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# *Shami* (*Prosopis cineraria* (L) Druce) - A Medicinal Benison

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## ABSTRACT

*Shami* (*Prosopis cineraria* (L) Druce) belongs to family Fabaceae known for its spiritual uses in India mentioned in almost all the *Nighantu's* of Ayurveda. It is endemic to Hot, Dry and Arid regions of India. Even though almost all the parts of *Shami* are having pharmacological actions specially the Bark and Fruit but these remain unexplored. It mainly contains tannins (gallic acid), alkaloids (spicigerine, prosophylline), Flavone derivatives (prosogerin A, B, C, D and E) and quercetin are widely used as anti-oxidant, anti-microbial, anti-bacterial, anti-convulsant, nootropic and antidepressant activity. Thus, the current article reviews on Ayurveda literature, botanical description, varieties and powder microscopy of *Shami*.

**Key words:** *Shami, Prosopis cineraria (L) Druce, Ayurveda.*

## INTRODUCTION

There is immense need of potential medicinal plants in current pharmaceutical industry. *Shami* is one of the auspicious trees mentioned in ancient scriptures of Ayurveda. Its importance has been accredited since Vedic period and continuous till date. It's leaves are distributed in Dasara a Hindu Festival among one another to express mutual love and respect. As all the parts are used in treatment of diseases and also as food and fodder it is referred as "*Kalpataru*" and "King of Dessert".[1] The fruits are used as a source of food in northern parts of India due to its nutritional value and also this tree produces a gum called mesquite gum.[2] This tree improves soil fertility through fixing atmospheric nitrogen. It supports honey bees with long and abundant flowering and honey produced is of a good quality.[3] Hence maximum utilisation of this medicinal tree, which is also easily available, should be done through proper research.

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### Ayurveda Literary Review

### Onomatology

The word meaning of *Shami* is "*Shamayati rogan iti, Shamu upashame*" – which pacifies diseases or cures diseases.

### History

### *Veda* and *Purana*

During vedic period *Shami* has got synonym like *Bruhatpalasha, Subhaga, Varshavridha* and *Rutavari*. In *Atharvaveda* it is said that, to produce fire during *Yagnas Ashwatha* and *Shami* were used as *'Uttara-arani'* and *"Adhara-arani'*. *Shami* leaves were used for *Godhana* after *Annaprashana Samskara*.[4] *Saayana* has defined that *Shami* is known to subside the effect of fire/burn hence the name *Shami*. It is one among *Shanta Vriksha* according to *Koushikasutra*. According to *Atharva Parishista*, to get *Putra Santana, Shami*

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leaves were used for *Snana* during *Moola Nakshatra*.[5]

### Post *Vedic* period

In Mahabharata, *Shami* was the tree that *Pandava's* hid their weapons for one year during the exile period.

### *Samhita* Period

### *Charaka Samhitha*

*Acharya Charaka* mentioned *Shami* under *Kashaya Skanda* and *Phala Varga*.[6] For the purpose of *Dhoopana* in *Arshas Shami Patra* along with *Arka Moola* has been mentioned.[7] *Shamiphala* has *Madhura Rasa, Guru, Rooksha Guna* and *Ushna Veerya* and *Keshagna Karma*.[6]

### *Sushrutha Samhita*

*Sushruta* mentioned about *Romashatana Karma* of *Shami Beeja* along with *Kadali, Shyonaka* and *Haratala.*[8] In Annapanavidhi *Adhyaya*, it is described that *Shami Phala* is having Madhura *Rasa, Guru*, *Rooksha Guna, Ushna Veerya* and *Keshanashana Karma.*[9] In *Visha Adhyaya Shami* is one of the ingredient in *Sarva Sarpa Vishaghna Ksharagada.*[10] *Shami* is also indicated in treatment of *Amatisara* along with *Aralutwaka, Tinduka, Dadima* etc.[11]

