

Growth of Tomato (*Solanum lycopersicum* L.) Seedlings in Different Potting Mixes, Under Hi – Tech Nursery in Green House Conditions

Nissi F. G.*

Centre of Excellence for Protected cultivation

Dr. Y.S.R. Horticultural University Venkataramannagudem, Andhra Pradesh

*Corresponding Author E-mail: nissiflora31@gmail.com

Received: 4.07.2018 | Revised: 9.08.2018 | Accepted: 16.08.2018

ABSTRACT

The study was carried out to explore the effect of potting media on seed germination and seedling growth in tomato cv. Arka Vikas. Four types of media in different combinations were studied. The experiment was laid out in Completely Randomized Design, with twelve treatmental combinations and three replications. Results showed that the number of seeds germinated was highest in T10 (170 seedlings), height of the seedlings was highest in T10 (19.30 cm). Highest root length was recorded in T3 (18.64 cm) which was on par with T6 (17.73 cm). Highest leaf area was recorded in T10 (43.96 Sq cm) Fresh weight of shoot was highest in T10 (14.12g) and highest fresh root weight was recorded in T3 (10.10 g). Dry shoot weight was highest in T3 (1.00 g) and highest dry root weight was recorded in T10 (0.6 g). T10 was found to be the best treatment for tomato seedling production.

Key words: Tomato seedling, Germination, Potting media, Plant growth, Coco peat, Vermiculite, Vermicompost, Perlite, Propagation.

INTRODUCTION

Tomato (*Solanum lycopersicum* L.) belongs to Solanaceae family. It is a herbaceous sprawling plant growing to 1-3 m in height with weak woody stem. Tomato is one of the most important "protective foods" because of its special nutritive value. Tomatoes are normally transplanted because much better results are gained when seedlings are raised in a nursery. The growth and production of tomato seedlings is now based almost entirely on artificial potting-mixes or substrates, rather than soil which was the common practice⁶. In some advanced countries, sterilized soils were

used as a medium for plants in the greenhouses, but this practice was very expensive and also there was a lack of good soil availability. The potting mixes or artificial substrates like peat, bark, vermiculite, rock wool and perlite etc., have the following advantages i.e., disease and weed free, light in weight, quicker growth and higher percent of germination. There are different kinds of potting-mixes available, each of which has its own physical and chemical properties. The present research has been done to find out the growth of tomato seedlings in different potting mixes under greenhouse conditions.

Cite this article: Nissi, F.G., Growth of Tomato (*Solanum lycopersicum* L.) Seedlings in Different Potting Mixes, Under Hi – Tech Nursery in Green House Conditions, *Int. J. Pure App. Biosci.* 6(5): 692-695 (2018). doi: <http://dx.doi.org/10.18782/2320-7051.6984>

MATERIAL AND METHODS

The present experiment was performed in uniform environmental conditions of Hi- tech nursery at Centre of Excellence for Protected Cultivation, Dr. Y.S.R. Horticultural University, Venkataramannagudem, Andhra Pradesh. The potting-mixes available in the open market of India are; Coco peat, Vermiculite, vermicompost and Perlite etc., and so these were used in different combinations. The experiment was laid out in the Hi – tech nursery *ie.*, in Greenhouse on 4th January, 2017. The treatments were

- T1 (2:1:1) Coco peat : Perlite : Vermiculite
 T2 (3:1:1) Coco peat : Perlite : Vermiculite
 T3(2:1:1) Vermicompost: Perlite : Vermiculite
 T4 (3:1:1) Vermicompost : Perlite : Vermiculite
 T5 (2:1:1:1) Vermicompost : Cocopeat: Perlite : Vermiculite
 T6 (3:1:1:1) Vermicompost : Cocopeat: Perlite : Vermiculite
 T7 (2:1:1:1) Cocopeat: Vermiculite : Perlite : Vermicompost

- T8 (3:1:1:1) Cocopeat : Vermiculite : Perlite : Vermicompost
 T9 (1:1:1:1) Cocopeat : Vermiculite : Perlite : Vermicompost
 T10: Vermicompost
 T11: Fully decomposed Cocopeat
 T12: Partially decomposed Cocopeat

The experiment was conducted in CRD with twelve treatments replicated thrice. The cultivar chosen for the experiment was ‘Arka Vikas’. In this experiment, seeds were sown in portrays having 198 cells. The portrays were stacked one above the other with an empty tray on the top to maintain constant and sufficient warm temperature to set uniform germination. Temperature of 21 to 30 should be maintained. The portrays were arranged on the platform in the climate controlled polyhouse in Hi-Tech Nursery.

