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# Medicinal use of *Pistacia lentiscus* fixed oil in Constantine province, north-east Algeria

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## ABSTRACT

Since ancient times, products from mastic tree, *Pistacia lentiscus* L., are known as part of the traditional pharmacopoeia of several Mediterranean countries. In the aim to know the different uses of this shrub in local traditional medicine of Constantine province (north east Algeria) a survey was conducted among herbalists and pharmacists of the region. The most widely used product of this shrub is its fixed oil (fatty oil) extracted from the fruits; the plants leaves are rarely used; while its gum and essential oil are practically unused. Leaves are used to relief throat sore and stomach aches, they are also considered to have hypoglycaemic and hypotensive properties. Mastic fixed oil is prescribed for two major indications: as a topical application, it is used in the treatment of skin conditions especially wounds and burns. And orally to treat respiratory problems such as: sore throat, bronchitis, allergies, and asthma. Other less common uses of this oil include the treatment of arthralgia, haemorrhoids, jaundice and gastrointestinal disorders. With the exception of Algeria and Tunisia, the medicinal use of this oil seems uncommon in other Mediterranean regions; furthermore most of scientific studies conducted on *Pistacia lentiscus* products concerned the therapeutic properties of its gum and leaves, or their essential oils but not the fixed oil. In recent years, the traditional wound healing effect of this oil was investigated and proved by local researchers; however its other claimed therapeutic properties are still unproven at least by scientific research.

**Keywords:** Algeria; fixed oil; pharmacopoeia; *Pistacia lentiscus*; survey.

## INTRODUCTION

*Pistacia lentiscus* L., the lentisk or mastic bush, is an evergreen shrub of the genus *Pistacia* (Anacardiaceae family) occurring in Mediterranean ecosystems in a wide variety of habitats [1]. The Discovery of mastic seeds in archaeological sites indicates that the Mesolithic and Neolithic populations already knew this bush tree [2]. Since ancient times, the therapeutic use of this plant products is part of the traditional medicine of several Mediterranean regions with different uses depending on the country [3] [4]. In Constantine province (north east Algeria), mastic tree is named D'ru " ضرور " in local Arabic dialect (sometimes pronounced " T'ru " طرو ). Few years ago, medicinal use of mastic products was only known in the limited circle of some families originated from rural north-eastern provinces of the country. Nowadays this natural product gained popularity among local families of Constantine province and other parts of the country. This study is a survey conducted in order to know the different uses of *Pistacia lentiscus* products in the traditional pharmacopoeia of Constantine region.

## MATERIALS AND METHODS

Constantine is one of the 48 provinces (Wilayas) of Algeria, This important economical and highly populated region is situated in the north east part of the country. Our survey was conducted in three of its major districts (Daira) (Constantine, El Khroub, Hamma Bouziane) (Figure1). The survey was conducted in March 2010 and has reached

herbalists and pharmacists. Open-ended responses questionnaires were used to collect information. The Questions concerned the various products of this shrub, their origin and their therapeutic properties.

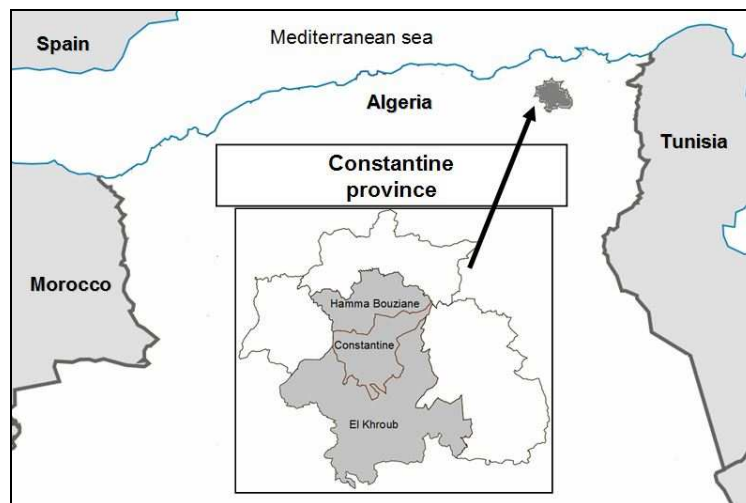


Figure 1: Map of investigated area in Constantine province

## RESULTS

In Constantine region, the most commercialized and used product of this shrub is its fixed oil, a fatty oil extracted from the plant's fruits which are small (3 to 6 mm diameter) reddish drupes becoming black at maturity. Leaves are rarely used, whereas both mastic gum and essential oil are practically unused.

Most of the mastic oil found in the market comes from two coastal provinces: Jijel and Skikda. In these regions, *Pistacia lentiscus*, is among the most abundant shrubs found in scrubland and forests. During olive harvest season, many rural families collect mastic drupes to extract its oil through traditional methods identical to those used for the extraction of olive oil. In Constantine region, the oil is sold in herbalists' shops, but also in many conventional pharmacies. Furthermore, many mastic oil- based cosmetics are also marketed (moisturizing creams, shampoo, soap...).

The few herbalists commercializing *Pistacia lentiscus* leaves recommend their use as an infusion to relief, throat sore, stomach pain and heartburn, leaves are also considered to have hypoglycaemic and hypotensive properties. Fixed oil presumed therapeutic properties are much more various, whether used alone or incorporated with other natural products, such as honey, beeswax and olive oil. All surveyed herbalists and pharmacists agree to recognise two major therapeutic uses of this oil: the first one is its use as a topical application to treat skin conditions such as burns, wounds and eczema; the other major use is as an oral medication for respiratory problems such as: sore throat, bronchitis, asthma, and respiratory allergies. Other less widespread indications of this oil include its use for the treatment of arthralgia, haemorrhoids, jaundice and gastrointestinal disorders.

