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A Comprehensive Review of A Multi-Faceted Drug: *Guduchi* (*Tinospora cordifolia* Willd.)

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ABSTRACT

In present era, *Ayurvedic* herbs are becoming increasingly popular all over the world. The demand of herbal drugs is progressively increasing due to their admirable efficacy, lesser side effect and good belief by communities on herbal drugs. Some of the herbal drugs are much popular in communities in both curative and preventive aspect. *Guduchi* (*Tinospora cordifolia* Willd.) is one such plant. This plant is extensively used in folklore and *Ayurvedic* system of medicine. Various pharmacological properties of *Guduchi* are described in ancient *Ayurvedic* texts i.e. *Jwarahara*, *Rasayana*, *Agnideepana*, *Vataraktanashaka*, *Sangrahi*, *Balya*, *Mehnashaka*, *Kasa-swasahara*, *Sarvakusthahara*, *Krimihara*, *Prameha*, *Arshnashaka*, etc. Synonym *Amrita* is credited to this drug due to its capability to convey enthusiasm, vitality and longevity to its benefactor. Due to its multi-faceted usage, this mission is on-going to declare this drug as a *Rashtriya aushadhi* (National herb) of India.

KEYWORDS

Tinospora cordifolia Willd, *Guduchi*, *Amrita*, *Rashtriya aushadhi*, *Ayurveda*



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INTRODUCTION

Biodiversity of natural resources has helped not only for the primary human needs but also for health care since ancient times. Medicinal plants are performing an important role for primary healthcare since long. Ethnic communities have a rich knowledge base about usage of medicinal plants for treating various diseases. *Ayurveda* was developed through daily life experiences with the joint relationship between human and nature. Classical *Ayurvedic* literature gives emphasis over the 2000 plant species for their therapeutic use. Not only in *Ayurveda*, but also in other traditional and folklore systems of medicine plants are the main therapeutic agents used by human and still play an important role to form medicinal preparations¹. According to a WHO report, about 80% population of world depends on traditional system of medicine for primary health care, where plants are the foremost component over other natural resources². The progress of these traditional system of medicine with the perception of safety, efficacy and quality will help not only to preserve their traditional values but also to explain the practise of natural products in the health care³.

In the present scenario, there is a vast range of herbal drugs which are being used singly

as well as compound medicine. The availability of the drugs is being threatened due to irrational use and improper harvesting system of the medicinal plants.

Guduchi (*Tinospora cordifolia* Willd.) is unique versatile rejuvenating climbing herb which plays a basic role in Indian medicinal system. This single herb has shown a great potential for treatment of various disease since times immemorial. *Vedas* and *Ayurvedic* classics extensively mentioned about the uses of this drug. Due to its ethno-medicinal importance and significant role in treating various diseases it is also discerning to declare it as a *Rashtriya aushadhi*.

Guduchi is used both as curative and preventive medicine. It is used as single drug and in compound formulations. The aim of this review is to compile all the references of *Guduchi* as stated in *Brihatrayee and Nighantu* and published information on ethno-medicinal or folklore usages, pharmacological reports of this plant and available data on internet regarding its pharmacological actions.

MATERIALS AND METHODS

The information regarding *Guduchi* is compiled from *Brihatrayee*, various *Nighantu* and research articles for its details like synonyms, classification (as



Gana/Varga), vernacular names, pharmacodynamics, part used, dose, indications, folklore claims etc.

In *Vedic* literature, *Atharvaveda* (*commentator Sayana*) states about *guduchi*. *Guduchi* was used to avoid snakes and scorpions⁴. *Guduchi* is indicated in *Brihatrayee* (*Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya*) & *Laghutrayee* (*Bhavaprakash Samhita, Sharangdhar Samhita, Kashyap Samhita*) and various *Nighantu* for many disease as a single drug or various formulations.

