World Academy of Science, Engineering and Technology
International Journal of Pharmacological and Pharmaceutical Sciences
Vol:8, No:7, 2014

Preparation and in vivo Assessment of Nystatin-Loaded Solid Lipid Nanoparticles for Topical Delivery against Cutaneous Candidiasis

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Abstract : Solid lipid nanoparticles (SLNs) have gained great attention for the topical treatment of skin associated fungal infection as they facilitate the skin penetration of loaded drugs. Our work deals with the preparation of nystatin loaded solid lipid nanoparticles (NystSLNs) using the hot homogenization and ultrasonication method. The prepared NystSLNs were characterized in terms of entrapment efficiency, particle size, zeta potential, transmission electron microscopy, differential scanning calorimetry, rheological behavior and in vitro drug release. A stability study for 6 months was performed. A microbiological study was conducted in male rats infected with Candida albicans, by counting the colonies and examining the histopathological changes induced on the skin of infected rats. The results showed that SLNs dispersions are spherical in shape with particle size ranging from 83.26±11.33 to 955.04±1.09 nm. The entrapment efficiencies are ranging from 19.73±1.21 to 72.46±0.66% with zeta potential ranging from -18.9 to -38.8 mV and shear-thinning rheological Behavior. The stability studies done for 6 months showed that nystatin (Nyst) is a good candidate for topical SLN formulations. A least number of colony forming unit/ ml (cfu/ml) was recorded for the selected NystSLN compared to the drug solution and the commercial Nystatin® cream present in the market. It can be fulfilled from this work that SLNs provide a good skin targeting effect and may represent promising carrier for topical delivery of Nyst offering the sustained release and maintaining the localized effect, resulting in an effective treatment of cutaneous fungal infection.

Keywords : candida infections, hot homogenization, nystatin, solid lipid nanoparticles, stability, topical delivery
Conference Title : ICPPS 2014 : International Conference on Pharmacy and Pharmaceutical Sciences
Conference Location : Zurich, Switzerland
Conference Dates : July 30-31, 2014