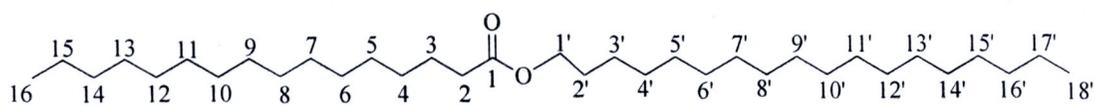
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บทคัดย่อ

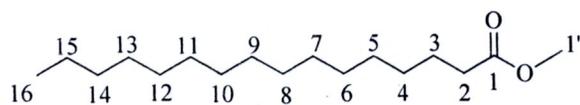
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การแยกสารจากส่วนสกัดเฮกเซน ไดคลอโรมีเทน และ เมทานอลของเหง้าแห้ง *Globba reflexa* สามารถแยกสารบริสุทธิ์ได้ทั้งหมด 5 ชนิด คือ stearyl palmitate (26), methyl palmitate (27), (*E*)-15,16-bisnorlabda-8(17),11-dien-13-one (28), villosin (29), coronarin D (32) และสารผสมของ β -sitosterol (13), stigmasterol (30) และ campesterol (31) โดยโครงสร้างของสารพิสูจน์ได้จากการเปรียบเทียบข้อมูลทางสเปกโทรสโกปี และข้อมูลทางกายภาพกับข้อมูลของสารที่มีการรายงานไว้แล้ว โดยสารที่แยกได้ทั้งหมดมีการรายงานเป็นครั้งแรกในพืชชนิดนี้

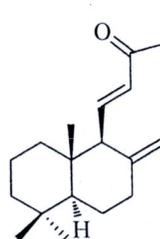
เมื่อนำสารประกอบ 23, 24 และ 27 ส่งทดสอบฤทธิ์ต้านเชื้อวัณโรค (*Mycobacterial tuberculosis*) และความเป็นพิษต่อเซลล์มะเร็งเยื่อช่องปาก เซลล์มะเร็งเต้านมและเซลล์มะเร็งปอด พบว่า สารประกอบทุกชนิดไม่แสดงฤทธิ์ในการต้านเชื้อวัณโรค ในการทดสอบความเป็นพิษต่อเซลล์มะเร็ง พบว่า สารประกอบ 24 แสดงฤทธิ์สูงในการยับยั้งเซลล์มะเร็งปอดและเซลล์มะเร็งเยื่อช่องปากด้วยค่า IC_{50} 2.12 และ 6.85 $\mu\text{g/mL}$ ตามลำดับ ส่วนสาร 23 และ 27 แสดงฤทธิ์ปานกลางถึงต่ำในการยับยั้งเซลล์มะเร็งด้วยค่า IC_{50} ในช่วง 16.25-49.22 $\mu\text{g/mL}$ นอกจากนี้เมื่อทดสอบฤทธิ์การต้านเชื้อมาลาเรีย (*Plasmodium falciparum*) ของสารประกอบ 23 และ 24 พบว่า สารประกอบทั้งสองชนิดไม่แสดงฤทธิ์ในการต้านเชื่อดังกล่าว



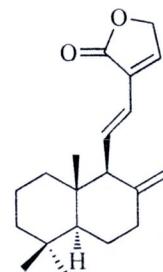
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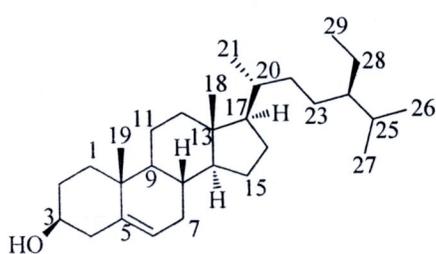
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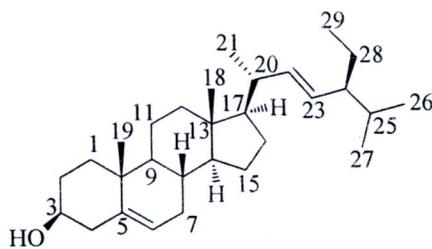
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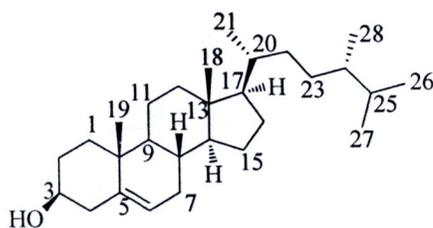
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ABBREVIATIONS AND SYMBOLS

<i>br</i>	broad
cm	centimeter
cm ⁻¹	wave number
¹³ C NMR	carbon 13 nuclear magnetic resonance
CH ₂ Cl ₂	dichloromethane
CC	column chromatography
CDCl ₃	deuterated chloroform
COSY	correlated spectroscopy
<i>d</i>	doublet
<i>dd</i>	doublet of doublets
<i>ddd</i>	doublet of doublet of doublets
DEPT	distortionless enhancement by polarization transfer
<i>dt</i>	doublet of triplets
EIMS	electron impact mass spectrometry
EtOAc	ethyl acetate
FCC	flash column chromatography
FT-IR	fourier transform infrared spectroscopy
g	gram
Gr	Group
HMBC	heteronuclear multiple bond correlation
HMQC	heteronuclear multiple quantum coherence

$^1\text{H NMR}$	proton nuclear magnetic resonance
Hz	hertz
IC_{50}	50% inhibitory concentration
J	coupling constant (hertz)
m	multiplet
m/z	a value of mass divided by charge
MeOH	methanol
mg	milligram
MHz	megahertz
MIC	minimum inhibitory concentration
mL	milliliter
mm	millimeter
MS	mass spectrometry
ppm	part per million
CC	column chromatography
s	singlet
TLC	thin layer chromatography
δ	chemical shift (ppm)
ν_{max}	maximum absorption frequency
μg	microgram
μM	micromolar
$[\alpha]_{\text{D}}$	specific rotation