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Reviews

A Review about Lavender Importance

Zainab F. Mhmood ^{a, *}, Sumaya S. Hashim ^a, Dunya M. Ahmed ^a

^a College of Science, University of Baghdad, Iraq

Abstract

This present review aimed to focus on the lavender oil which used in alternative medicine for many centuries. Because of *Lavandula* species are highly aromatic plants and produce essential oils with composition varies within the same species and among different species. The oil contains hundreds of chemical compounds and the major compounds such as linalool, linalyl acetate, β -ocimene, terpinen-4-ol, lavandulyl acetate and more others act on many chronic and degenerative illnesses, such as cancer autoimmune disorders, cardiovascular, rheumatoid arthritis, and neurodegenerative diseases. The secondary metabolites found in this plant have high antioxidant activity, important antimicrobial agents, several microorganisms, have activity against many fungal species, antiproliferative activity, anti-inflammatory activity, pain relief effect, wound healing effect and recognized as an antiseptic and insecticide agent. Also used as an ingredient in bath salts and washing agents as well as commercial cosmetic products: hair shampoo, cosmetic and bath products.

Keywords: essential oil, antimicrobial, aromatherapy, *Lavandula*, therapeutic.

1. Introduction

Lavender is one of the important members of the Lamiaceae family. This species are widely distributed in the Mediterranean region and cultivated in Italy, France, and Spain. The *Lavandula augustifolia* Mill. specie is well known as important aromatic and medicinal herb that is used in traditional and folk medicines for its importance in the treatment of several gastrointestinal, rheumatic and nervous disorders (Hajhashemi et al., 2003). Several studies showed that *Lavandula augustifolia* essential oil (EO) has antinociceptive, immunomodulatory and anti-inflammatory properties (Peana et al., 2002). Ebn-e-sina and Razi also prescribed lavender for treatment of epilepsy and migraine attacks. Furthermore, lavender is considered beneficial in treatment of pain and tumor (Gorji, 2003). Although the main active ingredients of these oils are monoterpenes (linalool, linalyl acetate, lavandulol, geraniol, bornyl acetate, borneol, terpineol, and eucalyptol or lavandulyl acetate), they may have different anti-bacterial and anti-fungal activities, depending on their chemical composition (Glinka, Glinka, 2008).

A good anti-microbial properties of lavender essential oil is achieved by high and almost equal content of linalool and linalyl acetate (a ratio above one) (Glinka, Glinka, 2008). Most commonly lavender is recommended for oral administration. However, it is also being employed in

* Corresponding author

E-mail addresses: zainab.farqad@gmail.com (Z.F. Mhmood)

aromatherapy (inhalation of lavender) (Sasannejad et al., 2012), aromatherapy massage, dripping oil and bathing (Xu et al., 2008). In this paper we review the therapeutical effects of lavender oil components that have valuable effects like antibacterial, antifungal, carminative (smooth muscle relaxing), sedative, antidepressive and effective for burns and insect bites (Morris, 2002).

2. Discussion and results

Classification of lavender

There are several types of genus *Lavandula*, including: *L. angustifolia*, true lavender, English lavender, *L. dentate*, French lavender, *L. latifolia*, spike lavender and *L. stoechas*, French or Spanish lavender; hybrids of lavender (Renaud et al., 2001).

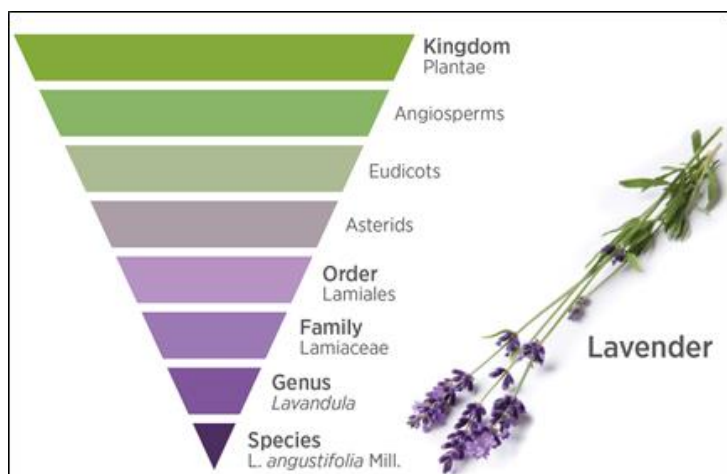


Fig. 1. The classification of Lavender (Growth, 2020)

Origin and distribution

The name “lavender” belongs to ancient times and comes from the Latin word lavare, which means washing and bathing. Most lavender originates in the Mediterranean Sea, in calcareous, rocky areas; also grow in many other countries of the world) (Smigielski et al., 2009).

