AROMATIC PROFILING AND BIOACTIVE POTENTIAL OF *Lavendula Angustifolia*: A REVIEW

ABSTRACT

Plants are the vital source around which human life revolves. Starting from our food to medicine we obtain, all such valuable resources come from resilience creatures called plants. Plants are gifted with certain properties that make them precious in all aspects of life. They produce bioactive substances that make them medicinally important for pharmaceutical use. The aromatic plants which are important as industrial raw material are used as essence material in various baking and brewing industries because of their pleasant aroma .These plant undergo distillation processes to extract the essential oils from oil secreting glands. The present review deals with aromatic profiling and bioactive potential of *Lavendula spp* and their commercial importance as a plant material.

Keywords: Aromatic, Bioactivity, Lavender, essential oil.

INTRODUCTION:

Aromatic plants are significant and great importance because of their wide commercial uses.Growing use of aromatic flowers as cut flowers and their use in perfumery products lead to their flourishment as a raw material. Angiosperms are distributed all around the globe and there are about 3,00,00 spp. and 427 families around globe while in India about 251 angiosperm families exist as per present statistics of BSI, Kolkata. Angiosperms are plants that are rich in aroma while it contain certain families rich in essential oils such as Lamiaceae, Lauraceae, Myricaceae etc. to name a few. The largest genera include *Salvia, Stachys, Plectranthus, Scutelaria, Thymus, Vitex, Nepeta* [Kuete *et.al.*, 2017].The family is important as it has ornamental and condimental herbs which are commercially vital. The present plant belongs to one such family Labiatae which is also called sage or **mint** family. The important species of this genus that are *Lavendula latifolia* and *Lavendula angustifolia* Mill. which are native to Mediterranean region from Africa to Asia [Verma *et.al.*,2010]. In India, it is well marked from

Uttrakhand to Kashmir valley [Singh *et.al*., 2015]. The plant holds great importance since ancient period as Iranian folk medicine.[Sharif *et.al*,2003]

