



Research Article

PHARMACOGNOSTICAL STUDY OF *GUDUCHI KANDA GHANA VATI* AND *PATRA GHANA VATI*

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ABSTRACT

Guduchi has *Balya, Deepan-Pachana, Tridosha Shamaka* and *Rasayana* properties. *Ghana Vati* is prepared from *Guduchi kanda* and *Patra*. As *Patra* of *Guduchi* is seldom used, its *Ghana vati* is prepared to find its efficacy in comparison to *Kanda ghana vati* in *Madhumeha*. *Madhumeha* is a leading disorder of the 21st century. In this disease the ligaments of the brain and spinal cord become weak. According to *Ayurveda*, *Madhumeha* is of two types: first occurs due to *Dhatu kshaya janya prakupit vayu* and the second one occurs due to *Pitta evum kapha avrut vayu*. In this present study pharmacognostical aspect of *T. cordifolia* is shown. Comparison is seen in the organoleptic characters and HPTLC and TLC of *Kanda* and *patra ghan vati*. Then the comparative effect of *Guduchi kanda* and *Patra ghana vati* will be observed in *Madhumeha* patients. *Guduchi kanda ghan vati* has been used earlier in *Madhumeha* but first time *Guduchi patra ghan vati* will be observed in such a situation.

INTRODUCTION

To get the desirable effect from any medicine its source must be genuine so it is necessary to identify the plant correctly and collection, preservation, transportation processes must be accurate. Adulterated or substituted plants will not give the same desirable effect. Identification of raw materials should be done before using any drug. *Guduchi* (*Tinospora cordifolia* Miere) belongs to the Menispermaceae family. The chemical constituents present in *Guduchi* are: tinosporide, cordifolide and neosporin, tinosporin, tinosporic acid and tinosporol, heptacosanol, cordifol, B-sitosterol and tinosporidine, tinosporide, octacosanol and a crystalline compound (C₁₃ H₁₆O₅)⁶, diterpenoid furanolactone, quaternary alkaloids, magnoflorine, tembetarine, a new hypoglycemic agent was isolated and it was found to be 1, 2 - substituted pyrrolidine. It act as *Tridosahara, Rasayana* and *Balya* etc.^[1]

Tinospora cordifolia shows Immuno-modulatory, Hepato-protective activity,^[2] osteo-protective activity^[3], Antioxidant activity^[4] and anti-inflammatory activity^[5]. *Giloy* is useful in the treatment of a number of ailments like diabetes, helminthiasis, heart diseases, leprosy, rheumatoid arthritis, supports the immune system, the body's resistance to infections, supports standard white blood cell structure, function, and levels ^[6] and also helps in digestive ailments like hyperacidity, colitis, worm infestations, loss of appetite, abdominal pain, excessive thirst and vomiting, and even liver disorders like hepatitis ^[7,8]. Because of the chemical constituents like diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds, essential oils, a mixture of fatty acids, and polysaccharides this plant shows its pharmacological properties ^[9]. According to *Ayurveda* when *Vata dosha* get mingled with other *Dosha* shows its features. In this case, the urinary bladder sometimes gets filled with urine and sometimes becomes empty. This made it difficult to treat. All types of *Prameha* when ignored leads to *Madhumeha*.^[10]

MATERIALS AND METHODS

Plant material: The raw drugs (*Guduchi kanda* and *Patra*) were obtained from Gujarat, India. *Guduchi* stem and leaves are collected. Principle - Boiling

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Ingredients - Green *Guduchi* stem - 1 part Water (R.O) - 4 Parts.

Unit process for *Kwath* preparation

- Preparation of raw drug
- Size Reduction
- Mixing of water
- Overnight Soaking
- Application of mild heat with continuous stirring
- Reduction in volume of liquid
- Straining and collection of the galenical

Unit process for *Ghana* preparation

- Reheating of the *Kwath*
- Continuous stirring
- Complete evaporation of Water
- Conversion in semi solid form
- Drying in the oven
- Drying in sunlight
- Scrapping and collection of Ghana
- Preservation

Pharmacognostical Evaluation^[11]

The formulation was identified and authenticated and powder microscopy was done at Alarsin, Mumbai. The study includes organoleptic evaluation and microscopic evaluation. They are stored according to SOP of WHO guidelines (World Health Organisation, 1996).

