

Chemists

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California Extra Virgin Olive Oil | Better.Fresher



Nutritional aspects of extra virgin olive oil

Natalia Ruiz

Active Constituents in Extra Virgin Olive Oil (EVOO)

✓ Mono-unsaturated fatty acids (i.e. oleic acid)

✓ Natural antioxidants:

○ Phenolic compounds (i.e. Hydroxytyrosol, tyrosol, derivatives of oleuropein)

○ α -tocopherols (Vitamin E)

○ Squalene

○ Oleocanthal



Health Benefits of EVOO

EVOO has a wide range of therapeutic properties which are beneficial to health:



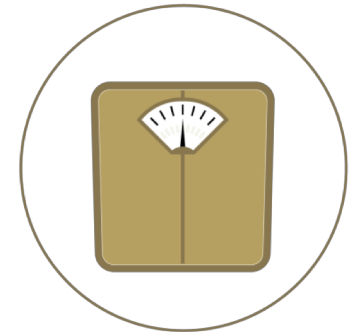
Cardiovascular Health



Anti-Ageing



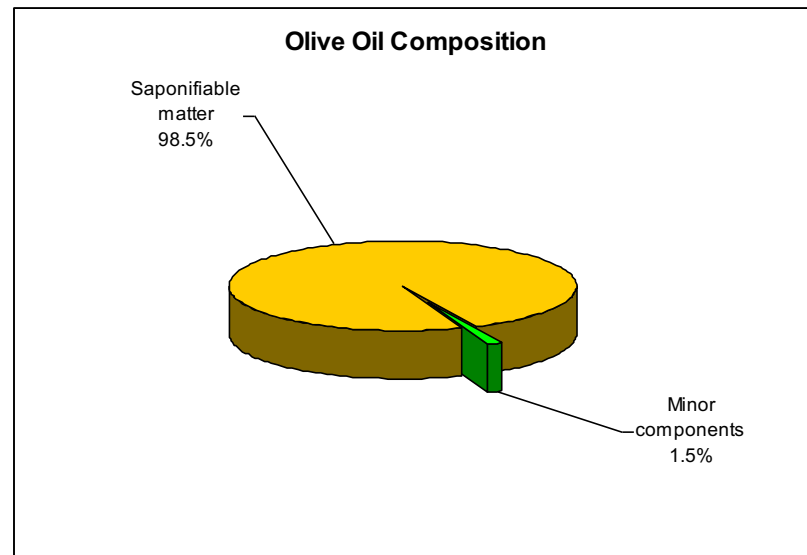
Inflammation



Weight Control



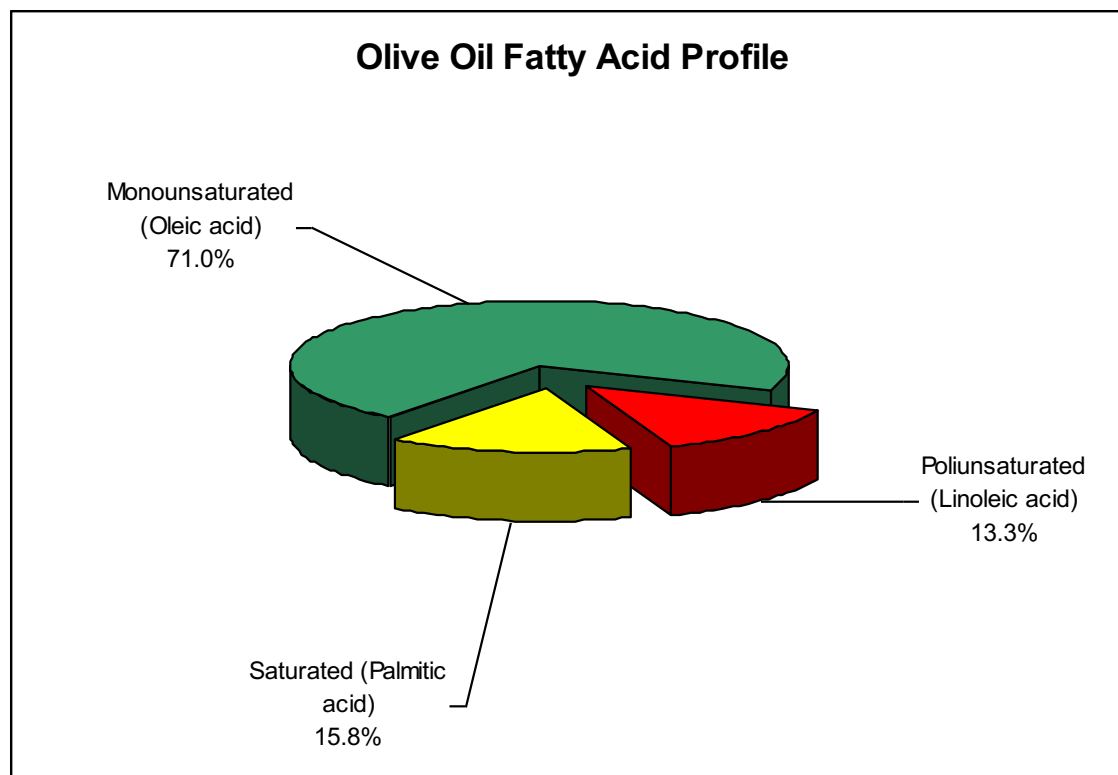
NUTRITION INFORMATION		
Serving per package: (insert number of serving)		
Serving size: 15 ml		
	Avg Qty per 15 ml	% Daily Value*
Energy	120 Cal	
Fat, total	14 g	18%
- saturated	2.5 g	13%
- monounsaturated	10 g	
- polyunsaturated	1.5 g	
- trans	0 g	
Cholesterol	0 mg	0%
Sodium	0 mg	0%
Carbohydrate	0 g	0%
Protein	0 g	0%



