
# PO60 - 25004 - LIPID-BASED NANOSTRUCTURES AS STRATEGIES TO ENHANCE CURCUMIN'S BIOAVAILABILITY: EFFECT OF CARRIER OIL PHYSICAL STATE

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**Abstract**

Curcumin, a lipophilic compound derived from turmeric, is attacking considerable attention in food science due to its wide range of health-promoting functions, such as anti-inflammatory, anticarcinogenic and antioxidant activities. However, its health benefits are limited by its poor solubility in aqueous media, low bioavailability and quick degradation in aqueous solutions. Nano-based delivery systems can be a strategy to overcome some of these issues, increasing curcumin's stability and solubility in aqueous solutions and enhancing curcumin's permeability in the human body.

In this context, three formulations of lipid-based nanostructures (i.e. nanoemulsions (NE), solid lipid nanoparticles (SLN) and nanostructured lipid carriers (NLC)) with the carrier oil at different physical states (i.e. liquid, solid and liquid/solid mixture, respectively) have been tested as strategies to enhance the bioavailability of curcumin. These lipid-based nanostructures have been submitted to the *in vitro* harmonized static digestion and their cytotoxicity and cellular uptake were evaluated using the Caco-2 cell line.

All nanostructures presented some instability at gastric phase, however NE presented the highest increase of particle size while SLN and NLC exhibited similar values. NE showed the highest values of curcumin's bioaccessibility and stability, while SLN presented the lowest values. SLN and NLC presented similar values of FFA released while NE presented the highest values. All nanostructures presented no cytotoxic effects at all concentrations tested, and SLN showed to cross the cellular layer more easily. Therefore, it can be concluded that the physical state of the carrier oil exhibited a high influence on the behavior of particles during digestion process and on cellular permeability.

This work contributes to the development of nanostructures with improved bioavailability and on their application in food sector by gathering fundamental data on digestion, absorption and safety of different nanostructures.


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