



## A Critical Literary Review of Shaka /Teak (*Tectona Grandis* Linn) and the Pharmacognosy of Shaka Pushpa

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**ABSTRACT:** Ayurveda is one of the oldest sciences in the world, with a long history of managing diseases, involving the use of plant products in different forms, as using it directly or in combined forms. Approximately 90% of Ayurvedic preparations are plant based. *Shaka* (*Tectona grandis* Linn.) is a tropical hardwood tree, used mainly as timber. It belongs to the family Lamiaceae. Instead of timber purposes, various parts of teak have therapeutic properties. The plant is well described in Ayurvedic classics and Nigantus for various disease conditions like Kusta, Prameha, Rakthapitta etc. *Shaka* (Teak) remains pharmacologically less evaluated and therapeutically less used drug in research field. This is an attempt to compile the basic literary knowledge of *Shaka* (*Tectona grandis*) from various classical texts. The pharmacognostical study of *Shaka Pushpa* has been done and added to the compilation.

### INTRODUCTION

*Shaka* (*Tectona grandis* Linn.) is a tropical hardwood tree, used mainly as timber. It belongs to the family Lamiaceae. In English its name is Teak. It's a large deciduous tree indigenous to Peninsular India and Madhya Pradesh. Teak is one of the valuable and commercial timber. Instead of its timber purposes, various parts of teak have therapeutic and pharmacologic properties like antioxidant, anti-inflammatory, antipyretic, analgesic, wound healing etc. *Shaka*(Teak) remains pharmacologically less evaluated and therapeutically less used drug in research field.

In this paper efforts has been made to compile the classical literature of *Shaka* (*Tectona grandis* Linn) along with the pharmacognostical aspects of *Shaka Pushpa*.

### OBJECTIVE

1. To provide comprehensive literary knowledge of *Shaka* (*Tectona grandis* Linn) as per Ayurvedic classics.
2. Pharmacognosy of *Shaka Pushpa*.

### LITERATURE STUDY:

#### NIRUKTHI

*Shaka – Saknotibaaramsoodumiti*<sup>1</sup>

## REFERENCES FROM AYURVEDIC LITERATURES

In Susrutha Samhita Shakapatra is said among *anusastras* and *Shakaphala in Parushakaityadi gana* and *masaanumasiak karma in saarirastana*. Astangahridaya mentions Shaka in *Parushakadi Gana*

## CLASSICAL CATEGORIZATION

**Table No:1 Vargikarana according to Nigantus**

<i>Nigantu</i>	<i>Varga</i>
1. <i>Dhanwanthari Nigantu</i> <sup>5</sup>	<i>Amraadi Varga</i>
2. <i>Kaiyadeva Nigantu</i> <sup>6</sup>	<i>Aushadi Varga</i>
3. <i>Abidhana Ratnamala</i> <sup>7</sup>	<i>Kasayadravaya Varga</i>
4. <i>Nigantu Adarsam</i> <sup>8</sup>	<i>Nirguntyadi Vargam</i>
5. <i>Priya Nigantu</i> <sup>9</sup>	<i>Saradi Vargam</i>
6. <i>Madanapala Nigantu</i> <sup>10</sup>	<i>Vatadi Varga</i>
7. <i>saaligrama Nigantu</i> <sup>11</sup>	<i>Phala Varga</i>
8. <i>Bavaprakasa Nigantu</i> <sup>12</sup>	<i>Vatadi Varga</i>
9. <i>Raja Nigantu</i> <sup>13</sup>	<i>Prabadradi Varga</i>

In *Nigantus*, it is mentioned that *Shaka* is useful in *kusta, Prameha*.

In *Kaiyadeva Nigantu*, *Shaka Pushpa* is considered as *Pramehagna*.

