WWW.IJRPR.COM

International Journal of Research Publication and Reviews

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

Exploring Medicinal Benefits & Properties of *Semecarpus Anacardium Linn*

Mr. Gaurav Bhanushali[1] , Mr. Shivprasad Patil[2], Dr. Sonali Uppalwar[3]

Ideal institute of Pharmacy, Posheri, Wada.

ABSTRACT

Semecarpus anacardium is also known as a Marking Nut, renowned for its therapeutic properties. Conventionally used to treat to treat variety of condition (ailments) such as rheumatism, snake bites,certain skin conditions.It also possess the anti carcinogenic properties for the treatment and the prevention of cancer and anti inflammatory properties to treat inflammation. The studies states about Anti-microbial properties,Anti-Inflammatory properties and etc of semecarpus anacardium.This Review provides comprehensive overview of the medicinal and therapeutic properties and Phytochemical constituents and application of Semecarpus anacardium.

Keywords : Semecarpus anacardium, Marking Nut, Bhallataka, Medicinal Properties, Phytochemical Constituents, Therapeutic Application.

Introduction

Semecarpus anacardium linn is also known as a marking that a kind of medicinal plant which is basically used to treat variety of condition (ailments) such as rheumatism, snake bites,certain skin conditions.

It also possess the anti carcinogenic properties for the treatment and the prevention of cancer and anti inflammatory properties to treat inflammation because of this properties it has become a strong candidate for its development of innovative pharmaceutical product (1)

In Indian subcontinent it is found in Assam (khasia hills)

Maharashtra (kokan)

Tamilnadu (Kanara hills),Madhya Pradesh and Gujarat & Himalayan region. It is found in Northern part of Australia (upreti et al.2016)

This marking nut contains bioactive ingredients and are heart in shape. Some of the traditional medicines used the semecarpus anacardium not in their preparation and also utilise in antiquity. It gained it's importance thousands of year back so it is use as a part of trade between the merchants of the various reason currently at global level due to synthetic investigation it has traded all over the world. This provides a overview about its phytochemical constituents pharmacological effect and recent research carried on semacarpus anacardium (3) the height of the tree can reach up to 350 feet in the sub Himalayan region. It is moderate in size a kind of deciduous tree. it is found in hotter regions of Indian subcontinent

Eg . Orissa, Bengal ,Bihar ,Central India like Madhya Pradesh and Gujarat and Assam. Had global level it is found at Northern Australia and Eastern archipelago.(4)

Taxonomical classification:-

Sub Kingdom:- tracbeobionta

Kingdom. :- plantae

Super classification:- spermatophyta

Group:- Magnoliopsidae

Category:- Magnoliopsida

Subclass:- rosidae

Family:- anacardiaceae

Category:- anacardium (5)

Plan structure and overview

- It is able to tolerate drought like condition
- Seasonal tree grow up to 10 to 15 m
- Leaf size is upto 30 to 60 cm long
- 12 to 30 cm wide.
- Hairy underneath, large, oblong ovate smooth above.
- Leaf is attached through heart shape and a narrow stalk base
- Colour of the flower is green and whitish
- In the month of July and may pre flush new leaves during this two month.
- In the month from December to March raping of the fruit starts ripen fruits are black in colour 2 cm to 3 cm wide.

Names in other languages:-

Russian:- semelcarpus Analcard

Gujarati:- bhilama

Telugu:- nallajeedi

Tamil:- erimugi(7).

Liquid which is expected from these nuts with of alkenyl phenol contains anacardic acid.Sufficient amount of protein and minerals is present in kernel flour and also used as a flour for poultry and animals.Their formulations contains how amount of fibre so ultimately they have high anacardic acid so they can be used as functional food preparation.

Figure 1 Semecarpus Fruits

The word semecarpus is derived from the Greek word Semeion which means marking and Carpus which means nuts,While anacardium means cardium i.e Heart.

