www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(1): 909-911

www.thepharmajournal.com
Received: 14-10-2021
Accepted: 26-11-2021

Komala BM
Master of Science Agriculture Horticulture Vegetable Science, Department of Horticulture, Naini Agricultural Institute Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Deepanshu
Assistant Professor, Department of Horticulture, Naini Agricultural Institute Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Komala BM
Master of Science Agriculture Horticulture Vegetable Science, Department of Horticulture, Naini Agricultural Institute Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Effect of growing media and bio fertilizers on growth, quality and yield of capsicum (*Capsicum annum*) in shade net

Komala BM and Deepanshu

Abstract
The present experiment was carried out during November, 2020 to May, 2021 in shade net, Research field, Department of Horticulture, SHUATS, Prayagraj. The experiment was conducted in randomized block design (RBD), with fifteen treatments replicated thrice with growing media (FYM + cocopeat + vermicompost + perlite + vermiculite) and application of biofertilizer (Azotobacter + PSB + Rhizobium) on variety (Arka Gaurav). On capsicum the treatments were used to find out the most suitable growing media and Biofertilizer for quality and growth of the capsicum. The results of the experiment have revealed that application of treatment of T_9 (cocopeat + vermicompost + perlite + vermiculate (1:1:1:1) + Azotobacter + PSB) has significantly increased the growth and yield parameters like plant height, number of branches, plant spread and yield parameters like days to first harvest, number of fruits per plant and maximum fruit yield. This study used to evaluate the effect of selected treatments on yield of capsicum. And the capsicum plants responded significantly to the growing media and biofertilizer supply.

Keywords: Shade net, capsicum, growing media, biofertilizer

Introduction
Capsicum (*Capsicum annum*), also called as pepper, is additionally a main vegetable and spice crop originated within the American tropics and belongs to the family solanaceae having somatic chromosome number 2n=22. It is rich in vitamin A, vitamin C and minerals like calcium, magnesium, phosphorus, potassium. The fruits may be thin and long, large and thick, short and bell-shaped, small and round. The unripe fruits may be green, creamy white, yellow, purple, red and orange. The pungency of fruit is mainly due to presence of a compound called capsaicin (0.1-1.5%).The genus capsicum includes over 30 species, five of which (C. *annuum*, C. *frutescens*, C. *chinense*, C. *baccatum*, and C. *pubescens*) are domesticated and mainly grown for consumption.

Growing media plays an important role in successful cultivation of any crop. It should have a property of good water holding capacity and also able to drain excess water to come to field capacity which creates congenial root environment. For proper plant growth, organic fertilizers such as farmyard manure and vermicompost etc. provide consistently all essential nutrients, be it macro or micro, in an adequate quantity resulting in healthy growth of the plants. Azatobacter improves seed germination. It helps to increase nutrient availability and restore fertility. Phosphate solubilizing bacteria increase the availability of phosphorus in media and increase root growth.

Materials and Methods
This chapter contains the details of the materials used and the methods adopted in the present study entitled Effect of growing media and bio fertilizer on growth, quality and yield of capsicum in shade net was carried out on growth and yield parameters in capsicum during 2020 - 2021 at that Research Field, Department of Horticulture, Naini Agricultural Institute (NAI), Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The experiment was laid by randomized block design (RBD) with 15 treatments T_1 control (Garden soil + FYM) T_2 (cocopeat + vermicompost (1:1) + Rhizobium + PSB), T_3 (cocopeat + vermicompost + Perlite (1:1:1) + Rhizobium + PSB), T_4 (cocopeat + vermicompost + vermiculite (1:1:1) + Rhizobium + PSB), T_5 (cocopeat + vermicompost + perlite + vermiculite (1:1:1:1) + Rhizobium + PSB, T_6 (cocopeat + vermicompost (1:1)+ Azatobacter + PSB), T_7 (Cocopeat + Vermicompost + Perlite (1:1:1) + Azotobacter + PSB), T_8 (Cocopeat + Vermicompost + Vermiculate (1:1:1) + Azotobacter + PSB), T_9 (Cocopeat + Vermicompost + Perlite + Vermiculate (1:1:1:1) + Azotobacter + PSB), T_{10} (Cocopeat + Vermicompost +

