

A conceptual study to evaluate the efficacy of Guduchi in Kushtha Chikitsa

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ABSTRACT

Thousands of *Yogas* have been given by our *Ayurvedic Acharyas* to benefit humanity. *Tinospora cordifolia*, often known as *Guduchi*, is a fantastic medication that has numerous medicinal uses and benefits. *Acharyas* have traditionally utilized *Guduchi* to treat *Kushtha* (disorders of the skin). Nearly all *Nighantukaras* suggested *Guduchi* as a *Kushtha* cure. It is my responsibility as an *Ayurvedavachapati* to demonstrate the legitimacy and practicality of *Ayurvedic* medications in society. I therefore decided on a medication that is widely accessible in markets, on lawns, in gardens, etc. *Guduchi* is regarded as an immune system enhancer. It is utilized in practically all forms of fever and is commonly used in COVID-19 situations because of its antipyretic properties. Few people are aware that *Guduchi*, whether taken alone or in conjunction with other medications, can have surprising effects on skin conditions. *Guduchi* possesses various features such as *Kushthaghna*, *Rasayana*, and *Tridosha-samaka*. Based on these attributes, I can state that it is quite effective in curing *Kushtha Roga*.

INTRODUCTION

Ayurveda a life science is a vast ocean guided about health and health-related problems. *Rasa Shastra* and *Bhaishjya Kalpana* are very important branches of *Ayurveda* because in *Rasa Shastra* we study *Rasa Aushadhis* (mineral-based drugs) and their utility while in *Bhaishjya Kalpana* we study the preparations of *Ayurvedic* herbo-mineral formulations. As our *Ayurvedic Acharyas* gave thousands of *Yogas* to serve humanity. *Guduchi*¹ (*Tinospora cordifolia*) is a wonderful drug which used for many of diseases and give health benefits. *Guduchi* is used by *Acharyas* since long time for the treatment of *Kushtha*² (skin disorders). Almost every *Nighantukara* mentioned *Guduchi* for the treatment of *Kushtha*. As *Ayurvedavachapati* this is my duty to prove the authentication and efficacy of *Ayurvedic* Drugs in society. So, I choose a drug that is easily available all around in the market as well as in gardens lawns, etc. *Guduchi* is known as an immunity booster. It is widely used in COVID conditions; because it acts as an antipyretic it is used in almost all types of fever. Very few people know that *Guduchi* gives unexpected results in skin disorders whether used as a single drug or with the combination of other drugs. *Guduchi* has properties like *Tridosha-samaka*, *Kushthaghna*, *Rasayana*, etc., and because of these properties I can say that it is very efficient in treating *Kushtha Roga*.

Statement of the Problem

Our current lifestyle does not allow us to even sit and eat peacefully. We are unaware of our false eating and sleeping habits. *Ayurveda* strictly mentions that good and compatible food gives you a good and healthy life. Skin disorders are mostly caused due to improper and incompatible food intake. Starting from skin allergy to very serious skin disorder is only due to continuous intake of incompatible food combinations. There are many formulations already mentioned in *Ayurvedic* classical texts but due to a lack of evidence-based parameters they are ignored by everyone. So, with the help of this research study firstly we give evidence for the efficacy of *Ayurvedic* formulation and secondly, a highly used gem (*Guduchi* itself) will get the spotlight again for its wonderful work.

LITERATURE REVIEW

Guduchi origin: -³

In ancient times, the arrogant, *Lankesh*, lord of demons *Ravana*, being lustful, forcibly abducted the wife of *Lord Shri Ram*, *Shri Sita Mata* - then the great mighty *Shri Ram* killed the enemy *Ravana*, who abducted his wife, fighting with the army of monkeys. At that time, *Sahastraksha Devraj Indra* was very pleased with the death of *Ravana*, who was the enemy of the Gods, and then *Indra*, by raining dots of 'Amrit', irrigated the dead apes on the battlefield by the demons. After that, wherever the drops of 'Amrit' from the monkeys fell on the earth, there was a medicine called "*Guduchi*" originated.

