



REVIEW ARTICLE

**PHARMACOLOGICAL IMPORTANCE OF *ANACARDIUM OCCIDENTALE*: A
REVIEW**

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ABSTRACT:

Anacardium occidentale L., having family *Anacardiaceae* is frequently used to treat infections. *Anacardium occidentale* is a medium-sized tree, spreading, evergreen, much branched; grows to a height of 12 m. When grown on lateritic, gravelly, coastal sandy areas. There is different information on the pharmacological activities of cashew tree byproducts, such as anti-inflammatory and antidiabetic agents, as well as acetylcholinesterase inhibitors. The objective of this review to scientific advancement, chemical constituent, biological and microbiological activities and technological applications.

Keywords: *Anacardium occidentale* L., *Anacardiaceae*, pharmacological activities.

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INTRODUCTION:

Anacardium Occidentale is commonly known as Cashew tree which is a tropical evergreen tree producing cashew nut and cashew apple. Cashew nut is used in most of the recipes as well as served as a snack. Cashew apple pulp is generally processed into sweet astringent fruit drink or distilled to form liquor. The *Anacardium occidentale* L. is a member of the *Anacardiaceae* family, along with mango, pistachio, poison ivy and poison oak. The cashew seed, often simply called a

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cashew, is extensively consumed. It is eaten on its own, used in recipes, or processed into cashew cheese or cashew butter. The cashew apple is light reddish to yellow fruit, whose pulp can be procedure into a sweet, astringent fruit drink or distilled into liquor. The cashew apple contains tannins, vitamin C, sugars, carotenoids, organic acids, proteins, fibers, and water.¹ Its fruit, commonly known as the cashew, consists of two parts: the fruit itself (the nut), and the fashion accessory fruit (or flower stalk), also known as the cashew apple^{2,3}.

Cashews are evergreen trees with deep taproots. The crop originated from the northern part of South America. The Portuguese introduced cashew to Mozambique in the 16th century where it flourished forming extensive forests; eventually it also spread in the East Africa region



Figure 1: *Anacardium occidentale*

Classification of *Anacardium occidentale*

Kingdom: Plantae

(Unranked): Angiosperms

(Unranked): Eudicots

(Unranked): Rosids

Order: Sapindales

Family: Anacardiaceae

Genus: *Anacardium*

Species: *A. occidentale*

Common Name

English: cashew

Hindi: caju

Occurrence:

Tropical America, Jamaica, South Africa, Malagasy, Mozambique, West Indies, Southeast Asia including India, Sri Lanka and Philippines.

Morphology Description

Leaves: The leaves are short-stemmed, simple, oval shaped, breech-oblong with notched edges and strokes. They have a pointed base and rounded tip, curved inwards. The leaves are simple, alternate, yellowish green to dark green brownish in colour, length 4 cm to 22 cm and width 2 cm to 15 cm. They have a rounded tip with a small indentation in the middle, tapering base (acutus) and a flat edge (truncatus). The petiole is about 3 cm in length, pinnate and the upper and lower leaf surfaces are smooth, not hairy.



Figure 2: Leaves of *Anacardium occidentale*

Flowers: The flowers are produced in a panicle up to 26 cm long. Each flower is small, pale green at first then turning reddish in colour, with five slender, acute petals 7 to 15 mm long. They are fragrant, terminal, small, androgynous, 6-12 mm long with white colored corolla. The flowers are yellowish, small and crowded at the tip of the branches



Figure 3: Flowers of *Anacardium occidentale*

Fruit Stalk (Pseudo fruit): The fruit of the cashew tree is an accessory fruit (sometimes called a pseudocarp or false fruit). What appears to be the fruit is an oval or pear-shaped structure that develops from the pedicel and the receptacle of the cashew flower. The enlarged fleshy stalk of fruit is soft, watery and reddish yellow in colour. The cashew apple is known in Central America as "marañón". It ripens into a yellow and/or red structure about 5–11 cm long. It is edible, and has a strong "sweet" smell and a sweet taste. The pulp of the cashew apple is very juicy, but the skin is fragile, making it unsuitable for transport. The fruit (nut) is ash-colored, kidney-shaped and about 2 cm long.

