The Pharma Innovation Journal 2022; SP-11(5): 1940-1943

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(5): 1940-1943

www.thepharmajournal.com
Received: 14-03-2022
Accepted: 17-04-2022

Chityala Vinay Kumar
M.Sc. Ag. Horticulture (Vegetable Science), School of Agriculture, Lovely Professional University, Phagwara, Punjab, India

Panta Sai Siva
M.Sc. Ag. Horticulture (Vegetable Science), School of Agriculture, Lovely Professional University, Phagwara, Punjab, India

Mahendar Komma
M.Sc. Ag. Horticulture (Vegetable Science), School of Agriculture, Lovely Professional University, Phagwara, Punjab, India

Corresponding Author
Chityala Vinay Kumar
M.Sc. Ag. Horticulture (Vegetable Science), School of Agriculture, Lovely Professional University, Phagwara, Punjab, India

Impact of integrated nutrient management on vegetable crops: A review

Chityala Vinay Kumar, Panta Sai Siva and Mahendar Komma

Abstract
Now-a-days, increases in demand on vegetable crops but supply is less due to population, for improve in supply of vegetables, INM play a key role for increasing the supply. Importance of INM and effect on soil and crop through combined of inorganic and organic sources to provide more yield and nutritional values to vegetable crops like Radish, chiili, Red cabbage etc. To reduce more supply of artificial fertilizers to crop by supplying organic sources like FYM, vermi-compost, poultry manures, green manuring crops to improve soil nutrition and supply required amount of nutrients to plants for producing required quantity. This review explained about how it effect on vegetable crops through INM in different elements on yield and growth parameters of vegetable crops.

Keywords: Integrated nutrient management, vegetable crops, yield

Introduction
Vegetables are widely acknowledged as a crucial supplement for maintaining excellent health and ensuring nutritional security. They are important sources of vitamins, minerals, carbs, proteins, and roughages. An individual's daily need for a balanced diet may be easily satisfied by eating 125 grammes of leafy vegetables, 100 grammes of root and tuber vegetables, and 75 grammes of miscellaneous vegetables per day. Radish, carrot, chilli, cabbage, and other vegetables serve an important function in delivering nutrients to humans.

Organic matter such as FYM, vermicompost, and chicken manure are now required for integrated nutrition management. Chemical and fertilizer-based agricultural technologies have been introduced to meet the ever-increasing demands for food supply from an ever-increasing population. This has a big influence on raising output and productivity, but it's not free. Land degradation, a drop in factor productivity, and, most importantly, health hazards have all been recorded, highlighting the need of organic farming for long-term production.

As a result, customers are increasingly turning to organically grown foods, which provide nutritious and safe food, and the organic food business is expanding at a rate of 12-15 percent each year.

For long-term viability, organic, inorganic, and bio-fertilizers must be used in the establishment of high-quality vegetable crops. Organic agriculture recycles crop waste, animal manure, farm organic wastes, and rubbish. Organic manures, such as vermicompost and poultry manure, significantly improved plant height, number of leaves, root length, and root diameter, as well as yield, in vegetable crops. Because of its high organic matter content, FYM is the most often used manure to improve crop nutrition.

Organic manures feed the soil and maintain the long-term survival of the agro-ecosystem. Organic farming, which is now popular, is created by growing crops with a package of organic manures, and organic farming may discover a new market niche.

The utilisation of plant wastes and manures in agriculture is the focus of organic farming. Organic manuring improves soil texture, raising environmental consciousness, changing eating habits, and increasing customer demand for organic foods and supplements. The purpose of this research was to examine how different organic nutrient sources influenced radish yield and quality criteria. Vermicompost is rich in micro and macro nutrients, growth hormones, and enzymes. FYM is not a nutrient-dense crop, but it does help to increase the soil's organic carbon content.

Rani, L., *et al.*, (2021) tested the effect of integrated nutrition management on chilli growth and quality (*Capsicum annum*. var. Ankita N.S-015) Seven different treatments were applied to the test crop chilli (var. Anlita N.S-015).

Each treatment was duplicated three times and imposed over a statistically planned out field in randomised block design (RBD) with three replications and a total number of plots of 21. Chillies of the Ankita N.S-015 cultivar were transplanted at a 60cm x 30cm spacing. The treatment T2 (100 percent RDF NPK + Azospirillum) had the highest plant height (74.250 cm), number of primary brunches (8.100), number of secondary brunches (8.090), number of tertiary branches (5.480), days to anthesis (45.450), and days to flowering (45.450). (54.600). Treatment T2 had the highest intake of nitrogen, phosphorus, and potassium, followed by T3 and T1. The results showed that combining a soil test-based recommended fertiliser dose (50 percent) with Azospirillum + PSB was the optimum treatment for increasing production and return.

