Liposomes as Carriers for Lauric Acid: Physicochemical Characterization in Different pH Conditions

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Introduction and Objectives. Acne vulgaris, one of the most common skin diseases, is mainly due to skin colonization by *Propionibacterium acnes*. Alternative therapies against *P. acnes* include treatment with fatty acids, in particular lauric acid (LA). Protonated LA is sparingly water soluble and incorporates in liposomal bilayers. The aim of this study is to obtain LA containing liposomes maximizing LA contents, maintaining liposomal stability and defined internal aqueous compartment. ***Methods***. Large unilamellar vesicles (LUV´s) were prepared by extrusion through 100 nm filters. LUV´s were characterized by phase transition temperatures, Tm, and, under shelf conditions, by encapsulation efficiency, LA *in vitro* skin permeation. LUV´s morphological features were characterized by small angle X-ray scattering (SAXS) and Cryo-electron transmission microscopy. ***Results***. Stability assays showed that, regardless LA concentration, formulations were more stable at higher pH´s, when LA is mostly in the form of laurate. Differential scanning calorimetry, DSC, indicated that, at low pH´s and higher LA concentrations, the interaction between the bilayer and LA is favored, increasing Tm and reducing cooperativity. Incorporation of hydrophilic probes confirmed the presence of an internal aqueous compartment in DPPC:LA LUVs. LA permeated the skin of a Franz cell assay and a maximum rate is obtained at 30% LA. LUVs morphology was quite different from the expected spherical form, and vesicles with more than one bilayer were observed. ***Conclusion***. These results may lead to optimization of conditions for a dermatological formulation and increased effectiveness of LA delivery to the target site.

Keywords: Lauric acid, liposomes, LUV.
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