WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

"Exploring The Medicinal Potential Of Semecarpus Anacardium Linn"

Mr. Vivek Yadav [1], Miss. Harshada Dhak [2], Dr. Sonali Uppalwar [3]

Ideal Institute of Pharmacy, Posheri, Wada.

ABSTRACT:

Background:- Semecarpus anacardium Linn, marking nut, has been used in folk medicines for decades. The review aims at analyzing its medicinal potency, phytoconstituents, and pharmacological activities extensively.

Main body:- The bioactivities of the different research studies indicate that this species of plants has anti-inflammatory, antioxidant, antimicrobial, anticancer, and neuroprotective properties. Its medicinal potency is due to their bioactive compounds: flavonoids, phenolic acids, and alkaloids. however, further research is needed to clarify its pharmacokinetics, toxicity, and clinical applications.

Method:- Literature search strategy (databases, keywords). Inclusion/exclusion criteria (study design, language, publication year). Study selection process. Data extraction and synthesis methods. Some key research databases to Consult: PubMed,Scopus,Web of science, Science direct, Google scholar.

Result:- This review highlights the medicinal potential of Semecarpus anacardium Linn, revealing a rich phytochemical profile and diverse pharmacological activities. Its therapeutic applications, coupled with a relatively low toxicity profile, render it a promising candidate for further research and development.

Conclusion:- Semecarpus anacardium Linn is a promising medicinal plant requiring comprehensive research to unlock its therapeutic potential.

Keywords: Medicinal potential, Phytochemistry, Pharmacology, Traditional medicine.

Introduction :

Long used to treat a variety of ailments, such as rheumatism, snake bites, and skin issues, is the medicinal plant Semecarpus anacardium, often known as "marking nut." Recent research has focused on the anti-inflammatory and anti-carcinogenic properties of Semecarpus anacardium, making it a strong candidate for the development of innovative pharmaceuticals..(1). It is native to the Sub-Himalayan region, the Kanara Forest (Tamil Nadu), Madhya Pradesh, Gujarat, Konkan region (Maharashtra), Assam (Khasia Hills), and Northern (Upreti et al., 2016) Australia. The nut is heart shaped and well known that the extracts of nut contain medicinal ingredients.(2). Indigenous medicine still makes use of S. anacardium nut preparations, which were utilized in antiquity. Trading in the bhilawa nut (S. anacardium) dates back thousands of years (King, 1957). Current reporting from every Several scientific investigations on S have been carried out all across the world. Anacardium to assess its potential medical benefits. The current analysis provides an overview of Phytochemical composition, pharmacological action, and enhancement of plants Research on S. anacardium.(3). This moderately sized deciduous tree can reach a height of 3500 feet in the outer Himalayas and hotter regions of India. It is widely distributed in Assam, Bihar, Bengal and Orissa, Chittagong, central India, and the western peninsula of the East Archipelago, Northern Australia. (4). Taxonomical classification is Subkingdom: Tracbeobionta; Kingdom: Plantae; Superclassification: Spermatophyata; Group: Magnoliopsidae; Category: Magnoliopsida; Subclass: Rosidae; Sequence: Semecarpus; The Anacardiaceae: family; Class: Semecarpus; Category: Anacardium. (5). Plant structure and function overview. It Is a drought tolerant seasonal tree growing up to 10-15 m. The leaf is 30-60 cm, Long and 12-30 cm wide, large and single, alternate and oblongo-ovate- Smooth above and somewhat hairy underneath. Leaf attachment feature Includes a heart shaped and a stalk narrowing base. Flower colour is green. White and moves in clusters. The trees flush in new leaves during these two months May and July. Understanding the population likely affects biodiversity within the various abdomens of removing the pericarp but may inflict skin rash and seed oil is therapeutically active. Fruit of plants ripens from December to March. Ripe fruits glow. Black in colour, and 2-3 cm wide

Medium shade bearer, angled Ovoid or oblong drupe, 2.5 to 3.8 cm long, compressed, carried on an orange Coloured receptacle form of the disk, the base of the 4 calyx and the extremity of the peduncle. Seed is dark brown in colour while the kernel is edible after Removal of the pericarp but, at times, may lead to cutaneous eruption and Seed oil is very medicinal. Seeds are collected mainly during December-March months.(6).

Synonyms Popular names in various languages: Marathi: Bibba, Bhillava; English: Indian Marking Nut Tree, Marsh Nut, Oriental Cashew Nut; Hindi: Bhela (Bhel), Bhelwa, Bhilawa (Bhilv), Bhilwa; Sanskrit: Antahsattva, Arusharah, Aruskara (Arukara), Arzohita, Balla'ta (Bhallata, Ballata), Bhallataka; (Bhalltaka), Bhallatakah, Viravrksa, Visasya; Tamil: Erimugi (Erimuki); Telugu: Nallajeedi; Gujarati: Bhilamu; Russian: SemekarpusAnakard. (7).

Cashew nut Shell liquid extracted by solvents is a solution of alkenyl phenols, Mainly anacardic acid. As defatted, cashew kernel flour is a Good source of protein and minerals. In addition, it can provide Low-fat fabricated food and animal feed. Most feeds for animals or poultry .Are formulated with a high proportion of cashew fiber. In addition, cashew fibre with cashew nut shell liquid, Both have very high anacardic acids levels and hence can be It has been used in functional food formulations.(8).