Altaf, M. A., *et al.,* (2019) [6] investigated the effects of NPK, organic manure, and their combination on chilli plant growth, yield, and nutrient absorption (*Capsicum Annum* L.) The study used a randomised full block design with three replications and nine treatments of organic manures in conjunction with NPK fertilisers. They found that the T9 treatment (N: P: K 100:50:50+FYM@8 tonne per hectare) produced the maximum yield. With T9 treatment (N: P: K 100:50:50kg+FYM@8 tonne per hectare), plant height at harvest, number of branches per plant, number of fruits per plant, fruit breadth, fruit length, and fruit weight all rose considerably. NPK100% +FYM@8 tonne per hectare enhanced oleoresin production and ascorbic acid content in the same way. The use of FYM@8 tonnes per hectare in conjunction with NPK100% enhanced the yield.

Beher, S., *et al.,* (2020) [10] conducted an experiment on integrated nitrogen management in chilli to determine the impact of different nitrogen source combinations on chilli yield, uptake, quality metrics, and economics. T5 - 50% RDF+ 50% N via Vermicompost had the highest chilli production, including fruit yield (14511.4 kg hectare) and nitrogen absorption by fruit (122.31 kg hectare) owing to a 50/50 mix of urea and Vermicompost. T2 had the highest B: C ratio in terms of chilli quality characteristics such oleoresin, capsaicin, and ascorbic acid (100 percent RDF).

Pradhiepan, T., *et al.,* (2018) [11] conducted an experiment on the Effect of Integrated Nutrient Management on Chilli Green Chiili Production to determine the optimal mix of applications for chilli green chiili yield. MIPC-01 (Mahailluppallama Kaludawali Selection). The following five treatment combinations were laid out in a Randomized Completely Block Design and replicated four times: T1- No fertiliser (control plot), T2- 100 percent RIF, T3- 50 percent RIF + 15 t ha-1 cattle manure, T4- 50 percent RIF + 15 t ha-1 cattle manure + 250 kg ha-1 partially burnt paddy husk, and T5- 50 percent RIF + 15 t ha-1 cattle manure + 500 kg ha-1 partially burnt pa The destructive random sampling approach was used to collect data on growth and yield metrics. The application of 50 percent is finished.

In a field study, Aswathi, P., *et al.*, (2021) [1] employed an RBD design with seven treatments and three replications for each treatment. Organic manures and inorganic fertiliser were applied 25 days, 35 days, and 45 days after planting. The T5 R.D.F 75 percent + 25 percent treatment has been judged to be successful based on the current study. In terms of plant growth and root yield parameter, vermicompost was shown to be the best treatment combination for Radish (*Raphanus sativus* L.) cv. Scarlet Red Globe grown in Prayagraj Agro-climatic conditions. Treatment T5 R.D.F 75 percent + 25% FYM also showed the best benefit: the cost ratio (1:3.61) was found in treatment T5 R.D.F 75 percent + 25% FYM. Respectively.

Khadse, V, A., *et al.,* (2021) [4] used a factorial randomised block design to perform a study with nine treatment combinations and four replications. Three nitrogen sources are used in the treatments: 100 percent nitrogen from urea, 50% nitrogen from FYM + 50% nitrogen from urea, and 50% nitrogen from FYM + 50% nitrogen from Vermicompost + Biofertilizers, as well as three vegetables: coriander, fenugreek, and spinach. The usage of 50 percent nitrogen via FYM + 50 percent urea, followed by 50 percent nitrogen via FYM + 50 percent nitrogen via Vermicompost + Biofertilizers, significantly increased all crop development parameters. The top yielding INM treatments were 50 percent N via FYM + 50 percent N through urea, followed by 50 percent N via FYM + 50 N Vermicompost + Biofertilizers.

T1 Control (Recommended dose of fertiliser (100 kg N, 80 kg P2O5, and 50 kg K2O /ha), T2 (100 percent N through FYM), T3 (100 percent N through Vermicompost), T4 (100 percent N through Poultry manure), T5 (75 percent NPK + 25% N through FYM), T6 (75 percent NPK + 25 percent N through Vermicompost), T7 (75 percent NPK + 25 percent N through Verm T6 exhibited the most significant plant height at 45 days (35.23 cm). The plant with the highest number of leaves per plant (13.50) was discovered (T6), Treatment had the longest leaf length (29.97) and the highest shoot weight (91.50). (T6). Treatment T6 (75 percent NPK + 25 percent N through vermicompost) had the highest root development.

Vikas *et al.,* 2019 carried out a field study with twenty-six treatment combinations that were duplicated three times. When 75 percent RDF + Azotobacter + Microbial Consortium + Pseudomonas was used, plant height (35.73 cm), number of leaves per plant (21.70), length of leaves (23.93 cm), root diameter (3.10 cm), root weight (200.63 g), dry weight of leaves per plant (17.93 g), yield per plot (8.02 kg), and total yield per hectare (595.34 q/ha) were all highest.

