Antimicrobial, antibiofilm and cytotoxic effect of essential oils and essential oil-based nanoemulsions

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The development of antibiotic resistance is a great challenge to the medical field and there is a pressing need to look for new and improved antimicrobials. Aromatic plants and their components have been examined as potential inhibitors of bacterial growth and most of their properties have been linked to essential oils and other secondary plant metabolites. Essential oils from different sources have been widely promoted for their potential antimicrobial capabilities. Nanoemulsions (NEs) are colloidal dispersions in which main components are oil, emulsifying agents and aqueous phases and previous studies showed that essential oils incorporated in NEs exerted an higher antibacterial activity. In order to test the inhibiting activity on bacterial growth and biofilm production, essential oils and the newly constructed NEs were tested towards clinical multidrug resistant bacterial Gram-negative and Gram-positive strains. Activity of synthesized NEs in tumor cell lines of different origins was also evaluated.