



A PHARMACOGNOSTICAL AND PHYSICO-CHEMICAL ANALYSIS  
OF *GUDUCHI MODAKA (VATI)*

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ABSTRACT

**Background:** *Guduchi Modaka* is a *Modaka Kalpana* but it is formulated as *Vati* preparation due to its easy palatability of patients and its long term storage. *Guduchi* having *Balya*, *Deepan-Pachana*, *Tridosha Shamaka* and *Rasayana* property and its preparation i.e. *Guduchi Modaka* having *Tridosha Shamaka* and *Rasayana* property. Till date no published data is available on pharmacognostical and analytical profile of *Guduchi Modaka*, So present study is planned. **Aims:** To evaluate pharmacognostical and physico-chemical characters of *Guduchi Modaka (Vati)*. **Materials & Methods:** Prepared drug was collected from pharmacy I.P.G.T. & R.A. and authenticated in respective Laboratory of I.P.G.T. & R.A., G.A.U., Jamnagar. Standard procedures were followed to undertake the pharmacognostical and physico-chemical analysis. **Results:** The phrmacognostical results of *Guduchi Modaka* showed Fibers of *Guduchi*, border-pitted vessels, simple starch grain etc. without staining and Lignified collenchyma cells, brown content of *Guduchi* after staining with (Phloroglucinol & Con. HCL). Physicochemical analysis of *Guduchi Modaka* revealed weight variation 28.45%, Hardness 1.95 kg/cm<sup>2</sup>, Disintegration time > 1 hr. etc., In HPTLC, *Guduchi Modaka* revealed 8 spots at 254 nm and 4 spots at 366 nm. **Discussion:** Pharmacognostical study helps in exact authentication of ingredients present in formulation through its organoleptic characters like taste, odor, color and touch along with microscopical characters and physico-chemical parameters. The presence of all contents of raw drugs in the final product shows the genuinity of the final product. All the pharmaceutical parameters analyzed showed values permissible for the *Vati*. **Conclusion:** As there are no reported study on the *Guduchi Modaka*, The findings of the study will be useful in the standardization of the drug and study might help as reference guidance for future scientific evaluations of the drug.

**Keywords:** HPTLC, *Guduchi Modaka*, *Vati*, *Rasayana*, analysis, Physicochemical.

**INTRODUCTION:** The desirable effect of the medicine depends upon the genuine nature of its ingredients, so exact identification of original plant is essential. If the plant is adulterated, then the quality of prepared drug will not yield desirable therapeutic results. So, before using a drug it is necessary to identify raw materials at the basic level with the help of microscopic and morphological characteristics. *Guduchi (Tinospora*

*cordifolia Miere)* belongs to *Menispermaceae* family The constituents reported from stem are: *tinospoxide*, *cordifolide* and *unosporin*, *tinospodin*, *tinosporic acid* and *tinospodinol*, *heptacosanol*, *cordifol*, *B-sitosterol* and *tinospodinine*, *tinospoxide*, *octacosanol* and a crystalline compound (C<sub>13</sub> H<sub>16</sub>O<sub>5</sub>)<sub>6</sub> and a new *diterpenoid furanolactone*. The quaternary alkaloids, *magnoflorine* and *tembetarine* have been identified. A new

hypoglycemic agent was isolated and it was found to be 1, 2 - substituted pyrrolidine. A new phenolic lignan 3 - (x, 4 - dihydroxy - 3- methoxy benzyl) - 4 - (4-hydroxyl -3-methoxybenzy 10-Tetrahydrofuran along with octacosanol, nonacosan - 15- one and p - sitosterol) were isolated. It act as *Tridosahara*, *Rasayana* and *Balya* etc.<sup>1</sup> *Tinospora cordifolia* possessed Immunomodulatory and Hepato-protective activity.<sup>2</sup> It also has osteo-protective activity,<sup>3</sup> Anti-oxidant activity<sup>4</sup> and Anti-inflammatory activity.<sup>5</sup> its preparation i.e. *Guduchi Modaka* having *Tridosha Shamaka* and *Rasayana* property.<sup>6</sup> So it may be useful in *Nirama* stage (chronic stage) of *Amavata* (Rheumatoid arthritis). Till date no published data is available on pharmacognostical and analytical profile of *Guduchi Modaka*, So present study is planned.

## Materials and Methods

### Plant material

The raw drugs were obtained from the pharmacy department, GAU, Jamnagar, Gujarat, India. The ingredients, useful part and ratio of drug are mentioned in Table-1.

### Pharmacognostical Evaluation:<sup>7</sup>

The formulation was identified and authenticated and powder microscopy was done in the pharmacognosy department, IPGT & RA, GAU, Jamnagar, Gujarat, India. The study includes organoleptic evaluation and microscopic evaluation (Anonymous, 1999). They are stored according to SOP of WHO guidelines (World Health Organization, 1996).

