



Received on 18 May 2022; received in revised form, 07 July 2022; accepted, 01 August 2022; published 01 February 2023

## **SEMECARPUS ANACARDIUM LINN: AN ETHNOMEDICAL, PHYTOCHEMICAL AND PHARMACOLOGICAL REVIEW**

Abhinav G. Bais<sup>\*</sup>, Sachin M. Hiradeve and Vaibhav P. Uplanchiwar

Nagpur College of Pharmacy, Wanadongri, Hingna Road, Nagpur - 441110, Maharashtra, India.

### **Keywords:**

*Semecarpus anacardium*, Marking nut, Bioactive compounds, Ayurveda, Rasayana

### **Correspondence to Author:**

**Mr. Abhinav Bais**

Assistant Professor,  
Nagpur College of Pharmacy,  
Wanadongri, Hingna Road,  
Nagpur - 441110, Maharashtra, India.

**E-mail:** abhinavbais1995@gmail.com

**ABSTRACT:** *Semecarpus anacardium* Linn. (Family Anacardiaceae), generally known 'Ballataka' or 'Bhilwa', is a factory well-known for its medicinal value in ayurvedic and siddha system of the drug; it's also used for non-medicinal purpose like marking of cloth, hair color, etc. since ancient time. Phytochemical analyses of *Semecarpus anacardium* nut shows that, its nut contains a variety of biologically active composites similar as biflavonoids, phenolic composites, bhilawanols, minerals, vitamins, and amino acids, which shows colorful medicinal parcels. The oleic acid content present in the kernel indicated that it could be used as a good source of salad oil. Traditional healers and croakers use *Semecarpus anacardium* in their clinical practice. Several trials have proved its anti-atherogenic, anti-inflammatory, antioxidant, antimicrobial, anti-reproductive, CNS stimulant, hypoglycemic, anticarcinogenic and hair growth protagonist conditioning. An exhaustive literature survey was performed on *Semecarpus anacardium* Linn by using various scientific databases to validate the ethnomedicinal properties of the plants. The present review of literature has focused on ethnomedicinal, nutritional value, phytochemical components, and pharmacological properties of *Semecarpus anacardium* Linn.

**INTRODUCTION:** The ancient traditional system of medicine *i.e.* "Ayurveda," is acquiring broad acknowledgment worldwide. In Ayurveda, practically all restorative arrangements are gotten from plants, whether in the straightforward type of crude plant materials or the refined type of unrefined concentrates, blends thus on<sup>1</sup>. In different regions, the term Complementary and Alternative Medicine (CAM) is used for different conventional medications. The CAM can be characterized as any therapy utilized in formation (correlative) or instead of (elective) standard clinical treatment.

In elective medication, restorative plant arrangements have been found inescapable, especially because of infections not manageable to treatment by present-day method<sup>2</sup>. The word, Simeion presents *Semecarpus* in Greek means stamping/following, and *carpus* in Greek means nut. *Anacardium* implies *cardium*, for example, heart molded checking nut. *Bhallatak* artistic means sharp like lance. *Bhallatak*, or stamping nut, has been known to the world since old times. The stem, sap, and soil products are utilized by humankind for assorted purposes like wood, paint, waterproofing, food, and medication.

Due to its valuable therapeutic properties, it is acclaimed as *Ardhavaidya* in Ayurveda and as a Golden oak seed during the era of Galen in the western world. *Semecarpus anacardium* Linn. (Family: *Anacardiaceae*), a part of *Rasayana* Herbs, is conveyed in the sub-Himalayan district, tropical and focal pieces of India.

	<p style="text-align: center;"><b>DOI:</b> 10.13040/IJPSR.0975-8232.14(2).538-46</p>
	<p style="text-align: center;">This article can be accessed online on <a href="http://www.ijpsr.com">www.ijpsr.com</a></p>
<p>DOI link: <a href="http://dx.doi.org/10.13040/IJPSR.0975-8232.14(2).538-46">http://dx.doi.org/10.13040/IJPSR.0975-8232.14(2).538-46</a></p>	

The nut is ordinarily known as 'stamping nut' and in the vernacular as 'Ballataka' or 'Bhilwa' with high medicinal value<sup>3, 4</sup>. *Semecarpus anacardium* Linn. (Family: Anacardiaceae) nut uncover the presence of biflavonoids, phenolic compounds, bhilawanols, minerals, nutrients, and amino acids. An assortment of nut extricate arrangements from this source are powerful against numerous illnesses, viz., joint pain, cancers, contaminations, etc.

