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Influence of different growing media on rapid multiplication of turmeric (*Curcuma longa*) by protray technique

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Abstract

An experiment was carried out to study the “Influence of different growing media on rapid multiplication of turmeric (*Curcuma longa*) by protray technique ” was carried out in kalavai, Ranipet district. The experiment was carried out in Completely Randomized Design (CRD) with 11 treatments. In this study, the different treatments comprising of T1: Red soil, T2: Coir pith, T3: Red soil + FYM (1:1), T4: Red soil + Vermi compost (1:1), T5: Coir pith + FYM (1:1), T6: Coir pith + Vermicompost (1:1), T7: Red soil + Coir pith + FYM (1:1:1), T8: Red soil + Coir pith+ Vermicompost (1:1:1), T9: Red soil + FYM + Vermicompost (1:1:1), T10: Red soil + Vermicompost + FYM + Coirpith (1:1:1), T11: Control (Garden soil only). Turmeric minisetts is planted under various composition of media and observations were recorded for best media for rapid multiplication by protray technique. The study revealed that the T7 - Red soil + Coir pith + FYM (1:1:1) in turmeric recorded significantly good vegetative growth and when compared to other treatments and T1 - Red soil is recorded to produce least growth on turmeric plants. Observations were recorded on growth parameters including plant height, leaf area, root length, length of leaves, pseudostem girth, other yield and quality attributes.

Keywords: Turmeric minisetts, Protray technique, CRD, Growing media, Growth parameters.

Introduction

In India, spices occupy an important place among the agro products exported. *Curcuma longa* known as yellow turmeric (Manjal in Tamil) is a rhizomatous herbaceous plant belonging to the family Zingiberaceae, which is native to tropical South Asia is a valued spice and aromatic cum medicinal plant. It is also known as “Indian saffron” and has been widely used in ayurvedic medicines. Rhizomes of *Curcuma longa* are also used in medicines as a stomachic, carminative and emmenagogue, and recently as a health food in Japan. The principle compound Curcumin has anti-inflammatory, antioxidant, antiseptic, anticarcinogenic, antibacterial, antifungal, anticoagulant properties and used in drug industry and cosmetic industry. The essential oil obtained from turmeric is reported to have antifungal and antimicrobial activity and is used in the treatment of early stages of cervical cancer. Curcumin is the pigment that lends the bright stunning yellow colour to turmeric which can be used as a dye.

Indian turmeric is considered to be the best in the world. Erode, a city in the South Indian state of Tamil Nadu, is the world’s largest producer of and the most important trading centre for turmeric. Turmeric is normally propagated by dibbling the seed rhizomes (single nodal cuttings). The traditional method of propagation using 15g mother or seed rhizomes. Traditional method requires the seed rate of 2000-2500 kgha-1 of rhizomes if it is sown as a sole crop. It makes the cultivation expensive for large scale production. In turmeric, the sprouting, vigour and viability hold a direct relationship with the size of planting material and the media used for propagation. It also reduces seed cost by an average of 15 % and reduced the cost of cultivation while the yield and BCR was on par with that of seed rhizome planting. In this study, we evaluated the growth of turmeric under different growing medias. The medias used are red soil, vermicompost, coir pith, garden soil, Farmyard manure. So, the study we carried out on Influence of different growing media on rapid multiplication of turmeric (*Curcuma longa*) by portray technique and the objectives are;

- To evaluate the different media on growth of turmeric in pro-tray technique.
- To assess the different media on rooting of turmeric in pro-tray technique.

Materials and Methods

- **Crop:** Turmeric (*Curcuma longa*)
- **Design:** CRD (Completely Randomized Design)
- **Variety:** Salem local

For the rapid multiplication of turmeric minisetts using different media in pro-tray nursery, rhizome bits with two nodes were prepared from mother rhizomes of turmeric (*Curcuma longa*). The two node rhizome bits were subjected to different pre sprouting treatments with chemicals or growth regulators to find out the better sprouting treatments. Numbers of rhizome bits sprouted were recorded in weekly intervals. Best growing media is selected according to the readings taken.