Vati Preparation

Fresh *Guduchi* of appropriate size is taken and properly washed with water. *Guduchi* stems are cut down into pieces and then put in a big container. Four times of water is added into it and boiled until it is reduced to one fourth. After the decoction gets cooled down it is strained for two to three times. It is further heated with continuous stirring until it becomes semisolid. Then stop heating and dry under sun until its *Vati* can be made.^[12]

Similarly *Guduchi patra ghan vati* is prepared by heating *Guduchi patra* in four times of water. Here *Guduchi satva* is used as a binding agent.

Ingredients

<i>Guduchi kanda ghana vati</i>	<i>Guduchi</i> stem	Water
<i>Guduchi patra ghana vati</i>	<i>Guduchi</i> leaves	Water and <i>Guduchi satva</i> as binding agent

Microscopic Study

Raw material: TS and LS of *Guduchi kanda* and *Patra* are taken and studied under microscope. Cross section passing through midrib shows collateral vascular bundles. Cross section lamina shows dorsiventral structures with mesophyll differentiated into palisade and spongy tissue. TS of petiole shows epidermis, cortex, endodermis, fibrous pericycle, vascular bundles in pith.

TS of Stem shows wheel shaped appearance, mucilage canals, dense parenchyma, medullary rays, starch grains, xylem surrounded by phloem, pericyclic fibres. TS petiole shows epidermis, cortex, endodermis, fibrous pericycle, vascular bundles.

Vati powder shows vessels with reticulate secondary wall thickening tracheids, tracheidal fibres with bordered pits and horizontal perforations and starch grains.

Organoleptic Study

Guduchi Vati was evaluated for organoleptic characters like taste, odour, colour and touch.^[13]

Physico-Chemical Analysis

Physico-chemical Parameters of *Guduchi Vati* like weight variation, Hardness, Disintegration time, Loss on drying, Ash value, water soluble extract, Alcohol soluble extract, pH were determined as per the API guideline.^[14]

Table 1: Analytical report (physico chemical analysis)

Tests	<i>Guduchi kanda ghana vati</i>	<i>Guduchi patra ghana vati</i>
Average weight	514 mg	562 mg
Diameter	12.1 mm	12.3 mm
Thickness	5.6 mm	6.1 mm
Hardness	5 kg/cm ³	4.5kg/cm ³
Friability test	nil	nil
Disintegration time	21 min	20 min
pH	5.6	6.8
Ash	7.41%	7.77%
AIA	1.02%	1.20%
Water soluble extracts	30.00%	35.57%
Alcohol soluble extracts	7.56%	4.8%

Organoleptic characters of *Guduchi Vati*

Organoleptic characters of contents of *Vati* like colour, taste, odour and touch were recorded separately and are mentioned. (Table 2)

Table 2: Organoleptic characters of *Guduchi Vati*

Drug name	<i>Guduchi kanda ghana vati</i>
colour	Creamish grey
Taste	Very bitter
Odour	Slightly aromatic
Nature (touch)	Hard

Drug name	<i>Guduchi patra ghana vati</i>
Colour	Creamish grey
Taste	Very bitter
Odour	Slightly aromatic
Nature (touch)	Hard

