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EVALUATION OF INFLUENCE OF *DESHA* (PLACE OF COLLECTION) ON PHARMACOGNOSTIC AND PHYTOCHEMICAL PROFILE OF *SIRISA TWAK* (*ALBIZZIA LEBBECK* BENTH.)

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ABSTRACT

Introduction: *Acharyas* have given much importance to the place of collection, as *desha* plays a vital role in augmenting the phytoconstituents present in the drugs. In the criteria for standardisation, the place of drug collection plays a crucial role in ensuring the quality of the drug. *Sirisa (Albizzia lebbeck* Benth.*)* is highly valued in our classics due to its various *karmas* like *Vishagna, Shotahara, Vedanasthapana, Visarpahara, Varnya, Kushtagna, Vranahara, Kandugna, Kasahara, Swasahara and Pamakushtahara* making it an essential medicinal plant. It is considered an *Agrya* among *Vishagna dravyas*. **Objectives:** The present research focuses on *desha* as one of the factors that might affect the therapeutic efficacy of this essential herbal drug. **Method:** *Sirisa* bark was collected from three different agro-climatic zones of Karnataka. The samples were dried, powdered and subjected to qualitative and quantitative analysis. **Result:** Macroscopic, microscopic, physicochemical, and HPLC studies suggest that Sirisa collected from *Jangala* and *Sadharana desha* are best for pharmacognostic and phytochemical evaluation. **Conclusion:** It may be concluded that *Sirisa (Albizzia lebbeck* Benth.) bark should be collected from *Jangala* and *Sadharana desha* for better therapeutic efficacy, revalidating the classical reference in ancient Ayurvedic texts.
Keywords: *Sirisa, Albizzia lebbeck, Jangala desha, Sadharana desha, Vishaghna.*

INTRODUCTION

Medicinal plants *should be collected from a particular desha* (place) to obtain herbal products of the best therapeutic efficacy. *Ayurveda*, an ancient Indian system of medicine, has recognised the importance of considering *desha* in plant collection and processing. *Ayurvedic* literature mentions that drug is capable of producing maximum therapeutic effect when their potency is augmented by *Desha Sampat* (collecting the plants from the appropriate habitat), *Kaala Sampat* (collecting the plants in the proper season), *Guna Sampat* (collecting the plants when they are enriched with excellent attributes) and *Bhajana Sampat* (storing the plants in appropriate containers)[1]. The quality of medicinal plants depends upon the method of collection. *Sirisa* is botanically identified as *Albizzia lebbeck* Benth. It is a large deciduous tree belonging to the family Mimosaceae. Bark, flowers, seeds, and leaves are helpful parts. It is considered an *Agrya* among *Vishagna dravyas*[2]. The stem bark of the plant is used in *Visha, Pamakushta, Kandu, Visarpa, Sarpadamsha, Kasa, Swasa, Vrana, Shotha, Sheetapitta, Netrabhishyanda and Raktadushti*[3]. It has pharmacological actions like antiallergic, analgesic, anti-inflammatory, and antioxidant [4]. Though it is considered the best anti-poisonous drug, the influence of environmental factors such as *desha* on the phytochemical composition of *Sirisa* remains unexplored. *Acharyas* have opined that *Jangala* and *Sadharana desha* are best for the collection of drugs[5]. Hence, to re-validate this concept, the present study used a comparative pharmacognostic and phytochemical analysis of *Sirisa twak* (*Albizzia lebbeck* Benth.) with special reference to *desha*.

MATERIALS AND METHODS

Sirisa (*Albizzia lebbeck* Benth.) was collected from three different agroclimatic zones of Karnataka: *Jangala*—Bellary, *Anupa*—Udupi, and *Sadharana*—Mysore (Figure 1). The drug's sampling is shown in Table 1. The present study was carried out under the following headings: collection of the drug, Preliminary processing—drying, Pharmacognostic evaluation (Macroscopic study and organoleptic study, Microscopy of bark and powder), Physical evaluation, Chemical evaluation (Preliminary Phytochemical analysis), and HPLC.

Fig 1 : Samples of a) *Jangala* b) *Anupa* c) *Sadharana desha*

Table 1: Sampling of the Drug

Specimen Number	*Desha*	Place of Collection	Code	Date of Collection
1	*Jangala*	Bellary	Sample 1	5/6/2023
2	*Anupa*	Udupi	Sample 2	25/8/2023
3	*Sadharana*	Mysuru	Sample 3	20/6/2023

The barks of *Sirisa* (*Albizzia lebbeck* Benth.) were authenticated, and Microscopic, Physiochemical, and Preliminary phytochemical evaluations were carried out in the Department of *Dravyaguna,* Sri Dharmasthala Manjunatheshwara College of Ayurveda, Hassan. HPLC was done at Poornayu Research Labs, Nagarabhavi, Bengaluru.

The collected barks were dried under the sun and coarsely powdered using clean and dried *Khalva Yantra*. The powder was weighed using a digital balance and stored in an airtight plastic container. As Per API standards, a physicochemical analysis was conducted. All the tests were carried out in triplicates.

For HPLC: A - 0.4ml ACN in 200ml water (0.2% ACN), B – Methanol, Diluent- Methanol: Water = 1:1, Chromatographic system, Column- 150x4.6 mm, 5µm, C18, Flow rate- 1.2 ml/min, Detector- 280nm, Injection volume – 20 µl, Standard- 5mg in 50ml with diluent 500mg sample in 50ml standard with diluent was sonicated for 20mins, filtered and injected.