### Preparation of the *Guduchi Modaka* (Vati):<sup>8</sup>

The formulation was prepared at Pharmacy of Gujarat Ayurved University, Jamnagar,

Gujarat, India. First of all fine powder of *Guduchi* stem are taken and after it *Guda*, *Ghee* and *Madhu* each are added in given proportions and *Vati* are prepared. No any preservative was used for preparation of *Vati*. Parts of individual drugs in prepared *Vati* are mentioned in Table-1.

### Microscopic Study:

*Vati* was broken and fine powder was taken then examined under microscope without staining for the observation of cellular materials, then stained with Phloroglucinal and conc. Hcl<sup>9</sup> for the lignified characters. Raw drugs were separately studied under microscope; the microphotographs of diagnostic characters were taken by using Carl Zeiss trinocular microscope.<sup>10</sup>

### Organoleptic Study:

*Guduchi Modaka Vati* was evaluated for organoleptic characters like taste, odor and color, touch.<sup>11</sup>

### Physico-Chemical Analysis:

Physico-chemical Parameters of *Guduchi Modaka 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.<sup>12</sup>

### HPTLC:

Methanol extract of *Guduchi Modaka Vati* was used for High performance thin layer chromatography (HPTLC) study. Methanol extract of *Guduchi Modaka Vati* was spotted on pre-coated silica gel GL60254 aluminum plate as 10mm bands by means of a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Toluene (9ml) and ethyl acetate (1ml) was used for *Guduchi Modaka Vati* as a mobile phase. The development time was 30 minutes. After development, Densitometry scanning was performed

with a Camag TLC scanner III in reflectance absorbance mode at 254 nm and 366 nm under control of Win CATS software (V1.2.1. Camag).<sup>13</sup>

### Observations and Results:

#### Microscopic Study of *Guduchi Modaka Vati*:

The diagnostic microscopical characters of sample showed Fibers of *Guduchi*, border-pitted vessels, simple starch grain, cork cells, collenchyma cells embedded with oil globules of *Ghrta* without staining and Lignified collenchyma cells, brown content of *Guduchi*, lignified border pitted vessels of *Guduchi* after staining with Phloroglucinol & Con. HCL are shown in Plate – 1 (Figure 1–8).

#### Organoleptic characters of *Guduchi Modaka Vati*:

Organoleptic characters of contents of *Vati* like color, taste odor and touch were

recorded separately and are mentioned. (Table-2).

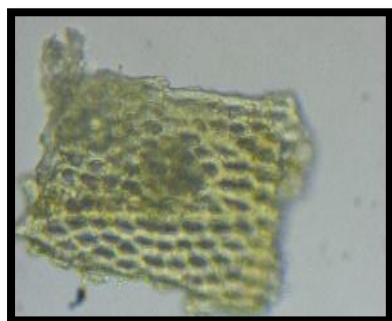
#### Physicochemical tests result:

Physicochemical analysis of *Guduchi Modaka Vati* revealed the weight variation 28.45%, Hardness 1.95 kg/cm<sup>2</sup>, Disintegration time > 1 hr., loss on drying 9.1%, Ash value was 15.10% w/w, water soluble extract was 35.90%, Alcohol (Ethanol) soluble extract 20.40% and PH Value 6 (Table- 3).

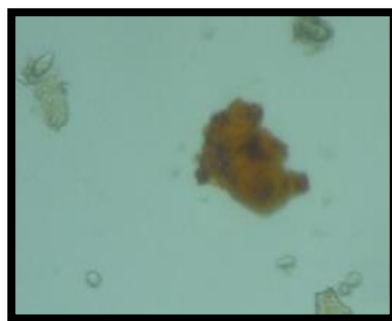
#### HPTLC study results:

Chromatographic study (HPTLC) was carried out under 254 and 366 nm UV to establish fingerprinting profile. It showed 08 spots at 254 nm with Rf values and 04 spots at 366 nm with Rf values recorded which may be responsible for expression of its pharmacological and clinical actions (Plate-2 & 3, Table- 4).

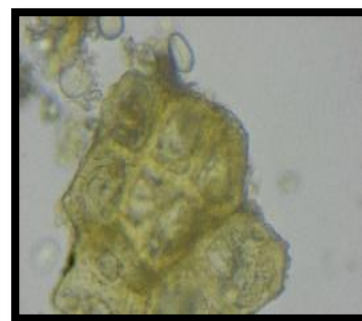
#### Plate 1: Microphotographs of *Guduchi Modaka Vati* (Figure 1-8)



Border Pitted Vessel



Brown Content



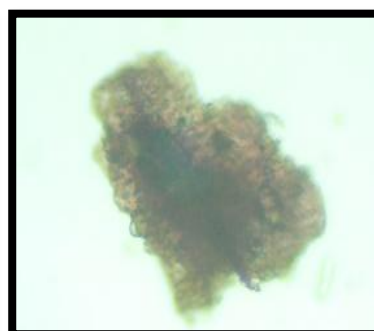
Collenchyma Cells



Cork in Surface View



Lignified Chol. Cells



Lignified Border Pitted Vessel



Simple Fibre



Simple Starch Grain

Plate 2&3: Densitogram of Guduchi Modaka Vati at 254 & 366 nm.

