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The Use of Medicinal Plants in the Prevention and Treatment of Myocardial Infarction: A Review of Traditional Medical Sources

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A B S T R A C T

Objective: Myocardial infarction remains a leading cause of mortality worldwide, highlighting the need for effective preventive and therapeutic strategies. Traditional Iranian medicine has long employed medicinal plants to strengthen the heart and mitigate complications associated with heart attacks. This review aims to identify medicinal plants historically used in the management and prevention of myocardial infarction according to traditional Iranian medical texts.

Methods: In accordance with the principles of traditional medicine, this review systematically examined classical texts, specialized herbal literature, and credible online sources to identify plants associated with the prevention and treatment of myocardial infarction.

Results: Historical evidence indicates that traditional communities relied on plants such as *Crocus sativus L., Borago officinalis L., Curcuma longa L., Trigonella foenum-graecum L., Thymus vulgaris L., Althaea officinalis L., Cuminum cyminum L., Melissa officinalis L., Lavandula angustifolia Mill., Valeriana officinalis L., Achillea millefolium L., Citrus aurantium L., Allium sativum L., Salvia officinalis L., Papaver rhoeas L., Capsicum annuum L., Citrus limon (L.) Burm. f., Vaccinium macrocarpon Aiton, Camellia sinensis (L.) Kuntze, Hordeum vulgare L., Mentha spicata L., Matricaria chamomilla L., Zingiber officinale Roscoe, Cinnamomum verum J. Presl, Berberis vulgaris L., Anethum graveolens L., Cichorium intybus L., Elettaria cardamomum (L.) Maton, Punica granatum L.* as herbal remedies for the prevention and management of myocardial infarction.

Conclusion: Medicinal plants demonstrate significant potential in the prevention and treatment of myocardial infarction. Their traditional applications may serve as valuable complementary strategies alongside modern cardiovascular therapies. Scientific validation of these plants could facilitate the development of novel, safe, and effective cardiac medications.

Keywords: Heart, myocardial infarction, medicinal plants, traditional medicine, Iran, Treatment

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Introduction

Myocardial infarction (MI) is one of the leading causes of mortality worldwide and imposes a substantial economic and healthcare burden on societies [1]. It typically results from the sudden obstruction of coronary arteries, leading to reduced blood flow to the myocardium and potentially causing permanent cardiac damage [2]. Major risk factors for MI include hypertension, diabetes, obesity, tobacco use, chronic stress, and a sedentary lifestyle [3,4]. These factors contribute to coronary artery injury and increase the likelihood of impaired myocardial perfusion [5].

Common clinical manifestations of MI include chest pain or pressure, which may radiate to the arms, shoulders, neck, jaw, or back [6]. Additional symptoms may include shortness of breath, cold sweats, nausea, dizziness, and arrhythmias. In women and elderly patients, symptoms may be mild or atypical [7].

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Prevention strategies primarily emphasize lifestyle modification, a healthy diet, and the management of cardiovascular risk factors [8]. Key preventive measures include the consumption of fruits, vegetables, whole grains, and fish; regular physical activity; smoking cessation; stress management; and the control of blood pressure and blood glucose levels [9].

For centuries, traditional Iranian medicine and other historical medical systems have sought to identify plants with cardioprotective properties [10]. Historical texts document the use of medicinal plants to strengthen the heart, improve circulation, and prevent arterial blockage [11].

Recent scientific studies indicate that many medicinal plants contain bioactive compounds, including flavonoids, alkaloids, and terpenoids [12]. These compounds exhibit antioxidant, anti-inflammatory, anticoagulant, and blood pressure-regulating effects, and they may modulate molecular pathways involved in cardiac injury and coronary artery obstruction [13]. Evidence from traditional medical sources also suggests that medicinal plants can enhance cardiovascular health [14]. By reducing inflammation, inhibiting low-density lipoprotein (LDL) oxidation, and improving endothelial function, these plants may lower the risk of myocardial infarction; some additionally possess antihypertensive and anticoagulant properties [15].

The treatment of MI requires immediate intervention and may involve restoring coronary blood flow through pharmacotherapy, angioplasty, stenting, or bypass surgery [16]. Long-term management includes the use of statins, beta-blockers, and anticoagulants, in conjunction with lifestyle modifications and participation in cardiac rehabilitation programs to reduce the risk of recurrent events [17].

This review aims to comprehensively examine traditional sources and contemporary scientific evidence regarding the use of medicinal plants in the prevention and management of myocardial infarction, thereby providing a foundation for the safe and targeted clinical application of these natural resources.

