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B Vennela

M.Sc Ag. Horticulture
(Vegetable Science), Naini,
SHUATS, Prayagraj, Uttar
Pradesh, India

Dr. SS Sarvanan

Associate Professor, Department
of Horticulture, Naini, SHUATS,
Prayagraj, Uttar Pradesh, India

Dr. Vijay Bahadur

Associate Professor, Head,
Department of Horticulture,
Naini, SHUATS, Prayagraj,
Uttar Pradesh, India

Effect of NPK and organic manures on plant growth fruit yield and fruit quality of Snake gourd (*Trichosanthes anguina* L.) CV. Faizabad long SPCL

B Vennela, Dr. SS Sarvanan and Dr. Vijay Bahadur

Abstract

An experiment was conducted in the Vegetable Research Farm, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad (Uttar Pradesh) Thirteen treatments having one cultivar were laid out in Randomized Block Design (RBD) with three replications. Find out the Effect of NPK and Organic manures on growth, fruit yield and fruit quality of Snake Gourd (*Trichosanthe anguina* L.) cv. Faziabad Long On the basis of present investigation it is concluded that the application of treatment T4 75% NPK+25% Poultry Manure, T8 50% NPK+50% Poultry Manure and T10 25% NPK+75% Vermicompost was superior in terms of growth parameters, fruit yield and fruit quality of Snake Gourd (*Trichosanthe anguina* L.) cv. Faziabad Long.

Keywords: Randomized block design, urea, dap, mop and fym, varmicompost, sheepmanure, poultrymanure, growth, yield, and quality and snake gourd cultivars

Introduction

Vegetables play a major role in Indian agriculture and responsible in solving problems of malnutrition among human population. Growing vegetable crops generate greater employment potential in rural areas bringing national security. India is the second largest producer of vegetables after China and contributes about 12 per cent of the world vegetable production (Nayak *et al.*, 2016)

Snake gourd (*Trichosanthes anguina* L.) is an annual vegetable crop, climbing vine, providing both long and short fruits. India is a native home of snake gourd. Vegetables are important in maintaining satisfactory nutritional level in human diet. There will be increasing demand for this commodity with accelerated industrial growth and increasing urban area. Vegetable are not only important source of vitamins and minerals but they can also help in improving economic condition of farmer. Snake gourd is a popular vegetable crop in southern India grown principally for the immature fruits that can be cooked. The fruit is rich in minerals, calcium, phosphorus, and vitamins, riboflavin, thiamine, niacin and carotene. Lateritic soil is best suited for cultivations of cucurbitaceous family crop. The traditional method of farming and less use of organic manure reduces the quality of snake gourd. For increasing the productivity economical fertilizer package need to be formulated which can provide all the essential elements through both organic and inorganic sources to get good quality, produce with higher production, keeping the production cost at sustainable level of an average farmer. Intensive use of only chemical fertilizers to achieve high production has created various problems. Continuous applications of heavy doses of chemical fertilizers without organic manures has led to deterioration of soil health in terms of physical and chemical properties of soil, decrease in soil microbial activities, and also reductions in soil humus (Anjanappa *et al.*, 2011)^[1].

Materials and Methods

The experiment entitled "Effect of NPK and Organic manures on plant growth, fruit yield and fruit quality of Snake Gourd (*Trichosanthe anguina* L.) cv. Faziabad Long" was conducted in rainy season adapting randomized block design consisting of 13 treatments and three replications The different treatments were allocated randomly in each replications (T1) Control(RDF)100N:50P:50Kkg/ha,(T2)75%Npk+25% Vermicompost,(T3)75%Npk+25%Fym,(T4)75%Npk+25% Poultrymanure,(T5)75npk+25%Sheepmanure,(T6)50%Npk+Vermicompost,(T7)50%Npk+50%Fym,(T8)50%Npk+50%Poultrymanure,(T9) 50%Npk+50%Sheepmanure,

Corresponding Author:**B Vennela**

M.Sc Ag. Horticulture
(Vegetable Science), Naini,
SHUATS, Prayagraj, Uttar
Pradesh, India

(T10)25%Npk+75%Vermicompost, (T11)25%Npk+75%Fym, (T12)25%Npk+75% Poultrymanure, (T13)25% Npk+75% Sheepmanure Fertilizers were used in inorganic and source forms. The inorganic fertilizers used were urea as Nitrogen, SSP. as phosphorus and MoP as potash. Among organic manure as decomposed farmyard manure, vermicompost and poultry manures were used.

The nitrogen was applied in two splits *viz.* at the sowing and after 30 days of sowing. The seed of snake gourd were dibbled at the rate of 2-3 seed per hill at spacing of 1.5 m × 0.5 m. thinning and gap filling were carried out at 20 days after sowing in order to have one healthy plant per hill. The observations regarding yield, weight of fruit, length of fruit, fruit per vine and nutrient content were taken and data were analyzed statistically.

Prayagraj is situated at 25.57 ° N latitude and 81.50 ° E longitude and at an altitude of 98 m above mean sea level (MSL). The Prayagraj region has a subtropical and semi arid climate, prevailing in the south-east part of U.P. with both the extreme in temperature i.e. the monsoon commencing from mid August and withdrawing by the mid November. The temperature rise up to 45 °C to 48 °C in summer and goes down to as low as 2.5 °C during winter. The meteorological data including the weekly average of maximum and minimum temperature relative humidity (RH) and rainfall. First weeding at 20 days after sowing with the help of khurpi, second weeding was done 40 days after sowing. The experimental crop was given irrigation by flooding of regular intervals depending upon soil moisture at required stages of the crop.

Result and Discussion

1. Effect of NPK and organic manures on plant height (cm) of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

The plant height was influenced by different level of NPK with different source of organics manures at 30, 60 and 90 DAS and result were found to be significant.

The highest plant height (132.83, 258.64 and 338.47cm) was observed in treatment combination of T₁₀ 25% NPK+75% Vermicompost followed by T₆ 50% NPK+50% Vermicompost, T₄ 75% NPK+25% Poultry Manure, T₂ 75% NPK+25% Vermicompost and T₇ 50% NPK+50% FYM and T₁₁ 25% NPK+75% FYM. The plant height was found to be minimum (78.76, 118.66, 228.43cm) in the treatment combination of T₁ CONTROL (RDF) (100N:50P:50K kg/ha). These findings are in consonance with the earlier studies of Arancon *et al.*, (2006) [2], Prabha *et al.*, (2007), Narkhede *et al.*, (2011).

2. Effect of NPK and organic manures on Number of branches plant⁻¹ of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

Influence of different level of NPK with different source of organic manures on number of branches per plant was found to be significant different among the treatments. The maximum number of (13.58) branches per plant was recorded in the treatment combination of T₁₀ 25% NPK+75% Vermicompost followed by T₆ 50% NPK+50% Vermicompost, T₇ 50% NPK+50% FYM, T₃ 75% NPK+25% FYM and T₂ 75% NPK+25% Vermicompost. The minimum number of (5.28) branches per plant was recorded in the treatment T₁CONTROL (RDF) (100N:50P:50K kg/ha). These findings are in consonance with the earlier studies of Arancon *et al.*, (2006) [2], Prabha *et al.*, (2007), Narkhede *et al.*, (2011).

Effect of NPK and organic manures on fruit length (cm) of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

Influence of different level of NPK with different source of organic manures on fruit length (cm) was found to be significant different among the treatments. The maximum fruit length (cm) (98.55) was recorded in the treatment combination of T₁₀ 25% NPK+75% Vermicompost followed by T₆ 50% NPK+50% Vermicompost, T₇ 50% NPK+50% FYM, T₃ 75% NPK+25% FYM, T₂ 75% NPK+25% Vermicompost and T₁₁ 25% NPK+75% FYM. The minimum fruit length (cm) (47.99) was recorded in the treatment T₁CONTROL (RDF) (100N:50P:50K). These findings are in consonance with the earlier studies of Arancon *et al.*, (2006) [2], Prabha *et al.*, (2007), Narkhede *et al.*, (2011)

Effect of NPK and organic manures on fruit weight (gm) of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

The fruit weight (gm) as influenced by different level of NPK with different source of organic manures is furnished in table 4.2 and fig. 4.2.

Influence of different level of NPK with different source of organic manures on fruit weight (kg) was found to be significant different among the treatments. The maximum fruit weight (gm) (682.42) was recorded in the treatment combination of T₁₀ 25% NPK+75% Vermicompost followed by T₆ 50% NPK+50% Vermicompost, T₇ 50% NPK+50% FYM, T₃ 75% NPK+25% FYM, T₂ 75% NPK+25% Vermicompost and T₁₁ 25% NPK+75% FYM. The minimum fruit weight (kg) (382.48) was recorded in the treatment T₁CONTROL (RDF) (100N:50P:50K kg/ha). These findings are in consonance with the earlier studies of Arancon *et al.*, (2006) [2], Prabha *et al.*, (2007), Narkhede *et al.*, (2011). The results of the present investigation have similarity with the findings reported earlier by Rai *et al.*, (2012), Kameswari *et al.*, (2011) in cucumber, Vijay Kumar *et al.*, (2012) in bottle gourd, Dewagan (2012) in bottle gourd.

Effect of NPK and organic manures on number of fruit per plant of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

Influence of different level of NPK with different source of organic manures on number of fruit per plant was found to be significant different among the treatments. The maximum number of fruit per plant (18.33) was recorded in the treatment combination of T₁₀ 25% NPK+75% Vermicompost followed by T₆ 50% NPK+50% Vermicompost, T₁₁ 25% NPK+75% FYM, T₇ 50% NPK+50% FYM and T₂ 75% NPK+25% Vermicompost. The minimum number of fruit per plant (5.22) was recorded in the treatment T₁CONTROL (RDF) (100N:50P:50k). These findings are in consonance with the earlier studies of Arancon *et al.*, (2006) [2], Prabha *et al.*, (2007), Narkhede *et al.*, (2011). The results of the present investigation have similarity with the findings reported earlier by Rai *et al.*, (2012), Kameswari *et al.*, (2011) in cucumber, Vijay Kumar *et al.*, (2012) in bottle gourd, Dewagan (2012) in bottle gourd.

Effect of NPK and organic manures on fruit yield per plant (t/ha) of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

Influence of different level of NPK with different source of organic manures on fruit yield (t/ha) was found to be significant different among the treatments. The maximum fruit yield per plant (t/ha) (37.53) was recorded in the

treatment combination of T10 25% NPK+75% Vermicompost followed by T₆ 50% NPK+50% Vermicompost, T₁₁ 25% NPK+75% FYM, T₇ 50% NPK+50% FYM, T₂ 75% NPK+25% Vermicompost, T₁₂ 25% NPK+75% Poultry Manure and T₃ 75% NPK+25% FYM. The minimum fruit yield (t/ha) (5.99) was recorded in the treatment T₁CONTROL (RDF) (100N:50P:50k). These findings are in consonance with the earlier studies of Arancon *et al.*, (2006) [2], Prabha *et al.*, (2007), Narkhede *et al.*, (2011). The results of the present investigation have similarity with the findings reported earlier by Rai *et al.*, (2012), Kameswari *et al.*, (2011) in cucumber, Vijay Kumar *et al.*, (2012) in bottle gourd, Dewagan (2012) in bottle gourd.

Effect of NPK and organic manures on TSS of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

Influence of different level of NPK with different source of organic manures on TSS was found to be significant different among the treatments. The maximum TSS (3.11) was recorded in the treatment combination of T10 25% NPK+75% Vermicompost followed by T₆ 50% NPK+50% Vermicompost, T₇ 50% NPK+50% FYM, T₁₂ 25% NPK+75% Poultry Manure and T₁₃ 25% NPK+75% Sheep manure. The

minimum TSS (2.05) was recorded in the treatment T₁CONTROL (RDF) (100N:50P:50K kg/ha). These findings are in consonance with the earlier studies of (Marilou *et al.*, 2012).

Effect of NPK and organic manures on Ascorbic acid of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

The ascorbic acid as influenced by different level of NPK with different source of organic manures is furnished in table 4.2 and fig. 4.2.

Influence of different level of NPK with different source of organic manures on ascorbic acid was found to be significant different among the treatments. The maximum ascorbic acid (5.28) was recorded in the treatment combination of T10 25% NPK+75% Vermicompost followed by T₁₁ 25% NPK+75% FYM, T₁₂ 25% NPK+75% Poultry Manure, T₁₃ 25% NPK+75% Sheep manure, T₉ 50% NPK+50% Sheep manure and T₅ 75% NPK+25% Sheep manure. The maximum ascorbic acid (3.20) was recorded in the treatment T₁ CONTROL (RDF) (100N:50P:50K kg/ha). These findings are in consonance with the earlier studies of (Marilou *et al.*, 2012).

Table 1: Effect of NPK and Organic manures on plant height, number of branches, number of female flowers, at different plant crop growth stages on one cultivar

S. No	Treatment	Treatment Combination	Plant Height			Number Of Branches/Plant	Number \of Female Flower/Vine
			30days	60days	90days		
1	T1	CONTROL(RDF)(100N:50P:50K)	78.76	118.66	228.43	5.28	8.13
2	T2	75%NPK+25%VERMICOMPOST	121.59	242.33	341.38	10.31	18.60
3	T3	75%NPK+25% FYM	116.92	241.63	348.72	10.67	19.21
4	T4	75%NPK+25%POULTRY MANURE	123.92	246.73	348.63	13.58	15.42
5	T5	75%NPK+25%SHEEP MANURE	110.77	232.59	333.44	6.19	12.53
6	T6	50%NPK+50%VERMICOMPOST	131.89	252.58	355.09	8.20	14.77
7	T7	50%NPK+50%FYM	127.86	248.44	352.73	11.88	18.37
8	T8	50%NPK+50%POULTRY MANURE	107.74	229.81	334.45	8.03	19.84
9	T9	50%NPK+50%SHEEP MANURE	110.83	237.63	338.47	9.20	16.81
10	T10	25%NPK+75%VERMICOMPOST	132.83	258.64	358.52	12.19	20.58
11	T11	25%NPK+75% FYM	118.99	240.85	341.72	9.80	17.37
12	T12	25%NPK+75%POULTRY MANURE	113.92	234.34	334.97	9.17	15.73
13	T13	25%NPK+75%SHEEP MANURE	102.48	215.81	322.30	7.74	14.53
		F-test	S	S	S	S	S
		C.D. at 0.5%	0.794	0.392	2.768	0.209	0.239
		S.Ed. (±)	0.385	0.190	1.341	0.101	0.116

Table 2: Effect of NPK and Organic manures on fruit length (cm), fruit weight (kg), number of fruit per plant, total yield per vine (kg) fruit yield per plant(q/ha). At different plant growth stages on one cultivar

S. No	Treatment	Treatment Combination	Fruit Length (Cm)	Fruit Weight(gm)	Number of Fruits Per Plant	Total Yield Per Vine (Kg)	Fruit Yield per Plant (t/ha)
1	T1	CONTROL(RDF)(100N:50P:50K)	47.99	382.48	5.22	2.00	5.99
2	T2	75%NPK+25%VERMICOMPOST	92.47	630.39	12.00	7.56	22.69
3	T3	75%NPK+25% FYM	93.51	648.59	10.67	6.92	20.75
4	T4	75%NPK+25%POULTRY MANURE	83.40	558.37	8.67	4.84	14.51
5	T5	75%NPK+25%SHEEP MANURE	72.54	480.38	7.00	3.36	10.08
6	T6	50%NPK+50%VERMICOMPOST	79.82	674.72	15.00	10.12	30.36
7	T7	50%NPK+50%FYM	96.84	660.42	12.33	8.15	24.43
8	T8	50%NPK+50%POULTRY MANURE	98.55	611.89	8.67	5.31	15.94
9	T9	50%NPK+50%SHEEP MANURE	88.48	580.51	9.67	5.61	16.83
10	T10	25%NPK+75%VERMICOMPOST	97.58	682.42	18.33	12.51	37.53
11	T11	25%NPK+75% FYM	91.51	595.73	13.67	8.13	24.40
12	T12	25%NPK+75%POULTRY MANURE	85.51	579.68	12.33	7.15	21.44
13	T13	25%NPK+75%SHEEP MANURE	77.62	542.51	8.00	4.34	13.02
		F-test	S	S	S	S	S
		C.D. at 0.5%	0.402	27.352	2.383	1.485	44.547
		S.Ed. (±)	0.195	13.253	1.155	0.719	21.548

Table 3: Effect of NPK and organic manures on TSS and ascorbic acid at different plant growth stages on one cultivar

S. No	Treatment	Treatment Combination	TSS(°Brix)	Ascorbic Acid(mg/100gm)
1	T1	CONTROL(RDF)100N:50P:50K)	2.05	3.20
2	T2	75%NPK+25% VERMICOMPOST	2.43	3.76
3	T3	75%NPK+25% FYM	2.68	3.63
4	T4	75%NPK+25% POULTRY MANURE	2.79	3.56
5	T5	75%NPK+25% SHEEP MANURE	2.43	4.66
6	T6	50%NPK+50% VERMICOMPOST	2.62	3.60
7	T7	50%NPK+50% FYM	2.61	4.33
8	T8	50%NPK+50% POULTRY MANURE	2.75	4.95
9	T9	50%NPK+50% SHEEP MANURE	2.31	4.74
10	T10	25%NPK+75% VERMICOMPOST	2.79	5.14
11	T11	25%NPK+75% FYM	2.40	4.54
12	T12	25%NPK+75% POULTRY MANURE	3.11	5.14
13	T13	25%NPK+75% SHEEP MANURE	2.75	4.77
		F-test	S	S
		C.D. at 0.5%	0.197	0.239
		S.Ed. (±)	0.095	0.116

Table 4: Economics of different varieties and benefit cost ratio of Snake gourd (*Trichosanthes anguina* L.) cv. Faizabad long

Treatments	Treatments combinations	Yield tha-1	Selling Rate (t Rs.)	Gross return (t Rs.)	Cost of cultivation	Net return t Rs.	Benefit cost ratio
T1	CONTROL (RDF) (100N:50P:50K kg/ha)	5.99	21000	125790	120645	5146	1.04
T2	75% NPK+25% Vermicompost	22.69	21000	476490	120645	355845	3.94
T3	75% NPK+25% FYM	20.75	21000	435750	139166	296584	3.13
T4	75% NPK+25% Poultry Manure	14.51	21000	304710	122916	181794	2.47
T5	75% NPK+25% Sheep manure	10.08	21000	211680	122916	88764	1.72
T6	50% NPK+50% Vermicompost	30.36	21000	637560	157687	479873	4.04
T7	50% NPK+50% FYM	24.43	21000	513030	137687	375343	3.72
T8	50% NPK+50% Poultry Manure	15.94	2100	334740	125187	209553	2.67
T9	50% NPK+50% Sheep manure	16.83	2100	353430	125187	228243	2.82
T10	25% NPK+75% Vermicompost	37.53	2100	788130	176209	611921	4.47
T11	25% NPK+75% FYM	24.40	2100	512400	146209	366191	3.50
T12	25% NPK+75% Poultry Manure	21.44	2100	450240	127459	322781	3.53
T13	25% NPK+75% Sheep manure	13.02	2100	273420	127459	145961	2.14

Conclusion

The present investigation it is concluded that the treatment T₁₀ 25% NPK+75% Vermi compost and was recorded the best among in all treatment combinations of NPK and organic manures in term of plant growth parameters, early flowering, fruit yield (37.53t/ha) and. It was obtained the highest cost benefit ratio (1: 4.47). T₁₂ 25% NPK+70% Poultry Manure increase the quality parameters like TSS (Brix) (3.11) and Ascorbic acid (5.28 mg/100gm).

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