Vegetable Science (2018) 45 (1) : 134-136

Short Communication

Response of organic inputs on growth, yield and quality of ridge gourd (*Luffa acutangula* Roxb.)

Nishant Barik, Deepa Borbora Phookan and Jumi Saikia

Received: July 2017 / Accepted: April 2018

Ridge gourd is an important cucurbitaceous vegetable crop. It is quite lower in saturated fats as well as calories. It is really abundant with dietary fiber, vitamin C, riboflavin, zinc, thiamin, iron, as well as magnesium. A few of the health advantages are an excellent blood purifier, possessing laxative properties, a cure for jaundice, beneficial for diabetes, aiding weight loss, anti-inflammatory and anti-biotic, fortifying the immune system, skin care and good for stomach. Nearly everyone has some idea about organic agriculture. As a strategy for growing food and managing Earth, organic principles and practices are very important, may be even critical, to our survival. Starting with the biggest picture, the Principles of Organic Agriculture are Health, Ecology, Fairness and Care. These come from the International Federation of Organic Agriculture Movements (IFOAM), which represents grass roots organic organizations from all over the planet.

The present investigation was carried out during kharif 2016 and 2017 at Experimental Farm, Department of Horticulture, AAU, Jorhat. The experiment consisted of 7 treatments with 3 replications and the design of experiment was Randomized Block Design. The variety of ridge gourd was an open pollinated variety 12-Patta which is a local variety grown by the farmers of Orissa and was grown at a spacing of 1.2 X 1.0 m The seeds prior to sowing were soaked with slurry of water along with biofertilizer consortium (BC) @ 200g mixed with 4kg of seeds for over night. Seeds were sown in plots consisting of different treatments such as, T_1 :[RDF (20:30:30 kg ha^{-1} NPK + FYM @10t ha^{-1})], T_2:(RP + BC + Compost @ 2.5 t ha^{-1}), T_3:(RP + BC + Compost @ 5 t ha^{-1}), T_4:(RP + BC + VC @ 2.5 t ha^{-1}), T_5:(RP + BC + VC @ 5 t ha^{-1}), T_6: (EC @ 2.5t ha^{-1}) and T_7:(EC @ 5t ha^{-1}). Rock phosphate was applied at the dose of SSP fertilizer and BC was mixed to the soil or compost @ 3.5kg ha^{-1}. The plants were grown and fruits were harvested at horticulture maturity stages. Different yield, quality parameters and soil analysis were done as per standard procedures.

Highest values in the growth parameters were found in conventional treatment (Table 1). Such results might be due to readily supplements of nutrients through chemical fertilizers which helped in increasing rate of photosynthesis and quick absorption and translocation of carbohydrates might have helped in increasing vine length ultimately number of laterals and number of nodes got increased. However, among the organic treatments the highest vine length (5.09m) in T_2, number of laterals (5.11) in T_5, number of nodes (37.72) in T_3 were observed. Similar results were reported by Bindiya (2011), T_1 recorded the highest female flowers (32.69) followed by T_5 (29.22). More female flower production might be due to more induction of flowering hormones like auxin and consequently more female flowers produced in T_1. Such result was in accordance with Bindiya (2011). Among organic treatments T_5 recorded highest number of female flowers *i.e.* 29.22. This could be due to several bio-humic substances and number of hormones like auxin and cytokinin influenced by vermicompost which might have promoted the growth and induction of flowers. Table1 revealed that the T_1 (RDF) exhibited the highest values in most of the yield attributing parameters. The highest fruit yield per vine of 1.91kg was recorded in T_1 followed by T_5 (1.42kg). Similar trend of highest yield of 159.02q ha^{-1} was recorded in T_1 followed by T_5 (118.40q ha^{-1}). Such results might be due to more readily supplement of essential nutrients through inorganic fertilizers which resulted in

