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Effect of various potting media on the growth and development of brinjal (*Solanum melongena* L.) seedlings for grafting

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Abstract
The investigation entitled "Effect of various potting media on the growth and development of Brinjal (*Solanum melongena* L.) seedlings for grafting" was undertaken at College of Horticulture, Dr. B. S. K. K. V, Dapoli (M.S.) during the year 2020-2021. The experiment was conducted in Split Plot Design (SPD) with eight treatments and three replications. The treatments comprise; T_1- Non-Sterilized Cocopeat (100%), T_2- Non-Sterilized Cocopeat (75%) + Vermicompost (25%), T_3- Non-Sterilized Cocopeat (75%) + Rice husk (25%), T_4- Non-Sterilized Cocopeat (75%) + Saw Dust (25%), T_5- Sterilized Cocopeat (100%), T_6- Sterilized Cocopeat (75%) + Vermicompost (25%), T_7- Sterilized Cocopeat (75%) + Rice husk (25%), T_8 - Sterilized Cocopeat (75%) + Saw Dust (25%). The different treatments studied in which the treatment T_6- Sterilized Cocopeat (75%) + Vermicompost (25%) recorded the highest graftable seedling per cent (87.68%) (91.25%), required minimum number of days for germination (5.67 days) (5.33 days) and minimum days for seedling to graftable stage (46.20 days) (43.70 days) in rootstock and scion respectively.

Keywords: Brinjal, sterilization, potting media, grafting, rootstock, scion

Introduction
Brinjal (*Solanum melongena* L.) is one of the widely distributed and cultivated species of the *Solanaceae* family. Brinjal or eggplant is the most popular vegetable crop cultivated worldwide hence regarded as "King of vegetables" (Chandan *et al.*, 2019) [4].
Brinjal is the third most widely grown vegetable species in Asia and accounts almost 50% of the world's brinjal production. India is the largest producer and consumer of Brinjal in the world with 744 thousand ha and 12682 thousand MT area and production respectively. Maharashtra ranks 9th in brinjal production in India with 19.63 thousand ha and 336.92 thousand MT area and production respectively, followed by West Bengal, Odisha, Jharkhand, Gujarat, Bihar, Madhya Pradesh, Chhattisgarh, Tamil Nadu and Maharashtra (Anon, 2019) [3].
Seedling production is an important step in the graft production system because it influences the final result of grafting. Potting media is a major factor that influences seed germination, seedling emergence, seedling growth and quality of seedlings in a nursery (Aklibasinda *et al.*, 2011 and Unal, 2013) [2, 12]. The Potting media is not only a place for sowing and planting seedlings, but also a source and storage of plant nutrients (Indriyani *et al.*, 2011) [5]. It also harbours the root system and therefore supports the plant (Abad *et al.*, 2005) [1].
Potting media for use in protray nurseries is available in two basic forms: soil-based and organic based. In the soil substrate, field soil is the main component and organic substrate, namely bark, peat, compost, coconut shell, earthworm compost, rice husk or inorganic materials, such as perlite and vermiculite, which promote the good development and production of vegetable roots. Growers of tropical areas often create a potting media by using available material locally. Several growth media had been evaluated on various plants by previous researchers (Kumar *et al.*, 2016) [7].

Material and Methods
The field experiment was carried out at High-Tech nursery of College of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist- Ratnagiri during the year 2020-2021. The experiment was conducted in Split Plot Design (SPD) with eight treatments and three replications. Ten seedlings were randomly selected and tagged in each treatment of all three replications of scion and rootstock to record the periodical observations at an interval of 7 day.

The observations on the minimum days for germination and seedling to graftable stage and graftable seedling per cent was recorded in experiment of each treatment.

