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# Medicinal herbs in Albania: A treasure that we should preserve

Orjon Rroji [1, *] and Admir Jançe [2]

[1] *Public Health Research Center, Faculty of Medical Technical Science, European University of Tirana (UET), Tirana, Albania.*
[2] *Department of Imaging, Faculty of Medical Technical Science, European University of Tirana (UET), Tirana, Albania.*

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## Abstract

The aim of the present review is to highlight the significance and therapeutic benefits of medicinal herbs used for medical purposes. A comprehensive literature search was conducted using major scientific databases, including Scopus, PubMed, ScienceDirect, and Google Scholar, to identify relevant published studies. The therapeutics effects of *Salvia officinalis*, *Papaver rhoeas*, *Hypericum perforatum*, *Oleum olivarum*, *Spartium junceum*, honey *(Mel)* and *Propolis* have been described in this review. We summarized the therapeutic effects of each medicinal herb described and we could say that *Salvia officinalis* has anti-inflammatory activity, antioxidant properties, antimicrobial effects, neuroprotective potential and antitumoral activity. *Papaver rhoeas*, has antioxidant activity, anti-inflammatory effects, analgesic properties, cytoprotective effects and antimicrobial activity. *Oleum olivarum,* has cardioprotective effects, antioxidant activity, anti-inflammatory properties, metabolic benefits, neuroprotective effects and wound healing and skin protection. Honey *(Mel)* has antibacterial activity, wound healing promotion, anti-inflammatory effects, antioxidant properties, and immunomodulatory effects. *Hypericum perforatum* has anti-inflammatory effects, antimicrobial properties, wound healing, and antioxidant activity. *Propolis* has antimicrobial activity, antioxidant properties, anti-inflammatory effects, wound healing and immunomodulatory effects. *Spartium junceum* has anti-inflammatory activity, antioxidant effects, wound healing support, and antimicrobial effects. All these in combination with each other form the Bastari ointment, a traditional folk medicine used in Tirana Highlands to heal various wound types.

**Keywords:** Medicinal Herbs; Albania; *Salvia Officinalis*; *Papaver Rhoeas*; *Hypericum Perforatum*; *Oleum Olivarum; Spartium Junceum*; Honey *(Mel)* and *Propolis*

## 1. Introduction

The World Health Organization (WHO) defines medicinal plants as those that contain bioactive compounds which can be utilized for therapeutic purposes or serve as precursors in the synthesis of pharmacologically active drugs. These plants are widely employed within traditional medicine systems and also serve as important sources of active ingredients for modern pharmaceutical development. Since ancient times, all cultures have relied on plants as sources of medicinal remedies. The World Health Organization (WHO) estimates that up to 80% of the global population depends on traditional medicine to meet their primary healthcare needs. A significant proportion of traditional therapeutic practices involve the use of plant extracts or their bioactive constituents (1). The therapeutic efficacy of medicinal plants from the Balkan region in promoting wound healing, as documented in traditional medical practices, has been corroborated by a growing body of scientific evidence. The unique geographical and ecological conditions of the Balkan Peninsula have fostered an exceptional diversity of medicinal plant species, further underscoring the region's significance as a valuable source of bioactive compounds (2). In the traditional cultures of the Balkan peoples, including Albania, the region's diverse flora holds considerable medical, economic, and anthropological significance. This importance is evidenced by the extensive body of knowledge concerning the diversity of plant species and their various