## SYNONYMS

Synonyms mentioned by different Acharyas are enumerated in the table given below

TableNo:2

Synonyms	K N	S N	Ni A	Sa N	M N	D N	B N	R N
<i>Kharacchada</i>	✓	✓	✓		✓	✓		
<i>Bhumisaham</i>	✓		✓		✓	✓	✓	
<i>Saaka</i>	✓	✓	✓	✓		✓		✓
<i>Sthirasaara</i>				✓				✓
<i>Gruhadruma</i>				✓				✓

## INTERPRETATION OF SYNONYMS

*Kharachada* – *Kharaachadaaasyaithi*, its leaf is rough<sup>8</sup>

*Bhumisaha* – *Sahatheithisaha*, its wood stands for long time<sup>8</sup>

*Saaka*– *saknotibaaramsoodumiti*, woods are heavy<sup>1</sup>

*Gruhadruma*– *gruhaopakaranopayogivrukshaha*, used in making household appliances<sup>6</sup>

*Sthirasaara*–*sthiodridahasaaroasya*, heart wood is firm<sup>6</sup>

*Bruhatchada*- *bruhadakaarashchadapatranasya*, with large rough leaves<sup>6</sup>

## VERNACULAR NAMES<sup>14</sup>

English – Indian Teak, Teak

Hindi – Sagwan, Sagauna, Sagu, Sagun, Sakhu

Gujrati – Sagwan, Sag, Saga, Sagach

Bengali – Segunagachh, Segun

Kannada – Tegu, Sagawani, Thega, Jadi, Tega, Tyagadamara, Tekka-maram

Malayalam – Thekku, Tekka-maram, Tekku, Tekka

Marathi – Sagwan, Sag

Punjabi – Sagwan, Sagun

Tamil – Tekku, Tekkumaram, Tek

Urdu – Sagwan

## **BOTANICAL DESCRIPTION**

Botanical name - *Tectona grandis*Linn.f

Family – Lamiaceae

## **SYSTEMIC POSITION<sup>15</sup>**

Kingdom: Plantae

Subkingdom: Viridiplantae

Infrakingdom: Streptophyta

Super division :Embryophyta

Division:Tracheophyta

Class:Magnoliopsida

Subclass:Asteriane

Order:Lamiales

Family:Lamiaceae

Genus: Tectona

Species: grandis

## **DISTRIBUTION<sup>14</sup>**

Indigenous to Peninsular India and Madhya Pradesh, extending to parts of Rajashtan, Southern Uttar Pradesh, Orissa, Assam, Bihar, Maharashtra, Andra Pradesh, Tamil Nadu, Karnataka, and Kerala

## **BOTANICAL DESCRIPTION<sup>14</sup>**

**Habitat** - A large deciduous tree,

- 10-20 m tall; branchlets 4-angled, densely clothed with yellowish-grey tomentum.
- Leaves opposite, elliptic or obovate, 30-50 X 15-20 cm, cuneate at base, entire or crenulate, acute or acuminate, rough and glabrous above, stellate, grey to tawny tomentose beneath.
- Flowers – in large, erect, terminal, branched, tomentose panicles 30-60 cm long, Calyx 2.3 – 3 mm long, stellate tomentose, campanulate: teeth 5-6, subequal, upto 1mm long, Corolla – white, 5-6 lobed, lobes subequal
- Fruit – enlarged to 2-2.5 cm or more, bladder enclosing fruit, subglobose, 10-12 mm in diameter, shallowly 4 lobed, stellate hairy, enveloped by light brown, bladder-like calyx.
- Seed – 2-4, oblong, brown, enclosed in the bony endocarp

## **Floral morphology<sup>16</sup>**

The actinomorphic flowers have six whitish petals making up a corolla with a diameter of  $6 \pm 31 \text{ mm}^{30 \pm 07}$  ( $n=30$ ).

Corolla - The lower halves are undivided forming a tube to which six stamens are attached.

Anther - Each anther has two microsporangia, each bearing two chambers.

