

ABSTRACT

The idea of developing potential anticancer drug by choosing lighter lanthanide Schiff base metal complexes is a major role of the presented work. Cancer is one of the major problems in the society and it the primary targets in medicinal chemistry. There are several platinum based chemotherapeutic agents that have been reported. The non-platinum metal based agents like gallium, germanium, palladium, gold, and ruthenium are also reported. The various metal complexes containing Schiff base ligands exhibit cytotoxicity. The lighter-lanthanide Schiff base complexes and its biological importance is reported only in limited. In world wide breast cancer is the leading type of cancer in women, which is 25% of all the cases. Overcome from the breast cancer depends on the type of cancer, disease extension and the age of the person. The survival rates for the developed countries are high and developing countries are poorer. The selective estrogen receptor modulators like tamoxifen reduce the breast cancer but increase the thromboembolism and endometrial cancer. So these drugs are not recommended for the prevention of breast cancer at average risk but may be offered for those at high risk.

In order to evaluate the anticancer and antimicrobial activity of the lighter Ln(III) complexes containing [N,O] donor Schiff base ligands against human breast cancer cell line(MCF-7), four bacterial strains including *B. Subtilis*, *E. Coli*, *P. auroginosa* and *S. aureus* and two antifungal strains including *C. albicans* and *A.niger*. In the present work the four unsymmetrical Schiff base ligands namely 3-Methoxy-2-((2-morpholinoethylimino)methyl)phenol (L1), 3-Methoxy-2-((2-piperazin-1-yl) ethylimino)methyl)phenol(L2), 3-Methoxy-2-((3-methylpyridin-2-ylimino) methyl)

phenol(L3), 3-Methoxy-2-((quinolin-3-ylidene)methyl)phenol(L4) were derived from the condensation of amines including 4-(2-Aminoethyl morpholine), 1-(2-Aminoethyl)piperazine, 2-Amino-3-methyl pyridine, 3-Amino quinoline with o-vanillin. The four series of Ln(III) complexes (Ln=La, Ce, Pr, Nd, Pr, Sm and Gd) containing the four unsymmetrical Schiff base (L1-L4) have been synthesized. All the Schiff base ligands and its Ln(III) complexes was characterized by using elemental analysis, molar conductance, FT-IR, UV-Vis, Photoluminescence spectra, ^1H and ^{13}C NMR spectra, simultaneous TG-DTA and powdered X-ray diffraction analysis.

All the characterization techniques and pharmacological techniques exhibit the following results.

The Morpholine Schiff base ligand(L1) acts as tridentate ligand and its six Ln(III) complexes were non-electrolytes and isostructural. The Ln(III) complexes(LaL1, CeL1, PrL1, NdL1, SmL1 and GdL1) containing two coordinated water molecules and two bidentate nitrate ions. All the six Ln(III) complexes possess nine coordination.

The Piperazine Schiff base ligand(L2) acts as tetradentate ligand and its six Ln(III) complexes were 1:1 electrolytes, and isostructural. The Ln(III) complexes (LaL2, CeL2, PrL2, NdL2, SmL2 and GdL2) containing two coordinated water molecules, one ionic nitrate and one bidentate nitrate ions. All the six Ln(III) complexes possess eight coordination.

The Pyridine Schiff base ligand(L3) acts as tridentate ligand and its six Ln(III) complexes were non-electrolytes, and isostructural. The Ln(III) complexes (LaL3, CeL3, PrL3, NdL3, SmL3 and GdL3) containing two

coordinated water molecules and two bidentate nitrate ions. All the six Ln(III) complexes possess nine coordination.

The Quinoline Schiff base ligand(L4) acts as bidentate ligand and its six Ln(III) complexes were non-electrolytes, and isostructural. The Ln(III) complexes (LaL4, CeL4, PrL4, NdL4, SmL4 and GdL4) containing two coordinated water molecules and two bidentate nitrate ions. All the six Ln(III) complexes possess eight coordination.

The antimicrobial results revealed that all four Schiff base (L1-L4) and its Ln(III) complexes exhibits moderate antibacterial and antifungal activity. All the four series of Ln(III) complexes exhibit higher activity than its free ligands.

The four Schiff base ligands (L1-L4) and its four series of six Ln(III) complexes were evaluating for their anti-cancer activity against human breast cancer cell line[MCF-7] using MTT assay. The results revealed that all the four ligands and its Ln(III) complexes exhibit good cytotoxicity. The pyridine Schiff base ligand (L3) and its Ln(III) complexes has higher cytotoxicity than other three Schiff base ligands(L1, L2 and L4) and its Ln(III) complexes. All the complexes exhibit higher cytotoxicity than the free ligands.