DISCUSSION

The Macroscopic evaluation of three samples of *Sirisa* bark collected from different *deshas* had no difference in appearance except for the impression of lenticels in Sample 1. The texture was rough in all the Samples. There was a colour difference, i.e., Sample 1 was brown, Sample 2 was Creamish brown, and Sample 3 was dark brown. All three samples had a characteristic odour and fibrous fracture. Samples 1 and 3 had an astringent taste, and Sample 3 was slightly astringent. The microscopic evaluation (Figure 2) showed that all three samples showed the presence of cork and stone cells, but only Sample 1 showed medullary rays. Powder microscopy reveals that cork was present in all the samples. Stone cells were present in Samples 1 and 3. Phloem fibres and crystals in adjacent parenchyma of fibres were present in Samples 1 and 2. Only Sample 2 showed the presence of radially cut medullary rays. Prismatic crystals were present in Samples 2 and 3. So, the Macroscopic and Microscopic features resemble the features of *Albizzia lebbeck* Benth. Mentioned in API, which proves the genuinity and identity of the samples taken.

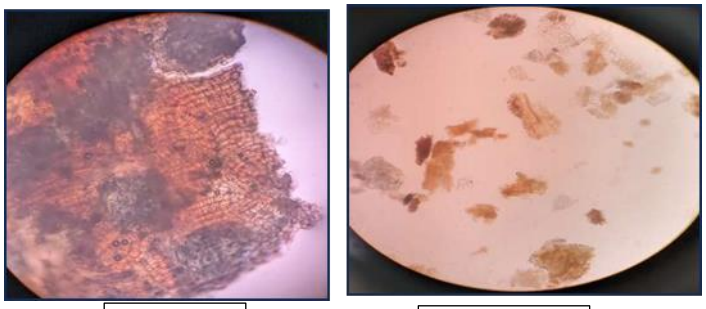

Figure 2: Microscopy of *Albizzia lebbeck*

Foreign matter was absent in all three samples as the samples were collected from the natural habitat, indicating the purity of the drug. The moisture content of Sample 1 was higher than that of the other two samples, indicating a higher chance of faster contamination/spoilage. Alcohol and Water extractive values of Sample 1 and Sample 3 were within the standard limit, indicating the presence of more Phyto constants. In contrast, Sample 2 was not within the standard limit, suggesting that it has fewer Phyto constants. The total ash values of Sample 1 and Sample 3 were within the standard limit. In contrast, Sample 2 was not within the standard limit, indicating the presence of inorganic mineral content or soil in the drug.

Acid insoluble ash values of Sample 3 and Sample 2 were within the standard limit, whereas Sample 1 was

not within the standard limit, providing insights into the presence of silicaceous matter. The Phytochemical investigation of the aqueous and alcoholic extract of Sample 1 and Sample 3 revealed the presence of Alkaloids, Carbohydrates, Steroids, Saponins, Tannins, Flavonoids and Glycosides, which help in determining the purity, quality and potency of the drug.

Three samples were assayed for total catechins according to the protocol given in quality standards. The results (Table 3) showed that the sample collected from *Sadharana desha* contained the highest percentage of total catechin, which proves the purity and potency of the herb used in the study.

Table 2 lists the physicochemical constants and standards as per the Ayurvedic Pharmacopoeia of India (API)[6].

Table 2: Physicochemical constants of *Sirisa (Albizzia lebbeck* Benth.)

Sl.No	*Desha*	Foreign matter (%)	Loss on drying (%)	Total ash (%)	Acid insoluble ash (%)	Alcohol soluble extractive value (%)	Water soluble extractive value (%)
1.	*Jangala*	0	0.01±0	3.66±0.57	1.66±1.52	21.33±2.88	21.33±7.09
2.	*Anupa*	0	0.006±0.005	10.33±0.57	0.33±0.57	2±1.73	4.08±0.14
3.	*Sadharana*	0	0.006±0.005	4.33±0.57	0	19.66±1.52	15.33±2.51
API Standard[6]		NMT 1		NMT 8	NMT 1	NLT 12	NLT 6

API - Ayurvedic Pharmacopoeia of India; NMT - Not more than; NLT - Not less than

Table 3: HPLC (High Performance Liquid Chromatography)

Sl.No	Sample	% of Catechin
1.	Sample 1	0.03
2.	Sample 2	0.74
3.	Sample 3	0.92

Hence, the *Jangala* and *Sadharana desha* samples' values stand higher than the *Anupa desha* samples in terms of physicochemical and HPLC profiles. Similarly, a study on "Comparative Study of Phyto Compounds in Bilva Phala (Fruit of *Aegle marmelos*) W.R.T Desha" reported that *Jangala* and *Sadharana deshaja bilva phala* are best for medicinal preparation [7].

This study indicates that *Sirisa* bark collected from *Jangala* and *Sadharana desha* contains more active chemical constituents, assuring the drug's therapeutic efficacy.

CONCLUSION

The study proves that Samples collected from *Jangala* and *Sadharana desha* are best in pharmacognostic and phytochemical evaluation, thereby revalidating the classical *Ayurvedic* references, which state that medicinal plants must be collected from particular place for producing excellent therapeutic efficacy, in which *Jangala* and *Sadharana desha* are considered as *prashasta* [5]. Further Research can be done on the Collection of *Sirisa* bark from the same *desha* w.s.r to different *Kala* (*rutus*).

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