11DELVINO
ITALIA

Olive oil and wine: a little bit of useful lightness in Cardiovascular Prevention

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Expert in cardiovascular prevention and rehabilitation

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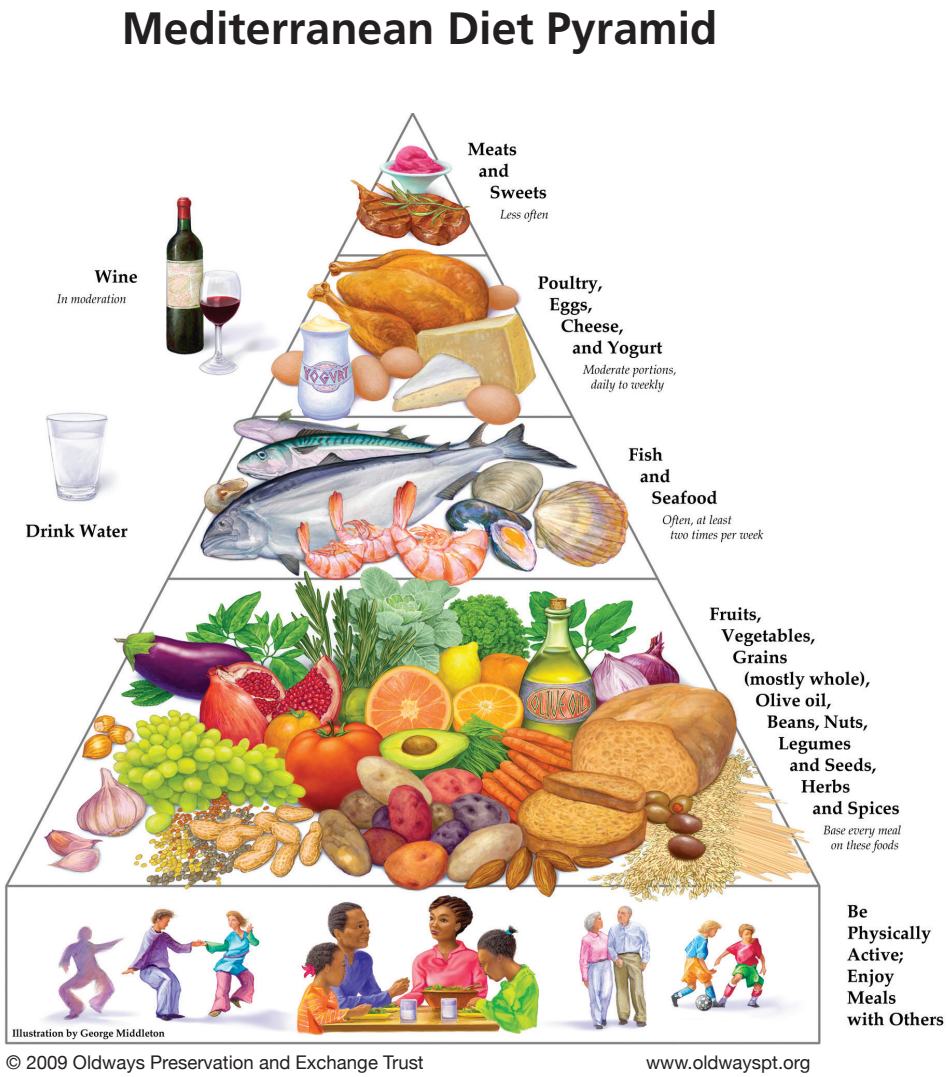
Znojimo

The Mediterranean Sea and region

(Sikaliadis et al., 2021)

The American physiologist **Ancel Keys** identified the **connection between what people were eating and mortality**, bringing the health benefits of Mediterranean diet to light

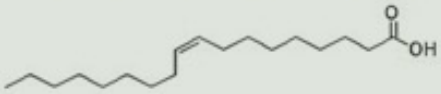
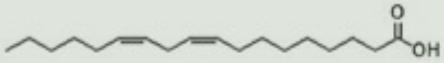
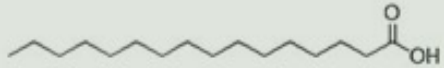
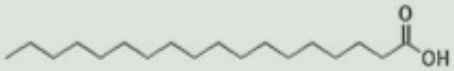
The Mediterranean diet became widely known to the public a few decades later, after a **Conference in Cambridge (USA) in 1993**, when the modern recommendations of the diet were represented visually with the **MedDiet pyramid**



Olive from Olea europaea is native to the Mediterranean region and, both the oil and the fruit are some of the main components of the Mediterranean diet

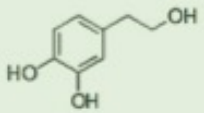
Olive oil

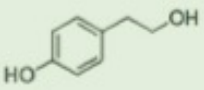
Saponifiable fraction (98-99%)

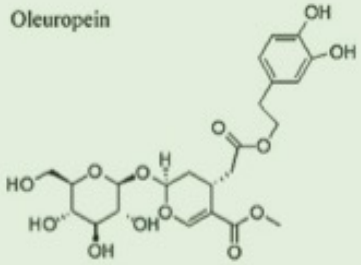
MUFA: Oleic acid		63-83%
PUFA: Linoleic acid		13,5%
Palmitic acid		7-17%
SFA: Stearic acid		1,5-4%

Unsaponifiable fraction (1-2%)

POLYPHENOLS:

