



A RARE MULTIPURPOSE PLANT

KALI HALDI

CULTIVATION GUIDE

INTRODUCTION



Curcuma caesia Roxb. (Common name, Black Turmeric) is a perennial herb of distinguishable bluish-black rhizome with a bitter and pungent smell and it is famous for its medicinal properties. In west Bengal, the rhizome of the plant is used in Kali Puja, and hence the plant is called **Kali haldi**. By etymology, Kali is the feminine form of Kala, which means black color and hence the plant is termed as black turmeric in English. This species has been regarded as endangered by the central forest department of India due to biopiracy.

Plants have a short stem with large oblong leaves. It bears ovate pyriform or oblong, ovate or cylindrical rhizomes, which are often branched and brownish yellow in color. The plant originates from India and South-East Asia. It grows in rich humid and clayey soils among them *curcuma longa*. It is widely cultivated as a medicinal plant in Southeast Asian countries. In India it is found in west Bengal, Madhya Pradesh, Orissa, Chhattisgarh and Uttar Pradesh. It flourishes well in moist deciduous forest areas.

The rhizome of kali haldi has a bitter, sharp, hot taste, and a pleasant odour. It has anti-bacterial and anti-fungal properties, and is laxative. It is used as a tonic for the brain and the heart. Rhizomes are useful in treating leucoderma, piles, bronchitis, asthma, tumors, and tuberculous glands of the neck, enlargement of the spleen, epileptic seizures, inflammations, and allergic eruptions.

Black turmeric is a rare herb. It is the underground portion of the stem, or rhizome, of the *Curcuma caesia* plant. The plant itself is sometimes grown as an ornamental, but the root has been used for centuries for medicinal and religious purposes. Black turmeric offers benefits similar to the orange variety, but the darker cultivar contains higher concentrations of curcumin than any other *Curcuma* species. In Hindi, the herb is called Kali Haldi. It is used widely in India for health and religious purposes.

MEDICINAL USES



Black turmeric contains the highest concentrations of curcumin of any plant species. It is a powerful antioxidant and anti-inflammatory. The root has been used medicinally for centuries to treat arthritis, asthma, and epilepsy. Black turmeric root is crushed and can be applied to bruises and sprains to ease discomfort or applied to the forehead to help relieve symptoms of migraines.

The rhizome of the plant is aromatic, contains essential oil and used for a variety of purposes. The characteristic pungent smell of the rhizome is due to the presence of essential oil rich in camphor and starch.

The rhizome is traditionally used in the treatment of hemorrhoids, leprosy, asthma, cancer, fever, wounds, vomiting, menstrual disorder, anthelmintic, aphrodisiac, gonorrheal discharges and inflammation. Furthermore, the smooth muscle relaxant, anti-tumour and anti-oxidant properties of *Curcuma Caesia* rhizome extract had been reported.



Scientific classification

Kingdom	Plantae
Class	Magnoliopsida
Order	Zingiberales
Family	Zingiberaceae
Subfamily	Zingiberoideae
Genus	Curcuma

Vernacular names

Hindi	Kali Haldi
Manipuri	Yaingang Amuba or Yaimu
Marathi	Kali-halad
Telugu	Nalla Pasupu
Bengali	Kala haldi
Mizo	Aihang, Ailaihan
Assamese	Kalahaladhi
Malayalam	Kari manjal
Sanskrit	Rajani Nishaa, Nishi, Ratri.

PHYTO-CONSTITUENTS



Phytochemical Screening of n-hexane, petroleum ether (60:80), benzene, chloroform, ethyl acetate, methanol, and water extract of rhizome *Curcuma caesia* revealed the presence of alkaloids, phenols, phytosterols, terpenoids, carbohydrates, tannins, glycosides, saponins, quinones, amino acids, oils and flavonoids.

About 30 volatile oil components were identified in the rhizomes of *Curcuma caesia* by GC-MS, representing 97.48% of the oil, with camphor (28.3%), ar-turmerone (12.3%), (Z)-Ocimine (8.2%), 1-ar-curcumene (6.8%), 1, 8-cineole (5.3%), element (4.8%), borneol (4.4%), bornyl acetate (3.3%) and curcumene (2.82%) as the major constituents. Rastogi et al reported linalool as the major component comprising 20.42% followed by ocimine (15.66%), 1- ar-curcumene (14.84%), zingiberol (12.60%), 1, 8-cineole (9.06%), and borneol (7.4%) as major constituent.

