Synthesis, Characterisation and Evaluation of Novel Antibacterial Agents

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Abstract
Among the transition metal complexes, ruthenium-based complexes have been widely studied and some have displayed significant antibacterial activity. This can be due to their ability to; strongly bind nucleic acids and proteins, ligand exchange kinetics similar to those of their platinum counterparts, the prevalence of two main oxidation states (II and III) and the iron-mimicking property when bound to biological molecules.1,2 However, only very recently studies have shown significant interest in their antimicrobial properties.3,4

A series of novel octahedral Ru (II) complexes with varying auxiliary ligands, (L1) 2, 2’-bipyridine, and 1, 10-phenanthroline were synthesised bound to a series of systematically varied polypyridyl ligand (L2), of the form [Ru(L1)2L2](PF6)2. 5

The complexes were prepared from starting materials such as 1,10 phenanthroline, phendione, Ru(bpy)2Cl2 and Ru(phen)2Cl2 and all samples are characterised by electronic (UV/Vis, Fluorescence), vibrational (IR/Raman) and NMR (1H, 13C, COSY) spectroscopy. An example of the Raman spectrum and 1H NMR for Ru(phen)2Cl2 is presented below in figure 6 and 8 respectively.

Conclusion
To date phendione has shown the most antibacterial effectiveness for the gram-positive and gram-negative bacterial strains tested at different concentrations. The CPIP ligand shows effectiveness at higher concentrations than the phendione on the same bacterial strain studied. However, it shown ineffective against MRSA.

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References