

NATURAL PRODUCTS, CAM THERAPIES, AND TRADITIONAL CHINESE MEDICINE

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Polyphenols found in *Pinot noir* pomace protect endothelial cells from the cytotoxic effect of Polycyclic aromatic hydrocarbons: A contribution to the recovery of industrial waste

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Introduction: Polycyclic Aromatic Hydrocarbons (PAH) are pollutants found in the air generated mainly by biomass burning. PAH produced by the contamination of firewood in Temuco, Chile, is made up of Phenanthrene, Fluoranthene, and Pyrene. PAHs are positively correlated with ROS production in endothelial cells, generating cellular dysfunction and the development of cardiovascular diseases. Grape pomace (GP) undergoes incomplete extraction during the vinification process, having high contents of phenolic components which are beneficial for human health due to their antioxidant activity.

Objectives: To evaluate the protective effect of Pinot noir pomace extract (EGP) on human endothelial cells against the cytotoxic effect of PAH.

Methodology: Chemical, in silico, molecular, and in vitro analyzes were carried out to evaluate the protective effect of Pinot noir pomace on endothelial cells subjected to the cytotoxic effect of PAH.

Results: 5 glycosylated anthocyanins, and 9 low molecular weight polyphenols, were found. Molecular docking indicated that cyanidin-3-glucoside and quercetin showed the highest affinities for the Nrf2 binding site on the Keap1 protein. HUVEC were exposed to increasing concentrations of PAH diluted in DMSO in a ratio of 3:1:1. The MTS assay showed that 150 μM PAH was sufficient to reduce viability by 75% (p < 0.0001). When cells were pre-treated with 400μg/mL EGP, 150μM PAH did not exert cell death (80% viability). HO-1 and NQO-1 significantly increased their expression after EGP treatment.

Conclusion: The polyphenolic components found in EGP had a beneficial effect as a protective agent in individuals living in areas contaminated with PAH, such as the city of Temuco, Chile.

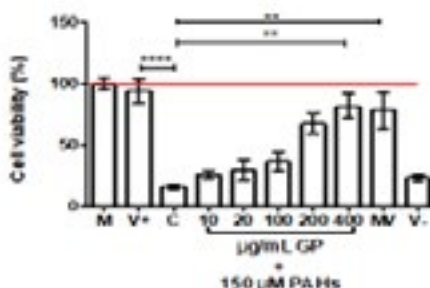


Figure 1: Effect of extracts generated from Pinot noir pomace on the viability of HUVEC. Endothelial cells were previously treated for 24 hours with different concentrations of pomace extract, and then 150 μM were added to each group of cells. Results are expressed as mean ± SD. The comparison between groups was carried out with ANOVA and Tukey's post test. Differences are statistically significant when p value < 0.05. M: cells and medium; V+: Cells +0.1% DMSO; C: Cells +150 μM PAHs; MV: 200 μM malvidin-3-glucoside; V-: Cells +10% DMSO.

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Biography

Jesús Herrera-Bravo has research experience in natural products and their in vitro evaluation. He is the research team leader working in air pollution studies. He is currently the Director of the Department of Basic Sciences at Universidad Santo Tomás, Chile.

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