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Medicinal Plants for Enhancing Vision in Traditional Medicine

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A B S T R A C T

Objective: Plants serve as a rich repository of bioactive compounds with the potential to promote ocular health, prevent eye diseases, and enhance visual function. Traditional medicine has long utilized plant-based remedies to improve vision. This review aims to identify and elucidate the mechanisms of action of natural antioxidants derived from plants that exhibit beneficial effects on visual health.

Methods: In this review study, relevant articles were searched using keywords such as medicinal plants, vision, vision improvement, and traditional medicine. Databases like Google Scholar, SID, Magiran, PubMed, and Scopus were used for the search.

Results: Medicinal plants including fennel, lemon, saffron, cranberry, green tea, turmeric, grapes, celery, and dandelion were found to enhance vision.

Conclusion: This review highlights the potential of medicinal plants to enhance visual function and prevent ocular diseases. The antioxidant properties of these plants can safeguard ocular tissues from oxidative damage, thereby mitigating the risk of conditions such as dry eye syndrome, glaucoma, and other ocular disorders. To fully harness the therapeutic potential of medicinal plants, further research is imperative to elucidate their precise mechanisms of action and optimize their application in both traditional and modern medicine.

Keywords: Vision, Medicinal plants, Traditional medicine

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Introduction

Eyes, sophisticated organs of sensory perception, are integral to both visual acuity and spatial orientation [1]. As a primary receptor of light, it transduces electromagnetic radiation into neural signals, which are subsequently processed by the brain to yield visual perception [2]. Beyond its fundamental role in vision, the eye enables a multitude of daily activities, thereby enhancing environmental interactions, promoting safety, and increasing efficiency [3].

Vision, one of the five primary senses, significantly impacts an individual's quality of life [4]. Visual impairment can stem from a variety of factors, including genetic predisposition, aging, ocular diseases such as cataracts and glaucoma, or even nutritional deficiencies [4]. The underlying pathophysiology of visual impairment often involves a reduction in the eye's accommodative capacity or retinal dysfunction. These conditions can result in decreased visual acuity, blurred vision, or complete blindness, which can adversely affect an individual's daily routines and social interactions [5].

Several therapeutic interventions, including eyeglasses, contact lenses, topical medications, and laser surgeries, are available to improve visual function [6]. However, these modalities are not without potential adverse effects. Prolonged use of ocular medications can result in ocular surface disease, such as dry eye syndrome and ocular irritation, or even damage to the delicate ocular tissues [7]. Moreover, while laser surgeries are effective, they carry inherent risks, including infection and procedural errors [8].

The use of medicinal plants to promote ocular health has been a cornerstone of traditional medicine for centuries. These plants, rich in antioxidant and anti-inflammatory compounds, have demonstrated potential in preventing ocular diseases and enhancing visual function. Regular consumption of these plants may contribute to overall ocular well-being and mitigate oxidative stress-induced damage. In traditional medicine, herbal remedies have long been employed to fortify visual acuity [9]. The present review aims to identify and elucidate the efficacy of natural antioxidants in improving visual function.

Methodology

In this review study, a systematic search was conducted to identify relevant articles on medicinal plants that are effective in enhancing vision in traditional medicine. The databases used for this search included Google Scholar, Scientific Information Database [SID], Magiran, PubMed, and Scopus.

Search Strategy:

The search was conducted using a combination of the following keywords: "medicinal plants," "vision", "vision improvement", "traditional medicine", and "Iranian medicine". Additionally, Boolean operators [AND, OR] were employed to refine and enhance the accuracy of the search and to retrieve more relevant results.

Inclusion Criteria

Articles that addressed the effects of medicinal plants on improving vision and treating eye diseases.

Studies that examined the use of plants in traditional medicine and Iranian medicine for vision enhancement.

Studies published in both Persian and English languages.

Exclusion Criteria

Articles that focused solely on improving other aspects of general health without directly addressing vision or eye health.

Studies that lacked reliable scientific methodology or were not supported by credible sources.

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Results

Medicinal plants such as fennel, lemon, saffron, cornelian cherry, green tea, turmeric, grapes, celery, and dandelion have been identified as effective in improving vision. Table 1 presents a list of these medicinal plants along with additional details.

Persian name	English name	Scientific name	Herbal family	Mechanism	Type of plant
Razianeh	Fennel	*Foeniculum vulgare*	Apiaceae	Antioxidants and Vitamin A for Retina Protection	Perennial
Limotorsh	Lemon	*Citrus limon*	Rutaceae	Vitamin C as an antioxidant to prevent cell damage	Perennial
zafaran	Saffron	*Crocus sativus*	Iridaceae	Crocin and safranal with anti-inflammatory effect and protection of retinal cells	Perennial
Zoghalakhteh	Cornelian Cherry	*Cornus mas*	Cornaceae	Antioxidants and flavonoids to improve blood circulation in the eye	Perennial
Chayesabz	Green Tea	*Camellia sinensis*	Theaceae	Catechins with strong antioxidant properties to reduce oxidative stress	Perennial
zardchoubeh	Turmeric	*Curcuma longa*	Zingiberaceae	Curcumin with anti-inflammatory and retinal protection effect	Perennial
Angour	Grapes	*Vitis vinifera*	Vitaceae	Resveratrol and antioxidants to protect	Perennial

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				the retina against oxidative stress	
Karafs	Celery	*Apium graveolens*	Apiaceae	Antioxidants and nutrients to ocular health	Biennial
Ghasedak	Dandelion	*Taraxacum officinale*	Asteraceae	Anti-inflammatory and antioxidant compounds to protect vision	Perennial

Table 1. Medicinal Plants Effective in Enhancing Vision in Traditional Iranian Medicine [9-18]

Distribution of Plant Families

The diverse taxonomic distribution of the plants presented in this table underscores their broad botanical representation. Prominent families, including Apiaceae, Rutaceae, and Zingiberaceae, are well-recognized for their contributions to ocular health. For instance, *Foeniculum vulgare* [fennel] and *Apium graveolens* [celery], both members of the Apiaceae family, are rich sources of antioxidants and nutrients that strengthen ocular blood vessels and protect the retina. This taxonomic diversity suggests that each plant family offers unique bioactive compounds with specific ocular health benefits.