Perlite (1:1:0.5) + Rhizobium + PSB), T_{11} (Cocopeat + Vermicompost + Vermiculite (1:1:0.5) + Rhizobium + PSB), T_{12} (Cocopeat + Vermicompost + Perlite + Vermiculite (1:1:0.5:0.5) + Rhizobium + PSB), T_{13} (Cocopeat + Vermicompost + perlite (1:1:0.5) + Aztaobacter + PSB), T_{14} (Cocopeat + Vermicompost + Vermiculite (1:1:0.5) + Azatobacter + PSB), T_{15} (Cocopeat + Vermicompost + perlite + Vermiculite (1:1:0.5:0.5). All the standard recommended cultural practices were followed to raise a successful crop during the course of investigation.

Results and Discussion

The research results statically provided us with the evidence of improving growth, quality and yield traits of capsicum in response to growing media and bio fertilizers. The mean data showed significant to thePlant height, Tallest Plant height at 150 days after planting (52.63 cm) was recorded in T_9followed by T_{15} with (51.36cm), shortest plant height (42.08 cm) was recorded in control.themore number of primary branches at 150 days after planting (4.17) was recorded in T_9 followed by T_{15} with (3.92) a smaller number of primary branches (2.81) was recorded in control. The highest plant spread at 150 days after planting (45.50 cm^2) was recorded in T_9followed by T_{15} with (43.07 cm^2), lowest plant spread (23.72 cm^2) was recorded in control.The growth characters of capsicum were increased with application of cocopeat and vermicompost. These results may be attributed to the role of macro and micro-nutrients, as well as the improved soil conditions due to vermicompost application, which conduced to stimulate metabolic processes and encourage growth, synthesis and accumulation of more metabolites in plant tissues. Several investigators mentioned similar results on different plants such as Kumar and Kohli (2005) [1]. The mean data showed significant to the first flowering, a smaller number of days (45.56) was recorded in T_9, followed by $T_{15}$with (46.33), a greater number of days (53.00), was recorded in control.The mean showed significant to the Days to 50% flowering, a smaller number of days (51.00) was recorded in T_9, followed by T_{15} with (51.33), a greater number of days (57.33), was recorded in control.The mean showed significant to the Days to fruit setting, a smaller number of days (61.22) was recorded in T_9, followed by T_{15} with (62.67), a greater number of days (72.22), was recorded in T_1 control. The mean showed significant to theDays to first fruit picking, a smaller number of days (82.67) was recorded in T_9, followed by T_{15} with (84.89), a greater number of days (91.56), was recorded in T_1 control. Muro *et al.*, (2005) Among the treatments, cocopeat + vermiculite (1::1) was found to be earliest to 50% flowering and first harvest as compared to other growing media combinations. The better growth performance of capsicum plants in cocopeat + vermicompost may be due to the high water holding capacity, aeration, reduced bulk density and slightly high potassium content in the medium. The mean data showed significant to the Number of flower cluster/plant, a greater number of flower clusters (4.97) was recorded in treatment T_9 followed by T_{15} with (4.78), a smaller number of flower cluster (2.00 cluster), was recorded in T_1 control.This might be due to enhanced photosynthetic and other metabolic activities which leads to increases in various plant metabolites responsible for cell division and elongation. This correlates the finding of Ngupok *et al.* (2018) The mean data showed significant to the Fruit set/cluster, a greater number of fruit set (3.81) was recorded in T_9 followed by T_{15} with (3.44), a smaller number of fruit set (1.00), was recorded in T_1 (control). The mean data showed significant to the Number of fruits/plants, more number of fruits per plant (8.02) was recorded in T_9, followed by T_3 with (7.78), less number of fruits (2.22), was recorded in T_1 (control) Basavaraja *et al.* (2003) reported that the treatments receiving 50% cocopeat + Azatobacter root dipping + 50% vermicompost has significant and highest yield of capsicum. This could be attributed to the significant increase in the components number of fruits per plant and yield per plant.The mean datashowed significant to theAverage fruit weight, more fruit weight (74.11 g) was recorded in T_9 followed by T_{15} with (72.89 g), less fruit weight (58.67 g), was recorded in T_1 (control). Nair and Peter (2002) reported the beneficial effect of combined application of organic manures and inorganic sources which increased fruit number, fruit weight per plant of capsicum compared with either organic or inorganic fertilizer applied alone. The mean data showed significant to theFruit yield/plant, more fruit yield (594.36 g) was recorded in T_9followed by T_{15} with (567.08 g), less fruit yield (130.24 g), was recorded in T_1 (control). The mean data showed significant to the Fruit yield (qtl/ha), more fruit yield (21.38) was recorded in T_9 followed by T_{15} with (19.47), lesser fruit yield (1.12 kg), was recorded in treatment T_1 (control) studies on sweet pepper production using different organic and soilless substrates compared to soil under high plastic tunnels were carried out by Popescu *et al.* (1995) found that plants grown on the organic substrates produced twice the yields more than grown in soil. The mean data showed significant to theFruit length, highest fruit length (6.04 cm) was recorded in T_9 followed by $T_{15}$with (4.17 cm), lowest fruit length (3.10 cm), was recorded in T_6 (control). The mean data showed significant to theFruit diameter, highest fruit diameter (4.41cm) was recorded in T_9 followed by T_{15} with (4.17cm), lowest fruit diameter (3.10 cm), was recorded in treatment T_6 (control). Saen and Pathom (2005) revealed that four branch pruning increased fruit length and fruit diameter in bell pepper variety. Thapa reported that pruned yellow pepper plants produce more number of fruits and higher yield as compare to non-pruned plants. The mean data showed significant to the Total Soluble Solids, more content of total soluble solids (8.11 °brix) was recorded in T_9 followed by T_{15} with (7.96 °brix), less content of total soluble solids (6.20 °brix), was recorded in T_1 (control). Rahimi *et al.* (2013) reported higher sugar content in vermicompost related treatments. The mean data showed significant to the Ascorbic acid, more content of ascorbic acid (169.48 mg) was recorded in T_9 followed by T_{15} with (168.76 mg), less content of ascorbic acid (164.28 mg), was recorded in T_1 (control). The mean data showed significant to the shelf life, a greater number of days (5.55) was recorded in T_9 followed by T15 with (5.05), a smaller number of days (4.02), was recorded in T1 (control).

