

TURMERIC: PROTRAY TECHNOLOGY

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Introduction:

Turmeric (*Curcuma longa* L.) is a tropical perennial rhizomatic spice crop belonging to the family Zingiberaceae and triploid species ($2n = 3x = 63$) commonly used as a spice, cosmetics and natural food dye. Turmeric is one of the most important ancient spices grown in India which plays an important role in the national economy. India is hub of spices as well as the largest producer and exporter of turmeric in the world and accounts for more than 46 per cent of the world trade. The highest genetic diversity is concentrated in India and Thailand, with at least 40 species in each area, followed by Burma, Bangladesh, Indonesia and Vietnam. Turmeric is also known as the “golden spice” as well as the “spice of life”. It is still used as a symbol of well-being and widely used in ceremonies and religious functions. Turmeric is valued for its deep yellow colour (0.2-8% curcumin) pungency (2.2-4.2% termerol) and aromatic flavour of volatile oil (1.5-5%). During Vedic period turmeric referred as “earthy herb of the Sun” with the orange-yellow rhizome it was regarded as the “sacred spice” (Reshma *et al.*, 2020).

Turmeric is commonly propagated through rhizomes. Hence, large quantity of rhizome is required because of the low efficiency of vegetative propagation. The availability of quality planting material is also low during the cropping season (June - September). In order to overcome these problems, a technology on rapid multiplication of turmeric using single bud rhizome has been standardized at TNAU, Coimbatore. In this protray technique of turmeric, planting material requirement will be reduced; about 25 per cent of planting material requirement can be reduced. As rhizome is cut and used for the preparation of planting material, the diseased rhizome can be eliminated. So, it helps in screening of rhizomes for diseases and the planting material will be disease free. Due to these advantages,

the turmeric transplants derived from rhizome bud can be selected as the planting material for turmeric cultivation which will augment the turmeric cultivation with good propagating materials and also increase the farm income. It is not only a simple technique for adoption, but also accounts high success rate.

Brief review on single node cutting of Turmeric

Hossain *et al.*, (2005) studied on effects of seed rhizome size on growth and yield of turmeric (*Curcuma longa* L.) they opined that seed rhizomes with a greater diameter developed vigorous seedlings. The plants grown from 30 -40 g and 50 g shows maximum in plant height (140 cm) tiller number (3.5) and leaf number (12-14/plant) shoot dry weight (40 g/plant) which were significantly higher than those from lighter rhizome.

Malhotra *et al.*, (2016) reported that single bud techniques of turmeric for seedlings production in portray was more beneficial as compared to direct planting method.

Comparison of direct planting and transplanting (single bud rhizome) method of turmeric on sprouting and vegetative phases of the plant

Growing phase	Direct planting method (whole seed)	Transplanting method (single bud rhizome)
1. Sprouting phase	20 DAP	Plants have 3-4 leaves (1 month old)
2. Vegetative phase		
i. One month after planting	2-3 leaves per plant	6-7 leaves per plant
ii. Tillering stage	3 MAP	1 ½ - 2 MAP
3. Rhizome development phase	Starts from 5 MAP	Starts from 3 MAP
4. Rhizome maturation phase	7-9 MAP	6-7 MAP

Source: Malhotra *et al.*, 2016

Planting of turmeric by traditional way required more amount of quality planting material but less availability and highest cost are the main constraint. Even though, it takes nearly five to six months for rhizome development along with better crop establishment.

Hence, to overcome these constraints rapid multiplication of turmeric through single bud method is one of the best methods (Thapa *et al.*, 2017).

Method of planting in portray

- Select healthy turmeric rhizomes for seed purpose. Treat the selected rhizomes with mancozeb (0.3%) and quinalphos (0.075%) for 30 min and store in well ventilated place.
- One month before planting, the seed rhizomes are cut into single buds with small piece of rhizomes weighing 5- 7 g.
- Treat the single bud sprouts (mancozeb 0.3%) for 30 min before planting
- Fill the pro-trays (98 well) with nursery medium containing partially decomposed coir pith and vermicompost (75:25), enriched with PGPR/Trichoderma 10g/kg of mixture.
- Plant the turmeric bud sprouts in pro-trays. Maintain the pro-trays under shade net house (50%). Adopt need based irrigation with rose can or by using suitable sprinklers.
- Seedlings will be ready within 30-35 days for transplanting (Indian Institute of Spices Research, Kozhikode).

Advantages in single bud rhizome method of planting

- ✓ Reduction in the requirement of seed rhizome quantity by 25 per cent .
- ✓ Saving huge quantity of rhizome which can be used for commercial purpose.
- ✓ Reduction in the cost of planting material.
- ✓ Saving land usage 1-2 months from normal duration period of the crop.
- ✓ Overcoming the disease incidence and also a screening for disease infected materials.
- ✓ Effective biological control of diseases.
- ✓ Early rhizome development (starts from three months after planting).
- ✓ Overcoming the delay in monsoon arrival up to 1-2 months.
- ✓ Production of disease free planting materials.

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