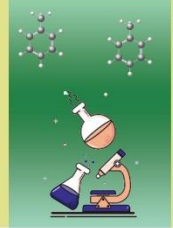


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# Herbal Remedies for Measles: Exploring the Role of Medicinal Plants in Disease Management

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Remedy**\* Corresponding author:****E-mail:** zjoudi1359@gmail.com**ABSTRACT**

Measles is a common viral childhood disease characterized by high fever, cutaneous rash, cough, and conjunctival inflammation. It may lead to severe complications such as pneumonia and encephalitis. Given the growing interest in natural therapeutic approaches, investigating the potential role of medicinal plants in the management of this disease has become increasingly important. This review aims to compile, identify, and document medicinal plants traditionally used in Iran for the treatment of measles. A comprehensive literature search was conducted within the framework of traditional medicine, focusing on classical medical texts, ethnobotanical references, and reliable online databases to identify medicinal plants reported for measles treatment. Traditional Iranian medicine documents the use of a wide variety of medicinal plants for the management of measles, including *Thymus vulgaris* L., *Althaea officinalis* L., *Achillea millefolium* L., *Valeriana officinalis* L., *Lavandula angustifolia* Mill., *Aloysia citrodora* Paláu, *Matricaria chamomilla* L., *Berberis vulgaris* L., *Echium amoenum* Fisch. & C.A.Mey., *Echinacea purpurea* (L.) Moench, *Ficus carica* L., *Rubus idaeus* L., *Petroselinum crispum* (Mill.) Fuss, *Descurainia sophia* (L.) Webb ex Prantl, *Arctium lappa* L., *Mentha spicata* L., *Citrus limon* (L.) Burm.f., *Brassica oleracea* L., *Viola odorata* L., *Isatis tinctoria* L., and *Salvia officinalis* L. The analysis indicated that the families Lamiaceae and Asteraceae were the most frequently represented. Leaves were identified as the most commonly used plant part in the treatment of measles. A diverse range of medicinal plants has been traditionally employed in Iranian medicine for the management of measles. These plants may represent promising natural sources for alleviating disease symptoms. However, scientific validation through pharmacological and clinical studies is necessary to ensure their safety, efficacy, and rational therapeutic application.

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## Introduction

Measles constitutes a highly contagious viral pathology that predominantly affects the pediatric population and individuals lacking immunization (Bester, 2016). The clinical trajectory typically commences with a prodromal phase characterized by pyrexia, non-productive cough, coryza, conjunctivitis, and photophobia, followed days later by the manifestation of a distinct erythematous maculopapular rash (Perry and Halsey, 2004). While the disease often resolves spontaneously, it can precipitate severe complications, including otitis media, gastroenteritis, pneumonia, encephalitis, and ocular sequelae leading to visual impairment (de Vries et al., 2012). Furthermore, Subacute Sclerosing Panencephalitis (SSPE) represents a rare, delayed, and invariably fatal neurodegenerative complication that may arise years post-infection (Campbell et al., 2007).

Pathophysiologically, the infection is initiated via viral replication within the respiratory mucosa, subsequent to transmission through aerosolized respiratory droplets. This is followed by systemic dissemination via the bloodstream to peripheral organs, including the integumentary system and lymph nodes (Misin et al., 2020; de Vries et al., 2012). While the host immune response mediated by T-cell activation and antibody production is critical for viral clearance, the characteristic rash is partially attributed to immune-mediated damage to the microvasculature (Iinuma, 2008). Prophylactically, the measles, mumps, and rubella (MMR) vaccine remains the gold standard, with a two-dose regimen conferring greater than 97% immunity (de Vries et al., 2012).

Despite the efficacy of vaccination, specific antiviral therapeutics for established infections remain elusive. Consequently, clinical management is predominantly supportive, focusing on hydration, antipyretics, and the administration of Vitamin A to mitigate morbidity (Krugman et al., 1965). Antibiotic therapy is reserved strictly for secondary bacterial coinfections and offers no prophylactic benefit against the viral etiology itself (Gladstone, 1930; Gunn, 1935). Given these therapeutic limitations, complementary approaches, particularly those rooted in traditional medicine, have garnered increasing scientific interest for their potential role in managing viral pathologies (Abdulrahman and Hamad, 2022).

