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Research Article

Albizia lebbeck (L.) Benth

A Preliminary Phytochemical Analysis of different parts of Shirisha (Albizia lebbeck (L.) Benth) with special reference to Vishaghna Karma

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Introduction: Shirisha is a prevalent drug primarily known for its Anti poisonous activity. The drug has multifaceted activities and is indicated in various diseases. The Phyto Constituents contribute to pharmacological activities. Hence, the phytochemical analysis of different parts of Shirisha is taken up in the present study. To screen the Shirisha Patra (Leaves), Pushpa (Flowers), Beeja (Seeds), and Kanda Twak (stem bark) by Phyto-Chemical method. To collect different parts of Shirisha & to subject all the samples for the physical constituent, chemical analysis by standard following methods.

Materials and Methods: Materials: The leaves, seeds, stem bark and flowers were collected from the same plant from its natural habitat. The collected plant parts were cleaned, dried, and powdered. Physical analysis were done with the help of digital Ph meter, Pycnometer, Hot air oven etc. and chemical analysis of ethanol and aqueous extraction was done with soxhlet apparatus. Methods: Standard macroscopic methods were employed to analyze the physical parameters of the Shirisha (Albizialebbeck (L.) Benth) leaves, seeds, Flowers & stem bark. Fresh samples of all parts were collected, and dried powders were studied under a microscope to reveal the plants' microscopic features. A preliminary phytochemical investigation of the plant material was also conducted using standard methods.

Results and Discussion: Phytochemical screening of successive extracts of both extracts of different parts (leaves, Seeds, Pods & Stem bark) of Shirisha shows the presence of Alkaloids, Proteins, Saponins, Steroids, Flavonoids and Triterpenoids.

Keywords: Shirisha, Albizia lebbeck (L.) Benth Seed, Stem bark, leaf, Flower, phyto-chemical

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Introduction

In *Ayurvedic* medicine, *Shirisha* is considered an *Agryadravya* antidote against all types of poisons. **[1,3]** *Acharya Charaka* quote the *Shirisha Vishaghnanam Shrestha.***[1]** Many *Ayurvedic* formulations of *Shirisha*, like *Pancha Shirishagada, Amrtaghrta, Paramoagada, Mahagandhahastiagad* etc.**[2]** have been indicated in poisoning. The classics and recent studies suggest all the parts of *Shirisha* are useful,**[4-7]** however, it has been established that every part of the plant has anAntidotal value against either snake or scorpion venoms.**[8]**

By focusing on different therapeutic uses of *Shirisha* and its multifaceted activities, it is considered as the best antitoxic drug in managing of all types of *Visha* conditions, especially in *Keeta Visha* (insects bite) as well as in allergic conditions.**[9-11]** Saponin isolated from *Shirisha* bark and methanolic pod extract of *Shirisha* includes an Antispermatogenic effect. And also have analgesic, anti-inflammatory anti-diarrheal, Anxiolytic and Nootropic activity.**[12]**

By considering these facts Analytical study plays a pivotal role in the authentication of drugs, to understand the probable mode of action of various pharmacological actions, and as a part of standardization So, here is an effort to screen the preliminary phyto-chemical analysis in different partsof *Shirisha* like *Patra, Beeja*, Pods, *Pushpa,* and *Kanda Twak* were taken. *Shirisha* is general and universal antidote.

Materials and Methods

The study was conducted under differentheadings

- Collection and preparation of the drug
- Macroscopic study of different parts
- Microscopic study of different parts
- Preliminary Phytochemical screening of the different parts of drug.

The samples were subjected to the above-mentioned studies by following the standard methods mentioned in *Ayurvedic* Pharmacopea of India.

Place of Work: The study was carried out in the quality control laboratory, Department of *Rasashastra* and *Bhaishajya Kalpana* Pharmacy.

Drug Collection:

The *Shirisha Patra, Pushpa, Beeja, Kaanda Twak* are collected from natural habitat.

