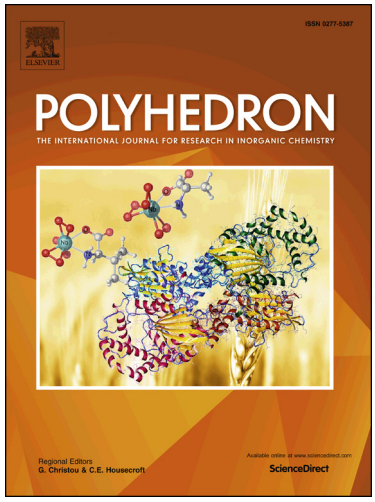

Synthesis, characterization and biological activities of S-2- or S-4-methylbenzyl-β-N-(di-2-pyridyl)methylenedithiocarbazate and Cu(II), Ni(II), Zn(II) and Cd(II) complexes

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Synthesis, characterization and biological activities of S-2- or S-4-methylbenzyl-β-N-(di-2-pyridyl)methylenedithiocarbazate and Cu(II), Ni(II), Zn(II) and Cd(II) complexes

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Metal complexes of general formula, $[M(NNS)_2]$ (M = Cu(II), Ni(II), Zn(II) and Cd(II); NNS' = S-2-methylbenzyl-β-N-(di-2-pyridyl)methylenedithiocarbazate (**1**), NNS''= S-3-methylbenzyl-β-N-(di-2-pyridyl)methylenedithiocarbazate (**2**) and NNS'''= S-4-methylbenzyl-β-N-(di-2-pyridyl)methylenedithiocarbazate (**3**) have been synthesized by reacting the respective metal acetates with the Schiff bases in an ethanol/acetonitrile mixture. They have been characterized by various physico-chemical techniques. Magnetic and spectral evidence indicate the formation of six-coordinate complexes in which the Schiff base coordinates as a uninegatively charged tridentate NNS ligand. The crystal structures of $[Ni(NNS')_2]$ (**5**), $[Ni(NNS''')_2]$ (**13**) and $[Cd(NNS')_2]$ (**7**) were solved *via* single-crystal X-ray crystallographic analysis. All three complexes possess a distorted octahedral geometry where two Schiff bases are coordinated to the central metal ion via the pyridine nitrogen-atom, the azomethine-nitrogen atom and the thiolate-sulphur atom; like donor atoms in the N_4S_2 donor set are mutually *trans*. The complexes have been assayed against selected pathogens and cancer cell lines. The complexes were inactive against all the fungal strains tested, but were mildly active against the bacterial strains tested, especially against *Bacillus subtilis*. Anti-microbial activity generally improved upon complexation with the transition metal ions. The Schiff bases and their transition metal complexes were mostly inactive against the examined