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## ETHNOBOTANICAL HERITAGE OF AZERBAIJANI AND CENTRAL ASIAN TURKIC PEOPLES: TRADITIONAL MEDICINAL PLANTS AND THEIR USES

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**Abstract.** Ethnobotanical knowledge constitutes an important element of the historical and cultural heritage of many societies, reflecting the long-standing interaction between humans and the natural environment. Among Azerbaijani and Central Asian Turkic peoples, medicinal plants have occupied a significant place in traditional healthcare systems, daily life, and cultural practices for centuries. This knowledge has been transmitted across generations through oral traditions, folk medicine, and written medical sources, forming an essential component of the ethnocultural identity of these communities.

The present study examines selected medicinal plants traditionally used by Azerbaijani and Central Asian Turkic peoples, including *Artemisia* spp., *Ferula* spp., *Peganum harmala*, *Hypericum perforatum*, *Crocus sativus*, *Nigella sativa*, and *Rosa damascena*. Drawing upon ethnobotanical, historical, and comparative sources, the research analyzes their traditional uses, methods of preparation, cultural significance, and place within local medical traditions.

The findings demonstrate that these medicinal plants have played an important role not only in the treatment of various ailments, such as digestive disorders, inflammatory diseases, and skin conditions, but also in the preservation of traditional ecological knowledge and cultural practices. Historical records and ethnographic evidence reveal substantial similarities in the use of medicinal plants among Turkic communities across the Caucasus and Central Asia, indicating the continuity of shared cultural traditions.

The study concludes that the ethnobotanical heritage of Azerbaijani and Central Asian Turkic peoples represents a valuable source for understanding historical healthcare practices, cultural interactions, and traditional environmental knowledge. Documenting and analyzing this heritage contribute both to the preservation of cultural memory and to contemporary research on medicinal plants and traditional medicine.

**Keywords:** ethnobotany, traditional medicine, cultural heritage, Turkic peoples, Azerbaijan, Central Asia,

### Introduction

Ethnobotanical knowledge constitutes an important component of the historical and cultural heritage of many societies, reflecting the long-standing interaction between humans and the natural environment. Throughout history, medicinal plants have played a central role in traditional healthcare systems and have served not only as therapeutic resources but also as elements of cultural identity, belief systems, and everyday practices. Among the Turkic peoples of Azerbaijan and Central Asia, knowledge concerning medicinal plants has been transmitted across generations through oral traditions, folk medicine, and written medical sources, forming an integral part of their ethnocultural heritage.

Traditional medicinal practices in Azerbaijan and Central Asian countries are deeply rooted in historical experience, ecological adaptation, and centuries of interaction with local flora. Historical sources indicate that medicinal plants occupied an important place in the medical traditions of the

medieval Islamic world, including the works of renowned scholars such as Avicenna (Ibn Sina), whose writings significantly influenced medical knowledge throughout the Caucasus and Central Asia. Local communities accumulated extensive knowledge concerning the identification, harvesting, preparation, and therapeutic application of plant species found in their natural environment, creating a rich body of traditional ecological knowledge that continues to survive in folk medicine.

The use of medicinal plants such as *Artemisia* spp., *Ferula* spp., *Peganum harmala*, and *Hypericum perforatum* reflects ancient ethnobotanical traditions based primarily on the collection of wild flora (Söukand & Pieroni, 2016). At the same time, cultivated species including *Crocus sativus*, *Nigella sativa*, and *Rosa damascena* became closely associated with agricultural practices, trade networks, and cultural traditions throughout the region. The exchange of medicinal knowledge along historical trade routes, particularly those connecting the Caucasus, Persia, and Central Asia, contributed to the dissemination and preservation of plant-based therapeutic practices among Turkic communities.

Several of these plants acquired considerable historical, cultural, and economic significance. Saffron (*Crocus sativus*), for example, has long been regarded as one of the world's most valuable medicinal and aromatic plants. Historical evidence demonstrates its importance in regional and international trade, while in Azerbaijan, particularly on the Absheron Peninsula, saffron cultivation has remained an important agricultural and cultural tradition for centuries (Bathaie & Mousavi, 2010). Likewise, plants such as *Peganum harmala* and *Rosa damascena* occupied not only medicinal but also ritual and symbolic functions within local cultural practices.

The ethnobotanical study of medicinal plants used by Azerbaijani and Central Asian Turkic peoples provides valuable insights into historical healthcare practices, traditional ecological knowledge, and the cultural interactions that shaped regional medical traditions. Furthermore, the comparative analysis of historical records, ethnographic materials, and contemporary ethnobotanical data contributes to a better understanding of the continuity and transformation of traditional medicinal knowledge over time.

Therefore, the aim of this study is to analyze selected wild and cultivated medicinal plants within the historical and ethnobotanical heritage of Turkic peoples in Azerbaijan and Central Asia and to examine their traditional uses, cultural significance, and historical importance within local medical traditions.

In the context of modern biotechnology and photo pharmacology, these medicinal plants serve as crucial raw material bases for the extraction of bioactive secondary metabolites. The integration of traditional ethnobotanical knowledge with advanced bioprocessing techniques facilitates the development of standardized phyto functionals and sustainable therapeutic agents, bridging ancient wisdom with contemporary technical innovation.

## Materials and Methods

The present study is based on a qualitative ethnobotanical investigation of medicinal plants traditionally used by Azerbaijani and Central Asian Turkic peoples. The research combines ethnobotanical, historical, ethnographic, and botanical approaches in order to examine the role of medicinal plants within traditional healthcare systems and cultural practices.

The study was conducted through a systematic review of scientific literature, ethnographic publications, historical sources, and academic studies related to medicinal plants and traditional medicine in the Caucasus and Central Asia. Particular attention was given to plant species that have maintained a significant place in the folk medicine, cultural traditions, and historical medical practices of Turkic communities.

In addition to the analysis of published sources, ethnographic observations obtained during field visits to saffron cultivation areas in the Absheron Peninsula were incorporated into the study. These observations provided supplementary information concerning the preservation of traditional knowledge, local cultivation practices, and the contemporary cultural significance of medicinal plants, particularly *Crocus sativus*.

