

Tinospora cordifolia as medicinal herb

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Abstract

Tinospora cordifolia is a popular medicinal plant which is used in several traditional drugs to cure several conditions. The common names are Amrita and Guduchi and belong to family Menispermaceae. It is considered an essential herbal plant of Indian system of drug (ISM) and has been used in the treatment of fever, urinary problem, dysentery, skin conditions leprosy, diabetes, and numerous further conditions. The plant reported containing chemical constituents including Alkaloids, Terpenoids, Lignans, Steroids and others that establish the photochemistry and pharmacological exertion of *Tinospora cordifolia*. The present review highlights the pharma ecological significance viz antioxidant exertion, antimicrobial exertion, antibacterial exertion, antifungal exertion, anti-diabetic exertion, antistress exertion, hypolipidaemic effect, hepatic complaint, anticancer anti HIV eventuality, antiosteoporotic goods, antitoxic goods, crack mending, anticomplementary exertion, and immunomodulation exertion, systemic infection and Parkinson's complaint.

Keywords: Medicinal Plant; Plant Extract; Anemia; Natural Product

1. Introduction

Herbal phrasings are medicinal medication of one or further sauces present in specified amounts to give the benefits meant for ornamental, diagnose and to alleviate conditions of mortal beings or creatures(1). It is also known as botanical drug or phytomedicine. before in the twentieth century, herbal drug was the high drug system as antibiotics or anesthetics weren't available. adding use of an allo pathic system of drug due to its fast remedial action and herbal drug gradationally lost their fashion ability among the people. For illustration, Curcuma is used in Traditional Chinese drug for further than two thousand times to treat anti-inflammatory and robust antioxidant(2, 3). About 70 – 80 of people are still using herbal drug for their primary health because of the lower side effect and better comity with the mortal body(4). Herbal drug has gained instigation and is more effective as compared to synthetic medicines. cordifolia(reverse *Tinospora sinensis*(Lour.) Merr.) is also known as Guduchi/ Amrita and its names in Latin *Tinospora cordifolia*(Wild) Hook.f. & Thomson, English *Tinospora Gulancha*/ Indian *Tinospora*, Hindi Giloya. It belongs to the family of Menispermaceae and is set up in Myanmar, Sri Lanka, and China(5). The plant is generally used as traditional ayurvedic drug and has several remedial parcels(6,7) similar as hostility, rheumatism, urinary complaint, skin conditions, diabetes, anemia, inflammation, antipathetic condition, anti-periodic, radioprotective parcels, etc.(8, 9) The root of Giloya(*T. cordifolia*) is used as potent emetic, bowel obstruction. The bounce of this plant serves a salutary ménage remedy for habitual fever, relieves burning sensation, increases energy and appetite. Giloya is useful in the treatment of helminthiasis, heart conditions, leprosy, rheumatoid arthritis, support the vulnerable system, the body's resistance to infections, supports standard white blood cell structure, function, and situations(10). It also helps in digestive affections similar as hyperacidity, colitis, worm infestations, loss of appetite, abdominal pain, inordinate thirst, and puking, and indeed liver diseases like hepatitis(11). This pharmacological conditioning of the plant is due to its chemical ingredients like diterpenoid lactones, glycosides, steroids, sesquiterpe noid, phenolics, aliphatic composites, essential canvases, a admixture of adipose acids, and polysaccharides and is present in a different part of the plant body, including root, stem, and whole part(12).