HISTORY OF *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)*

SAMHITA PERIOD

- **Charaka Samhita:**⁴ In *Charaka Samhita*, *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)* is mentioned in *Vayasthapana, Dahaprashmana, Trishnanigrahna, Satmyashodhana, Triptighna* which indicates its medicinal properties itself.
- **Sushruta Samhita:**⁵ In *Sushruta Samhita*, *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)* is mentioned in *Guduchyadi, Patoladi, Argvadadi, Kakolyadi, Vallipanchmoola* which indicates its medicinal properties itself.
- **Astanga Sangraha:**⁶ In *Astanga Sangraha*, *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)* is mentioned in *Guduchyadi, Patoladi, Vali Panchmoola, Kakolyadi, Aragvadhadi* which indicates its medicinal properties itself.

NIGHANTU PERIOD

Description of *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)* in different *Nighantus* [Table no. 1]

S. No.	Nighantu	Varga
	<i>Dhanwantri Nighantu</i> ⁷	<i>Guduchyadi Varga</i>
	<i>Madanpala Nighantu</i> ⁸	<i>Abhayadi Varga</i>
	<i>Raj Nighantu</i> ⁹	<i>Guduchyadi Varga</i>
	<i>Priya Nighantu</i> ¹⁰	<i>Pippalyadi Varga</i>
	<i>Bhavprakash Nighantu</i> ¹¹	<i>Guduchyadi Varga</i>
	<i>Shodhal Nighantu</i> ¹²	<i>Guduchyadi Varga</i>

BOTANICAL DESCRIPTION¹³

- *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)* is a large extensively spreading glabrous, dioecious perennial deciduous climber, that grows on a wide range of hedges and trees.
- It is reported to bear distinct male and female **flowers**.
- **Its stem**, when fresh, has a green succulent bark covered by a thin **brown bark** and is studded with warty lenticels when dry, the stem shrinks and the bark separates from the wood.
- **Branches** are sending down slender pendulous fleshy roots, terete, striate with tubercled, pale sometimes shining or glabrous bark.
- **Leaves** membranous, 7-9 nerved, 5-10 cm, roundish, cordate, or heart-shaped (giving the name *cordifolia* to the plant) with a 2.5-7.0 cm petiole.
- **The flower** blooms in summer. Racemes are rather lax, 5.0 cm, elongating, and often longer than leaves.
- **The male flowers** are small, yellow, or green, and occur in clusters in the axils of small subulate bracts. Sepals are 6, 3 outers very small, ovate-oblong, acute, the inner 3 larger, membranous, broadly elliptical, concave, yellow.
- **Petals** are 6, equal, broadly spathulate, each loosely embracing a stamen, claw cuneate, reflexed to apex, pistillode.
- **Female flowers** are usually solitary, similar to males, but sepals green, margins not reflexed, staminode short, linear. Carpels 1-3, widely separated on the short fleshy gynophores, dorsally convexed and scarlet.
- **The fruits** are the size and shape of a large pea turn from green to red when ripe in winter and are mucilaginous.





GEOGRAPHICAL DESCRIPTION¹⁴

The plant is distributed throughout the tropical region of India up to 1,200 m above sea level from Kumaon to Assam, in the North extending through West Bengal, Bihar, Deccan, Kankan, Karnataka, and Kerala. It is indigenous to areas of India, Myanmar, Sri Lanka, China, Thailand, Philippines, Indonesia, Malaysia, Borneo, Vietnam, Bangladesh, North Africa and South Africa. It is typically growing in deciduous and dry forests at elevations up to 1000ft.

TAXONOMICAL CLASSIFICATION¹⁵

[Table no. 2]

S. No.	Taxonomical Classification	
	Kingdom	Plantae
	Phylum	Tracheophyta
	Class	Magnoliopsida
	Order	Ranunculales
	Family	Menispermaceae
	Genus	Tinospora
	Species	<i>Tinospora cordifolia</i>

SUMMARY OF AYURVEDIC PROPERTIES OF *Guduchi* (*Tinospora cordifolia* (Willd.) Hook. f. and Thoms.)¹⁶

- **Rasa-** Tikta, Kasaya
- **Guna-** Guru, Snigdha
- **Virya-** Ushna
- **Vipaka-** Madhura
- **Karma-** Tridoshshamaka

INDICATIONS¹⁷

Kushtha, Trishna, Vatarakta, Chardi, Agnimandya, Shula, Yakritkvikara, Kamla, Amlpitta, Pravahika, Grahni, Krimi, Hridayorbalya, Raktavikar, Pandu, Kasa, Sukradorbalya, Prameha, Visarpa, Jeernjwara, Vishmjwara, Kshya, Rasayana etc.

