

**AN APPROACH FOR OLIGOCHITOSAN VIA CHITINASE SYSTEM
AND THE CHEMICAL MODIFICATION**



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for the Degree of Master of Science
The Petroleum and Petrochemical College, Chulalongkorn University
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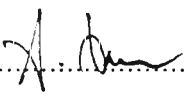
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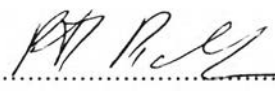
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บทคัดย่อ

ดารารัตน์ เมฆเกรียงไกร : การพัฒนาโครงสร้างไคตินให้เป็นโอลิโกเมอร์ด้วยกระบวนการย่อยด้วยเอนไซม์และการปรับโครงสร้างทางเคมี (An Approach for Oligochitosan via Chitinase System and the Chemical Modification) อ. ที่ปรึกษา : ผศ. ดร. สุวบุญ จิรชาญชัย ดร. รัฐ พิษณุางกูร และ รศ. ดร. เดวิด ซี มาร์ติน (Assoc. Prof. David C. Martin) 66 หน้า ISBN 974-334-169-2

ไคตินบริสุทธิ์จากแบคทีเรีย *Staphylococcus species* strain TU005 (E) ซึ่งพบในดินในประเทศไทย จากการตรวจวัดโดยวิธีคอลอริเมตริกที่อุณหภูมิ 37 องศาเซลเซียสพบว่ามีค่าแอกติวิตี 18 mU/mg โอลิโกไคโตแซนที่ได้จากการย่อยด้วยไคตินสฤกพบว่ามีคหณน็ดเป็น 1 ใน 3 เท่าของไคโตแซนตั้งต้นจากการวัดค่าอินทรินสิกวิสคอสิตี ปฏิกิริยาพทาโลอิลเลชัน (N-Phthaloylation) ที่ตำแหน่งคาร์บอนตัวที่ 2 ได้นำมาใช้เพื่อปกป้องหมู่อะมิโนให้คงอยู่และพบว่าปฏิกิริยานี้ทำสำเร็จจากการตรวจสอบกลุ่มพทาลิมิโด (phthalimido group) ที่ 1714 และ 1775 เลขคลื่นด้วย FT-IR. อนุพันธ์ที่ได้แสดงการละลายได้ดีในไดเมทิลฟอร์มามายด์ ไดเมทิลซัลฟอกไซด์ และ ไพริดีน ปฏิกิริยาโทซิลเลชันของโอลิโกไคโตแซน (O-Tosylation of oligochitosan) ทำได้สำเร็จที่อุณหภูมิห้องภายใต้ระบบสารละลายโดยตรวจสอบจากกลุ่มโทซิล (tosyl group) ที่ 817, 1599 และ 1173 เลขคลื่น การศึกษาการผนวกโมเลกุลของอัลคิลที่มีสายโซ่ยาวทำโดยการเตรียมลอริลพทาโลอิลโอลิโกไคโตแซน (O-Lauryl-N-Phthaloyloligochitosan) ซึ่งพบหมู่เมธิลีนได้อย่างชัดเจนที่ 2926 เลขคลื่น ผลการวิเคราะห์ด้วย XRD ของอนุพันธ์โอลิโกไคโตแซนเหล่านี้แสดงว่าปฏิกิริยาการปรับแต่งอนุพันธ์โอลิโกไคโตแซนทำให้การจัดเรียงตัวเป็นผลึกของโอลิโกไคโตแซนตั้งต้นลดลง

ABSTRACT

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KEYWORDS : *Staphylococcus species* strain TU005 (E), Oligochitosan, N-Phthaloylation, O-Tosylation, O-Lauryl-N-Phthaloyl oligochitosan.

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Chitinase was prepared from bacteria, *Staphylococcus species* strain TU005 (E), found in Thailand soil. The activity was 18 mU/mg as determined by colorimetric assay at 37°C. Oligochitosan obtained from enzymatic degradation was found to be one-third of the starting chitosan as clarified by intrinsic viscosity. N-Phthaloylation at C-2 position was conducted to protect amino group. The compound showed the characteristic peaks of phthalimido group at 1714 and 1775 cm^{-1} by FT-IR. The product became well dissolved in DMF, DMSO, and pyridine. The precursor, O-tosylation of oligochitosan, was successfully prepared at room temperature under homogeneous system as confirmed from the tosyl peak at 817, 1599, and 1173 cm^{-1} . The conjugation of long chain alkyl onto the precursors was prepared to obtain O-Lauryl-N-Phthaloyl oligochitosan as evidenced from the significant peak at 2926 cm^{-1} . The XRD patterns of these oligochitosan derivatives implied that the reaction decreased the crystallinity of the starting oligochitosan.

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