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Medicinal - Aromatic Use of Lavender in Turkey

Ayşe Gul SARIKAYA^{a*}

^a*Suleyman Demirel University, Atabey Vocational School, Atabey, Isparta, Turkey*

^a*Email: aysegulsarikaya@sdu.edu.tr*

Abstract

Turkey is known as one of the richest centers for flora in the world. Lavender taxa which is one of the important plant species, with origins in the Mediterranean region, enjoys wide usage due to its various properties. It is used in the perfume and cosmetics industries for its pleasant smell and in the pharmaceutical industry for its soothing and painkilling properties. In this study, the status and medicinal-aromatic uses of Lavender are presented.

Keywords: Lavender; essential oil; medicinal-aromatic; Turkey.

1. Introduction:

Plants are among the most important living beings that comprise the natural habitat of humans [1]. Humans' use of plants is as old as the history of humankind [2]. Since the beginning of life, human beings have used plants as food, fuel, weapons and shelter. Plants are known sources of nutrition and, due to notions of healing through nutrition; plants have been used as medicine as well. Although more than 40% of the listed medicines were of plant origin at the beginning of the 20th century, this rate fell to below 5% in the 1970s. However, especially after the 1990s, the discovery of new areas for use of medicinal and aromatic plants and consumers' growing demand for natural products increased the use of these plants. Today, the medicinal plant market is estimated to have a volume of \$60 billion per annum [3].

* Corresponding author.

E-mail address: aysegulsarikaya@sdu.edu.tr.

World Health Organization (WHO) data show that approximately 20.000 plants are being used for medicinal purposes. The main commercial centers for herbal drugs are Germany (Hamburg), the United States (New York) and Hong Kong [4,5].

Turkey is known as one of the richest centers for flora in the world. The country's number of flora species was estimated to be around 3.000-5.000 in the 1960s [6] and is estimated to be 8.500-9.000 today [7]. Turkey is composed of three different regions from a phyto-geography perspective. These are the Europe-Siberian, Mediterranean and Iran-Turan regions [1]. Therefore, Turkey has approximately 10.000 plant species. Around 3.500 of these species are endemic plants. In comparison, the total number of endemic plants on the European continent is only 2.650. Many products that comprise the raw materials of the medicine, cosmetics, chemicals and dye industries are obtained from the roots, branches and leaves of trees in the forest [8]. A large majority of the public in Turkey is closely interested in wild plants. Therefore, plants are classified for food, medicine, spice, natural tea, dye, perfume, pleasure, currying and decorative-ornamental.

In parallel with the increasing importance of medicinal plants in Turkey, agricultural projects have been initiated and rehabilitation work to develop varieties in these plants has increased in recent years. Varieties in accordance with standards have been developed in thyme, aniseed, coriander and various other medicinal and aromatic plants. Developing varieties for quality and standardized products that respond to consumer and industry needs, determining suitable ecological conditions, harvesting natural plants in a timely manner without damaging nature, post-harvest actions and determining processing technologies will increase the production and marketing opportunities for medicinal and aromatic plants [9].

Lavender, with origins in the Mediterranean region, enjoys wide usage due to its various properties. It is used in the perfume and cosmetics industries for its pleasant smell and in the pharmaceutical industry for its soothing and painkilling properties. The luteolin type flavonoids in lavender flowers have bacteriostatic and spasmolytic properties. Furthermore, lavender's volatile oil comprising b-pinene, linalool, campher, terpineol, linalyl acetate, camphor, borneol, fenchone and cineol compounds is a burning, delicious-smelling liquid with a light yellow colour. In Turkey, research has been conducted on different species of lavender [10]. The commonly cultivated lavender species in Anatolia are *Lavandula stoechas* L. subsp. *stoechas* L., *Lavandula angustifolia* and *Lavandula stoechas* L. subsp. *cariensis* (Boiss.) Rozeria [11].

2. General Properties and Medicinal - Aromatic Use of Lavender (*Lavandula* sp.)

Lavenders that are a species of the Lamiaceae family include about 26 varieties around the world. They are perennial and semi-briar plants that can grow to approximately 1 meter tall. Lavenders are common in central Europe, Mediterranean countries, the Canary Islands, Ethiopia and Eastern India. Some varieties with highly volatile oils are cultivated as culture plants in France, Spain and Italy. The most common two varieties are *Lavandula officinalis* L. and *L. angustifolia* Mill. (subsp. *angustifolia*) syn.: *spica* L., and among these, *L.*

angustifolia and another lavender variety, *L. stoechas* L., grow naturally in Turkey. The natural habitats of these varieties are Istanbul province, the Mediterranean and Aegean region of Turkey for *L. angustifolia* Mill. (subsp. *angustifolia*) syn: *spica* L. and for *L. stoechas* L. [12].

