

**STABILITY OF *PHYLLANTHUS EMBLICA* EXTRACT IN
LIPOSOMES**

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**A Thesis Submitted in Partial Fulfillment of the Requirements
For the Degree of Master of Science Program in Pharmaceutical Technology
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ความคงตัวของสารสกัดมะขามป้อมในลิโพโซม



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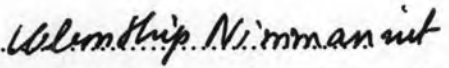
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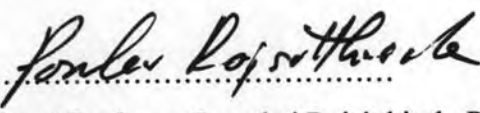
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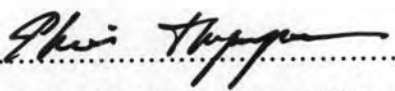
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มะขามป้อมมีประโยชน์มากมายเกี่ยวกับฤทธิ์ทางชีววิทยา ได้แก่ ฤทธิ์ในการต่อต้านอนุมูลอิสระ, ฤทธิ์ยับยั้งเอ็นไซม์ไทโรซิเนส, ฤทธิ์ในการต่อต้านจุลชีพ และป้องกันการเหนียวจากรงสีที่ก่อให้เกิดการทำลายของโครโมโซมที่เกิดจากรังสี อย่างไรก็ตาม ความคงตัวของมะขามป้อมเป็นเรื่องที่ต้องพิจารณา ดังนั้นวัตถุประสงค์ของงานวิจัยคือเปรียบเทียบความคงตัวของสารสกัดมะขามป้อมในลิโปโซมและสารละลายบัฟเฟอร์ที่พีเอช 5.5 และ 7.4 ส่วนประกอบของผนังเมมเบรนของลิโปโซมคือไขมันของฟอสฟาติดีลโคลีนจากไข่แดง (ไลโปยอี 80) และโคเลสเตอรอล ในอัตราส่วน 2:1 โคโยโมล และโคเลสเตอรอลเอสเทอร์ เป็นสารเพิ่มความคงตัว ความเข้มข้นของสารสกัดมะขามป้อม แปรผันจาก 1, 2, 3, 4 และ 5 มิลลิกรัมต่อมิลลิลิตร ความสามารถในการกักเก็บสาร และความคงตัวทางเคมีวัดจากปริมาณของสารฟีนอลทั้งหมดในสารสกัดมะขามป้อม โดยใช้ ยูวี-วิสทิเบิล สเปกโตรโฟโตเมตรี เปอร์เซ็นต์การกักเก็บสารสูงสุดคือ 52.83% ได้จากการเตรียมลิโปโซมด้วย 1 มิลลิกรัมต่อมิลลิลิตรของสารสกัดมะขามป้อมเตรียมที่พีเอช 5.5 นอกจากนี้การเตรียมข้างต้นมีความคงตัวอย่างน้อย 12 สัปดาห์ โดยเก็บในตู้เย็นที่ 4 องศาเซลเซียส ขนาดอนุภาคของลิโปโซมเก็บที่ 0 และ 12 สัปดาห์ ไม่แตกต่างกันมีนัยสำคัญ โดยขนาดอนุภาคคือ 5.790 ± 0.756 และ 5.553 ± 0.647 ไมโครเมตร ตามลำดับ โดยสรุปแล้วสารสกัดมะขามป้อมในลิโปโซมมีความคงตัวมากกว่าในสารละลายบัฟเฟอร์

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KEY WORD: *PHYLLANTHUS EMBLICA* / LIPOSOMES / STABILITY

PORNPEN KONGAIMPITEE: STABILITY OF *PHYLLANTHUS EMBLICA* EXTRACT IN LIPOSOMES. THESIS ADVISOR: ASSOC. PROF. UBONTHIP NIMMANNIT, Ph.D., THESIS COADVISOR: ASST. PROF. PORNCHAI ROJSITTHISAK, Ph.D., 139 pp.

Phyllanthus emblica L. (*P. emblica*) has many benefits in biological effects including anti-oxidant activity, anti-tyrosinase activity, anti-microbial activity and protection against radiation-induced chromosome damage. However, the stability is a major concern of *P. emblica* extract. Therefore, the objective of this research is to compare the stability of *P. emblica* extract in liposomes and buffer solutions at pH 5.5 and 7.4. The lipid compositions of liposomal membrane were egg phosphatidylcholine (Lipoid E80) and cholesterol at 2:1 molar ratio with cholesterol ester as a stabilizer. The concentrations of *P. emblica* extract were varied at 1, 2, 3, 4 and 5 mg/mL. The encapsulation efficiency and chemical stability were determined by measuring the amount of total phenolic compounds using UV-VIS spectrophotometer. The highest percent encapsulation efficiency was found at 52.83% obtained from liposome formulation containing 1 mg/mL of *P. emblica* extract prepared at pH 5.5. In addition, the above preparation was stable at least 12 weeks when stored in a refrigerator at 4°C. The particle size of the liposomes stored for 0 and 12 weeks was not significantly different with the mean particle sizes of 5.790 ± 0.756 and 5.553 ± 0.647 μm , respectively. It can be concluded that *P. emblica* extract in liposomes is more stable than that in buffer solutions.

Field of Study : Pharmaceutical Technology

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LIST OF ABBREVIATIONS

cm	centimeter
g	gram
GAE	gallic acid equivalent
h	hour
HPLC	high performance liquid chromatography
LUVs	large unilamellar vesicles
M	mole per liter
mg	milligram
μ g	microgram
min	minute
mL	milliliter
μ L	microliter
MLVs	multilamellar vesicles
mM	millimole per liter
μ m	micrometer
μ M	micromole per liter
nm	nanometer
nM	nanomole per liter
R ²	coefficient of determination
rpm	revolution per minute
RSD	relative standard deviation
sec	second
SUVs	small unilamellar vesicles
T _c	phase transition temperature
TEM	transmission electron microscope
TFA	trifluoro-acetic acid
UV	ultraviolet
VIS	visible