



## Research Article

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### COMPARATIVE PHYSICOCHEMICAL ANALYSIS OF WET AND DRY GUDUCHI (*TINOSPORA CORDIFOLIA* WILLD.) MIERS.

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#### ABSTRACT

Bhaishajya Kalpana is a branch of Ayurveda which deals with pharmaceuticals. It is based on certain scientific principles which need to be followed for quality pharmaceutical preparations. Use of dry form drugs over fresh form in pharmaceutical preparation is one of the principles. It excludes some drugs such as Guduchi (*Tinospora cordifolia*) As Guduchi is being widely used in Ayurveda for preventive as well as curative purpose; it has been selected for the study. In order to find difference between morphological and physicochemical characteristics analysis of wet and dry Guduchi, was carried as per standards of Ayurved Pharmacopoeia of India (API). It was noticed that almost all the Macroscopic and Microscopic profile matches with standard parameters of Guduchi in API. It is observed that pH Value of fresh Guduchi was more than its dry form which is directed to its alkaline nature. Foreign matter content was found to be negligible in Fresh form. Fresh Guduchi also showed more water soluble extractive than dry, however alcohol soluble extractive was higher in dry form. This study has added new analytical parameters for wet Guduchi i.e. pH. Value, Total ash, water soluble and alcohol soluble extractive other than foreign matter and moisture content. So, it could be considered as a standard for future study. This study evidenced classical principle of using Fresh Guduchi over dry. Further qualitative analysis needs to be done by using qualitative parameters.

**Keywords:** Guduchi, Wet, Dry, standards.

#### INTRODUCTION

Bhaishajya Kalpana is the science which mostly deals with pharmaceuticals of plant-based drugs. Pharmaceuticals in Ayurveda has basis of certain pharmaceutical principles which needs to be followed in order to break cycle of disease pathogenesis. Among all such scientific codes, one of the most essential principles is regarding collection of fresh and dry form of drugs. As per the classics of Bhaishajya Kalpana fresh drugs should be taken double quantity of dry drugs for any pharmaceutical processing. Exception for this rule is few drugs such Guduchi (*Tinospora cordifolia*) Nimba (*Azadirachta indica*), Vasa (*Adhatoda vasica*), Kushmanda (*Benincasa hispida*) and Shatavari (*Asparagus racemosus*) Ashwagandha (*Withania somnifera*) etc<sup>1</sup>.

The excluded drug from this principle are the drugs having more water content and still used as fresh form. So, the rationale behind this principle needs to be ascertained in dry and fresh sample. Those drugs which are available easily in fresh form need to compare with its dry form. In this context Guduchi (*Tinospora cordifolia*) is selected for present research.

Guduchi is an incredibly versatile vine in Ayurvedic system of medicine since ancient times. In Ayurveda, it is designated as Rasayana drug recommended to enhance general body resistance and promote longevity and as anti-stress and adaptogen<sup>2</sup>. It is been widely use in Bhaishajya Kalpana as a single or in combination for various potent preparations such as Kwatha (Decoction)<sup>3</sup>, Ghana<sup>4</sup> (thick liquid concentrate), Satwa<sup>5</sup> (Starch) etc. It has varied range of therapeutic potential such as Kushtaghna (Relieves skin disease), Jwaraghna (Antipyretics), Hridya (Cardiac tonic), Krimighna (Anti-helmintic), Rasayana

(Immune-booster and anti-aging)<sup>6</sup> etc. In view of broad usefulness in Ayurveda pharmaceuticals present study is planned to rule out difference in physicochemical parameters in both dry and fresh Guduchi.

#### Aim and Objective

Aim of present study was to compare physicochemical parameters of fresh and dry Guduchi as per API standards with the objectives such as to authenticate Dry and wet Guduchi, Macroscopic and microscopic study, Physicochemical parameters, estimate new parameters for wet Guduchi and comparison between dry and wet Guduchi physicochemical parameters.