Pistil -has a long ( $6\pm 55$  mm<sup>3</sup> $0\pm 11$ , n=31), narrow bifurcate style, and a hairy ovary containing four ovules.  
Stigma - is of the wet papillate type with unicellular papillae.



Flowers of *Tectona grandis* Linn. (Fig 3)



Fruits of *Tectona grandis* Linn.

## PHARMACOGNOSY OF SHAKA PUSHPA

### Macroscopic analysis of Flowers of *Tectona grandis* Linn.



Macroscopy of the flower of *Tectona grandis* Linn (Fig 5)

### Longitudinal section of Flower of *Tectona grandis* Linn.

The inflorescence is terminal or axillary, dichotomous, and cymose panicles. Teak flowers are bisexual and actinomorphic.

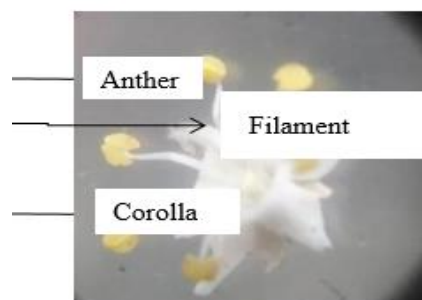
**Calyx** - Campanulate with six unequal oblanceolate sepals

**Corolla** - funnel-shaped dull white, tube short with six sub-equal petals, broadly oblong lanceolate .

**Stamens** - 6, alternating with petals, inserted near the base of the corolla, filaments and anthers oblong.

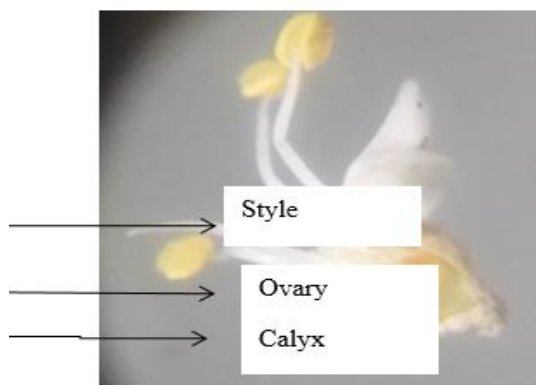
**Ovary**-globose, densely hairy, 4 locular and style with bifid stigma

**Pictures showing the Flower parts of *Tectona grandis* Linn.**



Flower parts of *Tectona grandis* Linn. (Fig 6)

