TITLE: Coexistence with *Corynebacterium striatum* modulates virulence of *Staphylococcus aureus* by inhibition of biofilm formation

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ABSTRACT:
Corynebacterium striatum and *Staphylococcus aureus* have been reported as pathogens of harmful infections such as bacteremia and sepsis. The ability of biofilm formation in protheses and invasive medical devices considerably increases pathogenicity and resistance against antimicrobial agents. Microbe-microbe interactions between *S. aureus* and *Corynebacterium* spp. may occur in cases from acute infections, including chronic polymicrobial. In this study, monotypic and/or heterotypic biofilm formation by *S. aureus* and *C. striatum* were evaluated by assays on circular glass coverslips (13.0 × 0.2 mm). Briefly, bacterial strains were grown in Tryptic Soy Broth for 48h at 37°C in aerobiosis. Subsequently, bacterial strains were centrifuged at 13.400 rpm for 10 min and resuspended in 1mL TSB with 1% glucose in turbidity equivalent to O.D. 0.4 at λ680. Infected coverslips with 200µL of the *S. aureus* strain were incubated for 30 min, then 200µL of *C. striatum* strains were added and cultured for additional 48h at 37°C. The coverslips were washed with PBS with sterile silica grains for removal of adherent sessile cells from glass surfaces. Bacterial suspensions were submitted to dilutions up to 10^{-8} and spots were cultivated in selective media for counting of CFU/mL^{-1} of *S. aureus* and *C. striatum* strains. Similarly, the assessment of inhibition of staphylococcal biofilm formation was performed to heterotypic biofilm formation, using the Time Kill method with modifications. The heterotypic biofilm formed by *S. aureus* strains plus *C. striatum* presented lower CFU/mL count for the first species in all analyzes after 48h of cultivation. The use of *C. striatum* culture supernatant for 48h as an inhibitory agent of staphylococcal biofilm formation showed that the longer the exposure time of *S. aureus* to the solution, the lower the count of cells adhered to the abiotic surface. The results suggest that *C. striatum* may stand out in relation to *S. aureus* in heterotypic biofilm, as it has a higher CFU count. The supernatant of *C. striatum* culture for 48 hours can regulate the sessile life state of *S. aureus* to planktonic, observed by the increase in the number of CFU in the supernatant in relation to the number of cells adhered to the substrate. In conclusion, present findings suggest the possibility of coexistence with *C. striatum* in limiting *S. aureus* virulence potential inhibition of ability of adherence to abiotic surfaces and biofilm formation.

Keywords: biofilm, *Corynebacterium striatum*, hydrophilic surface, *Staphylococcus aureus*

Development Agency: This study was financed in part by the National Council for Scientific and Technological Development (CNPq), Coordination for the Improvement of Higher Level Personnel - Brazil (CAPES) - Finance Code 001 and Research Support Foundation for the State of Rio de Janeiro - Brazil (FAPERJ).