



RESEARCH ARTICLE

Cut tuber enhances growth and propagation efficiency in teasel gourd (*Momordica subangulata* Blume subsp. *renigera*)

Raniya Sherin P N¹, Nisha S K^{1*}, Sarada S¹, Lekshmi S L¹ & Sheena A²

¹Department of Vegetable Science, College of Agriculture, Kerala Agricultural University, Vellayani, Thiruvananthapuram 695 522, Kerala, India

²Instructional Farm, College of Agriculture, Kerala Agricultural University, Vellayani, Thiruvananthapuram 695 522, Kerala, India

*Correspondence email - nisha.sk@kau.in

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Abstract

Teasel gourd is a semi-domesticated vegetable valued for its nutritious, non-bitter, tender fruits. In Kerala, its cultivation remains limited primarily due to the poor availability of quality planting material. A study was conducted (2023–2024) at the Department of Vegetable Science, College of Agriculture, Vellayani, Kerala, to standardise the rooting media and tuber type for propagation. The treatments were factorial combinations of three media (soil + cocopeat + farmyard manure (FYM) in a 1:1:1 ratio, cocopeat + vermicompost in a 1:1 ratio and sand alone) and two types of tubers (cut tuber (3–5 cm²) and whole tuber), arranged in a completely randomised design with four replications. Cut tubers exhibited the earliest sprouting (15.36 days), the highest sprouting and survival percentages (75.83 and 74.83 %, respectively) and the highest shoot length and root length. In contrast, the highest number of shoots (2.97) and roots (42.22) were recorded in whole tubers. Among the potting media, soil + cocopeat + FYM (1:1:1) showed the highest sprouting and survival percentages, which were on par with cocopeat + vermicompost (1:1). Cut tubers planted in soil + cocopeat + FYM (1:1:1) recorded the highest survival percentage (86.50 %), shoot length (158.49 cm), number of leaves (27.83) and root length (31.61 cm) at 45 days after planting (DAP). The study revealed that cut tubers of 3–5 cm² planted in soil + cocopeat + FYM (1:1:1) were the most effective for the production of quality planting material in teasel gourd, which can boost its cultivation on a commercial scale.

Keywords: cut tuber; potting media; propagation; teasel gourd; whole tuber

Introduction

Teasel gourd (*Momordica subangulata* Blume subsp. *renigera*, 2n = 56) is a semi-domesticated, dioecious, perennial vegetable crop valued for its tender, bitterless fruits with high nutritional content. It is a unique and versatile vine climbing up to a height of 8–10 m. The species is native to India and is believed to have originated through natural hybridisation between *Momordica dioica* and *Momordica cochinchinensis*, followed by spontaneous chromosome doubling (1). In India, teasel gourd is primarily cultivated in Eastern and North-Eastern states, mainly Odisha, West Bengal, Assam, Tripura and in some parts of the Andaman Islands. Across its distribution, the name varies depending on local ethnicity and dialect. It is known as ‘bhat karela’ in Assam, ‘kakrol’ and ‘kankrol’ in North Bengal and ‘gantola’ in Bengaluru (2). It is characterised by its robust growth habit, tuberous root system and light green, ovate cordate leaves. The plant produces large, showy, creamy-yellow flowers with distinct male and female blooms that are solitary and axillary. This species is pollinated by Ctenoplectra bees in its native habitat (3). The natural pollination contributes only 15–50 % fruit set, whereas artificial pollination between 6 and 10 a.m. ensures 95–100 % fruit set (4). Hand pollination can be carried out more efficiently in a vertical net trellis system (5). Fruits are ovoid-ellipsoid, spiny and change colour from green to bright orange upon ripening. Seeds are enclosed in a red mucilaginous aril.

