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An investigation on the surface properties of lipid nanoparticles

Claudia Elizabeth Mora-Huertas
National University of Colombia, Colombia

Co-Author
Aldemar Gordillo-Galeano
National University of Colombia, Colombia

The characterization of lipid nanoparticles is necessary for a better understanding of their performance as carrier of active molecules. Size and surface charge have been widely used to this end. However, other relevant surface parameters remain largely incomplete. As a contribution on this regard, this research work reports a comparative study on the surface of Solid Lipid Nanoparticles (SLN), Nanostructured Lipid Carriers (NLC) and nanoemulsions (NE) that were prepared by the emulsion-diffusion method using trimyristin and caprylic/capric triglyceride for the lipid matrix and poloxamer 188 as surfactant. Zeta potential behavior, surface hydrophobicity, surfactant surface coverage and stability after addition of electrolytes were investigated as surface properties of the nanosystems. Results evidence that the amount of adsorbed surfactant varies among the nanodispersions in the order: SLN > NLC > NE. On the contrary, the surface hydrophobicity shows the order NE > NLC > SLN; just the opposite. In addition, SLN are more susceptible to salt-induced flocculation than NE, although the estimated zeta potential values for all the investigated nanosystems vary between -6 mV and -8 mV. A single integrated view of these findings underlines that, in spite of the use of the triglyceride and surfactant of the same nature to prepare the lipid nanosystems, their particle structure and physical state strongly influence the surface properties in these kinds of lipid colloids. Consequently a marked incidence in their in vivo behavior could be expected, that must be considered when they are intended to develop pharmaceutical products.

Biography

Claudia Elizabeth Mora-Huertas, Pharmacist, MBA, PhD. Titular Professor. Department of Pharmacy, Universidad Nacional de Colombia.

cemorah@unal.edu.co

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