



## QUANTITATIVE ESTIMATION OF SATVA EXTRACTED FROM DIFFERENT STEM SIZES OF GUDUCHI (*TINOSPORA CORDIFOLIA* (WILLD.) MIERS)

Sharma Rohit<sup>1\*</sup>, C.R Harisha<sup>2</sup>, Galib<sup>3</sup>, Patgiri BJ<sup>4</sup>, Prajapati P.K<sup>5</sup>

<sup>1</sup>\*M.D Scholar, Dept. of R.S & B.K, I.P.G.T & R.A, Gujarat Ayurved University, Jamnagar, Gujarat, India

<sup>2</sup>Head of Pharmacognosy Laboratory, I.P.G.T & R.A, Gujarat Ayurved University, Jamnagar, Gujarat, India

<sup>3</sup>Lecturer, Dept. of R.S & B.K, I.P.G.T & R.A, Gujarat Ayurved University, Jamnagar, Gujarat, India

<sup>4</sup>Reader, Dept. R.S & B.K, I.P.G.T & R.A, Gujarat Ayurved University, Jamnagar, Gujarat, India

<sup>5</sup>Head of Dept. R.S & B.K, I.P.G.T & R.A, Gujarat Ayurved University, Jamnagar, Gujarat, India

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### ABSTRACT

*Tinospora cordifolia* (Willd.) Miers known as *Guduchi* in Sanskrit is an important drug of Ayurvedic system of medicine since ancient times. The plant is useful in wide range of diseases like *Jwara* (fever), *Kamala* (jaundice), *Prameha* (diabetes) etc. *Guduchi Satva*, the starchy material of the stem is well-known single drug formulation of *Guduchi* and is the potent one. Species of the plant, size of the stem, collection time, maturity or immaturity of plant may affect the percentage of *Guduchi Satva*. Keeping these points in view, an attempt has been made to estimate quantitative variation in *Guduchi Satva* by using three different sizes of the stem. The results of this study revealed the yield of *Guduchi Satva* was more in medium size of the stem (1.6-2.0cm) than thin size (1.0-1.5cm) and thick size (2.1-2.5cm). These findings can be considered in further Pharmaceutical validation of *Guduchi Satva*

**Key Words:** *Guduchi*, *Satva*, Stem, *Tinospora*.

### INTRODUCTION

*Tinospora* is one of the important genera of the family, consisting of about 15 species. Some medicinally important species includes *T. cordifolia*, *T. malabarica*, *T. tementosa*, *T. crispa*, *T. uliginosa*, etc.<sup>1</sup> *Tinospora cordifolia* is a large, glabrous, deciduous, climbing shrub. The stem structure is fibrous and the transverse section exhibits a yellowish wood with radially arranged wedge shaped wood bundles, containing large vessels, separated by narrow medullary rays<sup>2</sup>. The stem is bitter, stomachic, stimulates bile secretion, enriches the blood and useful in jaundice, urinary disease and upper respiratory tract infections<sup>3</sup>. The description of the plant with its therapeutic attributes is extensively available in most of the classical texts like *Charaka*, *Sushruta* and *Ashtanga Hridaya*, *Bhava Prakasha*, *Dhanavantari Nighantu* etc. In Hindi, the plant is commonly known as *Giloe*<sup>4</sup> which is a Hindu mythological term that refers to the heavenly elixir that has saved celestial beings from old age and kept them eternally young. Other common names and synonyms are *Guduchi*, *Amrita*, *Amritavalli*, *Madhuparni*, *Guduchika*, *Chinnobhava*, *Vatsadani*, *Tantrika*, *Kundalini*, *Chakralakshnika* (Sanskrit), *Gulanacha* (Bengali), *Gurcha* (Hindi), *Garó*, *Galac* (Gujarati), *Thippateega* (Telugu), *Amrutavalli* (Kannada), *Amrita*, *Gilo* (Kashmiri), *Chittamrutu* (Malayalam), *Gulvel* (Marathi), *Guluchi* (Oriya), *Gilo* (Punjabi), *Seendal*, *Seendil Kodi* (Tamil), *Siddhilata*, *Amarlata* (Assamese) Heartleaf Moonseed, *Tinospora* (English)<sup>5</sup>.

