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ANTI BREAST CANCER AND STUDIES OF ZINC (II) COMPLEX CONTAINING MIXED LIGANDS SCHIFF BASE (4-BROMO-(2-CARBOXYPHENYL)-PYRIDINE-2-YL ETHYLENE AMINE) AND 1, 10-PHENANTHROLINE

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ABSTRACT

Zinc(II) tetra fluoro borate Schiff's base complex has been prepared from 4-bromo-(2-carboxyphenyl)-pyridine-2-yl ethylene amine and 1,10-phenanthroline. We report anti-breast cancer activity and study of Zinc(II) complex of mixed ligands Schiff base, 4-bromo-(2-carboxyphenyl)-pyridine-2-yl ethylene amine and 1,10-phenanthroline. It has been evaluated for anti breast cancer activity against MCF-7 cell line.

KEYWORDS: Schiff Base, 4-Bromo- (2-carboxyphenyl)-pyridine-2-yl ethylene amine, 1,10-Phenanthroline, Zinc(II) complex, Anti Breast Cancer.

INTRODUCTION

Schiff bases and their bio-active complexes have been studied extensively over the past decade. Schiff bases provide potential sites for bio-chemically active compounds. Various transition and inner-transition metal complexes with bi, tri and tetradentate Schiff bases containing nitrogen and oxygen or sulphur donor atoms play an important role in biological systems.[1]

Transition metal complexes capable of cleaving DNA and RNA under physiological conditions via oxidative and hydrolytic mechanisms are important. Binding studies of transition metal complexes have become a very important field in the development of DNA molecule probes and chemotherapeutics in recent years.[2-9]

Transition metal complexes having N, O donor Schiff bases play a vital role in pharmaceutical, biological chemistry and in biological processes of the human body. For example, zinc (II) is the second most abundant transition metals in humans. Zinc show prominent activity against antimicrobial, antibacterial and antifungal. They are found either at the active sites or as structural components of a good number of enzymes. Zinc (II) with *d*10 configuration permits a wide range of symmetries and coordination numbers and it has significant use in bioinorganic chemistry. Hence, this field has attracted the attention of several medicinal chemists to investigate further in view of the growing resistance to chemotherapy by cancer cells.[10]

In the present research paper, we report anti brest cancer activity of zinc (II) complex of mixed ligands Schiff base, 4–bromo (2-carboxyphenyl)-pyridine-2-yl ethylene amine and 1, 10-phenanthroline.

EXPERIMENTAL SECTION

Materials

All chemicals used were of the analytical reagents grade (AR) and of highest purity available. 2-amino, 5 bromo benzoic acid, 2-acetyl pyridine (Lanchester) was purchased from the respective concerns and was used as received.

Methods

Zinc was analyzed by titrimetric method. Elemental analysis (C, H and N) were performed on a Thermo Finnigan FLASH EA-112 CHNS analyzer. Infrared spectra were recorded on Perkin Elmer FT-IR spectrometer as KBr pellets in the 4000-400 cm-1 spectral range. 1H NMR spectra of ligands were recorded on Bruker 400 MHz spectrometer using DMSO as a solvent. Electronic spectra were recorded on a Shimadzu UV-visible NIR spectrophotometer. Molar Conductance (ΛM) was measured on the ELICO (CM-185) conductivity bridge using 10-3 M solution in DMF. Magnetic susceptibility was measured on Gouy balance at room temperature using Hg $[Co(SCN)_4]$ as calibrant.

