



MEDICINAL PLANTS

A Key to Healthy Lifestyle



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INTRODUCTION

Medicinal plants have played a vital role in human healthcare since ancient times. In India, traditional systems of medicine such as Ayurveda, Unani, Siddha, and folk medicine rely extensively on plant-based remedies for the prevention and treatment of various diseases. These plants contain several bioactive compounds that help improve immunity, prevent illnesses, and promote overall well-being. In recent years, there has been increasing global interest in herbal medicines due to their natural origin and comparatively fewer side effects than synthetic drugs.

India is one of the richest countries in terms of plant biodiversity and possesses a wide variety of medicinal plant species used in traditional healthcare practices. Many of these plants are commonly found in forests, agricultural fields, and home gardens and are widely used for treating common health problems.

This report highlights the importance of medicinal plants in promoting a healthy lifestyle and creating awareness about their therapeutic value. The report provides information on 25 important medicinal plants, including their traditional uses and health benefits. For example, *Mimosa pudica* (*Lajwanti*) is traditionally used for wound healing and treating skin infections. *Mussaenda frondosa* (*Dhobi Tree*) is known for its medicinal value in treating fever and digestive disorders. *Costus igneus* (*Insulin plant*) is widely recognized for its role in managing blood sugar levels and is used as a natural remedy for diabetes. *Euphorbia hirta* (*Dadmari*) is traditionally used in herbal medicine for respiratory problems, skin diseases, and digestive disorders. Similarly, *Tinospora cordifolia* (*Giloy*) is well known for boosting immunity and helping in the treatment of fever and infections.

The report also emphasizes the importance of conserving medicinal plant resources and promoting their sustainable use. Through awareness initiatives under the Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP), MoEFCC Govt. of India, efforts are being made to disseminate knowledge about medicinal plants and encourage communities, students, and researchers to adopt natural healthcare practices while conserving biodiversity.



Sweet Flag (*Acorus calamus*) is a highly beneficial medicinal plant that supports brain health, digestion, and overall well-being, which explains its long use in traditional medicine. Modern research also confirms many of its health benefits, making it useful in managing neurological, metabolic, and inflammatory conditions. However, its powerful nature requires careful dosage and medical guidance to avoid side effects. With proper use and sustainable cultivation, Sweet Flag can serve as an effective natural remedy while protecting human health and plant resources.

Sweet Flag (*Acorus calamus*) - वच पौधा

Sweet Flag (*Acorus calamus* L.), known as वच (Vach) in Hindi and வசம்பு (Vasambu) in Tamil, is a perennial medicinal plant belonging to the family Acoraceae. It grows naturally in temperate regions of Asia and is widely distributed across the Indian subcontinent, including the Himalayan region, as well as parts of Southeast Asia, China, Japan, and Indonesia. The plant is characterized by tall, sword-shaped leaves and an aromatic underground rhizome, which is the primary medicinal part. Botanically, *Acorus calamus* occurs in different cytological forms, of which the sterile triploid form is most commonly cultivated. Due to its wide geographical distribution and long-standing presence in traditional medicine systems, Sweet Flag holds significant importance in medicinal plant research¹.



Traditional Significance

Sweet Flag (*Acorus calamus*) has been used in traditional medicine for over 3,000 years². Historical records indicate its trade between ancient India and Mesopotamia and its mention in Egyptian papyri around 1300 BC. In India, it is described in classical Ayurvedic texts such as the Charaka Samhita and the Sushruta Samhita as a brain rejuvenator and digestive stimulant. The plant reached Europe in the sixteenth century through botanical gardens and later spread to North America and other regions, where different cultures adopted it for medicinal and household uses. Although concerns about toxicity led to restrictions on its use in food products in some countries, *Acorus calamus* continues to be used in traditional Ayurvedic and Chinese medicine. Interestingly, while it is invasive in many parts of the world, the plant is now endangered in parts of its native India due to excessive harvesting for medicinal trade³.

Sweet Flag (*Acorus calamus* L.) belongs to Kingdom Plantae, Phylum Magnoliophyta, Class Liliopsida, Order Acorales, Family Acoraceae, Genus *Acorus*. It is a semi-evergreen perennial herb growing 60-200cm tall with creeping rhizomes⁴. The leaves are sword-shaped, 60-150cm long, 0.8-1.5cm wide, with wavy edges, prominent midrib, and sweet tangerine fragrance when crushed. Rhizomes are cylindrical, thumb-thick, brown outside, white inside, with fibrous roots. Flowers appear on 3-10 cm greenish spadix in late spring, but the plant is often sterile.

Medicinal Benefits

Sweet Flag (*Acorus calamus*), commonly known as Vacha, is an important Ayurvedic medicinal plant widely used to improve memory, enhance brain function, and support mental clarity. It is traditionally used to manage speech disorders, epilepsy, nervous weakness, tremors, and mental confusion. The herb is also highly effective for digestive problems such as stomach pain, gas, constipation, intestinal worms, poor appetite, and weak digestion. In respiratory conditions, it is used to relieve cough, asthma, throat infections, and fever. Sweet Flag is applied externally for skin problems, where it helps in faster wound healing, reduces infections, rashes, boils, and skin inflammation. It is also used in women's health for painful menstruation and excessive bleeding. Additionally, the

plant supports relief from joint pain, arthritis, headache, depression, diabetes, and high blood pressure⁵. Modern scientific studies support many of these uses and report that its natural compounds, such as asarone and eugenol, possess analgesic, antifungal, neuroprotective, and antioxidant properties.

Sweet Flag (*Acorus calamus*) should be used only after consulting a qualified doctor or Ayurvedic practitioner. Traditionally, the dried rhizome powder is taken in a dose of 500 mg to 5 g per day, usually in divided doses with warm water or milk. Decoctions and standardized herbal formulations are also used under medical supervision. Although the plant shows several medicinal benefits, high doses or long-term use may cause adverse effects due to the presence of β -asarone. Therefore, proper dosage, limited duration of use, and medical supervision are essential to ensure its safe and effective use.



It may cause side effects when taken in excessive amounts or for prolonged periods. Common side effects include nausea, vomiting, stomach irritation, dizziness, headache, and drowsiness. Allergic reactions such as skin irritation, itching, or breathing discomfort may occur, especially in sensitive individuals. The herb is strictly contraindicated during pregnancy and breastfeeding and should be avoided by children and individuals with liver or kidney disorders, bleeding problems, seizure disorders, or severe mental health conditions⁶. People taking blood thinners, sedatives, antidepressants,

or blood pressure medications should use it only under medical supervision due to possible drug interactions.

Growing Conditions

Acorus calamus is a semi-aquatic perennial herb that grows best in moist, marshy, and waterlogged conditions. The plant prefers warm climates with moderate to high rainfall and grows well in temperatures ranging from about 10–38 °C⁷. It requires abundant sunlight, ideally 5–6 hours of direct sunlight daily, for healthy growth and rhizome development. Sweet Flag thrives in clayey or loamy soils that can retain moisture, with a soil pH ranging from mildly acidic to slightly alkaline. It is commonly cultivated in shallow standing water or very moist soils along riverbanks, wetlands, and paddy field margins. Proper moisture maintenance and good organic matter in the soil support optimal growth and yield of medicinal rhizomes⁷.

Cultivation

Acorus calamus can be successfully grown at home in pots, containers, or small wet garden areas, making it suitable even for people without farmland. Healthy rhizome pieces with visible buds are used for planting, as rhizome propagation is easier and more reliable than seeds. The plant prefers moist, loamy soil rich in organic matter and grows best when the soil remains consistently wet. Containers should be placed in a location that receives partial to full sunlight for about 5–6 hours daily⁸. Regular watering is essential to maintain moisture, but extreme stagnation of water should be avoided to prevent rotting. Light organic manure or compost may be added occasionally to support healthy growth. Under home conditions, growth is slow, and rhizomes usually become ready for harvesting after

about 18–24 months⁷. Home cultivation provides pesticide-free medicinal material and is ideal for personal or family use.

Commercial cultivation of *Acorus calamus* is best suited to marshy, waterlogged, or semi-aquatic environments such as wetlands, riverbanks, and paddy field margins. The crop is propagated using sprouted rhizomes planted in well-prepared fields enriched with organic manure. Planting is usually done during the monsoon season when soil moisture is naturally high. Maintaining shallow standing water throughout the growth period is important for proper rhizome development. Regular weeding during the early growth stage helps reduce competition and improves yield. The plant requires moderate nutrients and generally faces fewer pest and disease problems compared to other crops. Harvesting is carried out after 6–8 months, when leaves begin to dry and turn yellow, indicating rhizome maturity⁹. The harvested rhizomes are cleaned, cut into pieces, and dried before processing. Commercial cultivation not only provides good economic returns but also helps conserve natural populations by reducing over-harvesting from the wild.



Cardamom Ginger (*Alpinia calcarata*) is an important medicinal plant supported by both traditional use and modern scientific research. Its rhizome shows strong antidiabetic, anti-inflammatory, antimicrobial, and digestive benefits with a good safety profile. The plant is easy to cultivate at home and commercially, providing health support and income opportunities for small farmers. Although preclinical studies are promising, medical supervision is necessary due to limited human trials. Further clinical research can help establish *Alpinia calcarata* as a reliable natural remedy for chronic diseases.

Cardamom Ginger (*Alpinia calcarata*) – इलाइची अदरक पौधा

Cardamom Ginger (*Alpinia calcarata* Roscoe), commonly known as Kulanjan, is a rhizomatous perennial medicinal plant belonging to the family *Zingiberaceae*. It is native to tropical Southeast Asia and is widely cultivated in countries such as Sri Lanka, India, Malaysia, and Bangladesh. The underground rhizome is the main medicinal part of the plant and is rich in bioactive compounds, including essential oils, diterpenes, and polyphenols, which contribute to its therapeutic value. Traditionally, *Alpinia calcarata* has been used in Ayurvedic and Sri Lankan indigenous medicine to treat conditions such as arthritis, cough, asthma, digestive disorders, fever, and diabetes. Modern scientific studies support these traditional uses and report antibacterial, antifungal, anti-inflammatory, antidiabetic, antioxidant, gastroprotective, and anticancer activities. Toxicological studies further indicate that the plant is safe at recommended doses, showing no significant adverse effects. Overall, *Alpinia calcarata* is a valuable medicinal plant that bridges traditional knowledge and modern research, offering promising potential for natural and safe healthcare applications¹⁰.



Traditional Significance

Cardamom Ginger (*Alpinia calcarata*) is native to the Western Ghats and tropical regions of India, Sri Lanka, and Southeast Asia, where it naturally grows in moist and shaded forest areas. The plant has a long history of use in traditional medicinal systems, particularly in Sri Lankan Ayurveda and Indian folk medicine. It has been traditionally used to treat digestive disorders, joint pain, respiratory problems, fever, and inflammatory conditions. In Sri Lanka, the plant is locally known as “Warana” and has been an important ingredient in traditional herbal preparations for centuries. The medicinal value of Cardamom Ginger is mainly attributed to its aromatic rhizome, which contains essential oils and bioactive compounds such as flavonoids, phenolic acids, and terpenes¹¹. These compounds are responsible for its anti-inflammatory, antimicrobial, analgesic, and antioxidant properties. Modern scientific studies have supported many of its traditional uses, highlighting its potential benefits in pain relief, digestion, respiratory health, and cancer-related research. Despite its medicinal importance, *Alpinia calcarata* is less widely cultivated compared to common ginger (*Zingiber officinale*).

Cardamom Ginger (*Alpinia calcarata* Roscoe) belongs to the kingdom Plantae, phylum Tracheophyta, class Liliopsida, order Zingiberales, and family Zingiberaceae. It is a rhizomatous perennial herb that typically grows to a height of about 1–1.5 meters. The leaves are long, lance-shaped, and arranged alternately along the stem, measuring approximately 40–50 cm in length and 2–2.5 cm in width, with a dark green upper surface and a lighter underside. The rhizome is thick, aromatic, and pungent, producing a characteristic ginger–cardamom fragrance due to the presence of essential oils. Flowers are borne in terminal panicles measuring about 10–15 cm in length and have white petals with red markings. The fruits are orange-red, globose capsules containing seeds¹². The

plant naturally thrives in shaded and moist forest environments of the Western Ghats, Sri Lanka, and Southeast Asia.

Medicinal Benefits

Cardamom Ginger (*Alpinia calcarata*), also known as Kulanjan, is a useful medicinal plant mainly valued for its rhizome. It helps control blood sugar levels and supports people with diabetes by improving digestion of food and reducing excess sugar absorption. The plant is well known for reducing inflammation and pain, making it helpful in joint pain, arthritis, and body aches. It also protects the stomach by reducing acidity and helping in healing ulcers, which makes it useful for people suffering from indigestion, gas, and stomach irritation. Cardamom Ginger is effective against many bacteria and fungi, helping the body fight infections, cough, cold, and respiratory problems. In addition, it supports overall immunity, reduces fever, and helps the body recover from weakness¹³. Studies also suggest that it may help slow the growth of cancer cells. Importantly, it is considered safe when used in proper amounts under medical guidance.

Cardamom Ginger (*Alpinia calcarata*), also known as Kulanjan, is usually taken in small and safe amounts. In traditional use, its dried rhizome powder is taken in a dose of about 500 mg to 3 grams per day, often with warm water or milk¹⁴. It can also be consumed as a mild decoction prepared from the dried rhizome. Scientific studies show that the plant is generally safe and does not cause harm to the liver, kidneys, or other organs when used in proper amounts. However, it should not be used during pregnancy or breastfeeding. People with bleeding problems, diabetes, or those taking medicines such as blood thinners or regular long-term drugs should use it only after consulting a doctor¹⁵. Overall, Cardamom Ginger is safe and beneficial when taken in the right dose and under medical guidance.



Cardamom Ginger (*Alpinia calcarata*) is generally considered safe when taken in proper amounts. Scientific studies show that even higher doses did not cause serious harm to the liver, kidneys, blood, or other organs¹⁶. However, in some people, especially at higher doses, mild side effects such as stomach discomfort or nausea may occur. Allergic reactions are rare, but sensitive individuals may experience skin irritation or itching when handling the fresh rhizome or essential oil. People with asthma may feel mild breathing discomfort if they inhale the strong aroma of the oil. This herb should not be used during pregnancy or breastfeeding due to lack of sufficient safety information. Caution is also advised for people with bleeding disorders, diabetes, or those taking regular medicines such as

blood thinners or antidiabetic drugs. Therefore, Cardamom Ginger should be used only after consulting a doctor, and it is best to start with a small dose to check individual tolerance¹⁷.

Growing Conditions


Cardamom Ginger (*Alpinia calcarata*) grows well in tropical and subtropical climates with temperatures of 13–36 °C and an average annual rainfall of about 1645 mm, making it

suitable for regions like Kerala, Karnataka, Tamil Nadu, and Sri Lanka, especially hilly areas up to 1400 m altitude¹⁸. The plant prefers fertile red loam soil rich in organic matter with good drainage and tolerates partial shade, allowing cultivation as an intercrop in coconut or rubber plantations¹⁹. It is propagated using fresh rhizome pieces (5 cm) planted on raised beds, while tissue culture is also used for commercial production. Application of farmyard manure, balanced NPK fertilizers, and biofertilizers supports healthy growth, with irrigation required during dry periods. Harvesting begins after 18 months, though 36–42 months gives maximum yield of about 8–10 tons fresh or 2–2.5 tons dry rhizomes per acre²⁰. With moderate cultivation costs and good market demand, Cardamom Ginger is well suited for small farmers in shaded, moist agroforestry systems.

Cultivation

Cardamom Ginger (*Alpinia calcarata*) is well suited for home gardens because it grows well in partial shade and needs limited care. It can be grown in large pots (15–20 liters) or shaded garden beds using moist, well-drained loamy soil mixed with compost. Healthy rhizome pieces (5–7 cm with buds) are planted about 4–5 cm deep and spaced 30 cm apart²¹. Regular watering is required to keep the soil moist, along with light organic fertilizer once a month. The plant matures in 18–24 months, yielding about 0.5–1 kg of dry rhizome per plant, making it ideal for personal medicinal use.

Commercial cultivation of *Alpinia calcarata* is suitable for shaded agroforestry systems such as coconut or rubber plantations. It is propagated using 500–1500 kg of fresh rhizomes per acre, planted on raised beds in fertile red loam soil. Application of farmyard manure, balanced NPK fertilizers, and biofertilizers, along with proper irrigation during dry periods, supports healthy growth. Harvesting starts after 18 months, but 36–42 months gives maximum yield of about 8–10 tons fresh or 2–2.5 tons dry rhizomes per acre²². With moderate cultivation cost and good market price, it is a profitable option for small farmers.

A close-up photograph of arrowroot leaves. The leaves are long, lanceolate, and have a prominent central vein with secondary veins branching off. They are a vibrant green color and appear to be part of a dense cluster. The background is blurred, showing more of the same plant and some sunlight filtering through.

Arrowroot (*Maranta arundinacea*) is a safe, gluten-free, and easily digestible plant with long-standing use in traditional nutrition and medicine. It supports gut health, immune function, and blood sugar management, making it suitable for vulnerable groups such as infants and the elderly. The plant is easy to cultivate under tropical conditions and provides good yield and income for small farmers. Overall, arrowroot represents a sustainable functional food with significant nutritional and economic value.

Arrowroot (*Maranta arundinacea*) – अररोट / मारंता पौधा

Arrowroot (*Maranta arundinacea* L.), commonly known as अररोट, is a perennial medicinal plant belonging to the family Marantaceae. It is native to tropical America and is now widely cultivated in India, Sri Lanka, and other tropical regions for its nutritious, starch-rich rhizomes²³. Arrowroot powder is valued for being gluten-free, easily digestible, and hypoallergenic, making it suitable for infants, elderly people, and patients with weak digestion. In Ayurveda, it is considered a cooling and light food used to manage diarrhea, gastric irritation, fever, and recovery after illness. Modern studies support its benefits in improving gut health, providing low-glycemic energy for diabetes management, soothing skin inflammation, and supporting overall nutrition²⁴. Due to its safety, nutritional value, and medicinal importance, *Maranta arundinacea* serves as a valuable plant linking traditional healing systems with modern dietary and therapeutic needs.



Traditional Significance

Arrowroot (*Maranta arundinacea* L.) originated in the tropical rainforests of the Caribbean, Central America, and northern South America, where it was cultivated by indigenous communities for thousands of years as a safe and nutritious starch food. During the colonial period, the plant was introduced to India and other tropical regions, where it became an important part of traditional medicine and diet. In Ayurveda, arrowroot is known as *Sita Tavakshiri* or *Araruta* and is valued for its cooling, light, and nourishing properties. It has been traditionally used to manage digestive disorders, diarrhea, fever, weakness, and as a safe food for infants and recovering patients. Over time, arrowroot cultivation spread across Kerala, Tamil Nadu, Sri Lanka, and Southeast Asia due to rising demand for its pure, gluten-free starch. Today, arrowroot is widely recognized for its easy digestibility, low glycemic nature, and importance in gluten-free and therapeutic nutrition²⁵.

Arrowroot (*Maranta arundinacea* L.) is a perennial herb belonging to the family Marantaceae under the order Zingiberales. It grows as an erect plant about 1–1.5 m tall with large²⁶, oblong green leaves and underground cylindrical rhizomes, which are the main edible and medicinal parts. The rhizomes are rich in easily digestible starch and give the plant its economic value. Arrowroot prefers moist, well-drained soil and partial shade, and produces small white flowers during the rainy season.

Medicinal Benefits

Arrowroot (*Maranta arundinacea*) provides several important medicinal benefits mainly due to its starch and natural plant compounds. It shows antioxidant activity that helps reduce body inflammation and protects cells from damage. The resistant starch in arrowroot improves digestion by supporting healthy gut bacteria, making it useful for diarrhea, stomach irritation, and bowel disorders. Scientific studies confirm its anti-inflammatory effect, which supports its traditional use in joint pain, skin irritation, and

gastrointestinal inflammation²⁷. Arrowroot starch also helps in wound healing by promoting tissue repair and preventing infection when used in topical applications. In addition, it strengthens immunity, helps recovery after illness, and is safe for infants, elderly people, and patients due to its low glycemic index, easy digestibility, and hypoallergenic nature²⁸.



Arrowroot (*Maranta arundinacea*) is generally safe when used as food and in traditional preparations. As a dietary ingredient, arrowroot powder can be consumed in amounts of about 10–30 grams per day, commonly used in porridge, soups, or as a thickening agent²⁹. In traditional Ayurvedic use, 3–15 grams of arrowroot powder mixed with water or milk is taken for digestive problems, diarrhea, or recovery after illness, while infants are given small amounts as a thin gruel. Scientific studies report that arrowroot powder shows very low toxicity and does not harm the liver, kidneys, or other organs when used in normal amounts. Side effects are rare, but excessive intake may cause bloating, gas, or constipation due to its high starch content, and allergic reactions may occur in sensitive individuals. Arrowroot is considered safe in food amounts during pregnancy and breastfeeding, but higher medicinal doses should be avoided²⁹. People with diabetes or those taking regular medicines should consult a healthcare professional before using arrowroot for medicinal purposes.

Arrowroot (*Maranta arundinacea*) is generally very safe when used in normal food amounts, and no serious toxicity has been reported in scientific studies. However, taking large quantities (more than about 30 grams per day) may cause bloating, gas, or constipation due to its high starch content. Allergic reactions are rare but may include skin rash, itching, or swelling in sensitive individuals³⁰. Raw arrowroot juice should be avoided, as a few reports of liver problems are linked to improper processing; only commercially processed arrowroot powder should be used. High medicinal doses are not recommended during pregnancy and breastfeeding, although normal food use is considered safe. People with diabetes, intestinal blockage, or those taking regular medicines should start with a small amount and consult a healthcare professional before using arrowroot for medicinal purposes³¹.

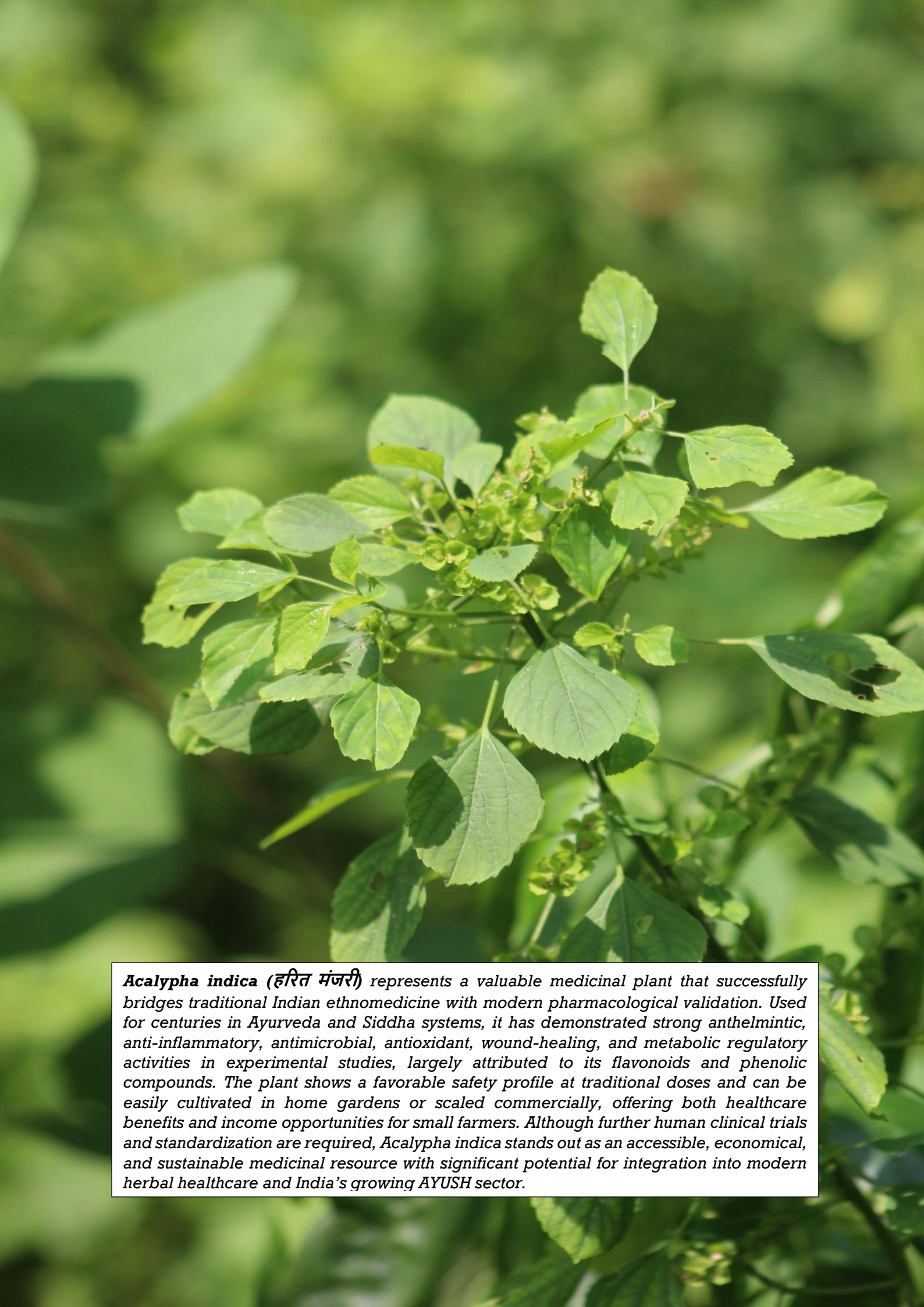
Growing Conditions

Arrowroot (*Maranta arundinacea*) grows best in warm, humid tropical and subtropical climates with moderate rainfall and frost-free conditions. It prefers temperatures around 23–29°C and grows well in regions such as Kerala, Tamil Nadu, Karnataka, and coastal areas. The plant thrives in fertile, well-drained sandy loam or clay loam soil rich in organic matter and requires partial shade, making it suitable for cultivation under coconut or rubber trees and in shaded home gardens. Propagation is usually done by planting small rhizome pieces in moist soil during the rainy season, with regular watering to keep the soil consistently moist³². The crop matures in about 8–12 months, after which the rhizomes are harvested when leaves turn yellow, yielding starch-rich tubers.

Cultivation

Arrowroot (*Maranta arundinacea*) is easy to cultivate both at home and on a commercial scale. For home cultivation, it grows well in large pots (20–30 liters) or shaded garden beds with 2–4 hours of morning sunlight and protection from strong afternoon sun. The plant prefers moist, well-drained loamy soil mixed with compost. Rhizome pieces of 5–7 cm with buds are planted about 5 cm deep and watered regularly so the soil never dries completely. Under proper care, arrowroot matures in about 8–10 months, and a single pot can yield around 2–4 kg of fresh rhizomes or 500 g–1 kg of starch³³.

For commercial cultivation, arrowroot performs best in sandy loam soil with a pH of 5.5–7.0 and partial shade, commonly grown as an intercrop under coconut or rubber plantations. About 3 tons of fresh rhizomes per hectare are used as planting material. The crop requires organic manure and balanced fertilizers, along with regular irrigation during dry periods. Harvesting is done after 8–12 months when leaves turn yellow, producing approximately 20–47 tons of fresh rhizomes or 5–12 tons of starch per hectare. With a cultivation cost of around ₹2.5–3 lakh per hectare and starch prices of ₹80–120 per kg, arrowroot cultivation can generate a gross income of ₹4–6 lakh per hectare, making it a profitable and low-risk option for small farmers³³.



***Acalypha indica* (हरित मंजरी)** represents a valuable medicinal plant that successfully bridges traditional Indian ethnomedicine with modern pharmacological validation. Used for centuries in Ayurveda and Siddha systems, it has demonstrated strong anthelmintic, anti-inflammatory, antimicrobial, antioxidant, wound-healing, and metabolic regulatory activities in experimental studies, largely attributed to its flavonoids and phenolic compounds. The plant shows a favorable safety profile at traditional doses and can be easily cultivated in home gardens or scaled commercially, offering both healthcare benefits and income opportunities for small farmers. Although further human clinical trials and standardization are required, *Acalypha indica* stands out as an accessible, economical, and sustainable medicinal resource with significant potential for integration into modern herbal healthcare and India's growing AYUSH sector.

Indian Nettle (*Acalypha indica*) हरित मंजरी पौधा

Indian Nettle (*Acalypha indica* L.), commonly known as हरित मंजरी in Hindi and Kuppaimeni in Tamil, is a medicinal herb belonging to the family Euphorbiaceae and widely distributed across tropical Asia. It grows commonly along roadsides, wastelands, and cultivated fields and has long been used in Ayurveda, Siddha, and tribal medicine for treating skin diseases, respiratory ailments, digestive disorders, rheumatism, and parasitic infections. The plant is an erect herb (30–90 cm tall) with serrated leaves and axillary flower spikes, and all parts contain bioactive compounds such as flavonoids, phenolics, tannins, saponins, and alkaloids. Scientific studies support its antibacterial, antifungal, anti-inflammatory, antioxidant, wound-healing, and anthelmintic activities, though human clinical evidence is limited³⁴. Traditionally processed preparations are considered safe at controlled doses, while raw juice should be avoided, highlighting the need for proper dosage and further clinical research.



Traditional Significance

Indian Nettle (*Acalypha indica* L.) is native to tropical Asia, including India, Sri Lanka, Bangladesh, and Southeast Asia, where it commonly grows as a weed in roadsides, wastelands, crop fields, and disturbed soils up to about 1000 m elevation. Known as हरित मंजरी in Hindi and Kuppaimeni in Tamil, the plant has been used for more than 2000 years in Ayurveda, Siddha, and tribal medicine. Ancient texts describe its use in treating skin diseases, respiratory disorders, digestive problems, intestinal worms, rheumatism, and infections³⁵. Ethnomedicinal records from several Indian tribal communities highlight its wide traditional importance, while modern studies support its antibacterial, antifungal, anti-inflammatory, antioxidant, wound-healing, and anthelmintic activities.

Acalypha indica belongs to the family Euphorbiaceae under the order Malpighiales. It is an erect annual or short-lived perennial herb, usually growing 30–90 cm tall, with quadrangular, softly hairy stems. The leaves are alternate, ovate to lanceolate in shape, with serrated margins and sometimes a coppery tinge, especially in young leaves³⁵. Flowers are small, greenish, and unisexual, arranged in axillary spikes, and the plant produces tiny three-lobed capsules containing black seeds. All parts of the plant contain medicinally active compounds and release a milky latex when injured, making it a distinctive and easily identifiable medicinal weed.

