Inhibition of *Candida albicans* biofilm formation on medical-grade silicone-disk by a *Lactobacillus*-derived biosurfactant

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Nowadays *Candida albicans* is the fungus most frequently associated with the formation of biofilms on a wide variety of medical devices and affects mainly immune-compromised patients. The presence of biofilm, in fact, protect the microorganism from host defenses, as well as significantly reduce its susceptibility to antifungal agents. Development of new technologies based on the control of the *Candida* sp. biofilm growth is, thus, foreseen as a major breakthrough in the clinical practice and preventive medicine.

Lactobacilli have recently caught the attention of medical and scientific researchers due to the extraordinary health enhancing benefits they exhibit. These bacteria produce a wide variety of secondary metabolites with anti-microbial activity, such as hydrogen peroxide, lactic acid, bacteriocins. In addition, lactobacilli interfere with the adhesion and the biofilm formation of different pathogens such as *Candida albicans* on a wide variety of medical devices by the production of adhesion inhibitors, such as biosurfactants. Pre-coating with biosurfactants can be used as a preventive strategy to inhibit pathogenic biofilm growth on catheters and other medical insertional materials reducing the use of pharmaceuticals.

The aim of the present study was to investigate the ability of the biosurfactant produced by *Lactobacillus* sp. CV8LAC strain to inhibit *Candida albicans* biofilm formation on medical-grade silicone disks. A *C. albicans* pathogenic biofilm-producer strain, isolated from central venous catheter, was incubated in 12 wells-plates containing SE disks for 24h, 48h and 72h in presence of the biosurfactant. Reduction of fungal biofilm formation was evaluated by viable cell counting method. Assays were carried out in triplicate and were repeated on different days. Co-incubation with 2000 μg/ml of CV8LAC biosurfactant significantly (p<0.05) reduced *C. albicans* biofilm formation on SE disks of 87.42%, 91.14% and 89.42% respectively at 24h, 48h and 72h. The anti-adhesion activity of CV8LAC biosurfactant against *C. albicans* was also evaluated in pre-coating experiments in 12-well microtiter plates. SE disks were pre-coated with a 2000 μg/ml biosurfactant solution or with Phosphate-buffered Saline (PBS) only, for control disks. After incubation at 37° C for 24h, the disks were transferred in a new 12-well plate and incubated with a *C. albicans* suspension. Anti-adhesion activity was evaluated by viable cell counting method. Assays were carried out in triplicate and were repeated on different days. Pre-treatment of SE disks with CV8LAC biosurfactant significantly (p<0.05) reduced *C. albicans* adhesion of 88.9% at 90 minutes and biofilm formation of 60%, 68.6% and 31.8% respectively at 24h, 48h and 72h.

**Keywords** *Lactobacillus* sp.; biosurfactant; *Candida albicans*; biofilm