



A REVIEW ON LAVANDULA ANGUSTIFOLIA

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ABSTRACT

Lavandula species is a flowering plant that is common in Europe and across the Mediterranean. Lavender has many health benefits for humans. In addition to its use in herbal medicine, it is widely used in the fields of cosmetics, perfumes, foods, and aromatherapy. This present review aimed to focus on the lavender plant which used in alternative medicine for many centuries. Because of *Lavandula* species are highly aromatic plants and produce essential oils which 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, and 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, linalool, linalyl acetate, β -ocimene.

INTRODUCTION

Lavender (*Lavandula angustifolia*) is a plant with a number of beneficial properties for the human body. Besides its application in herbal treatment, lavender is widely used in the cosmetic, perfume, food, and aromatherapeutic industries.^[1] Lavender is native to the Mediterranean region (France, Spain, Andorra, and Italy), but is grown in many other countries of the world, including Poland. Lavender has been known from ancient times, as evidenced by work of Dioscorides entitled "De Materia Medica," which praises its medicinal properties. The Romans used lavender as a bath additive, and in the middle ages it was one of the most valuable essential oil plants used in perfume and soap making. It was also used both as a food additive and a laxative.^[2]

Origins and cultivation

Lavender (*Lavandula angustifolia*, *Lavandula officinalis*, *Lavandula vera*) is a perennial evergreen plant that is also known as therapeutic lavender, true lavender, and common lavender. Lavender is a Mediterranean plant native to France, Spain, Andorra, and Italy, although it is also grown in Poland. The various common names of lavender and its related substances include common lavender, garden lavender, English lavender, *Lavandula burnatii*, *Lavandula dentate*, *Lavandula dhofarensis*, *Lavandula latifolia*, *Lavandula officinalis* L., *Lavandula*

stoechas, limonene, perillyl alcohol, pink lavender, perillyl alcohol, true lavender, and white lavender. Lavender is well-drained and grows best on fertile, calcareous soils (*Lavandula angustifolia*). It thrives in full sun with some wind protection. Few years after cultivation, lavender can be enriched with organic manure or artificial fertilizers.^[3] This promotes excessive green growth and reduction of shoot sites. In Poland, lavender is not completely frost resistant and requires a thick winter cover. Plants can be grown vegetatively, tissue cultured, or generatively from seeds, as well as soft and hard wood cuttings. Pruning lavender shrubs on a regular basis increase flowering and plant growth. From July to August, the plant is in full flower. Harvesting is best done on a sunny, dry day. Before opening, flowers should be picked and dried in bundles in a cool, well-ventilated location. Flowers (*Flos Lavandulae*) and flowering aerial parts (*Herba Lavandulae*) are used for herbal purposes, and essential oils are made from fresh or dried tops of flowering plants.^[4]

Taxonomy of Lavender

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Asterids
Order: Lamiales
Family: Lamiaceae

Genus: *Lavandula*
Species: *angustifolia*



Fig. 1: Depiction of *Lavandula angustifolia* plant.

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 hydro distillation; the oil is yellow and has strong floral-herbal lavender scent with a delicate hint of fruit and wood. The essential oil composition varies within the same species and among different species.^[5] This is due to many factors such as genotype, extraction methods, growing, location, and climatic conditions. The oil contains hundreds of chemical compounds and the major compounds consisted of oxygenated monoterpenes while smaller amounts of monoterpene esters are present. 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%).^[6]

Health benefits and uses of lavender

The lavender oil is highly regarded for skin and beauty and is commonly used in fragrances and shampoos which helps to purify the skin. Lavender oil has antiseptic and anti-inflammatory properties which can heal minor burns and bug bites. It may also be useful in treatment of anxiety, insomnia, depression, and restlessness. Consuming lavender as a tea can help digestive issues such as vomiting, nausea, intestinal gas,

