Title: Biosurfactant production and its impact on antimicrobial activity.

Authors: Carvalho, F. S[1], Bastos, C. G[1], Almeida, D[1], Carvalho, R. S[1], Parreira, A. G[1], Gonçalves, D. B[1], Murta, E. F. C[2], Ribeiro, R. I. M. A[1], Granjeiro, P. A[1].

Institution: [1]Universidade Federal de São João del-Rei (UFSJ), Campus Centro Oeste Dª Lindu. Rua Sebastião Gonçalves Coelho, 400. Bairro Chanadour - Divinópolis – MG, 35.501-296. Brasil. [2]Universidade Federal do Triângulo Mineiro (UFTM), Faculdade de Medicina, R. Getúlio Guaritá, s/n, Abadia, Uberaba, MG, 38025-440, Brasil.

Summary:

Among hospital infections, urinary infections are highlighted probably for the urinary tract instrumentation use both for diagnosis as well as drainage of urine. The use of multiple antibiotic select resistant bacteria, causing a decreased response to treatment and high toxicity. Thus, the use of Biosurfactants (BS) brings a new alternative in fighting infections. They are surface-active biodegradable compounds, with microbial origin and low toxicity. The objective was to investigate different BS production processes from *Bacillus subtilis* ATCC19659 and evaluate their antimicrobial activity. *B. subtilis* isolates were used for the production of BS, measured in accordance to the variation of the procedure, culture medium and incubation time. Methods I, II and III used the mineral medium containing glucose and solution of metals, differing in production time and aeration. Method IV used a medium containing soybean flour, followed by a change in pH after production. All methods were subjected to acid precipitation and organic extraction. The BS was assessed as the minimum inhibitory concentration (MIC) by the broth microdilution technique and subsequently the determination of minimum bactericidal concentration (MBC). Concentrations of 1000-50 $\mu g.ml^{-1}$ and BS Sodium dodecyl sulfate (SDS), positive control, were used compared to Gram negative bacteria *Klebsiella pneumoniae* (ATCC 43816) *Escherichia coli* (ATCC 25922) and *Proteus mirabilis* (ATCC15290) and Gram positive *Staphylococcus aureus* (ATCC29213), *Staphylococcus epidermidis* (ATCC12228) and *Enterococcus faecalis* (ATCC 14506). The results showed that the best biosurfactant production was by method II and IV which showed the highest yield. The BS had CIM 250 $\mu g.ml^{-1}$ for the strain of *S. aureus*, followed by 500$\mu g.ml^{-1}$ for *S. epidermidis* and *E. faecalis* and 1000 $\mu g.ml^{-1}$ for the others. None of the isolates showed bactericidal results. The SDS presented CIM 250 $\mu g.ml^{-1}$ for *K. pneumoniae*, 500$\mu g.ml^{-1}$ for *S. aureus* and *S. epidermidis* and 1000 $\mu g.ml^{-1}$ for *P. mirabilis*. The MBC for SDS presented CIM 500 $\mu g.ml^{-1}$ for *K. pneumoniae* and 1000 $\mu g.ml^{-1}$ to *S. aureus*. It was concluded that BS had better bacteriostatic activity to Gram positive *E. faecalis* and *S. aureus* compared to the SDS. This is an alternative and innovative method for the biotechnological production of BS with antimicrobial activity with potential application to human health.

Key - words: *Bacillus subtilis*, biosurfactant, Antimicrobial.

Encouragements agency: CNPq, FAPEMIG, UFSJ.