Classification

Kingdom:Plantae

Clade:Tracheophyta

Order:Lamiales

Family:Lamiaceae

Genus:*Lavendula*

Species:*augustifolia*

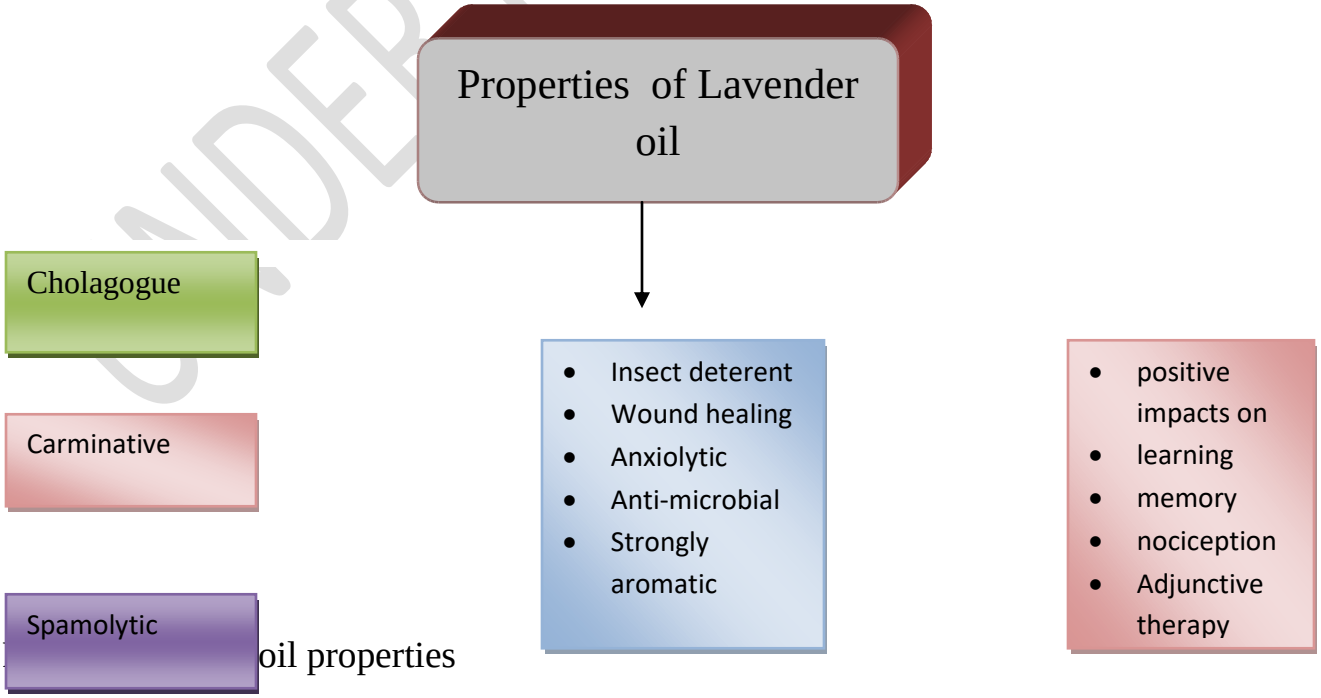
PLANT DESCRIPTION

The plant is an semi-woody, evergreen, perennial plant with lanceolate leaves covered by tomentum, square stem curled at edges. The inflorescence is spike like and has bright purple flowers that are important ornamental blooms. The plant is native to Spain and some neighboring countries but now naturalized in India. This plant requires fertile loamy soil, and it is propagated vegetatively as well as by seed. The flowers have excellent flavour properties and sell as sachets. The plant possesses majestic flowers that are known for their aroma and used as cut flowers and have various bioactive compounds of economic importance.

Fig. 1. Plant morphology (Source: https://commons.wikimedia.org/wiki/File:Lavandula_angustifolia_002.JPG)

BIOACTIVE POTENTIAL

Lavender augustifolia Mill. is a member of Lamiaceae which is a family rich in *polyphenols* and other bioactive substances. The flowers are the economical part of the plant that yield phenolic compounds and other active constituents. Cardia *et.al.*,2018 used GC-MS chromatography and NMR spectroscopy to examine the bioactive compounds like1,8 cineole, linalool, camphor which help to control acute inflammatory response and Lavender oil induced the leukocyte chemotaxis in vitro by just varying the concentration of bioactive compounds. Linalool, p-cymene, limonene and camphor were known impart the anti-inflammatory activity which was observed in lavender by lipoxygenase inhibitory activity as reported by Carrasco *et.al*,2015.Terepenoids found in Lavender oil are known to play predominant role in plant-insect communication which was examined by cytological investigation of TPS-TPS,TPS-CYP450 linked to substances that function as attractants and repellants [Li *et.al*,2021].Characterization of the genetic diversity were examined in *Lavender angustifolia* Mill. using sequence related amplified polymorphism which showed higher genetical diversity as reported by Rusanov *et.al*,2020.Cristina *et.al*,2014 examined the volatile oils from the tea samples of *Lavendula angustifolia* Mill. Using GC-MS spectroscopy. The dominant bioactives were Linalyl acetate and linalool which corresponds to 1.05% essential oil in the given species and it shows subsequent amounts of Chlorogenic acid and Rosmarinic acid using its alcohlic extracts was reported [Ghelardini *et.al*,1999].



