

CHAPTER V

CONCLUSIONS

The effects of oils, surfactants and cosurfactants on the ternary and pseudoternary phase diagrams of microemulsions and permeation were investigated.

The results of this study were as follows:

1. Regarding the effects of oils, isotropic areas on the ternary and pseudoternary phase diagram from IPM showed greater values than caprylic/capric triglyceride.

2. Microemulsion could be prepared from all surfactants with a good stability. Brij 30 gave the high isotropic zone in the even system with and without cosurfactant.

3. The addition of cosurfactant into the ternary system, isotropic area on phase diagram tended to increase. The increasing effect is limited to the concentration of cosurfactant because of opposing properties of surfactant and cosurfactant. From the study, propan-2-ol gave demonstrated superior property than propylene glycol.

4. From the permeation profiles using the Franz diffusion and 40% ethanol in PBS as receptor fluid, IPM in the microemulsion provided permeability of asiaticoside, madecassic acid and asiatic acid significantly higher than caprylic/capric triglyceride as oil in most ternary systems.

5. The permeation profile in microemulsion without the addition of cosurfactant, Alatone exhibited the highest asiaticoside permeability. Whereas the permeability of madecassic acid and asiatic acid from Tween 80: Span 80 (2:1) and Brij 97 were significantly higher than other surfactants.

6. Propan-2-ol at the ratio of surfactant to cosurfactant of 1:1 demonstrated the higher permeability of asiaticoside, madecassic acid and asiatic acid than those obtained from the ratios of 2:1 and 4:1.

7. The microemulsion system containing IPM: Tween 80: Span 80: Propan-2-ol: water at the ratio 30: 20: 10: 30: 10 were prepared. From the permeation study of the microemulsion with *Centella* triterpene extract, the permeabilities of asiaticoside, madecassic acid and asiatic acid were obviously high from this formulation. Whereas the formulation added with the prepared *Centella asiatica* extract, showed the higher permeability of asiaticoside than that added with *Centella* triterpene extract.

8. The microemulsion formulations were stable in the presence or absence of *Centella asiatica* extract under the heating-cooling cycle.