Various Classical uses of *Guduchi* are as following⁵:-

Fever-

Juice of *Guduchi* and *Shatavari* in equal quantity mixed with jaggery alleviates fever caused by vata .(S.S.Utt.39/170)

The juice of *guduchi* mixed with *pippali* powder pacifies fever. (A.H.Ci.1/60)

The leaves of *guduchi* are used as vegetable in chronic fever. (Chakradutta 1/41)

Jaundice and *Halimaka*-

One suffering from jaundice should take paste of *Guduchi* leaves with buttermilk. (B.P.Chi. *pandu roga* 70)

Thirst-

Syrup of *guduchi* removes thirst. (C.S.Ci.22/45)

Cold infusion of *Guduchi* mixed with honey cures all three types of thirst. (S.S.Su.49/24)

***Amlapitta* (Acid gastritis) –**

Decoction of *Guduchi, Nimba, Patola* leaves mixed with honey alleviates varied forms of severe *amlapitta* .(B.P.Chi.10/16)

***Vatarakta*-**

An oil cooked with decoction of *Guduchi* and milk or decoction of *Draksha*, or decoction of *Madhuka* and *kashmarya* alleviates *vatarakta* (C.S.Ci.29/121)

***Kustha* –**

Juice or decoction of *guduchi* or *guduchi ghrita* is taken every morning to get rid of all types of *Kustha* (S. Ci.10/64)

For purifying breast milk-

One should administer decoction of *Katuki* or *Guduchi* and *Saptaparna* with *Shunthi* for purifying breast milk. (C. S. Ci. 30/261)

***Prameha*-**

Juice of *Guduchi* or *Amalaka* mixed with honey cures *Prameha*. (A.H.Ci.12/6)

***Filaria*-**

Regular use of *Guduchi* juice mixed with oil destroys filaria. (Chakradutta 42/16)

Synonyms-

Various synonyms of *Guduchi* is compiled from *Nighantu* are *Amrita* (That which perish easily), *Amritvalli* (The creeping plant that endows life by destroying disease), *Chinnaruha* (That which grows even after cutting or that which exists), *Chakralakshanika*(Wheel like appearance on cross section of stem), *Vatsadini*(That which is eaten by calves),



Madhuparnika(Tender leaves are sweet or less bitter than other parts), *Vayastha*(That which help in sustaining youthfulness), *Vishaghni* (That which cures *visha* or toxins), *Jwaranashini*(Antipyretic), *Kundali*(Forming a ring or moving in circles), *Vishalya* (That which relieves pain caused by *Shalya*/trauma,free from pain).

Classification-

Guduchi is classified in *Tikta Skandha* in all three *Samhitas* of *Brihatrayee* and also classified in different *Gana* or *varga* in *Brihatrayee* & various *Nighantu* in **Table 1**.

Table 1 Categorization of *Guduchi* under various *Gana* or *Varga* in *Brihatrayee* & *Nighantu*

<i>Samhit/ Nighantu</i>	<i>Gana / Varga</i>	Reference
<i>Charaka Samhita</i> ⁶	<i>Tikta skandha, Sandhaniya, Tripthighna, Stanyashodhan, Snehopaga, Trishnanigrahana, Dahaprashamana Mahakashaya</i>	<i>C.S.Vi.8/143</i> <i>C.S.Su.4/11,4/18,4/29,4/41,4/50.</i>
<i>Sushruta Samhita</i> ⁷	<i>Arghvadhadi, Shyamadi, Patoladi, Kakolyadi, Guduchyadi, Vallipanchamoola</i>	<i>S.S.Su.38/6, 38/29, 38/33, 38/51, 38/73.42/22</i>
<i>Ashtanga Hridaya</i> ⁸	<i>Tikta Varga, Patoladi gana, Guduchyadi, Arghvadhadi gana</i>	<i>A.h.Su. 10/29,</i> <i>A.h.Su.15/7,15/15,15/16</i>
<i>Dhanvantari Nighantu</i> ⁹	<i>Guduchyadi Varga</i>	<i>D.N. 1-8, P.no.16-17</i>
<i>Sodhala Nighantu</i> ¹⁰	<i>Guduchyadi Varga</i>	<i>So.N.part-1, Anekarthavarga 735</i>
<i>Madanpal Nighantu</i> ¹¹	<i>Abhayadi Varga</i>	<i>(M.N. Abhayadi varga 38-41)</i>
<i>Kaiyadeva Nighantu</i> ¹²	<i>Aushadhi Varga</i>	<i>K.N.Aushadhi varga 7-11</i>
<i>Bhavaprakasha Nighantu</i> ¹³	<i>Guduchyadi Varga</i>	<i>(B.P.N. Guduchyadi varga 6-9)</i>
<i>Raja Nighantu</i> ¹⁴	<i>Guduchyadi Varga</i>	<i>R.N. Guduchyadi varga 17-18,</i>
<i>Nighantu Aadarsha</i> ¹⁵	<i>Guduchyadi Varga</i>	<i>Ni.A .Vol 1</i>
<i>Pirya Nighantu</i> ¹⁶	<i>Pippalyadi Varga</i>	<i>Pri. Ni.16-19</i>