Description of the plant

Lavender grows to about 40–60 cm with regular compact clumps. The upper part of stem is green, while the lower part is woody. It has lanceolate leaves with curled edges and fibrous branched root system. The silver-green leaves are covered with tomentum that protects them from wind, strong sunshine, and excessive water loss. Pale violet flowers arranged in circles (3–5 flowers per circle), although, varieties with white flowers (Alba and Nana Alba) and pink flowers (Rosea) have also been bred (Góra, Lis, 2012).



Fig. 2. The whole plant (*Lavandula angustifolia*)

Lavandula angustifolia grows on fertile and well-drained lime soils. Lavender shrubs are regularly pruned in order to stimulate plant growth and to promote flowering. The flowering period take time from July to August.

Harvesting should be done in dry, sunny days. Flowers should be collected before opening, dried in bundles in shaded and well-ventilated places. The portions used for herbal purposes are flowers or flowering aerial parts, while the parts used for essential oil production consists of fresh or dried tops of flowering plants (Góra, Lis, 2012).

Composition-essential oil of lavender

The essential oil of lavender has been used in alternative medicine for many centuries. All *Lavandula* species and hybrids are highly aromatic plants; whose glands, found on flowers and leaves, produce a complex variety of essential oils. Essential oil is present in amounts from 2 % to 3 %. It is obtained by steam distillation or hydrodistillation; the oil is yellow and has strong floral-herbal lavender scent with a delicate hint of fruit and wood (Smigielski et al., 2009).

The essential oil composition varies within the same species and among different species. This is due to many factors such as genotype, extraction methods, growing, location, and climatic conditions (Śmigielski et al., 2013). The oil contains hundreds of chemical compounds and the major compounds consisted of oxygenated monoterpenes while smaller amounts of monoterpene esters are present (Hashim, Shawkat 2016). The dominant compounds reported from different countries were linalool (27.3–42.2 %), linalyl acetate (27.2–46.6 %), (Z)- β -ocimene (0.2–11.6 %), terpinen-4-ol (0.70–4.6 %), lavandulyl acetate (0.50–4.8 %), β -caryophyllene (1.8–5.1 %), (E)- β -ocimene (0.30–3.8 %), α -terpineol (0.30–2.0 %) and 1,8-cineole (0.10–1.2 %), Figure 3 (Śmigielski et al., 2013).

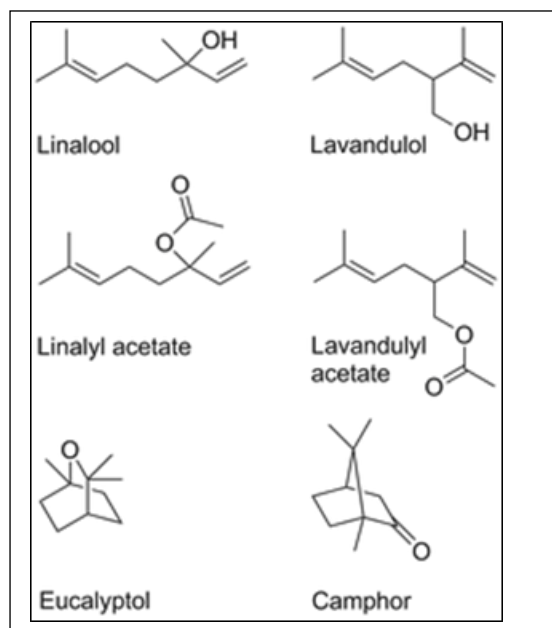


Fig. 3. Structure of major chemical components of *Lavandula angustifolia*

Lavender extraction procedures

Different extraction methods have been applied for extraction of volatile compounds of *L. angustifolia* which include hydrodistillation, supercritical CO₂ (SCE) and ultrasound-assisted extractions. Extraction of lavender flavoring components by the supercritical CO₂ offered new challenges for isolation (Da et al., 2009).

The volatile components extracted by supercritical CO₂ contained high percentages of valuable compounds such as linalool (43 %), linalyl acetate (23 %), camphor (8 %) and borneol (7 %) were detected in the lavender volatile components extracted by supercritical CO₂ (Danh et al., 2012) that can be used in the food and pharmaceutical industries.

Benefits and uses of the lavender plant:

Antioxidant activity of *Lavandula* spp. Plants

Many chronic and degenerative illnesses, such as cancer autoimmune disorders, cardiovascular, rheumatoid arthritis, and neurodegenerative diseases are triggered by oxidative stress. The secondary metabolites found in *Lavandula* spp. are flavonoids and phenolic acids, which have high antioxidant activity. Essential oil of *Lavandula* have antioxidant activity since they include thymol, linalool, limonene, fenchone, camphor, camphene, β -caryophyllene, 1,8-cineol and trans- α -necrotyl acetate (Carrasco et al., 2016). There are several studies about positive effects of *Lavandula* spp. on health that are related to antioxidant activity. In vitro studies showed that the lipoxygenase inhibitory and hyaluronidase inhibition effect and antibacterial activity of *Lavandula* spp. EO are related to its antioxidant activity (Carrasco et al., 2016). The antioxidant activity of *Lavandula* spp. play a critical role in the development of both treatment and pre-treatment strategies of most neurological disorders that are related to accumulation of oxidative stress in brain cells (Rabiei et al., 2014). In addition to that, anti-cholinesterase and anti-epileptogenic activities of *Lavandula* spp. are also related to the antioxidant activity of *Lavandula* spp. (Rahmati et al., 2013).