Fif. 1 Seeds of semecarpus anacardium

Semecarpus anacardium, also known as Oriental cashew nut belongs to family-anacardiaceae. The word Semecarpus comes from Greek word "simeion" meaning marking and "carpus" Meaning nut while anacardium means like cardium i.e, heart. As it produces water insoluble permanent mark on clothes, washer men on olden days used the nuts to mark clothes which gave the name "marking nut" to the plant by the Europeans.(9).

Fig. 2 Flower of semecarpus anacardium

Fig. 3 Leaves of semecarpus anacardium

Figure 4

Phytochemical constituents :

Medicinal plant preparations in alternative medicine have been found to be widespread, particularly in diseases not amenable to modern treatment. Various nut extract preparations of S. anacardium are effective against many diseases, such as arthiritis, tumours, infections etc (Premalatha, 2000). The isolation of its active principle and structure and function can be of great help in knowing the mechanism of its pharmacological action. In this regard, several isolated phytopharmaceuticals from different parts of S. anacardium have been based on this principle.(3).

The vast significant components of the S. Anacardium Linn are bhilwanols, phenolic compounds(10, 11) biflavonoids (12), sterols and Glycosides (11, 13), Bhilwanol from fruits was a mixture of cis- and transisomers of ursuhenol; this compound consists mainly of 1,2,dihydroxy- 3(pentadecadienyl 8′,11′)benzene and 1,2,hydroxy-3(pentadecadienyl 8′)benzene.(14), The other components isolated are, anacardoside (15), semecarpetin (16),

Figure 5

Nallaflavanone (17), jeediflavanone(18, 19),
semecarpuflavanone,(20)galluflavanone,(21,22) Anacarduflavone(23) mono-olefi n I, diolefi n II, bhilawanol-A, Bhilawanol-B, amentoflavone tetrahydroamentoflavone Semicarpol, anacardic acid, tetrahydrobustaflavone, O-trimethyl Biflavanone A1(24), O-trimethyl biflavanone A2,(24) 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.(24) .

Pharmacological action:

Anti-inflammatory:

Ramprasath VR et al. investigated, The alleviating effects of SA nut extraction on Inducing and inducing adjuvant arthritis. Semecarpus anacardium fundamentally reduced. The carrageenan- induced paw edema and cotton Pellet granuloma.(40). These results demonstrate the High anti- inflammatory activity and therapeutic potential Of SA Linn. Nut extract against all stages of
Inflammation is similar to that of indomethacin. (25). Salvem et al. evaluated that ethyl acetic acid derivative concentrate of SA resulted in exclusion of considerable dynamic rule, tetrahydroamen to flavone (THA), a biflavonoid.(41). The in-vitro cyclooxygenase (COX-1)-catalysed prostaglandin biosynthesis study of THA yielded an IC50 value of 29.5 µM (COX-1) and 40.5% inhibition at 100 g/mL (COX-2). In vivo carrageenan-induced paw edema measurement produced a portion subordinate. The soothing effect of THA and the activity was comparable to that of Ibuprofen.(26). Showed 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. (27). In other cases, they mentioned the therapeutic effects of focused impact on changes associated with collagen and glycosaminoglycan digestion in adjuvant ligament Wistar rats. Reduced levels of collagen and GAGS fragments (chondroitin sulfate, heparan sulfate, hyaluronic acid) and increase in the levels of connective tissue deteriorating lysosomal glycohydrolases, such as acid phosphatase, beta- glucuronidase, beta-Nacetyl glucosaminidase, and cathepsin-D observed in joint animals were restored to near normal Levels of SA-induced mitigation movement in middle people of irrigation regarding lysosomal chemicals and its effect on proteoglycans. Mythilypriya et al. The groups were treated with Semecarpus Anacardium.(28). 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 Nadjuvant joint inflammation.(42). The medication Likewise shows an immunomodulatory impact During irritation. Semecarpus anacardium impedes The TNF-á along these lines seriousness of irritation Is diminished.(29).

Anti-arthritic effect:

The milk extract of the nut was found to be active against adjuvant-induced arthritis in albino Wistar rat at the dose level of 150 mg/kg body weight, based on the dose-dependent study. Milk extract of the nut inhibits acute tuberculin reaction in sensitized rats and also the primary phase of adjuvant arthritis A chloroform extract of the nut Significantly reduced acute carrageen induced paw edema in rats and was Active against secondary lesions of adjuvant induced arthritis suggested that the diseased state of Adjuvant arthritis may be associated with augmented lipid peroxidation and The administration of the drug may exert its anti arthritic effect by retarding Lipid peroxidation and causing a modulation in cellular antioxidant defence System.(43)(44). An antioxidant property of flavonoids is scavenging singlet O2 and terminating peroxides by their low redox potential might augment for the inhibition of lipid peroxidation. This study indicates that the altered level of glycolytic and gluconeogenic enzymes reverted back to near normal levels by the treatment of S. anacardium nut milk extract. Elevated levels of antioxidants (SOD, CAT, GPX, GSH) and the biochemical markers of inflammation (C-reactive protein (CRP) level and Erythrocyte Rate (ESR) to near normal levels in arthritis induced Wistar Rats.(45)(46). The treatment with the drug also significantly reduced paw thickness and arthritic scores linked with arthritic rat. IN addition to this, S. anacardium also possess a capability to modulate the

Accumulation of neutrophils and brings down the Elevated levels of lysosomal enzymes in adjuvant induced Arthritis rats. In addition to this, S. anacardium nut milk extract exerts its Action on adjuvant arthiritis in rats through stabilizing action on lysosomal Membrane and thereby preventing its leakage from lysozomes.(47)(48). This would Prevent the injurious attack to normal tissue and also would tend to retard Amplification and spread of the inflammatory process. All these observations indicated that S.anacardium nut milk extract Is a good therapeutic agent for the arthritis.(3). (49)(50).

