

**BHALLATAKA (*SEMECARPUS ANACARDIUM* LINN.): AYURVEDIC
REVIEW WITH PHARMACOLOGICAL EFFECTS****Meenakshi*, Ramamurthy Aku** and Chaudhary Krutika*****

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(302002) Rajasthan, India.**ABSTRACT**

Semecarpus anacardium Linn. (SA) is a deciduous tree distributed in the sub-Himalayan tract and in hotter parts of India. It is a well-known plant due to many medicinal values as in *Ayurvedic* and *Siddha* systems of medicine. *Bhallataka* is an *upavisha dravya* (semi-poisonous), so to avoid its toxicity purification of *Bhallataka* is done by various methods. The aim of this review is to compile all the medicinal applications of *Bhallataka* stated in *Brihatrayee*, *Nighantus*. Also the chemical constituents, and various pharmacological activities of this plant are discussed in this study.

KEYWORDS: *Semecarpus anacardium*, *Bhallataka*, pharmacology.**INTRODUCTION**

Ayurveda is fundamental science of life & the primary aim of *Ayurveda* is maintenance of good health and second is to cure the disease.^[1] Most of *Ayurveda* medicines are prepared from plants, whether in the simple form of raw plant materials or in the refined form of crude extracts, mixtures and so on. *Acharya Charak* says even a poison become a potential medicine if used properly similarly improper use of potential drugs can be harmful or fatal.

SA is found in outer Himalayas from Sutlej to Sikkim and throughout the hotter parts of India. Absent in the Eastern Peninsula and Sri Lanka. Normally, leaves fall between February to April of this plant. The new leaves and flowers are appearing in May. The pericarp of the fruit largely used in dyeing and used as a kind of marking ink; hence it is called as marking nut. The fleshy cup or hypocarp can be eaten after being roasted.

SA is a medium sized dioecious or polygamus deciduous tree with a rough dark colored bark, having an acrid juice. Young parts, beneath of leaves, and panicles are pale in color. Leaves are large, crowded towards the extremities of the branches, oblong or obavate oblong, rounded at the apex, rounded cordate or cuneate at the base usually contracted below the middle, entire coriaceous. hispidly pubescent beneath; lateral nerves 16-24 pairs, stout, slightly arched; petioles short and thick, not winged. Panicles equalling or shorter than the leaves, stout, branches spreading. Flowers 1/4-1/3 inch diameter, subsessile, fascicled, greenish white, oblong, much longer than the calyx filament subulate. Drupe 1 inch long, obliquely ovoid or oblong. smooth, shining, black, seated on an orange red cup. For medicinal purpose generally its fruit (*Phala*) is used.

Its fruits are heart shaped, obliquely ovoid drupaceous nut, with a fleshy pear shaped receptacle. It is up to 2.5 cm. long and 2 cm. broad. Surface black or brownish black, glossy sometimes. Internally, the nut contains a viscous oily liquid of black colour, odour-none; taste-acrid and sweet. The material more often consists of under developed fruits which are smaller in size, brownish in colour and light in weight which are not suitable for medicinal purpose.

Taxonomical classification of *Bhallataka*

- Kingdom - Plantae
- Phylum - Spermatophyta
- Sub-phylum- Angiospermae
- Class- Dicotyledonae
- Order- Sapindalis
- Family- Anacardiaceae
- Genus- Semecarpus
- Species - Anacardium
- Latin Name - Semecarpus Anacardium *Linn.*

Various synonymes of *Bhallataka*

- *Agnimukhi* – Due to hot potency it cause burning sensation in the body just like fire
- *Agni*-A plant of which the fruit has escharotics properties
- *Arushka*- Touch of fruit juice can cause wound
- *Arushkara*- Which produces redish brownish rashes over the body
- *Beejapada*- This tree is full of seeds

