

## BLESSED TREE OF OLIVE

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## ABSTRACT

The olive plant (*Olea europaea*) has been known and used for medicinal purposes since ancient times. In this article, we shall review the pharmaceutical benefits and uses of the various parts of the olive plant in detail. New clinical research is leading to additional pharmaceutical uses of the olive plants. Emerging uses such as applications in oncology and green methods of combating corrosion are mentioned briefly.

**Keywords:** Olives, *Olea europaea* Linn., Olive oil, Uses and applications, Phytochemistry.

## INTRODUCTION

The olive tree has a rich history. The ancients knew these virtues, and olive oil became a key to their religious and political ceremonies, from the temples of Ra in Egypt where lamps burned olive oil, to the temple of Solomon, where kings were anointed with oil based ointments. The olives, like the dates, holds great value in ancient and modern cultures. The dove holding an olive branch in its mouth has become a universal symbol of peace. It is said to have originated in the story of Prophet Noah. The dove appeared as a sign that the flood, which had been sent as a punishment, would abate. Olive trees can be found in all the continents except the Antarctica including tropical, subtropical, and temperate regions of the world. Olive trees are mostly distributed in the coastal areas of the eastern Mediterranean basin, the contiguous coastal areas of southeastern Europe, northern Iran at the south end of the Caspian Sea, western Asia, and northern Africa. They have a cultivation history of several 1000 years. We shall note the names in several other languages: *Olive* (English, French and German), *Zaitun* (Arabic-Persian, Hindi, Urdu and several Indian languages), *Oliva* (Russian, Latin and Italian), *Olivo* (Spanish), *Elia* (Greek), *Zayit* (Hebrew) and so on. It is estimated that there are about a billion olive trees in the world today (as of 2015), and the vast majority of these are found in the Mediterranean countries, although traditionally marginal areas account for no more than 25% of olive planted area and 10% of oil production [1]. Olive tree and its fruit are also important in the context of religion. Olives are narrated several times in the Bible, both in the new and old testaments [2]. Olive has also been praised as a blessed tree and fruit in the Holy Quran in Surah No. 24, Al-Noor (the light), verse 35 [3-5]. It is among the oldest known cultivated trees in the world (being grown before the written language was invented). Olives have been found in Egyptian tombs from 2000 years BC. The olive trees on the Mount of Olives in Jerusalem are reputed to be over 2000 years old, still relative newcomers considering the long domestication of the olive. The olive tree of Vouves (see Fig. 1) is an ancient tree located on the Greek island of Crete and is one of seven olive trees in the Mediterranean believed to be at least 2000-4000 years old. The exact age of the olive tree of Vouves cannot be ascertained, but several studies indicate that it is the oldest among them. The olive tree of Vouves is estimated at over 3000 years old [6]. It still produces olives, which are highly prized. Olive trees are hardy and drought, disease- and fire-resistant explaining partly the reason for their longevity and their widespread use in the region.

In this article, we shall outline the taxonomy, phytochemistry and the medicinal benefits of olive plants and its products.

## TAXONOMY

Olive trees are from the Oleaceae family (or the family of dicotyledons) which includes 30 genera of deciduous trees and shrubs. This family has

about 600 species comprising several tribes including *Fontanesieae*, *Forsythieae*, *Jasmineae*, *Myxopyreae*, and *Oleae*. The genus *Olea* got its name from the Greek "elaia" and the Latin "oleum" but it is known by nearly 80 different names as it is available across the continents. The genus *Olea* comprises 30 species. The olive (*Olea europaea* Linn.) is the only species to have fruit that can be consumed directly or processed [7].

The olive tree is not very tall and grows to <10 M high. It is an evergreen tree with leaves that are pale green above and silvery below. The bark is pale gray and the flowers are numerous, small and creamy-white in color (see Fig. 2). Olives are cultivated through grafting; the method routinely used to propagate fruit trees. The stem or bud of one plant is joined to the stem or bud of another to form a new plant. It can take more than 5 years for a tree to start producing fruit. The trees can be harvested annually and continue to produce fruits until they become very old and hollow. The fruit of the tree is a drupe with fleshy fruit and a hard seed. The oval-shaped olives are approximately 2-3 cm long. Olives go through a number of growth stages. They start out as a green fruit, which turns yellowish, then, reddish and finally black as they ripen.

## PHYTOCHEMISTRY

The whole tree of olive is useful, its fruit produces oil, the leaves possess medicinal value. Phytochemical research carried out on the various parts of the olive tree has led to the isolation of numerous compounds including flavonoids, flavone glycosides, flavanones, iridoids, iridane glycosides, secoiridoids, secoiridoid glycosides, triterpenes, biophenols, benzoic acid derivatives, xylitol, sterols, isochromans, sugars, and the list is steadily growing. The various parts of olive tree have found a number of uses in both traditional and contemporary medicine [8-10]. Some of its exemplary uses are given the following section.

