

Square planar complexes featuring thiosemicarbazone ligands: Synthesis, characterization, cytotoxicity assessment, and exploration of their interaction with biomacromolecules.

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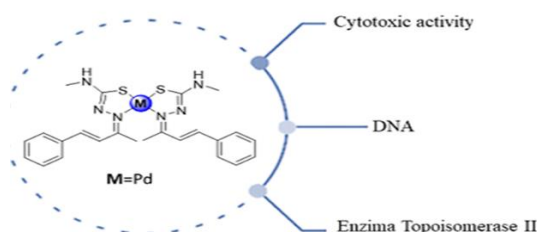
Palavras Chave: *ct-DNA*, *topoisomerase*, *cytotoxicity*, *thiosemicarbazone*, *palladium(II)*.

Highlights

Eight recently developed palladium complexes displayed a distorted square planar geometry. The importance of subtle modifications in ligands was investigated to enhance cytotoxic activity. Comprehensive investigations into compound interactions with DNA and topoisomerase II α .

Abstract

Cancer is one of the world's leading causes of death, and many researchers are looking for new ways to treat it. Chemotherapy is often used in cancer treatment, employing cytotoxic agents that may have different mechanisms of action. Complexes containing thiosemicarbazones have been extensively studied in developing candidates for new metallodrugs. Thus, this study reports the synthesis and characterization of eight new palladium complexes containing thiosemicarbazone ligands derived from chalcones and benzalketones. Several techniques characterized the compounds. Crystallography was successful for five complexes and two ligands, allowing X-ray diffraction analysis. DNA interaction assays using agarose gel electrophoresis and UV-Vis titration revealed no DNA interaction or inhibition of topoisomerase II α enzyme activity. However, these compounds exhibited potent cytotoxic effects (IC₅₀) against breast tumor (MCF-7) and prostate (DU-145) cell lines as well as non-tumor prostate (PNT2) cell lines. These results highlight the importance of structural variations in achieving cytotoxic effects and provide insights into the design of bioactive compounds.



Compound	IC ₅₀ (μmol·L ⁻¹ ± Standard error)		
	DU-145	MCF-7	PNT2
[Pd(BT-H) ₂]	0.22 ± 0.02	0.41 ± 0.10	0.83 ± 0.02
[Pd(BT-M) ₂]	0.97 ± 0.04	0.56 ± 0.06	0.39 ± 0.07
[Pd(BT-E) ₂]	4.49 ± 0.19	0.91 ± 0.06	1.09 ± 0.04
[Pd(CT-H) ₂]	3.17 ± 0.09	0.907 ± 0.078	1.01 ± 0.13
Cisplatin	15.00 ± 1.40	8.64 ± 0.8	11.74 ± 1.20

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