- *Bhallata*-Touch of which is effective like an arrow
- *Bhalli*- A tree with irritant sap of the bark act like an arrow
- *Bhedana*- it has capacity of *bhedana* of *arbudadi*
- *Bhutanashana*- Drug which kills worms and organism
- *Dahana*- It causes ulceration and burning sensation when applied over the skin
- *Dhanurbeeja*- Fruit are obliquely ovoid
- *Ranjaka*- Which cause reddish discoloration of the body
- *Shophakrita*- Juice of fruit produces blisters & swelling on touch
- *Tailabeeja*- Fruit nuts having oil
- *Vatari*- Act as vatahara
- *Veertaru*- A large tree
- *Veeravruksha*- Drug having good potency

METHODS & MATERIAL

Vedic kala: (2500 B.C. – 600 B.C.): - There is no reference regarding the drug '*Bhallataka*' in Vedas. But there are many references of *Bhallataka* in other *granthas* of vedic period, which are summarized as follows Earliest references about *Bhallataka* are found in Panini sutra.

A. *Ramayana* period: In the epic of *Ramayana*, references of *Bhallataka* are found in *Ayodhyakand*^[2] and *Aranyakanda*.^[3]

3. *Purana* (Puranik Kala: 1500 B.C – 300 B.C):-

A. *Agni purana*: There are some references in which *Bhallataka taila* was used as *kushthaghna* and *rasayanadravya*. *Paryaya* are given in the text.

B. *Garuda purana*: In *prathamakhanda* of *Garuda purana*, various references about the qualities and medicinal uses of *Bhallataka* are found.

C. *Brahma purana*: In *Avantikavarnanam* of *Brahma purana*, *Bhallataka* references are found.

4. *Kautilya Arthashastra*: Some references of *Bhallataka* are found in the 14th part i.e. *Aushnishadikam*, in the chapters named *Parbalaghataprayoga*, *Sadhyapranaharadhupa*, *Ardhamasikamaraka yoga*, *Masikamaraka yoga* and *Dansha yoga*.

5. *Varaha Mihir samhita*: *Bhallataka* used in the treatment of horses has been mentioned in this *samhita*.

6. *Samhitakala*: (2000 B.C. - 1300 A.D.): - The *Samhitakala* is very important in the history of Ayurveda. In this *kala*, the Ayurveda came in the knowledge of the common man. In this

period various *Samhitas* and compiled work by various *Acharyas* have been done. These are following

Classical categorisation

- Acc to *Charaka* -- *Deepaniya mahakashaya, Kushthaghna mahakashaya, Mutrasangrahaniya mahakashaya, Katukaskandha*
- Acc to *Sushruta* -- *Nyagrodhadi gana, Mustadi gana, Kashaya varga*
- *Ashtanga hridaya* -- *Mustadi gana*
- Acc to *Bhavaprakas Nighantu* – *Haritakiyadi varg*
- Acc to *Gunaratanmala* -- *Haritakiyadi varg*
- Acc to *Dvanantari Nighantu* – *Chandanaadi varg*
- Acc to *Raj Nighantu* – *Aamradi varga*
- Acc to *Kayadeva Nighantu* – *Aushadhiyadi varga*

RESULTS

Classical Review- *Charaka Samhita*

S. N.	Roga	Formulation	Reference
1	<i>kushtha</i>	<i>ghrita+bhallataka</i>	<i>C.Su 4/13</i>
2	<i>Kaphaja gulma</i>	<i>Bhallatakadyi ghrita</i>	<i>C. chi.5/143</i>
3	<i>Prameha chikitsa</i>	<i>Trikantakadya sneha Bhallatakasava</i>	<i>C. Chi 6/38 C.chi.6/45</i>
4	<i>Shotha chikitsa</i>	<i>Gandira arishta</i>	<i>C.chi.12/29</i>
5	<i>Udara chikitsa</i>	<i>Pipplayadi kshara</i>	<i>C.Chi 13/158</i>
6	<i>Sushka arsha</i>	<i>Bhallatak+other drug (paste)</i>	<i>C.Chi 14/54</i>
7	<i>Urustambha</i>	<i>Bhallatak+pippalimoola+pippali</i>	<i>C.Chi 27/32</i>
8	<i>Vata disorder</i>	<i>Oil with bhallataka + other drug</i>	<i>C.Chi 27/45</i>
9	<i>Mandala kushtha</i>	<i>Kanaka kshiri tailam</i>	<i>C.Chi 7/113</i>
10	<i>Odema, skin disorder, diabetes</i>	<i>Madhukasava</i>	<i>C.Chi 15/146</i>
11	<i>Rasayan prayoga</i>	<i>Bhallataka ksheera Bhallataka kshoudra Bhallataka taila wih milk yastimadhu 10 prepration (kshira, ghrita, kshaudra, guda, yush saktu, tailam,lavana, tarpana,sarpi.</i>	<i>C.Chi 1 (2) /13 C.Chi 1(2) /14 C.Chi 1(2) /15 C.Chi 1(2) / 16</i>

