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A critical review on Guduchi (*Tinospora cordifolia* (Willd.) miers)

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Abstract

T. cordifolia (Guduchi) is a large, glabrous, perennial, deciduous, climbing shrub of weak and fleshy stem found throughout India. It is a widely used plant in folk and Ayurvedic systems of medicine. The chemical constituents reported from this shrub belong to different classes, such as alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides. Various properties of *T. cordifolia*, described in ancient texts of Ayurveda, like *Rasayana*, *Sangrahi*, *Balya*, *Agnideepana*, *Tridoshshamaka*, *Dahnashaka*, *Mehmashaka*, *Kasa-swasahara*, *Pandunashaka*, *Kamla-Kushtha-Vataraktanashaka*, *Jwarhara*, *Krimihara*, *Prameha*, *Arshnashaka*, *Kricch-Hridroganashak*, etc., are acquiring scientific validity through modern research adopting "reverse pharmacological" approach. Potential medicinal properties reported by scientific research include anti-diabetic, antipyretic, antispasmodic, anti-inflammatory, anti-arthritic, antioxidant, anti-allergic, anti-stress, anti-leprotic, antimalarial, hepato-protective, immuno-modulatory and anti-neoplastic activities. This review brings together various properties and medicinal uses of *T. cordifolia* described in Ayurveda, along with phytochemical and pharmacological reports.

Keywords: Ayurveda, potential herb, reverse pharmacology, *Tinospora cordifolia*

Introduction

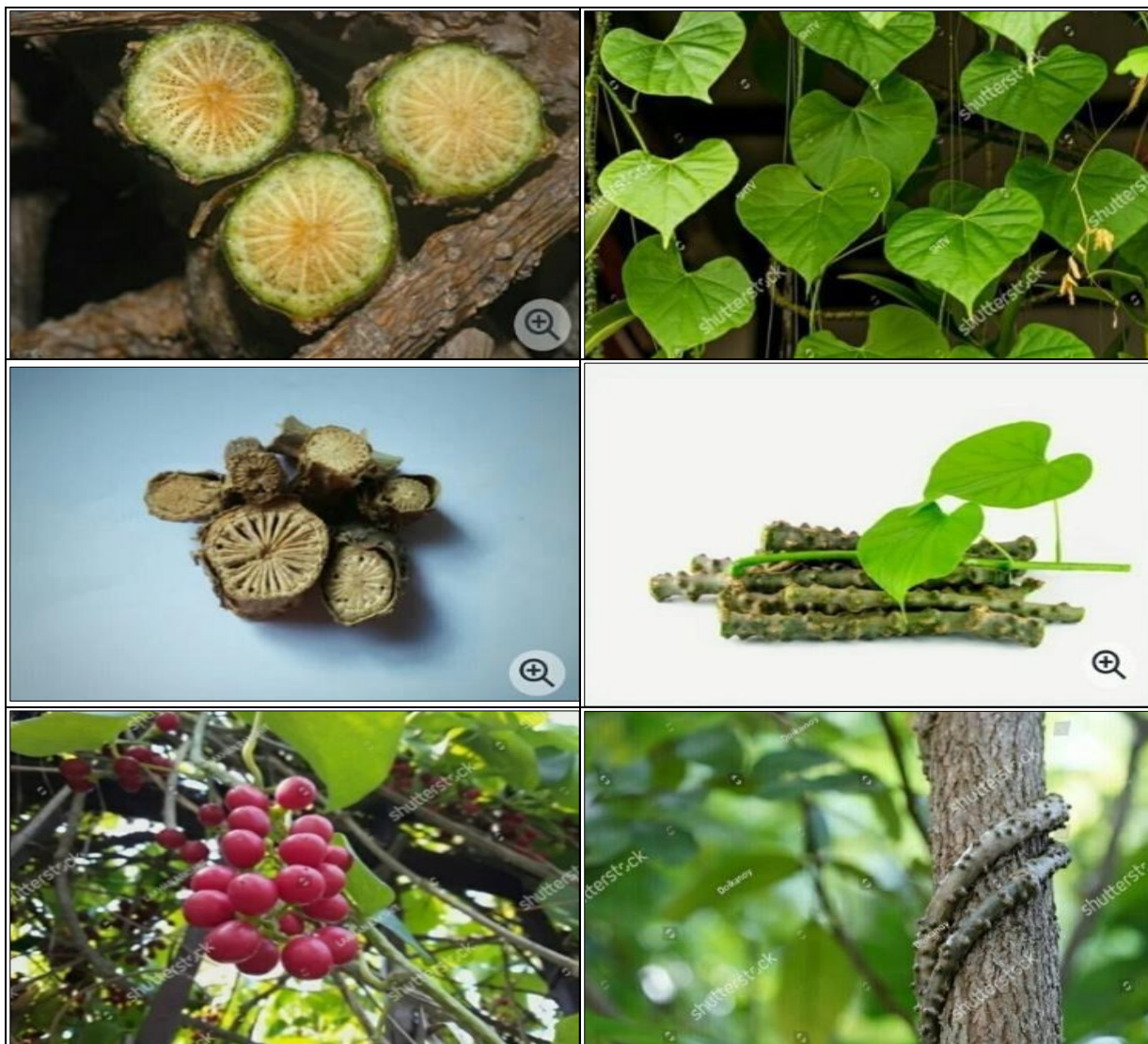
Medicinal plants play an essential role in the treatment and maintenance of good health. Throughout history, Guduchi has been utilized in Ayurvedic remedies to cure a variety of diseases. Scientists have recently expressed a keen interest in the development of novel medications derived from traditional medicinal herbs. Guduchi is a Menispermaceae family herbal shrub found in rich biodiversity and knowledge of ancient traditional herbs. Gulancha, amrita, Giloya, gulvel, and other names have been given to it. The plant family Menispermaceae consists of 70 genes and roughly 450 species found in tropical areas. All parts such as roots, stem, leaves, flower, fruits, and the entire plant of Guduchi have therapeutic value as it contains a variety of phytochemicals with various pharmacological properties.