**Plant Description:** It is a moderate-sized deciduous tree found in the external Himalayas and more smoking pieces of India up to 3500 ft. tallness. The plant is found in overflow in Assam, Bihar, Bengal and Orissa, Chittagong, focal India, and a western landmass of East Archipelago, Northern Australia<sup>5</sup>. It is a medium-to-huge size tree, 15-25 m in stature with dim bark shedding in unpredictable little pieces, leaves basic substitute, block - elliptical, 30-60 cm long and 12-30 cm expansive, adjusted at the zenith coriaceous glabrous above and that's only the tip of the iceberg or less pubescent, underneath. The blossoms are greenish white in panicles and show up with new leaves in May and June, effectively perceived by huge leaves and the red blast oozing tar, which darkens on openness. The nut is around 2.5 cm long, ovoid and smooth, brilliant dark **Fig. 1**. It is much of the time found in drier instead of damping areas. The natural product matures from December to March and is 2-3 cm wide. No particular soil fondness. It is a moderate shade carrier, sideways ovoid or elongated drupe, 2.5 to 3.8 cm long, compacted, sparkling dark when ready, situated on an orange-hued container type of the circle, the foundation of the calyx and the furthest point of the peduncle. The bark is dark in shading and radiates an aggravation emission on incising<sup>6</sup>.



**FIG. 1: FLOWERING SEMECARPUS ANACARDIUM ALONG WITH SEEDS/FRUITS**

The seed oil is essentially utilized for a therapeutic reason. Seeds (1/4, 1/2 piece) are typically regulated bubbled in milk, and the milk is polished off. The quantity of pieces might be expanded continuously relying upon the patient's reaction up to 3 entire nuts and along these lines it is decreased steadily in an equivalent style. The technique for continuous portion acceleration and in this manner steady decline of measurement over weeks is called *Vardhaman prayog* in old-style Ayurveda. The seeds oil is additionally utilized normally blended in with food things. For the effective reason, the oil is applied in a conceivable base amount or blending it in with other regularly utilized non-poisonous oils.



**FIG. 2: MARKING NUTS ON TREE**

It is commonly called by various names throughout the country, as mentioned below.

**Sanskrit:** Antahsattva, Arusharah, Aruskara (Arukara), Arzohita, Balla'ta (Bhallata, Ballata)

**English:** Indian Marking Nut Tree, Marsh Nut, Oriental Cashew Nut

**Hindi:** Bhela (Bhel), Bhelwa, Bhilawa (Bhilv), Bhilwa

**Tamil:** Erimugi (Erimuki)

**Telugu:** Nallajeedi

**Gujarati:** Bhilamu

**Russian:** Semecarpus Anakardii

**Urdu:** Baladur, Billar

**Nutritional Value:** The Nutritive value of unusual food (kernels of *S. anacardium*), which is known to be consumed by some populations, was extensively

studied <sup>7</sup> **Table 1.** The oleic acid content present in the kernel indicated that it could be used as a good source of salad oil. The marking nut kernels are being used for consumption, especially during pregnancy and lactation, because of its amino acid profile. They can replace the usage of other oil

seeds because of their high protein and fat content. However, the vesicant nature of bhilwa juice and manufacturing difficulties of kernels prevents its usage <sup>7</sup>. If this vesicant nature is abolished, this juice forms a good source for the pharmaceutical industry

**TABLE 1: NUTRITIVE VALUE OF THE MARKING NUT KERNEL**

Proximate Principles		Minerals and Vitamins		Essential Amino acids	
(g/100gm)		(mg/100g)		(mg/g protein)	
Moisture	3.8	Iron	6.1	Arginine	9.6
Protein	26.4	Phosphorus	836	Histidine	1.8
Fat	36.4	Calcium	295	Lysine	4.1
Fiber	1.4	Thiamine	0.38	Lecucine	7.3
Minerals	3.6	Riboflavin	0.17	Isoleucine	4.4
Carbohydrate	28.4	Nicotinic acid	1.06	Methionone	1.5
Calories	5.87			Theronine	2.1
				Phenylalaine	2.5
				Valine	4.7
				Tryptophan	1.1

**Ethnomedical History:** Folk medicine *Semecarpus anacardium* (SA) is one of the most popular medicinal valuable plants in the world of Ayurveda. Charak, Sushrut, and Vagbhata, the main three treatises of Ayurveda, have described the medicinal properties of SA and its formulation. Bhallataka is used both internally as well as externally. The fruits, oil, and seeds have great medicinal value, and are used to treat a wide range of diseases. The detoxified nut of SA were used in Ayurveda for skin diseases, tumors, malignant growths, fevers, haemoptysis, painful menstruation, vaginal discharge, deficient lactation, constipations, intestinal parasites. (Charaka, Sushruta), before using SA for medicinal purposes, it's necessary to detoxifying due to its high toxicity. Numbers of detoxification methods have been recorded, and the most common method involves rubbing SA seeds with brick powder and washing the seeds with warm water.

