

ผลของอาหารเลี้ยงเชื้อต่อการสร้างสารเมแทบอลิต์ทุติยภูมิของ
Emericella varicolor Berk & Br.



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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรดุษฎีบัณฑิต
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EFFECTS OF CULTURE MEDIA ON SECONDARY METABOLITES PRODUCTION OF
Emericella varicolor Berk & Br.

Mr. Jatupol Liangsakul

A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy Program in Biotechnology

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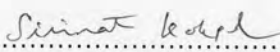
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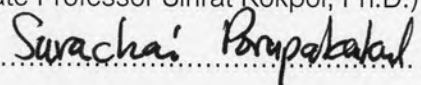
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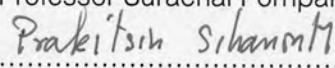
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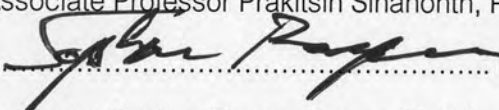
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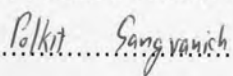
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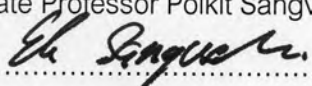
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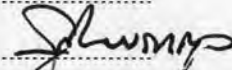
จตุพล เหลียงสกุล : ผลของอาหารเลี้ยงเชื้อต่อการสร้างสารเมแทบอไลต์ทุติยภูมิของ *Emericella varicolor* Berk & Br. (EFFECT OF CULTURE MEDIA ON SECONDARY METABOLITES PRODUCTION OF *Emericella varicolor* Berk & Br.) อ. ที่ปรึกษาวิทยานิพนธ์หลัก : รศ.ดร. สุรัชย์ พรภคกุล, อ.ที่ปรึกษาวิทยานิพนธ์ร่วม : รศ.ดร. ประกิตต์สิน สีहनพนธ์, 347 หน้า

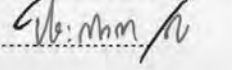
วัตถุประสงค์ของงานวิจัยนี้ศึกษาผลของอาหารเหลว MEB, MCzB และ CzB ต่อสารเมแทบอไลต์จากราเอนโดไฟต์ *Emericella varicolor* Berk & Br. เมแทบอไลต์จากเส้นใยและน้ำเลี้ยง *E. varicolor* ที่เลี้ยงใน 3 อาหารทำการแยกและพิสูจน์เอกลักษณ์โดยใช้วิธีทางสเปกโทรสโกปี พบว่าส่วนสกัดเอทิลอะซิเตตจากเส้นใยจากอาหาร MEB แยกโดยวิธีคอลัมน์โครมาโทกราฟีได้สารที่พบแล้ว 2 ชนิดคือ stellatic acid A และ ergosterol B รวมทั้งสาร sesterterpene ชนิดใหม่คือ Emervaridione C1 ขณะที่ส่วนสกัดเอทิลอะซิเตตจากน้ำเลี้ยงของอาหาร MEB แยกได้สารกลุ่ม heptyl benzyl alcohol 2 ชนิด คือ varioxiranediol D1 และ varitetraol A D2 และสารที่ทราบแล้วอีก 1 ชนิด คือ dihydroterrein E ส่วนสกัดเอทิลอะซิเตตจากเส้นใยที่ได้จากการเลี้ยงในอาหาร MCzB แยกได้สาร A, สาร B สารกลุ่มแซนโทน 2 ชนิด คือ 14-methoxy tajixanthone 25-acetate F1 และ tajixanthone hydrate F2 สารกลุ่มแอนทราควิโนน 2 ชนิด คือ 1-hydroxy-6,8-dimethoxy-3-methylanthraquinone G1 และ 4,6-dihydroxy-5,7-dimethoxy-2-methyl anthraquinone G2 และสารกลุ่ม steroidal anthraquinone ใหม่ 2 ชนิด คือ evanthrasterol A H1 และ evanthrasterol B H2 ส่วนสกัดเอทิลอะซิเตตจากน้ำเลี้ยงของอาหาร MCzB แยกได้สารกลุ่มแอนทราควิโนน 2 ชนิดคือ G2 และ dermoglaucin G3 และสารใหม่ 2 ชนิด คือ emervaridionin C2 และ varitetraol B D3 ส่วนสกัดเอทิลอะซิเตตจากเส้นใยที่เลี้ยงในอาหาร CzB แยกได้สาร A และสาร B ในขณะที่ส่วนสกัดเอทิลอะซิเตตจากน้ำเลี้ยงของอาหาร CzB แยกได้สาร D3 และ varitetraol C D4 สารเมแทบอไลต์ที่แยกได้นำไปทดสอบความเป็นพิษต่อเซลล์มะเร็งคน 5 ชนิด ได้แก่ HEP G2 (ตับ), SW 20 (ลำไส้), CHAGO (ปอด) KATO-3 (กระเพาะอาหาร) และ BT474 (เต้านม) ฤทธิ์การยับยั้งจุลินทรีย์และฤทธิ์การยับยั้งอนุมูลอิสระพบว่า สาร F1 และสาร F2 มีฤทธิ์ยับยั้งเซลล์มะเร็งในระดับปานกลาง ส่วนสาร G1, G2, G3, H1 และ H2 ไม่มีฤทธิ์ในการยับยั้งจุลินทรีย์และการยับยั้งอนุมูลอิสระ