Test: HPTLC

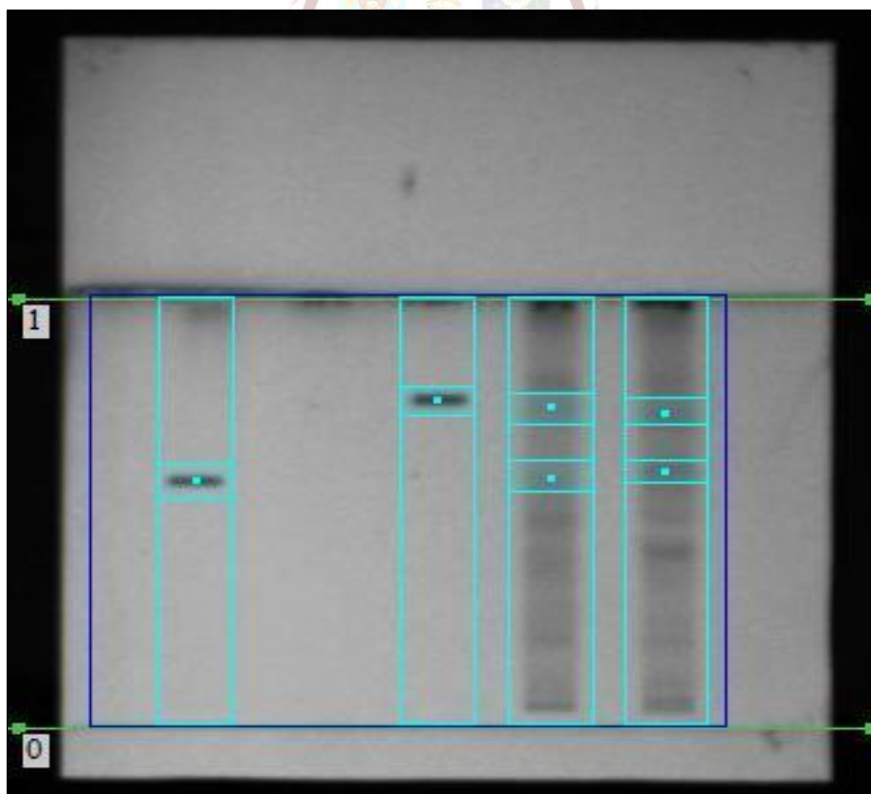
HPTLC: stationary phase is silica gel 60 F₂₅₄

Mobile phase is butanol: ethyl acetate:acetic acid:water (3:5:1:1)

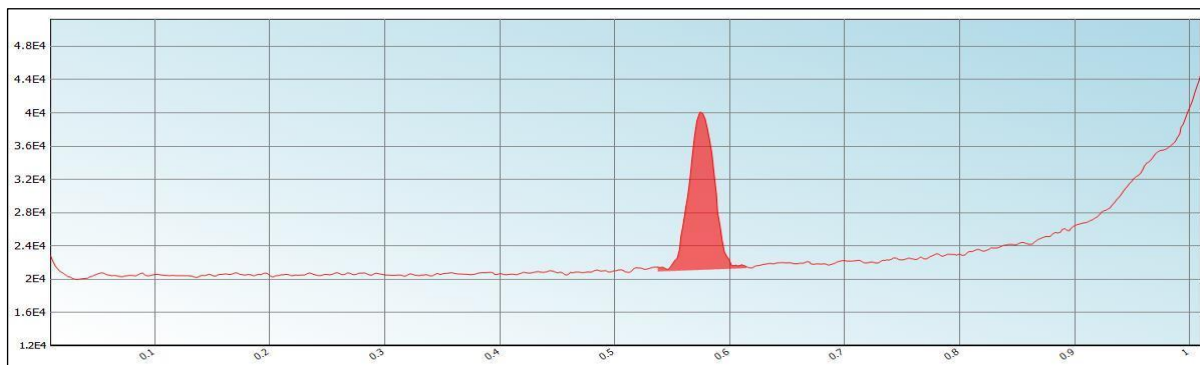
Stationary Phase:- Silica Gel 60 F₂₅₄

Mobile Phase:- Butanol : Ethyl Acetate : Acetic Acid : Water (3:5:1:1)