The second common recommended method is to tie the seeds in a muslin cloth and suspend it in a vessel containing coconut water, heated for about 3 hrs continuously <sup>8</sup>. Seed oil is mainly used for medicinal purposes. Seeds are generally boiled in milk, and the milk is consumed. The seed oil is used in the minimum possible quantity, typically mixed with food items or mustard oil. Externally, the oil is applied on wounds to prevent pus formation and better healing of wounds. Medicated with garlic, onion, and ajavayana in sesame oil give

better results. In glandular swellings and filariasis, the application of its oil facilitates to drain out pus and fluids and eases the conditions. It is also used as a brain tonic, blood purifier and haematinic tonic. The combination, *Semecarpus anacardium*, *Terminalia chebula*, *Sesamum indicum* L. seeds powders with jaggery has excellent results in chronic rheumatic disorders. In dysmenorrheal and oligomenorrhea the medicated milk or its oil is salubrious also it reduces the urinary output, hence beneficial in diabetes of kapha type, Bhallataka is the best rejuvenative (rasayana) for skin ailments, vata disorders, and as a preventive measure to increase the body resistance <sup>9</sup>.

**Phytochemistry:** The main parts of the *Semecarpus anacardium* Linn. oil are phenolic compounds. On exposure to air, phenolic compounds get oxidized to quinones. The oxidation cycle can be forestalled by holding the oil under nitrogen. Two principle phenolic compounds and a glucoside are bhilavanol A (monoeneptadecyl catechol I), bhilavanol B (dienepentadecyl catechol II) and anacardoside (glucoside) <sup>10, 11</sup> Bhilwanol from organic products was demonstrated to be a combination of cis-and transisomers of ursuhenol; this compound comprises mostly of 1,2,dihydroxy-3(pentadecadienyl 8',11') benzene and 1,2,hydroxy-3(pentadecadienyl 8') benzene <sup>12</sup>. Other parts confined are anacardoside, <sup>13</sup> semecarpetin, <sup>14</sup> nallaflavanone, <sup>15</sup> jeediflavanone, <sup>16, 17</sup> semecarpufllavanone, <sup>18</sup> gallufllavanone, <sup>19, 20</sup>

anacarduflavone <sup>21</sup> mono-olefin I, diolefin II, bhilawanol-A, bhilawanol-B, amentoflavone tetrahydroamentoflavone semicarpol, anacardic corrosive, tetrahydrobustaflavone, O-trimethyl biflavanone A1(21), O-trimethyl biflavanone A2,119] O-tetramethyl biflavanone A1, O-

hexamethyl bichalcone A, O-dimethyl biflavanone B, O-heptamethyl bichalcone B1, O-hexamethyl bichalcone B2, O-tetramethyl biflavanone C., phenolics <sup>22</sup>. The chemical structures of various constituents of the plant are shown in **Fig. 3**.

**TABLE 2: STRUCTURE WITH EXTRACT AND ISOLATED CONSTITUTE OF SEMICARPUS ANACARDIUM**

S. no.	Structure	Plant Part	Extract	Isolated Constitute	Structure
1	Butein	oil and seeds	Phenolic	1, 2-dihydroxy-3 (pentadecadienyl-8, 11) benzene, 1, 2- dihydroxy-3 (pentadecadienyl-80, 110) –benzene	Acetone
2	Anacarduflavanone	Nut Shell	Ethanollic	n-hexane	
3	Jeediflavone	Nut Shell	Alcoholic	Acetic anhydride , Pyridine	
4	Nallaflavonone	Nut Shell	Alcoholic		

### Pharmacology:

**Anti Atherogenic Effect:** Sharma A *et al.* revealed the anti-atherogenic potential of SA. Administration of *S. anacardium* nut shell extract to cholesterol-fed rabbits significantly reduced serum cholesterol (-73.3%) and serum LDL-Chol. (-80%). The extract feeding also prevented the accumulation of cholesterol /triglycerides in the liver, heart muscle, and aorta and caused regression of plaques (75.3-83.5%). These results indicate that SA is hypocholesterolemic in action and prevents cholesterol-induced atheroma <sup>23</sup>.

**Antiinflammatory:** Ramprasath VR *et al.* explored the mitigating impacts of SA nut removal on creating and creating adjuvant joint inflammation. *Semecarpus anacardium* fundamentally diminished

the carrageenan-instigated paw edema and cotton pellet granuloma. These outcomes show the powerful calming impact and restorative viability of SA Linn. Nut removal against all periods of aggravation is tantamount to that of indomethacin <sup>24</sup>. Salvem *et al.* researched that ethyl acetic acid derivation concentrate of SA prompted the seclusion of significant dynamic rule, tetrahydroamen to flavone (THA), a biflavonoid. The *in-vitro* cyclooxygenase (COX-1)- catalyzed prostaglandin biosynthesis examination of THA gave an IC<sub>50</sub> worth of 29.5 µM (COX-1) and 40.5% hindrance at 100 g/mL (COX-2).