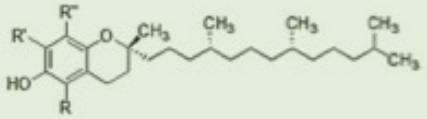
Hydroxytyrosol 

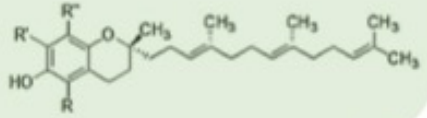
Tyrosol 

Oleuropein 

+ HIGH NUMBER OF VITAMINS

TOCOPHEROLS:

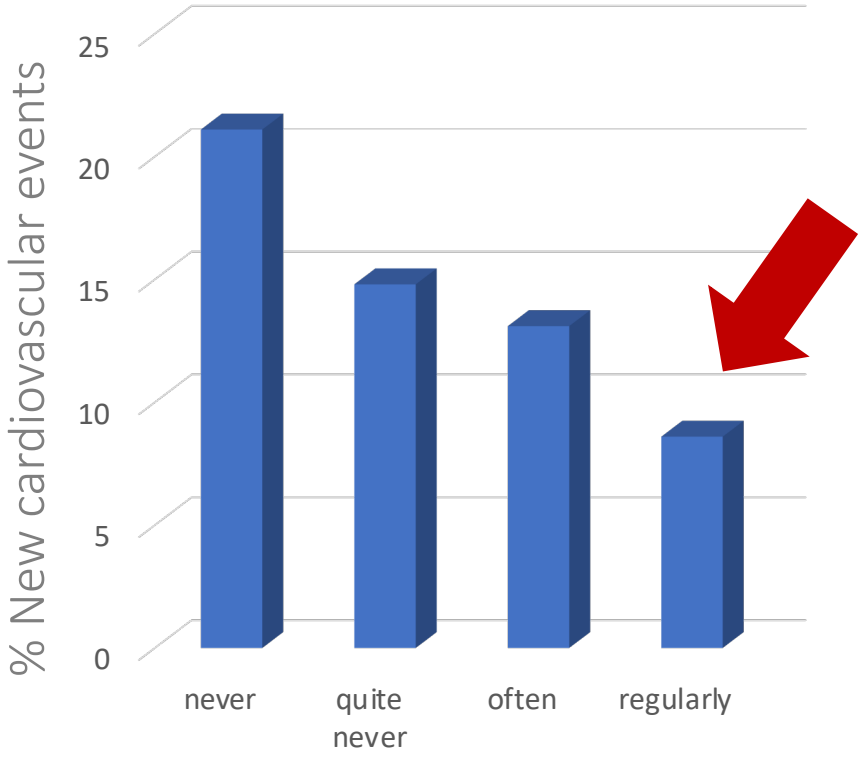


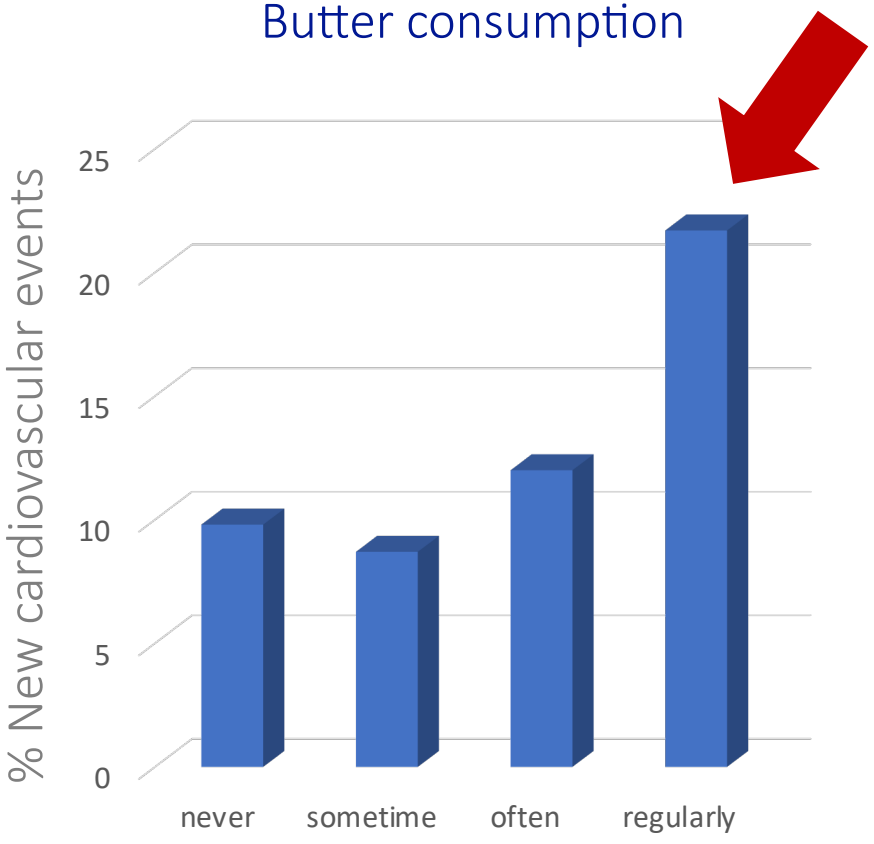


The cardiovascular effect of the value of Mediterranean diet: Olive oil

Olive oil consumption

Butter consumption



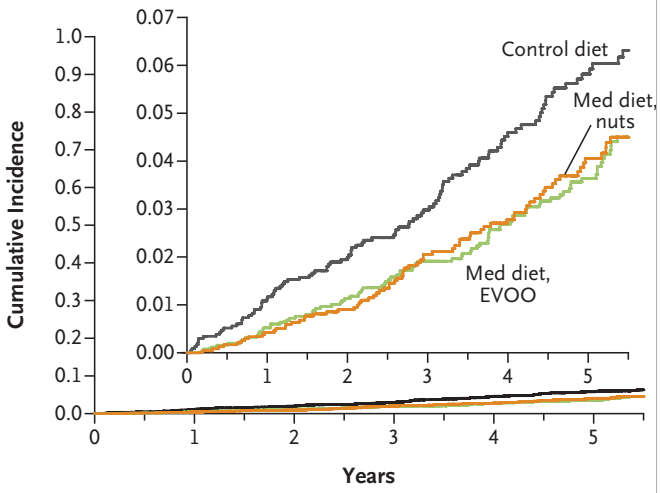


GISSI Prevention trial

KAPLAN-MEIER ESTIMATES OF THE CUMULATIVE INCIDENCE OF END-POINT EVENTS IN THE TOTAL STUDY POPULATION

A **Primary End Point (acute myocardial infarction, stroke, or death from cardiovascular causes)**

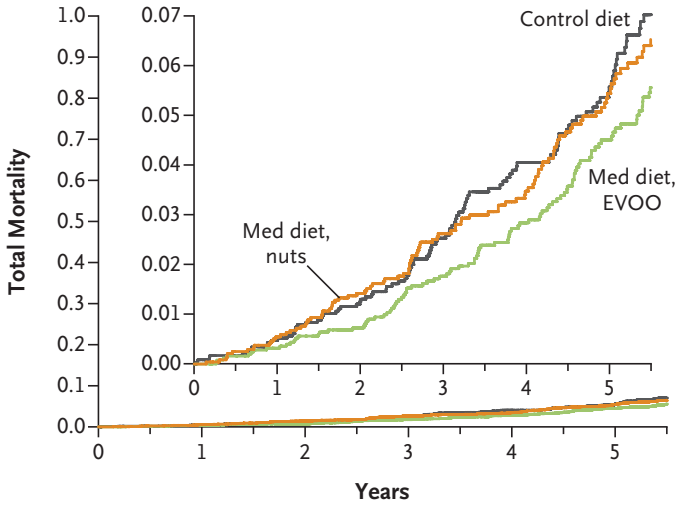
Med diet, EVOO: hazard ratio, 0.69 (95% CI, 0.53–0.91)
Med diet, nuts: hazard ratio, 0.72 (95% CI, 0.54–0.95)



No. at Risk						
Control diet	2450	2268	2020	1583	1268	946
Med diet, EVOO	2543	2486	2320	1987	1687	1310
Med diet, nuts	2454	2343	2093	1657	1389	1031

B **Total Mortality**

Med diet, EVOO: hazard ratio, 0.90 (95% CI, 0.69–1.18)
Med diet, nuts: hazard ratio, 1.12 (95% CI, 0.86–1.47)



