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A Review Study Of Guduchi (Tinospora Cordifolia)

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ABSTRACT: Guduchi (Tinospora cordifolia) is a revered herb in traditional Ayurvedic medicine, widely recognized for its diverse therapeutic benefits. This review aims to consolidate current scientific and clinical knowledge on Guduchi, highlighting its pharmacological properties, clinical applications, and safety profile. Guduchi, also known as Giloy, is celebrated for its immunomodulatory, anti-inflammatory, antipyretic, and antioxidant properties, which contribute to its use in managing various health conditions, including metabolic disorders, respiratory infections, and autoimmune diseases. The review synthesizes findings from recent studies, focusing on Guduchi's bioactive compounds, mechanisms of action, and efficacy in clinical settings. Additionally, the review addresses potential side effects and interactions, providing a comprehensive understanding of Guduchi's role in contemporary health care. The findings underscore Guduchi's promise as a functional therapeutic agent, while also calling for further rigorous research to fully elucidate its clinical potential and safety profile.

KEYWORDS: Guduchi, Tinospora cordifolia, Ayurvedic medicine, immunomodulatory, anti-inflammatory, antioxidant, clinical applications, safety profile.

INTRODUCTION: Guduchi, scientifically known as Tinospora cordifolia, is a prominent medicinal herb in Ayurvedic medicine, celebrated for its extensive therapeutic applications and health benefits. Commonly referred to as "Giloy" or "Amrita" (meaning "immortality" or "nectar of life"), Guduchi has been used for centuries in traditional Indian medicine to promote overall health and well-being. This perennial climber, belonging to the Menispermaceae family, is native to tropical regions of India, Southeast Asia, and parts of South America. Its stem, which is the primary part used in medicinal preparations, is characterized by its heart-shaped leaves and yellowish-green, tuberous fruits. Guduchi is renowned for its diverse pharmacological properties, which include immunomodulatory, anti-inflammatory, antipyretic, and antioxidant effects.

The herb's ability to boost the immune system, combat infections, and detoxify the body makes it a versatile therapeutic agent. In traditional practices, Guduchi is utilized for managing conditions such as fever, chronic infections, diabetes, and digestive disorders, as well as for enhancing vitality and longevity. Modern scientific research has increasingly focused on elucidating Guduchi's mechanisms of action and validating its therapeutic claims. Studies have identified several bioactive compounds in Guduchi, including alkaloids, glycosides, and terpenoids, which contribute to its medicinal properties. These compounds have been shown to modulate immune responses, reduce oxidative stress, and exert anti-inflammatory effects, aligning with traditional uses and highlighting Guduchi's potential as a valuable natural remedy in contemporary medicine. Despite its promising attributes, there is a need for further research to comprehensively understand Guduchi's efficacy, safety, and optimal therapeutic uses. This introduction provides an overview of Guduchi's traditional significance, contemporary scientific interest, and the current state of knowledge regarding its therapeutic potential.

- **Botanical Name:** Tinospora cordifolia (Wilid.) Meirs ex Hook .f & Thoms. , Tinospora malabarica Meirs ex hook, Tinospora crispa Meirs.
- **Family:** Menispermaceae
- **Kula:** Guduchi
- **Vernacular Names:**

Table no. 1: Showing vernacular names of Guduchi

Language	Name
English	Gulancha/ Indian tinospora
Hindi	Giloe, Gurach
Assame	Amarlata
Marathi	Ambarvel , Gulavela
Bengali	Giloe , Gulancha
Punjabi	Batindu
Gujarati	Gado, Gulo
Oriya	Gulochi , Gulancha
Kannada	Amrutha balli , Uganiballi
Malayalam	Amrytu , chittamratu
Tamil	Amrida valli
Telugu	Tippa teega
Kashmiri	Amrita, Gilo.
Udru	Gilo,Gilokhushk, gilo-i-sabz, sat gilo,satgilo
Persian	Gul-bel, gulbel
Arabic	Gilo ,sat gilo
Tibetan	Sle tras, sle tres, sle-tres

➢ CHRONOLOGICAL REVIEW:

Mythological Review: In the mythological context, it is said that during the historical war between Lord Rama and Ravana, many monkey warriors supporting Lord Rama were killed. Pleased by the victory and Ravana's death, Lord Indra sprinkled elixir on the dead bodies of the monkeys, bringing them back to life. Wherever the elixir drops fell on the earth, Guduchi plants sprang up.

