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Health Related Properties of Roditis White Wine Extracts

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INTRODUCTION-AIM

Food of plant origin contain a variety of phenolics, which have been reported to have multiple biological actions. Wine is rich in phenolic compounds and has been related to the above beneficial properties. Red wines contain much higher total phenolics and flavonoids than white wines (1, 2). The aim of present work is to evaluate the ability of different extracts of Roditis wine- a well known white Greek wine- (a) to inhibit oxidation of low density lipoprotein (LDL) and platelet aggregation (b) to decrease the population of cancer and endothelial cells, (c) to decrease the levels of heat shock proteins. The phenolic composition of these extracts was also assessed.

METHODS

Wine: The wine used was young white wine made from the Roditis grape variety.
Analysis of phenolics: Total phenolics were determined by the Folin method. All samples were analysed by HPLC-DAD using the Waters 600E system. A Spherisorb C18 column (4.0x250-mm) with 5-μm packing, and a non linear gradient of CH_3COOH, CH_3OH/CH_3COOH was used.
Wine extracts: Total wine extract was obtained by evaporation and redissolving in 10% ethanol or DMSO. Liquid/liquid extractions were performed to obtain three extracts (R1, R2, R3) containing different classes of polyphenols. Each of the three extracts was loaded on a Sephadex LH-20 column and eluted separating non-polymeric (fraction a) and polymeric polyphenols (fraction b).
LDL oxidation, platelet aggregation, proliferation assays and expression of heat shock proteins: All assays were perfomed as described previously (2). In LDL oxidation and platelet aggregation assays, total phenolics of samples ranged from 728 to 15,000 mg/L, as gallic acid. In proliferation and hsps assays, total phenolics of samples ranged from 10,000 to 20,000 mg/L, as gallic acid.

RESULTS

Total wine extract and the fractions R1, R2, R3 inhibited LDL oxidation, the fractions were active in the order R2>R3>R1. The fraction R2 contained mainly tyrosol and phenolic acids and the R3 phenolic acids. The sub-fractions R2a, R2b, R3a and R3b were further examined (Table 1).

Table 1
Inhibition of Cu^{2+}-induced LDL oxidation by Roditis wine sub-fractions.

Sub-fraction	Dilution fold	Lag time (min)	Rate of diene production (nmol/mg/min)	Total diene
2a	50	no oxidation	no oxidation	no oxidatio
	100	170	3.2	61.0
2b	5	no oxidation	no oxidation	no oxidatio
	10	200	5.2	105.1
3a	25	no oxidation	no oxidation	no oxidatio
	50	170	6.4	111.9
3b	10	no oxidation	no oxidation	no oxidatio
	25	150	3.5	74.6

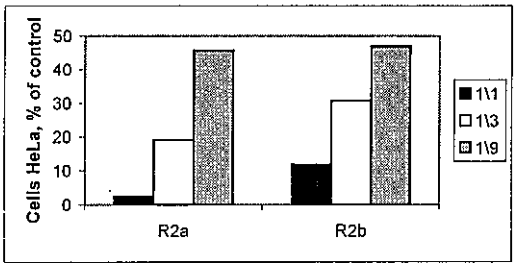

Figure 1. Decrease of the number of cancer cells in cultures by Roditis wine sub-fractions R2a and R2b. 1/1 undiluted, 1/3 3-fold dilution, 1/9 9-fold dilution.

Among them, the most active was the R2a that contained mainly benzoic and hydroxycinammic acids, tyrosol and a flavonol. The sub-fractions R1a and R3a inhibited platelet aggregation exhibiting IC50 values 59.7 and 76.7μg/ml, respectively. These sub-fractions were rich in phenolic acids.

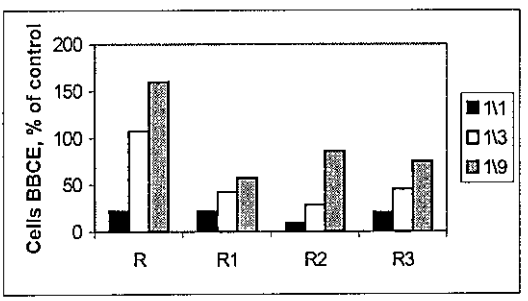

Figure 2. Decrease of the number of endothelial cells in cultures by Roditis wine total extract and fractions. 1/1 undiluted, 1/3 3-fold dilution, 1/9 9-fold dilution.

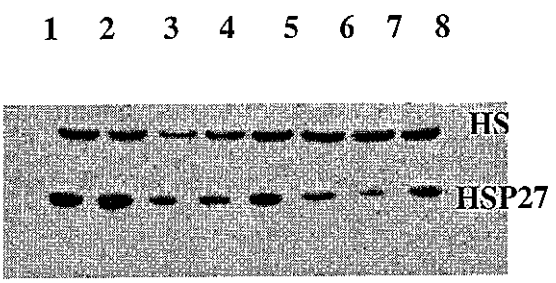

Figure 3. Effect of Roditis wine total extract, fractions and sub-fractions on Hsp70 and Hsp27 protein levels.1 = DMSO, 2 = R, 3 = R1, 4 = R2, 5 = R3, 6 = R1a, 7 = R2a, 8 = R3a.

Among the three Roditis wine fractions, the R2 decreased significantly the population of cancer cells. Moreover, both R2a and R2b sub-fractions were also active (Figure 1). The main peaks of the R2a are presented above, while the R3a contained mainly flavonols, phenolic acids and trans-resveratrol. All three Roditis wine fractions decreased the population of endothelial cells (Figure 2), indicating that several phenolics of Roditis wine may be active. The effect of Roditis wine samples on Hsp70 and Hsp27 is presented in Figure 3. The R1 fraction and to a lesser extent the R2 decreased the levels of both heat shock proteins. On the other hand, total wine extract and the R3 fraction had no effect. Among sub-fractions, the R2a and R1a, in the order R2a>R1a decreased the levels Hsp27, while they had no effect on Hsp70. The R3a fraction had no effect on both proteins. The composition of sub-fractions R2a and R1a indicated that several phenolics might be active in decreasing the level of Hsp27.

CONCLUSIONS

Present results show some health beneficial properties of Roditis white wine, possibly indicating the potential of white wines. The phenolic composition of the extracts tested suggests that several phenolic compounds may be active; it is possible that wine phenolics act synergistically. Roditis white wine, and possibly all white wines, may be considered as a pool of active phenolic compounds useful in pharmacology.

REFERENCES:

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