Rhizome bit with two nodes were selected for the experiment. The rhizome bits were planted separately in pro-trays of 5 cm diameter plug holes filled with different propagation media. The pro-trays were kept in a shade house and irrigated regularly using rose can and the seedlings from the rhizome bits were examined regularly for

its growth under the different propagating media to find out the effect of type of media on the growth of turmeric sprouts.

Experimental Design: CRD Number of Treatments: 11

Treatment details

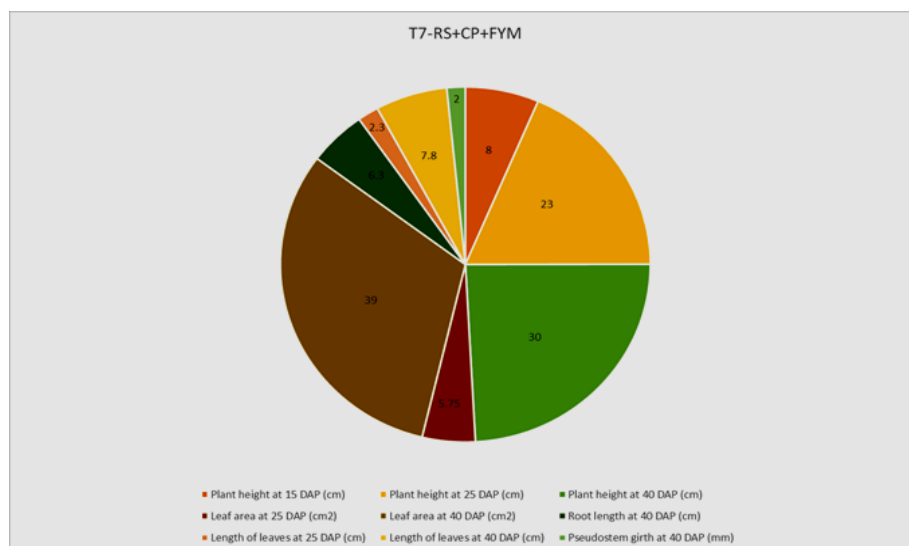
T1: Red soil, T2: Coir pith, T3: Red soil + FYM (1:1), T4: Red soil + Vermi compost (1:1), T5: Coir pith + FYM (1:1), T6: Coir pith + Vermicompost (1:1), T7: Red soil + Coir pith + FYM (1:1:1), T8: Red soil + Coir pith + Vermicompost (1:1:1), T9: Red soil + FYM + Vermicompost (1:1:1), T10: Red soil + Vermicompost + FYM + Coirpith (1:1:1), T11: Control (Garden soil only).

Analysis

The present study on the Influence of different growing media on rapid multiplication of turmeric (*Curcuma longa*) by pro tray technique was carried out at the Nursery Unit, kalavai, Ranipet District. The objective of the study was to standardize the minisett method of micro propagation and media for pro tray nursery technique for rapid mass multiplication of turmeric (*Curcuma longa*). The details of treatments used and the growth parameters adopted for the experiment are given below (Table 1)

Table 1: The details of treatments used and the growth parameters adopted for the experiment are given below