THERAPEUTIC USES¹⁸

- **Jwara** – *Guduchi Sawaras* and *Satavari Sawaras* equal parts are mixed and given along with jaggery in *Vata Jwara*.
- **Jwara** – Decoction prepared with *Guduchi, Parpati & Amalaki* may be administered in the case of *Pitta Jwara*.
- **Prameha** – *Guduchi Sawaras* with honey.
- **Amlapitta** – Leaves of *Guduchi, Nimba,* and *Patola* are made into juice and administered along with honey.

CHEMICAL CONSTITUENTS¹⁹

- A diterpenoid of columbin type – tinoporin is isolated from the plant, Tinosporide and Cordifolide, Tinosporidine and β -sitosterol isolated stems, cordifol, heptacosanol and octacosanol reported from the leaves.
- A new furanoid diterpene – tinosporide from stems, 18-norclerodene glucosie tinosporaside- from stem wood is reported.
- Five diterpene furan glycosider viz. cordifolisides A-E and two phenyl propane glycosides are isolated from aq. Extracts.
- Isocolumbin, tetrahydropalmatine, magnoflarine, and palmatine were isolated from roots.

PARTS USED²⁰

- Leaves
- Stem
- Areal roots

DOSAGE²¹

- Stem powder – 3-6 gm
- Stem Decoction – 50-100 ml
- Fresh Juice – 10-20 ml
- Guduchi Sattva – 1-2 gm

IMPORTANT FORMULATIONS²²

- Amritarishta
- Amritadikasaya
- Amritadi Guggulu
- Bala Guduchyadi Tailam
- Panch Tikta Guggulu Ghritam
- Chandraprabhavati
- Amrita Ghrit

PHARMACODYNAMIC PROPERTIES OF *Guduchi* (*Tinospora cordifolia* (Willd.) Hook. f. and Thoms.) IN NIGHANTUS:

[Table no. 3]

S. N.	Texts	Rasa	Guna	Virya	Vipaka	Karma
	Dhanwantri Nighantu ²³	Tikta-Kasaya	Guru	Ushna	-	Tridoshashamaka, Medhya, Sangrahi, Balya, Kandughna, Kushthghna etc.
	Madanpala Nighantu ²⁴	Katu-Kasaya	Tikshn, Laghu	Ushna	Madhura	Rasayana, Balya, Kamlanashak, Kushthaghna, Jwarhar, Vataraktanashaka, Krimirognashaka etc.
	Bhavprakash Nighantu ²⁵	Katu-Tikta-Kasaya	Laghu	Ushna	Madhura	Rasayana, Sangrahi, Balkarka, Agnidipaka, Tridosh-Aam-Trisha-Daha-Meha-Kasa-Pandu-Kamla-Kustha-Vatarakta-Jwara-Krimi-Nashaka
	Raj Nighantu ²⁶	Tikta-Kasaya	Guru	Ushna	-	Jwaranashani, Dahasamaka, Trishnasamaka, Prameha-Vatarakta-Panduhara
	Priya Nighantu ²⁷	Tikta	-	Ushna	-	Balya, Rasayana, Prameha-Kamla-Vataraktahara

SYNONYMS OF *Guduchi* (*Tinospora cordifolia* (Willd.) Hook. f. and Thoms.):

[Table no. 4]

S. N.	Synonyms	D.N. ²⁸	B.P.N. ²⁹	M.P.N. ³⁰	R.N. ³¹	P.N. ³²	M.A.N. ³³
	Amritvalli	+	+	-	+	-	-
	Chinna	+	+	+	+	-	+
	Chinnruha	+	+	+	+	-	+
	Amrita	+	+	+	+	+	+
	Somvalli	+	+	-	-	-	+
	Kundli	+	+	+	-	-	+
	Chakralkshna	+	-	+	-	-	-
	Madhuparni	+	+	-	-	-	+
	Tantrika	+	+	-	-	-	+
	Jwarnashni	+	-	+	-	-	+
	Dhara	+	-	-	-	-	+
	Devnirmita	+	+	-	-	-	+
	Jeevanti	+	+	+	-	-	+
	Rasayani	+	+	-	+	-	-
	Guduchi	+	+	+	+	+	+

Macroscopic characters of *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)*³⁴

Drug occurs in pieces of varying thickness ranging from 0.6-5 cm in diameter, young stems green with smooth surfaces and swelling at nodes, older ones show a light brown surface marked with warty protuberances due to circular lenticels, transversely smoothed surface shows a radial structure with conspicuous medullary rays traversing porous tissues, taste bitter.

