Research in Pharmaceutical Sciences, 2012;7(5)
School of Pharmacy and Pharmaceutical Sciences
Isfahan University of Medical Sciences

Preparation and characterization of solid lipid nanoparticles containing *Quercus infectoria* and *Terminalia chebula* extract as depigminting agents: optimization of formulations using experimental design

F. Emamipour*, M. Ansari, F. Sharififar

Pharmaceutics Research Center, Faculty of Pharmacy, Kerman University of Medical Sciences, Kerman, Iran

Background and Aims: Solid lipid nanoparticles (SLN) have emerged as carrier for controlled and targeted drug delivery system and improving the stability of ingredients. *Terminalia chebula* and *Quercus infec*toria extract were shown to have tyrosinase inhibitor activity. The main aims of this study were formulation and evaluation of factors affecting the entrapment efficiency (EE) of *Q. infectoria* and *T. chebula* extract into the SLN and formulation of a gel containing the SLNs.
Methods: SLN loaded with *Q. infectoria* and *T. chebula* extract was prepared with a high shear homogenization technique. Gallic acid was assigned as delegate of polyphenols in the extract and determined by a simple spectrophotometric method developed and validated in this study. L8 Taguchi orthogonal array with 7, 2 level factors (pH, amount of lipid phase, amount of surfactant (3 types), time and speed of homogenization) was implemented to determine the most influencing factor . Signal to noise ratio was calculated for EE% of poly phenols. Particle size , Zeta potential, transmision electron microscopy and stability of 8 formulation were investigated . Box Behnken method was constructed for equation modeling the 3 most important parameters with 17 experiments and 3 level factors. Physical stability and release of the active ingredient were studied.
Results: Experimental design showed that tween 80, tween20 and time of homogenization have more effects on EE%. Results showed that particles size of the SLN was in the range of 260-437nm, Zeta potential -6.92 through 10.6 mv, and EE% 25.53%-90%. Results depict that 84.9% and 52.7% of gallic acid content of the simple gel and gel containing the SLN were released after 72 hrs, respectively.
Conclusions: This study demonstrated that Gallic acid can be efficiently incorporated into SLNs and that the drug release from SLNs was slower as compared to gallic acid gel.

Keywords: *Quercus infectoria*; *Terminalia chebula*; Solid lipid nanoparticle; Experimental design