



## ORIGINAL ARTICLE

## Exploring Herbal Antioxidants in Reducing Fever in Children: Insights from Traditional Iranian Medicine and Their Antipyretic Mechanisms

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**ABSTRACT:** Fever is a common symptom of various childhood infectious diseases, ranging from viral and bacterial to fungal and parasitic infections. While traditional medical treatments are effective, there is growing interest in exploring natural alternatives. This review focuses on identifying indigenous medicinal plants from Iran that have demonstrated potential for reducing fever in children. This review synthesized experimental and ethnomedical data from reputable scientific journals, medical texts, and authoritative sources on traditional medicine. The focus was on evaluating the efficacy of indigenous plants in alleviating fever in children. The findings suggest that numerous indigenous plants from Iran possess bioactive compounds, including flavonoids, tannins, and alkaloids. These compounds have demonstrated antipyretic and anti-inflammatory properties. In traditional Iranian medicine, these plants are employed as herbal remedies to reduce fever in children. Indigenous medicinal plants from Iran may offer a promising complementary approach to fever reduction in children. However, further pharmacological studies are warranted to substantiate their therapeutic efficacy. If confirmed, these plants could potentially be integrated into standard treatment protocols.

**INTRODUCTION**

Childhood illnesses pose a significant global health burden, particularly in communities with limited healthcare access [1]. Epidemiological data highlight the prevalence of infectious and febrile diseases among children, leading to frequent healthcare visits [1]. Influenza, colds, and viral or bacterial infections are common causes of childhood fever. Fever can signal a range of conditions, from mild infections to severe illnesses, necessitating prompt medical attention [2]. Prolonged or severe fevers can adversely impact a

child's growth and overall health, emphasizing the need for effective interventions [2].

Chemotherapy remains the primary treatment for childhood infectious and febrile diseases. While antibiotics and antiviral drugs are effective, their overuse can lead to adverse effects and drug resistance [3]. Traditional medicine and herbal remedies have gained interest as complementary and alternative approaches. Herbal medicines, with their natural compounds and reduced side

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effects, are increasingly used to alleviate symptoms and improve children's health [4]. The potential benefits of herbal remedies in treating childhood infectious and febrile diseases include symptom reduction, improved overall condition, and minimized side effects compared to chemical medications. Integrating herbal remedies as a complementary treatment approach can enhance children's quality of life, reduce reliance on synthetic drugs, and contribute to improved public health [5]. This review seeks to identify the most effective indigenous medicinal plants from Iran for reducing fever in children.

## MATERIALS AND METHODS

To identify relevant literature, a comprehensive database search was conducted using keywords such as "indigenous medicinal plants of Iran," "fever reduction in children," "traditional Iranian medicine," and "antipyretic effects of plants." Several reputable databases were consulted, including PubMed, Scopus, Web of Science, Google

Scholar, SID (Scientific Information Database of Iran), and Magiran. Additionally, authoritative texts on traditional Iranian medicine, such as "Books of Iranian Traditional Medicine" and "Islamic Traditional Medicine Texts," were thoroughly examined.

The inclusion criteria for this study encompassed articles and sources that specifically addressed the efficacy of indigenous medicinal plants from Iran in reducing fever in children. Studies focusing on treatments other than medicinal plants, those with low scientific quality or incomplete/unreliable information, and articles unrelated to childhood fever were excluded.

The initial review and selection of articles were based on a careful examination of titles, abstracts, and keywords. Subsequently, the full texts of selected articles were evaluated to verify their relevance and data quality. A flowchart illustrating the search strategy and the reviewed articles and sources is provided in Figure 1.

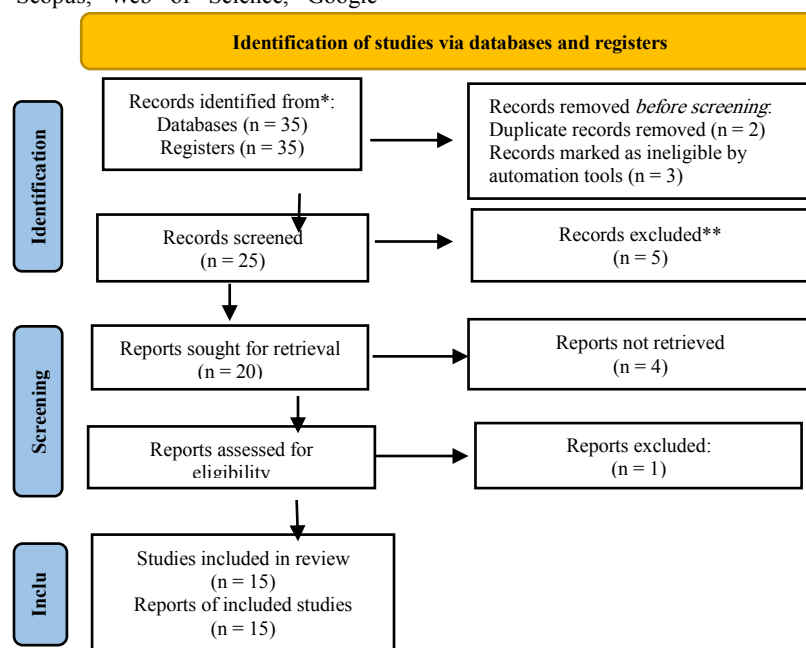


Figure 1. Flowchart of Search Strategy.