*Satva* is aqueous extractable solid substance collected from herbal drug<sup>6</sup>. The commonest example is *Guduchi Satva*, which is the starch of *Tinospora cordifolia*. In the Ayurvedic medicines the solid white extract of *Tinospora cordifolia* (Willd.) Miers Known as "*Guduchi Satva*" is very commonly prescribed<sup>7</sup>.

*Guduchi Satva* is found mentioned in *Rasendra Mangalam*<sup>8</sup> for the first time. Due to its usefulness in the disease Fevers, it is known as 'Indian Quinine'<sup>9</sup>. In Unani System of Medicine, mostly "Sat Giloe" is incorporated in the preparations. "Arq Giloe" prepared from the fresh plant is

considered as febrifuge, while "Arq Maul Laham Makokashiwala" is a general tonic<sup>10</sup>.

Earlier scholars worked in the pharmaceutical aspects of *Guduchi Satva* reported quantitative variation in the final product. Mehra P N (1969) *et al.*<sup>11</sup> reported yield of 0.48 % *Satva* with fresh stem and 1.20% with dried stem. Preeti Salunke (1997) *et al.*<sup>12</sup> reported extraction of 0.1 % of *Satva* from fresh stem. These variations may be due to differences in the species, size of the stem, collection time and levels of maturity of plant. The current study is performed with different sizes of stem to find out the ideal size of stem to be collected for *Guduchi Satva* preparation.

### MATERIALS AND METHODS

#### Procurement and identification of *Guduchi* stem:

Fresh *Guduchi* stem spreading over *Neem* (*Azadirachta indica*) tree (Fig. 1) was procured from the campus of I.P.G.T. & R.A., G.Ay.U, Jamnagar and identified at Pharmacognosy laboratory.

#### Batches:

The stem was categorized into three groups as follows (Fig. 2).

Total 15 batches of *Satva* (5 each from 1 group) were prepared to get an average data. All the thin, medium and thick sizes used were of same plant.

- (1) Three batches of 1.0-1.5 cm diameter of stem- Thin stem
- (2) Three batches of 1.6-2.0 cm diameter of stem- Medium stem
- (3) Three batches of 2.1-2.5cm diameter of stem- Thick stem

#### Method of preparation (Fig. 3):

1 kg of green *Guduchi* stem was collected. The Physical impurities were removed and washed thoroughly with water. Stem was made into pieces of 1.5-2 inches and crushed thoroughly to convert into slimy paste. This mass was further mixed with 4 times of Potable water in a Stainless steel vessel and kept for soaking overnight (12 hrs). Next morning this mass was macerated thoroughly in water for about 1 hour, filtered slowly through a clean four folded cotton cloth. The liquid was kept aside undisturbed for 4 hrs

for settlement. The supernatant liquid was decanted carefully. Heavy starchy sediment, which was settled at the bottom, was shifted into a tray, air dried under running fan, collected and stored as *Guduchi Satva* in airtight jars.

#### Observations:

1. As the maceration was completed after 1 hr, the sliminess of pulp was almost reduced.
2. The colour of liquid after straining with four folded cloth was greenish brown.
3. The colour of final Product was *Shankhabha* (clear white).

#### DISCUSSION:

First time *Guduchi Satva* preparation has been mentioned in *Yoga Ratnakar* and then *Rasa Yoga Sagar*, *Siddha Yoga Sangraha*, *Dravyaguna vigyana* etc. have described elaborately. All these texts have different method of preparation.

According to *Yoga Ratnakar*<sup>13</sup>, *Guduchi* stem is cut into small pieces and triturated well it was filtered through cloth and supernatant liquid is decanted and “*Shankhanibha*” sediment is collected. The quantity of liquid and overnight soaking is not stated in this reference. “*Shankhanibha*” reveals the colour of *Satva*.

