CODEN [USA] : IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

https://doi.org/10.5281/zenodo.13787511

https://www.iajps.com/volumes/volume11-september-2024/37-issue-09-september-24/

Available online at : http://www.iajps.com Review Article

REVIEW ON MEDICINAL PLANT *SPHAERANTHUS AMARANTHOIDES* (BURM.F) AND THEIR TRADITIONAL MEDICINALVALUES

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Abstract:

Sphaeranthus amaranthoides (Burm.f.), belonging to the Asteraceae family, holds significant importance in traditional medicine, especially in systems such as Ayurveda and Siddha. This plant is native to tropical and subtropical regions, notably India and Sri Lanka, and thrives in moist, marshy environments. It has been widely utilized to treat various ailments, including fever, skin diseases, inflammation, and digestive disorders. Traditional medicine recognizes its role in balancing the three doshas—Vata, Pitta, and Kapha—and it is used as an antipyretic, digestive aid, and anti-inflammatory agent. In Siddha medicine, Sphaeranthus amaranthoides is noted for its antimicrobial and antifungal properties, particularly in treating skin conditions like eczema and respiratory issues. Phytochemical studies have revealed key bioactive compounds in the plant, such as flavonoids, terpenoids, glycosides, and phenolic acids, which contribute to its pharmacological activities, including anti-inflammatory, antioxidant, antimicrobial, and hepatoprotective effects. Modern research supports its traditional uses, showing potential neuroprotective and analgesic effects. Traditional formulations of the plant include decoctions, poultices, and powders, which are used for internal and external treatments. This review highlights the botanical, pharmacological, and medicinal values of Sphaeranthus amaranthoides, emphasizing its long-standing therapeutic importance in traditional practices, along with emerging scientific validations.

Keywords: *Medicinal plants; Sphaeranthus amaranthoides; Traditional; Biological properties.*

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Please cite this article in press ***C. Ramalakshmi****.,* ***Review On Medicinal Plant Sphaeranthus Amaranthoides (Burm.F) And Their Traditional Medicinal values.,*** *Indo Am. J. P. Sci, 2024; 11 (09).*

1. INTRODUCTION:

Medicinal plants have long been a cornerstone of traditional medicine in various cultures worldwide (Rizvi et al., 2022). One such plant with a profound history of medicinal use is *Sphaeranthus amaranthoides* (Burm.f) (Geethalakshmi et al., 2013 & Gayatri et al., 2016). It belongs to the family Asteraceae and is commonly known in traditional medicine for its diverse therapeutic properties (Rolnik & Olas 2021). The plant has been traditionally used in different systems of medicine, including Ayurveda and Siddha, to treat a wide range of ailments (Pandey et al., 2013). This review focuses on *Sphaeranthus amaranthoides*, covering its botany, phytochemistry, and the medicinal values attributed to it in various cultural practices.

Figure 1: *Sphaeranthus amaranthoides*

2. Botanical Description of *Sphaeranthus amaranthoides*

2.1 Taxonomy

Kingdom: Plantae
Clade: Angiosperms
Family: Asteraceae
Genus: *Sphaeranthus*
Species: *S. amaranthoides*
Binomial name: *Sphaeranthus amaranthoides* (Burm.f.)

The plant is a herbaceous annual, often found in tropical and subtropical regions of Asia, primarily in India, Sri Lanka, and some parts of Southeast Asia. It grows in moist, marshy areas and is recognized for its small, spherical flower heads, which give the genus *Sphaeranthus* its name (Galani et al., 2010).

2.2 Morphological Features

- Height: Generally grows to a height of about 30-60 cm.
- Leaves: The leaves are ovate or elliptic, simple, and oppositely arranged.
- Stem: The stems are generally hairy and branched.
- Flowers: The plant produces small, spherical, purplish or pink flower heads, typically surrounded by involucral bracts.
- Fruit: The fruit is an achene, characteristic of the Asteraceae family.

The plant's structure, including its flower heads and leaves, has been traditionally harvested for various medicinal purposes.

3. Ethnobotanical Significance

In traditional systems like Ayurveda, Siddha, and folk medicine, *Sphaeranthus amaranthoides* has been regarded as a valuable plant with multiple therapeutic applications (Yanamadala et al., 2023). It has been widely used for centuries by indigenous communities to treat a myriad of conditions. This plant is known for its medicinal value in managing fever, inflammation, skin diseases, and digestive disorders, among others (Aziz et al., 2018).

3.1 Traditional Uses in Ayurveda

In Ayurveda, *Sphaeranthus amaranthoides* has been used to balance the three doshas: Vata, Pitta, and Kapha. It has been classified as a 'Tridoshahara,' which indicates its ability to alleviate all three doshic imbalances. Some of the traditional uses of the plant include:

- Antipyretic: Used to reduce fever, *Sphaeranthus amaranthoides* is administered in various formulations to help cool down body heat (Aronoff and Neilson 2001).
- Digestive aid: The plant is known to improve digestion and relieve issues like flatulence, indigestion, and bloating.
- Anti-inflammatory: The plant's extracts are used to treat inflammation, both internally and externally.

3.2 Siddha Medicine

In Siddha medicine, which originated in South India, *Sphaeranthus amaranthoides* has been used for its anti-microbial and anti-fungal properties. It is commonly used to treat:

- Skin diseases: The plant's paste or extracts are applied to the skin to manage conditions like eczema, psoriasis, and other fungal infections.
- Respiratory ailments: In cases of asthma and bronchitis, *Sphaeranthus amaranthoides* is believed to have expectorant properties that

help clear the respiratory system (Geethalakshmi et al., 2013 & Galani et al., 2010).

