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FORMULATION OF FAST DISSOLVING ORAL STRIPS  
CONTAINING *GARCINIA MANGOSTANA* HUSK EXTRACT

Miss Nittaya Ruamkittham

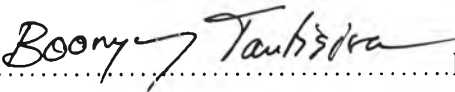
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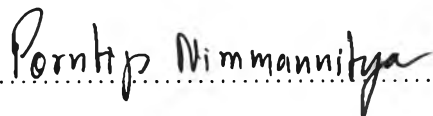
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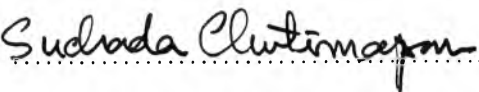
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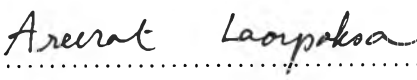
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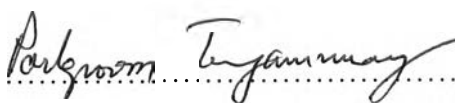
  
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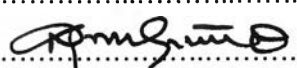
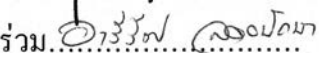
  
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นิตยา รวมกิจกรรม : การตั้งตำรับแผ่นอมชนิดละลายเร็วในช่องปากของสารสกัดจากเปลือกผลมังคุด (FORMULATION OF FAST DISSOLVING ORAL STRIPS CONTAINING *GARCINIA MANGOSTANA* HUSK EXTRACT) อ. ที่ปรึกษา : รศ. ดร. สุชาดา ชุตินาวรพันธ์, อ. ที่ปรึกษาร่วม : รศ. อารีรัตน์ ลออภิภา, 223 หน้า. ISBN 974-53-2337-3.

การศึกษานี้มีวัตถุประสงค์เพื่อพัฒนาตำรับแผ่นอมชนิดละลายเร็วในช่องปากของสารสกัดจากเปลือกผลมังคุดเพื่อยับยั้งแบคทีเรียในช่องปาก โดยใช้สารก่อฟิล์มชนิดละลายน้ำที่มีความหนืดต่ำได้แก่ ไฮดรอกซีโพรพิลเมทิลเซลลูโลส (เอชพีเอ็มซี) และ ไฮดรอกซีโพรพิลเซลลูโลส (เอชพีซี) และประกอบด้วยสารปรุงแต่งอื่นๆในตำรับเช่น สารให้ความหวานคือ อะซิซัลเฟมโพแทสเซียม สารแต่งกลิ่นรส คือ เมนทอลและน้ำมันยูคาลิปตัส โดยศึกษาถึงผลของสารก่อฟิล์มต่อคุณสมบัติทางกายภาพ คุณสมบัติเชิงกลและเวลาในการละลายของแผ่นอม เปรียบเทียบกับผลิตภัณฑ์ทางการค้ารูปแบบฟิล์ม เอ ซึ่งเป็นแผ่นอมชนิดละลายเร็วที่มีขายในท้องตลาด จากการศึกษาเวลาในการละลายพบว่าแผ่นอมเปล่าที่มีสารก่อฟิล์มผสมระหว่างเอชพีเอ็มซี 3 ซีพีเอส และเอชพีซี แอลวี ในสัดส่วน 2:1 3:1 4:1 และ 5:1 มีค่าไม่แตกต่างกับผลิตภัณฑ์ทางการค้ารูปแบบฟิล์ม เอ อย่างมีนัยสำคัญทางสถิติ ( $p > 0.05$ ) จากการศึกษาสแกนนิ่งอิเล็กตรอนไมโครสโคปี พบว่าแผ่นอมที่มีสารสกัดจากเปลือกผลมังคุดมีพื้นผิวเป็นรูพรุน การปลดปล่อยยารวดเร็วกว่า 80 เปอร์เซ็นต์ ภายในเวลา 3-7 นาที โดยสูตรที่มีการปลดปล่อยยาเร็วที่สุดคือ สูตรผสมระหว่างเอชพีเอ็มซี 3 ซีพีเอส และเอชพีซี แอลวี ในสัดส่วน 5:1 ผลจากดีฟิเอนเซียนซ์สแกนนิ่งแคลอริเมทรีแสดงให้เห็นว่าสารสกัดจากเปลือกผลมังคุดและสารปรุงแต่งอื่นๆในตำรับไม่อยู่ในรูปผลึก การศึกษาฤทธิ์ต้านจุลินทรีย์ในหลอดทดลองของแผ่นอมที่มีสารสกัดพบว่าสามารถต้านแบคทีเรียในช่องปากและฟัน ได้แก่ *สแตปฟีโลคอคคัส ออเรียส* เอทีซีซี 25923 และ *สเตรปโตคอคคัส มิวเดนส์* เอทีซีซี เคพีเอสเค<sub>2</sub> ในการศึกษาความคงตัวของยาได้สถานะกึ่งที่อุณหภูมิ 40 องศาเซลเซียส ความชื้นสัมพัทธ์ 75 เปอร์เซ็นต์ พบว่าแผ่นอมมีความคงตัวดี