The selected plant species (*Artemisia* spp., *Ferula* spp., *Peganum harmala*, *Hypericum perforatum*, *Crocus sativus*, *Nigella sativa*, and *Rosa damascena*) were examined from historical and ethnobotanical perspectives. The analysis focused on their traditional medicinal applications, preparation methods, cultural functions, historical significance, and their role in the transmission of traditional ecological knowledge.

A comparative-historical and ethnobotanical method was employed to identify similarities and differences in the use of medicinal plants among Turkic communities in Azerbaijan and Central Asia. Furthermore, elements of source criticism were applied in evaluating historical and ethnographic materials in order to ensure the reliability and contextual interpretation of the available evidence. This methodological framework enabled the integration of historical records, ethnobotanical data, and contemporary observations to provide a comprehensive understanding of traditional medicinal plant use in the region.

## **1 *Crocus sativus* L. (Saffron)**

### **Botanical Background and Historical Significance**

*Crocus sativus* L., commonly known as saffron, is a perennial geophytic plant belonging to the Iridaceae family and is regarded as one of the most valuable medicinal and aromatic plants in the world. The dried stigmas of the saffron flower constitute the economically important part of the plant and have been widely used as a spice, natural coloring agent, perfume ingredient, and medicinal substance for centuries (Abdullaev, 2002). Historical evidence suggests that saffron has been cultivated and utilized for more than three millennia in various civilizations, particularly throughout the Middle East, the Mediterranean basin, Persia, and Central Asia (Mousavi & Bathaie, 2011).

Beyond its medicinal value, saffron occupied an important place in the economic and cultural history of numerous societies. Historical records indicate that saffron was a highly valued commodity in regional and international trade networks due to its rarity, labor-intensive production, and diverse applications in medicine, food preparation, textile dyeing, and religious practices. Its exceptional value contributed to its reputation as one of the most expensive plant products in the world and played a role in historical commercial exchanges across Eurasia.

In the Caucasus region, particularly in Azerbaijan, saffron cultivation has a long-standing history and is closely associated with the Absheron Peninsula. Favorable climatic and soil conditions enabled the development of saffron cultivation, which became an important component of local agricultural traditions. Historical accounts indicate that saffron produced in Absheron was highly valued and was traded beyond the region, contributing to local economic life and cultural practices.

Within Azerbaijani folk culture, saffron has traditionally been used not only as a medicinal plant but also as a culinary ingredient, natural dye, and symbolic element in various social and cultural practices. The continuity of saffron cultivation in Absheron from historical times to the present day demonstrates the preservation of traditional agricultural knowledge and reflects the enduring relationship between local communities and their natural environment. Consequently, saffron represents an important element of both the ethnobotanical heritage and historical memory of Azerbaijan.

### **Ethnobotanical Uses**

Saffron has occupied an important place in the traditional medical and cultural practices of many societies throughout history. Among Azerbaijani and Central Asian Turkic communities, saffron has traditionally been used in folk medicine for the treatment of digestive disorders, respiratory ailments, cardiovascular complaints, and nervous conditions. Historical medical sources describe saffron as a sedative, stomachic, antispasmodic, stimulant, and emmenagogue agent (Baytop, 1999).

In addition to its medicinal applications, saffron has long served as an important cultural and economic resource. In Azerbaijani traditional cuisine, it has been widely used as a flavoring and coloring agent in various dishes and beverages. Saffron was also employed in textile dyeing, perfumery, and cosmetic preparations due to its distinctive aroma and vibrant color (Mousavi & Bathaie, 2011). In many local traditions, saffron symbolized prosperity, purity, and hospitality, reflecting its significance beyond practical medicinal use.

Ethnographic observations and historical accounts indicate that knowledge concerning saffron cultivation, harvesting, and processing has been transmitted across generations, particularly in the Absheron Peninsula. These practices represent an important component of the ethnobotanical heritage of Azerbaijan and demonstrate the continuity of traditional ecological knowledge.

### **Chemical Composition**

The chemical composition of saffron includes numerous biologically active compounds. Among the most important constituents are crocin, picrocrocin, and safranal, which are responsible for the characteristic color, taste, and aroma of the plant (Giaccio, 2004; Kanakis et al., 2004). In addition, saffron contains carotenoids, flavonoids, and various secondary metabolites that contribute to its medicinal properties (Abdullaev & Espinosa-Aguirre, 2004).

### **Pharmacological Properties**

Modern scientific studies have confirmed several medicinal properties traditionally attributed to saffron. Research indicates that saffron exhibits antioxidant, anti-inflammatory, antidepressant, and neuroprotective effects, while its principal bioactive compounds, particularly crocin and crocetin, have attracted attention for their potential therapeutic applications (Pitsikas, 2015; Abdullaev, 2002). These findings demonstrate a notable correspondence between traditional medicinal knowledge and contemporary pharmacological research.

### **Cultivation and Economic Importance**

Beyond its medicinal applications, saffron has historically been an important agricultural and commercial product. Due to the labor-intensive nature of cultivation and harvesting, saffron has long been regarded as one of the world's most valuable plant products. Historical records indicate that saffron was traded across extensive commercial networks linking the Caucasus, Persia, Anatolia, and Central Asia.

In Azerbaijan, particularly on the Absheron Peninsula, saffron cultivation has remained an important element of local agricultural culture for centuries. The persistence of cultivation practices into the present day reflects both the economic value of the crop and the preservation of traditional agricultural knowledge. Consequently, saffron represents not only a medicinal plant but also a significant component of the historical, cultural, and ethnobotanical heritage of Azerbaijan.

## **2 *Nigella sativa* L. (Black Cumin)**

### **Botanical and Ethnobotanical Background**

*Nigella sativa* L., commonly known as black cumin or black seed, is a medicinal plant belonging to the Ranunculaceae family. The species is widely distributed throughout Southwest Asia, the Middle East, and the Mediterranean region and has been cultivated for centuries for both medicinal and culinary purposes. Among Turkic peoples of the Caucasus and Central Asia, black cumin occupies an important place in ethnobotanical traditions due to its medicinal, nutritional, and cultural significance.