No. at Risk						
Control diet	2450	2270	2027	1586	1272	949
Med diet, EVOO	2543	2486	2324	1991	1691	1310
Med diet, nuts	2454	2345	2097	1662	1395	1037

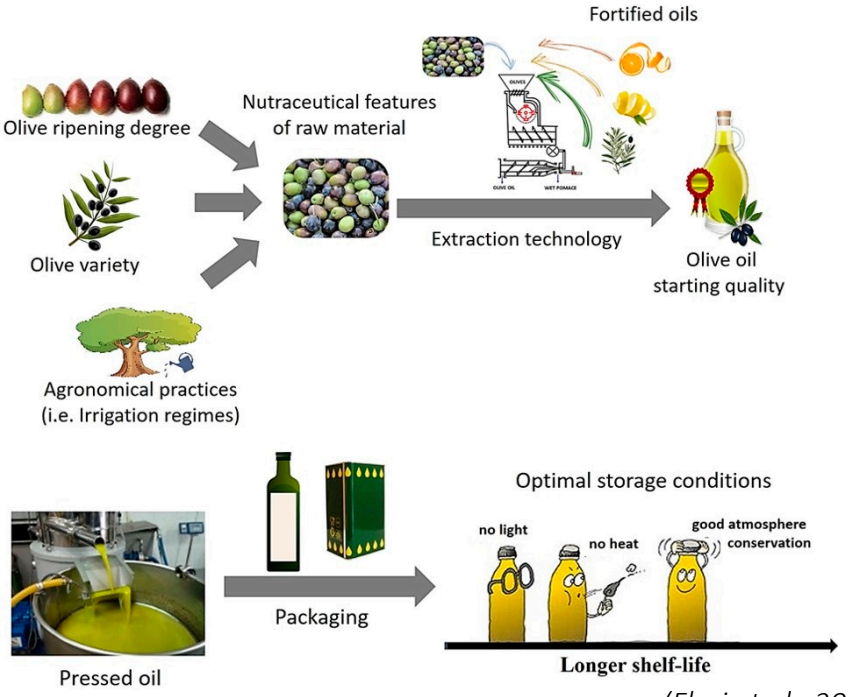
(Adapted from Estruch et al., 2018)

Based on numerous clinical trials carried out in the past few decades, in 2004 the **US Food and Drug Administration (FDA)** and more recently the **European Food Safety Authority (EFSA),** authorized the health claims for olive oil, suggesting a dose of 20-23 g/day as a replacement for the same amount of saturated fats to reduce the risk of coronary diseases

(Flori et al., 2019)

Extra Virgin Olive Oil is described as having **a free acidity,** expressed as oleic acid, of **not more than 0.8 grams per 100 grams** and **a peroxide value of less than 20 milliequivalent O_2**. It must be produced entirely by mechanical means **without the use of any solvents**, and under temperatures that will not degrade the oil (less than 86°F, 30°C).
The name Extravirgin olive oil is not correlated to the polyphenols content.