### *Astanga Hridaya*

*Shami* is classified under *Hriberadi Gana*, which is useful in Spider-poisoning.[12] *Vagbhatacharya* mentioned *Shami* for the purpose of dhoopana in *Arshas* along with *Arkamoola*. *Lepa* preapared with *Beeja* of *Shigru, Shami, Mulaka* and *Sarshapa* pounded in sour butter milk reduces *Granthi* and *Ganda*.[13] In *Balagraha Pratishedhadhyaya* it is said that babies should be bathed at night with *Kashaya* of bark and leaves of *Putika, Barbara, Tumbi, Vishala, Araluka, Shami* and *Bilva*.[14]

### *Astanga Sangraha*

*Shami Phala* is described as *Guru, Ushna, Madhura* and *Keshgna*.[15]

### *Nighantu Kala*

Almost all the *Nighantukara's* quoted *Shami* specially in *Raja Nigahntu*,[17] *Kaiyadeva Nighantu*[16] and *Madanapala Nighantu* have described about *Shamiphala* having *Medhya* and *Keshagna Karma.*[18] According to *Dhanvanatari Nighantu, Shami* is one among *Panchabringa* (*Devadali, Shami, Bringaraja, Nirgundi, Shanapushpi*) which are used for bathing after *Rogamukti*.

### Synonyms[16-18]

### Based on Morphology

Tree - *Tunga, Bahukantaki, Bhadra*

Fruit - *Shivaphala, Kacharipuphala, Shankuphala, Shaktuphala*

Leaves - *Supatra, Sooksmapatra, Pavitra Patra*

### Based on properties and action

*Medhya, Keshamathani, Keshahantri*

### Miscellaneous

*Lakshmi, Shivani, Ishani, Papashamani, Esha, Mangalya, Shankari, Sita, Jaya, Vijaya* etc.,

### *Gana /Varga* [6],[8],[12],[15-18]

**Table 1: Table showing *Gana/Varga* according to different authors.**

| *Samhita/Nighantu* | *Gana/Varga* |
|---|---|
| *Charaka Samhita* | *Phala Varga*<br>*Kashaya Skanda* |
| *Dhanvantari Nighantu* | *Aamradi Varga* |
| *Kaiyadeva Nighantu* | *Oshadhi Varga* |
| *Raja Nighantu* | *Shalmalyadi Varga* |
| *Bhavaprakasha Nighantu* | *Vatadi Varga* |
| *Nighantu Adarsha* | *Babbulyadi Varga* |
| *Madanapala Nighantu* | *Vatadi Varga* |
| *Priya Nighantu* | *Haritakyadi Varga* |
| *Shodala Nighantu* | *Aamradi Varga* |
| *Astanga Nighatu* | *Prakeernadi Varga* |

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### *Rasapanchaka*[19]

- *Rasa - Tikta, Katu,Kashaya*
- *Guna - Laghu, Ruksha*
- *Veerya - Sheeta (Phala Ushna)*
- *Vipaka - Katu*
- *Doshakarma - Kaphashamaka, Vatavardhaka*

***Karma*:** *Sangrahi, Vishaghna, Krimighna, Raktapittahara, Rechani, Rochani*

*Phala* is *Keshaghna* and *Medhya*

***Rogaghnata*:** *Atisara,Visha, Arsha, Shwasa, Kasa, Kusta, Krimi, Bramaroga* and *Netraroga.*

**Part used:** *Twak, Patra* and Fruits

### Varieties/*Bhedha*

According to Bhavaprakasha[20] - *Shameera* (*Prosopis stephaniana* kunth)

Smaller variety - Found in Punjab and Gujarat.

According to Raja Nighantu[17] - *Shanta* (*Prosopis grandulosa*)

### Vernacular names

English: Sprounge Tree; Hindi: chchankora, chchakora, sami; Kannada: Bannigida, Telugu; Jammi chettu; Marathi: Sundar, Savandal; Rajasthani: Khejri, jhand.

### Geographical Distribution

### Worldwide

The plant grows well in Western and Southern Asia, including Afghanistan, Iran, India, Oman, Pakistan and Saudi Arabia.

### India

The plant grows in dry and arid regions of India mainly Rajasthan, Haryana, Punjab, Gujarat, Western Uttar Pradesh and drier parts of Deccan.

