PA137

Preliminary studies on the *«in vitro»* anti-tumoral and anti-diabetic effects of seed oils from Sicilian white and red grapes.

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BACKGROUND

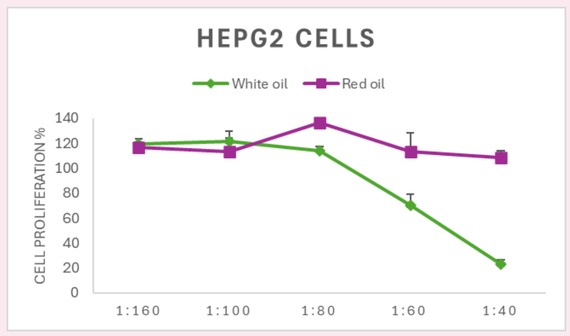
Vitis vinifera, the most popular vine species, possesses numerous health-promoting properties, (e.g., antioxidant and anti-aging[1]). We evaluated the possible cytotoxic activity and anti-diabetic effect of white (Catarratto/Insolia/Grillo mix) and red grape (Sangiovese) seed oils (WGSO and RGSO) on colon (Caco-2) and liver (HepG2) cancer cells. Differentiated non-tumoral Caco-2 cells were tested in parallel.

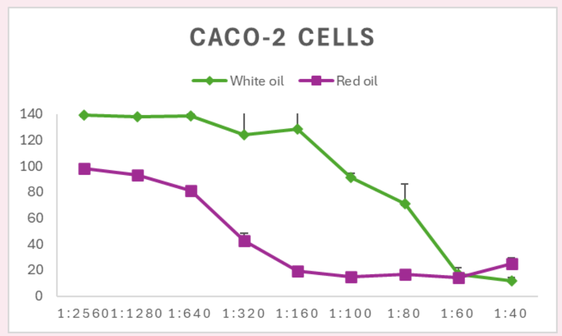
AIM E METHODS

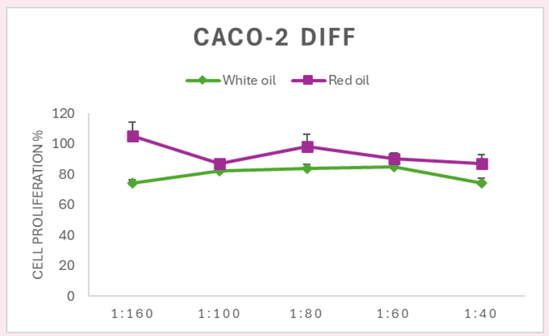
To test the potential cytotoxic effect: **1)** cell viability after 24 h was evaluated by MTT assays; **2)** the cell cycle state and **3)** the induction of apoptosis after treatment with IC_{50} oil concentrations were evaluated by flow cytometry.
To test the effect of sublethal oil concentrations on glucose metabolism by HepG2 liver cells: **4)** the accumulation of intracellular glycogen was detected via PAS staining [3]; **5)** extracellular glucose consumption was quantitated by enzymatic method.

BIOLOGICAL ASSAYS ON THE CYTOTOXIC EFFECT

1)



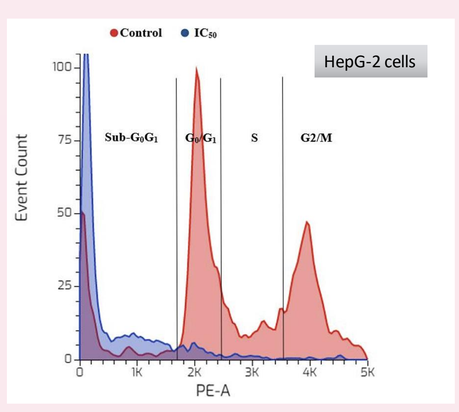


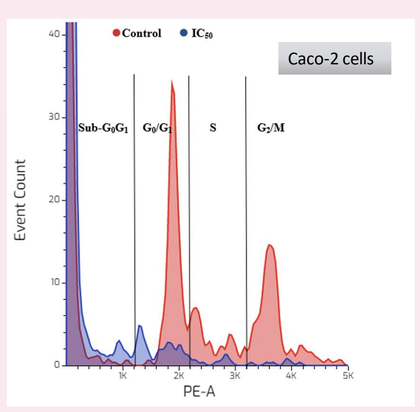


1) MTT assays[2] showed that Caco-2 cells were more sensitive than HepG2 cells to the viability-restraining effect of the oils, whereas only WGSO was cytotoxic on HepG2 cells. Both oils were not cytotoxic to differentiated Caco-2 cells.