Medicinal Benefits

Indian Nettle (*Acalypha indica*) shows a wide range of medicinal benefits supported by modern scientific studies. It has strong anthelmintic activity, helping to kill and expel intestinal worms, and exhibits marked anti-inflammatory effects by reducing swelling, pain, and inflammatory cytokines. The plant demonstrates effective antibacterial and antifungal action against common pathogens, supporting its traditional use in skin infections and wound care³⁶. Its high flavonoid and phenolic content provides antioxidant protection, promotes faster wound healing, relieves pain, and supports liver health. In addition, *Acalypha indica* shows promising antidiabetic, antiallergic, antitubercular, and

anticancer potential, validating its long-standing use in Ayurveda and Siddha medicine, although further human clinical studies are still required.



Acalypha indica is generally considered safe when used in traditional doses, with animal studies showing low toxicity and a wide safety margin. For internal use, dried leaf powder or extract is commonly taken in amounts equivalent to about 5–10 g per day for adults, divided into two or three doses, while decoctions (20–50 ml twice daily) are used in Ayurvedic and Siddha practices. For external application, a paste or gel prepared from fresh leaves is applied to wounds, eczema, or skin infections two to three times daily³⁷. Children above six years are usually given half the adult dose. The plant should be avoided during early pregnancy, in individuals with bleeding disorders, and used cautiously in patients taking antidiabetic medicines due to possible additive

effects. Continuous internal use should be limited to a few weeks, and medical guidance is recommended to ensure safe and effective use³⁷.

Acalypha indica is generally well tolerated at recommended doses, with side effects occurring infrequently. Mild gastrointestinal discomfort such as nausea or loose stools may appear with higher intake, and topical use may cause mild skin irritation in sensitive individuals. Allergic reactions are rare but can include itching, rashes, or swelling, and the herb should be discontinued immediately if such symptoms occur. Its use is contraindicated during pregnancy and breastfeeding due to insufficient safety data, and it should be avoided in individuals with bleeding disorders, active peptic ulcers, or severe liver or kidney disease. Caution is also advised when used alongside anticoagulant, antiplatelet, or antidiabetic medications, and prolonged use should be undertaken only under medical supervision.

Growing Condition

Acalypha indica grows best in tropical and subtropical climates with warm temperatures around 25–35 °C and can tolerate slightly cooler conditions for short periods. It prefers bright indirect sunlight or partial shade and does not perform well under harsh direct sun³⁸. The plant grows well in well-drained loamy or sandy loam soil rich in organic matter, with a slightly acidic to neutral pH. Regular watering is needed to keep the soil moist, but waterlogging should be avoided; once established, the plant can tolerate short dry spells. It naturally thrives in moist, shaded environments such as riverbanks, forest edges, and wastelands, and can be easily propagated by seeds or stem cuttings, making it a hardy and easily cultivable medicinal weed.

Cultivation

Acalypha indica is a low-maintenance plant that grows easily in home conditions, including regions like Patna with warm tropical weather. It can be propagated either by seeds or stem cuttings. Stem cuttings of 10–15 cm length root quickly when planted in a well-drained medium made of coco peat, garden soil, and sand or perlite, usually forming roots within two weeks under warm conditions. Seeds can be surface-sown in trays, where they germinate within 7–10 days under moist and well-lit conditions. The plant grows well in

12–15 inch pots filled with loamy soil mixed with compost and sand, placed in bright indirect sunlight such as an east-facing balcony. Regular watering is required, keeping the soil moist but not waterlogged, and light fertilization once a month supports healthy growth. Occasional pruning helps maintain bushy growth. Common pests like aphids and mealybugs can be managed using neem oil spray. Leaves can be harvested throughout the year, and a healthy plant can yield about 200–300 g of fresh leaves annually.

Commercial cultivation of *Acalypha indica* is economically viable due to its fast growth, multiple harvests, and strong demand in herbal medicine markets. The crop grows best in fertile loamy or sandy loam soils with good drainage and a pH range of 6.0–7.5. Land preparation includes deep ploughing and incorporation of organic manure before planting. Plants are grown at close spacing, allowing high planting density per acre. The crop responds well to balanced fertilization and regular irrigation, especially during dry periods. Harvesting begins within 45–60 days, and multiple cuts can be taken each year. Leaves are shade- or solar-dried and processed for sale to herbal medicine manufacturers. With proper management, the crop provides high annual yields and attractive profits after the first year. Regions like Patna and Gaya, with fertile alluvial soils, are well suited for cultivation, especially when integrated into crop rotation systems.



Turmeric (*Curcuma longa*, हल्दी) is a well-validated medicinal plant that effectively bridges traditional Ayurvedic use with modern scientific research. Its active compound curcumin shows strong anti-inflammatory, antioxidant, metabolic, and anticancer benefits while maintaining a high safety profile. Turmeric is easy to cultivate at home and commercially, providing both health benefits and economic value for farmers. Overall, turmeric represents a sustainable and evidence-based medicinal crop with significant relevance to modern healthcare and the AYUSH sector.

Turmeric (*Curcuma longa*) हल्दी

Turmeric (*Curcuma longa*), commonly known as हल्दी in Hindi, is one of the most important medicinal plants in Indian traditional medicine and has been widely used in Ayurveda, Siddha, and Unani systems for thousands of years³⁹. The rhizome of turmeric contains curcumin (about 3–5%) along with other curcuminoids and essential oils, which are responsible for its strong anti-inflammatory, antioxidant, antimicrobial, hepatoprotective, and anticancer properties. Traditionally, turmeric has been used to manage digestive disorders, inflammatory conditions, skin diseases, liver ailments, and wound healing.

Modern scientific research strongly supports these uses, demonstrating its effectiveness in reducing arthritis pain, improving metabolic and cardiovascular health, protecting the liver and nervous system, and inhibiting inflammatory and cancer-related pathways such as COX-2 and NF-κB. Turmeric is considered safe and well-tolerated at daily doses of 1–3 g of curcumin. Beyond its medicinal value, turmeric also plays a vital role in Indian cuisine, cultural rituals, cosmetics, and home remedies, making it a unique plant that bridges traditional household use with evidence-based clinical applications³⁹.



Traditional Significance

Turmeric (*Curcuma longa*) originated in southwest India, particularly the Tamil Nadu and Kerala regions, and has been cultivated for over 4,000 years. Its earliest references appear in ancient Indian texts such as the *Atharvaveda* and classical Ayurvedic treatises including the *Charaka Samhita* and *Sushruta Samhita*, where it was described as *Haridra* and used for wound healing, blood purification, jaundice, anemia, and detoxification. The medicinal and cultural importance of turmeric spread beyond India through trade routes, reaching China by the 7th century CE, the Middle East by the 8th century, and Europe by the 13th century, where it was famously described by Marco Polo as the “saffron of India.” Today, India remains the world’s leading producer, contributing nearly 80% of global turmeric supply, with major cultivation centers such as Erode in Tamil Nadu and significant production in Bihar’s alluvial regions⁴⁰. Turmeric continues to hold a central place in Ayurveda, Siddha, and Unani medicine, forming a key ingredient in numerous traditional formulations and modern curcumin-based products.

Curcuma longa belongs to the family Zingiberaceae and is a sterile, triploid perennial herb propagated only through rhizomes. The plant grows about 1–1.5 meters tall and forms a leafy pseudostem from large basal leaves that are oblong to lanceolate in shape, dark green above and lighter beneath, with a strong aromatic smell when crushed. The inflorescence arises directly from the rhizome as a compact spike bearing pale yellow sterile flowers enclosed by green or purplish bracts⁴¹. The underground rhizomes are the economically important part and occur as a central mother rhizome with several finger-

like branches; they are yellow to orange inside due to the presence of curcuminoids and essential oils responsible for turmeric's color, aroma, and medicinal value. The plant has fibrous roots and is traditionally propagated using healthy rhizome pieces.

Medicinal Benefits

Turmeric (*Curcuma longa*) exhibits a wide range of medicinal benefits supported by extensive scientific research. Its active compound curcumin shows strong anti-inflammatory activity by inhibiting key inflammatory pathways, making it effective in conditions such as arthritis and other inflammatory disorders. Turmeric also acts as a powerful antioxidant, protecting cells from oxidative stress and reducing tissue damage. Studies demonstrate its anticancer potential through the induction of apoptosis and inhibition of tumor growth in various cancer models. In addition, turmeric supports blood sugar control, improves lipid profiles, protects liver function, enhances brain health, and promotes cardiovascular health. Its antimicrobial, wound-healing, and immunomodulating properties further validate its traditional use, while modern bioavailable formulations have improved its clinical effectiveness, making turmeric a well-established and safe medicinal plant when used in recommended doses.



Turmeric (*Curcuma longa*) is considered safe for regular use and has GRAS (Generally Recognized as Safe) status, with toxicity studies showing very high safety margins. For therapeutic purposes, curcumin is commonly used at 1–3 g per day, which corresponds to 5–10 g of turmeric rhizome powder or 500 mg–2 g of standardized curcumin extract, usually taken in two or three divided doses. Absorption is significantly improved when curcumin is consumed with black pepper (piperine) or lipid-based formulations. Clinical studies commonly use 500 mg twice daily for osteoarthritis and 1 g per day for metabolic conditions. Children above 12 years are generally given half the adult dose, and topical formulations containing 5–10% curcumin are used for wounds and skin disorders⁴². Although turmeric is safe in culinary amounts during pregnancy, high medicinal doses should be avoided, especially in individuals with gallbladder disease, bleeding disorders, or iron deficiency. Continuous high-dose use should be limited in duration and undertaken under medical supervision.

Growing Condition

Turmeric (*Curcuma longa*) grows best in warm tropical and subtropical monsoon climates with temperatures ranging from 25–35 °C, and it does not tolerate frost. It requires high humidity (70–90%) and performs well under full sun to partial shade, preferably with morning sunlight and some protection from intense afternoon heat. The crop needs well-distributed annual rainfall of about 1500–2500 mm, making monsoon regions such as Bihar and eastern India highly suitable. Turmeric thrives in loose, fertile loamy or sandy loam soils rich in organic matter, with a slightly acidic to neutral pH of 5.5–7.5, and good drainage is essential to prevent waterlogging; raised beds are often recommended⁴³. Adequate soil moisture is required during the early growth stages, while established plants can tolerate short dry periods. Overall, warm temperatures, moist but well-drained

soil, and monsoon rainfall create ideal conditions for healthy turmeric growth and rhizome development.

Cultivation

Turmeric (*Curcuma longa*) can be easily grown at home in Patna using healthy, firm rhizomes weighing about 30–50 g with visible buds. Planting is best done from late May to early July in large pots (18–24 inches deep) with proper drainage. A loose soil mixture of compost or cocopeat, garden soil, and sand or perlite works well. About 2–3 rhizomes should be planted per pot at a depth of 10–15 cm with buds facing upward. Pots should be placed where they receive 6–8 hours of morning sunlight and afternoon shade to protect plants from high summer temperatures. Regular watering is required to keep the soil moist but not waterlogged, and organic manure or diluted fertilizer can be applied every 2–3 weeks. Under good care, plants grow up to about one meter tall and are ready for harvest in 8–10 months, yielding approximately 1–1.5 kg of fresh turmeric per pot⁴⁴.

Commercial turmeric cultivation performs well in fertile alluvial soils of Patna and Gaya districts in Bihar. The land is prepared through deep ploughing and incorporation of 20–25 tons of farmyard manure per acre, followed by the formation of raised beds to ensure good drainage. Planting is done during May–June using 8,000–10,000 rhizome sets per acre at recommended spacing. The crop requires balanced fertilization, regular irrigation during dry periods, and timely control of pests and diseases. Harvesting is carried out after 8–9 months when most leaves turn yellow, producing about 8–12 tons of fresh rhizomes per acre. With moderate input costs, turmeric cultivation can provide a net profit of ₹3–5 lakh per acre, making it a profitable option for farmers⁴⁴.



Costus igneus (इंसुलिन का पौधा) is a promising medicinal plant that lowers fasting blood glucose by 20–35% through corosolic acid and insulin-like proteins, with a good safety margin at traditional doses. It also provides antioxidant, lipid-lowering, and kidney-protective benefits that support metabolic health. The plant is easy to grow at home, yielding 1–2 kg of fresh leaves annually at low cost. However, blood glucose monitoring is essential when used with antidiabetic medicines, and further clinical studies are needed.

Insulin Plant (*Costus igneus*) इंसुलिन का पौधा

Insulin Plant (*Costus igneus*), commonly known as इंसुलिन का पौधा in Hindi, is a medicinal herb native to Brazil and widely cultivated in South India, particularly in Kerala and Tamil Nadu, and is increasingly grown in home gardens across Bihar. It belongs to the family Costaceae and is an upright perennial plant reaching about 1–2 meters in height, characterized by thick, fleshy leaves arranged in a distinctive spiral pattern. Traditionally, the consumption of one to two fresh leaves daily has been practiced as a supportive measure for managing type 2 diabetes. Scientific studies attribute its antidiabetic activity to bioactive compounds such as corosolic acid, flavonoids, and saponins, which enhance insulin sensitivity, improve glucose uptake, and reduce blood glucose levels in experimental models, with effects comparable to standard oral antidiabetic drugs. In addition to glycemic control, the plant exhibits antioxidant, antimicrobial, hypolipidemic, diuretic, and potential anticancer properties. Due to its easy cultivation, ornamental value, and therapeutic potential, *Costus igneus* bridges traditional folk knowledge with emerging scientific evidence; however, since human clinical data are limited, its use should be considered supportive and undertaken with medical guidance, especially when used alongside conventional antidiabetic medications.



Traditional Significance

Insulin Plant (*Costus igneus*) originated in the tropical rainforests of Brazil and gained prominence in India after its introduction to botanical gardens in Kerala around 2005. The plant became popular following its promotion by traditional healers and Ayurvedic practitioners as a supportive remedy for diabetes, based on the folk practice of consuming one leaf daily. Its use spread rapidly through tribal communities, home gardeners, and social media, leading to widespread cultivation across South India and later into regions such as Bihar and Patna⁴⁵. In traditional medicine, the plant has also been used for wound healing, inflammation, and urinary disorders. With the growing burden of diabetes in India, *Costus igneus* has emerged as a widely accessible household medicinal plant used mainly as an adjunct to conventional therapy.

Costus igneus belongs to the family Costaceae and is a rhizomatous perennial monocot propagated vegetatively. It grows as an upright, unbranched plant about 1–2 meters tall with a characteristic spiral arrangement of leaves around the stem⁴⁶. The leaves are large, thick, and fleshy, oblong to lanceolate in shape, dark green on the upper surface and distinctly red or scarlet on the underside, which is a key identifying feature. The plant produces terminal flower spikes with small tubular flowers, while seeds are absent due to sterility. Short horizontal rhizomes give rise to multiple shoots, forming dense clumps⁴⁶. Rapid growth, succulent foliage, fibrous roots, and high ornamental value make the plant easy to identify and suitable for home garden cultivation.

Medicinal Benefits

Costus igneus shows strong antidiabetic activity, mainly due to the presence of corosolic acid and insulin-like proteins in its leaves. Experimental studies demonstrate significant reductions in fasting and postprandial blood glucose levels by improving insulin sensitivity, enhancing peripheral glucose uptake, and inhibiting carbohydrate-digesting enzymes. Small human studies and traditional use suggest that regular consumption of fresh leaves may help support blood sugar control in type 2 diabetes when used alongside standard treatment. In addition to its glucose-lowering effects, *Costus igneus* exhibits hypolipidemic activity by reducing cholesterol and triglyceride levels, antioxidant properties that protect tissues from oxidative stress, and antimicrobial effects against common bacterial pathogens. The plant also shows anti-inflammatory activity through suppression of inflammatory signaling pathways, antiurolithiatic potential by inhibiting kidney stone formation, and preliminary anticancer effects through apoptosis induction, supporting its broader traditional use in metabolic and inflammatory disorders⁴⁷.

Costus igneus demonstrates a favorable safety profile in experimental studies, with acute oral toxicity tests reporting LD₅₀ values above 5000 mg/kg and no mortality, behavioral changes, or organ toxicity observed in sub-chronic administration up to 1 g/kg/day for 30 days. Traditionally, the recommended human dose is one to two fresh leaves daily, chewed before meals, which corresponds to approximately 200–400 mg of dried leaf material and has been associated with a 15–28% reduction in fasting blood glucose over three months when used under monitoring. Alternatively, dried leaf powder or decoction may be taken at an estimated human-equivalent dose of 5–10 g per day, divided into two doses. Children above 12 years are advised to use half the adult dose, while topical application of leaf paste for wounds is considered safe for prolonged use⁴⁸. Despite its general safety, internal use should be avoided in pregnancy and lactation due to insufficient clinical data, and in individuals with type 1 diabetes because of unpredictable hypoglycemia. Caution is necessary when taken alongside antidiabetic medications, with regular blood glucose monitoring recommended during initial use. Continuous internal consumption should be limited to three months, with periodic assessment of blood glucose and HbA1c levels to ensure safe and effective use.



Costus igneus is generally safe at traditional doses of 1–2 fresh leaves per day, but mild side effects such as nausea, diarrhea, abdominal discomfort, dizziness, and fatigue may occur in 5–10% of users. The most important risk is hypoglycemia, especially when used with antidiabetic medications; rare cases of severe low blood sugar requiring hospitalization have been reported with unsupervised combined use. Allergic reactions are uncommon (<2%) and include skin rash or itching after leaf contact, with occasional breathing discomfort in sensitive individuals. High doses (>10 g dry leaf equivalents) may cause temporary elevation of liver enzymes. The plant should be avoided in insulin-dependent diabetes, pregnancy, lactation, and in children under 12 years, and used cautiously in patients with gallbladder or kidney disorders or those taking glucose-lowering drugs, with regular blood glucose monitoring advised⁴⁸.


Growing Condition

Costus igneus grows best in tropical to subtropical climates (USDA zones 9–11) with temperatures between 21–38°C and cannot tolerate frost, though it survives brief drops to around 10°C. The plant prefers partial shade or bright indirect light, with 4–6 hours of morning sun and protection from harsh afternoon sunlight, making it suitable for east-facing balconies or shaded gardens in Patna⁴⁹. It thrives in fertile, well-drained loamy soil rich in organic matter (pH 6.0–7.5); an ideal pot mix is garden soil, compost, and cocopeat or sand. Soil should be kept consistently moist but never waterlogged to prevent root rot. High humidity (70–90%) supports rapid growth, especially during the monsoon season, when plants can reach about 1 meter in 4–6 months⁴⁹.

Cultivation

Costus igneus is easy to grow at home using rhizome divisions or stem cuttings (10–15 cm with 2–3 nodes). Plant during May–June in 12–16 inch pots filled with well-drained soil made of garden soil, compost, and cocopeat or sand (pH 6.0–7.5). Place the pot in an east-facing balcony or garden area receiving 4–6 hours of morning sunlight with afternoon shade⁴⁹. Water when the top 2 cm soil becomes dry (every 2–3 days in summer, weekly in winter) and apply vermicompost tea every two weeks with half-strength NPK fertilizer once a month. The plant grows rapidly to 1–2 m height and should be protected from cold below 15°C in Patna winters.

Commercial cultivation is limited and mostly small-scale, as the plant spreads easily. Rhizomes are planted at 30 × 30 cm spacing in loamy soil enriched with farmyard manure (about 15 tons per acre) and irrigated during dry periods. Annual yields of 5–8 tons of fresh leaves per acre can be obtained, providing a net income of approximately ₹1–2 lakh per acre. Micropropagation is also used for rapid multiplication of disease-free planting material⁵⁰.



Peperomia pellucida (चमकदार झाड़ी) is a valuable tropical medicinal plant that bridges traditional Ayurvedic knowledge with modern scientific research. It exhibits notable anti-inflammatory, antigout, antimicrobial, and antioxidant activities while maintaining a low toxicity profile. The plant grows easily as a backyard weed and requires minimal care, making it highly accessible for household use. Its rich phytochemical composition supports both traditional remedies and emerging herbal applications. However, further clinical studies are necessary to fully establish its therapeutic efficacy and long-term safety.

Shiny Bush (*Peperomia pellucida*) चमकदार झाड़ी

Shiny Bush (*Peperomia pellucida*), known as चमकदार झाड़ी in Hindi, is a succulent annual herb native to tropical Central and South America and now widely naturalized across India, Southeast Asia, Africa, and Pacific islands, where it commonly grows as a backyard weed. Traditionally valued in Ayurveda (Pansara), Siddha, and Filipino folk medicine, the plant is used for managing gout, arthritis, urinary tract infections, skin disorders, and digestive complaints. Belonging to the Piperaceae family, it is a low-growing plant (15–40 cm tall) characterized by translucent, shiny, heart-shaped leaves, soft erect stems, and small white flower spikes. Phytochemical studies report the presence of bioactive compounds such as patuloside A, pellucidin A, flavonoids, and essential oils, which contribute to its experimentally validated anti-arthritic, diuretic, anti-inflammatory, antibacterial, antioxidant, and analgesic activities, with animal studies showing uric acid reduction and inflammation control comparable to standard drugs. Easily propagated from seeds or stem cuttings during the monsoon and suitable for home gardens, *Peperomia pellucida* represents an accessible tropical medicinal plant bridging traditional ethnomedicine with modern pharmacological evidence, although human clinical studies remain limited and supervised use is recommended⁵¹.



Traditional Significance

Shiny Bush (*Peperomia pellucida*) is a succulent annual herb belonging to the Piperaceae family and is native to tropical Central and South America. It has become widely naturalized across India including Bihar, Uttar Pradesh, and southern states such as Kerala—as well as in Southeast Asia, Africa, and Pacific islands. The plant commonly grows as a fast-spreading backyard weed in shaded, moist, loamy soils with high humidity and partial shade. It thrives in tropical and subtropical climates at temperatures of 25–35°C and flowers almost throughout the year, forming dense, low-growing clumps up to about 45 cm tall. When crushed, the leaves and stems release a mild peppery odor, and the plant is traditionally consumed as a wild leafy vegetable in various regional food preparations across Asia and Africa.

Botanically, *Peperomia pellucida* is a shallow-rooted, glabrous herb with soft, succulent, erect to ascending stems that branch freely and often root at lower nodes, reaching a height of 15–45 cm. The leaves are simple, fleshy, glossy, and translucent, heart- to kidney-shaped (2–4 cm long), with prominent parallel veins visible from the underside and short petioles. Inflorescences appear as slender, upright spike-like spadices bearing minute, sessile, apetalous white flowers, followed by tiny dot-like fruits adapted for ant dispersal. The stems are cylindrical, semi-succulent, and green to reddish-purple, while propagation occurs easily through seeds or stem cuttings, especially during the monsoon season. Its compact, spreading habit and shiny foliage make it suitable for use as a ground cover, ornamental pot plant, or border plant in home gardens.

Medicinal Benefits



Peperomia pellucida (Shiny Bush) exhibits a wide range of medicinal benefits supported by traditional use and preclinical scientific studies. The plant shows strong anti-inflammatory and analgesic activity by inhibiting prostaglandin synthesis and COX pathways, significantly reducing carrageenan-induced edema and pain responses in animal models at doses comparable to standard anti-inflammatory drugs. It is particularly effective in managing gout and arthritis, as extracts lower serum uric acid levels through xanthine oxidase inhibition⁵². Antimicrobial studies demonstrate broad-spectrum activity against pathogenic bacteria such as *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and fungi including *Candida albicans*, validating its traditional use for treating wounds, boils, abscesses, and skin infections, while topical applications promote wound healing. Additional pharmacological effects include antihypertensive action via ACE inhibition and vasorelaxation, diuretic activity beneficial for urinary disorders, antioxidant free-radical scavenging due to flavonoids and phenolic compounds, mild antidiabetic effects, gastroprotective properties, and preliminary anticancer potential observed in cell line studies. Although these findings highlight significant therapeutic promise, most evidence remains preclinical, and further well-designed human clinical trials are required to establish efficacy and safety⁵³.

Traditional use of *Peperomia pellucida* involves moderate oral doses that have shown a wide margin of safety in experimental studies. Preclinical evaluations report effective anti-inflammatory and analgesic activity at doses of 100–400 mg/kg of leaf extracts, while traditional preparations include fresh leaf juice (approximately 5–10 g per day for adults) or decoctions prepared from 20–30 g of boiled leaves taken once or twice daily for conditions such as gout, arthritis, and infections. Acute toxicity studies demonstrate no mortality, behavioral changes, or organ damage in rodents even at doses up to 5,000 mg/kg, and subchronic administration (up to 500 mg/kg) shows stable liver and kidney function with only minor, non-significant hematological changes⁵⁴. Based on traditional Ayurvedic practice, human consumption at moderate levels (generally below 10 g dried leaf equivalent per day) is considered safe. However, caution is advised in pregnant women, individuals with low blood pressure, those taking diuretics, or patients with electrolyte imbalance, as mild hypotensive or diuretic effects may occur. Rare adverse effects such as mild gastrointestinal discomfort or contact dermatitis have been reported, and medical consultation is recommended before therapeutic use, especially alongside conventional medications⁵⁴.

Peperomia pellucida is generally safe, with studies showing no toxicity even at high doses, though mild side effects such as stomach upset, skin irritation, or occasional low blood pressure may occur. Allergic reactions are rare but possible, especially in individuals sensitive to Piperaceae plants. It should be avoided during pregnancy and lactation, in people with low blood pressure, those taking diuretics or ACE inhibitors, and in children under 12 years. Medical advice is recommended before therapeutic use⁵⁵.


Growing conditions

Peperomia pellucida grows best in moist, shaded environments with loose, well-drained loamy soil and high humidity, which is why it commonly appears as a weed during the monsoon season in tropical and subtropical regions like India. The plant prefers bright indirect light or partial shade and should be protected from direct sunlight to avoid leaf scorch. Optimal growth occurs at temperatures between 18–27°C, with tolerance down to about 10°C but no frost resistance. Soil should be kept evenly moist but not waterlogged, using a light potting mix with good aeration, while propagation is easily achieved through seeds or stem cuttings, making the plant low-maintenance and suitable for home gardens.

Cultivation

Peperomia pellucida can be easily grown at home from seeds or stem cuttings. Seeds are sown on moist coco coir or peat–perlite mix during summer or monsoon and usually germinate within 3–21 days at 18–27°C. Stem cuttings (5–10 cm with nodes) root quickly in 7–10 days when placed in moist soil or water. The plant prefers bright indirect light, high humidity (>60%), and evenly moist soil, watered when the top 2 cm dries. Light fertilization with diluted liquid fertilizer every two weeks promotes healthy growth, and leaves can be harvested at any time⁵⁶.

For small-scale commercial production, *Peperomia pellucida* is grown as a low-input, fast-growing herb in humid tropical regions, especially during the monsoon. Plants are spaced about 30 × 30 cm in shaded, loamy fields enriched with farmyard manure, allowing dense planting and multiple harvests (3–4 cuts per year). Fresh herbage yields can reach 10–15 tons per hectare annually with minimal pest issues, making it suitable for herbal raw material production. Low cultivation costs and growing demand in traditional medicine and anti-gout herbal products offer good economic potential⁵⁷.



Sickle Pod (Cassia tora), known as चक्रवर्ण पौधा (Chakramarda), is a powerful example of how traditional Ayurvedic wisdom aligns with modern science, offering proven benefits for skin infections, fatty liver, eye problems, constipation, and high cholesterol through its anthraquinone-rich profile. Scientific studies confirm its antimicrobial, antioxidant, and hypolipidemic effects with high safety (NOAEL >2000 mg/kg). Easily grown as a monsoon weed from simple seeds, it supports both home-based herbal care and sustainable cultivation. Wild and cultivated seeds fetch ₹40–60/kg, with field yields of 8–12 quintals/ha and 200–400% ROI. Cassia tora stands out as an accessible, low-cost super-herb poised for wider clinical validation and global herbal recognition.

Sickle Pod (*Cassia tora*) चकवण पौधा

Sickle Pod (*Cassia tora*), commonly known as चकवण पौधा or Chakramarda, is an annual leguminous herb belonging to the Fabaceae family, native to tropical regions of Asia and Africa and widely naturalized across India, Southeast Asia, and Australia. It grows abundantly as a monsoon weed in wastelands, roadsides, and agricultural fields, reaching a height of about 30–120 cm⁵⁸. The plant is characterized by pinnate leaves bearing 3–7 oblong leaflets, bright yellow axillary flowers, and distinctive sickle-shaped pods containing numerous glossy brown to black seeds rich in bioactive anthraquinones such as emodin, chrysophanol, and aloe-emodin. In traditional systems of medicine, including Ayurveda and Traditional Chinese Medicine, *Cassia tora* has long been used to treat skin disorders such as ringworm, eczema, and psoriasis, as well as eye ailments, constipation, digestive problems, and liver disorders. Modern scientific studies support many of these traditional uses by demonstrating antimicrobial, anti-inflammatory, antioxidant, hypolipidemic, and anticancer activities. Although largely wild-harvested, the plant also holds economic importance, as its seeds are used in herbal formulations and as a caffeine-free coffee substitute, highlighting its medicinal and functional relevance in both traditional and contemporary healthcare systems⁵⁸.



Traditional Significance

Sickle Pod (*Cassia tora*) is an annual leguminous herb belonging to the Fabaceae family, native to tropical regions of Asia and Africa and now widely naturalized across India—particularly in Bihar, Uttar Pradesh, Rajasthan, and southern states—as well as Southeast Asia and Australia. It grows abundantly as a resilient monsoon weed in wastelands, roadsides, agricultural fields, and disturbed soils, thriving in warm and humid climates with temperatures of 25–35°C and moderate rainfall. The plant completes its life cycle within 4–6 months and produces substantial biomass, allowing harvest two to three times per year. For over two millennia, it has been valued in traditional medical systems such as Ayurveda (documented in the *Charaka* and *Sushruta Samhitas*) and Traditional Chinese Medicine, where its seeds and leaves are used in herbal preparations including powders, decoctions, and teas for skin, eye, digestive, and liver health. In addition to its medicinal importance, the seeds are also used as a caffeine-free coffee substitute and as a source of natural gums, contributing to its economic relevance.

Botanically, *Cassia tora* is an erect, branched annual herb reaching 30–120 cm in height with a well-developed taproot system. The plant bears pinnate compound leaves measuring 7–15 cm in length, composed of 3–7 opposite oblong to lanceolate leaflets with glandular dots and slightly hairy veins. Bright yellow flowers, about 1–1.5 cm in diameter, are produced in short axillary racemes, followed by distinctive flat, sickle-shaped pods measuring 10–15 cm in length that twist upon drying. Each pod contains 30–50 hard, glossy

brown to black seeds rich in fixed oils and anthraquinones such as emodin, chrysophanol, and aloe-emodin. The stems are stout, ribbed, and green to purplish in color, while the leaves emit a mild odor when crushed. Flowering generally occurs from June to September in India, and the plant's robust upright habit, drought tolerance, and prolific seed production make it suitable for wild harvesting as well as low-input cultivation.