Historical evidence suggests that the use of *Nigella sativa* dates back to ancient civilizations. Archaeological discoveries indicate that black seed was used in Ancient Egypt and was found among the funerary objects of Tutankhamun, demonstrating its importance in early medical and ritual practices (Sharma et al., 2009). Over time, the plant became integrated into the medical traditions of the Middle East, Persia, and Central Asia, where it was widely employed as a medicinal remedy and dietary supplement.

Within the medical traditions of the Islamic world, *Nigella sativa* acquired particular significance and was frequently mentioned in classical medical literature. Medieval scholars and physicians regarded black seed as a valuable therapeutic plant used for maintaining general health and treating a variety of ailments. Through cultural interactions and historical trade routes connecting the Middle East, the Caucasus, and Central Asia, knowledge concerning the medicinal use of black cumin spread among Turkic communities and became incorporated into local folk medicine traditions.

In Azerbaijan and neighboring regions, black cumin has traditionally been cultivated and used both as a medicinal herb and as a culinary spice. Folk medical practices commonly employed the seeds in herbal preparations intended to support digestion, strengthen the body, and promote general

well-being. The continued use of black cumin in traditional medicine reflects the preservation of ethnobotanical knowledge and demonstrates the enduring role of medicinal plants in the cultural heritage of Turkic peoples.

#### **Traditional and Ethnomedicinal Uses**

In traditional medicine, *Nigella sativa* seeds have been widely used for the treatment of digestive disorders, respiratory diseases, inflammatory conditions, and general weakness. The seeds have traditionally been consumed directly, incorporated into food, or processed into medicinal oils and herbal preparations. Among Azerbaijani and Central Asian Turkic communities, black cumin has long been regarded as a valuable medicinal plant associated with maintaining health and strengthening the body.

In the medical traditions of the Islamic world, black seed is commonly known as *Habbatul Barakah* ("the seed of blessing"). Classical scholars, including Avicenna, described *Nigella sativa* as a medicinal substance capable of enhancing vitality and supporting recovery from fatigue. As a result, the plant acquired not only therapeutic significance but also cultural and symbolic value within many Muslim societies (Ahmad et al., 2013).

Among Turkic communities of the Caucasus and Central Asia, black cumin became integrated into both folk medicine and everyday dietary practices. Traditional knowledge concerning its preparation and use was transmitted through generations and formed part of the broader ethnomedical heritage of the region. The continued use of black cumin in contemporary folk medicine demonstrates the persistence of traditional ecological knowledge and cultural continuity.

#### **Chemical Composition**

The medicinal properties of *Nigella sativa* are associated with its rich chemical composition. The seeds contain numerous biologically active compounds, including alkaloids, flavonoids, saponins, essential oils, and fatty acids. Among these constituents, thymoquinone is regarded as the principal bioactive compound responsible for many of the plant's therapeutic effects (Hannan et al., 2021).

Other important components include p-cymene,  $\alpha$ -pinene, thymohydroquinone, carvacrol, and limonene, as well as fixed oils rich in linoleic and oleic acids that contribute to the nutritional and medicinal value of the seeds (Ahmad et al., 2013).

#### **Pharmacological Properties**

Contemporary scientific studies have confirmed many of the traditional medicinal applications of *Nigella sativa*. Research has demonstrated antioxidant, anti-inflammatory, antimicrobial, immunomodulatory, and hepatoprotective activities associated with the plant and its principal active compound, thymoquinone (Khazdair et al., 2021).

In addition, experimental investigations suggest potential benefits in the management of metabolic disorders and indicate possible anticancer properties of certain bioactive constituents (Almatroodi et al., 2020). These findings illustrate the close relationship between traditional ethnomedical knowledge and modern pharmacological research, highlighting the continuing scientific relevance of medicinal plants long used in folk medicine.

### **3 *Hypericum perforatum* L. (St. John's Wort)**

#### **Botanical and Ethnobotanical Background**

##### *Hypericum*

*Hypericum perforatum* L., commonly known as St. John's wort, is a perennial herbaceous plant belonging to the Hypericaceae family. The species is widely distributed throughout Europe, Asia, and North Africa and has become naturalized in many other regions of the world. The plant is characterized by bright yellow flowers and leaves containing numerous translucent glands that appear perforated when viewed against the light, giving rise to the species name *perforatum* (Barnes et al., 2001).

Historically, St. John's wort occupied an important place in the traditional medical practices of both Europe and Asia. In many cultures, the plant was associated with healing rituals and was widely employed in the treatment of wounds, burns, skin disorders, and inflammatory conditions. Within the ethnobotanical traditions of the Caucasus and Central Asia, herbal preparations derived from



*Hypericum perforatum* were commonly used to support digestion, alleviate nervous disorders, and promote general well-being.

Among Turkic communities, knowledge concerning the collection, preparation, and medicinal application of St. John's wort was transmitted through generations as part of traditional ecological knowledge. The plant was frequently gathered from natural habitats and incorporated into folk medical practices, illustrating the close relationship between local communities and their surrounding environment.

#### **Traditional and Ethnomedicinal Uses**

Traditional medicinal systems employed *Hypericum perforatum* for a wide range of ailments, including gastrointestinal disorders, nervous system disturbances, skin diseases, wounds, and inflammatory conditions. Herbal infusions, decoctions, oils, and tinctures prepared from the plant were commonly used both internally and externally.

In many folk medical traditions, St. John's wort was regarded as a remedy capable of restoring physical and emotional balance. Its use for nervous conditions, emotional distress, and sleep disturbances contributed to its enduring reputation as an important medicinal plant. The persistence of these practices in different regions of Eurasia demonstrates the continuity of ethnomedicinal knowledge across generations (Barnes et al., 2001).

#### **Chemical Composition**

The medicinal activity of *Hypericum perforatum* is associated with a diverse range of biologically active compounds, including naphthodianthrone, phloroglucinols, flavonoids, tannins, and essential oils. Among these constituents, hypericin, pseudohypericin, and hyperforin are considered the principal compounds responsible for many of the plant's therapeutic properties (Butterweck, 2003).