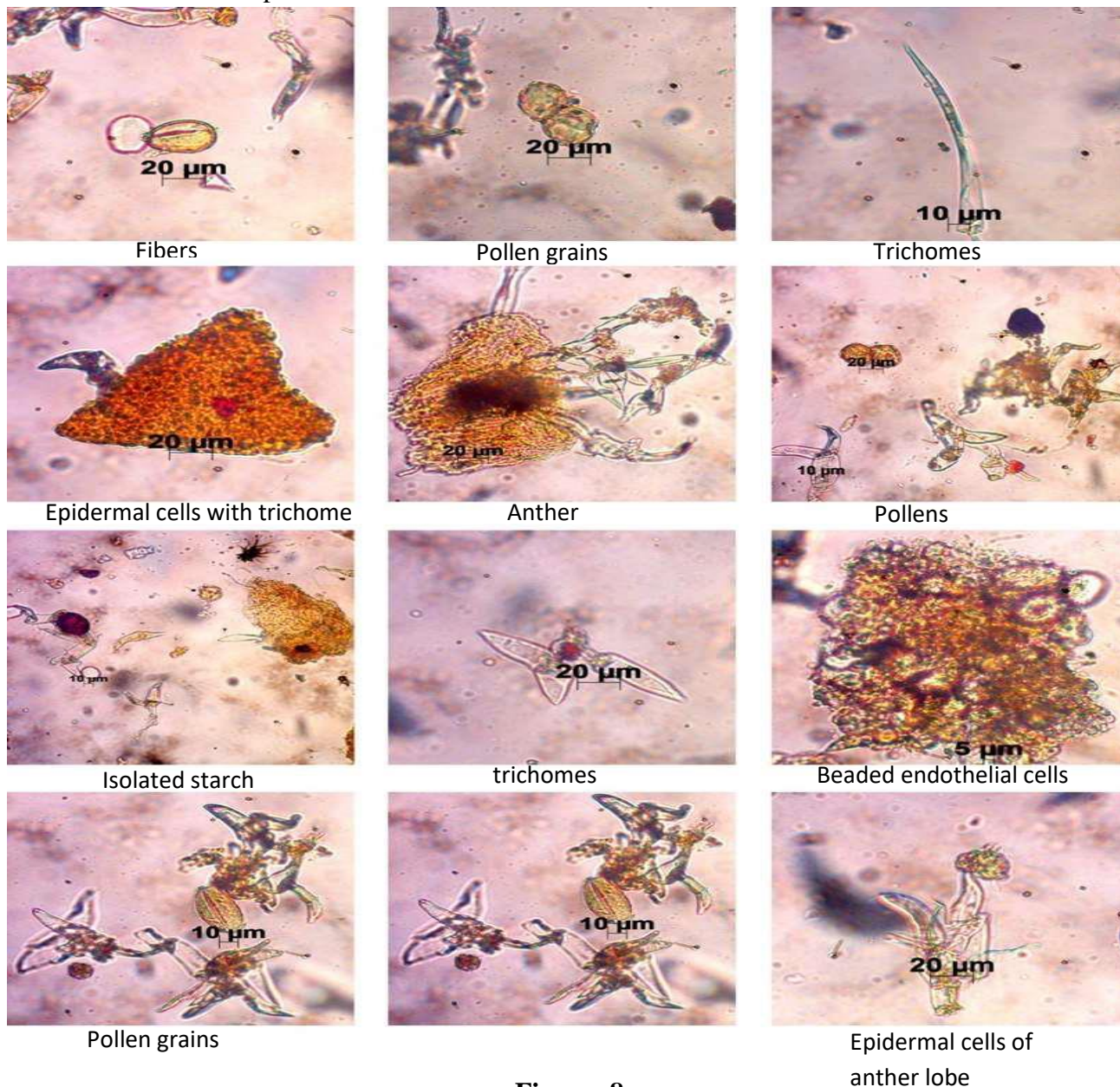




Flower parts of *Tectona grandis* Linn. (Fig 7)

**Microscopic study of Powder of *Tectona grandis* Linn. Flowers (fig 8)**

Microscope slides were prepared by soaking a pinch of fine powder of Shaka Pushpa in distilled water for 1 hour. It was then transferred to a slide using a brush and visualized under Compound Microscope and then under Trinocular Microscope. The features were then noted.



**Figure: 8**

**Physico Chemical analysis of *Tectona grandis* Linn flowers**

The Physicochemical analysis of powder of *Shaka Pushpa* (*Tectona grandis* Linn.) was taken. Ash value is the general criteria to assess the purity of the drug. Water-soluble , Acid insoluble ash , Alcohol soluble extract, Water-soluble extract.Crude alcohol and aqueous extract of the drug were done for qualitative analysis. It showed the alkaloids,flavinoids, saponins, carbohydrates, tannins present in the drug and was identified by particular reagents in aqueous and alcohol extract.

Successive solvent extraction of the drug with increasing polarity was applied for the isolation of the active constituents from the crude drug. The extraction was done in the order of Petroleum Ether, Chloroform, Isopropyl Alcohol, and Water. Qualitative chemical examination of various extracts was done by successive solvent extraction. Alkaloids, Quinones, Phenols, Tannins, and Flavonoids were present in particular extracts.

