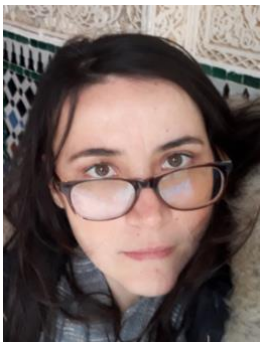
FP-15

DOI: 10.14232/syrptbrs.2023.70



Solid lipid particles as carriers for sustained drug release

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Solid lipid particles (SLP) are carrier systems based on a high melting point lipid as a solid core. They are derived from an oil-in-water emulsion by exchanging the liquid lipid (oil) with a solid lipid. SLP has emerged as an alternative colloidal carrier among all colloidal carriers due to its advantages. Recently, SLP has been widely used for skin delivery due to their safe interaction with skin layers, and improved skin permeation. However, encapsulation of hydrophilic drugs into the hydrophobic lipid of SLP is a major problem because during the production process the drug tends to partition towards the aqueous phase.

The aim of the present study was to enhance the skin delivery of metformin by making SLP containing metformin using the rotor-stator homogenization method. To achieve the optimum skin delivery for metformin, the effects of the ratio of two surfactants (soy lecithin: tween 60) on particle properties and their performance were investigated. *In vitro* drug release test was performed under skin conditions on phosphate buffer saline pH 7.4.

Results showed that the highest entrapment efficiency of 86.70% was obtained for formulation with a low concentration of soy lecithin and high concentration of tween 60 whereas the smallest particle size (0.3µm) was obtained for the formulation with the highest soy lecithin concentration and low concentration of tween 60. The drug release profiles show that the percentage of free metformin that passes through the membrane reached 100% in the first hour. The release profile of the SLP exhibited a rapid release in the first hour of around 30% of the encapsulated metformin. The release then slowed, to plateau at around 35% by the 2 hours. The drug release from lipid formulations was prolonged remarkably in comparison with the drug solution.