Mechanisms of Action

The primary mechanisms of action underlying the ocular benefits of these plants are centered around their antioxidant and anti-inflammatory properties. Antioxidants play a crucial role in maintaining ocular health by mitigating oxidative stress and reducing cellular damage. For instance, *Crocus sativus* [saffron] contains crocin and safranal, compounds with potent anti-inflammatory effects that protect retinal cells. Similarly, *Camellia sinensis* [green tea] and *Vitis vinifera* [grapes] contain catechins and resveratrol, respectively, which are well-known for their antioxidant properties and ability to reduce oxidative stress.

In addition to antioxidants, anti-inflammatory compounds such as curcumin, found in *Curcuma longa* [turmeric], contribute to reducing retinal inflammation and preventing cellular degeneration. These plants hold particular promise for individuals with ocular conditions such as retinal degeneration and impaired ocular blood flow.

Perennial vs. Biennial Plants

The majority of plants listed in this table are perennials, with the exception of *Apium graveolens* [celery], which is a biennial. Perennials, characterized by longer life cycles, offer greater potential for sustained production of medicinal compounds. Their longevity enables consistent production of stable compounds, such as antioxidants and nutrients, over multiple growing seasons. Plants like *Vitis vinifera* [grapes] and *Camellia sinensis* [green tea] are perennial crops extensively studied for their medicinal properties, particularly in the context of ocular health.

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In contrast, the biennial *Apium graveolens* [celery] has a shorter life cycle, potentially requiring more intensive cultivation and harvesting practices. However, its rich antioxidant profile makes it a promising candidate for enhancing ocular vascular health.

Discussion

Enhancing visual acuity and maintaining ocular health have been longstanding objectives in both conventional and traditional medicine. Historically, medicinal plants have been recognized as effective agents for the treatment and prevention of ocular diseases. Contemporary scientific research, coupled with historical use, has validated the beneficial effects of many medicinal plants on ocular health. Among these, plants such as fennel, lemon, saffron, cornelian cherry, green tea, turmeric, grapes, celery, and dandelion stand out due to their antioxidant and nutrient-rich properties, which are particularly effective in strengthening vision.

Foeniculum vulgare [fennel] is a medicinal plant rich in vitamins and minerals. It contains phytochemicals such as anethole, which possess anti-inflammatory and antioxidant properties, playing a significant role in reducing ocular inflammation and improving retinal health [19]. *Citrus limon* [lemon], with its high content of Vitamin C and antioxidants, is effective in combating oxidative damage and reducing the risk of ocular diseases such as cataracts [20].

Crocus sativus [saffron], containing compounds like crocin and safranal, which are renowned for their potent antioxidant properties, can enhance visual function, improve visual acuity, and reduce retinal damage. Studies have demonstrated that saffron consumption can alleviate symptoms of age-related ocular diseases, including macular degeneration [21].

Cornus mas [Cornelian cherry] is rich in anthocyanins and Vitamin C, which possess a strong capacity to strengthen ocular blood vessels and improve retinal blood circulation. These compounds contribute to reducing inflammation and protecting the eyes from oxidative damage [22]. *Camellia sinensis* [green tea], with its polyphenolic compounds such as catechins, is beneficial in preventing diseases like glaucoma and macular degeneration. Its antioxidant properties help prevent cellular damage to the eye [23].

Curcuma longa [turmeric], containing the active compound curcumin, is recognized as a natural anti-inflammatory agent. Curcumin helps mitigate inflammation and prevent the degeneration of ocular cells, contributing to enhanced vision and preserved ocular health [24]. *Vitis vinifera* [grapes], particularly the skin, which is rich in resveratrol, is a potent antioxidant that can protect the retina from damage induced by intense light and reduce the risk of age-related ocular diseases [25].

Apium graveolens [celery], with its content of Vitamin A and essential minerals like potassium and calcium, can help strengthen vision and prevent dry eye syndrome [26]. *Taraxacum officinale* [dandelion], with its anti-inflammatory properties and rich nutritional profile, contributes to ocular health and helps alleviate symptoms of diseases such as glaucoma and cataracts [27].

Based on the identified natural compounds in these plants, it can be concluded that these medicinal plants offer potential as complementary treatments and preventive strategies for enhancing vision and safeguarding ocular health from environmental damage and aging. The incorporation of these plants, particularly when combined with a balanced and nutritious diet, can significantly support and improve ocular health. However, further research is imperative to determine optimal dosages and elucidate the precise mechanisms of action of these plants, thereby enabling their scientifically validated and recommended use in routine medical practice.

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Conclusion

In conclusion, medicinal plants such as fennel, lemon, saffron, cornelian cherry, green tea, turmeric, grapes, celery, and dandelion, with their inherent antioxidant, anti-inflammatory, and nutritional properties, offer significant potential for enhancing visual function and preventing ocular diseases. The consumption of these plants can be considered a natural approach to maintaining ocular health and strengthening vision.

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The authors have no competing interests to declare that are relevant to the content of this article.

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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:

RS: Conceptualization, the original draft writing, investigation, writing including reviewing and editing and investigation and formal analysis; SHH: Supervision, and project administration; SHH and RS Conceptualization, the original draft writing, writing including reviewing and editing

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