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Review Article

Exploring the Role of *Paeonia emodi* (*Ood-e-Saleeb*) in Neurological Health: Traditional Uses and Modern Pharmacological Insights: A Review

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Abstract

Ood-e-Saleeb, derived from *Paeonia emodi Wall.* (Ranunculaceae), is a medicinal herb extensively used in Unani medicine, particularly for neurological disorders. Found in the western temperate Himalayas, its roots, seeds, and flowers exhibit significant therapeutic properties. Traditionally, it has been utilized as a nervine tonic, nerve stimulant, and antispasmodic agent in conditions like paralysis (*Fālij*), facial palsy (*Laqwa*), tremors (*Ri'sha*), epilepsy (*Ṣar'*), and hysteria (*Ikhtināq al-Raḥim*). Recent pharmacological studies highlight its neuroprotective potential, particularly in diabetic peripheral neuropathy, where it modulates oxidative stress, inflammation, and neuronal apoptosis. Bioactive compounds such as paeoniflorin, flavonoids, and tannins contribute to its effects by enhancing neurogenesis, regulating neurotransmitter activity, and protecting against neuronal degeneration. Its ability to improve nerve function in diabetic neuropathy is linked to mechanisms involving advanced glycation end products (AGEs) and NF-κB pathway modulation. This review consolidates its traditional and modern pharmacological relevance, emphasizing its role in neurological disorders, including diabetic peripheral neuropathy, and its potential for further research and therapeutic applications.

Keywords: *Ood-e-Saleeb*, Neurological Disorders, Diabetic Peripheral Neuropathy, *Paeonia emodi*, Neuroprotection

Introduction

Ood-e-Saleeb is a medicinal plant derived from the dried root tubers of *Paeonia emodi Wall. (Ranunculaceae),* a hardy, leafy perennial herb or subshrub. It naturally flourishes in the western temperate Himalayan regions, extending from Kumaon to Hazara, encompassing areas like the upper Tons Valley and Kashmir. [1,2,3,4]

Figure 1: Plant of *Ood-e-saleeb*

Figure 2: Seeds of *Ood-e-saleeb*

Botanical name

Paeonia emodi [1,5,6,7,8]

Synonym

Paeonia officinalis [2,5,6,9,10,11,12,13]

Family

Ranunculaceae [1,2,5,8,13]

Paeoniaceae [14]

Vernaculars (*Asma-e-Mufradah*)

Arabic: *Ood-e-saleeb, Ood al-Rih* [6,11,13]

Persian: Fawania, Ood ul Hameer [11,15,16]

English: Himalayan Paeoni, Paeoney rose [6,9,17]

Hindi: Ood Salap [3,8,14,17,18]

Sanskrit: Svetamula [4]

Urdu: Ood-e-Saleeb [17]

Unani: Ood-e-Saleeb[3,14] **,**Alfedi [16]

Suryani: Faryufa,[19] Fawaniya [16]

Material and Methods

A comprehensive literature review was conducted to gather relevant information on *Paeonia emodi Wall.* (*Ood-e-Saleeb*) with a special focus on its pharmacological actions, traditional Unani uses, and its potential effects on neurological disorders, particularly diabetic peripheral neuropathy. The sources included Unani classical texts, pharmacopoeias, and modern scientific research articles published in peer-reviewed journals**.**

The data was collected from various electronic databases, including PubMed, Scopus, Web of Science, Google Scholar, and traditional Unani medicine books. Keywords such as "*Paeonia emodi*," "*Ood-e-Saleeb*," "neurological disorders," "diabetic peripheral neuropathy," "neuroprotection," "antioxidant," and "anti-inflammatory" were used to retrieve relevant studies. Articles published in English, Urdu, Arabic, and Persian were considered to ensure a broad understanding of both traditional and modern perspectives.

Description

Macroscopic: The tuberous roots have a light brownish-grey coloration and can grow up to 8 cm long and 3 cm wide. They possess a spindle-like shape with a deeply grooved surface and noticeable longitudinal shrinkage. When fractured, they reveal a firm, granular texture and release a mild aroma. Their taste starts off sweet but gradually becomes bitter over time. [4,14,17]

Microscopic: A cross-section of the root tuber reveals a circular structure with wavy edges. The periderm consists of multiple layers, including two or three layers of cork cells that are tangentially elongated on the outer side, along with a phelloderm made up of similarly elongated parenchymatous cells. Stone cells are present in the cortex, either individually or in clusters. The phloem comprises several layers of parenchyma filled with starch grains and calcium oxalate crystals. The xylem contains tracheids, parenchyma, and pitted vessels, which are generally arranged in clusters. Xylem fibers are distinctly thick-walled. The medullary rays are either uni- or multi-seriate, varying from two to six cells in width and five to thirteen cells in height, while the pith consists of thin-walled, circular cells. [17]