During starting of modern era washerman used semecarpus anacardium to Mark specific name or number of person with the aid of these nuts so it is also known as **marking nuts.**it is possible to mark on cloth because it produce insoluble permanent mark on clothes marking nuts was actually named by Europeans (9)

Figure 2 Seeds of Semecarpus anacardium

Figure 3 Flower of Semecarpus anacardium

Phytochemical Constituents:-

In conditions such as arthritis tumors infections various nut extract preparations are effective against such conditions. These extracts are basically use for diseases which are not able to modern treatment. (Premalatha,2000). In order to know the mechanism of its action or pharmacological action the isolation of active principle and structure and function can help greatly.

According to this regard various isolated phytopharmaceuticals from the different part of semicarpus anacardium have been based on this principle.(3)

Bhiwanols,phenolic compounds are most significant components of semicarpus anacardium.(10,11). Biflavonoids(12), glycosides and sterols (11,13). Blend of ursuhenol consist 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) 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:-

The semicarpus and aardium nut shows alleviating effects on extraction induce the symptoms of adjuvant arthritis according to research of Ramprasad VR et al.

The cotton palette granuloma an paw edema induced by carrageenan.(40). according to above given results we could say semi Corpus and a cardiom has high anti inflammatory activity. Indomethacin is also a bioactive component in order to possess inflammatory activity (25). Salvem et al. determined that a significant dynamic rule, tetrahydroamen to flavone (THA), a biflavonoid, was excluded by the ethyl acetic acid derivative concentrate of SA.(41). THA's in vitro prostaglandin biosynthesis study, which was catalyzed by cyclooxygenase (COX-1), produced an IC50 value of 29.5 µM (COX-1) and 40.5% inhibition at 100 g/mL (COX-2).A part of subordinate was obtained by measuring of paw edema occurred by carrageenan in vivo. THA's guarentees activity is similar to ibuprofen (26).demonstrated the oil ether, methanolic, ethanolic, chloroform, and ethyl acetic acid derivative concentrates of Semicarpus anacardium products inoder to investigate the calming effect in rodents with pale skin by using the Method of Carrageenan-initiated Paw Edema. The concentrate demonstrated critical mitigating action on par with aspirin in accordance with reference standard.In other instances, they review says about the pharmacological benefits of targeted effects on modifications linked to the digestion of collagen and glycosaminoglycan in Wistar rats with adjuvant ligaments. The decrease in collagen and GAGS fragments (chondroitin sulfate, heparan sulfate, and hyaluronic acid) and the rise in connective tissue-degrading lysosomal glycohydrolases (acid phosphatase, beta-glucuronidase, beta-Nacetylglucosaminidase, and cathepsin-D) seen in joint animals were reversed in middle people of irrigation with respect to SA-induced mitigation movement on lysosomal chemicals and their impact on proteoglycans. Mythilypriya and others Semecarpus anacardium has been used to treat the groups (28).due to presence of phenolic compounds in nuts, such as semicarpol and bhilawanol, is responsible for their ability to decline the duration of adjuvant joint inflammation and the intense tuberculin response in sharpened rodents.(42). During irritation, the drug provides immunomodulatory effects. The semecarpus anacardium obstructs or inhibits TNF-á consequently decline in the severity of irritation.(29).

Key Findings on Anti-Arthritic Effect

- Efficacy: The milk extract of a nut, at the dose of 150 mg/kg body weight, was found to be bioactive against adjuvant-induced arthritis in rats, so we could say it is a dose-dependent effect (43)(44).
- Reduced Symptoms: Treatment with the drug significantly decreases paw thickness and also arthritic scores in the affected rats.
- Acute Inflammation Inhibition: The nut's milk extract obstructs acute tuberculin reaction in sensitized rats and in the primary phase of adjuvant arthritis. A extract from chloroform significantly decreases acute carrageenan-induced paw edema (44).

Proposed Mechanisms of Action:-

The anti-arthritic effect is recommended to be multifaceted, which involves antioxidant and anti-inflammatory properties:

1. Antioxidant and Anti-Lipid Peroxidation Effects

- The drug is which shows its effect by retarding lipid peroxidation (damage to cell membranes by free radicals) and modulating the cellular antioxidant defense mechanism (43)(44).
- Increased Antioxidant Levels: Treatment with the nut milk extract reversed elevated levels of endogenous antioxidants—Superoxide Dismutase (SOD), Catalase (CAT), Glutathione Peroxidase (GPx), and Glutathione (GSH)—back to near-normal levels in the arthritis-induced rats (45)(46).
- Flavonoid Role: it show antioxidant property of flavonoids (scavenging singlet O2) and also by terminating peroxides) it would be be responsible for the inhibition of lipid peroxidation.

