

**PREPARATION AND EVALUATION OF DRUG RELEASE
CHARACTERISTIC OF CROSSLINKED CHITOSAN/SILK
FIBROIN BLEND FILMS**



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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
The University of Michigan, The University of Oklahoma,
and Case Western Reserve University

2002

ISBN 974-03-1616-6

Thesis Title : Preparation and Evaluation of Drug Release
Characteristic of Crosslinked Chitosan/Silk Fibroin
Blend Films
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Accepted by the Petroleum and Petrochemical College, Chulalongkorn University, in partial fulfilment of the requirements for the Degree of Master of Science.

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ABSTRACT

4372019063 : POLYMER SCIENCE PROGRAM

Sopon Kruaykitanon: Preparation and Evaluation of Drug Release
Characteristic from Crosslinked Chitosan/Silk Fibroin Blend Films.

Thesis Advisors: Dr. Ratana Rujiravanit and Prof. Alexander M.

Jameison, 114 pp. ISBN 974-03-1616-6

Keywords : Chitosan/ Silk Fibroin/ Blend Film/ Drug Release

Crosslinked chitosan/silk fibroin blend films were prepared by solution casting using glutaraldehyde as crosslinking agent. Drug release characteristics of the blend films with various blend compositions were investigated. Theophylline, diclofenac sodium, amoxicillin trihydrate and salicylic acid were used as model drugs. The release studies were carried out at 37°C in buffer solutions at pH 2.0, 5.5 and 7.2. It was found that the blend film with 80% chitosan content showed the maximum amount of drug release at pH 2.0 for all types of drugs. From swelling study, the maximum degree of swelling of the drug-loaded blend films was also obtained at pH 2.0 and 80 % chitosan content. The amounts of drugs released from films with 80% chitosan content were in the order: salicylic acid > theophylline > diclofenac sodium > amoxicillin. The maximum amount of salicylic acid, theophylline, diclofenac sodium and amoxicillin release from blend films with 80% chitosan content at pH 2.0 were 92.7%, 81.1%, 76.6%, and 37.2%, respectively.

บทคัดย่อ

โสภณ กรวยกิตานนท์ : การเตรียมและการศึกษาการปลดปล่อยของยาของฟิล์มพอลิเมอร์ผสมที่มีโครงสร้างเป็นร่างแห (Preparation and Evaluation of Drug Release Characteristic of Crosslinked Chitosan/Silk Fibroin Blend Films) อ.ที่ปรึกษา : ดร.รัตนา รุจิรวนิช และ ศ. อเล็กซานเดอร์ เอ็ม เจมิสัน 114 หน้า ISBN 974-03-1616-6

งานวิจัยนี้เป็นการเตรียมฟิล์มพอลิเมอร์ผสมที่มีโครงสร้างเป็นแบบร่างแหใช้เทคนิคการเตรียมด้วยสารละลาย ระหว่างไคโตซานและซิลค์ไฟโบรอิน โดยใช้กลูตารัลดีไฮด์เป็นสารที่ก่อให้เกิดการเชื่อมโยง เพื่อศึกษาลักษณะการปลดปล่อยของยาจากพอลิเมอร์ผสมที่อัตราส่วนต่างๆกัน ในงานวิจัยนี้ได้เลือกใช้ ทีโอโพลิน กรดซาลิไซลิก ไคโคลฟีแนคโซเดียม และอมอกซิซิลิน เป็นยาต้นแบบ คดยศึกษาการปลดปล่อยของยา ณ อุณหภูมิ 37 องศาเซลเซียส ในสารละลายที่มีค่าความเป็นกรดต่างค่าที่พีเอช 2.0 5.5 และ 7.2 ตามลำดับ จากงานวิจัยนี้พบว่า สำหรับยาต้นแบบทุกชนิด ปริมาณยาที่ปลดปล่อยออกจากฟิล์มพอลิเมอร์ผสมมีปริมาณสูงสุด เมื่อฟิล์มผสมมีปริมาณไคโตซานเป็นองค์ประกอบในฟิล์มอยู่ร้อยละ 80 ในสารละลายที่มีค่าพีเอช เป็น 2.0 เมื่อศึกษาอัตราการบวมตัวของฟิล์มพอลิเมอร์ผสมที่มียาต้นแบบผสมอยู่ พบว่าระดับการบวมตัวของฟิล์มพอลิเมอร์ผสมเป็นไปในทำนองเดียวกัน นั่นคือมีอัตราการบวมตัวสูงสุดเมื่อฟิล์มผสมมีปริมาณไคโตซานเป็นองค์ประกอบในฟิล์มอยู่ร้อยละ 80 ในสารละลายที่มีค่าพีเอชเป็น 2.0 เมื่อเปรียบเทียบปริมาณยาแต่ละชนิดที่ปลดปล่อยออกมาจากฟิล์มพอลิเมอร์ผสมที่มีปริมาณไคโตซานเป็นองค์ประกอบร้อยละ 80 พบว่า ปริมาณของซาลิไซลิกที่ปลดปล่อยออกจากฟิล์มผสมมีมากกว่า ทีโอโพลิน ไคโคลฟีแนคโซเดียมและอมอกซิซิลิน ตามลำดับ ปริมาณสูงสุดของกรดซาลิไซลิก ทีโอโพลิน ไคโคลฟีแนคโซเดียม และอมอกซิซิลินที่ถูกปลดปล่อยออกจากฟิล์มผสมที่มีปริมาณไคโตซานอยู่ร้อยละ 80 ณ พีเอช 2 คิดเป็นอัตราร้อยละ 92.7 81.1 76.6 และ 37.2 ตามลำดับ

ACKNOWLEDGEMENTS

I would like to thank the Petroleum and Petrochemical College, Chulalongkorn University, where I have gained my knowledge and enriched my skill in polymer science. I would also like to acknowledge Surapon Food Public Company for their support of shrimp shells, the raw material used throughout this work. Also, I would like to thank KPT Cooperation (Thailand) for their supplying 50%w/w of NaOH solution, the chemical reagent that utilized for preparation of chitosan.

I would like to express grateful appreciation to my advisors, Dr. Ratana Rujiravanit, Prof. Alexander M. Jameison, and Prof. Seichi Tokura for their invaluable suggestion and criticism.

I am also indebted to my family and friends for their encouragement and understanding during my studies and thesis work.

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