Antimicrobial Effect of Copper Coordination Compounds Containing Sulphanilamides and 4-Phenylthiosemicarbazone Pyridine-2-Carboxyaldehyde

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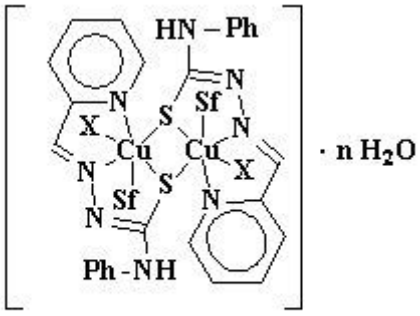
Thiosemicarbazide derivatives are widely used in medicine to treat various types of diseases. They all possess a wide range of donor atoms and form with metal ions bio-active coordination compounds of various composition, structure and properties. In this connection, the synthesis and study of new biometal complexes with similar ligands is of both scientific and practical interest.[1]

The aim of this work is to study the antimicrobial activity of copper (II) coordination compounds containing sulphanilamides (Sf) and 4-phenyl-thiosemicarbazone pyridine-2-carboxyaldehyde. The composition of the studied compounds is presented in the figure given below. The antimicrobial activity has been studied "*in vitro*" under liquid nutritive environment (peptonate bullion, pH = 7.0) by means of successive dilutions method. The substances were dissolved in DMSO at a concentration of 10 mM, the subsequent dilutions were prepared under peptonate bullion. The standard stems *Staphylococcus aureus*, *Bacillus cereus*, *Escherichia coli, Shigela sonnei* and *Salmonella abony* were used as reference culture.



$X = Cl^-, Br^-, NO_3^-$;
$n = 0\text{-}2$; $Ph = C_6H_5$-.

It has been established that initial 4-phenylthiosemicarbazone pyridine-2-carboxyaldehydes are not active towards the reference culture, whereas the synthesized copper coordination compounds with these ligands display selective bacteriostatic and bactericide activity. The antimicrobial activity towards Gram-positive bacteria is displayed in the concentration range 0.07-75 μg/mL.

The minimum inhibitory concentration (MIC) and minimum bactericide concentration (MBC) of the studied compounds towards Gram-negative test cultures are displayed in the concentration range 0.29-75 μg/mL. The experiment has shown that MIC and MBC of the synthesized compounds are influenced by the nature of inner sphere acid residues and sulphanilamides (Sf): nitrate-, ion-based compounds are more active than chlorine-based complexes. It has been established that depending on the nature of the sulphanilamide the MIC and MBC decrease as follows: Sulphadimezine ≅ Sulphazine > Norsulphazol > Ethazol ≥ Streptocide> Sulphacil.

1. Gulea, A., Poirier, D., Pahonțu, E. M., Țapcov, V., Bejenari, N., and Roy, J., *Inhibitori ai leucemiei mieloide umane în baza compuşilor coordinativi ai cuprului(II) cu saliciliden-tiosemicarbazide*, Brevet de invenție MD Nr. 3890, 2009. Publ. BOPI Nr. 4/2009, p. 35.