

Antibiofilm Activity of the Ternary Cadmium Complex with 1,10-phenanthroline and Cyanoguanidine against *Pseudomonas aeruginosa* †

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Abstract: In recent years, infections caused by antimicrobial-resistant strains have become a global health challenge. *Pseudomonas aeruginosa* is a pathogen that causes infections in immunocompromised patients. Control of this pathogen has become increasingly difficult due to its adaptive resistance mechanisms, like biofilm-mediated resistance. A biofilm is an aggregate of microorganisms that adhere to each other on a living or non-living surface. Previously, we determined the minimum inhibitory concentration of the [Cd(1,10-phenanthroline)₂(SO₄)H₂O]cyanoguanidine•5H₂O complex (187 µg/mL), cyanoguanidine (>1500 µg/mL) and phenanthroline (375 µg/mL) against *P. aeruginosa* ATCC 27853. Besides, the *Artemia salina* test showed an improved safety profile for the complex. In this work, we evaluated the antibiofilm activity of the cadmium complex and the ligand phenanthroline against this bacterial strain by using the crystal violet assay (pre- and post-adhesion assays) in 96-well microtiter plates. The complex showed dose-dependent antibiofilm activity, inhibiting the biofilm formation close to 25%, 70%, and 80% in the pre-adhesion assay (20%, 50%, and 55% in the post-adhesion assay) at 0.25, 0.5, and 1 MIC values, respectively. The ligand phenanthroline showed similar behavior. In summary, a complexation is a powerful tool for designing alternative antimicrobial drugs active against biofilm-forming strains and with an improved safety profile.

Keywords: cadmium complex; *Pseudomonas aeruginosa*; antibiofilm activity; crystal violet assay; pre- and post-adhesion assays.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.