Cytotoxic, Cytostatic, Antineoplastic and Antitumour Activity :

Semecarpus anacardium has been used as an antitumor agent. Properties. Various preparations of marking nut had been used in clinical.(51)(52). It has been demonstrated to be significant in practice and promising results for that matter, especially regarding cancer.Of oesophagus, liver, urinary bladder and leukemia. (30)(53). The pericarp oil was found to have anticancer activity. The flavonoids contained in S. anacardium nut can prevent various cancers. SAN-AB is chloroform extract of the whole nut (pericarp and seed) when administered by intraperitoneal injection, diluted with peanut oil, it has no toxicity.(54). It showed differential activity towards tumour cells in Yoshida sarcoma (ascites tumour in rats). S. anacardium nut extract demonstrated potent anticarcinogenic activity against AFB1 mediated hepatocellular carcinoma.(55). The adverse effects induced by AFB1 were reversed to near normal levels with reference to biochemical Parameters and histological pattern. (3)Serum alpha protein level returned to near normal Levels after treatment with S. anacardium nut milk extract. This thus provided the additional evidence to employ S. anacardium nut milk extraemplo An antitumour agent.(56)(57). The low Levels of non- enzymatic antioxidants (uric acid, vitamin C, vitamin E,glutathione, total thiol, non-protein thiols, cytochrome P450) were recovered Into normal values after drug administration.(58). The Deleterious effects linked to low levels of antioxidant are also S. anacardium nut extract controls.(59). Therefore, S. anacardium nut extract Acts as a potential anticarcinogenic agent against radiation damage caused By AFB1 induced HCC via the property of its antioxidant along with the induction Of in vivo antioxidant defence system.(60). The influence of the drug S.Anacardium extract on the aflatoxin B (AFB1) induced hepato carcinogenicity of adult Albino male Wistar rats in relation to tumor marker enzymes (lactate dehydrogenase, aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase and γ-glutamyl transpeptidase). Treatment with the S. anacardium nut extract restored the reduced levels of these enzyme activities to almost normal value.(31)(61).

Anti microbial activity:

Prepared aqueous and organic solvent extracts of the plant and screened for antimicrobial (disc diffusion Method) and phytochemical properties.(62). The petroleum ether PEE and aqueous extract fractions AQE showed inhibitory activity against Staphylococcus aureus 10 mm and Shigella flxneri 16 mm, respectively, at 100 mg/ml.(63). Chloroform extract showed inhibition against Bacillus licheniformis, Vibrio cholerae and Pseudomonas aeruginosa, the ethanol extract

demonstrated inhibition to Pseudomonas aeruginosa and S. aureus. (32)(64). Nair et al., reported that the alcoholic extract of dry nuts of SA, Bhallatak was found bactericidal in vitro against three gram negative strains, Escherichia coli, Salmonella typhi and Proteus vulgaris and two gram positive strains, Staphylococcus aureus and Corynebacterium diphtheriae. Latter reports showed that the alcoholic extracts of different parts of the plant, viz., leaves, twigs and green fruit also possess anti-bacterial properties, especially. The leaf extract. No dermatoxic effect (irritant property) was observed in the mouse skin irritant assay. (33)(65).

Neuroprotective Activity:

Farooq evaluated pro-benefit effect of nuts of SA, Milk extracted on CNS, Primarily due to its locomotor and nootropic activities 52. Vinutha researched that the neurodegenerative disease cholinergic cells loss, particularly.(66)(67). The basal forebrain is followed by the loss of The neurotransmitter acetyl choline (Ach). The SA is active in prolonging the half-life of acetylcholine by Ach esterase inhibitor.SA is beneficial in cognitive decline, improving the memory. (34)(68).

Anti oxidant activity:

Rats given Kalpaamruthaa demonstrated normal levels of lipid peroxide and antioxidant defenses, according to Shanmugam62.(69). Veena assessed the antioxidant levels in the blood and tissues of the control and experimental animals' kidney, liver, and breast.(70). Lipid peroxidation (LPO) was elevated and antioxidant levels were lowered in cancerous conditions. When using drugs (SA and KA), there was a drop in LPO and an increase in antioxidant.(71)(72). Sahoo studied the antioxidant activity of ethyl acetate extract of stem bark of SA. Ethyl acetate extract exhibited the stronger antioxidant activity (owing to the presence of the highest total phenolic content of 68.67% measured as pyrocatechol equivalent) compared to the other (hexane, chloroform, and methanol) extracts.(73)(74). The isolation of the ethyl acetate extract of SA stem bark yielded a bright yellow solid crystal, which was identified as butein. This compound exhibited antioxidant activity (IC50 values of 43.28 ± 4.34 μg/ml.(35)(75).

Anti-Spermatogenic Effect:

SA extract feeding caused Anti-spermatogenic effectevidenced by reduction in number of spermatogenesiscells and spermatozoa in male albino rats. Sharma studiedreduction in sperm density in cauda epididymides may be due to changes in the androgen metabolism. Meiotic and postmeiotic germ cells were highly sensitive to androgen concentration and the alteration in androgen level in testes may affect the transformation of spermatocytes to spermatids.(36)(76).

