



E-CONTENT

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Topic: Cultivation & Uses of *SPICES*-Turmeric, Coriander & Ginger

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TURMERIC / HALDI

(*Curcuma longa*; Family: Zingiberaceae)

One of the most essential and necessary spices in an Indian household is turmeric. The uses of turmeric are vast. It is a component in meals, medications, colours, condiment, dye, drug and cosmetic in addition to its use in religious ceremonies. It requires sandy and clay soil that drains well. Additionally, it thrives on alluvial, medium-black, or red soils. Turmeric is another crop that India produces in large quantities. Andhra Pradesh, Tamil Nadu, Orissa, Karnataka, West Bengal, Gujarat, Meghalaya and Assam are some of the important states of India cultivating turmeric. The majority of the nation's production of turmeric, or about half, is produced in Andhra Pradesh.

Turmeric ranks 4th as foreign exchange earner among the spices after Pepper, Cardamom and Ginger.

BOTANY:

Curcuma has 42 species. *C. longa* is cultivated in large area in A.P. *C. aromatica* is grown in some parts of India locally known as **Kasturi** used for the preparation of **Kumkum**. Erect herbaceous perennial 60-100 cm rhizome with fingers. Rhizome is brown on outside and dull orange inside. Leaves are broadly lanceolate with long leaf stalk.



Varieties: Varieties belong to three categories.

VARIETIES

S. No.	TYPE	DURATION	Examples
1.	Long duration types	9 months	Duggirala, Tekurpeta, Armor and Mydukur, CLL 324, 326, 327.
2.	Medium duration types	8 months	Kothapet, Krishna, Kesari, CLL 317.
3.	Short duration types	6-7 months	Amalapuram, Dindigram, PCT – 13 (Suguna), PCT – 14 (Sudarshan).

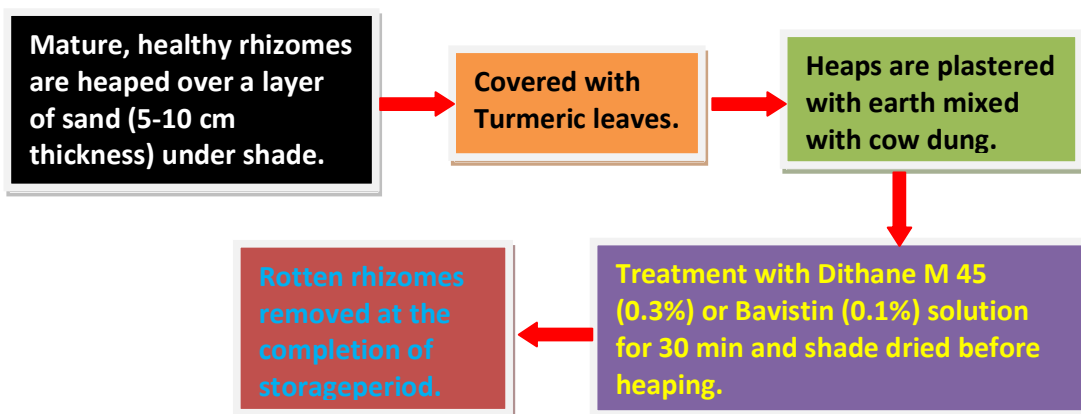
ARMOOR is the popular type in Nizamabad

KASTURI and **KESARI** are good in Curcumin content, but poorer in curing percentage.

Propagation:

Through *Rhizomes, Mother rhizomes, Cut mothers, Primary fingers*. Planting primary fingers has become a common practice in Andhra Pradesh, because they keep better in storage, more tolerant to wet soil and involve low seed rate.

Preservation of seed rhizomes:



Climate:

Tropical herb. Grows well 1200 m above MSL. Requires warm and moist climate. Rainfall 100 to 200 cm. Temperature range preferable is 20 to 30⁰ C.

Soils:

Can be grown on various soils. Thrives best in well drained, friable, rich sandy or clay loam soils. Crop stands neither water logging nor alkalinity.