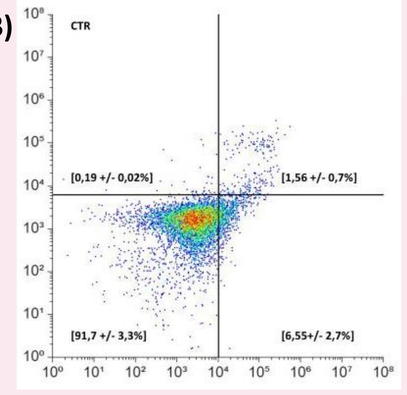
2) Investigation on cell cycle state upon treatments with WGSO revealed an increase of the sub-G_0G_1 fraction in both cancer cell lines, suggesting the occurrence of DNA fragmentation. **3)** This, at least for Caco-2 line, was linked to the activation of apoptosis as demonstrated by AnnexinV-FITC assay[2]. In the other experimental conditions, non-apoptotic type of cell death was observed.

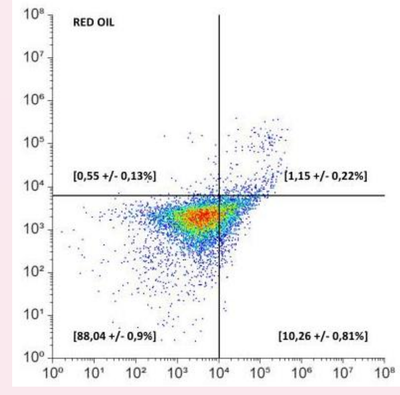
2)



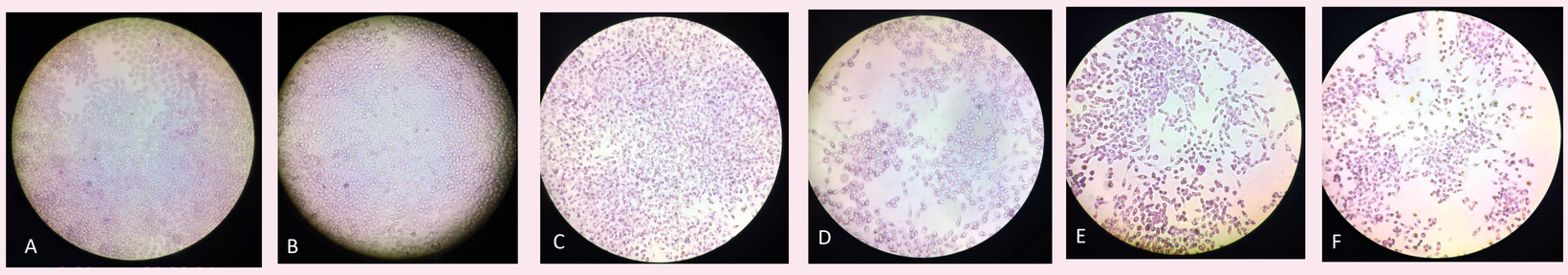


3)

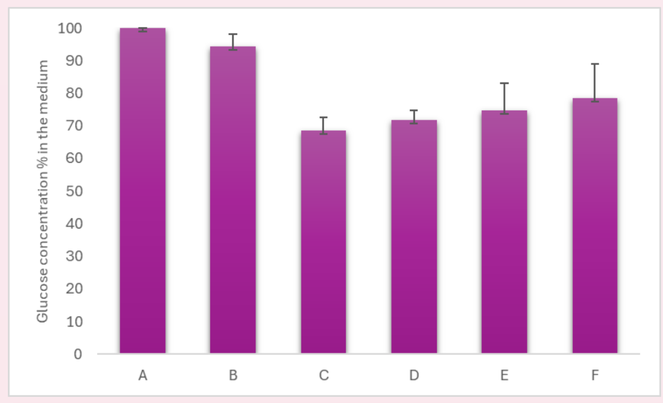




BIOLOGICAL ASSAYS ON GLUCOSE METABOLISM



4) Glycogen staining in control (A), insulin-treated (B), RSGO-treated (C), insulin-RSGO co-treated (D), WSGO-treated (E) and insulin-WSGO co-treated cells (F). PAS reaction[3].



5) Percent of glucose concentration in the medium of control (A), insulin-treated (B), RSGO-treated (C), insulin-RSGO co-treated (D), WSGO-treated (E) and insulin-WSGO co-treated cells (F).

CONCLUSION

- Differential cytotoxic effects are exerted by the oils on HepG2 and Caco-2 tumor cells but not on differentiated Caco-2 cells.
- PAS and glucose consumption assays showed that both oils acted as potential anti-diabetic supplements, determining the decrease of extracellular glucose and the accumulation of intracellular glycogen.
- The preliminary data obtained in both lines of research represent a good starting point for a deeper molecular investigation on the beneficial effects of grape seed oils and their applications.

REFERENCES

1) Garavaglia J, et al., Nutrition and Metabolic Insights 2016; 9:59-64.

2) Luparello C., et al., Biology 2019; 8:76.

3) Crùz-Bermùdez A., et al., Free Radical Biology and Medicine 2019; 135:167–181.