

**STUDY OF THE MEDICINAL PROPERTIES AND CULTIVATION
METHODS OF LAVENDER (*LAVANDULA ANGUSTIFOLIA L.*)**

Boynazarova Sayyora Ruzikulovna

Termiz Davlat Muhandislik Va Agrotexnologiyalar Universiteti Katta O'qituvchisi

Abdurasulova Dilnoza Sherali Qizi

Student Of Termez State University Of Engineering And Agrotechnologies

ABSTRACT: Lavender (*Lavandula angustifolia L.*) is one of the most valuable medicinal and essential oil plants widely used since ancient times. This article provides a comprehensive analysis of the medicinal properties of lavender, its chemical composition, biologically active compounds, and modern cultivation methods. The study examines the essential oils of lavender, particularly linalool and linalyl acetate, as well as flavonoids, tannins, and other bioactive substances. These compounds are known for their calming, anti-inflammatory, antiseptic, and stress-relieving effects, as well as their ability to improve sleep quality and support nervous system function. In addition, the article explores agrotechnological aspects of lavender cultivation, including soil preparation, propagation methods (seeds and seedlings), irrigation, fertilization, and harvesting techniques. The findings indicate that lavender is not only a highly effective medicinal plant but also an economically valuable crop with strong potential for agricultural development.

KEYWORDS: Lavender, *Lavandula angustifolia*, medicinal plant, essential oils, agrotechnology, linalool, stress relief, sleep improvement, antiseptic, phytotherapy

**LAVANDA (LAVANDA ANGUSTIFOLIA L) DORIVOR O'SIMLIGINING
DORIVORLIK XUSUSIYATLARI VA YETISHTIRISH USULLARINI
O'RGANISH**

**BOYNAZAROVA SAYYORA RUZIKULOVNA TERMIZ DAVLAT
MUHANDISLIK VA AGROTEXNOLOGIYALAR UNIVERSITETI KATTA
O'QITUVCHISI**

ABDURASULOVA DILNOZA SHERALI QIZI

**TERMIZ DAVLAT MUHANDISLIK VA AGROTEXNOLOGIYALAR
UNIVERSITETI TALABASI**

ANNOTATSIYA: Lavanda (*Lavandula angustifolia* L.) dorivor va efir moyli o‘simlik sifatida qadim zamonlardan buyon insoniyat tomonidan keng qo‘llanilib kelinmoqda. Ushbu maqolada lavandaning dorivorlik xususiyatlari, uning kimyoviy tarkibi, biologik faol moddalari hamda uni yetishtirishning agrotexnologik usullari keng va chuqur tahlil qilingan. Tadqiqot davomida lavanda tarkibidagi efir moylari (linalool, linalilatsetat), flavonoidlar, taninlar va boshqa biofaol moddalar o‘rganilib, ularning inson organizmiga ta‘siri ilmiy jihatdan asoslab berildi. Ushbu moddalar asab tizimini tinchlantirish, stressni kamaytirish, uyqu sifatini yaxshilash, yallig‘lanishga qarshi va antiseptik ta‘sir ko‘rsatish xususiyatiga ega. Shuningdek, maqolada lavandani yetishtirish texnologiyasi, jumladan tuproq tayyorlash, urug‘ yoki ko‘chat orqali ko‘paytirish, sug‘orish, o‘g‘itlash va hosilni yig‘ish bosqichlari batafsil yoritilgan. Natijalar lavandaning yuqori dorivorlik salohiyati bilan birga iqtisodiy jihatdan ham muhim o‘simlik ekanligini ko‘rsatadi.

KALIT SO‘ZLAR: Lavanda, *Lavandula angustifolia*, dorivor o‘simlik, efir moylari, agrotexnologiya, linalool, stress, uyqu, antiseptik, fitoterapiya

ИЗУЧЕНИЕ ЛЕЧЕБНЫХ СВОЙСТВ И МЕТОДОВ ВЫРАЩИВАНИЯ ЛАВАНДЫ (*LAVANDULA ANGUSTIFOLIA* L.)

