

**Co(II), Ni(II) and Cu(II) complexes of
bis(1,2-diphenyl-1-hydroxyimino-2-ethylidene)-
1,5-carbohydrazone and bis(1,2-dimethyl-1-hydroxyimino-2-
ethylidene)-1,5-carbodihydrazone N₄-macrocycles as
precursors for vitamin B₁₂ and coenzyme B₁₂ models**

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A series of novel N₄-macrocyclic ligands (HL) have been synthesized by the condensation of carbohydrazone, H₂N–NH–CO–NH–NH₂ with 1,2-diphenyl-1-hydroxyiminoethane-2-one and 1,2-butane-3-hydroxyiminoethane-2-one in 1:2 molar ratio. These ligands upon reaction with Co(II), Ni(II), and Cu(II) chlorides in 1:1 molar ratio have yielded mononuclear metal complexes of the type M(HL)Cl(H₂O). Also, the reactions of the ligand with the corresponding metal salts in 1:2 molar ratio have yielded binuclear complexes of the type M₂LC₂(H₂O)₂. The mononuclear Co(II), Ni(II) and Cu(II) complexes were also prepared by template synthesis. The isolated complexes have been characterized by elemental analysis and spectroscopic methods. The biological activities of the complexes have been studied by screening the compounds against *E. coli*, *S. aureus*, *A. niger* and *C. albicans*.