ABSTRACT

THE CHARACTERISTICS AND PENETRATION OF DICLOFENAC SODIUM IN SOLID LIPID NANOPARTICLES SYSTEM FROM CARBOMER 940 GEL BASES PREPARATION (SLN System of Diclofenac Sodium-Stearic Acid–Tween 80–Propilen Glycol)

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The present study was designed to determine characteristics and penetration of diclofenac sodium in solid lipid nanoparticles (SLN) system from Carbomer 940 gel bases preparation. The compositions of SLN was diclofenac sodium 1%, stearic acid 10%, Tween 80 8% and propylene glycol 15%, which had been characterized in the previous study. There were two formulas in this study. Formula I was Carbomer gel without SLN system but with the same compound as SLN and formula II was Carbomer gel with SLN system. The result showed that SLN system didn't have effect on consistency, color and odor, but formula with SLN system has higher pH and spreadability. Data analyze showed that pH of formula I was 6,03 ± 0,02 and formula II was 6,25 ± 0,07. Spread diameter of zero load for formula I was 5,67 ± 0,12 and formula II was 6,67 ± 0,25. Spreadability of formula I was 0,0277 ± 0,0006 and formula II was 0,0338 ± 0,0013. Abdominal skin from male wistar rat was used as penetration membrane for this study. The penetration rate of diclofenac sodium, named flux, from formula I and formula II were 0,8529 ± 0,1659 $\mu g/cm^2/min$ and 0,5842 ± 0,0131 $\mu g/cm^2/min$. Membrane permeability for formula I and formula II were $(1,0011 \pm 0,1947) \times 10^{-4}$ cm/min, and $(0,6596 \pm 0,0148) \times 10^{-4}$ cm/menit. The results were analyzed statistically using Independent sample t-test with degree of freedom 4 (df) and degree of confident 95% ($\alpha = 0,05$). Research result revealed that penetration rate of diclofenac sodium from Carbomer gel with SLN system are slower than Carbomer gel without SLN system. Membrane permeability to diclofenac sodium for Carbomer gel with SLN system are lower than Carbomer gel without SLN system.

Keywords : diclofenac sodium, solid lipid nanoparticles (SLN), penetration, carbomer 940, stearic acid, tween 80