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Effect of integrated nutrients management on growth, yield, productivity and profitability of Fenugreek (*Trigonella foenum-graecum* L.) cv. RMt-305

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Abstract
The present study was entiled as "Impact of integrated nutrients management on growth, yield, productivity and profitability of Fenugreek (*Trigonella foenum – graecum* L)" The research was conducted during *Rabi season* of 2020-21, at Pt. K.L.S. College of Horticulture and Research Station, Bharregaon Farm Rajnandgaon (C.G.). The experimental results revealed that significantly the highest yield attributes *viz.*, number of pod plant^{-1}, number of seed pod^{-1}, weight of seed (0.21 g pod^{-1}), seed yield (1.1 g plot^{-1}) and seed yield (1096.67 kg hectare^{-1}) were observed under treatment T_1 **(**100% RDF 40:40:20 kg./ha. N: P: K + Rhizobium 1.5 kg./ha. + PSB 5 kg./ha**),** whereas, minimum was recorded under T_4 (25% RDF + 75% FYM + Rhizobium 1.5 kg./ha. + PSB 5 kg./ha.).

Keywords: Horticulture, integrated nutrients management, Biofertilizers, Fenugreek, Productivity, Profitability

1. Introduction
India, 'The land of spices' is the world's largest producer, consumer and exporter of spices. Fenugreek (*Trigonella foenum-graecum* L.) locally known as 'methi' belonging to the family-Leguminosae and Sub family-Papilionacea is widely used as spice and condiment to add flavour in various to a variety of cuisines. Fenugreek is a multipurpose spice crop, every part of the plant is being used as leafy vegetable, medicine, fodder and condiment (Khiriya *et al.*, 2003) [8]. Fenugreek seeds are known to lower the blood glucose and blood cholesterol levels because they have large amounts of soluble fiber in them. Recent studies in England indicate that fenugreek seeds contain substantial amounts of steroidal substance 'diosgenin' which is used as a starting material in the synthesis of sex hormones and as oral contraceptives, the biological and pharmacological actions of fenugreek are attributed to the variety of its constituents, *viz.*, steroids, nitrogen compounds, polyphenolic substances, volatile constituents and amino acids etc. (Mehrafarin *et al.*, 2010) [10].
Fenugreek is mainly grown in India, Pakistan, China, Nepal and Bangladesh. In India, it is commercially grown in Rajasthan, Gujarat, Madhya Pradesh, Haryana, West Bengal, Punjab and Maharashtra. Rajasthan occupies 80% of area and production (Babaleshwar and Shetty, 2017) [3]. In Chhattisgarh, Fenugreek is grown for seed purpose with an area of 2544.00 ha, production of 10633.00 metric tonnes. In Rajnandgoan, Fenugreek is grown for seed purpose with an area of 120 ha. with production of 285 MT. (Anonymous 2020) [1-2]
The grain yield and quality of fenugreek seed are known to be influenced by different factors such as nutrition, cultural practices etc. Among these, nutrition plays an important role and which has great influence on vegetative growth as well as grain yield (Sharma *et al.*, 2006). However, fertilizer application generally remained much below as compared to its removal. This gap can be attained by application of both organic and inorganic form of fertilizers through integrated nutrient management, is more efficient than application of chemical fertilizers alone. The concept of integrated nutrient management was proved to be successful in many horticultural crops, which reduces the cost of cultivation, improves the soil health and reduces chemical residues (Jain and Choudary, 2006) [6].

2. Materials and Methods
The research was conducted at the Horticultural Research cum Instructional farm Bharregaon, Pt. K.L.S. College of Horticulture and Research Station, Pendri, Rajnandgaon, I.G.K.V.

Raipur, (CG.), during the year 2020-2021. The region is located at around latitude 21.10° N and 81.03° E longitude, with a standard altitude of 307 m above mean sea level. The soil of experimental site was sandy loam in texture with pH 7.2 E.C. of 0.25 dSm^{-1} and organic carbon of 0.64 percent. The available nitrogen, phosphorus and potassium contents were 150, 13.88 and 204.96 kg/ha.

The experiment was laid out in Randomized Block Design with three replication and eight treatments. Seeds were sown on November 10, 2020 at the of 20 ×10cm spacing. Furrows were properly covered with a thin layer of soil and the plots irrigated lightly.

