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Antimicrobial potency of Ru(II) arene based pyridil complexes

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Discover a new class of ruthenium-based complexes that were investigated as potential antimicrobial agents: dinuclear polypyridil ruthenium(II) complexes exhibited excellent growth inhibition, and Ru(II) arene complexes with acetyl pyridine ligands exhibited moderate antimicrobial activity in the panel of bacteria¹. Here we have synthesized 14 new Ru(II) arene complexes with pyridine-based ligands and examined their antimicrobial potency, trying to correlate their structure and biological activity. Reported complexes were obtained in a reaction of $[\text{Ru}(\eta^6\text{-benzene})\text{Cl}(\mu\text{-Cl})_2]$ or $[\text{Ru}(\eta^6\text{-toluene})\text{Cl}(\mu\text{-Cl})_2]$ with halogen derivatives of picolinic acid or pyridine dicarboxylic acids in a 1:2 molar ratio in ethanol. The complexes were soluble in DMSO and water. Their structural characterization included IR and NMR spectroscopy and MS spectrometry, and purity was confirmed by elemental analysis. In this report, we demonstrate the activities of these novel compounds against six typical gram-negative and two gram-positive bacteria. A micro-well dilution assay was used to determine the minimum inhibitory concentration (MIC), and minimum bactericidal concentration. Streptomycin and chloramphenicol, commercial antibiotics, were used as a positive control. The best activity of all tested bacteria was observed against *E. coli*, with a MIC value of 1.25 mg/mL, for C3, C6, and C10 complexes. Also, all synthesized complexes showed the same activity against *C. albicans*.

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References

1. Bu S, et al. Antibacterial activity of ruthenium polypyridyl complexes against *Staphylococcus aureus* and biofilms. *J Biol Inorg Chem* 2020;25:747–57.