J. Indian Soc. Coastal Agric. Res. 36(2): 128-131 (2018)

Effect of Integrated Nutrient Management on Growth, Yield of Snake Gourd (*Trichosanthes anguina* L.) and Soil Properties of Lateritic Soils of Konkan

Received: 20.11.2018 Accepted: 08.01.2019

Vegetables are important in maintaining satisfactory nutritional level in human diet. Vegetables are not only an important source of vitamins and minerals but these can also help in improving economic condition of the farmers. India is a native home of snake gourd. Snake gourd (*Trichosanthes anguina* L.) is an annual vegetable crop, climbing vine, providing both long and short fruits. It 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. Intensive cultivation and improper fertilizer use lead to deficiency of nutrients, thus resulting in lower yield of crops. Therefore, the use of farm input in the form of organic manures has become necessary. Though manures are usually very bulky and the cost of transportation is high but are safe sources of nutrition as they are environmentally friendly, release their nutrients in a slow and steady manner to crop in the field thereby activating soil microbial activities (Eifediyi and Remison, 2010). Organic manure sustains cropping systems through better nutrient recycling and improvement in soil physical, chemical and biological properties.

Continuous application 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 reduction in soil humus (Anjanappa *et al*., 2011). Lateritic soil is best suited for cultivation of cucurbitaceous crops (Ghayal, 2016). The traditional method of farming and less use of organic manure reduces the quality of snake gourd. For increasing the productivity an economical fertilizer package needs to be formulated which can provide all the essential elements through both organic and inorganic sources to get good quality produce with higher production and at the same time keeping the production cost at sustainable level of an average farmer.

In view of above, a field experiment was conducted at Vegetable Improvement Scheme, Central Experiment Station, Dr. B. S. Konkan Krishi Vidyapeeth, Wakawali, Maharashtra during *Kharif* 2016 to evaluate the effect of integrated nutrient management on growth and yield of snake gourd cv. "Kokan Shweta" as well as to study its effect on soil properties and available nutrient status. The experimental soil was moderately acidic is reaction (pH 5.62), high in organic carbon (15.9 g kg^{-1}), medium in available nitrogen (266.62 kg ha^{-1}), low in available phosphorus (6.87) and high in available potassium (289.49 kg ha^{-1}). The experiment was laid out in randomized block design with three replications. There were eleven treatments comprised of sources of organic and inorganic fertilizers. The two organic manures *i.e.* vermicompost (0.64% N, 0.59% P and 0.87% K) and poultry manure (1.41% N, 0.30% P and 0.92% K) were used for the study. The treatment details are: control (T_1), recommended dose of fertilizers (RDF) (100:50:50 NPK kg ha^{-1}) through inorganic fertilizers (T_2), 25 % N through vermicompost (VC) + 75 % N through inorganic fertilizer (T_3), 25 % N through poultry manure (PM)+ 75 % N through inorganic fertilizer (T_4), 50 % N through VC + 50 % N through inorganic fertilizer (T_5), 50 % N through PM + 50 % N through inorganic fertilizer (T_6), 75 % N through VC + 25 % N through inorganic fertilizer (T_7), 75 % N through PM + 25 % N through inorganic fertilizer (T_8), 100 % N through VC (T_9), 100 % N through PM (T_{10}), 50 % N through VC + 50 % N through PM (T_{11}). The full quantity of poultry manure, vermicompost, P_2O_5 in the form of single super phosphate and K_2O in the form of muriate of potash were applied at time of sowing. 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 chemical properties of soil and available nutrient status of soil at harvest were determined and the data were analyzed statistically as described Panse and Sukhatmate (1967)

It is evident from the data presented in Table 1 that the fruit yield varied significantly from 10.95 to 19.82 t ha^{-1}. The treatment T_6 *i.e.,* 50% N through poultry manure + 50% N through inorganic fertilizer produced significantly highest fruit yield over all treatments except treatments T_5, T_7 and T_8. The increase in yield of snake gourd due to the presence of more N in poultry manure than in other organic manures *i.e.,* vermicompost was reported by Haque *et al*. (2014). Similar, findings were also reported by Kameshwari *et al*. (2011) and Dodake *et al*. (2015) who reported the highest fruit yield with 50% RDF + 50% poultry manure in snake gourd, ridge gourd and bitter gourd, respectively.

