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***Rosmarinus officinalis* L., PROPERTIES, AREAS OF APPLICATION**

©**Bakhshaliyeva A.**, ORCID 0009-0001-9658-5589, Nakhchivan State University,
Nakhchivan, Azerbaijan, arzukeyimli85@gmail.com

***Rosmarinus officinalis* L., СВОЙСТВА, ОБЛАСТИ ПРИМЕНЕНИЯ**

©**Бахшалиева А.**, ORCID: 0009-0001-9658-5589, Нахчыванский государственный
университет, г. Нахчыван, Азербайджан, arzukeyimli85@gmail.com

Abstract. Presents information about the botanical characteristics of rosemary, the regions and species of rosemary found in Azerbaijan, its chemical composition, fields of application, medicinal and therapeutic properties, as well as the preparation of its oil. The conducted research has revealed that there are two species of the genus *Rosmarinus* in nature: 1. *Rosmarinus officinalis* and *Rosmarinus eriocalyx*. In the flora of Nakhchivan Autonomous Republic, the species *Rosmarinus officinalis* is found, while *Rosmarinus eriocalyx* is encountered in the Mediterranean region. Based on literature data and our research, species belonging to this genus are used in medical, ecological, decorative, and cosmetic fields.

Аннотация. Представлена информация о ботанических характеристиках розмарина, об ареале распространения и видах розмарина, встречающихся в Азербайджане, его химическом составе, областях применения, а также о его лечебных и терапевтических свойствах и способах приготовления масла. Проведённые исследования показали, что в природе существуют два вида рода *Rosmarinus*: *Rosmarinus officinalis* и *Rosmarinus eriocalyx*. Во флоре Нахичеванской Автономной Республики встречается вид *Rosmarinus officinalis*, тогда как *Rosmarinus eriocalyx* распространён в Средиземноморском регионе. Согласно литературным данным и результатам наших исследований, виды этого рода используются в медицинской, экологической, декоративной и косметической сферах.

Keywords: Rosemary, culinary, medicinal, cosmetic, aromatherapy, species, genus.

Ключевые слова: розмарин, кулинария, медицина, косметика, ароматерапия, виды, род.

Rosemary is one of the medicinal plants that has been used since ancient times in the treatment of various diseases. The name "rosemary" is derived from the Latin words *ros* (dew) and *marinus* (sea). Rosemary, also known as *Rosmarinus officinalis*, is a perennial shrub belonging to the Lamiaceae (mint or labiates) family and is currently classified under the species *Salvia rosmarinus*. Initially, rosemary was categorized under the genus *Rosmarinus*; however, recent studies have reclassified it as a species within the *Salvia* genus. This plant is believed to have originated from the southern coasts of the Mediterranean and is now cultivated as an aromatic plant in various parts of the world [2].

Rosemary has significant value and a wide range of applications in different fields, particularly in culinary, medicinal, cosmetic, and aromatherapy practices [6]. Due to its high content of bioactive compounds, vitamins (B, C, D, E, K), and minerals, rosemary is used not only as a flavoring agent but also in the treatment of various diseases. In recent years, this plant has increasingly attracted attention in Azerbaijan as a therapeutic remedy [1].

Discussion and conclusions of the study

Botanical Characteristics – Rosemary is a perennial, evergreen, densely branched shrub that can grow to a height of 1.5 to 2 meters. It has tough leaves that are 1.5–3.5 cm long and 0.2–0.4 cm wide, arranged oppositely, sessile, with a leathery surface and downward-curved margins. The leaves are simple in structure, densely covered with fine hairs on the underside, giving a grayish appearance, while the upper surface is shiny and dark green with a characteristic aromatic scent. The plant produces small flowers, typically white, pale, or deep violet in color, arranged in small racemose inflorescences. The flower color can vary depending on the species and environmental conditions. Rosemary blooms throughout the year. It has both perennial and annual shoots: the perennial shoots are dark gray, while the annual ones are light gray and hairy. The plant develops a strong root system and produces small brown seeds. It can be propagated by various methods, including seeds, cuttings, and division [7]. The aromatic compounds in the plant contribute to its distinctive fragrance. The most valuable among these are 1,8-cineole, camphor, and rosemary turpentine [4]. One of the main components responsible for the plant's therapeutic effects is its chemical composition [2].