The flowers of the lavender plant are used for economic purposes. The volatile oil obtained from the plant's flower and flower sap is among the most commonly traded volatile oils in the world. Among volatile oil components, the most common are linalool and linalyl acetate. The quality of volatile oil is determined by the ratio of linalyl acetate among these components.

Lavender reaches its full florescence period in July, depending on species and variety, climate and soil conditions and altitude and location, and it is harvested during this period. The saw-weed knife is used in harvesting the plant. In recent years, gas fence harvester machines have been used as well. Harvesting with machinery saves both labor and time [11].

The harvested flowers are either directly processed to obtain volatile oil or left to dry in a shaded environment in a manner that will not cause heating. The dried lavender flowers are separated from their stems manually or via other methods. Since drying is accomplished by spreading the plants on open ground in farming conditions, a certain amount of volatile oil is lost in production. Volatile oils are obtained from lavender generally via water or steam distillation methods. While the volatile oil yield changes based on the variety of the no-stem dry flowers, it differs between 3% and 9% [11].

Lavender volatile oil is most commonly used in cosmetics and perfume. In addition, lavender is also used to produce perfumed soaps and other products due to its pleasant odor, in pharmaceuticals and pain killers, in sedatives and in aromatherapy due to its properties that prevent insomnia. Lavender also has urine-increasing and rheumatism pain-prevention properties and lavender flowers are used for herbal teas due to their sedative properties [11].

Lavender oil has somnific, sedative, tranquilizing and stress-reducing properties that stimulate the central nervous system. These properties result from the high level of linalool contained in lavender. Furthermore, the antiseptic and antibiotic properties of lavender oil are strong as well. Therefore, lavender oil has special importance among aroma therapeutic oils. Lavender sprouts are used to produce herbal teas that are beneficial for human health. Furthermore, pillows made from lavender sprouts are a must for peaceful and high-quality sleep [2].

Lavandula stoechas subsp. *stoechas* L., which can grow to 50 cm tall in the wild maquis in Turkey, has end stems with fresh flowers that are used for medical purposes and its partially dried flowers and leaves are used in perfumery and the cosmetics industry. The flowers are used to provide a scent for certain preparations in the pharmaceutical industry and in compounds of drugs that regulate the central nervous system. However, they

are also used in skin-cleansing lotions, perfumes and perfumed bath soaps and bubbles, as well as cosmetics, due to the linalool and linalyl acetate within. The public, on the other hand, brews lavender flowers as tea to drink to protect against vertigo and nervous maladies. Lavender is also used as a painkiller. As drugs, the flowers are found in compounds against acne, asthma, bronchitis, hair loss, gynecological diseases, neuropathy, certain skin diseases, pulmonary diseases, rheumatism, tapeworms, coughs and vertigo. French lavender once was widely used as an antiseptic in healing salves, as a sedative or expectorant, as protection against urinary tract infections and eczema wounds and to strengthen the nerves and heart, but now its use for such purposes is less frequent.

The *Lavandula angustifolia* Miller subsp. *angustifolia* Miller, which grows naturally in Istanbul province, the Mediterranean and Aegean regions in Turkey, has its fresh flowered stem ends used for medical purposes and the partially dried flowers and leaves in the perfume and cosmetic industries. This variety yields a volatile oil called oleum lavandulae at 0.5%-1% rates by distilling its flowered stem ends; 0%-40% of this volatile oil is linalool, while 5%-55% is linalyl acetate. In addition, eucalyptole, bornyl, geraniol, limonene and cineol are among the compounds of these oils; they are used to provide a scent for certain preparations in the pharmaceutical industry and in compounds of drugs that regulate the central nervous system. As drugs, they are used in compounds against acne, asthma, bronchitis, hair loss, certain skin diseases, tapeworms and vertigo.