Classical References

In VEDA Sounakiya Atharvavedaand Panini Upadhi Bhojavrtta Sayanadelined that Guduchi is kept in every house to avoid snakes and scorpions. CHARAK has categorized it in Vayahsthapana, Dahaprasamana, Trishnanigraha, Triptighna, Stanya-shodhana and also in Agyadravyas(principal drugs) by attributing Grahi, Vatahara, Dipaniya, Kapha-Raktaharaand Vibandhahara properties. He also identified it as one of the best Medhya Rasayanas (Brain tonic). SUSHRUTA has mentioned itin Guducyadi, Patoladi, ValliPanchmula, Kakolyadi,and Aragvadhadi gana[Astanga Samgrahas mentioned it into Guducyadi, Patoladi, Aragvadhadi. Description of Guduchiis found in almost all nighantus. Dhanvantarinighantu, Bhavaprakashnighantu and Rajanighantu described it under Guducyadi Varga. Sodhalaincluded it into OsadhiVarga.

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Classical Text	Gana / Varga
<i>Charaka Samhita</i>	<i>Triptighna, Stanyashodhana, Dahaprashamana, Snehopaga, TrishnaNigrahana, Sandhaniya, Vayasthapana.</i>
<i>Sushruta Samhita</i>	<i>Guduchyadi, Patoladi, Aaragvadhadi, Kakolyadi, Vallipanchmool.</i>
<i>Ashtanga Hridaya</i>	<i>Shakavarga, Padmakadigana, Patoladigana, Guduchyadigana, Aaragvadhadigana, Shyamadigana.</i>
<i>Bhavprakasha Nighantu, Dhanvantari Nighantu, Raj Nighantu, Shaligrama Nighantu, Nighantu Aadarsha, Shodal Nighantu</i>	<i>Guduchyadivarga</i>
<i>Madanapal Nighantu</i>	<i>Abhayadivarga</i>
<i>Kaiyadeva Nighantu</i>	<i>Aushadiyavarga</i>
<i>Priya Nighantu</i>	<i>Pippalyadivarga</i>



Botanical Classification ^[1]

The plant is popularly known as *Guduchi*, is an herbaceous vine belonging to the menispermaceae and is found normally deciduous and dry forests. The botanical classification of this medicinal herb is given below:

Kingdom: Plantae

Subkingdom: Tracheobionta

Division: Magnoliophyta

Class: Magnoliopsida

Clade: Angiosperms

Order: Ranunculales

Family: Menispermaceae

Genus: *Tinospora*

Species: *T. cordifolia*, *T. Malabarica*, *T. Crispa*

Bhedas/Varieties the varieties of *Guduchi* according to various authors

SN	Classical texts/ <i>Nighantu</i>	No.	<i>Bhedas</i>
1.	<i>Dhanvantari Nighantu</i>	2	<i>Padma Guduchi Kanda Guduchi</i>
2.	<i>Kaiyadeva Nighantu</i>	2	<i>Guduchi Pinda Guduchi</i>
3.	<i>Raj Nighantu</i>	2	<i>Guduchi Kanda Guduchi</i>

Distribution

Tinospora cordifolia is the accepted botanical source for *Guduchi*. *T. Malabarica* and *T. Crispa* are used as substitutes

and sometimes as adulterants also. Distribution of these three species varies across the country.

