

**TITLE:** Sophorolipids produced by *Candida*: production, stability and anti-adhesion activity in catheters.

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## **ABSTRACT**

Urinary infections are associated with the use of catheters and often involved with the formation of biofilms, which are polymeric structures that create a safe environment for multiplication and acquisition of resistance to antibiotics by adhered microorganisms. Among the strategies to prevent biofilm adhesion the use of active biomolecules is a trend and within them the biosurfactants (BS) stand out. BS are compounds derived from the secondary metabolism of microorganisms such as bacteria, filamentous fungi and yeasts. Sophorolipids produced by yeasts of the genus *Candida* sp. demonstrate easy recovery of the culture medium, high productivity and good substrate conversion. This study aimed to evaluate the stability and anti-adhesive activity of sophorolipids produced by *Candida* against bacteria of medical importance and biofilm forming in urinary catheters. Isolates from *Candida* were inoculated in mineral medium supplemented with glucose for the production of sophorolipids. After centrifugation of the growth medium the supernatant was subjected to organic extraction to evaluate its stability in the pH ranges 2, 4, 6, 8, 10, 12 and 13 and thermal stability at 0.01, 0.1 and 1, 0 mg.mL<sup>-1</sup> of glycolipid, submitted to 100°C for periods of 20, 40, 60, 100 and 140 min. Coated process was performed with cylinders of siliconized latex catheters (1 cm x 0.5 mm) in the presence of sophorolipids or SDS (positive control) at 37°C, 150 rpm in different times 0, 4 and 12h. Anti-adhesion assay was performed in the absence of coating and in the presence of sophorolipids or SDS in different concentrations as 0.02, 0.2 and 2 mg.mL<sup>-1</sup> for evaluation of the anti-adhesion of *Escherichia coli* ATCC 25922, *Enterococcus faecalis* ATCC 19433 and *Candida albicans* ATCC 14053. At 1 mg mL<sup>-1</sup> the lowest surface tension was observed at pH 6. The effect of the heat treatment at different time intervals demonstrated that there was no significant change in the surface tension of the BS as a function of time. At 2 mg mL<sup>-1</sup> the sophorolipids inhibited the adhesion of *Escherichia coli* ATCC 25922, *Enterococcus faecalis* ATCC 19433 and *Candida albicans* ATCC 14053 by 97, 57 and 97%, respectively. In all the treatments the effect of the BS was concentration dependent. The stability in ranges of pH and temperature makes it very promising for application in industrial and environmental segments. The anti-adhesive effect demonstrates important anti-biofilms effect in biomaterials for medical application.

**Keywords:** sophorolipids, *Candida*, stability, anti-adhesion.

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