Medicinal Benefits

Cassia tora is widely used for skin problems such as ringworm, eczema, acne, boils, and psoriasis. Crushed fresh leaves or leaf paste kill fungi and harmful bacteria like *Staphylococcus*, reducing itching, redness, and helping wounds heal faster, similar to antibiotic creams. The seeds support liver health by removing toxins and reducing fatty buildup caused by oily diets; studies show they lower bad cholesterol and liver enzymes, helping in weight and fat control. For eye care, seed decoction is traditionally used to relieve redness, dryness, and blurred vision, while leaf extracts protect the eyes from cataract formation by preventing oxidative damage. *Cassia tora* also improves digestion by relieving constipation, gas, and stomach pain, acting as a mild natural laxative and protecting the stomach lining from ulcers. Additionally, it helps control blood sugar by slowing glucose absorption after meals, making it useful for diabetics⁵⁹. Laboratory studies further show that leaf extracts reduce inflammation and inhibit the growth of breast and cervical cancer cells without harming normal cells, though more human studies are needed. Overall, *Cassia tora* shows strong scientific support for skin, liver, eye, and digestive health and is generally safe when used in recommended amounts, but regular use should be done under medical guidance⁵⁹.



Sickle Pod (*Cassia tora*) is traditionally used in Ayurveda at well-established and safe doses, including 3–6 g of seed powder daily in divided doses for skin, liver, and digestive disorders, 1–3 g seed powder at bedtime as a mild laxative for constipation, and 5–10 ml of leaf decoction for skin and eye ailments, while freshly crushed leaf paste is applied topically 1–2 times daily for ringworm, eczema, and itching⁶⁰. Experimental studies demonstrate therapeutic efficacy of *Cassia tora* extracts at 200–500 mg/kg without acute toxicity, and safety evaluations report LD₅₀ values above 2000 mg/kg with sub-chronic administration (up to 90 days at 500 mg/kg) showing no mortality, organ damage, or significant hematological and biochemical alterations. Mild gastrointestinal effects such as loose stools or abdominal discomfort may occur at higher doses (>10 g/day) due to anthraquinone content⁶¹. Use is contraindicated during pregnancy and lactation because of possible emmenagogue effects, in children below 5 years of age, and in patients with inflammatory bowel disease; individuals with low blood pressure should monitor BP during use. Rare allergic reactions such as skin rashes may occur, and long-term internal use should be undertaken only under the supervision of a qualified healthcare practitioner⁶¹.

Sickle Pod (*Cassia tora*) shows a good safety profile with low toxicity, as studies report no acute adverse effects up to 2000 mg/kg and a NOAEL above 2000 mg/kg/day in 13-week animal studies with normal organ function and blood parameters; however, excessive

intake may cause mild side effects such as loose stools or diarrhea (due to anthraquinone laxative action at >10 g/day), abdominal cramps, or nausea⁶². Allergic reactions are rare but may include skin rashes, itching, or contact dermatitis in sensitive individuals, particularly with topical leaf paste use should be stopped immediately if hives or swelling appear. Medicinal use is contraindicated during pregnancy and lactation (possible uterine stimulant effect), in children under 5 years, and in patients with inflammatory bowel disease or ulcerative colitis, as it may worsen diarrhea; caution is also advised for hypotensive individuals and those using diuretics or laxatives due to additive effects. For prolonged or therapeutic use, consultation with a qualified Ayurvedic or healthcare practitioner is recommended.

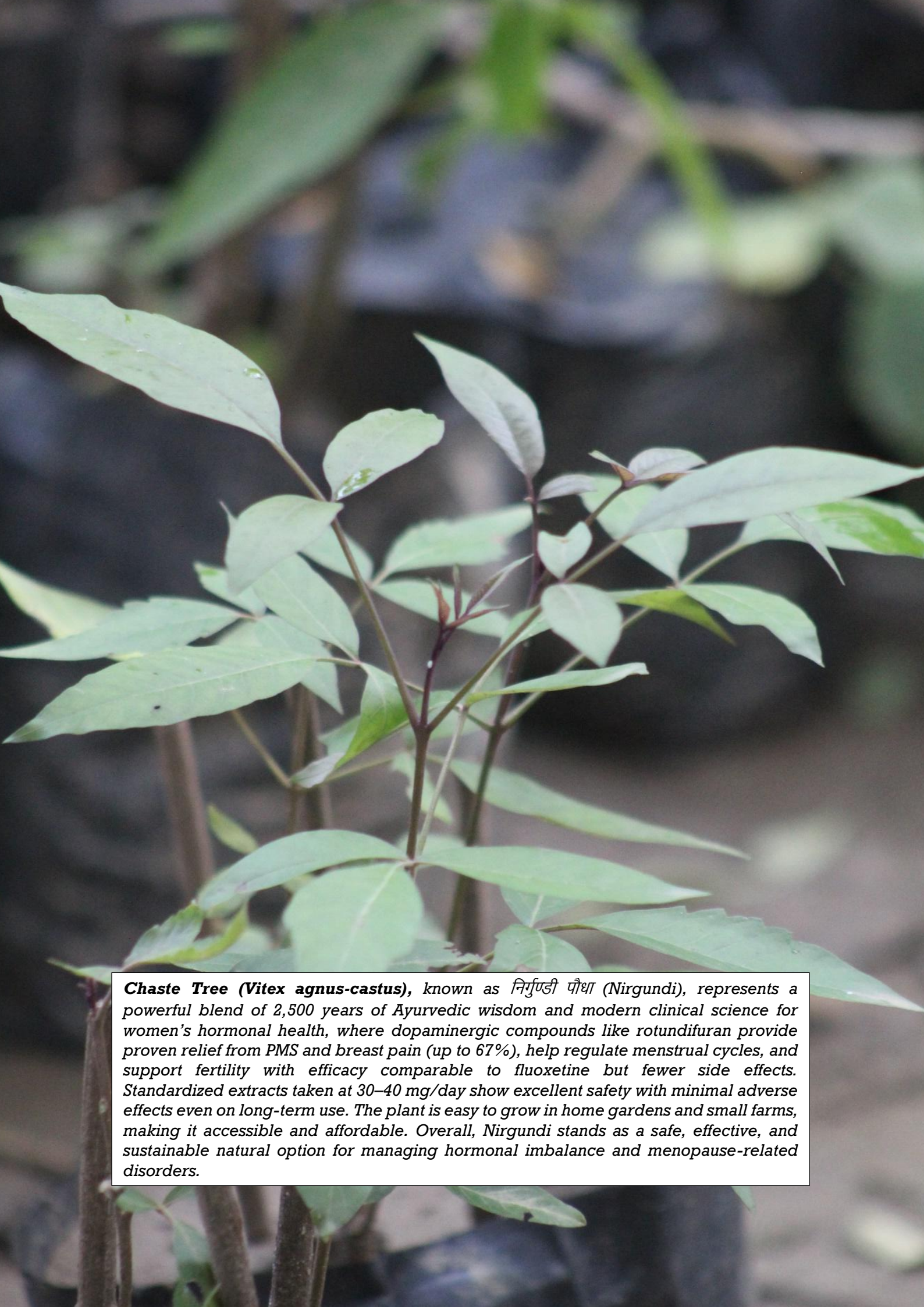
Growing conditions

Sickle Pod (*Cassia tora*) grows easily as a hardy annual in tropical and subtropical regions, preferring warm temperatures of about 25–35°C with full sun to partial shade. It thrives best in moist but well-drained loamy or sandy soils with a pH range of 6.0–7.5 and tolerates moderate drought once established, though good moisture during germination and flowering improves growth⁶³. The plant requires around 6–8 hours of sunlight daily, is sensitive to frost, and performs poorly below 10°C. It is commonly propagated by seeds sown in summer (April–May in India), germinating within 1–3 weeks under warm conditions with minimal care⁶⁴.

Cultivation

Sickle Pod (*Cassia tora*) can be easily grown at home from seeds. Scarify seeds by soaking them in hot water (around 60°C) for 6–8 hours or lightly nick the hard seed coat, then sow 2–3 cm deep in 15–25 cm pots filled with loamy soil mixed with 20–30% compost or coco coir (pH 6.0–7.5). Sowing is best during April–June. Seeds germinate in 6–20 days at 25–30°C under full sunlight (8 hours daily). Keep soil consistently moist but ensure proper drainage. Thin seedlings to 20–30 cm spacing. Water daily in summer, apply diluted 10-10-10 NPK fertilizer every 2 weeks, and remove dry leaves for better growth. Young leaves can be harvested anytime, while pods mature in about 3–4 months⁶⁵.

Cassia tora is cultivated on sandy loam to clay loam soils with good drainage (pH 6.0–7.5). Fields are prepared by ploughing and harrowing, followed by application of 5–10 tons FYM/ha and basal NPK (30:60:30 kg/ha). Scarified seeds (20–30 kg/ha) are sown 2–3 cm deep at 50–70 cm row spacing during June–July after the first monsoon rains, achieving 70–80% germination. Light irrigation is needed initially; the crop becomes drought-tolerant later. Manual weeding is done 2–3 times. Leaf biomass can be harvested at 90–120 days, and mature pods are collected from October to December. Average yields include 8–12 quintals of seeds per hectare and 5–7 tons of leaves, with low input costs and high profitability due to strong demand in herbal and gum markets⁶⁶.



Chaste Tree (*Vitex agnus-castus*), known as निर्गुण्डी पौधा (Nirgundi), represents a powerful blend of 2,500 years of Ayurvedic wisdom and modern clinical science for women's hormonal health, where dopaminergic compounds like rotundifuran provide proven relief from PMS and breast pain (up to 67%), help regulate menstrual cycles, and support fertility with efficacy comparable to fluoxetine but fewer side effects. Standardized extracts taken at 30–40 mg/day show excellent safety with minimal adverse effects even on long-term use. The plant is easy to grow in home gardens and small farms, making it accessible and affordable. Overall, Nirgundi stands as a safe, effective, and sustainable natural option for managing hormonal imbalance and menopause-related disorders.

Chaste Tree (*Vitex agnus-castus*) निर्गुण्डी पौधा

Chaste Tree (*Vitex agnus-castus*), known in Hindi as निर्गुण्डी पौधा (Nirgundi Paudha), is a deciduous shrub or small tree belonging to the Lamiaceae (formerly Verbenaceae) family, native to the Mediterranean region and Western Asia and now widely naturalized across India (including Bihar, Uttar Pradesh, and Himalayan foothills), as well as Central and South America and Australia. The plant grows 2–8 m tall in sunny, well-drained soils and is recognized by its aromatic, palmately compound leaves with 5–7 lanceolate leaflets emitting a camphor-like fragrance, along with striking spikes of lavender-blue to white flowers and small dry berries⁶⁷.



These berries are rich in biologically active compounds such as diterpenes (rotundifuran), flavonoids (casticin, vitexin), and iridoids, which underpin its medicinal value. For over 2,500 years, *Vitex agnus-castus* has held an important place in Ayurveda, Unani, and European herbal medicine, particularly for women's health, where it is used to manage premenstrual syndrome (PMS), mastalgia, irregular menstruation, menopausal symptoms, infertility, and hormonal imbalance. Modern clinical studies confirm its dopaminergic action on the pituitary gland, leading to reduced prolactin levels and significant relief from PMS symptoms often comparable to conventional drugs but with fewer side effects alongside additional anti-inflammatory, antioxidant, antimicrobial, and insect-repellent properties⁶⁸. Standardized berry extracts (30–40 mg/day, endorsed by German Commission E) are now widely used in global herbal supplements, positioning *Vitex agnus-castus* as a strong example of traditional gynecological medicine validated by contemporary pharmacological research.

Traditional Significance

Chaste Tree (*Vitex agnus-castus*) is a deciduous shrub or small tree of the Lamiaceae family, native to the Mediterranean basin and Western Asia and now widely naturalized across India (including Bihar, Uttar Pradesh, and the Himalayan foothills), as well as Central and South America and Australia. Cultivated for more than 2,500 years, it has been documented in Ayurveda, Unani medicine, and European monastic herbalism since the time of Hippocrates, primarily for women's reproductive and hormonal health⁶⁹. Traditionally valued for regulating menstrual cycles, relieving premenstrual syndrome (PMS), mastalgia, menopausal discomfort, and infertility, the plant gained modern scientific recognition due to its dopaminergic action on the pituitary gland, which reduces prolactin secretion. Standardized berry extracts (30–40 mg/day, endorsed by German Commission E) are now widely used in global women's health supplements, with clinical trials confirming efficacy comparable to conventional agents such as fluoxetine, but with superior tolerability and additional anti-inflammatory, antioxidant, antimicrobial, and insect-repellent benefits.

Vitex agnus-castus grows as an erect, multi-stemmed shrub or small tree reaching 2–8 m in height with a spreading canopy of 3–5 m. The plant bears opposite, palmately compound leaves with 5–7 lanceolate to ovate leaflets (3–12 cm long) that emit a strong camphor-pepper aroma when crushed due to glandular trichomes on their wrinkled gray-

green upper surfaces and silvery undersides. Stems are woody, quadrangular, and gray-brown with peeling bark. During summer (July–September), the plant produces long terminal panicles (15–30 cm) of fragrant lavender-blue to violet-white flowers that attract pollinators, followed by small, spherical, blackish dry drupes (5–6 mm) resembling peppercorns and containing four hard nutlets rich in essential oils (0.5–1%). The species is drought-tolerant once established, prefers sunny locations with well-drained neutral to slightly alkaline soils (pH 6.5–7.5), and undergoes winter dormancy in cooler climates, making it suitable for hedges, containers, and medicinal landscapes.

Medicinal Benefits

Vitex agnus-castus is best known for supporting women's hormonal health by naturally lowering elevated prolactin levels through dopaminergic diterpenes such as rotundifuran, which helps correct estrogen–progesterone imbalance and regulate menstrual cycles. Clinical evidence shows that taking 20–40 mg/day of standardized berry extract significantly reduces premenstrual syndrome (PMS) symptoms and cyclic breast pain (mastalgia), with studies reporting around 67% reduction in breast pain and improvement in irritability, bloating, headaches, and mood swings in over 80% of women within 3 months effects comparable to NSAIDs or fluoxetine but with fewer side effects⁷⁰. The herb also helps regularize irregular periods, reduce heavy bleeding, and relieve menstrual cramps, while improving fertility in conditions like luteal phase defect and some cases of PCOS by reducing prolactin levels (about 18–45%). During menopause, *Vitex* may ease hot flashes, night sweats, and joint discomfort, supported by its anti-inflammatory flavonoids. Additional benefits include mild antimicrobial activity for skin issues and insect-repellent properties⁷¹. Overall, the strongest scientific evidence supports its use for PMS and breast pain, with recommended doses of 30–40 mg/day of standardized extract taken consistently for 3–6 months under medical guidance⁷⁰.



Standardized *Vitex* berry extracts are commonly taken at 20–40 mg per day (standardized to ~0.5% agnusides), once daily in the morning for 3–6 months, as recommended by German Commission E and supported by clinical trials for PMS and breast pain relief; traditional use includes 3–6 g dried berries or 5–10 ml decoction daily⁷². Safety is generally excellent, with very low toxicity and only mild, reversible side effects in a small number of users, such as nausea, headache, acne, or skin rash. However, *Vitex* should be avoided during pregnancy and lactation, in hormone-sensitive cancers, and in people taking dopamine-related medications (e.g., Parkinson's drugs). Long-term studies show safe use up to 18 months in healthy women, but medical consultation is advised, especially when used for hormonal conditions or alongside other therapies⁷².

Vitex agnus-castus has an excellent safety profile, with mild side effects reported in fewer than 2% of users, mainly dose-related nausea, headache, acne, skin rash, or mild gastrointestinal discomfort that usually resolve after dose reduction or discontinuation. Rare effects include temporary menstrual irregularities or spotting, but long-term studies (up to 18 months) show no hepatotoxicity or serious hormonal disturbances⁷³. Allergic

reactions are uncommon but may present as contact dermatitis, itching, hives, or rash, particularly in individuals sensitive to plants of the Lamiaceae family; use should be stopped immediately if swelling or breathing difficulty occurs. Contraindications include pregnancy and lactation (possible uterine and hormonal effects), hormone-sensitive cancers (breast, ovarian, endometrial), Parkinson's disease, and concurrent use of dopamine-acting drugs (e.g., bromocriptine, antipsychotics) or hormone therapies; it is also not recommended for children or before surgery, and prolonged use should be monitored by a healthcare professional⁷³.


Growing Condition

Chaste Tree grows best in full sun with at least 6–8 hours of direct sunlight each day, which promotes healthy growth and good flowering, though it can tolerate light shade with fewer blooms. It prefers well-drained loamy, sandy, or clay soils with a neutral to slightly alkaline pH (around 6.0–7.5), and heavy soils should be improved with sand or compost to avoid waterlogging. The plant thrives in warm conditions with ideal temperatures of 20–35°C and, once established, becomes drought-tolerant, needing only occasional deep watering, especially during the first year⁷⁴. It can also tolerate mild frost when mature, making it suitable for many Indian regions, including Bihar, if grown in sunny, well-drained sites and protected from extreme winter cold.

Cultivation

Chaste Tree can be easily grown at home from seeds or cuttings. Seeds should be lightly scarified (soaked in hot water or nicked) and sown indoors during February–March; they germinate in about 2–4 weeks at 22–24°C under bright indirect light. Semi-ripe stem cuttings (5–8 cm long) taken during July–August root well in a moist sand–peat mix. Transplant seedlings after frost into a sunny location receiving 6–8 hours of direct sunlight. Plant in well-drained loamy or sandy soil (pH 6.0–7.5) mixed with compost, spacing plants 3–5 m apart⁷⁵. Water deeply once a week during the first year; after establishment, the plant becomes drought-tolerant. Light fertilization in spring and pruning after flowering help maintain bushy growth and good flowering. Large containers (20–40 L) with proper drainage can also be used for balcony or terrace gardening.

For commercial berry production, Chaste Tree is cultivated on small to medium farms (1–5 ha) in warm, sunny regions with well-drained soils. Plants are spaced about 4 × 4 m, giving roughly 600–650 plants per hectare. Propagation is mainly through cuttings to ensure uniform quality. The crop starts yielding after 3–4 years, producing about 2–4 kg of dried berries per plant annually (1.2–2.5 tons/ha)⁷⁵. Basic inputs include farmyard manure, moderate NPK fertilization, drip irrigation during dry periods, and annual pruning to enhance berry yield. With low pest pressure and strong global demand for standardized herbal extracts, the crop offers good long-term returns for medicinal plant growers⁷⁵.



***Mimosa pudica* (लाजवन्ती)** is a unique medicinal herb that blends fascinating touch-sensitive behavior with proven therapeutic value. Traditional Ayurveda and modern studies validate its wound-healing, antidiabetic, neuroprotective, anti-inflammatory, and antimicrobial properties. The plant is easy to cultivate in Indian home gardens and also shows potential for sustainable commercial use as a medicinal crop. With proper dosage and precautions, *Mimosa pudica* represents an important evidence-based herbal resource for future natural healthcare applications.

Sensitive Plant (*Mimosa Pudica*) लाजवन्ती पौधा

Sensitive Plant (*Mimosa Pudica*) लाजवन्ती पौधा Introduction (1 comprehensive paragraph) Sensitive Plant (*Mimosa pudica*), popularly known as लाजवन्ती / लज्जालु पौधा, is a small creeping annual or perennial herb of the legume family Fabaceae, native to tropical Central and South America but now widely naturalized throughout tropical Asia, including most parts of India where it grows abundantly along roadsides, fields, and wastelands. It is best known for its unique seismonastic/ thigmonastic movement, where the compound, fern-like leaves instantly fold and droop within seconds of touch or vibration and gradually reopen after a short period, a mechanism believed to protect the plant from herbivores and environmental stress. The plant typically reaches about 15–60



cm in height, with slender, prickly, branching stems, bipinnate leaves bearing many small sensitive leaflets, pink to purplish spherical “puffball” flower heads, and flat bristly seed pods containing multiple small brown seeds. In traditional systems of medicine such as Ayurveda and folk medicine, लाजवन्ती is valued for its astringent, wound-healing, anti-inflammatory, antidiarrheal, and antidiabetic properties, and various parts of the plant (leaves, roots, and whole plant) are used in preparations for conditions like wounds, piles, diarrhea, urinary disorders, and certain nervous complaints, making it both a botanical curiosity and an important medicinal herb⁷⁶.

Traditional Significance

Sensitive Plant (*Mimosa pudica*), known in traditional Indian medicine as लाजवन्ती / लज्जालु, is a diffuse, prickly, creeping annual or perennial subshrub belonging to the Fabaceae (formerly Mimosaceae) family. It is native to the neotropical regions of Central and South America, including Mexico, but has become a pantropical invasive weed widely naturalized across Asia, Africa, and Australia. In India, it grows abundantly in humid and semi-humid regions such as Bihar, Uttar Pradesh, West Bengal, and southern states, colonizing roadsides, agricultural fields, wastelands, forest margins, and other disturbed soils with moderate moisture and slightly acidic to neutral pH (5.0–7.5). For more than 2,000 years, *Mimosa pudica* has held an important place in Ayurveda, Siddha, and tribal medicine, where classical texts such as Charaka Samhita, Sushruta Samhita, and Bhavaprakasha describe it under the name Lajjalu. It is traditionally classified as having cooling potency (sheetala veerya) with astringent and bitter taste (kashaya–tikta rasa) and is prescribed for conditions like wounds, piles, dysentery, diarrhea, bleeding disorders, urinary and gynecological problems, edema, nervous disorders, and snakebite. Phytochemical studies reveal the presence of mimosine (1–3%), flavonoids such as quercetin and vitexin, tannins, saponins, terpenoids (lupeol), sterols, d-pinitol, and polysaccharides, which together explain its validated pharmacological actions including wound healing, anti-inflammatory, antidiabetic, anticonvulsant, antidepressant, antifertility, diuretic, and antivenom activities⁷⁷.

Botanically, *Mimosa pudica* is an erect to sprawling herb reaching 15–60 cm in height, often spreading laterally up to 1–1.5 meters. The stems are slender, cylindrical, green to reddish-brown, longitudinally grooved, and sparsely armed with small recurved prickles that aid in creeping and defense. Leaves are alternate, stipulate, and bipinnate, consisting of 4–6 pairs of pinnae, each bearing 10–26 pairs of narrow, linear-oblong leaflets measuring about 6–12 mm in length. These leaflets are glabrous on the upper surface, slightly hairy beneath, and are

highly sensitive due to specialized pulvini at their bases. The plant bears axillary, globose flower heads about 8–10 mm in diameter, composed of numerous tiny pink to purplish flowers with prominent stamens, usually appearing during the monsoon season but often flowering year-round in tropical climates. Fruits are flat, oblong, bristly loments that break into 2–5 single-seeded segments, containing small brown oval seeds. A defining physical feature is its rapid thigmonastic and seismonastic movement: upon touch, vibration, or shaking, the leaflets fold inward within 1–2 seconds due to rapid changes in turgor pressure mediated by ion fluxes (potassium and calcium) in the pulvinar cells, reopening gradually within 10–30 minutes. Microscopically, the plant shows calcium oxalate crystals, lignified fibers, starch grains, and characteristic trichomes, supporting its identification and medicinal quality. This unique combination of sensitive movement, prickly habit, and rich medicinal chemistry makes *Mimosa pudica* both a botanical curiosity and a highly valued therapeutic herb⁷⁸.

Medicinal Benefits

Mimosa pudica (लाजवन्ती) is a well-known medicinal plant used in traditional medicine and supported by modern scientific studies. Its leaves and roots contain helpful natural compounds such as flavonoids, tannins, mimosine, and polysaccharides. These compounds help the plant heal wounds faster by increasing collagen formation and reducing swelling and inflammation. Studies also show that *Mimosa pudica* helps control blood sugar levels by slowing the breakdown of carbohydrates, making it useful for diabetes management⁷⁹. Research confirms that the plant has calming effects on the brain, helping with anxiety, depression, seizures, and nerve protection. It also protects the liver from damage caused by chemicals and acts as a strong antioxidant by removing harmful free radicals. In addition, *Mimosa pudica* fights bacteria, fungi, and parasites, relieves pain, supports urination, lowers fat levels in the blood, boosts immunity, and shows potential in treating venom effects. Overall, *Mimosa pudica* is a multi-purpose medicinal plant with strong laboratory evidence and wide traditional use, though further human studies are needed.

Mimosa pudica (Sensitive Plant / Lajwanti) is used in Ayurveda with carefully regulated doses depending on the condition and individual constitution. Traditionally, fresh leaf or root juice is taken in a dose of about 10–20 ml once or twice daily for problems such as diarrhea, urinary disorders, and bleeding conditions. A decoction prepared from the whole plant or roots (around 50–100 ml per day) is commonly used for piles, wounds, inflammation, and internal swelling, while dried leaf or root powder is consumed in a dose of 1–3 g once or twice daily with honey or warm water for diabetes, insomnia, and digestive complaints⁸⁰. Fresh leaf paste is widely applied externally on wounds, ulcers, and piles to promote healing.



At therapeutic levels, the plant is generally considered safe and non-toxic, but internal use should be avoided during pregnancy and breastfeeding due to reported antifertility and uterine effects. Excessive intake may cause mild side effects such as nausea, bloating, dryness of mouth, or gastric discomfort, especially because of its tannin content, so reduced doses are advised for children and elderly individuals and prolonged use should be done under professional guidance⁷⁹. It is generally safe when used in recommended amounts, but some people may experience mild side effects such as nausea, dry mouth, bloating, or constipation, mainly due to its tannin and mimosine content, especially if taken in excess or on a sensitive stomach; taking it with honey or ghee can help reduce these effects. Allergic reactions are rare but may include skin itching or rashes after handling the fresh plant or applying it on the skin,

and very sensitive individuals may feel mild irritation from pollen, so a small patch test is advised before topical use. It should be avoided during pregnancy and breastfeeding because of its antifertility and hormone-affecting actions, and it is not recommended for children under 5 years without medical supervision. People with chronic constipation, scanty menstrual flow, liver or kidney problems, or those taking diabetes medicines should use it cautiously, as it may worsen constipation or increase the risk of low blood sugar⁸¹.

Growing condition

The sensitive plant grows best in warm tropical to subtropical climates, making monsoon conditions ideal for its healthy growth. It prefers temperatures between 18–30°C and cannot tolerate frost; therefore, in cooler winters it should be kept indoors or protected from cold. The plant requires bright light and grows well in full sun for about 6–8 hours daily, while partial shade is beneficial outdoors to prevent leaf scorching. It thrives in well-drained loamy or sandy soil with a slightly acidic to neutral pH range of 5.5–7.5 and does not require very rich or heavily fertilized soil. Watering should be regular to keep the topsoil moist, but excess watering must be avoided as waterlogging can lead to root rot. High humidity supports proper leaf movement and overall plant health, and light fertilization during the active growing season helps maintain steady growth⁸¹.

Cultivation

The sensitive plant can be easily cultivated at home across India using seeds, cuttings, or division. Seeds should be lightly scarified by nicking the hard coat or rubbing with sandpaper, then soaked in warm water (40–50°C) for 24 hours to improve germination. Seeds are sown shallow (about 0.3 cm deep) in trays filled with a light medium such as vermicompost mixed with sand, where they germinate in 15–30 days at temperatures of 24–30°C⁸². Transplant seedlings after true leaves appear. Stem cuttings of 8–12 cm taken during the monsoon root easily within 10–14 days in vermiculite or perlite, while clump division can be done in spring. Plants grow well in 20–30 cm pots with good drainage, filled with a sterile potting mix of cocopeat or loam, compost, perlite, and a small amount of neem cake (pH 6–7). They require 6–8 hours of bright light, temperatures between 20–35°C, high humidity (60–90%), and regular watering to keep the topsoil moist but never waterlogged. Light fertilization with half-strength balanced NPK every two weeks during the growing season supports healthy growth. Pinching the tips encourages bushy growth, and common pests like spider mites or mealybugs can be controlled with neem oil spray.

For commercial cultivation, *Mimosa pudica* is grown as a short-duration medicinal crop, mainly using locally collected or selected high-mimosine germplasm. The crop prefers well-prepared loamy soils with good drainage; land preparation includes deep ploughing, harrowing, and incorporation of farmyard manure (8–10 t/ha), with raised beds in water-prone areas. Scarified seeds are sown during the kharif season (June–August depending on region) at a rate of 6–8 kg/ha, or 25-day-old seedlings are transplanted at spacings of 30×30 cm or 25×40 cm, giving a plant density of about 25,000–40,000 plants per hectare. Regular irrigation (about 25 mm weekly), split application of NPK fertilizers, and timely weeding are essential for optimal biomass production. The crop is harvested 90–120 days after sowing, with 3–4 cuttings taken at 45-day intervals before flowering to maximize active compounds. Average yields range from 12–18 t/ha fresh biomass (3–5 t/ha dry), which is shade-dried and processed for medicinal extracts, offering good economic returns with relatively low input costs⁸³.



***Myxopyrum smilacifolium* (चरुथमुल्ला)** is an elegant woody climber from the Western Ghats that blends ornamental beauty with strong medicinal value. Rich in iridoids and phenolic compounds, it shows proven anti-asthmatic, anti-inflammatory, anti-arthritic, antioxidant, and wound-healing activities supported by traditional Siddha use and modern research. Its ability to suppress inflammatory cytokines and inhibit COX-2 makes it especially valuable for respiratory and joint disorders. The plant is easy to propagate through cuttings and suitable for both home gardens and commercial cultivation with good economic potential. With short-term safety and clear traditional cautions, it holds strong promise as a future evidence-based herbal medicine.

Myxopyrum (*Myxopyrum smilacifolium*) मिक्सोपिरम पौधा

Myxopyrum (*Myxopyrum smilacifolium* Blume / *Myxopyrum serratum* A.W. Hill), commonly referred to as मिक्सोपिरम पौधा, is a large woody climbing shrub belonging to the Oleaceae (olive) family, native to the tropical evergreen and semi-evergreen forests of the Western Ghats of India (Kerala, Tamil Nadu, Karnataka), Sri Lanka, and parts of Southeast Asia. The plant exhibits a strong scandent habit, often climbing 10–20 meters over trees, and is botanically characterized by robust gray-brown stems, opposite thick leathery serrated leaves, clusters of small fragrant white flowers, and black oblong drupes⁸⁴. Traditionally valued in Siddha, Ayurveda, and tribal medicine under names such as Charuthamulla and Kshetramulla, different parts of the plant especially leaves, stems, and roots are used to manage respiratory disorders (asthma, bronchitis), rheumatism, fever, wounds, neuralgia, headaches, and ear ailments. Phytochemical investigations reveal the presence of iridoid glycosides, flavonoids, phenolic compounds, tannins, saponins, and terpenoids, which are responsible for its anti-inflammatory, antioxidant, analgesic, wound-healing, and immunomodulatory activities. Although still under-explored scientifically, emerging pharmacological evidence supports its traditional uses, highlighting *Myxopyrum* as a promising medicinal climber with significant potential for treating inflammatory and respiratory conditions⁸⁵.



