ABSTRACT

The antifungal properties of citrus essential oils are well documented; however, it is currently unknown which components are responsible for such effects. The aim of this study was to compare the effect of *Citrus sinensis* var Valencia peel essential oil and two of its major components (limonene and citral) in spore germination of *Aspergillus niger*. Orange peel essential oil was obtained by microwave assisted extraction and analyzed by means of gas chromatography and mass spectrometry. The essential oil obtained, limonene, and citral were applied at different concentrations (0 to 11800 ppm) in a dispersed phase to evaluate spore germination and mycelial growth and the results were analyzed by determination of absorbance and transmittance of inoculated media during 8 days of incubation, and fungal biomass, respectively. Main compounds identified in orange peel essential oil were limonene, citral, 1-r-α-pinene and linalool; of which limonene represented 93.41%. During the experiments a linear decrease in absorbance was observed as a function of concentration for each compound, while transmittance showed an opposite behavior. Both represented the decrease in biomass production, and therefore spore germination, with increased compound concentration. Maximum inhibition of mycelial growth was obtained only with the essential oil and citral. The minimal inhibitory concentrations of orange peel essential oil and citral for spore germination of *A. niger* were 300 and 200 ppm, respectively, while the MIC for limonene was not reached, even at higher concentrations. Although limonene is the major compound of orange peel EO it cannot be considered as strong inhibitor of this mold since large concentrations were needed to observe any effects. On the other hand, citral and the essential oil showed a stronger antifungal effect. These results indicate that the antifungal effect of orange peel essential oil is due to the synergistic effect of its different constituents.

Keywords: Orange peel essential oil, Aspergillus niger*, antifungal effects*