GEOGRAPHICAL DISTRIBUTIONS



The plant originates from India and South-East Asia. It is widely cultivated as a medicinal plant in Southeast Asian countries. This plant is widely distributed in all over the India, however because of its rareness, it is now been cultivated for commercial purposes.

In India it grows in West Bengal, Madhya Pradesh, Orissa, Bihar, North-East and Uttar Pradesh, Andhra Pradesh, Maharashtra, Gujarat, Telangana, Karnataka, Kerala, Chattisgaarh, Tamil Nadu, Bihar, Delhi, Punjab, Haryana, Himachal Pradesh etc. *Curcuma caesia* is sparsely found in Papi Hills of East Godavari, West Godavari, and Khammam Districts of Andhra Pradesh.



TRADITIONAL USES



Traditionally, the rhizomes of *Curcuma caesia* are used in treating leprosy, cancer, wounds, impotency, fertility, tooth ache, vomiting, allergies, leucoderma, asthma, tumours, piles, bronchitis, enlargement of the spleen, epileptic, menstrual disorder, smooth muscle relaxant activity, anthelmintic, aphrodisiac, gonorrheal discharges, etc. The paste is applied on bruises, contusions and rheumatic arthritis pains in Manipur. Decoction of fresh rhizome as anti-diarrhoeic and to get relief from stomach ache. The Khamti tribe of Lohit district applied the paste of fresh rhizome in

case of snake and scorpion bite. In Assam fresh rhizome juice mixed with mustard oil and is given to cattles in dysentery. In Asian Rhizome of *Curcuma caesia* used for wound, pox & tumour.

PHARMACOLOGICAL ACTIVITIES

- Neuropharmacological activity,
- Anti-convulsant and Muscle Relaxant Effects,
- Smooth Muscle Relaxant and Anti-asthmatic Activity
- Anti-fungal Activity,
- Depressant and hypnotic activity,
- Antiemetic activity,
- Anthelmintic Activity.
- Locomotor Depressant,
- Anti-oxidant Activity,
- Analgesic Activity,
- Antimicrobial activity,
- Anti-Inflammatory activity,
- Anti-ulcerogenic activity,

CLIMATE



Curcuma Caesia usually grows in moist deciduous regions. It can be grown throughout the year if land is fertile and having good source of irrigation. However, the best season to plant black turmeric is monsoon or summer. It requires warm and humid climate to grow. Keep the kali haldi plant in partial sun in the warmer zones so as it prefers warm direct or indirect sun. one can grow kali haldi at 10°C to 45°C temperature.

SOIL



Rich organic soil that is moist and well-drained. It is grown on different types of soils from light black, ashy loam and red soils clay loam. However, it grows best in a well-drained sandy or clay loam. Keep the soil moist throughout the growing season from spring to fall and feeding with a liquid fertilizer in growing season is ideal. *Curcuma caesia* grows well in sandy loam, acidic soils of pH 4.5–6.5. It is a partial shade-loving species; however, it grows well in open sun under cultivated conditions.

VARIETIES

There is no recommended variety found in black turmeric, However, among the collected materials, accession no. IC-319760 (NBPGR) was found to give better rhizome yield.

LAND PREPARATION



The land is prepared during April - May. Before that soil is subjected to deep ploughing, tilling during March / April. Fertilizers and manure are mixed during April/ May. Raised beds are prepared keeping the bed size at 45-60 cm and height 25-30 cm. The raised beds are well irrigated before sowing the planting material. In kali haldi, roots are the major economic part. Thus, land should be prepared in such a way that it should not have any hindrance in the development of roots and get more length and girth for better quality. The land was ploughed once with mould board plough and

harrowed twice to bring the soil to fine tilth after receiving pre-monsoon rain. Nourish the soil with plenty of organic matter at the time of land preparation. After mixing all above fertilizer in soil the field is then levelled by planking.

Supplementing with organic manures and fertilizers like- Vermicompost- Which provide nutrition and earthworms to land, Neem Cake- It is organic insecticide, which is helpful to eradicate all soil borne insects, Gypsum- It acts as a conditioner to the soil which results in soil aeration and Trichoderma- This is fungicide which is very useful to destroy all soil borne harmful fungus. These all are beneficial in getting a good yield of the crop

AGRO-TECHNIQUE

(A) Propagation

Rhizome/ bits or kand is the only propagation/ planting material in kali haldi. Mature and healthy rhizomes are collected before plantation and used as a planting material. Our organization provides a good quality planting material as well as organic fertilizers to the growers.

