Schiff bases have often been used as chelating ligands in the field of coordination chemistry and their metal complexes are of great interest for many years. It is well known that N and S atoms play a key role in the coordination of metals at the active sites of numerous metallobio molecules. Schiff base metal complexes have been widely studied because they have industrial, antifungal, antibacterial, anticancer and herbicidal applications. They serve as models for biologically important species and find applications in biomimetic catalytic reactions. Chelating ligands containing N, S and O donor atoms show broad biological activity and are of special interest because of the variety of ways in which they are bonded to metal ions. It is known that the existence of metal ions bonded to biologically active compounds may enhance their activities. The variety of possible Schiff base metal complexes with wide choice of ligands, and coordination environments, has prompted us to undertake research in this area. Zinc can function as active site of hydrolytic enzymes, where it is ligated by hard donors (N or O). It has long been recognized as an important co-factor in biological molecules, either as a structural template in protein folding or as a Lewis acid catalyst that can readily adopt the coordination numbers 4, 5, or 6. The catalytic role of Zn comprises Lewis acid activation of substrate, generation of a reactive nucleophile (Zn-OH) and stabilization of the leaving group. As a part of our continuing work on dissymmetric tetradentate Schiff base complexes containing N, S and O donor atoms and in light of the importance of Cd and Zn ion metals, recently, we now report the synthesis and characterization of Co (III) complex of the Schiff base ligand (N1E, N2E) - N1-((1H- pyrrol-2-yl) methylene) - N2-(1- phenylethylidene) ethane-1,2-diamine; Co (III) complex; synthesis; 1HNMR, 13CNMR.

**EXPERIMENTAL**

**Material and Method**

All reagents were supplied by Merck and were used without further purification. Melting point was determined in an Electrothermal 9200. The FT-
IR spectra were recorded in the range 400–4000 cm⁻¹ by KBr disk using a Bruker Tensor 27 M 420 FT-IR spectrophotometer. The NMR spectra were recorded by Bruker 250 MHz Avance and Bruker 300 MHz Avance.

**Synthesis of the (E)- N¹-(1-phenylethylidene) ethane-1,2-diamine Ligand**

For synthesis of the (E)- N¹-(1-phenylethylidene) ethane-1,2-diamine ligand, to a magnetically stirred of acetophenone (3.70 g, 30 mmol) was added ethylene diamine (1.85 g, 30 mmol) via a syringe and in 60-90°C for 24 h was refluxed.

**Synthesis of the MPEA Ligand**

(E)- N¹-(1-phenylethylidene) ethane-1,2-diamine (1.36 g, 8.4 mmol) and 2-pyrrol carbaldehyde (0.8 g, 8.44 mmol) were dissolved at room temperature. The mixture was stirred and heated for 4 h to give a clear solution. After cooling to room temperature, the resulting white precipitate was filtered. Mp 178°C Yield: 80%. Anal. Calc. for C₁₅H₁₇N₃: C, 75.31; H, 7.11; N, 17.57%. Found: C, 75.55; H, 7.28; N, 17.85%. FTIR (KBr pellet, cm⁻¹): 3175.1 (w, NH), 2866.9 (w, =CH); 641 (m, C=N), 1012.6 (w, CH), 1HNMR (δ ppm CDCl₃, 300 MHz): 2.6 (CH₃), 3-4 (CH₂CH₂), 6-7.5 (phenyl group and hetero atomic group), 8-9 (=CH₂), 9-10 (hexchang (-NH)); 13CNMR (δ ppm CDCl₃, 300 MHz): 20-40 (-CH₂), 50-60 (-CH₂CH₂), 100-140 (phenyl group and hetero atomic group), 140-160 (=CH), 160-180 (PH-C=N) (Figure 1, 2, 3).

**Synthesis of the Co (MPEA)**

MPEA (1.2 g, 3 mmol) and CoCl₂.6H₂O (0.7 g, 3 mmol) were dissolved in CH₃CN. The mixture was stirred for 3 h to give a clear solution. The resulting dark green mixture was filtered. Yield: 83%. Anal. Calc. for C₁₅H₁₇N₃Co: C, 60.41; H, 5.70; N, 14.09%. Found: C, 60.75; H, 5.95; N, 14.20%. FTIR (KBr pellet, cm⁻¹): 3133.7 (w, NH), 2805.5 (w, =CH); 1625.9 (w, C=N), 1034.5 (w, CH). (Figure 4).

**RESULTS AND DISCUSSION**

Schiff bases are potentially capable of forming stable complexes with metal ions. Schiff bases form a significant class of compounds in medicinal and pharmaceutical chemistry with several biological applications that include antibacterial [1-6]”, antifungal and antitumor activity. Schiff base complexes play a vital role in
Fig. 2:

Fig. 3: $^{13}$C-NMR spectrum of MPEA (in CDCl$_3$)
describing metal complexes related to synthetic and natural oxygen carriers Cobalt (III) salt reacts with Schiff base ligand in 1:1 (L:M) molar ratio in solvent to afford complex. The ligand and complex are stable at room temperature. In this paper, a direct, simple and one step method has been used to synthesize these compounds. The advantages of the method are; that there is no side product, the reaction is quite fast, there are mild conditions, and the accompanied color change that provides visual means for ascertaining the progress of the reaction.

In summary, the synthesis and characterization of complex have been described. A complex of CO (III) was synthesized simply. Co (MPEA) was prepared by the reaction of MPEA and CoCl₂.6H₂O. In this study we have reported the synthesis of a new diaminederivative and its Co (III) complex. The structural characterizations of synthesized compounds were made by using the elemental analysis, IR, ¹H-NMR and ¹³C-NMR techniques. These MPEA ligand and Co (III) compound were obtained in relatively high yield, 80 and 83% respectively. The infrared spectrum of the complex and ligand was obtained. The IR spectra of the Schiff base show characteristic bands due to ν(NH), ν(=CH), ν(C=N) and ν(CH) in the region 3175.1 cm⁻¹, 2866.9 cm⁻¹, 641 cm⁻¹ and 1012.6 cm⁻¹ respectively. In the case of Co (III) complex we observed characteristic bands due to (NH), ν(=CH), ν(C=N) and ν(CH) in the region 3133.70 cm⁻¹, 2805.52 cm⁻¹, 1625.92 cm⁻¹ and 1034.5 cm⁻¹ respectively. The ¹H-NMR spectra of MPEA compound displays a signal at 206 ppm which is assigned to CH₃, a signal at 3-4 ppm which were assigned to –CH₂–CH₂–, signals at 6-7.5 ppm which are assigned phenyl group and heteroatomic group and one signal at 8-9 ppm which is assigned to =CH.

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