POSTERS

CYTOTOXIC EFFECTS OF SICILIAN GRAPE SEED OILS ON CANCER CELLS

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Given the increasing demand for natural compounds to prevent and treat chronic diseases like cancer and the sustainability of bioactive-rich winemaking by-products, seed oils from Sicilian white (WGSO) and red grapes (RGSO)1 were investigated for their cytotoxic effects on HepG2 (liver) and CaCo-2 (colorectal) human cancer cells, and differentiated intestinal CaCo-2 cells as normaloid counterpart. Specifically, this study examined the effects of the oils on cell viability, redox balance, cell cycle progression, and cell death pathways. Dose-response curves showed differential sensitivity, with RGSO active solely in CaCo-2 cells and WGSO affecting both cellular models, while differentiated CaCo-2 cells were unresponsive. Following application of the ID50 doses of oils, flow cytometry was utilized to investigate cytomorphological traits (FSC/SSC) and cell cycle profiles. Apoptosis was investigated through Bcl-2, Bax and CASP3 markers and Annexin V staining. Cumulative evidence indicated the lack of canonical apoptosis induction. Examination of CASP1, GSDMD, MLKL, and HMGB1 to identify alternative death mechanisms suggested limited and transient activation of regulated cell death pathways. Stress response was evaluated through Hsp60 and Hsp90 expressions. WGSO induced marked ROS overproduction (quantified by H2DCFDA assay), associated with cell damage, particularly in CaCo-2 cells. In HepG2 and, to a lesser degree, CaCo-2 cells WGSO compromised autophagic function, as suggested by the decrease of acidic vesicular organelles and changes in Beclin-1, p62, and LC3 levels. Conversely, in CaCo-2 cells RGSO induced a generally weak metabolic perturbation with a state of multifactorial stress, characterized by transient death pathway activation and autophagy inhibition. Current findings highlight the therapeutic promise of WGSO and RGSO as bioactive substrates warranting additional research into their integration within functional food matrices possessing anticancer efficacy.

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References

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