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CONTENTS

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Section: Bioorganometallic Chemistry

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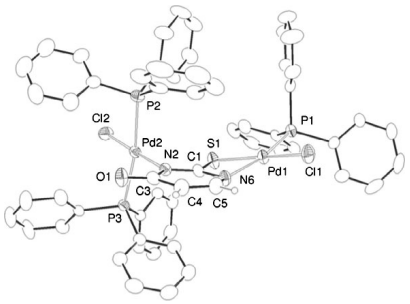
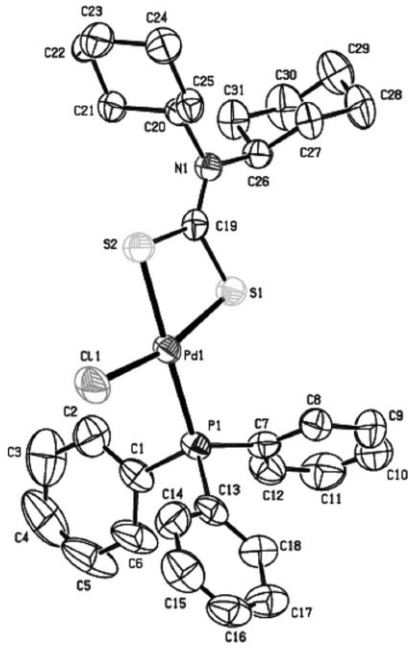


Square planar metallic and homonuclear bimetallic complexes of Pd(II) with 2-thiouracil (HTU) and organophosphines have been synthesized and characterized by FT-IR and multinuclear ^{1}H, ^{13}C, ^{31}P NMR spectroscopy. The thiouracil ligand TU acts as bidentate, is bound through the thioxo moiety and the endo amino group and forms a bridge between a $PdCl(R_3P)$ and a $PdCl(R_3P)_2$ moiety [R_3P = Ph_3P, $(o\text{-tolyl})_3P$, $ClPh_2P$] in the homonuclear bimetallic complexes. The square planar geometry around Pd(II) has been confirmed for these complexes by a single-crystal X-ray diffraction study of compound **1**, $[Pd_2(TU)(PPh_3)_3Cl_2]$. These compounds were also screened against human tumor cell lines and showed promising *in vitro* cytotoxicity.



Pd(II) complexes with organophosphines and dithiocarbamates derivatives of α-amino acids were synthesized by reacting N,N-dicyclohexyldithiocarbamate (DCHDTC, compounds **1–3**) and N-methylcyclohexyldithiocarbamate (MCHDTC, compounds **4–6**) with $(R_3P)_2PdCl_2$ (R = Ph, *o*-tolyl, Ph_2Cl) in a 1 : 1 molar ratio. The complexes were characterized by elemental analyses, FT-IR, multinuclear (^{1}H, ^{13}C and ^{31}P) NMR and single X-ray crystallography showing that the dithiocarbamate acts as a bidentate ligand and binds to Pd(II) via two sulfur atoms resulting in a square planar geometry around Pd(II). The cytotoxicity of compounds **2, 3** and **4** was determined *in vitro* against six human tumour cell lines, MCF7, EVSA-T, WIDR, IGROV, M19 MEL, A498 and H226. The compounds **3** and **4** showed a moderate to low cytotoxicity whereas compound **2** exhibited a very low cytotoxicity. The results of antifungal assays showed that compounds **1–6** possess antifungal activity against *Fusarium moniliformes, Fusarium saolani, Mucor sp., Aspergillus niger* and *Aspergillus fumigatus.* The anti-inflammatory screening results of **1–6** are quite similar to the one observed for the standard drug Declofenac at 10 mg/kg, which inhibited the oedema by 74% after 4 hours.

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Section: Materials, Nanoscience and Catalysis

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Section: Main Group Metal Compounds

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