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Impact of integrated nutrient management on various yield parameter of brinjal (*Solanum melongena* L.)

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Abstract
A field experiment was conducted during the summer season of year 2024-25 at the Instructional farm Khudmudi, College of Horticulture and Research Station, Mahatma Gandhi University of Horticulture & Forestry, Durg (C.G.), to evaluate the "Impact of integrated nutrient management on various yield parameter of Brinjal (*Solanum melongena* L.)". The field experiment was laid out in Randomized Block Design with eleven treatments and three replications. The experiment included organic manures and inorganic fertilizers viz., NPK (Nitrogen, Phosphorus or Potassium), FYM and Vermicompost along with a control treatment (T_0) involving only water. Among the treatments, it resulting in the maximum number of fruits per plant (15.20), longest fruit length (16.80), maximum fruit weight (73.42 g), highest fruit yield per plant (1.11 kg), fruit yield per plot (13.38 kg) and total yield (412.41 q/ha). Therefore, it can be suggested that the dose of 75% RDF + 25% Vermicompost (20 t/ha) suitable for the commercial cultivated of Brinjal. This treatment also achieved the highest economic return, demonstrating maximum net profit (Rs. 3,21,885.00) and an advantageous benefit-cost (B:C) ratio (4.00). These results indicate that use of nutrients can play a crucial role in increasing both the production and economic viability of Brinjal cultivation.

Keywords: INM, NPK, FYM, vermicompost, brinjal, yield

Introduction
Brinjal (*Solanum melongena* L.) is an important vegetable crop in the tropics and subtropics. It belongs to the Solanaceae family. It grows all over the world and can reach heights of 40 to 150 cm. It can grow straight up or spread out. This crop grows a lot in a small area and can grow in a wide range of climates. It is high in vitamins and minerals, including calcium, magnesium, phosphorus, iron, sodium, copper, potassium, and sulphur, but low in calories and fats. Its main components are carbohydrates, Fiber, protein, and water. Brinjal is grown on 39.056 thousand hectares in Chhattisgarh, yielding approximately 713.399 thousand tons annually. It is the third most important vegetable crop in the Solanaceae family, with an annual global production of 59 million metric tons from an area of 19.63 lakh ha (Anonymous, 2021-22). In India, it is produced on 6.8 lakh hectares of land, yielding 12.8 million tonnes (Anonymous, 2022-23; 2022). Brinjal fruit is rich in calcium (0.02%), phosphorus (0.02%), iron (0.0013%), protein (1.3%), fat (0.3%), and carbs (6.4%). In addition, it has 34 mg of carotene, 0.05 mg of riboflavin, 0.05 mg of thiamine, 0.5 mg of niacin, and 12 mg of ascorbic acid per 100 g of fruit. This vegetable's many plant parts are used to treat conditions like cholera, syphilis, fever, and liver pain, among others. It is used in a variety of recipes, such as curries, pickles, bharta, spiced rice, and for roasting, frying, and stuffing meat and dried fish. It is also a good source of dietary Fiber, carbohydrates, and proteins. Brinjal is considered a "poor man's crop" due to its great productivity. White brinjal is generally beneficial for diabetics, but purple fruits have a higher amino acid concentration. Additionally, it has been suggested as a great treatment for liver issues.
One of the most important components needed for vigorous plant growth that increases yield is nitrogen. The high-yielding crop types of today need large amounts of artificial nitrogenous fertilizers in order to produce the expected yield. Maximizing the advantages of all possible sources of organic, inorganic, and biological components in a coordinated way while preserving soil fertility and plant nutrient supply at an ideal level to maintain the

targeted productivity is the aim of integrated plant nutrient management. In order to maintain soil productivity, the system calls for the prudent combination of inorganic fertilizers, biofertilizers, and organic wastes. Because it uses local resources, the proper use of both organic and inorganic sources will enhance soil health and maximize production, making it a financially viable method of providing crops with nutrients.