#### **Pharmacological Properties**

Modern scientific investigations have confirmed numerous biological activities traditionally attributed to *Hypericum perforatum*. Studies have demonstrated antidepressant, anti-inflammatory, antimicrobial, antioxidant, and wound-healing properties associated with the plant (Butterweck, 2003).

Particular scientific attention has focused on its antidepressant activity. Clinical studies suggest that extracts of St. John's wort may contribute to the management of mild to moderate depression through interactions with neurotransmitter systems including serotonin, dopamine, and norepinephrine (Linde et al., 2008). These findings provide an example of the correspondence between traditional medicinal practices and contemporary pharmacological research.

#### **Safety and Potential Risks**

Despite its therapeutic value, the use of *Hypericum perforatum* requires caution because of potential interactions with pharmaceutical medications. Research indicates that the plant may affect drug metabolism through the induction of cytochrome P450 enzymes, thereby reducing the effectiveness of certain medications (Henderson et al., 2002).

Reported adverse effects include gastrointestinal discomfort, dizziness, fatigue, and increased sensitivity to sunlight. Consequently, the use of St. John's wort should be carefully monitored, particularly when combined with prescription drugs.

### **4 Glycyrrhiza glabra L. (Licorice)**

#### **Botanical and Ethnobotanical Background**

*Glycyrrhiza glabra* L., commonly known as licorice, is a perennial herbaceous plant belonging to the Fabaceae family. The species is widely distributed throughout the Mediterranean region, Central Asia, and parts of the Middle East and is cultivated in many countries because of its medicinal and economic importance. The roots and rhizomes constitute the principal medicinal parts of the plant and have been utilized for centuries in various traditional medical systems (Fiore et al., 2005).

Licorice possesses a long and well-documented history in ethnomedicine. Historical evidence indicates that the plant was widely employed in the medical traditions of Ancient Egypt, Greece, Rome, Persia, and China. In these civilizations, licorice was commonly prescribed for respiratory

disorders, digestive complaints, and inflammatory conditions (Pastorino et al., 2018). The widespread distribution of the plant and its therapeutic reputation contributed to its inclusion in numerous historical pharmacopoeias and medical texts.

Within the medical traditions of the medieval Islamic world, licorice was also recognized as an important medicinal plant. Classical physicians, including Avicenna (Ibn Sina), described its beneficial effects in the treatment of respiratory diseases, throat irritation, and digestive disorders. Through the influence of Islamic medicine, knowledge concerning the medicinal use of licorice spread widely across the Caucasus and Central Asia and became integrated into local healing traditions (Avicenna, 2005).

In Azerbaijan and other regions of the Caucasus and Central Asia, licorice root has long been used in folk medicine for the treatment of cough, bronchitis, throat inflammation, and gastrointestinal disturbances. Herbal decoctions prepared from the roots were traditionally regarded as effective remedies for relieving respiratory congestion and supporting general health. The continued use of licorice in folk medicine illustrates the preservation of ethnobotanical knowledge and highlights the enduring significance of medicinal plants in the cultural heritage of Turkic peoples. Throughout history, *Glycyrrhiza glabra* has been widely used in traditional medicine for the treatment of respiratory and gastrointestinal disorders. In folk medical practices, decoctions and infusions prepared from licorice roots were commonly administered to relieve cough, bronchitis, sore throat, gastric irritation, and digestive complaints. Due to its naturally sweet taste, licorice was often incorporated into herbal mixtures intended to improve the palatability of medicinal preparations.

Among Azerbaijani and Central Asian Turkic communities, licorice root has traditionally been regarded as a remedy capable of soothing respiratory discomfort and promoting recovery from common illnesses. The plant was frequently used during seasonal respiratory infections and was considered beneficial for maintaining general health and vitality. The persistence of these practices illustrates the continuity of traditional ethnomedical knowledge and the importance of medicinal plants in everyday healthcare.

### **Chemical Composition**

The medicinal properties of *Glycyrrhiza glabra* are primarily associated with its rich content of biologically active compounds. The roots contain triterpenoid saponins, flavonoids, coumarins, polysaccharides, and essential oils. Among these constituents, glycyrrhizin is considered the principal active compound responsible for many of the plant's pharmacological effects (Pastorino et al., 2018).

Other important bioactive substances include liquiritin, isoliquiritigenin, glabridin, and various flavonoids that contribute to the antioxidant and anti-inflammatory properties of the plant. These compounds have attracted considerable scientific attention because of their therapeutic potential and broad spectrum of biological activities.

### **Pharmacological Properties**

Modern pharmacological research has confirmed many of the traditional medicinal uses of *Glycyrrhiza glabra*. Experimental and clinical studies have demonstrated anti-inflammatory, antioxidant, antimicrobial, antiviral, hepatoprotective, and immunomodulatory activities associated with licorice root and its bioactive constituents (Pastorino et al., 2018; Wahab et al., 2021).

Particularly noteworthy is the plant's traditional and scientifically documented use in respiratory disorders. Licorice preparations have been shown to possess expectorant and soothing properties that may help relieve irritation of the respiratory tract. In addition, studies suggest that certain licorice-derived compounds exhibit protective effects against oxidative stress and inflammation, supporting many of the traditional therapeutic applications of the plant.

The correspondence between traditional medicinal knowledge and contemporary pharmacological findings demonstrates the continuing relevance of licorice within both ethnobotanical research and modern phytotherapy.

### **Safety and Potential Risks**

Despite its considerable therapeutic value, excessive consumption of licorice may produce adverse effects. Prolonged intake of glycyrrhizin has been associated with hypertension,

hypokalemia, and electrolyte imbalance due to its influence on mineralocorticoid metabolism (Wahab et al., 2021).

Consequently, the therapeutic use of licorice should be approached with caution, particularly among individuals with cardiovascular disorders or those receiving long-term medical treatment. Appropriate dosage and professional supervision are recommended when licorice preparations are used for medicinal purposes.