oil properties

AROMATIC PROFILING IN *LAVENDULA ANGUSTIFOLIA:*

Lavandula angustifolia Mill is rich in various aromatic compound that makes it a majestically useful and mainstay herb in the gardens worldwide. It's also called as English lavender and it finds its place in all the restaurants and kitchens where it is used as aflavouring agent and for seasoning purposes and cosmetic industry. Wang *et.al.*, 2020 evaluated the volatile or odour characteristics [LE] with lavender essential oil [LEO] using Gas chromatography-Mass chromatography [GC-MS] and Principal chemical analysis [PCA]. The studyfound out the LE contains high amount of boiactive substances like lavendulyl acetate, linalool oxides I and II than LEO, and has herbal and clove like odour, whereas more earthy green and watery odour of LEO was due to higher amount of Linalool and camphor and finally he concluded that LE is better than LEO in terms of odour characteristics. Methanolic extracts of Lavender were used to estimate flavone content by using UV-vis spectroscopy as reported by Margaoan *et.al.*,2017. Lazari *et.al.*,2018 elucidated the antiviral and scavenging activity while Gezizi *et.al.*,2018 reported the Anti-proliferative property of Essential oils. Roj etal., 2019 used Box-Behnken method to extract the phenolic compounds under controlled conditions and found highest phenolic content was found in *Lavender angustilfolia* Mill. at 54.5°C.

Table 1. Aromatic profiling

S.NO	Volatile compounds	total % in Lavender oil
1	$\alpha - terpineol$	1.35
2	Camphor	9.67
3	Sebinene	0.5
4	Myrcene	0.68
5	Limonene	0.24
6	1,8 cinoele	8.6
7.	Linaloool acetate	3.75
8.	Cryptone	0.98
9.	Terepiene-4-ol	3.8
10.	Linalool	47.55

Predoi *et.al*., 2018 examined the aromatic potential of plants based on the compounds present in it and using Gas chromatography they found that dominant compounds in the essential oil of basil and lavender are oxygenated monoterepenes responsible for the characterstic essence. The other compounds were in trace amounts and the plant is researched in its infancy stage and other properties are yet to be unveiled. The antimicrobial activity of the *Lavendula aungustifolia* Mill was seen by Aires *et.al*,2017 who used HPLC-DAD and minimum inhibitory concentration [MIC] to characterize phenolic substances and flavanoids in lavender and they found out that Hydroxycinnamic acid [Chlorogenicand, rosmarinic acids]and flavonoids were responsible for high antibacterial activity against *Staphylococcus aureus* isolated from diabetic foot ulcers. Lavender due to its characteristic aroma and beauty was indiscriminately used which lead to its overexploitation and therefore certain strategies and tools under biotechnology were used to revive it such as micropropagation vis meristem proliferation and organogenesis as reported by Romamno *etal.*, 2013. Ayaz et.al, 2017 examined the essential oils of lavender to provide protection against neural disorder like Alzheimer disease and dementia, it shows improved congnitive performance against epilepsy and convulsions in animals and human subjects and

they are cheap, easy to obtain and safe to use with good efficiency. Oran *et.al.*, 2011 inferred the methanolic extracts of *Lavendula angustifolia* Mill. used to control the diabetic dyslipidemia using the hormone sensitive lipase and pancreatic lipase potential which was imparted by Rosmarinic acid and gallic acid in Lavender oil which protects a person from cardiovascular diseases. Souri *et.al*, 2019 reported the Apoptotic activity using ELISA and TTC staining by targeting oxidative stress.

CONCLUSION

Lavender oil is a known element which has found place in cosmetic, perfumery and culinary industry due to bioactive potential and characteristic aroma of the flower and leaves. It is important plant from time immemorial when it was used in bath by romans in ancient time, so we can trace back it is importance as a plant. Lavender is being researched at a pretty infant stage because of localised occurrence and it is only reviewed for bioactive and pharmacological basis that too on a small pace and much more research is required in this part so as to flourish its literature about other such potentials and secrets that are to be unraveled in the coming time.The present study reviewed the aromatic profiling and bioactive substances that impart the plant certain useful properties that make it a mainstay herb in the gardens and adds to it's economic production as a plant. So, there is a lot of scope of this plant to be researched and reviewed as with time and better understanding, we can explore the plant on a large scale based on new properties and can make it a multifarious drug.

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