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The Role of Plant-Based Antioxidants in the Prevention and Mitigation of Hemorrhoid Complications: A Comprehensive Review in Traditional Iranian Medicine

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A B S T R A C T

Objective: Hemorrhoids arise from the inflammation and distension of the blood vessels surrounding the rectum. This region is characterized by a dense network of blood vessels subjected to significant pressure fluctuations during bowel movements. Traditional Iranian medicine incorporates the use of various herbal remedies for the management of hemorrhoids and associated symptoms. This review aims to comprehensively examine and document the traditional Iranian medicinal plants utilized in the treatment of hemorrhoids.

Methods: A comprehensive literature search was conducted utilizing key terms such as "medicinal plants," "hemorrhoids," "traditional medicine," and "ethnobotany." Electronic databases including Google Scholar, Scopus, PubMed, SID, and Magiran were systematically searched to identify relevant studies. In addition, a thorough review of existing ethnobotanical literature was undertaken to ensure a comprehensive understanding of traditional Iranian practices related to hemorrhoid management.

Results: This review identified a diverse array of medicinal plants traditionally used in Iran for the management of hemorrhoids, including olive, coconut, aloe vera, apple, turmeric, chamomile, cranberry, hazel, lemon, almond, ginger, psyllium, flixweed, and yarrow.

Conclusion: The results of this review indicate that medicinal plants with anti-inflammatory, antioxidant, and soothing properties play an important role in the prevention and mitigation of hemorrhoid complications. Due to their antioxidant and anti-inflammatory effects, these plants help reduce inflammation and speed up the healing of damaged tissues. Additionally, a fiber-rich diet aids in improving bowel movements and reducing pressure on the rectal area, making it a key factor in the prevention of hemorrhoids.

Keywords: Hemorrhoids, Medicinal plants, Traditional medicine, Iran

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Introduction

Hemorrhoids arise from the distension and inflammation of the vascular cushions located within the anorectal region [1]. These cushions, comprised of blood vessels and connective tissue, are subject to increased intra-abdominal pressure during defecation [2]. Factors such as chronic constipation, obesity, and pregnancy can contribute to elevated intra-abdominal pressure, thereby exacerbating hemorrhoidal disease. Hemorrhoids can be broadly classified into two categories: internal and external [3]. Internal hemorrhoids originate above the dentate line and are typically asymptomatic in their early stages [3]. However, they can manifest with painless rectal bleeding, which may lead to iron-deficiency anemia if left unaddressed. Anemia, regardless of its etiology, is associated with adverse health outcomes across various patient populations [4].

Individuals with hemorrhoids may delay bowel movements, which can further contribute to constipation, exacerbate the condition, and lead to more severe complications [5]. The causes of hemorrhoids include prolonged straining during bowel movements, chronic constipation, insufficient fluid intake, a low-fiber diet, excessive spice consumption, pregnancy, prolonged sitting, poor posture while sitting, heavy lifting exercises like weightlifting, frequent diarrhea, and obesity. All these factors can lead to swelling and damage to the anal blood vessels, resulting in hemorrhoids

[6]. Treatment options for hemorrhoids include topical medications such as ointments and suppositories to alleviate pain, sclerotherapy injections to shrink the hemorrhoidal vessels, rubber band ligation to cut off blood supply to the hemorrhoid, surgical removal of clots, infrared coagulation, laser treatment, and bipolar coagulation. Surgery is usually performed on an outpatient basis [7]. To prevent hemorrhoids, it is recommended to avoid excessive straining during bowel movements, increase water and fluid intake, include more fiber in the diet, and refrain from prolonged sitting or standing [7].

The choice of therapeutic intervention for hemorrhoids depends on the severity and specific characteristics of the condition. Prompt surgical intervention may be necessary in cases where there is a risk of significant blood loss due to hemorrhoidal rupture. Regardless of the chosen treatment approach, lifestyle modifications are crucial for the management of hemorrhoids. Maintaining a high-fiber diet, ensuring adequate

fluid intake, and engaging in regular physical activity are essential for promoting healthy bowel function and preventing constipation. Traditional medicine has a long history of utilizing herbal remedies for the treatment of various ailments, including hemorrhoids [8,9]. This review aims to systematically investigate and document the traditional Iranian medicinal plants employed in the management of hemorrhoidal symptoms.

Methodology

A comprehensive literature search was conducted utilizing a combination of keywords, including "medicinal plants," "hemorrhoids," "piles," and "traditional medicine." These keywords were systematically combined and searched across various electronic databases, including Google Scholar, Scopus, PubMed, SID, and Magiran.

