

องค์ประกอบทางเคมีจากรากเจตพังคี

(*Cladogynos orientalis* Zipp. ex Span.) และฤทธิ์ทางชีวภาพ

นางสาว นุษราคม ทรัพย์อุดมผล

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CHEMICAL CONSTITUENTS FROM THE ROOTS OF  
*Cladogynos orientalis* Zipp. ex Span.  
AND THEIR BIOLOGICAL ACTIVITY

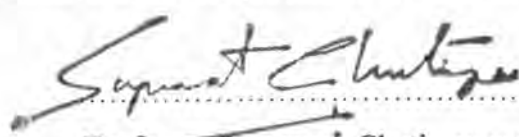
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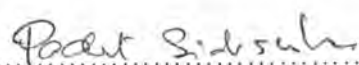
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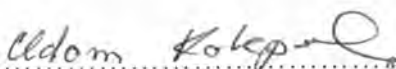
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บุษราคัม ทรัพย์อุดมผล : องค์ประกอบทางเคมีจากรากเจตพังคี และฤทธิ์ทางชีวภาพ (CHEMICAL CONSTITUENTS FROM THE ROOTS OF *Cladogynos orientalis* Zipp. ex Span. AND THEIR BIOLOGICAL ACTIVITY) อ. ที่ปรึกษา : อ. ดร. สันติ ทิพยางค์ , 143 หน้า. ISBN 974-639-378-2.

ในการเสาะหาสารที่มีฤทธิ์ทางชีวภาพ โดยนำรากเจตพังคี(*Cladogynos orientalis* Zipp. ex Span.) มา บด แล้วสกัดด้วยตัวทำละลายอินทรีย์ต่างๆดังนี้ เฮกเซน, ไคลลอโรมีเทน, เอทิล อะซิเตท, บิวทานอล และเอทานอล ซึ่งสิ่งสกัดเฮกเซน, ไคลลอโรมีเทน และเอทิล อะซิเตท แสดงความเป็นพิษต่อไรซีน้าตาล(Brine shrimp, *Aetemia salina* Linn.) จึงทำการแยกสิ่งสกัดเหล่านี้ โดยวิธีคอลัมน์ โครมาโทกราฟี สามารถแยกได้ของผสม 2 ชนิด และสาร บริสุทธิ์ อีก 8 ชนิด ได้แก่ สารใหม่ 1 ชนิด คือ 4 $\alpha$ ,8 $\alpha$ ,9 $\alpha$ -trimethyl-12-(13-furanyl)-5,12-epoxy-2-oxo-cleroda-1(10),11(12)-diene-4-methyl ester (chettaphanin III)พร้อมด้วยสารผสม 2 สาร และสารประกอบ 7 สารที่พบมาแล้ว คือ ของผสมไซตรงเอสเทอร์, ของผสม stigmasterol กับ  $\beta$ sitosterol,  $\beta$ sitosterol, chettaphanin I, chettaphanin II, cyperenoic acid, scopoletin, (-)-spathulenol และ taraxerol ซึ่งสูตรโครงสร้างของสาร furanoditerpene (chettaphanin III) ชนิดใหม่นี้ พิสูจน์ด้วยวิธีทางสเปกโตรสโคปี

Chettaphanin II, cyperenoic acid, (-)-spathulenol และ chettaphanin III แสดงความเป็นพิษต่อไรซีน้าตาลด้วยค่า LC<sub>50</sub> 19.95, 32.58, 72.64 และ 79.54  $\mu$ g/ml ตามลำดับ นอกจากนี้ยังพบว่า cyperenoic acid ยังมีฤทธิ์ต้านเชื้อแบคทีเรีย *E. coli*, *B. cereus*, *S. aureus*, *S. derby*, ปานกลาง และมีฤทธิ์ต้านเชื้อรา *Cladosporium albicans* ด้วย

ภาควิชา ..... ๓๓  
สาขาวิชา ..... เคมอินทรีย์  
ปีการศึกษา ..... ๒๕๔๑

ลายมือชื่อนิสิต ..... บุษราคัม ทรัพย์อุดมผล  
ลายมือชื่ออาจารย์ที่ปรึกษา ..... สันติ ทิพยางค์  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม .....