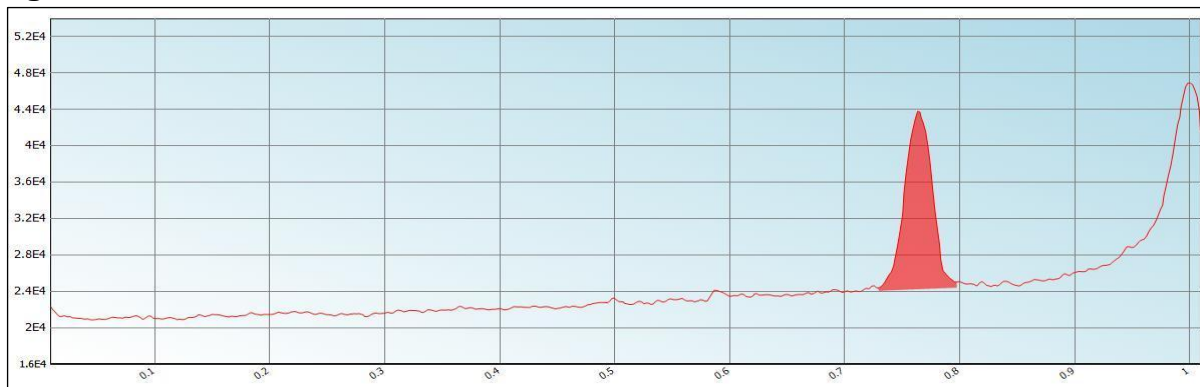
Plate



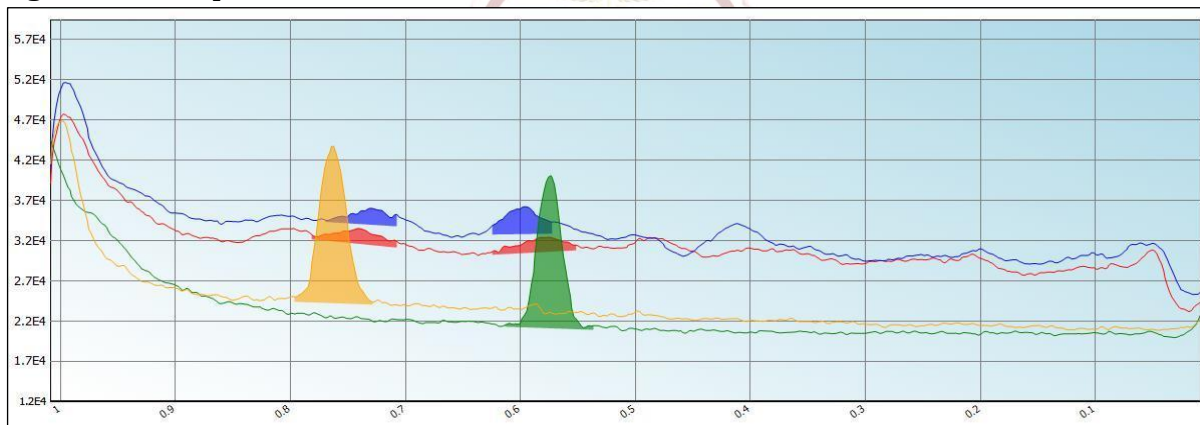
Graph



Chromatogram of Gallic Acid



Chromatogram of Tinosporin



Legend: Lane 1 Lane 2 Lane 3 Lane 4

Graph of Samples

Lanes

ID	Width	Bands	Volume	Notes
Gallic Acid	76	1	195.93	
Tinosporin	77	1	222.82	
GP	88	2	128.7	
GV	87	2	109.23	

Bands

Rf	Gallic Acid	Tinosporin	GP	GV
0.749	0	222.82	77.24	42.1
0.586	195.93	0	51.46	67.13

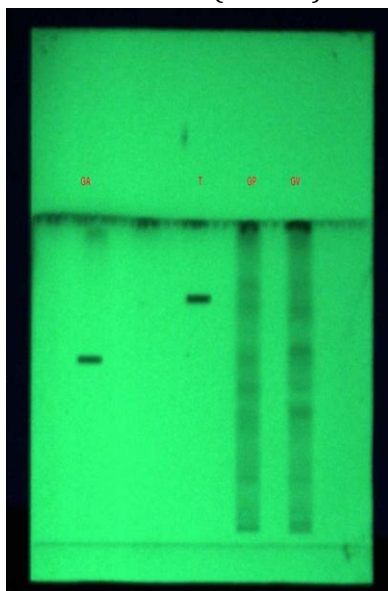
Note: GP: *Guduchi Patra Ghanavati*, GV: *Guduchi Kand Ghanavati*

TLC:

