

**PRETREATMENT BY MICROWAVE/ALKALI TREATMENT  
OF CORN COBS FOR BIOFUEL PRODUCTION**




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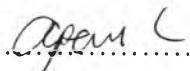
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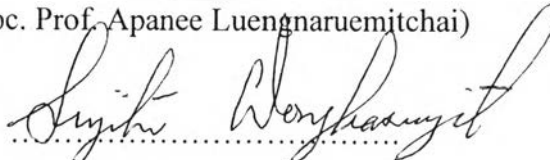
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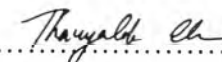
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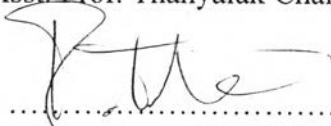
  
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## ABSTRACT

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Boonyisa Wanitwattananurmlug: Pretreatment by Microwave/alkali  
Treatment of Corn Cobs for Biofuel Production

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Corn cobs are one type of the most promising lignocellulosic biomass for biofuel production. The complexity of lignocellulosic biomass requires a pretreatment step to improve the yield of fermentable sugars. The main objective of this work was to optimize the conditions of pretreatment of corn cobs using microwave and potassium hydroxide (0.75 % w/v to 3 % w/v) at a specific temperature range. The pretreated corn cobs were subjected to enzymatic hydrolysis to produce the reducing sugar. The highest sugar yield of 52.19 g/100 g was obtained from the corn cobs pretreated by microwave and 2 % potassium hydroxide at 120 °C for 25 min. The results indicated that microwave-assisted alkali treatment was an efficient way to improve the enzymatic hydrolysis accessibility.

## บทคัดย่อ

บุญญา วานิชวัฒนรำลึก : การพรีทริทเมนต์ซังข้าวโพดด้วยรังสีไมโครเวฟและโพแทสเซียมไฮดรอกไซด์เพื่อใช้ในการผลิตเชื้อเพลิงชีวภาพ (Pretreatment by Microwave/alkali Treatment of Corn Cobs for Biofuel Production) อ. ที่ปรึกษา : รศ. ดร. อาภาณี เหลืองนฤมิตชัย และ รศ. ดร. สุจิตรา วงศ์เกษมจิตต์ 74 หน้า

ซังข้าวโพดเป็นชีวมวลประเภทลิกโนเซลลูโลสชนิดหนึ่งที่มีความเป็นไปได้ในการนำมาผลิตเชื้อเพลิงชีวภาพ ความซับซ้อนของชีวมวลประเภทลิกโนเซลลูโลสต้องการขั้นตอนในการเพิ่มประสิทธิภาพผลผลิตของน้ำตาล จุดประสงค์ของงานวิจัยนี้คือการหาสภาวะที่เหมาะสมสำหรับการพรีทริทเมนต์ซังข้าวโพดด้วยไมโครเวฟและโพแทสเซียมไฮดรอกไซด์ที่ความเข้มข้นต่างๆ (0.75 ถึง 3 เปอร์เซ็นต์โดยน้ำหนัก/ปริมาตร) ในช่วงของอุณหภูมิที่กำหนด การพรีทริทเมนต์ซังข้าวโพดจึงเป็นสาระสำคัญของการย่อยสลายโดยใช้เอนไซม์เพื่อผลิตน้ำตาลที่พร้อมสำหรับการหมัก ปริมาณน้ำตาลสูงสุดคือ 52.19 กรัมต่อ 100 กรัมของซังข้าวโพด ถูกผลิตจากซังข้าวโพดที่ผ่านการพรีทริทเมนต์ด้วยโพแทสเซียมไฮดรอกไซด์ 2 เปอร์เซ็นต์โดยน้ำหนัก/ปริมาตร ที่อุณหภูมิ 120 องศาเซลเซียส เป็นเวลา 25 นาที ซึ่งแสดงให้เห็นว่าการพรีทริทเมนต์ด้วยรังสีไมโครเวฟและโพแทสเซียมไฮดรอกไซด์มีประสิทธิภาพในการเพิ่มประสิทธิภาพของการเข้าถึงของเอนไซม์ในการย่อยสลาย

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