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Low-cost Nursery Media for Improving Germination of Chip Budded Seedlings for SSI

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The quality and vigour of the chip budded seedlings are important components in SSI technology which in turn, depends on the nature of growing media. The most commonly used media for chip budded seedlings is pure coco peat which is a costlier one and availability is also restricted. Hence an alternate organic media to pure coco peat compressing low cost organic sources *viz*., Press mud, Coco peat, Coir pith, Town Compost and Vermicompost are essential to widespread this technology. Hence, an experiment was conducted at Sugarcane Research Station, Sirugamani in 2013-14 to find out suitable low cost media for producing vigorous seedlings of chip budded seedlings of Sugarcane. The experiment was conducted in RBD with 11 treatments comprising of different media with three replications. The treatments include Composted Coir pith :Vermicompost @2:1 ratio (T1), Composted coir pith + press mud @ 2:1 ratio (T2),Composted Coir pith

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:Vermicompost @3:1 ratio (T3), Composted coir pith + press mud @ 3:1 ratio (T4), Bagasse + Press mud @ 1:1 ratio (T5), Banana leaf compost: Press mud @1:2ratio (T6), Sugarcane trash Compost + press mud @ 1:1ratio (T7), Municipal Waste (Town Compost) + Sugarcane trash compost + Press mud @ 1:1 ratio (T7), Municipal waste (town Compost) + Sugarcane trash compost @ 1:1 ratio (T8), Composted Coir pith clone (Coco peat) (T9), Press mud alone (T10), Farm boon (composted press mud) (T11). Single budded chip buds from the healthy mother canes o TNAU Sugarcane Si 7 variety were prepared using bud chipper machine and the same was treated with 0.05% Carbendazim, Malathion 2% and Urea @ 1 for 15 minutes. The chip buds were shade dried for 2 hours and then planted in the pro trays filled with the media as per the treatments. The nursery media in different treatments were prepared using bud chipper machine and the same materials as per the treatments, half filed in the pro trays and the treated chip buds were planted in slanting position in the canes of the trays and then covered with the respective media. The trays were incubated for 5 days to induce sprouting and then kept under 50 % shade ned and water was sprinkled every day on the pro trays the grown up seedlings were observed for different growth parameters viz., Germination %, Survival percentage, Root and Shoot length, Shoot and root dry weight, dry matter production and vigour index.The results revealed that there was a significant difference on germination recorded at 20 DAS due to different nursery media tried. Higher germination of 66.93% was observed with T3 treatment (coir pith + Vermicompost @ 3: 1 ratio) It was on par with T6 treatment (Banana leaf Compost: Press mud % 1:2 ratio) and T10 treatment (Press mud alone). Regarding survival % recorded at 30 DAS, the higher revival % was recorded with T3 treatment. However, it was on par with T4, T5 & T10 treatments (Bagasse: press mud @ 1:2 ratio). The lower shoot length was recorded with T11 treatment where the nursery media of farm boon was used. There was no significant difference in influencing root length and number of leaves / seedling and root / shot ratio due to different treatments (nursery media) tried.

Keywords: Nursery media; chip bud; portray; composted coir.

1. INTRODUCTION

Sugarcane is one of the most important cash crops which not only provides main stay to the sugar industry but also supplies raw materials to various allied industries for manufacturing alcohol and chipboard, thereby playing a vital role in the Indian agricultural and industrial economy [1]. It is cultivated in an area of 4.8 Mha with a total annual stripped cane production of 376.9 MT Nayak, H., & Yadav, S. P. [2]. Conventionally, cane sugar is cultivated using setts at the rate of 6-8 tonnes ha^{-1} (roughly equivalent to 10% of the total production) is used as planting material, which comprises of about 25-30 cm stalk pieces having 2-3 buds Nasimiyu [3]. Planting material of such a huge mass creates logistical challenges in the transportation, handling and storage of seed cane [4-6]. On the other hand, the tissue culture technique is losing its popularity due to its complexity and physical constraints [7]. Thus, in order to produce high-quality cane with low-cost technology, the bud chip method can be a viable alternative to of sugarcane planting which reduces the mass as well as enables quick seed multiplication [8]. The technology has proved to be more economical and convenient compared to the method of planting two to three-budded setts [9]. Bud chip method entails separating the buds alone from cane, sprouting them in a growing media in a nursery using small plastic trays or cups and transplanting the seedlings raised from buds into the main field [10]. In connection to this, an experiment was carried out at the Sugarcane Research Station in Sirugamani in 2013-14 to determine the best low-cost media for generating strong seedlings of chip budded sugarcane seedlings.The main objective of this study is to find out the cheapest source of nursery media for improving germination of chip germination of chip bud seedlings for SSI, using Locally available materials and to find out the economics of different nursery media for raising chip bud seedlings.