Traditionally cultivated in homesteads, this cucurbit is gaining attention for its commercial potential due to good keeping quality, ability to withstand long-distance transport and attractive market price. The fruits are rich in protein, calcium, phosphorus, iron and carotene. Despite its high nutritional value, teasel gourd remains underutilised and poorly exploited due to its dioecious nature, seed dormancy and unpredictable sex ratio in seed-based populations. These factors make seed propagation unsuitable for commercial cultivation. Consequently, farmers largely rely on vegetative propagation through tubers for maintaining true-to-type plants and ensuring uniformity in production. Tuber morphology of *Momordica subangulata* subsp. *renigera* is different from that of other tuber-bearing *Momordica* species. *Momordica dioica* and *Momordica sahyadrica* form taproot tubers that produce shoot sprouts exclusively at the caudex region, whereas *M. subangulata* ssp. *renigera* develops both taproot and adventitious tubers, with shoot sprouts across the entire tuber surface, facilitating efficient multiplication using both whole and cut tubers (6). Tuber propagation is influenced by several factors, including the type of planting material as well as the rooting medium in which they are planted. Cut tubers, when compared to whole tubers, offer the advantage of getting more planting material, making propagation more economical. The size of planting material has an effect on sprouting and initial growth (7). The choice of rooting medium is

equally important, as it affects aeration, moisture retention and nutrient availability, which play a vital role in sprout emergence and early plant establishment (8). The present study was undertaken to assess the performance of cut and whole tubers of teasel gourd in different rooting media.

Materials and Methods

The present investigation was carried out at the Department of Vegetable Science, College of Agriculture, Vellayani, Kerala Agricultural University. The experiment was laid out in a completely randomized design (CRD) with 4 replications. The treatments were factorial combinations of three media (soil + cocopeat + farmyard manure in 1:1:1 ratio, cocopeat + vermicompost in 1:1 ratio and sand alone) and two types of tubers (cut tuber (3–5 cm²) and whole tuber). The tubers were cut into pieces of 3–5 cm² size by using a sharp knife. Before planting, the tubers and cut pieces were treated with carbendazim + mancozeb 75 WP (Saaf) at 3 g L⁻¹ to prevent rotting. These were planted in 4 × 6-inch polythene bags filled with potting mixture as per the treatments. The polybags were irrigated regularly. The bags were kept free from weeds by periodical hand weeding.

Data collection

Sprouting percentage

The sprouting percentage was calculated at 15, 30 and 45 DAP by the following formula and expressed in percentage (%):

$$\text{Sprouting percentage} = \frac{\text{Number of tubers sprouted}}{\text{Number of tubers planted}} \times 100$$

(Eqn. 1)

Survival percentage

The survival percentage was calculated at 45 DAP by using the formula given below:

$$\text{Survival percentage} = \frac{\text{Number of tubers survived}}{\text{Number of tubers planted}} \times 100$$

(Eqn. 2)

Growth performance

Growth parameters were taken from 5 plants per treatment in each replication. Number of days taken to sprout, number of shoots per tuber, shoot length, number of leaves, root length and number of roots were counted at 15, 30 and 45 days after sprouting (DAS) of the tuber.

Statistical analysis

The recorded data were subjected to statistical analysis according to the method described (9). The analysis of variance (ANOVA) was calculated using GRAPES (an online R-based tool).

Results and Discussion

Days to sprouting

Types of tuber and potting media had a significant effect on the number of days to sprouting (Table 1). Sprouting was earliest in cut tubers (T₂) (15.36 days) compared to whole tubers (T₁) (22.81 days). The early sprouting observed in cut tubers may be attributed to dormancy breaking caused by the cutting process. This mechanical intervention triggers physiological changes that promote growth responses leading to faster sprouting (10). Among the potting media, soil + cocopeat + FYM (P₁) recorded the earliest sprouting. The addition of FYM may have improved media structure and aeration, thereby facilitating root development and sprout emergence (11). Interaction effects were not significant for days to sprouting.