MONO-UNSATURATED FATTY ACIDS

Average value in EVOO:

Saturated ~ 15%
Mono-unsaturated ~ 70%
Poly-unsaturated ~ 15%
Trans fat = 0



Mono-unsaturated fats (MUFA) are less susceptible to oxidation and has higher stability. The most important MUFA in EVOO is Oleic Acid.



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Cardiovascular Health



Oleic acid supports cardiovascular health by:

- ✓ Reducing the risk of developing stiff or blocked arteries
- ✓ Reducing LDL cholesterol (bad cholesterol) and Increasing HDL cholesterol (good cholesterol)
- ✓ Help people with type 2 diabetes: reducing blood levels of glucose, by consequence less insulin needed.



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Cardiovascular Health



EVOO does not contain trans fats

- Trans fats are unsaturated fat with adverse health benefit and strongly associated to coronary heart disease.
- Trans fat increase LDL cholesterol, and decrease HDL cholesterol.

All refined oils contain trans fat in different amount.



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Weight control



- Positive relationship between adherence to Mediterranean Diet and weight management/BMI.
- Evidence shows that people who consume a Mediterranean style diet, where EVOO is the main source of fat, usually have a lower body mass index (BMI) and are able to maintain it for longer.
- EVOO also naturally helps you feel more satisfied/full after meals, which help with the amount of food you eat, and help you to manage weight more effectively. That is associated to the bio-active compound OEA (Oleoiletanolamide – derivative of oleic acid) has been shown to increase satiety. It is proposed that when OEA accumulates in the small intestine, it regulates appetite control, through a vagal nerve mediated pathway.



PHENOLIC COMPOUNDS

In EVOO has been found 17 different phenolic compounds:

Hydroxytyrosol

Tyrosol

Vainillic Acid

Vainillin

p-coumaric Acid

Hydroxytyrosol acetate

DDOA: Dialdehydic form of decarboxymethyl oleuropein aglycone

DDLA: Dialdehydic form of decarboxymethyl ligstroside aglycone

DOA: Decarboxymethyl oleuropein aglycone

Pinoresinol

Cinnamic Acid

1-Acetoxi-pinoresinol

Luteolin

AOA: aldehydic form of oleuropein aglycone

Apigenin

ALA: aldehydic form of ligstroside aglycone

Phenolic compounds are considered to be the most bioactive substances found in EVOO.



PHENOLIC COMPOUNDS

The concentration of total polyphenols in EVOO varies between 50 – 1500 mg/kg.

The concentration depends on a variety of factors, such as:

- **growing conditions** (weather, water, MI, etc)
- **olive cultivars**,
- **production method** (healthy olives, time between harvest and process, malaxing temperature, etc)
- **storage conditions** (O₂, temperature, metals)



TOCOPHEROLS

Alpha-tocopherol is the form of vitamin E that is preferentially absorbed and accumulated in humans. Recommended Daily Amount (RDA) for adults of Vitamin E is 10 mg/day.