- Leaf - Matured leaves were collected, washed in running tap water to remove dust particles, dried in shade and made into powder
- Stem bark – The stem bark was peeled, cleaned in running tap water to remove mud and other foreign matter, cut into pieces and dried in the shade. Later, the dried material is made into coarse powder.
- Seeds - The matured pods were collected, seeds were removed from the Pods, kept for shade dry, later made into a Coarse Powder.
- Flowers - Collected from the tree and kept under shade to make it dry, later converted into powder form.
- Pods - Matured pods were collected, washed with tap water to remove the dust particles, dried in shade and made into powder.

Drug Authentication: The drug was authenticated as *Albizia lebbeck* by the Department of *Dravyaguna*.

Macroscopy observation[13-17]

The leaf of *Albizia lebbeck* is compound and opposite bipinnate, consisting of 8–10 paired leaflets. The leaf color is lime-green, with a darker abaxial than the adaxial side. This color is maintained even after drying, and the leaf withers quickly when detached from the tree. [Table no. 01]

Bark - Pale, Young shoots glabrous, Bark is fissured.
Flower - Complete, bisexual, fragrant, greenish yellow.
Fruits - Leguminous pod
Seed - Non endospermic, brown.

Table 1: Organoleptic Character of Different Parts of *Shirisha* (Powder)

Organoleptic Character	Leaves	Seeds	Stem	Pods	Flowers
Color	Green	Slight yellowish Brown	Dark brown	Yellowish brown	Pale yellowish
Texture	Smooth	Smooth	Rough	Rough	Soft
Odor	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
Taste	Astringent	Astringent	Astringent	Astringent	Astringent
Appearance	Amorphous	Amorphous	Amorphous	Amorphous	Amorphous

Sample Analysis:[7]

- Physicochemical Analysis of Observations and Results
- Physical Constituents of different parts of *Shirisha*

Discussion

Acharya Charaka has mentioned *Shirisha* as *Vishaghna Shrestha Dravya* [*Sirishahvishaghnanam Shreshthah - Charak Sutra 25/4*]. *Shirisha* has many therapeutic uses and multifaceted activities, hence it is considered as the best antitoxic drug in many *Visha* conditions,**[18]** even existing research literature also says that the bark decoction of *Shirisha* possesses anti-anaphylactic, anti-asthmatic activity and these potentials can be assumed as supportive measures in poisoning treatment. The plant is considered the most potent alexipharmic/ antidotal / prophylactic and every part of it is prescribed for treating bites and stings from venomous animals.**[19-22]**

So, *Shirisha* (*Albezia lebeck*) is known for its *Vishaghna* activity. In this study, all the parts of *Shirisha* were screened for physicochemical constituents. The alcoholic and aqueous extracts of Bark, Leaf, Flower, and seed were subjected to chemical analysis.

Physical Constants: Physical constants like Moisture value, Ash value, and Extractive values were within the range of standards mentioned in the *Ayurvedic* Pharmacopeia of India. This suggests the samples of *Shirisha* were of good qualitatively. [Table - 02]

Table 2: Physicochemical Analysis Result of Different Parts of Shirisha

SN	Parameters	Beeja	Kanda	Patra	Pods	Pushpa
1.	PH	5.48	5.37	5.75	5.37	5.40
2.	Specific gravity	1.009	1.0279	1.026	1.0361	1.025
3.	Total Ash value	6.6	8.4	10.2	4.4	-
4.	Moisture content	3.2	1.6	1.12	3.8	2
5.	**Solubility Test**					
	Formalin	Sparingly Soluble	Partially Soluble	Sparingly soluble	Insoluble	Partially Soluble
	Ethanol	Partially Soluble	Sparingly Soluble	Partially soluble	Insoluble	Partially Soluble
	Methanol	Partially Soluble	Sparingly Soluble	Partially Soluble	Insoluble	Partially Soluble
	Xyline	Sparingly Soluble	Partially Soluble	Sparingly Soluble	Insoluble	Partially Soluble
	Chloroform	Partially Soluble	Sparingly Soluble	Partially Soluble	Insoluble	Partially Soluble

