

**ISOLATION OF BIOSURFACTANT-PRODUCING BACTERIA: EFFECT
OF CARBON SOURCE AND ACTIVITY OF OIL RECOVERY**

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ABSTRACT

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Biosurfactants are gaining more and more attention and have already been utilized for a number of important industrial applications due to their biodegradability, capability to be produced from renewable resources, good functionality under extreme conditions (particularly those pertaining tertiary crude-oil recovery), and good compatibility with human beings. From this research, a biosurfactant solution produced from *Bacillus Subtilis* PT4, isolated from an oil sludge, was studied for its properties. The surface tension of nutrient broth was reduced to 26.4 mN/m when PT4 was incubated with 2% palm oil at 37°C, 51 hours, as compared to an incubation time of 36 hours with sludge oil, suggesting that PT4 is more compatible with sludge oil than with palm oil. The critical micelle concentration (CMC) of the produced biosurfactants, after cultivation for 51 hours, was found to be 25 mg/l, corresponding to a minimum surface tension of 26.4 mN/m. From the oil recovery results, the efficiency of the produced biosurfactants was 63.56% for motor oil and 59.10 % for palm oil.

บทคัดย่อ

นายนำพล อาจทวีพร : การคัดแยกและผลิตสารลดแรงตึงผิวชีวภาพโดยจุลินทรีย์ *Bacillus Subtilis* PT2 สัมพันธ์กับประสิทธิภาพในการดึงน้ำมันดิบ โดยพิจารณาผลกระทบที่เกิดจากการเปลี่ยนชนิดของน้ำมัน (Isolation of Biosurfactant-Producing Bacteria : Effects of Carbon Sources and Activity of Oil Recovery) อ.ที่ปรึกษา : ผศ. ดร.รัตนา รุจิรวนิช, รศ. ดร.สุเมธ และ ศ. ดร.มาชาฮิโกะ อาเบะ, 68 หน้า

สารลดแรงตึงผิวชีวภาพได้รับความสนใจเพิ่มสูงขึ้นและได้ถูกนำมาใช้ในอุตสาหกรรมที่สำคัญในหลายด้าน เนื่องจากอุตสาหกรรมย่อยสลายทางชีวภาพ สามารถผลิตได้จากแหล่งวัสดุหมุนเวียน สามารถทำงานได้ดีในสภาวะสูง (โดยเฉพาะในการผลิตน้ำมันชั้นตอนที่สี่) และเข้ากันได้กับมนุษย์ ในงานวิจัยนี้สารละลายที่สารลดแรงตึงผิวชีวภาพผลิตจากเชื้อ *บาซิลลัส ซับติลิส* PT4 แยกจากตะกอนน้ำมัน ได้ถูกนำมาศึกษาคุณสมบัติต่างๆ โดยแรงตึงผิวของสารละลายที่สารลดแรงตึงผิวชีวภาพได้ลดลงเหลือ 26.4 mN/m หลังจากทำการเพาะเชื้อด้วยน้ำมันปาล์ม 2% ที่อุณหภูมิ 37 องศาเซลเซียส เป็นเวลา 51 ชั่วโมง และเมื่อนำผลมาเปรียบเทียบกับสารลดแรงตึงผิวที่ผลิตโดยใช้น้ำมันที่สกัดจากตะกอนน้ำมันเป็นเวลา 36 ชั่วโมง พบว่าเชื้อ PT4 มีความเข้ากันกับน้ำมันจากตะกอนน้ำมัน มากกว่าน้ำมันปาล์ม สำหรับค่า CMC นั้นสารลดแรงตึงผิวที่ได้จากการเพาะเชื้อเป็นเวลา 51 ชั่วโมง คือ 25 mg/l ซึ่งเป็นจุดที่ให้ค่าแรงตึงผิวต่ำสุดคือ 26.4 mN/m นอกจากนี้ได้นำสารลดแรงตึงผิวนี้ไปทดสอบประสิทธิภาพในการกำจัดน้ำมัน ผลปรากฏว่าสามารถกำจัดน้ำมันหล่อลื่นได้ 63.56 % และกำจัดน้ำมันปาล์มได้ 59.10 %.

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CURRICULUM VITAE

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