2. MATERIALS AND METHODS

Experiments were conducted for two years (2013- 14 and 2014- 15) at Sugarcane Research Station, Sirugamani (Fig. 1) to find out the cheapest source of media for improving germination of chip bud seedlings for SSI, using locally available materials and to find out the economics of different nursery media for raising chip budded seedlings. The nutrient content of different nursery media tried is given in Table 1.

The chip buds were shade dried for 2 hours before being planted in pro trays filled with medium based on the treatments. The nursery media for the various treatments were created using a bud chipper machine and the same materials as the treatments, half filed in the pro trays, and the treated chip buds were planted in a slanting posture in the canes of the trays before being coated with the appropriate media.

Treatment Details:

T1.	Composted Coir pith : Vermicompost @ 2: 1 ratio
T2.	Composted Coir pith : Press mud @ 2: 2 ratio
T3.	Composted Coir pith : Vermicompost @ 3: 1 ratio
T4.	Composted Coir pith : Press mud @ 3 : 1 ratio
T5.	Bagasse : press mud @ 1 : 2 ratio
T6.	Banana leaf compost : press mud @ 1 : 2 ratio
T7.	Sugarcane trash compost: Press mud @ 1: 1 ratio
T8.	Municipal Waste (Town Compost): Sugarcane trash compost @ 1: 1 ratio
T9.	Composted coir pith alone
T10.	Press mud alone
T11.	Farm boon

Table 1. Nutrient content of different nursery media and its cost

Compost	(%)	$P_2 0_5$(%)	$K_2 0$ (%)	Cost *
Press mud	1.90	1.06	0.40	Rs.90/t
Banana leaf compost	2.50	0.40	4.00	Rs.1000/t
Farm boon	1.50	0.80	0.70	Rs.10/kg
Composted Coir pith	1.06	0.40	1.02	Rs .5/kg
Raw coir pith	0.26	0.01	0.78	Rs.500 per tractor load
Vermicompost	1.50	0.30	0.56	Rs. 5/kg
Municipal waste Compost	0.31	0.30	0.37	Rs.3/kg