## **5 *Peganum harmala* L. (Syrian Rue)**

### **Botanical and Ethnobotanical Background**

*Peganum harmala* L., commonly known as Syrian rue, is a perennial medicinal plant belonging to the Nitrariaceae family. The species grows naturally in the arid and semi-arid regions of the Middle East, the Caucasus, and Central Asia. Due to its widespread distribution and long-standing use in traditional medicine, *Peganum harmala* occupies a significant place in the ethnobotanical heritage of Turkic peoples (Moloudizargari et al., 2013).

Historical evidence indicates that the plant has been utilized for centuries in both medicinal and ritual contexts. In Azerbaijan and many Central Asian societies, the seeds and aerial parts of *Peganum harmala* have traditionally been used in folk medicine for the treatment of digestive disorders, parasitic infections, inflammatory conditions, and various common ailments. Traditional healers frequently employed seed-based preparations because of their perceived medicinal value and protective properties (Herraiz et al., 2010).

The continued use of *Peganum harmala* across different regions of the Caucasus and Central Asia demonstrates the persistence of traditional ecological knowledge and highlights the role of medicinal plants in preserving cultural identity and local healing practices.

### **Chemical Composition and Pharmacological Properties**

The medicinal properties of *Peganum harmala* are primarily associated with its alkaloid compounds, particularly harmine, harmaline, and harmalol. These  $\beta$ -carboline alkaloids are considered the principal bioactive constituents of the plant and have been reported to exhibit antimicrobial, antiparasitic, antioxidant, and neuropharmacological activities (Moloudizargari et al., 2013).

Modern scientific studies have demonstrated that extracts of *Peganum harmala* possess biological activities that correspond to many of its traditional medicinal applications. Experimental research has reported antimicrobial effects against several bacterial and fungal pathogens, while other studies suggest potential neurological and therapeutic applications associated with its alkaloid content (Herraiz et al., 2010).

### **Cultural and Ritual Significance**

Beyond its medicinal value, *Peganum harmala* occupies a distinctive place in the cultural and spiritual traditions of Azerbaijani and Central Asian Turkic communities. The burning of its seeds, commonly known as *üzərlik tüstüsü* in Azerbaijan, has traditionally been practiced in homes and communal spaces as a ritual intended to protect against misfortune, ward off negative influences, and purify the environment.

Such practices reflect the close relationship between traditional medicine, folk beliefs, and everyday life. The ritual use of *Peganum harmala* demonstrates that medicinal plants often served not only therapeutic purposes but also symbolic and cultural functions within local communities. Consequently, the plant represents an important element of the historical memory, intangible cultural heritage, and ethnobotanical traditions of the region.

## **6 *Ferula* spp. Botanical and Ethnobotanical Background**

*Ferula* species belong to the Apiaceae family and comprise a large group of perennial plants distributed throughout Central Asia, the Caucasus, Iran, and neighboring regions. Many species of the genus have been valued for centuries because of their medicinal, aromatic, and economic importance. Several *Ferula* species grow naturally in arid and semi-arid environments and have traditionally been collected from the wild by local communities.



Historical records indicate that *Ferula* species occupied an important place in the traditional medical systems of the Middle East and Central Asia. Through long-term interaction with the natural environment, Turkic communities developed extensive knowledge concerning the identification, collection, and medicinal use of these species. In this context, the ethnobotanical landscape of Kazakhstan is particularly significant; the country's flora is exceptionally rich in medicinal plants, especially in the Alatau and steppe regions. Research by local scientists indicates that various *Ferula* taxa, alongside species like *Artemisia terrae-albae*, have played a foundational role in Kazakh traditional medicine (*emshilik*).

Similarly, in Azerbaijan and other parts of Central Asia, *Ferula* plants have traditionally been regarded as valuable medicinal resources. The resinous exudates and roots were commonly used for the treatment of digestive disorders, respiratory diseases, and infectious conditions. Folk healers employed preparations derived from roots and resins to alleviate gastrointestinal complaints and general weakness, illustrating the preservation of traditional ecological knowledge across the Turkic world.

### **Traditional and Ethnomedicinal Uses**

For centuries, *Ferula* species have been utilized in folk medicine as digestive stimulants, expectorants, and antimicrobial remedies. Resin obtained from several species was traditionally administered for stomach disorders, intestinal complaints, and respiratory diseases. In some regions, preparations derived from *Ferula* were also used to enhance appetite and support general health.

The medicinal use of *Ferula* was not limited to therapeutic purposes alone. Historical and ethnographic evidence suggests that certain species also possessed economic significance due to their aromatic resins, which were traded across regional commercial networks connecting Central Asia, Persia, and the Caucasus.

### **Chemical Composition and Pharmacological Properties**

The biological activity of *Ferula* species is associated with a variety of bioactive compounds, including sesquiterpene coumarins, sulfur-containing compounds, flavonoids, and essential oils. These constituents have been reported to possess antimicrobial, anti-inflammatory, antioxidant, and antispasmodic activities (Iranshahy & Iranshahi, 2011).

Modern pharmacological studies have demonstrated that extracts and resins obtained from several *Ferula* species exhibit significant biological activity. Research suggests potential applications in the treatment of gastrointestinal disorders, inflammatory diseases, and certain infectious conditions. These findings support many traditional medicinal uses that have been preserved in folk medicine for generations.

### **Historical and Cultural Significance**

Beyond their medicinal value, *Ferula* species formed part of the traditional economic and cultural life of communities inhabiting the Caucasus and Central Asia. The collection and trade of medicinal resins contributed to local livelihoods and facilitated the transmission of ethnobotanical knowledge across regions.

The long-standing use of *Ferula* species demonstrates the close relationship between people and their natural environment and highlights the importance of medicinal plants in preserving cultural traditions. Consequently, *Ferula* represents an important element of the ethnobotanical heritage of Azerbaijani and Central Asian Turkic peoples.