Test: TLC

Stationary Phase: Silica Gel G

Mobile Phase: Butanol : Ethyl Acetate : Acetic Acid : Water (3:5:1:1)



Sample	Rf			
	Gallic Acid	Tinosporin	GP	GV
Spot 1	0.586		0.749	0.749
Spot 2		0.749	0.586	0.586

Note: GP: *Guduchi Patra Ghanavatti*, GV: *Guduchi Kand Ghanavatti*



Guduchi Patra



Guduchi Kanda

Pharmacognostical description

Tinospora cordifolia is a large deciduous, extensively spreading climbing shrub with several coiled branches. The stem is filiform, fleshy and climbing in nature; bark is white to grey [15]. Powder of

the stem is creamish brown or dark brown, characteristic odour, bitter taste and is used in dyspepsia, fever, and urinary diseases[16]. *Guduchi satva* is the starch of *Guduchi* stem. Leaves are simple,

heart-shaped, and the upper surface is greener than the lower surface. Mature leaves become yellow in colour. Flowers are unisexual, axillary position, 2–9 cm long leaflet branches and greenish-yellow in colour, male flowers are clustered, female usually solitary [17]. Its fruits are single-seeded, fruits during the winter and flowers grow during the summer [18]. The root is thread-like, aerial, squarish, sometimes continuously lengthening to touch the ground [19], aerial roots are characterised by tetra to penta arch primary structure [20].

- **Antidiabetic activity:** The anti-diabetic activity is due to alkaloids (Magnoflorine, Palmetine, Jatrorrhizine), tannins, cardiac glycosides, flavonoids, saponins, etc. [21] The crude extract of the stem in ethyl acetate, dichloromethane (CDM), chloroform and hexane was studied for inhibition of the alpha-glucosidase enzyme. Different doses (200 and 400 mg/kg b. w) of Ethanolic extract of *T. cordifolia* leaves were prepared. *T. cordifolia* showed antidiabetic activity in diabetic animals with an efficacy of 50%-70% compared to insulin [22]. From Guduchi Prasant *et al.*, isolated alkaloids, cardiac glycosides, saponins, flavonoids, tannins, and steroids that contain anti-diabetic properties. Alkaloids from this plants showed insulin-mediated actions due to insulin hormone [23]. Gestational diabetes can increase the GSH content and other reactive species that can act as a threat to the mother as well as the foetus. In a diabetic rat model, *T. cordifolia* root extracts of Guduchi attenuated the brain mediated lipid level and down-regulated the blood glucose and urinary glucose level emphasising its anti-diabetic and lipid-lowering activity [24]. The root extract of Guduchi showed an antihyperglycemic effect in the alloxan-induced diabetic model by decreasing its excess glucose level in urine as well as in normal [25].
- **Antioxidant activity:** Mehra *et al.*, evaluated the antioxidant activity by DPPH (1-diphenyl-2-picrylhydrazyl) free radical scavenging method. Using the result of the formulation showed potent antioxidant activity and inhibitory concentration (IC50) at 5 µg/ml as compared to standard drug ascorbic acid [26].
- **Antimicrobial activity:** Antimicrobial activity of the *T. cordifolia* with different solvents on different micro-organism, showed good antifungal and antibacterial activity. [27]
- **Anti-toxic effects:** Gupta *et al.*, reported the extract to scavenge free radicals generated during aflatoxicosis. It showed protective effects of *T. cordifolia* on thiobarbituric acid reactive substances (TBARS) levels and increased the level of GSH, ascorbic acid, protein, and the activities of antioxidant enzymes. The alkaloids of *T. cordifolia* such as choline, tinosporin, isocolumbin, palmatine, tetrahydropalmatine, and magnoflorine showed protection against aflatoxin-induced nephrotoxicity [28] Sharma *et al* studied the stem and leaves extract of the plant has shown hepatoprotective effect in Swiss albino male mice against lead nitrate induced toxicity [29]. Oral administration of plant extracts prevented the occurrence of lead nitrate induced liver damage [30].
- **Antistress activity:** Sarma *et al.* reported ethanolic extract of *T. cordifolia* at the dose of 100 mg/kg gives significant anti-stress activity in all parameters compared with standard drug diazepam (dose of 2.5 mg/kg) [31]. Clinical research showed the improved I. Q level of patients. In *Ayurveda*, it acts as *Medhya Rasayana* or brain tonic by increasing mind power like memory and recollection. [32]
- **Hypolipidemic effect:** Stanely *et al.*, studied the hypolipidemic effect of an aqueous extract of the root on the rats. It produces a decrease in tissue cholesterol, serum, phospholipids, and free fatty acid in alloxan diabetic rats. [33]
- **Hepatic disorder:** Protective Effects of *Tinospora cordifolia* water extract (TCE) on Hepatic and Gastrointestinal Toxicity was reported by Sharma *et al.*, a significant increase in the levels of gamma-glutamyl transferase, aspartate transaminase, alanine transaminase, Triglyceride, Cholesterol, HDL and LDL ($P < 0.05$) in alcoholic sample whereas their level get down regulated after TCE intervention. Patients showed the normalised liver function. [34]
- **Anticancer activity:** Ali *et al.*, studied the anticancer activity of *T. cordifolia*. The palmatine extract indicates the anticancer potential in 7,12-dimethylbenz (a) anthracene DMBA induced skin cancer model in mice [35]. Mishra *et al.*, showed the anti-brain cancer potential, 50% ethanolic extract of *T. cordifolia* (TCE) using C6 glioma cells significantly induced differentiation in C6 glioma cells, and reduced cell proliferation. [36]
- **Anti-HIV potential:** Kalikae *et al.*, showed that the root extract of *T. cordifolia* affects the immune system of HIV positive patients. The stem extract of *Tinospora cordifolia* reduces the ability of eosinophil count, stimulation of B lymphocytes, macrophages, level of haemoglobin, and polymorphonuclear leukocytes [37,38].
- **Anti-osteoporotic effects:** Abiramasundari *et al* reported *T. cordifolia* affects the proliferation, differentiation, and mineralization of bone-like matrix on osteoblast model systems in-vitro and