Sprouting percentage

The percentage of sprouting from cut tubers (T₂) (15.83, 66.67 and 75.83 %) was significantly higher than that of whole tubers (T₁) (0.00, 57.50 and 67.50 %) at 15, 30 and 45 DAP, respectively (Table 1). A previous study reported that longitudinally splitting tubers into 4 pieces resulted in the highest mean sprouting compared to whole tubers in teasel gourd (6). At 15 and 45 DAP, the potting media soil + cocopeat + FYM (P₁) recorded the highest sprouting percentage (13.75 and 78.75 %) which was on par with cocopeat + vermicompost (P₂) (8.75 and 73.75 %). At 30 DAP, P₁ recorded the highest sprouting (73.75 %). In the interaction between types of tuber and potting media, cut tubers planted in soil + cocopeat + FYM showed the highest sprouting percentage at both 15 DAP (27.5 %) and 30 DAP (82.50 %) (Table 2). However, no significant difference was observed at 45 DAP, possibly because the dormancy of whole tubers had been broken over time.

Survival percentage

Types of tubers had a significant effect on survival percentage at 45 DAP. The highest survival percentage was recorded in cut tuber (T₂) (74.83 %) compared to whole tubers (T₁) (66.58 %) (Table 1). Properly treated cut tubers may exhibit improved survival rates due to effective dormancy breaking and reduced risk of decay (12). A significant difference was also observed among potting media. The

Table 1. Effect of types of tuber and potting media on days to sprout, sprouting percentage and survival percentage

Treatment	Days to sprout	Sprouting percentage						Survival percentage	
		15 DAP		30 DAP		45 DAP		45 DAP	
Types of tubers (T)									
T ₁ (whole tuber)	22.81 ^b	0.00	(0.00) ^b	57.50	(49.39) ^b	67.50	(55.31) ^b	66.58	(54.74) ^b
T ₂ (cut tuber)	15.36 ^a	15.83	(24.55) ^a	66.67	(55.27) ^a	75.83	(62.07) ^a	74.83	(60.81) ^a
SEm (±)	0.416	1.557		1.049		1.795		1.412	
CD (0.05)	1.236	4.625		3.117		5.333		4.195	
Potting media (P)									
P ₁ (soil + cocopeat + FYM)	17.13 ^a	13.75	(18.00) ^a	73.75	(59.62) ^a	78.75	(64.45) ^a	77.75	(62.89) ^a
P ₂ (cocopeat + vermicompost)	18.67 ^b	8.75	(16.53) ^a	66.25	(54.53) ^b	73.75	(59.28) ^a	73.13	(58.85) ^a
P ₃ (sand)	21.46 ^c	1.25	(2.30) ^b	46.25	(42.84) ^c	62.50	(52.34) ^b	61.25	(51.59) ^b
SEm (±)	0.51	1.907		1.285		2.198		1.729	
CD (0.05)	1.514	2.696		3.818		6.531		5.138	

Figures in parentheses indicate the corresponding angular value. Different letters indicate that group means are statistically significantly different, usually at $p < 0.05$.

Table 2. Interaction effect of types of tuber and potting media on days to sprout, sprouting percentage and survival percentage

Treatment	Days to sprout	Sprouting percentage						Survival percentage	
		15 DAP		30 DAP		45 DAP		45 DAP	
T × P (types of tuber × potting media)									
T ₁ P ₁	21.00	0.0	(0.00) ^b	65.00	(53.78) ^b	70.00	(56.79)	69.00	(69.62) ^{bc}
T ₁ P ₂	21.67	0.0	(0.00) ^b	62.50	(52.27) ^b	70.00	(56.79)	69.75	(61.07) ^{bc}
T ₁ P ₃	25.75	0.0	(0.00) ^b	45.00	(42.12) ^c	62.50	(52.34)	61.00	(56.63) ^c
T ₂ P ₁	13.25	27.5	(36.00) ^a	82.50	(65.47) ^a	87.50	(72.11)	86.50	(56.17) ^a
T ₂ P ₂	15.67	17.5	(33.06) ^a	70.00	(56.79) ^b	77.50	(61.77)	76.50	(51.75) ^b
T ₂ P ₃	17.17	2.5	(4.62) ^b	47.50	(43.56) ^c	62.50	(52.34)	61.50	(51.43) ^c
SEm (±)	0.721	2.696		1.817		3.109		2.446	
CD (0.05)	NS	8.011		5.4		NS		7.267	

