

**Title DYNAMIC OF BIOFILM FORMATION ALONG THE GROWTH CURVE IN SURGICAL CLAMPS BY *Staphylococcus aureus* AND *Acinetobacter baumannii* strains**

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**Resumo:**

Biofilms are an aggregate of microbial cells attached to a biotic or a non-biotic surface enclosed in a matrix of extracellular polymer. Biofilms may have different bacteria as well as yeasts, and it has importance on the matrix formation and composition. Hospital-acquired infections are responsible for significant morbidity and mortality in healthcare environment; many of them are related with contamination by bacterial pathogens that grow as biofilms on medical devices. This study aimed to evaluate the dynamics of biofilm formation by *Staphylococcus aureus* ATCC 25923 and *Acinetobacter baumannii* ATCC 19606 together and separately, in surgical clamps. The clamps were incubated, in duplicates, on tryptic soy broth ( $10^6$  CFU/ml), under shaking for 2, 4, 6, 8, 12 and 24 hours at 37 °C. After the incubation, the clamps were sonicated and the attached bacteria were counted. The obtained data were similar to *S. aureus* at time of 2h and 4h ( $6.8 \times 10^2$  CFU/ml); a successive increasing could be observed from 6h ( $90.7 \times 10^2$  CFU/ml) reaching the higher value at 12h ( $408.25 \times 10^2$  CFU/ml) that remained stable until 24h. *A. baumannii* reached  $24 \times 10^2$  CFU/ml after 2h and 4h, of incubation, with a significant increasing in 6h ( $205.24 \times 10^2$  CFU/ml); value that remained stable until 12h. We also evaluated the growth of these two strains together and detected that *A. baumannii* reached higher numbers than *S. aureus* at the times of 2h and 4h ( $45,27 \times 10^2$  CFU/ml and  $36,1 \times 10^2$  CFU/ml respectively). The implantation changed its profile after that time and after 6h of incubation, *A. baumannii* exceed the numbers *S. aureus* of ( $127,4 \times 10^2$  UFC/ml and  $138,1 \times 10^2$  UFC/ml respectively) . The quantitative evaluation of bacteria strains through the growth curve showed that these bacteria had the same behavior in the lag- (2h-4h) and early-log- (6h) phases, with significant higher numbers of *A. baumannii*. *A. baumannii* strain also achieve stationary phase faster (8 hours) than *S. aureus* 12 h. The assay with both strains showed that the establishment of this polymicrobial biofilm may be determined by the *A. baumannii*, suggesting that these bacterium affects the biofilm formation by *S. aureus*. Interactions between strains or species bring beneficials from one or both, include coaggregation of cells and protection against antimicrobial compounds. These and other mechanisms are likely to deliver synergistic effects that result in cooperative biofilm formation.

**keywords:** Biofilm, Hospital infections, Surgical clamps, *Acinetobacter baumannii*, *Staphylococcus aureus*.

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