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A study of ruthenium complexes of some biologically relevant a-N-heterocyclic carboxylic acids

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a-N-heterocyclic acids like pyridine-2-carboxylic acids, pyridine 2,6-, 2,5-, 2,3- dicarboxylic acids, imidazole-4,5-dicarboxylic acid and pyrazine-2-carboxylic acid exhibit diverse biological activities and also display a variety of coordination modes towards transition metal ions. The present study reports on the preparation, properties and biological activities (antibacterial action) of several ruthenium complexes involving these ligands.

All the complexes are synthesized by following a general procedure via the Ag-complex of the appropriate a-N-heterocyclic carboxylic acid ligand. Ag^+ ion has a very high affinity for Cl^- to form AgCl and, thus free L is released in the reaction medium for coordination to M.

$$Ag^+ + 2LH \rightarrow Ag(LH)_2^+$$

$$Ru(PPh_3)_3Cl_2 + Ag(LH)_2^+ \xrightarrow[\text{Reflux}]{\text{MeOH}} Ru(PPh_3)_2(L)_2.$$

Ligands used are pyridine 2,3-, 2,5-, and 2,6-dicarboxylic acids, imidazole-4,5-dicarboxylic acid, pyridine-2-carboxylic acid and pyrazine-2-carboxylic acid. All the complexes are characterised by elemental analysis, various spectroscopic techniques and cyclic voltammetric studies. Coordination geometry around the Ru(II) acceptor center is established and structure of one representative complex $[Ru(PPh_3)_2(L)_2]$ (LH = pyridine-2,3-dicarboxylic acid) is solved by single crystal X-ray diffraction technique.

Antibacterial activities of the complexes are evaluated by determining their capacity to inhibit the growth of *E. coli* 10536 (MIC) in a nutrient broth.