

## Calorimetric Study of DPPC and Lauric Acid Liposomes for Use in Cosmetics

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**INTRODUCTION.** Lauric acid, LA, a natural fatty acid, has demonstrated significant antimicrobial activity against *Propionibacterium acnes*, a gram positive microorganism associated with acne vulgaris, one of the most common skin problems. The study of liposomes containing LA, with potential for dermatological application in the prevention and treatment of acne, may help to elucidate previous studies in this area and contribute to the use of a new alternative formulation against this disease.

**OBJECTIVES.** Prepare and characterize multilammelar liposomes, MLVs, of 1,2-dipalmitoyl-sn-glycero-3-phosphocholine (DPPC) with different molar ratios of LA, verifying its effect on these liposomes phase transition.

**MATERIAL AND METHODS.** LA (Cibraquim) and DPPC (Avanti Polar Lipids), at DPPC:LA molar ratios ranging from 0 to 50:50 were solubilized in chloroform. The solvent was evaporated under a nitrogen stream to obtain a film, left 40 min under vacuum. The films were hydrated with 10 mM Tris-HCl pH 7.4 buffer, vortexed and placed in ultrasound bath, forming MLVs. The MLVs suspensions were analyzed by Differential Scanning Calorimetry (VP-DSC, MicroCal).

**RESULTS AND DISCUSSION.** LA does not change the main phase transition ( $T_m \approx 42^\circ\text{C}$ ) and enthalpy ( $\Delta H \approx 8.5 \text{ kcal/mol}$ ) values of DPPC MLVs. Moreover the width at half height ( $\Delta T_{1/2}$ ) of the samples containing different molar ratios of DPPC:LA shows lower cooperativity degree when compared to DPPC alone ( $\Delta T_{1/2} = 0.25^\circ\text{C}$ ). A four-fold increase of  $\Delta T_{1/2}$  was observed for samples with LA above 30%. The pre-transition of DPPC changes in MLVs with 10, 20 and 30% LA and, above 30%, the pre-transition disappears.

**CONCLUSION.** Lauric acid decreases the cooperativity of the bilayer of MLVs liposomes depending of DPPC:LA molar ratio. High percentage of LA eliminate the pre-transition of MLVs. The study of the stability and characterization MLVs formulations containing LA, under different conditions, is important due to its application in cosmetic formulations against *P. acnes*.

Keywords: Lauric acid, liposomes, phase transition.

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