

Palladium/Platinum Complexes of Tridentate 4-Acylpyrazolone Thiosemicarbazone with Antioxidant Properties

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Abstract : The need for the development of new sustainable bioactive compounds with unique properties that can become potential replacement for commonly used medicinal drugs has continued to gain tremendous research concerns because of the problems of disease resistant to these medicinal drugs and their toxicity effects. NOS-donor heterocycles are particularly of interest as they have showed good pharmacological activities in the midst of their interesting chelating properties towards metal ions, an important characteristic for transition metal based drugs design. These new compounds have also gained application as dye sensitizers in solar cell panels for the generation of renewable solar energy, as greener water purification polymer for supply and management of clean water and as catalysts which are used to reduce the amount of pollutants from industrial reaction processes amongst others, because of their versatile properties. Di-ketone acylpyrazolones and their azomethine schiff bases have been employed as pharmaceuticals as well as analytical reagents, and their application as transition metal complexes have being well established. In this research work, a new 4-propyl-3-methyl-1-phenyl-2-pyrazolin-5-one-thiosemicarbazone was synthesized from the reaction of 4-propyl-3-methyl-1-phenyl-2-pyrazolin-5-one and thiosemicarbazide in methanol. The pure isolate of the thiosemicarbazone was further reacted with aqueous solutions of palladium and platinum salts to obtain their metal complexes, in an effort towards the discovery of transition metal based synthetic drugs. These compounds were characterized by means of analytical, spectroscopic, thermogravimetric analysis TGA, as well as x-ray crystallography. 4-propyl-3-methyl-1-phenyl-2-pyrazolin-5-one thiosemicarbazone crystallizes in a triclinic crystal system with a P-1 (No. 2) space group according to x-ray crystallography. The tridentate NOS ligand formed a tetrahedral geometry on coordinating with metal ions. Reported compounds showed varying antioxidant free radical scavenging activities against 2, 2-diphenyl-1-picrylhydrazyl DPPH radical at 100, 200, 300, 400 and 500 µg/ml concentrations. The platinum complex have shown a very good antioxidant property against DPPH with an IC₅₀ of 76.03 µg/ml compared with standard ascorbic acid (IC₅₀ of 74.66 µg/ml) and as such have been identified as a potential anticancer candidate.

Keywords : acylpyrazolone, free radical scavenging activities, tridentate ligand, x-ray crystallography

Conference Title : ICLS 2017 : International Conference on Life Sciences

Conference Location : New York, United States

Conference Dates : August 07-08, 2017