- **Vedic Period:** In the Vedic era, Sayana in the Saunakiya Atharvaveda mentioned that Guduchi was kept in every house to ward off snakes and scorpions. In the Kaushika Sutra, Guduchi is referred to as 'Kudruchi'.

Samhita Period:

- **Charaka Samhita:** Multiple synonyms for Guduchi are mentioned, and it is included under seven different Dashemani. Guduchi is recognized for its excellent Sangrahika (consolidating) and Vibandhaprahamana (anti-Constipation) properties.
- **Sushruta Samhita:** Guduchi is described in 41 places and included in nine groups (Ganas) based on its diverse therapeutic uses. It is also part of smaller groups like Vallipanchamulla.
- **Ashtanga Samgraha:** Guduchi is mentioned alone or in combination with other remedies for treating conditions such as Jwara (fever) and Prameha (diabetes).

Nighantu Period:

- **Dhanvantari Nighantu:** Guduchi is first mentioned in one of the seven Vargas. Two varieties, Guduchi and Kanda Guduchi, are described.
- **Kaiyadeva Nighantu:** Guduchi is listed in the Aushada Varga, with varieties noted as Guduchi and Pinda Guduchi.
- **Bhavprakasha Nighantu:** Guduchi is included under the Guduchyadi Varga, highlighting its mythological origin and its properties as a rejuvenator (Rasayana), appetizer (Deepana), and strength-giver (Balya).
- **Raj Nighantu:** Details two types of Guduchi and Kanda Guduchi along with their therapeutic uses. o Shaligrama Nighantu: Describes Guduchi in the Guduchyadi Gana.

Modern Period:

- **Dravyaguna Vijnana:** Provides the Latin name, vernacular names, synonyms, botanical description, properties, and actions on different systems, therapeutic doses, and formulations of Guduchi. o Indian Medicinal Plant: Illustrates the botanical description, different species, and medicinal uses of Guduchi. o Materia Medica: Gives a detailed description of Guduchi, including its use in treating scorpion bites.

Table no.2: showing the classification according to various authors.

Classical text	Gana/ varga
Charaka Samhita	Triptighna, Stanyasodhana, Dahaprashamana, Snehapoga, Trsnanigrahana, Sandhaniya, Vayasthapana
Sustruta Samhita	Guduchyadi, Patoladi, Aragwadahadi, Kakolyadi , Vallipanchamula
Ashtanga Hridaya	Shaka Varga,Padmakadi Gana , Patoladi Gana,, Guduchyadi Gana, Aragvadhadi Gana, Shyamadi Gana
Bhavprakasha Nighnatu, Dhanvantari Nighantu, Raj Nighantu, Shaligrama Nighantu, Nighantu Adarsha, Shodala Nighantu	Guduchyyadi Varga
Madanapal Nighantu	Abhayadi Varga
Kaiyadeva Nighantu	Aushadiya Varga
Priya Nighantu	Pippalyadi Varga

Macroscopic Characteristics

The drug occurs in pieces varying from 0.6-5 cm in diameter. Young stems are green with smooth surfaces and swelling at nodes, while older stems are light brown with warty protuberances from circular lenticels. The transversely smoothed surface shows a radial structure with prominent medullary rays traversing porous tissue. The taste is bitter.

Microscopic Characteristics

A transverse section of the stem shows the outermost cork layer, with an outer zone of thick-walled, brown, compressed cells and an inner zone of thin-walled, colorless, tangentially arranged cells. The cork is broken in places due to lenticels. The secondary cortex has 5 or more rows of cells, with the outer row smaller than the inner.

Sclereids groups, 2 to 10 cells, are found in the secondary cortex near lenticels. The cortex's outer zone has 3 to 5 rows of irregularly arranged, tangentially elongated chlorenchymatous cells. Inner cortical cells are polygonal and filled with starch grains. Several secretory cells are scattered in the cortex. Pericyclic fibers are lignified, with wide lumens and pointed ends, and associated with crystal fibers containing single prisms. The vascular zone has 10-12 or more wedge-shaped xylem stripes, surrounded by semi-circular phloem stripes, alternating with wide medullary rays. The phloem consists of sieve tubes, companion cells, and parenchyma with calcium oxalate crystals.

The cambium has 1 or 2 layers of tangentially elongated cells per vascular bundle. Xylem includes vessels, tracheids, parenchyma, and fibers, with primary xylem vessels being narrow and secondary xylem vessels thick-walled and lignified. Medullary rays contain variously shaped starch grains. The pith comprises large thin-walled cells, mostly containing starch grains.

