

**HYDROLYSIS OF SUGARCANE BAGASSE FOR SUGAR PRODUCTION
BY MICROBES FROM THAI HIGHER TERMITES**

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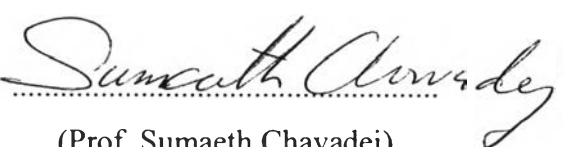
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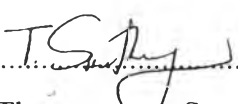
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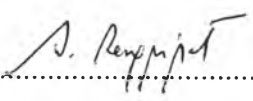

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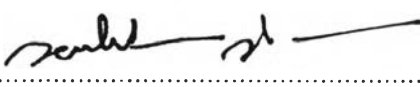
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ABSTRACT

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One of important agricultural residues found in huge quantities to be considered, especially in tropical countries, is sugarcane bagasse. This research studied and optimized the production of sugars through hydrolysis of sugarcane bagasse using cellulose-producing bacteria, *Microcerotermes* sp., from Thai higher termites. Without a pretreatment of sugarcane bagasse, we studied the following effects on the hydrolysis of sugarcane bagasse: particle size of ground bagasse (40 and 60 mesh), operating temperature (30 and 37°C), bacteria strain (A 002 and M 015) and type of fermentation media. The sugarcane bagasse used as the raw material obtained from Mitr Phol Sugar Corp., Ltd., consisted of 45.63 wt% cellulose, 21.02 wt% hemicellulose, 29.50 wt% lignin, and 3.85 wt% extractives. The result shows that the bacteria strains have a significant effect on the hydrolysis of sugarcane bagasse. The maximum glucose concentration in the product was 1.03 g/L obtained from the hydrolysis of 60 mesh ground bagasse with M 015 bacteria strain at 37°C.

บทคัดย่อ

ชุนารี นิพนธ์รัตนา : การผลิตน้ำตาลจากขานอ้อยโดยอาศัยกระบวนการย่อยสลายด้วยเชื้อจุลินทรีย์จากปลวกชั้นสูง (Hydrolysis of Sugarcane Bagasse for Sugar Production by Microbes from Thai Higher Termites) อ. ที่ปรึกษา : รศ. ดร. ปราโมช รังสรรค์วิจิตร ศ. ดร. สุเมธ ชวเดช ผศ. ดร. ธรรมบุญ ศรีทะวงศ์ และ รศ. ดร. ศิริรัตน์ เร่งพิพัฒน์ 71 หน้า

ขานอ้อยหรือกากอ้อยนับเป็นหนึ่งในเศษวัสดุเหลือใช้ทางการเกษตรสำคัญที่พบได้เป็นจำนวนมาก โดยเฉพาะอย่างยิ่งในประเทศเขตร้อน งานวิจัยนี้ศึกษาการผลิตน้ำตาลจากการย่อยสลายขานอ้อยโดยใช้แบคทีเรียที่สามารถผลิตเอนไซม์เซลลูเลส (*Microcerotermes* sp.) ภายในลำไส้ปลวกชั้นสูงซึ่งพบในประเทศไทย โดยพิจารณาผลกระทบของขนาดอนุภาค (40 และ 60 เมช) อุณหภูมิ (30 และ 37 องศาเซลเซียส) สายพันธุ์ของเชื้อแบคทีเรีย (A 002 และ M 015) และชนิดของน้ำหมักที่ใช้ ต่อกระบวนการย่อยสลายขานอ้อย ขานอ้อยที่ใช้เป็นวัตถุดิบในกระบวนการได้จากโรงงานของบริษัทน้ำตาลมิตรผล อำเภอด่านช้าง จังหวัดสุพรรณบุรี และประกอบด้วยเซลลูโลสร้อยละ 45.63 เฮมิเซลลูโลสร้อยละ 21.02 ลิกนินร้อยละ 29.50 และสารแทรกร้อยละ 3.85 ผลจากการทดลองพบว่าสายพันธุ์ของเชื้อแบคทีเรียกระทบกระบวนการย่อยเพื่อผลิตน้ำตาล ความเข้มข้นของกลูโคสซึ่งเป็นน้ำตาลเพียงชนิดเดียวที่ตรวจพบจากกระบวนการย่อยมีความเข้มข้นสูงสุดเท่ากับ 1.03 กรัมต่อลิตร ได้จากการย่อยสลายตัวอย่างขานอ้อยขนาด 60 เมช ด้วยแบคทีเรียสายพันธุ์ M 015 ที่อุณหภูมิ 37 องศาเซลเซียส

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