hence finds potential application as an anti-osteoporotic agent.

• Biological activities of *T. Cardifolia* concerning different parts of the plant.

Active compound	Biological activity
Terpenoids	Stem: respiratory tract infection, skin diseases, anti-hyperglycemic property
Alkaloids	Stem and root: anti cancer, anti oxidant
Lignans	Root : anti neoplastic, antioxidant
Steroids	Aerial parts of stem: anti stress

DISCUSSION

Pharmacognostical study aids in ingredient authentication through organoleptic characters like taste, odour, colour and touch along with microscopical characters and physico-chemical parameters. This prevents adulteration to a greater extent. Same contents as in raw drug as well as in the final product shows its genuinity. The physicochemical analysis shows that the water soluble extract is more than the alcohol soluble extract. The phyto-chemical evaluation of *Guduchi Vati* shows the presence of carbohydrates, oil globules of *Ghritha*, brown content and lignin. HPTLC is the most common form of chromatographic method used to identify the number of ingredients present in a formulation. It also helps to determine the purity of the sample. *Guduchi* is indicated in the treatment module of *Madhumeha* in *Ayurveda*. In this study also both types of *Guduchi ghan vati* (stem as well as leaf) show promising effects on *Madhumeha* patients.

CONCLUSION

In microscopy *Guduchi* shows fibres, border pitted vessels, simple starch grain, cork cells, collenchyma cells embedded with oil globules of *Ghritha* without staining and Lignified collenchyma cells, brown content, lignified border pitted vessels after staining with (Phloroglucinol & Con. HCL). As *Guduchi patra ghana vati* is not studied till date, the findings of the study will be useful.

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REFERENCES

1. Bhava Mishra, Bhavaprakash Vidhyotini Commentary Part 2 Guduchyadi Varga, 11th edition, Varanasi, Chaukhambha Sanskrit Series, page no. 269-271.
2. Rege N, et al. Immunotherapy with *Tinospora Cordifolia*: A new lead in the management of obstructive jaundice, *Indian J gastroenterol.* 1993; 12:5-8.