According to Narayan, there was spermicidal action in the aqueous extract of the aerial portion of SA. When albino rats are given an ethanolic extract of SA fruit, they experience spermatogenic arrest.(77)(78). There was a noticeable decline in sperm motility and density. The quantity of spermatids, secondary spermatocytes, and primary spermatocytes was likewise significantly reduced by the fruit extract feeding.(79). These findings unequivocally demonstrate SA70's anti-

spermatogenic properties. Male albino rats fed SA extract had a decrease in spermatogenic cells and spermatozoa, indicating an anti-spermatogenic action.(37)(80).

Traditional uses:

In Ayurvedic medicine, semecarpus anacardium is used to induce abortion, improve sexual potency, boost sperm count, cure digestive issues, and balance phlegm (kapha dosha). The reddish- orange portion of the plant is harvested, partially dried in the sun, and then consumed.(81)(82). It's crucial to remember that the plant is toxic in its original form and needs to be properly purified. If not handled properly, the oil derived from its seeds can result in blisters and excruciating sores.(83). Using Semecarpus anacardium medicinally requires care and appropriate processing. Bhallataka is used in traditional medical systems for hair maintenance.(84). In folk medicine, it is used to dye hair and is thought to encourage hair growth. However, because of its strong qualities and possible negative effects, it should be used with caution. (38)(85).

It Is used as a hematinic tonic, brain tonic, and blood purifier. For the treatment of chronic rheumatic illnesses, powdered seeds of Semecarpus anacardium, Terminalia chebula, and Sesamum indicum L. combined with jaggery are a great remedy. In cases of oligomenorrhea (scanty menstruation) and dysmenorrhea (painful menstruation), medicated milk or its oil is beneficial.(86)(87). It helps with kapha-type diabetes because it lowers urine production.(88). The best rasayana for vata disorders, skin conditions, and as a preventative step to increase bodily
resilience is Bhalabhataka.(39)(89).

Toxicity:

In Ayurveda, there has been classification of Semecarpus Anacardium and it is volved in the use of poisonous plants.57 The Semecarpus anacardium is of Extreme heat level with sharp characteristics and thus should be administered carefully. A person who develops allergic symptoms, should stop and refrain from The use of bhallataka. Due to lack of safety data, adults with predominant pitta Constitutions as well as pregnant women, very young children, and the very old Are advised not to use it. Similarly, its use should be controlled during hot weather. Because of the effects on the body caused by taking it internally, side effects include skin rashes, burning and itching of intense degree, extreme thirst and sweaty condition, decrease in urination with dark colored urine, blood in urine may also occur. It is first essential to cleanse the neem oil before using Semecarpus anacardium for the internal treatment by immersing it in warm water or other means. It is Advisable that one should take a bland and cooling diet especially rice, milk, Butter and ghee since they help in alleviating the side effects of the drug. Adding salt and spices to food should be avoided completely and at such times The bhallataka treatment, sun, heat and excessive sex should be avoided. The Fresh juice of the leaves of amlika (Tamarindus indica) taken internally is one of the remedies for these symptoms.(90).

Clinical Studies :

Semecarpus anacardium Linn, a traditional medicinal plant, has been investigated in various clinical studies to validate its therapeutic potential.(91).

Human Clinical Trials

1. ***Antipsoriatic efficacy:*** A randomized controlled trial (RCT) demonstrated significant improvement in psoriasis symptoms with Semecarpus anacardium Linn extract topical application.(92).
2. ***Wound healing:*** A clinical study showed accelerated wound healing with Semecarpus anacardium Linn oil treatment.(93).
3. ***Antimicrobial efficacy:*** Semecarpus anacardium Linn extract exhibited potent antimicrobial activity against human pathogens.(94).
4. ***Hepatoprotective effects:*** Semecarpus anacardium Linn supplementation protected against liver damage in patients with hepatitis.(95).

Preclinical Studies

1. ***Anti-inflammatory activity:*** Semecarpus anacardium Linn extract inhibited inflammation in animal models.(96).
2. ***Anticancer properties:*** Semecarpus anacardium Linn compounds showed cytotoxicity against cancer cell lines.(97).
3. ***Neuroprotective effects:*** Semecarpus anacardium Linn extract demonstrated neuroprotection in animal models.(98).

Ongoing and Future Research Directions

1. Standardized extract formulation.
2. Large-scale clinical trials.
3. Mechanism of action studies.
4. Toxicity and safety evaluations.
5. Combination therapy research.(99).

Conclusion:

In summary, the therapeutic potential of Semecarpus anacardium Linn, sometimes referred to as marking nut, has been proven, hence supporting its historic use in folk remedies. A thorough examination of its phytoconstituents and pharmacological activity indicates a wide range of bioactivities, such as neuroprotective, anti-inflammatory, antioxidant, and antibacterial qualities. The reason for its therapeutic efficacy is the presence of alkaloids, phenolic acids, and flavonoids. Although Semecarpus anacardium exhibits potential for treating respiratory, rheumatism, and skin illnesses, further research is necessary to fully understand its pharmacokinetics, toxicity, and
clinical uses. This review emphasizes how crucial it is to investigate Semecarpus anacardium as a beneficial natural remedy for a range of illnesses.

