

Standardization and Comparative Study of *Guduchi Churna*, *Guduchi Ghan Vati* and *Guduchi Satwa*

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ABSTRACT

Guduchi is one of the highly valued and common medicinal plant mentioned in Ayurvedic literature. It is considered one of the best rasayana (which facilitating and improves the fundamental tissue like *Dhatu*, *Agni*, *Srotas* etc. of human body). It consists of the dried and matured pieces of stem of *Tinospora cordifolia*, belonging to Menispermaceae family. Three formulations from *guduchi* stem has been prepared i.e. *Churna*, *Ghan Vati* and *satwa* by adapting the methodology described in *Bhaisajya Ratnavali*, *Ayurveda Sara Sangraha*, *Sharandhar Samhita* & *Bhavaprakasa Nighantu* and a comparative study between the prepared dosage form was performed. Physicochemical parameters were carried out in-between the prepared dosage form which it is showed marked variations. The principal constituent of the plant is alkaloid whose quantitative estimation has been performed. *Satwa* showed negative results as it is particularly insoluble in alcohol and water. Bio-active secondary metabolites are present in the plant which was further confirmed by performing the preliminary phytochemical screenings.

Key words: *Guduchi*, *Guduchi churna*, *Guduchi ghav vati*, *Guduchi satwa*.

INTRODUCTION

Ayurveda is the combination of two words *ayur* & *veda*, which means “science of life”. *Ayurvedic* medicine aims to integrate and balance the body, mind and spirit [1, 2]. There are five basic *kalpanas* they are *swarasa*, *kalka*, *shrit (kwath)*, *sheet (hima)* and *phanta* mentioned in *brihatray* [3-5] To full fill the requirement and necessity i.e. shelf life, low dose, quick action etc.; several *upkalpanas* were developed i.e. *churna*, *ghan*, *vati*, *avleha*, *Sneha*, *satwa* etc. [6, 7]. *Guduchi* (*T. cordifolia*) is one of the most versatile *rasayan* (rejuvenate) *dravya*. It works on all the tissue elements in the body [3-5, 7-11]. The *Tinospora cordifolia* is substitute or adulterated with *T. sinensis* and *T. crispa*. The *satwa* might be adulterated with the potato flour/arrowroot/banana [12, 13].

Description of Guduchi in Ayurvedic text

The details of various opinions regarding *gana/varga*, synonyms, uses and verities mentioned by ancient scholar is tabulated in the Table 1

Table 1: *Guduchi* description in Ayurvedic literature

Sr. No.	Text Name	Gana (group)	Synonyms	Uses	Verity
1	<i>Charka Samhita</i> [3]	<i>Vayahsthapana, Dahaprasamana, Trishnanigraha, Trishnanigrahana, Stanya-shodhana and Triphthighan</i>	-	<i>Grahi, Vatahara, Dipaniya, Kapha-Raktahara and Vibandhahara, Medhya Rasayanas</i>	-
2	<i>Sushrut Samhita</i> [4]	<i>Guducyadi, Shyamandi, Patoladi, ValliPanchmula, Kakolyadi and Aragvadhadi gana</i>	-	-	-
3	<i>Astanga Sangraha</i> [5]	<i>Guducyadi, Patoladi and Aragvadhadi</i>	-	-	-
4	<i>Bhavprakash Nighantu</i> [14]	<i>Guducyadi Varga</i>	<i>Amritvalli, Chinna, Chinnaruha, Amrita, Soma, Chinnodbhava, Dhira, Vatsadini, Somavalli, Kundali, Chakralakshadika, Jvaranashini, Jivanti, Madhuparni, Tantrika, Vayastha, Vishalya, Rasayani and Chandrahasa</i>	<i>Rasayana, Sangrahi, Hridya, Balya, Agnidipan, Kamla, Kustha, Vatarakta, Jvara, Krimi, Vaman, Pandu, Meha, kasa and Arsha</i>	-
5	<i>Shodhala Nighantu</i> [15]	<i>Osadhi Varga and Guduchyadi varga</i>	<i>Amrita, Chinna, Chinnanga, Shyama, Jvaranashini, Chinnodbhava, Tantrika, Amritlata, Vayastha, Devnirmita, Kundali, Mandali, Vishalya, Naagkanya, Chakrangi, Somavalli, Dhara, Vatsadini, Jivanti, Madhuparni, and</i>	-	-
6	<i>Dhanvantari Nighantu</i> [16]	<i>Guducyadi Varga</i>	<i>Amritvalli, Chinna, Chinnaruha, Amrita, Chinnodbhava, Amritlata, Dhara, Vatsadini, Somavalli, Kundali, Chakralakshada, Naagkumari, Chinnangi, Jvaranashini, Jivanti, Madhuparni, Tantrika, Devanirmita, Vayastha, Mandali, Saumya, Vishalya, Amritsambhava, Pindamrita, Bahuchinna, Kandarohini, Rasayani, Mrattika, Chandrahasa, Bhishagjita, Kandodhbhava, Kandamrita, Kandaguduchi, Pindamrita, Bahuchinna and Kandarohini</i>	<i>Sannipata, Visha, Jvara, Bhoobadha, Vali and Palit</i>	<i>Guduchi and Kanda Guduchi</i>
7	<i>Madanpal Nighantu</i> [17]	<i>Abhyadi varga</i>	<i>Kundali, Chinna, Vayastha, Amritvallari, Chinnodbhava, Chinnaruha, Amrita, Jvaranashini, Vatsadini, Chandrahasa, Jivanti and Chakralakshada</i>	<i>Rasayana, Sangrahi, Balya, Agnidipan, Kamla, Kustha, Jvara Vatarakta and Pittaj Krimi</i>	
8	<i>Aadarsh</i>	<i>Guduchyadi Varga</i>	<i>Amrita, Chinnaruha, Chinnodbhava,</i>	-	-