Antibacterial activity

Essential oils from plants have been demonstrated as important antimicrobial agents against several microorganisms (Varona et al., 2013). The antimicrobial activities of these oils are different in relation to their chemical composition (Mutlu-Ingok, Karbancioglu-Guler 2017). Lavender oils have demonstrated an antibacterial activity against *Citrobacter freundii*, *Enterobacter aerogenes*, *E. coli*, *Propionibacterium acnes*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Shigella sonnei*, *S. aureus*, *Streptococcus pyogenes* (Sasaki et al., 2015).

Antifungal activity

Many studies reported that *Lavandula* oils have activity against many fungal species, including *C. albicans*, *Aspergillus* strains, and *Cryptococcus neoformans*. *L. angustifolia* oils activity has been reported against *C. albicans* commonly associated with yeast infections (de Rapper et al., 2016). Lavender oil reduced the severity of *Candida* infections (Minooeianhaghighi et al., 2017).

Antiparasitic activity

Lavender has activity against the parasites *Schistosoma mansoni* and *Leishmania major* (Shokri et al., 2017). The EO from *L. angustifolia* leaves dominated by borneol, epi- α -muurolol, α -bisabolol, precocene I, and 1, 8-cineole, exerted an effects on adult *S. mansoni* and egg development (Mantovani et al., 2013). *L. angustifolia* EO and its nano-emulsion showed anti-leishmanial activity on promastigotes of *Leishmania major* (Shokri et al., 2017).

Antiproliferative activity

Three new aryl-benzofurans were isolated from the whole plant of *L. angustifolia*; these isolated compounds showed inhibitory activities against human leukemia, human alveolar basal epithelial carcinoma, human neuroblastoma, and human prostate cancer and MCF7 human breast adenocarcinoma cell lines (Tang et al., 2017).

Anti-inflammatory activity

Lavandula spp. is frequently used as remedies for various inflammatory diseases treatment (Giovannini et al., 2016). *L. stoechas* EO has shown anti-inflammatory properties due to its important volatile composition (Carrasco et al., 2015). *L. multifida* terpenoids have been showed an anti-inflammatory activity comparable to that of indomethacin (Sosa et al., 2005).

Pain relief effect

Lavender has been demonstrated as a plant with sedative, calming, analgesic, and antispasmodic healing properties and effective in elevating moderate depression (Gaware et al., 2013).

Furthermore, *Lavandula* EOs have been used in the aromatherapy treatments to relief pain. EOs are absorbed or inhaled and thus, limbic system is affected. As a result, several variations in

the body could be noticed such as stimulation of physiological responses of the nervous, endocrine, or immune systems, affecting heart rate, blood pressure, breathing, brain wave activity, and the release of various hormones (Gaware et al., 2013). Seyyed-Rasooli et al. have reported that using of lavender oil in inhalation aromatherapy and aromatherapy massage could reduce the anxiety and pain of burn patients (Seyyed-Rasooli et al., 2016). Furthermore, lavender oil was found as an effective on the reduction of menstrual pain depending on self-aromatherapy massage of the abdomen (Kim et al., 2011).

Wound healing effect

A wound-healing effect of lavender is one of a promising treatment for skin disorders. It has been reported that application of lavender ointment effectively stimulated wound contraction. This activity was due to its compounds such as linalool and linalyl acetate (Djemaa et al., 2016). Furthermore, a report by Vakilian et al. have showed that lavender oil could be used as an alternative to povidone-iodine which is an antiseptic and used for surgical and skin wounds (Vakilian et al., 2014). Also, it has been reported that there is no side effects associated with lavender oil treatment.

Side effects of lavender oil

The following are common side effects that may appear in some people after using the oil:

An allergic reaction or sensitivity to the sun, when applying lavender oil to the skin.

Stimulating breast growth in boys before using products that contain lavender oil frequently, as some studies have indicated that it may enhance the estrogen hormone responsible for the emergence of female characteristics and breast growth, as it may prevent the androgen that means properties and prevents breast growth (Gilani et al., 2000).

3. Conclusion

From what has been presented previous about lavender, we can conclude that it is a magical herb because its fragrant aromatic oil has wide and multiple benefits, for example, but not limited to: its importance in treating many gastrointestinal, rheumatic and nervous disorders. Lavender essential oil has been used as antioxidant, antibacterial, antifungal, anti-inflammatory and for pain relief effect and it is one of a promising treatment for skin disorder.

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