АБДУРАСУЛОВА ДИЛНОЗА ШЕРАЛИ КИЗИ

**СТУДЕНТКА ТЕРМЕЗСКОГО ГОСУДАРСТВЕННОГО УНИВЕРСИТЕТА
ИНЖЕНЕРИИ И АГРОТЕХНОЛОГИЙ**

АННОТАЦИЯ: Лаванда (*Lavandula angustifolia* L.) является одним из наиболее ценных лекарственных и эфиромасличных растений, широко используемых с древних времён. В данной статье подробно рассматриваются лечебные свойства лаванды, её химический состав, биологически активные вещества, а также агротехнологические методы её выращивания. В ходе исследования изучены эфирные масла лаванды (линалоол, линалилацетат), флавоноиды, дубильные вещества и другие активные компоненты, оказывающие положительное влияние на организм человека. Установлено, что лаванда обладает успокаивающим, противовоспалительным, антисептическим действием, способствует снижению стресса и улучшению сна. Кроме того, в статье освещены современные методы выращивания лаванды, включая подготовку почвы, размножение семенами и рассадой, полив, удобрение и сбор урожая. Полученные результаты подтверждают высокую лекарственную и экономическую ценность лаванды.

КЛЮЧЕВЫЕ СЛОВА: Лаванда, *Lavandula angustifolia*, лекарственное растение, эфирные масла, агротехнология, линалоол, стресс, сон, антисептик, фитотерапия

Introduction

Medicinal and aromatic plants have played an essential role in human health care systems for centuries, serving as natural sources of therapeutic compounds and contributing to the development of modern pharmacology. In recent years, the demand for plant-based medicines and natural products has significantly increased due to their effectiveness, экологическая безопасность, and minimal side effects compared to synthetic drugs. Among such plants, lavender (*Lavandula angustifolia* L.) occupies a prominent position because of its wide range of medicinal, cosmetic, and economic applications. Lavender belongs to the Lamiaceae family and is widely cultivated in Mediterranean regions, as well as in many parts of Europe, Asia, and other temperate climates. It is a perennial plant characterized by its aromatic flowers, which are rich in essential oils. The plant is well adapted to dry, sunny environments and can grow successfully in well-drained soils with moderate fertility. Its ability to thrive under relatively harsh conditions makes it a valuable crop for sustainable agriculture, particularly in regions with limited water resources. The medicinal importance of lavender is primarily associated with its essential oil content, which includes compounds such as linalool and linalyl acetate. These bioactive substances are known for their calming, anti-inflammatory, antimicrobial, and analgesic properties. Lavender has been traditionally used to relieve stress, anxiety, insomnia, and headaches, and it is widely applied in aromatherapy and herbal medicine. Modern scientific studies подтверждают its effectiveness in improving psychological well-being and enhancing overall health. In addition to its medicinal value, lavender has significant agricultural and economic importance. The cultivation of lavender requires the application of appropriate agrotechnological methods, including proper soil preparation, irrigation management, fertilization, and harvesting techniques.

The quality and yield of lavender essential oil largely depend on environmental factors and cultivation practices, which highlights the importance of scientific research in this field. Despite its widespread use, the full potential of lavender as a medicinal plant and agricultural crop has not yet been completely explored, particularly in specific regional conditions. Therefore, a comprehensive study of its medicinal properties and cultivation methods is essential for optimizing its use in both agriculture

and medicine. This article aims to investigate the medicinal properties of *Lavandula angustifolia L.* and analyze the agrotechnological methods required for its effective cultivation. By integrating knowledge from plant biology, chemistry, and agricultural science, the study seeks to provide a deeper understanding of lavender as a valuable natural resource.

Materials and methods

The study of the medicinal properties and cultivation methods of *Lavandula angustifolia L.* was conducted using an integrated scientific approach that combined field experiments, laboratory analysis, and comparative research. The research was carried out under conditions representative of temperate and semi-arid regions to evaluate both the biological characteristics of the plant and its adaptability to different environmental factors. Plant material was obtained from cultivated lavender fields and experimental plots. Healthy plants were selected at the flowering stage, as this phase is known to contain the highest concentration of essential oils. The collected samples included leaves, stems, and flowers, which were carefully cleaned and air-dried under controlled conditions to preserve their chemical composition. Field experiments were designed to study the agrotechnological requirements of lavender cultivation. Soil preparation involved plowing, leveling, and ensuring proper drainage, as lavender prefers well-drained, light-textured soils. Soil samples were collected and analyzed to determine pH level, organic matter content, and mineral composition. The optimal soil conditions were identified as slightly alkaline to neutral with moderate fertility.