1. Traditionally, olives have been viewed as a very healthy food. Besides providing energy, they compose of significant amounts of plant-derived antioxidants, minerals, phytosterols, and vitamins
2. Olives are a moderate source of calories; 100 g of fruits provide just 115 calories. Their calorie content basically comes from fats. Nonetheless, the fruit composes healthy fat in the form of mono-unsaturated fatty acids. Mediterranean diet that is rich in monounsaturated fatty acids help to prevent coronary artery disease and strokes by favoring healthy blood lipid profile
3. Olive fruit contains tyrosol phenolic compounds such as oleuropein and oleocanthal. These compounds are responsible for its bitter and pungent taste. Oleocanthal, oleuropein, and its derivative hydroxytyrosol are nature's most powerful anti-oxidants. Together with Vitamin E and carotenoids, they play a vital role fighting against cancer, inflammation, coronary artery disease, degenerative nerve diseases, diabetes, etc.



Fig. 1: The olive tree of Vouves appears to be the oldest olive tree

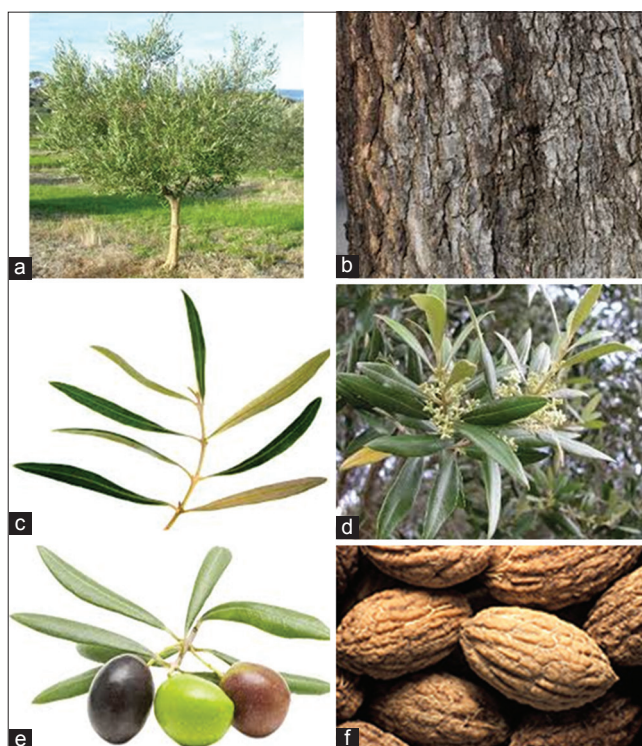


Fig. 2: *Olea europaea*: (a) Tree; (b) stem bark; (c) leaves; (d) inflorescence; (e) fruits; (f) seeds

4. Studies suggest that oleocanthal has ibuprofen like anti-inflammatory activities. The Mediterranean diet that uses olive and its oil may be responsible in part for the lower incidences of coronary artery disease
5. Olive contains a good amount of Vitamin E. 100 g cured, and canned fruits provide 1.65 mg (11% of daily requirement) of  $\alpha$ -tocopherol. Vitamin E is a powerful lipid soluble antioxidant, required for maintaining the integrity of cell membrane of mucus membranes and skin by protecting it from harmful oxygen-free radicals
6. In addition, the fruits contain good amounts of minerals such as calcium, copper, iron, manganese, and zinc. Further, they are small sources of B-complex vitamins
7. Oil expressed from these fruits is recognized as one of the healthiest edible oils since it contains less saturated fat, and composes linoleic (omega-6) and linolenic acid (omega-3) essential fatty acids at the recommended 8:1 ratio.

The olive leaves are antihypertensive, diuretic, astringent and antiseptic. Tea made from olive leaves is used to reduce fevers. The olive oil is a nourishing demulcent and laxative. Olive oil is used externally to treat burns and insect stings. Olive leaves contain oleuropein, which lowers blood pressure by increasing coronary blood flow. Studies on rodents have shown that oleuropein reduced the infarct size and reduced blood lipids. Oleuropein also helps to prevent the oxidation of high-density lipoproteins. A Spanish study concluded that a moderate consumption of olive oil may reduce systolic blood pressure of healthy men who do not typically consume a Mediterranean diet. Studies have shown that olive phenolics are powerful antioxidants and could partially account for the observed health benefits of the Mediterranean diet. The main phytochemicals for this anti-oxidant action are hydroxytyrosol and oleuropein. Oleuropein may inhibit hyperglycemia and oxidative stress induced by diabetes. The intake of oleuropein may help in the prevention of diabetic complications associated with oxidative stress. *In vitro* studies have shown that oleuropein is nontoxic antioxidant with potent anti-tumor effects. Epidemiological data shows that the Mediterranean people who consume a lot of olive oil have low cancer rates. The olive leaves have a high concentration of phenolic compounds, especially oleuropein. Oleuropein has been shown to exhibit antiproliferative activity against a number of cancer types [11]. Contemporary research on olive tree across the globe is finding additional uses.