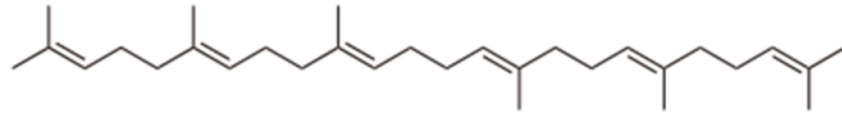
In EVOO the main tocopherol is alpha (~90% of the total), with very low amount of beta, gamma and delta.

The concentration of natural α -tocopherols in EVOO varies between 150 – 300 mg/kg.

In Olive oil is allowed to add artificial antioxidants (< 200mg/kg) to prevent rancidity or extend shelf life. It is commonly used artificial alpha tocopherols.



SQUALENE



Squalene, an isoprenoid compound structurally similar to beta-carotene.

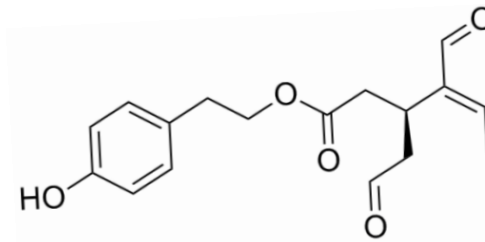
It is transported in serum generally in association with LDL and is distributed in human tissues, with the greatest concentration in the skin, where it is one of the major components of skin surface lipids.

Olive Oil is considered one of the richest renewable sources of squalene.

Extra virgin olive oil contains squalene in an amount of about 2000-6500 mg/kg, while refined olive oil contains about 25% less



OLEOCANTHAL



- Oleocanthal is a tyrosol ester and its chemical structure is related to oleuropein.
- It is a natural nonsteroidal anti-inflammatory compound.
- Oleocanthal is found in quantities ranging from 1 to 500 mg/kg in extra-virgin olive oil.
- It is responsible for the burning sensation at the back of the throat when consuming EVOO.

Olive oil is the only cooking oil which contains oleocanthal .





Cardiovascular Health

Antioxidants compounds (polyphenols, tocopherols and squalene) support cardiovascular health by:

- ✓ Potent antioxidant activity (scavenge of free radicals)
- ✓ Increasing the amount of good cholesterol (HDL) in the body, and reducing the amount of bad cholesterol (LDL).
- ✓ Reducing blood pressure.
- ✓ Squalene is a major intermediate in the biosynthesis of sterols, including cholesterol, steroid hormones and vitamin D.



Anti-Ageing



- The free radical theory proposes that ageing is caused by both normal metabolic processes and oxidative stress.
- Free radicals are oxidising agents which cause damage to cells, particularly affecting the lipid components of the cell membrane, altering membrane fluidity and resulting in subsequent cell ageing.
- This oxidative damage to cells can be prevented by antioxidant substances from diet sources, which have the ability to deactivate free radicals through a process of donating protons.



Anti-Ageing



Natural antioxidants, which are found in high levels in premium EVOO, play a role in protecting lipids membranes from oxidative damage.

EVOO, which contains:

- ✓ At least 5 mg of biophenols per 20 g of olive oil, have been shown to significantly reduce the levels of oxidised LDL in the plasma, which may delay atherosclerosis.
- ✓ Tocopherols (predominantly α -tocopherol, or vitamin E) also reduce the risk of atherosclerosis via:
 - Prevention of lipoproteins oxidation.
 - Reduction of free radical production.



Inflammation



- ✓ Oleocanthal has been found to have anti-inflammatory and antioxidant properties. Similar to classical non-steroidal anti-inflammatory drugs, it is a non-selective inhibitor of cyclooxygenase (COX), which is a similar mode of action to ibuprofen.
- ✓ Oleocanthal, has been recently linked to reduced risk of Alzheimer's disease , because it can reduce the accumulation of β -amyloid proteins involved in this disease
- ✓ Also has been demonstrated that oleocanthal shows potential as a therapeutic agent in the treatment of inflammatory degenerative joint diseases



COMPARISON OF DIFFERENT COOKING OILS

OIL TYPE/BRAND	MUFAs (%)	α Tocopherols (ppm)	Squalene (ppm)	Polyphenols (ppm)	Trans Fats (%)
Premium Extra Virgin Olive Oil	70-76	150-300	3500-6500	500-1400	0.0
Average Extra Virgin Olive Oil	65-74	70-170	2500-5500	170-340	0.0
Olive Oil (refined blend)	65-74	70-150*	2000-4000	10-150	0.1-0.3
Rice Bran Oil	40-45	30-60*	350-450	<1	0.6-1.9
Vegetable Oil	50-60	70-200*	30-300	<1	0.6-1.5
Canola Oil	60-70	100-200*	100-200	<5	0.6-1.7
Virgin Coconut Oil	4-8	5-10	0.0	<1	0.0