* Corresponding author: Orjon Rroji

therapeutic and practical applications (3). The knowledge and awareness of medicinal plant use has emerged from centuries of efforts to combat diseases, during which humanity learned to harness therapeutic compounds derived from barks, seeds, fruiting bodies, and other plant parts (4). Compounds derived from natural products can function either as direct therapeutic agents for wound healing or as drug delivery carriers for transporting other active pharmaceutical substances (5). Traditional practices and ethnobotanical knowledge, as documented in several herbal manuscripts, can serve as a foundational pillar for the discovery of novel bioactive natural products aimed at treating various challenging conditions, among them also the skin disorders (2). The Balkan Peninsula and the Mediterranean region are characterized by remarkable plant biodiversity and a rich tradition of folk medicine (2,6), thus it is our duty to preserve it and to pass the knowledge to the next generation. The diversity of the flora and the high degree of endemism are closely linked to the region's geographical position, climatic conditions, and geological composition (2,6,7). The study of Barina & Pifkó (2011) (8) shows some of the phytogeographical areas of the medicinal herbs distributed in Albania. The flora of Albania exhibits close biogeographical connections with the Mediterranean and Southern European Mountain floras. To date, 3,629 plant species have been recorded in the country, representing approximately 30% of Europe's total plant diversity. However, this number is anticipated to grow, as extensive areas — particularly in the northern and southeastern regions — remain insufficiently explored (9). Although the study area is distinguished by its rich floral diversity and significant levels of endemism, a relatively small fraction of the cataloged plant species has been systematically explored and chemically analyzed (10). In this section, we will examine some of the most widely used medicinal herbs in Albania, including *Salvia officinalis*, *Papaver rhoeas*, *Hypericum perforatum*, *Oleum olivarum*, *Spartium junceum*, honey *(Mel)* and *Propolis*.

The aim of the present review is to highlight the significance and therapeutic benefits of medicinal herbs used for medical purposes.

## 2. Material and Methods

A comprehensive literature search was conducted using major scientific databases, including Scopus, PubMed, ScienceDirect, and Google Scholar, to identify relevant published studies.

## 3. Discussion

### 3.1. *Salvia officinalis*

*Salvia officinalis* (Sage) is a species belonging to the Liliaceae (formerly *Labiatae*) family. Although native to the Middle East and Mediterranean regions, it is now cultivated and naturalized in many parts of the world. In traditional medicine, *S. officinalis* has been employed to treat a wide range of ailments (11). Currently, numerous studies have investigated the pharmacological activities of *Salvia officinalis* (L.), demonstrating its potential anti-inflammatory (12), antioxidant, neuroprotective (13), antimicrobial (14), antitumor, and antidiabetic properties (15). *Salvia officinalis*, known as "sage," in Albanian, represents the largest genus within the *Liliaceae* family, comprising approximately 900 species. The aerial parts of *S. officinalis* have a long-standing history of use both in culinary applications and traditional medicine. Valued for its flavoring and aromatic properties, this plant is widely incorporated into a variety of food preparations. In the traditional medicine systems of Asia and Latin America, *S. officinalis* has been utilized to treat a broad spectrum of disorders, including convulsions, ulcers, gout, rheumatism, inflammation, dizziness, tremors, paralysis, diarrhea, and hyperglycemia (14).

The major phytochemical constituents of *Salvia officinalis*, identified in its flowers, leaves, and stems, have been extensively elucidated. This species contains a broad spectrum of bioactive compounds, including alkaloids, carbohydrates, fatty acids, and various glycoside derivatives (e.g., cardiac glycosides, flavonoid glycosides, and saponins). Moreover, it is rich in phenolic constituents such as coumarins, flavonoids, and tannins, as well as polyacetylenes. A diverse range of terpenoids — encompassing monoterpenoids, diterpenoids, triterpenoids, and sesquiterpenoids — alongside waxes, have also been reported. The presence of these compounds underscores the significant pharmacological potential of *S. officinalis* (11).

### 3.2. *Hypericum perforatum*

*Hypericum perforatum*, commonly referred to as balsam flower or St. John's wort, is a widely recognized medicinal plant with an extensive history of traditional use owing to its broad pharmacological profile. It has been traditionally utilized in the management of various dermatological conditions, including burn wound healing, as well as gastrointestinal disorders such as gastric and duodenal ulcers and gallbladder dysfunctions. Additionally, it has been employed in the treatment of inflammatory conditions affecting the bronchial and genitourinary systems, as well as for alleviating

symptoms associated with colds, migraines, and headaches. Beyond these uses, *H. perforatum* has demonstrated hypoglycemic and anti-obesity effects and is well-documented for its efficacy in the treatment of mild to moderate depressive disorders (16). Balsam flower (*Hypericum perforatum*) has a long-standing history of use in folk medicine across various cultures, administered both orally and topically for the treatment of wounds and burns. In a clinical study conducted by Öztürk et al. (2007)(17), it was demonstrated that an oil extract of *H. perforatum* significantly promoted the healing of surgical wounds following cesarean section, an effect attributed to enhanced epithelial reconstruction.

