Short Communication

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Standardization of soilless media for brinjal (*Solanum melongena*) plug tray nursery

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Abstract

An experiment was conducted at Polytechnic in Horticulture, ACHF, NAU, Paria (Gujarat), during winter season, 2017-20 in net house condition. The experiment was laid out in a Complete Block Design in 16 treatments with three replications. Among difference soilless media ratio for brinjal(*Solanum melongena* L.) plug tray nursery, the treatment T_4 (vermicompost: cocopeat 1:1) was found best for the maximum seed germination (88.11%), seedling survival percentage in main field (91.24%), seed vigour index (1138.12) and highest B:C ratio (1.39). Treatment T_1 (vermicompost alone) was found best for early germination (5.73 days), while treatment T_5 (vermicompost: vermiculite, 1:1) showed maximum shoot length (14.04cm), root length (9.31cm), stem girth (1.89cm) and highest dry matter content (6.69g).The minimum damping off infection was found (0.03%) in treatment T_3 (Vermiculite alone), T_{10} (vermicompost: cocopeat 1:2) and T_{11} (vermicompost: vermiculite 1:2). The farmers and nurserymen raising brinjal seedling in plug tray nursery are advised to use media of vermicompost: cocopeat as 1:1 ratio for maximum germination percentage, good seedling vigour, highest BCR and maximum survival of seedling in plug tray as well as main field.

Key words: Soilless media, Plug tray, Shoot length. Root ratio

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Brinjal (*Solanum melongena* L.) is one of the most important Solanaceous crop of India. Choice of plant growing media and fertilizer are important when propagating plants from seed or cuttings in containers. Various other materials may be mixed instead to create "soilless" media to be used in container propagation. Quality of seedlings is the key element in successful vegetable cultivation. Quality is particularly related to good root development and a balanced shoot to root ratio. Transplants stocky, with healthy foliage, producing new roots quickly and having good Carbohydrate reserves are appropriate for planting, and additionally they should not have any nutrient deficiency or pest and disease problems (Kubato *et al*., 2013). Hence an experiment was conducted to find out the best soil less media for brinjal plug tray nursery.

The experiment was laid out in a Complete Block Design in 16 treatments and three replications. The treatment consisted of T_1= vermicompost, T_2= cocopeat , T_3=vermiculite (horticulture grade 2), T_4= vermicopost: cocopeat (1:1), T_5= vermicompost : vermiculite (1 :1), T_6 = cocopeat : vermiculite (1 :1) T_7 = vermicompost : cocopeat (2 :1) T_8 =vermicompost : vermiculite (2 :1), T_9 = cocopeat : vermiculite (2 :1) T_{10} = vermicompost : cocopeat (1 :2), T_{11} = vermicompost : vermiculite (1 :2), T_{12} = cocopeat : vermiculite (1 :2), T_{13} = vermicompost : cocopeat : vermiculite (1 :1 :1), T_{14} = vermicompost : cocopeat : vermiculite (2 :1 :1), T_{15} = vermicompost : cocopeat : vermiculite (1 :2 :1) and T_{16} = vermicompost : cocopeat : vermiculite(1 :1 :2).

The data for days to germination were significantly affected by different ratio of soilless media on brinjal plug tray nursery. The minimum days (5.73) for germination was recorded in treatment T_1, while maximum days (8.57) for germination was recorded in T_{15}. The maximum seed germination (88.11 %) in T_4 and minimum (73.42%) in T_9. The maximum shoot length (14.04 cm) was found in treatment T_5 and minimum (7.47cm) in treatment T_3. The analysis of variance revealed significant difference in root length among treatments. The treatment T_5 recorded highest root length (9.31cm). The minimum root length (5.55cm) was found in T_3.The treatment T_6 recorded maximum number of leaves/seedling (6.69), while minimum leaves/seedling (4.42) was recorded in T_{11} (Table 1). The maximum stem girth (1.89cm) was recorded in treatment T_5, while minimum (0.90cm) in T_3. The highest seed vigour index (1138.12) was found in treatment T_4 and minimum (545.10) was found in T_3. The maximum survival percentage (91.24 %) was recorded in T_4. The data pertaining to damping off showed significant difference among the treatments. Minimum damping off infection was found in treatment T_3, T_{10}, T_{11} (0.03 %). The treatment T_5 recorded highest (6.69g) dry matter content while minimum (3.89 g) in treatment T_3. Maximum (1.39) benefit cost ratio (B:C) recorded with treatment T_4 while minimum (0.80) in treatment T_3 (Table 2).

Similar result were found by Yadav and Bajpay 2019 , the use of protrays on growing of different seedlings

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is very helpful in ensuring increased development of roots, germination rate, proper spacing, seed viability, individual area for each seed, avoids contamination or any mixtures possibilities etc. It was found that coir pith growing media has 99% germination rate, vermicompost has 87%, and coir pith+ vermicompost has 92%. It is because coir pith has very good EC , pH etc. The oxygen circulation in coir pith is far better than the other media. With coir pith it was recorded as shoot length having 89.3mm, root length having 37.9mm, stem diameter having 1.77mm,and number of leaves having 4 at the age of 30 days. The next experiment is based on organic fertilizers and growing medias. According to Tuzel *et al.*2014, poor impact of vermicompost in the quality of seedlings of tomato, but when used in mixture with peat, and FYM shows better results. The next experiment is based on growth impacts of tomato with nutriseeds. According to Hota and Selvan 2017, it was noted that for growing tomato. Vermicompost has also potential to germinate in higher quantity i.e;98.6%.The media having vermicompost, coir pith, in which vermicompost has soya chunks shows higher germination as compared to vermiculite. The next experiment is based on impact of pine bark, goat manure, pine bark only composition vegetable seedlings growth. According to Mupondi, *et al*. 2010, it was observed that pine bark goat manure has very good effect on growth of the vegetable seedlings, that results in improved nutrients, weight contents etc, and can be used in selected vegetables. The next experiment is based on growth impacts due to mixing of Spent Coffee Grounds (SCG) with media. Chrysargyris *et al* 2019, it was found that SCG has very bad impact on the *Brassica olerecia* species, less plant height, number of leaves, fresh weight etc.