Fruit: The true fruit of the cashew tree is a kidney or boxing-glove shaped drupe that grows at the end of the cashew apple. The drupe develops first on the tree, and then the pedicel expands into the cashew apple. Within the true fruit is a single seed, the cashew nut. The fruit is thick, with oval seeds, 2-3 cm in length. The seeds are reddish brown-skinned with two large cotyledons and a small embryo.



Figure 4: Fruits of *Anacardium occidentale*

Chemical constituents

Leaves of young cashew nut have Vitamin A, Vitamin C, protein, fat, carbohydrate, calcium, phosphorus, iron and water. Cashew nuts contain tannins, cardol and anacardic acid useful as anti-bacterial and anti-septic. Immature nut oil contains triglycerides, fatty acids, alkyl-substituted phenols and cholesterol. The main constituents of the free fatty acids are palmitic and oleic acids. The seed is surrounded by a double shell (kernel) containing an allergenic phenolic resin, anacardic acid, a potent skin irritant chemically related to the more well known allergenic oil urushiol. Anacardic acids, the by-product of cashew processing, have medicinal uses. The kernel contains 7.6-16% moisture, 18-24% protein, 43-57% fats, and 19-21% carbohydrates.

The stem bark contains a mixture of tannins (hydrolysable and non-hydrolysable), with reported anti-inflammatory activity. The bark is also reported to have activity against the lipopolysaccharide (LPS)-induced septic shock, as well as LPS-induced microvascular permeability in mice. The roots of the tree are reported to have hypoglycemic potential. The crude ethanolic extract of cashew root showed hypoglycemic potencies in guinea pigs and rats. The apple of cashew contains flavanoids. One anthocyanin and thirteen glycosylated flavonols were detected in a methanol-water extract. The apple also contains aromatic volatiles (ca 3.6 $\mu\text{g}/\text{kg}$ fresh fruit), aldehydes, carotenoids, anacardic acid and ascorbic acid.

Uses of cashew (*Dravyaguna*):

Many parts of the cashew plant are used. The cashew "apple," the enlarged fully ripe, fruit may be eaten raw, or preserved as jam or sweetmeat. The juice is made into a beverage (Brazil cajuado) or fermented into a wine.

Fruits or seeds of the cashew are consumed whole, roasted, shelled and salted, in Madeira wine, or mixed in chocolates. Shelling the roasted fruits yields the cashew nut of commerce. Seeds yield about 45% of pale yellow, bland, edible oil, resembling almond oil. From the shells or hulls is extracted a black, acrid, powerful vesicant oil, used as a preservative and water-proofing agent in insulating varnishes, in manufacture of typewriter rolls, in oil- and acid-proof cements and tiles, in brake-linings, as an excellent lubricant in magneto armatures in airplanes, and for termite proofing timbers.⁴

Medicinal Properties

The fruit bark juice and nut oil are used as home remedies for calluses, corn, warts, cancerous ulcers and elephantiasis. Decoction prepared from the leaves and bark of the tree is given for treating diarrhea and thrush. Oily residue from pericap is used to apply on cracks on the feet. Seed oil is alexeritic and amedicidal which helps in treating gingivitis, malaria and syphilitic ulcers.

According to Ayurveda, fruit can be used in the treatment of anthelmintic, aphrodisiac, ascites, fever, dysentery, piles, Leucoderma, etc. In some places the bark and leaves of the tree are used for toothaches and pain in the gums.

Edible Uses:

The fleshy peduncle called cashew apple when ripe is used in beverages. The kernel is consumed as raw nuts, roasted nuts, fried nuts, salted nuts, dry fruit, and is added to cakes and deserts. In countries the leaves are used as vegetables. The wood of the tree is used as fuel.

