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# Palladium (II) complexes based on Schiff base ligands derived from *ortho*-vanillin; synthesis, characterization and cytotoxic studies

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## Abstract

6-Methoxy-2-[(E)-Aryliminomethyl]-phenol (Aryl = Phenyl; 2,6-dimethyl; 2,6-diisopropylphenyl; 2,6-dichlorophenyl), comprising L<sub>1</sub>-L<sub>4</sub> ligands, and palladium complexes [Pd(L<sub>n</sub>)<sub>2</sub>, n = 1-4] have been synthesized. The geometries of the [Pd(L<sub>n</sub>)<sub>2</sub>] complexes were derived from single X-ray crystallography experiments. The central Pd(II) ion is four-coordinated and surrounded by N<sub>2</sub>O<sub>2</sub> environment, adopting a square planar geometry. The ligand is bidentate, coordinating via imine nitrogen and phenolate oxygen atoms to the metal center. Analysis of the valence geometry within the phenolate rings suggests that in all complexes, the O1-C1 has a double bond character. FT-IR, <sup>1</sup>H, <sup>13</sup>C NMR and single X-ray crystal structures were reported. The cytotoxicity effect of four Pd(II) complexes was assessed on three cancerous cell lines: MCF-7 (breast carcinoma), A549 (lung carcinoma) and SKOV3 (ovarian carcinoma) and compared with that for *cis*-platin. One out of four metal complexes, Pd(L<sub>1</sub>)<sub>2</sub>, exhibited the highest anti-proliferative activity on three investigated cancerous cells lines which is more effective than *cis*-platin. The results showed that this complex could effectively induce apoptotic death in cancerous cells, probably due to direct interaction by cellular DNA.

**Key words:** Metallodrug, *cis*-platin, *ortho*-vanillin, apoptotic effect, Annexin V

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