

P824 Medical-grade silicone coated by AC7 biosurfactant inhibits fungal biofilm formation preserving biocompatibility

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Introduction and Aim: Coating of medical-grade materials with biosurfactants (BS) produced by bacteria is a promising strategy to limit pathogenic biofilm growth on the surface of implantable medical devices. This study aimed at assessing fungal antibiofilm activity and biocompatibility of medical-grade silicone coated by a BS lipopeptide.

Methods: AC7BS was extracted from cultures of *Bacillus subtilis* AC7 according to Rivardo et al. 2009. Sterilized medical-grade silicone elastomeric disks were BS coated by physical absorption (dipping in 2 mg/ml AC7BS for 24 h and drying). Sterilized uncoated disks were used as controls. Biofilm of *Candida albicans* IHEM 2894 on treated and control disks was formed as described by Ceresa et al. 2016.

The anti-biofilm activity was evaluated at 1.5, 24, 48 and 72h. Biofilm biomass, fungal viability and percentage of biofilm-covered surface were quantified by crystal violet staining, MTT assay and scanning electron microscopy (SEM), respectively. Cytotoxicity was evaluated by LDH assay (ISO 10993) using human normal lung fibroblasts (MRC5), and testing AC7BS concentrations equal to 2.0, 1.0, 0.5, 0.4, 0.3, 0.2, 0.1 mg/mL.

Inhibition of biofilm biomass, fungal viability and biofilm-covered surface was studied in respect to controls. Statistical significance was considered for $p < 0.05$.

Results: AC7BS coated silicone was able to significantly counteract fungal biofilm in terms of biomass, cells viability and biofilm-covered surface at all tested time-points (Fig.1). No cytotoxic effect on eukaryotic cells was observed at AC7BS concentrations up to 0.5 mg/mL.

Conclusions: AC7BS was able to significantly inhibit fungal biofilm formation on medical grade silicone. The long-term effect on fungal biofilm and the low cytotoxicity make this BS a promising compound for realizing implantable silicone medical devices with effective antibiofilm properties.

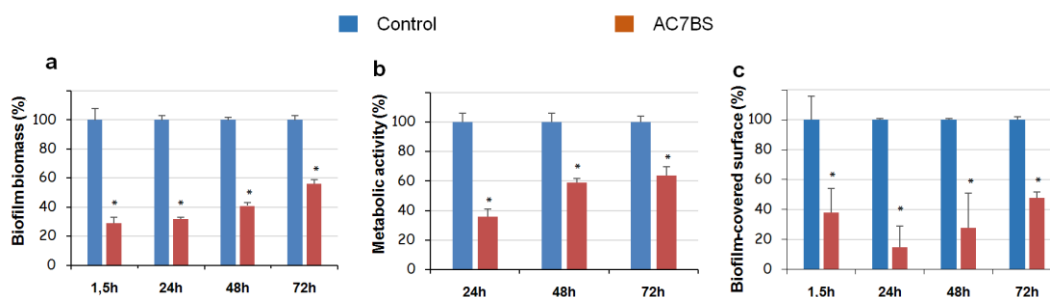


Figure 1: Antibiofilm activity of AC7BS coated silicone disks. Inhibition of biofilm biomass, fungal viability and biofilm-covered surface is reported as percentage of controls (uncoated disks). Time-points refer to biofilm maturation age. * $p < 0.05$.

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