Table 1: Effect of different ratio of soilless media on growth parameters of brinjal seedlings (plug tray nursery)

Treatment	Days to germination	Germination (%)	Shoot length (cm)	Root length (cm)	Number of leaves/ Seedling
T_1	5.73	85.68	10.70	6.78	5.31
T_2	6.52	87.97	10.38	6.70	4.99
T_3	6.88	82.43	7.47	5.55	5.03
T_4	5.91	88.11	12.66	8.21	5.65
T_5	7.24	80.96	14.04	9.31	6.17
T_6	7.50	81.09	12.51	9.08	6.69
T_7	6.73	84.30	13.17	7.75	5.58
T_8	6.88	77.74	12.04	7.42	5.00
T_9	6.68	73.42	11.13	7.13	5.53
T_{10}	6.15	81.02	8.70	7.28	4.77
T_{11}	7.29	81.15	8.43	5.73	4.42
T_{12}	7.21	78.53	10.68	6.97	5.63
T_{13}	7.53	82.79	10.91	6.08	5.13
T_{14}	6.48	78.87	11.26	7.00	5.75
T_{15}	8.57	82.56	11.15	7.65	5.99
T_{16}	7.56	79.40	9.69	5.98	5.22
S.E.m ±	0.33	0.69	0.73	0.56	0.33
C.D.@ 5%	0.96	1.94	2.09	1.63	0.95
C.V.%	7.15	2.54	6.40	7.91	9.06
YxT					
SEm ±	0.29	1.19	0.40	0.33	0.28
CD@ 5%	0.80	3.38	1.13	0.91	0.79

CONCLUSION

The treatment T_4 (vermicompost: cocopeat 1:1) was found best for maximum seed germination (88.11%), seedling survival percentage in main field (91.24%), seed vigour index (1138.12) and highest B:C ratio (1.39). Treatment T_1 (Vermicompost alone) was found best for early germination (5.73 days), while treatment T_5 (Vermicompost: Vermiculite, 1:1) showed maximum shoot length (14.04cm), root length (9.31cm), stem girth (1.89cm) and highest dry-matter content (6.69g).

Table 2: Effect of different ratio of soilless media on growth parameters of brinjal seedlings (plug tray nursery)

Treatment	Stem girth (cm)	Seed Vigour Index-I	Survival of seedling in main field (%)	Damping off infection (%)	Dry matter content (g)	BCR
T_1	1.35	916.96	10.70	1.39(1.53)	5.19	1.33
T_2	1.20	913.40	10.38	0.55(1.24)	4.69	1.28
T_3	0.90	617.18	7.47	0.03(1.02)	3.89	0.80
T_4	1.71	1138.12	12.66	0.91(1.36)	6.12	**1.39**
T_5	1.89	1137.13	14.04	0.19(1.08)	6.69	1.17
T_6	1.47	1013.84	12.51	0.07(1.03)	5.70	1.01
T_7	1.46	1111.81	13.17	1.85(1.69)	5.42	1.38
T_8	1.48	934.05	12.04	0.10(1.05)	5.05	1.16
T_9	1.30	812.42	11.13	0.04(1.02)	4.81	1.03
T_{10}	1.13	704.44	8.70	0.03(1.02)	4.03	1.08
T_{11}	1.13	685.49	8.43	0.03(1.02)	4.06	0.89
T_{12}	1.18	837.16	10.68	0.05(1.03)	5.14	0.98
T_{13}	1.17	902.59	10.91	0.68(1.29)	4.84	1.28
T_{14}	1.25	888.72	11.26	0.52(1.23)	5.13	1.16
T_{15}	1.30	920.98	11.15	1.04(1.43)	5.34	1.21
T_{16}	1.23	769.06	9.69	0.62(1.70)	5.07	1.06
SEm ±	0.10	61.26	0.73	0.18	0.30	
CD@ 5%	0.31	176.94	2.09	0.52	0.87	
CV%	8.77	6.11	6.40	62.32	4.82	
YxT						
SEm ±	0.07	31.89	1.22	0.19	0.14	
CD@ 5%	0.19	89.53	3.43	0.53	0.39	

T_1: vermicompost
T_2: cocopeat
T_3: verminculite
T_4: vermicompost + cocopeat (1 :1)
T_5: vermicompost + verminculite(1:1)
T_6: cocopeat + verminculite (1:1)
T_7: vermicompost+ cocopeat (2:1)
T_8: vermicompost+verminculite (2:1)
T_9: cocopeat +verminculite (2 :1),
T_{10}: vermicompost + cocopeat (1:2)
T_{11}: vermicompost+verminculite (1:2)
T_{12}: cocopeat +verminculite (1 :2)
T_{13}: vermicompost + cocopeat +verminculite (1:1:1)
T_{14}: vermicompost + cocopeat + verminculite (2:1:1)
T_{15}: vermicompost + cocopeat + verminculite (1:2:1)
T_{16}: vermicompost + cocopeat + verminculite (1:1:2)

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