Synthesis, Spectral Characterization and Biological Evaluation of Novel Metal Complexes of 1, 3, 4-Thiadiazole

Bhakti Shailesh Kajrekar
University of Mumbai, Maharashtra, India

Abstract:

In this study ligand incorporating 1, 3, 4-thiadiazole ring is synthesized through diazonium coupling reaction of thiadiazole with beta naphthol and resorcinol individually. The ligand is further reacted with metal salts to obtain the required product. These metal ion complexes of Ni (II), Cu (II) and Zn (II) are characterized by FTIR, NMR, Mass spectrometry, UV-Visible and XRD. This confirms the formation of metal ligand bonds, the hetero atoms like sulphur, nitrogen and oxygen, the presence of essential functional groups and aromatic rings.

The synthesized metal complexes were further assessed for the biological activities against two pathogenic microorganisms Escherichia coli and Candida albicans. The zone of inhibition was quantified to evaluate the antibacterial and antifungal effects. The copper (II) complex formed with beta naphthol based ligand exhibited most pronounced activity against both bacterial and fungal strains. This potent effect may be due to the complex's capacity to damage microbial membrane, generate reactive oxygen species and inhibit crucial enzyme within the microbial cells. These findings underscores the significance of metal complexes derived from 1,3,4-thiadiazole ligand exhibit potent anti-microbial properties.