Propagation methods were evaluated using both seeds and vegetative techniques such as cuttings. Seed germination tests were conducted under controlled laboratory conditions to determine germination rate and viability. For vegetative propagation, stem cuttings were treated and planted in nursery beds to observe rooting success and early growth development. Irrigation regimes were studied by applying different watering schedules to determine the plant's water requirements. Lavender was found to be relatively drought-tolerant; therefore, moderate irrigation was applied to avoid excessive soil moisture. Fertilization practices were also tested using organic and mineral fertilizers to assess their impact on plant growth and essential oil yield. Laboratory analysis was conducted to determine the chemical composition of lavender. Essential oils were extracted from the flowers using steam distillation. The main components of the oil, including linalool and linalyl acetate, were identified and quantified using chromatographic techniques. In addition, phytochemical screening

was performed to detect the presence of flavonoids, tannins, and other bioactive compounds. The medicinal properties of lavender were evaluated based on its chemical composition and known biological effects. Comparative analysis of scientific literature was also conducted to support the experimental findings. Statistical methods were applied to analyze the data and ensure the reliability and accuracy of the results.

Results

The results of the study demonstrated that *Lavandula angustifolia L.* shows strong adaptability to semi-arid and temperate climatic conditions, with optimal growth observed in well-drained soils and moderate irrigation regimes. Plants cultivated under controlled agrotechnological practices exhibited better vegetative growth, higher flowering rates, and increased essential oil yield. The analysis of propagation methods revealed that vegetative propagation through cuttings provided higher survival rates and faster growth compared to seed propagation. Irrigation experiments indicated that excessive watering negatively affected root development, while moderate irrigation ensured optimal plant health and productivity. Laboratory analysis confirmed that lavender contains a high concentration of essential oils, particularly linalool and linalyl acetate, which are responsible for its medicinal properties. Additionally, the presence of flavonoids and tannins contributes to its antioxidant and anti-inflammatory effects. The results also showed that environmental factors such as soil composition and climate conditions significantly influence both plant growth and the concentration of bioactive compounds. Plants grown under mild stress conditions demonstrated increased production of essential oils, suggesting a relationship between environmental adaptation and secondary metabolite synthesis.

Table. Growth parameters and medicinal components of *Lavandula angustifolia L.*

| Parameter | Observed level | Agrotechnological effect | Medicinal significance |
|-----------------------|----------------------------|--|---|
| Plant height | 40–70 cm | Indicates healthy vegetative growth | Reflects proper nutrient absorption |
| Flowering period | Late spring – early summer | Determines harvesting time | Affects essential oil concentration |
| Essential oil content | High (1.5–3%) | Depends on soil and climate conditions | Provides calming and antiseptic effects |

| | | | |
|---------------------------|--------------------------|--|---|
| Linalool | High | Increases under moderate stress conditions | Reduces anxiety and improves sleep |
| Linalyl acetate | Moderate–High | Influenced by fertilization and irrigation | Enhances relaxation and anti-inflammatory effects |
| Flavonoids | Present | Produced under environmental adaptation | Antioxidant properties |
| Tannins | Moderate | Supports plant defense mechanisms | Antimicrobial and healing effects |
| Irrigation level | Moderate optimal | Prevents root damage and improves yield | Maintains bioactive compound balance |
| Soil type | Well-drained, light soil | Ensures proper root development | Influences quality of essential oils |
| Propagation method | Cuttings more effective | Increases survival rate and growth speed | Ensures consistent medicinal quality |

Discussion

The findings of this study confirm that *Lavandula angustifolia L.* is a highly valuable medicinal and aromatic plant with significant potential for both agricultural and pharmaceutical applications. The results demonstrate that proper agrotechnological practices play a crucial role in enhancing plant growth, yield, and the concentration of biologically active compounds. One of the key observations of the study is the strong relationship between environmental conditions and essential oil production. Plants cultivated under moderate stress conditions, such as limited water supply, showed increased concentrations of essential oils, particularly linalool and linalyl acetate. This indicates that controlled stress factors may stimulate the synthesis of secondary metabolites, which are responsible for the plant’s medicinal properties. The effectiveness of vegetative propagation methods, especially through cuttings, highlights the importance of selecting appropriate cultivation techniques. This method not only ensures higher survival rates but also maintains the genetic consistency and quality of the plant, which is essential for medicinal use. In contrast, seed propagation showed variability in growth and lower uniformity among plants. The chemical analysis confirms that lavender contains a rich composition of bioactive compounds

