


BIODEGRADATION OF LDPE/BANANA STARCH FILMS COMPATIBILIZED WITH
ETHYLENE VINYL ACETATE COPOLYMER



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ศูนย์วิทยทรัพยากร

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การย่อยสลายทางชีวภาพของฟิล์มพอลิเอทิลีนชนิดความหนาแน่นต่ำ/แป้งกล้วย
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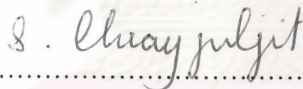
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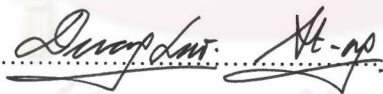
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กาญจนา เจริญคุณธรรม : การย่อยสลายทางชีวภาพของฟิล์มพอลิเอทิลีนชนิดความหนาแน่นต่ำ/แป้งกล้วยโดยใช้เอทิลีนไวนิลแอสีเทตโคพอลิเมอร์เป็นสารช่วยผสม. (BIODEGRADATION OF LDPE/BANANA STARCH FILMS COMPATIBILIZED WITH ETHYLENE VINYL ACETATE COPOLYMER) อ.ที่ปรึกษา : ดร. ดวงดา อัจจงค์, 118 หน้า. ISBN 974-03-0445-1.

งานวิจัยนี้ศึกษาอิทธิพลของปริมาณแป้งและสารช่วยผสม (compatibilizer) ที่มีต่อสมบัติความทนแรงดึง และการย่อยสลายทางชีวภาพของฟิล์มพอลิเมอร์ผสมชนิดใหม่ระหว่างพอลิเอทิลีนชนิดความหนาแน่นต่ำ (LDPE) และแป้ง โดยมีเอทิลีนไวนิลแอสีเทตโคพอลิเมอร์ (EVA) เป็นสารช่วยผสม แป้งที่ใช้ในการศึกษา ได้แก่แป้งกล้วย โดยใช้แป้งในปริมาณ 0-20 เปอร์เซ็นต์โดยน้ำหนักของแป้งกล้วย ทำการขึ้นรูปฟิล์ม จากนั้นศึกษาสมบัติทางกายภาพ และสมบัติความทนแรงดึง ศึกษาการสลายตัวทางชีวภาพของฟิล์มโดยการแช่ลงใน activated sludge และการใช้เอนไซม์ และติดตามการสลายตัวของฟิล์มด้วยการวัดการเปลี่ยนแปลงน้ำหนัก การเปลี่ยนแปลงลักษณะทางกายภาพ ตลอดจนการเปลี่ยนแปลงของสมบัติความทนแรงดึง

ผลการศึกษาพบว่า ปริมาณแป้งกล้วยและสารช่วยผสมมีผลต่อการสลายตัว สมบัติทางความร้อน และสมบัติความทนแรงดึงของฟิล์ม โดยการย่อยสลายของฟิล์มจะเพิ่มขึ้นเมื่อปริมาณแป้งกล้วยเพิ่มขึ้น ขณะที่สมบัติความทนแรงดึงมีค่าลดลง โดยเฉพาะการย่อยสลายของฟิล์มโดยใช้เอนไซม์จะมีอัตราการย่อยสลายที่เร็วกว่าการย่อยสลายโดยใช้ activated sludge การเติมสารช่วยผสมลงไปทำให้สมบัติความทนแรงดึงและความทนต่อความร้อนเพิ่มขึ้น ขณะที่อัตราการสลายตัวลดลงเมื่อเทียบกับฟิล์มที่ไม่ได้เติมสารช่วยผสม

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This research investigated the effects of starch and compatibilizer contents on tensile properties and biodegradability of new polymer blend films from low-density polyethylene (LDPE) and starch. The compatibilizer used in the blends was ethylene vinyl acetate copolymer (EVA). Banana starch was used in this study. Dried banana starch of 0 - 20% w/w of LDPE and EVA of 0, 5, 10, 20% w/w of banana starch were added to the LDPE. After film formation, physical and tensile properties of the films were examined. The biodegradation of LDPE/banana starch films was performed by activated sludge and enzymatic degradation methods. Biodegradation process was followed by measuring the changes in weight loss, physical appearance, and tensile properties. The results showed significant effects of banana starch and EVA contents on the biodegradability, thermal properties, and tensile properties of the blend films. The biodegradation rate increased with increasing amount of starch, while tensile properties of the films decreased. In particular, the degradation rate of the films exposed to enzymatic degradation was higher than those subjected to activated sludge. The addition of EVA in the polymer blends led to an increase in tensile properties and thermal stability whereas the biodegradability of the films was slightly decreased compared to the films without EVA.

Department Materials Science

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Field of study Applied Polymer Science and Textile Technology Advisor's signature *Duangdao Aht-ong*

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