# Preparation and stability evaluation of urea-loaded solid lipid nanoparticles for topical application.

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**Background and Aims:** Among lipid nanocarriers, solid lipid nanoparticles (SLN), are multipotential and biocompatible nanostructures which have versatile applications. These particles can also be used for improvement of drug stability. In this study, SLN containing urea were prepared for improved stability.

**Methods:** Solid lipid nanoparticles were prepared by solvent evaporation/diffusion method. Stearic acid and surfactant were dissolved in aceton as a volatile solvent and was then mixed with aqueous solution of urea, dispersed in cold water containing Tween 80 as the stabilizer. Obtained nanoparticles were characterized by determination of mean particle size, zeta potential and entrapment efficiency (EE). Stability of system was then checked by measuring particle size, differential scanning calorimetry (DSC) and entrapment efficiency (EE) over a six months period.

**Results:** SLN mean particle size was obtained to be $130 \pm 4$ nm and more than 50% of the particles were found to be below 200 nm after 90 days of storage at 4 C. Zeta potential of nanoparticles was showed to be about -17 Mv. Initial entrapment efficiency (EE) was obtained to be about 40%. There were no significant changes in entrapment efficiency during stability studies in refrigerator. Thermal analysis was revealed no drug-excipient incompatibilities and good stability during 3 month storage at 4 C.

**Conclusions:** In conclusion, it seems that SLN is a suitable and stable formulation for urea for topical application.

**Keywords:** Solid lipid nanoparticles; Urea; Physical and chemical stability