



Semecarpus anacardium L. f.

ANACARDIACEAE

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Synonyms

Semecarpus anacardium L. f.: *Cassuvium anacardium* Kuntz

Local Names

***Semecarpus anacardium*: English:** Marking Nut Tree, Marsh Nut, Oriental Cashew Nut; **Hindi:** Bhilwa, Billar, Bhelwa, Bhilawa (Bhilv), Bhela (Bhel); **Marathi:** Bibba, Bhillava; **Nepali:** Bhalaayo, Rani Bhalayo, Bhella, Bheli (Tharu), Bheul, Bhellataka, Bhalah (Newari), Tingsi (Chepang), Kh ursin (Gurung), Baral (Tamang); **Sanskrit:** Antahsattva, Arusharah, Aruskara (Arukara), Arzohita,

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Bhallatakah, Bhallataka (Bhallataka), Bhallata, Viravrksa, Vishasya; **Tamil:** Erimugi (Erimuki); **Telugu:** Nallajeedi, Bhallatamu; **Urdu:** Baladur, Billar, Bhilavan

Botany and Ecology

***Semecarpus anacardium*:** Trees, 4–20 m tall; branchlets brownish. Petiole 1–3 cm, sparsely pubescent; leaf blade obovate-oblong to narrowly elliptic, 8–35 × 2–9 cm, leathery, adaxially glabrous to minutely pubescent, abaxially variable in hairiness from densely tomentose or pubescent to rarely glabrous, with distinct papillae except on midrib and major veins, base cuneate to obtuse, margin entire, apex variable from acute to rounded, lateral veins 11–25 pairs, prominent abaxially, reticulate venation prominent abaxially, distinct to indistinct adaxially. Inflorescence paniculate, 15–30 cm, tomentose or pubescent; floral subtending bracts 0.5–3 mm. Pedicel missing or very short; flowers greenish white. Calyx lobes broadly ovate, 0.5–1 mm, obtuse apically. Petals ovate-oblong to elliptic, 1.5–3 mm, minutely pubescent to glabrous, longitudinally veined. Stamens 2.5–3 mm; anthers ca. 0.7 mm; staminodes in female flowers ca. 1 mm. Disk round, flat, 1–2 mm across, pilose. Ovary ca. 2 mm across, densely pubescent. Drupe ovoid to broadly ellipsoid, 1–2 × 0.7–1.5 cm, apex obtuse, lower part covered by hypocarp (Hooker 1882; Press et al. 2000; Grierson and Springate 2001; Wu et al. 1994–2013; Xuejun et al. 2011) (Figs. 1 and 2).

Most of the species of genus *Semecarpus* are distributed in the tropical Asia to Oceania and the plant is distributed at the outer Himalayas from Sutlej to Sikkim and fairly at hotter parts of India as far as east of Assam, Burma, Malaysia, and Australia (Press et al. 2000). *S. anacardium* is found in various parts of the world right from the outer Himalayas to the Coromandel Coast Africa, East Asia to Indian subcontinent, Indo-Malaysian region, western peninsula, North Africa and in China, Nepal,

Fig. 1 *Semecarpus anacardium* (Anacardiaceae), plant. (Photo Ripu Kunwar)



Fig. 2 *Semecarpus anacardium* (Anacardiaceae), nuts, edible and useful in cough and cold. (Photo Bharat B Shrestha)



India, Burma, Malaysia, N. Australia. It grows naturally in the tropical Moist deciduous and semi evergreen forests having dry climate.

Phytochemistry

The most significant components of the *S. anacardium* oil are phenolic compounds. On exposure to air, phenolic compounds get oxidized to quinones. The oxidation process can be prevented by keeping the oil under nitrogen. Two main phenolic compounds and a glucoside are bhilavanol A (monoene-pentadecyl catechol I), bhilavanol B (dienepentadecyl catechol II), and anacardoside (glucoside) (Goudgaon et al. 1984; Gil et al. 1995). Vesicant reactions of Bhallataka possibly attributable to these phenolic compounds. Important biflavonoids such as semecarpufflavanone, jeediflavanone, gallufflavanone, nallaflavanone, semecarpetin, and anacardufflavanone have also been isolated (Murthy 1985a, bn). The most significant components of the *S. anacardium* Linn. are bhilwanols, phenolic compounds (Mathur and Agrawal 1953), biflavonoids, sterols (Ishatulla et al. 1977), and glycosides (Rao et al. 1973a, b). Bhilwanol from fruits was shown to be a mixture of cis- and trans-isomers of ursuhenol; this compound consists mainly of 1, 2, dihydroxy-3 (pentadecadienyl 8', 11') benzene and 1, 2, hydroxy-3 (pentadecadienyl 8') benzene (Indap et al. 1983). Other components isolated are anacardoside (Majumdar et al. 2008), semecarpetin, nallaflavanone, jeediflavanone, semecarpufflavanone, gallufflavanone, anacardufflavone mono-olefin I, diolefin II, bhilawanol-A, bhilawanol-B, amentoflavone tetrahydroamentoflavone semicarpol, anacardic acid, tetrahydrobustafflavone, O-trimethyl biflavanone A1(21), O-trimethyl biflavanone A2, 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 (Semalty et al. 2010a, b).