#### MATERIALS AND METHODS

##### Collection and Authentication of Raw drugs

Collection of Fresh and dry *Tinospora cordifolia* stem were done from Manakarnika Ayurved Aushadhalaya, Pune, Maharashtra. Samples of Guduchi was deposited to Repository section with voucher no S/B – 380. Authentication of Dry and Wet Guduchi samples, Macroscopic, microscopic and organoleptic characteristics of Dry and fresh Guduchi were done at Agharkar Research institute, Pune, Maharashtra as per API standards.<sup>7</sup>

##### Physicochemical Characteristics

Physicochemical analysis was carried out at Agharkar Institute according to the API Appendices-2 three times and the mean was calculated.

**pH Value Analysis**

Weighted 10 g of powdered plant material was mixed with 100 ml of water and was shake vigorously it was then allowed to sediment. After 15 minutes pH was measured<sup>8</sup>.

**Foreign Matter**

Weighted 100 g of the plant material and was spread it out in a thin layer. Observed the sample with the unaided eye or with the use of 6X lens and separated the foreign organic matter manually as completely as possible. Weighted the sorted foreign matter and determined the percentage of foreign matter from the weight of the plant material taken.<sup>9</sup>

**Total Ash**

Incinerated 2 g accurately weighted, of the ground drug in a tarred platinum or silica dish at a temperature not exceeding 600°C until free from carbon, cool in a desiccator for 30 min and weighted without delay. Percentage of ash was calculated with reference to the air-dried drug<sup>10</sup>.

**Extractive analysis**

**Water soluble extractive**

Macerated 5 g of the air-dried drug, coarsely powdered, with 100 ml chloroform water (2.5 ml chloroform in purified water to produce 1000 ml) of specified strength in a closed flask for 24 hours, shaking frequently for 6 hours and allowing standing for 18 hours. Filtered rapidly, taking precautions against loss of solvent, 25 ml of the filtrate was evaporated to dryness in a tarred flat bottomed shallow dish and dried at 105<sup>0</sup>, to constant weight and weighted. Then calculated the percentage of water-soluble extractive with reference to the air-dried drug<sup>11</sup>.

**Alcohol soluble extractives**

Macerated 5 g of the air-dried drug, coarsely powdered, with 100 ml of ethanol of specified strength in a closed flask for 24 hours, shaking frequently for 6 hours and allowed to stand for 18 hours. Filtered rapidly, taking precautions against loss of solvent and evaporated 25 ml of the filtrate to dryness in a tarred flat bottomed shallow dish and dried at 105<sup>0</sup>, to constant weight and weighted. Calculated the percentage of alcohol-soluble extractive with reference to the air-dried drug<sup>12</sup>.

**RESULT**

**Table 1: Macroscopic Characters**

S. No.	Sample	Status	Macroscopic characters
1	<i>Tinospora cordifolia</i>	Fresh	Stem pieces of varying thickness, ranging from 0.8-1.6 cm in diameter. Green in colour with smooth surfaces and swelling at nodes.
2	<i>Tinospora cordifolia</i>	Dry	Stem pieces of varying thickness, ranging from 0.6-1.2 cm in diameter. Greenish brown in colour. Surface of the stem appears to be studded with warty tubercles and surface skin is longitudinally fissured. Swelling at nodes. Transversely smoothened surface shows a radial structure with conspicuous Medullary rays traversing porous tissues.

