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Abstract

In vitro Cytotoxicity of New Organotin (IV) N-Methyl-N-Benzyl-Dithiocarbamate Compounds on Human Lung Carcinoma Cell Line (A549)

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Abstract

Background and Aim: The successful synthesis of dibutyltin (IV) N-methyl-N-benzyldithiocarbamate (Compound 1) and tricyclohexyltin (IV) N-methyl-N-benzyldithiocarbamate (Compound 2) was achieved using the in-situ method. This study aims to characterize both compounds using CHNS elemental analysis, FTIR, NMR spectroscopies, and X-ray crystallography. The congruence between experimental and theoretical CHNS values was assessed to validate the suggested formula structures.

Method: The characterization of Compound 1 and Compound 2 involved CHNS elemental analysis, FTIR spectroscopy to identify key infrared absorbance peaks (ν(C==N) and ν(C==S)), NMR spectroscopy to observe the 13C chemical shift of carbon in the NCS2 group, and X-ray crystallography to analyze the crystal structure of Compound 1.

Results: The experimental CHNS values demonstrated good congruence with the theoretical values, supporting the suggested formula structures. The key infrared absorbance peaks for ν(C==N) and ν(C==S) were identified between 1475–1481 cm–1 and 971–975 cm–1, respectively. The 13C chemical shift of carbon in the NCS2 group ranged from 200.66–202.32 ppm. The crystal structure analysis of Compound 1 revealed an anisobidentate coordination mode between the central Sn atom and the dithiocarbamate ligands.

Conclusion: Compound 1 and Compound 2 exhibited significant toxicity effects against human lung carcinoma cells (A549). The IC50 values were determined to be 0.80 µM for Compound 1 and 2.77 µM for Compound 2. These findings indicate the potential of both compounds as effective agents against lung carcinoma cells.

Keywords: *Organotin, Dithiocarbamate, A549 cells, Cytotoxicity, Anticancer*

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