Vernacular names- English: *Gulancharia tinctoria*, *Tinospora*; Hindi: – *Gulanchara*, *Giloy*, *Amrita*, *Gulneha*, *Gulbel*, *Guloh*, *Gurcha*; Bengali: - *Golanchara*, *Giloe*; Gujrati: - *Gulvel*, *Galo*; Kannada:- *Amrutaballi*, *Yuganiballi*, *Madhuparni*. Malyalam:-*Chittamritu*, *Amritu*; Marathi:-*Gulvel*; Punjabi:- *Gilo*, *Gilo- gulanch*,

Garham, *Palo*; Tamil:- *Amrutavalli*, *Chintilikkoti*, *Chindil*, *Seendal*, *Seendil kodi*; Assam: – *Siddhilata*,*Amarlata*; Kashmiri:- *Amrita*, *Gilo*;Oriya: – *Gulochi*,*Gulanchara*; Urdu: – *Gilo*;

Part used (Prayojyang)-Stem¹⁷, Root, Leaves¹³ are usable parts of *Guduchi*.

Pharmacodynamics (Rasapanchaka)¹⁷



Rasa- Tikta, Kashaya

Guna-Guru, Snigdha,

Veerya-Ushna

Vipaka-Madhura

Dose- *Guduchi* is indicated in the form of *Swarasa* (juice), *Kwatha* (decoction), *Churna* (powder) and *Satva*. According to *Sharangadhara Samhita*, the universal dose for the *Swarasa* is half *Pala* (24 ml), for *Kwatha* is two *Pala* (96 ml) and that of *Churna* is one *Karsha* (12 g)¹⁸. As per

Ayurvedic pharmacopoeia of India, dose of *Swarasa* is 5 to 10 ml¹⁹. Acc.to *BhavprakashNighantu*. Dose of *guduchi churna* is 1-3gm, *Kwatha*-40-80ml, *Satva*- 0.5 to 2gms¹³.

Ethno medicinal, Folk & Tribal use – *Tinospora cordifolia* catches a special mention for its use in tribal medicine or folk medicine in different part of country. Ethno medicinal, Folklore Pharmacological uses of *Tinospora cordifolia* is listed in Table- 2

Table 2 Different Ethno medicinal and Pharmacological Uses of *Tinospora cordifolia*

S.no.	Plant part used as medicine	Ethno medicinal & Pharmacological use	Reference cited
1	Leaf ^{20,21,22}	<ul style="list-style-type: none"> Used in the treatment of gout and ulcer leaf extract showed inhibition of E. coli Extraction of leaves improves fertility & decoction of leaves cures malarial fever. 	20 21 22
2	Stem ^{23,24,25}	<ul style="list-style-type: none"> Bitter stomachic stimulates bile secretion, diuretic, enriches the blood, cures jaundice, medication of skin diseases. Juice is useful remedy in diabetes, vaginal and urethral discharges, fevers and enlarged spleen Decoction of stem is used as an anthelmintic agent to expel intestinal worms and to cure jaundice. Stem as decoction used for washing sore-eyes and syphilitic-sores, antipyretic and antimalarial. Starch (<i>Satva</i>) extracted from stem intended for treatment of chronic diarrhoea. 	23 24,25
3	Root ²⁶	<ul style="list-style-type: none"> Water extract of <i>Guduchi</i> root is used as a powerful emetic, in visceral obstruction and in leprosy. 	26
4	Stem and Root ²⁷	In combination with other drugs, it is used as an antidote to snake bite	27
6	Fruit ²⁸	Mix with ghee or honey used as tonic and in treatment of jaundice and rheumatism. The juice of ripe fruits with a little honey is given to children in cold	28
7	Whole plant ^{29,30,31}	<ul style="list-style-type: none"> Beneficial in the treatment of :- Urolithiasis General weakness/ Debility Dyspepsia Dysentery 	29 30 31