## DISCUSSION

*Pistacia lentiscus* is a wide spread plant throughout the Mediterranean region. According to traditional pharmacopoeias of these regions, practically all parts of the plant can be used for medicinal purposes [5]. The most known product of this plant is its gum called, mastic, hence the name mastic tree. This aromatic resinous substance exudates from the trunk and main branches of *Pistacia lentiscus* especially those of the variety *chia* which grows particularly in the South region of the Greek Island Chios [6]. Other products obtained from this shrub include: its leaves; galls; bark; essential oils, obtained by steam distillation of gum or different aerial parts of the plant [7]; and finally the plant's fixed oil obtained from its fruits.

In Constantine region, the traditional use of mastic leaves to treat stomach ache, throat infections and hypertension is perfectly in line with other traditional pharmacopoeia [8] [9]. However, unlike other Mediterranean regions, the most used product of this shrub in Constantine region is its fixed oil. This particular product is not common in most Mediterranean regions, where the extraction of the fruit's oil is no longer in use [2]. In fact this oil, used to be a food condiment rather than a medicinal oil [10].

The review of experimental studies demonstrating biological and pharmacological activities of *Pistacia lentiscus* [11-15], shows that most of the studies were conducted on the plant's gum, especially Chia variety one, which is historically the most known and used product of *P. Lentiscus*, with very ancient references concerning its effect to treat gastrointestinal disorders [6]. Studies used the whole gum, its extracts or its essential oils. The plant's leaves therapeutic effects were also investigated using leaves' extracts or their essential oils along with other aerial parts of the plant. On the contrary, the medicinal use of the fixed oil seems limited geographically and not enough investigated scientifically. Indeed, therapeutic use of the fixed oil of *Pistacia lentiscus*, especially for the treatment of skin and respiratory conditions appear to be only reported by traditional pharmacopoeia of north African regions, in areas going from eastern Algeria to Tunisia [16] [5]. Other references about the traditional use of this oil, report its use in the north west parts of Tunisia, as an edible oil, but also as a medicinal oil in the treatment of scabies, rheumatism and in the manufacture of anti-diarrhoea pills [17] [18].

The limited geographical distribution of this oil users, explains the few studies dealing with its therapeutic effects. The available studies are almost exclusively made by local researchers who witnessed the increasing popularity of this oil in recent years. One of the first experimental studies on mastic fixed oil was reported by Bensegueni (2007) [19] who has studied traditional unguents used to treat wounds in Constantine region, one of the studied products was based on a mixture of mastic oil and beeswax. Results showed a significant healing effect of this unguent on experimental burns in rats. Later on, two leading experimental studies were conducted to confirm this wound healing effect using only mastic oil. In the first study, the effect of mastic oil was tested on full thickness excision wounds in rat model [5]. Animals were treated either with mastic oil or one of its two oily fractions: saponifiable and unsaponifiable. Effects of mastic oil and its two fractions were compared to Madecassol® a commercial protective and cicatrizing cream containing *Centelle Asiatica* extracts. Results showed a significant wound contraction in the presence of *Pistacia lentiscus* oil, this wound healing effect was more pronounced in animals treated with the oily unsaponifiable fraction. Preliminary phytochemical investigations of the latter fraction has revealed the presence of tocopherols and phytosterols, two compounds suspected to be implicated in the wound healing process [5]. In the second experimental study, mastic oil healing effect was tested on full thickness experimental burns in rabbit model [20]. Burn wounds treated with *Pistacia lentiscus* fixed oil showed a better evolution than those treated with Madecassol®. The use of mastic oil reduced the inflammatory phase, stimulated wound contraction and reduced the epithelization period [20]. Other studies confirmed the traditional use of mastic fatty oil to accelerate wound healing, Mammeri et al. (2012) [21] tested the burn healing effect of a mixture of honey and mastic, results showed that mastic oil used alone or mixed with honey promote significantly wound contraction compared with cicatryl® a commercial skin protector used for the treatment of burns and wounds. Furthermore mastic oil showed better wound contraction than honey during the inflammatory and proliferative phases [21].

Local researchers has Investigated, as well, the possible adverse effects of mastic oil. Used topically, mastic oil was found to be slightly irritating to both eyes and skin of rabbits [22]. Repeated dermal toxicity tests, has shown a reversible slight erythema after two weeks of application. After prolonged use, some rabbits presented a local sensitization and a reversible skin thickening [22]. This dermal irritant effect explains the traditional use of this oil in a mixture with beeswax [19].

Concerning internal use of mastic oil, tests of repeated toxicity via rectal route, showed that mastic oil is well tolerated with no adverse effect neither on liver nor renal functions; rabbits subjected to six consecutive weeks of oil administration, showed no anatomical or blood biochemical variations of biological signification toxicity [23]. In mice acute toxicity studies using a single dose of mastic oil, administered orally (p.o) or intaperitoneally (i.p) showed low acute toxicity (LD50 value = 37 ml/kg body wt., p.o. ; LD50 value = 2.52 ml/kg body wt., i.p.) [24].

All these studies are however, insufficient, since many of the claimed therapeutic effects of this oil are still unproven at least by scientific research studies.

## CONCLUSION

In Constantine region, among the known *Pistacia lentiscus* products, the fixed oil extracted from its fruits is the most widely used product of this plant. Apart from Algeria and Tunisia, the medicinal use of this oil is not common in other Mediterranean pharmacopoeias. Among the diverse claimed therapeutic properties of this oil, only its wound healing effects was scientifically proved. Further experimental studies should be undertaken to understand the exact mechanisms of this effect and also to confirm or infirm the other traditional uses of this oil.

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