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Review Article

One of the herbal drug *Tinospora cordifolia* (GILOY): A systemic review

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ABSTRACT

Natural products with medicinal value are gradually gaining importance in clinical research due to their well-known property of no side effects as compared to drugs. The roots and stem contain several secondary metabolites having curative properties. The plant is genetically diverse, containing different active components, including steroids, aliphatics, alkaloids, glycosides, and diterpenoid lactones. These active compounds are distributed over all parts of the plant, such as the root and stem. T. cordifolia is widely used in traditional Ayurvedic medicine in India. It has shown great potential for the development of biopharmaceutical products for the treatment of various diseases. The plant bears various antioxidants, antidiabetic, antiallergic, anticancerous and many more properties that make them a topic of great importance & interest.

Key Words: Taxonomical classification, Golancha, Tippateege, Cordifolia, berberine, Seenthil choornam, Epoxyclerodane diterpene

INTRODUCTION

Herbal medicines represents one of the most important fields of traditional medicine all over the world.The herb Tinospora cordifolia (TC) belongs to the Menispermaceae family and is commonly known as Gu-lancha or Tinospora in English and Giloya or Ambervel in Hindi[1]. It is a large, extensively-spreading, climbing shrub with several elongated twining branches. Leaves are simple, alternate. Lamina are broadly ovate or ovate cordate.Flowers are unisexual, small on separate plants and appearing when plant is leafless, greenish yellow on axillary and terminal racemes. Male flowers are clustered, but female flowers are usually solitary.[12]

Taxonomical classification

Kingdom:	Plantae
Subkingdom:	Tracheobionta
Division:	Magnoliophyta
Class:	Magnoliopsida
Subclass:	Ranunculidae
Order:	Ranunculales
Family:	Menispermaceae
Genus:	Tinospora
Species:	cordifolia

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Giloy leaf [20]

Giloy stem[20]

Vernacular Names
Sanskrit: Guduchi, Amrita
Bengali: Golancha
English: Tinospora
Gujarati: Gulvel
Hindi: Gulancha
Kannada: Amrutaballi, Madhuparni
Malayalam: Amrytu, Chittamritam
Oriya: Gulochi
Tamil: Amudam, Chindil
Telugu: Tippateege, Guricha
Urdu: Gilo, Satgilo

Though every part of the plant has therapeutic value, the stem is the most frequently used part of the medicinal preparations [16]. The whole plant possesses diverse health benefits and has been used as traditional medicine against various human ailments since the distant past. [8] The plant is likely to be safe for oral use over a short time. T. cordifolia stem extract, can be safely used for 8 weeks. [11]

PHYTOCHEMICAL CONSTITUENT

The different classes of compounds which are found in this plant are classed in groups like alkaloids, steroids, terpenoids, polysaccharides, glycosides and different aromatic and aliphatic compounds that are present in their phytoactive form that are responsible for the wide range of medicinal therapeutic properties. The presence of these compounds is found in various plant parts but highly concentrated in the stem, leaves and root part of the plant.[9]The main compound of this plant is berberine and furanolactone and furthermore compounds like tinosporone, tinosporic acid, cordiflolislides A to E, giloin, gilenin, crude giloininand, arabinogalacten, polysaccharides, picrotene, bergenin, gilosterol, tinosporol, tinosporidine, sistosterol, cordifol, heptacosanol, octacosonal, tinosporide, ecdysterone, makisterone A, hydroxyecdysone, magnoflorine, tembetarine, syringine, glucan, polysaccharides, sryingine apiosylglycoside, isoclumbin, plamatine, tetrahydropalmaitine, jatrorrhizine are few of the compound s that have been lolated from the plant. The presence of three compounds like cycloeuphordenol, Cyclohexyl-11-heneicosanone and 2-Hydroxy-4-methoxy-benzaldehyde has been isolated from the plant and has been seen to be present in various other plants. [10]

CHEMICAL CONSTITUENT RESPOSIBLE FOR BIOACTIVITY [16, 17, 18, 19]

Sr.No.	Bioactivity	Chemical constituent
1.	Antimicrobial activity	Furanolactone, Tinosporon, Jateorine, Columbin
2.	Antidiabetic activity	Berberine, choline, Tembetarine, Palamtine, Jatrorrhizine
3.	Anticancer activity	Magnoflorine, palmatine, Tinocordiside, Cordifolioside A
4.	Antidepressant activity	Tinosporin, berberine, Jatrorrhizine
5.	Antipsychotic activity	Berberine, Choline,Tembetarine,Magnoflorine, Tinosporin, Palmetine, Isocolumbin, Aporphine alkaloids, Jatrorrhizine, Tetrahydropalmatine
6.	Hepatoprotective activity	Magnoflorin, Tinosporin, Isocolumbin, Palmatine, Tetrahydropalmatine
7.	Cardioprotective effect	Furanolactone, Tinosporin, Tinosporide, Jateorine, Columbin, Clerodane derivatives
8.	Antifeedant activity	Tincordin, Tinosporide, Columbin, 8-hydroxy columbin
9.	Radioprotective & cytoprotective activit	Cordifolioside A
10.	Anti-inflammatory	Furanolactone, Tinosporin, Tinosporide, Jateorine, Columbin,