Morphological Characters of Menispermaceae

Family: Menispermaceae - characterized by moon or crescent-shaped seeds.

Habit: Tropical twining woody climbers, herbs, or trees, often perennial or deciduous, with simple to uniserrate hairs.

Stem: Rapidly growing stems with trilacunar nodes.

Leaves: Alternate, usually palminerved, entire or lobed, exstipulate.

Inflorescence: Dioecious, small or minute, fascicled, panicled, or racemose, rarely solitary. Sepals are usually 6, imbricate in 2-4 series.

Male Flowers: Stamens hypogynous, equal in number and opposite the petals; filaments free or connate; anthers usually adnate, extrorse, or lateral.

Female Flowers: Staminodes 6 or 0. Ovaries typically 3; ovules solitary, usually amphitropous; style usually recurved, simple or lobed. Ripe carpels drupaceous; style-scar sub-terminal or sub-basal.

Seeds: Usually hooked or reniform, often curved around an intrusion of the endocarp; albumen even or ruminate, or absent; cotyledons flat, semiterete, or fleshy, appressed, or spreading.

Tinospora cordifolia:

A large, glabrous, deciduous climbing shrub found throughout tropical India, ascending to an altitude of 300m. It has succulent stems with long, fleshy aerial roots. The bark is grey-brown or creamy white and warty. Leaves are membranous and cordate with a broad sinus. Flowers are small, yellow or greenish-yellow, appearing when the plant is leafless, in axillary and terminal racemes or racemose panicles. Male flowers are clustered, and females are usually solitary. Drupes are ovoid, glossy, succulent, red, and pea-sized, with curved seeds. The plant is sometimes cultivated for ornament and propagation by cuttings. The leaves serve as good fodder for cattle. T. cordifolia is mentioned in Ayurvedic literature for use in general debility, dyspepsia, fevers, and urinary diseases. The dry stems, with bark intact, are used medicinally and should contain no more than two percent foreign organic matter. The drug has shown antiperiodic, antispasmodic, anti-inflammatory, and antipyretic properties, and one-fifth of the analgesic effect of sodium salicylate. Its aqueous extract has a high phagocytic index and inhibits Mycobacterium tuberculosis in vitro. The stem contains a variety of constituents, including a glucoside, alkaloids (e.g., berberine), crystalline substances, bitter principles, a neutral fatty alcohol, and essential oil. Bitter principles like columbin, chasmanthin, and palmarin, and compounds like tinosporon, tinosporic acid, and tinosporol, have been identified in the stem. The alcoholic extract shows activity against Escherichia coli. The plant's extracts have been studied for their effects on fasting blood sugar, glucose tolerance, and epinephrine-induced hyperglycemia in rabbits and albino rats, indicating an influence on carbohydrate metabolism and endogenous insulin secretion.

Uses: The aqueous extract of the dry stem (Giloe-ka-sat or Guduchi sat) is used as a tonic in various diseases causing debility. The leaves are rich in protein and fairly rich in calcium and phosphorus and can be used as fodder. A decoction of the leaves treats gout, and young leaves bruised in milk are used as a liniment for erysipelas. The leaves applied with honey treat ulcers. The dried and powdered fruit, mixed with ghee or

honey, is a tonic and used in treating jaundice and rheumatism. The root, a powerful emetic, treats visceral obstructions and leprosy. Guduchi (Tinospora cordifolia) has a multi-spectrum action, profoundly stimulating immune system cells and preventing dysfunction caused by psychological and physical stress in animals. This anti-stress effect is mediated through the immune cells, affecting the Psycho-Neuro-Endocrine-Immune (PNI) axis. One of the actions ascribed to Rasayanas, like Guduchi, is their ability to help the body fight infections. The stem of Tinospora cordifolia is used in various Ayurvedic preparations to treat general debility, dyspepsia, fever, and urinary diseases. It is bitter, stomachic, diuretic, stimulates bile secretion, causes constipation, alleviates thirst, burning sensation, and vomiting, enriches the blood, and cures jaundice. The stem extract is beneficial for skin diseases. The root and stem, when combined with other drugs, are prescribed as antidotes for snake bites and scorpion stings. The dry barks of T. cordifolia have antispasmodic, antipyretic, anti-allergic, anti-inflammatory, and anti-leprotic properties. T. cordifolia benefits the immune system in various ways. Alcoholic and aqueous extracts have shown immunomodulatory activity. Pre-treatment with T. cordifolia has protected against mortality induced by intra-abdominal sepsis following cecal ligation in rats and significantly reduced mortality from E. coli-induced peritonitis in mice. In clinical studies, it has protected cholestatic patients against E. coli infections. These activities are not due to its antibacterial properties, as the plant extract has shown negative in-vitro antibacterial activity.