Leaf area, tuber weight, tuber length, tuber diameter, tuber yield (kg/plot), tuber yield (q/ha), NPK content, starch, and fertility levels were all measured in a field trial by Koodi *et al.,* (2016). In F3 (100 percent RDF + 2.5 t VC/ha), the maximum vine length (172.9 cm), leaf area (185.3 cm2), chlorophyll content (1.178 mg/g), tuber weight (323.62 g), tuber length (15.20 cm), tuber diameter (8.57cm), tuber yield (12.32 kg/plot), tuber yield (228.16 q/ha), TSS content (4.56 percent), NPK content (0.348 percent, 0.310 percent

Biofertilizers, when used in conjunction with chemical fertilisers, increase crop output and nutrient efficiency, according to Olowoake and Adeoye (2010) [7]. Despite the fact that meeting farming's nutritional needs alone with chemical fertilisers is becoming increasingly challenging due to their rising costs. A defined as the use of chemical fertilisers may result in a loss in organic matter content, increased soil acidity, deterioration of soil physical qualities, and higher rate of erosion due to the instability of soil aggregates. One strategy to keep or improve soil fertility is to preserve or increase its organic content. This is made easier when biofertilizers like Azospirillum and PSB are used. According to study, organic fertilisers are less likely to seep into ground water than synthetic fertilisers.

Roshini *et al.,* (2019) [8] presented the results of an experiment on the influence of biofertilizers on carrot growth and yield using a combination of several biofertilizers and the recommended amount of NPK, which was developed using

factorial RBD with three replications. In terms of growth and yield characters, the combination of Azospirillum + PSB + Azotobacter + VAM produced a better result, with weight of root (121.99g), yield per plot (5.12kg), and yield per hac (194qt/ha). The use of such biofertilizers in conjunction with conventional fertiliser would help to draw in additional nutrients for crop growth and yield, as well as benefit to long-term soil health.

Godara *et al.,* (2014) [2] used recommended doses of NPK, biofertilizers (azospirillum, azotobactor, PSB), and farm yard manure in an experiment on the need for integrated nutrient management for corriander (*Coriander sativum* L.). They came to the conclusion that using NPK and biofertilizers produces the maximum profitability and yields when compared to using single inorganic fertilisers. With the application of (50 percent RDF + Azospirillum (2.5 kg/ha) + Azotobacter (2.5 kg/ha) + PSB (2.5 kg/ha) + farm yard manure 5t/ha), net returns (50966/ha) and benefit cost ratio (3.66) were achieved, respectively.

According to Vithwel and Kanaujia (2013), a combination of biofertilizers (Azospirillum + VAM + PSB) and chemical fertiliser boosted NPK availability and encouraged soil fertility, which helped the plant optimise water absorption, adequate aeration, and productivity, resulting in higher yield and quality. The usage of chemical fertilisers on an external basis is likely to have increased the number of attribute characters. Improves plant nutrient absorption and shows a reaction on yield-attributing components, demonstrating the response in terms of enhanced cell division, elongation, and vegetative growth, and hence the economy's development.

Singh, A., *et al*., (2021) [9]. Treatment T5 (75 percent NPK + 25 percent Vermicompost+ Azospirillum) outperformed all other treatments in terms of growth, yield characteristics, yield, quality, and gross return (258, 347) Rs/hac, with the highest BCR (3.12) of Broccoli, according to their study Effect of integrated nutrient management on growth, yield, and quality of broccoli (*Brassica oleracea* var. italica) cv.TSX-07 However, because this is based on a one-season study, further trials may be needed to corroborate the findings.

Jeelani Zargar *et al*., (2021) The treatment combination of 75 percent inorganic nitrogen + Vermicompost + Azotobacter + Phosphate Solubilizing Bacteria had significantly higher values for all morphological (50 percent head initiation and maturation) and yield parameters (head size, net and gross head weight, and marketable yield) than the other treatment combinations in their study Integrated nutrient management studies in cabbage (*Brassica oleracea*) under subtropical plains of Jammu. The use of different organic manures (FYM and Vermicompost) in combination with biofertilizers and reduced nitrogen (50 and 75 percent) had no effect on TSS, but ascorbic acid content in cabbage was statistically higher (51.16 mg/100g) in the treatment containing 50 percent inorganic nitrogen + Vermicompost + Azotobacter + Phosphate Solubilizing Bacteria (PSB).