**Table 2: Microscopic Character**

S. No.	Sample	Status	Analytical character
1	<i>Tinospora cordifolia</i>	Fresh	TS show cork, cortex and vasculature. The cork contains outer zone of thick-walled brownish compressed cells and an inner zone of thin-walled colorless, tangentially arranged cells. Cork tissue is broken at some places due to lenticels. Cortex is wide. Pericyclic fibres lignified and are associated with a large number of crystals fibres containing a single prism in each chamber. Vascular zone composed of vascular strands with about 10 or more wedge shaped strips of xylem surrounded by semi-circular strips of phloem. Cambium is of 1 to 2 layers, xylem consists of vessel elements, tracheids, parenchyma and fibres. Pith is made up of large thin-walled cells containing starch grains.
2	<i>Tinospora cordifolia</i>	Dry	TS show cork, cortex and vascular bundles. Cork consists of thick-walled brownish compressed cells on outer region and thin walled colorless, tangentially arranged cells towards inner region. Vascular bundles are in ring. Cortex is wide. Pericyclic fibres lignified and are associated with a large number of crystals fibres containing a single prism in each chamber. Vascular zone composed of vascular strands with about 10 or more wedge shaped strips of xylem surrounded by semi-circular strips of phloem. Cambium is of 1 to 2 layers, xylem consists of vessel elements, tracheids, parenchyma and fibres. Pith is made up of large thin-walled cells containing starch grains.

**Table 3: Organoleptic Characters**

S. No.	Sample	Status	Organoleptic characters
1	<i>Tinospora cordifolia</i>	Fresh	Odour: Odorless, Taste: very bitter
2	<i>Tinospora cordifolia</i>	Dry	Odour: Odorless, Taste: bitter

**Table 4: pH and Foreign Matter**

S. No.	Sample	Status	pH	Foreign Matter % w/w	Foreign matter % w/w API STD <sup>13</sup>
1	<i>Tinospora cordifolia</i>	Fresh	7.88	0.05	Nil
2	<i>Tinospora cordifolia</i>	Dry	6.37	1.22	Not more than 2 per cent,

Table 5: Ash Analysis

S. No.	Sample	Status	Total ash (% w/w)	Total Ash (% w/w) API std <sup>13</sup>
1	<i>Tinospora cordifolia</i>	Fresh	6.71	----
2	<i>Tinospora cordifolia</i>	Dry	7.46	Not more than 16 %

Table 6: Extractive Analysis: Water soluble extractives

S. No.	Sample	Status	Water soluble extractive (% w/w)	Water soluble extractive (% w/w) API std <sup>13</sup>
1	<i>Tinospora cordifolia</i>	Fresh	7.6	-----
2	<i>Tinospora cordifolia</i>	Dry	7.0	Not less than 11 per cent,

Table 7: Extractive Analysis: Alcohol soluble extractives

S. No.	Sample	Status	Alcohol soluble extractive (% w/w)	Alcohol soluble extractive (% w/w) API std <sup>13</sup>
1	<i>Tinospora cordifolia</i>	Fresh	2.1	----
2	<i>Tinospora cordifolia</i>	Dry	3.1	Not less than 3 per cent,



Figure 1: Dry Guduchi

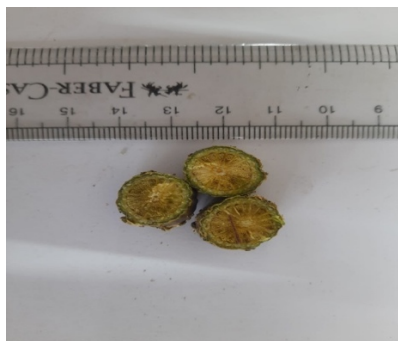


Figure 2: Wet Guduchi



Figure 1

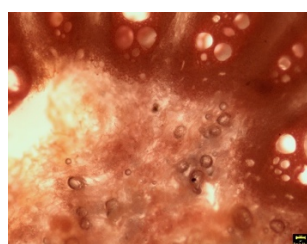


Figure 2

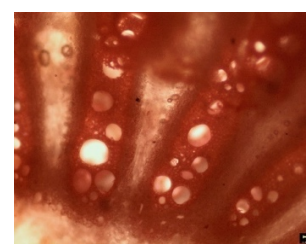


Figure 3

Figure 3-5: T.S. of *Tinospora cordifolia* (Wet)

