

SYNTHESIS, SPECTRAL AND THERMAL CHARACTERIZATION OF NI(II), CU(II) AND ZN(II) COMPLEXES WITH NEW LIGAND TOWARDS POTENTIAL BIOLOGICAL APPLICATION

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ABSTRACT : Series of new complexes of the type $[M_2(L)Cl_4]$ are prepared from the new ligand $[N^1, N^4\text{-bis}(\text{benzo}[\text{d}]\text{thiazol-2-yl})\text{succinamide} (L)]$ derived from ethan-1,2-dicarbonyl chloride and 2-aminobenzothiozole, where, $M = \text{Ni}(\text{ii}), \text{Cu}(\text{ii})$ and $\text{Zn}(\text{ii})$ also complexes of mix-ligands, the type $[M(L)(8\text{-HQ})Cl]$, where, $M = \text{Ni}(\text{ii}), \text{Cu}(\text{ii})$ and $\text{Zn}(\text{ii})$, 8-HQ = 8-Hydroxyquinoline. Chemical forms are obtained from their ^1H , ^{13}C NMR, Mass spectra (for (L)), FT-IR and U.V spectrum, melting point, molar conduct. Using flame (AA), % M is determined in the complexes. The content of C, H, N and S in the (L) and its complexes was specified. Magnetic susceptibility and thermal analysis (TGA) of prepared compounds were measured. The propose geometry for all complexes $[M_2(L)Cl_4]$ was tetrahedral while for $[M(L)(8\text{-HQ})Cl]$ was octahedral. By the weight loss method in a 0.1M H_2SO_4 solution for mild steel, corrosion inhibition of the (L) was evaluated. Anti-bacterial activity of the (L) and their complexes was examined for two type of bacteria. TGA studies of ligand and nickel complex show multi-step decomposition pattern of their organic frameworks.

Key words : 2-aminobenzothiozole, metal complexes, thermal studies.

INTRODUCTION

Heterocyclic chemistry is one of the most complex parts of organic chemistry. Industrially produced compounds are useful such as pharmaceuticals and chemical agricultural materials and have an important role in human life (Alminderej, 2018). Benzothiazole is one of the most important hetero cyclic compounds, which have great efficacy such as anti-microbial, anti-consultants, anti-biotic, anti-fungal agents, anti-oxidants, analgesics, anti-inflammatory, schistosomiasis, diuretic and fungicides in wood, skin production, geysers in pulp and paper industry, pesticides and chemotherapy (Osowole *et al*, 2013; Totaand Battu, 2018). 2-aminobenzothiazole applications in organic and medical biochemistry, drug discovery and development for the treatment of diabetes, epilepsy, autonomic sclerosis, tuberculosis, viral infections made it important in the medical field (Swamy *et al*, 2012; Tota and Battu, 2018). Poly functional ligands of 2-aminobenzothiazoles were studied as a central muscle relaxant and were found to interfere with the neurotransmission of glutamate in biochemical, behavioral experiments and electrophysiological (Jangid *et al*, 2017). Metal complexes containing Sulpher, Nitrogen chelating ligands have been of great importance because of their chemically-physical

properties, distinct biological activities and models of metalloenzyme active sites. The Nitrogen and Sulpher atoms play an important role in metal co-ordination in the active locations of the different metallo biomolecules units and in inhibition corrosion. The different metal ions that are most likely to be used are Cu, Ni and Zn due to the formation of low molecular weight complexes, and thus, proved to be more useful against many diseases (Joseph *et al*, 2014; Savithri *et al*, 2018). 8-hydroxyquinol is an important compound that has the ability to coordinate with different ions as bidentate through N atom of the quinoline ring and O atom after the removal of the hydroxyl proton to form a five-ring between this ligand with the central metal ion helps to increase the stability of the complexes (Mir *et al*, 2018). Mixed ligands complexes were studied because of their biological importance (Witwit *et al*, 2018). Thus, this work aims at synthesis, investigating and biological activity of mixed-ligand complexes of ethan-1,2-dicarbonyl chloride and 2-aminobenzothiozole and mixed ligand complexes with 8-hydroxyquinoline. The main objective of this study is to determine the structure and geometry of (L) and their Ni(ii), Cu (ii) and Zn (ii) complexes.