Classical Review- *SushrutaSamhita*

S.N.	Roga	Formulation	Reference
1	Ulcer, fracture, bleeding disorders, obesity	Nyagrodhadi gana	Su.Su. 38/49
2	Vata & kapha disorder	Oil of bhallataka+ tuvaraka	Su.Su/45/122
3	Krishnikaran karma		Su. Chi. 1/105
4	vatavikara	Kalyanak lavana	Su. Chi. 4/33
5	mahakushta	Saktu-kalpna & oil	Su. Chi. 10/4
6	Shitaputana graha	Bhallataka+kapittha	Su.Ut.34/3
7	Nagmesha graha	Bhallataka+vacha+hingu+ajmoda	Su.Ut. 36/7
8	Yakshma, Pandu, Gulma	Eladi rasayana	Su.Ut.41/50

Classical Review- *Ashtanga hridaya*

S. N.	Roga	Formulation	Reference
1	Mansika vikara	Fleeshy part of bhallataka	A.H.Su.6/134
2	Yoni vyapad	Mustadi gana	A.H.Su.15/40
3	Visham jwara	Bhallataka+gudh	A.H.Su.1/154
4	kasa	Vashishtha rasayana	A.H.Chi. 3/135
5	Rajyakshma	Eladi ghrita	A.H.Chi 5/29
6	Sushka arsha		A.H.Chi.8/162
7	Grahani chikitsa	Madhuka pushpasava	A.H.Chi.10/47
8	Kaphaj gulam	Bhallataka ghrita	A.H.Chi 14/80
9	Udara roga	Bhallataka kshar	A.H. Chi. 15/70
10	Kushtha	Bhallataka taila	A.H. Chi. 19/12
11	Shivtra	Paste	A.H. Chi. 20/16
12	Indralupta	Bhallataka-juice	A.H.Ut.24/30

References from Nighantus

S.N	Nighantu		Reference
1	Dhanvantari-nighantu	Chandanaadi varg	149-150
2	Madanpal Nighantu	Abhayaadi varg	280-281
3	Kaiyadeva Nighantu	Aushdi varg	496-500
4	Bhavaprakash Nighantu	Haritakiyadi varg	
5	Sodhala nighantu	Chandanaadi varg	460-461
6	Raj Nighantu	Aamaraadi varg	66-69

Other references of *Bhallataka* (SA)

Sodhala nighantu:- Properties, synonyms, indications and purification method of the drug are mentioned.^[4]

Siddhamantra:- The *Bhallatakasthi* (seed/nut) is considered under *kapha-vataghnava*.^[5]

Shaligrama nighantu:-, Properties of *Bhallataka* Synonyms and purification (*shodhan*) method of the drug are mentioned and also about the *Nadi Bhallataka*.^[6]

Priyanighantu:- The drug is mentioned under *haritakyadi varga*.^[7]

Vanoushadhinidarshika:- Different names, family, usable parts, dose, chemistry, shelf life, properties, purification method and effects by the usage of unpurified seed of the *Bhallataka*.^[8]

References from *Rasa granthas*

Rasa Tarangini:- *Bhallataka* synonyms, *grahya bhallataka swarupa* (selection methods of the fruits) that which sinks in water were the main criteria for the selection of *Bhallataka* fruits & need for *Bhallataka shodhana*, different *shodhana* methods, dose, *amayikaprayoga* (therapeutic indications), and formulations are described in detail.^[9]