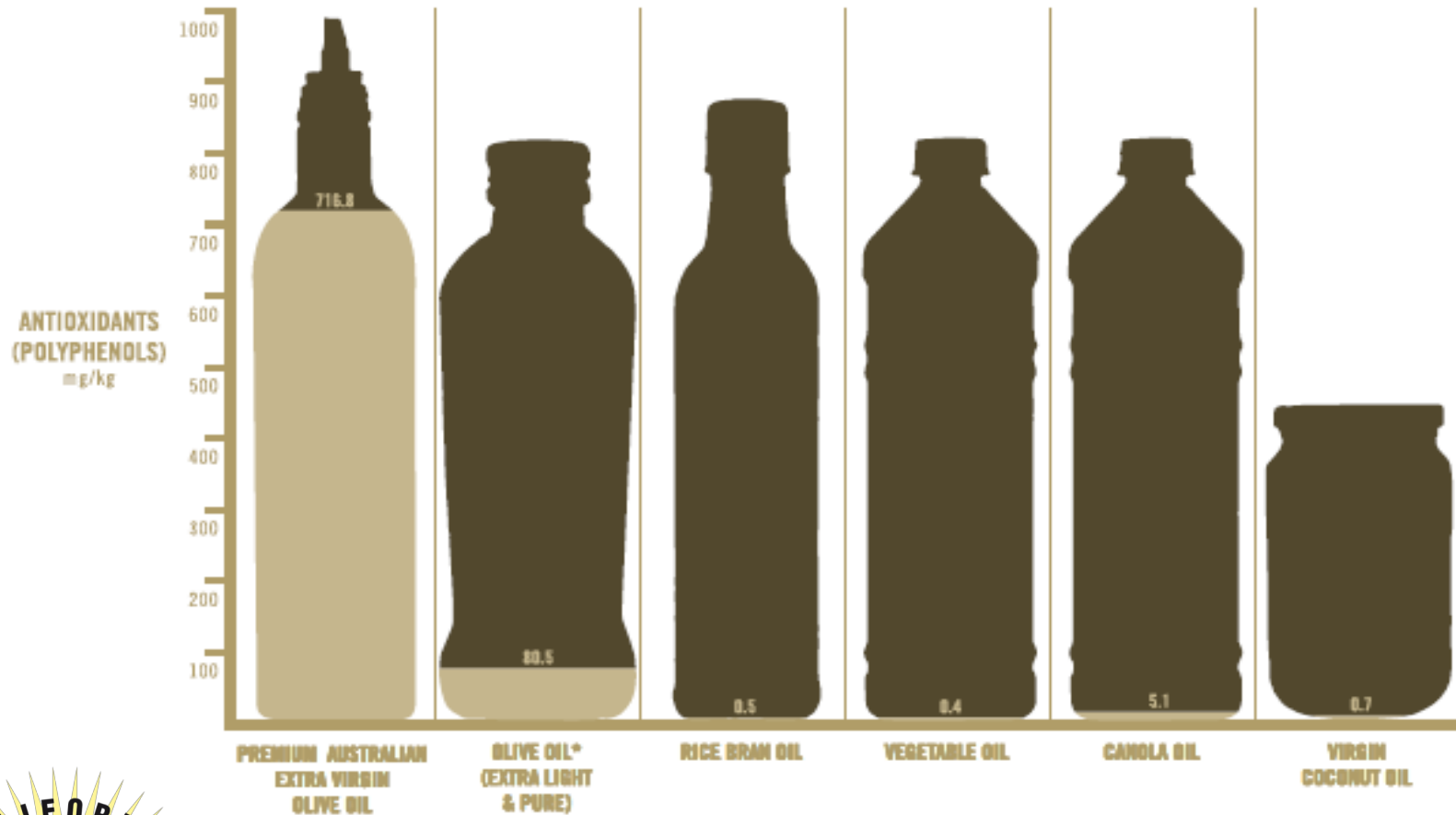
* Most alpha tocopherols in seed oils and refined olive oil are not naturally present but artificially added



