

BACTERIOSTATIC AND BACTERICIDAL ACTIVITY OF DERIVATIVE LIGANDS OF 2-THIAZOLINE-2-THIOL AS A RESULT OF THEIR COMPLEXATION WITH SILVER

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Summary

There is a considerable concern related to the development of new classes of antimicrobial agents due to the increasing bacterial resistance to the drugs in current clinical use. In this regard, the metal complexes are an attractive alternative since their development is based on selection and modification of biologically active substances that are often already described. A series of 16 inedited compounds containing hydrotris(2-mercaptothiazolyl)borate (L1) and 1,2-Bis(2-thiazolin-2-ylsufalnyl)ethane (L2) ligands complexed with the metals Ag⁺, Fe⁺, Mn²⁺, Co²⁺, Cu²⁺, Zn²⁺, Ni³⁺, Cr³⁺, and Sn²⁺ have been synthesized, and their potential as antibacterial agents was examined. The bacteria used to determine the minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) were *Acinetobacter baumannii* ATCC 19606, *Enterobacter cloacae* ATCC 23355 and *Escherichia coli* ATCC 25922, and it was performed by broth microdilution method as described by the Clinical and Laboratory Standards Institute (CLSI). Streptomycin was used as positive control and dimethylsulfoxide, which was used in the dilution of compounds, as negative control. The tested concentrations were 500; 250; 125; 62.5; 31.25; 15.63; 7.81, and 3.90 µg/mL. The silver complexes were those with the best results. The L1-Ag⁺ complex exhibited bacteriostatic activity against all tested bacteria with MIC values of 250 µg/mL against *A.baumannii* and *E.cloacae*, and 125 µg/mL against *E.coli*. The bactericidal activity of this complex was evidenced against *E.cloacae* and *E.coli* with MBC values of 500 and 125 µg/mL, respectively. On the other hand, L2-Ag⁺ complex showed bactericidal and bacteriostatic activity against two bacteria. The respective values of MIC and MBC against *E.cloacae* were 3.90 and 31.25 µg/mL and against *E. coli* 250 and 500 µg/mL. The bacteriostatic activity of the complex L2-Ag⁺ against *E.cloacae* was equivalent to the positive control, whereas bactericidal activity was higher (CBM streptomycin value 500 µg/mL). The antimicrobial property of silver is already well known, however, its toxicity in the generated complex should be further evaluated.

Keywords: 2-thiazoline-2-thiol, antibacterial, metal complexes, silver

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