**Karnataka -** Chitradurga, Bagalkot, Raichur, Gulbarga, Bidar.

### *Prosopis cineraria*. L. druce[21]

### Taxonomical classification of *Prosopis cineraria*. L. druce

**Table 2: Table showing Taxonomical classification of *Prosopis cineraria***

| | |
|---|---|
| **Kingdom** | Plantae |
| **Subkingdom** | Tracheobionta - Vascular plants |
| **Super division** | Spermatophyta - Seed plants |
| **Division** | Magnoliophyta - Flowering plants |
| **Class** | Magnoliopsida - Dicotyledons |
| **Subclass** | Rosidae |
| **Order** | Fabales |
| **Family** | Leguminosae |
| **Subfamily** | Mimosaceae |
| **Genus** | *Prosopis* L. - mesquite |
| **Species** | *Prosopis cineraria* (L.) Druce |

### Botanical Description[22]

**Habitat:** Found in dry and arid regions like Punjab, Rajasthan, Gujarat, Afghanistan, Persia.

**Habit:** A moderate sized evergreen tree, upto 9-18 m. high, sending its roots many feet into the ground

**Bark:** The Bark is thick, dark brown in color and hard.

**Leaves:** Compound, bipinnate, stipulate, stipules modified into spines, Alternate, petiolate. Leaflets are ovate, Apex is mucronate, base is unequal, margin is entire and reticulate venation. Size of leaf is 1-1.5 cm. long and 0.4-0.6 cm. broad.

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**Inflorescence:** Racemose spike

**Flowers:** Are small, yellow or creamy white, nearly sessile in slender pedunculated axillary spikes 5-13 cm long.

**Fruit (Pods):** The pods consist of three parts, mesocarp (56% of the pod) that grind to produce flour, endocarp (35%) that discard as waste alongside seeds (9%). Pods are yellow to reddish brown, Fleshy pods are sickle shape, dry pods are cylindrical shape and slightly curved; 10-20 cm long and 0.5-0.8 cm thick, 10-15 seeded pod.

**Seeds:** Are non-endospermic and dark brown in colour packed in brown pulp. Seeds are ovoid in shape. 10-25 seeds are present in 1 fruit.

**Flowering and Fruiting:** February to May.

## Pharmacognosy

### Macroscopic characters

- Fruit pod colour is creamy, outer skin is rough and inside it is sticky in texture.
- Seed are usually shiny, light brown in colour.

### Microscopic characters[23]

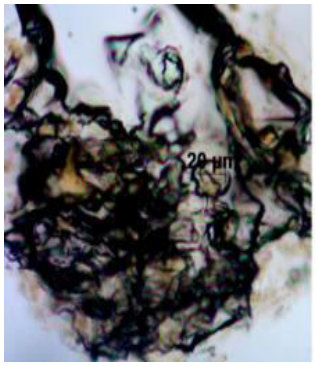
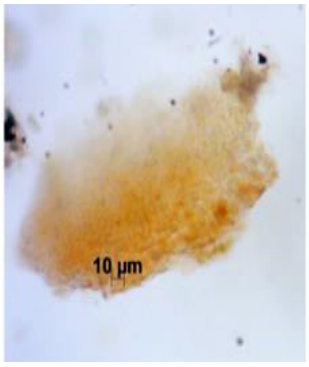
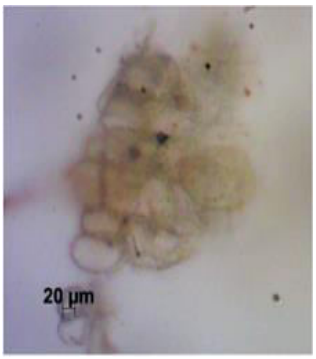
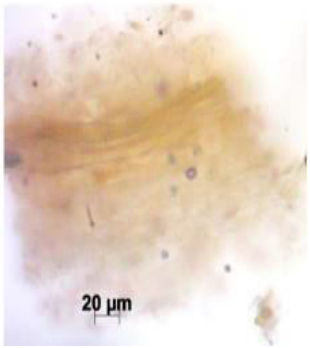
**Fruit Pod:** Detail T.S. shows single layered, horizontally oval, light to dark brown coloured epidermis covering thick cuticle followed by very loosely arranged thin walled parenchymatous mesocarp. Endocarp 1 to 2 layered dark brown parenchymatous. The two small crescent shaped vascular bundle situated just below the epidermis located opposite to sharp edged central large cavity left by seed.