Pharmacological activities – *Tinospora cordifolia* is a popular and extensively used plant in traditional system of medicine for its immunomodulatory, anti-diabetic and

anti-pyretic properties. The plant significantly improves immune system. This plant possesses many useful properties. The common pharmacological



activities of *Tinospora cordifolia* are as following-

1-Immunomodulatory activity-

Tinospora cordifolia is well documented for their Immunomodulatory activity since many years; some compounds are being isolated, characterised on the basis of this activity. *Tinospora cordifolia* leaf extract has been investigated in human for the Immunomodulatory effect on immunodeficiency virus positive patients. On the basis of reported results the plant leaf extract has showed significant immunostimulatory effect³².

2-Anti-cancer activity- *In-vitro* study on alcoholic extract of *Tinospora cordifolia* show that it suppresses cell proliferation which leads to cell necrosis in a dose-dependent (25-75 µg/ml) and time dependent (24-120 hours) manner in oral squamous cell carcinoma cell line with a significant cytostatic effect³³.

3-Hypoglycaemic activity- Aqueous extract of *Tinospora cordifolia* was evaluated for hypoglycaemic effect for altered time intervals in mice. The plant extract at a dose of 400 mg/kg b.w. per day, exhibits a significant (70.37%) decrease in the blood glucose concentration³⁴. In another study, the plant has been evaluated for hypoglycaemic and hypolipidaemic activity in the alloxan induced diabetic rats. Significant reductions in blood glucose,

hepatic glucose-6-phosphatase, serum acid phosphatase, alkaline phosphatase and lactate dehydrogenase have been observed³⁵. Root extract of *Tinospora cordifolia* was administered in dose of (2.5 and 5.0 g/kg b.w.) for 6 weeks. It significantly reduced serum cholesterol, phospholipids and free fatty acids³⁶. The aqueous, alcoholic and chloroform extracts of the leaves of *Tinospora cordifolia* have shown a significant hypoglycaemic activity in normal as well as in alloxan-treated rabbits.³⁷.

4-Hepatoprotective activity- *Tinospora cordifolia* is reported to have hepatoprotective activity. Animal study of stem and leaves extract of *Tinospora cordifolia* on rats was done in carbon tetrachloride induced liver damage³⁸. The stem of *Tinospora cordifolia* and *Tinospora sinensis (satva)* has significantly reduced the levels of serum ALT [Alanine aminotransferase], AST [Aspartate aminotransferase] and ALP [Alkaline phosphatase] in the paracetamol induced liver cirrhosis in rats³⁹.

5-Anti-Inflammatory activity- Anti-inflammatory activity of *Tinospora cordifolia* as *Guduchi Ghana* is testified using carrageenan induced paw oedema model in rats. Significant reduction in oedema was observed⁴⁰.



6-Anti-stress activity- The Anti-stress activity of *Tinospora cordifolia* & *Asparagus racemosus* were investigated by the Cold Water Swim Stress Model in rats. Both extract of *Tinospora cordifolia* and *Asparagus racemosus* reduced stress induced by lipid peroxide and significantly enhance the plasma glutathione level compared by the well-known antistress agent Diazepam⁴¹.