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The World Health Organization reported that 80 of the world population relies primarily on traditional drugs involving the use of plant excerpts or their active ingredients. India with its mega-biodiversity and knowledge of rich ancient traditional systems of drug (Ayurveda, Siddha, Unani, Amchi and original health traditions) give a strong base for the application of a large number of shops in general healthcare and relief of common affections of the people(13). *Tinospora cordifolia* is one of the non controversial and considerably used saucos in Ayurvedic drug. It belongs to family Menispermaceae. It's a rough, succulent, woody climbing shrub native to India. It's also set up in Burma and Sri Lanka. It thrives well in the tropical region, frequently attains a great height, and climbs up the caddies of large trees. The stem is argentine or delicate white, deeply cleft spirally and longitudinally, with the space between spotted with large ensign-suchlike lenticels. The wood is white, soft, and pervious, and the lately cut face snappily assumes a unheroic shade when exposed to air Leaves are simple, alternate, exstipulate, long petiolate, and chordate in shape showing multicoated reticulate venation. Long thread like upstanding roots come up from the branches. Flowers are small and Unisexual. manly flowers are in clusters womanish flower are solitary. Six sepals arranged in two curls of three each. Six petals arranged in two curls, they are obovate and membranous. Aggregate fruit is red, fleshy, with numerous drupelets on thick stalk with sub terminal style scars, scarlet coloured(14). *Tinospora cordifolia* is known by different name in several different languages in India viz, Tippa- teega(Telugu),Shindilakodi(Tamil),Amruthu, Chittamruthu (Malayalam), Amrutha balli(Kannada), Rasakinda (Sinhala), gurcha(Hindi), garo(Gujarati), Amritavalli (Sanskrit), (Marathi), Guluchi(Oriya)(15). *Tinospora cordifolia* Is an important medicine of Indian systems of drug and used in drugs since times old. The medicine is well given Indian bitter and specified in complications, diabetes, dyspepsia, hostility, urinary problems, skin conditions and habitual diarrhoea and dysentery. It has been also indicated useful in the treatment of heart complaint, leprosy, and helmenthiasis. The bounce attained from the stem is largely nutritional and digestive and used in numerous conditions(16). *Tinospora cordifolia* is a well known medicinal plant in traditional medicinal system and recent scientific studies have emphasized the possible use of *Tinospora cordifolia* in ultramodern drug. The present review aims to validate the medicinal parcels of *Tinospora cordifolia* and its implicit prospects for the farther scientific disquisition for the development of effective remedial composites.

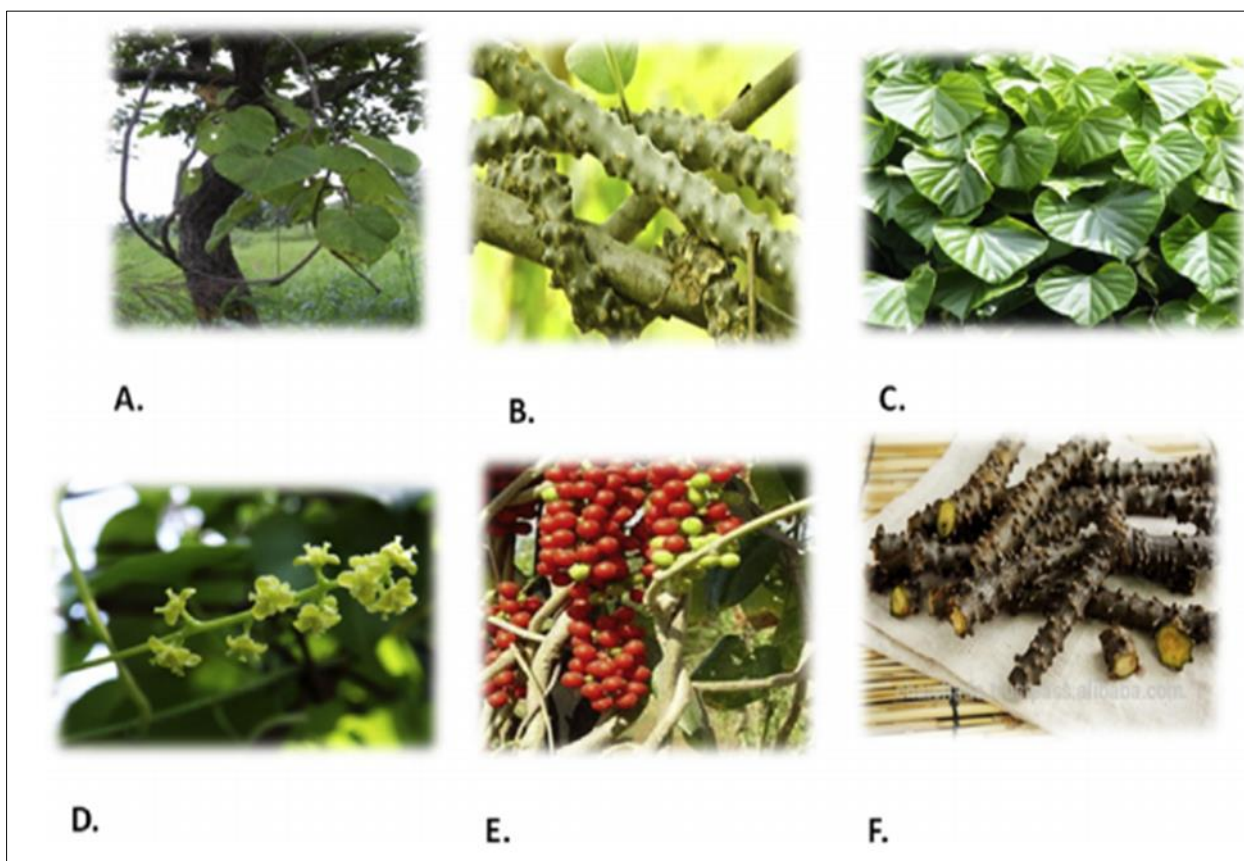


Figure 1 Morphology of *Tinospora cordifolia* A) Steam, B) root, C) flower, D) seed