## Results

In traditional Iranian medicine, a variety of plants have been historically used to manage fever in children. Notable examples include borage, chamomile, mint, thyme, damask rose, marshmallow, rose, lavender, valerian, jujube, yarrow,

linden, elderberry, hyssop, and garlic. A comprehensive list of these antipyretic medicinal plants, along with their traditional uses, is presented in Table 1.

**Table 1.** Medicinal Plants for Fever Reduction in Children

English name	Scientific name	Herbal family	Main Active Compound	Antipyretic Mechanism	Traditional Uses	Herbal name [6-17]
<b>Iranian Borage</b>	<i>Echium amoenum</i>	Boraginaceae	Flavonoids, tannins	Reduces fever through anti-inflammatory effects and inhibition of prostaglandin production	Traditionally used for its anti-inflammatory and soothing properties	Children's fever reducer
<b>Chamomile</b>	<i>Matricaria chamomilla</i> L.	Asteraceae	phenolic acids, bisabolol	Lowers fever by reducing inflammation and oxidative stress	Widely used to relieve fever, anxiety, and digestive issues	Children's fever reducer
<b>Peppermint</b>	<i>Mentha piperita</i> L.	Lamiaceae	Menthol	Provides antipyretic effects through its soothing and anti-inflammatory properties	Used to treat colds, digestive issues, and fever	Children's fever reducer
<b>Thyme</b>	<i>Thymus vulgaris</i> L.	Lamiaceae	Thymol, carvacrol, flavonoids	Reduces fever with antimicrobial and anti-inflammatory effects	Used traditionally to treat respiratory infections and fever	Children's fever reducer
<b>Pussy Willow</b>	<i>Salix aegyptiaca</i> L.	Salicaceae	Salicin	Lowers fever through antioxidant effects and immune system support	Used in traditional medicine for its cooling and soothing effects	Children's fever reducer
<b>Marshmallow</b>	<i>Althaea officinalis</i> L.	Malvaceae	Flavonoids, phenolic acids	Alleviates fever with its anti-inflammatory properties and soothing effects	Commonly used for throat and gastrointestinal irritations	Children's fever reducer
<b>Rose Water</b>	<i>Rosa damascene</i> Mill.	Rosaceae	Anthocyanins	Reduces fever through anti-inflammatory and antioxidant effects	Used in traditional medicine for its cooling and calming properties	Children's fever reducer
<b>Lavender</b>	<i>Lavandula angustifolia</i> L.	Lamiaceae	Linalool, camphor	Helps reduce fever with its calming and anti-inflammatory properties	Traditionally used for anxiety, sleep disorders, and mild fevers	Children's fever reducer
<b>Valerian</b>	<i>Valeriana officinalis</i> Mill.	Caprifoliaceae	Valerenic acid	Lowers fever with its calming effects and reduction of inflammation	Used traditionally to relieve anxiety, insomnia, and fever	Children's fever reducer
<b>Jujube</b>	<i>Ziziphus jujuba</i> Mill.	Rhamnaceae	Saponins, flavonoids	Reduces fever through immune system support and antioxidant effects	Commonly used in traditional medicine for its soothing properties	Children's fever reducer
<b>Yarrow</b>	<i>Achillea millefolium</i> L.	Asteraceae	Achilleine	Lowers fever with its anti-inflammatory and diaphoretic properties	Traditionally used for fever, colds, and wounds	Children's fever reducer
<b>Linden</b>	<i>Tilia platyphyllos</i> Scop.	Tiliaceae	Flavonoids, mucilages	Reduces fever through its diaphoretic and anti-inflammatory effects	Used traditionally to promote sweating and relieve fever	Children's fever reducer
<b>Black Elderberry</b>	<i>Sambucus nigra</i> L.	Adoxaceae	Anthocyanins	Lowers fever with its antiviral properties and immune system support	Used in traditional medicine to treat colds, flu, and fever	Children's fever reducer
<b>Hyssop</b>	<i>Hyssopus officinalis</i> L.	Lamiaceae	Phenolic Acids	Alleviates fever through its anti-inflammatory effects and stimulation of sweating	Used traditionally for respiratory issues and fever relief	Children's fever reducer
<b>Garlic</b>	<i>Allium sativum</i> L.	Alliaceae	Allicin	Reduces fever with its anti-inflammatory and antioxidant properties	Commonly used to treat colds, flu, and infections	Children's fever reducer

## DISCUSSION

Infectious diseases are a primary cause of fever, a physiological response to viral, bacterial, fungal, and parasitic infections. Fever represents an early indicator of the immune system's response to pathogens and is a common symptom in various infectious diseases [18].