NS - Non-significant; T₁ - Whole tuber; T₂ - Cut tuber; P₁ - Soil + cocopeat + farmyard manure (FYM); P₂ - Cocopeat + vermicompost; P₃ - Sand. Figures in parentheses indicate the corresponding angular value. Different letters indicate that group means are statistically significantly different, usually at $p < 0.05$.

highest survival percentage (77.75 %) occurred in soil + cocopeat + FYM (P₁), which was on par with cocopeat + vermicompost (P₂) (73.13 %). Enhanced microbial activity from FYM may improve nutrient cycling and support sprout growth (13). The interaction between types of tuber and potting media had a significant effect on survival percentage. Cut tubers planted in soil + cocopeat + FYM (T₂P₁) recorded the highest survival percentage (86.50 %), while the lowest survival (61 %) was observed in whole tubers planted in sand medium (T₁P₃) (Table 2). The lower survival in sand media may be attributed to its poor nutrient retention and low water-holding capacity (14).

Number of shoots

The number of shoots was significantly higher in whole tubers compared to cut tubers. Whole tubers retain a larger, undisturbed surface area, which may provide more sites for sprouting. In contrast, cutting the tubers reduces the available periderm area, thereby limiting the number of active sprouting points (15). Whole tubers (T₁) recorded the highest number of shoots (1.95, 2.64 and 2.97) compared to cut tubers (T₂) (1.00, 1.53 and 1.75) at 15, 30 and 45 days after sprouting (DAS), respectively (Table 3). Among the potting media, soil + cocopeat + FYM (P₁) recorded the highest number of shoots per tuber (1.83), which was on par with cocopeat + vermicompost (P₂) (1.62) at 15 DAS. At 30 DAS, P₁ again recorded the highest number of shoots (2.46), while P₃ recorded the lowest (1.67). At 45 DAS, P₁ recorded the highest number of shoots (2.67), which was on par with P₂ (2.46). Organic manures promote microbial growth and activity, which are essential for breaking down soil nutrients and making them readily available to plants (16). The interaction between types of tuber and potting media had no significant effect on the number of shoots.

Table 3. Effect of types of tuber and potting media on shoot parameters

Treatment	No. of shoots			No. of leaves		
	15 DAS	30 DAS	45 DAS	15 DAS	30 DAS	45 DAS
Types of tubers (T)						
T ₁ (whole tuber)	1.95 ^a	2.64 ^a	2.97 ^a	9.75 ^b	17.70 ^b	22.00 ^b
T ₂ (cut tuber)	1.00 ^b	1.53 ^b	1.75 ^b	12.28 ^a	19.56 ^a	24.78 ^a
SEm (±)	0.126	0.166	0.135	0.297	0.336	0.439
CD (0.05)	0.375	0.493	0.403	0.881	0.999	1.305
Potting media (P)						
P ₁ (soil + cocopeat + FYM)	1.83 ^a	2.46 ^a	2.67 ^a	13.17 ^a	21.13 ^a	26.08 ^a
P ₂ (cocopeat + vermicompost)	1.62 ^a	2.12 ^{ab}	2.46 ^a	12.08 ^b	19.63 ^b	24.96 ^a
P ₃ (sand)	0.96 ^b	1.67 ^b	1.96 ^b	7.79 ^c	15.13 ^c	19.13 ^b
SEm (±)	0.155	0.203	0.166	0.363	0.412	0.538
CD (0.05)	0.46	0.604	0.493	1.079	1.224	1.598

Different letters indicate that group means are statistically significantly different, usually at $p < 0.05$.

