

องค์ประกอบทางเคมีและฤทธิ์ทางชีวภาพของ โกงกางใบเล็ก

(Rhizophora apiculata Bl.)

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CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITIES OF  
RHIZOPHORA APICULATA BL.

Mr. Warinthorn Chavasiri

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วรินทร์ ชวศิริ : องค์ประกอบทางเคมีและฤทธิ์ทางชีวภาพของโงก่างใบเล็ก (CHEMICAL CONSTITUENTS AND BIOLOGICAL ACTIVITIES OF RHIZOPHORA APICULATA BL.)

อ.ที่ปรึกษา : รศ.ดร.อุคม กักผล, 553 หน้า.

ผลการทดสอบฤทธิ์ทางชีวภาพเบื้องต้นพบว่า สิ่งสกัดของใบและเนื้อไม้ของโงก่างใบเล็กมีฤทธิ์ทางชีวภาพ เมื่อทำการแยกสิ่งสกัดจากใบของโงก่างใบเล็ก สามารถแยกได้สาร 15 ชนิด ซึ่งสามารถพิสูจน์สูตรโครงสร้าง โดยอาศัยสมบัติทางกายภาพ, ปฏิกิริยาทางเคมี และหลักฐานทางสเปกโทรสโกปีได้ 13 ชนิด คือ ของผสมของไฮโดรคาร์บอนโซ่ตรง ( $C_{27}-C_{33}$ ),  $\beta$ -amyrinpalmitate, ของผสมของ  $\beta$ -amyrinpalmitate และซีฟง,  $\beta$ -amyrinonylpalmitate, ของผสมของแอลกอฮอล์โซ่ตรง ( $C_{30}-C_{36}$ ),  $\beta$ -amyrin, ของผสมของ  $\beta$ -sitosterol, stigmasterol และ campesterol, lupeol, taraxerol, taraxeryl cis-p-hydroxycinnamate, careaborin, wallichenol และ  $\beta$ -sitosteryl-3-O- $\beta$ -D-glucopyranoside ในการแยกสิ่งสกัดจากเนื้อไม้โงก่างใบเล็ก นอกจากของผสมสเตียรอยด์และ  $\beta$ -sitosterylglycoside แล้ว สามารถแยกสารได้อีก 9 ชนิด ซึ่งพิสูจน์สูตรโครงสร้างได้ 7 ชนิดคือ ของผสมของสเตียรอยด์เอสเทอร์และซีฟง, ของผสมของแอลกอฮอล์โซ่ตรง ( $C_{28}-C_{32}$ ), ของผสมของกรดคาร์บอกซิลิกโซ่ตรง, 2,6-dimethoxy-p-benzoquinone, syringaldehyde, ของผสมของไฮดรอกซีเอสเทอร์โซ่ตรงและของผสมของเอมีคโซ่ตรง สารที่แยกได้ทั้งหมดนี้ไม่มีรายงานว่าเป็นองค์ประกอบของพันธุ์ไม้ชนิดนี้มาก่อน ยกเว้น  $\beta$ -amyrin, taraxerol,  $\beta$ -sitosterol และ triacontanol สารประกอบ taraxeryl cis-p-hydroxycinnamate พบว่าเป็นเอสเทอร์ของ taraxerol ตัวใหม่ซึ่งพบเป็นครั้งแรก สารที่แยกได้ส่วนใหญ่มีฤทธิ์ยับยั้งการเจริญเติบโตของเชื้อรา Pythium ultimum, Rhizoctonia solani, Helminthosporium teres, แบคทีเรีย Xanthomonas campestris และต่อต้านการกินของแมลง boll weevil สารประกอบ lupeol, 2,6-dimethoxy-p-benzoquinone, syringaldehyde และ  $\beta$ -sitosteryl-3-O- $\beta$ -D-glucopyranoside มีรายงานว่ามียุทธศาสตร์ทางเภสัชวิทยามากมาย นอกจากนี้ยังได้รายงานการวิเคราะห์องค์ประกอบของสิ่งสกัดด้วยตัวทำละลายหลายชนิดทั้งจากใบและเนื้อไม้ในรูปของเกลือคลอไรด์, แนนิน, สารประกอบจำพวกฟีนอล, น้ำตาล และกรดอะมิโนไว้ด้วย

ภาควิชา .....เคมี.....  
สาขาวิชา .....เคมีอินทรีย์.....  
ปีการศึกษา ..... 2530 .....

