

Rational design of lyotropic liquid crystal based carriers for Resveratrol transdermal administration

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Introduction : Lyotropic liquid crystals (LLCs), soft nanostructured systems combining anisotropic order with a gels' mechanical stability, have become promising alternatives towards improving biodisponibility, pharmacological effectiveness, and patient compliance for transdermal delivery of active principles [1]. Because of their unique properties and structure, LLCs show potential use as drug delivery systems for both hydrophilic and hydrophobic active principles, especially for transdermic administration [2]. Resveratrol, 3,4,5-trihydroxy-trans-stilbene, a natural phenolic compound, has shown interest due to having a variety of beneficial health effects, such as anti-inflammatory, antioxidant, and antimicrobial activities [3].

The aim of this work is developing lyotropic liquid crystal based DDS, suitable for Resveratrol delivery, a cosmetic antioxidant, and study the influence of the active ingredient encapsulation on the morphology of the self-assembled surfactant mesophases.

Materials and methods : LLCs obtained at various concentrations of Pluronic P123 in water were characterized using SAXS, polarized optical microscopy (POM) and rheology and used for the encapsulation of the hydrophobic active ingredient.

Results : The systems with minimum content of surfactant and various lyotropic liquid crystal morphologies were selected as carriers for the hydrophobic active principle. The presence of cosmetic oily phase Bakuchiol in the formulation modify the hydrophobicity of the surfactant and results in changes of LLC morphology , depending on the oil concentration. Encapsulation efficiency and Resveratrol release studies were performed and showed promising results.

Conclusions : LLCs were prepared, using Pluronic P123 and water. The obtained systems show a high drug loading efficiency and exhibit prolonged release profile of Resveratrol, proving their use as transdermal drug delivery systems.

Keywords:

drug delivery, surfactants, self-assembly.

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