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# MULTIPURPOSE PLANT - TINOSPORA CORDIFOLIA

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## ABSTRACT

Tinospora cordifolia belongs to the family of Menispermaceae which is large, deciduous, climbing shrub found in India. It is also called as heart leave moonseed plant in English and Guduchi in Sanskrit. It is being used in diet by Indian people. It can be used in disease condition like fever, diabetes, dyspepsia, jaundice, urinary problem, skin disease, chronic diarrhea and dysentery. Guduchi can also be used in treatment of heart disease, leprosy, and helminths. The starch is obtained from the stem which is high nutritive and digestive which is used in many diseases. The various benefits are obtained by the use of Guduchi as a dietary components have been discussed in this article.

**KEYWORDS:** Tinospora cordifolia, chemical constituents, Glycosides, Alkaloids, Diterpenoids, Biological Activity, Steroids, Sesquiterpenoids.

## INTRODUCTION

Now a days, herbal medicinal product are getting more and more fame and popularity. Due to their high efficacy and no side effect. So herbal medicinal research regarding medicinal use of different plant is increasing, researcher are taking interest into it. India is consist of wide variety of medicinal plants among them Tinospora cordifolia has a wide array of bioactive principles as well as it has been proven medicinally important plant, yet have not received considerable scientific attention. The therapeutic effect of this medicinal plant is due to the presence of active substance like alkaloid, vitamins, glycosides, tannins, etc. Our ancestors were using medicinal plant as natural medicines, so we can say that practices has been

existence since prehistoric times. crude extract of plants has the presence of natural chemical constituents such as psilocin, berberine, morphine etc and natural compounds for the synthesis of drugs such as nicotine, quinine etc. India with its vast bio-diversity and huge knowledge of ancient traditional system of medicine such as Ayurveda, Siddha, Unani, etc provide strong base for the utilization of large number of plants in general healthcare and common ailments of the people. Tinospora cardifolia is a climbing shrub belong to the family Menispermaceae, where this family contain about 70 genus and 450 species found in tropical regions of India, Sri Lanka, Bangladesh and China. Tinospora Cordifolia is also known as Guduchi in Hindi, Amrita in Sanskrit, Tippa teega in Telugu, Seenthilkodi in Tamil, Amruthaballi in Kannada, Giloy in Hindi, Garo in Gujarati, Gulvel In Marathi, Chittamrithu in Malayalam. Tinospora cordifolia is an important drug in Indian medicine and has been used in medicine since ancient times**.** The drug is well known Indian bitter and prescribed in fever, diabetes, urinary problems, skin diseases, dyspepsia, jaundice and chronic diarrhoea and dysentery. It is useful in the treatment of heart disease, leprosy, and helmenthiasis. The starch obtained from the stem is high nutritive and digestive and used in many diseases.

**Botanical Classification**

Common name: Guduchi.

Kingdom: Plantae.

Scientific name: Heart-leaved Moonseed.

Division: Magnoliophyta.

Genus: Tinospora.

Species: T. cordifolia.

Class: Magnoliopsida.

Order: Ranunculale.

Family: Menispermaceae.

**Growth Requirement**

This plant can be grown in any climate but the warm climate is the most preferred climate. It grows at the altitude of 300 meter. The plant is very rigid and Planting is usually done during rainy season (July to August), it prefers medium black or red soil for its cultivation. It can be successfully grown in a variety of soils, from sand to clay loam. However, for growth, the soil must be well-drained, moist enough, and rich in organic matter.

**Growth Constraints**

Giloy can be propagated by vegetative cuttings and seed. But this method is not suitable for the large scale production, because Viability of seeds is very less, poor seed set and germination of seeds are the main problems associated with its clonal propagation Vegetative cuttings are also not suitable due to less productivity and also dependent upon weather conditions for its further growth. So the plant tissue culture techniques may be suitable methods for its large scale production in a lesser time and space.

**Ayurvedic Description**

गुडूची मधुपर्णी स्यादमृता अमृतवल्लरी।

छिन्ना छिन्नरूहा छिन्नोद्भा वत्सादनीति च॥

जीवन्ती तंत्रिका सोमा सोम वल्ली च कुण्डली।

चक्रलक्षणिका धीरा विशल्या च रसायनी॥

चन्द्रहासा वयस्था च मण्डली देवनिर्मिता।

गुडूची कटुका तिक्ता स्वादुपाका रसायनी।

संग्राहिणी कषायोष्णा लघ्वी बल्या अग्निदीपिनी।

दोष त्रयामतृड्दाहमेहकासाश्च पाण्डु ताम।

प्रमेह श्वास कासार्शः कृच्छ हृद्रोग वातनुत।

{Shloka no. 8-10, Guduchyadi Varga, Bhava Prakash Nighantu, Indian material medica of SRI BHAVMISHRA (C. 1500-1600A.D)}