The weight of fruit per plot, length of fruit and numbers of fruits per vine ranged from 13.14 to 23.79 kg per plot, 67.74 to 87.30 cm and 8.69 to 12.67, respectively. Here also the treatment T_6 *i.e.,* 50% N through poultry manure + 50% N through inorganic fertilizer produced highest fruit weight per plot, length of fruit and numbers of fruits per vine as compared to all other all treatments except treatments T_5, T_7 and T_8. Similar findings were also reported by Kameshwari *et al*. (2011) with 50% RDF plus 50% poultry manure in ridge gourd and Haque *et al*. (2014) in ridge gourd and snake gourd.

The soil samples were collected immediately after harvest of the crop and analyzed for various soil fertility parameters. It is evident from the Table 2 that the soil physico-chemical properties *i.e*., pH, EC, organic carbon and available N, P_2O_5, and K_2O contents of soil were significantly influenced due to various treatments. The soil pH, EC and organic carbon content in soil at harvest ranged from 5.30 to 5.82, 0.14 to 0.21 dS m^{-1} and 13.95 to 19.70 (g kg^{-1}), respectively. The treatment T_6 receiving 50 N through poultry manure + 50% N through inorganic fertilizer recorded significantly higher soil pH (5.82) over rest of the treatments.The application of poultry manure either alone or in combination with chemical fertilizers showed significantly increase in soil pH and EC over application of manures.

These results are in conformity with the findings of Adeleye *et al*. (2010) in yam and Dodake *et al*. (2015) in bitter gourd crop.

The data presented in Table 2 revealed that the available nitrogen, phosphorus and potash status at harvest ranged from 249.31 to 363.70 kg ha^{-1}, 6.80 to 16.88 and 289.21 to 566.13 kg ha^{-1}, respectively. Further, it was observed that the treatment T_6 consisting application of 50 per cent N through poultry manure + 50% N through inorganic fertilizer resulted in significantly higher available N (363.70 kg ha^{-1}), P (16.88 kg ha^{-1}) and K (566.13 kg ha^{-1}), respectively, over all other treatments. Dodake *et al*.

Table1. *Effect of different treatments on yield attributing characters of snake gourd*

No.	Treatments	Fruit yield kg ha^{-1}	Weight of fruit per plot (kg)	Fruit per vine	Length of fruit (cm)
T_1	Control	10.95	13.14	8.67	67.74
T_2	RDF 100:50:50 NPK Kg ha^{-1}	16.78	20.14	11.93	72.56
T_3	25 % N (VC) + 75 % N inorganic fertilizer	16.18	19.41	9.87	72.53
T_4	25 % N (PM) + 75 % N inorganic fertilizer	16.36	19.63	10.40	73.32
T_5	50 % N (VC) + 50 % N inorganic fertilizer	19.58	23.50	10.73	84.47
T_6	50 % N (PM) + 50% N inorganic fertilizer	19.82	23.79	12.67	87.30
T_7	75 % N (VC) + 25 % N inorganic fertilizer	19.16	22.99	10.40	76.69
T_8	75 % N (PM) + 25 % N inorganic fertilizer	19.19	23.02	10.13	72.48
T_9	100 % N (VC)	17.79	21.35	10.00	82.42
T_{10}	100 % N (PM)	18.63	22.36	10.00	83.25
T_{11}	50 % N (VC) + 50 % N(PM)	16.93	20.31	10.80	76.42
	C.D. at 5%	1.150	1.380	1.143	1.540

Vermicompost (VC), Poultry manure (PM) and Inorganic fertilizer (IF)

(2015) also reported increase in available nitrogen in lateritic soils of Konkan with the application of 50 % RDF + 50 % poultry manure in bitter gourd. Similar results were also reported by Kameswari *et al*. (2011). The superiority of poultry manure over other manures in terms of available nitrogen was also reported by Bhikane (2002) for cowpea and Gedam *et al*. (2008) for groundnut in lateritic soil of Konkan.

From the results of the present investigation it can be concluded that the application of 50% N through poultry manure plus 50% N through inorganic fertilizers proved better for obtaining higher fruit yield and to build up soil fertility in lateritic soil of Konkan coastal region of Maharashtra.