RESULTS AND DISCUSSION

Treatments	Number of seeds germinated	Height of seedling (cm)		
		10 th Day	20 th Day	25 th Day
T1	83.00	4.06	5.10	5.16
T2	154.00	3.39	5.33	7.20
T3	125.00	5.44	6.03	14.23
T4	127.00	4.60	8.76	15.70
T5	121.00	2.50	4.60	6.60
T6	109.00	2.18	4.30	8.40
T7	111.00	2.06	3.53	5.40
T8	92.00	3.13	4.46	5.33
T9	83.00	3.06	4.33	5.51
T10	170.00	2.42	8.03	19.30
T11	132.00	3.68	6.33	9.10
T12	155.00	3.68	5.40	5.63
SE _±	2.59	0.22	0.29	0.36
CD @ 5%	7.61	0.65	0.84	1.05

Treatments	Root length (cm)	Leaf Area (Sq Cm)	Fresh Weight (g)		Dry Weight (g)	
			Shoot	Root	Shoot	Root
T1	8.11	7.46	3.27	4.76	0.40	0.30
T2	14.54	16.89	4.62	4.70	0.40	0.40
T3	18.64	29.30	12.65	10.10	1.00	0.50
T4	11.47	24.75	7.83	4.40	0.70	0.40
T5	11.85	8.33	4.10	3.60	0.30	0.23
T6	17.73	8.20	4.27	3.30	0.23	0.40
T7	14.53	5.78	2.64	3.00	0.30	0.20
T8	13.61	5.83	2.68	3.30	0.20	0.20
T9	16.55	7.97	2.28	2.30	0.40	0.20
T10	12.99	43.97	14.12	8.60	0.90	0.60
T11	10.63	16.52	5.54	4.00	0.600	0.33
T12	13.68	8.39	2.68	2.30	0.200	0.13
SE _±	0.51	2.74	0.32	0.22	0.192	0.05
CD @ 5%	1.51	8.06	0.96	0.65	0.065	0.14



Seed germination depends on both internal and external conditions. The most important external factors include temperature, water, nutrients, oxygen and light. Number of seeds germinated was highest in T10 (170 seedlings) followed by T12 (155 seedlings) and T2 (154 seedlings). Height of the seedlings was highest in T10 (19.30 cm) followed by T4 (15.70 cm). Highest root length was recorded in T3 (18.64 cm) which was at par with T6 (17.73 cm). Highest leaf area was recorded in T10 (43.96 Sq cm) followed by T3 (29.3 Sq cm) and T4 (24.74 cm²) which were at par with each other.

Copyright © Sept.-Oct., 2018; IJPAB

Fresh weight of shoot was highest in T10 (14.12 g) followed by T3 (12.65 g) and highest fresh weight of root was recorded in T3 (10.10 g). Dry shoot weight was highest in T3 (1.00g) and highest root dry weight was recorded in T10 (0.6 g). Vermicompost is reported as having bioactive principles considered to be beneficial for root growth, root initiation, germination and growth of the plant¹, as also having a balanced composition of nutrients⁷. Vermicompost, mixed with Coco peat which is having natural rooting hormones and anti fungal properties, vermiculite and perlite

which improves water holding capacity, permeability and airflow in the media, affects physical, chemical & biological properties of the media and is a source of soil nutrients. Organic matter from vermicompost may also improve nutrient availability and improve phosphorus absorption³, and all these factors are favoured for seed germination, height of seedlings, root length, leaf area, fresh and dry weight of shoot and root. Combined application of vermicompost, coco peat, vermiculite and perlite in different treatments showed significant positive effect on germination, seedling growth and plant biomass, probably owing to a synergistic combination of all these factors in improving physical condition of the media and providing nutritional factors⁵.

CONCLUSION

Eventhough vermicompost alone promoted better growth of seedlings, handling of portyays is difficult as vermicompost weighs more. Vermicompost in combination with cocopeat, vermiculite, perlite is good for better growth of seedlings as well as easy handling of portrays.

REFERENCES

1. Bachman, G.R. and Metzger, J.D., Growth of bedding plants in commercial potting substrate amended with vermicompost. *Biores Tech.*, **99**: 3155-3161(2008).
2. Ghulam Nabi, The growth of tomato plants in different potting mixes, under greenhouse conditions. *Science Vision* Vol.8 (1) July - September, pp **122 – 125** (2002).
3. Karama, A.S. and Manwan, I., Penggunaan pupuk organik pada tanaman pangan. Makalah pada Lokakarya Nasional Efisiensi Penggunaan Pupuk. *Cisarua Bogor*, 12-13 November 1990, pp. **44** (1990).
4. R.L. Bhardwaj, Effect of growth media on seed germination and seedling growth in papaya (*Carica papaya* L.) cv. Red Lady *J. Hortl. Sci.* Vol. **8(1)**: 41-46 (2013).
5. Sahni, S., Vermicompost enhances performance of plant growth promoting rhizobacteria in Cicer arietinum rhizosphere against *Sclerotium rolfsii*. *Crop Prot.*, **27**: 369-376 (2008).
6. Wilson, G. C. S., New perlite system for tomato production. *Florentica international*. No **2**: 23- 36 (1984).
7. Zaller, J.G., Vermicompost as a substitute for peat in potting media: Effects on germination, biomass allocation, yields and fruit quality of three tomato varieties. *Sci. Hort.*, **112**: 191-199 (2007).