The above shloka explains the synonyms, properties, and actions of the herb Guduchi. The synonyms of Guduchi are Madhu Parni, Amrtà, Amrta, Vallari, Chinna, Chinnaruha, Chinnodbhava, Vatsadani, Jivanti, Tantrika, Soma, Somavalli, Kundali, Cakralaksanika, Dhira, Visalya, Rasayani, Candrahasa, vayastha, Mandali and Deva Nirmita. Guduci is pungent, bitter, and astringent in taste, sweet in post-digestive effect, tissue vitalizer, absorbent, hot in potency, light in action, strength-giving, and appetizer. It alleviates all the three Dosas and Ama (indigested food, retained in the intestines) It cures thirst, burning sensation, urinary diseases including glycosuria, cough, anemia, jaundice, skin diseases, Vata lacta (arthritis with skin lesions), fever, parasite infestation, vomiting. It also cures twenty types of urinary diseases, dyspnea, cough, hemorrhoids, difficulty in micturition, cardiac problems, and Vata diseases. Morphology as per Bhava Praksaha Nighantu. The drug consists of dried matured pieces of stem. This is widely distributed through- out India. It is a large, succulent vine with rough cork bark. Leaves: 5-10 cm long, heart-shaped, and stalked.

Flowers – panicles, small and yellow. Fruit – flask-shaped and turns red when ripe. Long filamentous aerial roots often develop from the branches.

**Ayurvedic properties of Guduchi**

- Rasa (Geshmak) – Tikata (bitter), Kashaya (adstringierend)
- Guna (Tugend) – Guru (Shva), Snigda (Orig)
- Virya (Potenz) – Ushana (Shafe Potenz)
- Vipaka (Nachverdauung). -Madhura (süß)
- Karma (Aktion) -Tridosa Shamaka, Vata Shamaka by Usna Virya and Madhura Vipaka, Pittahara by Tikta, Kasaya Rasa and Madhura Vipaka. Kapa Shamaka by the seiners Usna Viriya and Tikta, Kashaya Rasa. Jwalahara, Rasayana, Sangrahi, Dipana, Amahara, Trishnahara, Dahahalo, Pramehagna, Kasahara, Kustagna, Barya, Krimigna, Chadigana, Arsogna, Mediya, Hridya, Chakushya, Vayasthapana. Kanda Guduchi: Jwalahara, Vishgani, Butgani, Vali Parit Nasini.

**Important phytoconstituents present in Guduchi**

It contains clerodane furano-diterpenes like columbin, tinosporaside, a lignan-3-4- bis-tetrahydrofuran, alkaloids like Jatrorrhizine, palmatine, berberine, tembeterine, a sesquiterpene glucoside- tinocordifolioside, phenylpropene disaccharides like cordifolioside A and B. others include choline, tinosporic acid, tinosporal and tinosporan.

**Morphological Description**

Tinospra cordifolia is largely spreading climbing shrub different parts of Giloy have following type of morphology.

**Stem**

The bark of Giloy is cream to gray and sometimes spiral-shaped. The stems are juicy, long, fleshy, and climbing. The cross section of the stem has a wheel-like structure. The starch extracted from Giloy is called "SATVA".

**Leaves**

The leaves are heart-shaped and round, partially twisted into a semicircle. It has a bitter and cloudy smell. The leaf blade is oval, 10-20 cm long and 8-15 cm wide.

**Flowers**

Flowers are greenish yellow in colour. They are small and unisexual, male flowers are clustered and female flowers exist in solitary. There are six sepals which are in two series of three each, where outer one is smaller than the inner sepals. Flowers is seen during summer {March to June}

They are at 2mm in size

**Fruit**

Fruits are single seeded and red-orange in colour,

**Seed**

Because the seeds are curved, this family is called the lunarseed family. They are white, bean-shaped, and curved. The embryo also automatically took on a curved shape. The endocarp is variably decorated and exhibits taxonomic characteristics.

**Arial root**

They are characterized by four to five arch-like primary structures. The root cortex is divided into an outer thick-walled zone and an inner parenchymal zone.

**Natural product**

There are so many medically active compound present in the Giloy like alkaloid, glycosides, steroid, etc. so by isolating them we can formulate number of formulation or number of different natural product.