*Note: * Prevailing market price during 2013-15*

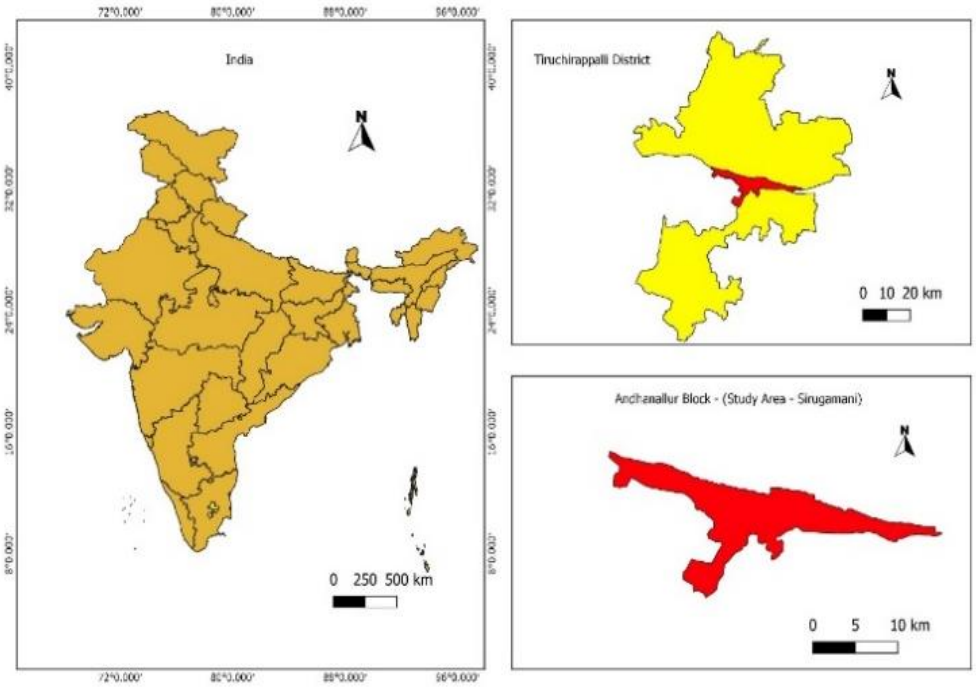

Fig. 1. Study area Map

Test variety selected for the study was TNAU Sugarcane Si 7. Single bud chips from the healthy mother canes were prepared using Bud Chipper machine and the same was treated with 0.05 % carbendazim WP and urea 1 % for 15 minutes. Malathion at 20 ml was also added. The same were dried for 2 hr under shade and then used for nursery plantation. For raising nursery, different nursery medias were tried as per the treatment schedule. The media was prepared in a such a way that the water droplets won't ooze out from the media when the media was squeezed by the hand. Then half of each cone was filled with the media and the buds were placed in a slightly slanting position by themselves in the cones of tray and filled the trays completely with media. Then, the filled pro trays were placed one above the other and finally an empty tray upside down at the top was placed to protect the chip budded seedlings. Four sets each consist of 14 trays were placed together and wrapped tightly with polythene sheets and allowed for incubation for 5 days to create high temperature and relative humidity. After 5 days, the bundle was opened and all the trays were kept under 50% shade net and watering to the trays was done with rose cane based on the moisture content of media. The details of pro tray are given as below.

Pro tray Specifications:

- 50 holes/ tray
- 0.8 mm gauge thickness
- Size: 52 cm X 28 cm
- Pit size: dia 5 cm X depth 4.5 cm
- Cost – Rs. 10- 11/tray

The observation on pro tray's weight, chip bud's weight, the quantity of media required for filling one tray etc., were recorded at the time of filling the trays. (Table 2).

Germination count was recorded at 20 DAP in the pro trays and germination % was calculated. Survival % was recorded at 30 DAP. Root parameters like root volume, root length, root density etc., and growth parameters like shoot length, seedling height, number of leaves etc., were also recorded. Vigour index was worked out.

Table 2. Pro tray – treatment wise particulars (*)

Treatments	Pro tray Weight (g)	Chip bud Weight (50 nos.) (g)	Pot Mixture Weight (g) / tray	Quantity of pot mixture required for 100 trays (kg)
T1 – Composted Coir pith : Vermicompost @ 2 : 1 ratio	110	813	1370	137
T2 – Composted Coir pith : Press mud @ 2 : 1 ratio	110	723	1497	150
T3 – Composted Coir pith : Vermicompost @ 3 : 1 ratio	110	710	1557	156
T4 – Composted Coir pith : Press mud @ 3 : 1 ratio	110	673	1270	127
T5 – Bagasse : Press mud @ 1 : 2 ratio	110	693	1190	119
T6 – Banana leaf compost : Press mud @ 1 : 1 ratio	110	697	1780	178
T7 – Sugarcane trash compost : Press mud @ 1 : 1 ratio	110	690	1640	164
T8 – Municipal Waste (Town Compost) : Sugarcane trash compost @ 1 : 1 ratio	110	747	1890	189
T9 – Composted Coir pith alone	110	747	1390	139
T10 – Composted Coir pith : Vermicompost @ 2 : 1 ratio	110	767	1807	181
T11 – Press mud alone	110	753	1940	194
Mean	110	728	1575	158

Note: Not statistically analysed

3. RESULTS AND DISCUSSION

3.1 First Year (2013-2014)

The results revealed that there was a significant difference on germination recorded at 20 DAS due to different nursery media tried. Higher germination of 66.93% was observed with T3 treatment where the nursery media of composted coir pith + Vermicompost @ 3: 1 ratio was used (Table 3). It was on par with T6 treatment (Banana leaf Compost: Press mud % 1:2 ratio) and T10 treatment (Press mud alone). With regard to survival % recorded at 30 DAS, the higher revival % was recorded with T3 treatment. However, it was on par with T4, T5 & T10 treatments (Bagasse: press mud @ 1:2 ratio). The lower shoot length was recorded with T11 treatment where the nursery media of farm boon was used. There was no significant difference in influencing root length and number of leaves / seedling and root / shot ratio due to different treatments (nursery media) tried.

The higher seedling height of 55.57 cm was observed with T2 treatment where the nursery media of composed coir pith and press mud @ 2:1 ratio was used and the lowest was with T6 treatment where the nursery media of banana leaf compost and press mud @ 1:2 ratio was used (39.13cm).

