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Traditional Treatment of Parkinson's: Medicinal Plants Effective for Parkinson's in Traditional Iranian Medicine

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A B S T R A C T

Objective: Parkinson's disease (PD) is a chronic, progressive neurological disorder characterized by the degeneration of dopaminergic neurons in the substantia nigra, a region of the brain responsible for motor control. Following Alzheimer's disease, Parkinson's is the second most prevalent neurodegenerative disorder. Despite the availability of various pharmacological treatments, these medications often exhibit side effects and may have varying efficacy and duration of action. To address the limitations of conventional therapies, this review aims to identify the most promising medicinal plants traditionally employed in the management of Parkinson's disease.

Methods: This review employed a comprehensive search strategy to identify relevant literature on the use of medicinal plants for Parkinson's disease. Authoritative scientific databases, including Web of Science, PubMed, Scopus, and Google Scholar, were systematically searched using the following keywords: 'medicinal plants,' 'traditional medicine,' 'Parkinson's,' and 'neurology.' Irrelevant articles were excluded from the review process.

Results: Traditional Iranian medicine incorporates a diverse array of medicinal plants for the management of Parkinson's disease. Notable examples include *Nigella sativa* (black cumin), *Boswellia serrata* (frankincense), *Thymus vulgaris* (thyme), *Hypericum perforatum* (St. John's wort), *Zingiber officinale* (ginger), *Heracleum persicum* (Persian hogweed), *Curcuma longa* (turmeric), *Cinnamomum verum* (cinnamon), *Olea europaea* (olive), *Camellia sinensis* (tea), *Prunus domestica* (plum), *Ficus carica* (fig), *Echium amoenum* (Iranian borage), *Prunus dulcis* (almond), *Lavandula angustifolia* (lavender), and various *Scutellaria* species.

Conclusion: While medicinal plants may offer potential benefits as adjunctive therapies for Parkinson's disease, further research is warranted to establish their efficacy and safety. Current studies on these plants are limited in scope, and additional evidence is required to draw definitive conclusions regarding their role in the management of Parkinson's.

Keywords: Neurology, Parkinson's, Medicinal Plants, Traditional Treatment, Iran

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Introduction

Parkinson's disease (PD) is a chronic, progressive neurological disorder characterized by the degeneration of dopaminergic neurons in the substantia nigra, a brain region crucial for motor control [1]. These neurons produce dopamine, a neurotransmitter essential for planning and executing voluntary movements [2]. For reasons not fully understood, dopaminergic neurons in the substantia nigra gradually degenerate in individuals with PD. When approximately 80% of dopamine-producing neurons are lost, PD symptoms become evident [3]. The depletion of dopamine results in a range of motor symptoms, including tremor, bradykinesia, rigidity, and postural instability [3]. Additional symptoms may encompass a reduction in facial expressions, decreased blinking, impaired fine motor skills (e.g., tying shoelaces, buttoning shirts), micrographia, balance and postural difficulties, increased risk of falls, slow and monotonous speech, dysphagia, drooling, fatigue, and foot pain [3].

A definitive diagnosis of Parkinson's disease (PD) is typically based on a comprehensive assessment of clinical

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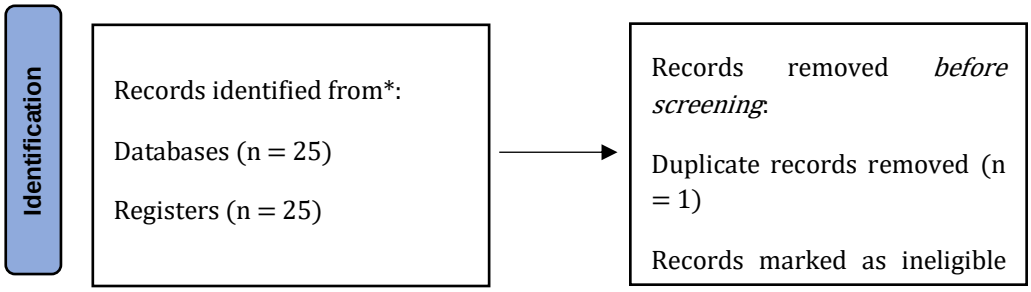
features. While there is no single definitive test, the diagnosis is primarily made based on the presence of cardinal Parkinsonian symptoms [4]. In addition to pharmacological interventions, a multidisciplinary approach to managing PD is often recommended, incorporating physiotherapy, occupational therapy, and speech therapy to address motor symptoms, gait disturbances, speech difficulties, muscle rigidity, and cognitive function. Lifestyle modifications, including a healthy diet and regular exercise, can also play a supportive role [5]. Pharmacological interventions for PD primarily focus on increasing dopamine levels in the brain or targeting other neurotransmitters involved in the disease. Levodopa, a precursor to dopamine, is considered the most effective medication for PD. However, prolonged use of Levodopa may lead to motor complications, such as dyskinesia, limiting its early use [6].

