

Some Co(II) Mixed Ligand Complexes Effect on the Germination and Root Length of Wheat

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Abstract

Mixed ligand cobalt(II) complexes of the type $M(NHA)(HL) \cdot 2H_2O$ have been synthesized by using naphthalhydroxamic acid (NHA, L1) as a primary ligand and N- and/or O-donor amino acids (HL) such as L-alanine (L2) and glycine (L3) as secondary ligands. The metal complexes have been prepared and characterized by analytical and spectral methods. The elemental analysis data which display the formation of 1:1:1 [M:L1:L2] and 1:1:1 [M:L1:L3] complexes. The molar conductance studies of the complexes in DMSO at 10^{-3} concentration indicate their nonelectrolytic nature for all prepared complexes. Room temperature magnetic susceptibility measurements revealed paramagnetic nature of the complexes and indicate the presence of an octahedral structure, the electronic spectral results display the existence of p-p* and n-p*. The infrared spectral data show the chelation behaviour of the ligands toward Co(II) ion through OH, C=O and -NH₂ groups. A theoretical treatment of the formation of complexes in the gas phase was studied, using the HYPERCHEM-6 program for the molecular mechanics and semi-empirical calculations. The effect of CoCl₂·6H₂O, L1, L2, L3 and their complexes on the germination and root length of wheat seeds were evaluated at different concentrations. The prepared complexes were found to exhibit enhanced activity on germination and root length to ligands and metal ion.

Keywords

Co(II), Mixed ligand complexes, Germination, Wheat.

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