Ecology – Rosemary thrives in sunny environments and does not favor sandy soils. It grows best in soils with a pH between 6 and 7. The plant is light-demanding, drought- and salt-tolerant, and has low soil nutrient requirements. It does not tolerate excessive moisture [7].



Figure. *Rosmarinus officinalis* L.

Distribution and Varieties of Rosemary in Azerbaijan, rosemary is more commonly found in subtropical regions and areas close to the Mediterranean climate zone. It is particularly widespread in the southern regions, especially in Absheron, Ganja, Gabala, Lankaran, and Astara under natural conditions. The climatic conditions in Azerbaijan also support the healthy development and cultivation of this plant. As such, rosemary is cultivated in areas such as the Absheron Peninsula and the Ganja-Gazakh region. The main species of this plant found in Azerbaijan is *Rosmarinus officinalis*, which is the predominant variety cultivated and naturally occurring in the country [1].

Chemical Composition :The medicinal effects of rosemary are primarily attributed to its abundance of biologically active compounds. In particular, rosemary contains essential oils,

flavonoids, terpenoids, and phenolic compounds. Its chemical composition includes the following key substances:

Rosemary contains a high concentration of essential oils. One of the most significant of these is 1,8-cineole (also known as eucalyptol), which possesses both antibacterial and anti-inflammatory properties [3]. This compound is responsible for rosemary's beneficial effects on the respiratory system, easing breathing and alleviating symptoms of colds [6].

Another important compound in rosemary's chemical profile is camphor, which is primarily known for its analgesic and soothing effects [5]. Camphor not only helps relieve headaches and muscle pain but also has a calming effect on the nervous system.

The Importance and Uses of Rosemary :One of the key compounds responsible for the distinctive aroma and therapeutic effects of rosemary is rosmarinic turpentine. This compound not only improves blood circulation but also enhances metabolic activity [3].

The flavonoids present in rosemary primarily possess antioxidant properties. These compounds strengthen the body's defense against free radicals, slow down the aging process, and most importantly, offer protective effects against cancer [4].

Rosemary also contains numerous phenolic compounds, which further contribute to its anti-inflammatory and antimicrobial properties. Rosemary is a versatile plant used for various purposes, especially in culinary practices. It is a significant component of Mediterranean cuisine and is widely used in the preparation of meat, fish, and vegetable dishes [6].

In Azerbaijan, particularly in the Lankaran and Astara regions, the fresh and dried leaves of rosemary are used as a spice in cooking [1].

In addition, rosemary tea is highly popular. Such tea not only improves mood but also provides numerous benefits to the digestive system [2].

Historically, rosemary has been recognized for its medicinal and healing properties and has been used as a remedy for various ailments. Due to its analgesic, anti-inflammatory, and antimicrobial effects, it has found application in the treatment of multiple diseases [3].

Rosemary improves blood circulation and also contributes to the regulation of metabolism [4].

In Azerbaijani folk medicine, rosemary has long been used for the treatment of headaches, colds, and digestive disorders [1].

Additionally, rosemary-based preparations help relieve headaches and reduce mental fatigue [6].

Overall, due to its wide range of medicinal benefits, rosemary is commonly used in traditional medicine across the southern and subtropical regions of Azerbaijan.

Rosemary oil is also highly valued in folk medicine. It is used in the treatment of headaches, neurological disorders, and migraines. The oil has a calming effect on the nervous system and helps reduce pain. In Azerbaijan, rosemary tea is commonly used as a traditional remedy for alleviating headaches [1]. Moreover, rosemary is effective in relieving anxiety, stress, depression, and mental fatigue [6].

As noted above, rosemary regulates both the digestive system and blood circulation. It also has a protective effect against food poisoning. Furthermore, rosemary facilitates the digestion of nutrients and helps regulate bowel movements [2]. In several villages in Azerbaijan, rosemary tea is widely used in the treatment of digestive problems.

The Therapeutic Applications and Health Benefits of Rosemary :Rosemary is also used in the treatment of common colds and respiratory diseases. It is applied to relieve symptoms of colds by helping to clear the respiratory tract. The essential oils contained in rosemary possess properties that facilitate breathing and help suppress coughing [4].

In traditional medicine, rosemary is either consumed as a tea or applied topically through massage using rosemary oil.