	Nighantu [18]		Kundalni, Vatsadini		
9	Kaiyadeva Nighantu [19]	Aushada varga	Kundali, Soma, Chinna, Chinnodbhava, Amrita, Madhuparni, Chinnaruha, Vayastha, Chakralakshada, Chandrahasa, Amritlata, Dhara, Vara, Vatsadini, Pindamrita, Shatirupa, Vichinna,	Rasayana, Sangrahi, Hridya, Balya, Agnidipan, Kamla, Kustha, Vatarakta, Jvara, Krimi, Vaman, Pandu, Meha and kasa	Guduchi and Pinda guduchi
10	Raja Nighant/ Nighantu Raja or Abhidhana Cudamani [20]	Guducyadi Varga	Amrita, Amritavalli, Jvarari, Shyama, Vara, Surakrita, Madhuparnika, Chinnodbhava, Amritlata, Rasayni, Chinna, Somalatika, Amritsambhava, Vatsadini, Chinnaruha, Vishalya, Bhishagpriya, Kundalini, Jivantika, Naagkumarika, Chandika, Chandrahasa	Jvara, Daha, Pida, Pipasa, Vaman, Vatarakta, Premeha, Pandu and Bhrama	Guduchi and Kanda Guduchi
11	Hridayadipaka Nighantu [21]	Doshaghna varga	-	-	-
12	Priya Nighantu [22]	Pippalyadi Varga	-	Rasayana, Balya, Kamla, Vatarakta, Jvara and Meha	-
13	Shaligram Nighantu [23]	Guduchyadi gana	-	-	-
14	Sausruta Nighantu [24]	Guduchyadi varga, Patoladi Varga and Vallipanchamula	Amritvalli, Kundali, Madhuparni and Chinnaruha	Sarvajvara, Dipana, Hrillasa, Aruchi, Vaman, Pipasa, and Dahanashan	-

MATERIALS AND METHOD

Collection of plant material

The stem was collected from herbal garden of Lovely Professional University and the collected drug were dried under the sun and shade.

Authentication of the plant material

Authentication of drug was carried out by Guru Nanak Dev University, Department of Botanical and Environmental Sciences, Amritsar. (12/10/2012) Ref no.-1068.

Preparation of Guduchi churna [14, 25-27]

Dried stem pieces were weighed in *tula* yantra coarsely powdered by *imam dasta* and the coarse powder was further grinded in electrical grinder. Sieved through sieve no. 80. Stored well in closed container.