The *in-vivo* carrageenan-instigated paw edema measure brought about a portion subordinate calming impact of THA and the action was



equivalent to that of ibuprofen<sup>25</sup>. Satayavati *et al.* revealed the calming movement of SA for both immunological and non-immunological origins<sup>26</sup>. Bhitre *et al.* demonstrated the methanolic, ethanolic, chloroform, ethyl acetic acid derivation, and oil ether concentrates of products of SA and tried to study the calming movement utilizing the method of Carrageenan-initiated paw edema in pale-skinned person rodents. The concentrate showed critical mitigating action equivalent to the reference standard aspirin<sup>27</sup>. Premlatha *et al.* have been accounted for invulnerable modulatory intensity, against oxidative, layer balancing out, cancers marker regulative, glucose level reestablishing and mineral guideline properties of nut extricate in hepatocellular carcinoma and found to detoxify a powerful hepatocarcinogen aflatoxin B1 and makes its metabolites be discharged in urine<sup>28</sup>.

In other cases, they clarified the therapeutic impacts of concentrating on the progressions related to collagen and glycosaminoglycan digestion in adjuvant ligament Wistar rodents. Diminished degrees of collagen and glycosaminoglycans (GAGS) parts (chondroitin sulfate, heparan sulfate, hyaluronic corrosive) and expansion in the degrees of connective tissue corrupting lysosomal glycohydrolases, for example, corrosive phosphatase, beta-glucuronidase, beta-N-acetyl glucosaminidase, and cathepsin-D saw in joint creatures were returned to approach ordinary levels upon treatment with *Semecarpus anacardium*. Mythilypriya *et al.* studied the mitigating movement of SA in adjuvant-instigated joint rodent model concerning middle people of irritation (lysosomal chemicals) and its impact on proteoglycans<sup>29</sup>.

The presence of phenolic accounts for its intensifies like semicarpol and bhilawanol in the nuts found to restrain intense tuberculin response in sharpened rodents and the essential period of adjuvant joint inflammation. The medication likewise shows an immunomodulatory impact during irritation. *Semecarpus anacardium* impedes the TNF- $\alpha$  along these lines seriousness of irritation is diminished.

**Antioxidant Activity:** *Semecarpus anacardium* (SA) has been accounted for in different

investigations to have strong cancer prevention agent action. Verma *et al.* explored cell reinforcement action of the watery concentrate (nuts of SA) in AKR mouse liver during the improvement of lymphoma. Organization of the watery concentrate of SA to lymphoma-relocated mouse prompts an expansion in the exercises of cell reinforcement chemicals. However, LDH movement is cut down, essentially showing a decline in carcinogenesis<sup>30</sup>.

Receptive oxygen species (ROS) and responsive nitrogen species (RNS) are profoundly receptive transient compound species, which assume a significant part in the etiology of tissue injury in rheumatoid joint inflammation (RA). Treatment with SA recovered the adjusted cancer prevention agent protection parts to approach ordinary levels. These confirmations propose that SA might have constrained the free revolutionary intervened harm during joint inflammation by its free extreme extinguishing and antioxidative potential<sup>31</sup>.

Sahoo *et al.* examined the cancer prevention agent movement of ethyl acetic acid derivation concentrate of stem bark of SA. Ethyl acetic acid derivation extricate showed the more grounded cancer prevention agent movement (because of quality of most elevated all out phenolic content of 68.67% estimated as pyrocatechol same) contrasted with the other (hexane, chloroform and methanol) separate. The disengagement of the ethyl acetic acid derivation concentrate of SA stem bark yielded a brilliant yellow strong precious stone, which was recognized as butein. This compound showed cancer prevention agent action (IC<sub>50</sub> upsides of  $43.28 \pm 4.34 \mu\text{g/ml}$ ), which was similar to rutin, taken as a standard<sup>32</sup>. Shanmugam Arulkumaran *et al.* saw that rodents treated with Kalpaamruthaa showed ordinary lipid peroxide levels and cancer prevention agent safeguards<sup>33</sup>.

**CNS Activity:** Farooq *et al.* assessed the gainful impact of nuts of SA, separated with milk, on CNS, fundamentally for its locomotor and nootropic exercises in various trial creature models. The concentrate was tried; however, a slight CNS depressant impact was noted with just 150 mg/kg of the concentrate, and it was found to have nootropic activity<sup>34</sup>.