**Seed:** Detailed T.S. shows two rows of compactly placed outer palisade cells with a distinct thick line of "Linea Fissure" across the cell and embedded with granular contents underneath this lines 15 to 20 rows of tangentially running sclerenchymatous cells of various size, shapes and thickness; Tegmen consists of a narrow tangentially running thin walled cells bulbous near their partition wall.

### Powder microscopy of Fruits of *Prosopis cineraria*

Under microscopic observation fruits of *Shami* revealed the presence of Epidermal cells of seed with oils, Epidermis of testa, Thick walled parenchyma, Fibre, Parenchymatous cells with vascular strands.

### Powder microscopy of prosopis *cineraria* fruit powder.

| | |
|---|---|
|  |  |
| **Epidermis of testa** | **Epidermal cells of seed with oils** |
|  |  |
| **Thick walled parenchyma** | **Parenchymatous cells with vascular strands** |
|  |  |
| **Fibre** | **Vessels** |

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### Nutritional value[24]

**Table 3: Table showing nutritional value of *Prosopis* fruits.**

| Compounds | *Prosopis* fruits |
|---|---|
| Energy (kcal/100 g) | 361 |
| Carbohydrate (g/100 g) | 69.2 |
| Total sugars (g/100 g) | 13.0 |
| Fibre (g/100 g) | 47.8 |
| Protein (g/100 g) | 16.2 |
| Fat content (g/100 g) | 2.12 |
| Saturated fatty acids (g/100 g) | 0.6 |

### Phytoconstituents[25]

**Tree:** Quercetin, tannin and tryptamine

**Bark:** Glycoside. vitamin K1, n-octadecyl acetate, the long chain aliphatic acid. glucose, rhamnose, sucrose and starch.

**Flowers:** Patuletin glycoside patulitrin, luteolin and rutin sitosterol, and spicigerine. Flavone derivatives Prosogerin A and Prosogerin B.

**Leaves:** campesterol, sitosterol and stigmasterol, octacosanol, Tricosan1-ol, and 7,24-Tirucalladien-3-one along with a piperidine alkaloid spicigerine

**Seeds:** Prosogerin C, Prosogerin D, Prosogerin E, Gallic acid, patuletin, patulitrin, luteolin, and rutin.

### Therapeutic uses of *Shami*

1. Ash of *Kadali* & *Syonaka*, *Haratala* and seeds of *Shami* all are pounded together with *Sheeta Jala.* This paste acts as a good depilatory agent.(SS.C.1.107)
2. Leaves of *Aralu, Tinduka, Dadima, Kutaja* and *Shami* are useful in *Amatisara.*(SS.U.40.41)
3. *Shami* leaves fumigation is useful in *Arshas*.(C.CHI.14.49)

### Eye Diseases

1. Conch-shell (*Shanku*) rubbed with breast milk in a copper vessel and fumigated with ghee smeared *Shami* leaves is applied to the eyes to relive irritation and pain of eyes.(AHU 16.35)
2. Fruits of *Udumbara* rubbed with breast milk in an iron vessel and fumigated with ghee smeared *Shami* leave removes burning, pain, redness, irritation in eye diseases.(AHU 16.36)
3. *Kantakari* bark, *Madhuka*, and *Tamra Bhasma* pounded with goat's milk and fumigated with leaves of *Shami* and *Amalaka* with ghee alleviates swelling pain in eye.(AH. U 16.42)

### Ethno medicinal uses[24]

1. Flowers are mixed with sugar and administered orally to prevent miscarriage.
2. Leaf paste of P. *cineraria* is applied on boils and blisters, including mouth ulcers in livestock and leaf infusion on open sores of the skin.
3. Smoke of the leaves is considered good for eye troubles and infection.
4. The bark and paste of leaves are used in Scorpion bite.
5. The bark used for treating osteoarthritis.