Commercial Uses:

The bark of cashew tree is used in tanning industry. It is also used as an insecticide, and an adhesive for book binding. It is used in pharmaceutical industry as substitute for gum Arabic and is also used in making ink. The juice of cashew apple is used for making wine. The cashew apple is used in preparing various juices, syrups, candies and pickles. The residue of cashew apple is used to extract pectin. Vinegar is prepared from fresh fruit of cashew. The cashew nut shell is used in the cosmetic industry, pharmaceutical industry, textile industry, paper industry, and ink making. Cashewnut shell yields a vesicant juice known in trade as Cashewnut Shell Liquid (CNSL). CNSL is used in preservation of boats, nets, and wood. CNSL is used in insulating varnishes and resins. It is also used in paint industry, particle board adhesives, thermo-plastic resins, thermosetting resins, and plastic industry. The shell oil is also used as insecticide against mosquito larvae.

Advantageous properties of Cashew trees^{5,6}

- Produce cashew nuts. These contain about 17% protein and are rich in minerals (calcium, phosphorus and iron) and vitamins (vitamins A, D, K and E).
- The cashew apple juice can be drunk as fresh juice, turned into vinegar, or turned to wine that can then be distilled to produce brandy. It is also used in jams, jellies, chutney and candied fruit. Cashew apple is rich in vitamin A and very rich in vitamin C (about 150-400 mg per 100 g fresh weight, which is about five times that in orange juice).

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- They make good shade trees because of having evergreen leaves and a wide-spreading canopy.
- Sap with insecticidal properties can be tapped from the trunks. It can also be used as a varnish.
- They can be cut down for firewood and charcoal.

Other activity of *Anacardium occidentale*

S.No.	Topic	Author	Year	Work done
1	Antioxidant Activity of Various Extracts of Leaves of <i>Anacardium Occidentale</i> ⁷	YS Jaiswal, PA Tatke, Satish Y Gabhe, Ashok Vaidya	2010	They worked on Antioxidant Activity of Various Extracts of Leaves of <i>Anacardium Occidentale</i> . The antioxidant activity of aqueous, ethanol and petroleum ether (60-800C) extracts of the leaves of <i>Anacardium occidentale</i> was estimated. The order of the antioxidant potency of the plant extract is ethanol > aqueous > petroleum ether. The results suggest that the leaves of <i>A. occidentale</i> are a potent source of natural antioxidants
2	Antioxidant and antimicrobial activity of leaves of <i>Terminalia catappa</i> and <i>Anacardium occidentale</i> : comparative study ⁸	Rajesh B.R, Potty V.P, Prabha Kumari C, A Miranda M.T.P, Sreelekshmy S.G	2015	Worked on antibacterial and antioxidant activities of methanolic leaf extract of <i>Terminalia catappa</i> and <i>Anacardium occidentale</i> . The antioxidant activity of methanolic extracts of <i>T. catappa</i> and <i>A. occidentale</i> were determined using DPPH reagent. The methanolic

- extract of *A. occidentale* leaf shows the most effective scavengers of DPPH radicals than *T. Catappa* leaf.
- 3 Pharmacological Evaluation and Detection of Anacardic Acid in Callus Culture and Various Plant Parts of *Anacardium occidentale* L.⁹ Sija. S. L, 2015 Potty. V. P, Santhoshlal P. S Various Plant Parts of *Anacardium occidentale* L was carried out to evaluate the presence of anacardic acid, total phenolic compound, antioxidant activity and antibacterial activity in methanolic extract of callus and various plant parts such as flower, young leaves, shoot and cotyledon. Total phenolic contents were measured by the Folin-Ciocalteu method using gallic acid as standard compound. All extracts exhibited a DPPH radical scavenging activity and among the extracts. The antibacterial capabilities of various extracts were also investigated against two common human pathogens of clinical importance, *Escherichia coli* and *Staphylococcus aureus*. Presence of anacardic acid in various extracts was also estimated by using HPTLC technique.
- 4 Elementary Chemical Profiling and Antifungal Properties of V. Rajesh 2009 Kannan, C.S. Worked on Phytochemicals present in the CNSL using solvent extract method. Antifungal