Department of Horticulture, Assam Agricultural University, Jorhat-785013

Corresponding author, Email: deepajorhat111@yahoo.co.in

Table1: Response of organic inputs on Plant growth parameters of sponge gourd

Treatment	Vine length (m)	Number of laterals per vine	Number of female flowers per vine	Number of fruits per vine	Fruit length (cm)	Fruit girth (cm)	Fruit weight (g)	Fruit set (%)	Yield per vine (kg)	Yield per hectare (q)
T_1	6.05	5.50	32.69	19.02	20.10	12.54	100.55	58.15	1.91	159.02
T_2	5.09	3.27	25.74	13.72	16.85	11.32	73.69	53.30	1.02	84.78
T_3	5.01	3.83	27.01	14.21	18.28	11.59	81.24	52.57	1.16	96.53
T_4	4.44	4.50	27.23	14.83	17.27	11.22	75.03	54.48	1.11	92.80
T_5	4.32	5.11	29.22	15.28	18.87	12.80	92.85	52.27	1.42	118.40
T_6	3.87	3.61	26.74	14.48	17.92	11.64	80.32	54.19	1.16	96.93
T_7	4.10	4.83	28.70	15.00	19.09	12.60	92.15	52.22	1.38	115.41
SEd	0.26	0.65	1.15	0.80	0.38	0.42	3.51	1.06	0.10	8.40
$C.D_{(0.05)}$	0.57	1.42	2.51	1.75	0.83	0.91	7.64	2.31	0.22	18.31

increase rate of photosynthesis. This helped in more translocation and accumulation of carbohydrates in the sink resulting more yield. Such findings were in conformity with Bindiya (2011). High yield and yield attributes found in organic treatments might be due to the synergistic interaction between organic treatments and biofertilizers consortium. Mineralization of macro and micro nutrients from organic manures might have helped to get such result. Such finding was in accordance with Mali (2004). However, highest ash content @ 7.65% was recorded in T_7 (EC @ 5t ha^{-1}) where as the lowest ash content of 6.27% was observed in T_1 (RDF) (Table 2). This result clearly indicated that the significantly higher amount of non-combustible substances present in organic treatments than inorganic treatment. The reasons behind such result attributed to production of more growth promoting substances and more minerals content in organic treatments and also comparatively lower moisture content. Such finding was in accordance with Singh et al. (2011), Singh et al. (2013) and Kumar et al. (2015). Ascorbic acid was found to be highest in T_6 (4.53mg $100g^{-1}$) whereas the lowest value was recorded in T_1 (3.10mg $100g^{-1}$). This might be due to negative relationship between applied nitrogen levels and vitamin C content.

The highest in total sugar and reducing sugar found in T_7 *i.e.* 5.44% and 4.05% respectively. Such results might be due to quick metabolic transformation of soluble compounds and more conversion of organic acid into sugar. The increase in sugar content might also be due to the degradation of polysaccharides into monosaccharide. Action of biofertilizer consortium in organic treatments which affects soil dynamics and plant metabolisms and ultimately results in differences in plant composition and nutritional quality (Worthington 2001). Bindiya (2011) and Kameswari and Narayanamma. (2011). The highest value of leaf nitrogen in conventional treatment might be due to quick mineralization of chemical fertilizer and readily available to the soil which was quickly up taken by plants. However, the lower nitrogen content in organic treatments could be due to slow mineralization of organic manures. Such finding was in conformity with Kumar et al. (2015). Table 3 revealed that the highest leaf phosphorus and potassium content of the plant were recorded in T_7 *i.e.* 0.27% and 2.79% respectively. The reason behind result attributed as PSB a component of enriched compost helped Solubilizing the insoluble phosphorus to soluble form and reduced its fixation. This was in accordance with Herencia et al. (2011) and Kumar et al. (2015). Low PLW in organic treatments might be due to higher availability of antioxidants which interferes with metabolic activities within the vegetables (Mc Sheehy 1977). Moreover, the availability of all macro & micro nutrients from the organic sources in moderate amounts might have also helped in enhancing

Table 2: Response of organic inputs on quality parameters of sponge gourd

Treatment	Moisture content (%)	Ash content (%)	Ascorbic acid (mg $100g^{-1}$)	Total sugar (%)	Reducing sugar (%)	Leaf Nitrogen (%)	Leaf phosphorus (%)	Leaf potassium (%)	PLW (%)
T_1	93.60	6.27	3.10	4.95	3.73	0.29	0.12	2.35	26.28
T_2	92.18	6.30	3.24	5.20	3.71	0.18	0.11	2.52	25.55
T_3	92.80	6.90	3.50	5.22	3.68	0.21	0.18	2.75	21.24
T_4	92.89	6.49	3.92	5.26	3.80	0.19	0.15	1.92	22.95
T_5	93.00	7.36	3.91	5.34	4.00	0.24	0.14	2.27	23.61
T_6	92.47	7.22	4.53	5.34	3.75	0.20	0.20	2.72	20.07
T_7	93.12	7.65	4.29	5.44	4.05	0.25	0.27	2.79	18.60
S.Ed	0.15	0.18	0.21	0.05	0.04	0.02	0.03	0.12	1.59
$C.D_{(0.05)}$	0.32	0.39	0.46	0.10	0.08	0.03	0.05	0.16	3.47