Chemical Analysis: The extracts were subjected for chemical analysis, and the result suggests the presence of Alkaloids, Phenols, Flavanoids, Saponins etc. Any pharmacological activity of the drug is attributed to its chemical components.[Table - 03 - 06]

Table 3: Physical characters of extracts of Leaf, Seed, pods, Stem bark:

Sample	Extracts	Colour	Odour	Nature	Taste
Leaf	Ethanolic	Green	Specific	Sticky	Astringent
	Aqueous	Brown	Specific	Sticky	Astringent
Seed	Ethanolic	Brown	Specific	Sticky	Astringent
	Aqueous	Brown	Specific	Sticky	Astringent
Pods	Ethanolic	Brown	Specific	Sticky	Astringent
Stem bark	Ethanolic	Reddish Brown	Specific	Sticky	Astringent
	Aqueous	Blakish Brown	Specific	Sticky	Astringent

Table 4: Phyto-Chemical Analysis of Ethanolic Extraction of different parts of *Shirisha*

SN	Constituent Name	Leaves	Seeds	Pods	Stem Bark
1.	Alkaloids	Present	Present	Present	Present
2.	Carbohydrates	Absent	Absent	Absent	Present
3.	Tannins	Present	Present	Absent	Absent
4.	Steroids	Present	Present	Present	Present
5.	Triterpenoids	Present	Present	Present	Present
6.	Flavanoids	Present	Present	Present	Absent
7.	Proteins	Present	Present	Present	Present
8.	Saponins	Absent	Absent	Absent	Present
9.	Carotenoids	Absent	Absent	Absent	Absent

Table 5: Phyto-Chemical Analysis of Aqueous Extraction of Different parts of *Shirisha*

SN	Constituent Name	Leaves	Seeds	Stem bark
1.	Alkaloids	Present	Present	Present
2.	Carbohydrates	Absent	Absent	Present
3.	Tannins	Present	Present	Absent
4.	Steroids	Present	Present	Present
5.	Triterpenoids	Present	Present	Present
6.	Flavanoids	Present	Present	Absent
7.	Proteins	Present	Present	Present
8.	Saponins	Present	Present	Present
9.	Carotenoids	Absent	Absent	Absent

Table 6: Physical characteristics of extracts of Leaves, Seeds, Pods, and Stem bark.

Sample	Extracts	Colour	Odour	Nature	Taste
Leaf	Ethanolic	Green	Specific	Sticky	Astringent
	Aqueous	Brown	Specific	Sticky	Astringent
Seed	Ethanolic	Brown	Specific	Sticky	Astringent
	Aqueous	Brown	Specific	Sticky	Astringent
Pods	Ethanolic	Brown	Specific	Sticky	Astringent
Stem bark	Ethanolic	Reddish Brown	Specific	Sticky	Astringent
	Aqueous	Blakish Brown	Specific	Sticky	Astringent

Microscopic observation

Microscopic features of the leaf, seeds, stem bark, and flowers were enclosed.

