

A CRITICAL REVIEW ON BHALLATAKA (SEMECARPUS ANACARDIUM LINN)

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ABSTRACT

Semecarpus anacardium is commonly known as *Bhallataka*. It has been used since hundred of years in Indian system of medicine (Ayurveda). In Ayurvedic classics i.e. *Charak*, *Sushrut*, *Vagbhat Samhita* and also in *Rasagranthas* we get the reference about *Bhallataka*. It has lots of medicinal property due to various chemical compounds, which are present in it, like bhilawanol, biflavonoids, phenolic compounds etc. Semecarpol (monohydroxy phenol) and Bhilawanol (o-dihydroxy compound) is the active constituents present in *Semecarpus anacardium* Linn. It has been well known as a medicine since ancient times where the fruit, gum and oil are used for their medicinal properties. The present review deals with the description, chemical composition and to highlight the latest review of scientifically proved pharmacological activity of *Semecarpus anacardium* such as antibacterial, anti inflammatory, anti-oxidant activity, analgesic action, anti cancer activity and antimicrobial activity etc.

Keywords: *Bhallataka*, *Semecarpus anacardium*, antimicrobial, anti-oxidant

INTRODUCTION

Semecarpus anacardium is a well known medicinal plant in Ayurvedic medicine. It is one of the most powerful and fast acting Ayurvedic herbs. The plant *Bhallataka* (*Semecarpus anacardium* Linn.) belong to family anacardiaceae; commonly known as marking nut, dhobi nut, *bhilawa*, *biba*. It is one of the best, versatile, most commonly used herbs as household remedy. It has been used all over India since centuries. It was held in high esteem by ancient sages of Ayurveda. It is a plant well known for its great medicinal value in Ayurveda and is effective in wide range of diseases. It is used extensively in piles, skin diseases, etc. Since it is very hot in potency, it is used only after purification procedures. The word *Bhallataka* describes the sharp attribute of the herb^[1]. Because of its hot

potency, light and sharpness property, it gives faster relief. *Bhallataka* is used both internally as well as externally. Before *Bhallataka* is therapeutically used, they are to be subjected to a processes called *Shodhan sanskara* (purification procedure) as it is one of the irritant organic vegetable poison. This process reduces the toxicity of *Bhallataka* and enhances its therapeutic properties. Different recipes of *Bhallataka* are mentioned in the *Charak samhita*.^[2] Properties of receptacles, fruits, medicated oil of *Bhallataka* are mentioned in *Sushruta samhita*^[3,4]. The tree bark exudes a gum resin used in leprosy, venereal infections and nervous debility, juice from the nut is used in ascites, rheumatism, asthma, neuralgia, epilepsy and psoriasis, as well as for warts and tumours, the juice of the

nut was effective against epidermal carcinoma, it also has some antidiabetic activity, nut bruised and the exudates is used as an abortifacient and a vermifuge^[5]. Many formulations of *Bhallataka* are mentioned in *Bhaishajyaratnawali*. *Bhallataka* is one of the main drugs in practice of *Ayurveda*. Recent reports from all over the world reveals several scientific studies have been conducted on *S.anacardium* to evaluate its medicinal value. Further research and more efforts on *Semecarpus anacardium* are needed. Hence present review summarizes its description, phytochemistry, therapeutic activity & pharmacological activity.

AIM AND OBJECTIVES:-

- 1) To take review of *Bhallataka* in *Ayurvedic Samhitas*.
- 2) To take review of *Bhallataka* available in Modern medical science.
- 3) To take review of the proven therapeutic activity & pharmacological activity of *Bhallataka* such as anti-bacterial, anti-carcinogenic, anti-inflammatory, anti-atherogenic, antioxidant etc.

MATERIAL AND METHOD:-

Ayurveda Classical texts as well as Modern text and different Internet sites were used for the search of relevant research papers on therapeutic activities and literature regarding *Bhallataka*.