*Hypericum perforatum* is characterized by a diverse and complex phytochemical profile. Its constituents include flavonoids (such as quercetin, quercitrin, rutin, and hyperoside), anthraquinone derivatives (notably naphthodianthrones), prenylated phloroglucinols (e.g., hyperforin), as well as tannins, xanthones, and other phloroglucinol derivatives. Among its key bioactive components are hypericin and pseudohypericin, which contribute significantly to its pharmacological activities (16).

### 3.3. *Papaver rhoeas*

*Papaver rhoeas* L., a species belonging to the *Papaveraceae* family, is traditionally utilized both as a food source and as a medicinal agent for the treatment of various conditions, including inflammation, respiratory disorders, diarrhea, cough, insomnia, asthma, and anxiety. Extracts derived from *P. rhoeas* have been reported to exhibit a broad range of pharmacological activities, such as antioxidant, antimutagenic, cytoprotective, antibacterial, analgesic, and antiulcerogenic effects (18). Numerous international phytochemical investigations have demonstrated that *Papaver rhoeas* harbors a diverse and abundant array of primary and secondary metabolites. Its primary metabolites include essential amino acids and carbohydrates that contribute to their nutritional value, alongside fatty acids and vitamins vital for metabolic processes. The plant is also rich in secondary metabolites such as phenolic compounds—recognized for their potent antioxidant properties—and flavonoids, which exhibit anti-inflammatory, antimicrobial, and cytoprotective effects. Alkaloids present in *P. rhoeas* contribute to its pharmacological activity, including analgesic and antispasmodic properties. Additionally, coumarins and organic acids contribute to its bioactivity by modulating inflammatory responses and supporting cellular metabolism. The essential oils contained within *P. rhoeas* provide aromatic qualities and have demonstrated antimicrobial and antifungal activities. Collectively, these metabolites substantiate the widespread traditional use of *Papaver rhoeas* in both dietary applications and phytotherapeutic remedies (19).

### 3.4. *Oleum olivarum*

*Oleum olivarum,* Virgin olive oil demonstrates significant anti-atherosclerotic potential through multiple mechanisms, including the enhancement of endothelial function by increasing nitric oxide bioavailability, which contributes to vasodilation and improved vascular tone. It also plays a role in maintaining blood pressure homeostasis by modulating the renin-angiotensin system. Furthermore, virgin olive oil preserves lipoprotein function by preventing the oxidation of low-density lipoproteins (LDL), thereby reducing atherogenic risk. Its rich content of bioactive compounds, particularly phenolic antioxidants such as hydroxytyrosol, oleuropein, and tyrosol, confer potent anti-inflammatory effects by downregulating pro-inflammatory cytokines and inhibiting NF-κB signaling pathways. These polyphenols also exert antioxidant effects by scavenging reactive oxygen species and enhancing endogenous antioxidant enzyme activities, thus protecting vascular and other tissues from oxidative stress-induced damage (20).

Clinically, regular consumption of extra virgin olive oil (EVOO) has been associated with reduced incidence of cardiovascular events, improved lipid profiles, and lowered markers of systemic inflammation. In the context of wound healing, EVOO polyphenols have been shown to promote re-epithelialization, collagen synthesis, and angiogenesis, facilitating tissue repair and regeneration. These effects are mediated through modulation of cellular signaling pathways, including upregulation of growth factors and antioxidant defenses at the wound site.

From a biochemical perspective, EVOO is composed primarily of triacylglycerols (~98%), predominantly oleic acid (a monounsaturated fatty acid), along with smaller proportions of saturated and polyunsaturated fatty acids. It also contains mono- and diacylglycerols, phospholipids, and minor constituents such as sterols, tocopherols, and volatile compounds contributing to its nutritional and therapeutic properties (21). The synergistic action of these compounds underpins the wide-ranging health benefits attributed to EVOO, supporting its role in both cardiovascular protection and tissue healing.