Eight treatment comprising of T_1 (100% RDF 40:40:20 kg./ha. N: P: K + Rhizobium 1.5 kg./ha. + PSB 5 kg./ha), T_2 (75% RDF + 25% FYM + Rhizobium 1.5 kg./ha. + PSB 5 kg./ ha.), T_3 (50% RDF + 50% FYM + Rhizobium 1.5 kg./ha. + PSB 5 kg./ ha.), T_4 (25% RDF + 75% FYM + Rhizobium 1.5 kg./ha. + PSB 5 kg./ ha.), T_5 (75% RDF + 25% VC + Rhizobium 1.5 kg./ha. + PSB 5 kg./ ha.), T_6 (50% RDF + 50% VC + Rhizobium 1.5 kg./ha. + PSB 5kg./ ha.), T_7 (25% RDF + 75% VC + Rhizobium 1.5 kg./ha. + PSB 5 kg./ ha.), T_8 (CONTROL (100% RDF 40:40:20 Kg./ha. N:P:K)).

Farm Yard Manure (FYM) and Vermicompost (VC) was applied to soil at the time of land preparation. Under inorganic fertilizer treatments (25%, 50%, 75% and 100% Recommended Dose of Fertilizers (RDF)) nitrogen, phosphorus and potassium nutrients were applied in the form of urea, Di-amonium phosphate and murate of potash, respectively. Half dose of nitrogen and full dose of phosphorous and potassium was supplied as basal dose at the time of sowing. The remaining 50% of nitrogen was given as top dressing at 30 days after sowing. Biofertilizers, *viz.*, *Rhizobium meloloti* and phosphate solubilizing bacteria (PSB) *Bacillus megatherium.* The Rhizobium culture @ 1.5 kg. Inoculants mixed in sugar syrup and applied to the fenugreek seed (22 kg/ha) by slurry method. PSB @ 5 kg/ha was inoculated with the respective organic manures and thoroughly incorporated in to soil one week before sowing of the crop. The data were recorded on growth traits *viz.*, plant height, plant spreading, number of primary branch $plamt^{-1}$, number of secondary branches $plant^{-1}$, fresh weight and dry weight of the plant, days to 50% flowering, days to first pod formation, days to 50% pod formation and yield traits *viz.*, number of pod $plant^{-1}$, length of pod (cm), at harvest time, number of seed pod^{-1}, weight of seed pod^{-1}, seed yield $plot^{-1}$, seed yield $hectare^{-1}$.

3 Results and Discussion

3.2 yield parameters

The highest yield attributes *viz.*, number of pod $plant^{-1}$ (37.67), number of seed pod^{-1} (19.23), weight of seed (0.21 g pod^{-1}), seed yield (1.1 g $plot^{-1}$) and seed yield (1096.67 kg $hectare^{-1}$) were observed under treatment T_1 (100% RDF 40:40:20 kg./ha. N: P: K + Rhizobium 1.5 kg./ha. + PSB 5 kg./ha), which is at par with the treatment T_2 (75% RDF + 25% FYM + Rhizobium 1.5 kg./ha. + PSB 5 kg./ ha.) and T_8 (CONTROL (100% RDF 40:40:20 Kg./ha. N:P:K)).

The higher number of pods $plant^{-1}$ in the nutrient combination due to optimum dosage of organic and inorganic combinations could be attributed to increase the available nitrogen in the soil throughout the life cycle of crop. The increased and balanced supply of nitrogen to plant promotes synthesis of more carbohydrates resulted in more flowering, fruiting and partitioning of food material and subsequent distribution from source to sink. The organic manures and bio-fertilizers increase the soil microbial activity, improve the availability of phosphorous and in turn plays unique role in energy conversion and transfer, helpful in flowering, increased the number of pods each plant and increased number of seeds in each pod. Similar results was reported by Khiriya *et al.* (2003) [8] and Choudhary *et al.* (2011) [5] Karma Chewang Bhutia *et al.* (2017) [7] in fenugreek.

Further, the yield increase due to cumulative effect of more number of seeds pod^{-1} and maximum weight of seed through increased nutrient uptake by plant might have stimulated the rate of various physiological processes like growth and assimilation by the balanced application of organic and inorganic nutrients along with bio-fertilizers (Rhizobium + PSB) presented in table 2. Similar results were reported by Karma Chewang Bhutia *et al.* (2017) [7] in fenugreek.

