

Abstract

Silver(I) Complexes with Clinically Used Azoles: Synthesis, Structural Characterization and Antimicrobial Evaluation †

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† Presented at the 8th International Electronic Conference on Medicinal Chemistry, 1–30 November 2022; Available online: <https://ecmc2022.sciforum.net/>.

Abstract: Recently, we synthesized silver(I) complex with the antifungal agent itraconazole, which showed improved anti-*Candida* potential and therapeutic safety in comparison to itraconazole and rescued zebrafish embryos affected by lethal *C. albicans* infection, when used in safe doses. Inspired by these results, in the present study, three new silver(I) complexes with clinically used azoles, econazole (ecz), clotrimazole (ctz) and voriconazole (vcz), [Ag(ecz)₂]SbF₆ (Ag1), [Ag(ctz)₂]SbF₆ (Ag2) and {[Ag(vcz)₂]SbF₆]_n (Ag3) were synthesized and structurally characterized by elemental microanalysis, mass spectrometry, spectroscopy (¹H NMR, IR and UV-Vis), cyclic voltammetry, molar conductivity measurements, and single crystal X-ray diffraction analysis. The spectroscopic and crystallographic results revealed that, in the synthesized silver(I) complexes, azole ligands are monodentately coordinated to the Ag(I) ion through the nitrogen atom forming [Ag(azole)₂]⁺ complex cation. The antimicrobial effect of complexes and azole ligands was evaluated against different *Candida* species, as well as Gram-positive and Gram-negative bacteria. The synthesized complexes Ag1–3 exhibited good to moderate antimicrobial activity being, in most cases, more active than the corresponding azole ligands. Complexes Ag2 and Ag3 also showed strong inhibitory activity against *C. albicans* biofilm formation and strong inhibition of *C. albicans* filamentation at subinhibitory concentrations.

Keywords: silver(I) complexes; antifungal azoles; antimicrobials; biofilms



Citation: Stevanović, N.L.; Lazić, J.; Kljun, J.; Stanković, M.; Nikodinovic-Runic, J.; Turel, I.; Djuran, M.I.; Glišić, B.Đ. Silver(I) Complexes with Clinically Used Azoles: Synthesis, Structural Characterization and Antimicrobial Evaluation. *Med. Sci. Forum* **2022**, *14*, 102. <https://doi.org/10.3390/ECMC2022-13249>

Academic Editor: Alfredo Berzal-Herranz

Published: 1 November 2022

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Supplementary Materials: The following are available online at <https://www.mdpi.com/article/10.3390/ECMC2022-13249/s1>.

Author Contributions: Conceptualization, N.L.S., I.T., M.I.D. and B.Đ.G.; methodology, N.L.S., J.N.-R., I.T., M.I.D. and B.Đ.G.; software, J.K.; validation, J.N.-R., I.T., M.I.D. and B.Đ.G.; investigation, N.L.S., J.L., J.K. and M.S.; resources, J.N.-R., I.T., M.I.D. and B.Đ.G.; writing—original draft preparation, N.L.S., J.L., J.K. and M.S.; writing—review and editing, J.N.-R., I.T., M.I.D. and B.Đ.G.; visualization, N.L.S., J.L., J.K. and M.S., funding acquisition, J.N.-R., I.T., M.I.D. and B.Đ.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research has been financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Agreements No. 451-03-68/2022-14/200042 and 451-03-68/2022-14/200122) and by the Slovenian Research Agency (grant P1-0175). The EN→FIST Centre of Excellence, Trg OF 13, SI-1000 Ljubljana, Slovenia, is acknowledged for the use of the

SuperNova diffractometer. This research has also received funding from the Serbian Academy of Sciences and Arts under project No. F128.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The spectroscopic data used to support the findings of this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.