Preparation of Guduchi ghan vati [14, 25-27]

Fresh *guduchi* stem were taken out and cutted into approximately uniform size with the help of knife and then it was weighed. The cutted pieces were crushed by *imam dasta*. The pieces were transferred into a vessel containing 4 times water and then *kwath* was prepared in *mridu agni* until it gets reduced 1/4th. Then it was filtered. The obtained filtrate was concentrated to a thick consistency. It was further dried under sun light. The 60% of above *ghan* was mixed with 40%

guduchi churna and granulated. Afterwards granules were dried and further punched into 250 mg tablets by direct compression method. Store in well closed container.

Preparation of *Guduchi satwa* [14, 25-27]

Fresh *guduchi* stems were washed and cut into uniform size pieces with knife and weighed in *tula yantra*. The cut pieces were crushed in *imam dasta*. The pieces were transferred into vessel containing 4 times water. The water was added with the help of measuring cylinder. It was macerated for sometimes and was left undisturbed for a night. Next day the upper portion was decanted in muslin cloth and the white colored residue obtained was dried. Store in well closed container.

Physicochemical properties [28-30]

The various physicochemical parameters i.e. foreign matter, loss of drying, total ash, acid insoluble ash, alcohol soluble extractive, water-soluble extractive, pH was determined as per the standard protocol.

Post-compression parameters

Tablets were prepared by using direct compression technique. Prepared tablets (weighing 250 mg) were evaluated for the post-compression parameters i.e. hardness, friability, weight variation test, disintegration time.

Preliminary qualitative phytochemical analysis [31-34]

This study was carried out to identify the presence of secondary metabolites in plant part.

Estimation of alkaloids [35-36]

Quantification of Total alkaloids parentage was done and calculated by adopting standard protocol method.

RESULTS AND DISCUSSIONS

Prepared *Guduchi Churna*

<i>Guduchi</i> stem (dried)	-	250 g
<i>Guduchi churna</i>	-	225 g

Prepared *Guduchi ghan vati*

<i>Guduchi</i> stem	-	4 kg
<i>Guduchi ghan</i>	-	180 g
<i>Guduchi</i> Granules	-	50 g
<i>Guduchi vati</i>	-	200 Tabs

Prepared *Guduchi satwa*

<i>Guduchi</i> stem	-	5 kg
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Guduchi satwa - 72 g

Table 2 Organoleptic parameters

Parameters	GC	GG	GGV	GS
Colour	Light brown	Dark brown	Dark brown	White
Odour	Characteristic	Characteristic	Characteristic	Characteristic
Taste	Bitter	Bitter	Bitter	Characteristic
Touch	Smooth	Smooth	Smooth	Smooth

*GC= Guduchi churna, GG = Guduchi ghan, GGV = Guduchi ghan vati, GS = Guduchi satw

Table 3 Physico-chemical parameters

Parameters	GC	GG	GGV	GS
Foreign matter (w/w)	Nil	Nil	Nil	Nil
Loss on drying (w/w) (105°C)	8%	8%	1%	3%
Total ash (w/w) (450°C)	6.5%	10.5%	13%	1%
Acid insoluble ash(w/w) (450°C)	1.5%	1%	1.5%	0.5%
Water soluble extractive value (w/w)	20.5%	4.8%	25.6%	Nil
Alcohol soluble extractive value (w/w)	3.2%	2.4 %	2.4%	Nil

*GC= Guduchi churna, GG = Guduchi ghan, GGV = Guduchi ghan vati, GS = Guduchi satwa

Loss on drying depicts the amount of moisture present in the formulation which may lead to microbial contamination leading to deterioration of the formulation. LOD was found more in *guduchi ghana* and *churna* while minimum in a case of *vati* and *satwa* though the formulations were within the limit of standard values. Foreign matter is indication of the adulterants and undesirable products that may be present. It was found to be nil for all the three formulations. Total ash illustrates the amount of organic matter that is calcinated. The maximum was found in the case of *ghan vati*. Acid insoluble ash is done to establish the amount of inorganic content that is insoluble in dilute HCL. All the three formulations were found to be within the standard limits. The extractive values indicate the amount of chemical constituents that which can be dissolve in the specific dosage form, thus when it is taken within the body it should be absorbed.

Weight variation test

The average weight of the tablets was found to be 250.05 mg. the average deviation of all tablets from the average weight was found to be within the limits of $\pm 5\%$.