Shoot length

Cut tubers (T₂) exhibited the highest shoot length of 68.31, 103.98 and 140.50 cm compared to whole tubers (T₁) (55.24, 77.95 and 97.24 cm) at 15, 30 and 45 DAS, respectively (Fig. 1). Previous study reported that physiological changes induced by cutting can enhance growth vigour, as biochemical processes become activated more rapidly in cut tubers (17). Cutting also increases the availability of carbohydrates for developing shoots, which may lead to increased shoot length compared to whole tubers (18). Among the potting media, the highest shoot length was recorded in soil + cocopeat + FYM (P₁) (69.01 and 99.98 cm), which was on par with cocopeat + vermicompost (P₂) (66.47 and 96.45 cm) at 15 and 30 DAS, respectively. The lowest shoot length was recorded in sand (P₃) (49.85 and 76.46 cm). At 45 DAS, P₁ again recorded the highest shoot length (133.80 cm) (Fig. 2). Plant growth is significantly influenced by the availability of soil resources, particularly nutrients (19). Incorporating organic materials such as compost and manure into the soil not only enhances crop yield but also maintains soil fertility over longer periods. In the interaction, the highest shoot length was observed in cut tubers planted in soil + cocopeat + FYM (T₂P₁) (76.84, 115.11 and 158.49 cm), which was on par with cut tubers in cocopeat + vermicompost (T₂P₂) (76.60, 113.79 and 158.24 cm) at 15, 30 and 45 DAS, respectively (Table 4). The lowest shoot length was recorded in whole tubers planted in sand medium (T₁P₃) (48.21, 69.89 and 84.38 cm) at 15, 30 and 45 DAS, respectively (Fig. 3).

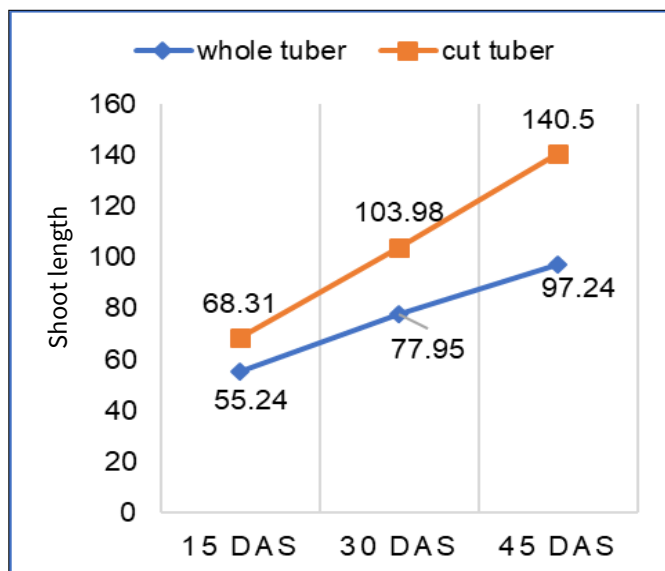


Fig. 1. Effect of whole tubers and cut tubers on shoot length.

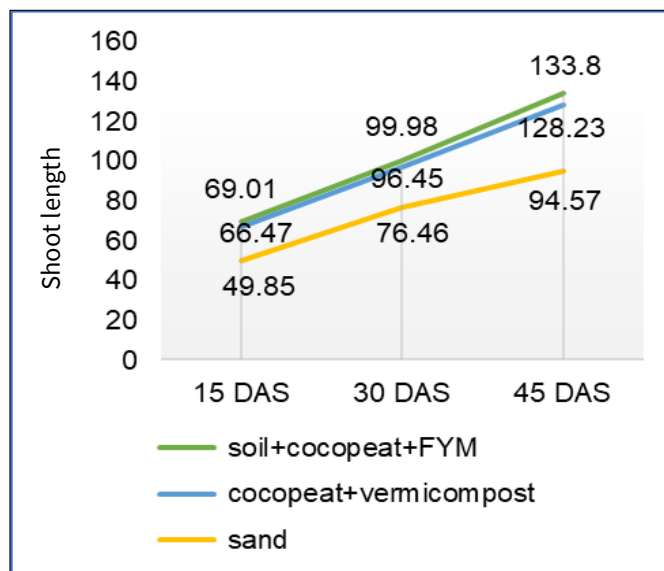


Fig. 2. Effect of types of potting media on shoot length.