PLANT DESCRIPTION:-

It is a medium sized to large tree, 15-25m in height. It is found in the outer Himalayas from the Sulej to Sikkim and fairly common throughout the hotter parts of India. Leaves are simple, alternate, obviate oblong, rounded at the apex, coriaceous, glabrous above and more or less pubescent beneath, main nerves 15-25pairs. Flowers are greenish white fascicled in pubescent pedicles. Fruits are obliquely ovoid or ob-

long drupes and 2-5cm long. The upper portion of the fruit is cup shaped smooth, fleshy, orange red in colour and sweet & edible when ripe. The lower base which may be turned the nut, consists of smooth, black shining pericarp. The *Semecarpus anacardium* nut is approximately 1”x 0.75”x0.33” and weighs on an average 3.5gm. It contains a corrosive resinous juice which is white when the fruit is immature, but brownish or quite black when the fruit is ripened. Marking nut tree is similar to the cashew nut tree, in having an edible false fruit that is orange & fleshy and the true fruit is black oily and bitter, the kernels of the nut are edible, but the juice of the nut is highly vesicant, and has been traditionally used to mark cloth by washer men.^[5]

CHEMICAL COMPOSITION:-

The black corrosive juice of the pericarp contains a tarry oil consisting of 90 percent of an oxy-acid named anacardic acid and 10 percent of a higher, non-volatile alcohol called cardol. Naidu isolated catechol and a monohydroxyphenol which he called ‘anacardol’, besides two acids and a fixed oil from the kernel of the nut. Pericarp also contains a vesicating oil 32p.c., soluble in ether and which blackens on exposure to the air. Fruit yields 2.14p.c.of ash.^[5] Oil & seeds of the plant consist of Bhilawanol and anacardoside; while fruits consist of nicotinic acid, riboflavin, thiamine and essential amino acid-arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine; Nuts consist of bhilawanol (mixture of 1,2-dihydroxy-3-(pentadecenyl-8’)-benzene- and 1,2 dihydroxy-3-(pentadecadienyl-8’,11’)-benzene, biflavantetrahydrorobusta-flavone and tetrahydroamentoflavone, biflavonides A, B and C later two characterised as 3’,8-binarigenin and 3’,8-biliquiritigenin, nallaflavone; while *semecarpus* biflavone B, biflavonoid-jeediflavanone, galluf-

lavanone, semecarpus flavanone, anacardiac acid, aromatic amines, bhilawanol(1-pentadeceny-1-2,3-dihydroxybenzene) and 1-pentadecadienyl-2,3-dihydroxybenzene are the contents of nut shell; amentoflavone(leaves); linoleic, myristic, oleic, palmitic and steric acid(kernel oil);anacardiac acid , cardol,catechol, anacardol, fixed oil, semecarpol, bhilawanol(plant).^[6]

AYURVEDIC PROPERTIES:-

Bhallataka fruit has *Katu, Tikta, Kashaya rasa* and *laghu, Snigdha, Tikshna guna* and *ushna virya* and *madhura vipaka*^[7].

THERAPEUTIC USES OF BHALLATAKA

'As *Rasayana*'-for this purpose *bhallataka kshir, bhallataka kshudra & bhallataka taila* are different pharmacological preparation of *bhallataka*(*semecarpus anacardium linn*) are mentioned in *Charaka Samhita*^[8], '*Arsha*'(Haemorrhoid)-*Bhallataka kwath* has potent efficacy to cure *Arsha*.it is given to patient early in the morning but before consuming this,entire oral cavity is coated with ghee(butter). Patient should consume cooked rice mixed with ghee(butter) and milk diet during this period, '*Kushtha*'(Skin diseases)-*kwatha*(Decoction) of *Bhallataka*(*semecarpus anacardium linn*), *Abhaya*(*Terminalia chebula*) and *Vidanga*(*Embelia ribs*) or only *Bhallataka taila* cures all types of skin diseases, '*Visha Anjana Chikitsa*'-If *vishayukta anjana*(collyrium) then the flowers of *Bhallataka* are rubbed in milk which is used as counter-collyrium^[9], '*Jwaraghna*'(Fever) -*Bhallataka* should give with *Guda*(jaggery) to prevent *jwara*(fever)^[10], '*Pleehodara*'(Spleenomagely) -*Modaka* is prepared by equal proportion of *Bhallataka*(*semecarpus anacardium linn*), *Abhaya*(*Terminalia chebula*), *Jeeraka*(*Cuminum*

cuminum) and *guda*(jaggery) cures *pleehodara* within seven days^[11].

