


## Review of Medicinal Plants Effective in Skin Wound Healing in Western Iran Based on Ethnobotanical Evidence

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Article Info	ABSTRACT
<b>Article type:</b> Review Article	<b>Objective:</b> The skin acts as a barrier between the human body and the external environment, protecting the body from chemical and physical factors. Despite significant advances in wound treatment, wound healing remains a major challenge. This study reviews medicinal plants documented in ethnobotanical knowledge from western Iran that are used for skin wound healing.
<b>Article History:</b> Received: 07 March 2024 Revised: 07 March 2024 Accepted: 23 April 2024 Published Online: 01 July 2024	<b>Methods:</b> The review study employed keywords related to medicinal plants, wound healing, skin wounds, and the regions of Western Azerbaijan, Eastern Azerbaijan, Kurdistan, Kermanshah, Ilam, Khuzestan, and ethnobotany to search for relevant articles. Databases reviewed included Google Scholar, SID, MagaIran, PubMed, and Scopus. Ethnobotanical articles pertinent to the review were utilized.
 <b>Correspondence to:</b> MohamadReza Nazer	<b>Results:</b> The findings indicate that medicinal plants such as <i>Sisymbrium sophia</i> L., <i>Fumaria officinalis</i> L., <i>Plantago major</i> L., <i>Alcea</i> sp., <i>Urtica</i> sp., <i>Astragalus gossypinus</i> Fischer., <i>Mperata cylindrica</i> (L.), <i>Polygonum aviculare</i> L., <i>Sanguisorba minor</i> Scop., <i>Alcea angulata</i> , <i>Aristolochia olivieri</i> , <i>Calendula persica</i> , <i>Citrullus colocynthis</i> , <i>Fumaria parviflora</i> , <i>Nerium oleander</i> , <i>Scrophularia striata</i> , <i>Allium schoenoprasum</i> , <i>Ixiolirion tataricum</i> , <i>Thymus kotchyanous</i> , <i>Adonis aestivalis</i> , <i>Cardaria draba</i> , <i>Althaea officinalis</i> , <i>Beta vulgaris</i> , <i>Carthamus tinctorius</i> L., <i>Chrysanthemum coronarium</i> , <i>Helianthus annuus</i> L., <i>Matricaria recutita</i> L., and <i>Vicia sativa</i> are among the medicinal plants effective in wound healing in these regions.
<b>Email:</b> <a href="mailto:nazer@med.mui.ac.ir">nazer@med.mui.ac.ir</a>	<b>Conclusion:</b> Medicinal plants, rich in antioxidant compounds and secondary metabolites like tannins, anthocyanins, and flavonoids, offer a promising and often benign alternative to synthetic drugs for wound management. Given their historical use in wound healing, these botanicals warrant further investigation to elucidate their underlying mechanisms of action and to develop novel therapeutic interventions.
	<b>Keywords:</b> Skin, wound healing, medicinal plants, treatment, Iran
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### Introduction

Wound healing is a dynamic process involving intricate cellular interactions to restore damaged tissue. The initial inflammatory phase is characterized by cellular activation and the synthesis of essential repair proteins [1]. Subsequent phases encompass angiogenesis, tissue regeneration, and eventual scar formation [1]. The complexity of these processes, influenced by individual

physiological variations, often necessitates specialized care to optimize wound healing outcomes [2].

Traditional medicine, ethnopharmacology, and ethnobotany offer a rich tapestry of knowledge regarding wound healing [3]. Leveraging centuries of empirical observation, these disciplines have identified various medicinal plants with anti-inflammatory and

antimicrobial properties [4]. Topical applications of plant-based ointments and extracts have been traditionally used to promote wound healing and prevent infection [5]. Given their historical efficacy and favorable safety profiles, medicinal plants represent a valuable resource for contemporary wound care strategies [6].

Ethnobotany explores the intricate relationship between humans and plants, encompassing diverse applications such as medicine, food, and cultural practices [7]. By documenting and analyzing indigenous knowledge, ethnobotany offers invaluable insights into the therapeutic potential of plants [7]. This discipline plays a pivotal role in preserving and transmitting traditional wisdom, facilitating the discovery of novel bioactive compounds, and fostering a deeper understanding of the complex interactions between humans and the natural world [8]. The aim of this study is to review medicinal plants documented in the ethnobotanical knowledge of western Iran that are used for skin wound healing.