However, the quality of Olive oil depend on a process that begins with the olive ripening and finishes with the packaging



(Flori et al., 2019)

- Oleuropein is very abundant in the early stages of fruit maturation. In young fruits it can reach 14% of dry matter. Its content decrease during the maturation and Hydrossityrosol increase.
- Most part of Hydrossityrosol follows vegetation waters (hydrosulubility) during the process of oil making.
- Most content of polyphenols precipitates with the water emulsified (small part) inside oil after some months of conservation

WINE

The MONICA Project, a worldwide monitoring system for cardiovascular diseases organized by the World Health Organisation

Mediterranean diet and French Paradox

CORONARY HEART DISEASE IN MIDDLE-AGED FRENCHMEN
Comparisons between Paris Prospective Study, Seven Countries Study, and Pooling Project

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(Ducimetiere et al., 1980)

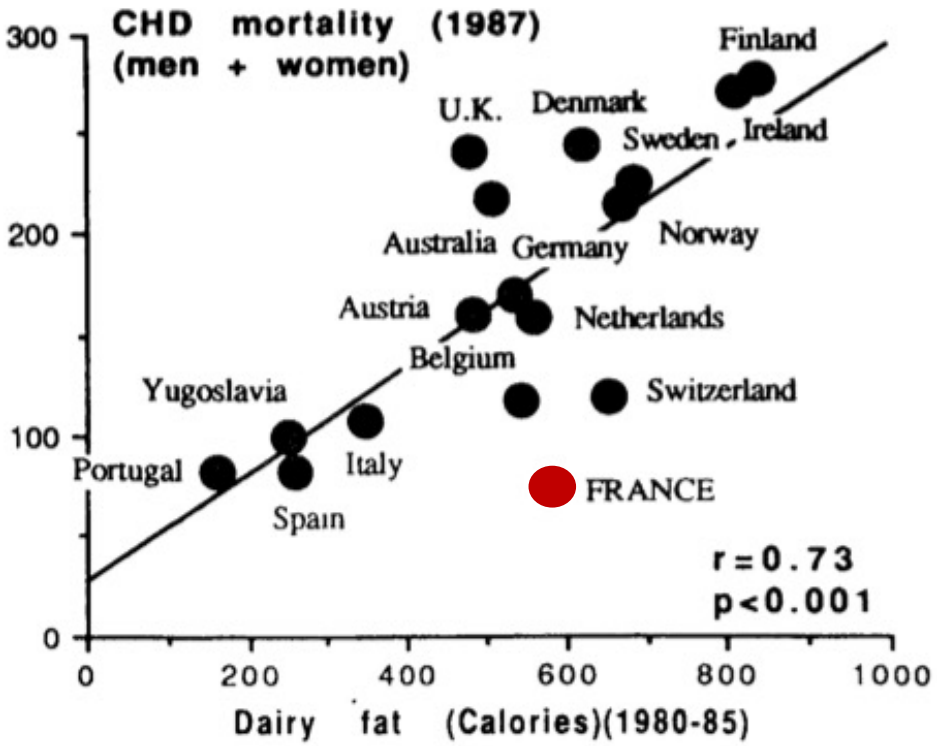
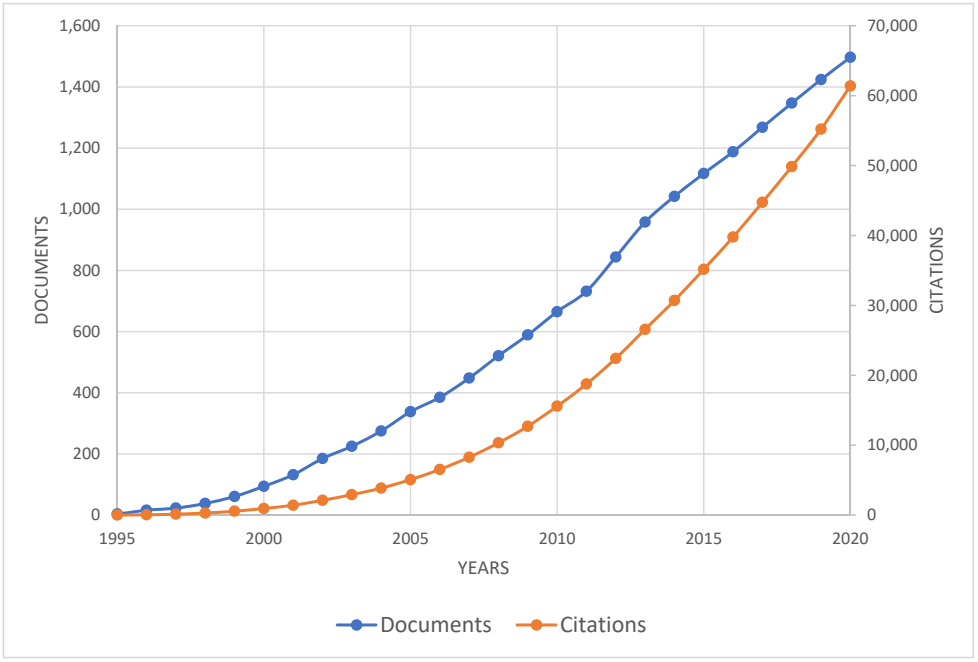