2. Modulation of Inflammatory Markers

- The extract plays vital role in normalisation of levels of key biochemical markers of inflammation:
- C-reactive protein (CRP) level (45)(46).
- Erythrocyte Sedimentation Rate (ESR) (45)(46).

- Enzyme Levels: The changed levels of glycolytic and gluconeogenic enzymes in the diseased state were also rerversed back to near-normal safe levels (45)(46).

3. Neutrophil and Lysosomal Stabilization

The drug has capacity to modulate the accumulation of neutrophils and bring down the increased levels of lysosomal enzymes in the arthritic rats (47)(48).

Lysosomal Membrane Stabilization: The milk extract's action on adjuvant arthritis is attributed, in part, to a stabilizing action on the lysosomal membrane, preventing its leakage (47)(48). This action is vital as it prevents injurious attacks to normal tissue and retardation of the amplification and spread of the inflammatory process (48).

Conclusion

These findings collectively says that the S. anacardium nut milk extract is a good therapeutic agent for arthritis (3)(49)(50) due to its capabilities to decrease acute and chronic inflammation, enhance the body's antioxidant defenses, and stabilize cellular components like the lysosomal membrane.

Mechanisms of Anticarcinogenic Action

The antitumour effect is strongly linked to its potent activity against to Aflatoxin B

giu(AFB -mediated hepatocellular carcinoma (HCC) and its ability to modulate key biochemical markers:

1. Reversing AFB

-Induced Damage Potent Activity: The nut extract states to be potent anticarcinogenic activity against AFB 1-mediated HCC (55).Biochemical and Histological Recovery:- undesirable effects stimulated by AFB were reversed to near-normal levels ranges concerning biochemical parameters and histological patterns (3).

Tumour Marked to be Normalized : Treatment with S. anacardium nut milk extract restored the elevated tumour marker enzyme levels to almost normal values ranges. These enzymes consist lactate dehydrogenase, aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, and γ-glutamyl transpeptidase (31)(61).

Serum Alpha-Protein: The serum alpha protein level (a very common tumour marker) returned to near-normal levels after treatment, providing inadditional with evidence to say that the use of the milk extract as an antitumour agent (56)(57).

2. Antioxidant and Defence System Induction

Recovery of Antioxidants: The drug which is administrated recovered the low levels of non-enzymatic antioxidants back to normal ranges. These vital antioxidants including uric acid, vitamin C, vitamin E, glutathione, total thiol, non-protein thiols, and cytochrome P450 (58).

Controlling Deleterious Effects: The extract controls the deleterious effects linked to these decreased antioxidant levels (59).

Protection Against Radiation Damage: The text says that the S.anacardium nut extract has a potential anticarcinogenic agent against radiation damage occurs due to AFB 1 -induced HCC. This is achieved through its inherent antioxidant property blended with the induction of the in vivo antioxidant defence mechanism(60)

Antimicrobial Activity Across Different Extracts

Different extracts of the plant demonstrated inhibitory effects against a range of bacterial species:

1. Specific Solvent Extract Activity

Extract Type Microorganism Inhibited Inhibition Zone/Effect Reference

Petroleum Ether Extract (PEE) Staphylococcus aureus 10 mm (at 100 mg/ml(63)Aqueous Extract (AQE) Shigella flexneri 16 mm (at 100 mg/ml) (63)Chloroform Extract Bacillus licheniformis Inhibition observed (32)(64)Vibrio cholerae Inhibition have been seen (32)(64)Pseudomonas aeruginosa Inhibition have been seen (32)(64)Ethanol Extract Pseudomonas aeruginosa Inhibition observed(32)(64)Staphylococcus aureus Inhibitiory action is seen (32)(64)

2. Alcoholic Extract (Bhallatak) Activity

Nair et al. states that the alcoholic extract of the dry nuts (referred to as Bhallatak) was bactericidal in nature in vitro against several strains (33)(65)

Gram-Negative Strains: Escherichia coli, Salmonella typhi, and Proteus vulgaris.

