

ABSTRACT

Characterization and Entrapment Efficiency of Diethylammonium Diclofenac with *Nanostructure Lipid Carrier* (NLC) in Different Ratio of Lipid (Stearic Acid : Oleic Acid = 60:40 ; 70:30 ; 80:20)

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The aim of this study was to determine the effect of lipid ratio of stearic acid and oleic acid on the physical characteristics as well as the entrapment efficiency of diethylammonium diclofenac with Nanostructure Lipid Carrier (NLC) system. Diethylammonium diclofenac is Non Steroid Anti Inflammatory Drugs (NSAID) widely use in the treatment of osteoarthritic and rheumatoid arthritic. An arthritic condition demands a controlled-release drug delivery sistem for a prolong period to satisfy the goals of the treatment like reducing pain and inflamation. Based on these problems, NLC is suitable drug delivery system for diethylammonium diclofenac. NLC were prepared by melt emulsification and high speed homogenization methods. In the formulation of NLC diethylammonium diclofenac, 3 different lipid ratios were used, including ratio of 60:40, 70:30, and 80:20. Diethylammonium diclofenac served as active ingredient, stearic acid as solid lipid, oleic acid as liquid lipid, and Tween 80 as surfactant. NLC were characterized for organoleptic test, pH, viscosity, particle morphology, particle size dan polydispersity index (PI), FTIR, Differential Thermal Analysis (DTA) and entrapment efficiency. Viscosity was determined by cone and plate viscometer. Shape and particle morphology was determined by Transmission Electrone Microscopy (TEM). All diethylammonium diclofenac NLC (60:40; 70:30; 80:20) formulas showed the pH value of $6,157 \pm 0,010$; $6,219 \pm 0,008$; and $6,326 \pm 0,014$. The viscosity value of $226,7 \pm 115,9$; $288,8 \pm 73,4$; and $323,7 \pm 44,5$ cPs. The measurement result of particle size of three different lipid ratios showed value of $351,9 \pm 34,8$; $518,1 \pm 92,3$; and $1370,0 \pm 326,5$ nm. Test of morphology particle diethylammonium diclofenac NLC by using Transmission Electrone Microscopy (TEM) indicated the spherical particle shape. The result of DTA showed that diethylammonium diclofenac was

entrapped into lipid nanoparticle. All the NLC formula showed no interaction between active ingredient and the component of NLC through FTIR spectra test. The result of entrapment efficiency test of all formulas (60:40; 70:30; 80:20) was $73,858 \pm 0,840 \%$; $73,654 \pm 2,079\%$; and $73,172 \pm 1,488\%$.

Keyword : diethylammonium diclofenac, NLC, physicochemical characterization, entrapmeny efficiency

