คุณสมบัติทางเคมีกายภาพและเชิงกล และการควบคุมการปลดปล่อยในเพลเลทเคลือบของฟิล์มผสมระหว่างเอธิลเซสลูโลส และแอมโมนิโอเมธาคริเลต โคโพลิเมอร์ ทั้งในระบบตัวทำละลายอินทรีย์ และในระบบชนิดกระจายตัวในน้ำ

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PHYSICO-CHEMICAL AND MECHANICAL PROPERTIES AND CONTROLLED RELEASE IN COATED PELLETS OF MIXING FILMS BETWEEN ETHYLCELLULOSE AND AMMONIO METHACRYLATE COPOLYMER IN ORGANIC AND AQUEOUS DISPERSION SYSTEMS

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สุภาพรรณ จูงเจริญวัฒนา : คุณสมบัติทางเคมีกายภาพและเชิงกล และการควบคุมการปลดปล่อยในเพลเลทเคลือบของฟิล์มผสมระหว่างเอธิลเซลลูโลส แอมโมนิโอเมธาคริเลต โคโพลิเมอร์ทั้งในระบบตัวทำละลายอินทรีย์ และในระบบชนิดกระจายตัวในน้ำ (PHYSICO-CHEMICAL AND MECHANICAL PROPERTIES AND CONTROLLED RELEASE IN COATED PELLETS OF MIXING FILMS BETWEEN ETHYLCELLULOSE AND AMMONIO-METHACRYLATE COPOLYMER IN ORGANIC AND AQUEOUS DISPERSION SYSTEMS) อ.ที่ปรึกษา : รศ.ดร. พจน์ กุลวานิช, อ.ที่ปรึกษาร่วม : ดร. นฤพร สุตัณฑวิบูลย์, 231 หน้า. ISBN 974-332-897-1.

ศึกษาคุณสมบัติของฟิล์มเดี่ยวและฟิล์มผสมระหว่างเอธิลเซลลูโลสและแอมโมนิโอเมธาคริเลต โคโพลิเมอร์ ชนิด บี ในระบบตัวทำละลายอินทรีย์ (เอธิลเซลลูโลส กับ ยูดราจิด อาร์ เอส 100) และในระบบชนิดกระจายตัวในน้ำ (ซัวร์ลีส กับ ยูดราจิด อาร์ เอส 30 ดี) รวมทั้งอิทธิพลของชนิดและปริมาณของพลาสติกไซเซอร์ต่อคุณสมบัติทางเคมีกายภาพและเชิงกลของฟิล์ม และผลต่อลักษณะการปลดปล่อยตัวยาจากโพรพราโนลอลไฮโดรคลอไรด์เพลเลทที่เคลือบด้วยฟิล์มเดี่ยวและฟิล์มผสมเหล่านี้ เตรียมโพรพราโนลอลไฮโดรคลอไรด์เพลเลทโดยใช้เทคนิคเอ็กซ์ทรูชัน-สเฟียรอ์ไรไนซ์เซชัน แล้วนำมาเคลือบฟิล์มโดยใช้เทคนิคการเคลือบแบบฟลูอิดไดซ์เบดชนิดพ่นจากด้านล่าง พบว่าชนิดและปริมาณที่แตกต่างกันของพลาสติกไซเซอร์มีอิทธิพลต่อลักษณะพื้นผิวและคุณสมบัติเชิงกลของฟิล์มเดี่ยวและฟิล์มผสม ในระบบตัวทำละลายอินทรีย์ ไดบิวทิล ทาเลททำให้ฟิล์มของเอธิลเซลลูโลสและฟิล์มผสมที่มีสัดส่วนของเอธิลเซลลูโลสอยู่มากกว่ามีลักษณะพื้นผิวและคุณสมบัติเชิงกลที่ดี ในขณะที่ไตรเอธิล ซิเทรตทำให้ฟิล์มของยูดราจิด อาร์ เอส 100 และฟิล์มที่มีสัดส่วนของยูดราจิด อาร์ เอส 100 อยู่มากกว่ามีลักษณะพื้นผิวและคุณสมบัติเชิงกลที่ดี ส่วนฟิล์มผสมทั้งหมดที่เตรียมจากระบบชนิดกระจายตัวในน้ำ และมีไตรเอธิล ซิเทรตเป็นพลาสติกไซเซอร์สามารถทำให้เกิดฟิล์มที่นุ่มและยืดหยุ่นได้ดี รวมทั้งทำให้ฟิล์มมีลักษณะเรียบมากขึ้น ในการเพิ่มปริมาณของพลาสติกไซเซอร์ สามารถทำให้เกิดลักษณะพื้นผิวและคุณสมบัติเชิงกลที่ดีขึ้น นอกจากนี้ชนิดและปริมาณที่แตกต่างกันของพลาสติกไซเซอร์ยังสามารถปรับเปลี่ยนลักษณะและอัตราเร็วของการปลดปล่อยยา การเติมยูดราจิด อาร์ เอส 100 ลงในฟิล์มผสมจะทำให้พื้นผิวมีลักษณะที่เรียบขึ้น แต่การเติมยูดราจิด อาร์ เอส 30 ดีในฟิล์มผสมไม่ได้ช่วยทำให้เกิดลักษณะพื้นผิวที่ดีขึ้น อย่างไรก็ตามฟิล์มผสมที่ได้ระหว่างโพลิเมอร์ 2 ชนิดทั้งในระบบตัวทำละลายอินทรีย์ และในระบบชนิดกระจายตัวในน้ำสามารถทำให้อัตราการปลดปล่อยของยาช้าลงเมื่อเปรียบเทียบกับฟิล์มเดี่ยวๆ ที่เตรียมจากยูดราจิด อาร์ เอส (แอมโมนิโอเมธาคริเลต โคโพลิเมอร์ ชนิด บี) ผลจากอินฟราเรดสเปคตรัมแสดงให้เห็นว่าเกิดปฏิกิริยาระหว่างโพลิเมอร์ 2 ชนิดนี้เตรียมจากระบบชนิดกระจายตัวในน้ำ แต่จากลักษณะของเอ็กซ์เรย์ดิฟแฟรคโทรแกรมไม่สามารถตรวจสอบการเกิดปฏิกิริยาใดๆ ระหว่างโพลิเมอร์ 2 ชนิดในระบบชนิดกระจายตัวในน้ำ