Need for *Bhallataka Shodhana*- (Purification method)

Because it is very hot in nature, its mere skin contact may cause boils. To reduce its hot potency and toxicity, it is subjected to purification procedure.According to *Raj nighantu*, ***Bhallataka* ripe seeds are taken, and put into water. Only those which sink are used for purification and rest is discarded.** The seed is cut into two and kept immersed in dry brick powder for some time.During this time, the dry brick powder absorbs all the strong pungent oil of *Bhallatak*, reducing its pungency and making it usable for medicinal purpose. various other *shodhan* methods are described in *rasagranthas*,like *Swedana* with *Narikel jal*^[12], *Shodhan* with *Bufalo's stool*, *Gomutra*, *Narikel jal*, *Godugdha* and *Curd*^[13].

Bhallataka Formulation

- 1 '*Bhallatakadi Modaka*'- It is used in *pleeha*(spleenomagely)^[14] & *pittaj arsha*(Haemorrhoids).^[15]
- 2 '*Bhallatakavaleha Brihada*'-It cures *arsha* and all diseases^[16]
- 3 '*Bhallatakadi Kwatha*'-It cures *urustambha*(stiffness in muscles of thighs).^[17]
- 4 '*Bhallataka Ghrita prathama*' - It cures *Gulma* (cystic growth), *Pandu* (anaemia), *Shwas* (asthama), *Grahani* (irritable bowel syndrome), *Kasa* (cough)^[18]
- 5 '*Bhallatakadi Ghrita Dwitiya*'-It cures *Gulma & Raktagulma*.^[19]
- 6 '*Bhallatakadya Taila*'-It cures *Nadivrana* (sinus), *Apachi* (Benign growth)^[20]
- 7 '*Bhallatakadi Lepa*'-It cures *Indralupta* (alopecia)^[21]

8 'Amrit Bhallataka'-It acts as nervoin tonic, rejuvenate the body and cures *kushtha*(skin diseases)^[22]

9 'Maha Bhallataka Guda'-It cures *Shwitra*(vitiligo), *Kushta*(skin diseases), *Visphota*(blisters), *Pama*(scabies), *Vatarakta*(Gout), *Udavarta*, *Pandu*(anaemia), *Krumi*(worms), *Arsha*(piles), *Kasa*(cough), *Shwas*(asthama), *Bhagandar*(fistula), *Amavata*(Rheumatoid arthritis).^[23]

10 'Sanjivani Vati'-It cures *Ajirna*(Indigestion), *Gulma*(cystic growth), *Visuchika*(cholera), Snake bite & *sannipata*^[24]

11 'Bhallataka Rasayana'-*Balavardhak*(Increase power of body), it cures *raktalpata*(anaemia).^[25]

12 'Bhallatakarishtha'-it cures dropsy, abdominal enlargement, Rectal fistula, Duodenal diseases, Parasites, Leprosy, Diabetes, Emaciation & *kikkasa*(stretching of the skin)^[26]

Sign and Symptoms of Bhallataka poisoning:-

Skin contact with the acrid juice results in irritation, inflammation, vesication, ulceration and painful blisters containing acrid serum which causes an eczematous eruption. These lesions resembles a bruise which may later ulcerate and slough. Burning pain in the mouth with blisters formation in the mouth, tongue and throat. Ingestion produces GI distress with blister formation in and around the mouth. Severe poisoning results in vomiting, abdominal pain, diarrhea, hypotension, tachycardia, delirium and coma. Pupils may be dilated.

Fatal Dose:- Uncertain but considered to be 5-10 gms, Seeds- 6-8 and Oil- 9-10ml^[27]

Fatal period:- 12-24 hours^[27].

