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Turmeric (*Curcuma Longa*) Cultivation in India

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Turmeric is the dried rhizome of *Curcuma longa*, an herbaceous plant. The rhizome has 1.8-5.4% *curcumin*, the pigment and 2.5-7.2% of essential oil. It is used as an important condiment and as a dye with varied applications in drug and cosmetic industries. In India, Andhra Pradesh is the leading state followed by Maharashtra, Tamil Nadu, Orissa, Kerala and Bihar. It is principal ingredient in Indian culinary and used as flavouring and colouring agent. It is used in drug and cosmetic industry because of its anti-cancer and anti-viral property. Turmeric has special place in religious and ceremonial occasions. Rhizomes are used for propagation.

Soil

It gives best results, when grown on well drained loamy soils also in sandy or clay loam or red loamy soils. Avoid water stagnation in field as it cannot survive in water logged conditions.

Popular Varieties with Their Yield

Punjab Haldi 1, Punjab Haldi 2, Amalapuram, Armour, Dindigam, Erode, Krishna, Kodur, Vontimitra, P317, GL Purm I and II, RH2, RH10, Rajapuri, Salem, Sangli turmeric and Nizamabad bulb.

Land Preparation

Prepared field by ploughing land, two - three times. After ploughing do planking operation. For turmeric planting, beds of 15cm height, 1m width and of convenient length are prepared. Keep distance of 50cm between beds.

Sowing

To get higher yield, complete rhizome sowing in field by April end. It is also raised by transplanting method, for that rhizome transplantation should be completed within first fortnight of June. For transplanting 35-45 days old seedling is used. Sow rhizomes in line and keep distance of 30 cm between the row and 20 cm between two plants. After rhizome planting, straw mulch @ 2.5 ton/acre is applied in field. Depth of soil should not exceed 3 cm.

Direct sowing and transplanting method is used for planting. For sowing, select fresh and diseased free rhizomes (mother rhizomes as well as fingers) are used. Seed rate of 6-8 quintals is sufficient for sowing one acre land. Before sowing, carry out rhizome treatment with Quinalphos 25EC @20ml + Carbendazim @10gm/10Ltr of water and prepare solution. Then dip rhizomes for 20min in solution. It protects rhizomes from fungal infestation.

Fertilizer

At the time of field preparation, apply well decomposed cow dung @150 q/acre in soil. Apply N:P:K @10:10:10 kg/acre in form of Urea @25 kg/acre, SSP @60 kg/acre and MOP @16 kg/acre. Full dose of Potash and Phosphorus are applied at time of rhizome planting. Nitrogen dose is given in two equal splits. First half dose of N is given 75 days after planting and remaining half dose is given three month after planting.

Weed Control

Apply Pendimethalin 30EC @800ml per acre or Metribuzin 70WP @400gm/acre in 200 litre of water within two - three days after planting rhizomes. After weedicide application, cover field with green manure or paddy straw. Earthing up operation is carried to enhanced root development. After 50-60 days of planting, carry out first earthing operation and next should be done after 40 days.

Irrigation

It is grown as rainfed crop so provide irrigation depending upon rainfall intensity and rainfall frequency. For light textured soil, in whole life cycle, 35-40 irrigations are required. After planting, crop is mulched with green leaves @40-60q/acre. Repeat mulching @30q/acre after every fertilizer application.

Plant Protection

A) DISEASE AND THEIR CONTROL:

Blight and leaf spots: If infestation of blight and leaf spot is observed, take spray of Mancozeb @30 gm or Carbendazim @30gm in 10 litre water by interval of 15-20 alternatively. Or spray with Propiconazole @2ml/litre of water.

Root or Rhizome Rot: To prevent crop from root rot, drench crop with Mancozeb @3gm/litre at 30, 60 and 90 days after planting.

Bacterial wilt: To prevent crop from bacterial wilt, drench plants with Copper oxychloride @3gm/Litre of water immediately after disease is seen in field.

Leaf Blotch: If infestation is observed to control take spray of Mancozeb @20gm or Copper oxycloride @25gm/10Ltr of water.

B) PEST AND THEIR CONTROL

Rhizome fly: If Infestation of rhizome fly is observed in field, to control take spray of Acephate 75SP @600gm in 100 Litre of water. Repeat the spray with 15 days interval.

Sucking pest: To control sucking pests take spray of neem based pesticide like Azadirachtin 0.3EC @ 2 ml/Litre of water.

Shoot borer: If infestation of shoot borer is observed, take spray of Dimethoate @250ml/150Ltr or Quinalphos @250ml/150Ltr of water to control shoot borer.

Harvesting

Depending upon the variety, the crop becomes ready for harvest in seven to nine months. The land is ploughed and the rhizomes are gathered by hand picking or the clumps are carefully lifted with a spade. Harvested rhizomes are cleaned of mud and other extraneous matter adhering to them. The average yield per hectare is 20-25 tonnes of green turmeric.

Processing

Curing

The fresh turmeric is cured before marketing. Curing involves boiling of fresh rhizomes in water and drying in the sun. The mother rhizomes and the fingers are generally cured separately in the traditional method, the cleaned rhizomes are boiled in copper or galvanized iron or earthen vessels, with water just enough to soak them. Boiling is stopped when froth

comes out and white fumes appear giving out a typical odour. The boiling lasts for 45-60 minutes when the rhizomes are soft. In the improved scientific method of curing the cleaned fingers (approximately 50kg) are taken in a perforated trough of size 0.9 X 0.55x0.4m, made of GI or MS sheet with extended parallel handle. The pan is then plunged in the perforated through containing the lingering. The alkaline solution (0.1% sodium carbonate or sodium bicarbonate) is poured into the trough to immerse the turmeric fingers. The whole mass is boiled till the fingers become soft. The cooked fingers are taken out of the pan by lifting the trough and draining the solution into the pan. The cooking of turmeric is to be done within two to three days after harvesting. The cooked fingers are dried in the sun by spreading 5-7 cm thick layers on bamboo mat or drying floor. During night time, the materials should be heaped or covered. Drying is completed in 10-15 days.

Polishing

The appearance is improved by smoothening and polishing outer surface by manual or mechanical rubbing. The improved method is by using hand operated barrel or drum mounted on a central axis, the sides of which are made of expanded metal mesh. When the drum filled with turmeric is rotated at 30 rpm, polishing is effected by abrasion of the surface against the mesh as well as by mutual rubbing against each other as they roll inside the drum. The turmeric is also polished in power-operated drums. The yield of polished turmeric from the raw materials varies from 15-25%.

Colouring

In order to impart attractive yellow colour, turmeric suspension in water is added to the polishing drum in the last 10 minutes. Composition of emulsion for colour coating of 100kg of half boiled turmeric is Alum 0.04kg, turmeric powder 2kg, castor seed oil 0.14kg, sodium bisulphate 30g, concentrated hydrochloric acid 30ml. When the rhizomes are uniformly coated with suspension, they may be dried in the sun.