

TITLE: BACTERIOSTATIC ACTIVITY OF METAL COMPLEXES AGAINST *Klebsiella pneumoniae*

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ABSTRACT:

Klebsiella pneumoniae is a Gram-negative bacterium responsible for respiratory, urinary tract and bloodstream infections. It is clinically important because it exhibits high resistance to antimicrobials, mainly through the production of beta-lactamase enzymes, such as, *Klebsiella pneumoniae* carbapenemase (KPC). In the search for new antibacterial agents, metallic complexes are considered promising since metal ions have a high capacity for interaction with biological molecules, being found reports in the literature of anti-inflammatory, anti-carcinogenic and antimicrobial activity. A series of eleven inedited compounds containing hydrotris(2-mercaptothiazolyl)borate, 1,2-Bis(2-thiazolin-2-isulfanyl)ethane, 3,5-dimethyl-1-thiocarboxamidapyrazole, albendazole, ibuprofen, and metronidazole ligands complexed with the metals Co, Cr, Cu, Mn, Ni, Pd, Sn, and Zn, have been synthesized, and their potential as antibacterial agents was examined. Two strains of *K. pneumoniae* – ATCC 43816 and clinical urine isolate – were used to determine the minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) by broth microdilution method as described by the Clinical and Laboratory Standards Institute (CLSI). Gentamicin was used as positive control and dimethylsulfoxide (DMSO), which was used in the dilution of compounds, as negative control. The tested concentrations were 125 to 0.24 µg/mL. Metronidazole complexed with tin was the compound that presented the best result with MIC values of 31.25 µg/mL, against the two strains of *K. pneumoniae* in study. Both hydrotris(2-mercaptothiazolyl)borate complexed with chrome and 3,5-dimethyl-1-thiocarboxamidapyrazole complexed with copper exhibited MIC values of 125 µg/mL, against the both strains. The MIC and MBC for gentamicin were both 0.49 µg/mL for the reference strain, and 0.49 µg/mL and 0.98 µg/mL, respectively, for the clinical isolate. The other compounds did not present antibacterial activity at the concentrations tested and none of the compounds showed bactericidal activity. The next step will be the realization of structural modifications to potentiate the bacteriostatic activity found and to allow bactericidal activity.

Keywords: antibacterial, broth microdilution, *Klebsiella pneumoniae*, metal complexes

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