According to *Siddha Yoga Sangraha*<sup>14</sup>, *Guduchi* stem is cut into small pieces and pounded well then it was kept for overnight soaking in water. Next day it was filtered through cloth, allowed for sedimentation, supernatant liquid is decanted and sediment is collected. In this reference soaking is mentioned, but the volume of liquid is not mentioned.

*Rasa Yoga Sagar*<sup>15</sup> has also not mentioned the quantity of liquid, but it states that the Kalka should be done so fine by triturating. The colour of *Satva* is “*Shubhrakhandnibha*”. In commentary of *Bhavprakash*<sup>16</sup>, four time of water for soaking has been mentioned.

So, Quantitative evaluation of *Satva* is not mentioned clearly in classical texts. Only sedimentation and filtration is described. There is also variation in the soaking time i.e. 12 to 24 hours.

In present study, *Guduchi* grown on *Neem* trees was collected from the natural habitat. *Neem Guduchi* is said to be the best as the synergy between these plants enhance its efficacy<sup>17</sup>.

Different sizes of *Guduchi* stem were collected to evaluate the quantitative variation of those sizes of stem, because no any classical texts have mentioned that which size of *Guduchi* stem is to be used for *Satva* preparation. So, pharmaceutically *Guduchi Satva* was prepared to find out which size of stem is the best for achieving more *Satva*.

The details of *Guduchi Satva* preparation are placed in Table no.1.

Organoleptic characteristic of *Guduchi Satva* are given in Table no.2. *Guduchi Satva* is described as slight bitter by some recent experts<sup>18</sup>, but in present study it was found tasteless. Freshly prepared *Satva* is good in taste, but carelessly prepared one is bitter in taste due to coming of bitter principle of stem in it.

The yield of *Satva* from thin, medium and thick stem was 1.2 %, 2.7 % and 0.76 % respectively. So, it was cleared from above figures that medium size of stem yielded more *Satva* i.e. 2.7 % (Avg. of 5 batches) than thin and thick size of stem. *Acharya Yadavji Trikamji* has mentioned ‘*Angustha*’ size of stem for the preparation of *Ghana*<sup>19</sup>. It may be inferred that ‘*Angustha*’ size of stem contains more starch. A survey of *Angustha* (Thumb) size of 20 Healthy volunteers having age between 21-25 yrs, average Weight - 55 to 65 kg and Height- 162 to 172 cm was done and recorded, which was ranging from 1.8-2.1cm and was corroborating with the medium size *Guduchi* taken in the present study.

#### CONCLUSION:

Yield of the *Guduchi satva* greatly depends on the size, environment, association and cellular activities; maximum metabolic activity of the starch grains in cellular constituents matures at after preliminary development, during this stage percentage of the starch also increases. The study reveals that the thin stem yields very less compared to the medium size, more than that thick stem. Medium size stem yields more than both thin and thick samples, whereas thick samples yield very less as compared to the both small and medium samples. The Organoleptic characters show almost similar in nature. Thus the present study concludes that Maximum Yield of *Satva* (2.7 %) was obtained in medium size (1.6-2.0 cm) stem of *Guduchi* and it may adopt for the future utilization in pharmaceutical companies.

Table no. 1- Average Results of 15 Batches (5 each from 1 group) of *Guduchi Satva*

| Part used | Parameters                     |                      |                            |                                 |                          |                                        |                                        |                           |                 |         |
|-----------|--------------------------------|----------------------|----------------------------|---------------------------------|--------------------------|----------------------------------------|----------------------------------------|---------------------------|-----------------|---------|
| Stem      | Fresh <i>Guduchi</i> stem (kg) | Diameter of Stem(cm) | Size of stem pieces (inch) | Total qty. of Potable Water (L) | Duration for soaking (h) | Total time taken for maceration (min.) | Total time taken for sedimentation (h) | Total time for drying (h) | Total yield (g) | % Yield |
| Thin      | 1                              | 1.0-1.5              | 1.5-2.0                    | 4                               | 12                       | 30                                     | 4                                      | 2                         | 12              | 1.2     |
| Medium    | 1                              | 1.6-2.0              | 1.5-2.0                    | 4                               | 12                       | 30                                     | 4                                      | 2                         | 27.5            | 2.7     |
| Thick     | 1                              | 2.1-2.5              | 1.5-2.0                    | 4                               | 12                       | 30                                     | 4                                      | 2                         | 7.5             | 0.76    |