Rasamritam:- *Bhallataka shodhana* is mentioned.^[10]

Ayurvediya Rasa Sastra by CB Jha *Bhallataka* is mentioned in *upavisha varga* (one of the semi-poisonous drugs), synonyms, *grahya lakshana* (selection methods), need of *shodhana*, *shodhana* methods, *Bhallataka* guna karma (properties and actions), *matra*(dose), contraindicated in *pitta prakriti* and treatment for its toxic nature and important formulations.^[11]

Rasa Sastra by Damodar Joshi:- Synonyms, necessity for *shodhana*, selection of *Bhallataka* fruits, *shodhana* methods, *rasadigunas*, *karma*, *vyadhiprabhava* (specific actions), dose and treatment for the toxic manifestation are mentioned.^[12]

Properties According to B.P.N.

S.N	Properties	<i>Bhallataka pakwa phala</i>	<i>Bhallataka asthi</i>	<i>Bhallataka majja</i>
1	<i>Rasa</i>	<i>Madhura</i>	<i>Tikta, Kashaya Madhura</i>	<i>Madhur</i>
2	<i>Guna</i>	<i>Guru, ruksha</i>	<i>Laghu, Snigdha, Tikshana</i>	
3	<i>viryā</i>	<i>Shita</i>	<i>Usna</i>	
4	<i>vipaka</i>	<i>Madhur</i>	<i>Katu</i>	
5	<i>karma</i>	<i>Vistambakaraka, Dhaturvarda ka, Vatakapha vardaka, Shukrajana, Balakaraka</i>	<i>Pachana, Chedana, Mala, bhedan, Medhya, Agnivaridaka, Kaphavatagna, Krimighana, Deepana</i>	<i>Dhatuwardaka, Sukrajanana, Vata pithashamaka, Rasayana</i>

Rasapanchaka in various Nighantu

Properties	Ni.A	B.P.N	G.R	D.N	R.N	K.N.
<i>Rasa</i>	<i>Kasaya, madhur</i>	<i>Kasaya, madhur</i>	<i>Kasaya, madhur</i>	<i>Kasaya, tikta</i>	<i>Kasaya, tikta</i>	<i>Kasaya, tikta</i>
<i>Guna</i>	<i>Laghu, snigdha</i>					
<i>Virya</i>	<i>Usna</i>	<i>Usna</i>	<i>Usna</i>	<i>Usna</i>	<i>Usna</i>	<i>Usna</i>
<i>vipaka</i>	<i>Madhur</i>	<i>Madhur</i>	<i>Madhur</i>	<i>Madhur</i>	<i>Madhur</i>	<i>Madhur</i>

NA- Nighantu Adarsh, BN- Bhavaprakas Nighantu, G.R.- Gunaratanmala, DN- Dvanantari Nighantu, RN- Raj Nighantu, KN- Kayadeva Nighantu.

