

Cinnamomum verum Presl

Synonyms : *Cinnamomum zeylanicum* Bl.

Family : Lauraceae

Group : Trijatum

Parts Used : Bark, Oil

Vernacular Names

English : Cinnamon

Malayalam : Karuva

Hindi : Darucini

Sanskrit : Darusita

Bengali : Dalchini

Gujarathi : Dalchini

Tamil : Ilavarngam, Karuva

Telugu : Sapna lavanga,



Distribution and Habitat: Seen in West coast tropical evergreen and semi ever green forest.

Botany: A moderate sized evergreen tree, 8-18 m in height and 50 cm in diameter with reddish brown soft bark, having numerous small warts

• **Leaves:** Stiff, ovate or elliptic ovate, shiny above, 3-5 ribbed from a little above the base, the side ribs ending about three- fourth up, the base usually rounded; petioles 1-2 cm long, grooved on upper surface; lamina ovate or elliptic, strongly 3 veined from the base. Leaf is reddish when young.

• **Flowers:** Small, 3mm in diameter, with foetid smell, each subtended by a small ovate hairy bract. They are in axillary or sub terminal cymes or panicles at the ends of twigs with creamy white peduncle; sepals 6, campanulate, pubescent; stamens 9 in three whorls with glands at the base; filaments hairy; anthers 4 celled, opening by four small valves; staminoides 3; ovary superior, one celled.

• **Fruits:** Ovoid, fleshy berry, dark purple in colour, having persistent perianth.

Properties: Stimulant, diuretic, expectorant, febrifuge

Chemical constituents: Diterpenes-cinnezelanin and cinnzeylanol. Cinnamon oil from bark contains eugenol. Cinnamaldehyde, camphor are other major constituents.

Uses: It is used in Diarrhoea, nausea, bronchitis, asthma, cephalalgia, cardiac diseases, fever, anorexia, inflammations, stomachalgia, tubercular ulcers.

Agrotechnology:

Soil and climate: Cinnamon is a hardy plant which tolerates a wide range of climatic conditions. Wild trees are confined to tropical evergreen rain-forests upto 1800 m above MSL. Crop thrives well from 300- 1000 m above MSL. It flourishes in places with an annual rainfall of 1500-2500 mm and an average temperature of 27° C. A hot moist climate is highly suited for cinnamon cultivation. Proximity to sea, humid conditions and saltish water are good for crop. Sandy loam soil with admixture of humus or vegetative mould is the best for sweet and fragrant bark. Waterlogged and marshy areas are unsuitable.

Propagation: Plant is propagated mainly by seed. True to type progeny is raised by cuttings of young 3-leaved shoots, divisions of old root stocks, air-layering of shoots and by tissue culture. Growth regulators are also used for inducing rooting and improving recovery. Application of a paste containing 1000 ppm IBA+ 2500 ppm NAA on girdled portion while layering is recommended.

Cinnamon being a cross pollinated crop, large variability is observed in progeny when propagated through seeds. This method is not suitable for propagation of elite types or varieties. True to type progeny is raised vegetatively by cuttings, air-layering or tissue culture. Root initiation and establishment in field are very difficult in cuttings. Tissue culture is also not feasible at farmers' level. Air-layering is very simple, effective and possible for every one. Optimum time for air-layering is April-May, when pre-monsoon showers are received. Six months to one year old twigs are suitable for layering. A ring of bark, 2 cm long, is removed from selected twig at the position where green colour of stem bark is turning from green to brown. A thick jute thread is tied around girdled portion to prevent patching up of bark from both cut ends. Girdled portion is then covered with moist sphagnum moss, coir pith or any suitable rooting medium held together by tying a plastic sheet around. A half cut is given at base of layers after one and a half months to induce stress and enhance rooting. Layers will be ready for separating from mother tree in three months when thick root growth is visible through transparent plastic cover. Since roots are geotropic in nature root growth is more on lower side of layer which is not exposed to direct sun light. Separated layers are carefully handled, plastic sheet is removed and planted in polythene bags, which are kept in shade for about a month and then transplanted.

Irrigation: Seedling or propagule is planted in main field at 2-3 m spacing. In India, under rainfed condition, planting during June-July is ideal whereas for irrigated crop, planting during Oct- Nov. is recommended. Shading and irrigation are essential immediately after planting.