Table 1: Effect of different concentration of growing media and bio fertilizers on growth and earliness parameters

SL. NO	Treatments	Plant height (cm)	No. of 1° branches	Plant spread(cm^2)	Days to first flowering	Days to 50% flowering	Days to fruit setting	Days to first fruit picking
1.	T_1	42.08	2.81	23.72	53.00	57.33	72.22	91.56
2.	T_2	46.33	3.34	36.83	50.78	56.00	69.22	89.67
3.	T_3	45.2	3.22	40.47	50.22	52.06	69.89	88.23
4.	T_4	46.13	3.32	42.60	51.11	56.63	68.89	87.40
5.	T_5	45	3.06	38.47	52.56	56.66	69.67	88.67
6.	T_6	48.67	3.36	42.67	50.11	55.00	65.33	85.24

7.	T_7	48.73	3.35	41.43	49.11	54.66	64.56	87.00
8.	T_8	50.05	3.03	42.37	47.00	52.33	63.22	86.22
9.	T_9	52.63	4.17	45.50	45.56	51.00	61.22	82.67
10.	T_{10}	45.95	3.26	41.83	52.44	56.66	70.67	89.11
11.	T_{11}	44.73	3.39	38.40	52.78	56.00	68.33	86.99
12.	T_{12}	42.67	3.12	38.10	51.78	55.00	70.00	88.66
13.	T_{13}	48.00	3.24	38.77	51.44	56.00	66.22	85.68
14.	T_{14}	49.00	3.42	42.37	52.33	55.70	65.67	83.76
15.	T_{15}	51.36	3.92	43.07	46.33	51.33	62.67	84.89
	S.Ed (+)	0.82	0.32	1.02	3.58	1.05	0.97	0.97
	C.D. (0.05)	2.37	0.94	2.96	0.97	3.90	2.82	2.82

Table 2: Effect of different concentration of growing media and biofertilizers on quality parameter

