

## Sweet Almond oil



### BOTANY

*Prunus amygdalus* Stokes var. *dulcis* DC. Common name *almond tree*. This is a deciduous tree from the Rosaceae family, which grows up to 10m tall. The bark is dark and cracked. The leaves are pointed, ovate-lanceolate, up to 12cm long, with toothed margins. The flowers are whitish-pink or pink, seldom white, usually clustered in pairs. The fruit is a drupe; the mesocarp is soft in the young fruit and hardens as the fruit ripens. The seed, commonly known as *sweet almond*, is edible. Popularly, this seed is included inside the *dried fruits* category. Sweet almonds are native to temperate and desert areas in the West of Asia, wherefrom it gradually spread to the warm and dry areas in the Mediterranean basin.

Sweet almond oil is obtained by cold pressing of the fruits of *Prunus amygdalus* Stokes var. *dulcis* DC.

### CHEMISTRY

Table 1 shows the approximate chemical composition of sweet almonds; values expressed as % weight (g/100 g food).

<b>Proteins</b> (g)	19.0
<b>Carbohydrates</b> (g)	4.8
<b>Fiber</b> (g)	15.0
<b>Total lipid content</b> (g)	53.5
Fatty acids Saturated (g)	4.2
Unsaturated Monounsaturated (g)	36.6
Polyunsaturated (g)	10.0
<b>Vitamin E</b> (mg)	26.18
<b>Calcium</b> (mg)	248.0
<b>Phytosterols</b> (mg)	120.0

Table 1. Chemical composition of sweet almonds (www.nucis.org/ametlles\_eng.htm).

## Lipids

The fatty acids composition of the lipid fraction of sweet almond is shown in table 2.

Fatty acids	Content (%)
Palmitic acid (C16:0)	4.0 - 9.0
Palmitoleic acid (C16:1)	Max. 0.6
Stearic acid (C18:0)	1.0 - 3.0
Oleic acid (C18:1)	62.0 - 86.0
Linoleic acid (C18:2)	20.0 - 30.0
Linolenic acid (C18:3)	Max. 0.4

Table 2. Fatty acids composition of the lipid fraction of sweet almond.

Remarkably, more than 90% of the fatty acids are unsaturated (oleic and linoleic). The high oleic acid (monounsaturated) content makes almond oil more resistant to oxidation than other oils with higher amounts of polyunsaturated fatty acids.

The unsaponifiable fraction, which usually amounts 0.7% of the almond oil, is mainly composed of squalane, tocopherol and phytosterols. Among phytosterols we find:  $\beta$ -sitosterol, campesterol, stigmasterol and avenasterol.  $\beta$ -sitosterol is the most abundant one reaching 80% of this fraction.

The following table compares the fatty acid composition of almond oil, olive oil, sunflower oil and coconut oil. Compared to almond oil, olive oil contains less linoleic acid and more palmitic acid, the rest of their composition being very similar. Therefore, several authors claim almond oil to be a good substitute for olive oil in the diet, to avoid the olive taste that they describe as unpleasant.

Fatty acids composition (%)				
	ALMOND	OLIVE	SUNFLOWER	COCONUT
C8:0	-	-	-	7.0
C10:0	-	-	-	7.0
C12:0	-	-	-	50.0
C14:0	---	---	0.5	18.0
C16:0	5.0	13.0	7.0	8.0
C16:1	-	1.0	-	-
C18:0	2.0	2.0	4.0	2.0
C18:1	70.0	72.0	22.0	5.0
C18:2	22.0	10.0	63.0	2.0
C18:3	0.5	1.0	1.0	-
C20:0	-	0.5	1.0	-
Unsaponifiable	0.7	1.5	1.0	0.2
Temp.Fusion / Solidification	-18°C	0°C	-10°C	24°C

Table 3. Fatty acids composition of different vegetable oil.

## TRADITIONAL USES

Almond is an important component of the Mediterranean diet. Interestingly, its high energy value and low sugar content make it an appropriate food for diabetic patients. Almond seeds are used to prepare cakes, soups, vegetables and sauces. They are the basis of the famous Christmas candies and marzipan, nutritious foods good to fight the cold Christmas weather.

Sweet almonds have been traditionally used for different preparations, such as oil, syrup, milk, pastry, cakes and beverages, and also for pharmaceutical and cosmetic preparations. Almonds are used to treat skin affections under the form of nutritious revitalizing face masks. Almond milk has been used as a nutritional supplement for anaemia patients, growing children and pregnant women due to its high nutritional value.

Almond oil is used to heal superficial skin burnt, dermatosis and dry skin. Additionally, it has laxative properties and can also be used to soften ear cerumen accumulation.

## COSMETIC PROPERTIES

### Skin barrier repairing activity

Sweet almond oil is a clear, pale straw-coloured, inodorous, and sweet tasted oil, with a high fatty acids content and emollient power, which favour restoration of the skin lipid balance. It is very well tolerated and therefore widely employed in cosmetics as an excipient, lubricant, sebum-restoring and reepithelization agent for products aimed at the hygiene and treatment of sensitive skin and children's skin. It is very useful as a vehicle for administration of essential oil to children, aged people and those who cannot tolerate alcoholic solutions.

The function of polyunsaturated fatty acids (PUFAs) in the regeneration of skin barrier function and skin hydration is well documented. Dry skin has been demonstrated to contain reduced linoleic acid amount, which suggests that this fatty acid is required for a correct barrier function. Polyunsaturated fatty acids, like linoleic acid, are considered essential for some functions, for example prostaglandin synthesis. It has also been proved that the ceramides present in epidermis contain several fatty acids derivatives, 41% of them being linoleic acid.

Additionally, oleic acid has been found to improve transportation of PUFAs into skin as it promotes skin penetration through a mechanism including softening of the horny layer. Polyunsaturated fatty acids or physiological lipids, locally applied, may reach lower skin layers thus enhancing skin properties.

Other informations show that increasing the levels of these essential fatty acids in the skin there is more production of beneficial eicosanoids with anti-inflammatory and anti-proliferative effects. The balance between the different eicosanoids is critical for maintaining healthy skin barrier structure and functions and skin homeostasis. In addition, these fatty acids are useful as vehicle of actives because they increase the penetration of the actives.

The unsaponifiable fraction – mainly composed of squalane, tocopherol and phytosterols (mainly sitosterol, campesterol and stigmasterol) – supplies the skin with highly nutritious substances. Topic applications of vegetal unsaponifiable fractions on dermal connective tissue, improves skin tonicity and flexibility.

Therefore, sweet almond oil is highly recommendable to formulate cosmetic products with moisturizing and emollient activities.

Finally, we should mention that the *International Cosmetic Ingredient Dictionary and Handbook 10th ed. (2004)* describes the following cosmetic functions for sweet almond oil: fragrant, occlusive and skin repairing agent. It also includes almond oil into several product categories, among them skin hydrating products, hair conditioning products, shampoos, oils and baby products.

## COSMETIC APPLICATIONS

Action	Active	Cosmetic Application
Skin barrier repairing	Fatty acids Tocopherols Phytosterols	-Moisturizing -Emollient

## RECOMMENDED DOSE

The recommended dose is between 0.5% and 5.0%.

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[www.arbolesornamentales.com/Prunusdulcis.htm](http://www.arbolesornamentales.com/Prunusdulcis.htm)  
[www.infoagro.com](http://www.infoagro.com)  
[www.botanical-online.com/medicinalsametllercastella.htm](http://www.botanical-online.com/medicinalsametllercastella.htm)