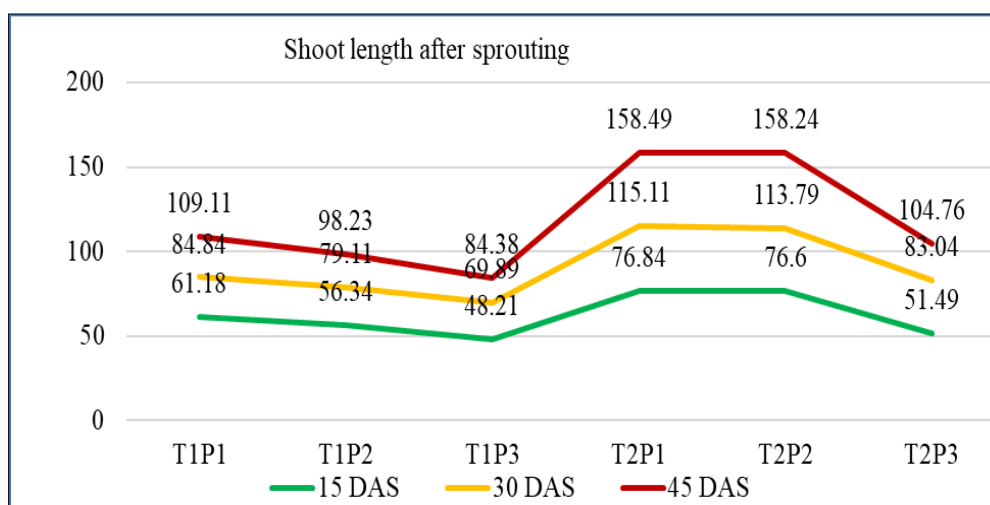


Fig. 3. Interaction effect of types of tuber and potting media on shoot length at 15, 30 and 45 DAS. T₁ - Whole tuber, T₂ - Cut tuber, P₁ - Soil + cocopeat + farmyard manure (FYM), P₂ - Cocopeat + vermicompost, P₃ - Sand.

Number of leaves

Among the types of tubers, cut tubers produced a significantly greater number of leaves (12.28, 19.56 and 24.78) compared to whole tubers (9.75, 17.70 and 22.00) at 15, 30 and 45 DAS respectively (Table 3). Cut tubers typically exhibit a higher metabolic rate, which may stimulate the formation of more leaf buds during the early stages of growth. It is also assumed that the wounding caused by cutting activates physiological processes, resulting in enhanced vegetative growth compared to non-wounded tubers (20). A significant difference was observed among the potting media. Soil + cocopeat + FYM (P₁) recorded the highest number of leaves (13.17, 21.13 and 26.08), while sand (P₃) recorded the lowest (7.79, 15.13 and 19.13) at 15, 30 and 45 DAS, respectively. The combination of soil, cocopeat and FYM likely enhanced leaf production by ensuring optimal nutrient availability, improved water retention, better aeration and greater microbial activity, thus creating ideal conditions for vigorous growth (21). The interaction between tuber type and potting media also had a significant effect on the number of leaves. At 15 DAS, the highest number of leaves was recorded in T₂P₁ (cut tubers in soil + cocopeat + FYM) (14.92), which was on par with T₂P₂ (cut tubers in cocopeat + vermicompost) (13.75). The lowest was observed in T₁P₃ (whole tubers in sand) (7.42). A similar trend was recorded at 30 DAS, where

T₂P₁ had the highest number of leaves (23.25) and T₁P₃ (15.09) had the lowest. At 45 DAS, T₂P₁ again produced the highest number of leaves (27.83), statistically comparable with T₂P₂ (27.25), while T₁P₃ recorded the lowest (19.00) (Table 4).