Medicinal plants have historically played a significant role in the management of Parkinson's disease within the framework of traditional medicine. These plants contain bioactive compounds, including antioxidants, flavonoids, and alkaloids, which may offer neuroprotective effects by mitigating oxidative stress, a critical factor in the progression of Parkinson's disease. The antioxidant and anti-inflammatory properties of medicinal plants may contribute to alleviating the symptoms of Parkinson's disease [7]. Additionally, these plants have been demonstrated to exert positive effects on the central nervous system [8]. Therefore, the integration of medicinal plants as a complementary approach to Parkinson's disease management may offer a natural and effective strategy for mitigating the symptoms of this condition.

Methods

This systematic review employed a comprehensive search strategy to identify relevant literature on the use of medicinal plants for Parkinson's disease. Authoritative scientific databases, including Web of Science, PubMed, Scopus, and Google Scholar, were systematically searched using the following keywords: 'medicinal plants,' 'traditional medicine,' 'Parkinson's,' 'neurology,' 'herbal extracts,' and 'neurodegenerative.' Both Persian and English language searches were conducted to ensure comprehensive coverage.

Following the initial search, a preliminary screening process was implemented to exclude articles that were clearly irrelevant to the study topic or did not meet the inclusion criteria. These criteria included the requirement for articles to focus on the use of medicinal plants for Parkinson's disease and to provide sufficient data for analysis. The remaining articles underwent a more detailed review, and those that met the inclusion criteria were thoroughly analyzed to inform the development of this review article (Figure 1).



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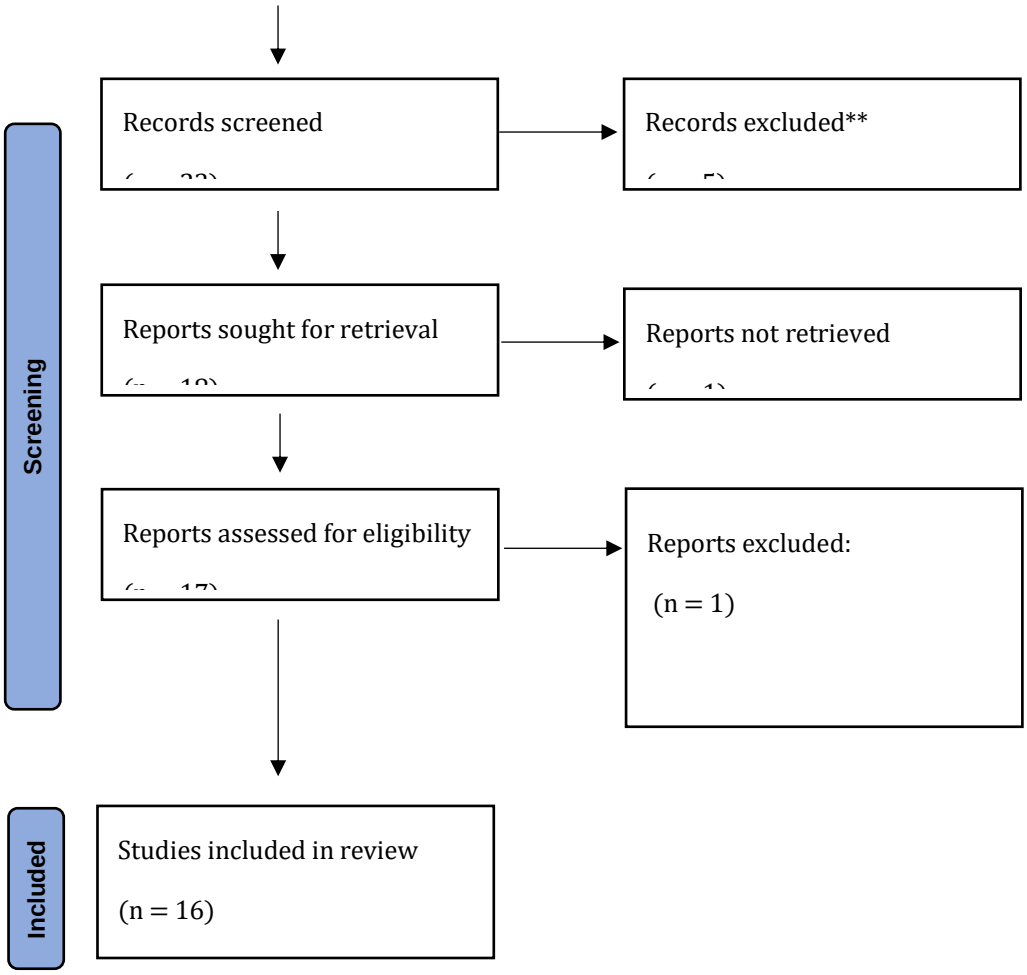


Figure 1. Flowchart of Search Strategy

Results

This review identified a range of medicinal plants traditionally employed in Iranian medicine for the management of Parkinson's disease. Notable examples include *Nigella sativa* (black cumin), *Boswellia serrata* (frankincense), *Thymus vulgaris* (thyme), *Hypericum perforatum* (St. John's wort), *Zingiber officinale* (ginger), *Heracleum persicum* (Persian hogweed), *Curcuma longa* (turmeric), *Cinnamomum verum* (cinnamon), *Olea europaea* (olive), *Camellia sinensis* (tea), *Prunus domestica* (plum), *Ficus carica* (fig), *Echium amoenum* (Iranian borage), *Prunus dulcis* (almond), *Lavandula angustifolia* (lavender), and various *Scutellaria* species. Table 1 provides a comprehensive overview of these medicinal plants and their potential applications in the management of Parkinson's disease.