Traditional Significance

Myxopyrum smilacifolium (Wall.) Blume is a large, straggling woody climber belonging to the Oleaceae family, naturally distributed in the tropical forests of India's Western Ghats (Kerala, Tamil Nadu, Karnataka), parts of Northeast India, and Sri Lanka. It grows in moist deciduous to evergreen forests on shaded slopes between 200–1500 m elevation, where its long, climbing stems (8–15 m) spread over trees and supports. In traditional Siddha and Ayurvedic medicine, the plant is valued for treating kapha-vata disorders, respiratory problems such as cough and asthma, rheumatism, fever, ear ailments, nerve pain, and wound healing. Leaves and stems are described as astringent, thermogenic, and analgesic, and experimental studies on aqueous and ethanolic extracts confirm strong antioxidant activity, free-radical scavenging, anti-inflammatory effects, and enhanced wound repair, supporting its long-standing ethnomedicinal use⁸⁶.

Botanically, the plant is a perennial climbing liana with robust, gray-brown, lenticellate stems and tuberous roots. Leaves are opposite, thick, and leathery, ovate-lanceolate with serrated margins, glossy dark green on the upper surface and paler beneath. Small, fragrant white flowers appear in terminal or axillary clusters during late winter to summer, followed by bluish-black fleshy drupes containing one or two seeds. Microscopical features include calcium oxalate crystals, collenchyma tissue, spiral and pitted xylem vessels, starch-filled parenchyma cells, and paracytic stomata. The plant has a bitter-astringent taste and a characteristic odor, and its attractive foliage and flowers also make it suitable as an ornamental medicinal climber for fences and trellises⁸⁶.

Medicinal Benefits

Myxopyrum smilacifolium (चरुथमुल्ला), known in Siddha and Ayurveda as Kshetramalla, is an important medicinal climber whose leaves, stem bark, and roots are widely used for treating respiratory, inflammatory, and pain-related disorders. The plant contains bioactive compounds such as iridoid glycosides, phenolic compounds, flavonoids, and polysaccharides, which together contribute to its therapeutic value. Traditionally, leaf decoctions and pastes are used to relieve cough, asthma, and bronchitis, and scientific studies confirm that its extracts reduce inflammation by suppressing pro-inflammatory cytokines and inhibiting COX-2 activity, resulting in significant reduction of swelling and joint pain. Strong antioxidant activity helps neutralize free radicals, while wound-healing properties accelerate tissue repair by enhancing collagen formation. The plant also shows broad-spectrum antimicrobial action against bacteria and fungi, along with antipyretic and mild analgesic effects. Additionally, it is used in traditional medicine for headaches, nerve pain, ear disorders, rheumatism, and general weakness, where it acts as a tonic and fever-reducing agent. These combined effects highlight *Myxopyrum smilacifolium* as a multi-functional medicinal plant with strong traditional backing and growing pharmacological validation⁸⁷.

Traditionally, this plant is used in small and short-term doses, most commonly as a leaf or stem powder taken at 1–3 g per day with warm water or honey, or as a decoction prepared by boiling about 2 g of dried plant material in 250 ml of water and reducing it to half, taken once or twice daily. In modern herbal practice, it is also available as capsules (approximately 300–500 mg of extract taken once or twice daily) and tinctures (20–30 drops twice daily), mainly for joint pain, cough, asthma, and inflammatory conditions⁸⁸. Experimental toxicity studies indicate a good safety margin, with no mortality or major behavioral changes observed in animals even at high oral doses, suggesting low acute toxicity. However, human clinical safety data are still limited, so prolonged or high-dose use without supervision is not recommended. Traditional medical guidelines advise avoiding use during pregnancy and breastfeeding, as well as in individuals with high Pitta conditions, active gastritis, peptic ulcers, bleeding disorders, or those taking anticoagulant or immunosuppressive medications, since excessive intake may cause stomach irritation, loose motions, or possible drug interactions. Therefore, any use beyond a few weeks should be done only under the guidance of a qualified Ayurvedic or healthcare professional⁸⁸.

Myxopyrum species generally show a good safety margin in animal studies; however, in humans, high doses or prolonged use may cause gastric irritation, acidity, nausea, loose stools, or abdominal discomfort due to their warming (ushna), pungent, and phenolic-rich nature. Rare allergic reactions such as skin rash, itching, or mild swelling can occur in sensitive individuals, especially with fresh plant contact or first-time oral use, so a small test dose or patch test is recommended⁸⁹. Traditional texts and modern reviews strongly advise avoiding use during pregnancy and breastfeeding because of insufficient human safety data and possible uterine or immune effects. Caution is also necessary in people with active gastritis, peptic ulcers, high Pitta tendency, bleeding disorders, or those taking anticoagulants, immunosuppressants, or multiple long-term medications. Therefore, *Myxopyrum* should be used only for short durations and strictly under the supervision of a qualified Ayurvedic or medical practitioner⁸⁹.

Growing conditions

Myxopyrum smilacifolium grows best in warm, humid tropical to subtropical climates with a long monsoon season and mild winters. In nature, it thrives along forest edges and in evergreen or semi-evergreen forests from low altitudes up to about 1500 m, where it climbs over nearby trees and shrubs⁹⁰. The plant prefers well-drained, moderately fertile soil rich in organic matter, with a slightly acidic to neutral pH range of about 5.5–7.5. Consistent soil moisture is important for healthy growth, but waterlogging should be avoided as it can damage the roots. It performs best in bright filtered light or partial shade rather than harsh direct sunlight, and requires natural or artificial support such as trees, fences, or trellises to climb and develop properly⁹⁰.


Cultivation

Myxopyrum smilacifolium can be successfully grown at home if proper support, moisture, and partial shade are provided. The most reliable propagation method is semi-hardwood cuttings taken during the monsoon season (June to September). Healthy cuttings of about 10–15 cm length with 3–4 nodes from current season growth are planted in a well-drained medium consisting of sand, vermiculite, and farmyard manure in a 2:1:1 ratio. Rooting improves under warm temperatures (25–30°C), high humidity, and diffused light, with roots forming in about 30–45 days. Layering of flexible stems during July–August is another effective method, giving good rooting within 2–3 months. Seed propagation is possible but less preferred due to low germination rates and slow growth⁹⁰.

For planting, a strong support system such as a trellis, fence, or arbor (2–3 m high) is essential, as the plant is a woody climber. It can be grown in large containers (40–50 L) or directly in the ground using pits filled with loamy soil mixed with compost, farmyard manure, and sand (3:2:1:1), maintaining a soil pH of about 6–7. During the early stage, plants prefer partial shade and consistently moist soil. As the plant establishes, it can tolerate more sunlight. Regular watering is needed, but waterlogging should be avoided. Light pruning after flowering helps promote lateral branching and healthy growth. Organic manures or small monthly doses of balanced fertilizer support steady development. Occasional pests such as scale insects or leaf spots can be managed using neem-based sprays⁹¹.

For commercial cultivation, the plant performs best in warm, humid agroclimatic zones with high rainfall, such as the Western Ghats regions of Kerala, Tamil Nadu, and Karnataka, at elevations between 500 and 1400 m. Land preparation involves deep ploughing and incorporation of organic manure to improve soil fertility and drainage. Rooted cuttings raised in nurseries are transplanted at the onset of the monsoon into pits enriched with compost and phosphorus fertilizer, with spacing of about 2.5 × 2.5 m to allow climbing and canopy spread⁹¹.

Crop management focuses on maintaining adequate moisture through drip or regular irrigation during dry months, along with periodic application of organic manures and balanced fertilizers. The plant responds well to pruning and can be harvested from the second year onward. Leaves and tender shoots are cut 3–4 times a year at intervals of about 100–120 days. Proper shade drying preserves active compounds, and dried material is stored at low moisture levels to maintain quality. Under good management, commercial fields can produce substantial dry leaf yield and generate attractive returns through herbal raw material and extract markets⁹¹.

A close-up photograph of the Bryophyllum pinnatum plant, showing several bright green, succulent leaves with a distinctively scalloped or serrated margin. The leaves are arranged in a fan-like pattern along a dark purple stem. The background is a soft, out-of-focus green, suggesting a natural outdoor setting.

Bryophyllum pinnatum (Leaf of Life / पत्थरचट्टा) stands out as a true botanical marvel, combining effortless survival with powerful healing potential—its fleshy leaves not only reproduce new plants but also deliver proven benefits such as faster wound healing, kidney stone reduction, asthma relief, blood sugar control, and broad antimicrobial action through compounds like bufadienolides and flavonoids. Deeply rooted in Ayurveda and Siddha medicine and now supported by modern research, this hardy succulent grows easily in home pots or at commercial scale with minimal inputs and good economic returns. With simple care requirements and wide therapeutic scope, yet necessary caution in pregnancy and heart conditions, पत्थरचट्टा represents a sustainable, accessible, and science-backed medicinal plant for future herbal healthcare.

Leaf of Life (*Bryophyllum pinnatum*) पत्थर चट्टा

Leaf of Life (*Bryophyllum pinnatum*), commonly known as पत्थरचट्टा, पानफुटी, or मिरेकल लीफ, is a succulent perennial herb belonging to the Crassulaceae family, originally native to Madagascar but now widely naturalized across tropical and subtropical regions of India, Africa, the Americas, and Australia. It grows abundantly in wastelands, rocky slopes, gardens, and roadside areas, reaching about 30–150 cm in height, and is easily recognized by its thick, juicy erect stems and large, fleshy, opposite leaves with scalloped margins that bear tiny plantlets (bulbils) along the edges, enabling remarkable vegetative reproduction. The plant produces drooping, tubular, bell-shaped flowers that range from greenish-yellow to pinkish-purple, usually appearing in winter to early summer, followed by small follicles containing numerous tiny black seeds. For centuries, it has held an important place in Ayurveda, Siddha, and folk medicine, where its fresh leaves are used to treat kidney stones, asthma, bronchitis, cough, wounds, ulcers, inflammation, hypertension, and diabetes⁹². Rich in bioactive compounds such as bufadienolides, flavonoids, phenolics, triterpenoids, and polysaccharides, modern studies support its antimicrobial, antioxidant, anti-inflammatory, anti-urolithiatic, antidiabetic, and anticancer potential, making *Bryophyllum pinnatum* a highly valued medicinal and household remedy plant, though careful use is advised due to the potency of its active constituents⁹².



Traditional Significance

Leaf of Life is a succulent perennial herb widely valued in Ayurveda, Siddha, and folk medicine for its broad healing properties. Native to Madagascar, it is now commonly found across tropical India, growing naturally on rocky slopes, wastelands, boundary walls, and around homes. For generations, its fresh leaves and juice have been used to manage kidney stones, asthma, cough, diabetes, wounds, inflammation, and hypertension. Its medicinal value comes from bioactive compounds such as bufadienolides, flavonoids, polysaccharides, and phenolics, which have attracted modern scientific attention for their antimicrobial, antioxidant, anti-urolithiatic, and anticancer activities⁹³.

The plant grows as an erect, fleshy herb about 30–120 cm tall, with thick, juicy, green to purplish stems and large opposite leaves that are oblong to ovate with scalloped margins. A unique feature is its ability to reproduce vegetatively, as tiny plantlets develop along the leaf edges and fall to the ground to form new plants. The leaves are thick, smooth, and mucilaginous when crushed, while the roots are shallow and fibrous. It bears drooping, tubular, bell-shaped flowers in shades of greenish-yellow to pinkish-purple, usually during cooler months, followed by small follicles containing numerous tiny black seeds. Its succulent nature, CAM photosynthesis, and drought tolerance make it especially suited to dry, rocky conditions and low-maintenance home cultivation⁹³.

Medicinal Benefits



Leaf of Life shows a wide range of medicinal benefits supported by traditional use and modern pharmacological studies. Fresh leaf juice and extracts help in respiratory problems such as asthma, bronchitis, cough, and pneumonia by acting as an expectorant, reducing mucus thickness, relaxing airway muscles, and lowering histamine release⁹⁴. The plant is especially well known for kidney stone management, as it prevents calcium oxalate crystal formation, increases urine output, and helps dissolve existing stones. It also shows strong antidiabetic activity by inhibiting digestive enzymes like α -glucosidase and α -amylase, leading to better blood sugar control. In wound care, crushed leaves speed up healing by increasing collagen formation and preventing bacterial and fungal infections. Additional benefits include anti-inflammatory and pain-relieving effects, blood pressure-lowering action, liver protection, antiviral potential, and anticancer activity in laboratory studies, making Leaf of Life a highly versatile medicinal plant with strong scientific backing⁹⁵.

In traditional Ayurveda, Siddha, and folk medicine, Leaf of Life is commonly used as fresh leaf juice (about 10–30 ml once daily) for conditions like asthma, diabetes, and kidney stones, while a leaf decoction (50–100 ml once or twice daily) is taken for cough, blood pressure, and general inflammation⁹⁶. Dried leaf powder is usually given in small doses of 1–3 g per day, often with honey or warm water, and is also available as capsules taken once or twice daily. For wounds, burns, or skin infections, freshly crushed leaves are applied directly to the affected area. Children are generally given half the adult dose. Safety studies show the plant is well tolerated at normal doses, with no serious toxicity reported in short-term use, though mild stomach upset may occur in some people. Because the leaves contain bufadienolides, use should be avoided during pregnancy and breastfeeding, in people with heart or kidney problems, and in infants. Caution is also advised when taken along with antidiabetic or diuretic medicines, and long-term use should always be done under medical or Ayurvedic supervision⁹⁷.

Leaf of Life is generally safe when used in recommended amounts, but taking high doses or prolonged use may cause mild side effects such as nausea, vomiting, diarrhea, stomach cramps, or drowsiness due to naturally occurring bufadienolides in the leaves⁹⁸. In rare cases, very high intake may affect heart rhythm, especially in sensitive individuals. Topical application of fresh leaf sap can sometimes irritate the skin, causing redness, itching, or rash, so a small patch test is advised before regular use. Allergic reactions are uncommon but may occur in people with sensitive skin; use should be stopped immediately if swelling, itching, or discomfort appears. The plant should be strictly avoided during pregnancy and breastfeeding because it may stimulate the uterus and affect the heart. It is also contraindicated in people with heart disease, low blood pressure, kidney problems, and in infants or young children without medical supervision. Caution is required when used along with diuretics, heart medicines (such as digoxin), or antidiabetic drugs, and cancer patients should consult their doctor before use⁹⁸.


Growing conditions

Leaf of Life grows best in warm tropical to subtropical climates, making it well suited for regions like Patna. It prefers temperatures between 18–35°C and cannot tolerate frost, so plants should be protected or kept indoors during cold winters. Bright indirect light to moderate sunlight is ideal; about 4–6 hours of sunlight daily supports healthy growth, while partial shade prevents leaf scorch during harsh summer months. The plant thrives in well-drained soil such as a cactus or sandy potting mix with a slightly acidic to neutral pH (6–7.5), as excess moisture can quickly cause root rot. Water only when the top 3–5 cm of soil becomes dry, and reduce watering in winter. Moderate humidity (40–70%) is sufficient, with occasional misting in very dry conditions. In Patna, it performs excellently on balconies or terraces during monsoon with light shade and grows well indoors near a sunny window in winter⁹⁸.

Cultivation

Home cultivation of Leaf of Life is very easy because it is a hardy succulent. The most common method is through leaf bulbils or plantlets that naturally grow along the leaf margins. These small plantlets (about 1–2 cm) can be gently removed and placed on moist soil made of coco peat and perlite (1:1). Roots develop within 7–14 days, and the plant can be transplanted after about 3 weeks with very high success. Whole mature leaves can also be planted base-down in sand or vermiculite, where roots appear in 2–4 weeks. Stem cuttings (10–15 cm long) can be used after allowing the cut end to dry for 1–2 days before planting. Pots of 20–30 cm size with good drainage are ideal, using a cactus-type soil mix (potting soil, perlite, and sand). The plant needs about 4–6 hours of sunlight daily with bright indirect light, temperatures between 18–35°C, and watering only after the top soil dries. Fertilizer can be applied once a month during the growing season, and pests like mealybugs can be controlled with neem oil or alcohol wiping.

For commercial cultivation, Leaf of Life can be grown successfully in states such as Kerala, Tamil Nadu, Bihar, Rajasthan, and other warm regions. Large-scale propagation is done using leaf plantlets raised in nursery beds prepared with coco peat and farmyard manure, giving more than 90% survival⁹⁹. Plants are spaced about 45 × 45 cm, allowing around 50,000 plants per hectare. Sandy loam soil with good drainage and pH between 6 and 8 is preferred, enriched with farmyard manure and basic phosphorus fertilizer. Drip irrigation is suitable, with moderate watering during dry periods. Leaves can be harvested every 3–4 months from the first year onward, yielding about 15–25 tons of fresh leaves per hectare annually. With low input costs and steady demand for herbal powders and extracts, Leaf of Life offers good economic returns for small and medium farmers⁹⁹.



***Abroma augusta* (Devil's Cotton/उलट केबल)** stands as a powerhouse of Ayurvedic healing powerfully regulating blood sugar through its antidiabetic alkaloids, toning reproductive health as an uterine stimulant and fertility booster, while easing urinary stones and digestive woes with its diuretic and laxative potency yet demands respect with pregnancy contraindications and potential mild GI upset, thriving effortlessly in Patna's tropical heat (20–40°C, 1200+ mm rain) via simple seed propagation or cuttings for home hedges/pots yielding medicinal roots by year 2, scaling profitably to 195 kg/ha commercial plantations for pharma supply, making it an accessible, fast-growing ally for health-conscious students blending tradition with self-reliant cultivation.

Devil's Cotton (*Abroma augusta*) उलट केबल

Devil's Cotton (*Abroma augusta* L.f.), commonly called उलट केबल / उलटकंबल / पीशाच कर्पास, is a fast-growing, semi-woody deciduous shrub belonging to the Malvaceae family, native to tropical and subtropical regions of the Indian subcontinent, including the Himalayan foothills, Northeast India, Central India, Bangladesh, and parts of Southeast Asia. The plant typically grows 2–8 meters tall and is widely distributed along forest edges, riverbanks, moist wastelands, and disturbed habitats with loamy to clayey soils. It is easily identified by its rough, stellate-hairy young branches, large alternate palmately lobed leaves with a cordate base, and solitary axillary yellow flowers marked with prominent purple veins that bloom during the monsoon season. The fruit is a large, woody follicle filled with black ovoid seeds surrounded by irritating hairs. For centuries, this plant has been highly valued in Ayurveda, Unani, and folk medicine especially for women's reproductive health where its roots and root bark are regarded as powerful uterine tonics, giving Devil's Cotton a distinguished place in traditional Indian medicinal systems¹.



Traditional Significance

Devil's Cotton is a fast-growing, semi-woody deciduous shrub belonging to the Malvaceae family, native to tropical and subtropical regions of India (especially the Northeast, Bengal, and central plains), as well as Bangladesh, Myanmar, and Southeast Asia¹⁰⁰. It commonly grows along moist forest margins, riverbanks, and wastelands in loamy to clayey soils. In classical Ayurvedic literature, the plant is described as Pishacha Karpasa, valued mainly for its strong action on the female reproductive system. The roots and root bark are traditionally used as an emmenagogue and uterine tonic to manage amenorrhea, painful or irregular menstruation, leucorrhea, dysfunctional uterine bleeding, and certain forms of infertility. Beyond gynecological use, it is also employed for diabetes, joint disorders, bronchitis, wound healing, and inflammatory conditions, which aligns with the presence of bioactive compounds such as abromine alkaloid, friedelin, β -sitosterol, choline, and tannins known for antidiabetic, antimicrobial, and anti-inflammatory effects¹⁰⁰.

Botanically, the plant grows as an erect, much-branched shrub or small tree reaching about 2–8 m in height, with stout cylindrical stems that are densely hairy when young and become gray-brown and fissured with age. The leaves are large, spirally arranged, palmately 3–7-lobed with a heart-shaped base, rough on the upper surface and densely hairy underneath, supported by long petioles¹⁰¹. Solitary axillary flowers appear mainly during the monsoon season, bearing yellow petals marked with distinct purple veins and a prominent staminal column. The fruit is a large, oblong, woody capsule that splits into five valves at maturity, releasing numerous black seeds surrounded by irritating hairs. Physically, the plant is recognized by its coarse texture, stellate hairs, fibrous bark, and hanging seed pods, features that make it easily identifiable in the field and closely linked to its traditional medicinal importance.

Medicinal Benefits

Abroma augusta is widely valued in traditional medicine, especially for women's reproductive health, where the root and root bark act as a strong uterine tonic. It helps stimulate menstruation, supports ovulation in irregular or anovulatory cycles (including PCOS), and significantly reduces menstrual pain and premenstrual symptoms by lowering inflammatory prostaglandins¹⁰². The plant is also effective in managing leucorrhea and dysfunctional uterine bleeding due to its astringent and healing properties, thereby improving fertility and cycle regularity. Beyond gynecological use, leaf and root extracts show strong antidiabetic activity by lowering fasting blood glucose, improving insulin sensitivity, and protecting kidney and heart tissues from diabetic damage. Additional benefits include anti-inflammatory action (reducing swelling and joint pain), broad-spectrum antibacterial and antifungal effects, wound-healing acceleration, cholesterol reduction, bronchodilation in asthma, and anticancer potential through apoptosis induction, highlighting its importance as a multi-target medicinal plant¹⁰³.



In traditional Ayurvedic practice, the root or root bark is used in carefully controlled doses depending on the condition. The common oral dose is 3–6 g of root or root-bark powder per day in divided doses for menstrual disorders, diabetes, or uterine weakness. A decoction is prepared by boiling 5–10 g of dried bark in about 400 ml of water and reducing it to 100 ml, taken as 30–50 ml once or twice daily for dysmenorrhea, leucorrhea, or irregular menstruation. Modern formulations may use capsules or tablets of about 500 mg extract taken once or twice daily, while topical pastes of bark powder are applied to wounds or inflamed areas. Use is generally limited to short courses of up to three months and should always be supervised by a qualified practitioner. At therapeutic doses, the plant is considered safe, with animal studies showing a wide safety

margin; however, it is strictly contraindicated during pregnancy and breastfeeding due to its strong emmenagogue and uterine-stimulating action. It should also be avoided in cases of heavy menstrual bleeding, active gastric ulcers, or strong Pitta conditions, and used cautiously in people with low blood pressure or those taking antidiabetic medicines, as mild nausea, dryness of mouth, or gastric irritation may occur at higher doses¹⁰².

At recommended therapeutic doses, *Abroma augusta* is generally well tolerated in traditional use, but mild side effects such as nausea, stomach discomfort, constipation, dry mouth, or a bitter taste may occur, especially when taken in excess or on an empty stomach due to its astringent (kashaya) and warming (ushna) nature; taking it with ghee or milk often reduces irritation. Allergic reactions are uncommon but may include skin rash, itching, or mild swelling after contact with fresh bark, roots, or sap, particularly in individuals sensitive to plant fibers or pollen, so a patch test is advised before topical application. The plant is strictly contraindicated during pregnancy because of its strong emmenagogue and uterine-stimulating effects that may increase the risk of miscarriage, and it should also be avoided during lactation, in cases of heavy or prolonged menstrual bleeding, active gastritis or peptic ulcers, and severe Pitta-dominant conditions. Caution is required in individuals with low blood pressure, those undergoing infertility treatments,

or patients using antidiabetic medicines due to possible potentiation effects, and therefore its medicinal use should always be guided by a qualified Ayurvedic or medical practitioner¹⁰⁴.

Growing conditions

Devil's Cotton grows best in tropical to subtropical climates with warm temperatures between 20–40°C and moderate to high rainfall, similar to Indian monsoon conditions. It naturally thrives along forest edges, riverbanks, and moist wastelands up to about 1000 m elevation. The plant prefers full sunlight for healthy growth and flowering, though it can tolerate partial shade. Fertile loamy to clayey soils with good drainage and a neutral to slightly acidic pH (around 6–8) are ideal, as waterlogging can damage roots. Regular rainfall during the monsoon supports rapid vegetative growth and flowering, while moderate irrigation is sufficient during dry seasons. High humidity (60–80%) further enhances growth, making it well suited for medicinal gardens and hedges in tropical regions¹⁰⁵.

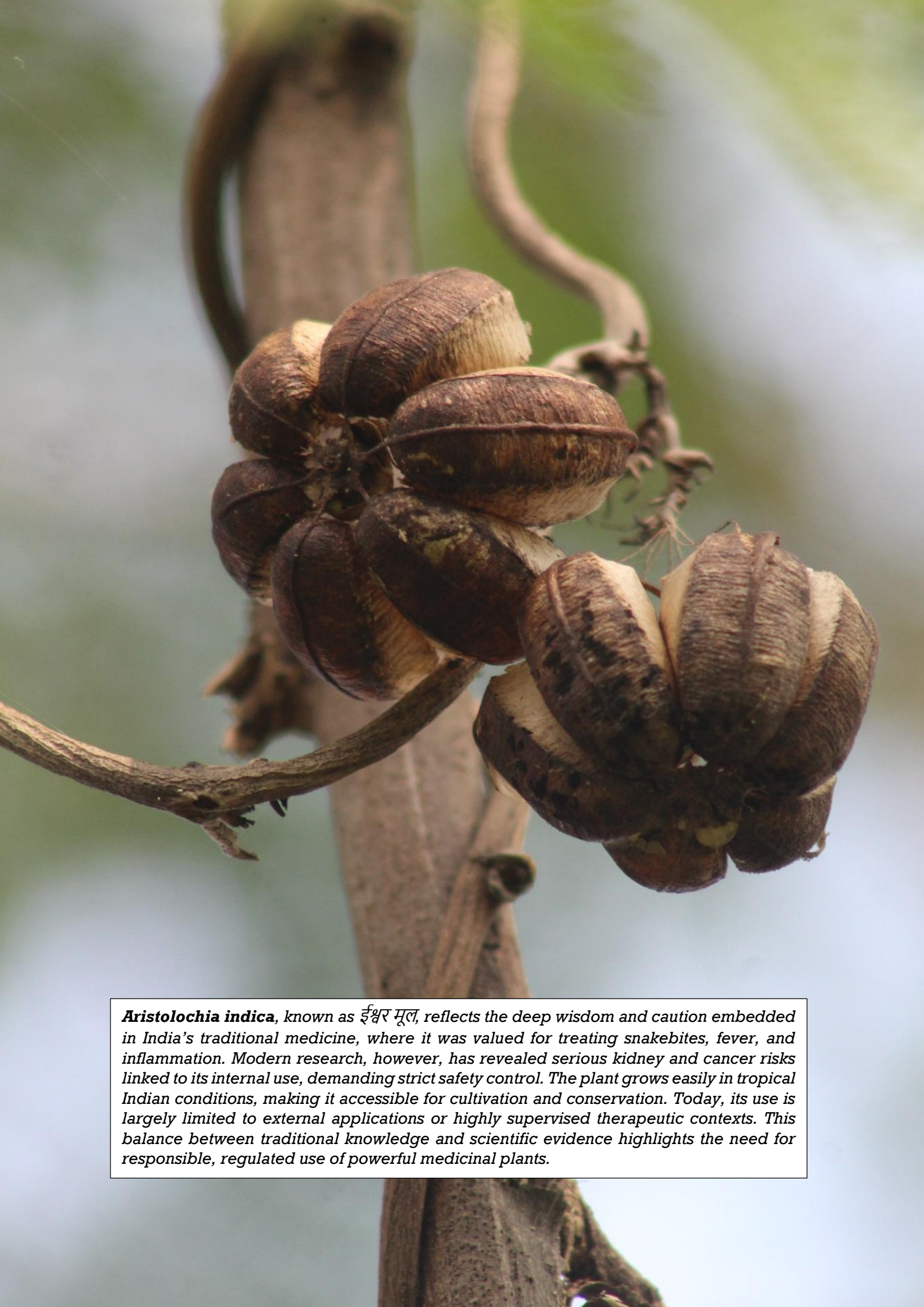
Cultivation

Devil's Cotton grows well in hot and humid subtropical climates, making regions like Patna suitable for home cultivation in backyards, pots, or as hedge plants. Propagation is most commonly done through seeds, which should be collected when fully mature and black (December–January). Seeds germinate better after soaking in water for 24–48 hours or mild acid scarification, and are sown in trays or polybags filled with a loam, sand, and farmyard manure mixture. Germination usually occurs within 12–30 days under warm conditions. Semi-hardwood stem cuttings or root suckers taken during the monsoon can also be used and root well under partial shade. Seedlings about 20–25 cm tall are transplanted during May–August at about 1 × 1 m spacing or into pots at least 30 cm deep.

For healthy growth, the plant requires well-drained loamy soil with a pH of 6–8 and moderate watering, allowing the topsoil to dry slightly between irrigations. It prefers full sun for at least six hours daily but tolerates partial shade. Basal application of farmyard manure at planting and a yearly dose of balanced NPK fertilizer after the monsoon supports good growth. Annual pruning helps maintain shape and allows sustainable harvesting of leaves and stems without damaging the plant. Medicinal roots are generally harvested after two years, and pest problems are minimal under normal conditions.

Commercial cultivation is suitable for supplying pharmaceutical and herbal industries, especially in tropical and subtropical regions. High-density plantations using 1 × 1 m spacing can accommodate about 10,000 plants per hectare. Land preparation involves deep ploughing followed by pit digging (30 × 30 × 30 cm), with farmyard manure and basal fertilizers applied before planting. Seedlings are transplanted during the monsoon season, relying mainly on rainfall, while supplemental irrigation is provided in drier regions, ensuring no waterlogging.

Regular weeding during the first year and light nitrogen top-dressing after establishment improve biomass production. Root harvesting is carried out after flowering, usually around 24 months, followed by shade drying of the bark. Average yields of about 195 kg of dry root bark per hectare have been reported, with relatively low cultivation costs, making the crop economically viable. The plant has few serious diseases, though damping-off at early stages can be managed with appropriate fungicidal treatment.



Aristolochia indica, known as ईश्वर मूल, reflects the deep wisdom and caution embedded in India's traditional medicine, where it was valued for treating snakebites, fever, and inflammation. Modern research, however, has revealed serious kidney and cancer risks linked to its internal use, demanding strict safety control. The plant grows easily in tropical Indian conditions, making it accessible for cultivation and conservation. Today, its use is largely limited to external applications or highly supervised therapeutic contexts. This balance between traditional knowledge and scientific evidence highlights the need for responsible, regulated use of powerful medicinal plants.