Table 2: The distribution of varieties of *Guduchi* are as described

<i>T. cordifolia</i>	Globally the species is distributed in India, Sri Lanka, Bangladesh. Within India it is distributed in Arunachal Pradesh and in South India. In India, it is found throughout tropical India, ascending to an altitude of 900 m from Kumaon eastward as well as southwards up to Sri Lanka. It is often cultivated.
<i>T. Malabarica</i>	It's found in Bangal, Khasia, Assam, Orissa, Konkana, Kanara, Madras presidency and Ceylon.
<i>T. Crispa</i>	It's found in Assam and Arunachal Pradesh within India. And also in Barma, Malay peninsula and Ceylon.

Chemical Constituents ^[2]

The different classes of compounds which are found in this plant are classed in groups like alkaloids, steroids, terpenoids, polysaccharides, glucosides and different aromatic and aliphatic compounds that are present in their phytoactive form that are responsible for the wide range of medicinal and therapeutic properties. The presence of these compound is found in various plant parts but highly concentrated in the stem, leaves and root part of the plant.

Some of the important formulations are

Guduchyadi Churna, *Guduchi Tail*, *Dashmoolarishta*, *Sanjivanivati*, *Kantakari Avaleha*, *Chyavanprash*, *Kashaya Churna*, *Panchanimba Churna*, *Guduchi Ghrita*, *Amrita Guggul*, *Amritashtaka Churna* etc. ^[3]

In Unani system, mostly "*Sat Giloy*" is incorporated in the preparations. "*Ara Giloy*" prepared from the fresh plant is considered a febrifuge, while "*Ara Maul-laham Mako-Kashiwala*" is a general tonic.

Discussion

In albino rats. It has significantly inhibited acute inflammatory response evoked by carrageenin when administered orally and intraperitoneally ^[4].

Memory enhancing activity: Studies have shown that Giloy helps in cognitive enhancement by immunostimulation and synthesis of acetylcholine. Thus contributing in increased choline level which shows that it has memory enhancing property for learning and memory in normal and memorydeficits animals ^[5].

Anti-diabetic activity: *T. cordifolia* is widely used in Indian Ayurvedic medicine for treating diabetes mellitus. Oral administration of an aqueous *T. cordifolia* root extract to alloxan diabetic rats caused a significant reduction in blood glucose and brain lipids. Though the aqueous extract at a dose of 400 mg/kg could elicit significant anti-hyperglycemic effect in different animal models, its effect was equivalent to only one unit/kg of insulin ^[6].

Ayurvedic properties and pharmacological effect

According to Ayurveda literature *Guduchi* is Tikta (Bitter), Kasaya (Astringent) in Rasa (Taste), Guru (Heavy) and Snigdha (Unctuous) in Guna (Properties), Ushna (Hot) in Virya (Potency) and Madhura (Sweet) in Vipaka (Metabolism). But Kaiydevnighantuhas mentioned Laghu (Light) Guna (Properties) in *Guduchi* ^[7]. According to Kaiydevnighantuand Bhavprakash, *Guduchi* is Katu (Pungent), Tikta (Bitter), Kasaya (Astringent) in Rasa (Taste) ^[8, 9]. Due to these properties, it alleviates all the three Doshasand Ama (Indigested food). Pharmacological effects of *Guduchi* are Rasayana (Tissue vitalizer), Sanghrahini (Absorbent), Balya (Strength giving) and Agnidipani (Appetizer). It cures Trishna (Thirst), Daha (Burning

sensation), Meha (Urinary disease including glycosuria), Kasa (Cough), Pandu (Anemia), Kamala (Jaundice), Kustha (Skin diseases), Vata-rakta (Arthritis with skin lesions), Jwara (Fever), Krimi (Worm infestation) and Vami (Vomiting). It also cure Prameha (Twenty types of urinary diseases), Swash (Dyspnoea), Arsh (Haemorrhoides), Mutrakricha (Difficulty in micturition), Hridrog (Cardiac problems) and Vata diseases ^[10]. *Guduchi* Sattvais claimed to be a potent tonic and rejuvenator. It is useful in fevers, diarrhoea, urinary tract infections, jaundice, skin diseases, irritable bowel syndrome and defects of semen morphology & spermatogenesis.

Conclusion

The pharmacological actions attributed to *Tinospora cordifolia* in Ayurvedic texts have been validated by a remarkable body of modern evidence suggesting that this drug has immense potential in modern pharma cotheraotics.

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