Synthesis, Spectroscopic Characterization, Electrochemical Properties and Biological Activity of 1-[(4Hydroxyanilino)-methylidene] naphthalen-2(1H)-one and its Mn (III) Complex

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The bidentate (HL) Schiff base was synthesized by reacting 2-hydroxy-1-naphthaldehyde with 4-aminophenol in absolute ethanol. The resulting HL ligand was also coordinated with the manganese ions to obtain Mn(III) complex [Mn(III)L₂ClPy (Py=pyridine)]. This Schiff base and its manganese(III) complex were characterized by multiple and usual methods including the ¹H NMR, ¹³C NMR, elemental analysis (EA), FT-IR, UV-Vis, mass spectroscopy (MS), XRD, XPS and cyclic voltammetry (CV). It was found that the ligand acts as a bidentate chelate. It coordinates with azomethine nitrogen and phenoxide oxygen. The other coordination sites, they are occupied by a chloride anion and a pyridine molecule completing the formation of Mn(III) Schiff base complex which is symbolized as Mn(III)L₂ClPy. Conductance values measured indicate that these compounds do not possess an electrolytic character. The electrochemical behavior of the (HL) ligand and its manganese(III) complex have been investigated using a glassy carbon electrode in the presence of 0.1 M Bu₄NClO₄ solution as a supporting electrolyte in dimethylformamide (DMF) solution. The redox system of manganese(III) complex seems to be consistent with a quasi-reversible system involving a mono electronic transfer (Mn^{III}/Mn^{II}). Both compounds, HL ligand and its Mn(III) complex were as well tested in biological activity. The obtained results indicate that they exhibit no antifungal activity but have moderate antibacterial activity towards the same organism studied. Also it is noted that this compounds have high DPPH radical-scavenging activity.

Keywords: Bidentate Schiff base ligand, Manganese(III) complex, X-Ray Analysis, XPS-analysis, Cyclic voltammetry, Biological activity.

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