Powder: The powder has a creamish-white appearance and contains patches of cork cells along with numerous stone cells, which range in size from 20 to 90 micrometers in diameter. These stone cells may appear individually or in clusters, characterized by narrow lumens and thick walls with pit canals. Additionally, it includes cluster crystals of calcium oxalate measuring between 2 to 7 micrometers, as well as vessels exhibiting pitted, reticulate, and scalariform patterns. Fragments of medullary rays are visible, along with starch grains varying in size from 4 to 30 micrometers in diameter. [17]

Hasas mustamla (Parts used)

Roots (*Bekh/Jar*) [3,12,17]

Seeds (*Tukhm/Bazar*), flowers (*Gul*) and roots (*Aṣl / Bekh/Jar*) [4]

Mizāj (Temperament)

Hot and Dry [9,20]

Hot 1° and Dry 2°[21]

Hot 3° and Dry 3 ° [5,12,13,17,19,22–25]

Hot 2° and Dry 2° [21,22,26]

Bitter (*Murra*) and Acrid (*Ḥirrīfa*) [26,27]

Miqdar-i-Khurak (Doses)

1 – 2 masha [28]

1-3 gms [3,7,9,13,21,29]

3-5 gms [17]

4 ½ masha [6,19]

4 masha [25]

1-5 masha [12]

Muḍirr (Adverse effect)

In hot temperaments and stomach [6,19,22]

For Pregnant ladies [5,12,13,22,23,26]

For kidneys [21]

Badal (Substitute)

Sapistan in most of action [6]

Ghariqoon, *Zarawand mudharij* [13,19]

Qushoor e Rumman [11]

Muṣliḥ (Correctives)

Shakar safed, *Sheer taza*, *kateera* [6,19,22,23]

Maul asl, *gulqand* [7,12,13,26]

Murakkabāt (Compound formulations)

Asbi[30]

Habbe Asab [7,9,12]

Khameera gaozaban ambri jadwar ood saleeb wala [5,7,12,17]

Majoon khidr [5]

Majoon zabeeb [5]

Majoon sara [5]

Afʻāl (Pharmacological Actions)

Muḥarrik-i-Aʻṣāb (Nerve stimulant), *Musakkin-i-Aʻṣāb* (Nerve calming agent)[6,9,21,25]

Muqawwī-i-Aʻṣāb (Nervine tonic) [17]

Muḥallil (Resolvent) [5,6,25,31,7,11,12,14,19–21,23]

Mulaṭṭif (Attenuant) [5–7,12,19,20,23–25,31]

Mufattiḥ-i-ʻUrūq (Deobstruent of vessels) [5,7,12,20,21,25,31]

Mufattiḥ (Deobstruent) [6,11,19,22–24]

Musakkin (Soothing/calming) [5,7,12,14,21,32]

Mujaffif (Drying agent) [5,12,19,21,24,31,32]

Dāfiʻal- Amrāḍ-i- Aʻṣāb-o-balghami [5,24]

Dāfiʻ-i-Tashannuj (Antispasmodic) [1,13,14,17]

Mahal-i-Istemaal (Therapeutic Uses)

Amrāḍ-i- Dimāgh-o- *Aʻṣāb* (Disorders of brain and nerves) like *Fālij* (Paralysis), *Laqwa* (Facial palsy), Riʻsha (Tremors), Ṣarʻ (Epilepsy), *Ikhtināq al-Raḥim* (Hysteria) [5,7,12,21,24,25]

Ḍuʻf al- Aʻṣāb (weakness of nerves) [17]

Wajaʻal- Aʻṣāb (Neuralgia)[14]

Tashannuj (Spasm) [17]

Taḥrīk-i-Aʻṣāb (Nerve irritation)

Kimyawi Ajza (Chemical Constituents)

Root contains Malates, phosphorus acid, starch, tannins and volatile oil. [5,7]

Peony is believed to contain paeonine and has been found to produce monoterpene ester glucosides similar to pinen, including paeoniflorin. Additionally, it contains anthocyanins like paeonin, tannins such as pentagalloyl glucose, and flavonoids, including kaempferol glycosides. Studies on animals suggest that paeoniflorin exhibits multiple effects, such as smooth muscle relaxation, vasodilation, anti-inflammatory activity, immune system enhancement, and certain central nervous system depressant properties. [14]

Root oil gave a mixture of n-alkanes, beta-amyrin, butyrospermol, cycloartenol, lupeol, 24-methyl-enecycloartenol, cholesterol, campesterol, sito sterol; octanoic, decanoic, lauric, myristic, myris- toleic, palmitic, palmitoleic, stearic, oleic, linoleic acids, and ethyl gallate. [3]

Salicylaldehyde is the chief component of the essential oil. [3]

The unsaponifiable fraction of root oil comprises C14-33n-alkanes, β-amyrin, butyrospermol, cycloartenol, lupeol, 24-methylenecycloartanol, cholesterol, campesterol, and sitosterol. Meanwhile, the saponifiable fraction includes octanoic, decanoic, lauric, myristic, myristoleic, palmitic, palmitoleic, stearic, oleic, and linoleic acids. [33]