REFERENCE:

1. *Nilesh Mhaske*, Vishvesh Rasane, Pallavi Kedar, Megha Kakade, Pallavi Dahiphale, Sanjivani Ahire; A SYSTEMATIC REVIEW: ANTI-INFLAMMATORY AND ANTI- CARCINOGENIC ACTIVITIES OF SEMECARPUS ANACARDIUM Linn.Nilesh Mhaske/Afr.J.Bio.Sc.6(14)(2024)ISSN:2663-2187.
2. Suyash A. Sawale And Shashibhal M. Pandey;A Critical review on 'Marking nut'— Semecarpus anacardium Linn.;2020 JETIR November 2020, Volume 7, Issue 11 www.jetir.org (ISSN-2349-5162).
3. T. GOUTHAMAN, M.S. KAVITHA, BAKRUDEEN ALI AHMED,T. SENTHIL KUMAR AND M.V. RAO ; A Review on Semecarpus anacardium L.:An Anticancer Medicinal Plant; RPMP Vol. 19 – Phytopharmacology & Therapeutic Values.
4. Kirtikar KR, Basu BD. Indian medicinal plants. Vol. 3. Dehradun, India: International Booksellers and Publishers; 1975. P. 667.
5. Vaishnavi C. Kardile,Sakshi M. Kawade, Kaushal A. Thorat, Shubham N. Girge ;A systematic review on Antiatherogenic Activity of Sem.Anacardium nut extract; 2024 IJNRD | Volume 9, Issue 8 August 2024| ISSN: 2456-4184 | IJNRD.ORG.
6. Upreti S, Anam MS, Rajendra SV, Das K, Dang R. Semecar-pus Anacardium-a wonderful plant with varied medicinal properties. Pharm Res. 2016; 15(4): 162-173.
7. Saurabh Balasaheb wakle; Mr. Dipmala ghorpade; Dr. Gajanan sanap; Review on semecarpus anacardium linn;IJARSCT;Volume 3, Issue 1, December 2023; ISSN (Online) 2581-9429.
8. Trevisan MTS, Pfundstein B, Haubner R, Würtele G, Spiegelhalder B, Bartsch H, et al. Characterization of alkyl phenols in cashew (Anacardium Occidentale.) products and assay of their antioxidant capacity. Food Chem Toxicol. (2006) 44:188–97. Doi: 10.1016/j.fct.2005.06.012.
9. Sabita Upreti, Mohd. Sauf Anam, Rajendra SV, Kuntal Das and Raman Dang ;SEMECARPUS AANACARDIUM- A WONDERFUL PLANT WITH VARIED M EDICINAL PROPERTIES; Journal of Pharmaceutical Research Vol.15. No.4, Oct. – Dec. 2016 : 162; ISSN- 0973-7200 online- ISSN- 2454-8405.
10. Mathur HN, Agarwal JS. Phenolic modifi ed resin of oil varnishes. J Sci Indian Res 1953;12:411.
11. Rao NS, Row LR, Brown RT. Phenolic constituents of Semecarpus anacardium. Phytochemistry 1973;12:671-81.
12. Ishatulla K, Ansari WH, Rahman W, Okigawa M, Kawanon N. Biofl avanoids from Semecarpus anacardium linn. Indian J Chem 1977;15:617-22.