A comprehensive literature search was conducted across multiple electronic databases, including Google Scholar, the Scientific Information Database (SID), Magiran, PubMed, and Scopus. These databases were selected based on their comprehensive coverage of peer-reviewed literature in the fields of traditional medicine, pharmacy, and medicinal plant research.

Inclusion Criteria:

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All articles included in the review met the following criteria:

Relevance to the study topic, specifically focusing on the use of medicinal plants for the treatment of hemorrhoids in traditional Iranian medicine.

High-quality scientific content, including peer-reviewed articles published in reputable scientific journals.

Results

A review of the traditional medicine literature in Iran revealed that the following medicinal plants are used for the treatment of hemorrhoids: olive, coconut, aloe vera, apple, turmeric, chamomile, cranberry, hazelnut, lemon, almond, ginger, psyllium, chia seeds, and yarrow [7-10]. The effective medicinal plants for hemorrhoids based on traditional sources are summarized in Table 1.

Table 1. Medicinal Plants Used for Hemorrhoids in Traditional Iranian Medicine

Persian name	English name	Scientific name	Herbal family	Type of plant	Antipyretic Mechanism
Zeytoun	*Olive*	*Olea europaea*	Oleaceae	Perennial	Anti-inflammatory, soothing, and vascular tonic
Nargil	*Coconut*	*Cocos nucifera*	Arecaceae	Perennial	Anti-inflammatory properties and improvement of digestive function
Aloevrea	*Aloe Vera*	*Aloe vera*	Asphodelaceae	Perennial	Anti-inflammatory, soothing, and moisturizing of anal tissues
Sib	*Apple*	*Malus domestica*	Rosaceae	Perennial	Contains pectin, improves digestive function, and softens stool
Zardchobeh	*Turmeric*	*Curcuma longa*	Zingiberaceae	Perennial	Strong anti-inflammatory and antioxidant, reduces hemorrhoid inflammation
Babouneh	*Chamomile*	*Matricaria chamomilla*	Asteraceae	Perennial	Anti-inflammatory, antispasmodic, and soothing for the digestive system

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Zoghalakhte	*Cranberry*	*Vaccinium macrocarpon*	Ericaceae	Perennial	Vascular tonic and reducer of anal inflammation
Fandogh	*Hazel*	*Corylus avellana*	Betulaceae	Perennial	Vascular tonic and reducer of anal inflammation
Limou	*Lemon*	*Citrus limon*	Rutaceae	Perennial	Vascular tonic, reduces inflammation and bleeding
Badam	*Almond*	*Prunus dulcis*	Rosaceae	Perennial	Soothing and moisturizing of tissues, reduces inflammation and provides relief
Zangabil	*Ginger*	*Zingiber officinale*	Zingiberaceae	Perennial	Strong anti-inflammatory, increases blood circulation, and alleviates pain
Esfarzeh	*Psyllium*	*Plantago ovata*	Plantaginaceae	Annual	Improves digestive function, increases stool bulk, and reduces pressure on the hemorrhoidal area
Khakeshir	*Flixweed*	*Descurainia sophia*	Brassicaceae	Annual	Laxative and facilitator of bowel movements, reduces inflammation and prevents constipation
Boumadaran	*Yarrow*	*Achillea millefolium*	Asteraceae	Perennial	Anti-inflammatory, antiseptic, and astringent, reduces bleeding and inflammation in hemorrhoids

Results

The table shows that the effective medicinal plants for treating hemorrhoids come from various botanical families. Common families such as Asteraceae, Rosaceae, Zingiberaceae, and Rutaceae play a prominent role in this collection. The mechanisms through which these plants exert their effects can be grouped into three main categories:

Anti-inflammatory: Many plants, such as turmeric (*Curcuma longa*), aloe vera (*Aloe vera*), and chamomile (*Matricaria chamomilla*), possess strong anti-inflammatory properties that play a

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crucial role in reducing inflammation in the anal region. The anti-inflammatory effects of these plants primarily occur through the inhibition of inflammatory pathways, alleviating swelling and pain associated with hemorrhoids.

Vascular tonics: Plants like hazelnut (*Corylus avellana*), cranberry (*Vaccinium macrocarpon*), and lemon (*Citrus limon*) help improve blood circulation and strengthen blood vessels. This mechanism is vital for preventing exacerbation of the condition and improving the flexibility of the vascular walls in the hemorrhoidal area.

Laxative and facilitative: Plants such as psyllium (*Plantago ovata*) and chia seeds (*Descurainia sophia*) work by increasing stool bulk and facilitating bowel movements, thereby reducing pressure on the anal region and helping prevent symptom aggravation.