Materials and Methods

The present investigation entitled "Impact of integrated nutrient management on various yield parameter of Brinjal (*Solanum melongena* L.)." was carried out at summer season of year 2024-25 at the instructional farm Village-Khudmudi under College of Horticulture and Research Station, Mahatma Gandhi University of Horticulture & Forestry, Durg (C.G.), The experimental area is located in the central part of the Chhattisgarh Plains, between 20°54′ to 21°32′ N latitude and 81°10′ to 81°36′ E longitude at an altitude of 317 meters above mean sea level. The entitled experiment was conducted in Randomized Block Design (RBD) with three replications. In all there were different eleven treatments viz., T_0: control, T_1: 100% RDF (100:50:50 kg/ha), T_2: 100% FYM, T_3: 100% VC, T_4: 50% FYM + 50% VC, T_5: 50% RDF + 50% VC, T_6: 50% RDF + 50% FYM, T_7: 25% RDF + 75% VC, T_8: 25% RDF + 75% FYM, T_9: 75% RDF + 25% FYM, T_{10}: 75% RDF + 25% VC. The seedling of the Brinjal var. Arka Navneet were transplanting in field on March 30, 2025, maintaining a spacing of 60 cm x 45 cm (Row to Row and Plant to Plant). The plot size for each treatment was 2m × 1.5m. The field Brinjal crop was analyzed in various treatments for key characters i.e. number of fruits per plant, average fruit length (cm), average fruit weight (g), average fruit yield per plot (kg), total yield (q/ha).

Results and Discussion

Number of fruits per plant

The findings of the present study indicate that the combined application of organic and inorganic, sources of nutrients had a positive effect on the number of fruits per plant compared to the control. The highest number of fruits per plant (15.20) was recorded with the treatment of 75% RDF + 25% Vermicompost (20 t/ha), while the lowest number (7.10) was observed in the control at the harvest stage. The increase in number fruits can be attributed to the beneficial effects of FYM, vermicompost, which improves soil water retention, which helps address nitrogen deficiency, which enhances crop yield by making phosphorus more readily available to plants.

Average fruit length (cm)

Among all the treatments, the highest length of fruit (16.80) was observed with the application of 75% RDF + 25% Vermicompost (20 t/ha). In contrast, the control plants recorded the lowest length of fruit (10.43). The notable increase in fruit length can be attributed to the balanced nutrient availability provided by this integrated nutrient management (INM) treatment, which likely enhanced the plant's internal metabolic functions.

Average fruit weight (g)

The highest fruit weight (73.42 g) was recorded with the application of 75% RDF+ 25% Vermicompost (20 t/ha), while the lowest fruit weight was noted in the control treatment (60.03 g). This increase can be attributed to the enhanced plant growth resulting from the balanced supply of essential nutrients-namely NPK along with organic inputs like FYM, vermicompost. Phosphorus, in particular, plays a crucial role in fruit weight and root development. The readily available nutrients from inorganic sources, along with improved nitrogen fixation, balanced carbohydrate-to-nitrogen ratio, likely contributed to the increase in fruit weight. The beneficial effects of vermicompost in enhancing fruit weight.

Average fruit yield per plot (kg)

The application of both organic and inorganic nutrient sources had a significant effect on fruit yield per plot compared to the control during the study period. The highest fruit yield per plot (13.38 kg) was achieved with the application of 75% RDF+ 25% Vermicompost (20 t/ha), whereas the lowest yield (5.14 kg) was recorded in the control treatment. fruit yield per plot increased notably with the gradual addition of inorganic nutrients and was further enhanced by the integrated use of FYM and vermicompost. This improvement in yield may be attributed to the balanced supply of NPK in combination with organic inputs, ensuring a slow and sustained release of nutrients that supports maximum productivity.

Total yield (q/ha)

The application of various combinations of organic and inorganic nutrient sources had a significant impact on fruit yield (q/ha). The highest fruit yield (412.41 q/ha) was observed with the treatment involving of 75% RDF+ 25% Vermicompost (20 t/ha), while the lowest yield (158.39q/ha) was recorded under the control. This improvement in yield may be attributed to balanced nutrient availability and improved nutrient uptake, which supported better fruit development and overall productivity. The superior yield in brinjal in this study can be linked to the synergistic effect of FYM, Vermicompost, when combined with inorganic fertilizers. These inputs likely enhanced photosynthate production through increased levels of growth hormones and amino acids, thereby contributing to improved fruit yield.

Table 1: Impact of integrated nutrient management on various yield parameters

Symbol	Treatments	Number of fruits per plant	Average fruit weight (g)	Average fruit length (cm)	Average fruit yield per plot (kg)	Total yield (q/ha)
T_0	Control	7.10	60.03	10.43	5.14	158.39
T_1	100% RDF (100:50:50)	12.53	65.78	14.27	9.90	305.13
T_2	100% FYM	11.73	63.51	11.70	8.95	275.85
T_3	100% VC	11.93	63.70	12.70	9.12	281.22
T_4	50% FYM + 50% VC	12.73	66.78	14.53	10.20	314.59
T_5	50% RDF + 50% VC	14.07	68.16	16.33	11.51	354.73
T_6	50% RDF + 50% FYM	13.80	66.94	15.67	11.08	341.75
T_7	25% RDF + 75% VC	14.27	68.61	15.20	11.74	362.15
T_8	25% RDF + 75% FYM	13.47	66.80	14.27	10.80	332.96
T_9	75% RDF + 25% FYM	14.73	70.42	14.87	12.45	383.83
T_{10}	75% RDF + 25% VC	15.20	73.42	16.80	13.38	412.41
	SE(m) ±	0.26	0.60	0.14	0.19	158.39
	C.D. at 5%	0.79	1.77	0.41	0.58	305.13