Traditional Iranian Medicine (TIM) is distinguished by a profound historical legacy regarding the utilization of pharmacological flora for the management of infectious diseases (Joudi, 2025). Classical literature frequently advocates for the administration of medicinal plants exhibiting anti-inflammatory, immunomodulatory, and antipyretic properties, specifically to ameliorate respiratory distress and augment host resilience during measles infection (Sonibare et al., 2009). Illustratively, bioactive compounds such as caffeine are often regarded as therapeutic agents of choice, owing to their demonstrated efficacy, superior tolerability profile, broad therapeutic spectrum, and favorable pharmacokinetics in the management of various pathologies (Joudi, 2025; Fakoor et al., 2019). These botanical interventions, typically prepared as infusions, syrups, or topical formulations, are intended to attenuate symptom severity and mitigate the risk of secondary complications (Sonibare et al., 2009).

Despite the long-standing and empirical application of TIM in pediatric infectious disease management, a systematic scholarly synthesis of this indigenous knowledge remains absent from the current literature. No comprehensive review has yet documented, categorized, and analyzed the specific medicinal plants traditionally indicated for the treatment of measles in Iran. This study aims to bridge this evident gap by identifying and critically synthesizing the flora employed in Traditional Iranian Medicine for the prevention and management of measles. By structuring this ethnomedical knowledge, the present work seeks to provide a coherent framework to substantiate future pharmacological and clinical investigations into novel therapeutic agents.

## Methods

### Study Design

This study was a systematic review of Iranian traditional medicine sources and medicinal plants associated with the prevention, management, and treatment of measles in children. The primary objective was to identify and compile information on indigenous Iranian medicinal plants traditionally employed to alleviate measles symptoms and support disease management in pediatric populations.

Data Sources and Search Strategy  
Data for this review were collected from classical Iranian traditional medicine texts, herbal encyclopedias, reputable online databases, and scientific articles related to traditional medicine and medicinal plants effective against viral diseases, particularly measles (Avicenna, 2005; Rhazes, 2003; Avicenna, 2004; Jorjani, 2002; Ahwazi, 2001; Baha'i, 2000; Rhazes, 1999; Sabzevari, 2005).

The search focused on identifying medicinal plants documented for use in measles treatment in traditional medicine texts. A supplementary search was conducted to confirm traditional efficacy using a combination of Persian and English keywords, including "measles," "viral disease," "traditional medicine," "medicinal plant," "natural treatment," and "herbal therapy."

### Inclusion and Exclusion Criteria

Inclusion criteria encompassed sources explicitly reporting the use of medicinal plants for the prevention or treatment of measles, with a particular emphasis on Iranian traditional medicine and scholars. Eligible sources included books, manuscripts, and published articles in Persian and English, as well as scientific studies evaluating the effects of medicinal plants mentioned in Iranian traditional medicine on measles or related viral infections.

Exclusion criteria included sources providing unrelated information, incomplete data, missing plant names or usage methods, duplicate studies, studies lacking novel data, low-quality scientific reports, non-credible sources or websites, and medicinal plants from other countries without relevance to Iranian traditional medicine unless directly compared with Iranian sources.

### Data Extraction and Synthesis

An initial list of indigenous Iranian medicinal plants used for measles was compiled. Extracted information included each plant's common and scientific name, the part of the plant used, and the

method of application (e.g., infusion, extract, topical application).

The collected data were presented in both tabular and descriptive formats. Plants were categorized based on their type of effect and the available scientific evidence, facilitating a clear understanding of their roles in the prevention and treatment of measles according to Iranian traditional medicine.

### Results

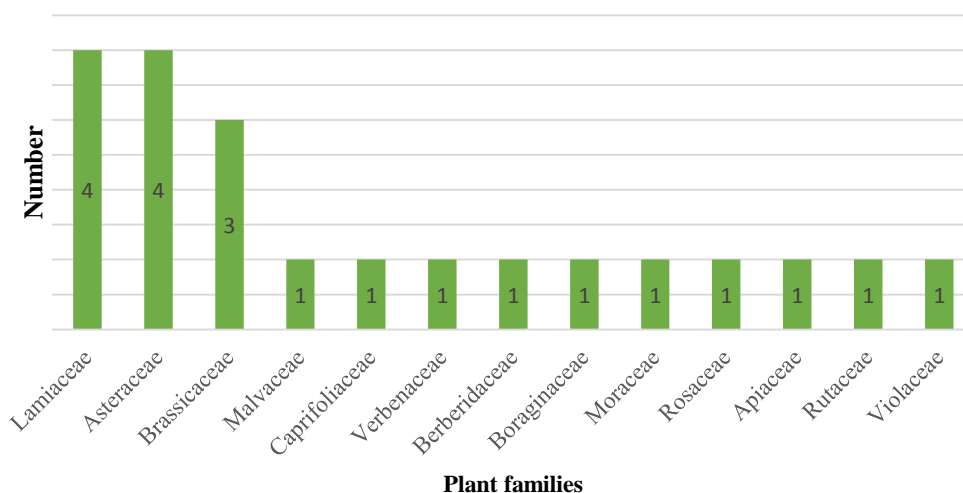
Information derived from Iranian traditional medicine and herbal pharmacotherapy sources indicates that 21 medicinal plants have been traditionally used in the management of measles (Table 1). These include *Thymus vulgaris* L., *Althaea officinalis* L., *Achillea millefolium* L., *Valeriana officinalis* L., *Lavandula angustifolia* Mill., *Aloysia citrodora* Paláu, *Matricaria chamomilla* L., *Berberis vulgaris* L., *Echium amoenum* Fisch. & C.A.Mey., *Echinacea purpurea* (L.) Moench, *Ficus carica* L., *Rubus idaeus* L., *Petroselinum crispum* (Mill.) Fuss, *Descurainia sophia* (L.) Webb ex Prantl, *Arctium lappa* L., *Mentha spicata* L., *Citrus limon* (L.) Burm.f., *Brassica oleracea* L., *Viola odorata* L., *Isatis tinctoria* L., and *Salvia officinalis* L. These plants constitute the most commonly utilized medicinal herbs in traditional Iranian medicine for the treatment of measles. They have been applied in various forms, including infusions, decoctions, syrups, and topical applications, reflecting their traditional roles in symptom alleviation, immune support, and overall disease management.

