TITLE: EVALUATION OF THE ANTIFUNGAL ACTIVITY OF AN ESSENTIAL OIL-BASED MICROEMULSION OF *ROSMARINUS OFFICINALIS* INTENDED TO THE TREATMENT OF FUNGAL KERATITIS.

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ABSTRACT:

Ocular diseases caused by fungi are considered of high gravity, and their occurrence have increased significantly over the recent years. Fungal keratitis, which affects the corneal tissue, is the most common. Its diagnosis is challenging and the treatment, that usually occurs late, increases the chances of morbidity of the patient. The reduced number of antifungal drugs, coupled with important physiological limitations of the eye, significantly reduces the therapeutic success. Thus, it is important to develop new antifungal formulations for improvement of the treatment and increase the chances of cure. This study aimed to evaluate a microemulsion containing essential oil of *Rosmarinus officinalis* (rosemary) against fungal species that potentially causes keratitis. The safety of the microemulsion was assessed using the chorioallantoic membrane assay (HET-CAM), according to the pre-established score. The antifungal activity was evaluated against *Candida albicans* ATCC 36802, *C. parapsilosis* ATCC 22019, *C. krusei* ATCC 20295, *Fusarium graminearum* IMI 263189 and *Aspergillus parasiticus* IMI 242695, which were selected by their relevance in clinical fungal keratitis. The method employed was the microdilution and the minimum inhibitory concentration was determined. Microemulsion that presented the percentage of inhibition higher than 70% and 90% were considered positive against filamentous fungi and yeasts, respectively. The formulation with 2.5% of essential oil (22.43 mg/mL) had an average score of 1.5 in the HET-CAM test, being classified as non-irritating to mild irritant. The minimum inhibitory concentrations obtained in the antifungal activity assay were: 10.59 mg/mL for *C. albicans*, (99.1% inhibition); 0.33 mg/mL for *C. parapsilosis*, (96.1% inhibition); 5.29 mg/mL for *C. krusei*, (100% inhibition); 10.59 mg/mL for *F. graminearum*, (90.5% inhibition) and 10.59 mg/mL for *A. parasiticus*, (79.5% inhibition). The current research provides significant results concerning the antifungal activity of the microemulsion containing essential oil of rosemary against microorganisms related to fungal keratitis. Further studies will be realized in animal models to determine the efficacy and safety of this formulation in fungal keratitis treatment.

KEYWORDS: Antifungal Susceptibility Tests; Essential Oil; Fungal Keratitis; Microemulsion; *Rosmarinus officinalis*.