Preparation of land:

To get fine tilth up to 20-25 cm depth, 4-6 deep ploughing is needed. Field is laid out into beds or ridges and furrows. Bed system gives higher yield by 54 to 80%. Beds of 1 m width and convenient length with a spacing of 40 to 50 cm between beds where natural drainage does not exist, ridges and furrows are prepared at 45 to 60 cm spacing.

Time of sowing:

Short duration varieties: Second fortnight of May.

Mid duration varieties: First fortnight of June.

Long duration varieties: Second fortnight of June to second fortnight of July.

Seed rate: Mother rhizomes 2000 – 2500 kg/ha

Primary fingers 1500 to 2000 kg/ha

Spacing:

Red loamy soils – 30 x 15 cm

Black heavy soils – 46 x 23 cm

Method of sowing: In ridges and furrow system, sown behind the plough. In bed system, rhizomes are dibbled at 5-10 cm pits. Treatment with dithane m 45 (0.3%) for 30 minutes is must before sowing. Germination starts in 10-20 days and will be over by 60 days.

Mulching: To protect sprouts.

To conserve moisture.

To reduce weed growth.

To enhance germination by mulching with dry leaves. Mulch with dry leaves thickly on which a layer of cow dung is spread. Second mulching is done after weeding and application of fertilizers, after 50 – 60 days of sowing.

Irrigation:

A good irrigation is given immediately after sowing. Thereafter, irrigate at weekly interval.

Manuring:

- 20-25 to of FYM during land preparation.
- 60 kg N, 60 kg P, 60 kg K/ha before planting the rhizomes.
- 60 kg N -----65 kg K/ha 60 das.
- 60 kg N -----per ha 120 das.
- 50% of top dressed Nitrogen may be applied in the form of oil cakes. Top dressing should be completed within 120 days after sowing.

After fertilization, the field is given a light hoeing and the clumps are earthed up and irrigated.

Weeding:

Three to four weedings are required at 60, 90, 120 and 150 days of planting. Weeding and hoeing are done simultaneously. Plants are earthed up and mulch is replaced. Provision of shade by raising *Castor* on bunds and within the crop. *Dhaincha* is also grown for shade purpose.

Intercrops:

Maize or Chillies are grown as inter crops. Turmeric can also be raised as an inter crop in coconut and arecanut plantations.

Rotations:

Turmeric is a heavy feeder. Hence depletes soil nutrients. Continuous cropping results in build up of diseases. It is rotated with rainfed paddy, sugarcane, banana, betelvine and vegetables.

Harvesting:

Depending upon the varieties, the crop comes to harvest in **7-9 months**.

1. Main season of harvesting falls in February-April.
2. Maturity indication is complete yellowing and drying up of plants.
3. Above ground parts are cut close to the ground level.
4. Field is irrigated 1-2 days in advance of harvesting the crop.
5. Crop is harvested by Ploughing or digging.
6. Rhizomes are gathered by hand picking and cleaned.
7. Rhizomes are washed.
8. Mother rhizomes are separated from the fingers before they are cured.

Yield: Indian average yield is 20,000 to 22,000 kg/ha.

Processing:

Fresh rhizomes are not useful for marketing. Curing makes fresh rhizomes marketable. Curing involves **boiling, drying** and **polishing**.

A. Boiling: Boiling is done either by traditional/improved method.

a. Traditional method:

Water is poured to cover rhizomes in the vessels of copper or galvanized iron or earthen material. Mother rhizomes and fingers should be boiled separately, since fingers take long time for boiling. Stop boiling when froth, fumes with typical odour comes. Over cooking should be avoided as it spoils the colour, while under cooking renders the dried product brittle.

b. Improved method:

Fifty kg of cleaned rhizomes are taken in a perforated trough made of GI sheet. It is immersed in a pan. Alkaline solution **0.1% Sodium carbonate/Sodium bicarbonate** is poured in the trough. Boil till fingers become soft. Alkaline solution helps in imparting orange yellow colour to the core.

B. Drying:

The boiled rhizomes are sun dried. Dry until they become hard, brittle, break with a metallic sound. After drying they should possess only 8 – 10 % moisture.

C. Polishing:

Dried rhizomes are smoothed by manual or mechanical rubbing. Manually they rubbed on hard surface or trampled under feet. Mechanically they are polished by mechanically operated polishing drums.