3.3 Other Ethnomedicinal Uses

Local communities often use *Sphaeranthus amaranthoides* as a remedy for treating wounds, ulcers, and boils. The plant is often ground into a paste and applied externally to reduce inflammation and promote healing (Geethalakshmi et al., 2013).

4. Phytochemical Composition

4.1 Active Constituents

Several phytochemical studies have been conducted on *Sphaeranthus amaranthoides*, which have revealed the presence of bioactive compounds responsible for its medicinal properties. The primary chemical constituents include:

- Flavonoids: Known for their antioxidant and anti-inflammatory properties.
- Terpenoids: Contributing to the plant's anti-microbial and anti-fungal effects.
- Glycosides: These compounds exhibit various biological activities, including cardioprotective effects.
- Phenolic acids: Recognized for their ability to scavenge free radicals, phenolic acids enhance the plant's antioxidant potential.
- Sterols: Phytosterols in the plant play a role in modulating cholesterol levels (Geethalakshmi et al., 2013 & Vitale et al., 2022).

4.2 Pharmacological Actions

The chemical compounds found in *Sphaeranthus amaranthoides* provide the plant with various pharmacological activities:

- Anti-inflammatory: Studies suggest that the flavonoids and terpenoids present in the plant contribute to its anti-inflammatory effects by inhibiting pro-inflammatory enzymes (Al-Khayri et al., 2022)
- Antioxidant: The presence of phenolic acids and flavonoids gives the plant potent antioxidant properties, which help combat oxidative stress and prevent cellular damage (Tungmunnithum et al., 2018)
- Antimicrobial: The terpenoids and flavonoids contribute to the plant's ability to inhibit bacterial and fungal growth, making it useful in treating infections (Vaou et al., 2021).
- Hepatoprotective: Some studies suggest that *Sphaeranthus amaranthoides* has protective effects on the liver, reducing the damage caused by toxins or oxidative stress (Madrigal-Santillán et al., 2014)
- Analgesic: The plant's extracts have shown potential in reducing pain through its action on the nervous system, making it useful for treating headaches and body aches (Uritu et al., 2018).

5. Modern Pharmacological Studies

- Several studies have confirmed the traditional claims associated with *Sphaeranthus amaranthoides* and explored its medicinal potential in various health conditions (Geethalakshmi et al., 2013 &Galani et al., 2010).

5.1 Anti-inflammatory Activity

In recent pharmacological studies, extracts of *Sphaeranthus amaranthoides* have demonstrated significant anti-inflammatory activity. In experimental models, it has been observed that the flavonoids in the plant reduce the production of pro-inflammatory cytokines, such as interleukins and tumor necrosis factor-alpha (TNF-α), which are involved in chronic inflammatory diseases like arthritis (Srivastava, 2015)

5.2 Antioxidant and Cytoprotective Effects

The antioxidant properties of *Sphaeranthus amaranthoides* have been extensively studied in vitro and in vivo. The phenolic compounds present in the plant have been found to scavenge free radicals and protect cells from oxidative damage. These effects suggest potential applications in preventing degenerative diseases such as cancer, diabetes, and cardiovascular disorders (Geethalakshmi et al., 2013, Działo et al., 2016).

5.3 Anti-microbial and Anti-fungal Properties

Extracts of *Sphaeranthus amaranthoides* have been tested against various strains of bacteria and fungi. Studies show that the plant's extracts can inhibit the growth of common pathogens, including *Escherichia coli*, *Staphylococcus aureus*, and *Candida albicans*. These findings support its traditional use in treating skin infections and wounds (Geethalakshmi et al., 2013 &Galani et al., 2010).

5.4 Neuroprotective Activity

Emerging research suggests that *Sphaeranthus amaranthoides* might have neuroprotective properties due to its ability to reduce oxidative stress and inflammation in the brain. Animal studies have indicated that it may help mitigate neurodegenerative diseases like Alzheimer's and Parkinson's by

protecting neurons from oxidative damage (Rojas-García et al., 2023).

5.5 Hepatoprotective Effects

In vivo studies on animal models have shown that *Sphaeranthus amaranthoides* helps protect the liver from damage caused by toxins such as alcohol and certain drugs. This supports traditional claims of its use in treating liver disorders (Meharie et al., 2020)

6. Traditional Formulations and Preparations

6.1 Decoctions

One of the most common traditional methods of using *Sphaeranthus amaranthoides* is in the form of decoctions. The plant parts are boiled in water, and the resulting liquid is consumed to treat ailments like fever, indigestion, and respiratory issues (Geethalakshmi et al., 2013 & Galani et al., 2010).

6.2 Poultices

For external applications, especially in the treatment of skin diseases, a poultice made from the crushed leaves or flower heads is applied to the affected area. This is believed to reduce inflammation, prevent infection, and promote healing (Dawid-Pać, 2013).

6.3 Powders

In traditional medicine, dried and powdered plant parts are often mixed with other herbs to create complex formulations. These powders are ingested to treat various internal disorders, including digestive issues and liver ailments (Shenefelt, 2011).

7. CONCLUSION:

Sphaeranthus amaranthoides (Burm.f) is a medicinal plant of significant importance in traditional medicine. Its use in Ayurveda, Siddha, and folk remedies reflects a long-standing recognition of its therapeutic potential. Modern pharmacological research has validated many of these traditional uses, especially its anti-inflammatory, antioxidant, and antimicrobial activities. However, more clinical studies are needed to fully understand its medicinal potential and to develop standardized formulations for therapeutic use. In light of its rich ethnobotanical history and emerging scientific evidence, *Sphaeranthus amaranthoides* holds promise as a valuable medicinal resource for the future of herbal medicine.

Declaration

Ethical

Not applicable.

Data Availability

All the data used to support the findings of this study are included within the article.

Competing interests

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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