Based on the analysis conducted, the families Lamiaceae and Asteraceae were the most prevalent among the documented plants. The frequencies of the remaining plant families are presented in figure 1.

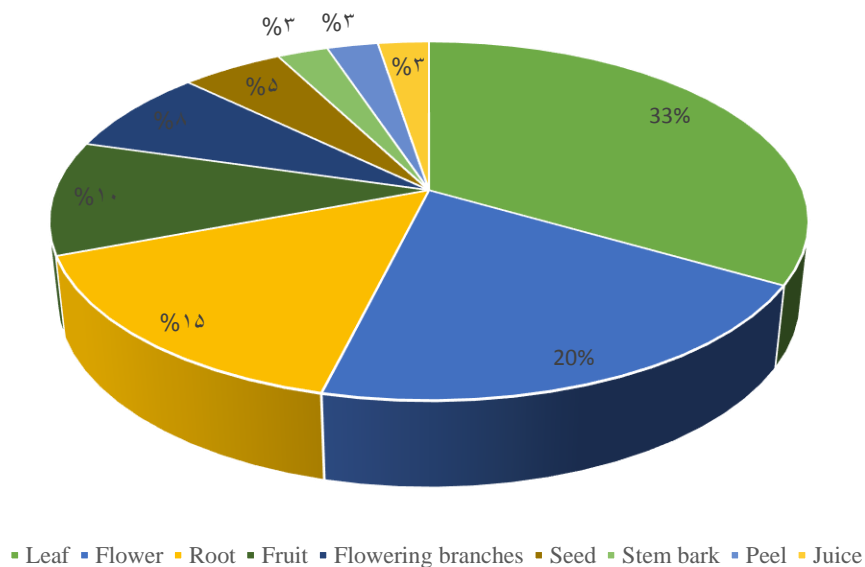
Regarding measles treatment, leaves were the most commonly utilized plant part. Detailed information on the percentage of different plant parts used is presented in figure 2.

