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ไมโครแคปซูลชนิดออกฤทธิ์นานที่บรรจุอินโดเมธาซิน



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**Preparation and Evaluation of Chitosan-Carboxymethylcellulose
Sustained Release Microcapsules Containing Indomethacin**

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วรี ดิยะบุญชัย : การเตรียมและประเมินผลโคโตแซน-คาร์บอกซีเมทิลเซลลูโลส ไมโครแคปซูลชนิดออกฤทธิ์นานที่บรรจุอินโดเมธาซิน (PREPARATION AND EVALUATION OF CHITOSAN-CARBOXYMETHYLCELLULOSE SUSTAINED RELEASE MICROCAPSULES CONTAINING INDOMETHACIN) อ. ที่ปรึกษา : รศ. ดร. กาญจน์พิมล ฤทธิเดช, 137 หน้า. ISBN 974-584-847-6

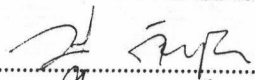
อินโดเมธาซินไมโครแคปซูลชนิดออกฤทธิ์นาน สามารถเตรียมได้ด้วยวิธีโคอาเซอร์เวชันเชิงซ้อน โดยการชักนำโคโตแซนซึ่งเป็นโพลีเมอร์ที่มีประจุบวก ให้เกิดปฏิกิริยาทางไอออนกับคาร์บอกซีเมทิลเซลลูโลสซึ่งเป็นโพลีเมอร์ที่มีประจุลบ ทำให้เกิดเป็นไมโครแคปซูลขึ้น ไมโครแคปซูลที่เตรียมได้ มีขนาดการกระจายอนุภาค อยู่ในช่วง 32-404 ไมครอน

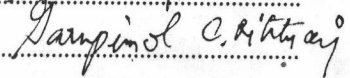
สภาวะต่างๆในกระบวนการผลิต มีผลต่อลักษณะพื้นผิว และการปลดปล่อยตัวยาออกจากไมโครแคปซูล พบว่าผนังไมโครแคปซูลที่เตรียมจากสารละลายโคโตแซนพีเอช 3 จะเรียบกว่าผนังไมโครแคปซูลที่เตรียมจากสารละลายโคโตแซนพีเอช 4 และ 5 ตามลำดับ

เมื่อเพิ่มระยะเวลาในการแข็งตัว พบว่าไมโครแคปซูลที่เตรียมจากสารละลายโคโตแซนพีเอช 3 จะมีการปลดปล่อยตัวยาช้าลง และปลดปล่อยตัวยาได้ช้าที่สุดเมื่อใช้ กลูตาราลดีไฮด์ 1.0 กรัม/โพลีเมอร์ 1.0 กรัม ส่วนไมโครแคปซูลที่เตรียมจากสารละลายโคโตแซนพีเอช 4 และ 5 พบว่าการปลดปล่อยตัวยาช้าลง เมื่อลดระยะเวลาในการแข็งตัว และปลดปล่อยตัวยาได้ช้าที่สุด เมื่อใช้กลูตาราลดีไฮด์ 0.5 กรัม/โพลีเมอร์ 1.0 กรัม นอกจากนี้พบว่า ไมโครแคปซูลที่เตรียมจากสารละลายโคโตแซนพีเอช 3 การปลดปล่อยตัวยาจะเร็วที่สุด ส่วนไมโครแคปซูลที่เตรียมจากสารละลายโคโตแซนพีเอช 4 และ 5 การปลดปล่อยตัวยาจะใกล้เคียงกัน ดังนั้นจึงสามารถควบคุมการปลดปล่อยตัวยาจากไมโครแคปซูลได้ โดยการควบคุมพีเอชของสารละลายโคโตแซน ระยะเวลาในการแข็งตัว และปริมาณกลูตาราลดีไฮด์

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สาขาวิชา

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ลายมือชื่อนิสิต 

ลายมือชื่ออาจารย์ที่ปรึกษา 

ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

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KEY WORD: CHITOSAN/ CARBOXYMETHYLCELLULOSE/ INDOMETHACIN/ MICROCAPSULES

WAREE TIYABOONCHAI: PREPARATION AND EVALUATION OF CHITOSAN-CARBOXYMETHYLCELLULOSE SUSTAINED RELEASE MICROCAPSULES CONTAINING INDOMETHACIN. THESIS ADVISOR: ASSO. PROF. GARNPIMOL C. RITTHIDEJ, Ph.D. 137 pp. ISBN 974-584-847-6

Controlled release indomethacin microcapsules can be prepared by using complex coacervation technique. The microcapsule is formed by ionic interaction of positive charged chitosan polymer and the negative charged carboxymethylcellulose polymer. Size distribution of the resulting microcapsules ranged between 32-404 micron.

The processing conditions can affected the microcapsules surface topography and its drug release behaviour. It was found that the microcapsule prepared with pH3 of chitosan solution had the smoothest surface in comparison with those prepared with pH4 and pH5 of chitosan solution respectively.

The drug release of microcapsules prepared from pH 3 of chitosan solution was declined with increasing hardening time and the drug release was slowest when prepared with glytaraldehyde 1.0 gm/polymer 1.0 gm. While those prepared from pH 4 and pH 5 solution their drug release slow down with decreasing hardening time and their drug release were slowest when prepared with glutaraldehyde 0.5 gm/polymer 1.0 gm. Further more it was found that microcapsules prepared from pH 3 of chitosan solution had fastest drug release profile. Microcapsules which were prepared from pH 4 and pH 5 of chitosan solution had similar drug release profile to one another. Hence microcapsules drug release can be controlled by varying the pH of chitosan solution, hardening time and glutaradehyde content.

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Abbreviations

CMC	carboxymethylcellulose
cm	centimetre
°c	degree Celsius
gm	gram
hr	hour
IPA	isopropyl alcohol
kg	kilogram
L	litre
mg	milligram
ml	millilitre
N	normal
nm	nanometer
psi	pound per square inch
rpm	revolution per minute
SD	standard deviation
w/v	weight by volume
µg	microgram
µm	micrometer