**Antimicrobial Activity:** Sharma *et al.* likewise found that because of the essence of flavonoid, alcoholic concentrate of dry nuts of *Semecarpus anacardium* shows antifungal action (*Aspergillus fumigatus* and *Candida albicans*) at 400 mg/ml fixation. Both the organisms showed restraint in development, decrease in size of cells, and Sporulation likewise diminished<sup>35</sup>. Sharma *et al.* examine that it's nut oil is a critical enemy of microbial movement against Gram-positive (*Bacillus subtilis*, *Staphylococcus aureus*) and Gram-negative (*Proteus vulgaris*, *Escheria coli*) Bacteria<sup>36</sup>.

Mohanta *et al.* arranged the plant's watery and natural dissolvable concentrates and evaluated for antimicrobial (circle dissemination strategy) and phytochemical properties. The petrol ether (PEE) and fluid concentrate portions (AQE) showed inhibitory action against *Staphylococcus aureus* (10 mm) and *Shigella flexneri* (16 mm) at 100 mg/ml, individually. While chloroform remove showed restraint against *Bacillus licheniformis*, *Vibrio cholerae* and *Pseudomonas aeruginosa*, the ethanol extricate showed hindrance to *Pseudomonas aeruginosa* and *S. aureus*<sup>37</sup>.

Nair *et al.* tracked down that the alcoholic concentrate of dry nuts of SA (Bhallatak) showed bactericidal action *in-vitro* against three gram negative strains (*Escherichia coli*, *Salmonella typhi* and *Proteus vulgaris*) and two gram positive strains (*Staphylococcus aureus* and *Corynebacterium diphtheriae*). Ensuing investigations have shown that the alcoholic concentrates of various pieces of the plant (leaves, twigs and green organic product) likewise have hostile to bacterial properties, particularly the leaf extricate. No dermatoxic impact (aggravation property) was seen in the mouse skin aggravation assay<sup>38</sup>.

**Reproductive Function (Antispermatic Effect):** *Semecarpus anacardium* separate taking care of caused antispermatic impact proved by decrease in quantities of spermatogenic cells and spermatozoa in male pale skinned person rats<sup>39</sup>. Vinutha *et al.* researched for SA (stem bark), removes including methanolic and progressive water separates for acetyl cholinesterase (AChE) inhibitory action (*in-vitro*). Results showed that methanolic concentrates to be more dynamic than

water removes. The intense AChE-repressing methanolic plant concentrates of SA (stem bark) comes to be 38 g/ml<sup>40</sup>.

**Antiatherogenic Effect:** The irregularity between the prooxidants and cell reinforcements is the fundamental driver of improvement of atherosclerosis. To forestall such condition, cell reinforcement treatment is valuable. *Semecarpus anacardium* shows such cell reinforcement property. It can search the super oxide and hydroxyl extremists at low focuses.

The course of atherogenesis is started by peroxidation of lipids in low-thickness lipoproteins, which was likewise viewed as hindered by *Semecarpus anacardium*<sup>41</sup>. Sharma *et al.* showed the cardiovascular action of SA, as it significantly lessens the tissue and serum hyperlipidemia by the restraint of gastrointestinal cholesterol ingestion combined with fringe removal subsequently having against artherosclerotic movement<sup>42</sup>. It is conceivable that the gainful antiatherogenic impact might be connected with its cell reinforcement, anticoagulant, hypolipidemic, platelet against conglomeration, and lipoprotein lipase delivering properties. The system of hypotriglyceridemic impact has likewise been demonstrated to be mostly because of the excitement of lipoprotein lipase action.

**Hypoglycemic Effect:** Arul *et al.* concentrated on the impact of ethanolic concentrate of dried nuts of SA on blood glucose and researched in both ordinary (hypoglycemic) and streptozotocin-initiated diabetic (antihyperglycemic) rodents. The ethanolic concentrate of SA (100 mg/kg) diminished the light glucose of ordinary rodents. The blood glucose levels were estimated at 0, 1, 2, and 3 h after the treatment, and the antihyperglycemic action of SA was contrasted and tolbutamide, a sulfonyl urea subsidiary utilized in diabetes mellitus<sup>43</sup>.

Krishnamurthy *et al.* created Kalpaamrutha (KA), a changed Siddha readiness, which contains SA Linn., EO and honey, and read up on the varieties in lipids lipid-processing compounds and lipoproteins in carcinogenic creatures and the impact of KA on the lipid digestion. The expanded degrees of all-out cholesterol, free cholesterol,

phospholipids, fatty substances and free unsaturated fats and diminished degrees of ester cholesterol in plasma, liver, and kidney found in disease enduring creatures were returned to approach ordinary levels on treatment with KA and SA. The impacts of KA were viewed as more compelling than SA<sup>44</sup>.