Lavender is abundant on the Aegean Islands and in northwestern, western and southwestern Turkey, as well as in provinces near Istanbul, Aydın, Bursa, Izmir and Mugla. *Lavandula stoechas* L. subsp. *cariensis* (Boiss.) Rozeira, which grows wild in the Anatolia among the maquis to reach up to 50 cm in height, is a perennial semi-briar lavender type; its fresh flowered stem ends are used for medical purposes and the partially dried flowers and leaves are used in perfumery and the cosmetics industry. It is used to provide a scent for certain preparations in the pharmaceutical industry and in compounds of drugs that regulate the central nervous system. However, in the perfume and cosmetics industries, it is used in skin-cleansing lotions, perfumes, perfumed bath soaps and bubbles due to the linalool and linalyl acetate within.

Among the public, the flowers are brewed as a tea and consumed to protect against vertigo and nervous maladies. Lavender is also used as a painkiller. As drugs, the flowers are used in compounds against acne, asthma, bronchitis, hair loss, gynecological diseases, neuropathy, certain skin diseases, pulmonary diseases, rheumatism, tapeworms, coughs and vertigo. French lavender was once widely used in antiseptic healing salves, as a sedative or expectorant, against urinary tract infections and eczema wounds and to strengthen the nerves and heart, but now is used less frequently for these purposes [13].

Although lavender and various other species of plants hold great business potential for Turkey, the production and exporting of volatile oils that are used in the scent and taste industry, in non-alcoholic beverages and in the pharmaceutical industry are not yet at the desired levels (Table 1).

Table 1. Exporting and Importing of Lavender Oil in the World and in Turkey [14].

Lavender Oil	2004	2005	2006	2007	2008
	Value (\$)	Value (\$)	Value (\$)	Value (\$)	Value (\$)
Global exporting	41.535	38.105	46.097	538	897
Global importing	47.749	48.236	48.789	4.472	1.205
Exporting in Turkey	-	-	2.157	162	-
Importing in Turkey	212.950	220.515	232.843	103.624	121.061

The lavender amounts processed by companies, the processed parts of lavender, the volatile oil rates and the approximate amounts of volatile oil production are presented in Table 2.

Table 2. Lavender amounts processed by companies, the processed parts of lavender, the volatile oil rates and the volatile oil production

Name of Plant	Processed Amount (kg/annum)	Processed Part of Plant	Volatile Oil Rate (%)	Volatile Oil Production Amount (kg)
Lavender	99.500	Flower	1.8-3.0	2.000

3. Results and Discussion

Providing state incentives for the production of volatile oils is considered an important issue with respect to developing the sector and its competitive power. Since volatile oil markets are very conservative, new producers are required to create and implement an integrated marketing strategy upon entering these markets. The main elements of this strategy involve consistency in product yield and quality and ensuring the required flow of information regarding market requirements and opportunities through a stable supply.

To ensure the stability of product quality and yield for volatile oils, the organized and systematic farming of the right plant species, appropriate technology, secure raw materials, product storage and transformation opportunities and an effective management system are required.

Unfortunately, Turkey is still an exporter of unprocessed medicinal plants. Cleaning, separating, classifying and mass and retail packaging transactions are generally applied to the production of a limited number of herbal drugs that are used as spices and for tea. The producers that manufacture herbal drugs in accordance with standards have a high possibility of obtaining market share in Europe by using free trade rights afforded

to European Union countries. To do so, increasing product diversity and production of drugs in the desired hygienic conditions should be ensured [15].

Each transaction for herbal products will ensure a value increase for the herbal drug and create added value to stay within our economy. Damage to nature should be prevented while gathering wild plants and ecologic balances should be preserved. Plants experiencing increased demand should be farmed and natural sources should be used as genetic sources in the production of agricultural plants [16].

Necessary precautions should be taken to control insensible gathering of medicinal and aromatic plants from nature. New varieties that are suitable for the volatile oil sector should be cultivated from among the agriculturally farmed varieties to support the volatile oil plant producers and the export of volatile oils.

The various properties of lavender, which is among the plants richest in volatile oil content with commercial importance that are in the natural flora of Turkey, should be identified and work should be undertaken to save the lavender for the sectors that need it most so as to attain a higher share of the global volatile oil trade with high-quality and standardized products. The gathering of lavender from the natural environment should be supervised and necessary precautions to protect the plant should be taken. The cultivation and production of the lavender plant should be supported by the state. Furthermore, development of the sectors that will use the lavender oil should be encouraged.

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