### 3.5. *Mel* (honey)

The wound healing properties of honey (*Mel*) are multifactorial, encompassing antibacterial, anti-inflammatory, antioxidant, and tissue-regenerative effects. The antibacterial activity is mediated by several biochemical factors,

including the production of hydrogen peroxide via glucose oxidase, which generates reactive oxygen species (ROS) at low, controlled levels that promote microbial killing without damaging host tissues. Additionally, methylglyoxal, especially prominent in Manuka honey, provides non-peroxide antimicrobial action (22). Honey's acidic pH (~3.2–4.5) further inhibits pathogen proliferation, while its high osmolarity induces osmotic stress on bacterial cells, leading to dehydration and cell death.

On a molecular level, honey modulates several key pathways involved in wound repair. It has been shown to upregulate growth factors such as vascular endothelial growth factors (VEGF) and transforming growth factor-beta (TGF-β), which stimulate angiogenesis and fibroblast proliferation, essential for granulation tissue formation. Honey also promotes the expression of collagen type I and III by activating fibroblasts, facilitating extracellular matrix remodeling critical for wound closure. Concurrently, its antioxidant compounds, including flavonoids and phenolic acids, scavenge excess free radicals, reducing oxidative stress and inflammation at the wound site.

Clinically, numerous randomized controlled trials have demonstrated honey's efficacy in accelerating the healing of acute and chronic wounds, including burns, diabetic foot ulcers, and surgical wounds. A meta-analysis by Jull et al. (2015)(23) reported that honey-treated wounds showed faster healing rates compared to conventional dressings, with reduced infection rates and pain. Moreover, honey dressings have been shown to downregulate pro-inflammatory cytokines such as interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α), thus modulating the inflammatory phase of wound healing and preventing chronic inflammation.

Furthermore, honey's mineral content, particularly zinc and copper, plays an essential role as cofactors for enzymes such as matrix metalloproteinases (MMPs) and superoxide dismutase (SOD), which regulate extracellular matrix turnover and mitigate oxidative damage, respectively. The amino acid proline in honey serves as a precursor for collagen synthesis, reinforcing tissue integrity. Vitamins represent a minor yet significant fraction of honey's composition, predominantly comprising water-soluble vitamins such as thiamine (B1), riboflavin (B2), pyridoxine (B6), p-aminobenzoic acid, folic acid (B9), and pantothenic acid (B5), alongside fat-soluble vitamins A, C, and E. Additionally, honey is a source of essential minerals including phosphorus, potassium, calcium, magnesium, sulfur, iron, copper, manganese, and zinc, which play critical roles in enzymatic functions and cellular metabolism relevant to tissue repair and antioxidant defense mechanisms (24).

In summary, the complex interplay of honey's biochemical constituents and its modulation of cellular signaling pathways underpin its well-documented clinical benefits in wound management, supporting its continued use as a bioactive dressing in modern therapeutic practice.

### 3.6. *Propolis*

*Propolis*, a resinous substance collected by honeybees from plant exudates, has been extensively employed in both traditional and modern medicine due to its diverse pharmacological properties. Its complex chemical composition varies depending on geographic origin and botanical sources but generally includes a rich mixture of bioactive compounds such as flavonoids (e.g., pinocembrin, chrysin, galanin), phenolic acids and their esters (e.g., caffeic acid phenethyl ester [CAPE]), terpenoids, aromatic acids, and various volatile oils (25).

The antimicrobial activity of propolis is primarily attributed to its flavonoid and phenolic acid content, which disrupts bacterial cell walls and membranes, inhibits bacterial enzyme activity, and interferes with nucleic acid synthesis. Its antiviral properties involve the inhibition of viral replication and attachment to host cells, as well as modulation of immune responses to viral infections. Antifungal effects result from membrane disruption and inhibition of fungal growth (25).

*Propolis* exerts potent anti-inflammatory effects by downregulating pro-inflammatory mediators such as cyclooxygenase-2 (COX-2), inducible nitric oxide synthase (INOS), and nuclear factor-kappa B (NF-KB) pathways, thereby reducing cytokine production including tumor necrosis factor-alpha (TNF-α) and interleukins (IL-1β, IL-6). Its antioxidant activity stems from its ability to scavenge reactive oxygen species (ROS) and enhance endogenous antioxidant defenses, protecting cells from oxidative stress-induced damage (25). Furthermore, *propolis* exhibits antitumor properties through the induction of apoptosis, cell cycle arrest, and inhibition of angiogenesis in various cancer cell lines. Its immunomodulatory effects involve enhancing macrophage activation, stimulating lymphocyte proliferation, and modulating cytokine profiles to balance immune responses. Collectively, these multifaceted mechanisms underscore *propolis'* therapeutic potential in treating infections, inflammatory conditions, oxidative stress-related diseases, and cancer, making it a valuable natural product in both pharmaceutical and nutraceutical applications (25).

