

RESEARCH ARTICLE

Cytotoxic and Antimicrobial Activities of Piperazine Bridged dithiocarbamate Homo Binuclear Mixed Ligand Complexes of Cu(II) with Amino acids

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ABSTRACT:

A new series of Cu(II) mixed ligand complexes with bridging piperazine dithiocarbamate along with chelated amino acids such as glycine, alanine, phenylalanine, methionine, tyrosine and cystine in the deprotonated form have been prepared. The synthesized complexes are characterized by thermal, elemental, metal, nitrogen and sulphur, UV-Vis, infra-red, ESR Spectral analysis magnetic susceptibility and powder XRD studies. The above studies are used for establishing the structure and composition of the complexes. Biological evaluation such as antibacterial, antifungal and anticancer properties have also been carried out on these complexes based on agar disc diffusion and MTT based assay method respectively

KEYWORDS: Piperazine dithiocarbamate, Cu(II), amino acids, antibacterial, antifungal and anticancer.

1. INTRODUCTION:

Two major areas in modern medicine that coordination chemistry can potentially play a role are antibiotic resistance and cancer biology. There is an increasing incidence of cancers all over the world but the treatment options are limited. Aberrant molecular pathways play a major role in the development and progression of cancers. There is an increasing need to develop new complexes that can target cancer cells without causing much damage to the normal cells. Microbes which cause diseases have become resistant to the existing drugs. This has become the increasing public health problem of the day. This can be effectively achieved by understanding the mode of resistance and equipping ourselves with newer and advanced antibiotics, by discovering new antibiotics and improving the antibiotics already in use. Therefore, there is an immediate need for developing new bactericides and fungicides.

Thus coordination chemistry offers great potential in the development of new therapeutic agents with antimicrobial and anticancer activities. The piperazine Dithiocarbamate acts as an important pharmacophore in various therapeutic areas such as antifungal, antipsychotic, antimicrobial, antioxidant, antimalarial and anti HIV protease⁽¹⁻⁴⁾. In today's medicine, amino acid-based compounds are gaining much popularity and are being used to diagnose, prevent and treat diseases and to maintain or restore the normal body conditions⁽⁵⁾. Amino acids play an important role in various protein-protein, peptide-protein, proteins-receptors and enzyme interactions in the human body. Amino acids have low toxicity, excellent biocompatibility, in vivo stability, selectivity, high cell permeability and favorable interaction with the biological system. These have resulted in amino acids being widely used in the current research in biomedical field⁽⁶⁻¹⁰⁾. Therefore, the functionalization of amino acids in the presence of heterocycles such as piperazine is expected to result in the formation of products with biological significance.

2. MATERIALS AND METHODS:

Chemicals and reagents:

All reagents and solvents used were of analytical grade and used without further purification. Copper Sulphate