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ANTIOXIDANTS IN COOKING OIL

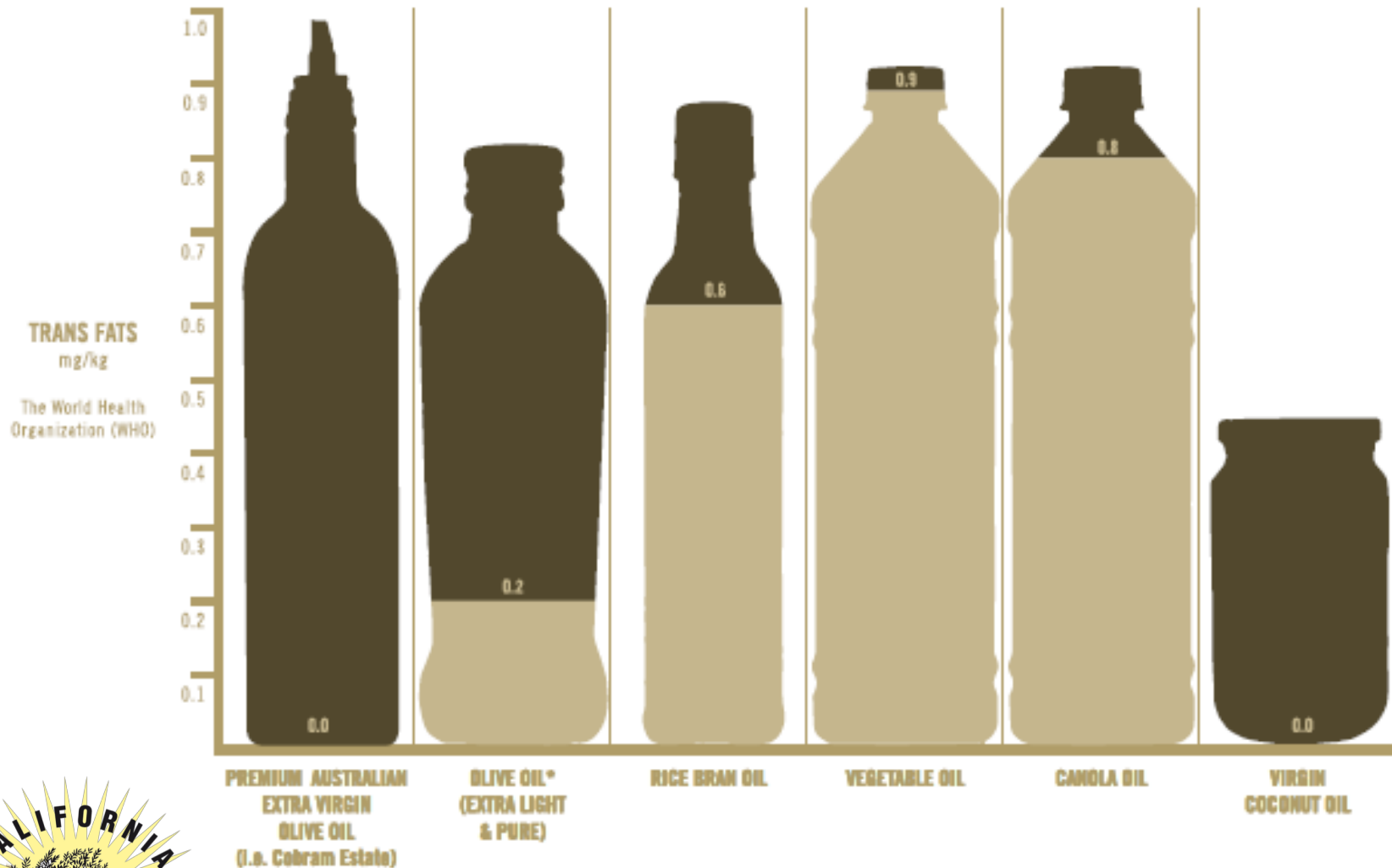
Based on analysis performed on standard supermarket products by ISO 17025 accredited laboratory



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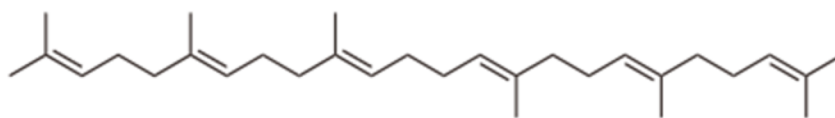
TRANS FAT IN COOKING OIL

Based on analysis performed on standard supermarket products by ISO 17025 accredited laboratory



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Thank you



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