

องค์ประกอบทางเคมีของ *Psilocybe samuiensis*



นางสาวสุนิษา สุวรรณเจริญ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต

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CHEMICAL CONSTITUENTS OF *Psilocybe samuiensis*

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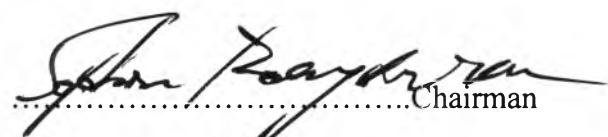
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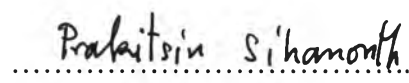
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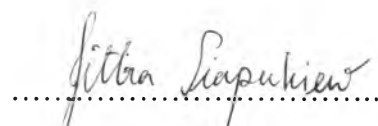
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สุนิษา สุวรรณเจริญ : องค์ประกอบทางเคมีของ *Psilocybe samuiensis* (CHEMICAL CONSTITUENTS OF *Psilocybe samuiensis*) อ. ที่ปรึกษา : ผศ.ดร. สุรัชย์ พรภักกุล, 79 หน้า. ISBN 974-14-2250-4.

จากการศึกษาองค์ประกอบทางเคมีของเส้นใยและน้ำหมักของเห็ดที่ทำให้เกิดประสาทหลอน *Psilocybe samuiensis* ซึ่งเป็นเห็ดขี้ควายสายพันธุ์ใหม่ จากเกาะสมุย จังหวัดสุราษฎร์ธานี แยกได้สารประกอบเซสควิเทอร์พีนอยด์ชนิดใหม่ 2 ชนิด คือ *ent*-2,3-secoaromadendrane-2,10,12-triol (1) และ *ent*-2,3-secoaromadendrane-2-methoxy-10,12-diol (2) จากสารสกัดน้ำหมัก นอกจากนี้ สารประกอบ 2 ยังสังเคราะห์ได้ด้วยการบำบัด 1 ด้วยปฏิกิริยาเมธอกซิเลชัน ทำการพิสูจน์โครงสร้างสาร 1 และ 2 โดยอาศัยข้อมูลทางสเปกโตรสโกปี ได้แก่ IR, MS, 1D และ 2D NMR (COSY, HSQC, HMBC และ NOESY) และนำสาร 1 มาทดสอบฤทธิ์ในการยับยั้งเซลล์มะเร็ง 5 ชนิด ได้แก่ SW620 (ลำไส้), BT474 (เต้านม), KATO-3 (กระเพาะอาหาร), HEP-G2 (ตับ) และ CHAGO (ปอด) และ ฤทธิ์ในการยับยั้งเชื้อจุลินทรีย์ 5 ชนิด ได้แก่ *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* และ *Candida albicans* พบว่าสาร 1 ไม่มีฤทธิ์ยับยั้งเซลล์มะเร็งทั้ง 5 ชนิดที่ทดสอบ และ ไม่มีฤทธิ์ในการยับยั้งเชื้อจุลินทรีย์ทั้ง 5 ชนิด

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Mycelia and fermentation broth of hallucinogenic mushroom *Psilocybe samuiensis*, a new species of *Psilocybe* mushroom found on buffalo dung from Samui island, Surat Thani province, Thailand were investigated. Two novel sesquiterpenoid compounds, *ent*-2,3-secoaromadendrane-2,10,12-triol (**1**) and *ent*-2,3-secoaromadendrane-2-methoxy-10,12-diol (**2**) were isolated from the extract of fermentation broth. Additionally compound **2** was synthesized by treatment of **1** with methanol and *p*-toluenesulfonic acid. The structure of both compounds were established by spectroscopic data (IR, MS and 1D and 2D NMR techniques including COSY, HSQC, HMBC and NOESY) and X-ray crystallographic data. Compound **1** was tested for cytotoxic activity against various human tumor cell lines including SW620 (colon), BT474 (breast), KATO-3 (gastric), HEP-G2 (hepatoma) and CHAGO (lung) and antimicrobial activity towards 5 microorganisms consisting of *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Candida albicans*. The results showed that compound **1** was inactive against all of those tumor cell lines and those five microorganisms.

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Field of study.....Chemistry.....

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LIST OF ABBREVIATIONS

$[\alpha]_D^{20}$	Specific rotation at 20 °C and Sodium D line (589 nm)
ATCC	American Type Culture Collection, Maryland, U.S.A
cm	centimeter
mm	millimeter
μm	micrometer
MHz	megahertz
TLC	thin layer chromatography
kg	kilogram
g	gram
mg	milligram
MeOH	methanol
EtOAc	ethyl acetate
CH_2Cl_2	dichloromethane
mp	melting point
KBr	potassium bromide
ν_{max}	the reciprocating wavelength (IR spectrum)
λ_{max}	the wavelength at maximum absorption (UV-VIS)
cm^{-1}	unit of wave number
s	strong (IR)
m	medium (IR)
w	weak (IR)
°C	degree Celsius
L	Liter
ml	milliter
R_f	rate of flow in chromatography
ppm	part per million
m/z	mass to charge ratio
MS	Mass Spectrometer
HRMS	High Resolution Mass Spectrometry
δ	chemical shift
NMR	Nuclear Magnetic Resonance

^{13}C -NMR	Carbon-13 Nuclear Magnetic Resonance
^1H -NMR	Proton Nuclear Magnetic Resonance
HMBC	Heteronuclear Multiple Bond Correlation
HSQC	Heteronuclear Single Quantum Correlation
COSY	Correlated Spectroscopy
NOESY	Nuclear Overhauser Enhancement Spectroscopy
J	coupling constant
d	doublet (for NMR spectrum)
dd	double of doublet (for NMR spectrum)
s	singlet (for NMR spectrum)
br s	broad singlet (for NMR spectral data)
SDA	Sabouraud's Dextrose Agar
YES	Yeast Extract Agar
PDA	Potato Dextrose Agar
MEA	Malt extract agar
CMA	Corn meal agar
NB	Nutrient broth
MTT	3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide