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Effect of Organic Manure and Bio-Fertilizers on Growth, Yield and Quality of Brinjal (*Solanum melongena* L.)

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ABSTRACT

The present experiment entitled "Effect of organic manures and bio-fertilizers on growth, yield and quality of Brinjal cv. Kashi Taru" was conducted at the Horticulture Research Farm of Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University, Lucknow, during rabi season of 2013-14. The experiment was laid out in Randomized Block Design (RBD) with three replications. The row to row and plant to plant spacing were maintained at 60 x 45 cm respectively. The Treatment combinations were Control, Recommended Dose of Fertilizers (RDF), Farm Yard Manure (FYM), Vermi-compost (VC), Azospirillum, RDF+ Vermi-compost (50%+50%), RDF+ Neem cake (50%+50%), Phosphate Solubilizing Bacteria (PSB), RDF+ Azospirillum (50%+50%), and RDF +PSB (50%+50%). The observations were recorded i.e. plant height (cm) number of branches per plant, number of leaves per plant, number of flower per plant, number of fruit per plant, fruit diameter (cm), fruit length (cm), fruit Weight (g), yield per plant (Kg), fruit yield per plot (Kg), fruit yield per ha (q), total Soluble Solids (T.S.S.), total Sugar (g), reducing Sugar (g) and vitamin C (mg/100g). From the analysis of data, it can be concluded that the use of FYM, vermi-compost, neemcake, PSB and Azospirillum at specific concentration considerably increased the weight of fruit as well as total yield.

Key words: *Organic manures, Bio-fertilizers, Yield, Growth, Quality.*

INTRODUCTION

Brinjal or eggplant (*Solanum melongena* L.) of the family Solanaceae is one of the important and popular vegetable crops grown in India and other parts of the world. Various sizes, shapes, colours and forms of cultivated as well as wild type of brinjal are found in India, white type brinjal fruits is said to be good for diabetic patients. The brinjal fruit has cardio tonic, laxative and analgesic properties and enriches the blood. The technique of organic farming is plays a role in cultivation of high value of vegetables crops.

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The great export potential of food crops, growing at 10-15% which had organically cultivated, suitable agriculture practices can minimize the entry of the pesticides and toxicants and prevent the water pollution of the soil and soil fertility, organic agriculture, though not in its orthodox version, has the potential to be accepted by the farmers[7], Bio fertilizers improve the quantitative and qualitative features of many plants[10]. Inorganic fertilizes are very high in cost and has become impractical to apply by small and marginal farmers. Inorganic fertilizes are harmful both soil and beneficial bacteria which is most important for both soil and growing of the crops, regular use of the inorganic fertilizers decrease the beneficial bacteria in the soil and soil fertility. The main aim of the investigation was to find out of the effect of organic manure and bio fertilizer on growth, yield and quality of the brinjal like effect of organic nutrient on growth, yield and quality of the brinjal and analyze the economics of organic manure in production of brinjal. The chemical fertilizers should be replaced with the natural and organic fertilizers which can play a key role of the conservation of the environment[3],

MATERIAL AND METHODS

The present investigation was carried out at Horticulture Research Farm of the Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University, Lucknow (U.P.) during winter season of 2013-14. The layout was under Randomized Block Design (R.B.D.) with twelve treatments and randomized in three replications. There were altogether thirty plots each of 2.4 x 1.8 m size. Sowing was done on November, 2013 with spacing 60 x45 cm. During the life cycle of the plants, hoeing, weeding and irrigation were provided at proper time so as to facilitate better growth and development of crop. The Treatment combinations were Control, Recommended Dose of Fertilizers (RDF), Farm Yard Manure (FYM), Vermi-compost (VC), Azospirillum, RDF+ Vermi-compost (50%+50%), RDF+ Neem cake (50%+50%), Phosphate Solubilizing Bacteria (PSB), RDF+ Azospirillum (50%+50%) and RDF+PSB (50%+50%). The observations were recorded i.e. plant height (cm) number of branches per plant, number of leaves per plant, number of flower per plant, number of fruit per plant, fruit diameter (cm), fruit length(cm), fruit Weight (g), yield per plant (Kg), fruit yield per plot (Kg), fruit yield per ha (q), total Soluble Solids (T.S.S.), total Sugar (g), reducing Sugar (g) and vitamin C (mg). The data on the growth and yield were statistically analyzed according to the method suggested by Fisher and Yates (1959).