**Table 1.** Medicinal plants used in the treatment of measles

Scientific Name	Plant Family	English Name	Plant Part Used	Chemical Composition	Molecular Formula	References
<i>Thymus vulgaris</i> L.	Lamiaceae	Thyme	Leaves, flowers	Thymol	C10H14O	Mancini et al., 2015
<i>Althaea officinalis</i> L.	Malvaceae	Marshmallow	Flowers, leaves, root	Palmitic acid	C16H32O2	Valiei et al., 2011
<i>Achillea millefolium</i> L.	Asteraceae	Yarrow	Flowers, leaves	Isololiolide	C11H16O3	Huang et al., 2024
<i>Valeriana officinalis</i> L.	Caprifoliaceae	Valerian	Root	Lignans	C22H22O8	Fan et al., 2020
<i>Lavandula angustifolia</i> Mill.	Lamiaceae	Lavender	Flowers, flowering branches	Linalool	C10H18O	Pokajewicz et al., 2021
<i>Aloysia citrodora</i> Paláu	Verbenaceae	Lemon Verbena	Leaves	$\beta$ -Spathulenol	C15H24O	Oukerrou et al., 2017
<i>Matricaria chamomilla</i> L.	Asteraceae	Chamomile	Flowers	$\beta$ -Farnesene	C15H24	Stanojevic et al., 2016
<i>Berberis vulgaris</i> L.	Berberidaceae	Barberry	Fruit, stem bark	Tetracosanoic acid methyl ester	C28H56O2	Hosseinihashemi and Anoshei, 2015
<i>Echium amoenum</i> Fisch. & C.A.Mey.	Boraginaceae	Borage	Flowers	Rosmarinic acid	C18H16O8	Azizi et al., 2018
<i>Echinacea purpurea</i> (L.) Moench	Asteraceae	Echinacea	Root, flowers	$\alpha$ - and $\beta$ -Amyrin	C30H50O	Petkova et al., 2023
<i>Ficus carica</i> L.	Moraceae	Fig	Fruit, leaves	Psoralen	C11H6O3	Mawa et al., 2013
<i>Rubus idaeus</i> L.	Rosaceae	Raspberry	Fruit, leaves	Ellagic acid	C <sub>14</sub> H <sub>6</sub> O <sub>8</sub>	Krauze-Baranowska et al. 2014
<i>Petroselinum crispum</i> (Mill.) Fuss	Apiaceae	Parsley	Leaves, root, seeds	Apigenin	C15H10O5	Chaves et al., 2011
<i>Descurainia sophia</i> (L.) Webb ex Prantl	Brassicaceae	Flixweed	Seeds	Scopoletin	C10H8O4	Mohamed and Mahrous, 2009
<i>Arctium lappa</i> L.	Asteraceae	Greater Burdock	Root, leaves	Arctigenin	C21H24O6	Azizov et al., 2012
<i>Mentha spicata</i> L.	Lamiaceae	Mint	Leaves, flowering branches	Carvone	C10H14O	Boukhebti et al., 2011
<i>Citrus limon</i> (L.) Burm.f.	Rutaceae	Lemon	Fruit, peel, juice	Limonene	C10H16	Paw et al., 2020
<i>Brassica oleracea</i> L.	Brassicaceae	Wild Cabbage	Leaves	Glucosinolates	C8H15NO9S	Bhandari and Kwak, 2015
<i>Viola odorata</i> L.	Violaceae	Sweet Violet	Flowers, leaves	Butyl-2-ethylhexylphthalate	C20H30O4	Akhbari et al., 2012
<i>Isatis tinctoria</i> L.	Brassicaceae	Indigo / Woad	Leaves, root	Tryptanthrin	C15H8N2O2	Speranza et al., 2020
<i>Salvia officinalis</i> L.	Lamiaceae	Sage	Leaves, flowering branches	$\alpha$ -Thujone	C10H16	Chalchat et al., 1998



**Figure 1:** Frequency of plant families used in the treatment of measles



**Figure 2:** Percentage of plant parts used in the treatment of measles

### Discussion

Measles is an acute viral disease typically characterized by fever, skin rashes, cough, and respiratory symptoms, which in some cases can progress to severe complications such as pneumonia and encephalitis. While management is primarily supportive, numerous studies suggest

that medicinal plants can serve as effective complementary therapies to reduce symptom severity and shorten disease duration. Ethnobotanical studies across various regions highlight the widespread use of medicinal plants to alleviate measles symptoms.

In northern Nigeria, at least 24 plant species including *Prosopis africana* Taub., *Ocimum americanum* L., *Sida acuta* Burm. F., *Azadirachta indica* A. Juss., *Moringa oleifera* Lam., and *Nigella sativa* L. are traditionally used to relieve fever and improve respiratory symptoms (Abdulrahman, 2022). Other species, such as *Diospyros barteri*, *Xylopiya aethiopica*, *Picralima nitida*, and *Morinda lucida*, are also employed in traditional measles management (Oluremi, 2015).

Similarly, in Pakistan (Dasht Mastung, Balochistan), 30 plant species from 30 families, including *Camellia sinensis* (green tea), *Jasminum sambac*, and *Allium sativum* (garlic), are traditionally used, with leaves, seeds, and roots commonly administered as infusions (Shahwani et al., 2025). These findings demonstrate both the diversity of medicinal plants and the potential of indigenous resources in alleviating measles symptoms.

Clinical evidence further supports the efficacy of medicinal plants in accelerating measles recovery. For instance, a study of 92 adult measles patients reported that traditional Chinese herbal formulations containing *Lonicera japonica*, *Forsythiae Fructus*, *Arnebiae Radix*, *Glycyrrhizae Radix* et Rhizoma, and other herbs led to faster clinical improvement and reduced complication rates compared with a control group that did not receive herbal treatment (Liu et al., 2025).