2. Growth Requirement

The plant is veritably rigid and it can be grown in nearly all climates but prefers warm climate. Planting is generally done during stormy season (July to August). As it's a rambler so it requires support for its growth. Fast growing species similar as Neem (*Azadirachta indica*), Jatropha (*Jatropha curcas*) and Moringa (*Moringa oleifera*) have been planted to give support for its growth. *Tinospora cordifolia* growing with Neem *Azadirachta indica* is called as NEEM GILOY has chemical composition as analogous as neem as well as giloy and show better remedial parcels (17) *cordifolia* prefers medium black or red soil for its civilization. Giloy can also be successfully grown in large variety of soils, ranging from flaxen to complexion gaul. still, the soil should be well drained with sufficient humidity and rich with organic matter for its growth.

3. Morphological Description

Tinospora cordifolia is a large deciduous, extensively spreading climbing shrub with a number of coiling branches. Different parts of *Tinospora* have following type of morphology.

3.1. Stem

Stem of this plant is rather succulent with long, filiform, fleshy and climbing in nature. Upstanding roots arise from the branches. The stem is delicate white to slate in colour and deeply left spirally (18) (Figure 1A)

3.2. Aerial Root

Aerial roots are present, these upstanding roots are characterized by tetra to penta- bow primary structure. still, cortex of root is divided into external thick walled and inner parenchymatous zone (19) (Figure 1B)

3.3. Leaves

Leaves of this plant are simple, alternate, exstipulate, long petioled roughly 15 cm, round, pulvinate, heart shaped, twisted incompletely and half way round. Lamina is ovate, 10-20 cm long, 7 nerved and deeply cordate at the base and membranous (20) (Figure 1C).

3.4. Flowers

Flowers are androgynous, raceme's, greenish unheroic in colour, appears when plant is splint less. mainly flowers are clustered and womanish flowers live in solitary inflorescence. Sepals are 6 in 2 series of 3 each. external ones are lower than the inner sepals. Petals are also 6, lower than sepals, free and membranous. Flowering occurs during March to June (21) (Figure 1D).

3.5. Fruit

They're orange-red in colour, fleshy, total of 1- 3 and elliptical, smooth, drupelets on thick stalk with a sub terminal style scars. Fruits develop during winter (22) (Figure 1E).

3.6. Seed

Curved seed have been reported this species. Hence this family is named as moonseed family also. As seeds are curved in shape, embryo also turned into curve shape automatically. Moreover, the endocarp is variously ornamented and provides important taxonomic characters.

Table 1 Taxonomy

Kingdom	Plantae - plant
Subkingdom	Tracheobionta - Vascular plant
Super division	Spermatophyta-Seed bearing plant
Division	Magnoliophyta - Flowering
Class	Magnoliopsida – Dicotyledons
Sub-class	Polypetalae – Petals are free
Series	Thalamiflorae – Many stamens and flower hypogynous
Order	Ranunculales
Family	Menispermaceae - The Moonseed family
tribe	Tinosporeae
Genus	Tinospora
Species	<i>T. cordifolia</i>

4. Phytoactive Compounds of *Tinospora carifolia*

Table 2 Phytoactive Compounds of *Tinospora carifolia*

Class	Chemical constituents	Activity	Plant part
Alkaloids	Berberine, Magnoflorine, CholinePalmatin, Tembetarine, Tinosporine, Isocolumbin, Aporphine alkaloids, Jatrorrhizine, Tetrahydropalmatine	Anti-viral infections Neurological, Immunomodulatory anti-diabetes, Anticancer	Stem & Root
Steroids	20 δ -Hydroxyecdysone, δ -sitosterol, β -sitosterol , GiloinsterolEcdysterone, Makisterone A	Inhibits TNF- α , IL-1 β , IL-6 and COX-2. inflammatory arthritis, IgA neuropathy	Shoot
Glycosides	Tinocordiside, Tinocordifolioside, Cordioside, 18-norclerodane glucoside, CordifoliosideSyringin, Syringinapiosylglycoside, Furanoidditerpene Glucoside ,Palmatosides, Cordifolioside A, B, C, D and E, Pregnane glycoside.	anticancer activities Treats neurological disorders like ALS, Parkinsons, Dementia	Stem
Diterpenoid lactones	Furanolactone ,Tinosporon, Tinosporides , Columbin, Clerodane derivatives, Jateorine	anti-inflammatory, anti-microbial ,anti-viral. Anti hypertensive, VasorelaxantInduce apoptosis in leukemia by activating caspase-3and bax, inhibits bcl-2.	Whole plant
Sesquiterpenoid	Tinocordifolin.	Antiseptic	Stem

