

องค์ประกอบทางเคมีจากใบพลู *Piper betle* Linn. และฤทธิ์ทางชีวภาพ



นางสาวน้ำฝน กูเจริญไพศาล

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**CHEMICAL CONSTITUENTS FROM THE LEAVES OF  
*Piper betle* Linn. AND THEIR BIOLOGICAL ACTIVITY**

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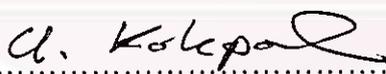
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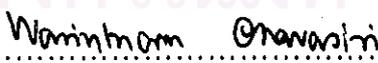
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พิมพ์ครั้งที่ ๑ ฉบับนี้จัดทำขึ้นเพื่อจำหน่ายแก่สมาชิกของชมรมพฤกษศาสตร์แห่งประเทศไทย

นำเสน **ฤทธิ์ทางชีวภาพ** : องค์ประกอบทางเคมีจากใบพญา *Piper betle* Linn. และฤทธิ์ทางชีวภาพ (CHEMICAL CONSTITUENTS FROM THE LEAVES OF *Piper betle* Linn. AND THEIR BIOLOGICAL ACTIVITY) อ. ที่ปรึกษา : รศ. ดร. อุดม ก๊กผล; 211 หน้า. ISBN 974-638-420-1.

ผลการทดสอบฤทธิ์ทางชีวภาพเบื้องต้นของใบพญา *Piper betle* Linn. พบว่าถึงสกัดในเอทานอล แสดงความเป็นพิษต่อ brine shrimp (*Artemia salina* Linnaeus) ทำการแยกสิ่งสกัดเป็นส่วนๆพบว่า ส่วนที่ละลายในคลอโรฟอร์มแสดงฤทธิ์ทางชีวภาพดีที่สุด เมื่อทำการแยกสิ่งสกัดด้วยวิธีทางโครมาโทกราฟี สามารถแยกสารได้ 10 ชนิด โดยอาศัยสมบัติทางกายภาพ และ ข้อมูลทางสเปกโทรสโกปี สามารถพิสูจน์สูตรโครงสร้างของสารได้ คือ 1) สารผสมระหว่าง 2,6-dimethyl cyclohexanol และ 5,6,7,7A-tetrahydro-4,4,7A-trimethyl-2(4H)-benzofuranone, 2) สารผสมแอลกอฮอล์โซ่ตรง ( $C_{17} - C_{33}$ ), 3) สารผสมของเอสเตอร์โซ่ตรง, 4) lupeol, 5) สารผสมแอลกอฮอล์โซ่ตรง ( $C_{21}, C_{23}$ ), 6) 2-propenyl hexanoate, 7) friedelan-3 $\beta$ -ol, 8) chavibetol 9) สารผสมสเตอรอยด์ 3 ชนิด คือ campesterol, stigmasterol และ  $\beta$ -sitosterol และ 10) allylpyrocatechol สารทั้งหมดที่แยกได้ พบว่า chavibetol และ allylpyrocatechol แสดงความเป็นพิษต่อ brine shrimp (*Artemia salina* Linnaeus) ได้ดีที่สุดด้วยค่า  $LC_{50}$  2.55 และ 16.36  $\mu\text{g/ml}$  ในเวลา 24 ชั่วโมง ตามลำดับ นอกจากนี้ในการแยกสิ่งสกัดบิวทานอล ยังพบสารอีก 6 กลุ่ม

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สาขาวิชา ..... ๒๕๕  
ปีการศึกษา ..... ๒๕๕๐

ลายมือชื่อนิติกร ..... นำเสน อุดม ก๊กผล  
ลายมือชื่ออาจารย์ที่ปรึกษา ..... อุดม ก๊กผล  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม ..... —

## C825232 : MAJOR CHEMISTRY

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NUMPHON KOOCHAROENPISAL : CHEMICAL CONSTITUENTS FROM THE LEAVES OF *Piper betle* Linn. AND THEIR BIOLOGICAL ACTIVITY.

THESIS ADVISOR : ASSOC. PROF. UDOM KOKPOL ,Ph.D. 211 pp.

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The preliminary bioassay results of the leaves of *Piper betle* Linn. indicated that the ethanol crude extract exhibited cytotoxicity activity against brine shrimp (*Artemia salina* Linnaeus). Ethanol crude extract was separated to eight fractions and its chloroform fraction revealed the most biological activity. Fractionation of crude chloroform extract using column chromatography led to the isolation of ten substances. By means of physical properties, and spectroscopic data, the structures of compounds were elucidated. They were found to be 1) a mixture of 2,6-dimethyl cyclohexanol and 5,6,7,7A-tetrahydro-4,4,7A-trimethyl-2(4H)-benzofuranone, 2) a mixture of straight long chain alcohols (C<sub>17</sub>-C<sub>33</sub>), 3) a mixture of straight long chain esters, 4) lupeol, 5) a mixture of straight long chain alcohol (C<sub>21</sub>, C<sub>23</sub>), 6) 2-propenyl hexanoate, 7) friedelan-3β-ol, 8) chavibetol, 9) a mixture of steroids (campesterol, stigmasterol and β-sitosterol), and 10) allylpyrocatechol.

The bioassay results indicated that chavibetol and allylpyrocatechol exhibited cytotoxicity activity against brine shrimp (*Artemia salina* Linnaeus) with LC<sub>50</sub> values of 2.55 and 16.36 µg/ml at 24 hours, respectively. In addition, fractionation of crude butanol extract led to the isolation of six groups of substances.

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ภาควิชา.....  
สาขาวิชา.....  
ปีการศึกษา.....

ลายมือชื่อผู้คิด.....  
ลายมือชื่ออาจารย์ที่ปรึกษา.....  
ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....

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จุฬาลงกรณ์มหาวิทยาลัย

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## LIST OF ABBREVIATIONS

b	broad
cm <sup>-1</sup>	unit of wavelength
°C	degree celsius
cont.	continue
<sup>13</sup> C NMR	carbon 13 nuclear magnetic resonance
d	doublet (NMR)
DEPT	distortionless enhancement by polarization transfer
DMSO	dimethylsulfoxide
FID	Fame ionization detector
Fig.	Figure
g	gram
GC-MS	gas chromatography-mass spectroscopy
GLC	gas liquid chromatography
<sup>1</sup> H NMR	proton nuclear magnetic resonance
IR	infrared
J	coupling constant (NMR)
kg	kilogram
m	multiplet (NMR)
m/e	mass to charge ratio
MS	mass spectrometry
M <sup>+</sup>	molecular ion
ml	milliliter
mg	milligram
MW	molecular weight
m.p.	melting point
No.	number
ppm	part per million
R <sub>f</sub>	rate of flow in chromatography

Rt	retention time
LC <sub>50</sub>	concentration that caused 50 % lethality
wt. by wt.	weight by weight
$\delta$	chemical shift
s	singlet (NMR)
t	triplet (NMR)
TLC	thin layer chromatography



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