Note: RDF-Recommended Dose of Fertilizer, FYM-Farm Yard Manure, VC-Vermicompost,

Conclusion

Based on the findings of the present study titled "Impact of integrated nutrient management on various yield parameter of Brinjal (*Solanum melongena* L.)" it can be concluded that the application of 75% RDF+ 25% Vermicompost (20 t/ha), proved to be the most effective treatment for enhancing yield parameters. Therefore, this combination is recommended as a suitable nutrient management practice for the commercial cultivation of Brinjal.

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Reference

1. Agarwal S, Sharma J. Agronomic impact of earthworms, cow dung compost, vermicompost and chemical fertilizers on growth and yield of brinjal (*Solanum melongena* L.). International Journal of Environment Engineering. 2014;6(3):1-4.
2. Anuburani A, Manivannan K. Effect of integrated nutrient management on growth in brinjal cv. Annamalai. South Indian Journal of Horticulture. 2003;50(4-6):377-386.
3. Barman K, Collis JP, Muralidharan B, VM P. Effect of integrated nutrient management on plant growth of brinjal (*Solanum melongena* L.). International Journal of Agricultural Science and Research. 2017;7:179-182.
4. Bhattacharya P, Jain RK, Paliwal MK. Biofertilizers for vegetables. Indian Horticulture. 2000;(July-September issue). ICAR Publication, New Delhi. p. 31-33.
5. Chattoo MA, Ahmed N, Wani MH, Mir SA, Khan SH, Jabeen N. Effect of organic manures and inorganic fertilizers on growth, yield and quality of brinjal. Vegetable Science. 2011;38:135-139.
6. Chitesh C. Studies on use of organics in tomato (*Lycopersicon esculentum* Mill.) production. M.Sc. (Hort.) Thesis, University of Agricultural Sciences, Dharwad, Karnataka (India); 2005.
7. Darley J, Shanmugavelu KG, Thamburaj S. Studies on the efficiency of organic vs. inorganic form of nitrogen in brinjal. Indian Journal of Horticulture. 1988;45:100-103.
8. Devi AK. Effect of organic manures on growth and yield of brinjal (*Solanum melongena* L.). South Indian Horticulture. 2002;39:4-43.
9. Furgo PA. Role of organic pesticides and manures in management of some important chilli diseases. Journal of Mycology and Plant Pathology. 2000;30:96-72.
10. Hassan MM, Chowdhury BK, Islam MR. Influence of phosphorus and sulphur on yield, yield attributes and biochemical composition of brinjal. Journal of Agroforestry and Environment. 2012;6(2):109-114.
11. Kamili IA, Zargar MY, Chattoo MA. Effect of microbial inoculants, chemical nitrogen and their combination on brinjal (*Solanum melongena* L.). Vegetable Science. 2002;29:87-89.
12. Kumar A, Thakral KK. Effect of herbicides and nitrogen fertilization on growth and yield of chilli (*Capsicum annuum*). Indian Society of Weed Science. 1993;3:206-208.
13. Naidu AK, Kushwaha SS, Dwivedi YC. Influence of organic manures, chemical and biofertilizers on growth, yield and economics of brinjal. South Indian Horticulture. 2002;50(4-6):370-376.
14. Nandekar DN, Sawarkar SD. Effect of plant nutrients on different varieties of brinjal (*Solanum melongena* L.). Orissa Journal of Horticulture. 1990;18:1-5.
15. Prabhakar AS, Patil SV, Krishnamurthy K. Influence of organic manures, ammoniacal and nitrate nitrogen on the availability of soil and applied phosphorus. Journal of the Indian Society of Soil Science. 1972;20:413-415.
16. Ramakrishna T, Palled YB. Effect of plant geometry and fertilizer levels on quality of chilli cv. Vietnam-2. Karnataka Journal of Agricultural Sciences. 2004;17:309-310.
17. Singh AK, Gupta MJ, Srivastava R, Behera TK. Effect of NPK levels on growth and yield of tomato hybrids under multi-span polyhouse. Indian Journal of Horticulture. 2005;62(1):91-93.
18. Vanangamudi K, Subramanian KS, Baskaran M. Influence of irrigation and nitrogen on the yield and quality of chilli fruit and seed. Seed Research. 1990;18(2):114-116.