Microscopic characters³⁵

The transverse section of stem shows an outer-most layer of cork, differentiating into outer zone of thick-walled brownish and compressed cells, inner zone of thin-walled colorless, tangentially arranged 3-4 rows of cells, cork broken at some places due to opening of lenticels, followed by 5 or more rows of secondary cortex of which the cells of outer rows smaller than the inner one, just within the opening of lenticels, groups of sclereids consisting of 2-10 cells found in secondary cortex region, outer zone of cortex consists of 3-5 rows of irregularly arranged, tangentially elongated chlorenchymatous cells, cortical cell situated towards inner side, polygonal in shape and filled with plenty.

MAJOR CHEMICAL CONSTITUENTS OF *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)*³⁶

The chemical constituents of *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)* belong to different classes such as alkaloids, glycosides, steroids, phenolics, aliphatic, compounds, polysaccharides, leaves are rich in protein (11.2%), calcium and phosphorous. The stem contains clerodane furono diterpene glucoside (amritoside A, B, C and D).

BIOLOGICAL ACTIVITIES OF *Guduchi (Tinospora cordifolia (Willd.) Hook. f. and Thoms.)*³⁷

Antioxidant activity – Mehra et al., prepared the formulation and evaluated its antioxidant activity by DPPH (1-diphenyl-2-picrylhydrazyl) free radical scavenging method. They estimated the total flavanol and total phenolic content. 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. George et al., reported the methanolic, ethanolic and water extracts of *T. cordifolia* for their antioxidant activity, in which the stemic ethanol extract increased the erythrocytes membrane lipid peroxide, catalase activity and decrease the superoxide dismutase, glutathione peroxidase in alloxan-induced diabetic rats. The leaves extracts methanol, partitioned in water with ethyl acetate and butanol at 250 mg/ml, and showed their antioxidant activity, extracts of methanol phosphomolybdenum and metal chelating activity were high followed by ethyl acetate, butanol and water extract.

Antimicrobial activity – Antimicrobial activity of the *T. cordifolia* with different solvents on different micro-organism, showed good antifungal and antibacterial activity. Jeyachandran et al., reported the antimicrobial activity of stem extracts by in-vitro analysis against both gram-positive and gram-negative bacteria and showed good therapeutic activity on the infectious disease. It has taken a methanolic extract of *T. cordifolia* against both bacteria groups.

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 increase the level of GSH, ascorbic acids, protein and the activities of antioxidant enzymes viz., Superoxide Dismutase (SOD), Catalase (CAT), GPx enzyme, Glutathione S-transferase (GST) and glutathione reductase (GR) in kidney. The alkaloids such as choline, tinosporin, isocolumbin, palmatione, tetrahydropalmatine, and magnoflorine present in the plant of *T. cordifolia* showed protection against aflatoxin-induced nephrotoxicity.

Anti-Diabetic activity – The anti-diabetic activities is due to alkaloids (Magnoflorine, Palmetine, Jatrorrhizine), tannins, cardiac glycosides, flavonoids, saponin etc.

Anti-stress 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).

Hypolipidemic activity – Stanely et al., studied the hypolipidemic effect of an aqueous extract of the root on the rats weighing 2.5 and 5.0 g/kg body weight on sixth weeks, that resulted in decrease tissue cholesterol, reduction in serum, phospholipids and free fatty acid in alloxan diabetic rats. The dose of root extract 5.0 g/kg body weight showed the highest hypolipidemic effect. When the level of serum lipids in diabetes increased, they represented coronary heart disease, lower the serum lipids level decreased the risk of vascular disease. The ability of *T. cordifolia* root extract to reduce the level of serum or tissue lipids in diabetics animals have been studied before till then.

Hepatic Disorders – Effects of *T. 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 normalized liver function of *T. cordifolia* stand to relieve the symptoms.

Anti-HIV Potential – Kalikae et al., showed that the root extract of *T. cordifolia* affects the immune system of HIV positive patient. The stem extract of *T. cordifolia* reduces the ability of eosinophil count, stimulation of B lymphocytes, macrophages, level haemoglobin, and polymorphonuclear leucocytes.