Important formulations of Bhallataka

1. *Bhallataka taila - Kushta roga.- C.D.Kushta/93.p.401*
 2. *Bhallataka lauha -Arshas -C.D.Arshas/169-176.p.89-90*
 3. *Bhallataka kwatha - Urusthambha -C.D.Urusthambha/4.p.224*
 4. *Bhallataka lepa- Vrishya- C.D.Vrishya/54.p.600*
 5. *Bhallatakadya taila -Nadivrana -C.D.Nadivrana/19.p.374*
 6. *Bhallatakadya modaka- Pliha and yakrit -C.D. Pliha and yakrit /7.p.323*
 7. *Bhallatakadya lepa- Kushta- C.D.Kushta/51-52.p.396*
 8. *Prathama Bhallataka ghrita -Gulma -B.R.Gulma/159-162.p.685*
 9. *Dwithiya Bhallatakaghrita -Gulma -B.R.Gulma/159-162.p.686*
 10. *Bhallataka kwatha -Urusthambha -B.R.Urusthambha/16.p.610*
 11. *Bhallatakadya modaka- Arshas -B.R.Arshas/59.p.303*
 12. *Bhallatakadya modaka -Pliha and yakrit- B.R. Pliha and yakrit /41.p.774*
 13. *Bhallataka lepa- Kshudra -B.R. Kshudra /64.p.952*
 14. *Bhallatakadya taila- Nadivrana -B.R.Nadivrana /25.p.877*
 15. *Bhallatakadya taila -Vajikarana -B.R. Vajikarana /74.p.1143*
 16. *Bhrit Bhallatakavaleha- Arshas- B.R. Arshas /9.p.314*
 17. *Bhallataka shotha hara yoga -Shotha -B.R. Shotha /44-45.p.795*
 18. *Amruta Bhallataka Kushta -B.R.- Kushta/197-206.p.901*
 19. *Amruta Bhallataka Rasayana- B.R. Rasayana/176-181.p.1114-1115*
 20. *Mahabhallataka guda- Kushta -B.R. Kushta/207-221.p.902*
- C.D. – Chakradutta B.R. – Bhaisajyaratnavali

About 40 formulations of *Bhallataka* are mentioned in Bharat Bhaishajya Ratnakar. *Acharya Charaka* has described ten different formulations of *Bhallataka* in *Rasayana Adhyaya (C.Chi 1 (2) /13-16)*

Sodhana- Samskaara

The seed of *Bhallataka* should be soaked in water and then remove the floating ones after that collect the dipped pieces from water then rubbed over a fine powder of brick till outer coating is removed.

- With the help of knife, its upper portion should be removed. Then it should be washed with warm water.
- Thereafter these seeds should be tied in a piece of cloth in the form of pottali (round bolus) and cooked in “dholayantra” by adding cows milk for 3 hours.
- Thereafter, these seed should again be washed with warm water and dried.

Chemical constituents

- It contains 32% of an irritant oil, anacardiac acid, non-volatile alcohol-cardol and anacardol fixed oil.
- Tarry oil consist 90% of oxy-acid named anacardiac acid.
- ii) 10% higher, non-volatile alcohol called **cardol**.
- **Pericarp** – Vesicating oil 32% soluble in ether, which blackens on exposure of air.
- - Fruit – 2.14% of ash. -
- Root bark – Acrid, viscid juice. By extracting the crushed seeds (with petroleum, alcohol and water) it has been found to isolate the products.
- Potassium salt of an acrid with reducing properties.

Other constituents are –

- Dinitrohydrobilawanol dimethyl ether.
- (Monohydroxy phenol) semecarpol Bhilawanol.
- Tarry non-volatile corrosive residue.

Contraindications for *bhallataka*:-

Summer season

Pitta prakriti

Heamorrhagic condition

Pregnancy

Diarrhoea
Dysentery
Gastritis
Children
Old age
Kidney disorder

Antidote of *bhallataka*

- 1) Kernal (albumin) of coconut
- 2) *Sesamum indicum*
- 3) Fresh juice of leaves of *amlika/chincha* internally
- 4) Decoction of *corriandrum sativum* (Daniya)
- *Bhavaprakasha*- crushed *tila* in buffalo milk and add butter than apply
- Churna of *yastimadhu* and *tila* grind with milk and apply with butter
- *Chakdatutta*- Black *sesamum* along with *mulethi* is added in milk and paste is prepared after mixing with butter and then applied.
- Soil under the plant of *bhallataka* itself is used to apply on the affected part.
- *Bharatbhaishajayatanakara*- *Kwatha* prepared from *patra* of *Ashwatha* plant. *Sesamum* and black mud is mixed with butter and than applied
- Make paste of *sesamum* in buffalo milk and applied with butter
- *Ayurveda Oshadinighantu* –*Tanduliya swarasa* with sugar Application of *Devadaaru*, *musta*, *Sarshapa churna* with butter over swelling part.
- *Sharangadhara samhita*- Goat milk with *tila* and butter for local application.
- Black mud application over the swelling.