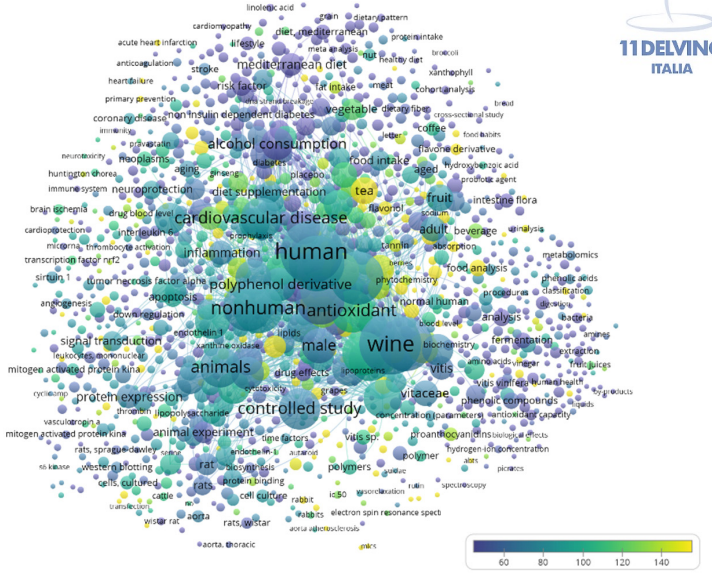
Fig 1—Relation between age-standardised death rate from CHD (mean for men and women)[1] and consumption of dairy fat in countries reporting wine consumption.

Regression equation: y = 26·3 + 0·27 dairy fat

(Renaud & Lorgeril, 1992)

Publication and citation trends of the relationships between wine polyphenols and health research displayed as cumulative function





Term map for relationships of wine polyphenols and health research

Top-recurring terms on the relationships between wine polyphenols and health research

Term	Occurrence
human/humans	1363
polyphenol/polyphenols	1108
wine	750
antioxidant/antioxidants	718
non-human	483
resveratrol	471
red wine	450
flavonoids	349
antioxidant activity	343
cardiovascular disease	330
controlled study	326
animals	322

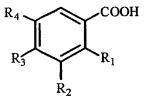
(Lucarini et al., 2021)

WINE POLYPHENOLS

NON-FLAVONOID PHENOLIC COMPOUNDS

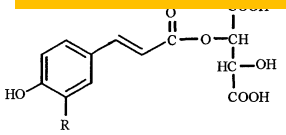
Phenolic acids

(Hydroxybenzoic and Hydroxycinnamic Acids)



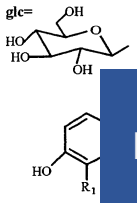
Benzoic acid	R_1	R_2	R_3	R_4
p-Hydroxybenzoic	H	H	OH	H
Protocatechuic	H	OH	OH	H
Vanillic	H	OCH_3	OH	H
Gallic	H	OH	OH	OH
Syringic	H	OCH_3	OH	OCH_3
Salicilic	OH	H	H	H
				OH

IMPORTANT ROLE IN OXIDATION REACTIONS



Hydroxycinnamic ester	R
Trans- caffeoyltartaric acid (caftaric acid)	OH
Trans-*p*-coumaroyltartaric acid (cutaric acid)	H
Trans- feruloyltartaric acid (fertaric acid)	OCH_3

Stilbenes

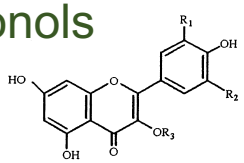


Stilbene	R_1	R_2	R_3
Trans-resveratrol	H	H	H
			H
			glc
			H

A GREAT NUMBER OF POTENTIAL BENEFITS FOR HUMAN HEALTH

FLAVONOID PHENOLIC COMPOUNDS

Flavonols



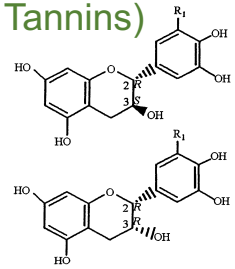
Flavonol
Kaempferol
Kaempferol-3-O-glucoside
Kaempferol-3-O-galactosi
Kaempferol-3-O-glucuroni
Quercetin
Quercetin-3-O-glucoside
Quercetin-3-O-glucuronide
Myrice
Myrice
Myrice
Isorhar
Isorhar

gal= galactose; glc= glucose; gluc= glucuronide acid

QUERCETINA PRECIPITATIONS

Flavanols

(Flavan-3-ols and Condensed Tannins)