In many countries, traditional remedies involve the consumption of powdered plants such as *Allium cepa*, *Allium sativum*, *Citrus aurantifolia*, *Momordica charantia*, and *Nauclea latifolia*, often combined with cow's milk, and in some cases used prophylactically to limit measles outbreaks. Advances in biotechnology have also enabled the development of plant-based oral vaccines, bridging traditional and modern approaches for measles prevention and treatment (Gupta, 2015). The pharmacological properties of these plants including anti-inflammatory, antiviral, immunomodulatory, and soothing effects help manage fever, cough, mucosal inflammation, and skin rashes, facilitating symptom control in measles (Catella et al., 2021; Khaled et al., 2025; Benedek, 2007; Marawne et al., 2022; Ramezanzadeh, 2020; Abou Zaid et al., 2025).

Existing studies suggest that medicinal plants can reduce both the severity and duration of measles through three primary mechanisms such as enhancing host immune responses, as observed with *Nigella sativa* and *Camellia sinensis*, reducing inflammation and alleviating clinical symptoms, as seen with *Thymus vulgaris*, *Eucalyptus spp.*, and *Allium sativum*, which possess strong anti-inflammatory properties; and exerting direct antiviral activity, with plants such as *Azadirachta indica* and *Forsythiae Fructus* demonstrating inhibition of measles virus replication. These findings indicate that medicinal plants not only

alleviate symptoms but can also serve as effective adjuncts in clinical measles management.

Traditional herbal treatments, particularly in the form of infusions combined with supportive care, can relieve symptoms, reduce complications, and promote faster recovery. Integrating traditional knowledge with modern medical practices especially in regions with limited access to vaccines and antiviral drugs represents a practical and effective strategy for improving measles outcomes.

Despite the breadth of this review, several important limitations should be acknowledged. First, the majority of the sources consulted were classical and historical texts of Iranian traditional medicine, which may be methodologically limited or lack quantitative data. Second, scientific evidence supporting the efficacy of many of the cited medicinal plants is scarce, with few clinical or experimental studies available. Finally, this review focused primarily on Iranian traditional medicine, and may not comprehensively capture medicinal plants used in other regions or cultural contexts for the treatment of measles.

Future research should focus on validating the therapeutic potential of these traditional remedies through rigorously designed in vitro, in vivo, and clinical studies. Comparative investigations assessing the efficacy of different plant preparations, dosages, and routes of administration are necessary to establish evidence-based guidelines. Furthermore, integrating modern pharmacological approaches with traditional knowledge may facilitate the development of novel, safe, and effective treatments for measles. Studies exploring the molecular mechanisms underlying the antiviral, anti-inflammatory, and immunomodulatory effects of these plants will further enhance our understanding and may contribute to the identification of new bioactive compounds. Finally, interdisciplinary collaboration among ethnobotanists, pharmacologists, and clinicians is essential to translate traditional knowledge into practical healthcare applications while ensuring safety and efficacy.

## Conclusion

Measles is an acute viral disease that can result in serious complications, and supportive care alone may be insufficient. Ethnobotanical and clinical evidence indicates that a variety of medicinal plants are effective in managing measles symptoms. Through their anti-inflammatory, antiviral, and immunomodulatory properties, these plants can reduce fever, cough, and skin rashes, while also shortening disease duration. Combining traditional herbal treatments with supportive care and modern approaches, such as plant-based oral vaccines, may enhance therapeutic efficacy. The primary mechanisms of

action include boosting host immunity, reducing inflammation, and inhibiting viral replication. The use of herbal infusions and traditional formulations, particularly in areas with limited access to medications and vaccines, offers a practical and effective strategy. Overall, integrating traditional and modern knowledge provides a comprehensive approach to mitigating the severity and complications of measles.

## Declarations

### Conflict of Interest

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

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### Consent for Publications

The author read and approved the final version of the manuscript and agrees to be accountable for all aspects of the work.

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### Authors' Contributions

Conceptualization: Zahra Joudi

Data curation: Zahra Joudi

Formal analysis: Zahra Joudi

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Investigation: Zahra Joudi

Methodology: Zahra Joudi

Project administration: Not applicable

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Supervision: Zahra Joudi

Validation: Zahra Joudi

Visualization: Not applicable

Writing – original draft: Zahra Joudi

Writing – review & editing: Zahra Joudi

### Ethical Considerations

All ethical principles and standards for scholarly research—covering plagiarism, data integrity, originality, and proper citation—were diligently upheld throughout the development and submission of this work.

### AI Use Disclosure

The author confirms that DeepSeek AI was used solely for language editing, grammar correction, and paraphrasing. No AI tools were used for data generation, experimental design, statistical analysis, molecular docking, or result interpretation. All AI-assisted content was reviewed and validated by the author.

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