Local Medicinal Uses

Semecarpus anacardium: Astanga sangraha (sixth century) mentioned about *S. anacardium* in Sutrasthana, Chikitsasthana, Utrasthana, and Kalpasthana (Vagbahata 1980). The properties of false fruit of Bhallataka are mentioned in the Sutrasthana. The major organoleptic properties are madhura (sweet), bhrimhana (nourishment), sheeta (cold), and fruit have medhya (memory booster), kaphavataghna property. In Chikitsasthana, cough can be treated with Avaleha prepared with *S. anacardium* and other drugs. Rajayakshma (tuberculosis) can be cured with Ghrita prepared with Bhallataka and other drugs. Bhallataka is the mainly chosen for caring piles, all types of skin diseases and worms. The kalpasthana mentioned about leha (linctus) prepared with juice of Bhallataka or sruta (decoction) of Bhallataka is a good vamanakalpa (emetic). It is believed in uttaratantra that Bhallataka prepared along with Dhoopanayoga (fumigation), vacha (*Acorus calamus*), etc. drugs are best for all the evil spirits. Although Bhallataka is powerful just like fire, when treated by following certain pharmaceutical measures the drug acts like amritha (nectar). Thus, showing the pharmacodynamics of the drug. Rasayana yoga ready with vidanga, Bhallataka, and nagara (*Zingiber officinale*) at the side of madhu and sarpi (ghee) is highlighted (Vagbhata Astanga Hridayam 2005).

The nut of *S. anacardium* has properties such as; Rasa (taste): Katu (Pungent), Tikta (Bitter) and Kashava (Astringent), Guna (qualities): Laghu meaning light to digest, Teekshna (piercing), Snigdha (unctuous) and ushna meaning hot. Sweet ripe fruit of Bhallataka promotes digestion, cures vata-kapha dosha, heals-wound, skin anomalies, piles, inflammation, bloating, ascite infestation, improves mal-absorption, etc. Seed balances vata and pitta dosha and have high nutritional value. Fruit cap pacifies pitta dosha, stimulate digestive system, and is very useful for hair growth. Fruits and oil are effective in treatment of neuritis, rheumatic pain, and gout (Nadkarni 1976). Fruits after detoxification have been used for improvement of eye-sight, prolongation of life, and in certain skin conditions. It has been reported to be used in treatment of asthma, piles, leprosy, arthritis, STDs such as syphilis and gonorrhoea, and skin ailments-like leukoderma (Kirtikar and Basu 1975). The nut has been used in Ayurveda for management of diabetes, wound healing, urinary tract infections, and anemia. It is a nerve tonic and an aphrodisiac, also useful in treatment of tumors of esophagus, skin, liver, etc. There are many Ayurvedic preparations marketed in India such as – Sanjivani vathi – poisoning and fever; Bhallataka Rasavana – anti-aging, skin diseases; Amrita Bhallataka Ghrita – skin disorders and hemorrhoids. As per Siddha system of medicine: Serankottai nei is a medicated ghee preparation consisting of nut extract of Bhalayo. It is a popular siddha drug and is used in treatment of cancer, neurological pain, and lung infection such as tuberculosis and in auto-immune disorders like osteoarthritis and rheumatoid arthritis (Senthilvel et al. 2016). Another modified siddha formulation is also available named Kalpaamruthaa, it contains nut milk extract along with dried powder of *Emblica officinalis* fruit and honey. This formulation has been evaluated for numerous ailments such as analgesic, antipyretic, ulcerogenic, anti-carcinogenic, anti-arthritic, etc. (Mythilypriya et al. 2007).

Ripe fruits are aphrodisiac, digestive, and stimulant. A paste or juice of the fruit is used in the treatment of bronchitis, dysentery, fever, asthma, and hemorrhoids (Manandhar 2002). The pure black acrid juice obtained from the fruits is used externally to remove rheumatic pains, aches, and sprains. A little of the oil is rubbed over the parts affected – it is an efficacious remedy except in such constitutions as are subject to inflammations and swellings. Mixed with garlic and other substances, the juice is used in the treatment of almost every sort of venereal complaint. The bark is mildly astringent (Lindley 1838).