Figure 1: Leaf mid rib

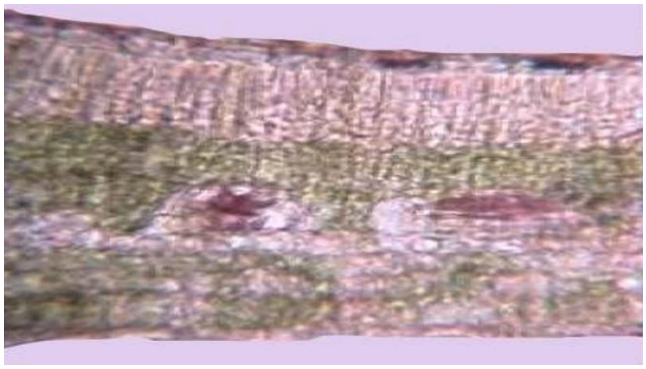

Figure 2: Leaf lamina

Figure 3: Flower

Figure 4: Flower

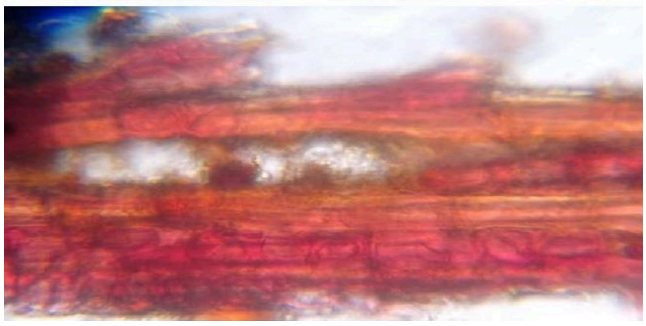

Figure 5: Stem bark

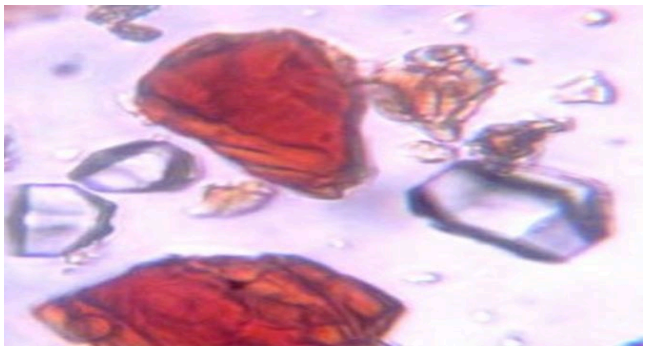

Figure 6: Stem Bark Powder

Macroscopy observation

Macroscopic features of the leaf, seeds, stem bark, pods and flowers were enclosed.

Figure 7: Pods

Figure 8: Seeds

Figure 9: Stem Bark

Figure 10: Leaves

Figure 11: Flowers

Figure 12: Pods Powder

Figure 13: Stem Bark Powder

Figure 14: Leaves Powder

Pharmacological activities: The literature regarding the drug *Shirisha* implies its multifaceted activities like, Anti-poisonous/ Anti-Venom, Antioxidants, Anti-allergic, Anti-inflammatory, Anti-microbial etc.**[23-27]** The *Vishaghna* term in Ayurveda would be understood as protecting from harmful entities. Harmful factors include snake poison, insect bites, free radicals, toxic chemicals, etc. Hence, here in this paper, the anti-poisonous activity, Antioxidant activity and Anti allergic activity of *Shirisha* are discussed.

Probable Mode of Action

Anti-Venom activity: The phyto-constituents like Saponins, Phenols, Flavonoids, and Steroids interact with Venom enzymes or toxins, neutralizing their activity or toxic effects. The phyto constituents inhibit venom activity by protein binding or neutralizing the enzyme.

Antioxidants: The Phenols and flavonoids act as donors of hydrogen ion to terminate the odd electron in free radicals. Hence, it acts as an antioxidant.**[25]**

Anti-allergic activity: Saponins act as anti-allergic agent by inhibiting the histamine receptor.**[27]**

Saponins are considered to be natural detergent that washes out/ flush out toxins, microorganisms, and any poisonous enzymes. Hence in *Ayurvedic classics*, *Shirisha* is considered as best *Vishaghna Dravya. Shirisha twak* and other parts are administered in decoction or in powder form with various *Anupana*. The saponin is soluble in both aqueous & alcohol form, the mode of action of pharmacological activities can be understood.

Conclusion

Shirisha (*Albezia lebbeck*), the drug is known for its *Vishaghna karma*, *Acharya Charaka* mentions *Shirisha* as *Agrya* amongst *Vishaghna Dravya*. The physical & chemical analysis of *Shirisha* parts confirms the presence of Saponins, Alkaloids, Flavonoids & phenols. These secondary metabolites are known for antioxidant, ant poisonous, natural detergent etc. pharmacological actions. *Vishaghna karma*, in a broader sense, can be understood as antioxidants that tackle free radicals, anti-poisonous, i.e., acts as a chelating agent for poisonous enzyme molecules in the body, and anti-allergic, which combats the histamine cells.As the secondary metabolites are responsible for the pharmacological activities, the complete analysis of *Shirisha* plant parts gives the basis for its *Vishaghna karma*, as explained in *Ayurveda*.