	Cashew (Anacardium occidentale L.) Nuts ⁸	Sumathi, V. Balasubramanian and N. Ramesh		activity of acetone, ethanol and ethyl acetate extracts on <i>A. flavus</i> , <i>A. fumigatus</i> , <i>A. niger</i> , <i>Curvalaria</i> sp and <i>Fusarium</i> sp. were studied. Distinct range of antifungal spectrum observed was compared with the phytochemicals present
5	Determination of the flavonoid components of cashew apple (Anacardium occidentale) by LC-DAD-ESI/MS ¹⁰	Edy Sousa de Brito, Manuela Cristina Pessanha de Araujo, Long-Ze Lin, James Harnly	2007	Worked on one anthocyanin and thirteen glycosylated flavonols were detected in a methanol-water extract. Among them, the 3-O-galactoside, 3-O-glucoside, 3-O-rhamnoside, 3-O-xylopyranoside, 3-O-arabinopyranoside and 3-O-arabinofuranoside of quercetin and myricetin, as well as kaempferol 3-O-glucoside were identified by direct comparison with standards or positively identified flavonoids in cranberry. The anthocyanin was the 3-O-hexoside of methyl-cyanidin. Trace amounts of delphinidin and rhamnetin were detected in the hydrolyzed extract, suggesting their glycosides were present, but undetectable, in the original extract.
6	Antimicrobial effect of <i>Anacardium occidentale</i> leaf extract	Jothi Varghes, Vijay	2013	Investigated the antimicrobial effect of <i>Anacardium occidentale</i> (cashew) leaf extract on

	against pathogens causing disease ¹¹	Kumar Tumkur, Vasudev Ballal, Giliyar Subraya Bhat		<i>Porphyromonas gingivalis</i> and <i>Prevotella intermedia</i> . Methanol and aqueous extracts of cashew leaves were prepared. Its antimicrobial activity against <i>P. gingivalis</i> and <i>P. in- termedia</i> was tested using the agar diffusion method at various dilutions of 75 µ, 50 µl, 25 µl, 10 µl and 5 µl respectively. 0.2% <i>Clorhexidine gluconate</i> (CHX) was used as control.
7	Antioxidant and antimicrobial activity using different extracts of anacardium occidentale L ¹²	Vijayakumar Arul doss and Kalaichelvan Puthupalayam Thangave	2011	Investigated antioxidant and antimicrobial property of different extracts of seed coat and leaf of cashew nut (<i>Anacardium occidentale</i> L.). The antioxidant activity was determined by the 2, 2- diphenyl -1 picryl hydrazyl (DPPH) methods. The antimicrobial activity had been tested for the plant parts using it aqueous, acetone and ethanol extracts against two Gram-positive human pathogenic bacteria like <i>Micrococcus luteus</i> (lab culture), <i>Staphylococcus aureus</i> (MTCC96), four Gramnegative human pathogenic bacteria <i>Salmonella typhi</i> (ATCC12600), <i>Klebsiella pneumonia</i> (MTCC109),

Escherichia coli (MTCC1687),
Pseudomonas aeruginosa
(MTCC733).The ethanol extract
of the seed coat of *Anacardium
occidentale* L. were most
efficacious against all the test
organisms with zone of inhibition
ranging from 12.0-34.0 mm, and
the acetonic extract of the leaf
sample of *Anacardium occidentale*
L. was also active against all the
test organisms with zone of
inhibition ranging from 12.0-28.0
mm.

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