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Natural products ingredients with metal ions for new efficient targeted chemotherapeutics

Christina N. Banti¹, Catherine P. Raptopoulou², Vassilios Psycharis² and Sotiris K. Hadjikakou^{1,*}

¹ University of Ioannina, Department of Chemistry, 45110, Ioannina Greece, ² NCSR "Demokritos", Institute of Nanoscience and Nanotechnology, A. Paraskevi Attikis, Greece

*Correspondence to: cbanti@uoi.gr; shadjika@uoi.gr

Abstract: Carvacrol, the main constituent of the essential oil of oregano possesses antiproliferative activity. The organoantimony derivative of formula $[\text{Ph}_3\text{Sb}(\text{Carv})_2]$ (TPAC) (CarvH= carvacrol) was synthesized and characterized in solid state by melting point, X-ray Fluorescence (XRF), Attenuated Total Reflection Fourier Transform Infra Red (ATR-FT-IR) spectroscopies, Thermogravimetric Differential Thermal Analysis (TG-DTA), Differential Scanning Calorimetry (DTG/DSC), while UV-Vis spectroscopy was used for the characterization in solution. The crystal structure of TPAC has been determined by X-ray crystallography.

The *in vitro* anti-proliferative activity of TPAC was evaluated against human breast adenocarcinoma cancer cell lines: MCF-7 (positive to hormones receptor (HR+)), MDA-MB-231 (negative to hormones receptor (HR-)). Its *in vitro* toxicity was checked against normal human fetal lung fibroblast cells (MRC-5). The *in vitro* genotoxicity of TPAC was tested on normal human fetal lung fibroblast cells (MRC-5) with the micronucleus (MN) assay using fluorescence microscopy. Moreover, the *in vivo* toxicity and genotoxicity of TPAC was tested by *Artemia salina* assay and *Allium cepa* assays. The MCF-7 cells morphology suggests apoptotic pathway for their death, especially through the mitochondrion damage, which was confirmed by DNA fragmentation, Acridine Orange/Ethidium Bromide (AO/EB) Staining and permeabilization of the mitochondrial membrane tests. The binding affinity of TPAC toward the calf thymus CT-DNA was *ex vivo* investigated by Uv-Vis, Fluorescence spectroscopies and viscosity measurements.

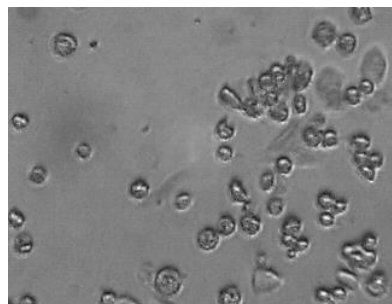


Figure 1. MCF-7 cells Treated with TPAC

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