Rhizomes can be planted in two ways-

- Direct Sowing- it is the popular way of sowing black turmeric for which beds are prepared of height minimum 1 feet and 1 or 2 feet wide and rhizomes are planted by keeping 2 feet x 2 feet spacing between row to row and plant to plant.
- Nursery Preparation- Nursery is prepare 25-30 days before of plantation, where rhizomes are sowed to make its plant. After plant gets about 1 feet height then it is transplanted to main land by keeping 2 feet x 2 feet spacing between row to row and plant to plant.

(B) Seed Rate

For on acre land 10,000 rhizomes are required at the spacing of 2 feet x 2 feet.

(C) Sowing Technique

It mandatory that rhizomes should be sowed minimum 2-3-inch-deep in soil at the time of sowing and immediate irrigation is required up to germination.

(D) Seed Treatment

Seed treatment is given to selected rhizomes are using chemicals and biological agents. Seed treatment prevents pest attack after sowing. Biological agents such as *Pseudomonas florescence* and *Trichoderma viride* can be used for seed treatment. Copper fungicides are used as chemical treatment.

(E) Irrigation

Kali haldi required a good source of irrigation in field. Around 2-3 irrigations are required during summer and winter, there is no need of irrigation in rainy season. Also, it depends on climatic conditions and soil quality. Over watering should be avoided.

(F) Weeding

The use of plastic mulching paper/shit is recommended to check the growth of weed and also use pre-emergence and post-emergence weedicides are suggested. However, manual weeding can be done if mulching shit is not used. Green mulch is also can be used to avoid weeds in land. Pruning is not necessary, taking dried leaves off will be sufficient.

(G) Pest and Diseases

Thrips, Nematode, Ants, Termites, Rhizome rot, Blotches in leaves and Leaf spot are sometimes observed in kali haldi cultivation. Use of organic and bioagents are recommended in this plantation.

(H) Intercropping

Kali haldi is grown as a single crop. but it may be intercropped beneath widely interrupted canopy trees, like Moringa, Amla and Mango etc.

HARVEST MANAGEMENT

- **Crop maturity and harvesting:** The crop takes about eight to nine months to mature. Harvesting is done in mid-February to March. Before digging the rhizomes, soil is moistened through irrigation, so that the rhizomes are not injured. Injury to the rhizomes may cause decay of the harvest.
- **Post-harvest management:** there is no specific requirement of any drying or other operation after harvesting. Only soil should be washed with clean water before storing it or sending it for selling.
- **Yield:** Estimated yield of fresh rhizomes is about 8000-9000 Kilograms per acre.



DOCUMENTATION OF ACTIVITIES

The documentation of all the activities starting from cultivation to post-harvest processing should be in the continuation and maintained properly. Records should be kept for each activity of cultivation such as sowing, weeding, irrigation, harvesting, and of post-harvest processing after harvest to sorting, drying, grading, packing and storage, with details of time and type of activity that refers to a complete history and ensure traceability of the final product.

PER ACRE COST OF CULTIVATION

S.N.	PARTICULARS	ACTIVITY	AMOUNT (RS.)
1	Land Preparation	Deep Ploughing, Leveling and other	10,000/-
2	Manure/ Fertilizers	Vermicompost, Neemcake, Trichoderma	30,000/-
3	Planting Materials	400 Kilo Rhizomes @ Rs.350/per kg	140,000/-
4	Irrigation	--	10,000/-
5	Intercultural Operation	Weeding, hoeing and other	10,000/-
6	Sowing	To sow rhizomes in the field	15,000/-
7	Harvesting	Digging our rhizomes	20,000/-
8	Post-Harvest Management	Washing and transportation	10,000
9	Electricity	To operate the drip system	5,000/-
Total Expenses			2,50,000/-

PER ACRE OUTPUT

YIELD PER ACRE	BUYBACK PRICE/KG	TOTAL SELLING PRICE
7000 Kg (wet mature rhizome)	Rs.90/Kg	6,30,000/-
Total Expenses		2,50,000/-
Total Income		3,80,000/-

Contact for More Information

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