Treatment in rats has resulted in significant leucocytosis and predominant neutrophilia. It has also been observed to stimulate macrophages, evidenced by an increase in the number and percentage of phagocytosis of S. aureus by peritoneal macrophages in rats. The anti-stress and tonic properties of the plant were clinically tested, showing good responses in children with moderate behavior disorders and mental deficits, significantly improving their IQ levels. The hepatoprotective action of T. cordifolia was demonstrated in an experiment where goats treated with T. cordifolia showed significant clinical and hemato-biochemical improvement in CCl4-induced hepatopathy. Extracts of T. cordifolia have also exhibited in vitro inactivating properties against Hepatitis B and E surface antigens within 48-72 hours. The aqueous extract of T. cordifolia exerted a significant antiinflammatory effect in cotton pellet granuloma and formalin-induced arthritis models, comparable to Indomethacin, resembling the action of non-steroidal anti-inflammatory agents. The dried stem produced significant anti-inflammatory effects in both acute and subacute models of inflammation. T. cordifolia was found to be more effective than acetylsalicylic acid in acute inflammation but inferior to Phenylbutazone in subacute inflammation. Its ethanolic extract has shown significant antipyretic activity in experimental rats. The stem of T. cordifolia is bitter, astringent, sweet, thermogenic, anodyne, anthelmintic, alterant, antiperiodic, antispasmodic, anti-inflammatory, antipyretic, antiemetic, digestive, carminative, appetizer, stomachic, constipating, cardiotonic, depurative, haematinic, expectorant, aphrodisiac, rejuvenating, galactagogue, and tonic. It is useful for burning sensation, hyperdipsia, helminthiasis, dyspepsia, vomiting, flatulence, acid gastritis, jaundice, hemorrhoids, menometrorrhagia, intermittent fever, tonic, inflammation, gout, cardiac debility, skin diseases, leprosy, erysipelas, anemia, cough, asthma, general debility, seminal weakness, urinary disorders, splenomegaly, rheumatoid arthritis, filaria, eye diseases. The whole plant, wellground, is applied to fractures. Starch from the roots and stem is useful for acid diarrhea due to intestinal canal acidity or acid dyspepsia. It is useful in relieving rheumatism symptoms. Juice from the fresh plant acts as a diuretic. Leaves are beneficial in treating jaundice.

Distribution: T.cordifolia; Globally the species is distributed in India, Sri Lanka and 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 900m from Kumaon eastward as well as southwards up to Sri Lanka. It is often cultivated.

Bhedas/Varities:

Table no. 3: showing the varieties of Guduchi according to various authors

Sr.no	Classical texts/Nighantu	No.	Bhedas
1	**Dhanvantari Nighantu**	2	Padma Guduchi Kanda Guduchi
2	**Kaiyedava Nighantu**	2	Guduchi Pinda Guduchi
3	**Raj Nighantu**	2	Guduchi Kanda Guduchi

Chemical Constituents: Tinosporine, tinosporan, tinosporic acid, tinosporol, tinosporide, tinosporidine, columbin, chasmanthin, palmarin, barberine, giloin, giloinisin, 1,2 – substituted pyrolidine, a diterpenoid, furanolactone, 18 – norclerodanediterpene – 0 – glycoside, aryltetrahydro-furanolognan, octacosanol, nonacosan – 15 – one and β-sitosterol, cordifolide, unosporin, heptacosanol, cordifol, cordifolon, magnoflarine, tembetarine, cardiofoliosides A & B, phenolic lignan – (α, 4- dihydroxy3-methoxy benzyl) – 4-(4-hydroxy-3-methoxybenzyl) – tetrahydrofuran, arabinogalactan.

Table no.4: Showing chemical constituents in T.Cordifolia.

T.Cordifolia	Diterpenoid of columbin type-tinosporin Tinosporide , cordifolide Tinosporidine and α & β sistosterol, Cordifol , heptasanol , octacosanol . Furanoid diterpene- tinosporide Five diterpene furan glycosider , cordifolisides A-E and two phenyl propane glycosides .