**Anti-Carcinogenic Activity:** Mathivadhani *et al.* read up SA nut extricate for inhibitory impact on human bosom malignant growth cells (T47D). Cytotoxicity examinations proposed that these cells had become apoptotic. *Semecarpus anacardium* was found to prompt quick Ca<sup>++</sup> assembly from intracellular stores of the T47D cell line, and its cytotoxicity against T47D all around corresponded with changed mitochondrial transmembrane potential. At the sub-atomic level, these progressions are joined by a decline in Bcl and expansion in Bax, cytochrome-C, caspases and PARP cleavage, and internucleosomal DNA fracture. Our outcomes prove that SA triggers apoptotic signals in T47D cells<sup>45</sup>.

Sugapriya *et al.* showed rebuilding of energy digestion in leukemic mice treated with SA nut milk extricate. Leukemia-bearing mice showed a huge expansion in LPOs, glycolytic catalyts, a diminishing in gluconeogenic chemicals, and a huge lessening in the exercises of the TCA cycle and respiratory chain proteins when contrasted with control creatures. *Semecarpus anacardium* treatment was contrasted and standard medication imatinib mesylate. *Semecarpus anacardium* organization to leukemic creatures brought about freedom of the leukemic cells from the bone marrow and inner organs<sup>46</sup>.

**Poisoning Nature and its Antidote:** *Semecarpus anacardium* is grouped in Ayurveda under the classification of harmful plants<sup>47</sup>. *Semecarpus anacardium* is incredibly hot and sharp in its ascribes; it ought to be utilized with alert. People showing hypersensitive responses to it should pause and keep away from the use of bhallataka. It should not be utilized in young kids, extremely old people, pregnant ladies and people of the prevalent pitta constitution. The utilization of the equivalent should be limited in the summer season. The poisonous indications of its inward use are skin rashes, consuming, tingling, unreasonable thirst and

perspiring, reduct in pee yield with hued pee, and blood in the pee (heamaturia) may show up. Before utilizing *Semecarpus anacardium* for interior restorative reasons, it is important to detoxify it by washing it with warm water or other strategies. One should take on a dull and cooling diet comprising rice, milk, spread, and ghee since they smother its symptom. The salt and flavors ought to be completely limited and during bhallataka treatment, it is prescribed to keep away from openness to sun, heat and unnecessary sex. The new squeeze of the leaves of amlika (*Tamarindus indica*) inside is one of the antitoxins for such manifestations.

**CONCLUSION:** *Semecarpus anacardium* is utilized for different therapeutic properties. The products of the soil separate show different exercises like antiatherogenic, calming, cancer prevention agent, antimicrobial, hostile to conceptive, CNS energizer, hypoglycemic, anticarcinogenic and hair development advertiser. More endeavors are expected to concentrate on the conventional employments of the plant and the resulting approval of movement and the instrument of activity. Presently a day's this plant is found uniquely in woodland region since people groups don't know as expected with its significance or toxic nature or huge size people groups are cutting this plant quickly from their encompassing region, it ought to be ration.

**ACKNOWLEDGEMENT:** The authors gratefully acknowledge the support provided by the Principal and Teaching Staff of Nagpur College of Pharmacy, Nagpur, Maharashtra, India.

**CONFLICTS OF INTEREST:** The authors declare that there are no conflicts of interest

## REFERENCES:

1. Mudem P: Review of Herbal Drug usage in India. Turkish Journal of Computer and Mathematics Education (TURCOMAT) 2021; 12(2): 1488-92.
2. Dhalla S, Chan KJ, Montaner JS and Hogg RS: Complementary and alternative medicine use in British Columbia: A survey of HIV positive people on antiretroviral therapy. Complementary Therapies in Clinical Practice 2006; 12: 242-8.
3. Mandal S and Rahaman C: Inventorization and Consensus Analysis of Ethno-veterinary Medicinal Knowledge among the Local People in Eastern India: Perception, Cultural Significance, and Resilience. Frontiers in Pharmacology 2022; 13.