## Materials and methods

A comprehensive literature search was conducted using the keywords "medicinal plants," "wound healing," "skin wounds," "West Azerbaijan," "East Azerbaijan," "Kurdistan," "Kermanshah," "Ilam," "Khuzestan," and "ethnobotany" within the Google Scholar, SID, Magiran, PubMed, and Scopus databases. Relevant ethnobotanical studies were included in the review process.

## Results

According to the results, it was determined that medicinal plants such as Kakhshir, Shah Tereh, Barhang, Khatmi, Gosneh, Gon Panbeh-I, Gandomak, Afl-e Haft Band, Toot-e Robahi, Zaravand, Hamishah Bahar-e Irani, Hendavaneh-e Abu Jahl, Kharzahr, Gol-e Mimosini-Sazoui, Piazhcheh Kohi, Khiarak, Cheshm-e Khorus-e Tabestan, Azmak, Choghondar, Golrang, Davoodi, Aftabgardaan, and Avishan are recognized as wound-healing medicinal plants in these regions. Further details regarding local names, plant families, used parts, and the regions where these plants are utilized as wound-healing medicinal plants are provided in Table 1.

**Table 1.** Indigenous Medicinal Plants of Iran Effective for Skin Wound Healing According to Ethnobotanical Records

Scientific name	Local name	Herbal name	Plant Parts Used	Region
<i>Sisymbrium sophia</i> L.	Khakeshir	Brassicaceae	Seed	Meshkinshahr, Ardabil [9]
<i>Fumaria officinalis</i> L.	Shahtareh	Papaveraceae	Aerial parts	Meshkinshahr, Ardabil [9]
<i>Plantago major</i> L.	Barhang	Plantaginaceae	Seed, Leaf	Meshkinshahr, Ardabil [9]
<i>Alcea</i> sp.	Khatmi	Malvaceae	Flower	Urmia, West Azerbaijan [10]
<i>Urtica</i> sp.	Gazaneh	Urticaceae	Aerial parts	Urmia, West Azerbaijan [10]
<i>Astragalus gossypinus</i> Fischer.	Gavan panbei	Fabaceae	Root	Behbahan, Khuzestan [11]
<i>Fumaria officinalis</i>	Shahtareh	Papavaraceae	Aerial parts	Behbahan, Khuzestan [11]
<i>Mperata cylindrica</i> (L.)	Gandomak	Poaceae	Root	Behbahan, Khuzestan [11]
<i>Polygonum aviculare</i> L.	Alafe haftband	Polygonaceae	Aerial parts	Behbahan, Khuzestan [11]
<i>Sanguisorba minor</i> Scop.	Tout robahi	Rosaceae	Aerial parts	Behbahan, Khuzestan [11]
<i>Alcea angulata</i>	Khatmi	Malvaceae	Root	Dehloran and Abadan, Ilam [12]
<i>Aristolochia olivieri</i> Collegno in Boiss.	Zaravand	Aristolochiaceae	Flower, Leaf	Dehloran and Abadan, Ilam [12]

<i>Calendula persica</i> C. A. Mey.	<i>Hamisheh baharirani</i>	<i>Asteraceae</i>	Flower	Dehloran and Abdanan, Ilam [12]
<i>Citrullus colocynthis</i> (L.) Schrad.	<i>Hendavaneh Aboujahl</i>	<i>Cucurbitaceae</i>	Fruit	Dehloran and Abdanan, Ilam [12]
<i>Fumaria parviflora</i> Lam.	<i>Shahtareh</i>	<i>Fumariaceae</i>	Flower, Leaf	Dehloran and Abdanan, Ilam [12]
<i>Nerium oleander</i> L.	<i>Kharzahreh</i>	<i>Apocynaceae</i>	Leaf, Flower	Dehloran and Abdanan, Ilam [12]
<i>Scrophularia striata</i> Boiss.	<i>Gole meimonisazouei</i>	<i>Scrophulariaceae</i>	Aerial parts	Dehloran and Abdanan, Ilam [12]
<i>Allium schoenoprasum</i>	<i>Piazche kouhi</i>	<i>Alliaceae</i>	Leaf	Sarein, East Azerbaijan [13]
<i>Ixiolirion tataricum</i>	<i>Khiaarak</i>	<i>Amarilidaceae</i>	Flower, Leaf	Sarein, East Azerbaijan [13]
<i>Thymus Kotchyanous</i>	<i>Avishan kouhi</i>	<i>Lamiaceae</i>	Leaf, Flower	Sarein, East Azerbaijan [13]
<i>Adonis aestivalis</i>	<i>Cheshkhorous tabestaneh</i>	<i>Ranunculaceae</i>	Leaf, Flower	Saqgez, Kurdistan [14]
<i>Cardaria draba</i>	<i>Azmak</i>	<i>Cruciferaeae</i>	Aerial parts	Saqgez, Kurdistan [14]
<i>Althaea officinalis</i>	<i>Gole khatmi</i>	<i>Malvaceae</i>	Flower	Silvanaya Urmia, West Azerbaijan [15]
<i>Beta vulgaris</i> L.	<i>Choghondar</i>	<i>Amaranthaceae</i>	Leaf	East of Khuzestan, Khuzestan [16]
<i>Carthamus tinctorius</i> L.	<i>Golrang</i>	<i>Asteraceae</i>	Flower	East of Khuzestan, Khuzestan [16]
<i>Chrysanthemum coronarium</i> L.	<i>davoudi</i>	<i>Asteraceae</i>	Leaf, Flower	East of Khuzestan, Khuzestan [16]
<i>Helianthus annus</i> L.	<i>Aftabgardan</i>	<i>Asteraceae</i>	Seed, Leaf	East of Khuzestan, Khuzestan [16]
<i>Matricaria recutita</i> L.	<i>Babouneh</i>	<i>Asteraceae</i>	Flower	East of Khuzestan, Khuzestan [16]
<i>Vicia sativa</i>	<i>Mashak</i>	<i>Fabaceae</i>	Leaf, Flower	Ajab Shir, East Azerbaijan [17]