RECENT RESEARCHES DONE:-

ANTI INFLAMMATORY ACTIVITY:-

The anti-inflammatory effects of *Semecarpus anacardium* (SA) nut extract investigated on developing and developed adjuvant arthritis. *Semecarpus anacardium* significantly decreased the carrageenan-induced paw edema and cotton pellet granuloma. These results indicate the potent anti-inflammatory effect and therapeutic efficacy of SA Linn. nut extract against all phases of inflammation is comparable to that of indomethacin.^[28]

ANTI-ARTHRITIC EFFECT:-

Semecarpus anacardium nut milk extract was found to be effective against adjuvant-induced arthritis in albino Wistar rat at the dose level of 150mg/kg body weight on the basis of dose dependent study.^[29] Nut milk extract modulates reactive oxygen/nitrogen species levels and antioxidative system in adjuvant arthritic rats. A significant increase in the levels of lipid peroxides (LPOs), ROS (superoxide radical, hydroxyl radical, H₂O₂ and myeloperoxidase) and RNS (nitrate + nitrite) observed in adjuvant arthritic animals were found to be significantly decreased on administration of the drug at 150 mg/kg body weight/day. Treatment with SA recouped the altered antioxidant defense components to near normal levels. These evidences suggest that the SA preparations are mainly used for irregularities caused during arthritis and to cure arthritis^[30]. All these observations indicated that *S.anacardium* nut milk extract is a good therapeutic agent for the arthritis.

ANTIOXIDANT ACTIVITY:-

Semecarpus anacardium has been reported in various studies to possess potent antioxidant activity. Investigated antioxidant activity of the aqueous extract of nuts of medicinal plant SA in AKR mouse liver during development of lymphoma. Administration of the aqueous ex-

tract of SA to lymphoma-transplanted mouse leads to increase in the activities of antioxidant enzymes, whereas LDH activity is brought down significantly indicating a decrease in carcinogenesis^[31]. This indicates the potent Antioxident activity of *Semecarpus anacardium*.

ANTIMICROBIAL ACTIVITY:-

Alcoholic and oil extracts of *S.anacardium* dry nuts have antimicrobial activity against Gram-positive and Gram-negative bacteria^[32]. An Ayurvedic preparations of *S.anacardium* called “*Bhallatakasava*” was shown to have antibacterial activity against tetanus causing micro organism^[33]. Anacardic acid from the nuts exhibited antimicrobial properties^[34].

ANTI- CARCINOGENIC ACTIVITY:-

The flavanoids present in the *S.anacardium* nut have the ability to prevent various cancers.^[35] *S.anacardium* nut extract revealed potent anticarcinogenic activity against AFB1(Aflatoxin B1) mediated hepatocellular carcinoma. The adverse effects induced by AFB1 were reversed to near normal cells with reference to biochemical parameters and histological pattern.^[36] *S.anacardium* oil prepared according to the Ayurvedic principle displayed strong cytotoxic activity in human leukaemia cell lines. It is surprised that this cytotoxic activity of *S.anacardium* oil in human leukaemia cells is attributed to its phenolic constituents, particularly biflavones.^[37]

CONTRACEPTIVE AGENT

The administration of ethanolic extract of *S.anacardium* fruit leads to spermatogenic arrest in albino rats. The significant reduction in the sperm motility and density was observed. The fruit extract feeding also caused marked reduction in the number of primary spermatocytes,

secondary spermatocytes and spermatids. The number of mature leydig cells was also decreased and degenerating cells increased proportionately. These results clearly show the anti spermatogenic activity of *S.anacardium*.^[38]

HYPOGLYCAEMIC ACTIVITY :-

Ethanolic extract of dried nuts (100mg/kg) of *S.anacardium* reduced blood glucose levels of both normal(hypoglycaemic) and streptozotocin-induced (antihyperglycaemic) diabetic rats. The antihyperglycaemic activity of *S.anacardium* was compared with tolbutamide, a sulfonylurea derivative used in diabetes in diabetes mellitus.^[39]

HYPOLIPIDEMIC AND HYPOCHOLESTEROLEMIC ACTIVITY

Semecarpus anacardium nut extract oil fraction at a dose of 1mg/100g body weight significantly reduced serum cholesterol levels and increased HDL cholesterol levels in the rat fed with atherogenic diet.^[40]

ANTHELMINTIC ACTIVITY:-

The antihelmenthic activity of different extracts of nuts of *Semecarpus anacardium* were evaluated separately on adult Indian earthworm (*Pheritima posthuma*). However, petroleum ether(PESA),chloroform extract(CESA) at 10 mg/ml and EESA at 20 mg/ml showed significant anthelmintic activities which are comparable with that of the effects produced by the reference standards albendazole (10 mg/ml) and piperazine citrate (10 mg/ml). So,the activity reveals concentration dependent nature of all the four different extracts. Potency of these extracts were found to be inversely proportional to the time taken for paralysis/death of the worms. Further studies regarding the isolation and characterization of the active principle(s) responsi-

ble for anthelmintic activity are currently under progress^[41].

