

INFLUENCE OF INTEGRATED NUTRIENT MANAGEMENT ON YIELD PARAMETERS OF BITTER GOURD (*Momordica charantia* L.)cv. Pattukkottai Local

¹M. Gayathiri and ²B. Porchelvi

¹. Assistant Professor, Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar-608 002 Email: gayathiriravi78@gmail.com

². PG Research Scholar, Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar-608 002 Email: porulbalu16@gmail.com

ABSTRACT

An experiment was carried out to study the influence of Integrated Nutrient Management on yield parameters of bitter gourd (*Momordica charantia* L.) cv. Pattukkottai Local in the Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar during January 2021. The experiment was conducted in Randomized Block Design with ten treatments and three replications. The treatments were application of organic manures viz., FYM @ 25 t ha⁻¹, vermicompost @ 5 t ha⁻¹ and neem cake @ 5 t ha⁻¹ combined with or without consortium of biofertilizer @ 2 kg ha⁻¹ and the RDF (20:30:60 kg ha⁻¹) in two levels (75 and 100 per cent). The result of the above experiment revealed that the yield parameters viz., number of fruits per plant, fruit length (cm), single fruit weight (g), fruit yield per plant (g) and fruit yield per hectare (kg) were recorded the maximum in the treatment where vermicompost @ 5 t ha⁻¹, consortium of biofertilizer @ 2 kg ha⁻¹ and 100 per cent RDF (20:30:60 kg ha⁻¹) was applied. The least parameters were observed in the control where no inorganic fertilizers were applied.

Keywords: Bitter gourd, Organic manures and inorganic fertilizers.

INTRODUCTION

Vegetables are essential to a healthy diet. Bitter gourd is old world origin and it is a native of tropical Asia particularly in the Indo Burma Region. It is widely grown in India, Indonesia, Malaysia, China and tropical America. Bitter gourd fruits are rich in Iron (1.8mg) Vitamins B and C (100g) rich in phosphorus (55mg/100g), Calcium (20mg/100g) and vitamin A (210/100g). Fruits are used after cooking and delicious preparation are made after stuffing and frying. Fruits have medicinal value and used for curing diabetes, asthma and rheumatism. Roots and stem of bitter gourd are used in many Ayurvedic medicines. Bitter gourd powder was used against ulcers. Protein of bitter gourd inhibit the growth of HIV viruses in human cell cultures. Bitter gourd contains alkaloid Momorcidin, which gives bitter taste to the fruit.

Integrated Nutrient Management (INM) is one of the most important components to obtain sustainable crop production. The integrated nutrient management associates available, accessible and

affordable plant nutrients to increase soil fertility and plant nutrient supply to achieve a given level of crop production, through optimizing the benefits from all the possible sources of plant nutrients. It has become imperative to increase the productivity by maintaining the soil health through the balanced use of inorganic and organic fertilizers will lead to build up of soil fertility, increase in crop productivity with concomitant nutrient balance, besides minimizing the population hazards as well as the fertilizer cost ^[6]. Considering the above point of view, the present investigation was carried out to study the influence of Integrated Nutrient Management on yield parameters of bitter gourd.

MATERIALS AND METHODS

A field experiment was conducted in a farmer's field at Alathur village in Pattukkottai Taluk, Thanjavur District, Tamil Nadu during January 2021. Bitter gourd cv. Pattukkottai Local was used for the experiment. The experiment was laid out in Randomized Block Design with ten treatments and three replications. The experiment was conducted by using various organic manures viz., FYM @ 25 t ha⁻¹, vermicompost @ 5 t ha⁻¹ and neem cake @ 5 t ha⁻¹ as basal along with recommended dose of inorganic fertilizers as 75 and 100 per cent (15:22.5: 45 kg ha⁻¹ and 20:30:60 kg ha⁻¹ respectively). Consortium of bio fertilizer (2 kg ha⁻¹) was applied ten days after the incorporation of organic manures. In control, only FYM @ 25 t ha⁻¹ was applied and no chemical fertilizers was applied Bitter gourd seeds of Pattukkottai Local was sown in 30 cm³ pits at a spacing of 2 x 1.5 m. Four seeds per pit was sown, later on thinned to two seedlings per pit. Nitrogen in the form of urea was applied in three split doses, one dose as basal, remaining dose was applied in fifteen and forty-five days. The full dose of phosphorus and potash were applied in the form of single super phosphate and muriate of potash as basal. Irrigation and weeding were done as per the requirement of the crop. The observations on yield parameters like number of fruits per plant, fruit length, single fruit weight, fruit yield per plant and fruit yield per hectare were recorded. The data were analyzed statistically following the method suggested by the authors. ^[2].

RESULTS AND DISCUSSION

The results obtained from the experiment on the influence of integrated nutrient management on yield parameters of bitter gourd are presented in the Table 1.

Number of fruits per plant

The number of fruits per plant (32.00) was recorded the highest in the treatment which received the application of vermicompost (5 t ha⁻¹), consortium of bio fertilizer (2 kg ha⁻¹) along with 100 per cent RDF (20:30:60 kg ha⁻¹). The author ^[7] reported that this was due to the increased nutrient availability from the organic manures especially by the application of vermicompost with inorganic nutrients might have increased the various endogenous hormonal level in the plant tissue. Increased number of fruits per plant also due to the application of consortium of bio fertilizer was reported by the author ^[8] in bitter gourd

Fruit length

Fruit length (16.50 cm) was recorded the highest in the treatment which received the application of vermicompost (5 t ha⁻¹), consortium of bio fertilizer (2 kg ha⁻¹) along with 100 per cent RDF (20:30:60 kg ha⁻¹). This might have easy accessibility of nutrients to plant through inorganic fertilizers along with better solubilization of organic manures with the action of Azotobacter and PSB. Integration of biological components like azotobacter with inorganic fertilizers and organic manures has proven to enhance the process of nitrogen fixation in soil, and also that this may be due to better translocation of nutrients to the aerial plant parts which in turn increased the fruit length ^[5].