**OLIVE OIL**

The smokeless burning of olive oil is a peculiar feature, which produces a bright light. An olive contains 10–40% oil by weight. Although olive fruits are very nutritious, it is not usually eaten due to its metallic taste. Olives are usually consumed in the form of pickles and preserved in salt or vinegar solutions. One can find an astounding array of olives from green and black varieties to stuffed ones in the market stores. One can also find a variety of olive oils in the market [10]. Olive oil is produced through a process known as crushing and pressing. While machines have taken over most of the work, traditional methods of extracting oil are still in use. Different methods of crushing and pressing are used to extract olive oil.

Types of olive oil include:

1. Extra virgin - considered the best, least processed, comprising the oil from the first pressing of the olives
2. Virgin - from the second pressing
3. Pure - undergoes some processing such as filtering and refining
4. Extra light - undergoes considerable processing and only retains a very mild olive flavor.

**Olives (*Olea europaea*), ripe, canned, (small to extra large)**

**Nutritional value per 100 g.**

Source: United States Department of Agriculture (USDA) National Nutrient Data Base, <http://www.ars.usda.gov/nutrientdata>

Principle	Nutrient value	Percentage of RDA
Energy	115 kcal	5.75
Carbohydrates	6.26 g	5
Protein	0.84 g	1.5
Total fat	10.68 g	50
Cholesterol	0 mg	0
Dietary Fiber	3.2 g	8
Vitamins		
Folates	0 $\mu$ g	0
Niacin	0.037 mg	<1
Pantothenic acid	0.015 mg	<1
Pyridoxine	0.009 mg	0
Riboflavin	0 mg	0
Thiamin	0.003 mg	0
Vitamin A	403 IU	13.5
Vitamin C	0.9	1
Vitamin E	1.65 mg	11
Vitamin K	1.4 $\mu$ g	1

Electrolytes		
Sodium	735 mg	49
Potassium	8 mg	17
Minerals		
Calcium	88 mg	9
Copper	0.251 mg	28
Iron	3.30 mg	41
Magnesium	4 mg	1
Manganese	0.020 mg	1
Phosphorus	3 mg	<1
Selenium	0.9 µg	1.5
Zinc	0.22 mg	2
Phyto-nutrients		
Carotene-β	237 µg	-
Crypto-xanthin-β	9 µg	-
Lutein-zeaxanthin	510 µg	-
Phytosterols	221 mg	-
Lipids (fatty acids)		
Total saturated	1.415 g	-
Total mono-unsaturated	7.888 g	-
Total poly-unsaturated	0.911 g	-

RDA: Reference daily intake or recommended daily intake, which is considered sufficient to meet the dietary requirements of most individuals

Corrosion control of metals is technically, economically, environmentally, and aesthetically important. The best option is to use inhibitors for protecting metals and alloys against corrosion. As organic corrosion inhibitors are toxic in nature, green inhibitors, which are biodegradable, without any heavy metals and other toxic compounds, are promoted. Moreover, the plant products are inexpensive, renewable, and readily available. Oil from the roots of the olive tree is an excellent choice to fight corrosion [12-14].

#### CONCLUDING REMARKS

Every part of the blessed tree of olive is fully utilized as the medicinal and cosmetic uses are many: The fruits are eaten or used to produce olive oil, the leaves possess medicinal value, and the wood of the tree is highly valued for carpentry work. Olive oil is applied to the skin as it brightens the complexion, softens the skin. It is used in the treatment of eczema and several other skin ailments. The olive oil is extremely nutritious as it is rich in antioxidants and the Vitamins E, A, D, and K. It is useful in balancing the fats and lowering the cholesterol and controlling the blood pressure. Olive oil also relates to the maintenance of a healthy digestive system [15-17]. The other traditional plants with plenty of uses include the date palm [18-25]. As the honeybees derive the honey from the nectar of flowers, the honey can be counted among the plant products [26,27]. We shall return to these in other articles.

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