



**PHARMACEUTICAL AND ANALYTICAL STUDY OF A POTENT
FORMULATION GUDUCHI SATVA**

**LEKSHMIPRIYA S¹, M R PANDYA², BIJAL PRAJAPATI³ AND SNIGHDA DAS
MANDAL⁴**

1: PhD Scholar, Department of Rasashastra & Bhaishajya Kalpana, Parul University

2: PhD Guide, Department of Rasashastra & Bhaishajya Kalpana, Parul University

3: HOD & Co-guide, Department of Pharmaceutics, Parul Institute of Pharmacy, Parul
University

4: HOD, Department of Pharmacology. Parul Institute of Pharmacy and Research, Parul
University

***Corresponding Author: Dr Lekshmipriya S; E Mail: ponni777@gmail.com**

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ABSTRACT

Guduchi is a widely known drug with immense potential benefits. There are mainly two kinds of Guduchi mentioned in Ayurveda classics. The Guduchi species considered for the present study is *Tinospora crispa* L. Hook. Guduchi satva is a well-known Ayurvedic formulation explained in Yogaratnakar/ Rajayakshma Chikitsa. The method of preparation is clearly explained in Ayurveda Sara Sangraha. As per the reference it is mainly used for treating Teevra tapa (Pyrexia), jwara (Fever), raktapitta (bleeding disorders), rakta pradara (Uterine haemorrhage) etc. The dose explained in classics is 4ratti to 1 Masha (500mg-1g). In the current study Guduchi satva will be prepared as per the Ayurveda Sara Sangraha reference by collecting Guduchi (*Tinospora crispa* L. Hook) of Menispermaceae family. Then the Guduchi satva analytical evaluation will be performed as per API guidelines.

Key words: Guduchi, *Tinospora crispa*, Guduchi satva, Ayurveda Sara Sangraha

1.0 INTRODUCTION

The concept behind *Ayurveda* is preventing unnecessary suffering and living a long healthy life. *Ayurveda* involves the use of natural means such as diet, herbs, spices, minerals, exercise, meditation, yoga, mental hygiene, sounds, smells and mechano-procedures to eliminate the root cause of the disease by restoring balance, at the same time create a healthy life-style to prevent the reoccurrence of imbalance [1]. The Indian *Ayurvedic* system has included herbals as one of its most powerful healing ingredients, which are recorded in the literature such as Vedas and Samhitas. Based on the material of origin, *Ayurvedic* medicines are divided into three classes, namely herbal, mineral and animal. Among this, herbal formulation has gained great importance and rising global attention recently. This scenario is obvious as major increase in the herbal formulation usage has been observed throughout the last few years in developed world, where market expansion occurred in European countries and USA [2]. The World Health Organization (WHO) estimates that 80% of the world's inhabitants still rely mainly on traditional medicines for their health care [3]. In the prevailing study the drug considered from *Tinospora* species is *Tinospora crispa* L.Hook. The potent *Ayurveda* formulation Guduchi satva is

prepared out of the *Tinospora crispa* L. Hook. It is very well detailed in the pharmaceutical aspect. Then the prepared Guduchi satva was subjected to analysis and anticipatory interpretation has been proven out in the current study.

2.0 MATERIALS AND METHODS

The study comprises of two parts:

2.1 Pharmaceutical Study

2.2 Analytical Study

2.1 Pharmaceutical Study:

- a) Procurement of Raw material
Tinospora crispa
- b) Authentication of the drug
- c) Preparation of Guduchi satva

a. Procurement of raw material:

The correct identification of herbal plant is the first step in quality control as recommended by WHO. The fresh stems of *Tinospora crispa* for the current study has been collected from Tirumala, Trivandrum, Kerala [4].

b. Authentication of the drug:

The stem along with the leaves was sent to FRLHT, Bangalore for identification and authentication of the drug. It has been authenticated as *Tinospora crispa* by Dr Noorunnisa beegum S, Associate Professor, Centre for Conservation of Natural Resources, TDU [4].

c. Preparation of Guduchi Satva:

Guduchi stem approximately 2.5-3.0 cm diameter and having dark brown colour with evident tubercles were collected in the month of December. The physical impurities were removed & washed thoroughly with water. The outer husk was peeled off and it has been cut into small pieces. It was crushed in a ulukhala yantra and soaked in 21 parts of water in a stainless-steel vessel [5]. The whole mixture was macerated rigorously to facilitate the starch into the liquid. The remnant fibrous & woody parts were removed, the vessel is placed undisturbed for 12hrs and the supernatant water is carefully filtered out through a four folded cotton cloth. The starch sediment at the base was washed with little quantity water, dried in tray dryer, collected the sample and stored as Guduchi satva in airtight container.