D. Colouring:

Rhizomes are coloured to improve the appearance.

Rhizomes are artificially coloured in **two ways**. Dry and Wet colouring.

Half polished fingers are coloured.

In dry process – turmeric powder is added in the last 10 min to polishing drum.

In wet process – turmeric powder is suspended in water and mixed by sprinkling.

For bright colour – boiled, dried, half polished fingers are taken in baskets and shaken continuously with an emulsion of-

-2kg turmeric powder,

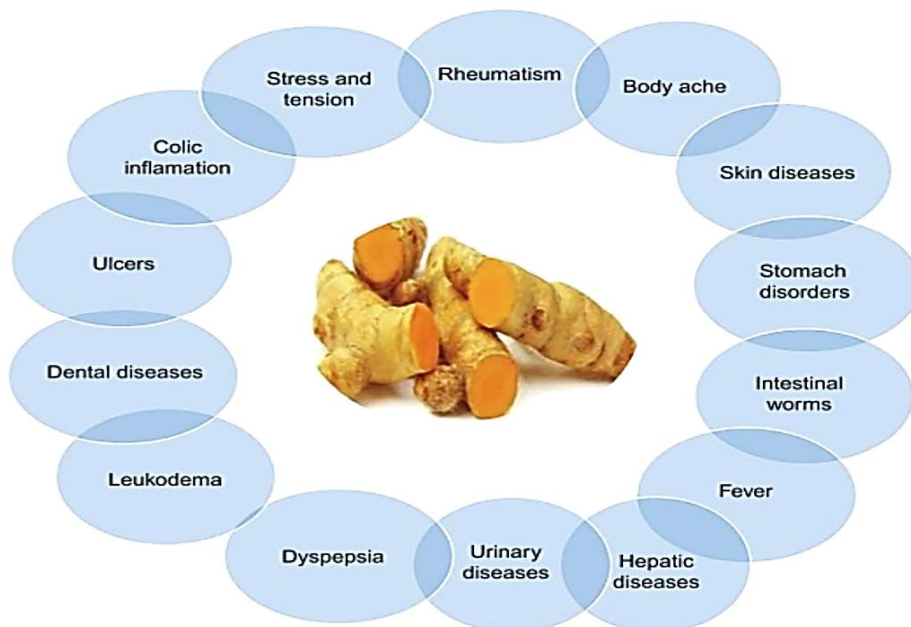
-0.04 kg alum,

-0.14 kg castor seed oil,

-30 g of Sodium bisulphate and

-30 ml HCl.

Coloured rhizomes are again sun dried before sending to market.



CORIANDER/Dhania/Cilantro

Coriandrum sativum

Family: Apiaceae;

Origin: Mediterranean region

Plant part used: Leaves and Fruits



Experts believe that coriander is used back to at least 5000 B.C. References to coriander can be found in Sanskrit writings, and the seeds were placed in Egyptian tombs. Coriander even rates a mention in the Old Testament, in which the manna provided to the Jews fleeing Egypt was described as being like coriander seed. Coriander was one of the first herbs grown by American colonists of Massachusetts. Seventeenth century Frenchmen used distilled coriander to make a type of liquor.

One of the most popular spices, particularly for dish garnishing. Coriander is mostly cultivated in Gujarat, Madhya Pradesh, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Karnataka and Rajasthan in India. Coriandrum is cultivated both for seed and leaves.

Botany:

Coriander plant is a thin stemmed, small, bushy herb, 25 to 50 cm in height with many branches and umbels. Leaves are alternate and compound. The whole plant has a pleasant aroma. Inflorescence is a compound umbels, comprises 5 smaller umbels. Fruit is globular, 3 to 4 mm diameter, when pressed break into two locules each having one seed. Fruit has delicate fragrance; seeds are pale white to light brown in colour.

Improved varieties:

- Lam CS 2 - Sindhu;
- Lam CS 4 – Sadhna;
- Lam CS 6 – Swati;
- Lam CS – 7

Climate: It can be grown under tropical and subtropical conditions. It requires cool climate in early stages and warm dry weather at maturity. It needs dry and cool weather free from rains at flowering and fruit setting stage. Heavy rains effect the crop.