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KEY WORD: *Cladogynos orientalis* Zipp. ex Span. / CHEMICAL CONSTITUENT / BIOLOGICAL ACTIVITY

BUTSARAKHAM SUPUDOMPOL : CHEMICAL CONSTITUENTS FROM THE ROOTS OF *Cladogynos orientalis* Zipp. ex Span. AND THEIR BIOLOGICAL ACTIVITY. THESIS ADVISOR : SANTI TIP-YPANG Ph.D. 143 pp. ISBN 974-639-378-2.

In a search for bioactive substances, dried and ground roots of *Cladogynos orientalis* Zipp. ex Span. were extracted with hexane, dichloromethane, ethyl acetate and ethanol. The hexane, dichloromethane and ethyl acetate crude extracts showed very high cytotoxicity to brine shrimp (*Artemia salina* Linn.). Fractionation of these crude extracts by column chromatography led to the isolation of two mixtures and eight compounds. They included one new compound: 4 $\alpha$ ,8 $\alpha$ ,9 $\alpha$ -trimethyl-12-(13-furanyl)-5,12-epoxy-2-oxo-cleroda-1(10),11(12)-diene-4-methyl ester (chettaphanin III) along with two mixtures and seven known compounds, a mixture of long chain aliphatic esters, a mixture of steroids (stigmasterol and  $\beta$ -sitosterol),  $\beta$ -sitosterol, chettaphanin I, chettaphanin II, cyperenoic acid, scopoletin, (-)-spathulenol and taraxerol. The structure of chettaphanin III, new furanoditerpene, was elucidated by spectroscopic methods.

Chettaphanin II, cyperenoic acid, (-)-spathulenol and chettaphanin III showed cytotoxicity to brine shrimp with LC<sub>50</sub> 19.95, 32.58, 72.64 and 79.54 $\mu$ g/ml, respectively. In addition, cyperenoic acid also showed significant antibacterial activity against *E. coli*, *B. cereus*, *S. aureus*, *S. derby*, and antifungal activity against *Cladosporium albicans*.

ภาควิชา.....เคมี  
สาขาวิชา.....เคมีอินทรีย์  
ปีการศึกษา.....๒๕๕๓

ลายมือชื่อนิสิต.....นางสาว นงนิตย์ ทรัพย์อุดม  
ลายมือชื่ออาจารย์ที่ปรึกษา.....สมศักดิ์ ทรัพย์มงคล  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....

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## LIST OF ABBREVIATIONS

$^{\circ}\text{C}$	degree celsius
CC, $\text{SiO}_2$	Column Chromatography using silica gel as absorbent
cm	centimetre
$\text{cm}^{-1}$	wave number
CHSHF	Heteronuclear Shift Correlation Spectroscopy
conc.	concentration
cont.	continue
COSY	Correlation Spectroscopy
$^{13}\text{C}$ -NMR	Carbon 13 Nuclear Magnetic Resonance
d	doublet (NMR)
dd	doublet of doublet (NMR)
DEPT	Distortionless Enhancement by Polarization Transfer
Fig.	Figure
FT	Fourier Transform
g	gram
GC	Gas Chromatography
$^1\text{H}$ -NMR	Proton Nuclear Magnetic Resonance
HMBC	Heteronuclear Multiple Bond Correlation
HMQC	Heteronuclear Multiple Quantum Correlation
hr.	hour
IU.	International Unit
IR	Infrared
J	coupling constant (NMR)
kg	kilogram
$\text{LC}_{50}$	Lethal Concentration (concentration caused 50% lethality)
m	multiplet (NMR)
$\text{M}^+$	Molecular ion
m/z	mass per charge



mg	milligram
ml	milliliter
MW	Molecular Weight
MTT	3,4,5-dimethylthiazol-2,5-diphenyltetra zolium bromide
nm	nanometer
no.	number
NOE	Nuclear Overhauser Effect
ppm	part per million
PTLC	Preparative Thin Layer Chromatography
R <sub>f</sub>	Retention factor
s	singlet (NMR)
TLC	Thin Layer Chromatography
TMS	Tetramethyl Silane
wt by wt	weight by weight
δ	chemical shift
μg	microgram
μl	microliter