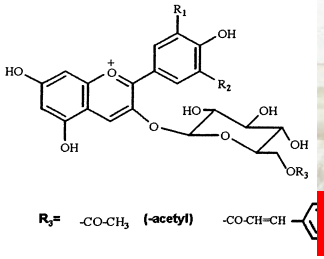


ASTRINGENCY

Flavan-3-ol	R_1	C-3
(+)-Catechin		S
(+)-Gallocatechin		S
(-)-Epic	R	R
	OH R	R

BITTERNESS

Anthocyanins



R_3= -CO-CH_3 (-acetyl) -CO-CH=CH

RED WINE COLOUR

THE CONTENT OF PHENOLIC COMPOUNDS IN WINE

Total polyphenols (Folin-Ciocalteu) mg/L

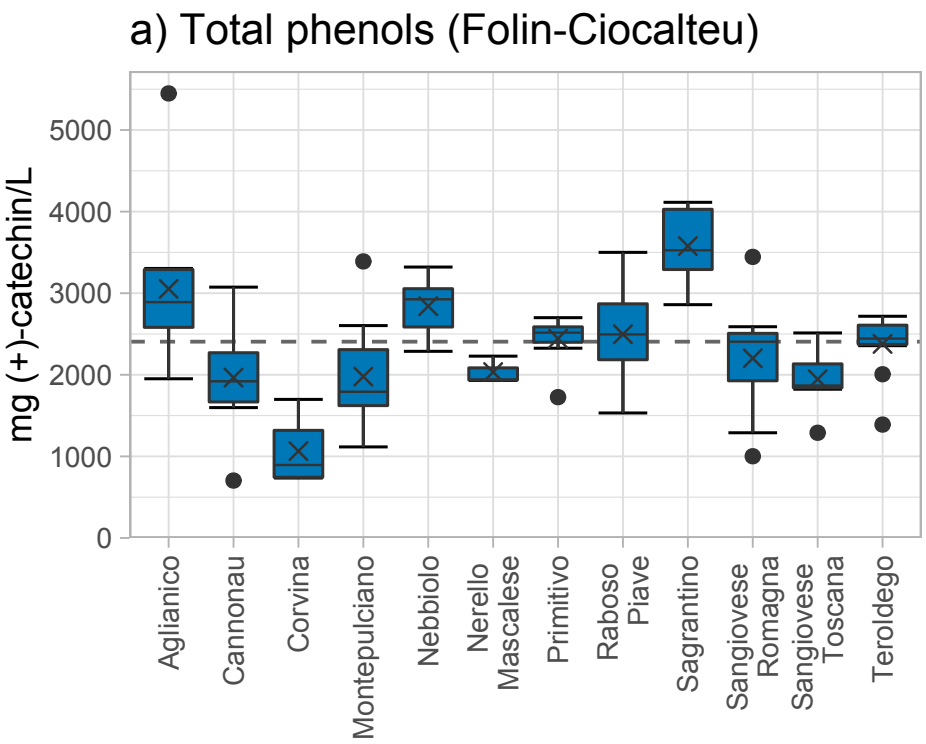
	2015
V_1	1834^{bc}
V_2	1623^{cd}
V_3	2182^{ab}
Mean	1880^{B}
K_1	1470^{cd}
K_2	2063^{b}
K_3	1407^{d}
Mean	1647^{C}
CS_1	2133^{ab}
CS_2	1972^{b}
CS_3	2485^{a}
Mean	2197^{A}
WK_1	389^{ab}
WK_2	427^{a}
WK_3	408^{a}
Mean	408^{A}
WCh_1	255^{c}
WCh_2	334^{bc}
WCh_3	295^{c}
Mean	294^{B}
ANOVA	
Vintage	**

Cabernet sauvignon

Chardonnay

(Adapted from Pajovic Scepanovic et al., 2019)

Among red wines…



(Giacosa et al., 2021)

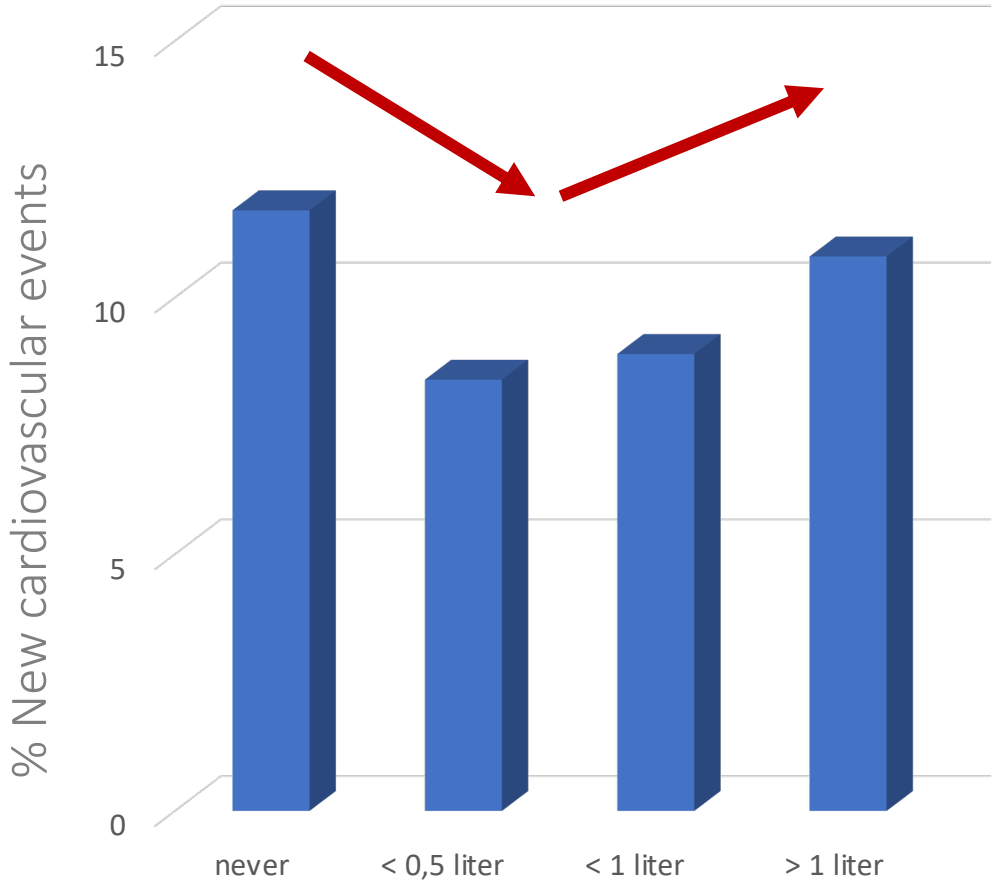
THE CONTENT OF RESVERATROL IN WINE

Table 2. Level of trans- and cis-resveratrol in some red wines.