Soil:

Well drained soil, moisture retentive, humus rich soils are essential. It can be grown in sandy loams to heavy black cotton soils. Heavy Black cotton soils of Deccan and South India are particularly suited.

Land preparation:

For rain fed crop plough 3-4 times. For irrigated crop plough twice or thrice. After ploughing is complete, the land is laid out into beds and channels.

For leaf purpose the crop is grown throughout the year (except March-May). For grain purpose the crop is grown during rabi season in A.P. and north and central India, for kharif in Tamil Nadu and Madhya Pradesh. Sometimes it is grown as a mixed crop in cotton and pulses.

i). **Sowing time:** For rabi crop mid October to middle of the November. For Kharif crop June-July to August-September.

ii). **Seed rate:** It needs 12-15 kg/ha in A.P. Crush or trample the seeds gently to separate mericarps. Soak the seeds in water for 12-21 hours. Treat with Thiram@2g/kg seed. Shade dry before sowing.

iii). **Method of sowing:** Broadcast sown for rainfed crop. A spacing of 3-40 cm x 15 cm is adopted for an irrigated crop. Germination starts within 10-15 days and will be over by 30 days.

Irrigation: A post sowing irrigation is to provided. Afterwards, the crop has to irrigated at two leaf stage, at branching stage, at flowering stage and seed filling stage.

Manuring:On fertile Black Cotton soils, it is not generally manured. During rabi season in A.P. 10-15 tonnes FYM; 20-30 kg N; 40 kg P₂O₅; 20 kg K₂O/ha is applied as basal dose. 20-30 kg Nitrogen is given at flowering under irrigated conditions.

Interculture:Maintain weed free conditions during first 30 days. First weeding is done within 30 days after sowing. Second weeding is done before the rows close up. Inter cultivate twice with a cultivar at monthly interval.

Harvesting:

The crop will be ready for harvest in 18-120 days. Kharif crops comes to harvest earlier than Rabi.

Harvesting:

Green colour turn to straw coloured. If harvesting is delayed, seeds shattered, fruits splitted. Plants are cut or pulled. Tied in bundles. Piled in shade for drying to avoid grain shattering and loss of essential oil. After 2-3 days of shade drying, the grain is threshed, winnowed and sundried. The moisture content is reduced from 2 to 6%. The cleaned, dried produce is stored in gunny bags lined with white polythene.

Uses:The young plant is used for flavouring and garnishing curries and soups. The fruits (seeds) are widely used as condiments with or without roasting in the preparation of curry powders, sausages and seasonings. It is an important ingredient in the manufacture of food flavourings, in bakery products, meat products, soda & syrups, puddings, candy preserves and liquors. In medicines, it is used as a carminative, refrigerant, diuretic, and aphrodisiac. In household medicines, it is used against seasonal fever, stomach disorders, and nausea. Coriander oil and oleoresins are primarily used in seasonings for sausages and other meat products.

GINGER / ADRAK

(*Zingiber officinale* Rosc.; Family: Zingiberaceae)





Ginger is a herbaceous rhizomatous, perennial plant but largely grown as annual. Height varies from 30-90 cm. The underground stem (Rhizome) grows horizontally, thick, flattened, branched, covered with small scales leaves and fibrous roots. Rhizome is used as a spice. Cultivation requires temperature range of 10 to 25 °C and is grown in tropical and subtropical climates. **India contributes up to 80% of the global supply of ginger as the top producer in the globe.** The main producers in India are Mizoram, Meghalaya, Kerela, Sikkim, and West Bengal, with Kerela being the largest (>40 %). Dried rhizomes scraped or peeled are greatly esteemed for their aroma, flavour and pungency.

Important varieties:

Varieties are named after their places. They are mainly clones. High Altitude Research Station, Pottangih has released the following varieties.

1. **Suprabha;**
2. **Suruchi;**
3. **Surari.**

Propagation: Propagated by **seed rhizomes**. Rhizomes are cut into small pieces (setts) of 2.5 to 5.0 cm, having one / two buds.

Climate: It requires warm humid climate. It grows upto 1500 m above MSL. It requires moderate rainfall from sowing to sprouting. It requires fairly heavy and well distributed rains during crop growth period. It requires dry weather from 28 – 35°C for about a month before harvesting during crop growth period.