Table 3: Response of organic inputs on soil parameters

Treatment	pH	Organic carbon (%)	Available N (kg ha^{-1})	Available P (kg ha^{-1})	Available K (kg ha^{-1})
T_1	5.52	1.17	253.01	46.15	118.54
T_2	5.38	1.23	267.01	37.15	112.58
T_3	5.50	1.39	266.19	45.48	114.56
T_4	5.47	1.30	256.80	55.87	123.59
T_5	5.58	1.45	278.92	53.01	132.31
T_6	5.67	1.35	260.24	65.03	127.11
T_7	5.69	1.50	277.73	68.39	135.64
S.Ed	0.05	0.02	1.67	4.38	2.51
$C.D_{(0.05)}$	0.11	0.05	3.64	9.55	5.47
Initial value	5.28	1.13	253.01	46.15	118.54

the shelf life. Such result could also be due to reduced respiration rate in organic treatments than inorganic treatment. The highest nitrogen content of 278.92 kg/ ha (Table 3) was recorded in the treatment T5 followed by T7 (277.73 kg/ha) which might be attributed to the application of organic and biofertilizer sources of nutrients. Such a buildup of available N could be attributed to the ability of *Azospirillum* to fix atmospheric N in the rhizosphere throughout the c The status of Phosphorus and Potash content was found highest in $T_{7.}$ This increased in available P might be due to the production of different organic acid by phosphate solubilising bacteria as well as during the decomposition of organic matters. Biswas (2008) reported that the organic acids act as a chelating agent and form stable complexes with Fe and Al, abundantly available in the acid soils and thereby release phosphorus from clutches of Fe and Al to the soil solution. High Potash content in T_7 might be due to mineralization of insoluble silicate minerals through the action of organic acids released during the decomposition of organic manures or produced by biofertilizer microbes. Besides, it could also be ascribed to prevention of leaching loss by more K retention by organic sources while inorganic fertilizers could have released K at a faster rate. These results are similar to the findings by Bahadur *et al*. (2006) and Biswas (2008) cropping period. Considering the positive effect on growth, yield, quality and soil health, T_5(Rock phosphate + Biofertilizer consortium + Vermicompost@ 5t ha^{-1}) is considered as the best treatment for adopting at the field level to reap good economic yield with BC ratio of 2.29.

Reference

Bahadur A, Singh J, Singh KP, Upadhaya AK and Rai M (2006) Effect of organic amendments and biofertilizers growth, yield and quality attributed of Chinese cabbage (*Brassica pekinensis*). Indian J Agril Sci 76(10): 596-598.

Bindiya Y (2011) Studies on the effect of organic manures and biofertilizers on growth, yield, quality and post harvest shelf life of gherkin (*Cucumis anguria* L.). PhD Thesis, ANGRAU, AP.

Biswas (2008) Production of enriched compost- promising technologies. ICAR News 14(3): 1-2.

Herencia JF, Garcia GPA, Ruiz DJA and Maqueda C (2011) Comparison of the nutritional quality of the crops grown in an organic and conventional fertilized soil. Sci Hort 129(4): 882-888.

Kumar J, Phookan DB, Lal N, Kumar H, Sinha K, Hazarika M and Kumar R (2015) Effect of Organic Manure and Biofertilizers on Yield and Yield Attributes Characteristic of Cabbage (*Brassica oleracea* L. var. *capitata*). J Eco-friendly Agric 11(1): 6-9.

Mali MD (2004) Effect of organic manures on yield and quality of cucumber (*Cucumis sativus* L.) cv. Himangi. M.Sc. (Agri.) Thesis, MPKV, Rahuri.

Mc Sheehy TW (1977) Nutritive value of vegetables grown under organic and chemical systems of farming. Qual Plant Foods Human Nutr 27(2): 113-123.

Singh BK, Pathak KA, Verma AK, Verma VK and Deka BC (2011) Effects of vermicompost, fertilizer and mulch on plant growth, nodulation and pod yield of French bean (Phaseolus vulgaris L.). Vegetable Crops Research Bulletin 74: 153-165.

Singh BK, Pathak KA, Ramakrishna Y, Verma VK and Deka BC (2013) Vermicompost, mulching and irrigation level on growth, yield and TSS of tomato (Solanum lycopersicum L.). Indian Journal of Hill Farming 26 (2): 105-110.

Worthington V (2001) Nutritional quality of organic versus conventional fruits, vegetables and grains. J Altern Compl Med 7: 161-173.