Treatments	Plant height at 15 DAP (cm)	Plant height at 25 DAP (cm)	Plant height at 40 DAP (cm)	Leaf area at 25 DAP (cm ²)	Leaf area at 40 DAP (cm ²)	Root length at 40 DAP (cm)	Length of leaves at 25 DAP (cm)	Length of leaves at 40 DAP (cm)	Pseudostem girth at 40 DAP (mm)
T1-RS	2.4	6.3	8	1.28	4.37	4.7	2.3	4.7	1.54
T2-CP	4.7	8.4	12.3	1.82	16	3.2	2.6	6.4	1.5
T3-RS+FYM	3.2	10.3	14.6	3	27	3.74	7.5	15	1.9
T4-RS+VC	3.7	11.4	16.3	1.44	19.72	5.2	1.2	5.8	1.0
T5-CP+FYM	6	15.6	18	6.12	40.8	4.72	3.4	8.5	1.2
T6-CP+VC	4.3	10.7	15.4	9.75	46.8	3.1	6.5	13	1.75
T7-RS+CP+FYM	8	23	30	5.75	39	6.3	2.3	7.8	2.0
T8-RS+CP+VC	5.4	16.4	24.7	1.275	16.38	5.1	0.75	3.9	1.45
T9-RS+VC+FYM	6.3	16.9	23.4	3.6	28.88	4.3	1.8	7.6	1.4
T10-RS+VC+FYM+CP	7.4	17.4	28.4	11.02	55.88	4.5	5.8	12.7	1.13
T11-GS	2.4	18.4	28.7	5.7	21.85	5	3.8	9.5	1.1
S.Ed	0.33	0.71	0.99	0.76	1.27	0.23	0.19	0.39	0.18
CD (0.05)	0.74	1.49	1.99	1.53	2.23	0.53	0.42	0.84	0.41



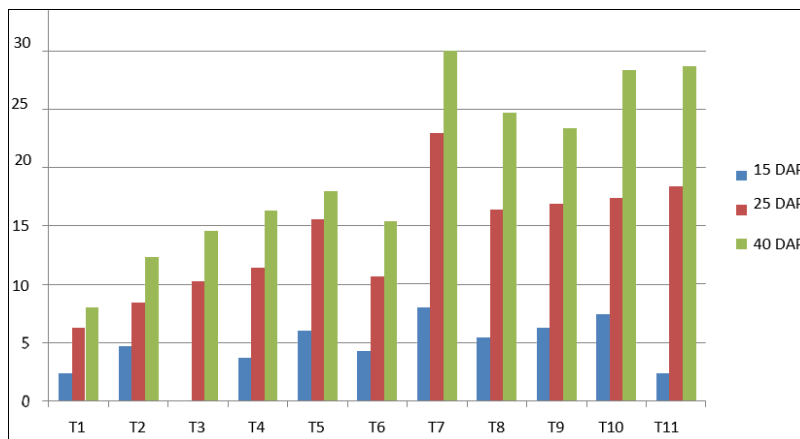


Fig 1: Effect of media on plant height (cm) in turmeric seedlings

DAP- Days After Planting

T1: Red soil, T2: Coir pith, T3: Red soil + FYM (1:1), T4: Red soil + Vermicompost (1:1), T5: Coir pith + FYM (1:1), T6: Coir pith + Vermicompost (1:1), T7: Red soil +

Coir pith + FYM (1:1:1), T8: Red soil + Coir pith + Vermicompost (1:1:1), T9: Red soil + FYM + Vermicompost (1:1:1), T10: Red soil + Vermicompost + FYM + Coirpith (1:1:1), T11: Control (Garden soil only).

