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**MICROENCAPSULATION OF CEPHALEXIN USING ETHYLCELLULOSE AND
ACRYLATE-METHACRYLATE COPOLYMER AS WALL MATERIALS**



MISS NATHAYA SUWANPATRA

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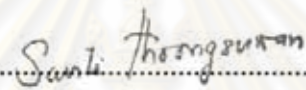
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By Miss Nathaya Suwanpatra
Department Pharmacy
Thesis Advisor Associate Professor Ubonthip Nimmannit, Ph.D.

Accepted by the Graduate School, Chulalongkorn University in Partial
Fulfillment of the Requirements for the Master's Degree.



..... Dean of Graduate School
(Associate Professor Santi Thoongsuwan, Ph. D.)

Thesis Committee:-


..... Chairman
(Associate Professor Prapapuck Silapachote, M.sc. in Pharm.)


..... Thesis Advisor
(Associate Professor Ubonthip Nimmannit, Ph.D.)


..... Member
(Assistance Professor Poj Kulvanich, Ph.D.)


..... Member
(Panida Vayumhasuwan, Ph.D.)

พิมพ์ต้นฉบับบทคัดย่อวิทยานิพนธ์ภายในกรอบสี่เหลี่ยมนี้เพียงแผ่นเดียว

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ในการศึกษานี้ได้มีการเตรียม เมมเบรนของเอซิลเซลลูโลส และอะครายเลท-เมธาครายเลท โคลิโพลีเมอร์ (ยูตราจิท อาร์แอล 100 และยูตราจิท อาร์เอส 100) โดยคัดเลือกชนิดและปริมาณ พลาสติไซเซอร์ที่เหมาะสมสำหรับเมมเบรนแต่ละชนิด ซึ่งพลาสติไซเซอร์ที่เหมาะสมสำหรับเอซิลเซลลูโลส และยูตราจิท คือ ไตรอะซิทีน ปริมาณที่เหมาะสม คือ 30 และ 20 เปอร์เซ็นต์ของน้ำหนักโพลีเมอร์ที่ใช้ ตามลำดับ ส่วนผสมของยูตราจิท อาร์แอล 100 และยูตราจิท อาร์เอส 100 ในอัตราส่วน 3 ต่อ 2 และ 2 ต่อ 3 เมื่อเติมไตรอะซิทีน 20 เปอร์เซ็นต์ จะให้เมมเบรนที่ใสและยืดหยุ่นได้ดี รวมทั้งมีการควบคุมการปลดปล่อยเซฟาเลซินได้ดี

การเตรียมเซฟาเลซินไมโครแคปซูล เตรียมโดย 3 เทคนิค คือ เทคนิคโคอะเซอเวชัน ฟลูอิดโคเชชัน และสเปรย์ดรายอิง โดยมีเอซิลเซลลูโลส และอะครายเลท-เมธาครายเลทโคลิโพลีเมอร์ ในอัตราส่วนดังกล่าวที่เลือกแล้วเป็นสารก่อกำบัง ศึกษาอัตราส่วนของตัวยาและสารก่อกำบังที่มีผลต่อลักษณะพื้นผิวของไมโครแคปซูล การกระจายขนาดและการปลดปล่อยตัวยา

วิธีโคอะเซอเวชันโดยใช้เอซิลเซลลูโลสจะให้เปอร์เซ็นต์ไมโครแคปซูลที่เตรียมได้สูงสุด (90%) รองลงมาคือวิธีฟลูอิดโคเชชัน (85%) และสเปรย์ดรายอิงต่ำที่สุด (น้อยกว่า 50%) เมื่อศึกษาขนาดของอนุภาค วิธีสเปรย์ดรายอิง จะให้ขนาดอนุภาคเล็กที่สุด ในการศึกษาการปลดปล่อยยา เซฟาเลซินจากไมโครแคปซูลที่มีเอซิลเซลลูโลสเป็นสารก่อกำบัง จะให้การปลดปล่อยยาช้าที่สุดในขณะที่ ไมโครแคปซูลที่มีอะครายเลท-เมธาครายเลทเป็นสารก่อกำบังจะให้การปลดปล่อยที่เร็วกว่าเมื่อ เพิ่มปริมาณของผนังโดยการลดอัตราส่วนของยาต่อสารก่อกำบังจะทำให้การปลดปล่อยยาจากไมโครแคปซูลช้าลง

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ภาควิชา เภสัชกรรม
สาขาวิชา เภสัชกรรม
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ลายมือชื่อนิติต ณัฐญา สุวรรณพัชตรา
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In this study, ethylcellulose and acrylate-methacrylate copolymer (Eudragit RL 100 , Eudragit RS 100) membranes were prepared by using appropriate type and amount of plasticizers. Thirty percent and twenty percent of triacetin based on polymer weight were good for ethylcellulose membrane and acrylate-methacrylate copolymer membrane, respectively. The ratios of 3:2 and 2:3 Eudragit RL 100 :Eudragit RS 100 also gave the transparent and flexible membranes, all of them could control the release rate of cephalexin.

Three microencapsulation techniques, i.e., coacervation, fluidization and spray drying techniques were investigated in preparation of cephalexin microcapsules. Ethylcellulose and acrylate-methacrylate copolymer corresponding to the above ratios were selected as wall materials of the microcapsules. The effect of core to wall ratios on the surface characteristics, particle sizes and dissolution of microcapsules were also studied.

The coacervation technique with ethylcellulose as wall material gave the highest percent yield (90%) of microcapsules. While the fluidization gave intermediate percent yield (85%). The spray drying technique gave the lowest yield (less than 50%) and the particle size was the smallest. The release of cephalexin from ethylcellulose walled microcapsules was the slowest one whilst the release from acrylate-methacrylate copolymer was faster. The increment of deposition of wall materials due to the decreasing of core to wall ratios resulted in the decreasing of dissolution rate.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ภาควิชา.....เภสัชกรรม.....

สาขาวิชา.....เภสัชกรรม.....

ปีการศึกษา.....2537.....

ลายมือชื่อนิสิต.....ณัฐญา สุวรรณรัตน์.....

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LIST OF ABBREVIATIONS

| | | |
|---------|---|---|
| ANOVA | = | Analysis of variance |
| °C | = | Degree celcius |
| cm | = | Centrimetre |
| CV | = | Coefficient of variation |
| cps | = | Centripoise |
| EC | = | Ethylcellulose |
| eq | = | equation |
| Fig | = | Figure |
| g | = | Gram |
| HPLC | = | High performance liquid chromatography |
| HPMCAS | = | Hydroxy propyl methyl cellulose acetate succinate |
| hr | = | Hour |
| kg | = | Kilogram |
| K_a | = | dissociation constant |
| l | = | litre |
| μ | = | Micron |
| μ l | = | Microlitre |
| μ g | = | Microgram |
| M | = | Molar |
| mg | = | Milligram |
| min | = | Minute |
| ml | = | Millilitre |
| mm | = | Millimetre |

| | | |
|----------------|---|------------------------------|
| mm WC | = | Millimeter water column |
| M ³ | = | Cubic metre |
| N | = | Newton |
| nm | = | Nanometre |
| pKa | = | dissociation exponent |
| %Q | = | percentage of drug released |
| rpm | = | Revolutions per minute |
| r ² | = | Correlation coefficient |
| RL | = | Eudragit R1 100 [®] |
| RS | = | Eudragit RS 100 [®] |
| SEM | = | Scanning electron microscope |
| SD | = | Standard deviation |
| TA | = | Triacetin |
| TC | = | Triethyl citrate |
| T _g | = | Glass transition temperature |
| UV | = | Ultraviolet |

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย