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Treatment of Angina pectoris with Indigenous Iranian Medicinal Plants: A Review on Traditional Persian Medicine

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A B S T R A C T

Objective: Angina pectoris is characterized by chest pain due to reduced blood flow to the heart, often caused by narrowed coronary arteries. This review examines medicinal plants traditionally used in Iran to alleviate angina symptoms, exploring both historical and modern applications. The goal is to enhance understanding of potential natural remedies for this condition.

Methods: This systematic review aimed to identify literature on the use of medicinal plants for angina pectoris. Searches were conducted across major scientific databases like Web of Science, PubMed, and Scopus, using keywords related to chest pain and herbal treatments. Articles included in the review were required to be in Farsi or English, focus on the effects of medicinal plants on angina, and be original research, reviews, or clinical trials, while excluding those with insufficient data or irrelevant content.

Results: Traditional Iranian medicine incorporates a rich array of herbal remedies for various ailments, including angina pectoris. Among the most commonly employed medicinal plants in Iran are garlic (*Allium sativum*), coriander (*Coriandrum sativum*), asafoetida (*Ferula assa-foetida*), cumin (*Cuminum cyminum*), ajwain (*Carum copticum*), parsley (*Petroselinum crispum*), pomegranate (*Punica granatum*), ginger (*Zingiber officinale*), green pumpkin (*Cucurbita pepo*), orange (*Citrus sinensis*), banana (*Musa spp.*), guava (*Psidium guajava*), apple (*Malus domestica*), turmeric (*Curcuma longa*), borage (*Borago officinalis*), lavender (*Lavandula angustifolia*), aloe vera (*Aloe vera*), almond (*Prunus dulcis*), basil (*Ocimum basilicum*), and alfalfa (*Medicago sativa*). These plants have been historically utilized as potential remedies for chest pain in Iranian traditional medicine.

Conclusion: The findings of this study suggest that traditional Iranian medicine offers a diverse array of medicinal plants with potential therapeutic benefits for angina pectoris. The identified plants exhibit a range of pharmacological properties, including anti-inflammatory, antioxidant, sedative, and antispasmodic effects. Additionally, these plants may contribute to improved blood circulation, potentially alleviating the symptoms of chest pain associated with angina.

Key words: Pain, Thorax, Chest pain, Herbal therapy, Traditional treatment, Angina pectoris, Persian medicine

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Introduction

Cardiovascular disease represents a significant global health burden, ranking as the leading cause of mortality worldwide [1]. The spectrum of cardiovascular disorders encompasses coronary artery disease, heart failure, arrhythmias, and congenital heart defects [2]. The prevalence of cardiovascular diseases has escalated in recent decades, primarily attributable to lifestyle changes and the increasing incidence of risk factors such as obesity, diabetes, and hypertension [3]. Projections indicate that cardiovascular diseases will continue to be the leading cause of death through 2030. The etiology of these conditions is multifaceted and involves a complex interplay of various factors.

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Several risk factors are associated with an increased likelihood of developing coronary artery disease, including elevated blood cholesterol levels, hypertension, diabetes, a family history of cardiovascular disease, smoking, and a sedentary lifestyle. These factors contribute to endothelial damage and the accumulation of atherosclerotic plaques, leading to narrowed coronary arteries, reduced blood flow, and an elevated risk of angina and myocardial infarction [4]. From a pathophysiological perspective, angina pectoris arises from insufficient oxygen delivery to the myocardium, often due to coronary artery stenosis [5]. This stenosis may result from atherosclerotic plaque formation, coronary artery spasm, or thrombotic occlusion. The resulting oxygen deprivation can manifest as chest pain or discomfort, which may radiate to the neck, shoulders, arms, or jaw [6].

The management of angina typically involves a combination of pharmacological and non-pharmacological interventions. Drug therapy often includes the administration of nitroglycerin, beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, and calcium channel blockers [7]. These medications mitigate angina symptoms by reducing myocardial workload, decreasing oxygen demand, and improving coronary blood flow. In more severe cases, surgical procedures such as percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) may be necessary [8].

Given the potential limitations and side effects associated with conventional treatments, there is a growing emphasis on developing novel preventive and therapeutic strategies, including the exploration of natural remedies and medicinal plants. Traditional Iranian medicine, along with other cultural traditions, has a rich history of utilizing medicinal plants for the treatment of angina and other cardiovascular conditions [8]. This review article was undertaken to identify the most promising medicinal plants employed in Iranian traditional medicine for the management of angina.

Methodology

This systematic review was conducted to identify medicinal plants traditionally employed in Iranian medicine for the management of angina pectoris. The methodology involved a comprehensive search, screening, selection, and quality assessment of relevant literature. Authoritative scientific databases, including Web of Science, Medline, PubMed, Scopus, and Google Scholar, were systematically searched using the following keywords: 'medicinal plants,' 'pain,' 'thorax,' 'chest pain,' 'herbal therapy,' 'herbal medicine,' 'traditional treatment,' and 'Persian medicine.' Additionally, MeSH terms were incorporated to enhance search precision.

To ensure comprehensive identification of relevant studies, a manual search of the reference lists of included articles was conducted. Inclusion criteria for this systematic review were limited to studies that [1] investigated the effects of Iranian medicinal plants on angina pectoris or chest pain and [2] provided full-text access. Articles were excluded if they were identified as duplicates in multiple databases, were unrelated to the study topic, or were written in languages other than Farsi or English.

Results

A diverse array of native medicinal plants are employed in traditional Iranian medicine to address chest pain, including garlic (*Allium sativum*), coriander (*Coriandrum sativum*), asafoetida (*Ferula assa-foetida*), cumin (*Cuminum cyminum*), fennel (*Foeniculum vulgare*), parsley (*Petroselinum crispum*), pomegranate (*Punica granatum*), ginger (*Zingiber officinale*), green pumpkin (*Cucurbita pepo*), orange (*Citrus sinensis*), banana (*Musa spp.*), guava (*Psidium guajava*), apple (*Malus domestica*), turmeric (*Curcuma longa*), borage (*Borago officinalis*), lavender (*Lavandula angustifolia*), aloe vera (*Aloe vera*), almond (*Prunus dulcis*), basil (*Ocimum basilicum*), and alfalfa (*Medicago sativa*). Table 1 provides a more comprehensive overview of these medicinal plants and their potential applications in the management of chest pain.

Table 1. Medicinal plants used for angina pectoris (chest pain) [9-12].

Scientific name	English Name	Family	Common mechanisms of action
Allium sativum	Garlic	Alliaceae	Inhibition of inflammatory enzymes, antimicrobial
Coriandrum sativum	Coriander	Apiaceae	Anti-inflammatory and antioxidant

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Ferula assa-foetida	Asafoetida	Apiaceae	Antispasmodic and anti-inflammatory
Cuminum cyminum	Cumin	Apiaceae	Antispasmodic and anti-inflammatory
Carum copticum	Ajwain	Apiaceae	Antispasmodic and anti-inflammatory
Petroselinum crispum	Parsley	Apiaceae	Anti-inflammatory and diuretic
Punica granatum	Pomegranate	Lythraceae	Anti-inflammatory and antioxidant
Zingiber officinale	Ginger	Zingiberaceae	Antispasmodic and anti-inflammatory
Cucurbita pepo	Pumpkin	Cucurbitaceae	Anti-inflammatory and antioxidant
Citrus sinensis	Orange	Rutaceae	Anti-inflammatory and antioxidant
Musa spp.	Banana	Musaceae	Anti-inflammatory and sedative
Psidium guajava	Guava	Myrtaceae	Anti-inflammatory and antioxidant
Malus domestica	Apple	Rosaceae	Anti-inflammatory and antioxidant
Curcuma longa	Turmeric	Zingiberaceae	Anti-inflammatory and antioxidant
Borago officinalis	Borage	Boraginaceae	Anti-inflammatory and sedative
Lavandula angustifolia	Lavender	Lamiaceae	Anti-inflammatory and sedative
Aloe vera	Aloe Vera	Asphodelaceae	Anti-inflammatory and regnative
Prunus dulcis	Almond	Rosaceae	Anti-inflammatory and antioxidant
Ocimum basilicum	Basil	Lamiaceae	Antispasmodic and anti-inflammatory
Medicago sativa	Alfalfa	Fabaceae	Anti-inflammatory

Discussion

Garlic (*Allium sativum*), containing compounds such as allicin, possesses well-documented antibacterial and antiviral properties, contributing to immune system enhancement [13]. Coriander (*Coriandrum sativum*), rich in essential oils and compounds like linalool, has been traditionally used to alleviate digestive symptoms and promote digestion [14]. Asafoetida (*Ferula assa-foetida*), characterized by the presence of compounds such as anhydroferulic acid, is renowned for its analgesic and antispasmodic effects [15]. Cumin (*Cuminum cyminum*), containing compounds like carvacrol and terpene, is known to reduce bloating and improve digestive function [16]. Ajwain (*Carum copticum*) is a source of antioxidants, including carbonyl compounds and omega-3 fatty acids, which contribute to inflammation reduction and digestive health promotion [17]. Parsley (*Petroselinum crispum*), rich in vitamin C and antioxidants, is beneficial for strengthening the immune system and promoting overall well-being [18].

Pomegranate (*Punica granatum*), rich in antioxidants such as punicalagin, has been associated with a reduced risk of cardiovascular disease and enhanced immune function [19].

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Ginger (Zingiber officinale), containing compounds like gingerol, possesses anti-inflammatory and analgesic properties [20]. Green pumpkin (*Cucurbita pepo*) is a valuable source of vitamin A and dietary fiber, supporting digestive health and visual function [21]. Oranges (*Citrus sinensis*), rich in vitamin C and flavonoids, contribute to immune system strengthening and a reduced risk of chronic diseases [22]. Bananas (*Musa* spp.), high in potassium and vitamin B6, are beneficial for cardiovascular health and nervous system function [23]. Guava (*Psidium guajava*), containing vitamin C and fiber, promotes digestive health and enhances immune function [24].

presence of linalool and limonene, is known for its calming effects on the nervous system and anxiety reduction [28]. Aloe vera (*Aloe vera*), rich in antioxidants and vitamins, is traditionally used for wound healing and skin soothing [29]. Almonds (*Prunus dulcis*), a valuable source of vitamin E and unsaturated fatty acids, contribute to cardiovascular and skin health [30]. Basil (*Ocimum basilicum*), containing essential oils and antioxidants, possesses anti-inflammatory and immune-enhancing properties [31]. Alfalfa (*Medicago sativa*), rich in vitamins B and C, supports digestive health and boosts immune function [32]. Plant secondary metabolites, such as alkaloids, flavonoids, and terpenes, have a variety of therapeutic properties. These compounds can be effective in treating conditions like diabetes, inflammation, and cancer. The use of medicinal plants containing these active compounds has long been a cornerstone in both traditional and modern medicine for the prevention and treatment of various diseases [33-38].

Conclusion

Research in traditional Iranian medicine has demonstrated the efficacy of a diverse array of medicinal plants in alleviating chest pain, including angina pectoris. These plants possess a range of pharmacological properties, including anti-inflammatory, antioxidant, sedative, and antispasmodic effects, which contribute to the reduction of chest pain symptoms. Additionally, many of these plants have been shown to improve blood circulation and increase oxygen supply to the heart thereby mitigating angina and other cardiovascular discomforts. The bioactive compounds found in these plants, such as flavonoids and essential fatty acids, may also contribute to regulating heart rhythm and lowering blood pressure, making them potential complementary therapies for individuals with angina. In conclusion, the use of medicinal plants in traditional Iranian medicine, due to their multifaceted therapeutic properties, is recognized as a comprehensive and natural approach to managing cardiovascular pain and discomfort.

Apples (*Malus domestica*), rich in antioxidants and dietary fiber, have been shown to lower cholesterol levels and promote cardiovascular health [25]. Turmeric (*Curcuma longa*), containing the bioactive compound curcumin, exhibits potent anti-inflammatory properties, supporting joint health [26]. Borage (*Borago officinalis*), a source of omega-6 fatty acids, has been associated with improved skin health and reduced inflammation [27]. Lavender (*Lavandula angustifolia*), characterized by the

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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.

Consent to participate

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

Author contributions

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

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