Pharmacological Activities: Hypoglycemic, anti-hyperglycaemic, CNS depressant, antibacterial, antimicrobial, antipyretic, anti-inflammatory, analgesic, antiarthritic anti-allergic, hepataprotective, immunosuppressive, immuno-stimulant, antineoplastic, anti-stress, anti-diabetic anti-tumor, adaptogenic, anti-leishmanial, antioxidant, antiendotoxic, hypotensive, diuretic.

Rasa Panchaka:

Table no.5: showing Rasapanchaka of Guduchi

Classical texts	Rasa	Guna	Veerya	Vipaka
Charaka-Samhita	Tikta	Guru	Ushna	Madhura
Sushruta Samhita	Tikta	Guru	-	Guru
Astanga Sangraha	Tikta	-	Ushna	-
Astanga Hridaya	Tikta	-	Sheeta	Katu
D.Ni	Tikta,Kasaya	Guru	Ushna	-
M.Ni	Katu,Tikta, Kasaya	Laghu	Ushna	Madhura
K.Ni	Tikta,Kasaya,Katu	Laghu	Ushna	Madhura
R.Ni	Tikta,Kasaya	Guru	Ushna	-

BP.Ni	Katu,Tikta, Kasaya	Laghu	Ushna	Madhura
Sha.Ni	Tikta,Kasaya	Guru,ushn A	Ushna	Madhura
Dravyaguna Vigyanam	Tikta,Kasaya	Guru,Snighda	Ushna	Madhura

Karmas

Table no.6: Showing Karmas of Guduchi.

Karma	CS	SS	AS	DN	KN	RN	BPN	Sha.N
Vatahara	+	+	+	-	-	+	-	+
Amahara	-	-	-	-	-	-	-	+
Sangrahi	+	-	-	+	+	-	+	+
Hridya	-	-	-	-	+	-	-	+
Balya	+	+	+	+	+	-	+	+
Vanhnikrita	-	-	-	-	+	-	-	-
Vatapittahara	+	+	+	-	-	-	-	-
Ayushya	-	-	-	+	-	-	-	+
Medya	-	-	-	+	-	-	-	-
Medohara	-	+	+	+	-	-	-	+
Pittahara	+	+	+	+	-	-	-	-
Vataraktahara		-	-	+	+	-	+	+
Dipaneyeya	+	+	+	-	-	-	+	+
Rasayani	+	+	+	-	+	-	-	+
Tridoshahara	-	+	+	+	-	-	+	+
Vayasthapaniya	+	-	-	-	-	-	-	-
Raktadoshahara	-	+	+	-	-	+	-	+

Rogaghnata:

Table no.7: Showing Rogaghnata of Guduchi according to various authors

Rogaghnata	CS	SS	AS	DN	KN	RN	BPN	Sh.N
Kamalahara	-	-	-	+	-	-	+	+
Pramehara	-	+	+	-	+	+	+	+
Kandugahna	-	+	+	+	-	-	-	+
Trishnanigrahana	+	-	-	-	+	-	-	+
Visarpaghna	-	-	-	+	+	-	-	+
Kasahara	-	-	-	-	-	-	+	+
Dahaprashamanam	+	+	-	-	-	+	+	+
Kushtahara	-	+	-	+	-	-	+	+
Krimighna	-	-	-	+	-	-	+	+
Rakatarshaghna	-	-	-	+	-	-	-	+
Bhramahara	-	-	-	-	-	+	-	+
Chardighna	-	+	-	-	-	+	+	+
Panduhara	-	-	-	+	-	+	+	+
Jwarahara	+	+	-	+	-	+	+	+

Safety and Considerations

Guduchi is generally considered safe for use, with few reported side effects when taken in recommended doses. However, individuals with specific health conditions or those on immunosuppressive medications should consult healthcare professionals before using Guduchi, as its effects may influence immune system dynamics.

CONCLUSION:

Guduchi (Tinospora cordifolia) plays a significant role in immunomodulation, offering both immune-enhancing and balancing effects. Through its actions on immune cells, cytokine production, and antioxidant mechanisms, Guduchi supports overall immune health and helps in managing various immune-related conditions. Its traditional use in Ayurvedic medicine is well-supported by modern scientific research, underscoring its potential as a valuable therapeutic agent for maintaining immune system balance and addressing immune disorders.

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