Synthesis of ligand (4- bromo-(2-carboxyphenyl)-pyridine-2-ylethyleneamine (L)

4- Bromo(2-carboxyphenyl)-pyridine-2-ylethyleneamine (L_1) is synthesized by mixing a solution of 2-Acetyl-pyridine (0.121 g, 1 mmol) in 10 ml of ethanol with solution of 2-amino 5-bromo benzoic acid (0.137 g, 1mmol) dissolved in 10 ml of absolute ethanol. The resulting mixture was refluxed at 80°C until the completion of reaction (checked by TLC). The

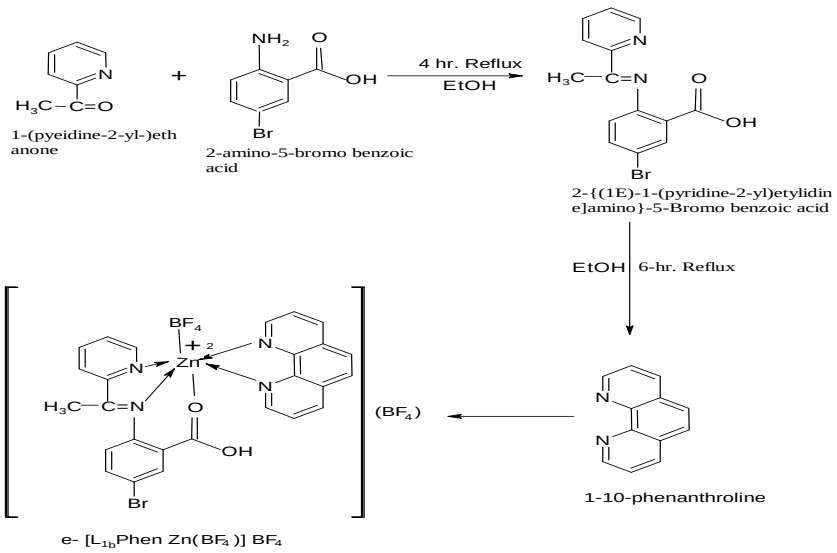
resultant brown colored liquid was concentrated to give dark brown colored solid and purified by crystallization to give product 4- bromo-(2-carboxyphenyl)-pyridine-2-ylethyleneamine[10] (Yield: 70%; M.P.:173^{0}C).

Synthesis of Zn (II) complex [ZnL(phen)BF4]BF4

To a ethanolic solution of $Zn(NO_3)_2.6H_2O$ (0.243g,1 mmol) a ethanolic solution of L_{1d} (0.285g, 1 mmol) was added followed by 1,10-phenanthroline (0.181g 1 mmol) as secondary ligand then the ethanolic solution of Sodium tetra fluoro borate (0.076g ,1 mmol) added with constant stirring. Resulting solution refluxed for 2 hr. The resulting solid Buff product was filtered, washed with ethanol and dried over $CaCl_2$ to give [ZnL(phen)BF4]BF4[10] (Yield: 66%; M.P.: 300^{0}C).

RESULTS AND DISCUSSION

Analytical data for zinc (II) complex conform to $C_{26}H_{19}N_4O_2$ Br F_8 B_2 Zn. The Complex is soluble in DMF and DMSO. The spectroscopic evaluation of the synthesized complex involved elemental analysis, IR, UV-Visible spectral investigations and the results are matched the proposed structure. Zinc (II) complex was obtained by the reaction of the ligands Schiff base 4-bromo-(2-carboxyphenyl)-pyridine-2-ylethyleneamine and 1,10-phenanthroline with $Zn(BF_4)_2$ in ethanol (**Scheme 1**).



Scheme 1: Synthesis of [ZnL(phen)BF4]BF4

Following table shows the results of Anti Breast cancer activity of MCF-7 cell line. These results are expressed in terms of present growth in the presence of the test compounds. The IC_{50} values are shown in table.

Compound no.	MCF 7 (Breast carcinoma) IC_{50} (ug)	Vero (African green monkey kidney normal) IC_{50} (ug)
E-[L1bPhenZnBF4]BF4	40.36	> 100
cyclophosphamide	18.97	6.128

CONCLUSION

In the present research paper we studied anti breast cancer activity of synthesized Zn(II) complex of 4-bromo-(2-carboxyphenyl)-pyridine-2-yl ethylene amine and 1, 10-phenanthroline. Thus Complex [ZnL(phen)BF4]BF4 shows promising anti breast cancer cell activity against MCF-7 cell line.

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