

(E)-N'-(2, 4-dihydroxybenzylidene)nicotinohydrazide and its Metal Complexes: Synthesis, Characterisation and Antitubercular Activity

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Abstract. Nicotinic acid hydrazide and 2,4-dihydroxybenzaldehyde were condensed at 20 °C to form an acylhydrazone (H₃L¹) with ONO coordination pattern. The structure of the acylhydrazone was elucidated by using CHN analyzer, ESI mass spectrometry, IR, ¹H NMR, ¹³C NMR and 2D NMR such as COSY and HSQC. Thereafter, five novel metal complexes [Mn(II), Fe(II), Pt(II) Zn(II) and Pd(II)] of the hydrazone ligand were synthesized and their structural characterization were achieved by several physicochemical methods namely: elemental analysis, electronic spectra, infrared, EPR, molar conductivity and powder X-ray diffraction studies. An octahedral geometry was suggested for both Pd(II) and Zn(II) complexes while both Mn(II) and Fe(II) complexes conformed with tetrahedral pyramidal. However, Pt(II) complex agreed with tetrahedral geometry. *In vitro* antitubercular activity study of the ligand and the metal complexes were evaluated against *Mycobacterium tuberculosis*, H37Rv, by using micro-diluted method. The results obtained revealed that (PtL¹) (MIC = 0.56 mg/mL), (ZnL¹) (MIC = 0.61 mg/mL), (MnL¹) (MIC = 0.71 mg/mL) and (FeL¹) (MIC = 0.82 mg/mL), exhibited a significant activity when compared with first line drugs such as isoniazid (INH) (MIC = 0.9 mg/mL). H3L¹ exhibited lesser antitubercular activity with MIC value of 1.02 mg/mL. However, the metal complexes displayed higher cytotoxicity but were found to be non-significant different (P > 0.05) to isoniazid drug.

Keywords: hydrazones, metal complexes, electron spin resonance, thermogravimetry, powder X-ray diffraction, antitubercular agents