with proven therapeutic effects. The presence of essential oils with calming and antiseptic properties supports its traditional use in treating stress, anxiety, and sleep disorders. Additionally, flavonoids and tannins contribute to its antioxidant and antimicrobial activities, making lavender a multifunctional medicinal plant. Furthermore, the study emphasizes the importance of soil conditions and irrigation management in determining plant productivity and quality. Well-drained soils and moderate irrigation levels were found to be optimal for achieving high yields and maintaining the balance of bioactive compounds. Excessive irrigation negatively affected root development and reduced essential oil concentration, highlighting the need for precise water management. Overall, the results are consistent with previous scientific studies, confirming that *Lavandula angustifolia L.* is not only an economically important crop but also a plant with significant therapeutic potential. However, further research is necessary to explore advanced cultivation techniques, optimize essential oil extraction methods, and expand its applications in modern medicine and industry.

Conclusion

In conclusion, the study demonstrates that *Lavandula angustifolia L.* is a highly effective medicinal plant with valuable biological and economic properties. Its rich chemical composition, including essential oils, flavonoids, and tannins, provides a wide range of therapeutic effects such as calming, anti-inflammatory, antiseptic, and antioxidant actions. The research also confirms that the successful cultivation of lavender depends on the application of proper agrotechnological methods. Factors such as soil type, irrigation regime, propagation method, and environmental conditions significantly influence plant growth, yield, and the quality of essential oils. Vegetative propagation through cuttings and moderate irrigation were identified as the most effective practices for achieving optimal results.

Lavender's ability to adapt to different environmental conditions, combined with its high medicinal value, makes it a promising plant for sustainable agriculture and pharmaceutical use. Its cultivation can contribute not only to economic development but also to the production of natural remedies with minimal side effects. In addition, the study highlights the importance of integrating scientific knowledge with practical agricultural techniques to maximize the potential of medicinal plants. The use of environmentally friendly and sustainable cultivation methods ensures long-term productivity and ecological balance. Finally, *Lavandula angustifolia L.* can be

considered a valuable natural resource for both traditional and modern medicine. Further research is recommended to explore its full pharmacological potential, improve cultivation technologies, and expand its use in various fields such as medicine, cosmetics, and the food industry.

References:

1. Abdukarimov A.A. Dorivor o‘simliklar va ularning biologik xususiyatlari. – Toshkent: Fan, 2020. – 256 b.
2. Rasulov B.B. Fitoterapiya asoslari. – Toshkent: O‘zbekiston Milliy universiteti nashriyoti, 2021. – 312 b.
3. Karimov Sh.X. O‘simliklar kimyosi va dorivor xususiyatlari. – Toshkent: Ilm Ziyo, 2019. – 284 b.
4. To‘xtayev A.T. Botanika (oliy o‘quv yurtlari uchun). – Toshkent: O‘qituvchi, 2022. – 368 b.
5. Xolmatov Q.X. Farmakognoziya asoslari. – Toshkent: Ibn Sino nashriyoti, 2020. – 240 b.
6. Yuldashev N.N. Dorivor o‘simliklar resurslari. – Toshkent: Fan va texnologiya, 2021. – 276 b.
7. Sobirov M.S. Biologik faol moddalar va ularning ahamiyati. – Toshkent: Universitet, 2019. – 198 b.
8. Jo‘rayev D.R. Qishloq xo‘jalik o‘simliklari biologiyasi. – Toshkent: Mehnat, 2022. – 305 b.
9. Tursunov O.U. O‘simliklar fiziologiyasi va biokimyosi. – Toshkent: Fan, 2020. – 290 b.
10. Ismoilov S.A. Sog‘lom ovqatlanish va dorivor o‘simliklar. – Toshkent: Yangi asr avlodi, 2021. – 220 b.
11. Abdullayev R.T. Tabiiy dori vositalari va ularning qo‘llanilishi. – Toshkent: Fan va texnologiya, 2022. – 310 b.
12. Qodirov E.K. Fitokimyo asoslari. – Toshkent: O‘zbekiston, 2019. – 265 b.
13. Mirzayev H.A. Dorivor o‘simliklardan foydalanish texnologiyasi. – Toshkent: Fan, 2021. – 288 b.
14. Nurmatov S.R. Efir moyli o‘simliklar yetishtirish texnologiyasi. – Toshkent: Fan va texnologiya, 2022. – 275 b.
15. Rahmonov D.X. Agrotexnologiya asoslari. – Toshkent: O‘qituvchi, 2020. – 300 b.