upset stomach and abdominal swelling. In addition to these benefits I also help relieve pain from headache, sprains, toothaches and scores.^[7] It can also be used to prevent hair loss. Lavender oil can also be effective in combating antifungal resistance infections. Lavender oil has also been found effective in treatments of wound healing. Lavender has an acceleratory effect on wound healing. Lavender oil is also useful in treatment of hair loss which is also called alopecia areata. This the condition in which hair lost from some or all areas of the body. It has been reported that treatment of hair by lavender oil can reduce hair loss in one month and promote hair growth over the course of 4 weeks. Lavender oil is also useful for patients with different anxiety disorders. One of the lavender oil named silexan available in 80 milligram gelatine capsules. It has been found that silexan had an anxiolytic or anxiety reducing effect on patients with generalized or subsyndromal anxiety within 2 weeks. It has been also found that lavender scent may help anxious dental patients. Those patients expose to lavender scent reported lower level of anxiety compared to the other patients. Lavender oil has also been shown to reduce the amount of painkilling medicine required after tonsillectomy. Lavender oil also helps to alleviate premenstrual emotional symptoms. Women's of reproductive age have experienced the benefits of lavender which help to alleviate premenstrual emotional symptoms and also experience the range of symptoms in the premenstrual phase commonly known as PMS. By aromatherapy treatment these benefits were achieved. The lavender aromatherapy could alleviate premenstrual emotional symptoms.^[8]

In the treatment of depression, colic, constipation, nausea and vomiting, migraines, otitis, high blood pressure, menstrual pain, eczema, cancer related pain, dementia, like the lavender is not much useful. Lavender fragrances could have a beneficial effect on insomnia and depression in female and in college students. The uses of lavender oil sometime on the skin might trigger prepubertal gynecomastia it is a condition that causes enlarge breast tissues in boys before puberty. Taking of lavender during pregnancy or while breast feedings has also not been confirmed. As lavender slow down the central nervous system so doctor's advice patients to stop using lavender at least 2 weeks before surgery.^[9]

Benefits of Lavender Oil

- It reduces anxiety and emotional stress
- Lavender protects against diabetes symptoms
- It also improves brain functions
- It helps to heal burns and wounds
- It improves sleep
- It reduces acne and restore skin complexion
- It helps in slow aging with powerful antioxidants
- It helps in relieving pain
- It alleviates headaches

Lavender oil is a natural antioxidant that works to prevent and reverse disease. Lavender oil increases the activity of the body. Lavender oil has antioxidants that prevent or reverse oxidative stress.

Lavender essential oil protect body from the following diabetes symptoms:

- From increased blood glucose level
- From metabolic disorder
- From weight gain
- From liver and kidney depletion
- From liver and kidney dysfunction
- From liver and kidney lipoperoxidation

Lavender oil is also been used against neurological damage. It is also been used for the issues like migraines, stress, anxiety and depression. By using lavender there is a decrease in the postnatal depression and anxiety disorder. Lavender oil also helps to cure Alzheimer's disease. Lavender oil is also used to prevent various infections and combat bacterial and fungal disorders. It has been reported that lavender oil speeds the healing of burns, cuts, scrapes, and wounds. 1:1 ratio of lavender oils is most effective in fighting against the skin disease. Lavender oil promotes collagen synthesis. It induces relaxation and relieves tension it works as a sedative, anti-anxiety, calming agent and anticonvulsant. Lavender oil is more useful when it is mixed with coconut oil, jojoba oil, or grapeseed oil. It helps to remove skin related problems like canker sores, acne, spots. Because of its sedative and calming properties, it works as medicine to treat sleep problems and insomnia. Inhaling lavender reduces sleep problems; improve quality of sleep, and duration of sleep.^[10]

Biological activities 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.^[11] 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. 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. 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. In addition to that, anti-cholinesterase and anti-epileptogenic activities of *Lavandula* spp. are also related to the antioxidant activity of *Lavandula* spp.^[12]

Antibacterial activity

Essential oils from plants have been demonstrated as important antimicrobial agents against several microorganisms. The antimicrobial activities of these oils are different in relation to their chemical composition.^[13] 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*.^[14]

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. Lavender oil reduced the severity of Candida infections.^[15]

