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Biofilm-forming ability of Candida species isolated from oral infections

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Background: *Candida albicans* is the most prevalent fungus in oral cavity. Of importance, the *Candida* species are well known for its ability to form biofilms that are recognized as a major virulence attribute for this yeast. Objectives: to evaluate the biofilm forming capacity of the clinical isolates *Candida* species from oral candidiasis patients.

Material/methods: The biofilm forming ability of oral *Candida* spp. isolates were evaluated at Fungal Culture Collection of Oral Microbiology and Pathology Testing Service Laboratory of the Dentistry Departament of Faculdade da Serra Gaúcha. All *Candida* strains were subcultured from thawed suspensions of pure clinical isolates. Prior to each experiment, the yeasts were streaked diluted on Sabouraud dextrose agar and incubated at 37°C for 48 h. Biofilms were quantified using traditional methods, that is, crystal violet (CV), tetrazolium (XTT) reduction and colony-forming unit assays (CFU). The kinetics of biofilm formation were measured by 2,3-bis(2-methoxy-4-nitro-5-sulfophenyl)-5-[(phenylamino)carbonyl]-2H-tetrazolium hydroxide [XTT] reduction; each isolate was tested at 6, 12 and 24h. Biofilms were categorized based on biofilm biomass (high, medium and low) In addition, *Candida* ATCC strains were used as controls for each experiment. Data were analysed using Kolmogorov –Smirnov's test indicated normal distribution for biofilm data, as well one-way analysis of variance (ANOVA) and subsequent post hoc analysis (Tukey's test) for multiple strains comparisons. *P* 0.05 was used for definition of statistical significance. This study was conducted according to the principles expressed in the Declaration of Helsinki.

Results: Seventy-eigth percent of oral isolates non-*albicans Candida* species had biofilm forming ability. For the other hand, 58% of *C. albicans* were biofilm formers. In addition, an significant difference of values between biofilm formers and non-biofilm formers was observed in the non-*albicans Candida* species ($p < 0.005$). No difference statistically significant in *C. albicans* strains were observed. We observed that the oral isolates of *C. parapsilosis* are strong biofilm producers. Already *C. albicans a*nd *C. tropicalis* are moderate producers. In addition, biofilm formation is dependent on clinical origin.

Conclusion: Non-*albicans Candida* species are quantitatively superior biofilm producers than *C. albicans*. Biofilm formation ability of the non-*albicans Candida* species is crucial in the development of oral candidiasis. Thus, biofilm formation is dependent of the species of *Candida* spp. In this way, biofilm production is the most important virulence factor of genus *Candida.*