Wound healing – Shanbhag T et al., the present study was aimed at evaluating the wound healing profile of alcoholic extract of *T. cordifolia* and its effects on dexamethasone suppressed healing. Incision, excision and dead space of the wound models were employed to investigate the wound healing potential of the plant increased tensile strength extract of *T. cordifolia* may be attributed to the promotion of collagen synthesis. The extract of *T. cordifolia* did not reverse dexamethasone suppressed wound healing.

Anticomplement and immunomodulating activity – Kapil et al., studied the syringin (TC-4) and cordiol (TC-7) isolate from *T. cordifolia* inhibited the in-vitro immune hemolysis of antibody-coated sheep erythrocytes by guinea pig serum. Immune hemolysis was reduced due to inhibition of the C3-convertase of the classical complement pathway. The compounds of *T. cordifolia* rise to significant increases in IgG antibodies in guinea pig serum. Cordioside (TC-2), cordiofolioside A (TC-5) and cordial (TC-7) activated macrophase with increasing incubation times.

REFERENCES

- [1]. Dhanwatri Nighantu, editor & commentary by Prof. Dr. Jharkhande Ojha and Dr. Umapati Mishar, Guduchyadi Varga, edition 2018, Chaukhamba Surbharti Prakashan, Varanasi, p-15.
- [2]. Agnivesh, Charaka, Dridhabal, Charaka Samhita, Volume-1, edition 2005, Chaukhamba Bharati Academy, Varanasi, p-445.
- [3]. Madanpala Nighantu, Mool Sanskrit Hindi Vyakhyasahit, Prof. (Dr. Gyanender Pandey, reprint edition 2022, Chaukhamba Orientalia, Varanasi, p-32-34.
- [4]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chunekar, Volume II, Chaukhamba Orientalia, Varanasi, p-35.
- [5]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chunekar, Volume II, Chaukhamba Orientalia, Varanasi, p-35.
- [6]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chunekar, Volume II, Chaukhamba Orientalia, Varanasi, p-35.
- [7]. Dhanwatri Nighantu, editor & commentary by Prof. Dr. Jharkhande Ojha and Dr. Umapati Mishar, Guduchyadi Varga, edition 2018, Chaukhamba Surbharti Prakashan, Varanasi, p-15.
- [8]. Madanpala Nighantu, editor & commentary by Pandit Hari Prasad Academy, Abhayadi Varga, first edition 2009, Chaukhamba Krishandas Academy, Varanasi, p-8.
- [9]. Raj Nighantu of Shri Narhari Pandit, by Dr. Satish Chandra Sankhyadhar, compiled and completed by Dr. Deepika Sankhyadhar forword by Prof. K.C. Chunekar, *Guduchyadi Varga*, first edition 2012, Chaukhamba Orientalia, Varanasi, p-33.
- [10]. Priya Nighantu, alongwith the author's Hindi commentary entitled 'PADMA' by Prof. Priya Vrat Sharma, Pippalyadi Varga, edition 2018, Chaukhamba Surbharti Prakashan, Varanasi, p-60.
- [11]. Bhavprakash Nighantu, of Shri Bhavmistra, edited with the ' Vidyotini' Hindi commentary, by Shri Brahmankara Mishra and Shri Rupaliji Vaisya, First part, Guduchyadi Varga, edition 12th 2018, Chaukhamba Sanskrit Bhawan, Varanasi, p-449.
- [12]. Shodhal Nighantu, Acharya Shoadhal, text with English-Hindi-commentaries; commentator Prof. (Dr.) Gyanendra Pandey, editor Prof. Dr. R.R. Dwivedi, forward Prof. M.S. Baghal, edition 2019, Chaukhamba Krishnadas Academy, Varanasi, P-22.
- [13]. <http://ijpsr.com/bft-article/tinospora-cordifolia-ethnobotany-phytopharmacology-and-phytochemistry-aspects/?view=fulltext>
- [14]. https://www.researchgate.net/publication/304173384_Tinospora_cordifolia_Thunb_Miers_Guduchi_-_An_Overview
- [15]. <https://www.gbif.org/species/3830780>
- [16]. Dravyaguna Vigyana, Acharya Priya Vrat Sharma, Volume II, Reprint edition 2019, Chaukhamba Bharati Academy, Varanasi, p-762.
- [17]. Dravyaguna Vigyana, Acharya Priya Vrat Sharma, Volume II, Reprint edition 2019, Chaukhamba Bharati Academy, Varanasi, p-762.
- [18]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chunekar, Volume II, Chaukhamba Orientalia, Varanasi, p-35.
- [19]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chunekar, Volume II, Chaukhamba Orientalia, Varanasi, p-48.
- [20]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chunekar, Volume II, Chaukhamba Orientalia, Varanasi, p-41.
- [21]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chunekar, Volume II, Chaukhamba Orientalia, Varanasi, p-41.

