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Anticandidal efficacy of cinnamon oil against planktonic and biofilm cultures of *Candida parapsilosis* and *Candida orthopsilosis*.

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Abstract

Candida parapsilosis is yeast capable of forming biofilms on medical devices. Novel approaches for the prevention and eradication of the biofilms are desired. This study investigated the anticandidal activity of sixteen essential oils on planktonic and biofilm cultures of *C. parapsilosis* complex. We used molecular tools, enumeration of colony-forming units, the colourimetric MTT assay, scanning electron microscopy (SEM) and a checkerboard assay coupled with software analyses to evaluate the growth kinetics, architecture, inhibition and reduction in biofilms formed from environmental isolates of the *Candida parapsilosis* complex; further, we also evaluated whether essential oils would interact synergistically with amphotericin B to increase their anticandidal activities. Of the environmental *C. parapsilosis* isolates examined, *C. parapsilosis* and *C. orthopsilosis* were identified. Biofilm growth on polystyrene substrates peaked within 48 h, after which growth remained relatively stable up to 72 h, when it began to decline. Details of the architectural analysis assessed by SEM showed that *C. parapsilosis* complex formed less complex biofilms compared with *C. albicans* biofilms. The most active essential oil was cinnamon oil (CO), which showed anticandidal activity against *C. orthopsilosis* and *C. parapsilosis* in both suspension (minimum inhibitory concentration-MIC-250 and 500 µg/ml) and biofilm (minimum biofilm reduction concentration-MBRC-1,000 and 2,000 µg/ml) cultures. CO also inhibited biofilm formation (MBIC) at concentrations above 250 µg/ml for both species tested. However, synergism with amphotericin B was not observed. Thus, CO is a natural anticandidal agent that can be effectively utilised for the control of the yeasts tested.

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