Methods

This study was conducted as a systematic review based on the principles of traditional Iranian medicine. The methodology comprised two main components:

1. Identification of medicinal plants
Medicinal plants historically used for the prevention and treatment of myocardial infarction in traditional Iranian medicine were identified through a comprehensive review of both written and digital sources. These sources included classical reference texts on traditional medicine and medicinal plants, specialized herbal literature, scientific databases, and other credible online resources [18–25].

2. Evidence matching and evaluation
The traditional uses of the identified plants were compared and analyzed against findings from modern scientific studies to assess the alignment between historical applications and contemporary evidence, including known molecular mechanisms involved in the prevention and management of myocardial infarction. Electronic databases searched included Web of Science, SID, Google Scholar, Scopus, and MagIran, using keywords related to prevention, treatment, medicinal plants, traditional medicine, and myocardial infarction.

This two-tiered approach enabled a comprehensive review of medicinal plant applications in myocardial infarction and facilitated a scientific evaluation of evidence derived from traditional medical sources.

Results

Traditional Iranian medicine employs a wide variety of medicinal plants for the prevention and treatment of myocardial infarction. Notable examples include *Crocus sativus L., Borago officinalis L., Curcuma longa L., Trigonella foenum-graecum L., Thymus vulgaris L., Althaea officinalis L., Cuminum cyminum L., Melissa officinalis L., Lavandula angustifolia Mill., Valeriana officinalis L., Achillea millefolium L., Citrus aurantium L., Allium sativum L., Salvia officinalis L., Papaver rhoeas L., Capsicum annuum L., Citrus limon (L.) Burm. f., Vaccinium macrocarpon Aiton, Camellia sinensis (L.) Kuntze, Hordeum vulgare L., Mentha spicata L., Matricaria chamomilla L., Zingiber officinale Roscoe, Cinnamomum verum J. Presl, Berberis vulgaris L., Anethum graveolens L., Cichorium intybus L., Elettaria cardamomum (L.) Maton, Punica granatum L.*

Detailed information regarding the characteristics, traditional uses, and reported effects of these medicinal plants in the context of myocardial infarction is summarized in Table 1.

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Table 1: Medicinal plants traditionally used for the prevention and management of myocardial infarction in Iranian traditional medicine

Common Name	Scientific Name	Family	Plant Part Used	Traditional Use
Saffron	*Crocus sativus L.*	Iridaceae	Stigma	Infusion, edible, poultice
Borage	*Borago officinalis L.*	Boraginaceae	Flower, leaf	Infusion, tea, edible
Turmeric	*Curcuma longa L.*	Zingiberaceae	Rhizome	Powder, edible, poultice
Fenugreek	*Trigonella foenum-graecum L.*	Fabaceae	Seed	Decoction, edible
Thyme	*Thymus vulgaris L.*	Lamiaceae	Leaf, flower	Infusion, tea
Hollyhock	*Althaea officinalis L.*	Malvaceae	Root, flower	Infusion, poultice
Cumin	*Cuminum cyminum L.*	Apiaceae	Seed	Decoction, spice, edible
Lemon Balm / Musk Willow	*Melissa officinalis L.*	Lamiaceae	Leaf	Infusion, tea
Lavender	*Lavandula angustifolia Mill.*	Lamiaceae	Flower	Distillate, infusion, poultice
Valerian	*Valeriana officinalis L.*	Caprifoliaceae	Root	Infusion, decoction
Yarrow	*Achillea millefolium L.*	Asteraceae	Leaf, flower	Infusion, poultice
Bitter Orange Blossom	*Citrus aurantium L.*	Rutaceae	Flower	Distillate, infusion
Garlic	*Allium sativum L.*	Amaryllidaceae	Clove	Raw, decoction, poultice
Sage	*Salvia officinalis L.*	Lamiaceae	Leaf	Infusion, tea
Poppy	*Papaver rhoeas L.*	Papaveraceae	Flower	Infusion, poultice
Red Pepper	*Capsicum annuum L.*	Solanaceae	Fruit	Edible, spice
Lemon	*Citrus limon (L.) Burm. f.*	Rutaceae	Fruit, peel	Juice, infusion

