**TITLE:** EVALUATION OF ANTIMICROBIAL AND ANTIBIOFILM ACTIVITIES OF SILVER NANOPARTICLES IN *Staphylococcus epidermidis* AND *Staphylococcus haemolyticus* STRAINS ISOLATED FROM BLOOD CULTURES

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**ABSTRACT:**

Since bacterial resistance to antimicrobials is growing, it is extremely important to search for new compounds that are effective against microorganisms or that increase sensitivity to existing antibiotics. For this reason, the synthesis of nanomaterials shows a relatively new and inexpensive approach against the current methods. Silver has its use registered since antiquity and is probably the most common element to synthesize nanoparticles. Lately, the healthcare-associated infections have called attention because of the increasing morbimortality of patients. In addition, about 70% of infections related to assistance are linked to the presence of biofilms in medical devices and coagulase-negative staphylococci are the main isolated microorganisms. This study was conducted to assess both antimicrobial and antibiofilm activity of nanosilver (NPAg) in *Staphylococcus epidermidis* and *Staphylococcus haemolyticus* strains isolated from blood cultures. NPAg solutions were chemically synthesized in the presence of stabilizers and samples were characterized by spectrophotometry. After confirmation of the spherical structure at 400 nm absorption spectrum, the NPAg antimicrobial activity was investigated by the disk diffusion method. It has been observed that nanosilver induced the formation of inhibition zones similar to those of positive control ($AgNO_3$), confirming its effectiveness. Based on the same method of analysis, we evaluated the combined effect of NPAg with different antimicrobials. The results showed synergistic effect of nanosilver with all antibiotics tested, mainly in the clinical strains (in descending order): gentamycin > erythromycin > norfloxacin > cefoxitin. The Minimum Inhibitory Concentration (MIC) and the Minimum Bactericidal Concentration (MBC) of NPAg were also examined. In addition, the ability to form biofilms on polystyrene surfaces was evaluated and all samples were classified as low to moderately adherent. The antibiofilm activity of varying concentrations of NPAg was then verified by viable cell counts. It has been observed reduction of UFC counts in biofilms cultivated with at least 28.56 µg/mL of NPAg (below the MBC). As future prospects, further studies should be conducted in order to analyze the antibiofilm activity of NPAg by different methodologies and in varied abiotic surfaces, such as catheters.

**Keywords**: silver nanoparticles, antimicrobial activity, antibiofilm activity, *Staphylococcus epidermidis, Staphylococcus haemolyticus.*

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