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**FORMULATION OF ASIATICOSIDE OBTAINED
FROM *CENTELLA ASIATICA* IN
MICROEMULSION GEL**

Mrs. Suvipha Sermboonsang

**A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Pharmaceutical Technology
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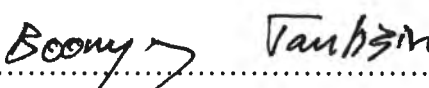
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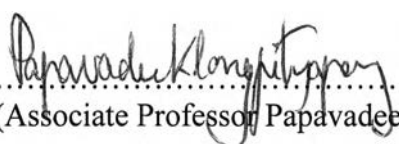
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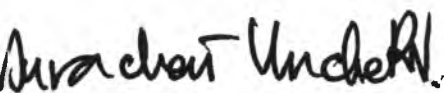
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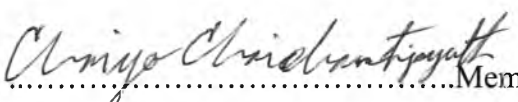
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การศึกษานี้เป็นการพัฒนาสูตรตำรับไมโครอิมัลชันเจลที่มีเอเชียติโคซายด์
ซึ่งสกัดจากไบบับก เอเชียติโคซายด์บริสุทธิ์เป็นที่ต้องการในทางยาและเครื่องสำอาง แต่ผลิต
ภัณฑ์ทั่วไปมักใช้สารสกัดหยาบที่สกัดด้วยเอทานอลซึ่งมีเอเชียติโคซายด์ปริมาณต่ำ ในการ
ทดลองนี้เอเชียติโคซายด์บริสุทธิ์สกัดได้จากไบบับก โดยใช้เอทานอล เฮกเซน คลอโรฟอร์ม
และ บิวทานอล ในการสกัด การทำให้เอเชียติโคซายด์บริสุทธิ์โดยผ่านเจลฟิลเตรชัน
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สกัดและวิเคราะห์เอเชียติโคซายด์ที่บริสุทธิ์ด้วยเครื่องเฮฟพีแอลซี เครื่องไฮรีโซลูชันลิควิด
โครมาโทกราฟีที่ประกอบด้วยอิลีกโตรสเปกโตรเมตรี ไอโอไนเซชัน ทำให้ได้เอเชียติโคซายด์ที่
สามารถนำมาเตรียมไมโครอิมัลชันเจล 6 ตำรับ โดยตำรับไมโครอิมัลชันเจลของ
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เอเชียติโคซายด์ผ่านคราบงูในฟรานซ์เซลล์ด้วยค่าฟลักซ์สูงกว่าตำรับอื่น

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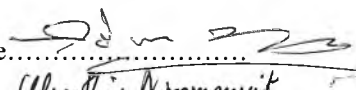

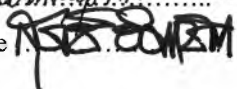
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##4376859833 PHARMACEUTICAL TECHNOLOGY (INTERNATIONAL)

KEY WORD: *CENTELLA ASIATICA*, ASIATICOSIDE, HIGH PERFORMANCE LIQUID CHROMATOGRAPHY, HIGH RESOLUTION LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY, ELECTROSPRAY IONISATION, MICROEMULSION GEL.
 SUVIPHA SERMBOONSANG: **FORMULATION OF ASIATICOSIDE OBTAINED FROM *CENTELLA ASIATICA* IN MICROEMULSION GEL.** THESIS ADVISOR: ASSOC. PROF. UBONTHIP NIMMANNIT Ph.D. THESIS COADVISOR: ASST. PROF. SURACHAI UNCHERN Ph.D., 134 PAGES. ISBN 974-170-831-9.

This study was aimed to develop microemulsion gels containing **asiaticoside** from *Centella asiatica*. Presently purified **asiaticoside** is needed in cosmetic and pharmaceutical formulations. But mostly used just crude extract from ethanol with low content of **asiaticoside**. In this study **asiaticoside** was isolated from fresh *C. asiatica* leaves by extraction with ethanol, hexane, chloroform, and buthanol. **Asiaticoside** was purified by gel-filtration chromatography which using Sephadex LH-20 as the stationary phase and recrystallization from methanol. The isolation & characterisation of **asiaticoside** were done by using high performance liquid chromatography (HPLC) & high resolution liquid chromatography-mass spectrometry (LC-MS) with electrospray ionisation. Six formulations of **asiaticoside** with different oil component and surfactant of microemulsion gel were prepared to evaluate the best formulation. Microemulsion gel containing **asiaticoside** was comprised of capric/caprylic triglyceride : polyoxyethylene 10 oyl ether (Brij 97[®]) : distilled water : **asiaticoside** = 15 : 70 : 14 : 1. This formulation penetrated through shed snake skin in modified Franz diffusion cell with higher flux value than other microemulsion gel formulation.

| | | | |
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LIST OF SYMBOLS AND ABBREVIATIONS

| | | |
|-----------------|---|---|
| °C | = | degree Celsius |
| conc. | = | concentration |
| cm | = | centimeter |
| cm ² | = | square centimeter |
| cm ³ | = | cubic centimeter |
| CP | = | centipoises |
| CV | = | coefficient of variation |
| e.g. | = | for example (exempli gratia) |
| et al. | = | and others (et alii) |
| etc. | = | and so on (et cetera) |
| df | = | degree of freedom |
| SS | = | sum of square |
| g. | = | gram |
| hr. | = | hour |
| HLB | = | hydrophilic-lipophilic balance |
| HPLC | = | high performance liquid chromatography |
| LC-MS | = | liquid chromatography-mass spectrometry |
| i.e. | = | that is (id est.) |
| k | = | release rate constant (% min ^{-1/2}) |
| K | = | degradation rate constant (% days ⁻¹) |
| M | = | molar |
| mg | = | milligram |

| | | |
|----------------|---|--------------------------------------|
| min | = | minute |
| ml | = | milliliter |
| mM | = | millimolar |
| max | = | wavelength at maximum absorption |
| MW | = | molecular weight |
| n | = | number of sample |
| nm | = | nanometer |
| N | = | Newton |
| No. | = | number |
| o/o | = | oil in oil or organic solvent in oil |
| o/w | = | oil in water |
| P | = | probability |
| pp. | = | page |
| r | = | correlation coefficient |
| R ² | = | coefficient of determination |
| rpm | = | revolutions per minute |
| RH. | = | relative humidity |
| SD | = | standard deviation |
| μg | = | microgram |
| μl | = | micro liter |
| μm | = | micrometer |
| UK lab. | = | United Kingdom Laboratory |
| UV | = | ultraviolet |
| UN | = | undetectable |