Results and Discussion

The data pertaining to the effect of sterilization and different potting media on days required for germination of rootstock and scion in various treatments have been presented in Table 1, showed that there was significant difference in sterilized media. The minimum days required for germination was recorded in S_1-Sterilized potting media (6.48 days) and (5.75 days) whereas, maximum days (6.50 days) and (6.00 days) were recorded in S_0-Non sterilized potting media for rootstock and scion respectively. The effect of potting media noticed significant difference in the number of days required for germination. In case of rootstock, minimum days were observed in M_2-Cocopeat @ 75% + Vermicompost @ 25% (5.67 days) which was at par with M_1-Cocopeat @ 100% (6.17 days) whereas, the maximum days was recorded in M_4– Cocopeat @ 75% + Saw dust @ 25% (7.21 days). In case of scion, minimum days required for germination were recorded in the M_2-Cocopeat @ 75% + Vermicompost @ 25% (5.33 days) which was at par with M_1-Cocopeat @ 100% (5.50 days) and M_3-Cocopeat @ 75% + Rice husk @ 25% (6.17 days) whereas, maximum days was recorded in M_4-Cocopeat @ 75% + Saw dust @ 25% (6.50 days). The interaction effect noted non-significant effect on days required for germination of rootstock and scion. The minimum days were observed in S_1M_2 (5.33 days) whereas, the maximum days were recorded in S_1M_4 (7.43 days). The minimum days were noted in S_1M_1 and S_0M_2 (5.00 days) while late germination was recorded in S_0M_4 (6.67 days). Maximum germination was noticed in sterilized potting media may be due to the availability of healthy growth media leading to early and more growth and fewer harmful micro-organisms (*Fusarium spp*, *Phythium spp*) which further increases the activity of beneficial microorganisms Baker (1967b). Present results were analogous to the findings recorded by Muhammad *et al.* (2016) [9] in tomato, Mathowa *et al.* (2017) [8] in sweet pepper.

The data pertaining to the effect of sterilization, potting media and their interaction on number of days required for rootstock and scion seedling to attain graftable stage are presented in Table 2 it was observed that, minimum days required for rootstock seedlings to reach graftable stage was recorded in S_0-Non-sterilized potting media (56.49 days) and S_1-Sterilized potting media (53.53 days) for scion seedlings. The maximum days was recorded in S_1-sterilized potting media (57.17 days) in rootstock and in S_0-Non sterilized potting media (59.54 days) for scion seedlings. The effect of potting media on days required for seedling to graftable stage revealed that the minimum days required for seedling to attain graftable stage was recorded in M_2-Cocopeat @ 75% + Vermicompost @ 25% (46.20 days) in rootstock and scion it was (43.70 days) whereas, the maximum days was recorded in M_4-Cocopeat @ 75% + Saw dust @ 25% (67.22 days) in rootstock and M_3-Cocopeat @ 75% + Rice husk @ 25% (62.75 days) in scion seedling. The interaction effect showed that there was significant difference. The minimum days required for seedling to graftable stage were recorded in S_1M_2 (45.70 days) which was at par with S_0M_1 (46.23 days) and S_0M_2 (46.70 days) in rootstock seedlings. In scion seedling it was recorded in S_1M_2 (42.67 days) which was at par with S_0M_2 (44.73 days) whereas, the maximum days were recorded in S_0M_4 (67.23 days) and S_0M_3 (64.57 days) scion seedlings. These results are in confirmatory with findings reported by Johnson (2011) [6] in brinjal and tomato, Palada (2009) [10] in sweet peppers.

The data pertaining to graftable seedling percentage of rootstock and scion for grafting were recorded 42 DAG in scion and 49 DAG in rootstock seedling, from the Table 3 sterilization of potting media found non-significant difference on graftable seedling percentage of rootstock while it was significant on scion seedling. The maximum graftable seedling of rootstock and scion were recorded in S_1-Sterilized potting media (81.78%) and (88.92%) respectively whereas, the minimum graftable seedling of rootstock and scion were recorded in S_0-Non-sterilized potting media (80.51%) and (86.33%) respectively. The effect of potting media on number of graftable seedling percentage of rootstock and scion recorded significant variations. The maximum graftable seedling percentage were recorded in M_2-Cocopeat @ 75% + Vermicompost @ 25% (87.68%) which was at par with M_1-Cocopeat @ 100% (83.68%) in rootstock seedling and (91.25%) in scion seedlings whereas, the minimum graftable seedling percentage were recorded in M_4- Cocopeat @ 75% + Saw dust @ 25% (75.01%) in rootstock and M_3- Cocopeat @ 75% + Rice husk @ 25% (85.86%) in scion seedling. The interaction effect of sterilization of media and potting media noted non-significant difference. The maximum graftable seedling percentage were recorded in S_1M_2 in rootstock (88.53%) and (92.63%) in scion seedling whereas, the minimum graftable seedling percentage were noted in S_0M_4 in rootstock (74.37%) and S_0M_3 (84.53%) in scion. The maximum graftable seedling percentage was observed in M_2-Cocopeat @ 75% + Vermicompost @ 25% might be due to high nutrient content, good pH and EC in this media similarly, vermicompost increase aeration, nutrient availability, water holding capacity and good seedling support. Similar findings recorded by Radha *et al.* (2018) [11] in chilli.