With regard to root volume, higher root volume (0.87 cc/ seedling) was observed with T5 treatment where bagasse: Press mud @ 1:2 ratio was used, and it was on par with T7, T9 and T11 treatments. Higher shoot dry weight of 5.97 g/ 10 seedlings was recorded with T5 treatment where the nursery media of Bagasse: press mud @ 1:2 ratios was used, and it was on a par with T2, T3, T9 and T10 treatments. The higher root dry weight of 0.52 g/10 seedlings was recorded with T2 treatment and the lowest root dry weight of 0.27 g/10 seedlings was recorded with T8 treatment (Table 3).

With regard to vigour index, the higher vigour index value of 1736 was recorded with T3 treatment. Where the nursery media of composed coir pith and vermicompost @ 3: 1 ratio was used, closely followed by T4 treatment (1714) where the nursery media of composted coir pith and press mud @ 3: 1 ratio was used.

The cost of producing chip budded seedlings (excluding the cost of nursery media) is given in Table. 4. From the table, it was observed that the cost of producing chip bud seedlings comes around Rs. 0.90/ seedling (excluding the media cost).

The effect of treatments on economics of producing chip bud seedlings (2013-14) is given in Table 6. The results revealed that the higher B/C ratio of 1.63 was observed with treatments T10 (Press mud alone) & T5 treatments (Bagasse: Press mud @ 1:2 ratio).

3.2Second Year (2014-2015)

The effect of treatments on germination of chip budded sugarcane seedlings at 5, 10, 20 and 30 DAP was given in Table 7. There was no significant difference in influencing germination percentage at 5 DAP due to different nursery media tried. But, at 10, 20 and 30 DAP there was a significant variation in influencing germination percentage. At 30 DAP higher germination at 63.3% was observed with T3 treatment where the nursery media of composted coir pith and vermi compost at 3: 1 ratio was used. However, it was on par with T10 treatment where press mud alone was used.

The effect of treatments of growth parameters of sugarcane chip budded sugarcane seedlings at 10 DAP is given in Table 8. From the table, it was observed that there was a significant influence on growth parameters viz., plant height, shoot height, number of leaves/ seedlings, root length and root volume. Higher vigour index value of 427 was recorded with T3 treatment where the nursery media of composted coir pith and vermicompost @ 3:1 ratio was used. Lower vigour index was recorded with T11 treatment where the nursery media of Farm boon alone was used.

The effect of treatments of growth parameters of chip budded sugarcane. seedlings of 20 DAP is given in Table 9. From the table, it was observed that there was no significant variation in influencing plant height and root volume due to different nursery media treatments tried. Higher vigour index value of 981 was recorded with T3 treatment where the nursery media of coco peat and vermicompost at 3:1 ratio was used; closely followed by T1 treatment (Composted Coir pith: Vermicompost @ 2:1 ratio) and T9 treatment (Composted coir pith alone).

Table 3. Effect of treatments on chip bud seedling attributes of sugarcane (TNAU Sugarcane Si 7) (2013-14)

Treatments	Germination % at 20 DAS	Survival % at 30 DAS	Shoot Length (cm)	Root length (cm)	Seedling Height (cm)	No. of leaves/ seedling	No. of Roots/ seedling	Root Volume (cc/plant)	Root / Shoot ratio	Shoot dry weight (g/10 seedlings)	Root dry weight (seedlings)	DMP (g/10 seedlings)	Vigour Index
T1	51.73	47.73	10.90	21.53	45.73	3.27	7.50	0.27	1.98	5.24	0.40	5.64	1548
T2	54.80	53.60	12.50	16.17	55.57	3.33	8.87	0.40	1.30	5.91	0.52	6.43	1544
T3	66.93	65.73	12.07	14.73	47.90	3.00	7.57	0.50	1.25	5.89	0.43	6.32	1736
T4	61.20	65.07	11.70	14.57	45.477	3.00	7.10	0.53	1.27	4.95	0.38	5.33	1714
T5	59.87	60.40	10.40	14.83	43.40	2.90	8.43	0.87	1.43	5.97	0.40	6.37	1524
T6	63.60	54.53	10.67	15.13	39.13	3.00	7.23	0.50	1.41	4.13	0.33	4.46	1414
T7	56.93	52.00	11.00	14.47	46.33	3.00	9.27	0.80	1.32	4.64	0.40	5.04	1317
T8	54.93	53.47	10.50	13.77	47.73	3.20	8.40	0.37	1.34	4.89	0.27	5.16	1294
T9	46.00	45.73	10.80	11.77	45.07	3.00	9.83	0.67	1.08	5.88	0.45	6.33	1047
T10	63.60	61.87	11.80	12.07	47.77	3.23	11.50	0.50	0.97	5.84	0.36	6.20	1515
T11	46.27	47.73	10.20	12.90	45.00	3.00	10.83	0.60	1.25	4.57	0.45	5.02	1090
SEd	3.36	3.75	0.66	3.53	2.97	0.16	0.92	0.14	0.44	0.14	0.01	0.47	
CD	7.01	7.83	1.37	NS	6.19	NS	1.92	0.30	NS	0.29	0.03	0.99	

