

**PREPARATION AND CHARACTERIZATION OF
CARBOXYMETHYLCHITIN/POLY (VINYL ALCOHOL)
BLEND FILMS**

Ms. Kamonrat Kuratchatchaval

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By: Ms.Kamonrat Kuratchatchaval
Program: Polymer Science
Thesis Advisor: Professor Alexander M. Jamieson
Dr.Ratana Rujiravanit

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K. Bunyakiat
..... College Director
(Assoc. Prof. Kunchana Bunyakiat)

Thesis Committee:

Alexander M. Jamieson
.....
(Prof. Alexander M. Jamieson)

Ratana Rujiravanit
.....
(Dr. Ratana Rujiravanit)

Suwabun Chirachanchai
.....
(Asst. Prof. Suwabun Chirachanchai)

บทคัดย่อ

กมลรัตน์ กุรัตนัชชवाल: การเตรียมและวิเคราะห์คุณสมบัติของฟิล์มที่ได้จากการผสมระหว่างซีเอ็ม-ไคตินและพีวีเอ (Preparation and Characterization of CM-chitin/PVA Blend Films) อ. ที่ปรึกษา: ศ. อเล็กซานเดอร์ เอ็ม เจมิสัน และ อาจารย์รัตนา รุจิรวนิช, 69 หน้า ISBN 974-13-0731-4

ฟิล์มของสารพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและพีวีเอในอัตราส่วนที่ต่างกัน ได้ถูกเตรียมขึ้นโดยเปรียบเทียบระหว่างฟิล์มที่เดิมและไม่เติมกลูตารัลดีไฮด์ซึ่งเป็นสารก่อการเชื่อมโยง ในงานวิจัยนี้ได้ทำการศึกษาถึงอิทธิพลของอัตราส่วนระหว่างซีเอ็ม-ไคตินและพีวีเอและสารก่อการเชื่อมโยงต่อพฤติกรรมการบวมตัวและสมบัติทางกลของฟิล์มสารพอลิเมอร์ผสม สำหรับพฤติกรรมการบวมตัวของฟิล์มสารพอลิเมอร์ผสมดังกล่าว พบว่า ฟิล์มของสารพอลิเมอร์ผสมให้การบวมตัวที่สูงในสารละลายบัฟเฟอร์ที่เป็นเบสและสารละลายเกลือเมื่อปริมาณซีเอ็ม-ไคตินเพิ่มขึ้น นอกจากนี้ ฟิล์มพอลิเมอร์ผสมที่เติมสารก่อการเชื่อมโยงเพิ่มขึ้นจะมีค่าการบวมตัวลดลง สำหรับผลของสารละลายเกลือต่อค่าการบวมตัว พบว่า ฟิล์มของสารพอลิเมอร์ผสมจะให้ค่าการบวมตัวสูงสุดเมื่ออยู่ในสารละลายเกลือโซเดียมคลอไรด์และลิเทียมคลอไรด์ เกี่ยวกับสมบัติทางกล พบว่าฟิล์มของสารผสมระหว่างซีเอ็ม-ไคตินและพีวีเอจะมีสมบัติการทนต่อแรงดึงสูงกว่าฟิล์มของซีเอ็ม-ไคตินและพีวีเอเพียงอย่างเดียวและจะได้ค่าสูงสุดในฟิล์มที่มีปริมาณซีเอ็ม-ไคติน 50% นอกจากนี้ ฟิล์มของสารพอลิเมอร์ผสมจะให้ค่าการซึมผ่านของก๊าซออกซิเจนที่ต่ำกว่าซีเอ็ม-ไคตินฟิล์มและพีวีเอฟิล์ม

ABSTRACT

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Degree of swelling/ Mechanical properties/ Oxygen permeability

Films of CM-chitin/PVA blends were prepared with various ratios of CM-chitin to PVA, with and without glutaraldehyde as a cross-linking agent. The effects of the ratio of CM-chitin to PVA and cross-linking agent on swelling behavior and mechanical properties of the blend films were studied. For swelling behavior, the blend films exhibited a dramatic change in the degree of swelling when the blend films were immersed in basic solutions ($\text{pH} > 7$). The degree of swelling of the films increased as the CM-chitin content increased. It appeared that cross-linking occurred in the blend films reduced the swelling capacity of the films. For the effect of salt type, the films immersed in various types of aqueous salt solutions, i.e., NaCl, LiCl, CaCl₂, and FeCl₃. Among these salts, the films immersed in NaCl and LiCl aqueous solutions gave the highest degree of swelling. For mechanical properties, the maximum tensile strength of the films was obtained for the blend films containing 50% CM-chitin. Furthermore, the tensile strength increased with the increasing of the amount of cross-linking agent whereas the elongation at break decreased. In addition, the effect of CM-chitin content on the oxygen permeability was investigated. It was found that the blend films had lower oxygen permeability than those of pure CM-chitin and PVA films.

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