4. Khare CP: Encyclopedia of Indian medicinal plants. Encyclopedia of Indian Medicinal Plants 1982; 419-21.
5. Mitra A and Zaman S: Biodiversity and Its Conservation. In Environmental Science-A Ground Zero Observation on the Indian Subcontinent. Springer Cham 2020; 143-214.
6. Bhitre MJ, Patil S, Kataria M, Anwikar S and Kadri H: Anti-inflammatory activity of the fruits of *Semecarpus anacardium* Linn. Asian Journal Chemistry 2008; 20: 2047-50.
7. Oliveira-Alves SC, Pereira RS, Pereira AB, Ferreira A, Mecha E, Silva AB, Serra AT and Bronze MR: Identification of functional compounds in baru (*Dipteryx alata* Vog.) nuts: Nutritional value, volatile and phenolic composition, antioxidant activity and antiproliferative effect. Food Research International 2020; 131: 150.
8. Manikantan MR, Pandiselvam R, Beegum S and Mathew AC: Harvest and postharvest technology. In The coconut palm (*Cocos nucifera* L.) Research and Development perspectives. Springer Singapore 2018; 635-722.
9. Jain P and Sharma HPA: potential ethnomedicinal plant: *Semecarpus anacardium* Linn. – a review, International Journal Of Research In Pharmacy And Chemistry 2013; 3(3): 564-572.
10. Bhattarai B, Chikanbanjar R, Luintel S, Gyawali S, Kunwar RM and Bussmann RW: *Semecarpus anacardium* L. f. Anacardiaceae. Ethnobotany of the Himalayas 2020; 1-8.
11. Gil RR, Lin LZ, Cordell GA, Kumar MR, Ramesh M, Reddy BM, Mohan GK, Narasimha AV and Rao A: Anacardoside from the seeds of *Semecarpus anacardium*, Phytochemistry 1995; 39 (2): 405-07.
12. Patel D, Inchlurkar SR, Kaushik Y and Chauhan NS: A toxicological review of Bhallataka. Journal of Ayurveda and Integrated Medical Sciences 2020; 5(02): 209-14.
13. Majumdar SH, Kulkarni SB and Chakraborty GS: Medicinal potentials of *Semecarpus anacardium* nut: A review. Journal of Herbal Medicine and Toxicology 2008; 2: 9-13.
14. Tiwari DK and Upmanyu N: Phytochemical analysis for bio-active potential of *Semecarpus anacardium* leaves. Plant Archives 2021; 21(1): 635-42.
15. Sundaram R, Muthu K, Shanthi P and Sachdanandam P: Antioxidant and antihyperlipidemic activities of catechol derivatives and biflavonoid isolated from *Semecarpus anacardium* seeds. Toxicology Mechanisms and Methods 2022; 32(2): 123-31.
16. Murthy SS: A biflavonoid from *Semecarpus anacardium*. Phytochemistry 1985; 24: 1065-70.
17. Murthy SS: Confirmation of the structure of Jeediflavonone: A biflavonane from *Semecarpus anacardium*. Phytochemistry 1984; 23: 925-7.
18. Upreti S, Rajendra SV, Das K and Aryal A: Antineoplastic Approach of *Semecarpus anacardium* Leaves against N-Nitroso Diethylamine Initiated Hepatocellular Carcinoma. Indian Journal of Pharmaceutical Education and Research 2018; 52: 610-7.
19. Nikam Y: Potent Ethanomedicinal Plant *Semecarpus anacardium* Linn: A Review Systematic Reviews in Pharmacy 2022; 13(3): 349-355.
20. Jain D, Chaudhary P, Kotnala A, Hossain R, Bisht K and Hossain MN: Hepatoprotective activity of medicinal plants: A mini review. J of Med Plants 2020; 8(5): 183-8.
21. Murthy SS: New biflavonoid from *Semecarpus anacardium* linn. Chemica Acta Turcica 1992; 20: 30.
22. Rahman KM, Rahman MS, Begum and Rashid B: Preliminary cytotoxicity screening of some medicinal plants. Journal of Pharmaceutical Science 2008; 7: 47-52.
23. Sharma A, Mathur R and Dixit VP: Hypocholesterolemic activity of nut shell extract of *Semecarpus anacardium* (Bhilawa) in cholesterol fed rabbits. Indian Journal Experimental Biology 1995; 33: 444-8.
24. Ramprasath VR, Shanthi P and Sachdanandam P: Immunomodulatory and antiinflammatory effects of *Semecarpus anacardium* Linn. Nut milk extract in experimental inflammatory conditions. Biological Pharmaceutical Bulletin 2006; 29: 693-700.
25. Selvam C and Jachak SM: A cyclooxygenase (COX) inhibitory biflavonoid from the seeds of *Semecarpus anacardium*. Journal of Ethnopharmacology 2004; 95: 209-12.
26. Satyavati GV, Prasad DN, Das PK and Singh HD: Anti-inflammatory activity of *Semecarpus anacardium* Linn. A preliminary study. Indian Journal of Physiology Pharmacology 1969; 13: 37-45.
27. Bhitre MJ, Patil S, Kataria M, Anwikar S and Kadri H: Anti-inflammatory activity of the fruits of *Semecarpus anacardium* Linn. Asian Journal of Chemistry 2008; 20: 2047-50.
28. Premalatha B and Sachdanandam P: Potency of *Semecarpus anacardium* Linn. Nut milk extract against aflatoxin B(1)- induced hepatocarcinogenesis: Reflection on microsomal biotransformation. Pharmacology Research 2000; 42: 161-6.
29. Mythilypriya R, Shanthi P and Sachdanandam P: Therapeutic effect of Kalpaamruthaa- a herbal preparation on adjuvant induced arthritis in Wistar rats. Inflammopharmacology 2008; 16: 21- 35.
30. Verma N and Vinayak M: *Semecarpus anacardium* nut extract promotes the antioxidant defence system and inhibits anaerobic metabolism during development of lymphoma. Bioscience Report 2009; 29(3): 151-64.
31. Ramprasath VR, Shanthi P and Sachdanandam P: *Semecarpus anacardium* Linn. Nut milk extract, an indigenous drug preparation, modulates reactive oxygen/nitrogen species levels and antioxidative system in adjuvant arthritic rats. Molecular and Cellular Biochemistry 2005; 276: 97-104.
32. Sahoo AK, Narayanana N, Sahana S, Rajanb SS and Mukherjee PK: *In-vitro* antioxidant potential of *Semecarpus anacardium* L. Pharmacology online 2008; 3: 327-35.
33. Shanmugam A, Ramprasath VR, Shanthi P and Sachdanandam P: Restorative effect of Kalpaamruthaa, an indigenous preparation, on oxidative damage in mammary gland mitochondrial fraction in experimental mammary carcinoma. Molecular and Cellular Biochemistry 2006; 291: 77-82.
34. Farooq SM, Alla TR, Rao NV, Prasad K, Shalam K and Satyanarayana S: A study on CNS effect of nut milk extract of *Semecarpus anacardium*. Pharmacology online 2007; 1: 49-63.
35. Sharma K, Shukla SD, Mehta P and Bhatnagar M: Fungistatic activity of *Semecarpus anacardium* Linn. nut extract. Indian J of Exp Biology 2002; 40(3): 314-8.
36. Sharma A, Barman N and Malwal M: Antimicrobial efficacy of nut oil of *Semecarpus anacardium*: A marking nut tree. Biotechnology 2010; 9(3):383-386.
37. Mohanta TK, Patra JK, Rath SK, Pal DK and Thatoi HN: Evaluation of antimicrobial activity and phytochemical screening of oils and nuts of *Semecarpus anacardium*. Scientific Research and Essay 2007; 2: 486-90.
38. Nair A and Bhide SV: Antimicrobial properties of different parts of *Semecarpus anacardium*. Indian Drugs 1996; 33: 323-8



