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An Overview of Herbal Plants Effective in Iron Deficiency Anemia

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A B S T R A C T

Objective: Iron deficiency anemia constitutes one of the most prevalent forms of anemia globally, arising from diminished iron stores within the body and a subsequent impairment in hemoglobin production. This condition is frequently associated with symptoms such as weakness, fatigue, and compromised immune function. Conventional treatment and preventive measures primarily focus on dietary adjustments and iron supplementation. This review aims to systematically identify herbal plants with traditional applications in the management of iron deficiency anemia.

Methods: To investigate the efficacy of native Iranian herbal plants in the management of iron deficiency anemia, this study commenced with the formulation of a clear research problem and objectives. Subsequently, a comprehensive literature search was conducted utilizing a combination of scientific databases, including PubMed, Google Scholar, Scopus, and Web of Science. Additionally, specialized resources such as reference books and encyclopedias were consulted. The search strategy employed a combination of relevant keywords, including "native Iranian medicinal plants," "Iron deficiency anemia," and "bioactive compounds in medicinal plants.

Results: Based on the review, it was identified that herbal plants such as beetroot, mint, garlic, saffron, peppermint, radish, plum, turmeric, hawthorn, and rosemary are traditionally used in Iranian medicine to treat iron deficiency anemia.

Conclusion: The utilization of herbal plants as natural supplements presents a promising avenue for the management of iron deficiency anemia, with the potential to enhance hemoglobin levels and alleviate associated symptoms. This study explores the potential of leveraging traditional medicine, specifically focusing on identifying and effectively utilizing native Iranian herbal plants, to address this prevalent health condition.

Keywords: Iron deficiency anemia, Vitamin C, Medicinal plants, Traditional medicine

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Introduction

Iron is an essential element for human physiology, playing a pivotal role in various biological processes, most notably in the transport of oxygen and carbon dioxide [1]. These processes are fundamental for energy production and overall organismal health. Dietary sources rich in iron, such as red meat, offal, and iron-fortified breakfast cereals, are crucial for maintaining adequate iron levels within the body [2]. Iron is naturally excreted through physiological processes such as sweating, the breakdown of intestinal cells, and bleeding [3]. It is estimated that approximately one-third of the global population experiences iron deficiency, with a higher prevalence observed in women compared to men [4].

Iron deficiency, characterized by inadequate iron stores and subsequent insufficient hemoglobin production, may initially present with subtle or even asymptomatic symptoms. Anemia, regardless of its etiology, is associated with adverse health outcomes across various patient populations [5]. However, severe iron deficiency can manifest with a range of symptoms, including fatigue, pallor, shortness of breath, dizziness, loss of appetite, brittle nails, tachycardia, and a craving for non-food substances [6]. Visible signs of iron deficiency may include pale skin, excessive fatigue, and cold extremities [7]. While iron deficiency itself may not pose a direct life-threatening risk, its untreated consequences can be significant. These may include severe fatigue, restless legs syndrome, cardiac complications, adverse pregnancy outcomes, and developmental delays in

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children. Furthermore, iron deficiency can exacerbate existing health conditions and complicate their management [8].

Medical management of iron deficiency anemia often involves iron supplementation to replenish depleted iron stores. However, untreated iron deficiency can have significant consequences, including severe fatigue, cardiac complications, and developmental delays in children [9]. Maintaining adequate iron levels can be achieved through dietary interventions, emphasizing the consumption of iron-rich foods such as red meat, spinach, dried fruits, and fortified cereals [8]. While iron supplements can be effective in addressing iron deficiency, they may also induce adverse effects, including gastrointestinal disturbances such as nausea, abdominal pain, constipation, and heartburn, as well as skin sensitivities and potential stomach damage [10,11]. Therefore, it is crucial to administer iron supplements with appropriate precautions, such as taking them with food. Any observed side effects should be promptly reported to a healthcare professional.

Traditional Medicine, has a long history of being beneficial for different diseases [12]. The use of herbal plants as a natural remedy for iron deficiency anemia has garnered significant attention in recent years [13]. Some herbs contain considerable amounts of iron and nutrients that can help improve the body's iron levels. Herbs such as Hesperis matronalis, Haskani, green tea, and spinach are considered natural sources of iron, and regular consumption of these can help prevent anemia [14]. Additionally, herbs like mint and turmeric, with their anti-inflammatory and digestive-supporting properties, can aid in better iron absorption in the body [15]. Some herbal plants also contain compounds that increase iron absorption in the digestive system [16]. Pears and citrus fruits, due to their vitamin C content, facilitate the absorption of iron. Furthermore, herbs such as thyme and bay leaves are recognized for their beneficial effects on the hematopoietic system and are used in traditional medicine as effective treatments for anemia. However, the use of herbal remedies should always be supervised by a doctor, as they may interact with conventional medications for iron deficiency treatment [16].

The objective of this review study is to identify and examine medicinal plants that are effective in treating iron deficiency anemia, based on the resources of traditional and indigenous Iranian medicine.