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NITTAYA RUAMKITTHAM : FORMULATION OF FAST DISSOLVING ORAL STRIPS CONTAINING *GARCINIA MANGOSTANA* HUSK EXTRACT.

THESIS ADVISOR : ASSOC. PROF. SUCHADA CHUTIMAWORAPAN, Ph.D.,

THESIS CO-ADVISOR : ASSOC. PROF. AREERAT LAORPAKSA, M. Sc. in PHARM., 223 pp. ISBN 974-53-2337-3.

The purpose of this study was to develop fast dissolving oral strips containing *Garcinia mangostana* husk extract. The films consisted of low viscosity hydrophilic polymers such as hydroxypropyl methylcellulose and hydroxypropylcellulose, acesulfame potassium as sweetener, and menthol and eucalyptus oil as flavoring agents. The physical and mechanical properties and dissolution time of film bases were compared with commercial product strips A. From the dissolution time data, it was found that the film prepared from mixed polymer between HPMC 3 cps and HPC LV at ratios 2:1, 3:1, 4:1 and 5:1 were not significantly different from commercial product strips A ( $p>0.05$ ). The films containing extract were light yellow and had porous surface based on observation from scanning electron microscopy. The dissolution profiles of all formulations showed the rapid release more than 80 percent of mangostin from films within 3-7 minutes and the fastest release was from formulation of HPMC 3 cps and HPC LV at ratio 5:1. Differential scanning calorimetry results exhibited that the *Garcinia mangostana* extract and additives were not in crystalline form in the films. The fast dissolving oral strips containing *Garcinia mangostana* husk extract showed *in vitro* antimicrobial activity against oro-dental bacteria, namely, *Staphylococcus aureus* ATCC 25923 and *Streptococcus mutans* ATCC KPSK<sub>2</sub>. Under stress conditions at 40 degree Celcius and 75 percent relative humidity, the strips showed a good stability.

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## LIST OF ABBREVIATIONS

ANOVA	=	analysis of variance
°C	=	degree Celcius
cm	=	centimeter
cm <sup>2</sup>	=	square centimeter
conc	=	concentration
cps	=	centipoises
CV	=	coefficient of variation
df	=	degree of freedom
E	=	hydroxypropyl methylcellulose
et al.	=	and others
g	=	gram
hr	=	hour
HPLC	=	high performance liquid chromatography
HPMC	=	hydroxypropyl methylcellulose
HPC LV	=	hydroxypropyl cellulose low viscosity
k	=	release rate constant
MBC	=	minimal bactericidal concentration
mg	=	milligram
MIC	=	minimal inhibitory concentration
min	=	minute
ml	=	milliliter
mm	=	millimeter
mm <sup>2</sup>	=	square millimeter
mPas	=	millipascal.second
N	=	Newton
No.	=	number
nm	=	nanometer
R <sup>2</sup>	=	coefficient of determination
RH	=	relative humidity
rpm	=	revolution per minute



RSD	=	Relative standard deviation
sec	=	second
SD	=	standard deviation
SS	=	sum of square
TLC	=	thin layer chromatography
UV	=	ultraviolet
VR	=	variance ratio
v/v	=	volume by volume
w/w	=	weight by weight
mcg, $\mu\text{g}$	=	microgram
$\mu\text{l}$	=	microliter
$\mu\text{m}$	=	micrometer