

**TITLE:** CYTOTOXICITY ASSAY OF NANOEMULSION FROM GERANIOL AND ESSENTIAL OIL OF PALMAROSA (*Cymbopogon martinii*) AND INHIBITORY ACTION AGAINST *Cutibacterium acnes* STRAINS.

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**ABSTRACT:**

Essential oils (EO) are secondary metabolism products of plant and they are known for antimicrobial properties. The major component of palmarosa EO is geraniol (70-80%). Incorporation of EO and geraniol in nanoemulsions guarantee value to dermocosmetic formulations because they are compounds of Brazilian biodiversity. Thus, the desire was to evaluate the nanoemulsions antibacterial activity against *Cutibacterium acnes* and the cytotoxicity of these compounds against keratinocytes. Nanoemulsion with EO and geraniol were prepared according to values of lipophilic-hydrophilic balance (LHB) with Span 80 and Tween20. Special nanoemulsion containing silver nanoparticles (AgNP) was prepared and tested against *C. acnes*. Resazurin Microtiter Assays (REMA) was performed to determine the Minimum inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) for palmarosa EO and geraniol (G) against American Type Culture Collection (ATCC) strains of *Cutibacterium acnes* 11827, 11828 and 6919. Cytotoxicity assays were performed to evaluate the cytotoxic potential of formulations against epidermal cells (keratinocytes or HaCaT cells). The basis of cell viability was the MTT viability assay and the cells were incubated in oven for 24h at 37°C with 5% CO<sub>2</sub>. The formulations were translucent and MIC and MBC values decreased for 11827 strain (from 1250 to 39,06 µg /mL) and for 11828 strain (from 5000 to 312,5 µg /mL) when the compounds was included in nanoemulsions and when AgNP was added in the formulation. Smaller droplet sizes facilitate penetration of the active compound. The best cytotoxicity results were to nanoemulsions with AgNP. Cell viability was above 90% after treatment with the compounds with AgNP. MIC for strains 11828 and 11827 (nanoemulsion+AgNP with EO) and strain 11827 (nanoemulsion+AgNP with G) had values above cytotoxicity assays (625 and 312,5 µg /mL, respectively). Thus, we can conclude that the nanoemulsions were successful in their preparation, have antimicrobial potential and they are not cytotoxic for nanoemulsions with silver.

**Keywords:** Silver nanoparticles, AgNP, antibacterial activity, *P. acnes*.

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