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Synthesis, characterization and preliminary *in vitro* biological activity assays of a novel copper(II) complex with 6-trifluoromethyluracil

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In 2019, the second leading cause of death in the world was attributed to bacterial infections. From a total of 13.7 million deaths, 7.7 million were attributed to bacterial pathogens [1]. In 1960, silver sulfadiazine (AgSDZ) became the standard compound for the topical antimicrobial treatment of burns [2]. However, the resistance acquired by the pathogens responsible for the infections has led to an increase in patient mortality [3]. In the search for antimicrobial treatment alternatives, nucleotide analogues have been highlighted as possible antibacterial agents. Considering this scenario, the present work describes the synthesis of a new heteroleptic copper(II) complex with the nucleoside analog 6-trifluoromethyluracil (L_1) and 1,10-phenanthroline (phen), and the evaluation of the potential action of the complex on bacterial strains. The synthesis of the complex was performed as follows: a methanolic solution of phen (0.50 mmol in 3.0 mL) was added to an aqueous solution of copper nitrate trihydrate (0.50 mmol in 1.0 mL) and kept under stirring for 1 hour. Separately, a solution of the deprotonated ligand (1.0 mmol in 3.0 mL of water plus 3.0 mL of methanol) was prepared by adding a solution of potassium hydroxide to the ligand suspension until it was solubilized. The deprotonated ligand solution was then added to the copper-phen solution. The reaction was kept stirring at room temperature for 4 hours and a precipitate was formed. The precipitate was separated by vacuum filtration, washed with methanol (~30 mL) and dried in a desiccator. The composition found for this complex was CuL_1Phen ($CuC_{22}H_{12}F_6N_6O_4{\cdot}CH_3OH$). Calculated (%): C 43.58; H 2.54; N 13.26. Experimental (%): C 42.71; H 1.94; N 13.00. The data from the IR analyses indicate that the coordination of the ligand L_1 occurs by its nitrogen and oxygen atoms. Antibacterial activity of the complex was evaluated by a minimum inhibitory concentration (MIC) assay. The complex showed activity against Gram-positive (*Staphylococcus aureus* (ATCC 25923) and *Bacillus cereus* (ATCC 14579)) and Gram-negative (*Escherichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 27853)) bacterial strains with concentrations in the range of 0.474 - 0.947 $mmol{\cdot}L^{-1}$.

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