Table 4. Cost of producing chip budded seedlings (excluding the cost of nursery media

Average Germination % of buds	No. of buds required / acre	No. of canes required (assuming 20 chip buds / cane)	Weight of cane required (kg)assuming nursery cane weight of 1.0 kg / 1. No.
Cost cane			
Cane 60/	750/	375/	375/
Cost of cane @ Rs 3/ : 375*3: Rs. 1125			

able 5. Cost of labourers

Particulars	Number of Labourers	Rate (Rs.209/head)	Amount(Rs)
Seed Cane cutting	3	209	627
Bud chip preparation	3	209	627
Sowing of buds	2	209	418
Watering	4	209	836
Chemical Cost (all 19)	1	100	100
Pro trays (100 Trays * Rs.13)	1300		325
Total			2933

Table 6. Effect of treatments on Economics of producing sugarcane chip bud seedlings (2013-14)

Treatments	Germination %	No. of chip buds required / acre to produce 4500 chip bud seedlings / acre	No. of canes required	Cane weight (Assume Seed cane 1 kg / No.)	Cane cost @Rs.3/ kg	Cost of production (Rs./seedling)	Labourer +Maintenance Cost (Rs. / seedling)	Media Cost (Rs./ Seedling)	Total Cost of Production (Rs./ Seedling)	Sale Price (Rs./ Seedling)	B/C ratio
T1	51.73	8699	435	435	1305	0.29	0.65	0.14	1.08	1.50	1.39
T2	54.80	8212	411	411	1233	0.28	0.65	0.11	1.04	1.50	1.44
T3	66.93	6723	306	306	918	0.20	0.65	0.16	1.01	1.50	1.49
T4	61.20	7353	368	368	1104	0.25	0.65	0.10	1.00	1.50	1.50
T5	59.87	7516	376	376	1128	0.25	0.65	0.02	0.92	1.50	01.63
T6	63.60	7075	354	354	1062	0.24	0.65	0.06	0.95	1.50	1.58
T7	56.93	7904	395	395	1185	0.26	0.65	0.09	1.00	1.50	1.50
T8	54.93	8192	410	410	1230	0.27	0.65	0.11	1.03	1.50	1.46
T9	46.00	9783	489	489	1467	0.33	0.65	0.14	1.12	1.50	1.34
T10	63.60	7075	354	354	1062	0.24	0.65	0.03	0.92	1.50	1.63
T11	46.27	9726	486	486	1458	0.32	0.65	0.39	1.36	1.50	1.10

Table 7. Effect of treatments on germination % at 5,10,20,30, DAP (2014-15)

Treatments	Germination @ 5DAP	Germination @ 10DAP	Germination @ 20DAP	Germination @ 30DAP
T1. – Composted Coir pith : Vermicompost @ 2 : 1 ratio	23.4	44.5	51.6	57.2
T2. – Composted Coir pith : Press mud @ 2 : 1 ratio	23.5	49.9	45.3	55.8
T3. – Composted Coir pith : Vermicompost @ 3 : 1 ratio	25.9	48.7	55.3	63.3
T4. – Composted Coir pith : Press mud @ 3 : 1 ratio	25.7	45.7	46.9	57.0
T5. – Bagasse : Press mud @ 1 : 2 ratio	25.0	45.2	46.4	54.4
T6. – Banana leaf compost : Press mud @ 1 : 2 ratio	24.3	41.1	42.8	53.5
T7. – Sugarcane trash compost : Press mud @ 1 : 1 ratio	24.2	42.5	43.3	49.6
T8. – Municipal Waste (Town Compost) : Sugarcane trash compost @ 1 : 1 ratio	20.8	41.1	45.8	52.9
T9. – Composted coir pith alone	22.9	37.9	46.3	49.1
T10. Press mud alone	18.3	40.1	53.1	58.9
T11. – Farm boon	-	2.5*	-	-
SEd	34.27	2.16	1.77	2.10
CD (0.05%)	NS	4.50	3.70	4.37