Soil:

It requires deep, well drained, humus rich soil. It is sensitive to water logging. It can be grown well on sandy loams, clay loams and laterite soils.

Mulching:

In ginger cultivation, mulching the field is an important operation. Mulching has several advantages, viz. Source of organic manure, Prevention of soil removal, Conserve soil moisture, Smoothers weed growth, Improves the physical properties of soil, Protects the setts and sprouts from hot sun and Provides favourable conditions for the sprouting of the setts.

Irrigation: Irrigation required at 4-10 day interval.

Manuring: At the time or before planting 25 – 30 tonnes of cattle manure, 50 kg P₂O₅; 25 kg K₂O are applied as basal dressing. At 60 and 90 days after planting Nitrogen is applied in two splits @ 37.5 and 37.5 kg/ha along with 25 kg K₂O.

Harvesting: For Green Ginger: 6 months after planting.

For Dry Ginger: 8 months after planting, when leaves turn yellow and start drying between 245 to 260 days.

For Preserved Ginger: 7 months after planting. Before they fully mature, after which they become more fibrous.

Light irrigation is given before harvesting. Dig the plants carefully. Soak them overnight. Wash thoroughly. Sundry for a day or two before marketing as green ginger.

Yield: Average yield under rain fed condition is 10-15 tonnes / ha.

Average yield under irrigated condition is 15-25 tonnes / ha.

Processing:

A. Dry Ginger: For the preparation of commercial dry ginger a series of steps are required. Fully developed rhizomes are harvested after 8 months of planting for preparation of Dry Ginger.

1. **Soaking in water:** The rhizomes are soaked overnight in cement tubs for easy removal of skin.
2. **Trampling:** The rhizomes are trampled under feet in the tub.
3. **Peeling:** The skin is peeled off, with sharp bamboo knives.
4. **Washing and Drying:** The peeled rhizomes are washed and sundried for 3-4 days on cement floors.
5. **Polishing:** After drying the rhizomes are polished by rubbing with a coarse cloth to remove all bits of skin or dirt. These are called **unbleached ginger**. To get **bleached Ginger**, peeled rhizomes are soaked in **2% lime water** for 6 hours, fumigated with **sulphur** for 12 hours.

Yield of dry Ginger is **16 to 25%** of the fresh Ginger.

B. Preserved Ginger: Ginger is harvested at **7 months** after planted for preparing the Preserved Ginger. It is preserved in syrup or brine.

GINGER

Preservation of Seed Rhizomes:

1. Ginger rhizomes are harvested during December – January.
2. They are to be planted during April – May. Hence, there is a need to preserve the seed rhizomes for a period of about 4 – 5 months.
3. The selected healthy rhizomes are treated with a solution of **0/1 % Quinolphos** and **0/3 % Dithane M 45** for 30 min.
4. The rhizomes are stored in pits dug in a cool and protected place.
5. Pits of 1 m depth, 1m width and of convenient length are prepared.
6. Walls are plastered with cow dung.
7. Layer of sand is spread at the bottom of the pit.
8. Layer of rhizomes are alternated with dry sand or saw dust layers.
9. Some gap is left at the top for aeration.
10. Pits are covered with wooden planks giving one or two holes for aeration.
11. Entire pit is plastered with mud leaving a hole.

USES of Ginger

Ginger has been used for culinary, medicinal, and other purposes for centuries. Its versatile uses include:

- ✚ Culinary Uses: Ginger is a popular spice in various cuisines worldwide. It adds a unique flavour and aroma to dishes and is used fresh, dried, or powdered in both sweet and savory recipes.
- ✚ Medicinal Uses: Ginger has long been valued for its medicinal properties. It is known for its potential anti-inflammatory, antioxidant, and digestive benefits. Ginger is commonly used to alleviate nausea, reduce muscle pain, and support overall digestive health.
- ✚ Beverage ingredient: Ginger is used to make ginger ale, and other beverages due to its distinctive taste and potential health benefits.
- ✚ Traditional Remedies: In many cultures, ginger has been used as a traditional remedy for various ailments such as colds, flu, indigestion, and motion sickness.

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