Md. Rafiqul Islam *et al.,* (2021) [3]. The amount of seed-borne fungus in curds and leaves was not substantially impacted by integrated nutrition management, according to their paper Influence of Different Integrated Nutrient Management Strategies on Growth, Yield, and Nutritional Qualities of Cauliflower. T3 was statistically equivalent to T4 and had the greatest performance among the different therapeutic combinations. Next to Kazi compost (70 percent poultry manure composted with 30 percent rice or saw dust), cow dung in conjunction with chemical fertilisers performed well. In both areas, coordinated nutrient management worked better than single application of inorganic fertilisers (compensating up to 25 percent of RDF). Kazi compost @ 5 t ha1 combined with other nutrients improves cauliflower growth, yield, and nutrition.

Conclusion

In the view of the importance of INM in vegetable crops which increases the quantity as well as quality of vegetable crops like carrot, cabbage, radish, etc. which improves soil properties along with nutritional values of vegetables. By utilisation or combination of natural and inorganic fertilizers with bio- fertilizers leads to increase in production of vegetables and reduces the cries of vegetable crops. By using INM methods cost of input will decreases with enhance the output to farmers.

References

1. Aswathi P, Prasad VM, Deepanshu VB. Integrated nutrient management in radish (*Raphanus sativus* L.) cv. scarlet red globe, 2021.
2. Godara AS, Gupta US, Lal G, Singh R. Influence of organic and inorganic source of fertilizers on growth, yield and economics of coriander (*Coriandrum sativum* L.). International Journal of Seed Spice. 2014;4(2):77-80.
3. Islam M, Hoque TS, Khan RNA, Farzana S, Ahmed M, Khodabakhshloo N. Influence of Different Integrated Nutrient Management Strategies on Growth, Yield and Nutritional Qualities of Cauliflower. Agricultural Research. 2021;10(4), 656-664.
4. Khadse VA, Mohod AA, Chirde PN, Chauhan AK. Response of leafy vegetables under organic and integrated nutrient management. The Pharma Innovation Journal. 2021;10(5):04-06.
5. Leela Rani P, Balaswamy K, Rao A, Ramachandra, Masthan SC. Evaluation of integrated nutrient management practices on growth, yield and economics of green chilli cv. Pusa Jwala (*Capsicum annuum* L.). Inter. J Bio-resource & Stress Management. 2015;6(1):76-80.
6. Muhammad Ahsan Altaf, Rabia Shahid, Muhammad Asad Altaf, Ming-Xun Ren, Ke Tan, Wen-Qian Xiang, *et al*. Effect of NPK, organic manure and their combination on growth, yield and nutrient uptake of chilli (*Capsicum annum* L.). Horticulture Int. J. 2019;3(5):217-222. DOI: 10.15406/hij.2019.03.00135.
7. Olowoake AA, Adeoye GO. Comparative efficacy of NPK fertilizer and composted organic residues on growth, nutrient absorption and dry matter accumulation in maize. The International Journal of Organic Agriculture Research and Development. 2010;2:43-53.
8. Roshni P, Narasimha Murthy DK, Salomi DR. Studies on biofertilizers and inorganics on growth and yield of carrot. Journal of Pharmacognosy and Phytochemistry. 2019;8(2):1559-1562.
9. Singh A, Soni SS, Singh RK, Singh MK, Mishra SK. Effect of integrated nutrient management on growth, yield and quality of broccoli (*Brassica oleracea* var. *italica*) cv. TSX-0788. The Pharma Innovation Journal 2021;10(2):220-222.
10. Subhashree Behera1. Poonam Preeti Pradhan1. Gayatri Sahu1. And Gour Hari Santra1. Integrated Nitrogen Management in Growth and Yield of Chilli (*Capsicum annum* L.) Under Red and Lateritic Soils of Odisha.

2020;32(12):28-34
11. T. Prradhiepan Seran TH, Hariharan G. Effect of Integrated Nutrient Management on Green Pod Yield of Chilli (*Capsicum annuum* L.) cv MIPC-01, Sabaragamuwa University Journal 2018; August 16(1):28-33 ISSN 1391-3166; eISSN 2386-2041
12. Vikas, Thaneshwari, Rishu Sharma, Neelam Thakur, Poonam Kumari, Homraj Sahare. Effect of inorganic fertilizers and bio-fertilizers on growth and root yield of Radish (*Raphanus sativus* L.) cultivar 'Safed Mooli–2'under Punjab condition.
13. Vithwel Kanaujia SP. Integrated nutrient management on productivity of carrot, Department of Horticulture, SAARC. Journal of. Agriculture. 2013;2:173-181.
14. Zargar J, Kumar M, Kumar S, Chopra S, Kumar S, Bhushan A, *et al*. Integrated nutrient management studies in cabbage (*Brassica oleracea*) under subtropical plains of Jammu. The Indian Journal of Agricultural Sciences. 2022;92(1):59-62.