ภาควิชา.....เภสัชอุตสาหกรรม..... **ลายมือชื่อนิสิต**.....

สาขาวิชา.....เภสัชอุตสาหกรรม..... **ลายมือชื่ออาจารย์ที่ปรึกษา**.....

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4076531633 : MAJOR INDUSTRIAL PHARMACY
KEY WORD : MIXING POLYMER/ PLASTICIZERS/ ORGANIC SYSTEM/ AQUEOUS SYSTEM
SUPARPUN CHUNGCHAROENWATTANA : PHYSICO-CHEMICAL AND MECHANICAL PROPERTIES AND CONTROLLED RELEASE IN COATED PELLETS OF MIXING FILMS BETWEEN ETHYLCELLULOSE AND AMMONIO METHACRYLATE COPOLYMER IN ORGANIC AND AQUEOUS DISPERSION SYSTEMS. THESIS ADVISOR : ASSOC. PROF. POJ KULVANICH, Ph.D., THESIS CO-ADVISOR : NARUEPORN SUTANTHAVIBUL, Ph.D. 231 pp. ISBN 974-332-897-1.

The properties of single film and mixed film of ethylcellulose and ammonio methacrylate copolymer type B prepared in organic system (ethylcellulose and Eudragit®RS100) and aqueous dispersion system (Surelease and Eudragit®RS30D) were investigated. The effect of type and amount of plasticizers on their physico-chemical and mechanical properties of film as well as on the release of the drug from propranolol hydrochloride pellets coated with these single film and blended films were observed. The propranolol hydrochloride pellets were prepared by extrusion-spheronization technique and were coated by a Wurster type fluidized bed technique. The surface appearances and the mechanical properties of single polymer and polymer blends were affected by the various types and amounts of plasticizers. For the organic system, dibutyl phthalate could improve appearances and mechanical properties of ethylcellulose and the polymer blends with higher portion of ethylcellulose while triethyl citrate could improve appearances and mechanical properties of Eudragit®RS100 and the polymer blends with higher portion of Eudragit®RS100. All of the triethyl citrate-plasticized films prepared from aqueous dispersion system produced soft and tough films with smooth surface. An increase in amount of plasticizers could produce good properties of both surface appearances and mechanical properties. The different type and amount of plasticizers could also modify the drug release characteristics. The incorporation of Eudragit® RS100 in the blended films improved the smoothness of the coating surface but the incorporation of Eudragit®RS30D did not improve the surface appearances of the blended films. Nevertheless, the mixtures of two polymers in both systems could retard drug release characteristics when compared to the pure films of Eudragit®RS type. The interaction between two polymers prepared from aqueous dispersion system was revealed by the IR spectra whereas the X-ray diffractograms could not detect any interaction of two polymers in aqueous dispersion system.

ภาควิชา.....เภสัชอุตสาหกรรม.....
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LIST OF ABBREVIATIONS

bar	kg/cm^2
°C	degree celcius (centrigrade)
cm	centimeter (s)
bp	boiling point
DBP	dibutyl phthalate
DSC	differential scanning calorimetry
EC	ethylcellulose
EuRS100	Eudragit®RS100
EuRS30D	Eudragit®RS30D
e.g.	exempli gratia, for example
et al.	et alli, and others
etc.	et cetera (and so on)
gm	gram (s)
hr	hour (s)
i.e.	id est, that is
IR	infrared
MFT	minimum film-forming temperature
MPa	millipascal
M.W.	molecular weight
mg	milligram (s)
min	minute (s)
ml	millimeter (s)
mp	melting point
No.	number
nm	nanometer (s)

PEG	polyethylene glycol
pH	the negative logarithm of the hydrogen ion concentration
pKa	the negative logarithm of the dissociation constant
q.s.	make to volume
r^2	coefficient of determination
rpm	revolutions per minute
SD	standard deviation
SEM	scanning electron microscopy
SR	Surelease®
Tg	glass transition temperature
TEC	triethyl citrate
TRC	triacetin
USP	The United States Pharmacopoeia
UV	ultraviolet
w/w	weight by weight
µg	microgram (s)
µm	micrometer (s), micron (s)
%	percentage
°	degree