Aliphatic compounds	Heptacosanol, Octacosanol, Nonacosan-15-one dichloromethane.	anti-inflammatory, Protection against 6-hydroxydopamine induced parkinsonisms in rats	Whole plant
Miscellaneous compound:	3, (α ,4-di hydroxyl-3-methoxy-benzyl)-4-(4- Compounds hydroxyl-3-methoxy-benzyl)-tetrahydrofuran , Giloinin, Tinosporic acid, Tinosporidine, Cordifol, Cordifellone, Jatrorrhizine, N-trans-feruloyltyramine as diacetate.	Protease inhibitors for HIV and drug resistant HIV.	Whole plant & Root

Tinospora cordifolia constitute different classes of phytoactive composites similar as steroids, alkaloids, glycosides, diterpenoid lactones, sesquiterpenoid, aliphatic compounds , Miscellaneous compound and polysaccharides (23)

5. Medicinal Uses

In India *Tinospora cordifolia* is extensively used in traditional ayurvedic drug because of its natural conditioning like anti-seditious, immunomodulatory, antioxidant, anti-diabetic, anti-periodic, anti-spasmodic, anti-neoplastic conditioning, anti-stress, anti-leprotic, anti-malarial, hepato-defensive, anti-allergic and anti-arthritic exertion and various other medicinal parcels. *Tinospora cordifolia* use in several affections complications, asthma, diabetes, dyspepsia, hostility, urinary problems, skin conditions and habitual diarrhoea and dysentery. It also plays a crucial part in the treatment of heart conditions, leprosy, helmenthiasis and rheumatoid arthritis.

- The root and stem of *T. cardifolia* as an cure to snake bite and scorpion sting (24- 26).
- The stem is bitter, stomachic, diuretic, stimulates corrosiveness concealment, allays thirst, enriches the blood and cures hostility (27).
- The juice of plant stem is useful in diabetes, dyspepsia, vaginal and urethral discharges (28).
- The dinghy of this plant acts as Anti-allergic, Anti-spasmodic, Anti-pyretic, Anti-leprotic (29- 31).
- The greasepaint of root and stem is used along with milk for treatment of cancer (32).
- The whole plant of *T. cardifolia* used in scabies in swine, diarrhoea, Urinary conditions, syphilis, skin conditions, bronchitis, to promote life, increase body's resistance and Stimulate the vulnerable system (33- 36).
- The dried fruit greasepaint mixed with ghee or honey, is used as a alcohol and also in the treatment of hostility and rheumatism (37).
- The dry stem crude excerpt of this plant which was poly saccharide in nature shows a poly clonal B- cell mitogen exertion and Active factors of stem excerpt enhanced the humoral response in mice (38).
- Giloy (*T. cardifolia*) juice which is a admixture of Giloy condiment and tulasi leaves is used against monkey malaria (39).
- The stem waterless excerpt of *T. cardifolia* show anti-inflammatory effect in both acute an sub acute models of inflammation (40).
- *T. cardifolia* shows anti – antipathetic Rhinitis exertion. Antipathetic rhinitis is the atopy complaint implies acuity response exposure to pollens of lawn, weeds, trees, dust etc (41).
- The *T. cordifolia* stem waterless excerpt shows radio-defensive exertion (42).
- It's used in treatment of hostility because it reduces body heat (43).
- The stem of this plant regulates the blood sugar position due to the presence of alkaloids (44).
- *Tinospora cardifolia* decreases the tissue damage caused by radiation (45).
- The plant is also used in treatment of eye disorders and fractures (46).

6. Conclusion

The present review focuses on the botanical description and medicinal significance of the plant *Tinospora cordifolia*. The plant, for its vast bio-diversity and traditional medicinal significance, it provides a new sight of grueling exploration for the scientists to insulate pharmacologically active and remedial plants from the plant to treat several dreadful conditions.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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