No.	Type of Wine, Grape Variety, Year of Production, (Country of Production)	Resveratrol Content in mg/L		
		Trans-Resveratrol	Cis-Resveratrol	Total
1	Red wine, "Exposicion Carmenere", 2005, (Chile)	1.80	1.20	3.00
2	Red wine "Estampa Cabernet Sauvignon", 2006, (Chile)	2.00	0.60	2.60
3	Red wine "Estampa Cabernet Sauvignon Merlot", 2006, (Chile)	1.60	0.80	2.40
4	Red wine "Negroamaro Salento IGT", 2006. (Italy, Apulia)	0.80	1.20	2.00
5	Red wine "Merlot Myskhako", 2006, (Russia)	0.50	1.40	1.90
6	Red wine "Salento IGT", 2006, (Italy, Apulia)	0.40	0.80	1.20
7	Red wine "Vistamar Cabernet Sauvignon", 2006, (Chile)	0.80	0.20	1.00
8	Red wine "Cabernet Myskhako", 2005, (Russia)	0.20	0.40	0.60
9	Red wine "Nero d'Avola Sangiovese Emporio", 2004, (Italy, Sicily)	0.50	0.10	0.60
10	Red wine "Las Moras Malbec", 2006, (Argentina)	0.25	0.35	0.60
11	Red wine "Merlot Tamani", 2006, (Russia)	0.40	0.10	0.50
12	Red wine "Cabernet Tamani", 2006, (Russia)	0.40	0.10	0.50
13	Red semi-dry Cabernet Sauvignon, 2006, (South Africa)	0.30	0.20	0.50
14	Red wine Chianti Badiolo, (Italy)	0.30	0.10	0.40
15	White wine Estampa Chardonnay, 2006, (Chile)	0.35	0.05	0.40
16	Red wine "Las Moras Bonarda", 2006, (Argentina)	0.09	0.15	0.24
17	White wine "Chardonnay Myskhako", 2007, (Russia)	0.12	0.07	0.19
18	White wine "Sauvignon Blanc Myskhako", 2007, (Russia)	0.09	0.02	0.11
19	Rose wine "Folonari Bardolino Chiaretto", 2005, (Italy)	0.05	0.06	0.11
20	White wine "Malvasia Chardonnay Salento IGT", 2006, (Italy, Apulia)	0.10	0.01	0.11
21	White wine "Chardonnay Sicily IGT", 2005\2006 (Italy, Sicily)	0.05	0.01	0.06

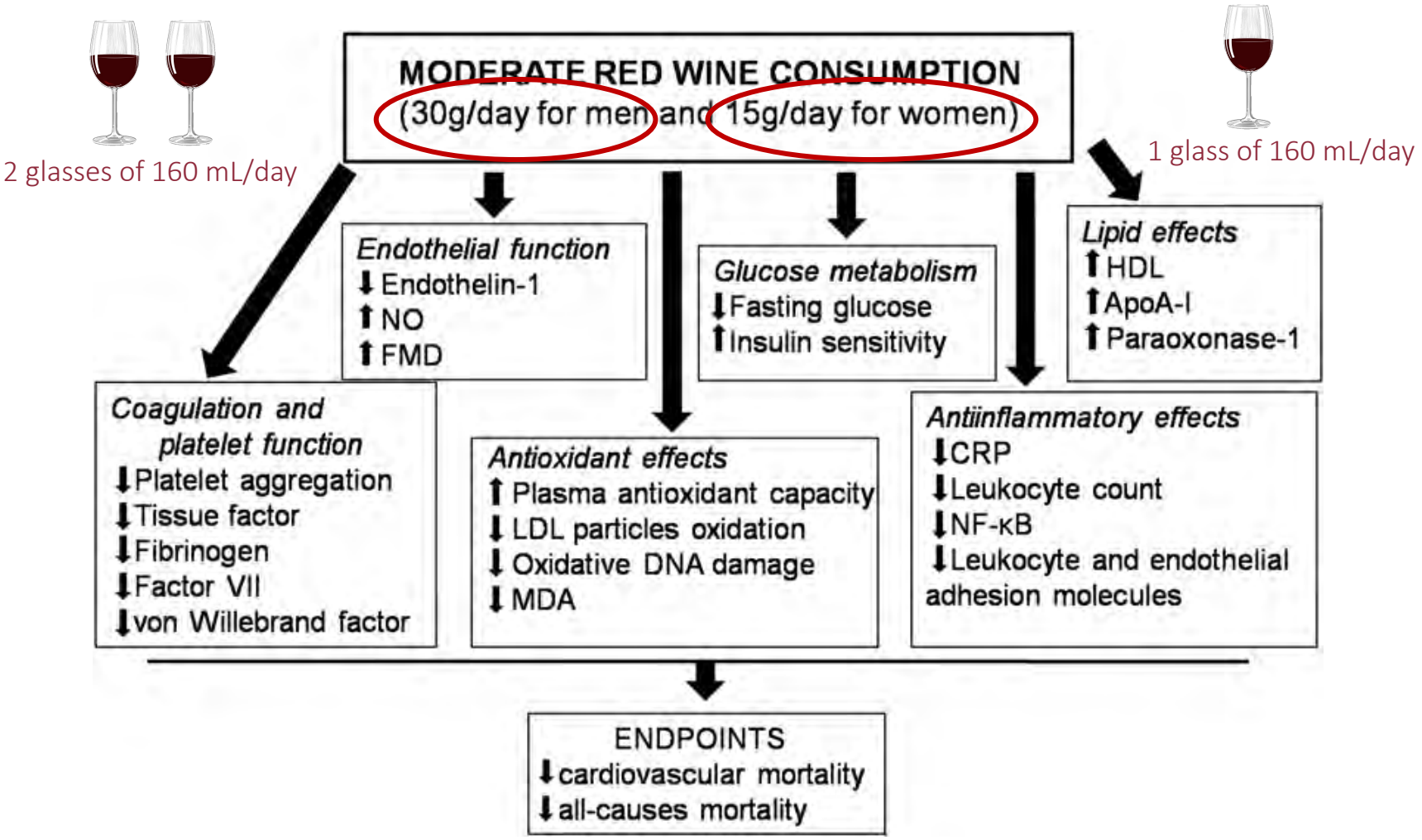
(Nemzer et al., 2021)