Gram-Positive Strains: Staphylococcus aureus and Corynebacterium diphtheriae.

Antibacterial Properties in Other Plant Parts

Further reports indicated that alcoholic extracts of different parts of the semecarpus anacardium plant also possess antibacterial properties and action , specifically the leaves, twigs, and green fruit, with the leaf extract being particularly effective (33)(65).

Safety Note

Importantly, the study noted that no undesirable effect (irritant property) was observed in the mouse skin irritant assay for these plant extracts (33)(65).

Antimicrobial Activity

Recent studies on the aqueous and organic solvent extracts of the plant have screened in formulations for antimicrobial (using the disc diffusion method) and phytochemical properties (62).

Key Findings by Extract Type:The petroleum ether extract (PEE) shows inhibitory actions against Staphylococcus aureus (10 mm zone of inhibition) (63).The aqueous extract fraction (AQE) shows inhibitory action against Shigella flexneri (16 mm zone of inhibitiory) (63).

Note: Both PEE and AQE results that it was taken at a concentration of 100 mg/ml (63).

The chloroform extract shows inhibitiory against Bacillus licheniformis, Vibrio cholerae, and Pseudomonas aeruginosa (32)(64).

The ethanol extract shows inhibition against Pseudomonas aeruginosa bacterias and S. aureus (32)(64).

Broader Activity and Specific Parts:

Nair et al. report say that alcoholic extract of the dry nuts (SA, Bhallatak) was found to be bactericidal in vitro against various strains:

Gram-negative: Escherichia coli, Salmonella typhi, and Proteus vulgaris (33)(65).

Gram-positive: Staphylococcus aureus and Corynebacterium diphtheriae (33)(65).reports finally says that the alcoholic extracts of different parts of the plant—specifically the leaves, twigs, and green fruit—also possess anti-bacterial properties, with the leaf extract being particularly noted (33)(65).

Safety Observation:

Significantly, no dermatoxic effect (irritant property) was observed in the mouse skin irritant assay for the extracts tested (33)(65).

Neuroprotective Activity

The neuroprotective action of SA extracts have been founded to be primarily focusing on effect of the central nervous system and cognitive function.CNS and Nootropic Effects Farooq's evaluation focused on mainly "pro-benefit effect" of milk-extracted nuts of SA on the Central Nervous System (CNS) (52). This positive effect and action was primarily to the extract's notable locomotor and nootropic action (52).

Mechanism and Cognitive Benefit

Research by Vinutha addressed neurodegenerative diseases involving the decline of cholinergic cells (66)(67). This cell loss, particularly in the basal forebrain, result into a subsequent loss of the crucial neurotransmitter, acetylcholine (ACh) (66)(67).

SA shows a vital mechanism of action: it is active in prolonging the half-life of acetylcholine by showing its action on Ach esterase inhibitor (34)(68).This activity makes SA beneficial in controlling cognitive decline and improving memory (34)(68).

Antioxidant Activity

The plant (referred to as SA, and its preparation Kalpaamruthaa or KA) is subject to research for its high antioxidant properties.

In Vivo Studies on Antioxidant Defensive action.Shanmugam found that rats treated with Kalpaamruthaa maintained normal range of lipid peroxide and shows normal antioxidant defenses mechanism (69).

Veena studies evaluated that antioxidant levels in the blood and various tissues (kidney, liver, and breast) of experimental animals (70).

In diseases such as cancerous conditions, Lipid Peroxidation (LPO) was found to be increased, and natural antioxidant levels were declined (71)(72).Treatment with these drugs (SA and KA) successfully found to be beneficial drop in LPO and a corresponding elevation in antioxidant defensive action (71)(72).

In Vitro Studies and bioActive Compounds

Sahoo studies states that the antioxidant capacity of various extracts from the stem bark of SA (73)(74).The ethyl acetate extract is found to be the strongest antioxidant activity compared to the hexane, chloroform, and methanol extracts (73)(74). This High grade performance was linked to the highest total phenolic content (measured as 68.67% pyrocatechol equivalent) found in this fraction (73)(74).