**Table no 3**

Sl no	Experiments	<i>Tectona grandis</i> Linn.
1	Foreign matter	Nil
2	Total ash	10%
3	Acid insoluble ash	2%
4	Water insoluble ash	5%
5	Moisture content	16%
6	Volatile oil	Nil
7	pH	7.52

**Alcohol and Water extractive values of powdered flower of *Tectona grandis* Linn.**

**Table no 4**

Sl.no	Type of extractive	<i>Tectona grandis</i> Linn
1.	Cold alcohol soluble	4.8%
2.	Hot Alcohol soluble	37%
3.	cold Water soluble	52%
4.	Hot Water soluble	23%

**Qualitative analysis of Alcohol and Water extracts of powdered of *Tectona grandis* Linn.flowers**

**Table No: 5**

Sl.no	Test	Cold alcohol soluble	Hot Alcohol soluble	cold Water soluble	Hot Water soluble
1.	Alkaloids	Present	Present	Present	Present
2.	Phenols and tannins	Present	Present	Present	Present
3.	Saponin	Absent	Absent	Present	Absent
4.	Flavonoids	Present	Present	Present	Present
5	Steroids	Present	Present	Absent	Absent

6	Quinone	Present	Present	Present	Absent
7	carbohydrates	Absent	Absent	Present	Present
8	Fixed oils and fats	Present	Present	Absent	Absent

**Successive solvent extractive values of *Tectona grandis* Linn.**

**Table no 6**

Sl no	Solvent	% extractives in <i>Tectona grandis</i> Linn.
1.	Petroleum ether	2.7%
2.	Chloroform	3.2%
3.	Iso-propyl Alcohol	1.6%
4.	Water	19%

**Qualitative analysis of different extracts of flowers of *Tectona grandis* Linn.**

**Table No:7**

Sl.no	Tests	Petroleum ether	Chloroform	Isopropyl Alcohol	Water
1.	Alkaloids	Present	Present	Present	Present
2.	Phenols and tannins	Present	Absent	Present	Present
3.	Saponins	Absent	Absent	Absent	Present
4.	Flavonoids	Present	Absent	Present	Present
5	Steroids	Present	Present	Absent	Absent
6	Quinone	Present	Present	Present	Present
7	Fixed oils and fats	Present	Present	Absent	Absent
8	Carbohydrates	Absent	Absent	Present	Present

**PROPAGATION AND CULTIVATION OF SHAKA<sup>19</sup>**

It thrives best in fairly moist, warm, tropical climates. Teak comes up on soils produced by a variety of geological formulations like traps, basalt, granitic gneisses, calcareous crystalline rocks, phyllites, and schists. Rich growth is noticed in soil produced by rocks rich in calcium oxide and other bases. Teak propagates naturally from seed, but the extent of natural regeneration depends on climatic and edaphic factors. It can be raised by direct sowing or by transplanting the nursery-raised seedlings. Due to the presence of a hard coat, the seeds remain dormant for some time, and one year old seeds show better germination than that of fresh ones. Before sowing seeds are soaked in water to soften the seed coat which hastens the germination. The seeds are sown in nursery beds, generally during April- May. The stumps are planted in crowbar holes. <sup>1</sup>

**AYURVEDIC PROPERTIES OF SHAKA**

Properties	Shaka	Shaka Pushpa
Rasa	Kashaya, Madhura	Kashaya, Thiktha
Guna	Ruksha, Sara	Ruksha, Vishada, Laghu
Veerya	Seetha	
Vipaka	Katu	

<b>Karma</b>	<i>Garbhasandhana, Dahapaha, Sramapaha,, Sthairyakrit</i>	<i>Pramehagna</i>
<b><u>Oshagnatha</u></b>	<i>Tridoshagna, Sleshmaanilahara, Kaphagna, Pittahara</i>	<i>Kapha Pithahara</i>