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References

1. Agnivesha, Charaka Samhita Vol- 2 (revised by charaka and Dridhabala) with commentary of Chakrapanidatta. Acharya Siddhi Nandan Mishra Editor- Translator- Vd. Harisha Chandra Singh Kushwaha. Published by Chaukhambha Orientalia, Varanasi, First edition- 2009 Reprint edition-2018. *Shloka-no- 23/218, Page-no-614 [Crossref] [PubMed][Google Scholar]*

2. Sushrutha. Sushrutha Samhita Ayurveda tatvasandeepika, hindi commentary, edited by Sharma P, V, Vol. 2. Varanasi; ChaukhambasurabharatiPrakashan 2013, 3/3,P 689. *[Crossref][PubMed][Google Scholar]*

3. Acharya Vagbhata, Astanga Hrudaya. Commentary of Arunadatta Sarvangasundara Uttarasthana; Vishapratishedam adhyaya,35/21. Varanasi: Chaukhambha Sanskrit Sansthan. 2016; 804. *[Crossref][PubMed][Google Scholar]*

4. Verma SC, Vashishth E, Singh R, Kumari A, Meena AK, Pant P et. al. , A review on parts of Albizia lebbeck (L.) Benth. *used as ayurvedic drugs. Research Journal of Pharmacy and Technology. 2013;6(11):1307-13 [Crossref][PubMed][Google Scholar]*

5. Mishra SS, Gothecha VK, Sharma A. Albizia lebbeck: a short review. Journal of herbal medicine and toxicology. 2010;4(2):9-15. *[Crossref][PubMed] [Google Scholar]*

6. Verma SC, Vashishth E, Singh R, Kumari A, Meena AK, Pant P et. al. , A review on parts of Albizia lebbeck (L.) Benth. *used as ayurvedic drugs. Research Journal of Pharmacy and Technology. 2013;6(11):1307-13 [Crossref][PubMed][Google Scholar]*

7. Shirisha K, Priyanka B, Rahman H, Bardalai D, Ali F. Review on Albizialebbeck (L.) Benth: a plant possessing diverse pharmacological activities. Research Journal of Pharmacognosy and Phytochemistry. *2013;5(5):263-8 [Crossref] [PubMed][Google Scholar]*

8. Bhavaprakash. Chikitsa Prakarana. Jangama Visha chikitsa 67/ 13-14. Published by Chowkhambha Krishnadas Academy, Varanasi, Edition-Reprint-2011. *[Crossref][PubMed][Google Scholar]*

9. Bhavaprakasha Nighantu. Vatadi Varga 13-14. by Brahmashankarmishra Shaastri & Ruplalji Vaishya, Published by Chaukhambha Sanskrit Sansthan First part. 11 edition-2004. *[Crossref][PubMed][Google Scholar]*

10. Elshiekh YH, Alagbash RE, Ali RA, Saad FO, Musharaf M. Phytochemical constituents, antibacterial screening and antioxidant activity of Albizialebbeck (L.) Benth (Seed). World Journal of Advanced Research and Reviews. *2020;7(1):035-40 [Crossref][PubMed][Google Scholar]*

11. Nurul IM, Mizuguchi H, Shahriar M, Venkatesh P, Maeyama K, Mukherjee PK, et. Al. , Albizia lebbeck suppresses histamine signaling by the inhibition of histamine H1 receptor and histidine decarboxylase gene transcriptions. International immunopharmacology. *2011 Nov 1;11(11):1766-72 [Crossref][PubMed][Google Scholar]*

12. https://www. easyayurveda. com/2012/12/26/Shirishaalbizia-lebbeck-uses-medicinal-qualities. . *[Crossref][PubMed][Google Scholar]*

13. The Ayurvedic Pharmacopoeia of India Published by Govt of India Ministry of Health and Family welfare Department of Indian systems of Medicine & Homeopathy New Delhi. Part-1, Volume-3, First edition. page no 234. . *[Crossref][PubMed][Google Scholar]*