Indian Birthwort (*Aristolochia indica*) ईश्वर मूल

Indian Birthwort, locally known as ईश्वर मूल / इश्वरी मूल / गरुड़मूली, is a perennial twining climber belonging to the Aristolochiaceae family and is native to the tropical forests, scrublands, and hedges of India, especially the Western Ghats, Kerala, Karnataka, Tamil Nadu, and parts of eastern and central India. The plant grows as a slender woody vine (about 3–5 m long) with heart-shaped leaves, distinctive pipe- or trumpet-shaped maroon to purple flowers, and thick cylindrical roots that are the main medicinal part. In Ayurveda, Siddha, and folk medicine, ईश्वर मूल has been revered for centuries as a powerful antidotal and stimulant herb, traditionally used in snakebite and scorpion sting management, as well as for fever, indigestion, joint pain, cough, helminth infections, skin disorders, menstrual problems, and urinary retention, due to its hot potency (उष्ण वीर्य) and Kapha-Vata balancing action. Phytochemically, the plant contains aristolochic acids along with flavonoids like luteolin and kaempferol, which explain its strong biological activity. However, modern research has clearly established that aristolochic acids are highly nephrotoxic and carcinogenic, leading to kidney failure and urinary tract cancers, resulting in strict bans or restrictions on its internal use in many countries. Today, Indian Birthwort is regarded as a powerful but dangerous medicinal plant, recommended only for external use or extremely controlled micro-doses under expert Ayurvedic supervision, highlighting the fine balance between traditional wisdom and modern safety concerns¹⁰⁶.



Traditional Significance

Indian Birthwort (*Aristolochia indica* L.) is a perennial twining climber belonging to the Aristolochiaceae family and is widely distributed across tropical and subtropical regions of India, including the Western Ghats, Kerala, Karnataka, Tamil Nadu, Assam, Odisha, and parts of central and eastern India, with natural extension into Sri Lanka. It commonly grows along forest edges, scrublands, rocky slopes, and hedges up to about 900 m elevation. The plant has been known in Indian traditional medicine since ancient times and is frequently mentioned in classical Ayurvedic texts for its antidotal use against snakebite and scorpion sting, as well as for treating fever, digestive disorders, helminth infections, skin diseases, menstrual problems, and urinary complaints. Tribal communities in different parts of India have also used root and leaf preparations for wound healing and postpartum care. Although the plant shows strong biological activity due to compounds like aristolochic acids, these same compounds are now known to cause kidney damage and cancer, leading to strict restrictions on internal use and limiting applications mainly to external or supervised medicinal use¹⁰⁶.

The plant is a slender, woody climber reaching about 3–5 meters in length, arising from a short rootstock and twining over nearby vegetation or supports. Stems are greenish when young, turning brown with age, and are generally smooth and cylindrical. Leaves are alternate, simple, and petiolate, measuring about 4–10 cm long, with ovate to elliptic shapes, rounded or slightly heart-shaped bases, wavy margins, and pointed tips; prominent veins arise from the base. Flowers are solitary or few in axils and are easily recognized by their curved, pipe-like

structure, greenish to brownish-purple color, and swollen basal chamber adapted for insect pollination. Fruits develop as ribbed capsules that split open to release numerous flat, winged seeds. Roots are long, cylindrical, rough on the outside, pale within, bitter in taste, and aromatic, and they form the main medicinal part traditionally collected in India¹⁰⁷.

Medicinal Benefits

In Ayurveda and Indian folk medicine, *Aristolochia indica* is mainly valued for its strong antidotal action against snakebites and scorpion stings, where root paste or leaf juice is traditionally used to induce vomiting and applied externally to reduce venom effects. The plant is also widely used to treat intermittent fevers, rheumatic arthritis, joint swelling, and inflammatory conditions, with root powder or decoctions helping to relieve pain and reduce swelling due to its warming and Kapha–Vata balancing nature. It supports digestion by acting as a carminative, mild laxative, and anthelmintic, helping in indigestion, abdominal colic, gas, diarrhea, and intestinal worm infections, especially in tribal medical practices¹⁰⁸. Leaf juice and powders are used in respiratory disorders such as cough, bronchitis, rhinitis, and childhood breathing problems, while external pastes aid in healing skin diseases, wounds, itching, leucoderma, and other chronic skin conditions. Additionally, traditional use includes support in menstrual disorders, urinary retention, postpartum uterine cleansing, and certain nervous conditions like epilepsy and mental disturbances. Modern preclinical studies have confirmed anti-snake venom, antimicrobial, anti-inflammatory, antioxidant, larvicidal, and antidiabetic activities; however, due to known kidney toxicity, internal use is strictly limited and only supervised or external application is recommended in India¹⁰⁹.



In traditional Ayurvedic practice, *Aristolochia indica* is administered only in very small and short-term doses because of its strong biological activity. Classical references describe the use of root powder (churna) at about 50–125 mg once or twice daily (maximum 250 mg) for no longer than 3–7 days, mainly in acute conditions. Leaf juice (5–10 ml) has been used as an emetic in cases of poisoning, while root decoction (30–50 ml) or cold infusion (around 40 ml) is mentioned for fever and urinary complaints. External application as paste is more common and considered safer, though patch testing is advised. Although animal studies report a high LD50 (>2000 mg/kg), the plant contains aristolochic acids (AA-I and AA-II), which are associated with severe kidney toxicity, fibrosis, and urothelial cancers even at low doses with prolonged use. Due to these risks, internal use has been banned or strictly restricted internationally, and in India it is limited to external use or carefully controlled formulations under expert supervision. The plant is contraindicated during pregnancy, lactation, in children, elderly individuals, and patients with kidney or liver disorders, and it should not be combined with nephrotoxic drugs such as NSAIDs. Possible side effects include nausea, vomiting, abdominal cramps, reduced urine output, and hypertension, and treatment should be stopped immediately if such symptoms appear¹¹⁰.

Aristolochia indica poses serious safety risks mainly due to aristolochic acids, which can cause nausea, vomiting, abdominal pain, diarrhea, fatigue, swelling, reduced urine output, and high blood pressure when taken internally. Repeated or long-term use may lead to aristolochic acid nephropathy, progressing to chronic kidney failure and significantly increasing the risk of urinary tract and bladder cancers. Allergic reactions are rare but may include skin rashes, itching, or blisters after contact with fresh plant material, so patch testing is advised for topical

use. It is strictly contraindicated in pregnancy and breastfeeding due to abortifacient and fetal kidney toxicity risks, and should be avoided in children, elderly individuals, and patients with kidney or liver disease. Internal use is strongly discouraged under modern medical guidelines, and any application should be limited to supervised external use only¹¹¹.

Growing conditions

The plant grows best in warm, moist tropical to subtropical climates typical of many parts of India. It prefers temperatures between 20–33°C, can tolerate short-term heat up to about 40°C, but is sensitive to frost and temperatures below 10°C. Well-distributed annual rainfall of around 100–150 cm, especially during the monsoon, and moderate to high humidity (60–80%) support healthy growth. It thrives in well-drained sandy loam or loamy soils rich in organic matter, with a slightly acidic to neutral pH (5.5–7.5), and can also grow on red lateritic or rocky soils provided drainage is good. Waterlogging and heavy clay soils should be avoided. The plant performs well in full sun to partial shade, with about 50% shade being ideal in forest-like conditions, and requires sturdy supports such as trellises, fences, or trees for its twining habit¹¹².

Cultivation

Aristolochia indica can be successfully grown at home in a sunny backyard or on a balcony using a 20–30 liter pot with proper drainage holes. A well-drained sandy loam soil mixed with about 30% farmyard manure or compost (pH 6–7) is ideal. The plant prefers partial shade with morning sunlight, and a trellis or bamboo support is necessary to allow its twining growth of 3–5 meters. Propagation is commonly done through fresh seeds, which are sown about 1 cm deep in seed trays containing a sand–soil (1:1) mix; seeds usually germinate within 15–25 days at 25–30°C. Semi-hardwood cuttings (10–15 cm) can also be rooted in cocopeat or perlite under humid conditions. Seedlings or rooted cuttings should be transplanted when they reach 15–20 cm height. Watering should keep the soil moist but never waterlogged, and light monthly feeding with vermicompost or diluted balanced fertilizer supports growth. Annual pruning improves branching, and protection from frost and aphids (using neem oil) is advised. Roots may be harvested sparingly after 12–18 months, and gloves should be used while handling due to the plant's toxicity.

For commercial purposes, cultivation is suitable in rainfed tropical regions of India such as Kerala and Tamil Nadu, using well-drained sandy loam or red soils with pH 6–7.5. Planting is done at 1.5 × 2 m spacing (around 10,000 plants per hectare) under partial shade provided by trees or pandals. Propagation is mainly through nursery-raised seedlings or root suckers for uniform growth. Land preparation includes ploughing and application of 10 tons FYM per hectare, along with a basal dose of balanced fertilizers. Regular irrigation during the first year, mulching, and periodic weeding are important for establishment. Roots and rhizomes are harvested from the second year onward, usually after leaf fall, yielding 600–800 kg/ha of dry roots, which may increase to 1–2 tons/ha by the third or fourth year. Harvested roots are shade-dried and stored in cool conditions. With controlled cultivation and proper management, the crop can generate ₹2–3 lakh per hectare, making it suitable for contract farming with AYUSH-based herbal industries.



***Senna alata* (बत्तीक पौधा)** is a fast-growing medicinal shrub valued across India for its strong antifungal action against skin infections such as ringworm and scabies, mainly due to anthraquinone-rich leaves used externally. Along with its antibacterial and anti-inflammatory benefits, it also improves soil fertility through nitrogen fixation, making it useful for sustainable home gardens. The plant is easy to cultivate, low-maintenance, and well suited to humid tropical climates from Bihar to Kerala. While it offers mild laxative effects, internal use must be limited to prevent digestive discomfort. Overall, *Senna alata* represents a practical blend of traditional Ayurvedic wisdom and modern validation when used responsibly.

Candlestick Plant (*Cassia alata*) बत्तीक पौधा

Candlestick Plant (*Senna alata* L., formerly *Cassia alata*), popularly known as बत्तीक पौधा or Ringworm Bush in India, is a tall, fast-growing evergreen shrub of the Fabaceae family that reaches about 3–6 m in height and spreads 2–4 m wide. Native to tropical America, it is now widely naturalized across humid and sub-humid regions of India such as Bihar, Uttar Pradesh, Kerala, Tamil Nadu, Odisha, and West Bengal, where it commonly grows along roadsides, riverbanks, fallow lands, and forest edges. The plant is easily recognized by its thick, green stems, very large paripinnate leaves that fold at night, and striking upright candle-like spikes of bright golden-yellow flowers that bloom mainly after the monsoon. It produces long, flat pods filled with numerous brown seeds, allowing it to spread rapidly and sometimes behave as an invasive species. In Ayurveda, Siddha, and folk medicine, the leaves are especially valued for treating fungal skin infections like ringworm, scabies, and eczema due to their rich content of anthraquinones, flavonoids, and other bioactive compounds, while the plant is also traditionally used as a mild laxative, febrifuge, and supportive remedy in diabetes, making *Senna alata* an important medicinal as well as ornamental shrub in tropical Indian landscapes¹¹³.



Traditional Significance

Candlestick Plant (*Senna alata* L.), locally called बत्तीक पौधा or ददमारी in many parts of India, is a fast-growing evergreen shrub widely naturalized in tropical and subtropical regions of the country, including Bihar, Uttar Pradesh, West Bengal, Kerala, Tamil Nadu, and Odisha. Originally introduced from tropical America, it now thrives along roadsides, riverbanks, wastelands, and moist forest margins, where warm temperatures and high humidity favor its rapid growth. In Ayurveda, Siddha, and Indian folk medicine, the plant is best known as a powerful antifungal remedy, especially for skin diseases such as ringworm (daad), scabies, eczema, psoriasis, and fungal nail infections. These uses are linked to bioactive anthraquinones such as chrysophanic acid, emodin, and rhein present in the leaves, along with flavonoids that contribute anti-inflammatory, mild laxative, febrifuge, and antidiabetic effects. While it is increasingly cultivated in eastern and southern India for herbal medicines and cosmetic formulations, its aggressive spread in some habitats requires controlled management¹¹⁴.

Senna alata is an erect, robust shrub typically growing 2–6 m tall with a broad, bushy habit and thick, pale green to brownish stems that are slightly hairy when young. The leaves are very large and paripinnate, measuring 30–80 cm in length, with 8–20 pairs of opposite, oblong-obovate leaflets that are glossy dark green on the upper surface and lighter beneath; a distinctive feature is their folding movement at night. The plant is most striking during flowering, producing tall, upright axillary spikes that resemble yellow candlesticks, composed of bright golden-yellow flowers arranged densely along the stalk. Flowering is most abundant after the monsoon. The fruits are flat, elongated, papery pods containing numerous hard brown seeds that aid in wide dispersal by wind and water.

Overall, its bold foliage, candle-like inflorescences, and hardy growth make *Senna alata* both a recognizable medicinal shrub and a prominent component of humid tropical landscapes¹¹⁵.

Medicinal Benefits

Senna alata is widely valued in Indian traditional medicine as a highly effective remedy for fungal skin infections. Fresh leaf paste or leaf extracts rich in anthraquinones such as chrysophanol, emodin, aloe-emodin, and rhein are traditionally applied to treat ringworm, tinea, scabies, eczema, candidiasis, and other dermatophyte infections, a use strongly supported by experimental studies showing inhibition of *Trichophyton*, *Microsporum*, and *Candida* species. The plant also demonstrates broad-spectrum antibacterial activity, with leaves, bark, flowers, and seeds suppressing pathogens like *Staphylococcus aureus*, *Escherichia coli*, and *Vibrio cholerae*, validating its application on infected wounds, boils, and abscesses. Anthraquinone glycosides present in the leaves and pods act as stimulant laxatives, promoting bowel movement and relieving constipation when used in controlled doses¹¹⁶. Flavonoids and phenolic compounds contribute antioxidant, anti-inflammatory, and analgesic properties, explaining its traditional use in rheumatism, joint pain, fever, and inflammatory skin conditions. Additionally, hypoglycemic effects observed in animal studies suggest a role in blood sugar regulation, along with reported anthelmintic, wound-healing, and hepatoprotective activities, though these benefits require further clinical validation for routine therapeutic use¹¹⁷.



Dosage and safety for *Senna alata* focus mainly on external use, as it is safest and most effective when applied to the skin. Fresh leaf paste or a 10–20% leaf extract is applied 2–3 times daily on ringworm, scabies, or fungal patches for about 7–14 days, and a leaf decoction bath (around 50 g leaves boiled in 2 liters of water) is used for widespread skin infections; for limited internal use, leaf powder 2–5 g per day with water or honey may be taken for constipation or fever for a maximum of one week, while leaf juice (10–20 ml) is sometimes used on wounds, with children given half doses and patch testing always advised¹¹⁸. Toxicity is generally low at therapeutic levels, but prolonged or high-dose internal use can cause stomach cramps, diarrhea, nausea, dehydration, electrolyte imbalance, and laxative dependence due to anthraquinones, and mild skin irritation

or allergy may occur in sensitive individuals. Internal use should be avoided during pregnancy and breastfeeding, in children under 12 years, and in people with inflammatory bowel disease, ulcers, kidney problems, or those taking diuretics, heart medicines, or antidepressants, so short-term, moderate use preferably external and guidance from a qualified practitioner are strongly recommended¹¹⁸.

Senna alata can cause side effects mainly when taken internally in high doses or for long periods, because its anthraquinones strongly stimulate the intestines; common problems include abdominal cramps, diarrhea, bloating, nausea, and vomiting, and prolonged use may lead to dehydration, low potassium levels, electrolyte imbalance, and dependence on laxatives, with occasional fatigue or dark-colored urine¹¹⁶. When used on the skin, it is

generally safe but may cause mild contact dermatitis such as redness, itching, burning, or rash, and in rare cases allergic reactions like hives or swelling, especially in sensitive individuals, so a patch test is advised before regular use. Internal use is contraindicated during pregnancy and breastfeeding due to uterine-stimulating effects, in children under 12 years, elderly or weak patients, and people with intestinal disorders (ulcers, IBS, Crohn's disease), kidney or liver disease, or existing electrolyte imbalance; it should also be avoided with diuretics, heart medicines, or steroids. Overall, *Senna alata* is safest when used externally and for short durations, with internal use only under professional guidance¹¹⁶.


Growing conditions

Senna alata grows best in hot, humid tropical climates, making it well suited to Indian lowlands such as Bihar and Kerala. It prefers warm temperatures around 22–35°C with high humidity and well-distributed rainfall, and it does not tolerate frost. The plant thrives in fertile, well-drained sandy loam or clay loam soils with a slightly acidic to neutral pH (about 5.5–7.5), though it can survive in poorer soils if waterlogging is avoided. Full sunlight for 6–8 hours daily supports healthy growth, abundant leaves, and flowering, while partial shade is also tolerated. It performs well in open gardens, roadsides, or wastelands where enough space is available for its tall, bushy growth¹¹⁹.

Cultivation

Home cultivation of *Senna alata* is simple and well suited to Indian tropical conditions. It can be grown in a sunny backyard or in large pots of about 25–40 liters with good drainage, using loamy or sandy soil mixed with around 30% compost (pH 6–7). Seeds germinate easily after soaking overnight and sowing 0.5–1 cm deep, usually sprouting within 10–20 days at warm temperatures (25–30°C); semi-hardwood cuttings of 15–20 cm length also root readily in cocopeat or perlite. Seedlings can be transplanted when 30–45 cm tall, spaced about 1–1.5 m apart near fences or trellises. Regular watering during the first month, light fertilization with vermicompost or balanced NPK during growth, and occasional pruning or pinching help produce a bushy, healthy plant. Leaves can be harvested as needed, though care should be taken to manage its fast growth and prevent invasive spread¹²⁰.

For commercial cultivation, *Senna alata* is grown on fertile, well-drained loamy soils (pH 5.5–7.5) in tropical regions such as Tamil Nadu and Bihar, under rainfed or irrigated conditions. Seeds are sown during the monsoon (June–July) either by broadcasting or in rows, after preparing the land with farmyard manure and basal fertilizers. Plants are thinned and weeded regularly, with limited irrigation during dry spells and light nitrogen top-dressing to boost leaf production. Leaves and pods are harvested from about four months onward, usually twice a year, dried in shade, and sold for herbal or AYUSH markets. With low input costs and moderate yields, the crop offers good returns while also improving soil fertility through nitrogen fixation¹²⁰.



Dhobi Tree (Mussaenda frondosa) is a useful and beautiful plant that has supported people for many years, both as a natural cleaning aid and as a gentle herbal remedy. Its bright white “flag” leaf makes the plant easy to identify, while its leaves, flowers, and roots offer cooling, soothing, and healing effects for common problems like wounds, skin irritation, fever, and stomach discomfort. Because it grows easily in villages, forests, and home gardens with very little care, it remains a valuable plant for families and herbal healers. By using it carefully and responsibly, we can enjoy its benefits while also protecting it for future generations.

Dhobi Tree (*Mussaenda Frondosa*) मुसँदा पौधा

Dhobi Tree (*Mussaenda frondosa* L.), known as मुसँदा पौधा, is an evergreen shrub or weak climber of the Rubiaceae family, growing 1.5–4 m tall and widely distributed in the moist tropical forests, woodland edges, and hill slopes of peninsular and northeastern India up to about 1800 m elevation. The plant has stout, terete stems that are glabrous to slightly hairy on young shoots, bearing opposite elliptic-ovate leaves (7–16 × 4–9 cm) that are leathery, glossy green, with an acuminate apex, rounded base, 5–9 prominent lateral veins, short petioles, and triangular interpetiolar stipules. Flowering occurs from April to October, producing dense terminal corymbs (6–15 cm across) of small funnel-shaped flowers with orange-yellow to reddish corollas (3–4.5 cm long, hairy within), accompanied by one to four enlarged creamy-white petaloid bracts (2.5–4 × 1.5–3 cm) that later turn pink, giving the plant its characteristic ornamental appearance and attracting butterflies. The fruits are fleshy, globose berries (1–1.5 cm) that ripen from orange-red to black and contain numerous small seeds dispersed by birds. Phytochemically, the leaves are rich in flavonoids such as quercetin and rutin, iridoids, triterpenoids including ursolic acid, and tannins, which support its traditional Ayurvedic use for anti-inflammatory, diuretic, and skin-healing purposes¹²¹.



Traditional Significance

Dhobi Tree (*Mussaenda frondosa* L.) grows naturally as an evergreen shrub or weak climber across the Western Ghats, Eastern Ghats, central Indian highlands, and northeastern hills up to about 1800 m elevation. It thrives in moist deciduous forests, forest margins, rocky slopes, and village landscapes, where it is widely cultivated for both ornamental and medicinal purposes. In Ayurveda and tribal ethnomedicine, different plant parts are valued for their cooling and Pitta-pacifying properties, attributed to flavonoids such as quercetin, kaempferol, and rutin, along with iridoids (mussaenosidic acid), triterpenoids (ursolic acid), and tannins. Traditional preparations are used for managing fevers, inflammatory swellings, menstrual discomfort, urinary complaints, and skin irritations, while the large white petaloid bracts have made the plant a popular hedge and garden ornamental in regions like Bihar and Kerala¹²².

Morphologically, the plant develops as an erect, branching shrub or scandent climber reaching 1.5–4 m in height, with stout, terete stems that are glabrous to sparsely pubescent on young growth. Leaves are opposite and petiolate, with elliptic-oblong to ovate-lanceolate blades measuring 7–15 × 4–9 cm, thick and glossy dark green above, paler beneath, with 6–9 pairs of lateral veins, entire margins, and acuminate tips; interpetiolar stipules are triangular to lanceolate. Inflorescences appear as flat-topped terminal or axillary cymes bearing tubular orange-yellow to reddish flowers with slender hairy corolla tubes, typically accompanied by one to four enlarged creamy-white petaloid bracts that gradually turn pink and persist after flowering. Blooming occurs mainly from

April to November, followed by fleshy globose berries that ripen from orange-red to black and contain numerous minute seeds dispersed by birds¹²³.

Ayurvedic use of *Mussaenda frondosa* follows conservative, short-term dosing to ensure safety. Leaf decoction prepared from 20–30 g leaves boiled in 400 ml water and reduced to about 100 ml is taken 50–100 ml twice daily for fevers, inflammation, and edema, while leaf or whole-plant powder (churna) is used at 1–3 g per day with honey or water for urinary and inflammatory complaints, not exceeding 5 g daily. Flower infusion (about 100 ml twice daily) and fresh leaf paste applied externally 2–3 times daily are common for skin conditions and wounds, whereas root decoction (30–60 ml) is used occasionally for mild diuretic purposes, all typically limited to 7–21 days. Toxicological studies indicate a wide safety margin, with no mortality or major behavioral changes in animals up to 2000 mg/kg body weight, suggesting low risk at therapeutic doses, although excessive intake may cause mild gastrointestinal upset due to saponins and tannins. Use is generally avoided during pregnancy and breastfeeding because of insufficient safety data, and caution is advised in young children, individuals with severe renal disorders, or those taking diuretics or antihypertensive drugs; rare contact allergies may occur, so topical preparations should be patch-tested and prolonged use beyond four weeks undertaken only under professional guidance¹²⁴.



Mussaenda frondosa is generally considered safe at therapeutic doses, with side effects being mild and infrequent; excessive internal use may cause gastrointestinal discomfort such as nausea, abdominal cramps, or loose stools due to its saponin- and tannin-rich composition. Topical application of fresh leaf paste may occasionally lead to contact dermatitis, presenting as localized redness, itching, or rash in sensitive individuals, which usually subsides after discontinuation; therefore, a patch test is recommended before use. Systemic allergic reactions are rare but may include mild swelling or urticaria in hypersensitive persons. The plant is contraindicated during pregnancy and breastfeeding because of insufficient safety data and possible uterine effects, and should be avoided in children below six years of age and in individuals with severe kidney or liver disorders due to its mild diuretic action. Caution is

also advised when used alongside diuretics or antihypertensive medications, as it may enhance hypotensive or electrolyte-lowering effects, and prolonged continuous use beyond four weeks should only be undertaken under qualified Ayurvedic supervision¹²⁵.

Growing conditions

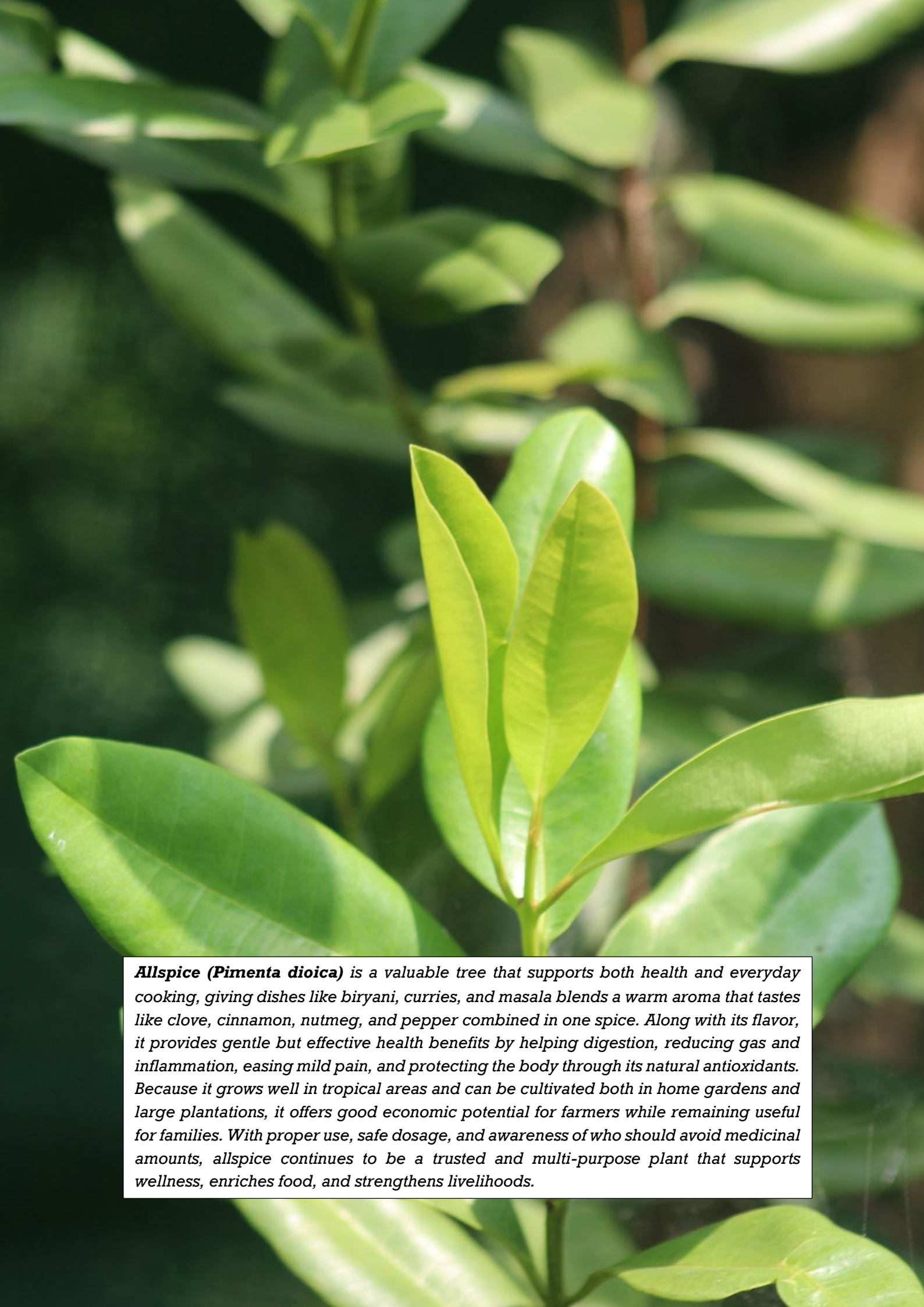
Mussaenda frondosa grows best in warm, moist tropical to subtropical regions, preferring temperatures between 18–32°C and high humidity, with good flowering during the monsoon and post-monsoon seasons; it does not tolerate frost or prolonged drought. The plant thrives in fertile, well-drained loamy or clay-loam soils rich in organic matter, with a slightly acidic to neutral pH (about 5.5–7.0), while waterlogged or very heavy clay soils hinder healthy growth. It performs well in partial shade to full sun, with morning sunlight being ideal, and is naturally suited to sheltered garden sites, forest margins, or rocky

slopes where it can grow as an understory shrub or climb with light support, protected from strong winds.

Cultivation

Dhobi Tree can be easily grown in home gardens, balconies, or as hedges using large pots (20–30 litres) or open garden beds. It grows best in loamy soil mixed with about 40% compost or farmyard manure (pH 5.5–7.0). Propagation is most successful through semi-hardwood cuttings (10–15 cm long) taken during June to August, which root within 3–4 weeks under moist conditions; seed propagation is also possible but slower. Young plants should be transplanted at 1–1.5 m spacing in partial shade with morning sunlight, watered regularly during the first month, and mulched to retain soil moisture. Monthly fertilization during the flowering season and pruning after flowering help maintain bushy growth. The plant tolerates light frost and requires minimal pest management, making it ideal for Bihar’s climate, where it produces attractive white bracts during the monsoon¹²⁶.

For commercial purposes, Dhobi Tree is cultivated mainly as an ornamental plant on 0.5–2 hectares in humid tropical regions such as Kerala and Bihar. Well-drained acidic loam soil with good organic matter supports healthy growth, and plants are spaced about 1.5 × 1.5 m apart. Nursery-raised cuttings are transplanted during the rainy season for better establishment, followed by regular irrigation and balanced fertilization to enhance flowering. Pruning twice a year improves plant shape and yield of bracted shoots. The crop is low-input, pest-tolerant, and profitable, with bracted plants sold through nurseries and landscape markets, making it suitable for small-scale commercial growers¹²⁶.



Allspice (*Pimenta dioica*) is a valuable tree that supports both health and everyday cooking, giving dishes like biryani, curries, and masala blends a warm aroma that tastes like clove, cinnamon, nutmeg, and pepper combined in one spice. Along with its flavor, it provides gentle but effective health benefits by helping digestion, reducing gas and inflammation, easing mild pain, and protecting the body through its natural antioxidants. Because it grows well in tropical areas and can be cultivated both in home gardens and large plantations, it offers good economic potential for farmers while remaining useful for families. With proper use, safe dosage, and awareness of who should avoid medicinal amounts, allspice continues to be a trusted and multi-purpose plant that supports wellness, enriches food, and strengthens livelihoods.

