

สารทฤษฎีภูมิของสเตรปโตมัยซิส TRA 9875-2 จากป่าชายเลน

นางสาว สริน ทัดทอง



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาเภสัชศาสตรมหาบัณฑิต

สาขาวิชาเภสัชเวช ภาควิชาเภสัชเวช

คณะเภสัชศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ปีการศึกษา 2543

ISBN 974-13-1251-2

ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

**SECONDARY METABOLITES OF MANGROVE *STREPTOMYCES* SP.  
TRA 9875-2**


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**A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Science in Pharmacy  
Department of Pharmacognosy  
Faculty of Pharmaceutical Sciences  
Chulalongkorn University  
Academic Year 2000  
ISBN 974-13-1251-2**

Thesis Title            SECONDARY METABOLITES OF MANGROVE  
                              *STREPTOMYCES* SP. TRA 9875-2  
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Field of Study         Pharmacognosy  
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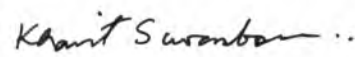
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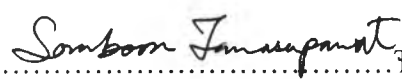
Accepted by the Faculty of Pharmaceutical Sciences, Chulalongkorn University in  
Partial Fulfillment of the Requirements for the Master's Degree.


  
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สริน ทัดทอง : สารทุติยภูมิของสเตรปโตมัยซิส TRA 9875-2 จากป่าชายเลน  
(SECONDARY METABOLITES OF MANGROVE STREPTOMYCES SP.  
TRA 9875-2) อ. ที่ปรึกษา : อ. ดร. คณิต สุวรรณบริรักษ์ อ. ที่ปรึกษาร่วม : รศ.  
ดร. สมบูรณ์ ธนาศุภวัฒน์ ; 123 หน้า. ISBN 974-13-1251-2

ในการศึกษาเพื่อหาสารออกฤทธิ์ทางชีวภาพจากแบคทีเรียกลุ่มแอกติโนมัยซีทส์ สามารถแยกเชื้อสายพันธุ์ TRA 9875-2 จากเศษไม้ผุในป่าชายเลนบริเวณชายฝั่งทะเลอันดามัน จังหวัดตรัง จากการศึกษาลักษณะทางสัณฐานวิทยา การเจริญ สรีรวิทยา ชีวเคมี และองค์ประกอบของผนังเซลล์ สามารถพิสูจน์เอกลักษณ์ของสายพันธุ์ TRA 9875-2 ได้ เป็นแบคทีเรียในสกุลสเตรปโตมัยซิส ซึ่งสกัดด้วยเอธิลอะซิเตทจากน้ำหมักเชื้อของสายพันธุ์นี้แสดงฤทธิ์ต้านเชื้อ *Candida albicans* ATCC 10231 และ *Staphylococcus aureus* ATCC 25923 ได้อย่างมีนัยสำคัญ เมื่อทำการแยกสารให้บริสุทธิ์ด้วยวิธีทางโครมาโตกราฟีโดยทำการทดสอบฤทธิ์ต้านจุลชีพควบคู่ไปด้วย สามารถแยกได้สารในกลุ่ม ansamycins ที่เคยพบแล้ว 2 ชนิด คือ geldanamycin และ 17-O-demethylgeldanamycin และสารใหม่ในกลุ่มเดียวกันนี้อีก 1 ชนิด คือ 17-O-demethyldihydrogeldanamycin การพิสูจน์โครงสร้างทางเคมีของสารเหล่านี้ใช้วิธีการวิเคราะห์ข้อมูล UV IR MS และ NMR spectroscopy ร่วมกับการเปรียบเทียบกับข้อมูลที่มีการรายงานมาแล้ว สาร geldanamycin แสดงฤทธิ์ทางชีวภาพอย่างมีนัยสำคัญได้แก่ ฤทธิ์ต้านเชื้อ *C. albicans* ATCC 10231 ฤทธิ์ความเป็นพิษต่อ human epidermoid และ breast cancer cell lines และ ฤทธิ์ต้านเชื้อมาลาเรีย *Plasmodium falciparum* (K1, multidrugs resistant strain) ในขณะที่สาร 17-O-demethylgeldanamycin แสดงความเป็นพิษอย่างอ่อนต่อ human epidermoid และ breast cancer cell lines

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ลายมือชื่ออาจารย์ที่ปรึกษาร่วม.....  .....

# # 4276599533: MAJOR PHARMACOGNOSY

KEY WORD : ACTINOMYCETES/ MANGROVE *STREPTOMYCES*/ ANSAMYCINS/  
GELDANAMYCIN/ ANTIFUNGAL ACTIVITY/ CYTOTOXIC ACTIVITY/  
ANTIMALARIAL ACTIVITY

SARIN TADTONG : SECONDARY METABOLITES OF MANGROVE  
*STREPTOMYCES* SP. TRA 9875-2. THESIS ADVISOR : MR. KHANIT  
SUWANBORIRUX, PH.D., THESIS CO-ADVISOR : ASSOC. PROF.  
SOMBOON TANASUPAWAT, PH.D. 123 pp. ISBN 974-13-1251-2

