NANO-STRUCTURED CHITOSAN FOR ALLERGEN DELIVERY SYSTEM

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ABSTRACT

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Nanoparticulate LCS-Phe-mPEG obtained from the conjugation of phenylalanine (Phe) and poly(ethylene glycol)methyl ether terminated with a carboxyl group (mPEG-COOH) onto low molecular weight chitosan is proposed. The structural characterization confirmed by FTIR at 1670 to 1630, 1551 to 1534, and 750 cm^{-1} for amide I, amide II, and the benzene ring of phenylalanine, respectively, and by ^1H NMR at 7.36 to 7.24 and 2.63 to 2.48 ppm for C_6H_5 of phenylalanine and $COCH_2CH_2CO$ of mPEG, respectively, indicates the successful reaction. Compound **2** exhibits the size of 150-250 nm in solution state, as evaluated by dynamic light scattering (DLS), and 50-60 nm in spherical shape in dry state as observed by TEM. A preliminary study of allergen entrapment done by simply mixing nanoparticles with the crude allergen solution shows a UV-Vis absorption at 595 nm, indicating the successful allergen incorporation in the nanoparticulate LCS-Phe-mPEG.

บทคัดย่อ

เจตสุดา จิรวุฒิวงศ์ชัย : ไคโตซานโครงสร้างระดับนาโนสำหรับระบบการขนส่งสารก่อภูมิแพ้ (Nano-structured Chitosan for Allergen Delivery System) อ. ที่ปรึกษา : รองศาสตราจารย์ ดร.สุวบุญ จิรชาญชัย และ ผู้ช่วยศาสตราจารย์ ดร.มานิตย์ นิธิธนากุล 45 หน้า

งานวิจัยนี้นำเสนอ อนุภาคระดับนาโน LCS-Phe-mPEG ซึ่งได้จากการเชื่อมต่อของฟีนิลอะลานีน (Phe) และพอลีเอทิลีนไกลคอลเมทิลอีเทอร์ปิดด้วยหมู่คาร์บอกซิลิก (mPEG-COOH) บนไคโตซานน้ำหนักโมเลกุลต่ำ (LCS) การพิสูจน์ทราบทางโครงสร้างด้วยเทคนิค FTIR ที่ 1670 -1630 1551-1534 และ 750 cm^{-1} สำหรับ เอไมด์ I เอไมด์ II และวงเบนซีนของฟีนิลอะลานีนตามลำดับ และด้วยเทคนิค ^1H NMR ที่ 7.36-7.24 และ 2.63-2.48 ppm สำหรับ C_6H_5 ของฟีนิลอะลานีน และ $COCH_2CH_2CO$ ของ mPEG ตามลำดับ แสดงให้เห็นถึงความสำเร็จของปฏิกิริยา เมื่อวัดขนาดอนุภาคในสภาวะสารละลายด้วยเทคนิค DLS พบว่ามีขนาด 150-250 นาโนเมตร และในสภาวะแห้งด้วยเทคนิค TEM มีขนาด 50-60 นาโนเมตร รูปร่างกลม สำหรับการศึกษาในเบื้องต้นเกี่ยวกับการกักเก็บสารก่อภูมิแพ้ในอนุภาคด้วยวิธีผสมอย่างง่าย ด้วยเทคนิคการดูดกลืนแสงที่ความยาวคลื่น 595 นาโนเมตร แสดงให้เห็นถึงความสำเร็จของการกักเก็บสารก่อภูมิแพ้ในอนุภาค LCS-Phe-mPEG

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