

P0542 Antifungal loaded organo-inorganic sol-gel coating decreases *Candida albicans* biofilm formation

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Background: *Candida albicans* prosthetic joint infections (PJI) represent less than 1% of the total, but they are difficult to treat and display a high recurrence rate. These type of infections involve fungal biofilm development and frequently result in invasive candidiasis and/or candidemia. In this work, we evaluate two separate organo-inorganic sol-gel coatings loaded with different concentrations of fluconazole and anidulafungin in order to prevent and treat PJI caused by *C. albicans*.

Materials/methods: A hybrid organo-inorganic sol-gel coating was selected using a mixture of two organopolysiloxanes: 3-methacryloxypropyltrimethoxysilane (MAPTMS) and tetramethoxysilane (TMOS) in a molar ratio of 1:2. Control coatings without additions of antifungal (C) and three coatings loaded with different saturation percentages of anidulafungin (A) or fluconazole (F) were used. All the sol-gel formulations were deposited by dip-coating on titanium discs manufactured by powder metallurgy followed by a thermal treatment at 60 °C for 1 hour.

C. albicans ATCC 10231 adherence study was performed by introducing each disc in 3ml containing 10⁶ CFU/ml in RPMI 1640 medium + glucose 2%, MOPS 1% and incubated at 37°C and in 5% CO₂ for 48 h. After incubation, samples were washed three times, sol-gel coating was scraped with sterile wood sticks and planktonic cells were estimated by absorbance at 600 nm, and CFU/cm² were estimated by drop plate method. Experiments were performed in triplicate. Results were analyzed by pairwise comparisons using Wilcoxon test with a level of statistical significance of 0.05 for CFU/cm².

Results: Results are shown in figure 1. Significantly, F100 reduced 85% the presence of planktonic cells (p.value=0.0008) but it did not significantly reduce biofilm development. A100 decreased the presence of planktonic cells in 78% (p. value=0.0000) and reduced 83% of biofilm development (p-value=0.0209).

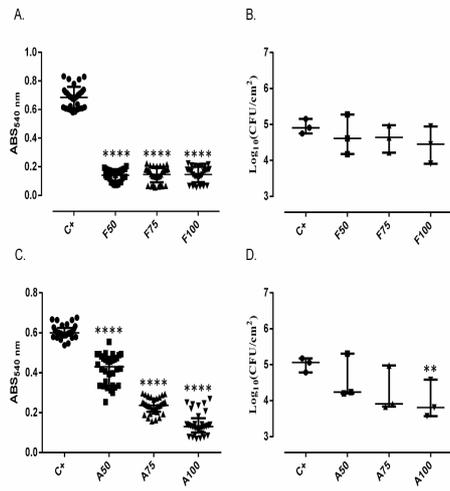


Figure 1. Results of the effect of organo-inorganic sol-gel loaded with fluconazole (F50, F75, F100) or anidulafungin (A50, A75, A100) on planktonic (A, C) and biofilm (B, D) CFU counts.

Conclusions: The organo-inorganic sol-gel coating loaded with anidulafungin is able to reduce fungal load in both planktonic and sessile state fungal cells. A100 could be a promising coating for preventing *C. albicans* PJI.