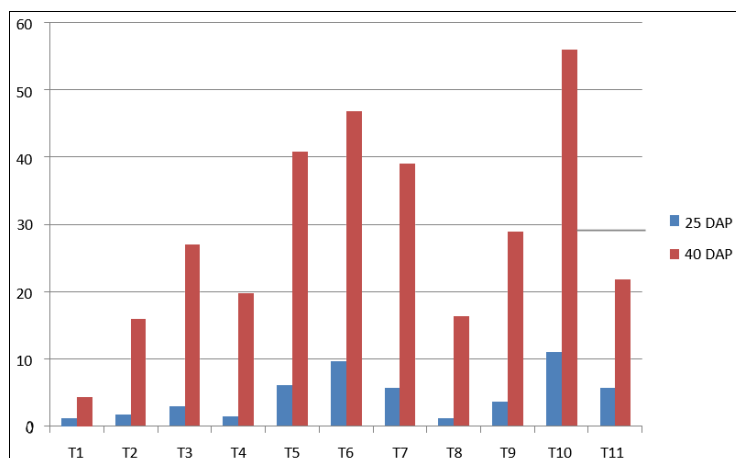


Fig 2: Effect of media on leaf area (cm²) in turmeric seedlings

DAP- Days After Planting

T1: Red soil, T2: Coir pith, T3: Red soil + FYM (1:1), T4: Red soil + Vermicompost (1:1), T5: Coir pith + FYM (1:1), T6: Coir pith + Vermicompost (1:1), T7: Red soil +

Coir pith + FYM (1:1:1), T8: Red soil + Coir pith + Vermicompost (1:1:1), T9: Red soil + FYM + Vermicompost (1:1:1), T10: Red soil + Vermicompost + FYM + Coirpith (1:1:1), T11: Control (Garden soil only).



Fig 3: Effect of media on Root length (cm) in turmeric seedlings

DAP- Days After Planting

T1: Red soil,T2: Coir pith,T3: Red soil + FYM (1:1),T4: Red soil + Vermi compost (1:1),T5: Coir pith + FYM (1:1),T6: Coir pith + Vermicompost (1:1),T7: Red soil +

Coir pith + FYM (1:1:1),T8: Red soil + Coir pith+ Vermicompost (1:1:1),T9: Red soil +FYM + Vermicompost (1:1:1) ,T10: Red soil + Vermicompost + FYM + Coirpith (1:1:1),T11: Control (Garden soil only).

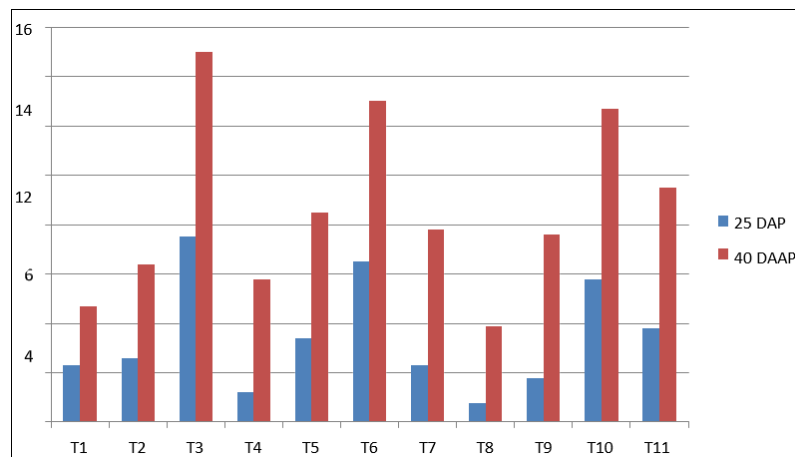


Fig 4: Effect of media on length of leaves (cm) in turmeric seedlings

DAP- Days After Planting

T1: Red soil,T2: Coir pith,T3: Red soil + FYM (1:1),T4: Red soil + Vermi compost (1:1),T5: Coir pith + FYM (1:1),T6: Coir pith + Vermicompost (1:1),T7: Red soil +

Coir pith + FYM (1:1:1),T8: Red soil + Coir pith+ Vermicompost (1:1:1),T9: Red soil +FYM + Vermicompost (1:1:1) ,T10: Red soil + Vermicompost + FYM + Coirpith (1:1:1),T11: Control (Garden soil only).

