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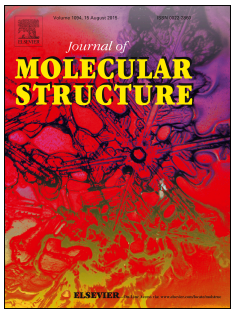

Design, synthesis, spectral characterization, DNA interaction and biological activity studies of copper(II), cobalt(II) and nickel(II) complexes of 6-amino benzothiazole derivatives

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Design, synthesis, spectral characterization, DNA interaction and biological activity studies of copper(II), cobalt(II) and nickel(II) complexes of 6-amino benzothiazole derivatives

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Abstract

Two novel Schiff bases, L^1 = (2-benzo[d]thiazol-6-ylimino)methyl)-4,6-dichlorophenol), L^2 = (1-benzo[d]thiazol-6-ylimino)methyl)-6-bromo-4-chlorophenol) and their bivalent transition metal complexes $[M(L^1)_2]$ and $[M(L^2)_2]$, where M = Cu(II), Co(II) and Ni(II) were synthesized and characterized by elemental analysis, NMR, IR, UV–visible, mass, magnetic moments, ESR, TGA, SEM, EDX and powder XRD. Based on the experimental data a square planar geometry around the metal ion is assigned to all the complexes (**1a-2c**). The interaction of synthesized metal complexes with calf thymus DNA was explored using UV-visible absorption spectra, fluorescence and viscosity measurements. The experimental evidence indicated that all the metal complexes strongly bound to CT-DNA through an intercalation mode. DNA cleavage experiments of metal(II) complexes with supercoiled pBR322 DNA have also been explored by gel electrophoresis in the presence of H_2O_2 as well as UV light, and it is found that the Cu(II) complexes cleaved DNA more effectively compared to Co(II), Ni(II) complexes. In addition, the ligands and their metal complexes were screened for antimicrobial activity and it is found that all the metal complexes were more potent than free ligands.

Keywords: Schiff base; Transition metal(II) complex; DNA interaction; Biological activity.

1. Introduction

The binding studies of small molecules with DNA are very important in the development of new therapeutic reagents and DNA molecular probes [1, 2]. In general, the small molecules can interact with double helix DNA in either non-covalent way which includes three binding modes, i.e., groove binding, electrostatic binding and intercalation binding or covalent way. Among these, intercalation is the most important DNA binding mode and affiliated to the

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