Manures and Fertilizers: During first year, seedling may be supplied with 20 kg cattle manure or compost and 20:20:25 g N, P₂O₅ and K₂O per annum which is gradually increased to 50 kg cattle manure and 200:180:200 g N, P₂O₅ and K₂O/tree/year for grownup plants of 6 years or more. This dose may be doubled for extra high yielding plants of age 15 years or more. Fertilizers may be applied in two equal splits during June-July and Oct-Nov. Application of Mussoriephos or Rajphos at 900 g/tree/year increases oil recovery by 75%. Foliar application of 4% urea increases leaf oil by 28%.

For first two years 3-4 weeding/ year are required. Thereafter, two weeding in a year during June-July and October-November are sufficient. Mulching also reduces weed growth. Seedlings need irrigation till they are established, if there is long drought period.

Pests and Diseases: Common diseases are leaf spot and die back caused by *Colletotrichum gloeosporioides*, grey blight by *Pestaloteopsis palmarum* and sooty mould caused by *Phragmocapinus betle* which can be controlled by spraying 1% Bordeaux Mixture or 0.3% mancozeb.

Harvesting: For preparation of quills, plants are harvested about 15 cm above ground level 3 years after planting when shoots have grown 2-2.5 cm in diameter and 1.5-2 m in length. Subsequent harvests can be done every 2-3 years. Generally, three germinating buds are allowed to grow as ratoon crop. Correct time for cutting shoots for peeling is determined by noting sap circulation between wood and corky layer. Peelers can judge this by making a test cut on stem with a sharp knife. If bark separates readily, cutting is taken immediately in early morning with sharp knife to prevent breaking and splitting of cut ends. The best time for peeling is when new flushes and leaves are hardened after a rainy season. Harvesting is normally done during October-November. Fully developed shoots harvested during rainy season gives good quality bark and high yield.

Processing: Leaves are used for extraction of leaf oil. Brown stem is scraped off and stems are cut into pieces of convenient length. Bark is split longitudinally and peeled off using peeling knife on same day of harvest or next day after softening. Peeled bark is rolled and made into cylindrical shape. Cylindrical pieces of bark dried in sun for 2-5 days and are packed in bundles. Dried cinnamon bark (quills) are graded on the basis of colour, taste, fragrance and weight and traded. First harvest yields 30-50 kg quills/ha/year. Better harvests are expected after 10 years when 180-200 kg of dried quills/ha/year is obtained.

About 75 kg/ha of quillings and featherings are also obtained additionally. These chips, featherings or trimmings of bark left after collection of quills are used for distillation and oil yield is 0.5-1.0% generally. Plants with intense purple flushes possessed higher bark oil content

Cinnamon bark oil is light yellow in colour when freshly distilled. On storage, it becomes reddish. It has specific gravity (15.5°C) of 0.950 to 1.030, refractive index (20°C) of 1.565 to 1.599, optical rotation (20°C) of 8° and its solubility in 70% alcohol is 10 volumes. Bark oil contains cinnamic aldehyde (60-75%), eugenol (10%), benzaldehyde, methyl amyl ketone, phellandrene, pinene, cymene, nonylaldehyde, linalool, cuminaldehyde, caryophyllene and esters of butyric acid.

Root bark oil (2-3% of root bark) is another variety of essential oil from cinnamon. It is colourless, lighter than leaf oil with specific gravity 0.994 and optical rotation +50° and contains most of terpenoids.

Cinnamon oleoresin is prepared by extracting cinnamon bark with organic solvents, yield using ethanol is 10-12% and using benzene is 2.5-4.3%. Recently 1,1,2-trichloro-1,2,2-trifluoroethane is also used.

Side shoots growing from base are cut to encourage growth of more side shoots till whole plant assumes shape of a bush so as to maximize leaf production. For extraction of leaf oil, leaves and tender twigs are harvested every year during May and/or November. Wilting of harvested leaves in shade for 24 hours reduces bulk and increases oil recovery. Steam distillation for 4-6 hours gives an oil yield of 0.5 to 0.8% generally on a commercial scale.