In addition, rosemary helps to alleviate pain and is used in the treatment of various infections. In Azerbaijan, it is known as a natural remedy in the treatment of fever and inflammatory conditions [1]. Rosemary oil is also widely used in the fields of aromatherapy and cosmetics. It not only helps prevent hair loss but also has a revitalizing effect on the scalp [6]. In Azerbaijan, rosemary oil is commonly used in the production of aromatherapy and skincare products [1]. In aromatherapy, rosemary oil is applied to reduce stress and elevate mood [5]. The numerous health benefits and therapeutic properties of the rosemary plant have been the subject of scientific investigation for many years. Various studies have confirmed the positive effects of rosemary on human health. Rosemary also has a positive impact on memory and cognitive functions. It has been shown to enhance memory and stimulate brain activity. Research has demonstrated that rosemary oil, when used in aromatherapy, improves both memory and concentration [3]. It is suggested that rosemary oil influences neurotransmitter activity in the brain, thereby supporting memory enhancement [1]. The Role of Rosemary in the Prevention and Treatment of Chronic Diseases.

The use of the rosemary plant is considered appropriate in the fight against chronic diseases. Its antioxidant properties significantly enhance its importance in the prevention and management of such conditions. For example, extracts derived from rosemary have been shown to help prevent the development of cardiovascular diseases and regulate blood glucose levels [2]. Rosemary has demonstrated effective results in the treatment of both diabetes and hypertension [6].

In Azerbaijan, the use of natural medications containing rosemary may contribute to the prevention of these types of chronic illnesses [1].

In cases of skin rashes, itching, and diathesis, rosemary infusions are prepared and applied in the form of compresses. Additionally, this type of infusion is used to massage the head, neck, hair roots, and the area behind the ears for relieving headaches. For over fifteen centuries, this plant has been used in traditional medicine for the treatment of various ailments. Studies have shown that individuals who consume rosemary tea every two to three days are significantly less likely to develop conditions such as sclerosis and Alzheimer's disease. Moreover, rosemary tea is beneficial for individuals seeking to lose weight. Unlike many other weight loss products, rosemary has a mild laxative effect, helping to relieve bloating and constipation, increase intestinal motility, and reduce appetite (<https://fizulihuseynov.com>).

Cultivation, Preparation, and Cautionary Use of Rosemary: this plant can be easily cultivated in household gardens or in pots. To prepare rosemary oil, freshly harvested rosemary should be gathered and dried in a shaded area. Once dried, it is placed in a jar, covered with olive oil, sealed, and stored in a warm room for 10 days. Alternatively, rosemary can be packed tightly into a sealable jar and covered completely with unrefined olive oil. The jar is then placed in an oven at 50°C for 4–5 hours.

The resulting oil extract is used as a massage oil due to its analgesic properties, particularly for myositis (muscle pain), rheumatism, and joint pain. This oil is also applied topically for the treatment of skin rashes, acne, and pimples [7].

Gargling with a rosemary infusion or chewing fresh rosemary leaves helps eliminate bad breath. If the *Helicobacter pylori* bacterium is detected in cases of gastrointestinal ulcers, consuming rosemary tea may be highly beneficial.

Some individuals suffer from indigestion or feel that food remains in the stomach for prolonged periods. In such cases, equal parts of rosemary and elecampane root (*Inula helenium*) can be mixed and brewed into a tea. Drinking this tea has shown positive effects, including diuretic properties that aid in relieving kidney pain, colds, and edema when consumed three times daily.

However, there are certain contraindications to rosemary use. It is not recommended during pregnancy or breastfeeding (<https://fizulihuseynov.com>).

To prepare rosemary tea, add 1 teaspoon of dried rosemary to 200–250 ml of boiled water, and let it steep for 5 minutes. Optionally, lemon or honey can be added to enhance flavor (<https://saglamqidalan.net>). It is generally safe to consume one to three cups of rosemary tea per day. However, it is advisable to start with small amounts and consult a healthcare provider, as rosemary may interact with certain medications and, if consumed in excessive doses, can lead to serious side effects [8].

Rosemary (*Rosmarinus officinalis*) is a valuable plant with wide-ranging applications not only in the field of culinary arts, but also in medicine, cosmetics, and aromatherapy. Its therapeutic properties and health benefits have been recognized and utilized by various cultures since ancient times. In Azerbaijan, rosemary grows naturally in the southern regions, and its cultivation is increasingly expanding in these areas. Moreover, rosemary is widely used in the cosmetic and aromatherapy industries, and its popularity continues to grow due to its beneficial effects and versatility.

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