Antiparasitic activity

Lavender has activity against the parasites *Schistosoma mansoni* and *Leishmania major*. 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. *L. angustifolia* EO and its nano-emulsion showed anti-leishmanial activity on promastigotes of *Leishmania major*.^[16]

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.^[17]

Anti-inflammatory activity

Lavandula spp. is frequently used as remedies for various inflammatory diseases treatment. *L. stoechas* EO has shown anti-inflammatory properties due to its important volatile composition. *L. multifida* terpenoids have been showed an anti-inflammatory activity comparable to that of indomethacin.^[18]

Neurological effects

Lavender has also demonstrated efficiency in treating brain tumors. Silver nanoparticles and lavender extract combined (La-AgNPs) for their effects on human brain tumor cells ability to proliferate and their ability to induce apoptosis (U87MG). They came to the conclusion that La-AgNPs in tumor cells can promote an increase in the expression of apoptotic proteins such P53 and caspases 3, 8, and 9. The study's findings demonstrate that via altering the P53 apoptotic pathway, La-AgNPs can cause apoptosis in these tumor cells.^[19]

Aromatherapy treatment

Each patient was given a 24-hr rest interval of between treatment and a series of physical, behavioral, and psychological assessments.^[20] Physiological markers of stress were blood pressure, heart rate and rhythm, and respiratory rate, as well as behavioral response (motor activity, facial expressions, unconscious patient's Glasgow Coma Score, etc.), of a subject during massage, aromatherapy, or rest.^[21] There was no significant difference. The aromatherapy group saw a significant reduction in anxiety during the first treatment session. There was no significant improvement in the second or third session, probably because other treatments were more effective than without aromatherapy. In a pilot study, long-term inpatients in neurology showed improved mood levels and reduced psychological symptoms after aromatherapy (tea tree, rosemary, and *L. angustifolia* oils).^[22]

Dermatological

Despite the fact that lavender oil was considered particularly beneficial during World War I, there is little evidence that it helps to accelerate wound healing and reduces scarring. Other skin conditions associated with lavender oil include psoriasis, dermatitis, and eczema. Topically applied lavender oil has also been shown to block some of the allergic pathways.^[23] As with other essential oils, the use of lavender raises concerns about possible allergic reactions and skin irritation. Cavanagh and Wilkinson claim that *L. latifolia* and *L. angustifolia* do not cause skin sensitization and are relatively moderately irritating to the skin, and that *L. angustifolia* does not cause phototoxicity in the well-cited essential oil safety studies.^[24]

Local anesthetic activity

The chemical components responsible for this biological activity are essential oils, some of which are used to treat gastrointestinal spasms. In vitro studies of the antispasmodic effects of essential oils from the above plants have shown that they can suppress seizures induced by various seizure-inducing substances through pharmacological mechanisms that suggest non-specific antagonistic interactions.^[25] Essential oils are thought to slow neurotransmission by interacting with the plasma membrane lipid bilayer, limiting Ca^{++} influx or preventing increased Na^{+} permeability. In addition, menthol is used in analgesics and local anesthetics, and eugenol is a membrane stabilizer with local anesthetic effects.^[26]

Pain relief effect

Lavender has been demonstrated as a plant with sedative, calming, analgesic, and antispasmodic healing properties and effective in elevating moderate depression. Furthermore, *Lavandula* EOs have been used in the aromatherapy treatments to relief pain. EOs are absorbed or inhaled and thus, limbic system is affected.^[27] 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. 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. Furthermore, lavender oil was found as an effective on the reduction of menstrual pain depending on self-aromatherapy massage of the abdomen.^[28]

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. Furthermore, lavender oil could be used as an alternative to povidone-iodine which is an antiseptic and used for surgical and skin wounds. Also, it has been reported that there is no side effects associated with lavender oil treatment.^[29]

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.^[30]

CONCLUSION

Lavender essential oil is an herb which is used in our daily life for many purposes. It has many health benefits also. Besides having the medicinal properties lavender is also very healthy for glowing skin and it protect skin from acne and other skin problems. Lavender has also some medical benefit also such as inhaling of lavender oil helps to improve sleep duration, sleep quality, and it provide relaxation. 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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