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Antimicrobial activities of biocompatible nanocapsules loaded with essential oils and their cyto/genotoxicity in human keratinocyte cell line

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Essential oils (EOs) of *Thymus capitatus* (Th) and *Origanum vulgare* (Or) were encapsulated in biocompatible poly(ϵ -caprolactone) nanocapsules (NCs).

These nanosystems exhibited antifungal, antibacterial and antibiofilm activities against *Candida albicans*, *Staphylococcus aureus* and *Escherichia coli*. Th-NCs and Or-NCs were more effective against all tested strains than pure EOs and at the same time were not cytotoxic on human keratinocyte cell line (HaCaT). The genotoxic effects of EO-NCs and EOs on HaCaT were evaluated using a comet assay for the first time, revealing that Th-NCs and Or-NCs did not induce DNA damage compared with untreated control HaCaT cells in vitro after 24 h. The cells morphological changes were assessed by label-free live cell Raman imaging.

This study demonstrate the ability of poly(ϵ -caprolactone) nanocapsules loaded with thyme and oregano EOs to reduce microbial and biofilm growth and could be an ecological alternative in the development of new antimicrobial strategies.

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Essential oils, cyto/genotoxicity, antimicrobial activities.