It is folkloric in Nepal. Its nut is edible and useful in cough and cold. Bark is anti-tetanus (Siwakoti and Siwakoti 2000; Rai 2004). A mixture of its fruit and cow dung solution keeps snakes out and acts as an ant repellent (Bhatta 1999; Kunwar et al. 2009a, b, 2015;). It is aphrodisiac (Coburn 1984; Acharya 2012) and used to treat over severe chapped feet (Manandhar 1985). Gastric troubles can be treated by utilizing mixture of paste of the seed and honey. The juice of the seeds is applied externally in the treatment of ringworm and severely chapped feet. The juice of the seeds has been tested as a possible anticancer agent. Oil obtained from the seeds is used to treat skin eruptions. The juice of the root is considered to be effective in causing sterility in women. The latex is applied externally in the treatment of headaches, skin diseases, and scabies (Manandhar 2002).

The fruits of *S. anacardium* are used as astringent, anti-inflammatory, anti-tumor. It is used in rheumatoid arthritis and for the treatment of tumor and malignant growths. Seeds yield Bhilawa nut-shell liquid used for marking. Bark is astringent in nature. It exudes gum resin used in leprosy infection. It is used for improving sexual power and increasing sperm count, curing diseases related to digestive system, balancing Kapha dosha in body. It is said that, no Kapha dosha remains after it is treated with this fruit. The red-orange part is collected and dried in sun. It is consumed after it is semi-dried. If consumed in very large quantity, it is said to induce abortion. In moderation, it is, however, considered good for female reproductive system. Apart from its medicinal properties, it is also poisonous without any purification. And the oil from its seeds can give blisters and painful wounds. The fruits and its oil (28–36%) have medicinal property. Juice of the fruit pericarp is used for marking cotton clothes. Noticeable impact observed in heart related illness, cancer. *S. anacardium* is classified in Ayurveda under the category of toxic plants (Sharma 1975). Because of its unbearably hot and sharp nature, it should be used with attention. If it shows allergic reactions to anybody, we should stop using Bhallataka. Young children, elderly people, women (during pregnancy), and people with pitta constitution should not use Bhallataka (Mukul 2009). The use of the same should be restricted in summer season. The toxic symptoms of its internal use are skin rashes, burning, itching, and excessive thirst and sweating, reduction in urine output with colored urine, sometimes blood in the urine (hematuria) may appear (Jain and Sharma 2013). Detoxifying is very important before applying of *S. anacardium* as internal medicinal purpose. It can be detoxified by washing with warm water or other method. One should adopt a bland and cooling diet consisting of rice, milk, butter, ghee because they suppress the side-effect of it. Fruits also used in Ayurveda medicines as astringent, heat generating, appetizer, digestive,

re-juvenative, aphrodisiac herb, and alleviates the skin and rheumatic disorders (Adams et al. 2007; Bhandary et al. 1995; Kunwar et al. 2009). Also applied as abortive and to cause sterility in women (Ahmad et al. 2006; Kunwar et al. 2009). The plant is burnt, and the smoke used to treat hemorrhoids (Mohagheghzadeh and Faridi 2006). The resin of the plant is applied locally to treat leprosy, nervous debility, and skin diseases. However, care is needed while applying the resin on skin as it is corrosive and may cause sores. Seed oil is applied on warts, tumors, sprains, piles, cuts, and for rheumatism and paralysis (Singh et al. 2002). The species is also used to treat snakebites (Houghton and Osibogun 1993).

Local Food Uses

Semecarpus anacardium: Local people eat roasted fruit rinds. The pulp of the pedicels is roasted and eaten (Gouthaman et al. 2008). The ripe fruits and petals are eaten raw (Dangol et al. 2017).

Local Handicraft and Other Uses

Semecarpus anacardium: The peel surrounding the seed furnishes a sort of permanent ink (Howes 1948). The juice of the pedicels, mixed with limewater, is used as a black marking ink to write on cloth (Uphof 1959). A black dye is obtained from the pedicels. The seeds are a source of tannins (Manandhar 2002). The wood contains an acrid juice, which renders it dangerous to those who work upon it (Lindley 1838). Seed oil is used for various industrial purposes such as a floor dressing; as additive substance to lacquers, dyes, and insulating material; in the plastics industry; for regenerating rubber materials; and to protect wood from white ants (Uphof 1959). Varnish is made from the acrid and adhesive juice of the produced from stem by tapping. The nut yields a strong and bitter substance used all over in India as a substitute for indelible ink for garments by Washer-men, thus it is often referred to as Dhobi Nut. It provides a black color to cotton materials; however, before application it should be mixed with water as a fixator (Kawale 2020). The fruits are also used as a dye. Kernel oil is used as lubricant as well as wood preservative against termites (Gouthaman et al. 2008).

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