Table 2. *Effect of different treatments on soil properties*

No.	Treatments	pH (1:2.5)	EC (dSm^{-1})	O.C. ($g\ kg^{-1}$)	Available nitrogen ($kg\ ha^{-1}$)	Available phosphorus ($kg\ ha^{-1}$)	Available potassium ($kg\ ha^{-1}$)
T_1	Control	5.30	0.14	13.95	249.31	6.80	289.21
T_2	RDF 100:50:50 NPK Kg ha^{-1}	5.48	0.17	15.90	330.14	12.07	429.73
T_3	25 % N (VC) + 75 % N I.F	5.58	0.18	16.65	305.99	13.15	440.74
T_4	25 % N (PM) + 75 % N I.F	5.62	0.20	16.95	319.01	13.67	510.74
T_5	50 % N (VC) + 50 % N I.F	5.70	0.18	19.05	339.39	12.98	531.34
T_6	50 % N (PM) + 50% N I.F	5.82	0.21	19.70	363.70	16.88	566.13
T_7	75 % N (VC) + 25 % N I.F	5.55	0.14	17.55	322.77	13.14	492.51
T_8	75 % N (PM) + 25 % N I.F	5.64	0.19	18.00	330.14	13.37	517.66
T_9	100 % N (VC)	5.72	0.13	19.20	308.03	15.12	533.41
T_{10}	100 % N (PM)	5.79	0.16	19.27	324.81	16.64	544.79
T_{11}	50 % N (VC) + 50 % N (P.M)	5.78	0.18	19.17	330.92	15.89	531.14
C.D. at 5%		0.034	0.037	0.478	1.512	0.999	9.296

Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth,
Dapoli- 415 712, Dist. Ratnagiri, Maharashtra
*Corresponding author: E-mail: suresh_dodake64@rediffmail.com

A. G. MAHALE,
S. B. DODAKE*
and M. C. KASTURE

REFERENCES

Anjanappa, M.,Venkatesh, J. and Suresh Kumara,B. (2011). Influence of organic, inorganic and biofertilizers on flowering, yield and yield attributes of cucumber (Cv. Hassan Local) in open field condition. *Karnataka Journal Agriculture Science* **25**(4): 493- 497.

Adeleye, E. O., Ajeni, L. S. and Ojeniyi, S. O. (2010). Effect of poultry manure on soil physico-chemical properties, leaf nutrient contents and yield of yam (*Dioscorea rotundata*) on *Alfisol* in South Western Nigeria. *Journal of Americal Science* **6**(10): 871-878.

Bhikane, S. (2002). Response of cowpea to application of organic manures with and without inorganic fertilizer. *Unpublished M. Sc. (Agri)*. *Thesis,* Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli, Maharashtra.

Dodake, S. B., Ambede, P. and Dabke, D. J. (2015). Effect of integrated nutrient supply system on yield, fruit quality, nutrient uptake by bitter gourd (*Momordica charantia*) and changes in soil properties of lateritic soil of Coastal region. *Journal of Indian Society Coastal Argriculture Research* **33**(2): 85-88.

Eifediyi, E. K. and Remison, S. U. (2010). Growth and yield of cucumber (*Cucumis sativus* L.) as influenced by farmyard manure and inorganic fertilizer. *Journal of Plant Breeding and Crop Science* **2**(7): 216-220.

Gedam, V. B., Rametke, J. R., Rudragadea and Power, M. S. (2008). Influence of organic manures on yield, nutrient uptake of groundnut and change in physico-chemical properties of soil after harvest of groundnut. *Crop Research* **36** (1, 2 & 3): 111-114.

Ghayal, R. G. (2016). Effect of different organic and inorganic fertilizers on yield and quality of cucumber (*Cucumis sativus* L.) and some soil properties. *Unpublished M.Sc. Thesis,* Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli, Maharashtra.

Haque, M. M., Uddin, M. S., Mehraj, H. and Uddin, A.J. (2014). Evaluation of snake gourd (*Trichosanthes anguina* L.) test hybrids comparing with four popular checks. *International Journal of Science and Biotechnology* **2**(4): 525-528.

Kameshwari, L. P., Narayanamma, M., Riazuddin Ahmed, S. and Chaturvedi, A. (2011). Influence of integrated nutrient management in ridge gourd [*Luffa acutangula* (Roxb.) L.] *Vegetable Science* **38**(2): 209-211.

Panse, V. G. and Sukhatme, P. V. (1967). *Statistical Methods for Agricultural Workers*, ICAR, New Delhi.