Observations:

1. During the maceration the sliminess was more in the water and gradually it reduced
2. The water turned turbid and the colour of the liquid after straining with four folded cloth was greenish.
3. The remnant fibrous woods found to be floating over the surface of the water

2.2 Analytical Profile of Guduchi satva

The analytical profile of Guduchi satva prepared out of *Tinospora crispa* is done

with the reference of PLIM guidelines [6]. The Analytical study has been carried out in Vasu Pharmaceuticals, Vadodara, Gujarat, India.

The following are the analytical profile data:

Physiochemical Studies: Physiochemical parameters like pH, LOD, total ash, acid insoluble ash and water soluble and alcohol soluble extractive values, total alkaloids, Heavy metal detection, Microbial limit tests, HPTLC, GCMS were determined as per PLIM guidelines

Phytochemical screenings: Preliminary qualitative phytochemical screening was carried out and revealed the presence of a wide range of phytoconstituents Alkaloid, Starch, Carbohydrates, Tannins & Polyphenols, Flavonoids, Saponins & Steroids. The HPTLC Fingerprinting analysis was carried out in Guduchi satva with solvent system i.e., Chloroform: Methanol (9:1 v/v) using CAMAG HPTLC system consisting of Linomat 5- Applicator. The chromatogram obtained was studied under 254 nm, 366 nm and 540nm after derivatization.

GCMS study was done to find out the bioactive compounds in Guduchi satva. It was carried out in SICART, Anand, Gujarat. The interpretations were done through PubChem & Dr. Duke's Phytochemical and Ethnobotanical data base.

3.0 RESULTS

Table 1: Preparation of Guduchi Satva

Quantity of Guduchi while collected	3.716kg	Loss in Kg/gm
After 3 days the quantity of Guduchi	2.830Kg	-886gm
After removing the foreign matter	2.016Kg	-814gm
After peeling off the outer covering	1.280Kg	-736gm
After making into pieces & crushing	1.240Kg	-40gm
Quantity of water added	26.04litres	-
Yield of Guduchi satva	29gms ie 2.4% only	-

Fig 01: *Tinospora crispa*Fig 02: crushed *Tinospora crispa*Fig 03: crushed *Tinospora crispa* with water

Fig 04: Guduchi satva at the bottom of vessel



Fig 05: Guduchi satva before drying



Fig 06: After drying



Fig 07: Final weighed product

Table 2: Analytical Profile of Guduchi satva with anticipatory interpretation

1	pH	4.68	Quantitative indication of acidic nature of the drug
2	Loss on Drying	6.31%	Indicates the loss of amount of water & other volatile impurities present in the sample
3	Total Ash	4.36%	It indicates the purity of the drug
4	Total Solid Content	93.69%	Constitutes both suspended and dissolved solids
5	Water Soluble Extractive	7.14%	Indicates the water-soluble constituents in the trial drug
6	Alcohol Soluble Extractive	3.14%	Indicates the Alcohol soluble constituents in the trial drug
7	Alkaloids (Gravimetry)	0.63%	The possible alkaloids are Tinosporine, Magnoflorine, Berberine, Choline, Jatrorrhizine

Table 3: Phytoconstituent Qualitative assay of Guduchi satva

1	Starch & Carbohydrates	+++
2	Alkaloids	++
3	Steroids	+
4	Glycosides, Saponins, Tannins, Flavonoids, Phenols, Proteins	Absent

Table 4: heavy Metal Analysis (AAS) & Microbial limit Tests

Heavy Metal Analysis of Guduchi satva		
1	Lead and cadmium	Absent
2	Arsenic	0.18ppm
3	Mercury	0.60ppm
Microbial Limit Tests of Guduchi satva		
1	Total microbial count plate count	2889 cfu/g
2	Total Yeast & Mould count	932 cfu/g
3	E. coli, Salmonella, S. Aureus, P. aeruginosa	Absent

Table 5: HPTLC fingerprint analysis report

Visualization	No: of spots	Rf value
254nm	1	0.24
366nm	5	0.13,0.24,0.55,0.61,0.74
540nm	7	0.24,0.31,0.37,0.55,0.73,0.84,0.87

