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PP18. Anticandidal activity of *Inula helenium* root essential oil: synergistic potential, anti-virulence efficacy, and mechanism of action

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Inula helenium L. (elecampane) is a widely occurring perennial plant species in Europe and East Asia, belonging to the Compositae family. Roots of *I. helenium* have been traditionally used for the treatment of various diseases and it is officially listed in pharmacopeias as a diuretic, diaphoretic, expectorant and anthelmintic [1]. The present study investigated the anticandidal potential of *I. helenium* essential oil, isolated from roots and chemically characterized by GC and GC/MS. Antifungal efficacy was studied using the microdilution method and the determined minimal inhibitory concentrations (MICs) were further used to study a potential synergistic interaction of the oil and an antifungal. Together with this, the mode of action (sorbitol and cholesterol assays) and anti-virulence effects (antibiofilm, germ-tube reducing and phospholipase-inhibitory activities) were also investigated.

The results showed that the isolated essential oil contained alantolactone and isoalantolactone as the dominant constituents (65.8 and 25.5%, respectively). The obtained MICs varied among the strains, but the oil generally exhibited a high anticandidal potential (0.009-0.312 mg/mL). The oil displayed a high synergistic effect in combination with the antifungal agent nystatin. Experiments on the mode of action demonstrated that the oil affected the cell membrane function, due to the enhancement of the oil's activity (lowering of active concentrations) in the presence of sorbitol and cholesterol. Considering the virulence factors, the oil exhibited an antibiofilm activity, as well as a very high germ-tube reducing potential (93.3-100% at MIC). Additionally, a complete inhibition of the enzyme phospholipase in the presence of *I. helenium* root essential oil was demonstrated.

Based on the presented results, the essential oil of *I. helenium* can be considered as a good candidate for a natural agent that can be further explored in the sense of candidiasis treatment.

References:
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