13. Govindachary TR, Joshi BS, Kamal VM. Phenolic constituents of Semecarpus anacardium. Indian J Chem 1971;9:1044.
14. Indap MA, Ambaye RY, Gokhale SV. Anti tumour and Pharmacological effect of oil from Semecarpus anacardium Linn. F. Indian J Physiol Pharmacol 1983;27:83-91.
15. Majumdar SH, Kulkarni SB, Chakraborthy GS. Medicinal Potientials of Semecarpus anacardium nut: A review. J Herb Med Toxicol 2008;2:9-13.
16. Murthy SS. Semicarpetin: A bifl avonoid from Semecarpus Anacardium. Phytochemistry 1988;27:3020-2.
17. Murthy SS. New dimeric fl avone from Semecarpus anacardium. Proc Indian Natl Sci Acad 1987;57:632.
18. Murthy SS. A bifl avonoid from Semecarpus anacardium. Phytochemistry 1985;24:1065- 70.
19. Murthy SS. Confi rmation of the structure of Jeedifl avonone: A Biflavonane from Semecarpus anacardium. Phytochemistry 1984;23:925-7.
20. Murthy SS. A bifl avanone from Semecarpus anacardium.Phytochemistry 1983;22:1518- 20.
21. Murthy SS. Naturally occurring bifl avonoid derivatives: Galluflavanone, a new bifl avonoid from Semecarpus Anacardium. Indian J Chem 1985;24:398-402.
22. Gedam PH, Sampathkumaran PS, Sivasamban MA. Composition of bhilawanol from Semecarpus anacardium. Indian J Phytochem 1974;13:513-5 .
23. Murthy SS. New bifl avonoid from Semecarpus anacardium linn. Clin Acta Turcica 1992;20:30.
24. Rahman KM, Rahman MS, Begum Rashid B. Preliminary Cytotoxicity screening of some medicinal plants of Bangladesh, Dhaka Univ. J Pharm Sci 2008;7:47-52.
25. Ramprasath VR, Shanthi P and Sachdanandam P: Immunomodulatory and antiinflammatory effects of Experimental inflammatory conditions. Biological Pharmaceutical Bulletin 2006; 29: 693-700.
26. Selvam C and Jachak SM: A cyclooxygenase (COX) Inhibitory biflavonoid from the seeds of Semecarpus Anacardium. Journal of Ethnopharmacology 2004; 95: 209-12.
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. 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.
29. Abhinav G. Bais , Sachin M. Hiradeve and Vaibhav P. Uplanchiwar; SEMECARPUS ANACARDIUM LINN: AN ETHNOMEDICAL, PHYTOCHEMICAL AND PHARMACOLOGICAL REVIEW; Bais et al., IJPSR, 2023; Vol. 14(2): 538-546. E-ISSN: 0975-8232; P-ISSN: 2320-5148.
30. Vad, B.G. 1973. Study of complete regression in four cases of cancer. Indian Practitioner 26: 253-263.
31. Premalatha, B. and Sachdanandam, P. 1998. Immunomodulatory activity of Semecarpus anacardium Linn. Nut milk extract in aflatoxin B1 Induced Hepatocellular Carcinoma in rats. Pharmacy and Pharmacology Communications 4: 507-510.
32. Premalatha, B. and Sachdanandam, P. 2000b. Potency of Semecarpus anacardium Linn. Nut milk extract against Aflatoxin B-induced hepatocarcinogenesis:Reflection on microsomal biotransformation enzymes. Pharmacological Research 42(2): 161-166.
33. Nair A, Bhide SV. Antimicrobial properties of different parts of Semecarpus anacardium. Indian Drugs 1996;33:323-8.
34. Vinutha B, Prashanth D, Salma K, Sreeja SL, Pratiti D, Padmaj R, Radhika S, Amit A, Venkateshwarlu K, Deepak M. Screening Of selected Indian medicinal plants for acetylcholinesterase Inhibitory activity, J Ethnopharmacol, 109(2), 2007, 359-363.
35. Mona Semalty, Ajay Semalty, Ashutosh Badola, Geeta Pant Josie, M. S. M. Rawat;Semecarpus anacardium Linn.: A review; Pharmacognosy Reviews | January-June 2010 | Vol 4 | Issue 7.
36. Sharma A, Verma PK, Dixit VP. Effect of Semecarpus Anacardium fruits on reproductive function of male albino rats,Asian J Androl, 5, 2003, 121-124.
37. Nair A, Bhide SV. Antimicrobial properties of different parts ofSemecarpus anacardium. Indian Drugs, 33, 1996, 323–328.
38. Saurabh Balasaheb wakle; Mr. Dipmala ghorpade; Dr. Gajanan sanap; Review on semecarpus anacardium linn;IJARSCT;Volume 3, Issue 1, December 2023; ISSN (Online) 2581-9429.
39. Deepa N, Vijay V, Uthanthi T , Therese M Faustina, ThamizhKuil R , Vasundra and Nirmala; Semecarpus Anacardium: A Review of Its Phytochemistry, Traditional Uses, Pharmacological and Toxicological Properties; International Journal of Pharmacy and Biological Sciences-IJPBSTM (2024) 14 (3): 08-16 Online ISSN: 2230-7605, Print ISSN: 2321-3272.
40. Semalty M, Semalty A, Badola A, Joshi GP, Rawat MS. Semecarpus anacardium Linn.: A review. Pharmacogn Rev. 2010 Jan;4(7):88-94. doi: 10.4103/0973-7847.65328. PMID: 22228947; PMCID: PMC3249908.
41. Joseph JP, Raval SK, Sadariya KA, Jhala M, Kumar P. Anti cancerous efficacy of Ayurvedic milk extract of Semecarpus anacardium nuts on hepatocellular carcinoma in Wistar rats. Afr J Tradit Complement Altern Med. 2013 Aug 12;10(5):299-304. PMID: 24311839; PMCID: PMC3847419.
42. Ali MA, Wahed MI, Khatune NA, Rahman BM, Barman RK, Islam MR. Antidiabetic and antioxidant activities of ethanolic extract of Semecarpus anacardium (Linn.) bark. BMC Complement Altern Med. 2015 Apr 29;15:138. doi: 10.1186/s12906-015-0662-z. PMID: 25925864; PMCID: PMC4436845.
43. Semalty M, Semalty A, Badola A, Joshi GP, Rawat MS. Semecarpus anacardium Linn.: A review. Pharmacogn Rev. 2010 Jan;4(7):88-94. doi: 10.4103/0973-7847.65328. PMID: 22228947; PMCID: PMC3249908.
44. Purushothaman A, Meenatchi P, Saravanan N, Karuppaiah M, Sundaram R. Isolation and Characterization of an Acyclic Isoprenoid from Semecarpus anacardium Linn. and its Antibacterial Potential in vitro: - Antimicrobial Activity of Semecarpus anacardium Linn. Seeds. J Pharmacopuncture. 2017 Jun;20(2):119-126. doi: 10.3831/KPI.2017.20.016. Epub 2017 Jun 30. PMID: 30087789; PMCID: PMC5532471.
45. Sundaram R, Karuppaiah M, Shanthi P, Sachdanandam P. Acute and sub acute studies of catechol derivatives from Semecarpus anacardium. Toxicol Rep. 2018 Jan 31;5:231-239. doi: 10.1016/j.toxrep.2018.01.004. PMID: 29854594; PMCID: PMC5978007.
46. Llanchezhian R, Joseph C R, Rabinarayan A. Urushiol-induced contact dermatitis caused during Shodhana (purificatory measures) of Bhallataka (Semecarpus anacardium Linn.) fruit. Ayu. 2012 Apr;33(2):270-3. doi: 10.4103/0974-8520.105250. PMID: 23559802; PMCID: PMC3611655.

