

Antimicrobial and Cytotoxic Effect of Nanostructured Lipid Carriers for Dermal Applications

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Nanostructured lipid carriers (NLC) as 2nd generation of lipid nanoparticles are promising systems to provide efficient skin delivery of therapeutic bioactive compounds. The use of vegetable oils in NLC formulations have numerous benefits for the skin due to their antioxidant, anti-inflammatory and antimicrobial activity. Many components naturally present in vegetable oils have been shown to have beneficial properties. This work aimed to assess the influence of the structure of nanostructured lipid carriers (NLCs) containing vegetable (sunflower, olive, corn, peanut, coconut, castor and sweet almond) and essential (eucalyptus) oils on epidermal cells bioavailability and its antimicrobial activity against four *Staphylococcus aureus* strains. Different solid lipid (SL): liquid lipid (LL) ratios were used to study the structural properties and bioavailability of the particles. The choice of vegetable oil influenced physicochemical stability by changing the diameter of NLC formulations (between 160nm and 185nm) and z-potential (between -46mV and -61mV). Crystallinity of the lipid matrix was also influenced by chemical composition of different oils. All the systems (independent of the type of oil) were characterized by concentration-dependent cytocompatibility toward human epidermal keratinocyte (HaCaT) and human dermal fibroblasts (HDFn). The SL:LL ratio in NLC formulations showed higher impact on human dermal fibroblasts than on human epidermal keratinocyte, with no toxic effect on both cell lines. Moreover, antimicrobial properties were found in all 16 systems with the different grade of efficiency. These results pose a strong argument that the using natural oils in nanocarriers formulation can be explored as a promising carrier for skin treatment.

Biography:

Dragana P C de Barros is senior research scientist, member of Biomolecular Diagnostic Laboratory at the Institute of Chemical and Biological Technology António Xavier, Portugal, with the scientific interest including the crossover between experimental and modelling studies in the area of bioprocess and cutaneous drug delivery systems development. She explores the potential of biodegradable lipid carriers based on natural compounds to capture polyphenolic compounds and the mechanism of transdermal delivery. DPC de Barros published 20 peer-reviewed scientific papers. She also has various communications published in the context of academic conferences, oral and poster communications in international and national conferences.