Table no.2- Organoleptic characteristic of *Guduchi Satva*

| Sr. No. | Parameter | Thin stem   | Medium stem | Thick stem  |
|---------|-----------|-------------|-------------|-------------|
| 1.      | Colour    | Pale white  | Pale white  | Pale white  |
| 2.      | Smell     | No specific | No specific | No specific |
| 3.      | Taste     | Tasteless   | Tasteless   | Tasteless   |
| 4.      | Touch     | Smooth      | Smooth      | Smooth      |

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Fig. 1- *Guduchi* collected from natural habitat with *Neem* tree.

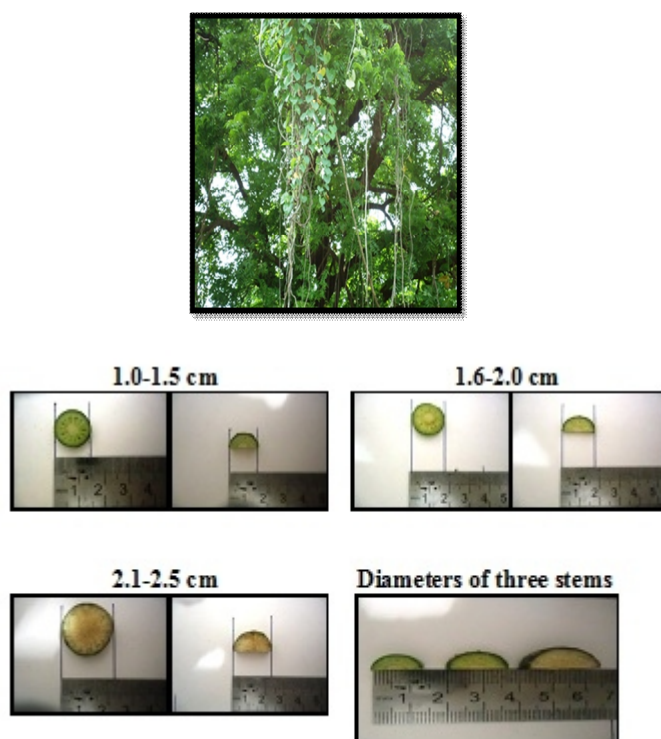
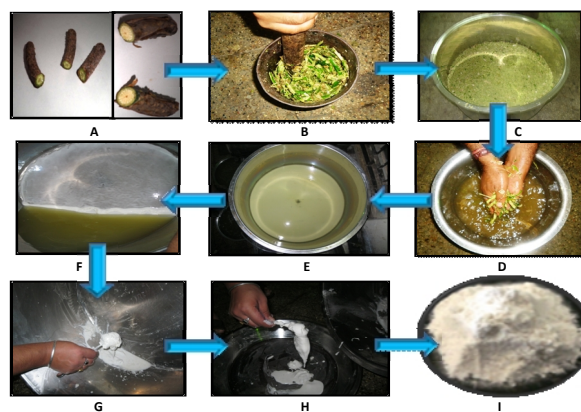


Fig. 2- Variations in Stem Diameters



A- *Guduchi* stem, B- pounding, C- overnight soaking, D- maceration, E-allowed for sedimentation, F- removal of supernatant liquid, G- scrapping of white sediment, H- collection and drying, I- *Guduchi Satva* after drying.

Fig. 3- Unique operating procedure of preparation of *Guduchi Satva*

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