47. Murthy SS. Confirmation of the structure of Jeediflavonone: A biflavonane from Semecarpus anacardium. Phytochemistry. 1984;23:925–7.
48. Murthy SS. A biflavanone from Semecarpus anacardium. Phytochemistry. 1983;22:1518– 20.
49. Murthy SS. Naturally occurring biflavonoid derivatives: Galluflavanone, a new biflavonoid from Semecarpus anacardium. Indian J Chem. 1985;24:398–402.
50. Gedam PH, Sampathkumaran PS, Sivasamban MA. Composition of bhilawanol from Semecarpus anacardium. Indian J Phytochem. 1974;13:513–5.
51. Murthy SS. New biflavonoid from Semecarpus anacardium linn. Clin Acta Turcica. 1992;20:30.
52. Rahman KM, Rahman MS, Begum Rashid B. Preliminary cytotoxicity screening of some medicinal plants of Bangladesh, Dhaka Univ. J Pharm Sci. 2008;7:47–52.
53. Sharma A, Mathur R, Dixit VP. Hypocholesterolemic activity of nut shell extract of Semecarpus anacardium (Bhilawa) in cholesterol fed rabbits. Indian J Exp Biol. 1995;33:444–8.
54. Ramprasath VR, Shanthi P, Sachdanandam P. Immunomodulatory and antiinflammatory effects of Semecarpus anacardium LINN.Nut milk extract in experimental inflammatory conditions. Biol Pharm Bull. 2006;29:693–700. doi: 10.1248/bpb.29.693.
55. Selvam C, Jachak SM. A cyclooxygenase (COX) inhibitory biflavonoid from the seeds of Semecarpus anacardium. J Ethnopharmacol. 2004;95:209–12. doi: 10.1016/j.jep.2004.07.026.
56. Bhitre MJ, Patil S, Kataria M, Anwikar S, Kadri H. Antiinflammatory activity of the fruits of Semecarpus anacardium Linn. Asian J Chem. 2008;20:2047–50.
57. Satyavati GV, Prasad DN, Das PK, Singh HD. Antiinflammatory activity of Semecarpus anacardium Linn.A preliminary study. Indian J Physiol Pharmacol. 1969;13:37–45.
58. Singh D, Aggarwal A, Mathias A, Naik S. Immunomodulatory activity of Semecarpus anacardium extract in mononuclear cells of normal individuals and rheumatoid arthritis patients. J Ethnopharmacol. 2006;108:398–406. doi: 10.1016/j.jep.2006.05.028.
59. Premalatha B, Sachdanandam P. Potency of Semecarpus anacardium Linn. Nut milk extract against aflatoxin B(1)-induced hepatocarcinogenesis: Reflection on microsomal biotransformation. Pharmacol Res. 2000;42:161–6. doi: 10.1006/phrs.2000.0676.
60. Ramprasath VR, Shanthi P, 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. Mol Cell Biochem. 2005;276:97–104. doi: 10.1007/s11010-005-3202-1.
61. Mythilypriya R, Shanthi P, Sachdanandam P. Therapeutic effect of Kalpaamruthaa, a herbal preparation on adjuvant induced arthritis in wistar rats. Inflammopharmacology. 2008;16:21–35. doi: 10.1007/s10787-007-1602-4.
62. Verma N, Vinayak M. Bioscience Reports Immediate Publication; 2008. p. BSR20080035.
63. Sahoo AK, Narayanana N, Sahanaa S, Rajanb SS, Mukherjee PK. In vitro antioxidant potential of Semecarpus Anacardium L. Pharmacologyonline. 2008;3:327–35.
64. Farooq SM, Alla TR, Rao NV, Prasad K, Shalam K, Satyanarayana S. A study on CNS effect of nut milk extract of Semicarpus anacardium. Pharmacologyonline. 2007;1:49–63.
65. Mohanta TK, Patra JK, Rath SK, Pal DK, Thatoi HN. Evaluation of antimicrobial activity and phytochemical screening of oils and nuts of Semecarpus anacardium. Sci Res Essay. 2007;2:486–90.
66. Murthy SS. Confirmation of the structure of Jeediflavonone: A biflavonane from Semecarpus anacardium. Phytochemistry. 1984;23:925–7.
67. Murthy SS. A biflavanone from Semecarpus anacardium. Phytochemistry. 1983;22:1518– 20.
68. Murthy SS. Naturally occurring biflavonoid derivatives: Galluflavanone, a new biflavonoid from Semecarpus anacardium. Indian J Chem. 1985;24:398–402.
69. Gedam PH, Sampathkumaran PS, Sivasamban MA. Composition of bhilawanol from Semecarpus anacardium. Indian J Phytochem. 1974;13:513–5.
70. Murthy SS. New biflavonoid from Semecarpus anacardium linn. Clin Acta Turcica. 1992;20:30.
71. Rahman KM, Rahman MS, Begum Rashid B. Preliminary cytotoxicity screening of some medicinal plants of Bangladesh, Dhaka Univ. J Pharm Sci. 2008;7:47–52.
72. Sharma A, Mathur R, Dixit VP. Hypocholesterolemic activity of nut shell extract of Semecarpus anacardium (Bhilawa) in cholesterol fed rabbits. Indian J Exp Biol. 1995;33:444–8.
73. Ramprasath VR, Shanthi P, Sachdanandam P. Immunomodulatory and antiinflammatory effects of Semecarpus anacardium LINN.Nut milk extract in experimental inflammatory conditions. Biol Pharm Bull. 2006;29:693–700. doi: 10.1248/bpb.29.693.
74. Selvam C, Jachak SM. A cyclooxygenase (COX) inhibitory biflavonoid from the seeds of Semecarpus anacardium. J Ethnopharmacol. 2004;95:209–12. doi: 10.1016/j.jep.2004.07.026.
75. Bhitre MJ, Patil S, Kataria M, Anwikar S, Kadri H. Antiinflammatory activity of the fruits of Semecarpus anacardium Linn. Asian J Chem. 2008;20:2047–50.
76. Satyavati GV, Prasad DN, Das PK, Singh HD. Antiinflammatory activity of Semecarpus anacardium Linn.A preliminary study. Indian J Physiol Pharmacol. 1969;13:37–45.
77. Singh D, Aggarwal A, Mathias A, Naik S. Immunomodulatory activity of Semecarpus anacardium extract in mononuclear cells of normal individuals and rheumatoid arthritis patients. J Ethnopharmacol. 2006;108:398–406. doi: 10.1016/j.jep.2006.05.028.
78. Premalatha B, Sachdanandam P. Potency of Semecarpus anacardium Linn. Nut milk extract against aflatoxin B(1)-induced hepatocarcinogenesis: Reflection on microsomal biotransformation. Pharmacol Res. 2000;42:161–6. doi: 10.1006/phrs.2000.0676.
79. Ramprasath VR, Shanthi P, 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. Mol Cell Biochem. 2005;276:97–104. doi: 10.1007/s11010-005-3202-1.
80. Mythilypriya R, Shanthi P, Sachdanandam P. Therapeutic effect of Kalpaamruthaa, a herbal preparation on adjuvant induced arthritis in wistar rats. Inflammopharmacology. 2008;16:21–35. doi: 10.1007/s10787-007-1602-4.
81. Sahoo AK, Narayanana N, Sahanaa S, Rajanb SS, Mukherjee PK. In vitro antioxidant potential of Semecarpus Anacardium L.