## USEFUL PARTS

*Saaram (Saaligrama Nigantu)*

*Pushpam*<sup>6</sup>

## MATRA<sup>20</sup>

*Churna* : 3-6 gm

*Kashaya*: 50-100 ml

## THERAPEUTIC USES

Flowers and seeds are used in Gujarat for stomach ache, *mutrakrichra*

In *mutragatashakamoola* is taken with *sarkara* and *ajapaya*<sup>1</sup>

The oil obtained from seeds, flowers, and wood is tricogenous and is useful in the treatment of eczema and ringworm.<sup>21</sup>

**YogasContaing Shaka:** *Ayaskriti, Pashanabhedighrita*.<sup>20</sup>

## FOLKLORE USE

- In *Vibandha*, juice of *Shaka* bark is administered orally twice daily in Banswara forest ( Rajasthan )<sup>22</sup>
- In *Udarasoola*, powder of stem bark is administered orally in kalmodi, Ukai ( Guj),KotadiBagicha ( Raj) <sup>23</sup>
- Ash of *Shaka* wood is applied in swollen eyelids in Patna (Bihar)<sup>24</sup>
- In *Mutrakrichra*, seeds of *Shaka* are boiled in water and kwath is prepared and ½ cup is given to the patient twice a day for 7 days at Chiklam forest, Nagpur<sup>25</sup>
- In *MukhaRoga*, juice of *Shaka* Stem is applied locally in Methwada ( M P )<sup>26</sup>
- In *Daha*, the paste of the bark is administered orally in Banswara ( Rajasthan) <sup>27</sup>
- In Sprain, stem bark paste prepared in oil and applied on the area, Nagpur (Maharastra) <sup>28</sup>
- In athisara, Powder of stem bark is administered orally by Pipliadevi, Dangs (Gujarat)<sup>29</sup>

## RESEARCH WORKS ON SHAKA

1. The hypoglycemic activity of methanolic extract of *Tectona grandis* root in alloxan induced diabetic albino rats. Themethanolic extract at 500 mg/kg dose level exhibited significant (p<0.05) hypoglycemic activity.
2. Antihyperglycemic activity of *Tectona grandis* Linn. bark extract on alloxan induced diabetes in rats by S. B. Varma and D. L. Jaybhaye. The extract was given as *Tectona grandis* suspension 2.5 g/kg body wt. and 5 g/kg body wt. Oral administration of *Tectona grandis* (2.5 and 5 g/kg body wt.) for 30 days shows a significant reduction in blood glucose in diabetic rats when compared with untreated diabetic rats.
3. Antidiabetic, antihyperlipidemic, and antioxidant potential of methanol extract of *Tectona grandis* flowers in streptozotocin-induced diabetic rats by SubramaniamRamachandran, AiyaluRajasekaran,



KTManisenthil Kumar. Administration of Methanol extract of *Tectona grandis* flower 100 and 200 mg/kg significantly reduced blood glucose levels in OGTT and Streptocozozoin induced diabetic rats.

4. Study of wound healing activity of *Tectona grandis* Linn .leaf extract on rats were done by Sushilkumar B Varma, Sapna P Giri.In excision wound model, 5% ointment of TG leaf extract showed a reduction in wound area 8 th day onwards. Reduction in wound area was very significant ( $P < 0.01$ ) as compared to control. Whereas 10% ointment of TG leaf extract and standard showed a reduction in wound area fourth day onwards, which was highly significant ( $P < 0.001$ ) as compared to control.

## **CONCLUSION**

Teak is a very common tree in India. Largely the usage is limited to timber. From the Literary review we can see that the Shaka is explained in various classical text books of Ayurveda. Various parts of the tree has health benefits too. As it is commonly available, it can be largely used in the health sector. In Nigantus ,it's been said as Pramehagna, as it can be utilised as Antidiabetic. In India various folklore uses are been seen. Local vaidyas utilize teak for Udarashoola, swollen eyelids, Mutrakrichra, Sprain, Athisara etc.in the compilation other than the timber purposes , the health benefits, Ayurvedic properties, Karma, Therapeutic uses of teak is been explained.

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