Table 4. Interaction effect of types of tuber and potting media on shoot parameters

Treatment	No. of shoots			No. of leaves		
	15 DAS	30 DAS	45 DAS	15 DAS	30 DAS	45 DAS
T × P (types of tuber × potting media)						
T ₁ P ₁	2.25	3.17	3.34	11.42 ^b	19.00 ^b	24.34 ^b
T ₁ P ₂	2.00	2.75	3.09	10.42 ^b	19.00 ^b	22.67 ^b
T ₁ P ₃	1.59	2.00	2.50	7.42 ^c	15.09 ^c	19.00 ^c
T ₂ P ₁	1.42	1.75	2.00	14.92 ^a	23.25 ^a	27.83 ^a
T ₂ P ₂	1.25	1.50	1.83	13.75 ^a	20.25 ^b	27.25 ^a
T ₂ P ₃	0.33	1.33	1.42	8.17 ^c	15.17 ^c	19.25 ^c
SEm (±)	0.219	0.288	0.235	0.514	0.583	0.761
CD (0.05)	NS	NS	NS	1.526	1.731	2.26

NS - Non-significant; T₁ - Whole tuber; T₂ - Cut tuber; P₁ - Soil + cocopeat + farmyard manure (FYM); P₂ - Cocopeat + vermicompost, P₃ - Sand. Different letters indicate that group means are statistically significantly different, usually at $p < 0.05$.

Number of roots

Whole tuber (T_1) produced a higher number of roots (12.20, 26.25 and 42.22) compared to cut tubers (T_2) (10.53, 20.86 and 32.42) at 15, 30 and 45 DAS respectively (Table 5). This may be attributed to the larger periderm surface area in whole tubers, which provides more rooting sites for root initiation (22). Among potting media, soil + cocopeat + FYM (P_1) registered the highest number of roots (12.17), which was on par with cocopeat + vermicompost (P_2) (11.54) at 15 DAS. Whereas, the lowest number of roots was recorded in sand (P_3) (10.38). At 30 DAS, the highest number of roots was observed in P_1 (26.08) and the lowest in P_3 (21.42). At 45 DAS also P_1 recorded the highest number of roots (40.21) and P_3 (34.38) the lowest. Interaction had no significant effect on the number of roots per tuber.

Table 5. Effect of types of tuber and potting media on root parameters

Treatment	No. of roots			Root length (cm)		
	15 DAS	30 DAS	45 DAS	15 DAS	30 DAS	45 DAS
Types of tubers (T)						
T_1 (whole tuber)	12.20 ^a	26.25 ^a	42.22 ^a	6.09 ^b	16.49 ^b	20.39 ^b
T_2 (cut tuber)	10.53 ^b	20.86 ^b	32.42 ^b	6.63 ^a	21.87 ^a	26.44 ^a
SEm ($\pm$)	0.22	0.605	1.226	0.146	0.299	0.344
CD (0.05)	0.653	1.798	3.643	0.432	0.889	1.021
Potting media (P)						
P_1 (soil + cocopeat + FYM)	12.17 ^a	26.08 ^a	40.21 ^a	7.32 ^a	22.51 ^a	27.54 ^a
P_2 (cocopeat + vermicompost)	11.54 ^a	23.17 ^b	37.38 ^{ab}	6.73 ^b	18.84 ^b	22.73 ^b
P_3 (sand)	10.38 ^b	21.42 ^b	34.38 ^b	5.03 ^c	16.18 ^c	19.98 ^c
SEm ($\pm$)	0.269	0.741	1.502	0.178	0.366	0.421
CD (0.05)	0.8	2.203	4.462	0.529	1.089	1.251

Different letters indicate that group means are statistically significantly different, usually at $p < 0.05$.