Table 4 Weight variation test

Sr. No.	Weight (in mg)	% of deviation with mean value
1.	250	0.02
2.	250	0.02
3.	250	0.02
4.	250	0.02
5.	250	0.02
6.	249	0.42
7.	250	0.02
8.	252	0.78
9.	249	0.42
10.	252	0.78
11.	249	0.42
12.	249	0.42
13.	250	0.02
14.	250	0.02
15.	250	0.02
16.	250	0.02
17.	252	0.78
18.	250	0.02
19.	250	0.02
20.	249	0.42

Table 5 Hardness, Friability and Disintegration time

Sr. No.	Hardness (kg/cm ³)	Friability %	Disintegration time (min.)
1	5.4	0.6	6 ± 1
2	5	0.7	6 ± 1
3	4.98	0.6	6 ± 1

The average hardness of the tablets was found to be 5 ± 0.2 kg/cm². The hardness indicates the compressibility of the tablet so that it will not broke until comes into the contact of body fluids. The friability of the tablets was found to be 0.6 % which is less than standard limit. Friability depicts the ease in transportation and processing of the tablet. The disintegration time of six

tablets was found to be in-between 6-7 min, which shows that the tablet will disintegrate into the body to reveal its constituents within the stipulated period of time.

pH

The pH of satwa is 7.32.

Table 6 Phytochemical screening of *guduchi*

Sr. No.	Qualitative Test	Phytochemical constituents	GC	GGV	GS
1	Ferric chloride test	Tannins	+	+	-
	Lead acetate test		+	+	-
	Bromine water		+	+	-
2	Borntrager's test	Glycoside	+	+	+
	Liebermann's Test		+	+	+
	Keller-Kiliani Test		+	+	+
	Salkowski's Test		+	+	+
3	Foam test	Saponin	-	-	-
4	Millon's test	Protein	+	-	-
	Biuret Reagent test		+	-	-
	Ninhydrin Test		+	-	-
5	Benedict's solution test	Carbohydrates	+	+	+
	Fehling's test		+	+	+
	Molisch's test		+	+	+
6	Mayer's reagent	Alkaloids	+	+	+
	Dragendroff reagent		+	+	+
	Wagner's reagent		+	+	+
	Hager's reagent		+	+	+
7	Liebermann Burchard's reaction	Steroids	+	+	+
	Salkowski test		+	+	+
8	Ferric Chloride Test	Phenols	+	+	-
	Liebermann's nitroso reaction		+	+	-
	Lead Acetate test		+	+	-
	Gelatin test		+	+	-

9	Alkaline reagent test	Flavonoids	+	+	-
	Zinc hydrochloride test		+	+	-
10	Iodine test	Starch	+	+	+

*GC= Guduchi churna, GGV = Guduchi ghan vati, GS = Guduchi satwa

Table 7 Estimation for alkaloid

Sample	% Total Alkaloid
Guduchi churna	0.6%
Guduchighan vati	1%
Guduchi satwa	0.3%

Maximum % of alkaloid found in *guduchi ghan vati* as compared to the other two samples.

CONCLUSIONS

The Ayurvedic system of medicine involves the practices of using fresh herbal material for the preparation of medicine. *Guduchi* is an important herb mentioned by ancient the seers. Due to palatability and other issues associated with the formulation the *Acharaya* prepared different formulation and dosage form the same. Since *churna*, *ghan vati* and *satwa* are prepared from the same plant a complete analytical profile would give a proper understanding of the variation between these three. As per literature review classical books were consulted which includes, *Bhaisajya Ratnavalli*, *Ayurveda sara sangraha*, *Sharandhara samhita*, *Bhavaprakash Nighantu* for the preparation of *churna*, *ghan*, *vati*, and *satwa* respectively.

Among the three dosage forms we considered *guduchi ghan vati* having to be best on the basis of Phytochemical screening, % of alkaloid is maximum in it, because during its processing the granules of the powdered drug was added in the *ghan*. Moreover, the palatability of *vati* is also more suitable then other prepared dosage form with the accurate dose precision. The total ash for the *vati* was found to be maximum which signifies the presence of inorganic content. The water soluble extractive value was found to be maximum in case of *vati*.

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