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Estimation of starch extracted from different diameter thickness stem of Giloe (Tinospora cordifolia Willd Miers)

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ABSTRACT

Tinospora cordifolia (Willd.) Miers. (Menispermaceae) commonly known as Giloe is a large, glabrous, perennial, deciduous, climbing shrub found throughout India. It is a widely used in folk and Ayurvedic system of medicine. Most of the requirement of Giloe is met from the wild. Harvesters harvest all diameter class of Giloe stem without knowing that which thickness stem is suitable for drug production. Giloe starch (satva) is well known single drug formulation of *T. cordifolia*. Stem thickness, time of collection, maturity of plant affects the percentage of Giloe starch. Keeping above into consideration a study was conducted to find out optimum thickness of stem to be collected for production of quality drug. Estimation of starch extracted from different thickness stem of *T. cordifolia* has been carried out in the present study. The study reveals that *T. cordifolia*, having diameter 16–18 mm is better in terms of starch (15.74±0.062%) and should be harvested for production of quality products.

Keywords: *Tinospora cordifolia*, Giloe starch, stem thickness, Madhya Pradesh, quality.

1. Introduction

Tinospora cordifolia (Willd.) Miers. (Guduchi) is a large, glabrous, deciduous climbing shrub belonging to the family Menispermaceae^[1-3]. It is distributed throughout the tropical Indian subcontinent and China, ascending to an altitude of 300 m. In Hindi, the plant is commonly known as Giloy, 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^[4-5]. Guduchi is widely used in veterinary folk medicine/ayurvedic system of medicine for its general tonic, anti-spasmodic, anti-inflammatory, anti-arthritis, anti-allergic and anti-diabetic properties^[6-7]. The plant is known as Amrita and the term is attributed to its ability to impart youthfulness, vitality and longevity to the consumer. The plant is used in ayurvedic, "Rasayanas" to improve the immune system and the body resistance against infections. The root of this plant is known for its anti-stress, anti-leprotic and anti-malarial activities the stem is bitter, stomachic, diuretic, stimulates bile secretion, causes constipation, allays thirst, enriches the blood and cures jaundice. The extract of its stem is useful in skin problems. The root and stem of *T. cordifolia* are prescribed in combination with other drugs as an anti-dote to snake bite and scorpion. Dry barks of *T. cordifolia* has anti-spasmodic antipyretic, anti-allergic, anti-inflammatory^[8] and anti-leprotic properties. According to ayurvedic practitioners Rasa of the plant are –tikta, Virya is heating and Vipaka is madhura. It is widely used for urinary complaints and rheumatism^[9].

From the stem of *Tinospora cordifolia* alkaloid berberin, tinosporin and palmitin are isolated while from roots, tinosporin and palmatine are isolated. From the whole plant, the diterpenoidal lactone tinosporide and tinosporon are obtained. Beside these compounds giloin, giloinin and tinosporic acid are also isolated from the whole plant of *Tinospora cordifolia*^[10-12].

In Ayurveda, the starch obtained from Giloe stem is known as Giloe Satva and well known drug. Rao *et al.* (1981) reported yield of 0.48% Satva in fresh stem and 1.20% with dried stem^[13]. Salunke (1997) reported 0.15 of satva from fresh stems of *T. cordifolia*^[15].

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However, they did not report the thickness of diameter to be harvested for quality produce. In the present study, an effort has been made to quantify starch (Gileo satva) extracted from varied thickness of *Tinospora cordifolia* stem.

2. Materials and Methods

i. Plant material

Fresh and healthy stem of *Tinospora cordifolia* were collected from Chhindwara, Seoni and Jabalpur districts of Madhya Pradesh. The stem was washed thoroughly in water and soil and other foreign particles were removed. The stem was cut into smaller pieces of 4–10 mm length and dried under shade. The stem was subsequently dried in a hot air oven at 40 °C for 48 h, powdered and used for extraction.

ii. Extraction of starch

Dried powdered stem of 25gm was soaked overnight in 200 ml of water. Next morning the mass was macerated thoroughly in water for about 1 hr and then filtered slowly through a fourfold muslin cloth. The liquid was then kept aside undisturbed for 4hrs for settlement. The supernatant liquid was decanted carefully. Heavy starchy sediment, which was settled at the bottom of container was shifted to tray, air dried under fan and collected^[15].

3. Results and discussion

Table 1 represents the percentage of crude fiber and starch in *T. cordifolia* stems of different sizes. Both the constituents increase with the increase in thickness of the stem. Maximum amount of crude fiber (0.092%) was found in 16–18 mm thick stem collected from Jabalpur while minimum (0.018%) was found in 2–4 mm thick stem collected from Seoni. Similarly maximum starch content (15.74%) was also found in 16–18 mm thick stem collected from Jabalpur while minimum (5.40%) was found in 2–4 mm thick stem collected from Seoni. Sharma, *et al.*, (2012) also extracted starch from *T. cordifolia* but there yield was low^[14], the reason may be that they reported the yield in fresh samples while we performed the experiments in dried samples.

Table 1: Starch percentage in *Tinospora cordifolia* stem

Sample	Stem class (Diameter in mm)	Starch %
Chhindwara	9 – 11	10.38±0.053
	5 – 8	6.84±0.05
	2 – 4	5.74±0.021
Jabalpur	16 – 18	15.74±0.062
	9 – 11	10.98±0.051
	5 – 8	8.49±0.054
Seoni	5 – 8	8.22±0.056
	2 – 4	5.40±0.042

Studies on starch content of *T. cordifolia* stem was also conducted at Directorate of Medicinal and Aromatic Plants Research, Anand Gujarat. Stem starch content varied from 12 to 52% on dry weight basis among the accessions (Newsletter January- June 2010)^[16]. All the phytoconstituents increased with the increase in diameter of the stem except alkaloids. It can be concluded that stem of thicker diameter contains more phytoconstituents than thinner. *T. cordifolia* collected from Jabalpur was found to be superior to that of other places, i.e Chhindwara and Seoni. The amount of gileo satva was also dependent on thickness of the stem. Thicker stem

contained higher percentage of satva than thinner stem. Thus it can be concluded that *T. cordifolia* stems should be harvested when they became thick having a diameter above 1 cm.

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