Root length

The mean comparison revealed that both tuber type and potting media significantly influenced root length. Cut tubers (T_2) exhibited the highest root length (6.63, 21.87 and 26.44 cm) when compared to whole tubers (T_1) (6.09, 16.49 and 20.39 cm) at 15, 30 and 45 DAS, respectively (Table 5). Cutting induces a wounding response that can trigger the production of growth hormones such as auxins and cytokinins, thereby promoting root elongation (23). Among potting media, soil + cocopeat + FYM (P_1) recorded the highest root length (7.32, 22.51 and 27.54 cm) and the lowest in sand (P_3) (5.03, 16.18 and 19.98 cm) at 15, 30 and 45 DAS, respectively. Cocopeat ensures uniform moisture availability, FYM enriches the medium with organic matter and nutrients and soil provides structural stability-together creating a highly favourable environment for root elongation. In contrast, sand offers poor water and nutrient retention and rapid drainage, resulting in suboptimal root growth (24). Interaction effects due to types of tuber and potting media had a significant effect on root length. The highest root length of 7.91 cm was recorded in cut tubers planted in soil + cocopeat + FYM (T_2P_1) at 15 DAS. Whereas, the lowest root length was recorded in whole tubers planted in sand medium (T_1P_3) (4.88 cm). At 30 DAS, T_2P_1 recorded the highest root length (26.25 cm) and the lowest in T_1P_3 (14.99 cm). At 45 DAS, the highest root length was recorded in T_2P_1 (31.61 cm) and the lowest in T_1P_3 (17.68 cm) (Table 6).

Table 6. Interaction effect of types of tuber and potting media on root parameters

Treatment	No. of roots			Root length (cm)		
	15 DAS	30 DAS	45 DAS	15 DAS	30 DAS	45 DAS
T × P (types of tuber × potting media)						
T_1P_1	12.75	28.17	45.42	6.73 ^b	18.78 ^c	23.48 ^c
T_1P_2	12.17	26.33	42.25	6.36 ^b	15.70 ^d	20.03 ^d
T_1P_3	11.67	24.25	39.00	4.88 ^c	14.99 ^d	17.68 ^e
T_2P_1	11.58	24.00	35.00	7.91 ^a	26.25 ^a	31.61 ^a
T_2P_2	10.92	20.00	32.50	7.09 ^b	21.99 ^b	25.43 ^b
T_2P_3	9.08	18.58	29.75	5.18 ^c	17.38 ^c	22.29 ^c
SEm ($\pm$)	0.381	1.048	2.124	0.252	0.518	0.595
CD (0.05)	NS	NS	NS	0.749	1.54	1.769

NS - Non-significant; T_1 - Whole tuber; T_2 - Cut tuber; P_1 - Soil + cocopeat + farmyard manure (FYM); P_2 - Cocopeat + vermicompost, P_3 - Sand. Different letters indicate that group means are statistically significantly different, usually at $p < 0.05$.

Conclusion

The study demonstrates that cut tubers, when combined with appropriate potting media such as soil + cocopeat + FYM or cocopeat + vermicompost, significantly improve sprouting percentage, vegetative growth and survival rates of teasel gourd. This highlights an efficient and reliable method for large-scale tuber propagation, ensuring better planting material availability and improved crop establishment. Standardisation of tuber size and planting density, along with evaluation of field performance and yield under different agro-climatic conditions, will further strengthen the large-scale adoption of this propagation method in teasel gourd.

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Authors' contributions

NSK contributed to the conceptualisation of the study, design of experiments, data analysis and interpretation and assisted in manuscript preparation. RSPN contributed to the conceptualisation and experimental design, conducted field and laboratory experiments, performed data collection and carried out data analysis and interpretation and prepared the manuscript. SS contributed to data analysis and interpretation and assisted in manuscript preparation. LSL and SA assisted in manuscript preparation. All authors read and approved the final manuscript.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interests to declare.

Ethical issues: None

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