14. Obika OI, Obika IE. Pharmacognostic characters of Albizia lebbeck (L.) Benth. leaves: macroscopy, microscopy, and phytochemical analysis. *Life Res. 2023;6(3):12 [Crossref][PubMed][Google Scholar]*

15. Suman A, Prasad M. Pharmacognostical standardization of Albizia lebbeck (L.) BENTH (Fabaceae). Journal of Drug Delivery and Therapeutics. *2019 Dec 20;9(4-s):1129-37 [Crossref][PubMed][Google Scholar]*

16. Kaur H, Harisha CR, Galib R, Prajapati PK. Pharmacognostical and preliminary phytochemical profiles of pod of Shirisha (AlbizialebbeckBenth.). Annals of Ayurvedic Medicine. *2016;5(3-4):78-87 [Crossref][PubMed][Google Scholar]*

17. Singab AN, Bahgat D, Al-Sayed E, Eldahshan O. Saponins from genus Albizia: phytochemical and biological review. Med Aromat Plants S. 2015;3(001). *[Crossref][PubMed][Google Scholar]*

18. He Y, Wang Q, Ye Y, Liu Z, Sun H. The ethnopharmacology, phytochemistry, pharmacology and toxicology of genus Albizia: A review. Journal of ethnopharmacology. 2020 Jul 15;257:112677. *[Crossref][PubMed][Google Scholar]*

19. Balkrishna A, Sakshi, Chauhan M, Dabas A, Arya V. A Comprehensive Insight into the Phytochemical, Pharmacological Potential, and Traditional Medicinal Uses of Albizia lebbeck (L.) Benth. Evidence-Based Complementary and Alternative Medicine. *2022;2022(1):5359669 [Crossref][PubMed][Google Scholar]*

20. Chulet R, Joseph L, George M, Pradhan P. Pharmacognostic standardization and phytochemical screening of Albizzialebbeck. J. Chem. *Pharm. Res. 2010;2(1):432-43 [Crossref][PubMed][Google Scholar]*

21. Yadav SS, Galib PK, Harisha CR. Pharmacognostical screening and phytochemical evaluation of Albizia lebbeckBenth. heartwood. Asian Journal of Biomedical and Pharmaceutical Sciences. *2011;1(5):01-6 [Crossref][PubMed] [Google Scholar]*

22. Sharma T, Rani C, Kumar D, Kumar H, Deep A. Phytochemical screening and traditional medicinal potential of Albizia Lebbeck (L.) Benth: An update. TMR Modern Herb Med. *2022;5(4):23 [Crossref] [PubMed][Google Scholar]*

23. Amog PU, Manjuprasanna VN, Yariswamy M, NanjarajUrs AN, Joshi V, Suvilesh KN et. Al. , Albizia lebbeck seed methanolic extract as a complementary therapy to manage local toxicity of Echiscarinatus venom in a murine model. Pharmaceutical Biology. *2016 Nov 1;54(11):2568-74 [Crossref][PubMed][Google Scholar]*

24. Farag M, Gamal AE, Kalil A, Al-Rehaily A, Mirghany OE, Tahir KE. Evaluation of some biological activities of Albizia lebbeck flowers. Pharmacology & Pharmacy. 2013;4(06):473-7. *[Crossref][PubMed] [Google Scholar]*

25. Tasneem R, Khan HM, Zaka HS, Khan P. Development and cosmeceutical evaluation of topical emulgel containing Albizia lebbeck bark extract. Journal of Cosmetic Dermatology. 2022 Apr;21(4):1588-95. *[Crossref][PubMed][Google Scholar]*

26. Zia-Ul-Haq M, Ahmad S, Qayum M, Ercişli S. Compositional studies and antioxidant potential of Albizia lebbeck (L.) Benth. Pods and seeds. *Turkish journal of Biology. 2013;37(1):25-32 [Crossref] [PubMed][Google Scholar]*

27. Saha M, Rahman SM, Rahman MA. Analysis of fatty acids of the seeds and leaf of the Albizia lebbeck fruits. International Journal of Advances in Pharmacy, Biology and Chemistry. 2016;5 (2):105-8. *[Crossref][PubMed][Google Scholar]*

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