**TITLE:** ANTIMICROBIAL AND ANTIBIOFILM ACTIVITY OF SOLUBLE POLYPYRROLE AGAINST ISOLATES OF *Staphylococcus aureus*

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**ABSTRACT:**

The microbial world is continually evolving which culminate in the appearance of microorganisms with a wide genetic diversification, being thus able to provoke several diseases. The inadequate use of antimicrobials in the treatment of bacteria of the genus *Staphylococcus* caused the emergence of multiresistant strains, representing a worldwide problem, and the control of its dissemination is an important challenge. The use of polymers has shown great relevance as intelligent materials in biological applications. Among these, polypyrrole (PPy) is one of the most studied and has been widely used in the biomedical field, representing a viable option for bactericidal applications. Thus, the objective of this study was to evaluate the antimicrobial and antibiofilm potential of soluble polypyrrole on strains of *Staphylococcus aureus.* Twelve isolates of *Staphylococcus aureus*, being one ATCC 25923 (control) and eleven isolated *Meticillin-resistant Staphylococcus aureus* (MRSA) from blood culture, were obtained from the bacterioteca of the Microbiology Laboratory of the Universidade Federal de Santa Maria. The antimicrobial activity of PPy (1000µg/mL) was measured by means of the broth Microdilution method, obtaining Minimum Bactericidal Concentration (CBM) and Minimum Inhibitory Concentration (MIC). To verify the potential of PPy to interfere in forming and consolidated biofilm, isolates were used previously characterized as strong or moderate biofilm producers using the gentian violet method and their OD were determined in a microplate reader, measured at 620 nm. All isolates were sensitive to the activity of this polymer, inhibiting bacterial growth in a CBM/MIC ranging from 7.81 to 62.5µg/mL. In the quantification of biofilm production, only eight isolates (66.6%) were able to form strong or moderate biofilms. The PPy was able to inhibit the formation of the phenotypic biofilm of all isolates, becoming weak formers. In contrast, this polymer was not efficient to remove the already consolidated biofilm. These results indicate the high bactericidal potential of polypyrrole soluble in multiresistant isolates of *Staphylococcus* spp., since antimicrobial therapies that overcome these conditions are increasingly difficult.

**Keywords:** biofilm, multiresistance, nanocomposites, polymers

**Development Agency:** Fundação de Amparo à Ciência e Tecnologia de Pernambuco (FACEPE)