- [22]. Dravyaguna Vigyana, by Dr. J.L.N. Sastry, foreword by Prof. K.C. Chuneekar, Volume II, Chaukhambha Orientalia, Varanasi, p-49.
- [23]. Dhanwatri Nighantu, editor & commentary by Prof. Dr. Jharkhande Ojha and Dr. Umapati Mishar, Guduchyadi Varga, edition 2018, Chaukhamba Surbharti Prakashan, Varanasi, p-16.
- [24]. Madanpala Nighantu, editor & commentary by Pandit Hari Prasad Academy, Abhayadi Varga, first edition 2009, Chaukhamba Krishandas Academy, Varanasi, p-9.
- [25]. Bhavprakash Nighantu, of Shri Bhavmistra, edited with the ' Vidyotini' Hindi commentary, by Shri Brahmsankara Mishra and Shri Rupali Vaisya, First part, Guduchyadi Varga, edition 12th 2018, Chaukhambha Sanskrit Bhawan, Varanasi, p-449.
- [26]. Raj Nighantu of Shri Narhari Pandit, by Dr. Satish Chandra Sankhyadhar, compiled and completed by Dr. Deepika Sankhyadhar foreword by Prof. K.C. Chuneekar, *Guduchyadi Varga*, first edition 2012, Chaukhambha Orientalia, Varanasi, p-33.
- [27]. Priya Nighantu, alongwith the author's Hindi commentary entitled 'PADMA' by Prof. Priya Vrat Sharma, Pippalyadi Varga, edition 2018, Chaukhamba Surbharti Prakashan, Varanasi, p-60.
- [28]. Dhanwatri Nighantu, editor & commentary by Prof. Dr. Jharkhande Ojha and Dr. Umapati Mishar, Guduchyadi Varga, edition 2018, Chaukhamba Surbharti Prakashan, Varanasi, p-16.
- [29]. Madanpala Nighantu, editor & commentary by Pandit Hari Prasad Academy, Abhayadi Varga, first edition 2009, Chaukhamba Krishandas Academy, Varanasi, p-9.
- [30]. Bhavprakash Nighantu, of Shri Bhavmistra, edited with the ' Vidyotini' Hindi commentary, by Shri Brahmsankara Mishra and Shri Rupali Vaisya, First part, Guduchyadi Varga, edition 12th 2018, Chaukhambha Sanskrit Bhawan, Varanasi, p-449.
- [31]. Raj Nighantu of Shri Narhari Pandit, by Dr. Satish Chandra Sankhyadhar, compiled and completed by Dr. Deepika Sankhyadhar foreword by Prof. K.C. Chuneekar, *Guduchyadi Varga*, first edition 2012, Chaukhambha Orientalia, Varanasi, p-33.
- [32]. Priya Nighantu, alongwith the author's Hindi commentary entitled 'PADMA' by Prof. Priya Vrat Sharma, Pippalyadi Varga, edition 2018, Chaukhamba Surbharti Prakashan, Varanasi, p-60.
- [33]. Madanpala Nighantu, editor & commentary by Pandit Hari Prasad Academy, Abhayadi Varga, first edition 2009, Chaukhamba Krishandas Academy, Varanasi, p-9.
- [34]. <http://www.ayurveda.hu/api/API-Vol-1.pdf>
- [35]. <http://www.ayurveda.hu/api/API-Vol-1.pdf>
- [36]. <https://www.sciencedirect.com/science/article/pii/S2405844019360979>
- [37]. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6827274/#:~:text=Major%20constituent%20of%20Tinospora%20cordifolia,%20alkaloid%20lignans%20steroids>