Based on the results of the table, various regions of Iran have been mentioned for the collection of plants. This geographical distribution helps us assess the frequency of plant species in each region. Accordingly, Ardabil has 3 plants, West Azerbaijan has 2 plants, Khuzestan has 5 plants, Ilam has 7 plants, East Azerbaijan has 3 plants, and Kurdistan has 2 plants.

The percentages for the different plant parts used are as follows:

Flowers: 30.3%; Leaves: 27.3%; Roots: 9.1%; Seeds: 12.1%; Aerial parts: 18.2% and Fruits: 3.0%

Given the data presented, we can conclude that: The regions of Ilam and Khuzestan have the greatest plant diversity in this table. The Asteraceae family has the most species present in different regions of Iran. Flowers and leaves are the most commonly used parts of plants in traditional medicine. This information could serve as a basis for further research on the geographical distribution of medicinal plants and the various plant parts used in different regions of Iran.

## Discussion

Traditional medicine and ethnobotany share a common focus on harnessing the therapeutic potential of medicinal plants. Rooted in centuries of empirical knowledge, traditional medicine has extensively utilized botanicals for wound management [18]. These plant-based remedies, characterized by their anti-inflammatory and antimicrobial properties, have historically contributed to wound healing and overall health promotion [18].

Ethnobotany systematically explores the intricate relationship between humans and plants, encompassing the documentation and preservation of traditional knowledge [19]. By investigating the cultural and medicinal uses of plants, ethnobotany contributes to the discovery and development of novel therapeutic applications [19]. This discipline is particularly valuable for identifying and understanding the wound healing properties of medicinal plants employed in traditional practices [19].

The therapeutic efficacy of medicinal plants in wound healing is attributed to their complex biochemical composition [20]. Bioactive compounds, including flavonoids, saponins, and antioxidants, mediate anti-inflammatory, antimicrobial, and regenerative processes [21]. Some plants aid in tissue repair by stimulating collagen production and other structural proteins [22]. By reducing inflammation, modulating oxidative stress, and stimulating collagen synthesis, these plants contribute to accelerated wound closure and tissue repair [23].

## Conclusion

The integration of traditional medicine and ethnobotany offers a promising framework for the development of innovative wound healing strategies. By synergizing historical knowledge with contemporary scientific research, it is possible to optimize therapeutic outcomes. This interdisciplinary approach not only preserves and promotes biodiversity but also contributes to the

advancement of public health through the discovery and development of novel therapeutic agents.

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## Statements and Declarations

### Competing interests:

The authors have no competing interests to declare that are relevant to the content of this article.

### Ethics approval:

This study was performed in line with the principles of the Declaration of Helsinki.

### Consent to participate:

Informed consent was obtained from all individual participants included in the study.

### Author contributions:

AR: Conceptualization, the original draft writing, investigation, writing including reviewing and editing and investigation and formal analysis; MRN: Conceptualization, supervision, and project administration; AR and MRN Conceptualization, the original draft writing, investigation, writing including reviewing and editing.

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