

Development of Nanostructured Lipid Carriers Made of Cocoa Butter: A Preliminary-study [†]

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[†] Presented at The Sixth International Meeting of Pharmaceutical Sciences (RICiFa), November 10-12, 2021, Córdoba, Argentina

Received: 26.04.2022; Revised: 4.05.2022; Accepted: 6.05.2022; Published: 8.05.2022

Abstract: This work proposes the design and development of a novel nanostructured lipid carrier (NLC) with a lipid composition that includes cocoa butter as a solid lipid because it is an accessible, safe, and low-cost material. A screening of lipids components for NLC preparation was carried out, followed by a mixture design with Minitab 18® to optimize the solid lipid:liquid lipid ratio in ranges from 0 to 10% at a constant amount of aqueous phase (85%) and surfactant (5%). All nanocarriers were characterized in terms of average particle size (APS), polydispersity index (PDI), zeta potential (ZP), and scanning electron microscopy (SEM). A preliminary nanocarrier composed of Precirol® ATO5, Labrafil® M1944-CS, and cocoa butter was obtained. All NLCs showed an APS less than 200 nm, a PDI less than 0.2, and a negative PZ. No significant differences in APS were observed under storage conditions (Room temperature and 4°C) for the first 30 days. NLC with a solid lipid:liquid lipid (3:7) ratio presented an APS=(110±15) nm, a PDI=(0.11±0.01), and ZP=(-17±1) mV, which was selected for future assays due to its colloidal stability. Moreover, this NLC tended to show a spherical morphology. The new nanocarrier is a promising drug delivery system made up of accessible materials and obtained by a potentially scalable process.

Keywords: nanostructured lipid carriers; cocoa butter; drug delivery system.

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Funding

This research was funded by Fondo Nacional para Investigaciones Científicas y Tecnológicas (FONCyT), grant number PICT 2018-N°1834, and a grant of the Consejo Nacional de Investigaciones Científicas y Técnicas de la República Argentina (CONICET).

Acknowledgments

The authors are grateful for the donation of lipids from Gattefosé pharmaceutical company.

Conflicts of Interest

The authors declare no conflict of interest.

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