Allspice / Jamaican Pepper Plant (*Pimenta dioica*) पंच मसाले का पौधा

Allspice (*Pimenta dioica*), known in Hindi as कबाब चीनी (Kabab Chini) or पंच मसाले का पौधा (Panch Masale ka Paudha), is an evergreen aromatic tree that originally comes from the Caribbean but now grows well in the warm, humid regions of South India like Kerala, Tamil Nadu, and Karnataka. The tree grows 10–20 meters tall and has smooth gray bark, shiny dark-green leaves, and a strong spicy smell that comes out when the leaves are crushed similar to a mix of clove, cinnamon, nutmeg, and pepper¹²⁷. During the rainy season, the tree produces small white flowers that later turn into round green berries; these berries are picked while unripe and dried to make the spice called allspice or pimento. The dried fruits contain natural essential oils, mainly eugenol, which give them their special fragrance and also make them useful in traditional healing. In Indian cooking, allspice is added to garam masala, biryani, pickles, and meat dishes, while in Ayurveda it is valued for helping digestion, reducing gas, relieving pain, and improving overall wellness.



Traditional Significance

Allspice (*Pimenta dioica*) is a tropical evergreen tree that was introduced to India from the Caribbean and now grows very well in regions like Kerala (Idukki and Wayanad), the hill areas of Tamil Nadu, and the plantations of Coorg in Karnataka. These places provide the ideal climate of high rainfall, good humidity, and moderate altitude. After about seven to ten years of growth, a mature tree can produce around 6–12 kilograms of dried berries each year, along with two to three kilograms of leaves used for extracting essential oil. The unripe berries are dried to create the spice known as allspice or pimento, which has a natural flavor combining clove, cinnamon, nutmeg, and pepper. Because of this unique taste, allspice is widely used in garam masala, biryani masala, kormas, vindaloo, pickles, and baked foods. The leaves also act as a substitute for bay leaves in rice dishes. The essential oil, mainly made of eugenol, is used in soaps, perfumes, toothpaste, and medicines. In Ayurveda, allspice is considered warming and light, helping in digestion, reducing gas, relieving stomach pain, improving appetite, and easing joint stiffness. In some places, the bark is used in decoctions for cough and diarrhea. Although Jamaica is the largest world producer, Indian cultivation is steadily increasing because of good market demand and steady yearly production¹²⁸.

Allspice grows into a medium to large evergreen tree with a round, balanced canopy that may spread up to 8–12 meters. The bark is smooth and grayish-silver and sometimes peels in thin layers to show a reddish inner surface. The branches are covered with opposite leaves that are thick, shiny, smooth, and dark green on the top side, while lighter and slightly glaucous on the underside. Each leaf is around 7–20 centimeters long and releases a strong spicy fragrance when crushed because of the small oil glands inside it. The tree produces many small white flowers arranged in loose clusters, and male and female flowers grow on separate trees. These flowers gradually develop into clusters of green berries that turn reddish and finally dark purple or brown when fully ripe. Each berry is small, round or slightly oval, and contains one or two hard brown seeds. For making the spice, the berries are harvested when they are still

greenish, as this stage contains the highest amount of essential oil. During drying, the fruits shrink, turn brown, become wrinkled, and become the familiar allspice used in cooking and herbal preparations¹²⁸.

Medicinal Benefits

Allspice (*Pimenta dioica*) offers several health benefits because its berries and leaves contain eugenol and other natural compounds that support digestion, reduce inflammation, and stop the growth of harmful germs. It is commonly used to ease indigestion, gas, bloating, stomach cramps, and mild diarrhea, and it also helps improve appetite by stimulating digestive juices. Its warming and pain-relieving effects can reduce joint pain, arthritis stiffness, muscle aches, tension headaches, and mild nerve pain, while warm compresses or diluted oil are used for sprains and chest congestion. The antibacterial and antifungal activity of allspice makes it helpful for sore throat gargles, minor mouth infections, toothache relief, and reducing the risk of wound infection. Its strong antioxidants protect the body from cell damage and may support heart health, liver function, and healthy blood sugar levels¹²⁹. Although these benefits are supportive and should not replace proper medical treatment, regular use in small amounts can contribute to overall wellness.



Allspice is generally safe when used in normal food amounts, such as 3–5 whole berries or about 0.5–2 grams of ground spice per day, and one or two fresh leaves used like bay leaves. For medicinal use, a small dose of 0.5–1 gram of powdered berry (about $\frac{1}{4}$ – $\frac{1}{2}$ teaspoon) taken once or twice a day with warm water or honey can support digestion and reduce mild pain, but the total amount should not exceed 3 grams per day¹³⁰. A mild herbal tea or decoction made by boiling the berries can be taken in small quantities, while the essential oil should only be used externally in very diluted form because it is strong and concentrated. Allspice is safe for most people, but high doses may cause mild stomach irritation in sensitive individuals. Because eugenol can slow blood clotting, people taking blood-thinning medicines, those with bleeding disorders, or anyone preparing for surgery should avoid using it in medicinal amounts. Pregnant and breastfeeding women should use only small culinary

quantities, not medicinal doses, and children under six should not take it as a remedy. People with severe liver or kidney problems should be cautious. When used in normal food quantities, allspice is safe for most people and fits well into everyday cooking¹³⁰.

Allspice is generally safe when used in normal cooking amounts, but taking larger medicinal doses can sometimes cause mild stomach problems such as nausea, heartburn, or loose stools because of its strong eugenol content. A few people may experience allergic reactions, including skin irritation, redness, or itching when the essential oil is applied without proper dilution, and those sensitive to clove or cinnamon may show similar reactions due to cross-sensitivity. Undiluted oil can cause burning on the skin or numbness in the mouth, so it should always be used carefully. Because eugenol can slow blood clotting, allspice should be avoided by people taking blood-thinning medicines like warfarin or aspirin, those with bleeding disorders, or anyone scheduled for surgery¹³¹. It should not be used in medicinal amounts during pregnancy or breastfeeding, and it is not recommended for children under six years

old or for individuals with serious liver or kidney problems. When used wisely and in small culinary quantities, it remains safe for most people.

Growing Conditions

Allspice grows best in warm tropical and subtropical climates with temperatures between 18°C and 30°C, and it can tolerate a minimum of around 10°C and a maximum of about 35°C. It needs high humidity and plenty of yearly rainfall, ideally between 1500 and 2500 mm, evenly spread throughout the year. The tree is sensitive to frost, which is why it grows well in the hill regions of Kerala and similar environments. It prefers deep, fertile soil that drains well, such as loam or clay-loam, with a slightly acidic to neutral pH of 5.5 to 7. Sandy soil can also be used if enough organic matter is added, but heavy clay or waterlogged areas should be avoided. Allspice can grow in full sunlight but also does well in light shade. For best fruit production, it is ideal to plant it on slopes or well-raised areas with good wind protection so that the flowers and young fruits do not get damaged¹³².

Cultivation

Allspice can be grown at home in warm tropical climates either in the ground or in large pots of about 30 to 50 liters. For best growth, use deep, loose, fertile soil mixed with about 30 percent well-rotted compost or cow dung, with a pH between 6 and 7. The plant can be grown from seeds or cuttings. Fresh seeds should be soaked in water for 24 hours and then sown about 1 centimeter deep in a mixture of sand and soil (1:1). Seeds usually sprout in 3 to 8 weeks when kept warm at around 25–30°C. Semi-hardwood cuttings of 10–15 centimeters can also be rooted successfully if dipped in rooting hormone and kept in moist conditions. Once seedlings reach 30–40 centimeters tall, they can be transplanted outdoors at a distance of 3–4 meters between plants in full sunlight or partial shade. Young plants need moderate watering to keep the soil moist but not soggy; older plants tolerate some dryness¹³³. Apply compost or fertilizer three to four times a year during the growing season and prune lightly to maintain shape. Berries can usually be harvested from the fourth or fifth year. The plant is naturally resistant to many pests, though occasional scale or mealybugs can be controlled with neem spray. In cooler northern parts of India, allspice can be grown indoors or in a greenhouse if humidity is maintained.

Commercial allspice cultivation is suitable for areas that receive good rainfall and have deep red or loamy soil. Plantations are usually established at 200–400 trees per hectare in regions like Kerala, Wayanad, and Coorg, where the altitude ranges from 500 to 1200 meters. Seedlings are first grown in nursery beds and later transplanted into pits of about 60 × 60 × 60 centimeters that have been filled with organic manure. Trees should be spaced 3–4 meters apart to allow room for their wide canopy. During the early years, farmers often intercrop with ginger or other shade-loving plants to make good use of space. Drip irrigation is used during dry months, supplying about 20–40 liters of water per tree each week. Fertilizers are given in small portions throughout the year, along with regular application of farmyard manure. Light pruning helps sunlight reach the lower branches and improves fruiting. The berries are harvested while still green, mainly from October to December, starting from the fifth year onward. Young trees give around 5–15 kilograms of dried berries per year, and older, well-managed trees can produce much more. After harvesting, berries are sun-dried for a few days until they turn hard and brown. Essential oil extracted from the dried berries is also a valuable product. With good management and steady market demand, allspice farming can provide strong returns to farmers. Common pests like aphids or fruit flies are managed through integrated pest control practices¹³³.



Night Jasmine (*Nyctanthes arbor-tristis*) पारिजात / हरकर्तृगार पौधा

Night Jasmine (*Nyctanthes arbor-tristis*), known in Hindi as पारिजात or हरकर्तृगार, is a small tree or large shrub that grows 3–10 meters tall and is commonly found across tropical and subtropical parts of India from the Himalayan foothills to Kerala. It is famous for its beautiful, sweet-scented white flowers with an orange center that bloom at night and fall to the ground by morning like a soft carpet, which is why people call it the “sad tree” or the “tree that blooms in the night.” The tree has rough, dark green leaves that grow opposite each other on square-shaped young branches, and its flowers appear in small clusters mainly during the rainy and early winter months. After flowering, it produces flat, round fruits that contain two seeds.



The plant has an important place in Ayurveda, where its leaves, flowers, and seeds are used to reduce fever, joint pain, arthritis, constipation, and certain skin problems due to the presence of natural healing compounds. Night Jasmine is also respected in Indian mythology and is often planted in home gardens, temples, and parks for its fragrance, beauty, and medicinal value¹³⁴.

Traditional Significance

Night Jasmine (*Nyctanthes arbor-tristis*), known as Parijat or Harsingar in Hindi, is a well-loved sacred plant in India and has been mentioned in mythology, folklore, and traditional healing practices for centuries. It grows naturally in the foothills of the Himalayas, across the plains of Bihar, and down into the forests of central and southern India. Many people plant it near temples and homes because its night-blooming flowers are believed to have divine origins. In Ayurveda, different parts of the plant—especially the leaves, flowers, bark, and seeds—are used to help reduce fever, joint pain, arthritis, sciatica, digestive problems, constipation, and certain skin conditions. Modern research also supports its traditional uses, showing that the plant contains helpful natural compounds like iridoids, flavonoids, and phenolics that reduce inflammation, lower fever, and support the immune system. Because of its cultural importance and medicinal usefulness, Night Jasmine continues to be valued in Indian households, gardens, and herbal medicine¹³⁵.

Night Jasmine is a medium-sized, deciduous shrub or small tree that usually grows 3 to 10 meters tall with a spreading shape. Its bark is grayish-brown and may peel in thin pieces, while the young branches are green, slightly hairy, and have a square-like shape. The leaves grow opposite each other and are rough and dark green on the top, softer and hairy underneath, and have clearly visible veins. The tree produces small clusters of highly fragrant flowers that open at night. Each flower has a slender, bright orange tube and five to eight white petals arranged like a pinwheel. These blossoms fall to the ground by early morning, creating a beautiful carpet of white and orange. Flowering usually happens from August to November. After flowering, the plant develops flat, round, two-lobed fruits that turn straw-colored when dry. Each fruit splits open to release one seed from each half. The

combination of its night-blooming flowers, unique shape, and pleasant scent makes Night Jasmine an attractive and easily recognizable plant in Indian gardens¹³⁶.

Medicinal Benefits

Night Jasmine (*Nyctanthes arbor-tristis*) is widely valued in Ayurveda for its ability to reduce joint pain, swelling, and stiffness, especially in conditions like arthritis, gout, and sciatica. The leaves and flowers contain natural compounds that help lower inflammation and provide relief from pain when taken as fresh juice, tea, or decoction. The plant is also known for its strong fever-reducing properties and is used traditionally to manage recurring fevers, including those associated with malaria. Its leaf and seed extracts show antimicrobial and antiparasitic effects, helping fight bacteria, fungi, and intestinal worms, making it useful for minor skin infections and digestive disturbances. The plant acts as a gentle laxative, helping relieve constipation and soothe the stomach. It also supports the immune system, improves respiratory comfort in cough, asthma, and bronchitis, and protects the liver from damage caused by toxins or medicines. Research has shown that Night Jasmine has antioxidant activity, may help control blood sugar, supports wound healing, and even shows early signs of anticancer and neuroprotective effects in laboratory studies. These combined benefits make Parijat an important and multipurpose medicinal plant in traditional Indian households¹³⁷.



Night Jasmine is generally safe when used in traditional Ayurvedic amounts, mainly through its leaves and flowers. A small daily dose of fresh leaf juice, about 5–20 ml, is commonly used for conditions like sciatica, joint pain, and fever. A decoction made by boiling 20–30 grams of leaves or flowers in water until reduced can be taken in doses of 30–60 ml twice a day for arthritis and inflammation¹³⁸. The powdered leaves or flowers can be taken in quantities of 1–3 grams a day with warm water or honey for digestive support, pain relief, or mild constipation. Fresh leaf paste can be applied directly on the skin two to three times a day for minor wounds or rashes. Seed powder is used in very small amounts, usually under 500 mg per day, mainly for hair-related problems. Most studies show the

plant is safe when used correctly, but taking too much may cause mild stomach discomfort. It should be avoided during pregnancy and breastfeeding due to limited safety data, and it is not recommended for children under five or for people with severe kidney problems. Long-term or high-dose use should only be done under proper guidance. When taken responsibly, Parijat is safe and effective for short-term use¹³⁸.

When used in normal traditional amounts, Parijat usually does not cause problems for most people, but taking higher doses than recommended can lead to mild stomach discomfort such as nausea, loose stools, or cramps¹³⁹. A few individuals may experience skin irritation when applying fresh leaf paste, so it is better to test a small area first before using it on larger parts of the skin. Because the plant has a naturally cooling effect, it may not suit people who already have very low body temperature or feel cold easily. Its medicinal use should be avoided during pregnancy and breastfeeding due to limited safety data, and it is not recommended for young children under five or for people with severe kidney issues.

Seed preparations should be used carefully because excessive amounts may cause slight drowsiness or interact with sedative medicines. When used properly and within safe limits, Parijat remains a well-tolerated herbal remedy for adults¹³⁹.

Growing conditions

Night Jasmine grows well in warm tropical and subtropical climates where temperatures stay between 15°C and 35°C. It cannot tolerate frost and may get damaged if temperatures drop below 5°C. The plant prefers areas that receive moderate to high rainfall, around 1000–2000 mm a year, with humidity levels of about 60–80 percent. It usually flowers best after the monsoon season when the weather becomes slightly dry¹⁴⁰. Night Jasmine can adapt to many soil types, including loamy, sandy, or slightly rocky soils, as long as the soil drains well and does not stay waterlogged. A soil pH between 6.0 and 8.0 is suitable. Although it can grow in poorer soils, it performs better in fertile ground enriched with organic matter. The plant can be placed in full sunlight or partial shade, and it grows well along boundaries, in open gardens, near temples, and in hedges where it receives good light and air circulation¹⁴⁰.

Cultivation

Night Jasmine can be grown at home from both seeds and cuttings. For seeds, collect mature pods, soak the seeds in warm water for 12–24 hours, and sow them during spring or monsoon about 0.5 cm deep in a mix of sand, soil, and compost. Seeds germinate in 2–4 weeks if kept warm at 25–30°C. Once the seedlings reach 5–10 cm, they can be moved to bigger pots. Cuttings can also be used by taking 10–15 cm semi-hardwood pieces during the rainy season, dipping them in rooting hormone, and placing them in moist cocopeat or perlite under shade until they root in about 20–30 days. For pot growing, use 20–30 liter terracotta pots with a soil mixture of garden soil, compost, sand, and vermicompost. Keep the plant in a sunny place with 6–8 hours of light daily. Water when the top soil becomes dry and feed monthly with compost. During flowering season, use a mild fertilizer to encourage more blooms. Prune the plant after flowering to maintain shape and remove dry branches. Common pests like aphids or mealybugs can be controlled with regular neem oil spray. Repot the plant every two years for healthy growth¹⁴¹.

For commercial farming, Night Jasmine grows well in warm regions with loamy or sandy loam soil and good drainage. Plantations are usually set up during the monsoon using pits of 60 × 60 × 60 cm and spacing of 2 × 2 meters, giving about 2500 plants per hectare. Before planting, each pit is filled with organic manure, neem cake, and some superphosphate. Drip irrigation is used in dry months, supplying 5–10 liters of water per plant per day. Mulching with straw helps conserve moisture. Light pruning every February keeps plants at about 1.5 meters height and promotes more branches, flowers, and better leaf growth. Leaves can be harvested 2–3 times per year, and flowers are collected daily early in the morning between September and December. Seeds are harvested from May to June. Mature plants from the third year onward give good yields and income through leaves, flowers, and nursery saplings. Intercropping with ginger or marigold in the first two years increases profit, and healthy planting stock can be produced through micropropagation for large-scale cultivation¹⁴¹.



***Tamilnadia uliginosa* (पिण्डारिया)** is a hardy dryland plant that offers strong traditional healing benefits. Its unripe fruits help control diarrhea and stomach infections, while the leaves and roots support skin healing, cough relief, and joint comfort. Scientific studies confirm its anti-inflammatory and antimicrobial actions. The plant grows easily in full sun with very little care and gives good yields even in poor soils. With safe use, it becomes a valuable natural resource connecting tribal knowledge with practical herbal wellness.

Tamilnadia (*Tamilnadia uliginosa*) पिण्डारिया / पिरार पौधा

Tamilnadia uliginosa, known in Hindi as पिण्डारिया or पिरार and often called Divine Jasmine, is a small deciduous tree that grows about 6–7 meters tall in the dry forest regions of Tamil Nadu, Maharashtra, Karnataka, and Odisha. It has thorny branches, shiny rounded leaves, sweet-scented white flowers, and yellow round fruits. In Ayurveda, the plant is known as Pindara and is considered cooling, light, and strengthening. Its unripe fruits are a traditional remedy for diarrhea, dysentery, intestinal worms, and digestive infections, while roasted fruit ash and fruit mixed with honey are used for boils and headaches. The roots are used as a cooling tonic for urinary problems and excess bile, and the leaves are applied for skin diseases, wounds, cough, asthma, and joint pain. The tree's bark shows antimicrobial activity, and its parts have been used traditionally as insect repellent, fish poison, and even a natural hair tonic. Because it grows easily in hot, dry areas with very little care, *Tamilnadia* remains an important but underused medicinal plant that connects tribal knowledge with modern herbal science.



Traditional Significance

Tamilnadia uliginosa grows naturally in the dry deciduous forests and scrublands of southern and central India, especially in regions of Tamil Nadu, Kerala, Karnataka, Maharashtra, Odisha, and Madhya Pradesh at low elevations. For many generations, tribal communities have used this tree as a multipurpose medicinal resource. The unripe fruits were traditionally given for diarrhea, dysentery, cholera, and stomach infections because of their strong astringent nature, while the roots were prepared as a cooling diuretic for urinary problems and excess bile. Leaves were crushed into poultices for wounds, joint pain, swelling, and skin infections, and the bark was sometimes used to stun fish or repel insects. In Ayurveda, the plant is described as having cooling and strengthening properties, and recent studies support its antimicrobial action, especially against harmful bacteria linked to dental and digestive issues¹⁴².

Tamilnadia uliginosa is a small tree or large shrub belonging to the Rubiaceae family, usually growing 3–7 meters tall with a compact, thorny canopy. It has rough grey-brown bark and branchlets armed with paired spines about 1–2 cm long. The leaves grow in opposite pairs and are glossy, elliptic to obovate, measuring around 3–10 cm in length. The plant produces clusters of fragrant white tubular flowers after the monsoon, mainly from October to February. These flowers develop into round berries about 1.5–2.5 cm wide, turning yellow and later black as they ripen, each containing several seeds within soft pulp. The tree is drought-tolerant due to its strong taproot system and yields sweet-sour edible fruits when ripe, while the unripe fruits remain astringent and medicinal. The wood is hard and yellowish, making the plant sturdy in dry and harsh climates¹⁴³.

Medicinal Benefits

Tamilnadia uliginosa offers a wide range of traditional healing uses, especially through its fruits, leaves, and roots. The unripe fruits are strong astringents and are commonly used to control diarrhea, dysentery, cholera, and intestinal infections; they may be taken as raw extract, roasted fruit ash, or mixed with honey to expel worms. Fruit pulp is applied on boils and pimples, and a boiled fruit drink is sometimes used early in the morning to relieve migraine. When ripe, the fruits become sweet and cooling and act as a gentle diuretic and strengthening tonic. The leaves, usually boiled to make a decoction or applied as a paste, help with skin diseases, ulcers, wounds, joint pain, rheumatism, cough, asthma, bronchitis, fever, colic, and continuous sneezing. The roots are valued as a cooling diuretic and are also used for biliousness and children's skin boils. Additional benefits include antimicrobial action from the bark, essential oil from the flowers, and hair-strengthening properties from the fruit juice, which is used for dandruff and lice. Overall, the plant shows anti-inflammatory, deworming, and anti-poison activity, supporting many of its traditional uses in rural and Ayurvedic medicine¹⁴⁴.



Tamilnadia uliginosa is considered safe in traditional Ayurvedic use, with studies showing no harmful effects at normal doses. Unripe fruits are usually taken in small amounts of about 1–3 grams per day, either raw, as roasted fruit ash, or mixed with honey or sugar for diarrhea, dysentery, cholera, and intestinal worms. Leaf decoction, prepared by boiling 10–20 grams of leaves in water, can be taken 20–50 ml twice daily for cough, joint pain, skin problems, and fever. Root powder or root decoction in doses of 3–6 grams is used for urinary issues, excessive bile, and as a mild diuretic. These remedies should be taken at least 30 minutes after allopathic medicines to avoid possible interactions. The plant should not be used during pregnancy or breastfeeding because of its strong astringent

effect, and it is not recommended for children under five years old or people with kidney problems without proper guidance. Excess use may increase bodily “coolness,” so it should be avoided in individuals with extreme Pitta imbalance or very cold body conditions¹⁴⁵.

Tamilnadia uliginosa is generally considered safe in traditional use and has shown no harmful effects in animal studies, but taking very large amounts may cause mild digestive discomfort such as constipation or nausea due to its strong astringent and cooling nature. Allergic reactions are uncommon, though a few people may experience slight itching or redness when leaf sap touches the skin, so a small patch test is recommended before applying it widely¹⁴⁶. The plant should not be used during pregnancy or breastfeeding because unripe fruits may act as a mild uterine stimulant. It is also not suitable for children under five years old, people with severe kidney problems, or individuals with extreme Pitta imbalance, as its cooling effect may worsen their condition. Because the bark and fruit can be toxic to fish, internal use should be limited to short periods under guidance, and it should not be combined with strong sedatives or laxatives, as it may increase their effects¹⁴⁶.

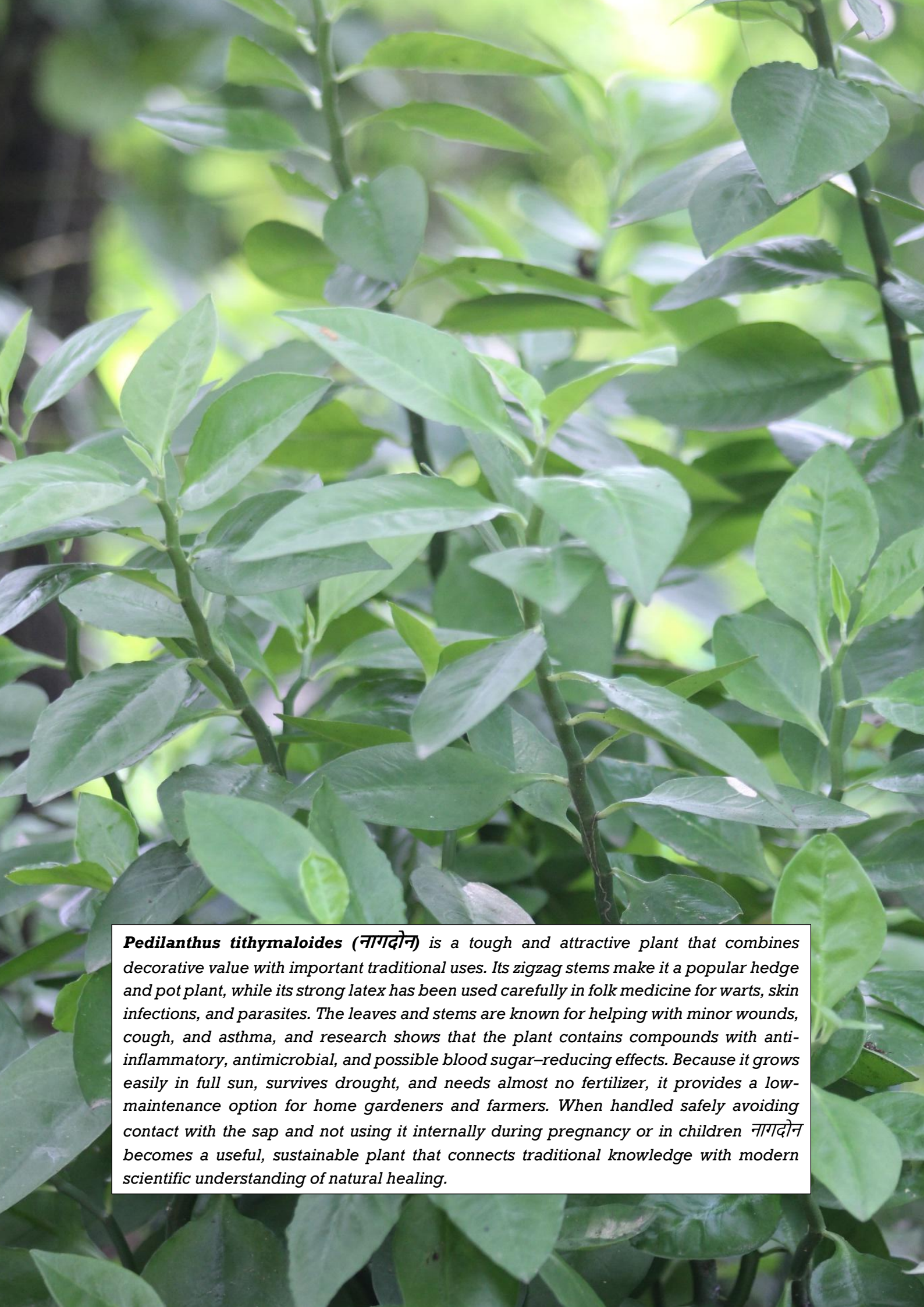
Growing Conditions

Tamilnadia uliginosa grows best in warm tropical and dry climates where daytime temperatures stay between 25°C and 35°C and nights remain above 10°C. It needs moderate rainfall of about 800–1500 mm a year and grows well in areas with 50–70 percent humidity. The plant becomes leafless during long summer droughts and starts flowering mainly after the monsoon, from October to February. It prefers sandy or loamy soil that drains well, with a pH between 6 and 8, and can even survive in rocky or slightly calcareous soils where many other plants struggle. *Tamilnadia* likes full sunlight and open spaces and is sensitive to frost. Its strong taproot system makes it well-suited for dry scrublands and low-maintenance cultivation¹⁴⁷.

Cultivation

Tamilnadia uliginosa can be grown at home from either seeds or cuttings. Fresh ripe fruits should be cleaned, the seeds soaked for 24–48 hours, and then sown 1 cm deep in a sand–soil mix during spring or the monsoon. Seeds usually sprout in 3–6 weeks under warm, slightly shaded conditions. Semi-hardwood cuttings taken during the rainy season also root well when dipped in rooting hormone and placed in moist cocopeat or perlite for 4–8 weeks. After seedlings reach 30–45 cm, they can be transplanted into 30–50 liter pots or directly into the ground using a mix of loam, compost, and sand. The plant grows best in full sun for 6–8 hours daily and needs moderate watering—more during the first year and much less once established, as it becomes drought-tolerant. A monthly dose of compost or mild fertilizer supports healthy growth, and pruning in late winter helps maintain shape and remove thorny or dry branches. Pests like mealybugs and scale insects can be controlled with neem oil spray. Fruits are usually harvested from the second year onward, while leaves can be picked throughout the growing season¹⁴⁸.

Tamilnadia uliginosa is well suited for commercial dryland farming in regions of Tamil Nadu, Karnataka, and Maharashtra with good sunlight and well-drained soil. Plantations are generally established during the monsoon in pits of 60 × 60 × 60 cm at 3 × 3 meter spacing, giving about 1100 plants per hectare. Each pit is enriched with farmyard manure, neem cake, and basic fertilizers before planting. The crop performs well under rainfed conditions but benefits from supplemental drip irrigation during summer, supplying 10–20 liters of water per plant a few times weekly. Light pruning after fruiting encourages bushy growth and increased leaf and fruit production. Intercropping with short-duration pulses or herbs in the first two years helps improve soil health and farm income. Unripe medicinal fruits are harvested in summer, giving about 1–2.5 tons per hectare, while leaves can be harvested two or three times a year with yields of 2–4 tons per hectare. Fruits are shade-dried and sold to herbal and pharmaceutical buyers, often earning ₹2–4 lakh per hectare from the third year onward. The plant also serves as a hardy thorny live fence and helps prevent soil erosion in dry areas¹⁴⁸.



***Pedilanthus tithymaloides* (नागदोन)** is a tough and attractive plant that combines decorative value with important traditional uses. Its zigzag stems make it a popular hedge and pot plant, while its strong latex has been used carefully in folk medicine for warts, skin infections, and parasites. The leaves and stems are known for helping with minor wounds, cough, and asthma, and research shows that the plant contains compounds with anti-inflammatory, antimicrobial, and possible blood sugar-reducing effects. Because it grows easily in full sun, survives drought, and needs almost no fertilizer, it provides a low-maintenance option for home gardeners and farmers. When handled safely avoiding contact with the sap and not using it internally during pregnancy or in children नागदोन becomes a useful, sustainable plant that connects traditional knowledge with modern scientific understanding of natural healing.