Wine consumption



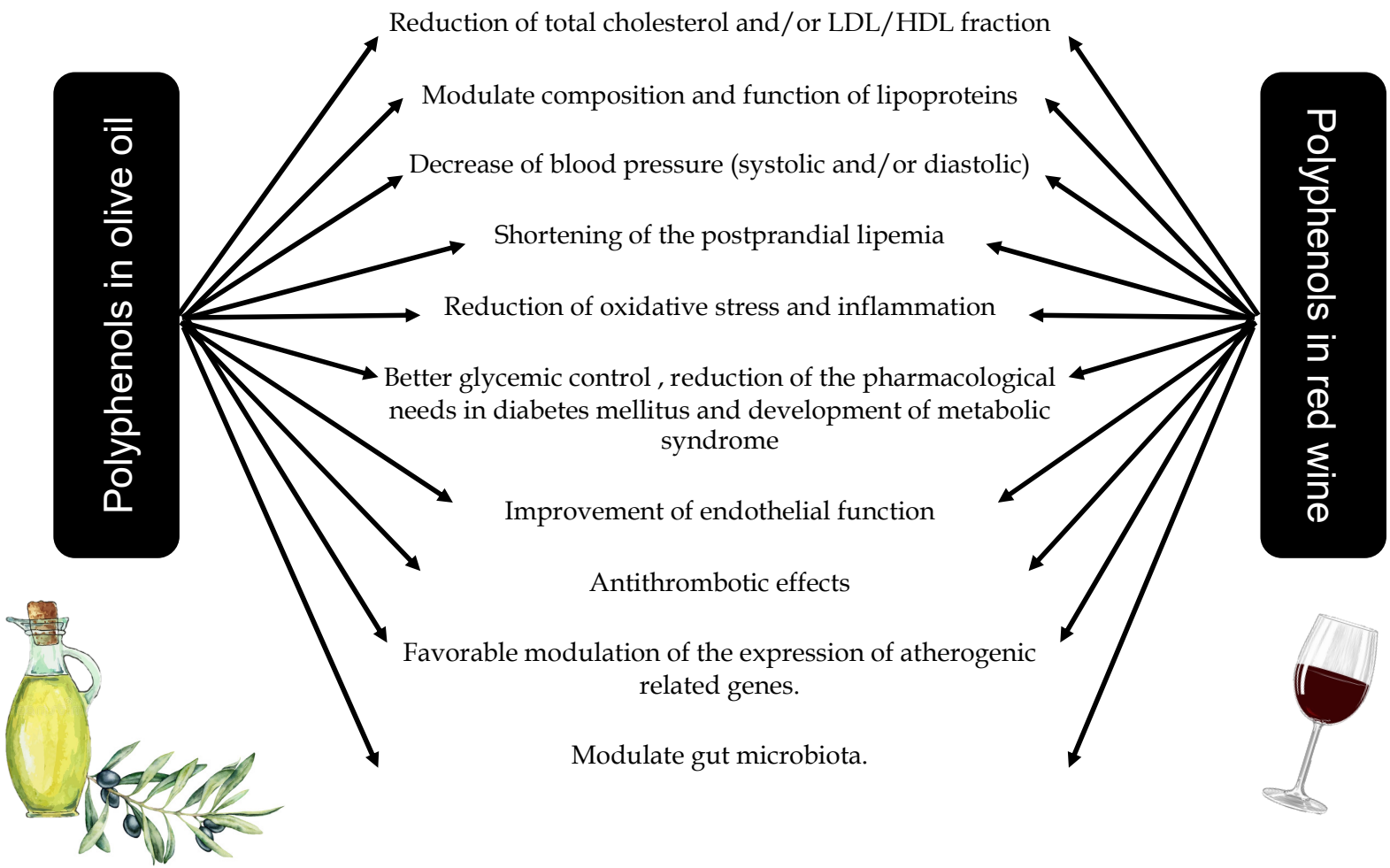
GISSI Prevention trial

Cardiovascular effects of moderate red wine consumption



(Chiva-Blanch et al., 2013)

Impact of polyphenol content in moderate consumption of wine and olive oil on cardiovascular disease prevention and management



(Ditano-Vázquez et al., 2019)

Don't Forget!

Caloric content of Wine ad Olive Oil

Red wine

11-16% v/v

135-195 kcal

White wine

9-14% v/v

107-173 kcal

Olive oil

900 kcal

Weight loss: benefits

-3.0 units of Body Mass Index

(about 9 kg)

Mortality: - 25%

Cholesterol: - 10%

Cholesterol HDL: + 4 mg/dl

Risk of diabetes: – 50%

Glycemia: – 30%

PAS: - 15 mmHg

PAD: - 10 mmHg

Ventricular mass: - 16%

Angina: - 50%

Exercise tolerance: + 33%

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Thank you!

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