## **7 *Artemisia* spp. (Wormwood) Botanical and Ethnobotanical Background**

*Artemisia* species, commonly known as wormwood, represent a large group of medicinal plants belonging to the Asteraceae family. These plants are widely distributed throughout the arid and semi-arid regions of Eurasia, including the Caucasus and Central Asia. Several species of *Artemisia* occur naturally in these regions and have long occupied an important place in the traditional medical practices of Turkic peoples (Abad et al., 2012).

Among the various species, *Artemisia absinthium* (bitter wormwood) is one of the best-known medicinal plants. Historical and ethnographic evidence indicates that wormwood has been used for centuries in traditional medicine for the treatment of digestive disorders, parasitic infections, fever,

and inflammatory conditions. Due to its strong biological activity, the plant was also regarded as a tonic and general health-promoting remedy.

Among Azerbaijani and Central Asian communities, knowledge concerning the collection and medicinal use of wormwood has been transmitted through generations as part of traditional ecological knowledge. Herbal infusions and decoctions prepared from the aerial parts of the plant were commonly used in folk medicine and occupied an important place in local healing traditions.

### **Chemical Composition and Pharmacological Properties**

The biological activity of *Artemisia* species is associated with their essential oils and numerous bioactive compounds, including artemisinin, flavonoids, and terpenoids. These constituents have been reported to possess antimicrobial, antiparasitic, antioxidant, and anti-inflammatory properties (Abad et al., 2012).

Particularly, artemisinin and its derivatives have attracted considerable scientific attention because of their well-established antimalarial activity. Modern pharmacological studies have also demonstrated antimicrobial effects against a variety of pathogenic microorganisms. These findings support many traditional applications of wormwood and illustrate the relationship between historical medicinal knowledge and contemporary scientific research.

### **Cultural Significance**

Beyond its medicinal value, wormwood has occupied an important place in the traditional culture of many Eurasian communities. In several Turkic traditions, aromatic plants belonging to the *Artemisia* genus were associated with protection, purification, and household well-being. Such practices demonstrate the close connection between medicinal plants, folk beliefs, and everyday life.

The long-standing use of *Artemisia* species in both medicine and cultural traditions highlights their significance within the ethnobotanical heritage of Azerbaijani and Central Asian Turkic peoples.

## **8 *Rosa damascena* Mill. (Rose)**

### **Botanical and Historical Background**

*Rosa damascena* Mill., commonly known as the Damask rose, is one of the most culturally significant medicinal and aromatic plants of the Near East, the Caucasus, and Central Asia. Historical evidence indicates that roses have been cultivated for several millennia and occupied an important place in the cultural, medical, and economic life of numerous civilizations. The cultivation of roses was particularly widespread in Persia and the South Caucasus, including present-day Azerbaijan, from where rose-related traditions spread to neighboring regions (Kovaleva, 1972).

Ancient authors and physicians frequently mentioned the medicinal value of roses. Classical scholars such as Dioscorides and Galen described rose-based preparations for digestive disorders, skin diseases, and inflammatory conditions. During the medieval period, roses became an important component of medical practice throughout the Islamic world (Ishaq ibn Husayn, 2011).

### **Traditional and Ethnomedicinal Uses**

Among Azerbaijani and Central Asian Turkic peoples, roses have traditionally been used in both medicine and everyday life. Rose petals, rose water, rose oil, syrups, jams, and *gulqand* were commonly prepared and employed as therapeutic as well as preventive remedies (Damirov et al., 1988; Lambarani, 1998).

Traditional medicine attributes antiseptic, calming, and anti-inflammatory properties to rose preparations. Decoctions prepared from rose petals were commonly used for oral health, skin care, and digestive complaints, while rose oil was applied externally for headaches, joint pain, and wound treatment.

### **Historical Medical Traditions**

The medicinal importance of roses received particular attention in the works of medieval physicians. Avicenna (Ibn Sina) described rose petals as possessing astringent, anti-inflammatory, and soothing properties and recommended rose-based preparations for headaches, eye diseases, digestive disorders, and skin conditions (Avicenna, 2005). These recommendations influenced medical traditions throughout the Caucasus and Central Asia and contributed to the preservation of rose-based remedies in local folk medicine.

Chemical Composition and Pharmacological Properties

Rose petals contain essential oils, flavonoids, phenolic compounds, and other biologically active substances associated with antioxidant, antimicrobial, and anti-inflammatory activities. Modern pharmacological studies have confirmed several medicinal properties traditionally attributed to rose preparations, demonstrating the relationship between historical medical knowledge and contemporary scientific research.

The continued use of roses in folk medicine, culinary traditions, and cultural practices illustrates their enduring significance within the ethnobotanical heritage of Azerbaijani and Central Asian Turkic peoples.

Table 1. Ethnobotanical characteristics, major bioactive compounds, and reported pharmacological activities of *Ferula* spp.

| lant species       | Traditional medicinal uses                                                                                                                  | Ethnobotanical significance                                                                                       | Major bioactive compounds                                                            | Reported pharmacological activities                                                |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <i>Ferula</i> spp. | Treatment of digestive disorders, respiratory ailments, intestinal cramps, and infectious diseases; widely used as an antimicrobial remedy. | One of the most important medicinal plant genera in Turkic ethnomedicine and traditional Central Asian medicine.. | Sesquiterpene coumarins, sulfur-containing compounds, terpenoids, and volatile oils. | Antimicrobial, antioxidant, anti-inflammatory, antispasmodic, and gastroprotective |

**Note.** Information presented in this table is summarized from ethnobotanical, phytochemical, and pharmacological studies reviewed in this article

The integrated ethnobotanical roles of *Ferula* spp., encompassing medicinal, cultural, ritual, culinary, and economic dimensions, are illustrated in Figure 1. This overview highlights the multifunctional importance of *Ferula* species in traditional Turkic and Central Asian societies.