### 3.7. *Spartium junceum*

*Spartium junceum* L. contains cellulose, a biocompatible and biodegradable polymer with significant utility across biomedical applications. Cellulose derived from *S. junceum* is employed in the fabrication of scaffolds for tissue engineering, wound dressings, artificial tissues and skin substitutes, as well as in controlled drug delivery systems, blood purification devices, and cell culture matrices (26).

Cellulose is a naturally occurring polysaccharide composed of β(1→4) linked D-glucose units, forming a linear polymer characterized by extensive hydrogen bonding within and between chains. This molecular architecture confers remarkable mechanical strength, chemical stability, and hydrophilicity, making cellulose an ideal biomaterial for various biomedical applications. Its biocompatibility ensures minimal immunogenicity and toxicity when interfaced with human tissues, while its biodegradability allows for gradual breakdown and integration within biological environments without eliciting adverse effects (26).

The porous structure of cellulose-based materials facilitates efficient oxygen and nutrient diffusion, supporting cell adhesion, proliferation, and differentiation, which are critical for tissue engineering scaffolds. Additionally, cellulose's capacity to retain moisture contributes to maintaining a hydrated wound environment, promoting faster and more effective wound healing. Its surface chemistry allows for facile chemical modification, enabling functionalization with bioactive molecules such as growth factors, antimicrobial agents, or drugs, thereby enhancing its therapeutic efficacy (26).

In drug delivery, cellulose derivatives can form hydrogels or nano/microparticles capable of controlled and sustained release profiles, improving pharmacokinetics and patient compliance. Furthermore, cellulose's compatibility with blood components makes it suitable for applications in blood purification and dialysis membranes. These combined physicochemical and biological properties underpin cellulose's widespread use in regenerative medicine, wound care, and controlled drug delivery systems (26).

### 3.8. In Tirana Highlands there is a traditional folk medicine called Bastari Ointment

Bastari Ointment is a traditional medicinal formulation that has been employed in the Tirana Highlands since World War I. This ointment comprises a complex blend of various medicinal plants alongside animal-derived components, resulting in a bioactive preparation with therapeutic efficacy. The wound-healing properties attributed to the medicinal plants of the Balkan region, as utilized in Bastari Ointment, are supported by a growing body of scientific literature validating their pharmacological potential and clinical relevance (27).

Bastari ointment is traditionally employed in the management and healing of various wound types, including infected wounds, burns, and deep tissue injuries, where it facilitates tissue regeneration and repair. Bioactive compounds derived from natural products, such as those present in Bastari ointment, can function either as direct therapeutic agents promoting wound healing or as carriers for the targeted delivery of other pharmacologically active compounds, thereby enhancing treatment efficacy (5,27). Indeed, the study conducted by Rroji & Kabili (2025)(27) concluded that the therapeutic efficacy of Bastari Ointment is closely linked to its ability to create a favorable biochemical microenvironment that actively supports and enhances the wound healing process.

## 4. Conclusion

Medicinal herbs remain readily accessible, with numerous studies substantiating their therapeutic applications and health benefits. Within the traditional cultures of the Balkan peoples, including Albania, the region's diverse flora holds substantial medical, economic, and anthropological significance. This is reflected in the extensive ethnobotanical knowledge concerning plant species diversity and their multifaceted therapeutic and utilitarian uses.

Bioactive compounds derived from natural products may act either as direct agents facilitating wound healing or as carriers for targeted delivery of other pharmacologically active substances. Traditional practices and ethnobotanical knowledge preserved in historical herbal manuscripts provide a foundational framework for the identification and development of novel bioactive natural compounds, with promise for the treatment of complex conditions, including dermatological disorders.

## Compliance with ethical standards

*Disclosure of conflict of interest*

The authors declare no conflict of interest.

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