COMBINATION OF SLNs AND TRANSCUTOL® P FOR IMPROVING 8-MOP SKIN DELIVERY

Giulia Pitzanti[1], Antonella Rosa[2], Mariella Nieddu[2], Donatella Valenti[1], Francesco Lai[1] and Chiara Sinico[1]

[1]*Dept. of Life and Environmental Sciences, University of Cagliari, Italy*
[2] *Dept. of Biomedical Sciences, University of Cagliari, Italy*

8-methoxypsoralen (8-MOP) is the most employed drug in psoralens + UVA (PUVA) therapy for the treatment of psoriasis. In PUVA, once psoralens are orally or topically administered, the patient is exposed to long-wave ultraviolet A radiation[1]. Since the oral administration of 8-MOP is associated with a wide range of side effects, topical PUVA should be preferred[2]. However, the existing topical 8-methoxypsoralen formulations, do not achieve good skin drug permeability as well as drug penetration to deeper skin layers[2].

The aim of this study was to formulate solid lipid nanoparticles (SLNs) able to increase 8-MOP skin delivery thanks to the synergic effect with the penetration enhancer Transcutol.

SLNs were prepared by a hot homogenization technique followed by ultrasonication. Different concentrations of the penetration enhancer were added to the formulations. SLNs' size, polydispersity index, zeta potential, entrapment efficiency and cytotoxicity were determined. In vitro skin penetration and permeation studies were also performed.

Freshly prepared SLNs showed a mean diameter within the range 126-130 nm, were homogeneously dispersed and possessed highly negative zeta potential and high entrapment efficiency. These parameters were almost kept constant over one month of storage at room temperature. In vitro skin penetration and permeation studies demonstrated that as Transcutol concentration increased, the % of 8-MOP accumulated in each skin layers increased. No cytotoxicity was observed for all the formulations.

Overall, the combination of SLNs and Transcutol increases 8-MOP accumulation in the deeper skin layers in comparison to the control without Transcutol. Moreover, the addition of Transcutol does not increase the nanoparticles cytotoxicity. The results indicated that the SLNs prepared in this study can be promising alternatives to the conventional 8-MOP formulations employed for psoriasis therapies.

(1) Sinico et al., *J. Drug Del. Sci. Tech.*. **2006**, 16, 115–120.
(2) Kassem et al., *Int. J. Pharm.* **2017**, *517* (1–2), 256–268.

Contact information of the corresponding author: Giulia Pitzanti

address: Department of Life and Environmental Sciences, University of Cagliari, Italy

phone: +39 3356271563

email: giulia.pitzanti@unica.it