ABSTRACT

Para Methoxycinnamic Acid (PMCA) in nanoemulsion drug delivery systems using soybean oil, corn oil and virgin coconut oil (VCO)

Tristiana Erawati M.

This study was aimed to determine the role of the type of vegetable oils. Soybean oil, corn oil and virgin coconut oil (VCO) were used as the oil phase in nanoemulsion drug delivery systems of p-methoxycinnamic acid (PMCA). The effect of differences of fatty acid contents in lipid of the oils on the characteristics of the nanoemulsion were observed in terms of, droplet morphology by TEM and droplet size by Delsa Nano. In addition, this research was also studied the effect on the release rate and penetration rate by Franz diffusion cell using cellophane membrane and full skin of male Wistar rats, and anti-inflammatory test of the PMCA in nanoemulsion was observed at mice’s ear skin.

Result of this research, showed the droplet morphology of the nanoemulsion that used soybean oil and VCO appeared more spherical than nanoemulsion using corn oil. Droplet size of nanoemulsion, the value of the release rate, and the rate of penetration of PMCA in nanoemulsion using soybean oil, corn oil and VCO were 57.3 ± 7.6, 62.1 ± 5.4, 30.6 ± 3.1 nm, 0.4243 ± 0.0123, 0.3925 ± 0.0100, 0.4024 ± 0.0339 g/cm², and 0.1102 ± 0.0122, 0.1398 ± 0.0384, 0.1513 ± 0.0314 g/cm²/minute, respectively. The percentage decrease of edema thickness by PMCA in nanoemulsion using soybean oil, corn oil and VCO were 114.13, 115.14 and 91.08 % respectively. The result of statistical test using one-way ANOVA (α = 0.05) resulted that there was no significant differences between the droplets size of the nanoemulsion using soybean oil and corn oil, and both are larger than nanoemulsion using VCO. There were no significant differences between the value of the release rate and the rate of penetration of PMCA and percentage decrease of edema thickness by PMCA in nanoemulsion using soybean oil, corn oil and VCO.

In conclusion, the differences in lipid fatty acid contents of soybean oil, corn oil and VCO influenced on the droplet morphology and droplet size of the nanoemulsion, but had no effect on the release rate, the rate of penetration and anti-inflammatory effects of PMCA.

Keywords: p-methoxycinnamic acid (PMCA), nanoemulsion, soybean oil, corn oil, virgin coconut oil (VCO), release rate, rate of penetration, anti-inflammatory effect.