8-Hypolipidaemic activity- An aqueous extract of *Tinospora cordifolia* roots in dose of 2.5 and 5.0 g/kg body weight for 6 weeks resulted in a significant reduction in serum and tissue cholesterol, phospholipids and free fatty acids in alloxan diabetic rats³⁶.

9-Anti-Leprotic activity- *Tinospora cordifolia* is reported for its anti-leprotic activity, along with wide use in eczema (*Kandu*) and other skin disorders like erysipelas (*visarpa*) and has been shown to exert anti-leprotic activity in a combination formulation of *Swertia chirata*, *Tinospora cordifolia*, *Achyranthes aspera*, *Acacia catechu*, *Lawsonia inermis* and *Nerium indicum*⁴².

10-Cardio-protective activity- An alcoholic extract of *Tinospora cordifolia* in an in vivo rat model of surgically-induced myocardial ischemia. Results of this study reported a dose dependent reduction in infarct size and in lipid peroxide levels of

serum and heart tissue were observed with the prior treatment of *Tinospora cordifolia* with various doses for 7 days compared to control animals. Hence, the present study suggests the cardio-protective activity of *Tinospora cordifolia* in limiting ischemia-reperfusion induced myocardial infarction⁴³.

11-Diuretic activity- In a study on rats and human volunteers, *Tinospora cordifolia* was found to have diuretic action⁴⁴. It was also found effective in modulation of morphology and some gluconeogenic enzymes activity in kidneys of diabetic rat⁴⁵.

Safety evaluations - Acute toxicity studies revealed the non-toxic nature of methanol extract of *Tinospora cordifolia*. Experimental study was done on normal healthy male rats and no mortality was observed in the extract-treated rats, behaviour of the treated rats was also appeared normal. There was no toxicity found at any selected dose until the end of the study⁴⁶.

DISCUSSION

Guduchi was widely used to evade snakes and scorpions in Vedic period. Synonyms like *Amrita*, *Amritsambhava* and *Devnirmita* indicates this herb as a divine herb. In *Ayurvedic* literature, *Guduchi* is



stated not only for therapeutic usage but also for surgical usage. *Guduchi swarasa* is cited as a *Medhya Rasayana* in *Charaka Samhita*⁶. *Guduchi* is stated in *shaka varga* (Vegetable)⁶.

In *Sushruta Samhita* *guduchi* fibres are indicated for *seevana karma* as *Ashtavidh shastra karma*⁷ and *Guduchi patra achadana* in *atidagdha agnikarma chikitsa*⁷. *Guduchi* is also mentioned as the treatment of piles. Formulation of buttermilk used with *guduchi* and other drugs is indicated for stimulation of digestive fire & alleviation of haemorrhoids⁷.

The *rasapanchaka* of *guduchi* – *Rasa* – *Tikta, Kashaya, Guna* – *Guru, Snigdha, Veerya* – *Ushna, Vipaka-Madhura* and *Dosha-Karma* – *Tridosha-shamaka*. The action of the drug perform by quality of its *Rasa*, *Guna*, *Veerya*, *Vipaka*, *Dosha-karmta*⁴⁷.

In present era, *guduchi* is widely use as *shaka* as well as drug also. *Guduchi* is indicated in form of *swarasa, Kwatha, Satva, Churna*. All the parts of this climbing shrub have a great potential to cure the various diseases. That's why, this drug is being popular as a home remedy in communities and as an immune-booster. The health benefits of this drug are observed due to the presence of the various notable phytochemicals like phenols,

terpenes, anthocyanins, flavonoids, alkaloids and glycosides. It is also notified that the plant has efficacy against Swine flu H1N1 Virus and other viral infections also⁴⁸.

CONCLUSION

In *Ayurvedic* literature *Tinospora cordifolia* is point out to have *rasayana* (revitalizing), *vayasthapana* (rejuvenating), *hridaya* (cardiotonic) and *chakshusya* (useful in eye disorders) properties. These pharmacological actions are remarkably validated by modern research evidences also. Thus, these facts suggest that this drug has immense potential in modern pharmaco-therapeutics and capable of getting honour of *Rashtriya Aushadhi*.



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