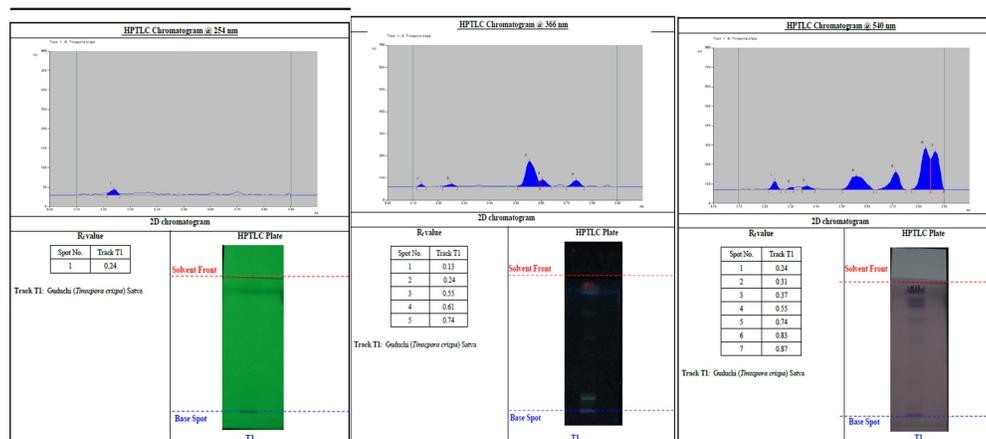


Fig 08:@254nm

Fig 09:@366 nm

Fig 10 @540nm

Table 6: GCMS Results with anticipatory interpretations

S. No.	Name of compound	Nature of compound	Activity
1	Eicosanoic Acid (Arachidonic Acid)	Plant Metabolite, Fatty acid ester	Antipyretic, Anti-inflammatory, Anti Allergic, Anti Cancerous, Anti-Hypertensive
2	Pentadecanoic Acid	Palmitic Acid, Methyl Ester	Antioxidant
3	N-hexadecanoic Acid	Palmitic Acid	Antioxidant
4	Octadecanoic Acid	Fatty acid Ester	Antioxidant, Antiviral
5	Nonadecanoic Acid	Fatty acid Ester	Antioxidant & in Colorectal CA
6	Dodecanoic Acid (Lauric Acid)	Fatty acid Ester	Anti hypercholesteremia Anti atherosclerosis
7	Tridecanoic Acid (Myristic Acid)	Fatty Acid Ester	Increases HDL level
8	Heptadecanoic Acid	Margaric Acid	Antioxidant
9	Pyrrrolidine	Natural Alkaloid	Antioxidant, Antipyretic, Anti-inflammatory, Anti-mycobacterial, Antiulcer, Anti-tuberculosis and herbicidal activity

4.0. DISCUSSION

In the current study the Guduchi satva is prepared out of *Tinospora crispa* variety and the yield obtained was 2.4%. The various article data also shows that the yield of Guduchi satva may vary with season and size of the stem. There are different methods explained for the preparation of Guduchi satva. The prevailing study focussed on the reference available in Ayurveda Formulary of India. If we compare *Tinospora cordifolia* and *Tinospora crispa* in the preparation of Guduchi satva during preparation more sliminess was observed in water with *Tinospora crispa*. Then the prepared Guduchi satva was subjected to analytical studies. The physiochemical analysis results with interpretations have been mentioned in Table No:2 of the current article. The qualitative phytoconstituent assay revealed the presence of starch, carbohydrate, alkaloids and steroids. So, the Guduchi satva prepared out of *Tinospora crispa* will have anti-oxidant, anti-pyretic, anti-inflammatory etc. properties. The HPTLC and GCMS reports were well discussed in **Table 05 & Table 06** of existing article. The GCMS reports vividly throws light into the major activities exhibited by the *Tinospora crispa* satva.

5.0 CONCLUSION

The current research was a sincere attempt to find out the yield of Guduchi satva with *Tinospora crispa* and established an analytical profile of Guduchi satva prepared out of the selected *Tinospora* species. Further research can be carried out in Guduchi satva prepared with *Tinospora crispa* in connection with the found activities. Also, Preclinical and Clinical studies can be initiated with this preliminary data.

6.0 REFERENCES

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