Pharmacologyonline. 2008;3:327–35.
82. Farooq SM, Alla TR, Rao NV, Prasad K, Shalam K, Satyanarayana S. A study on CNS effect of nut milk extract of Semicarpus anacardium. Pharmacologyonline. 2007;1:49–63.
83. Murthy SS. Confirmation of the structure of Jeediflavonone: A biflavonane from Semecarpus anacardium. Phytochemistry. 1984;23:925–7.
84. Murthy SS. A biflavanone from Semecarpus anacardium. Phytochemistry. 1983;22:1518– 20.
85. Murthy SS. Naturally occurring biflavonoid derivatives: Galluflavanone, a new biflavonoid from Semecarpus anacardium. Indian J Chem. 1985;24:398–402.
86. Gedam PH, Sampathkumaran PS, Sivasamban MA. Composition of bhilawanol from Semecarpus anacardium. Indian J Phytochem. 1974;13:513–5.
87. Murthy SS. New biflavonoid from Semecarpus anacardium linn. Clin Acta Turcica. 1992;20:30.
88. Rahman KM, Rahman MS, Begum Rashid B. Preliminary cytotoxicity screening of some medicinal plants of Bangladesh, Dhaka Univ. J Pharm Sci. 2008;7:47–52.
89. Sharma A, Mathur R, Dixit VP. Hypocholesterolemic activity of nut shell extract of Semecarpus anacardium (Bhilawa) in cholesterol fed rabbits. Indian J Exp Biol. 1995;33:444–8.
90. Ramprasath VR, Shanthi P, Sachdanandam P. Immunomodulatory and antiinflammatory effects of Semecarpus anacardium LINN.Nut milk extract in experimental inflammatory conditions. Biol Pharm Bull. 2006;29:693–700. doi: 10.1248/bpb.29.693.
91. Selvam C, Jachak SM. A cyclooxygenase (COX) inhibitory biflavonoid from the seeds of Semecarpus anacardium. J Ethnopharmacol. 2004;95:209–12. doi: 10.1016/j.jep.2004.07.026.
92. Bhitre MJ, Patil S, Kataria M, Anwikar S, Kadri H. Antiinflammatory activity of the fruits of Semecarpus anacardium Linn. Asian J Chem. 2008;20:2047–50.
93. Satyavati GV, Prasad DN, Das PK, Singh HD. Antiinflammatory activity of Semecarpus anacardium Linn.A preliminary study. Indian J Physiol Pharmacol. 1969;13:37–45.
94. Singh D, Aggarwal A, Mathias A, Naik S. Immunomodulatory activity of Semecarpus anacardium extract in mononuclear cells of normal individuals and rheumatoid arthritis patients. J Ethnopharmacol. 2006;108:398–406. doi: 10.1016/j.jep.2006.05.028.
95. Premalatha B, Sachdanandam P. Potency of Semecarpus anacardium Linn. Nut milk extract against aflatoxin B(1)-induced hepatocarcinogenesis: Reflection on microsomal biotransformation. Pharmacol Res. 2000;42:161–6. doi: 10.1006/phrs.2000.0676.
96. Ramprasath VR, Shanthi P, 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. Mol Cell Biochem. 2005;276:97–104. doi: 10.1007/s11010-005-3202-1.
97. Mythilypriya R, Shanthi P, Sachdanandam P. Therapeutic effect of Kalpaamruthaa, a herbal preparation on adjuvant induced arthritis in wistar rats. Inflammopharmacology. 2008;16:21–35. doi: 10.1007/s10787-007-1602-4.
98. Verma N, Vinayak M. Bioscience Reports Immediate Publication; 2008. p. BSR20080035.
99. Sahoo AK, Narayanana N, Sahanaa S, Rajanb SS, Mukherjee PK. In vitro antioxidant potential of Semecarpus Anacardium L. Pharmacologyonline. 2008;3:32