SL.NO.	Treatments	No. of flower cluster/plant	Fruit set /plant	No. of fruits per plant	fruit weight(g)	Fruit yield/plant (g)	Fruit yield(qtl/ha)	Fruit length (cm)	Fruit diameter(cm)
1.	T_1	2.00	1.00	2.22	58.67	130.24	1.12	3.82	3.1
2.	T_2	2.33	1.44	3.01	68.15	205.13	8.14	4.52	3.43
3.	T_3	3.00	1.33	3.46	64.81	224.24	10.18	4.54	3.38
4.	T_4	3.73	2.00	3.13	65.78	205.89	9.15	4.30	3.51
5.	T_5	3.55	1.67	3.22	60.55	194.97	7.38	4.70	3.09
6.	T_6	3.67	2.11	3.89	62.67	243.78	10.91	5.14	3.84
7.	T_7	3.70	2.22	5.56	66.44	369.40	13.47	5.00	3.74
8.	T_8	3.35	2.33	7.03	71.78	504.61	17.91	5.48	3.9
9.	T_9	4.97	3.81	8.02	74.11	594.36	21.38	6.04	4.41
10.	T_{10}	3.91	1.67	7.47	63	470.61	15.07	5.00	3.57
11.	T_{11}	3.71	1.22	5.56	61.78	343.49	12.09	5.21	3.62
12.	T_{12}	3.02	1.13	5.33	66.53	354.60	13.00	5.30	3.47
13.	T_{13}	5.44	1.11	7.63	64.67	493.43	16.47	5.05	3.88
14.	T_{14}	4.22	1.89	6.89	64.01	441.02	14.64	4.96	3.78
15.	T_{15}	4.78	3.44	7.78	72.89	567.08	19.47	5.87	4.17
	S.Ed (+)	0.38	0.18	0.44	1.65	4.49	17.09	0.23	0.13
	C.D. (0.05)	1.11	0.51	1.26	4.78	2.25	7.67	0.67	0.39

Conclusion

From the present investigation, it is concluded that the treatment with a combination of different growing media and bio fertilizer i.e., T_9 (cocopeat + vermicomost + perlite + vermiculite (1:1:1:1) + Azatobacter + PSB) had showed significantly superior in terms of growth parameters like plant height, number of primary branches per plant, plant spread, days to first flowering, days to 50% flowering, days to fruit setting, days to first fruit picking and yield parameter like flower cluster per plant, fruit set per plant, average fruit weight, yield per plant, yield per hectare, total soluble solids, ascorbic acid and cost benefit ratio was found to be the best out of various combinations, so it may be recommended to eastern U.P. growers by few more conjunctive trials at different location.

References

1. Chandrakala M, Kumar M, Hebsur NS. Effect of FYM and fermented liquid manures on quality of chilli (*Capsicum annum* L.) Research Journal of Agricultural Sciences. 2011;2(3):761-763.
2. Haddad M. Effect of three substrates on growth, yield and quality of tomato by the use of geothermal water in the south of Tunisia. Journal of Food, Agriculture and Environment. 2007;5:175-178.
3. Ingle ST. study on effect of chemical fertilizer and vermicompost on growth of chilli pepper plant *(capsicum annum*) Journal of Horticulture. 2011;4(2):524.
4. Jaipul Sharma S, Dixit AK, Sharma AK. Growth and yield of capsicum (*Capsicum annum*) and garden pea (*Pisum sativum*) as influenced by organic manures and biofertilizers. Indian journal of agriculture Sciences 2011;81:637-42.
5. Narkhede SD. Study on effect of chemical fertilizer and vermicompost on growth of chilli pepper plant (capsicum annum). Journal of Applied Sciences in Environmental Sanitation. 2011;6(3):327.
6. Saurabh A, Sharma A, Singh S. A review on effect of different soil fewer growing media on vegetable production. Journal of Pharmacognosy and Phytochemistry. 2019, 215-219.
7. Shetty GR, Manohar RK. Influence of integrated nutrient management on growth of coloured capsicum (*Capsicum annuum* L.) cv. OROBELLE under naturally ventilated greenhouse. The Asian Journal of Horticulture. 2008;3(2):287-289.
8. Swamy GN, Srinivasulu B, Madhumathi C, Tirupal D. Evaluation of Certain Varieties and Hybrids of Capsicum for Quality Attributes under Shade Net. Journal of Horticulture. 2015;2(1):354-376.