In the course of our investigation for bioactive metabolites of the actinomycetes, the strain TRA 9875-2 was isolated from a rotten bark sample collected from a mangrove forest along the Andaman coast, Trang province. Based on morphological, cultural, physiological, biochemical, and cell wall component studies, the strain TRA 9875-2 was identified as *Streptomyces*. The ethyl acetate extract from fermentation broth of this strain significantly inhibited the growth of *Candida albicans* ATCC 10231 and *Staphylococcus aureus* ATCC 25923. Antimicrobial assay-guided fractionation of the ethyl acetate extract yielded two known ansamycins, geldanamycin and 17-*O*-demethylgeldanamycin along with a new compound, 17-*O*-demethyldihydrogeldanamycin. The chemical structures of the isolated compounds were elucidated through extensive analyses of their UV, IR, MS, and NMR spectroscopic data and comparison with literatures. Geldanamycin exhibited significant antifungal activity against *C. albicans* ATCC 10231, cytotoxic activity against human epidermoid and breast cancer cell lines, and antimalarial activity against *Plasmodium falciparum* (K1, multidrugs resistant strain), while 17-*O*-demethylgeldanamycin exhibited weak cytotoxic activity against human epidermoid and breast cancer cell lines.

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Academic year 2000

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## ACKNOWLEDGEMENT

I wish to express my thanks to my thesis advisor, Dr. Khanit Suwanborirux, Department of Pharmacognosy, my thesis co-advisor, Associate Professor Dr. Somboon Tanasuwapat, Department of Microbiology and Associate Professor Surattana Amnouypol, Department of Pharmacognosy, Faculty of Pharmaceutical Sciences, Chulalongkorn University, for their guidance, suggestion, kindness, and encouragement throughout my research study.

I also wish to express my sincere appreciation to Dr. Prasat Kittakoop of the National Science and Technology Development Agency (NSTDA) for his valuable advice and assistance, Dr. Hisayoshi Kobayashi of the University of Tokyo for his assistance in FABMS and HRFABMS experiments and Dr. Chutima Jaruchoketaweechai of the Faculty of Pharmacy, Silpakorn University, for her valuable advice.

My sincere appreciation is conveyed as well to Bioassay Research Facilities of the National Center for Genetic Engineering and Biotechnology (BIOTEC) for performing bioassays of antimalarial and cytotoxic activities, the Scientific and Technology Research Equipment Center (STREC), and the Pharmaceutical Research Equipment Center of Faculty of Pharmaceutical Sciences, Chulalongkorn University for providing all research facilities.

I would like to express my gratitude to the University Development Commission (UDC) for granting the scholarship for this study and BIOTEC and the Graduate School of Chulalongkorn University for granting financial support to conduct this research.

I would like to acknowledge my thanks to the Department of Pharmacognosy and the Department of Microbiology, Faculty of Pharmaceutical Sciences, Chulalongkorn University for providing facilities during my study.

Finally, I wish to express my infinite gratitude to my family and my friends for their love, understanding, assistance, and encouragement throughout this graduate study.

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## ABBREVIATIONS

$[\alpha]_D^{25}$	=	specific rotation at 25° and sodium D line (589 nm)
ATCC	=	American Type Culture Collection, Maryland, U.S.A.
BC	=	breast cancer cells
benzene- <i>d</i> <sub>6</sub>	=	deuterated benzene
brs	=	broad singlet
°C	=	degree celsius
<sup>13</sup> C-NMR	=	carbon-13 nuclear magnetic resonance
CDCl <sub>3</sub>	=	deuterated chloroform
CHCl <sub>3</sub>	=	chloroform
cm	=	centimeter
COSY	=	correlation spectroscopy
δ	=	chemical shift
DEPT	=	distortionless enhancement by polarization transfer
d	=	doublet
DMSO- <i>d</i> <sub>6</sub>	=	deuterated dimethylsulphoxide
EC <sub>50</sub>	=	50% effective concentration
ED <sub>50</sub>	=	50% effective dose
EtOAc	=	ethyl acetate
ε	=	molar absorptivity
FABMS	=	fast atom bombardment mass spectrometry
g	=	gram
HMBC	=	<sup>1</sup> H-detected heteronuclear multiple bond correlation
HMQC	=	<sup>1</sup> H-detected heteronuclear multiple quantum coherence
<sup>1</sup> H-NMR	=	proton nuclear magnetic resonance
HPLC	=	high performance liquid chromatography
HRFABMS	=	high resolution fast atom bombardment mass spectrometry
Hz	=	hertz
IR	=	infrared
<i>J</i>	=	coupling constant
KB	=	human epidermoid carcinoma cells of the nasopharynx
L	=	liter



m	=	multiplet
methanol- <i>d</i> <sub>4</sub>	=	deuterated methanol
[M+H] <sup>+</sup>	=	protonated molecular ion
MHz	=	megahertz
μg	=	microgram
mg	=	milligram
μl	=	microliter
ml	=	milliliter
μm	=	micrometer
mm	=	millimeter
MeOH	=	methanol
nm	=	nanometer
NMR	=	nuclear magnetic resonance
NOESY	=	nuclear overhauser effect correlation spectroscopy
ppm	=	part per million
ppt	=	part per thousand
pyridine- <i>d</i> <sub>5</sub>	=	deuterated pyridine
q	=	quartet
rpm	=	round per minute
s	=	singlet
SDA	=	Sabouraud dextrose agar
sp.	=	species
t	=	triplet
TLC	=	thin layer chromatography
TOCSY	=	total correlation spectroscopy
TSA	=	Trypticase soy agar
UV	=	ultraviolet