

**INVESTIGATION OF DRUG RELEASE CHARACTERISTICS OF
CARBOXYMETHYL-CHITIN AND CHITOSAN FILM USING MODIFIED
FRANZ DIFFUSION CELL**



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A Thesis Submitted in Partial Fulfilment of the Requirements
for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
in Academic Partnership with
Case Western Reserve University, The University of Michigan,
The University of Oklahoma, and Institut Français du Pétrole

2004

ISBN 947-9651-56-1

Thesis Title: Investigation of Drug Release Characteristics of Carboxymethyl-Chitin and Chitosan Film Using Modified Franz Diffusion Cell

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ลลิตยา เอื้อพงษ์พันธ์: การศึกษาการปลดปล่อยของยาของฟิล์มไคโตซานและซีเอ็ม-ไคติน โดยใช้มอดิฟาย ฟรานซ์ ดิฟฟิวชันเซลล์ (Investigation of Drug Release Characteristics of Chitosan and Carboxymethyl-Chitin Films by Using Modified Franz Diffusion Cell.)
 อ.ที่ปรึกษา: ผศ. ดร.รัตนา รุจิรวนิช และ ศ. ดร. อเล็กซานเดอร์ เอ็ม จามิสัน

งานวิจัยนี้ศึกษาการเตรียมฟิล์มคาร์บอกซีเมทิล-ไคติน (ซีเอ็ม-ไคติน), ไคโตซาน และฟิล์มพอลิเมอร์ซึ่งผสมด้วย พอลิไวนิล แอลกอฮอล์ (พีวีเอ) และพอลิไวนิลไพโรลิโดน (พีวีพี) โดยเทคนิคการเตรียมด้วยสารละลาย โดยใช้กลูตารัลดีไฮด์เป็นสารที่ก่อให้เกิดการเชื่อมโยง และเลือกกรดซาลิไซลิกและทีโอฟีลีนเป็นยาต้นแบบ งานวิจัยนี้ศึกษาการปลดปล่อยของยาจากแผ่นฟิล์มพอลิเมอร์ในระบบอินวิโทร โดยใช้มอดิฟาย ฟรานซ์ ดิฟฟิวชัน เซลล์ ซึ่งศึกษา ณ อุณหภูมิ 37°C และใช้สารละลายที่มีค่าความเป็นกรดต่างคงที่ที่พีเอช 5.5 จากงานวิจัยนี้พบว่า สำหรับฟิล์มของไคโตซานและซีเอ็ม-ไคติน ปริมาณการปลดปล่อยของยาต้นแบบเพิ่มขึ้นเมื่อเพิ่มความเข้มข้นของยาในแผ่นฟิล์ม นอกจากนี้ ยังพบว่าเมื่อเพิ่มความเข้มข้นของสารที่ก่อให้เกิดการเชื่อมโยง ปริมาณยาที่ปลดปล่อยออกมาจากแผ่นฟิล์มไคโตซานและซีเอ็ม-ไคตินลดลง และสำหรับฟิล์มพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและพีวีเอ พบว่า การปลดปล่อยของยาลดลงเมื่อเพิ่มปริมาณของพีวีเอ ซึ่งผลที่ได้นี้เหมือนกับการศึกษาในฟิล์มพอลิเมอร์ผสมระหว่างไคโตซานและพีวีเอ ในกรณีของฟิล์มพอลิเมอร์ผสมระหว่างซีเอ็ม-ไคตินและพีวีพี ฟิล์มพอลิเมอร์ผสมในอัตราส่วน 1:1 .ให้ปริมาณยาที่ปลดปล่อยออกมามากที่สุด และในกรณีของฟิล์มผสมระหว่างไคโตซานกับพีวีเอ และ ไคโตซานกับพีวีเอ พบว่าเมื่อผสมพีวีเอ หรือ พีวีพีในฟิล์มทำให้อัตราการปลดปล่อยของยาเพิ่มขึ้น

ABSTRACT

4572010063: POLYMER SCIENCE PROGRAM

Lalisa Aurpongpun: Investigation of Drug Release Characteristics of Chitosan and Carboxymethyl-Chitin Films using Modified Franz Diffusion Cell.

Thesis Advisors: Assist. Prof. Ratana Rujiravanit and Prof. Alexander M. Jamieson, 101 pp. ISBN 974-9651-56-1

Keywords: CM-chitin / Chitosan / blend film / drug release

Carboxymethyl chitin (CM-chitin), chitosan, and the blend films of both polymers with polyvinylalcohol (PVA) and polyvinylpyrrolidone (PVP) were prepared by solution casting technique. Glutaraldehyde was used as a cross-linking agent. Salicylic acid and theophylline were used as model drugs. Drug release characteristics of CM-chitin, chitosan and the blend films were studied by using a modified Franz diffusion cell. The amounts of released drug were determined by UV-visible spectroscopy. For CM-chitin films, the percentage of releasing of salicylic acid and theophylline decreased with increasing drug concentration. For the chitosan films containing salicylic, the sequence of releasing of drug was 0.5% > 1.0% > 0.2%. For the chitosan films containing theophylline, the sequence was 0.1% > 0.5% > 1.0%. The amounts of drug released from CM-chitin and chitosan films decreased with increasing crosslinking level. In CM-chitin/PVA blend films, the release of salicylic acid decreased with increasing PVA contents. Similar results were obtained for pure chitosan and its blend films. In the CM-chitin/PVP blend films, the blend film with 1:1 ratio of CM-chitin and PVP gave the highest amount of released salicylic acid. Increasing the blend composition of PVP in the blend film to 75% resulted in decreasing drug release. In case of the chitosan/PVP blend films, the presence of PVP in the blend films increased the releasing rate of drug as compared to pure chitosan film.

ACKNOWLEDGEMENTS

I would like to thank the Petroleum and Petrochemical College, Chulalongkorn University where I have gained the knowledge in polymer science. I also would like to acknowledge Surapol Food Public Co., Ltd. For their support in supplying shrimp shells, KPT Cooperation (Thailand) for supply of sodium hydroxide 50% w/w solution.

I would like to express grateful appreciation to my advisors, Assist. Prof. Ratana Rujiravanit and Prof. Alexander M. Jamieson for their invaluable suggestion and criticism.

I would like to thank my friends for their friendship, helpfulness, cheerfulness, suggestions, and encouragement. I am also greatly indebted to my parents for their support, understanding and patience during this pursuit.

This thesis work is partially funded by Postgraduate Education and Research Programs in Petroleum and Petrochemical Technology (PPT Consortium).

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