3. Kapur P, et al, Evaluation of the Antiosteoporotic potential of *Tinospora Cordifolia* in female rats, *Mturitus.* 2008; 59:329-338.
4. Stanley Minzen Prince P, et al. Antioxidant action of *Tinospora Cordifolia* root extract in alloxan diabetic rats. *Phytother Res.* 2001; 15:213-8.
5. Wesley JJ, et al. Effect of alcoholic extract of *Tinospora Cordifolia* on acute and subacute Inflammation, *Pharmacology online.* 2008; 3:683-7.
6. K. Sinha, N.P. Mishra, J. Singh, S.P.S. Khanuja *Tinospora cordifolia* (*Guduchi*) a reservoir plant for therapeutic applications *Indian J. Tradit. Knowle.,* 3 (2004), pp. 257-27.
7. K. Salkar, C. Chotalia, R. Salvi *Tinospora cordifolia*: an antimicrobial and immunity enhancer plant *Int. J. Sci. Res.,* 6 (2017), pp. 1603-1607.
8. P. Upreti, R.S. Chauhan Effect of leaf powder of giloy (*Tinospora cordifolia*) in fish feed on survival and growth of post larvae of *Catla catla* *J. Appl. Nat. Sci.,* 10 (2018), pp. 144-148.
9. M.M. Khan, M.S. dul Haque, M.S. Chowdhury Medicinal use of the unique plant *Tinospora cordifolia*: evidence from traditional medicine and recent research *Asian J. Med. Biol. Res.,* 2 (2016), pp. 508-512.
10. Dr. Brahmanand Tripathy, Ashtang Hridayam of Srimad Vagbhatta, edited with Nirmal Hindi Commentary, *nidana sthana adhyay 10, Chaukhamba Sanskrit Pratishthan, Varanasi, 2014 edition. shlock no.18-21, page no. 497-498.*
11. Anonymous, the Ayurvedic Pharmacopoeia of India, Part-I, Vol. 1-4, Govt. of India, Ministry of Health & Dept. of ISM and H. New Delhi; Dept. of Ayush; 1999; 155-56.
12. Vaidya Yadav Ji Trikam Ji, Sidhayog Sangraha, Jwaradhikar, Shri Baidyanath Ayurveda Bhawan, 1995 edition, page no. 4.
13. Trease and Evans, *Pharmacognosy*, 15th Ed., W.B. Saunders Company Ltd. 1996; 569, 570.
14. Anonymous. The Ayurvedic Pharmacopoeia of India. Part 2. Appendices. 1st ed., Vol. 2. New Delhi: Government of India Publication; 2008. p. 233-5.
15. A.K. Upadhyay, K. Kumar, A. Kumar, H.S. Mishra *Tinospora cordifolia* (Wild.) Hook. f. and Thoms. (*Guduchi*)–Validation of the ayurvedic pharmacology

