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Platinum(II) complexes of S-benzyldithiocarbazate based Schiff base ligand: Green synthesis, characterization, cytotoxic and antioxidant assay

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In the present work, benzyl-2-((5-methylthiophen-2-yl)methylene)hydrazine-1-carbothiolate ligand and its platinum(II) complexes have been prepared by conventional and microwave assisted methods. Structural elucidation of the ligand and its Pt(II) complexes have been performed by elemental analysis, conductance measurements, mass spectrometry, powder XRD, FT-IR and ^{1}H NMR spectroscopic methods. On the basis of analytical and spectral data, a square planar geometry has been suggested for the metal complexes. Starting material ($PtCl_2$), Ligand (LH), metal complexes $[Pt(L)_2]$ and $[Pt(LH)_2]Cl_2$ have been screened for *in vitro* cytotoxic and antioxidant activity. Cytotoxic activity has been performed by MTT[3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide] assay against cervical cancer (HeLa) cell line and human breast adenocarcinoma (MCF-7) cell line. Cisplatin has been used as the standard drug. $[Pt(LH)_2]Cl_2$ complex have shown better cytotoxicity in comparison to ligand and other complex with IC_{50} values of 72.76 μM and 59.93 μM against HeLa and MCF-7 respectively. The antioxidant activity has been measured in terms of radical scavenging ability using the stable radical DPPH. Ascorbic acid has been used as positive control and methanol is used as negative control. The ligand shows excellent antioxidant activity with 70.82% DPPH inhibition.

Keywords: S-Benzyldithiocarbazate, Pt(II) complexes, Cytotoxic activity, Antioxidant activity