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Preparation and characterization of solid lipid nanoparticle (SLN) - containing poloxamer gel

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Background and Aims: Solid lipid nanoparticles (SLN), are a new generation of lipidic nanostructured carriers that have the potential of application through different routes. In this investigation it was decided to prepare an in-situ forming SLN-containing poloxamer gel for controlled drug delivery.
Methods: Solid lipid nanoparticles (SLN) were prepared by diluting a warm oil-in-water (o/w) microemulsion containing stearic acid, surfactants, and cosurfactants in cold water. After purification, the mean particle size and zeta potential of the particles were determined. SLN particles then were dispersed in a thermosensitive poloxamer 407 solution in aqueous medium at 4°C at different concentration and its effects on gel forming ability and rheological behavior of the system were investigated. Thermal behavior of the system was determined by DSC. Stability and PH of system were also evaluated.
Results: SLN size was found to be 130 ± 2 nm and zeta potential of the SLN dispersion was obtained to be – 44 ± 0.2 .DSC analysis confirmed inclusion of SLN into poloxamer gel at room temperature. Sol gel transition temperature checked invivo and invitro at temperature 4 to 37°C. Rheological studies showed that presence of SLN decrease gelling time and temperature sweep revealed interaction between poloxamer and SLN.
Conclusions: Present results show that the prepared system has a proper thermoresponsive and rheological behavior in the presence of SLN and has a potential for application in controlled drug delivery.

Keywords: Solid lipid nanoparticle; In situ forming system; Poloxamer gel; Controlled release