

**VINYL-CHITOSAN MACROMONOMER: AN APPROACH FOR  
CONTROLLED STRUCTURE CHITOSAN**



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**Thesis Advisor:** Asst. Prof. Suwabun Chirachanchai  
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**ABSTRACT**

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The preparation of water-soluble low molecular weight chitosan (LMCS) by acid hydrolysis is reported. The change in appearance from flake to powder and the reduction in molecular weight related to the hydrolysis time are clarified. The packing structure of low molecular weight chitosan observed from wide angle X-ray diffraction demonstrates the major change in reduction of intermolecular hydrogen bonding. Vinyl-chitosan macromonomer is originally proposed using the water-soluble low molecular weight chitosan reacted with acrylic acid monomer. The polymerization of acrylic acid and vinyl-chitosan macromonomer under the optimal molar ratio and reaction temperature are studied to clarify that the polymer obtained is a gel. The water absorption is applied to evaluate the performance of the gel product.

## บทคัดย่อ

นางสาวโกสุม สมัครรัตน์: ไวนิล-ไคโตซาน แมคโครมอนอเมอร์: แนวทางไปสู่การควบคุมโครงสร้างไคโตซาน (Vinyl-Chitosan Macromonomer: An Approach for Controlled Structure Chitosan) อ.ที่ปรึกษา: ผศ.ดร.สุวบุญ จิรชาญชัย และ รศ.ดร.เดวิด ซี มาร์ติน (Assoc. Prof. David C. Martin), 47 หน้า ISBN 974-03-1615-8

รายงานนี้กล่าวถึงการเตรียมไคโตซานน้ำหนักโมเลกุลต่ำที่สามารถละลายน้ำได้เตรียมโดยการย่อยด้วยกรด และได้ให้ความกระจ่างเกี่ยวกับการเปลี่ยนสภาพจากแผ่นเล็กๆเป็นผงและการลดลงของน้ำหนักโมเลกุลซึ่งสัมพันธ์กับเวลาที่ใช้ในการย่อย การเปลี่ยนแปลงการเรียงตัวของไคโตซานน้ำหนักโมเลกุลต่ำศึกษาโดยเอกซเรย์ดิฟแฟรกชันสเปกโตรสโกปี (X-ray Diffraction Spectroscopy) แสดงถึงการลดลงของพันธะไฮโดรเจนระหว่างโมเลกุลของไคโตซาน ไวนิล-ไคโตซานแมคโครมอนอเมอร์ถูกนำเสนอเป็นครั้งแรกโดยการผนวกของไคโตซานน้ำหนักโมเลกุลต่ำที่ละลายน้ำได้และกรดอะคริลิกมอนอเมอร์ การศึกษาเงื่อนไขที่เหมาะสมสำหรับการทำปฏิกิริยาพอลิเมอร์ระหว่างกรดอะคริลิกและไวนิล-ไคโตซานแมคโครมอนอเมอร์ให้ความกระจ่างว่าพอลิเมอร์ที่ได้เป็นเจล สมบัติของผลิตภัณฑ์เจลประเมินโดยการศึกษาความสามารถในการดูดน้ำ

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