Further isolation from the ethyl acetate extract of SA stem bark is crucial for the identification of a major compound: a bright yellow solid crystal named butein (35)(75).This isolated components such as butein, was finalized to possess potent antioxidant activity, reporting an IC 50 value of 43.28±4.34 µg/ml (35)(75).

Anti-Spermatogenic Effect

Studies clearly states that the plant extract (SA) possesses significant anti-spermatogenic properties in male albino rats (37)(80).

Action on Spermatogenesis and Sperm Density Feeding SA extract to male albino rats resulted in an anti-spermatogenic action, shown by a reduction in the number of spermatogenesis cells and spermatozoa (37)(80).

Sharma studied this effect, states that the decline in sperm density within the cauda epididymides might be due to alterations in androgen metabolism (36)(76).The text notes that meiotic and post-meiotic germ cells are very sensitive to androgen concentration, and any changes in the androgen level within the testes could subsequently change the transformation of spermatocytes to spermatids (36)(76).Spermicidal and Spermatogenic Arrest Action.According to Narayan, the aqueous extract of the aerial portion of SA shows spermicidal action (77)(78).

When in albino rats an ethanolic extract was administered of SA fruit, they experienced spermatogenic arrest (77)(78).This fruit extract feeding led to a noticeable decrease in sperm motility and density (79).

Further, the amount of spermatids, secondary spermatocytes, and primary spermatocytes was also found to be significantly reduced by the fruit extract (79).

Traditional Uses

The plant, known as Semecarpus anacardium or Bhallataka, has strongest and varied spaces in traditional medical systems, particularly Ayurveda.

Ayurvedic and General Medicinal Uses

In Ayurvedic medicine, it is traditionally used for a wide range of treatments: to induce abortion, enhance sexual potency, boost sperm count, cure digestive issues, and balance phlegm (Kapha dosha) (81)(82).The formulation involves harvesting the reddish-orange portion of the plant, partially drying it in the sun, and then consuming it (81)(82).It is valued as a hematinic tonic (for the blood), a brain tonic, and a blood purifier for body (86)(87).A traditional remedy for chronic rheumatic illnesses involves blended powdered seeds of Semecarpus anacardium, Terminalia chebula, and Sesamum indicum L. with jaggery (86)(87).Medicated milk or its oil is mostly considered beneficial for treating conditions like oligomenorrhea (scanty menstruation) and dysmenorrhea (painful menstruation) (86)(87).It is also believed to help with Kapha-type diabetes by working to lowering urine production in body (88).Bhalabhataka is hailed as the significant rasayana (rejuvenative) for Vata disorders, skin conditions, and as a preventative measure to elevated bodily resilience (39)(89).

Dermatological and Hair Care Uses

Bhallataka is used in traditional medical systems for hair maintenance (84).In folk medicine, it is majorly used to dye hair and is thought to encourage hair growth and density (38)(85).Important Safety and Processing NotesIt is absolutely important to remind that the plant is toxic in its original form and requires proper purification before use (83).If the oil obtained from its seeds is not handled properly, it can result into the blisters and excruciating sores (83).Due to its high qualities and potential negative effects, using Semecarpus anacardium medicinally demands care and suitable processing (38)(85).

Toxicity and Characteristics

Semecarpus anacardium (Bhallataka) is classified as a poisonous plant in Ayurveda (57).

It is characterized by an extreme heat level and sharp characteristics, necessitating careful administration.

Internal side effects are notable and include:

- Skin rashes, burning, and intense itching.
- Extreme thirst and sweaty condition.
- Decrease in urination with dark-colored urine.
- Potential for blood in urine.

Contraindications and Precautions

The use of Bhallataka is advised against or requires special care in several instances

- Allergic Symptoms
- Stop and refrain from use immediately if allergic symptoms develop.
- Pitta Constitution
- Adults with predominant pitta constitutions are advised not to use it due to lack of safety data.

Vulnerable Groups

Pregnant women, very young children, and the very old are advised not to use it.Weather Its use should be controlled during hot weather.

Pre-treatment.It is essential to cleanse the neem oil before internal use by immersing it in warm water or other means.

Lifestyle/Diet

Avoid sun, heat, and excessive sexual activity during the Bhallataka treatment.

Dietary contractions

Avoid adding salt and spices to food completely.