Single fruit weight

Single fruit weight (60.35g) was recorded the highest in the treatment which received the application of vermicompost (5 t ha⁻¹), consortium of bio fertilizer (2 kg ha⁻¹) along with 100 per cent RDF (20:30:60 kg ha⁻¹). This was due to inorganic sources of nitrogen on combination with biofertilizers lead the plant growth favourably with the production of more carbohydrates which perhaps accelerated better fruit weight of bitter gourd ^[3]. The results are in conformity with the findings of the author ^[1] in bitter gourd.

Fruit yield per plant and hectare

Fruit yield per plant (2.15 kg) and fruit yield per hectare (6.44 t ha⁻¹) were registered the highest in the treatment which received the application of vermicompost (5 t ha⁻¹), consortium of bio fertilizer (2 kg ha⁻¹) along with 100 per cent RDF (20:30:60 kg ha⁻¹). The combined application of inorganic fertilizers and vermicompost may have supplied adequate amount of nutrients and favoured metabolic rate and auxin activities in the plant, resulting in better yield attributes and higher fruit yield ^[4].

CONCLUSION

Based on the present investigation, it could be concluded that the application of vermicompost (5 t ha⁻¹), consortium of bio fertilizer (2 kg ha⁻¹) along with 100 per cent RDF (20:30:60 kg ha⁻¹) was found to be beneficial in improving the yield parameters of bitter gourd.

REFERENCES

- [1] Mulani, T.G., Musmade, A.M., Kadu,P.P., Mangave, K.K. 2007. Effect of organic manures and bio fertilizers on growth, yield and quality of bitter gourd (*Momordica charantia*.L) cv. Phule Green gold, *Journal of soil and crops*, 17(2): 258-261
- [2] Panse, V.G. and P.V. Sukhatme.1985. Statistical methods for Agricultural workers. **Indian Council of Agri. Res.**, New Delhi.
- [3] Prasad, P.H., Mandal, A.R., Sarkar, A., Thapa, U and Maity, T.K. 2009. Effect of bio fertilizers and nitrogen on growth and yield attributes of bitter gourd (*Momordica charantia*.L). *Int. conf on Hort.*2009, pp 738-739.

- [4] Priyanka Patel., Dr. K.D Patel, Vipul Mavdivya, Hardik Patel and Balkrushna Adodariya.2019. Effect of organic fertilizers on growth and yield attributes of bitter gourd (*Momordica charantia*.L). cv. Preethi. **Int. J. Chemi. studies.** 7(4): 514-516.
- [5] Sahu, P., 2020. Effect of integrated nutrient management on growth and fruit yield of cucumber (*Cucumis sativus*.L) .**J.Crop and weed**, 16(2): 254-257
- [6] Sudeshna Kharga, Pranabjyoti Sarma, S.D. Warade.P, Debnath.L. Wanghu, Amit kumar Singhand Akhoki G. Simray.2019. Effect of integrated nutrient management on growth and yield attributing parameters of cucumber (*Cucumis sativus*. L)under protected condition. **Int. J. Microbiol. App. Sci.** 8(8): 1862-1871
- [7] Sureshkumar.R., Karuppaiah, P., Rajkumar.M. and Sendhilnadhan.R.2016. Effect of organic and inorganic inputs on flowering and yield characters of bitter gourd (*Momordica charantia*.L) **Int. J. Curr. Research.** 8(04): 29527-29359
- [8] Thriveni. V., Mishra, HN., Pattanyak, SK.,Sahoo, GS and Thomson, T.2015. Effect of inorganic, organic and biofertilizers on growth, flowering, yield and quality attributes of bitter gourd (*Momordica charantia*.L). **Int. J. of Farm Sci**, 5(1):24-29

Table 1: Influence of Integrated nutrient management on yield parameters of bitter gourd.

Treatment details	Number of fruits plant ⁻¹	Fruit length (cm)	Single fruit weight(g)	Fruit yield plant ⁻¹ (kg)	Fruit yield hectare ⁻¹ (t)
T ₁ – FYM 25 t + 100 % RDF	25.22	13.60	46.02	1.58	4.73
T ₂ – VC 5 t + 100 % RDF	27.89	14.33	49.92	1.73	5.18
T ₃ – NC 5 t + 100 % RDF	23.91	12.86	42.60	1.42	4.25
T ₄ – FYM 25 t +CBF+ 75 % RDF	29.26	15.05	53.72	1.87	5.60
T ₅ – VC 5 t + CBF +75 % RDF	30.62	15.80	57.32	2.00	5.99
T ₆ – NC 5 t +CBF+ 75 % RDF	22.55	12.13	37.38	1.21	3.62
T ₇ – FYM 25 t +CBF+ 100 % RDF	30.65	15.86	57.35	2.03	6.08
T ₈ – VC 5 t + CBF +100 % RDF	32.00	16.50	60.35	2.15	6.44
T ₉ - NC 5 t + CBF +100 % RDF	22.59	12.16	37.42	1.25	3.74
T ₁₀ - Control	20.35	11.30	34.25	1.03	3.08
S.Ed	0.64	0.29	1.25	0.03	0.12
CD (P=0.05)	1.28	0.58	2.53	0.07	0.25

FYM-Farmyard manure, VC- Vermicompost, NC- Neem cake, CBF- Consortium of bio fertilizer, 75%RDF (15:22.5: 45 kg ha⁻¹) and 100% RDF (20:30:60 kg ha⁻¹)