Pharmacological Studies

Neuroprotective effect

A recent study examined the effects of an ethanol extract from *Paeonia emodi* Wall., ex Royle, administered at doses ranging from 300 to 600 mg/kg body weight, on several factors such as pentylenetetrazole-induced responses, memory deficits, oxidative stress, and anxiety, while confirming no adverse impact on motor function. *Paeonia emodi* Wall., ex Royle, has demonstrated therapeutic potential in managing conditions like dropsy and anxiety, primarily due to its antioxidant and free radical-scavenging properties. [34,35]

In rat models of streptozotocin-induced diabetic encephalopathy, treatment with paeonol significantly enhanced Na(+)-K(+)-ATP enzyme and ChAT activity while lowering AchE levels in the hippocampal region. Furthermore, it reduced neuronal apoptosis and caspase 3 expression, increased BDNF and IGF levels, and minimized Aβ accumulation in both the hippocampus and cerebral cortex. These beneficial effects are likely associated with the regulation of the advanced glycation end products/NF-κB pathway. [36]

Antioxidant effect

Antioxidants play a vital role in removing excess free radicals and reactive oxygen species from the body. Research has highlighted that both crude extracts and isolated compounds from *Paeonia* species possess significant free radical-scavenging abilities. [37]

Anti-inflammatory

Earlier studies have reported that the root extract of *Paeonia emodi*, rich in polysaccharides, significantly reduced inflammation in male albino rats during in vivo experiments. [35]

Microglial activation plays a crucial role in the inflammatory processes associated with numerous neurodegenerative diseases. Studies have shown that paeonol can suppress neuroinflammation in microglial cells, with its effects being influenced by specific regulatory proteins. These results indicate that paeonol may offer neuroprotective benefits and could be valuable in managing central nervous system disorders such as diabetic encephalopathy, cerebral ischemic injury, Alzheimer's disease, Parkinson's disease, aging-related conditions, and depression. [38]

Antidiabetic

Controlling the key enzyme phosphoenolpyruvate carboxykinase (PEPCK), which plays a vital role in glucose production, is essential for managing diabetes.

Studies have shown that an ethanol extract derived from *Paeoniae Radix* significantly reduced fasting hyperglycemia and downregulated PEPCK gene expression in streptozotocin-induced diabetic rats and db/db mice. [39]

Discission and Conclusion

Ood-e-Saleeb (*Paeonia emodi Wall.*) has been extensively utilized in Unani medicine for its potent neuroprotective properties. Traditionally, it has been prescribed for various neurological disorders, including paralysis (*Fālij*), facial palsy (*Laqwa*), tremors (*Ri'sha*), epilepsy (*Ṣar'*), and hysteria (*Ikhtināq al-Raḥim*). Recent pharmacological investigations support these traditional claims, demonstrating its effectiveness in modulating neuronal function, reducing oxidative stress, and inhibiting inflammatory pathways that contribute to neurodegenerative diseases.

One of its most promising applications is in the management of diabetic peripheral neuropathy (DPN), a progressive and debilitating complication of diabetes. Studies suggest that the bioactive compounds in *Paeonia emodi*, particularly paeoniflorin, flavonoids, and tannins, play a significant role in improving nerve function. These compounds exhibit antioxidant [37],anti-inflammatory [35,38], and neuroprotective [34,35] activities, which are crucial in mitigating neuronal damage caused by hyperglycemia-induced oxidative stress. Additionally, paeonol, a major phytochemical, has shown potential in regulating the NF-κB pathway, thereby reducing neuroinflammation and apoptosis in diabetic neuropathy models. [36]

Furthermore, *Paeonia emodi* demonstrates an ability to enhance neurotransmitter modulation and nerve regeneration, which are essential for restoring normal sensory and motor functions in neuropathic conditions. Its protective effects against neuronal apoptosis and its role in improving vascular supply to nerves further reinforce its therapeutic potential in treating diabetic neuropathy. [35,40–42]

Ood-e-Saleeb (*Paeonia emodi Wall.*) holds significant promise as a natural neuroprotective agent, particularly in the treatment of neurological disorders such as diabetic peripheral neuropathy. Its traditional use as a nervine tonic and recent scientific evidence highlighting its anti-inflammatory, antioxidant, and neuroregenerative properties suggest its potential as an adjunct therapy for neuropathic conditions. Given its multifaceted pharmacological actions, further clinical studies and mechanistic explorations are warranted to establish its efficacy and therapeutic application in modern medicine. Integrating *Paeonia emodi* into conventional neuropathy treatment strategies could offer a safer, plant-based alternative for managing nerve-related disorders, providing new hope for patients suffering from chronic neuropathic pain and neurodegenerative diseases.

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