An examination of the growth duration of these plants (annual, biennial, and perennial) indicates that most plants on this list are perennial. Perennial plants are more economically and practically suitable for long-term use in treating diseases, as they do not require annual planting and harvesting. Such plants, including olive (*Olea europaea*), coconut (*Cocos nucifera*), and turmeric, can provide sustainable and cost-effective sources for herbal medicines.

Discussion

Hemorrhoids, also known as piles, are a common anorectal condition characterized by the inflammation and distension of the blood vessels within the anal canal. This condition can manifest with a range of symptoms, including pain, bleeding, and discomfort, significantly impacting an individual's quality of life. Traditional medicine has historically recognized the therapeutic potential of medicinal plants in the management of hemorrhoids. Herbal remedies offer a promising alternative or adjunct to conventional treatments, often demonstrating favorable safety profiles with minimal side effects and the potential for long-term benefits.

A comprehensive review of traditional Iranian medicine reveals the utilization of a diverse array of medicinal plants for the management of hemorrhoids. Notable examples include *Olea europaea* (olive), *Cocos nucifera* (coconut), *Aloe vera*, *Malus domestica* (apple), *Curcuma longa* (turmeric), *Matricaria chamomilla* (chamomile), *Vaccinium macrocarpon* (cranberry), *Corylus avellana* (hazelnut), *Citrus limon* (lemon), *Prunus dulcis* (almond), *Zingiber officinale* (ginger), *Plantago ovata* (psyllium), *Descurainia sophia* (chia seeds), and *Achillea millefolium* (yarrow).

Olive Oil (Olea europaea): Traditionally employed as a laxative and anti-inflammatory agent, olive oil is rich in unsaturated fatty acids and phenolic compounds with potent antioxidant properties [11].

Coconut Oil (Cocos nucifera): Known for its moisturizing and soothing properties, coconut oil contains lauric acid and caprylic acid, which exhibit antibacterial and anti-inflammatory activities [12].

Aloe vera: Topical application of *Aloe vera* gel provides a cooling effect and exerts anti-inflammatory properties, thereby alleviating pain and inflammation associated with hemorrhoids. The therapeutic effects of *Aloe vera* are attributed to its rich content of polysaccharides and glycosides, which promote tissue regeneration [13].

In traditional practices, Malus domestica (Apple) is Rich in soluble fiber, particularly pectin, apples promote regular bowel movements and alleviate constipation, thereby reducing strain during defecation and minimizing the risk of hemorrhoid exacerbation [14]. Turmeric, known for its anti-inflammatory and antibacterial properties, is utilized in traditional medicine to reduce inflammation and prevent hemorrhoidal infections. Its active compound, curcumin, exhibits strong antioxidant effects [15]. Chamomile tea is employed as a topical anti-inflammatory and soothing remedy for hemorrhoids. Its main compounds include flavonoids and sesquiterpenes,

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which have anti-inflammatory properties [16]. Cranberry is recognized as astringent and anti-inflammatory for reducing bleeding and swelling associated with hemorrhoids. The anthocyanins present in cranberries help strengthen vascular walls [17].

Hazelnut oil, due to its moisturizing and anti-inflammatory properties, is used in hemorrhoid treatment. This oil is rich in vitamin E and unsaturated fatty acids that aid in skin regeneration [18]. Lemon juice is also used in traditional medicine to strengthen blood vessels and reduce inflammation in hemorrhoids. Lemons contain vitamin C and flavonoids that promote vascular health [19]. Almond oil serves as a laxative and topical soothing agent to alleviate hemorrhoidal symptoms. This oil contains unsaturated fatty acids and vitamin E that help soften damaged tissues [20]. Ginger, recognized for its anti-inflammatory properties and ability to improve circulation, is also utilized to relieve hemorrhoidal symptoms. Its active component, gingerol, has both anti-inflammatory and analgesic effects [21]. Psyllium seeds are employed as a natural laxative to facilitate bowel movements and reduce pressure on hemorrhoids. These seeds contain soluble fiber that helps soften stool [22]. Chia seeds, with their laxative and digestive-regulating effects, are also beneficial for alleviating hemorrhoidal symptoms. This plant contains mucilage that aids in softening stool [23]. Finally, yarrow is used for its anti-inflammatory and astringent properties to reduce bleeding and swelling associated with hemorrhoids. Its active compounds include flavonoids and sesquiterpene lactones, which have anti-inflammatory effects [24-27].

Conclusion

These plants, with their anti-inflammatory, soothing, and laxative properties, aid in reducing symptoms of hemorrhoids such as swelling and pain, facilitating a quicker recovery. Their use in traditional medicine underscores their potential effectiveness and highlights the importance of herbal remedies in managing this common condition.

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