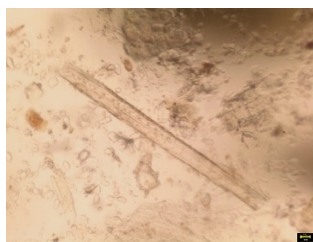


Figure 4

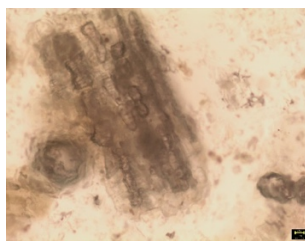


Figure 5

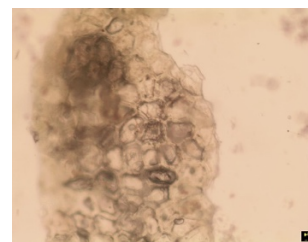


Figure 6

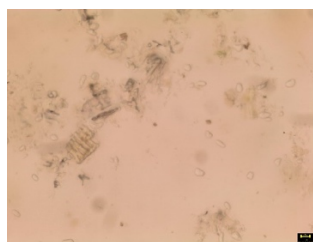


Figure 7

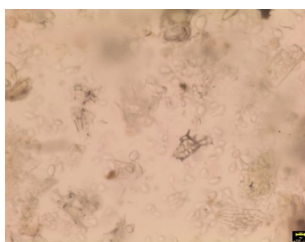


Figure 8

Figure 6-10: T.S. of *Tinospora cordifolia* (Dry)

## DISCUSSION

In ancient pharmacological practices, Vaidya used to practice fresh drug for treatment as their territory used to be near forest. They used to collect fresh plants drug for making pharmaceutical preparation as soon as diagnosis of patient was over. But eventually the old practices become diminished due to deforestation and commercialization of pharmaceutical products. In Ayurveda Fresh plant is preferred over dry. However, the dried drugs are moisture free and available after transportation involved hence it is taken for pharmaceutical study purposes As Guduchi is always taken in fresh form for pharmaceutical purposes such as Decoction, Ghana, Satwa etc. as per principles of Bhaishajya Kalpana, study has been planned to see difference in physicochemical parameters between dry and fresh form. It was observed that according to the Ayurved Pharmacopeia of India (API), the studied parameters have been matched.

Almost all the Macroscopic and Microscopic profile matched with standard parameters of Guduchi. (Table 1 and 2) In organoleptic characteristics, it was observed that fresh Guduchi has more bitter taste than dry form. It may be due to its more moisture content, as presence of water is important basis for taste. (Table 3)

pH of fresh Guduchi was more than its dry form and directed to its alkaline nature. (Table 4) The foreign matter content is found to be negligible in Fresh form of Guduchi whereas it is not more than 2% in dry sample as per API standards. It suggests that sample was free of admixtures, such as soils, stones, sand and dust. Total Ash value for dry sample of Guduchi is more than fresh. As per API standards total ash should not be more than 16 % (Table 5).

In case of extractive value analysis, fresh Guduchi showed more water-soluble extractive value than dry form, but in case of alcohol soluble extraction, dry sample has slightly higher value than fresh form which indicate that for Kwath (Decoction) preparation fresh sample should be used and for Asavarishta (Fermented preparation) dry sample could be used. As per API only two parameters for fresh Guduchi i.e. foreign matter and moisture content have been given, so the other analytical

standards have been matched with parameters of dry Guduchi only. In this comparison fresh Guduchi sample showed more promising parameters than dry sample.

## CONCLUSION

Present physicochemical comparative study between dry and wet Guduchi advocate scientific pharmaceutical principle of Bhaishajya Kalpana regarding collection of dry and fresh drugs. This study proved the scientific basis for use of Guduchi in fresh form for almost all pharmaceutical preparation. API has only two physicochemical parameters i.e. foreign matter and moisture for wet Guduchi, so present study added parameters such as Ph. value, Total ash, water soluble and alcohol soluble extractive. So, these added parameters could be considered as a standard for future study. The study showed Fresh Guduchi has higher standards than dry form. Further qualitative analysis needs to be done by using qualitative parameters.

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