ลายมือชื่อนิสิต ..... วรินทร์ ชวศิริ .....  
ลายมือชื่ออาจารย์ที่ปรึกษา ..... รศ.ดร.อุคม กักผล .....



WARINTHORN CHAVASIRI : CHEMICAL CONSTITUENTS AND BIOLOGICAL  
ACTIVITIES OF RHIZOPHORA APICULATA BL. THESIS ADVISOR : ASSO. PROF.  
UDOM KOKPOL, Ph.D., 553 PP.

The preliminary bioassay results indicated that the crude extract of the leaves and the heartwoods of Rhizophora apiculata Bl. were biologically active. Fifteen compounds were isolated from the crude extract of the leaves. Thirteen of them were elucidated their structural formulars by means of physical properties, chemical reactions and spectroscopic evidences as a mixture of saturated long chain aliphatic hydrocarbons (C<sub>27</sub>-C<sub>33</sub>), β-amyripalmitate, a mixture of β-amyripalmitate and waxes, β-amyrenonylpalmitate, a mixture of saturated long chain aliphatic primary alcohols (C<sub>30</sub>-C<sub>36</sub>), β-amyrin, a mixture of β-sitosterol, stigmasterol and campesterol, lupeol, taraxerol, taraxeryl cis-p-hydroxycinnamate, careaborin, wallichenol and β-sitosteryl-3-O-β-D-glucopyranoside. Nine additional substances, besides a mixture of steroids and β-sitosterylglycoside, were obtained from the separation of the crude extract of the heartwoods. Seven of them were identified as a mixture of steroidal ester and waxes, a mixture of saturated long chain aliphatic primary alcohols (C<sub>28</sub>-C<sub>32</sub>), a mixture of saturated long chain aliphatic carboxylic acids, 2,6-dimethoxy-p-benzoquinone, syringaldehyde, a mixture of saturated long chain aliphatic hydroxy esters and a mixture of saturated long chain aliphatic primary amides. All isolated compounds have not been reported to be the constituents of this particular species, except β-amyrin, taraxerol, β-sitosterol and triacontanol. The taraxeryl cis-p-hydroxycinnamate is found to be a novel naturally occuring ester of taraxerol. Most of the isolated compounds showed antigrowth and/or antifeedant activity against the fungi Pythium ultimum, Rhizoctonia solani, Helminthosporium teres, the bacteria Xanthramonas campestrous and the insect, boll weevil. Lupeol, 2,6-dimethoxy-p-benzoquinone, syringaldehyde and β-sitosteryl-3-O-β-D-glucopyranoside had been reported to be the biologically active ingredients in several pharmaceutical aspects. The determination of the polar fraction constituents of both parts as chloride salts, tannins, phenolic compounds, sugar and amino acids was also reported.

ภาควิชา .....เคมี  
สาขาวิชา .....เคมีอินทรีย์  
ปีการศึกษา ..... 2530

ลายมือชื่อนิติต ..... อธิพนธ์ ช่างสี  
ลายมือชื่ออาจารย์ที่ปรึกษา ..... อุดม กอกพล

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W. Chavasiri

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## LIST OF ABBREVIATION

b	broad	M <sup>+</sup>	molecular ion in
°C	degree Celsius		mass spectrum
Cpd.	compound	nm	nanometer
cm <sup>-1</sup>	unit of wavenumber	ppm.	part per million
d	doublet (NMR)	Rf	rate of flow in
dd	double doublet (NMR)		chromatography
DMSO	dimethyl sulfoxide	s	singlet (NMR)
g	gram (s)	s	sharp (IR)
GLC	gas liquid chromatography	wt	weight
hrs	hours		
HPLC	high performance liquid chromatography		
Hz	Hertz		
J	coupling constant		
kg	kilogram (s)		
l	liter (s)		
m	multiplet (NMR)		
m/e	mass to charge ratio		
mg	milligram (s)		
mL.	milliliter (s)		
m.p.	melting point		
MW.	molecular weight		