	activity	Clerodane derivatives
11.	Antioxidant activity	(-)Epicatechin, Tinosporin, Isocolumbin, Palmatine
12.	Antidyslipidemic activity	Berberine
13.	Neuroprotective effect	Berberine, choline, Tembetarine, Tinosporin, Palmitine, Jatrorrhizine
14.	Gastroprotective activity	Epoxyclerodane diterpene

USES

Plants are one of the most important sources of medicines. Today the large number of drugs derived from plants, like morphine from *Papaver somniferum*, Aswagandha from *Withania somnifera*, Ephedrine from *Ephedra vulgaris*, Atropine from *Atropa belladonna*, Reserpine from *Rauwolfia serpentina* etc. The medicinal plants are rich in secondary metabolites (which are potential sources of drugs) and essential oils of therapeutic importance. The important advantages claimed for therapeutic uses of medicinal plants in various ailments are their safety besides being economical, effective and their easy availability.Because of these advantages the medicinal plants have been widely used by the traditional medical practitioners in their day to day practice. [14, 15] The herb has a long history of being used in traditional system of medicines and by ayurveda practitioners in India to treat numerous disorders or disease [11]

Anti-diabetes property: The oral administration of various extracts (hexane, ethyl acetate and methanol) of Tinospora cordifolia stem (TCS) were found to have potent antidiabetic activity that reduces blood sugar level in streptozotocin-(STZ) induced diabetic rats [1]. The capsule developed from giloy is useful in the treatment of Dengue. It is very much useful in ayurvedic treatment [3]. It induces a marked protective action against 8 h restraint stress induced ulceration, which is comparable to that of diazepam [4]. T. cordifolia has also been shown to enhance cognition (learning and memory) in normal rats and reverse cyclosporine-induced memory deficit. Both the alcoholic and aqueous extracts of T. cordifolia produced a decrease in learning scores in Hebb William maze and retention memory, indicating enhancement of learning and memory [5]

Anti-toxic effects: Protective role of aqueous extract of stem and leaves of *Tinospora cordifolia* overcoming the toxic effects of lead is shown as its effects on the hematological values. [7]

Improving metabolization rate in broilers: The possible mechanisms of action of herb in the animal for growth promotion include changes in the intestinal macrobiotic, increased digestibility and nutrient absorption; enhanced nitrogen absorption, improvement of the immune response, morphological and histological modifications of the gastrointestinal tract and antioxidant activity [8]

Treats Arthritis: For rheumatic complaints like Rheumatoid arthritis, 20 to 30 ml of the juice of this plant is advised twice daily. Seenthil choornam and Seethil uppu is found to bring excellent results in the condtions like chronic skin ailments, bone disorders and infertility. [6] Giloy contains anti-inflammatory and anti-arthritic properties that help treat arthritis and its several symptoms. For joint pain, the powder from giloy stem can be boiled with milk and consumed. It can be used along with ginger to treat rheumatoid arthritis. Giloy juice contains anti-inflammatory and anti-arthritic properties [12]

Anti-Allergic: Tinospora Cordifolia has been studied for its antiallergic effect. It was found that Cordifolia provided significant relief from sneezing nasal discharge, nasal obstruction, and nasal pruritis compared with placebo with consistent improvement on examination of nasal smears and nasal mucosa. Tinospora cordifolia has been studied for its anti-allergic effect. It was found that T cordifolia provided significant relief from sneezing, nasal discharge, nasal obstruction, and nasal pruritus compared with placebo with consistent improvements on examination of the nasal smears and nasal mucosa. [2]

Homoeopathic View: It has a curative influence over seminal debility, fevers, especially intermittent fevers, jaundice, splenic affections, leprosy, leucorrhoea, rheumatism, skin diseases, secondary syphilis, genitourinary troubles such as gonorrhea, dysuria, etc.

CONCLUSION

Tinospora cordifolia could be further exploited in the future as a source of useful phytochemical compounds for the pharmaceutical industry. Even though there are many herbal plants in this world guduchi is considered to be having greater medicinal value. T. cordifolia can be potential dietary component which help in prevention of different diseases. The oral administration of various extracts (hexane, ethyl acetate and methanol) of Tinospora cordifolia stem (TCS) were found to have potent antidiabetic activity that reduces blood sugar level in streptozotocin-(STZ) induced diabetic rats.

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