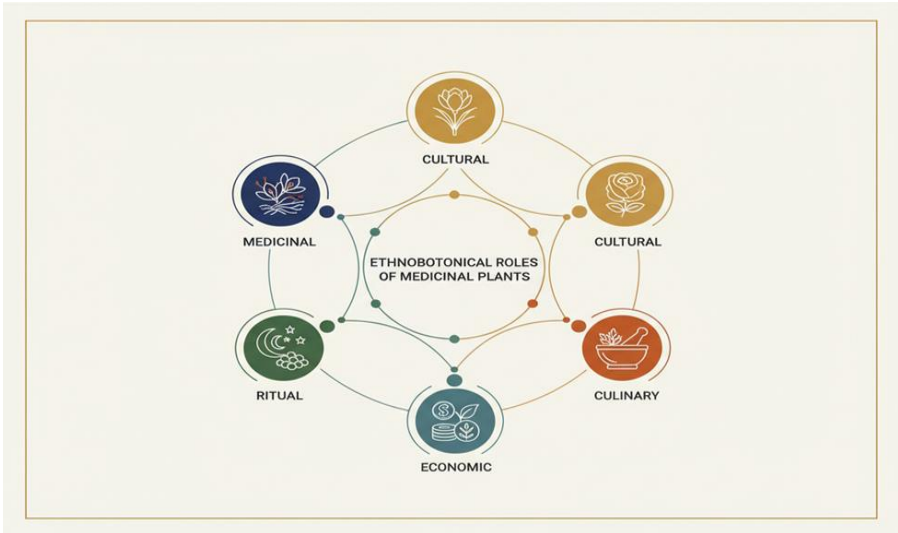


Figure 1. Schematic representation of the ethnobotanical roles of *Ferula* spp., illustrating their medicinal, ritual, culinary, cultural, and economic significance in traditional Turkic and Central Asian societies

## Discussion

The findings of this study demonstrate that medicinal plants occupy an important place in the historical and ethnobotanical heritage of Azerbaijani and Central Asian Turkic peoples. For centuries, local communities have relied on plant-based remedies not only for the treatment of diseases but also as an integral component of their cultural practices, traditional knowledge systems, and everyday life.

The examined species – *Crocus sativus*, *Rosa damascena*, *Nigella sativa*, *Hypericum perforatum*, *Glycyrrhiza glabra*, *Peganum harmala*, and *Artemisia* spp. – illustrate the diversity of medicinal plants used throughout the Caucasus and Central Asia. Despite differences in ecological conditions and local traditions, many similarities can be observed in the ways these plants were cultivated, prepared, and applied for therapeutic purposes. Such similarities indicate the existence of long-standing cultural interactions and shared ethnomedical traditions among Turkic communities.

Historical evidence suggests that medicinal plant knowledge developed through a combination of practical experience, environmental adaptation, and cultural exchange. Trade routes linking the Caucasus, Persia, Anatolia, and Central Asia facilitated not only the movement of goods but also the transmission of medical knowledge and healing practices. As a result, many medicinal plants became common elements of regional healthcare traditions and cultural life.

The study also highlights the importance of written medical traditions in preserving ethnobotanical knowledge. The works of medieval scholars, particularly Avicenna (Ibn Sina), played a significant role in documenting the medicinal properties of plants and contributed to the dissemination of medical knowledge throughout the Islamic world. Many remedies described in historical medical texts continued to be preserved in local folk medicine and remain known among communities today.

Another important finding concerns the close relationship between traditional ethnobotanical knowledge and contemporary scientific research. Modern pharmacological investigations have confirmed many therapeutic properties traditionally attributed to medicinal plants, including the anti-inflammatory, antimicrobial, antioxidant, and neuroprotective effects of various plant-derived compounds. This correspondence demonstrates the scientific value of traditional knowledge accumulated over generations.

Beyond their medicinal applications, several plants examined in this study possess important cultural and symbolic meanings. *Peganum harmala*, for example, remains associated with protective rituals and folk beliefs, while saffron and roses continue to occupy an important place in culinary traditions, handicrafts, and cultural identity. These examples illustrate that medicinal plants should be understood not merely as therapeutic resources but also as components of intangible cultural heritage.

The growing global interest in natural products and traditional medicine further emphasizes the importance of documenting and preserving ethnobotanical knowledge. As processes of modernization and globalization increasingly affect traditional lifestyles, valuable knowledge concerning medicinal plants risks being lost. Consequently, ethnobotanical research serves not only scientific purposes but also contributes to the preservation of cultural memory and historical heritage.

Overall, the integration of historical, ethnobotanical, and pharmacological perspectives provides a more comprehensive understanding of medicinal plant use among Azerbaijani and Central Asian Turkic peoples. The preservation and further study of this knowledge may contribute both to cultural heritage research and to the future development of plant-based therapeutic resources.

## Conclusion

The present study demonstrates that medicinal plants constitute an important component of the historical and ethnobotanical heritage of Azerbaijani and Central Asian Turkic peoples. The examined species - *Crocus sativus*, *Rosa damascena*, *Nigella sativa*, *Hypericum perforatum*, *Glycyrrhiza glabra*, *Peganum harmala*, and *Artemisia* spp. - reflect centuries of accumulated traditional knowledge concerning the use of natural resources for healthcare, cultural practices, and everyday life.

The findings indicate that both wild and cultivated medicinal plants have played significant roles in the development of local healing traditions. Wild-growing species such as *Artemisia* spp., *Peganum harmala*, and *Hypericum perforatum* have long been collected from natural environments and incorporated into folk medicine, while cultivated plants including saffron, black cumin, and roses became closely associated with agricultural traditions, trade networks, and cultural identity.

The study further reveals that ethnobotanical knowledge among Turkic communities developed through a combination of practical experience, environmental adaptation, cultural interaction, and the influence of historical medical traditions. The preservation of medicinal plant knowledge through oral transmission, folk medicine, and written medical sources contributed to the continuity of traditional healthcare practices across generations.

Particular attention should be given to the cultural significance of medicinal plants. Several species examined in this study continue to play important roles in rituals, culinary traditions, handicrafts, and local belief systems, demonstrating that their value extends beyond therapeutic applications. Consequently, medicinal plants should be regarded not only as natural remedies but also as elements of intangible cultural heritage.