Methodology

In this review study, the issue of iron deficiency anemia and the importance of using native Iranian medicinal plants as complementary treatments were first addressed. The main goal of the research was to identify and examine medicinal plants effective in the treatment of iron deficiency anemia in traditional Iranian medicine. To collect information, a comprehensive search was conducted in reputable international scientific databases such as PubMed, Google Scholar, Scopus, and Web of Science. Additionally, specialized resources including reference books, research articles, and credible encyclopedias were utilized. During the search process, specific keywords such as "native Iranian medicinal plants," "iron deficiency anemia," and "bioactive compounds in medicinal plants" were employed to identify plants traditionally used in Iranian medicine for treating iron deficiency anemia. In addition to scientific articles, historical sources and traditional medicine texts were also examined to gather more comprehensive information regarding the use of medicinal plants in this field. After collecting the data, a review and analysis of the medicinal plants based on their active compounds and their effects on improving the body's iron levels were performed.

Results

The results of this review indicated that in traditional Iranian medicine, plants such as beetroot, mint, garlic, saffron, peppermint, radish, plum, turmeric, hawthorn, and rosemary are recognized as effective treatments for iron deficiency anemia. The use of these plants contributes to improving iron levels in the body. The specific medicinal plants and their effectiveness in addressing iron deficiency anemia are summarized in Table 1.

Table 1. Medicinal Plants Effective in Treating Iron Deficiency Anemia in Traditional Iranian Medicine

Persian name	Scientific name	English name	Herbal family	Mechanism [16-25]

Choghondar ghand	Beta vulgaris	Beetroot	Chenopodiaceae	Contains iron and folate for red blood cell production and improved circulation.
Pouneh	Mentha pulegium	Pennyroyal	Lamiaceae	Strengthens the digestive system and enhances the absorption of iron and nutrients.
Sir	Allium sativum	Garlic	Amaryllidaceae	Enhances blood flow and improves iron absorption from food with anti-inflammatory properties.
zafarran	Crocus sativus	Saffron	Iridaceae	Strengthens red blood cell production and improves iron absorption with antioxidant properties.
Naena	Mentha	Mint	Lamiaceae	Facilitates iron and nutrient absorption with anti-inflammatory and calming properties.
Torobcheh	Raphanus sativus	Radish	Cruciferae	Contains iron and vitamin C, facilitating better iron absorption and aiding red blood cell production.
Aloo	Prunus domestica	Plum	Rosaceae	Enhances iron absorption and immune system function with iron, vitamin C, and antioxidants.
zadchoubeh	Curcuma longa	Turmeric	Zingiberaceae	Enhances iron absorption from plant sources with anti-inflammatory and antioxidant properties.
zalzalak	Crataegus monogyna	Hawthorn	Rosaceae	Increases red blood cell production and strengthens the digestive system for better iron absorption and improved circulation.
Rozmary	Rosmarinus officinalis	Rosemary	Lamiaceae	Enhances iron absorption, improves digestive function, and circulation with antioxidant and anti-inflammatory properties.

Discussion

Traditional medicine recognizes various medicinal plants as potential natural remedies for iron deficiency anemia. These plants, rich in bioactive compounds, possess the capacity to enhance iron absorption, bolster the immune system, and stimulate red blood cell production [26].

Beetroot, a rich source of iron and folate, plays a crucial role in supporting red blood cell production and improving circulation. Moreover, its antioxidant compounds, such as betalains, contribute to enhanced immune function and cardiovascular health [27]. Mint, containing compounds like menthol and methyl acetate, facilitates digestion and enhances iron absorption. Additionally, its anti-inflammatory properties contribute to improved iron bioavailability [28]. Garlic, rich in allicin, promotes blood flow and enhances iron absorption. Its anti-inflammatory properties also contribute to improved digestive function and a strengthened immune system [29].

Saffron, containing antioxidant compounds such as crocetin, stimulates red blood cell production and facilitates iron absorption from dietary sources [30]. Peppermint, with its anti-inflammatory compounds, supports enhanced iron absorption and nutrient uptake from the digestive system. Furthermore, its calming properties contribute to improved digestion and iron bioavailability [31]. Radish, a rich source of iron and vitamin C, facilitates iron absorption and contributes to immune system enhancement [32].

Plum, containing iron, vitamin C, and antioxidants, supports iron absorption and enhances immune function [33]. Turmeric, containing the bioactive compound curcumin, exhibits anti-inflammatory and antioxidant properties that contribute to improved iron absorption [34]. Hawthorn, renowned for its blood-strengthening properties, enhances red blood cell production and supports improved iron absorption [35].

Rosemary, containing antioxidant compounds such as rosmarinic acid and caffeic acid, facilitates digestion and enhances iron absorption [36]. Collectively, these findings suggest that the utilization of these medicinal plants may offer a natural and effective approach for the management of iron deficiency anemia by enhancing iron absorption, supporting red blood cell production, and bolstering overall health.

Conclusion

Based on the findings of this study, the use of medicinal plants for treating iron deficiency anemia can play an important role in improving hemoglobin levels and alleviating symptoms related to this condition. These plants, with their unique chemical compounds, help improve iron absorption, enhance immune function, and promote red blood cell production. Not only are these plants known in traditional medicine for treating iron deficiency anemia, but they also offer benefits in improving digestive function and reducing inflammation. Therefore, identifying and utilizing these plants could be instrumental in managing and preventing iron deficiency anemia and may serve as a natural complement to conventional medical treatments. However, it is recommended that the use of these plants be supervised by a healthcare professional and with careful attention to avoid any potential drug interactions or side effects.

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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.

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