Pharmacological effects

Hypoglycemic effect

Arul et al. studied the effect of ethanolic extract of dried nuts of SA on blood glucose and investigated in both normal (hypoglycemic) and streptozotocin-induced diabetic (antihyperglycemic) rats. The ethanolic extract of SA (100 mg/ kg) reduced the blood glucose of normal rats the blood glucose levels were measured at 0, 1, 2 and 3 h after the treatment and antihyperglycemic activity of SA was compared with tolbutamide, a sulfonyl urea derivative used in diabetes mellitus.^[13]

Antimicrobial activity

Nair et al. found that the alcoholic extract of dry nuts of SA (Bhallatak) showed bactericidal activity in vitro against three gram negative strains (*Escherichia coli*, *Salmonella typhi* and *Proteus vulgaris*) and two gram positive strains (*Staphylococcus aureus* and *Corynebacterium diphtheriae*). Subsequent studies have shown that the alcoholic extracts of different parts of the plant (leaves, twigs and green fruit) also possess anti-bacterial properties, especially the leaf extract. No dermatotoxic effect (irritant property) was observed in the mouse skin irritant assay.

- **Acute and subchronic toxicity** of S.A. on hemoglobin percent and RBC count of male albino rat. (Choudhari C.V. and Deshmukh)
- In vivo **Antimutagenic effect** of SA against mitomycin-c induced chromosome aberrations in mouse bone marrow cells.(D.Prabhu, Laila S Rajwani & P.V. Desai)
- **Immunomodulatory and antiinflammatory effect** of SA. Nut milk extract in Experimental inflammatory.(Vanu Ramkumar Ramprasat, Palanivelu shanthi)

CNS activity

Farooq et al. evaluated the beneficial effect of nuts of SA, extracted with milk, on CNS, mainly for its locomotor and nootropic activities in different experimental animal models. The extract tested but a slight CNS depressant effect was noted with only 150 mg/kg of the extract and it was found to possess nootropic activity.^[14]

Anticarcinogenic effect- Anti-Cancer Activity Mathivadhani studied SA nut extract for inhibitory effect on human breast cancer cell line (T47D). At the molecular level, it showed decrease in Bcl and increase in Bax, cytochrome c, caspases and PARP cleavage, and ultimately by internucleosomal DNA fragmentation.^[15] Sugapriya showed restoration of energy metabolism in leukemic mice treated by SA nut milk extract. SA treatment was compared with standard drug imatinib mesylate. SA administration to leukemic animals resulted in clearance of the leukemic cells from the bone marrow and internal organs.^[16]

Antioxidant Activity

Sahoo investigated the antioxidant activity of ethyl acetate extract of stem bark of SA. Ethyl acetate extract showed the stronger antioxidant activity (due to presence of highest total phenolic content of 68.67% measured as pyrocatechol equivalent) compared to the other (hexane, chloroform and methanol) extracts. The isolation of the ethyl acetate extract of SA

stem bark yielded a brightly yellow solid crystal, which was identified as butein. This compound exhibited antioxidant activity (IC₅₀ values of $43.28 \pm 4.34 \mu\text{g/m}$).^[17]

DISCUSSION & CONCLUSION

Semecarpus anacardium is one of the medicinally important plants which may be used as an alternative medicine. SA is used in clinical practice by physicians. Many studies show that SA has various photochemicals having power to fight against several diseases but because of its poisonous nature it should be used very safely. There are some instructions for *shodhana* of SA. *Bhallataka* has been used to cure so many disorders like *kustha*, *kaphaja gulma*, *prameha*, *shotha*, *udar rog*, *sushka arsha*, *urustambha*, *vata disorder*, *indralupta*, *rasayam prayoga* etc. It gives its best result in *vata & kapha prakriti* sometimes bad result for *pittaja prakriti*, so contraindicated to *pitta prakriti* & also in some other cases. For internal use *shodhan* (purification) has been done. This review article has a description of *Bhallataka* given in various *samhita & nighantu* etc. The review would be beneficial for the researcher working on SA.

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