Note: Sprout was observed

Table 8. Effect of treatments on growth parameters of sugarcane chip budded seedlings at 10 DAP (2014-15)

Treatments	Plant height (cm)	Shoot length (cm)	No. of leaves / seedling	Root length (cm)	Root volume (cc/ seedling)	Vigour Index
T1. – Composted Coir pith : Vermicompost @ 2 : 1 ratio	8.5	5.0	1.1	2.8	0.8	380
T2. – Composted Coir pith : Press mud @ 2 : 1 ratio	7.7	5.0	1.1	1.7	0.8	334
T3. – Composted Coir pith : Vermicompost @ 3 : 1 ratio	10.1	6.2	1.5	3.0	1.9	427
T4. – Composted Coir pith : Press mud @ 3 : 1 ratio	9.4	4.7	1.4	2.1	0.9	319
T5. – Bagasse : Press mud @ 1 : 2 ratio	6.1	3.4	1.0	1.2	0.5	237
T6. – Banana leaf compost : Press mud @ 1 : 2 ratio	5.6	2.9	0.7	0.6	0.3	144
T7. – Sugarcane trash compost : Press mud @ 1 : 1 ratio	8.6	5.3	1.3	1.9	1.2	306
T8. – Municipal Waste (Town Compost) : Sugarcane trash compost @ 1 : 1 ratio	10.2	5.6	1.4	4.2	1.3	403
T9. – Composted coir pith alone	9.9	5.2	1.4	2.6	1.0	296
T10. Press mud alone	5.4	1.6	0.4	0.5	0.1	63
T11. – Farm boon	-	-	-	-	-	0
SEd	0.58	0.56	0.13	0.33	0.15	-
CD (0.05%)	1.22	1.17	0.27	0.69	0.30	-

Table 9. Effect of treatments on growth parameters of sugarcane chip budded seedlings at 20DAP (2014-15)

Treatments	Plant height (cm)	Shoot length (cm)	No. of leaves / seedling	Root length (cm)	Root volume (cc/seedling)	Vigour Index
T1. – Composted Coir pith : Vermicompost @ 2 : 1 ratio	27.3	8.7	2.9	7.8	*1.0*	*912*
T2. – Composted Coir pith : Press mud @ 2 : 1 ratio	23.2	7.8	2.6	6.4	1.0	643
T3. – Composted Coir pith : Vermicompost @ 3 : 1 ratio	30.9	10.1	3.1	11.6	1.7	981
T4. – Composted Coir pith : Press mud @ 3 : 1 ratio	30.9	10.1	2.9	10.9	1.2	960
T5. – Bagasse : Press mud @ 1 : 2 ratio	20.4	8.0	2.8	5.6	0.7	582
T6. – Banana leaf compost : Press mud @ 1 : 2 ratio	21.1	8.1	2.9	6.0	0.9	627
T7. – Sugarcane trash compost : Press mud @ 1 : 1 ratio	26.3	9.7	2.9	5.3	0.8	650
T8. – Municipal Waste (Town Compost) : Sugarcane trash compost @ 1 : 1 ratio	32.5	10.2	3.4	9.3	1.0	893
T9. – Composted coir pith alone	30.9	9.4	3.3	10.5	1.4	921
T10. Press mud alone	25.2	8.6	3.2	6.2	0.8	638
T11. – Farm boon	9.4	5.3	1.5	3.1	1.0	181
SEd	11.73	0.38	0.20	1.73	0.34	-
CD (0.05%)	NS	0.80	0.42	3.61	NS	-

Table 10. Effect of treatments ongrowth parameters of sugarcane chip budded seedlings at 30DAP (2014-15)