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ปีการศึกษา.....2551.....

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JATUPOL LIANGSAKUL : EFFECTS OF CULTURE MEDIA ON SECONDARY METABOLITES PRODUCTION OF *Emericella varicolor* Berk & Br. ADVISOR : ASSOC. PROF. SURACHAI PORNPAKAKUL, Ph. D. CO-ADVISOR : ASSOC. PROF. DR. PRAKITSIN SIHANONTH, Ph. D., 347 pp.

The objective of this research was to investigate effect of Malt extract broth (MEB), Malt Czapek-Dox broth (MCzB) and Czapek-Dox broth (CzB) on secondary metabolites of the endophytic fungus, *Emericella varicolor* Berk & Br. Metabolites of *E. varicolor* cultured in these three media were isolated from mycelia and broth and characterized by spectroscopic techniques. EtOAc crude of mycelium obtained from culture in MEB was isolated by column chromatography to obtain two known compounds, stellularic acid A, ergosterol B, and a novel sesterterpene, Emervaridione C1 while EtOAc crude from fermentation broth of culture in MEB was isolated to obtain two novel heptyl benzyl alcohols, varioxiranediol D1 and varitetraol A D2 and a known compound, dihydroterrein E. EtOAc crude of mycelium obtained from the culture in MCzB was isolated to obtain A, B, two known xanthones (14-methoxy tajixanthone 25-acetate F1, and tajixanthone hydrate F2), two known anthraquinones (1-hydroxy-6,8-dimethoxy-3-methylantraquinone G1 and 4,6-dihydroxy-5,7-dimethoxy-2-methylantraquinone G2) and two novel steroidal anthraquinones (evanthrasterol A H1 and evanthrasterol B H2), EtOAc crude of fermentation broth of the culture in MCzB was isolated to obtain two anthraquinones (G2 and dermoglaucin G3), two novel compounds (emervariodionin C2 and varitetraol B D3). EtOAc crude of mycelium obtained from culture in CzB was isolated to obtain A and B while EtOAc crude of fermentation broth extracted culture in CzB was isolated to obtain two novel compounds D3 and varitetraol C D4. The isolated metabolites were examined cytotoxic activity against HEP G2 (hepatoma), SW 20 (colon), CHAGO (lung), KATO-3 (gastric) and BT474 (braest) human cancer cell lines, antimicrobial and antioxidant activity. Compound F1 and F2 exhibited moderately cytotoxic activity and compounds G1, G2, G3, H1 and H2 were inactive.

Field of Study : Biotechnology

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