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Solution and solid state NMR studies of some selenium analogues of auranofin (an anti-arthritic gold drug)

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Three mixed ligand complexes of gold(I) with phosphines and selenones, $[Et_3PAuSe{=}C<]Br$ as analogues of auranofin (Et_3PAuSR) have been prepared and characterized by elemental analysis, IR and NMR methods. A decrease in the IR frequency of the C=Se mode of selenones upon complexation is indicative of selenone binding to gold(I) via a selenone group. An upfield shift in ^{13}C NMR for the C=Se resonance of the selenones and downfield shifts in ^{31}P NMR for the R_3P moiety are consistent with the selenium coordination to gold(I). ^{13}C solid state NMR shows the chemical shift difference between free and bound selenone to gold(I) for ImSe and DiazSe to be ca 10 and 17 ppm respectively. Large ^{77}Se NMR chemical shifts (55 ppm) upon complexation in the solid state for $[Et_3PAuDiazSe]Br$ compared to $[Et_3PAuImSe]Br$ (10 ppm) indicates the former to be more stable and the Au–Se bond to be stronger than in the latter complex.

Keywords: Gold(I) complexes; Selenones; Triethylphosphine; Solid state NMR

1. Introduction

Current interest in the study of gold(I) phosphine complexes owes much to the successful use of auranofin (a gold(I) compound containing triethylphosphine and tetraacetylthioglucose ligands) for the treatment of rheumatoid arthritis [1,2]. In addition, auranofin and a number of phosphine–gold(I) complexes are also known to exhibit promising anti-tumor properties [3–5]. However, toxicity associated with the use of these gold(I) complexes is a serious disadvantage. Recent research has suggested that heavy metal toxicity can be reduced if selenium derivatives are employed [6]. Therefore, it will be of interest to report some selenium analogues of auranofin and the present studies describe the synthesis and characterization of some gold(I) complexes with Et_3P and selenones as *trans* ligands to gold(I). Some other reports

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