Treatments	Plant height (cm)	Shoot length (cm)	No. of leaves / seedling	Root length (cm)	Root volume (cc/ seedling)	Vigour Index
T1. – Composted Coir pith : Vermicompost @ 2 : 1 ratio	53.3	12.4	3.5	21.0	7.3	2114
T2. – Composted Coir pith : Press mud @ 2 : 1 ratio	45.7	13.1	3.5	18.6	6.0	1769
T3. – Composted Coir pith : Vermicompost @ 3 : 1 ratio	53.9	13.0	3.1	18.7	6.0	1807
T4. – Composted Coir pith : Press mud @ 3 : 1 ratio	50.3	12.8	3.4	15.6	5.0	1624
T5. – Bagasse : Press mud @ 1 : 2 ratio	45.1	11.4	3.1	14.3	7.3	1398
T6. – Banana leaf compost : Press mud @ 1 : 2 ratio	34.6	10.1	3.0	11.0	5.3	1118
T7. – Sugarcane trash compost : Press mud @ 1 : 1 ratio	35.8	9.0	3.0	11.0	5.3	992
T8. – Municipal Waste (Town Compost) : Sugarcane trash compost @ 1 : 1 ratio	41.8	10.0	3.0	12.1	6.0	1169
T9. – Composted coir pith alone	39.5	10.0	3.1	12.1	7.0	1085
T10. Press mud alone	30.6	8.9	3.2	10.8	4.3	963
T11. – Farm boon	13.8	5.5	2.1	6.8	2.2	298
SEd	61.15	0.74	0.19	1.87	1.42	-
CD (0.05%)	NS	1.56	0.39	3.90	2.96	-

Table 11. Effect of treatments on economics of producing sugarcane chip bud seedlings

Treatments	Germination %	No.of chip buds require / acre to produce 4500 chip bud seedlings / acre	No. of canes require	Cane weight (Assume Seed cane 1 kg / No.)	Cane cost @Rs.3/kg	Cost of production (Rs./seedling)	Labourer +Maintenance Cost (Rs. / seedling)	Media Cost (Rs./ Seedling)	Total Cost of Production (Rs./ Seedling)	Sale Price (Rs./ Seedling)	B/C ratio
T1	57.20	7867	393	393	1179	0.26	0.65	0.14	1.02	1.50	1.47
T2	55.80	8065	403	403	1201	0.27	0.65	0.11	1.03	1.50	1.46
T3	63.30	7109	355	355	1066	0.24	0.65	0.16	1.05	1.50	1.43
T4	57.00	7895	395	395	1185	0.26	0.65	0.10	1.01	1.50	1.49
T5	54.40	8272	414	414	1242	0.28	0.65	0.02	0.95	1.50	1.58
T6	53.50	8411	721	721	2163	0.48	0.65	0.06	1.19	1.50	1.26
T7	49.60	9073	454	454	1362	0.30	0.65	0.09	1.04	1.50	1.44
T8	52.60	8555	428	428	1284	0.29	0.65	0.11	1.05	1.50	1.43
T9	49.10	9165	458	458	1374	0.31	0.65	0.14	1.10	1.50	1.36
T10	58.90	7640	382	382	1146	0.25	0.65	0.03	0.93	1.50	1.61
T11	0.00	4500	225	225	675	0.15	0.65	0.39	1.19	1.50	1.26

The effect of treatments on growth parameters of sugarcane chip budded seedlings at 30 DAP is given in Table 10. The results revealed that there was no significant variation in influencing shoot length, no. of leaves / seedlings and root length due to different treatments tried. Higher vigour index of 2114 was recorded with T1 treatment (Composted Coir pith: Vermicompost@ 2: 1 ratio) followed by T3 treatment (Composted Coir pith: Vermicompost @ 3:1 ratio). The lower vigour index value of 298 was recorded with T11 treatment where the nursery media farm boon alone was used.

The effect of treatments on economics of producing sugarcane chip bud seedling is given in Tabled 11. The results revealed that the higher B/C ratio of 1.61 was observed with T10 treatment (Press mud alone) and the lower B/C ratio of 1.26 was observed with the nursery media of farm boon.

4. CONCLUSION

The nursery media for the various treatments were made with a bud chipper machine and the same materials as the treatments, half filed in the pro trays, and the treated chip buds were planted in a slanting posture in the trays' canes before being coated with the suitable media. The trays were incubated for 5 days to promote sprouting before being placed in 50% shade and watered daily on the pro trays. The mature seedlings were tested for several growth characteristics such as germination %, survival percentage, root and shoot length, shoot and root dry weight, dry matter production, and vigour index.While calculating the economics, it was observed that nursery media made entirely of press mud had a higher B/C ratio. The findings indicate that press mud nursery material should be utilized to grow pro tray chip bud seedlings.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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