Side Effects

the side effects of the drug, the following are advised:

- Bland and Cooling Diet: Consume a bland and cooling diet, specifically rice, milk, butter, and ghee.

Remedy: The fresh juice of the leaves of amlika (Tamarindus indica) taken internally is noted as one of the remedies for the symptoms(90). clinical and preclinical investigations into the therapeutic potential of Semecarpus anacardium Linn, also known as the marking nut, validating its historic use in traditional medicine (91).

Human Clinical Trials

- Clinical studies have investigated the efficacy of Semecarpus anacardium in several areas:
- Antipsoriatic efficacy: A randomized controlled trial (RCT) showed significant improvement in psoriasis symptoms with the topical application of the S. anacardium extract (92).
- Wound healing: A clinical study demonstrated accelerated wound healing when treated with S. anacardium oil (93).
- Antimicrobial efficacy: The extract exhibited potent antimicrobial activity against various human pathogens (94).
- Hepatoprotective effects: Supplementation with S. anacardium protected against liver damage in patients diagnosed with hepatitis (95).

Preclinical Studies

Studies which were conducted using animal models and cell lines have revealed further potential:

- Anti-inflammatory activity: The extract inhibitory action inflammation in animal models (96).
- Anticancer properties: Compounds from S. anacardium says cytotoxicity against cancer cell lines (97).
- Neuroprotective effects: The extract shows neuroprotection in animal models (98).

Conclusion and Future perspective

Summary of Therapeutic Potential

The evidence which says that therapeutic potential of Semecarpus anacardium (marking nut). The plant's efficacy is attributed to its phytoconstituents, such as alkaloids, phenolic acids, and flavonoids, which states that there will be various range of bioactivities, including:

- Neuroprotective
- Anti-inflammatory
- Antioxidant
- Antibacterial

S. anacardium claims that for treatment of respiratory, rheumatism, and skin illnesses.Ongoing and Future Research (99)

Future research is necessary to fully understand its therapeutic use, focusing on:

- Standardized extract formulation.
- Large-scale clinical trials.
- Mechanism of action studies.
- Toxicity and safety evaluations.

- Combination therapy research.

The review emphasizes the vital importance of investigating Semecarpus anacardium as a beneficial natural remedy for various illnesses.

REFERENCES

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 Chakraborthy SH, Kulkarni GS. SB, Medicinal Potientials of Semecarpus anacardium nut: A review. J Herb Med Toxicol 2008;2:9-13.

16. Murthy SS. Semicarpetin: A bifl avonoid from Anacardium. 1988;27:3020-2. Semecarpus Phytochemistry

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;24:106570.

19. Murthy SS. Confi rmation of the structure of Jeedifl avonone: A Biflavonane from anacardium. 1984;23:925-7. Semecarpus Phytochemistry

20. Murthy SS. A bifl avanone from Semecarpus anacardium.Phytochemistry 1983;22:151820.

21. Murthy SS. Naturally occurring bifl avonoid derivatives: Galluflavanone, a new bifl avonoid from Semecarpus Anacardium. Indian 1985;24:398-402. J Chem

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 SEMECARPUS LINN: P. Uplanchiwar; ANACARDIUM 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 microsomal on 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 acetylcholinesterase plants for 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; PMC3847419. PMCID:

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; PMC3249908. PMCID: 44. Purushothaman A, Meenatchi P, Saravanan N, Sundaram R. Characterization Isoprenoid Karuppaiah Isolation of an M, and Acyclic 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. 10.1007/s11010-005-3202-1. 61. Mythilypriya R, Shanthi doi: 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 biflavonane anacardium. 1984;23:925–7. Jeediflavonone: from A Semecarpus Phytochemistry.

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. 10.1248/bpb.29.693.

74. Selvam C, Jachak doi: SM. A cyclooxygenase (COX) inhibitory biflavonoid from the seeds of Semecarpus Ethnopharmacol. anacardium. J 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 Ethnopharmacol. anacardium. J 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 2006;108:398–406. Ethnopharmacol. 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 Sachdanandam VR, P. Shanthi 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. 10.1007/s11010-005-3202-1.

97. Mythilypriya R, Shanthi doi: 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