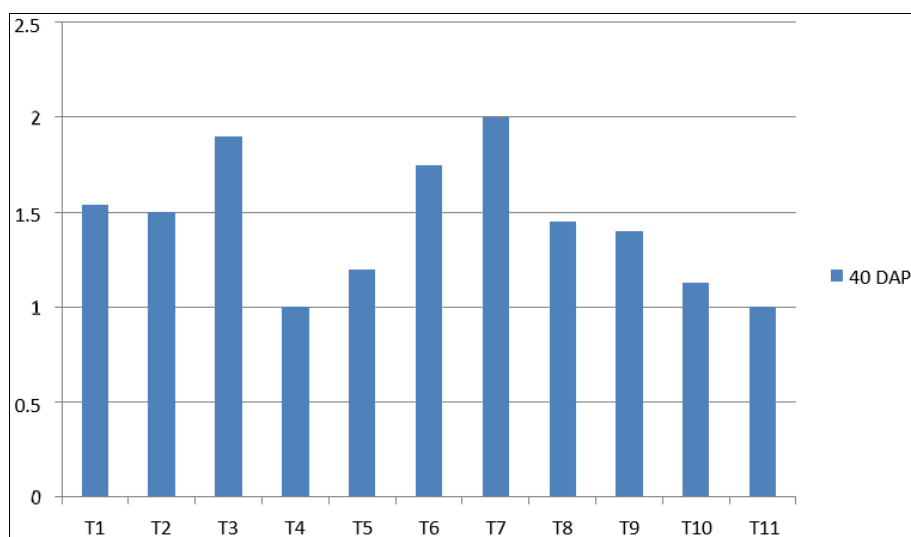


Fig 5: Effect of media on Pseudostem girth (mm) in turmeric seedlings

DAP- Days After Planting

T1: Red soil,T2: Coir pith,T3: Red soil + FYM (1:1),T4: Red soil + Vermi compost (1:1),T5: Coir pith + FYM (1:1),T6: Coir pith + Vermicompost (1:1),T7: Red soil + Coir pith + FYM (1:1:1),T8: Red soil + Coir pith+ Vermicompost (1:1:1),T9: Red soil +FYM + Vermicompost (1:1:1) ,T10: Red soil + Vermicompost + FYM + Coirpith (1:1:1),T11: Control (Garden soil only).

Results and Discussion

Among the various treatments tested maximum root length was observed in turmeric was noted in the media T7-redsoil + coirpith + farmyard manure(1:1:1) as a media mixture (6.3 cm at 40 DAP). The minimum values were recorded in T6-Coirpith+Vermicompost(1:1) as a media mixture cm at 40

DAP).The plant height was highest in T7 -Redsoil +coirpith +farmyard manure(1:1:1) as media mixture(30 cm at 40 DAP).The lowest plant height was recorded in T1- Redsoil (8 cm at 40 DAP).The leaf area was highest in T10-redsoil+Vermicompost+farmyard manure+ coirpith(1:1:1:1) as media mixture (55.88cm at 40 DAP).The least value was recorded in T1- redsoil (4.37cm at 40 DAP).The length of leaves was higher in T3 - Red soil +FYM (1:1) as media mixture(15 at 40 DAP).The lowest plant height was recorded in T8- red soil+coirpith+vermicompost(1:1:1) as media mixture(3.9 cm at 40 DAP).The pseudostem girth was highest in T7-redsoil +coirpith +farmyard manure as media mixture (2 mm at 40 DAP).The least growth was observed in T1-Redsoil+Vermicompost(1:1) as media mixture (1 mm at 40 DAP).

Conclusion

Finally we concluded that an experiment was carried out to study the “Influence of different growing media on rapid multiplication of turmeric (*Curcuma longa*) by protrait technique” was carried out in kalavai, Ranipet district. The experiment was carried out in Completely Randomized Design (CRD) with 11 treatments. Turmeric minisetts is planted under various composition of media and observations were recorded for best media for rapid multiplication by protrait technique. The study revealed that the T7 - Red soil + Coir pith + FYM (1:1:1) in turmeric recorded significantly the best treatment in (Table 1.1) for good vegetative growth and when compared to other treatments and T1 - Red soil is recorded to produce least growth on turmeric plants. Observations were recorded on growth parameters including plant height, leaf area, root length, length of leaves, pseudostem girth, other yield and quality attributes.

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