39. Sharma A, Verma PK and Dixit VP: Effect of *Semecarpus anacardium* fruits on reproductive function of male albino rats. Asian Journal of Andrology 2003; 5: 121-4.
40. Vinutha B, Prashanth D, Salma K, Sreeja SL, Pratiti D and Padmaja R: Screening of selected Indian medicinal plants for acetylcholinesterase inhibitory activity. Journal of Ethnopharmacology 2007; 109: 359-63.
41. Mary NK, Babu BH and Padikkala J: Antiatherogenic effect of Caps HT2, a herbal Ayurvedic medicine formulation. Phytomedicine 2003; 10(6): 474-482.
42. Sharma A, Mathur R and Dixit VP: Hypo cholesterolemic activity of nut shell extract of *Semecarpus anacardium* (Bhilawa) in cholesterol fed rabbits. Indian Journal of Experimental Biology 1995; 33: 444-448.
43. Arul B, Kothai R and Christina AJ: Hypoglycemic and antihyperglycemic effect of *Semecarpus anacardium* Linn in normal and streptozotocin-induced diabetic rats. Methods Finds Experiment Clin Pharma 2004; 26: 759-62.
44. Veena K, Shanthi P and Sachdanandam P: The biochemical alterations following administration of Kalpaamruthaa and *Semecarpus anacardium* in mammary carcinoma. Chemico Biol Interaction 2006; 161: 69-78.
45. Mathivadhani P, Shanthi P and Sachdanandam P: Apoptotic effect of *Semecarpus anacardium* nut extract on T47D breast cancer cell line. CBI 2007; 31: 1198-206.
46. Sugapriya D, Shanthi P and Sachdanandam P: Restoration of energy metabolism in leukemic mice treated by a siddha drug: *Semecarpus anacardium* Linn. nut milk extract. Chemico Biological Interaction 2008; 173: 43-58.
47. Nikam YP: Potent Ethanomedicinal Plant *Semecarpus anacardium* Linn: A Review. Systematic Reviews in Pharmacy 2022; 13(3).

**How to cite this article:**

Bais AG, Hiradeve SM and Uplanchiwar VP: *Semecarpus anacardium* Linn: an ethnomedical, phytochemical and pharmacological review. Int J Pharm Sci & Res 2023; 14(2):538-46. doi: 10.13040/IJPSR.0975-8232.14(2).538-46.

All © 2023 are reserved by International Journal of Pharmaceutical Sciences and Research. This Journal licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

This article can be downloaded to **Android OS** based mobile. Scan QR Code using Code/Bar Scanner from your mobile. (Scanners are available on Google Playstore)