

**Title: THE EFFECT OF SELENIUM-TRIAZOLE AND SELENIUM-QUINOLINE COMPOUNDS ON THE BACTERIA *Staphylococcus aureus* AND *Staphylococcus epidermidis***

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**Abstract:**

*Staphylococcus epidermidis* and *Staphylococcus aureus* are gram-positive bacteria found in the microbiota of skin and mucosal surfaces. Of all the species of the genus, *S. aureus* is the most important, accounting for the second largest number of infections in humans. The *S. epidermidis* is less virulent species compared to *S. aureus*, but this species is potentially pathogenic and introduces risk for patients that have devices such as catheters, prostheses, stents, etc. Both species can cause nosocomial infections, many with resistance to conventional antibacterial drugs. Therefore, it is necessary to search for new compounds more effective in treating these infections. In this study, we evaluated three chemical compounds: two from the class of selenium-triazole (A and B) and one from the class of selenium-quinoline (C). These compounds were tested against strains of *S. aureus* ATCC 25923 and *S. epidermidis* ATCC 35984. The bacteria were grown for 16-18 hours at 37 °C in Brain Heart Infusion medium (BHI), and 80 µL of the bacterial suspension ( $3 \times 10^8$  CFU/ml), 116 µL of Tryptone Soy Broth medium (TSB) and 4 µL of test compound (concentrations ranging from 50 µM to 2 mM) were added per well of a 96-well plates. Bacterial activity was evaluated as the difference between the optical density at 630 nm ( $DO_{630}$ ) at the end (24h) and the beginning (0h) of the incubation period. The experiments were performed in triplicate. The minimum inhibitory concentration (MIC) was defined as the lowest concentration of test compound capable to restrict bacterial growth to a level lower than 0.04 to  $DO_{630}$ . Serial dilutions of MIC were made and plated on Müller-Hinton plates (MH). After incubation period (37 °C, 16-18 hours), CFUs/ml were obtained and used to determine the viability of the bacterial cells. MIC of *S. epidermidis* ATCC 35984 was obtained for two tested compounds: the compound A (1.5 mM) and compound C (500 µM). The count of CFUs determined the viability of the treated cells after 24 hours of incubation. Statistical analysis indicated that the treated and untreated bacterial samples were equivalent in CFU/ml, which indicates bacteriostatic activity. Instead, the evaluated compounds showed no effect against *S. aureus* ATCC 25923 under the tested conditions. New studies are being performed to better evaluate the antibacterial ability of these compounds, including kinetics of antibacterial activity, molecular assays and electron microscopy.

**Keywords:** chemical compound, MIC, *S. aureus*, *S. epidermidis*