RESULT AND DISCUSSION

The maximum plant height was recorded at the time of maturity of plants under treatment T_9 (PSB 100%) has maximum plant height compared to control. The maximum plant height of 67.91 cm recorded under treatment PSB. The number of leaves per plant was significantly affected by various treatment of organic manure and alone and in combination with bio-fertilizers. The findings are in close agreement with[5,9]. At the time of maturity the maximum number of leaves recorded T_8 76.89 as compared to control. A maximum number of flower per plant (17.76) were recorded at RDF+ Neem cake which is consistent with the previous studies. While minimum numbers of flowers are observed per plant 7.27 cm under control treatment T_1 without any manuring. It is evident that the fruit diameter (cm) was significantly due to the organic manure and bio-fertilizers treatment. However, the highest value is observed in the treatment T_6 (38.20)[6]. find out that NPK 75:35:0 Kg/ha + Farmyard manure at 25 q/ha recorded highest fruit girth. The noted data clearly indicate that the T_6 significantly increased in the RDF+ Neemcake treated than the control. Statistical analysis revealed that maximum fruit weight T_6 (25.66 cm) was highly significant[6].observed the data of fruit length, plant height, number of leaves per plant, NPK at 100:60:50 Kg/ha + Farmyard manure at 25 t/ha calculated the highest values, whereas minimum length of fruit T_1 (5.98 cm) recorded under the control. The noted data clearly indicate that the T_6

significantly in increased in the RDF+ Neemcake treated than the control. Statistical analysis revealed that maximum fruit weight T_6 (102.45 gm.) was highly significant. It is clearly evident that the crop duration enhanced when the plants were treated with the organic manure and bio-fertilizers. It is clear from statistical analysis that the tomato fruits yield per plant was high in the treatment T_5 (2.12 Kg). It is clearly noticed that the treatment T_5 maximum fruit yield/plot of Brinjal over other treatments and minimum number of fruits were recorded in control. Statistical analysis proved that the maximum numbers of fruits were recorded in the case of treatment T_5 (12.31 kg). Here T_5 have yielded highest (28.49 t/ha) followed by T_8 (26.36 t/ha). The statistical analysis that proved T5 is the superior over the treatments. Total soluble solids (T.S.S.), quality of solids, dissolved in the liquid part of brinjal were observed to be increased after treatment with *Azospirillum*. The best result was observed which leads to T_6 5.77 ^{0}brix T.S.S. in compare to 4.12 ^{0}brix of control. Mohan *et al.* reported that case of organic farming on brinjal, applied recommended dose of FYM, N suitable through vermicompost and green manure (50% each) + recommended dose of NPK recorded highest total solid (6.13^0 Brix and 5.53^0 Brix) at fifth and sixth harvest respectively. Total sugars were taken after harvesting the crop and the maximum sugar (2.45 g) of the brinjal under the treatment T_6 and the minimum sugar under the control (1.1 g). Similar to Meenu chaodhary[1] conducted a field experiment to study the effect of organic and inorganic sources of nutrients on quality attributes of brinjal fruit. Reducing sugar were taken after harvesting the crop and the maximum sugar (0.42 g) of the brinjal under the treatment T_6 and the minimum sugar under the control T_1 (0.2 g). Similar Meenu Chaudhary[1]. Conduct a field treatment to study the effect of organic and inorganic sources of nutrients on quality attributes of brinjal fruits. Vitamin C were taken after harvesting the crop and the maximum Vit c (17.22 mg) of the brinjal under the treatment T_6 and the minimum sugar under the control T_1 (2.77 mg.)[8], Were reported maximum vitamin c in 100% NPK + FYM + Azospirillum + phosphobacteia treatment.