### Research Profile[26-28]

**Table 4: Table showing pharmacological actions of *Prosopis cineraria (l)* Druce.**

| SN | Activity | Parts | Chemical Constituents | Results |
|---|---|---|---|---|
| 1. | Nootropic Activity | Stem bark (methanol extract) | | The oral administrations of methanol extract of P. *cineraria* in all doses tested, significantly ($p < 0.05$) improved |

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| | | | | |
|---|---|---|---|---|
| | | | | both spatial reference and working memories in the MWM test in terms of decrease in escape latency. Pre-treatment for 7 days significantly inhibited the activity of AChE. |
| 2. | Antioxidant | Methanol, Petroleum ether, Ethyl acetate, Acetone and DichloromethaneExtracts of Fruit pods. | Linoleic acid | Trolox equivalent antioxidant capacity (TEAC) of the *Shami* pods extracts was evaluated as percent inhibition of ABTS free radicals. ABTS radical is a blue chromophore produced by the reaction between ABTS and potassium persulfate. The antioxidant activity as determined by ABTS assay was found to be highest in MeOH extract and least in case of DCM extract |
| 3. | Cytotoxic activity | Fruit pod | Flavone glycoside Patulitrin | Possessed significant cytotoxicity towards EAC tumour cells. |
| 4. | Antihyperglycemic activity | 50% Hydro-alcoholic extract Stem bark | | Fasting blood glucose level decreased by 27.3%, comparable to that of standard Glibenclamide, which produced 49.3% reduction and liver glycogen content was significantly increased as compared to control group. |
| 5. | Hypolipidemic activity | Ethanol extract of Fruits | flavonoids, glycosides and phenolic contents | Significantly reduced serum total cholesterol, LDLC, triglyceride, VLDL-C and also Total cholesterol/LDL-C and LDL-C/HDL-C Cholesterol and triglycerides. |
| 6. | Antibacterial activity | Aqueous and methanol extract of stem bark | flavanoids and tannins | Antibacterial activity at 250 µg/ml.Methanolic extract shows significant action on all pathogens. |
| 7. | Estrogenic activity | Methanolic extract of Pods | | In ovariectomized rats the extract induced vaginal estrus and increased vaginal epithelium height. The effects of |

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| | | | | |
|---|---|---|---|---|
| | | | | mesquite pod extract were similar to those caused by phytoestrogens but slighter compared to estradiol. |
| 8. | Anticonvulsant activity | Stem bark | Steroids Beta-sitosterol, and stigmasterol | The extract suppressed hind limb tonic extensions (HLTE) induced by MES (Maximal electroshock seizure) and also exhibited Protector Effect in Pentylenetetrazol Induced Seizures. |

## Discussion

*Shami Twak*, *Phala* and *Patra's* are widely used in treatment of many ailments in folklore practice. *Shami Phala* is frequently mentioned for its *Medhya* and *Keshaghna Karma* and the same can be explored through research. *Shami* pods possess *Keshaghna Karma* and are rich in protein and carbohydrate, thus can be a potent Cosmeceuticals and Nutraceuticals respectively. The *Atisaraghna Karma* of bark can be attributed to *Sheeta Sangrahi* property. The drug *Shami* possesses *Prabhavajanya Karma's* such as *Vishagna* and *Medhya*, use of *Shami* bark and paste of leaves in folklore for scorpion and snake bite substantiates its *Vishaghna Karma*. This tree is considered as auspicious according to *Vastu Shastra.*

## Conclusion

Medicinal plants are used for health care since antiquity. The unique feature of this tree is it can grow in dry and hot climate without much rain and also poor degraded soil. *Shami* is an abundantly available medicinal plant which is used for its medicinal, culinary and commercial purpose. Therapeutic uses of different parts of *Shami* in folklore uses is well established. A wide range of phytochemicals have reported in this plant with diverse pharmacological activities. These should be researched with different parts of the plant for all the actions mentioned in classical texts to expand the pharma worth of this plant.

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