- through experimental and clinical studies *Int. J. Ayurveda Res.*, 1 (2010), pp. 112-121.
16. P. Tiwari, P. Nayak, S.K. Prusty, P.K. Sahu Phytochemistry and pharmacology of *Tinospora cordifolia* *Syst. Rev. Pharm.*, 9 (2018), pp. 70-78.
 17. V. Arul, S. Miyazaki, R. Dhananjayan Studies on the anti-inflammatory, antipyretic and analgesic properties of the leaves of *Aegle marmelos* *Corr J. Ethnopharmacol.*, 96 (2005), pp. 159-163.
 18. U. Spandana, S.L. Liakhat Ali, T. Nirmala, M. Santhi, S.D. Babu A review on *Tinospora cordifolia* *IJCPR*, 4 (2013), pp. 61-68.
 19. A. Sinha, H.P. Sharma A medicinal plant: micropropagation and phytochemical screening of *Tinospora cordifolia* (Wild.) Miens ex Hook F & Thoms *IJAPBC*, 4 (2015), pp. 114-121.
 20. S.S. Singh, S.C. Pandey, S. Srivastava, V.S. Gupta, B. Patro, A.C. Ghosh Chemistry moreover, medicinal properties of *Tinospora cordifolia* (Guduchi) *Indian J. Pharmacol.*, 35 (2003), pp. 83-91.
 21. Anonymous, the Ayurvedic Pharmacopoeia of India. Part I. First ed.. Vol. 1, Department of AYUSH, Ministry of Health and FW, New Delhi (2001) 53-55.
 22. A.D. Chougale, V.A. Ghadyale, S.N. Panaskar, A.U. Arvindekar Alpha-glucosidase inhibition by stem extract of *Tinospora cordifolia* *J. Enzym. Inhib. Med. Chem.*, 24 (2009), pp. 998-1001.
 23. M.B. Patel, S. Mishra Hypoglycemic activity of alkaloidal fraction of *Tinospora cordifolia* *Pharma Innovation*, 5 (2016), p. 104.
 24. M.M. Shivananjappa, M. Muralidhara Abrogation of maternal and fetal oxidative stress in the streptozotocin-induced diabetic rat by dietary supplements of *Tinospora cordifolia* *Phytomedicine*, 18 (2011), pp. 1045-1052.
 25. D.Singh, P.K. Chaudhuri Chemistry and pharmacology of *Tinospora cordifolia* *Nat. Prod. Commun.*, 12 (2017), pp. 299-308.
 26. R. Mehra, T. Naved, M. Arora, S. Madan Standardisation and evaluation of formulation parameters of *Tinospora cordifolia* tablet *J. Adv. Pharm. Educ. Res.*, 3 (2013), pp. 440-449.
 27. V. Duraipandiyan, S. Ignacimuthu, K. Balakrishna, N.A. Aaharbi Antimicrobial activity of *Tinospora cordifolia*: an ethnomedicinal plant *Asean J. Trad. Knowlge*, 7 (2012), pp. 59-65.
 28. R. Gupta, V. Sharma Ameliorative effects of *Tinospora cordifolia* root extract on histopathological and biochemical changes induced by aflatoxin-b in mice kidney *Toxicol. Int.*, 18 (2011), pp. 94-98.
 29. V. Sharma, D. Pandey Beneficial effects of *Tinospora cordifolia* on blood profiles in male mice exposed to lead *Toxicol. Int.*, 17 (2010), pp. 8-11.
 30. V. Sharma, D. Pandey Protective role of *Tinospora cordifolia* against lead-induced hepatotoxicity *Toxicol. Int.*, 17 (2010), pp. 12-17.
 31. D.N.K. Sarma, R.L. Khosa, J.P.N. Chaurasia, M. Sahai Antistress activity of *Tinospora cordifolia* and *Centella asiatica* extracts *Phytother Res.*, 10 (1996), pp. 181-184.
 32. P. Baghel Plant of versatile properties of *Tinospora cordifolia* (Guduchi) *IJAIR*, 5 (2017), pp. 751-753.
 33. P.P.M. Stanely, V.P. Menon, G. Gunasekharam Hypolipidaemic action of *Tinospora cordifolia* roots in alloxan-induced diabetic rats *J. Ethnopharmacol.*, 64 (1999), pp. 53-57.
 34. B. Sharma, R. Dabur Protective effects of *Tinospora cordifolia* on hepatic and gastrointestinal toxicity induced by chronic and moderate alcoholism *Alcohol*, 51 (2016), pp. 1-10.
 35. H. Ali, S. Dixit Extraction optimization of *Tinospora cordifolia* and assessment of the anticancer activity of its alkaloid palmatine *Sci. World J*, 28 (2013), pp. 1-10.
 36. R. Mishra, G. Kaur Aqueous ethanolic extract of *Tinospora cordifolia* as a potential candidate for differentiation based therapy of glioblastomas *PLoS One*, 8 (2013), Article e78764.
 37. M.V. Kalikaer, V.R. Thawani, U.K. Varadpande, S.D. Sontakke, R.P. Singh, R.K. Khiyani Immunomodulatory effect of *Tinospora cordifolia* extracts in HIV positive patients *Indian J. Pharmacol.*, 40 (2008), pp. 107-110.
 38. S. Akhtar Use of *Tinospora cordifolia* in HIV infection *Indian J. Pharmacol.*, 42 (2010), pp. 57-63.

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