Table 1: Effect of different treatment combinations of organic manures along with bio-fertilizers on growth, yield and quality traits of brinjal at various stages of crop.

Sl. No.	Treatments	Plant height (cm)				Number of branches per plant	Number of leaves per plant				Number of flower per plant	Number of fruits per plants	Fruit diameter (cm)	Fruit length (cm.)	Fruit weigh t (g)	Fruit yield per plant (kg)	Fruit yield per plot (kg)	Fruit yield per ha (Tones)	T.S.S[a] Brix	Total sugar s (g)	Reducing sugars (g)	Vit. C (mg)
		30 DAT	60 DAT	90 DAT	120 DAT		30 DAT	60 DAT	90 DAT	120 DAT												
T_1	Control	14.38	19.10	30.13	46.34	2.74	5.44	11.33	19.22	35.67	7.27	8.65	23.99	5.98	55.21	0.27	4.21	9.74	4.12	1.10	0.20	2.77
T_2	Recommended Dose of Fertilizers (RDF)	15.93	27.28	39.08	62.84	5.54	6.67	19.00	27.22	71.56	9.32	10.87	24.88	14.33	98.76	0.65	6.56	15.18	4.76	1.43	0.24	4.22
T_3	Farm Yard Manure (FYM)	15.22	26.83	33.89	55.04	3.12	9.00	16.11	27.67	52.44	8.87	9.66	26.03	8.77	57.38	0.46	5.44	12.59	4.22	1.27	0.31	3.32
T_4	Vermi-compost (VC)	14.08	25.80	37.80	58.90	3.89	8.00	18.67	31.67	59.11	9.58	10.99	29.09	12.56	63.64	0.53	5.32	12.31	4.61	1.44	0.28	3.36
T_5	Azospirillum	14.38	26.84	38.89	61.02	4.65	9.56	18.00	32.00	60.67	11.33	17.55	34.71	17.77	70.49	2.12	12.31	28.49	5.00	1.73	0.35	10.65
T_6	RDF+Vermi-compost	18.99	30.29	40.34	67.91	6.55	9.22	18.67	30.14	66.22	14.12	16.54	38.20	25.66	107.70	1.79	11.26	26.06	5.77	2.45	0.42	17.22
T_7	RDF+Neem cake	15.07	28.54	34.57	60.76	4.77	9.67	18.98	30.78	64.22	17.76	13.76	31.07	23.43	102.45	1.53	10.43	23.75	5.39	2.20	0.37	14.54
T_8	Phosphate Solubilizing Bacteria (PSB)	15.61	27.22	37.24	52.57	9.32	10.67	21.11	34.89	76.89	16.21	14.21	36.26	19.23	64.37	1.33	11.39	26.36	5.12	2.25	0.29	14.87
T_9	RDF+ Azospirillum	16.63	28.74	39.34	65.30	8.47	8.65	20.34	33.54	70.14	16.13	13.77	35.66	21.00	87.77	1.17	9.66	22.36	4.90	1.90	0.26	10.59
T_{10}	RDF+PSB	14.32	27.27	36.74	60.98	5.34	8.89	18.89	33.44	69.00	15.67	12.34	33.63	18.87	92.67	1.02	10.10	23.37	5.11	2.13	0.26	11.21
S.E ±		0.698	0.868	1.208	1.5448	0.3578	0.52	0.87	1.15	1.71	0.5842	0.7664	1.2762	0.8886	2.7312	0.0658	0.5263	0.8658	0.1807	0.0796	0.0258	0.2898
C.D. at 5%		2.075	2.582	3.592	4.5905	1.0636	1.56	2.59	3.43	5.10	1.7362	2.2773	3.7924	2.6406	8.1162	1.9992	1.5645	2.5731	0.5360	0.2394	0.0830	0.8612

CONCLUSION

Results showed that use of FYM, Vermicompost, Neemcake, PSB and Azospirillum at specific concentration (PSB 100%, Azospirillum 100% at, FYM at 100%, Vermicompost at 100% and Neemcake at 100%) considerably increased the weight of fruit of as well as total yield of brinjal.

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