CARDIOPROTECTIVE ACTIVITY:-

From the study it may be concluded that the both high dose of extract of *semecarpus anacardium* nuts(SANE) (500 mg/kg) and low dose of SANE (100mg/kg) possess good cardio protective activity against isoproterenol (ISO) induced myocardial necrosis in rats. Further studies should be carried out to elucidate the active constituents responsible for the said effect with extensive evaluations of histological and ultra structural changes^[42].

CONTRA-INDICATION OF BHALLATAKA:-

Since *Bhallataka* is extremely hot and sharp in its attributes, it should be used with caution. Individuals showing allergic reactions to it should stop and avoid the usage of *Bhallataka*. It should not be used in small children, very old persons, pregnant women and individuals of predominant *pitta* constitution. The use of the same should be restricted in summer season. For its allergic reactions like rash, itching and swelling, the antidotes used externally are coconut oil, rala ointment, ghee, coriander leaves pulp or butter mixed with *musta* (*Cyperus rotundus*). The oily part of the nut is toxic and its degree of removal is proportional to its safety margin.

DISCUSSION

Semecarpus anacardium have been used for the treatment of diseases throughout the world since the beginning of civilization. *Semecarpus anacardium* linn is one of the best, versatile and most commonly used herbs as a household remedy, medicinal and non-medicinal purposes like marking of cloth, hair dye etc. since ancient times. In *Ayurveda*, *Bhallataka* (*Semecarpus anacardium* Linn) is in-

cluded under '*Upavisha Dravya*'^[43] and in modern classification of poisons; it is categorized under irritant organic vegetable poison. Though it is toxic in nature, it is most valuable plant in the world of *Ayurveda* and modern era also. In *Brihatrayi* (three major ancient scriptures) of *Ayurveda*, the medicinal properties and formulations of *Bhallataka* have been described. The fruits, nut, their oil and seeds are used to treat wide range of diseases like skin diseases, tumors, malignant growths, fever, haemoptysis, intestinal parasites etc. Due to its toxic activities, it should not get used before detoxification process. The most common detoxification method involves rubbing of *Semecarpus anacardium* nut with brick powder and then washing the nut with warm water.^[44] In the pharmaceutical industry natural products play an important role in drug development programs. Day by day our traditional medicine knowledge is decreasing and this article gives basic information of *Bhallataka* (*Semecarpus anacardium* Linn.) which would be very helpful in future. Most of the people don't know the importance and proper use of *Semecarpus anacardium* Linn. Specially this plant found only in forest area and quantitatively this plant is decreasing day by day so it is need to aware its importance to society, otherwise it will become rare and we will loss one of the important plants from earth and in future we will get only description of this plant in the dictionary of Indian medicinal plants. The vast survey of literature showed that *Semecarpus anacardium* has a broad spectrum of pharmacological activities. It has an esteemed status in herbs with diverse biological potentials and has a great scope for further new area of investigations. The fruit extract shows various activities like antibacterial, anti-cancer, anti-inflammatory, anti-atherogenic, antioxidant, anti-helmitic, contraceptive, hypoglycemic, hypolipidemic, cardio-

protective and many other properties. Further research and more efforts on *Semecarpus anacardium* needed to study traditional uses of the plant and subsequent validation of activity and mechanism of action for the welfare and survive of mankind.

CONCLUSION

It is concluded that *Semecarpus Anacardium* is used for various medicinal properties. The fruit and nut extract shows various activities like an anti inflammatory, hypoglycaemic, anticarcinogenic activity etc. It can be used as a drug of choice for many dreaded diseases but with some special precautions.

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