

**TITLE:** BEE VENOM FROM *Apis mellifera* AGAINST *S. aureus* BIOFILM

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**ABSTRACT:**

Some *Staphylococcus aureus* strains can produce biofilm that usually cause nosocomial infections and infections associated with implantable devices – urinary catheters and prostheses. The biofilm consists of an extracellular polymer matrix that surrounds a community and has a changed phenotype in relation to growth, gene expression and protein production. Biofilm allows the bacteria survival in hostile environments and the biofilm cells are 100 to 1000 times more resistant to antibiotics than planktonic bacteria. Therefore, the search for new antimicrobials is in evidence, including natural products with better efficacy and many therapeutic effects. The antibacterial action of bee venom (apitoxin) obtained through *Apis mellifera* bee is already known and we tested the performance of apitoxin to inhibit the biofilm production. Resazurin Assays Microtiter Plate (REMA) was performed for obtaining the Minimum Inhibitory Concentration (MIC) of the apitoxin against an ATCC *S. aureus* 29213 that can produce biofilm and resulted in a concentration of 2 µg/ml. We used a subinhibitory concentration of 1 µg/ml (1/2 MIC) from apitoxin in the biofilm assay. The biofilm assay started with the strain inoculated into TSB (tryptic soy broth) from TSA (tryptic soy agar) plate. Liquid culture was grown for 24 hours at 37 °C in an orbital shaker and after centrifuged and resuspended in a saline solution to an optical density equivalent to  $1 \times 10^9$  cells/mL. We used a 6-well tissue culture plates containing TSB supplemented with 0.25% of glucose and the apitoxin. Then we added the bacterial suspension and the growth occurred for 48 hours at 37 °C in a shaker. Every 8 hours the TSB medium containing suspended bacterial cells was removed and an equal volume of fresh TSB with 0.25% glucose and apitoxin was added. The product showed an inhibition of 35.1% ( $\pm 3.98$ ) over the production of biofilm. Apitoxin had a good performance in the inhibition of the bacterial growth (2 µg/ml) and in the inhibition of biofilm production (35.1%), then it is an interesting natural product to be studied and has a potential for development of antibiotics.

**Keywords:** bee venom, biofilm, *S. aureus*, apitoxin

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