Borage contains flavonoids, alkaloids, and mucilage, which offer anti-inflammatory and soothing properties. It reduces fever by inhibiting prostaglandin production [19]. Chamomile's apigenin, flavonoids, and azulene possess anti-inflammatory and antipyretic properties, reducing fever by lowering inflammatory cytokines [20]. Mint's menthol and flavonoids provide cooling and anti-inflammatory effects, aiding in fever reduction by soothing peripheral nerves and decreasing inflammation [21].

Thyme's thymol, carvacrol, and flavonoids offer antimicrobial and anti-inflammatory effects, lowering fever by inhibiting nitric oxide production and reducing prostaglandin levels [22]. Damask rose contains salicin, which is converted to salicylic acid, reducing fever by inhibiting cyclooxygenase and decreasing inflammatory prostaglandins [23]. Marshmallow's mucilage and flavonoids provide anti-inflammatory and soothing effects, aiding in fever reduction by alleviating inflammation in the respiratory and gastrointestinal tracts [24]. Rose's flavonoids and tannins exhibit anti-inflammatory and antioxidant properties, reducing fever through decreased oxidative stress and inflammation [25].

Lavender's linalool and flavonoids offer calming and anti-inflammatory effects, reducing fever by diminishing sympathetic nervous system activity and inflammation [26]. Valerian's valepotriates and flavonoids provide calming and anti-inflammatory effects, helping reduce fever by relaxing the nervous system and soothing muscles [27]. Jujube fruit's saponins and flavonoids have anti-inflammatory and antioxidant effects, aiding in lowering fever by enhancing immune function and reducing inflammation [28]. Yarrow's flavonoids and tannins exhibit anti-inflammatory and antipyretic properties, reducing fever by inhibiting inflammatory pathways and lowering prostaglandin production [29].

Linden's flavonoids and mucilage offer soothing and anti-inflammatory effects, helping lower fever by calming the nervous system and reducing inflammation [30]. Elderberry's anthocyanins and flavonoids have antiviral and anti-inflammatory effects, aiding in fever reduction by decreasing viral load and inflammation [31]. Hyssop's flavonoids and phenolic acids offer antimicrobial and anti-inflammatory effects, reducing fever by decreasing inflammation and promoting sweating [32]. Garlic's allicin and flavonoids have antimicrobial and antioxidant effects, helping lower fever by reducing oxidative stress and boosting immune function [33]. These plants, with their cooling, anti-inflammatory, antimicrobial, and soothing properties, are employed in traditional Iranian medicine for managing fever in children.

The use of antipyretic medicinal plants in treating children holds significant importance, rooted in historical and traditional medicine. Plants such as chamomile, peppermint, and thyme have been employed for thousands of years as natural remedies to reduce fever and alleviate symptoms of viral and bacterial infections. The primary advantage of these herbal treatments lies in their natural composition and reduced side effects compared to chemical medications. Many medicinal plants possess notable anti-inflammatory and antioxidant properties, which can aid in enhancing the immune system and lowering fever [34]. However, improper use or excessive doses of these plants can lead to adverse effects such as allergies or gastrointestinal issues. Therefore, their use should be carefully monitored by a healthcare provider [35]. On the other hand, the industrial production of these plants in the form of extracts and pharmaceutical products can increase accessibility and efficiency in utilizing these natural resources. Nevertheless, it requires thorough research and high-quality standards to ensure their effectiveness and safety [36]. Overall, when used knowledgeably and appropriately, antipyretic medicinal plants can be a valuable and safe option for managing fever in children.

## CONCLUSIONS

This review demonstrates that indigenous Iranian medicinal plants, including borage, chamomile, mint, thyme, damask rose, marshmallow, rose, lavender, valerian, jujube, yarrow, linden, elderberry, hyssop, and garlic, possess potential for reducing fever in children. These plants have been historically used for this purpose and their efficacy is attributed to their active biological compounds, such as flavonoids, tannins, alkaloids, and other effective components, which exhibit both antipyretic and anti-inflammatory properties. This positions them as promising complementary and natural treatments for pediatric fever. However, further clinical research and pharmacological studies are necessary to confirm their therapeutic effects and establish appropriate dosages for children. Integrating these plants alongside conventional treatments could offer a safer and lower-risk approach to controlling fever in children. Nonetheless, their use should be carefully monitored by healthcare professionals to prevent potential side effects and drug interactions.

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## Conflict of interests

The authors declare no conflicts of interest.

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