Table 1. Medicinal Plants Effective Against Parkinson's Disease in Traditional Iranian Medicine.

Persian name	Scientific name	Herbal family	English name	Bioactive compounds	Ref.
Siahdaneh	*Nigella sativa*	Ranunculaceae	Black Cumin	Thymoquinone, nigelidine	[9]

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Kondor	*Boswellia serrata*	Burseraceae	Indian Frankincense	Bosolic acid, beta-bosolic acid	[10]
Avishan	*Thymus vulgaris*	Lamiaceae	Thyme	Thymol, Carvacrol	[11]
Gole raei	*Hypericum perforatum*	Hypericaceae	St. John's Wort	Hyperforin, hypericin	[12]
Zangabil	*Zingiber officinale*	Zingiberaceae	Ginger	Gingerol, Shugaol	[13]
Golpar	*Heracleum persicum*	Apiaceae	Persian Hogweed	Coumarins, flavonoids	[14]
Zardchobeh	*Curcuma longa*	Zingiberaceae	Turmeric	Curcumin, Demotoxic Curcumin	[15]
Darchin	*Cinnamomum verum*	Lauraceae	Cinnamon	Cinnamaldehyde, epicatechin	[16]
Zeytoun	*Olea europaea*	Oleaceae	Olive	Oleuropein, hydroxytyrosol	[17]
Chay	*Camellia sinensis*	Theaceae	Tea	Catechins, L-theanine	[18]
Alou	*Prunus domestica*	Rosaceae	Plum	Anthocyanins, phenolic acids	[19]
Anjir	*Ficus carica*	Moraceae	Fig	Flavonoids, phenolic acids	[20]
Gavzaban	*Echium amoenum*	Boraginaceae	Echium	Pyridine alkaloids, flavonoids	[21]
Badan derakhti	*Prunus dulcis*	Rosaceae	Almond	Vitamin E, phenolic acids	[22]
Ostokhodous	*Lavandula angustifolia*	Lamiaceae	Lavender	Linalool, linalyl acetate	[23]
Scutelaria	*Scutellaria baicalensis*	Lamiaceae	Baikal Skullcap	Baikalin, Bakalin	[24]

Discussion

Currently, there is no definitive cure for Parkinson's disease, and treatment primarily focuses on managing symptoms and improving quality of life. A multi-faceted approach, including medication, dietary modifications, and lifestyle changes, is often recommended. While there is no definitive cure, various treatments, such as pharmacological

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interventions, surgical procedures, and complementary therapies, can provide relief from Parkinson's symptoms [25]. The therapeutic potential of medicinal plants for Parkinson's disease has been explored to a limited extent, primarily within the context of Ayurveda, an ancient Indian medical system. While medicinal plants may not offer a definitive cure, they may contribute to alleviating secondary symptoms, such as dementia and cognitive impairment, and promoting overall well-being [26].

The bioactive compounds present in these medicinal plants may exert neuroprotective effects by inhibiting microglial activation and reducing inflammation associated with dopaminergic neuron degeneration. These compounds may also exert anti-Parkinsonian effects through the inhibition of pro-inflammatory factors or the generation of dismutases. Herbal extracts can be formulated as single or multi-herb preparations for the potential treatment of Parkinson's disease [26].

The anti-Parkinsonian effects of medicinal plants are mediated by their bioactive compounds, including antioxidants, flavonoids, alkaloids, and terpenes [27]. These compounds exert their effects through diverse mechanisms, with a primary focus on reducing oxidative stress and protecting dopaminergic neurons from free radical damage, a key factor in Parkinson's disease progression [27]. Additionally, the anti-inflammatory properties of certain medicinal plants may contribute to mitigating neuroinflammation and preventing neuronal death [28]. Furthermore, some plants may improve motor function in Parkinson's patients by increasing dopamine levels or modulating the GABAergic or cholinergic systems [29]. Collectively, these mechanisms enable medicinal plants to alleviate symptoms and potentially delay the progression of Parkinson's disease.

Conclusion

Medicinal plants with therapeutic properties may offer a promising complementary approach to the management of Parkinson's disease. These plants can potentially mitigate symptoms and improve patient outcomes through various mechanisms, including the reduction of oxidative stress, inhibition of neuroinflammation, augmentation of dopamine levels, and enhancement of central nervous system function. While preliminary evidence suggests the potential benefits of these plants in controlling and treating Parkinson's symptoms, further rigorous clinical research is warranted. Larger-scale studies with well-designed methodologies are necessary to confirm the efficacy and safety of these herbal treatments. Until more definitive scientific evidence is available, the use of medicinal plants for Parkinson's disease should be approached with caution and under the guidance of healthcare professionals to minimize the risk of interactions with conventional medications and potential adverse effects.

Statements and Declarations

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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

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

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