Development of fluconazole controlled release formulations based on solid lipid nanoparticles for topical delivery.

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Abstract

Abstract: To overcome the disadvantage of the oral routes of antifungal fluconazole, new topical formulation was prepared in the form of solid lipid nanoparticles (SLNs) formulations. The fluconazole-SLNs were manufactured by modified high shear homogenization and ultrasonication method technique in which geleol was used as the solid lipid phase, tween 80, cremophor RH 40 and poloxamer 407 series as the surfactants. The produced fluconazole SLNs were characterized for particle size, zeta potential, entrapment efficiency, morphology by TEM and in-vitro release profiles. Also the optimized fluconazole-SLNs formulation was incorporated into carbopol gel and investigated for in-vitro antifungal activity. The results of the study revealed that fluconazole loaded SLNs showed extremely spherical shape having enriched core drug loading pattern with uniform particle size. A relatively high drug entrapment efficiency ranging from 41.45 to 77.94 % was obtained with zeta potential values lie between -24 to -29.8 mV indicating good stability. DSC examination revealed that fluconazole encapsulated in SLNs was in the amorphous state. In-vitro release study showed a sustained release of fluconazole from the SLNs up to 24 h following Higuchi order equations. In conclusion, SLNs with excellent particle size, high entrapment efficiency and controlled drug release can be produced representing a promising carrier for topical delivery of fluconazole.
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