Table 1: Effect of sterilization and different potting media on days required for germination of rootstock and scion

Days to Germination										
Treatment	**Rootstock**					**Scion**				
	M_1	**M_2**	**M_3**	**M_4**	**Mean**	**M_1**	**M_2**	**M_3**	**M_4**	**Mean**
S_0	6.33	6.00	6.67	7.00	6.50	6.00	5.00	6.33	6.67	6.00
S_1	6.00	5.33	7.16	7.43	6.48	5.00	5.67	6.00	6.33	5.75
Mean	6.17	5.67	6.91	7.21	6.49	5.50	5.33	6.17	6.50	5.88
	RES	S.Em±		CD at 5%		RES	S.Em±		CD at 5%	
S	SIG	0.17		1.01		SIG	0.20		1.24	
M	SIG	0.19		0.59		SIG	0.28		0.86	
S X M	NS	0.27		-		NS	0.40		-	

Sterilization of potting media	**Potting Media**	
S_0- Non sterilized media	M_1- Cocopeat (100%)	M_2- Cocopeat (75%) + Vermicompost (25%)
S_1- Sterilized media	M_3- Cocopeat (75%) + Rice husk (25%)	M_4- Cocopeat (75%) + Saw dust (25%)

Table 2: Effect of sterilization and different potting media on number of days required for rootstock and scion seedling to attain graftable stage

Treatment	Number of days required for seedling to graftable stage									
	Rootstock					Scion				
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_0	46.23	46.70	65.80	67.23	56.49	64.37	44.73	64.57	64.50	59.54
S_1	50.17	45.70	65.60	63.29	56.19	52.63	42.67	60.93	57.89	53.53
Mean	48.20	46.20	65.70	67.22	56.34	58.50	43.70	62.75	61.20	56.54
	RES	S.Em±		CD at 5%		RES	S.Em±		CD at 5%	
S	NS	0.66		-		SIG	0.55		3.32	
M	SIG	0.52		1.61		SIG	0.65		2.01	
S X M	SIG	0.74		2.27		SIG	0.92		2.84	

Sterilization of potting media	Potting Media	
S_0- Non sterilized media	M_1- Cocopeat (100%)	M_2- Cocopeat (75%) + Vermicompost (25%)
S_1- Sterilized media	M_3- Cocopeat (75%) + Rice husk (25%)	M_4- Cocopeat (75%) + Saw dust (25%)

Table 3: Effect of sterilization of media and different potting media on number of graftable seedling percentage of rootstock and scion

Treatment	Number of graftable seedling percentage (%)									
	Rootstock					Scion				
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_0	83.33(65.91)	86.83(68.72)	77.51(61.69)	74.37(59.59)	80.51	85.62(67.72)	89.87(71.44)	84.53(66.84)	85.29(67.45)	86.33
S_1	84.03(66.45)	88.53(70.21)	78.89(62.65)	75.65(60.43)	81.78	88.24(69.94)	92.63(74.25)	87.19(69.03)	87.62(69.40)	88.92
Mean	83.68	87.68	78.20	75.01	81.14	86.93	91.25	85.86	86.45	87.62
	RES	S.Em±		CD at 5%		RES	S.Em±		CD at 5%	
S	NS	0.75		-		SIG	0.36		2.18	
M	SIG	1.51		4.64		SIG	0.72		2.22	
S X M	NS	2.13		-		NS	1.02		-	

(Values in parenthesis indicates arcsine transformed values)

Sterilization of potting media	Potting Media	
S_0- Non sterilized media	M_1- Cocopeat (100%)	M_2- Cocopeat (75%) + Vermicompost (25%)
S_1- Sterilized media	M_3- Cocopeat (75%) + Rice husk (25%)	M_4- Cocopeat (75%) + Saw dust (25%)

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