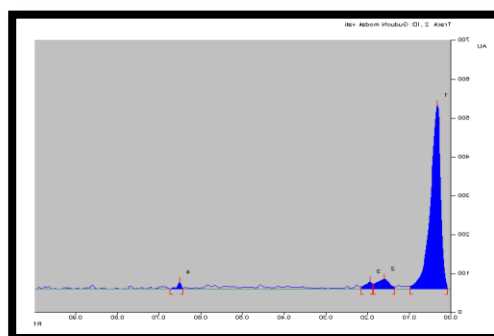
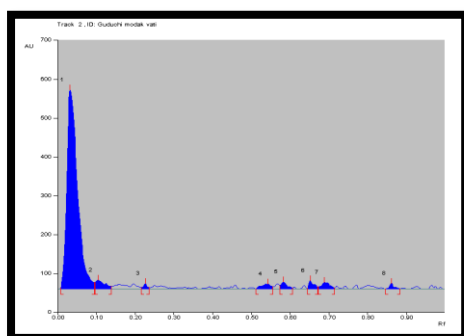


Table 1: Ingredients of Guduchi Modaka Vati

Drugs	Latin name	Part	Ratio
Guduchi	<i>Tinospora cordifolia</i> Miers.	stem	100 Parts
Madhu	-	-	16 Parts
Guda	-	-	16 Parts
Ghee	-	-	16 Parts

Table-2: Organoleptic characters of Guduchi Modaka Vati

Name of drug	Color	Taste	Odor	Nature of powder (touch)
Guduchi Modaka Vati	Greyish green	Bitter Astringent	Slightly aromatic	Hard

Table-3: Physico-chemical evaluation of Guduchi Modaka Vati

Sr. no.	Name of the Analysis	Values
1.	Weight variation	28.45%
2.	Hardness	1.95 kg/cm <sup>2</sup>
3.	Disintrigation time	> 1 hr.
4.	Loss on drying in percentage	9.1%
5.	Ash value in percentage	15.10% w/w
6.	Water soluble extract in percentage	35.90%
7.	Alcohol (Ethanol) soluble extract in percentage	20.40%
8.	PH Value	6.0

**Table- 4: HPTLC of Guduchi Modaka Vati**

254nm		366nm	
No of spots	Rf	No of spots	Rf
08	0.03, 0.10, 0.23, 0.54, 0.58, 0.65, 0.69 and 0.86.	04	0.03, 0.16, 0.19 and 0.65

**DISCUSSION:** Pharmacognostical study helps in exact authentication of ingredients present in formulation through its organoleptic characters like taste, odor, color and touch along with microscopical characters and physico-chemical parameters. This can prevent the accidental misuse of drugs and adulteration to a greater extent. The present pharmacognostical study revealed the presence of Fibers of *Guduchi*, border-pitted vessels, simple starch grain, cork cells, collenchyma cells embedded with oil globules of *Ghrita* without staining and Lignified collenchyma cells, brown content of *Guduchi*, lignified border pitted vessels of *Guduchi* after staining with Phloroglucinol & Con. HCL, these all are the common characters of the ingredients present in formulation. The presence of all contents of raw drugs in the final product shows the genuinity of the final product. All the pharmaceutical parameters analyzed showed values permissible for the *Vati*. The Physicochemical Parameters show that percentage of water soluble material is more than alcohol soluble extract. It also showed presence of acidic nature of *Vati* which will be helpful to improve the *Jatharagni* (digestive fire). The phyto-chemical evaluation of *Guduchi Modaka Vati* was done and it shows the presence of carbohydrates, oil globules of *Ghrita*, brown content and lignin. Thus it can be inferred that the drug may yield

desired pharmacological action. HPTLC is the most common form of chromatographic method used by *Ayurvedic* researchers to identify the number of ingredients present in a formulation. It also helps to determine the purity of the sample.

**CONCLUSION:** The Microscopic pictures showed fibers of *Guduchi*, border-pitted vessels, simple starch grain, cork cells, collenchyma cells embedded with oil globules of *Ghrita* without staining and Lignified collenchyma cells, brown content, lignified border pitted vessels after staining with (Phloroglucinol & Con. HCL), and all the previously described organoleptic characters, these all are the striking characters of *Guduchi (Tinospora cordifolia Miere)* belongs to *Menispermaceae* family and all previously described physico chemical parameters showed within permissible limits. As there is no any reported study on *Guduchi Modaka (Vati)* till date, The findings of the study will be useful in the standardization of the drug and study might help as reference guidance for future scientific evaluations of the drug.

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