Pedilanthus (*Euphorbia tithymaloides*) नागदोन पौधा

Pedilanthus (*Euphorbia tithymaloides*), commonly known in Hindi as नागदोन or नागडोन पौधा and popularly called Devil's Backbone or Zigzag Plant, is a semi-succulent ornamental shrub recognized for its unique zigzag stems and fleshy green leaves. It usually grows 1–2 meters tall and produces a milky white latex throughout its stems and leaves, as well as bright red or pink slipper-shaped flowers at the tips of its branches. Although originally native to tropical parts of the Americas, it is now widely grown in India especially in Tamil Nadu, Kerala, and the Andaman regions as a decorative hedge along boundaries, since animals avoid eating it due to the irritating latex. The plant thrives in hot, dry to subtropical climates and requires very little care, making it popular in home gardens. In traditional folk medicine, small controlled amounts of latex have been used externally for removing warts and treating skin infections, while leaf pastes are applied for worms, swellings, and minor wounds. However, because the latex is caustic and toxic, any medicinal use must be done with extreme caution and only under expert guidance¹⁴⁹.



Traditional Significance

Pedilanthus tithymaloides (नागदोन पौधा), often grouped under *Euphorbia tithymaloides*, originally comes from the dry tropical regions of the Americas but has become widely naturalized across India, especially in the Andaman Islands, Kerala's coastal areas, Tamil Nadu's dry zones, and urban gardens. It is commonly planted as a hardy, drought-tolerant hedge because its milky latex deters cattle and goats. Over time, the plant has gained popularity not only for its ornamental zigzag stems and colorful bracts but also for its traditional medicinal applications. Folk healers mainly use the latex externally for removing warts and corns, apply leaf paste on wounds and worm-infested skin, and sometimes use stem preparations for asthma, swelling, and infections. Modern research supports some of these uses by identifying antimicrobial, anti-inflammatory, and antiparasitic effects linked to compounds such as triterpenes, diterpenes, and flavonoids. However, because the latex is highly irritant and potentially toxic, all medicinal applications require strict caution and expert supervision¹⁴⁹.

Pedilanthus tithymaloides is a semi-succulent subshrub of the Euphorbiaceae family, typically growing 0.6–2.5 meters tall with distinctive zigzag stems that may stand upright or hang slightly. The stems are fleshy, green when young, and become brown with age. Leaves grow in opposite or nearly opposite pairs, usually elliptic to oblong, 4–10 cm long, glaucous green, and often shed during dry seasons. At the tips of the stems, the plant produces unique slipper-shaped cyathia surrounded by bright red, pink, or yellow bracts, giving the plant a decorative appearance. These structures contain tiny true flowers followed by small, three-seeded capsules that split open forcefully when mature. The entire plant contains sticky milky latex that is irritating to the skin and eyes. It is drought-

tolerant, often becoming leafless in summer, and flowers year-round in humid tropical areas, with peak blooming after the monsoon. Several variegated forms are grown as ornamental plants due to their attractive patterned leaves¹⁴⁹.

Medicinal Benefits

Pedilanthus tithymaloides (नागदोन) has been traditionally valued for several external and internal medicinal uses, mainly due to its strong, enzyme-rich milky latex and bioactive compounds like diterpenes, triterpenes, and flavonoids. The latex is applied externally in folk medicine for thick skin conditions such as warts, corns, and calluses, and is sometimes diluted and used for fungal infections like ringworm and scabies, as well as for soothing insect bites and minor skin irritations. The leaves and stems are considered safer and are used as decoctions for cough, asthma, bronchitis, throat inflammation, and mouth ulcers, while leaf paste is commonly applied to wounds and swellings because studies show it can speed up healing and reduce inflammation. Research also indicates that plant extracts may have anthelmintic effects against worms, as well as antimicrobial, anti-inflammatory, antioxidant, and blood sugar-lowering properties, along with possible activity against malaria and tuberculosis in experimental models. However, the latex and roots can be very irritating and toxic when taken internally, so any medicinal use must be done carefully and only under expert supervision¹⁴⁹.



Pedilanthus tithymaloides (नागदोन) should be used with great caution because its milky latex is naturally irritating and can cause strong reactions. In traditional practice, small external applications of diluted latex are used for warts and certain skin infections, but modern safety guidelines warn against applying it near the eyes, mouth, or broken skin. Leaves are considered safer and are sometimes used as mild decoctions for respiratory or skin conditions, but internal use of latex, roots, or concentrated extracts is strongly discouraged due to reports of possible liver and kidney toxicity in animal studies¹⁵⁰. The plant must never be used internally during pregnancy, breastfeeding, childhood, or by people with gastrointestinal, liver, or kidney problems.

Individuals sensitive to Euphorbia plants may experience skin irritation or allergic reactions, so gloves and careful handling are recommended. Because the latex can be caustic and unpredictable, any medicinal use should only be done under trained Ayurvedic or medical supervision.

Pedilanthus tithymaloides (नागदोन) contains a very strong and irritating latex that can cause skin redness, itching, burning, blistering, and rashes, especially in people with sensitive skin or allergies to Euphorbia plants. The latex must never be taken internally, as it can trigger vomiting, severe abdominal pain, diarrhea, and may damage the liver and kidneys, as indicated in animal studies. Inhaling the vapors from fresh sap can also irritate the throat and may lead to coughing or breathing difficulty in sensitive individuals. The plant is strictly unsafe for use during pregnancy, breastfeeding, and in children, and should be avoided by people with digestive problems, liver or kidney disease, or bleeding disorders. External use must be done carefully avoiding contact with the eyes,

mouth, and open wounds and a patch test is recommended before wider application. Gloves should always be worn when handling the plant, and any accidental exposure should be washed off immediately with soap and water.

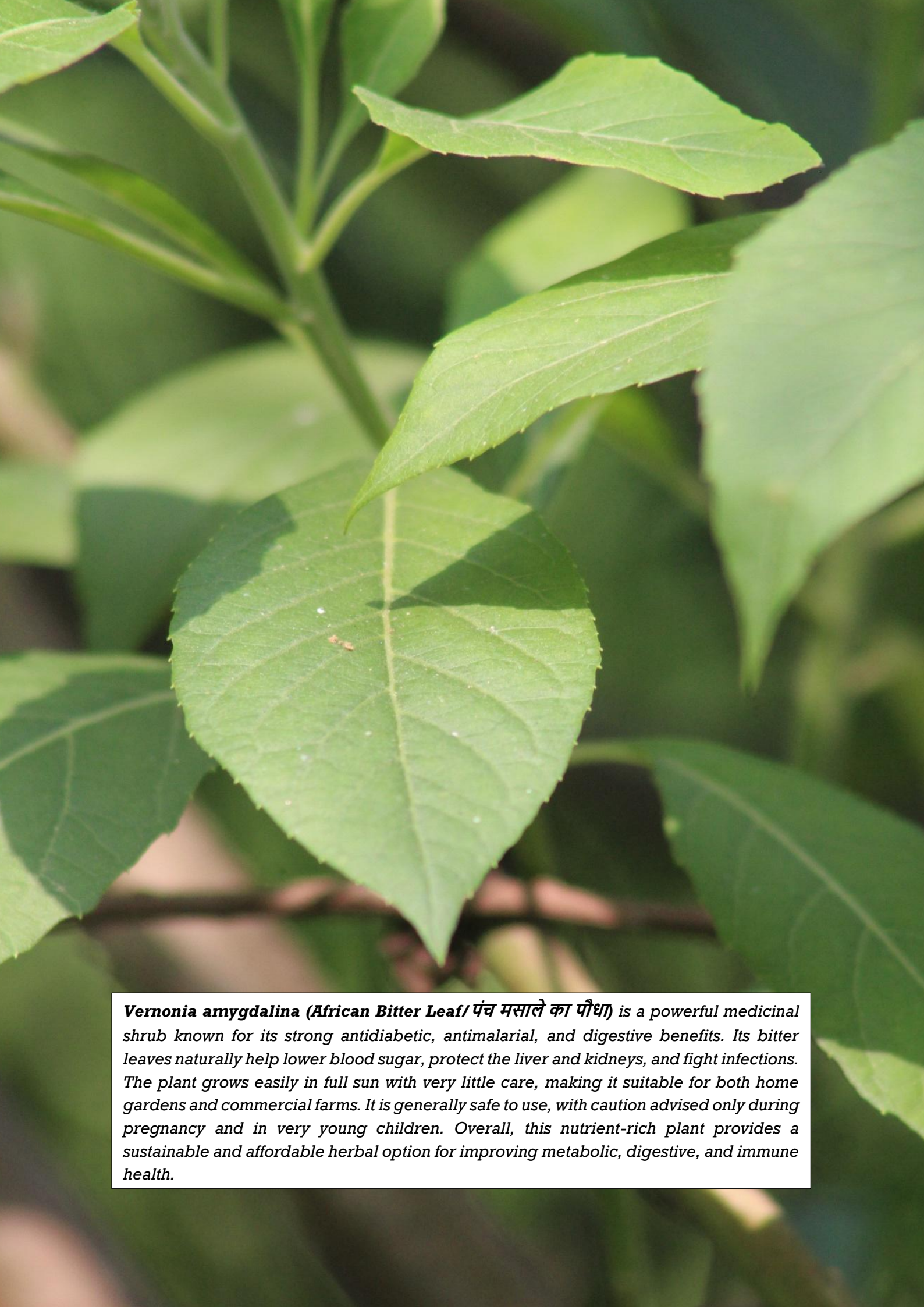
Growing conditions

Pedilanthus tithymaloides (नागदोन) grows best in warm tropical and subtropical climates, where daytime temperatures range from 20°C to 40°C and nights stay above 10°C. It tolerates low to moderate rainfall between 500–1500 mm and grows well in humidity levels of 40–70%. The plant naturally sheds its leaves during dry periods and can flower almost year-round, with peak blooming during and after the monsoon. It prefers sandy or loamy soil that drains well, with a neutral to slightly alkaline pH of 6.5–8.0, but can also survive in poor, rocky, or mildly saline soil. *Pedilanthus* thrives in full sunlight for 6–8 hours a day, making it suitable for hedges, boundary planting, and pots. It is wind-resistant and even tolerant of coastal conditions, making it a dependable drought-hardy ornamental plant¹⁵⁰.

Cultivation

Pedilanthus tithymaloides (नागदोन) is very easy to grow at home, mainly through stem cuttings. A 10–15 cm semi-hardwood cutting taken from the tip of a healthy stem can be left to dry for a day so that a callus forms at the cut end. This cutting can then be planted in a well-draining mix of sand and perlite or cocopeat, where it usually roots within 2–4 weeks without the need for rooting hormone. Seeds can also be used but are less common; they germinate in warm conditions within 10–20 days. The plant grows well in 20–30 cm pots or directly in the ground using sandy or loamy soil mixed with perlite or cocopeat to improve drainage. Full sunlight for at least 6–8 hours helps maintain the characteristic zigzag growth pattern and vibrant bracts. Watering should be minimal only when the top soil becomes dry because overwatering leads to root rot. The plant is naturally drought-hardy and needs little or no fertilizer. Occasional pruning after flowering helps shape the plant and maintain a neat 1–2 meter hedge. While handling, gloves should be worn because the milky sap is irritating, and mealybugs can be controlled with neem oil spray¹⁵¹.

For large-scale cultivation, *Pedilanthus tithymaloides* is used mainly for hedges and boundary fencing in dry and coastal regions of Tamil Nadu, Kerala, and the Andaman Islands. Farmers usually plant stem cuttings directly into the field during the monsoon at a spacing of 1–1.5 meters, allowing about 5000–8000 plants per hectare. The plant thrives in poor sandy or clay-loam soils with a pH of 6–8 and requires very little maintenance. Rainwater is often enough, with drip irrigation added only during very dry months. A small amount of farmyard manure is applied at planting, and the plant usually does not need regular fertilizers due to its drought tolerance. Annual pruning encourages dense growth, creating a strong natural fence that resists wind, salt spray, and grazing animals. Commercial returns mainly come from selling rooted cuttings or ornamental plants, often priced between ₹20–50 each. Beyond income, the species is valued for soil binding, erosion control, and forming low-cost, long-lasting barriers in harsh, saline, or rocky areas¹⁵¹.

A close-up photograph of the Vernonia amygdalina plant, showing several bright green, serrated leaves with prominent veins. The leaves are arranged in a cluster, and the background is a soft-focus green, suggesting a natural outdoor setting.

Vernonia amygdalina (**African Bitter Leaf/पंच मसाले का पौधा**) is a powerful medicinal shrub known for its strong antidiabetic, antimalarial, and digestive benefits. Its bitter leaves naturally help lower blood sugar, protect the liver and kidneys, and fight infections. The plant grows easily in full sun with very little care, making it suitable for both home gardens and commercial farms. It is generally safe to use, with caution advised only during pregnancy and in very young children. Overall, this nutrient-rich plant provides a sustainable and affordable herbal option for improving metabolic, digestive, and immune health.

African Bitter Leaf (*Vernonia amygdalina*) पंच मसाले का पौधा

Vernonia amygdalina, commonly known as African Bitter Leaf and referred to in Hindi as पंच मसाले का पौधा, is a hardy perennial shrub from the Asteraceae family that grows 2–7 meters tall and is originally native to tropical Africa. It has long, narrow, intensely bitter leaves (15–30 cm), small yellowish flower heads, and cotton-like seeds. The plant is highly valued in African traditional medicine for its powerful natural chemicals such as sesquiterpene lactones (vernoniosides), flavonoids, and alkaloids, which give it strong antidiabetic, antimalarial, liver-protective, and antimicrobial properties. For generations, people in Nigeria, Cameroon, and surrounding regions have used its leaves usually washed, squeezed, or boiled into a bitter tea or soup—to manage diabetes, stomach problems, fever, worms, and skin conditions. Modern research supports many of these uses, showing that Bitter Leaf can lower blood sugar by 20–40% through slowing carbohydrate breakdown and helping regenerate insulin-producing cells. Studies also report antioxidant effects that protect the liver and kidneys, along with promising anticancer activity. Because it contains vitamins A and C, iron, and fiber, and grows well in warm climates with minimal care, *Vernonia amygdalina* has become an important nutritional and medicinal plant that can be easily adapted to Indian home gardens for accessible metabolic and general health support.



Traditional Significance

Vernonia amygdalina (*African Bitter Leaf* / पंच मसाले का पौधा) is originally native to the woodlands and riverbank regions of sub-Saharan Africa, where it has been used for centuries as both a medicinal plant and a leafy vegetable. Through cultural exchange and herbal trade, it has now become naturalized in warmer parts of India. In African traditional medicine especially in Nigeria and Cameroon the leaves are squeezed, boiled, or used in soups to manage diabetes, malaria, stomach disorders, fever, and intestinal worms. Its strong medicinal value comes from compounds such as sesquiterpene lactones (vernoniosides), flavonoids, and plant steroids, which are known to lower blood sugar, fight infections, reduce inflammation, and protect organs from oxidative stress. Modern scientific studies support these traditional uses, showing significant reductions in blood glucose, improved liver and kidney health, and broad antimicrobial activity, highlighting its importance as a natural, nutrient-rich remedy¹⁵².

Vernonia amygdalina is a perennial shrub or small tree belonging to the Asteraceae family, typically growing 2–7 meters tall with light grey-brown, slightly fissured bark. Its leaves are arranged in opposite pairs, long and lance-shaped, usually 6–30 cm in length and 3–8 cm wide, dark green, leathery, and strongly veined. The plant produces clusters of small creamy-white, thistle-like flower heads about 1 cm wide, which appear mainly during the dry season and give off a mild sweet aroma. These flowers develop into small, ribbed, dry fruits with fine hair-like bristles that help in seed dispersal. Physically, the plant forms multiple stems from the base, is drought-tolerant, and sheds some leaves during the dry season, but regrows rapidly after pruning. It has deep, fibrous roots that help it survive hot climates and access underground moisture, and its highest leaf production occurs during the rainy months from May to August¹⁵³.

Medicinal Benefits

Vernonia amygdalina (African Bitter Leaf) is best known for its strong antidiabetic activity, with studies showing that its bitter leaves can lower blood sugar by slowing carbohydrate breakdown, improving insulin release, and supporting regeneration of pancreatic β -cells. Traditional use in Africa includes drinking leaf extracts or soups for diabetes, malaria, fever, diarrhea, stomach infections, and intestinal worms, with research confirming antimicrobial effects against bacteria such as *Salmonella* and *E. coli*, antimalarial synergy with chloroquine or artemisinin, and antiparasitic action against *Ascaris* and *Schistosoma*. The plant also supports heart and metabolic health by reducing blood pressure, improving cholesterol levels, and helping with weight management through natural fat-breaking compounds. Leaf pastes are applied for skin infections, boils, rashes, and rheumatic pain due to anti-inflammatory and antimicrobial properties. Laboratory studies further show strong antioxidant effects that protect the liver and kidneys from chemical or diabetic damage, along with anticancer potential linked to compounds like vernodalin that trigger apoptosis in breast, prostate, and leukemia cells. The roots and stems are traditionally used for conditions such as malaria, convulsions, venereal diseases, and prostate enlargement, and some studies report improved sperm quality and fertility. Overall, Bitter Leaf provides a wide range of scientifically supported benefits including antidiabetic, antimalarial, anti-inflammatory, antimicrobial, liver-protective, kidney-protective, and anticancer actions, making it a valuable medicinal plant in both traditional use and modern research¹⁵⁴.



Vernonia amygdalina (African Bitter Leaf) is generally considered safe when used in traditional food forms such as soups or lightly boiled leaf preparations, and scientific studies show low toxicity in animals even at high doses. Leaf extracts are commonly taken in small amounts in traditional medicine for diabetes, fever, and digestive problems, but modern guidelines advise beginning with very small quantities and increasing only under professional supervision, especially for people on blood sugar-lowering medications because the plant can intensify their effects. Most side effects are mild and may include nausea, loss of appetite, or stomach discomfort if taken in excessive amounts due to its strong bitterness. The plant should not be used during pregnancy or breastfeeding because of its potential uterine-stimulating effects, and it should be used cautiously in children and in individuals with kidney or liver conditions. People with diabetes or those taking antihypertensive medicines should monitor their levels closely when using Bitter Leaf as a supplement. Overall, when consumed in moderate, food-like amounts and with guidance for medicinal use, African Bitter Leaf is considered safe and well tolerated¹⁵⁴.

Vernonia amygdalina (African Bitter Leaf) is generally very safe, with animal studies showing no serious toxicity even at high doses, but mild effects can appear if too much is taken. Some people may experience nausea, reduced appetite, or loose stools because of the plant's strong bitterness, and individuals with diabetes may feel weak or dizzy if their blood sugar drops too low while also taking medication. Allergic reactions are rare, but a few people may develop mild skin irritation from contact with the sap. The plant should not be used during pregnancy or breastfeeding because it may stimulate the uterus, and it should be used carefully in children under five and in people with bleeding disorders due to possible mild antiplatelet effects. Those on diabetes or kidney treatments should monitor their sugar and kidney values

regularly. If digestive discomfort continues, the plant should be stopped. When used in moderate, food-like amounts, Bitter Leaf is well tolerated and safe for most people¹⁵⁴.

Growing conditions

Vernonia amygdalina (African Bitter Leaf / पंच मसाले का पौधा) grows best in warm, humid tropical climates where daytime temperatures remain between 22–35°C and nights stay above 15°C. It prefers regions with 750–2000 mm annual rainfall and 60–80% humidity, and it performs well in full sunlight, although it becomes drought-tolerant once its roots are established. The plant can grow in many soil types but thrives particularly in humus-rich loamy or sandy soils that drain well, with a slightly acidic to neutral pH of 5.5–7.0. It is commonly found along forest edges, riversides, grasslands, and disturbed farmlands, and it can grow at elevations up to 2800 meters. Flowering usually occurs during the dry season, especially from January to February.

Cultivation

Vernonia amygdalina (African Bitter Leaf / पंच मसाले का पौधा) can be grown easily at home from both seeds and stem cuttings. Seeds should be taken from mature fluffy fruits, soaked overnight, and sown 0.5–1 cm deep in a mixture of loam, sand, and compost during the rainy or warm season. They germinate in 12–25 days under partial shade and warm conditions, after which seedlings can be transferred to small pots and later into 30–40 liter containers or garden beds. Stem cuttings (20–25 cm) also root very well when planted in moist cocopeat or sandy soil during the monsoon. The plant prefers full sunlight for 6–8 hours daily and grows best in fertile, well-drained loamy soil enriched with compost or vermicompost. Watering should keep the soil moist in the first year but can be reduced once the plant is established, as it becomes drought-tolerant. Monthly feeding with mild organic fertilizers encourages lush leaf growth, especially during the rainy months. Regular pinching of the top shoots helps create a bushy plant and improves leaf yield. Common pests like aphids and caterpillars can be controlled with neem oil. Leaves can be harvested every 4–8 weeks once the plant is around 1–1.5 meters tall¹⁵⁵.

Vernonia amygdalina is well suited for small to medium-scale farming in humid tropical regions, making it a promising crop for Southern India. Plantations are usually established during the monsoon using stem cuttings or seeds at spacing of 1 × 0.75 meters, giving 13,000–15,000 plants per hectare. Pits of 30 × 30 × 30 cm are filled with farmyard manure, neem cake, and basic fertilizers before planting. The crop grows well in loamy, sandy, or light clay soils with a pH of 5.5–7.5 and benefits from drip irrigation during dry periods, though it can tolerate rainfed conditions above 1200 mm rainfall. Farmers prune the plants to a low height (about 0.5 m) after each harvest to encourage multiple stems and fast regrowth, allowing 4–6 harvests per year. Young fresh leaves yield around 20–25 tons per hectare annually, with 4–7 tons when dried. The crop can be intercropped with beans or onions during the first year and requires only basic pest management for leaf miners and occasional fungal wilt. After harvest, leaves are shade-dried or lightly wilted for storage and sold for use in vegetable markets, herbal teas, and medicinal extract preparation. With low input costs and steady demand, farms can earn ₹2–4 lakh per hectare from the second year onward¹⁵⁵.



Vaccinium erythrocarpum (करौदा), the rare Southern Mountain Cranberry of the Appalachian highlands, offers scarlet berries rich in proanthocyanidins that help prevent urinary tract infections, reduce oxidative stress, and support heart and digestive health. Its strong antioxidant levels, similar to commercial cranberries, make it valuable for natural urinary protection and overall wellness. Although it requires cool, acidic conditions such as those found in the Nilgiris, Sikkim, and Himalayan foothills it can be grown successfully in pots or heath beds using proper soil and chilling. The plant is generally very safe, with only mild oxalate-related cautions for people prone to kidney stones. For high-altitude growers in India, this unique berry presents a promising opportunity to cultivate a nutritious, medicinal, and niche-value crop with real potential in specialty food and herbal markets.

Cranberry (*Vaccinium erythrocarpum*) करौदा

Vaccinium erythrocarpum (करौदा), commonly called Southern Mountain Cranberry or Bearberry Cranberry, is a small deciduous shrub from the Ericaceae family that grows 1–1.5 meters tall in cool, high-altitude forests of the southern Appalachian Mountains (1500–2000 m) in the United States. It has attractive leathery oval leaves (3–6 cm) that turn bright red in autumn, along with delicate white-pink, bell-shaped flowers that bloom in May–June. By late summer, the plant produces shiny red berries (8–12 mm) with a tart cranberry-like taste, rich in vitamin C, proanthocyanidins, and strong antioxidants known for urinary tract protection, anti-inflammatory activity, and wound-healing support. Although not common in India, it can be successfully grown in cooler regions such as the Himalayan foothills and the Nilgiri hills, where acidic soil and cool temperatures match its natural habitat. Its berries offer promising nutraceutical value, while the plant itself adds ornamental beauty and benefits wildlife, making it a niche but valuable option for high-altitude gardens and specialty cultivation¹⁵⁶.



Traditional Significance

Vaccinium erythrocarpum (करौदा), commonly known as Southern Mountain Cranberry, naturally grows in the cool, mist-covered high elevations of the southern Appalachian Mountains (1200–2000 m) in the United States. It is admired locally for its bright autumn foliage and tart red berries that are used in pies, jellies, sauces, and traditional herbal teas. The berries are rich in proanthocyanidins and antioxidants, giving them urinary tract-protective and anti-inflammatory properties similar to commercial cranberries. Although rare in India, the plant can be cultivated in cool, acidic regions such as the Nilgiris, Sikkim, and Himalayan foothills, making it a potential niche crop for high-altitude berry farming and nutraceutical production¹⁵⁷.

This deciduous Ericaceae shrub grows 1–2 meters tall with smooth reddish-brown stems and a multi-stemmed, bushy habit that spreads slowly through rhizomes. Its alternate, leathery elliptic leaves (2–6 × 1.5–3 cm) are finely serrated and turn vivid crimson-orange in autumn, adding strong ornamental value. In May–June, the plant produces nodding, urn-shaped white to pink flowers (6–8 mm) with extended stamens that later develop into shiny scarlet berries (8–12 mm) containing 5–10 small seeds and offering a sharp cranberry-like flavor. Adapted to cool, acidic, well-drained soils, it is shade-tolerant, highly cold-hardy (down to –20°C), and depends on mycorrhizal roots for nutrient uptake, while its fruit also attracts birds and wildlife¹⁵⁷.

Medicinal Benefits

The bright scarlet berries of *Vaccinium erythrocarpum* (करौदा) are rich in proanthocyanidins (PACs), which help prevent urinary tract infections by stopping *E. coli* bacteria from attaching to the urinary lining an effect similar to commercial cranberries and shown in studies to reduce UTI recurrence by 25–50%¹⁵⁸. The fruits also provide vitamin C and strong antioxidants that protect against scurvy, support immunity, reduce

inflammation, and slow LDL oxidation, lowering cardiovascular risks. They can be eaten fresh, juiced, or made into jellies to aid digestion and improve overall antioxidant intake. The leaves, traditionally prepared as a decoction, act as a mild diuretic and digestive tonic and may help with diarrhea and hemorrhoids. Like other *Vaccinium* species, this plant shows potential anticancer activity through antioxidant-induced apoptosis, helps reduce inflammatory cytokines (TNF- α , IL-6), and supports oral health by inhibiting harmful bacteria involved in gum disease and ulcers¹⁵⁸.



Vaccinium erythrocarpum (करौदा) can be taken in amounts similar to regular cranberries, with 100–400 g of fresh berries per day or 240–480 ml of unsweetened juice (split into two doses) to support urinary tract health through its 36–72 mg of proanthocyanidins (PACs). Dried berries may be used at 20–50 g daily, and standardized cranberry extract capsules (300–500 mg) can be taken twice a day for 8–12 weeks for antioxidant and urinary benefits. A mild leaf tea can be prepared using 1–2 teaspoons (2–4 g) steeped for 10 minutes and taken 1–3 cups per day for short-term digestive or diuretic support. The plant is considered very safe, with only occasional mild nausea, stomach cramps, or diarrhea at high juice intake, but people with kidney stones should limit use due to oxalate content, and those on warfarin should monitor INR levels. It should be avoided in salicylate or aspirin allergies and used cautiously in chronic kidney disease, while normal food-level consumption is safe during pregnancy and breastfeeding¹⁵⁹.

Vaccinium erythrocarpum (करौदा) is generally very safe, with most people tolerating its berries and juice without problems, though high intake (over 400–500 ml juice per day) may cause mild nausea, acidity, bloating, or loose stools due to natural fruit acids. Allergic reactions are rare but may occur in individuals sensitive to cranberries or salicylates, causing itching, rashes, or swelling. Because the berries contain moderate oxalates, people with a history of kidney stones should limit or avoid frequent use. Those taking warfarin or blood thinners should be cautious, as cranberry products can increase INR and bleeding risk. It is also advised to use carefully in chronic kidney disease and avoid if there is a known aspirin/salicylate intolerance. Normal food-level use is safe during pregnancy and breastfeeding, but concentrated extracts should be taken only under medical guidance¹⁵⁹.


Growing conditions

Vaccinium erythrocarpum (करौदा) grows best in cool, temperate climates where summer temperatures stay between 15–25°C and winters drop to –10°C or lower, with at least 800–1200 chilling hours needed for proper bud break. It requires 1000–1500 mm of evenly distributed rainfall and is hardy in USDA zones 4b–6a, tolerating cold down to –20°C to –25°C. The plant thrives in strongly acidic, organic-rich soils (pH 4.3–5.5) such as peaty, sandy loam with 40–60% organic matter and excellent drainage, while still maintaining a moist root zone. It prefers full sun at high elevations or light dappled shade in forested areas and depends heavily on mycorrhizal fungi for nutrient uptake. The species is highly intolerant to alkaline soils, lime, or waterlogging, making correct soil preparation and drainage essential for successful cultivation.

Cultivation

Vaccinium erythrocarpum (करौदा) can be grown at home through seeds or softwood cuttings. Seeds need cold stratification for about 90 days at 4°C, then can be sown in spring in a peat–perlite mixture (1:1) with an acidic pH of 4.5–5.0, where they germinate in 4–8 weeks at 20–25°C. Softwood cuttings of 10 cm taken in July root well when dipped in IBA 3000 ppm and placed in a mist chamber for 16–20 weeks in perlite–peat. For container growing, use 25–50 litre pots filled with a mix of 50% peat moss, 30% pine bark, and 20% perlite, adjusting the acidity with elemental sulfur. The plant prefers partial shade in warm areas and needs winter chilling, which can be simulated by keeping young plants in the refrigerator for 6–8 weeks. Water should be soft or rainwater, keeping the soil moist but never waterlogged. Monthly feeding with an acid-loving plant fertilizer from April to August supports healthy growth. Mulching with pine needles helps maintain acidity and soil moisture. Protect berries from birds using netting, and manage fungal issues like mummy berry with preventive fungicide.

For commercial growing, *Vaccinium erythrocarpum* requires cool high-altitude climates such as the Nilgiris, Sikkim, or the Himalayan foothills. Plants are spaced about 1 × 1.5 metres, giving around 4500–6000 plants per hectare. Soil needs to be sandy loam heavily amended with peat to reach a pH of 4.5–5.2 and must drain well while staying consistently moist. Propagation is done from stratified seeds or rooted cuttings planted in late autumn or early spring. Drip irrigation is ideal, and nutrients should be supplied using ammonium sulfate (20–40 kg/ha split doses), since nitrate forms are poorly tolerated. Windbreaks and light shade help young plants establish. Fruiting begins in the third year, producing 1–3 kg per plant or roughly 0.5–1.5 tons per hectare. Berries are hand-picked in late summer or early autumn. Because this fruit is rare, it attracts premium prices of Rs.500– Rs.1000 per kg in gourmet and nutraceutical markets. The plant is also useful in erosion control and can be integrated into mixed ericaceous polyculture systems.



Roselle Hibiscus (*Hibiscus sabdariffa*, गुड़हल) stands out as a vibrant medicinal-culinary plant whose deep red calyces deliver proven antihypertensive, antidiabetic, antioxidant, and liver-protective benefits through their rich anthocyanin and vitamin C profile. Its tangy, ruby-colored tea naturally lowers blood pressure, supports heart and metabolic health, and provides antimicrobial and anti-inflammatory support valued in Ayurveda for generations. Easy to grow in Bihar's climate with simple care—full sunlight, June sowing, and basic fertilization—it yields calyces, leaves, fiber, and seeds that serve both nutrition and household wellness needs. With minimal effort and maximum healing potential, गुड़हल transforms home gardens into a source of daily vitality, herbal self-reliance, and sustainable health.