The correspondence between traditional medicinal practices and contemporary scientific research further emphasizes the value of ethnobotanical knowledge. Modern studies have confirmed many biological activities traditionally attributed to medicinal plants, highlighting the importance of preserving and documenting this knowledge for future generations.

In conclusion, the ethnobotanical heritage of Azerbaijani and Central Asian Turkic peoples represents a valuable source for understanding historical healthcare systems, cultural interactions, and traditional ecological knowledge. Continued research in this field will contribute both to the preservation of cultural heritage and to the broader understanding of the relationship between humans, plants, and traditional medicine.

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## **ӘЗЕРБАЙЖАН МЕН ОРТАЛЫҚ АЗИЯДАҒЫ ТҮРКІ ХАЛЫҚТАРЫНЫҢ ЭТНОБОТАНИКАЛЫҚ МҰРАСЫ: ДӘСТҮРЛІ ЕМДІК ӨСІМДІКТЕР ЖӘНЕ ОЛАРДЫ ПАЙДАЛАНУ**

**Аңдатпа.** Этноботаникалық білім көптеген қоғамдардың тарихи және мәдени мұрасының маңызды құрамдас бөлігі болып табылады және адам мен табиғи орта арасындағы ұзақ мерзімді өзара байланысты көрсетеді. Әзербайжан және Орталық Азия түркі халықтарының арасында дәрілік өсімдіктер ғасырлар бойы дәстүрлі денсаулық сақтау жүйелерінде, күнделікті өмірде және мәдени тәжірибелерде маңызды орын алып келді. Бұл білім ауызша дәстүрлер, халық медицинасы және жазбаша медициналық дереккөздер арқылы ұрпақтан ұрпаққа беріліп, аталған қауымдардың этномәдени бірегейлігінің ажырамас бөлігіне айналды. Осы зерттеу Әзербайжан және Орталық Азия түркі халықтары дәстүрлі түрде пайдаланатын тандап алынған дәрілік өсімдіктерді, соның ішінде *Artemisia* spp., *Ferula* spp., *Peganum harmala*, *Hypericum perforatum*, *Crocus sativus*, *Nigella sativa* және *Rosa damascena* түрлерін қарастырады. Этноботаникалық, тарихи және салыстырмалы дереккөздерге сүйене отырып, зерттеу олардың дәстүрлі қолданылуын, дайындау тәсілдерін, мәдени маңызын және жергілікті медициналық дәстүрлердегі орнын талдайды.

Зерттеу нәтижелері бұл дәрілік өсімдіктердің ас қорыту жүйесінің бұзылыстары, қабыну аурулары және тері аурулары сияқты түрлі сырқаттарды емдеуде ғана емес, сонымен қатар дәстүрлі экологиялық білім мен мәдени тәжірибелерді сақтауда да маңызды рөл атқарғанын көрсетеді. Тарихи деректер мен этнографиялық мәліметтер Кавказ бен Орталық Азиядағы түркі қауымдары арасында дәрілік өсімдіктерді пайдалануда елеулі ұқсастықтардың бар екенін көрсетеді, бұл ортақ мәдени дәстүрлердің сабақтастығын дәлелдейді.

Зерттеу қорытындысы бойынша, Әзербайжан және Орталық Азия түркі халықтарының этноботаникалық мұрасы тарихи денсаулық сақтау тәжірибелерін, мәдени өзара ықпалдастықтарды және дәстүрлі экологиялық білімді түсіну үшін құнды дереккөз болып табылады. Осы мұраны құжаттау мен талдау мәдени жадыны сақтауға, сондай-ақ дәрілік өсімдіктер мен дәстүрлі медицина саласындағы заманауи зерттеулердің дамуына үлес қосады.

**Түйін сөздер:** этноботаника, дәстүрлі медицина, мәдени мұра, түркі халықтары, Әзербайжан, Орталық Азия.

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## **ЭТНОБОТАНИЧЕСКОЕ НАСЛЕДИЕ АЗЕРБАЙДЖАНСКОГО И ТЮРКСКИХ НАРОДОВ ЦЕНТРАЛЬНОЙ АЗИИ: ТРАДИЦИОННЫЕ ЛЕКАРСТВЕННЫЕ РАСТЕНИЯ И ИХ ИСПОЛЬЗОВАНИЕ**

**Аннотация.** Этноботанические знания представляют собой важный элемент исторического и культурного наследия многих обществ, отражая многовековое взаимодействие человека с природной средой. Среди азербайджанского и центральноазиатских тюркских народов лекарственные растения на протяжении веков занимали значительное место в системах традиционного здравоохранения, повседневной жизни и культурных практиках. Эти знания передавались из поколения в поколение посредством устных традиций, народной медицины и письменных медицинских источников, формируя важную составляющую этнокультурной идентичности данных сообществ.

В настоящем исследовании рассматриваются отдельные лекарственные растения, традиционно используемые азербайджанским и центральноазиатскими тюркскими народами, включая *Artemisia* spp., *Ferula* spp., *Peganum harmala*, *Hypericum perforatum*, *Crocus sativus*,

*Nigella sativa* и *Rosa damascena*. На основе этноботанических, исторических и сравнительных источников анализируются их традиционные способы применения, методы приготовления, культурное значение и место в местных медицинских традициях.

Полученные результаты показывают, что данные лекарственные растения играли важную роль не только в лечении различных заболеваний, таких как расстройства пищеварения, воспалительные заболевания и кожные болезни, но и в сохранении традиционных экологических знаний и культурных практик. Исторические документы и этнографические данные свидетельствуют о значительном сходстве в использовании лекарственных растений среди тюркских сообществ Кавказа и Центральной Азии, что указывает на преемственность общих культурных традиций.

В заключение отмечается, что этноботаническое наследие азербайджанского и центральноазиатских тюркских народов представляет собой ценный источник для изучения исторических практик здравоохранения, культурных взаимодействий и традиционных экологических знаний. Документирование и анализ данного наследия способствуют как сохранению культурной памяти, так и развитию современных исследований лекарственных растений и традиционной медицины.

**Ключевые слова:** этноботаника, традиционная медицина, культурное наследие, тюркские народы, Азербайджан, Центральная Азия.

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