ABSTRACT

Solid Lipid Nanoparticle (Sln) Drug Delivery System Of Para Methoxy Cinnamic Acid (PMCA) Using Binary Lipid Beeswax-Glyceride Monostearic

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The ideal solid lipid nanoparticle (SLN) has the particle size less than 1000 nm with high drug entrapment (DE). As lipid base of SLN, beeswax can produce stable particle size but low DE. In contrast with glyceride monostearic (GMS), it can produce high DE but particle size is not stable. The use of binary lipid beeswax-GMS was aimed to overcome each limitation and to form an optimum SLN characteristics therefore increases the efectiveness of SLN as drug delivery system. Para methoxy cinamic acid (PMCA) was used as drug model.

Several ratios of binary lipid beeswax-GMS were characterized by DTA and FXRD prior use as SLN lipid base. SLN was made by high shear homogenization (HSH) method. SLN base and PMCA-loaded SLN were also characterized in terms of the morphology, particle size, viscosity and PMCA entrapment. PMCA release and PMCA penetration through full thickness Wistar rat skin were studied. The effectivity of binary lipid SLN as drug delivery system of antiinflamatory PMCA was determined based on oedema reduction of subplantar hindpaw rat that has been induced with caragenan injection. It was also based on the histology study of mice ear skin that has been induced by croton oil

The results showed that the differences of ratio of beeswax-GMS binary lipid had different lipid character, such as: melting temperature, orderness of lipid latice crystal and the number of polimorfism, that effected SLN character. SLN of binary lipid beeswax-GMS in ratio 50:50 made by high shear homogenization method has an optimal character (small particle size, homogen and physically stable). The antiinflamatory effect of PMCA-loaded binary lipid SLN was found to be 1.23 fold compared to PMCA loaded SLN produced by single lipid beeswax and 1.073% fold compared to PMCA loaded SLN made by single lipid GMS.

Based on Partial Least Square (PLS) statistic model analysis with α=0,05, it was concluded that the character of SLN-PMCA binary lipid beeswax-GMS in ratio 50:50 (such as: particle size, viscosity and drug entrapment) influenced PMCA flux release, furthermore it influenced positively PMCA topical antiinflamatory.

Key words: Drug delivery system, SLN, binary lipid, beeswax, glyceryl monostearic, PMCA