P3.6 - OREGANO ESSENTIAL OIL: AN EFFECTIVE AND NON-TOXIC APPROACH FOR PREVENT OR TREAT RESISTANT CANDIDA SPECIES

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ABSTRACT

Vulvovaginal candidiasis (VVC) is one of the most prevalent vaginal infectious diseases, and the emergence of drug-resistant *Candida* strains has presented a growing challenge in its treatment. This highlights the urgent need to develop effective and non-toxic alternative treatments. In this context, essential oils (EOs) have emerged as a promising alternative considering low toxicity and high antimicrobial activity.

This work is divided into two parts, the first consists of evaluating the effect of the vapor phase of oregano EO (VP-OEO) on biofilms of antifungal-resistant *Candida* species (*Candida albicans* and *Candida glabrata*) quantified by colony forming units' enumeration and determine their mode of action by flow cytometry. Interestingly, the VP-EOs has shown to be more effective against *Candida* growth than their liquid form. Indeed, the results revealed high antifungal activity of VP-OEO against these drug-resistant strains, significantly reducing biofilm formation and mature biofilms, with impact on membrane integrity and metabolic activity of the fungal cells. The second part consists of the design and evaluation of nanoencapsulated OEO (KNP-OEO) as another alternative application of OEO for VVC treatment. These nanoparticles provided stability to OEO and controlled release of the EO. The results demonstrated complete inhibition of *C. albicans* growth. Moreover, in *in vivo* assay with BALB/C female mice, a single intravaginal application of KNP-OEO reduced *C. albicans* growth and preserved a healthy vaginal microbiota, including *Lactobacillus* species.

In conclusion, these studies highlight the promising efficacy of OEO as an alternative for VVC treatment. Both approaches, VP-OEO and OEO-KNP, showed effective antifungal activity against drug-resistant strains while preserving vaginal health. These therapeutic options not only combat antifungal resistance, but also potentially propose a safer option for women's health due to their

natural characteristics. However, further research is needed to confirm these promising results and advance the development of these alternative VVC therapies.

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