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Cranberry	*Vaccinium macrocarpon Aiton*	Ericaceae	Fruit	Edible, infusion
Green Tea	*Camellia sinensis (L.) Kuntze*	Theaceae	Leaf	Infusion
Barley	*Hordeum vulgare L.*	Poaceae	Seed	Decoction, soup, infusion
Mint	*Mentha spicata L.*	Lamiaceae	Leaf	Infusion, tea
German Chamomile	*Matricaria chamomilla L.*	Asteraceae	Flower	Infusion, tea, poultice
Ginger	*Zingiber officinale Roscoe*	Zingiberaceae	Rhizome	Infusion, edible
Cinnamon	*Cinnamomum verum J. Presl*	Lauraceae	Bark	Infusion, edible
Barberry	*Berberis vulgaris L.*	Berberidaceae	Fruit	Decoction, edible
Dill	*Anethum graveolens L.*	Apiaceae	Leaf, seed	Infusion, edible
Chicory	*Cichorium intybus L.*	Asteraceae	Root, leaf	Infusion, edible
Cardamom	*Elettaria cardamomum (L.) Maton*	Zingiberaceae	Seed	Infusion, spice
Pomegranate	*Punica granatum L.*	Lythraceae	Fruit, peel	Juice, decoction

Discussion

Myocardial infarction (MI) and cardiovascular diseases represent some of the most pressing global health challenges, affecting millions of individuals annually and imposing substantial economic and social burdens on healthcare systems. Due to the side effects and limitations of conventional pharmaceuticals, there is growing interest in medicinal plants as complementary or alternative strategies for the prevention and management of these conditions [26].

Medicinal plants, which contain bioactive compounds such as flavonoids, phenols, alkaloids, saponins, and glycosides, have demonstrated anti-inflammatory, antioxidant, and metabolic regulatory effects. These properties contribute to the control of blood pressure, reduction of lipid levels, and prevention of cardiac fibrosis [27,28]. For example, *Allium sativum*, *Curcuma longa*, *Crataegus* spp., *Zingiber officinale*, *Cinnamomum verum*, and *Ginkgo biloba* have been shown to prevent cardiac ischemia, reduce oxidative stress, and improve vascular resistance [28,31].

Specific plant-derived compounds, such as oleanolic acid primarily extracted from olives and apple peels can mitigate myocardial infarction-induced damage by modulating cellular pathways such as Akt/mTOR and inhibiting cardiac fibrosis, thereby enhancing cardioprotection [29]. Additionally, plants from the Asteraceae and Lamiaceae families, including chamomile, thyme, sage, and mint, exhibit antithrombotic, diuretic, and vasorelaxant properties, which may reduce complications associated with hypertension, atherosclerosis, and myocardial infarction [32].

Flavonoid-rich Chinese medicinal plants, such as *Ginkgo biloba*, *Scutellaria baicalensis*, *Thymus vulgaris*, and *Salvia miltiorrhiza*, also improve endothelial function, reduce inflammation, and exert antioxidant effects, contributing to the prevention of cardiac injury [35]. Moreover, natural compounds such as curcumin, resveratrol, and quercetin can reduce free radical formation and enhance the endogenous antioxidant system, serving as effective agents in the prevention and treatment of MI-induced cardiac damage [37].

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Collectively, current evidence indicates that medicinal plants can not only lower the risk of myocardial infarction and promote cardiovascular health but also act as safe complementary agents alongside conventional therapies, potentially reducing drug dosages and minimizing adverse effects. These findings underscore the need for further clinical and mechanistic research on cardioprotective medicinal plants and may guide the development of natural therapeutics and preventive strategies worldwide.

Conclusion

Myocardial infarction remains a leading cause of mortality globally, imposing significant economic and social burdens. Evidence from traditional Iranian medicine demonstrates that numerous medicinal plants, including saffron, garlic, turmeric, thyme, hawthorn, and chamomile, have historically been used for the prevention and treatment of MI. These plants, rich in bioactive compounds such as flavonoids, phenols, alkaloids, and saponins, exhibit antioxidant, anti-inflammatory, and anticoagulant effects, contributing to the reduction of blood pressure, cholesterol levels, and ischemia-induced cardiac damage. Compounds such as oleanolic acid, curcumin, and resveratrol further enhance cardioprotection by inhibiting cardiac fibrosis and scavenging free radicals. Plants from the Asteraceae and Lamiaceae families, with diuretic, antithrombotic, and vasorelaxant properties, also contribute to the prevention of cardiac injury.

Integrating medicinal plants as adjuncts to conventional therapies may reduce the side effects of chemical drugs and improve cardiovascular outcomes. Scientific and clinical investigation of these plants provides a strong foundation for the development of natural therapeutics and global preventive strategies aimed at promoting cardiovascular health.

Declarations

Conflict of Interest

The author declares no conflict of interest related to the publication of this article.

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Consent for Publication

The author confirms that the final version of the manuscript has been reviewed and approved for publication.

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Authors' Contributions

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

Ethical Approval

As this study is a review article, it does not involve human or animal subjects and therefore does not require ethical approval or informed consent.

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