| Active Component | Compound | Plant Part | Biological Activity (Human being) |
|---|---|---|---|
| Alkaloids | Tetrahydropalmatine, alkaloids, Jatrorrhizine, Berberine, Choline, Tembetarine, Magnoflorine, Tinosporin, Palmetine, Isocolumbin, Aporphine | Stem, Root | immunomodulatory, psychiatric conditions, Anti-viral infections, Anticancer, anti-diabetes, inflammation, Neurological, |
| Steroids | β-sitosterol, δ-sitosterol, 20 β-hydroxyecdysone, ecdysterone, maxisterone A, gyroinsterol | Shoot. | Inhibits TNFα, IL-1 β, IL-6 and COX-2, induce cell cycle arrest in G2/M phase and apoptosis through c-Myc suppression, IgA neuropathy, glucocorticoid induced osteoporosis in early inflammatory |

| | | | |
|---|---|---|---|
| | | | arthritis. |
| Glycosides | Cordioside, Cordifolioside Syringin, Syringinapiosylglycoside, Pregnane glycoside, Palmatosides, Cordifolioside A, B, C, D and E, 18-norclerodane glucoside, Furanoid diterpene glucoside, Tinocordiside, Tinocordifolioside | Stem. | Stem treats neurological disorders such as ALS, Parkinson's disease, dementia, movement and cognitive disorders, and neuron loss in the spine and hypothalamus. Inhibits immune regulation and inhibits NF-kBand. Acts as a nitric oxide scavenger and exhibits anticancer effects. |
| Aliphatic | Octacosanol, Heptacosanol Nonacosan-15-one dichloromethane | Whole plant. | Anti-nociceptive and anti-inflammatory. Protection against 6-hydroxydopamine-induced parkinsonism in rats. Downregulates VEGF and inhibits TFN-α binding to DNA. |
| Sesquiterpenoid | Tinocordifolin | Stem. | Antiseptic |
| Diterpenoid Lactones | Tinosporon, Tinosporides, Jateorine, Columbin, Furanolactone, Clerodane derivatives [(5R,10R)-4R-8Rdihydroxy-2S-3R:15,16-diepoxy-cleroda-13 (16), 14-dieno-17,12S:18,1Sdilactone], | Whole Plant. | Vasorelaxant: relaxes norepinephrine induced contractions, inhibits Ca++ influx, anti-inflammatory, anti-microbial, antihypertensive, anti-viral. Induces leukemic apoptosis through activation of caspase-3 and Bax. |
| Others | 3,(a,4-di hydroxy-3- methoxy-benzyl)-4-(4- compounds hydroxy-3- methoxy-benzyl)- Giloin, N-transferuloyltyramine as diacetate, Tinosporic acid, tetrahydrofuran, Jatrorrhizine, Tinosporidine, Cordifol, Cordifelone, Giloinin. | Root, Whole Plant. | Protease inhibitors for HIV and drug resistant HIV. |

**(chemical constitutes of Giloy.)**

**Method of Preparation of Satva**

गुडूचीं खण्डशः कृत्वा कुट्टयित्वा सुमर्दयेत्।

वस्त्रेण विधृतं तोयं स्रावयेत्तच्छनैः शनैः॥

शुद्धशङ्खनिभं चूर्णमेतैः सम्मिश्रयेद्भिषक्।

{Reference: Yogaratnakara Rajayakshma Chikitsa}

According to above shloka,

First collect the Giloy plant then remove all other foreign material like soil, stone, weed, etc.

Now remove the outer layering i.e bark of the stem so that we can avoid the adulteration of the final product.

Then put the stems into water for socking less than an hour [if required]. Now cut the stems into small pieces of size 2,3 inches.

Now smash all of them using mortar and piston, so that their fibrous material will come out. [Use wooden or copper made mortor and piston beacouse this type of material will not distruct the phytoconstituents.]

Now wash all the smashed material by using water, [Quantity of water should be 4 times greater than that of the weight of the crude drug]

Then filter the water extract by using cloth so that we can filter the fibers and other unwanted material.

Now collect all the liquid extract in a big bowl having large surfacearea and place it at location where no one is going to disturb it so that satva can be settle down.

After 4,5 hours remove water without disturbing the satva at the base. After removing all the water place the remeaning extarct for the sun drying. During sun drying cover top of the bowl by transparent sheet so we can avoid air contamination, then collect the dried powder into suaitable container. This final collected product is called as “SATVA”.

## DISCUSSION

Tinospora cordifolia have an importance in tradational Ayurvedic medicine, we had discussed the compounds and their biological roles in Tinosopora cordifolia extract such properties may be used for production of new formulation. The various benefits are obtained by use of Tinospora cordifolia as a dieatry components have been discussed in this article. It is used in the treatment of fever, jaundice, chronic diarrehia, cancer, dysentry, bone fracture, pain, asthama, skin disease, poisonus insect, snake bite, eye disorders.

## CONCLUSION

A plant with multiple role as Tinospora cordifolia is allround resource for all forms of life. In this article we had already discussed that the plant extracts have active components in the form of alkaloids, glycosides, lactose, steroid, sesquiterpenoids, alphatic compounds and all these active copounds have immunomodulatory and physiologica role in different types. We have been studying how active ingredients actually interact with biological systems and influence their biological activity. This research has much to offer the world of medical science, and the plant Tinospora cordifolia is a truly remarkable source.

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