Roselle Hibiscus (*Hibiscus sabdariffa*) गुड़हल

Hibiscus sabdariffa (Roselle / गुड़हल) is an annual herbaceous shrub from the Malvaceae family that grows 2–3 meters tall and is widely cultivated across India, Africa, and tropical regions for its bright red, fleshy calyces that form around the seed pod. These ruby-red calyces are the main edible and medicinal part of the plant, used to make tangy teas, juices, chutneys, and soups rich in vitamin C, anthocyanins, and natural organic acids. Scientific studies show that Roselle tea can help lower high blood pressure, reduce LDL cholesterol, support healthy blood sugar levels, and protect the liver due to its strong antioxidant and anti-inflammatory compounds. In Ayurveda and Siddha, it is valued as a cooling (Sheeta), mild laxative, and diuretic herb used for fever, cough, hypertension, constipation, and general weakness. Beyond its health benefits, Roselle provides fiber from its stems and oil-rich seeds, making it a versatile plant that is easy to grow in home gardens and highly useful for nutrition, herbal remedies, and small-scale farming in subtropical India.



Traditional Significance

Hibiscus sabdariffa (Roselle / गुड़हल) originated in ancient India and the Old World tropics and has spread widely across Africa, Southeast Asia, and the Americas as a valuable multipurpose crop. It is cultivated mainly for its bright crimson, fleshy calyces that are used to make tangy teas, sherbets, jams, and jellies rich in anthocyanins and vitamin C. The plant also provides strong bast fiber from its stems for ropes and paper, edible seeds for oil extraction, and young leaves used as a sour vegetable. In Ayurveda, Siddha, and Unani traditions, Roselle is described as a cooling, diuretic, and heart-soothing herb used for fever, cough, indigestion, and high blood pressure. Modern scientific studies support these traditional uses, showing that Roselle tea can significantly reduce systolic blood pressure (7–13 mmHg), improve cholesterol levels, lower blood sugar peaks, and provide antioxidant and anti-inflammatory protection¹⁶⁰.

Hibiscus sabdariffa is an annual or biennial Malvaceae shrub that typically grows 1.5–3.5 meters tall with a strong, upright, and much-branched structure. Its stems are reddish and may be smooth or slightly hairy, while the leaves are alternate, 8–15 cm long, and deeply divided into 3–7 lobes with serrated margins and attractive red veins. The plant produces large, solitary, pale yellow flowers (7–10 cm) with a deep crimson center from September to December. After the petals fall, the calyx enlarges into thick, fleshy, bright red segments (3–5 cm) that form the edible part surrounding a 5-valved hairy capsule containing 20–50 kidney-shaped black seeds. Physically, the plant has a deep taproot that makes it drought-tolerant, grows rapidly into a bushy form, and is sensitive to day length flowering mostly when days become shorter. The calyces turn a rich ruby red and act as a natural pH indicator, while the foliage has a mild sour aroma¹⁶⁰.

Medicinal Benefits



Roselle Hibiscus (*Hibiscus sabdariffa*, गुड़हल) provides powerful medicinal benefits mainly through its bright red calyces, which are rich in anthocyanins, polyphenols, vitamin C, and organic acids. Regular intake of Roselle tea (1–3 cups daily) has been shown in clinical studies to reduce systolic blood pressure by 7–15 mmHg and diastolic pressure by 5–10 mmHg through ACE inhibition and natural vasodilation, making it useful for managing mild hypertension. Its calyx extracts also slow carbohydrate digestion by inhibiting α -glucosidase and amylase, reducing post-meal blood sugar spikes by 15–25%, while improving lipid levels by lowering LDL and triglycerides and increasing HDL. The plant supports liver health by lowering ALT and AST levels and boosting antioxidant enzymes, and its anti-inflammatory effects help relieve fever, cough, sore throat, and mild infections. Roselle also shows antibacterial activity against *E. coli*, *Salmonella*, and *Staphylococcus*, and laboratory studies indicate anticancer potential through apoptosis in breast and gastric cancer cells. The leaves act as a natural diuretic and mild laxative for edema and constipation, while the seeds provide cholesterol-lowering oil making Roselle a versatile herb for cardiovascular, metabolic, digestive, and immune support¹⁶¹.

Hibiscus sabdariffa (Roselle/गुड़हल) is typically taken as a tea made from 1.5–3 grams of dried calyces (1–2 teaspoons) steeped in 250 ml of hot water for 5–10 minutes, taken 1–3 times a day for blood pressure, digestion, and antioxidant benefits an amount supported by several clinical studies over 4–12 weeks. Decoctions can also be made using 10–20 grams of fresh calyces or 5–10 grams of leaves boiled down to 50–100 ml and taken two or three times daily for fever, cough, or urinary issues. Seed powder is used in some traditions at 5–10 grams per day for cholesterol support. The plant is generally safe and well tolerated, with only rare mild effects such as nausea or stomach discomfort. However, it should be avoided during pregnancy due to possible uterine stimulation and used cautiously by people with low blood pressure or those taking antihypertensive drugs to prevent excessive BP lowering. Individuals on ACE inhibitors, hydrochlorothiazide, or with hypoglycemia should consult a doctor before use, and high doses should be avoided in children¹⁶¹.

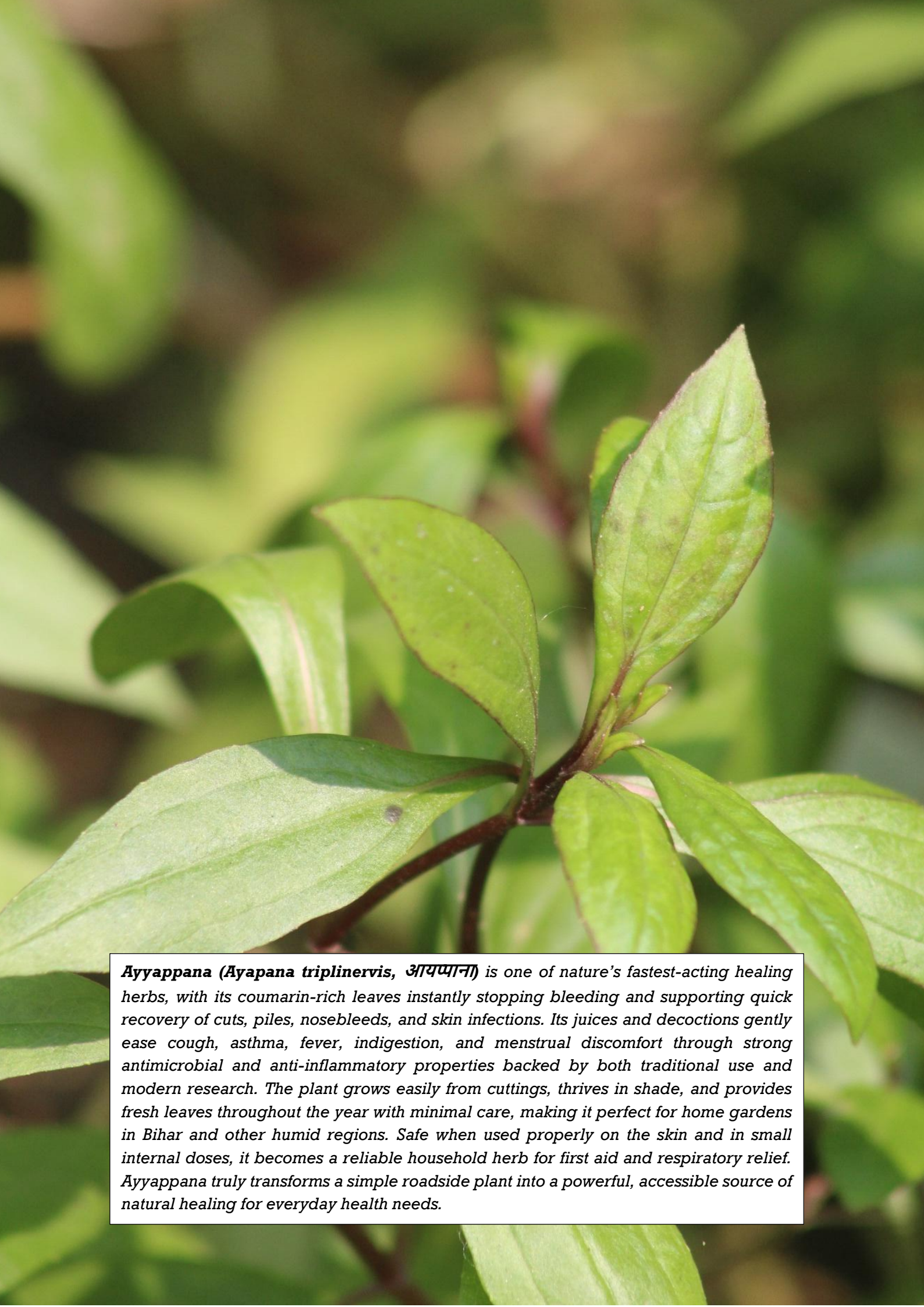
Growing conditions

Roselle Hibiscus (*Hibiscus sabdariffa*, गुड़हल) grows well in warm tropical climates at 18–35°C and needs full sunlight for at least 6 hours daily. It prefers kharif sowing (June–July) because flowering starts when nights become longer. The plant adapts to many soil types but performs best in deep, well-drained loamy soil with a pH of 5.5–7.5 and added organic manure. Seeds are sown 2.5–5 cm deep at 60 cm × 1 m spacing, with regular watering during early growth and less frequent watering later. Roselle becomes drought-tolerant once established, and calyces are ready to harvest 5–7 months after planting when they turn bright red and fleshy¹⁶¹.

Cultivation

Roselle Hibiscus (*Hibiscus sabdariffa*, गुड़हल) can be easily grown at home in Patna's warm subtropical climate by sowing seeds during June–July in 30–45 cm pots or in garden beds spaced about 1 × 1 meter. Use soaked or lightly scarified seeds planted 2–5 cm deep in sandy loam soil mixed with 20% compost and a pH of 6–7. Place the pots or beds in full sunlight for 6–8 hours a day and keep the soil moist but not waterlogged, watering whenever the top layer feels dry. After germination, thin plants to about 50–60 cm spacing and feed with a mild liquid fertilizer (NPK 10:10:10) once a month. Neem oil spray helps control common pests like jassids and aphids. Pinching the growing tips encourages bushier growth with 3–4 main stems. Calyces can be harvested 20–25 weeks after sowing, and a single homegrown plant can produce 100–500 grams of harvestable calyces over 2–3 months¹⁶¹.

For larger farms, Roselle is grown in 2–3 hectare fields with expected calyx yields of 15–25 tons per hectare. Land is prepared before the monsoon by plowing 20–30 cm deep and adding about 10 tons of farmyard manure per hectare along with a basal dose of NPK (50:25:25). Farmers sow 8–12 kg of treated seeds per hectare on raised ridges spaced 60 cm apart, with 90–120 cm between rows. Irrigation is done 4–5 times before flowering and reduced afterward to promote calyx development. Fertilizer is applied in three split doses totaling 120:60:60 NPK per hectare, along with 50 kg of zinc sulfate. Integrated pest management using neem spray helps control jassids and aphids, and intercropping with legumes improves soil fertility. Harvesting begins 150–180 days after planting and continues daily for 4–6 weeks. Calyces are sun-dried to 10–15% moisture, yielding 12–20 tons per hectare of processed calyx and 2–3 tons per hectare of stem fiber¹⁶¹.



Ayyappana (*Ayapana triplinervis*, अयप्पान) is one of nature's fastest-acting healing herbs, with its coumarin-rich leaves instantly stopping bleeding and supporting quick recovery of cuts, piles, nosebleeds, and skin infections. Its juices and decoctions gently ease cough, asthma, fever, indigestion, and menstrual discomfort through strong antimicrobial and anti-inflammatory properties backed by both traditional use and modern research. The plant grows easily from cuttings, thrives in shade, and provides fresh leaves throughout the year with minimal care, making it perfect for home gardens in Bihar and other humid regions. Safe when used properly on the skin and in small internal doses, it becomes a reliable household herb for first aid and respiratory relief. Ayyappana truly transforms a simple roadside plant into a powerful, accessible source of natural healing for everyday health needs.

Ayyappana (*Eupatorium triplinerve*) आयप्पाना

Ayyappana (*Eupatorium triplinerve*, आयप्पाना) is a hardy semi-perennial aromatic herb (0.5–1.5 m) from the Asteraceae family, originally native to tropical America but now widespread across Kerala, Karnataka, Assam, Bengal, and Bihar’s moist lowlands. Its leaves are richly infused with coumarin compounds especially ayapin, thymohydroquinone dimethyl ether, cineole, and eugenol responsible for the plant’s traditional reputation as a fast-acting herbal styptic and wound healer in Ayurveda and Siddha. Fresh leaf paste or juice rapidly stops bleeding from cuts, piles, and nosebleeds, while decoctions (20–30 ml) ease fever, cough, asthma, indigestion, dysentery, menstrual cramps, and general weakness through anti-inflammatory, expectorant, antimicrobial, and hepatoprotective actions. Revered as



Vishalyakarni for its ability to cleanse and close wounds swiftly, आयप्पाना transforms from a simple roadside weed into a powerful, accessible home remedy for bleeding injuries, respiratory troubles, and digestive disturbances across India¹⁶².

Traditional Significance

Ayyappana (*Ayapana triplinervis*, formerly *Eupatorium triplinerve*; आयप्पाना) traces its origins to the humid lowlands and riverine edges of the Amazon basin in Brazil, Peru, and Ecuador, from where it spread to tropical Asia through colonial-era plant exchanges. Over time, it naturalized widely across Kerala, Karnataka, Tamil Nadu, Assam, Bengal, Odisha, and Bihar, thriving along roadsides, paddy bunds, gardens, and moist wastelands. Traditionally introduced into Ayurveda and Siddha by early Portuguese herbal practitioners, it soon gained recognition as *Vishalyakarni* a rapid wound healer capable of instantly stopping bleeding from cuts, piles, and nosebleeds. Its aromatic leaves became valued for treating fever, cough, asthma, indigestion, diarrhea, and menstrual pain, owing to powerful coumarin-rich essential oils such as ayapin, thymohydroquinone dimethyl ether, and cineole. Modern phytochemical studies confirm its antimicrobial, anti-inflammatory, antioxidant, hepatoprotective, and mucolytic actions, validating its long-standing role as a multi-purpose medicinal herb across India and Southeast Asia¹⁶³.

Ayyappana is a semi-perennial aromatic herb of the Asteraceae family, growing 0.5–1.5 m tall with slender ascending branches arising from a semi-woody base that often roots when touching moist soil. Its stems are smooth, hairless, slightly reddish, and square in cross-section, exuding a distinctive camphor–coumarin scent when crushed. Leaves are opposite, simple, lanceolate (5–12 × 1–2.5 cm), tapering to a pointed tip and marked by the characteristic “three nerves” a central midrib and two parallel lateral veins an identification hallmark. Margins are finely serrated, upper surfaces glossy green, and lower surfaces faintly purple-tinged. Inflorescences appear as loose corymbs bearing 3–

7 small, pedicellate pale-pink to bluish tubular flower heads (6–8 mm), each with 15–25 florets and a uniseriate pappus aiding wind dispersal. Plants flower almost year-round in humid tropics and yield 1–2% volatile essential oil rich in coumarins, cineole, borneol, eugenol, flavonoids, vitamin C, and carotenoids. Its fast growth, creeping lower stems, and shade tolerance make it a resilient herb capable of forming dense medicinal patches in home gardens or wild landscapes¹⁶³.

Medicinal Benefits

Ayyappana (*Ayapana triplinervis*, आयप्पाना) is renowned for its powerful hemostatic action, with fresh leaf juice or paste (5–10 ml) capable of stopping bleeding from cuts, piles, and nosebleeds within minutes due to coumarin-driven platelet aggregation and rapid tissue sealing, a traditional Vishalyakarni effect now supported by studies showing anti-ulcer and gastroprotective flavonoids that speed epithelial repair. Its expectorant cold infusions (30–40 ml, three times daily) loosen and expel phlegm in cough, asthma, and bronchitis, while warm decoctions (20–30 ml) relieve intermittent fevers, dysentery, menstrual cramps, and indigestion through kapha-pitta balancing heat and potent antimicrobial essential oils such as thymohydroquinone dimethyl ether, thymol, cineole, and eugenol effective against *E. coli*, *Staphylococcus*, fungi, and helminths (MIC 50–200 µg/ml). Leaf juice serves as a mild carminative for colic and bloating, infusions strengthen weak hearts, and topical paste helps ringworm, itching, ulcers, and even animal-bite inflammation. Modern research further confirms hepatoprotective effects (reducing ALT/AST in CCl₄ toxicity), strong antioxidant activity (up to 80% DPPH scavenging), antinociceptive and anti-inflammatory responses (up to 60% paw-edema inhibition), and promising cytotoxic and antiviral actions including early evidence of Zika suppression solidifying Ayyappana as a versatile herbal remedy for bleeding control, respiratory relief, digestive detox, liver support, and skin infections¹⁶⁴.



Ayapana (*Ayapana triplinervis*, आयप्पाना) is generally safe in therapeutic amounts, but excessive intake (>20 g fresh leaves or strong decoctions) can cause nausea, stomach irritation, loose stools, or heartburn due to its pungent, warm potency and coumarin-rich profile. Individuals allergic to Asteraceae plants may experience rashes, itching, swelling, or respiratory discomfort after contact or ingestion, requiring immediate discontinuation. It is contraindicated during pregnancy and lactation because coumarins may act as emmenagogues or mildly stimulate uterine activity, and should not be used internally in children under 5¹⁶⁵. People taking anticoagulant or antiplatelet medications (warfarin, aspirin, heparin) or those with bleeding disorders must avoid it due to potential enhancement of bleeding risk, while severe liver disease warrants caution since coumarins are metabolized hepatically. For anyone undergoing surgery, Ayapana should be avoided at least 1–2 weeks prior, and internal use should always be supervised by a qualified practitioner when combined with chronic medications¹⁶⁴.

Growing conditions

Ayapana (*Ayapana triplinervis*, आयप्पाना) thrives in warm, humid tropical to subtropical climates such as Bihar's monsoon zones, growing vigorously at 24–37°C and tolerating elevations up to 1500–1600 m, especially in partially shaded forest margins, shrublands, and moist roadsides. It prefers soft, well-drained loamy soil enriched with organic matter (ideal pH 6.0–7.0), high humidity (70–85%), and consistently moist but never waterlogged conditions, making it ideal for shaded gardens and container planting. Propagation is easiest through stem cuttings, which root rapidly in moist soil or water, and plants spaced 30 × 30 cm form dense medicinal patches; regular light pruning encourages bushy growth. A balanced NPK fertilizer every 4–6 weeks during the growing season supports lush foliage, while repotting every 1–2 years keeps plants vigorous. Hardy, fast-growing, and low-maintenance, Ayapana makes an excellent groundcover or potted medicinal herb for home gardens¹⁶⁴.

Cultivation

Ayyappana (*Ayapana triplinervis*, आयप्पाना) is easy to grow at home using stem cuttings. Take 10–15 cm semi-hardwood cuttings during June to August and plant them 5 cm deep in 20–30 cm pots filled with loamy soil mixed with 30 percent compost or cocopeat (pH 6–7, good drainage). Keep the pot in partial shade with 4–6 hours of sunlight, maintain moist soil by regular watering, and mist occasionally for 80 percent humidity. Cuttings root within 7–14 days and grow quickly into bushy plants if the tips are pinched regularly. For a small medicinal garden, plant cuttings at 30 by 30 cm spacing; 10–20 plants can produce around 500 grams of fresh leaves every month. Feed the plant with vermicompost tea every two weeks or a mild NPK 5:10:10 solution once a month. Harvest leaves weekly after the plant is three months old and use pruned stems to create new plants. Ayyappana becomes a simple, low-maintenance household herb for cuts, wounds, cough, fever and digestion support¹⁶⁵.

Ayyappana is cultivated commercially in Kerala and Karnataka on 0.5 to 2 hectare farms, producing 5–10 tonnes per hectare of fresh leaves each year. Farmers prepare fields before the monsoon by enriching loamy soil (pH about 6.5) with 5 tonnes per hectare of farmyard manure and a basal NPK dose of 40:60:40 kg per hectare. About 20,000 stem cuttings are planted per hectare during June to July at 30 by 20 cm spacing, initially under 50–60 percent shade nets to support rooting. Drip irrigation is applied two to three times weekly to maintain soil moisture, and split applications of NPK and micronutrients like zinc and boron are added for better growth. Pest control mainly requires neem oil spray at 3 ml per litre for aphids and mealybugs. Leaves are harvested every 15–20 days starting 90 days after planting. Leaves are then shade dried or distilled for essential oil, which yields 1–2 percent. With leaf prices ranging from ₹20 to ₹50 per kilogram, farmers can earn ₹2–5 lakh per hectare, with additional income possible from oil extraction.



***Aerva lanata* (Mountain Knot Grass, गोरख भूई)** stands as Ayurveda's definitive Pashanbheda—an unassuming yet formidable herb whose mucilaginous roots and diuretic alkaloids effectively dissolve kidney stones, flush out urinary toxins, soothe inflammation, stabilize metabolism, and protect the liver, with research showing up to 80% expulsion of small calcium oxalate stones. Whether growing wild on Bihar's rocky slopes or thriving effortlessly in home pots with just sunlight and minimal watering, this hardy xerophyte delivers year-round medicinal harvests requiring almost no maintenance. As a lifelong ally for urinary health, brewing its roots into a simple decoction can support clear kidneys, relieve dysuria, reduce recurrence of stones, and restore internal balance—transforming a common roadside herb into a powerful agent of renal resilience and everyday vitality.

Mountain Knot Grass (*Aerva lanata*) गोरख भूट्टी

Aerva lanata (Mountain Knot Grass, गोरख भूट्टी / पाषाणभेद) is a hardy perennial undershrub (30–120 cm) from the Amaranthaceae family, commonly found on dry rocky slopes, sandy riverbeds, and open wastelands across Bihar and other parts of India. In Ayurveda, it is honored as one of the most powerful *Pashanbheda* herbs meaning “stone breaker” because its alkaloid-rich roots (lanatin, eritrinin), saponins, and soothing mucilage help dissolve kidney stones and flush out urinary crystals through a mild, safe diuretic action. The whole plant decoction is traditionally used to relieve painful urination, burning sensation, blood in urine, and small renal stones, while also supporting conditions like edema, leucorrhea, diabetes, cough, and asthma due to its cooling, bitter-sweet, and tridosha-balancing nature. Modern research supports these uses, showing that *Aerva lanata* increases urinary citrate and magnesium (which prevent stone formation), reduces calcium-oxalate crystal formation, protects liver cells from toxins, lowers blood sugar in experimental models, and fights bacteria like *E. coli* and *Staphylococcus* making this humble xerophyte an important herb for kidney health, urinary cleansing, and overall metabolic balance.



Traditional Significance

Aerva lanata (Mountain Knot Grass, गोरख भूट्टी / पाषाणभेद) is a hardy perennial herb native to the tropical belts of India, Africa, and Australia, flourishing from sea level up to 2100 m in dry plains, rocky hillsides, sandy riverbeds, wastelands, and cultivated fields. In Bihar, it appears abundantly as a drought-resistant xerophyte and has long been celebrated in Ayurveda since the Charaka–Sushruta period as one of the chief *Pashanbheda* herbs (“stone breaker”) used to dissolve and expel kidney and urinary stones¹⁶⁶. Traditional systems such as Siddha and Unani also prescribe it for urinary gravel, painful urination, edema, diabetes, cough, hemorrhoids, burns, and snakebite management. Modern studies validate these ancient uses by identifying key bioactive compounds like ervine, lanata-6-one, and flavonoids responsible for its strong diuretic, antiurolithiatic, hepatoprotective, antimicrobial, and antidiabetic properties¹⁶⁶.

Aerva lanata is a small Amaranthaceae undershrub (30–120 cm) with erect or spreading stems that may root at the nodes, giving it a creeping or stoloniferous habit ideal for dry terrain. The plant features a stout yellowish-brown taproot (7–20 cm) and many woolly, striated branches covered with fine white tomentose hairs, giving the entire plant a greyish appearance¹⁶⁶. Leaves are alternate, simple, and variable in shape elliptic to obovate (1–6 × 0.5–4 cm) with a soft pubescent upper surface and densely cottony underside. Axillary dense spikes (0.5–3 cm) form rounded clusters of tiny greenish-white flowers bearing silky-hairy perianth segments and two stigmas, followed by small ovoid utricles containing polished black reniform seeds (0.8–0.9 mm). The plant is drought-tolerant, fast-growing, flowers and fruits from September to January, and maintains vigor even in nutrient-poor soils due to its xerophytic adaptations¹⁶⁶.

Medicinal Benefits

Aerva lanata (Mountain Knot Grass, गोरख भूट्टी) is celebrated in Ayurveda as a powerful kidney stone dissolver, with root decoctions (50–60 ml or 5–10 g powder) shown to break down calcium oxalate and phosphate stones under 10 mm by increasing urine flow, raising urinary citrate and magnesium, and reducing crystal formation—an effect validated in studies reporting up to 80% stone expulsion. Its strong diuretic action rivals furosemide, helping relieve dysuria, hematuria, urinary burning, and edema, while its hepatoprotective compounds restore liver enzymes and boost antioxidant levels in toxin-induced liver damage¹⁶⁷. The plant also supports blood sugar control, lowering glucose by 25–35% through improved insulin activity and α -glucosidase inhibition, and improves cholesterol by reducing LDL, triglycerides, and total cholesterol. Additional benefits include bronchodilation for cough and mild asthma, antibacterial and antifungal effects against common pathogens, anti-inflammatory and anti-ulcer activity, and anticancer potential against leukemia and colon cancer cells. Together, these properties make *Aerva lanata* a versatile herb for urinary, liver, metabolic, respiratory, and infectious conditions¹⁶⁷.



Standard Ayurvedic dosage for *Aerva lanata* (गोरख भूट्टी) uses a root decoction made from 5–10 g powder boiled in 400 ml water and reduced to 100 ml, taken 50–60 ml twice or thrice daily for kidney stones, urinary burning, or retention. A cold infusion of the whole plant (30–40 ml, three times daily) is used for cough, sore throat, and fever, while 3–6 g of leaf/root powder can be taken daily with warm water or honey; experimental extract studies range from 200–800 mg/kg (human equivalent 400–1600 mg/day). The herb is generally safe for short-term use, with animal studies showing no kidney damage and an oral LD50 above 4000 mg/kg, though mild stomach upset may occur with excessive doses. It should not be used during pregnancy due to evidence of implantation failure in animal tests, and is also avoided during breastfeeding and in men trying to conceive due to temporary sperm motility reduction. People with diabetes or low blood pressure should monitor their levels closely, as the plant may enhance glucose-lowering or diuretic effects¹⁶⁷.

Aerva lanata (गोरख भूट्टी) is generally well tolerated at normal Ayurvedic doses, but taking very high or prolonged amounts may cause mild gastrointestinal discomfort such as nausea, stomach cramps, or loose stools because of its strong diuretic and saponin content. Allergic reactions are rare, but some sensitive individuals may experience skin rashes, itching, or swelling when handling or consuming the plant, and use should be stopped immediately if such symptoms appear¹⁶⁷. The herb is contraindicated during pregnancy and breastfeeding due to animal studies showing implantation failure and possible fetal risks, and it should also be avoided in men undergoing infertility treatment because it may temporarily reduce sperm motility. People with dehydration, electrolyte imbalance, or those already taking diuretics, insulin, or blood-pressure medications should use caution, as *Aerva lanata* can intensify their effects and lead to hypotension or hypoglycemia.

Internal use is not recommended for children under 12 or for individuals with significant kidney disease without medical supervision¹⁶⁷.

Growing conditions

Aerva lanata (Mountain Knot Grass, गोरख भूट्टी) grows best in hot, dry tropical and subtropical regions like Bihar's plains, foothills, and rocky uplands from sea level up to 2100 m. It prefers open, sunny locations with at least 6–8 hours of direct sunlight and thrives naturally on rocky slopes, wastelands, roadside soils, and disturbed fields where many other plants fail. The plant grows well in sandy or loamy soils with good drainage and a pH range of 6–8, and it tolerates moderate annual rainfall of 500–1500 mm. Its deep taproot (20–60 cm) gives it excellent drought resistance, allowing it to survive long dry periods with minimal moisture, though it responds well to organic manure for faster growth. *Aerva lanata* forms a spreading or upright habit covering 0.5–2 m and typically flowers between September and January, especially after the monsoon when soil moisture increases slightly¹⁶⁷.

Cultivation

Aerva lanata (गोरख भूट्टी) can be easily grown at home in 20–30 cm pots filled with sandy-loam soil mixed with 30% compost or gravel for drainage. It is best started from seeds sown after the monsoon (September–October) at a depth of 0.5 cm, or from 10 cm root cuttings planted during the rainy season, which root in 2–3 weeks under partial shade. Place the plant in full sunlight (6–8 hours daily) and water moderately once a week in summer is enough since the plant is naturally drought-tolerant. Adding organic mulch helps retain moisture. You can use a light fertilizer such as NPK 5:5:10 at 10 g per plant monthly during the first year. After flowering, prune the plant to maintain a 30–90 cm bushy shape. Leaves and tender roots can be harvested after 4–6 months and throughout the year, and the plant spreads easily via stolons, providing 200–500 g of fresh material per season for home remedies like stone-dissolving teas¹⁶⁸.

Commercial cultivation of *Aerva lanata* is practiced in dry regions of Rajasthan, Tamil Nadu, and Bihar, targeting 8–15 tons per hectare of dry herb. Land preparation begins before summer with deep plowing, application of 10 tons/ha farmyard manure, and a basal NPK dose of 50:50:50 kg/ha. Farmers sow 4–6 kg/ha of pre-soaked or scarified seeds in June–July on ridges spaced 45 × 30 cm, establishing around 20,000 plants per hectare. Light irrigation is needed only during establishment (3–4 sessions), after which the crop can rely on rainfall. Intercropping with legumes improves soil fertility, and weeding is done twice in early growth. Additional NPK topdressing along with micronutrients like zinc boosts leaf production. Aerial parts are harvested 5–6 months after sowing, with roots collected from the second year; farmers obtain 2–3 cuts per year. Shade drying to 10% moisture preserves quality. Average yields reach 10–12 t/ha leaves and stems plus 2 t/ha roots, generating ₹1–3 lakh per hectare at market rates of ₹30–60/kg for processed dry herb¹⁶⁸.

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