

ÁREA: INO

Exploring the Antimicrobial Potential of Copper(II) Complexes with N,S-Donor Thiazolinic Ligands

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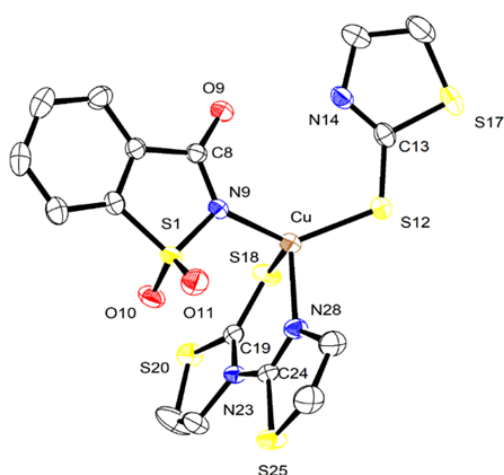
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Highlights

The copper(II) complex [Cu(sac)(mctz)(tdz)] was synthesized and characterized. The complex showed broad-spectrum antimicrobial activity. Results suggest promising potential for new copper-based antimicrobial agents.

Resumo/Abstract

The copper(II) complex [Cu(sac)(mctz)(tdz)] (where sac is saccharin, mctz is 2-mercaptothiazoline, and tdz is thiazoline) was evaluated against seven pathogenic bacterial strains. The MIC¹ values are presented in Table 1. The free ligand (mctz) exhibited no antibacterial activity, while the precursor complex [Cu(sac)₂(H₂O)₄]·H₂O (referred to as Cu-sac) showed only weak activity compared to the newly synthesized complex. In contrast, [Cu(sac)(mctz)(tdz)] displayed measurable MIC values against all the tested strains and demonstrated enhanced activity after 48 hours of exposure to the *S. aureus* strain. The compound showed the lowest MIC value for *E. faecium* (250 μmol L⁻¹ after 24 hours of incubation), and exhibited bactericidal activity at 100 μmol L⁻¹. These findings suggest that the obtained complex possesses promising antimicrobial potential. In the disk diffusion assay², the [Cu(sac)(mctz)(tdz)] complex exhibited good antimicrobial activity, showing the largest inhibition zone against *E. coli* (14.63 mm, 2.0%). Against *Salmonella enterica*, it reached 75.6% of the standard antibiotic's activity index.

Table 1. Minimum Inhibitory Concentration (μmol·L⁻¹) of the tested compounds against different bacterial strains

Microbial strain tested	Cu-Sac		[Cu(sac)(mctz)(tdz)]	
	24 h	48 h	24 h	48 h
<i>S. aureus</i> ATCC 25923	*	*	1000	500 ^a
<i>S. epidermidis</i> ATCC 12228	1000	1000 ^a	500	1000 ^b
<i>E. faecium</i> ATCC 19433	1000	1000 ^a	250	1000 ^a
<i>E. coli</i> ATCC 25922	*	*	500	500 ^a
<i>S. enterica</i> Typhi ATCC 0028	*	*	500	500 ^a
<i>P. mirabilis</i> ATCC 35659	1000	1000 ^a	500	500 ^b
<i>A. faecalis</i> ATCC 8750	1000	1000	1000	1000 ^a

Legend: where a = Bacteriostatic; b = Bactericidal; * It has no activity at the concentrations tested

[1]Clinical and Laboratory Standards Institute (CLSI) *Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically - Document: M7-A6*; Vol. 29.; Wayne, PA, USA, 2003; ISBN 1562388363.[2]Allardyce, C. S.; Dyson, P. J.; Ellis, D. J.; Salter, P. A.; Scopelliti, R., Synthesis and characterisation of some water soluble ruthenium(II)-arene complexes and an investigation of their antibiotic and antiviral properties. *J. Organomet. Chem.* 2003, 668 (1–2), 35–42.

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