Table 1: Effect of different treatments on yield parameter of fenugreek

Tr. no.	Treatment details	Number of pod $plant^{-1}$	Number of seed pod^{-1}	Weight of seed pod^{-1} (g)	Seed yield $plot^{-1}$ (kg.)	Seed yield $hectare^{-1}$ (kg.)
T_1	100% RDF 40:40:20 kg./ha. N:P:K + Rhizobium 1.5 kg./ha. + PSB 5kg./ha.	37.67	19.23	0.21	1.10	1096.67
T_2	75% RDF + 25% FYM + Rhizobium 1.5 kg./ha. + PSB 5kg./ha.	34.33	19.18	0.20	0.87	873.33
T_3	50% RDF + 50% FYM + Rhizobium 1.5 kg./ha. + PSB 5kg./ ha.	29.33	15.27	0.16	0.72	723.33
T_4	25% RDF + 75% FYM + Rhizobium 1.5 kg./ha. + PSB 5kg./ ha.	24.00	12.31	0.14	0.53	526.67
T_5	75% RDF + 25% VC + Rhizobium 1.5 kg./ha. + PSB 5kg./ ha.	30.00	18.00	0.18	0.82	820.00
T_6	50% RDF + 50% VC + Rhizobium 1.5 kg./ha. + PSB 5kg./ ha.	27.67	15.00	0.16	0.67	666.67
T_7	25% RDF + 75% VC + Rhizobium 1.5 kg./ha. + PSB 5kg./ ha.	24.67	13.82	0.15	0.63	626.67
T_8	CONTROL (100% RDF 40:40:20 Kg./ha. N:P:K)	33.00	18.38	0.19	0.85	853.33
	SEm (±)	2.61	1.27	0.01	0.06	55.95
	CD (5%) =	8.01	3.88	0.03	0.17	171.34
	CV (%) =	15.05	13.39	9.00	12.53	12.53

4. Conclusion

On the basis of present investigation, it may be concluded that the treatment T_1 (100% RDF 40:40:20 kg./ha. (N:P:K) + Rhizobium 1.5 kg./ha. + PSB 5 kg./ha.) was best at all the stage of growth parameters *viz.*, plant height, plant spreading, number of primary branch $plant^{-1}$, number of secondary branches $plant^{-1}$, dry weight, and yield traits *viz.*, number of pod $plant^{-1}$, number of seed pod^{-1}, weight of seed pod^{-1}, seed yield $plot^{-1}$, seed yield $hectare^{-1}$ showed better performance from other treatment of organic, inorganic and biofertilizers application.

5. References

1. Anonymous. Area, Production & Productivity of Horticulture Crops In Chhattisgarh, Horticulture and Farm Forestry Nava Raipur, Atal Nagar, Chhattisgarh,

2019-20
2. Anonymous. National Research Centre on Seed Spices database, 2019-20. www.nrcss.res.in.
3. Babaleshwar SB, Shetty GR, Shivakumar SJ, Nadukeri S. Influence of integrated nutrient management on growth and physiological attributes of kasuri methi (*Trigonella corniculata* L.) under hill zone of Karnataka. Environment & Ecology 2017;35(2):661-665.
4. Bhunia SR, Chauha RPS, Yadav BS, Bhati AS. Effect of phosphorous, Irrigation and Rhizobium on productivity, water use and nutrient uptake in fenugreek (*Trigonella foenum-graecum* L.). Indian Journal of Agronomy 2006;51:239-241.
5. Choudhary BR, Gupta AK, Parihar CM, Jat SL, Singh DK. Effect of integrated nutrient management on fenugreek (*Trigonella foenum-graecum*) and its residual effect on fodder pearl millet (*Pennisetum glaucum*). Indian Journal of Agronomy 2011;56(3):189-195.
6. Jain NK, Choudhary GR. Integrated nutrient management in fenugreek (*Trigonella foenum-graecum*). Indian Journal of Agronomy 2006;51(4):331-333.
7. Karma Chewang Bhutia. Growth, Phenology and Yield of Fenugreek (*Trigonella foenum-graecum* L.) as Influenced by Date of Sowing. Int. J Curr. Microbiol. App. Sci 2017;6(10):1810-1817.
8. Khiriya KD, Sheoran RS, Singh BP. Growth analysis of fenugreek under various levels of farmyard manure and phosphorus. J Spices Aromatic Crops 2003;10:105-10.
9. Meena DD, Thomas T, Rao PS. Effect of different levels of NPK, Rhizobium and FYM on soil properties, growth and yield of cowpea (*Vigna unguiculata* L.) var. Pusa Barsati. International Journal of Chemical Studies 2018;6(3):2117-2119.
10. Mehrafarin A, Qaderi A, Rezazadeh SH, Naghdi Badi H, Noormohammadi GH, Zand E. Bioengineering of Important Secondary Metabolites and Metabolic Pathways in Fenugreek (*Trigonella foenumgraecum* L.). Journal of Medicinal Plants 2010;9(35):1-18.
11. Mehta RS, Anwer MM, Aishwath OP, Meena RS. Growth, yield and quality of fenugreek (*Trigonella foenum-graecum* L.) as influenced by nitrogen, phosphorus and bio-fertilizers. Indian Journal of Horticulture 2012;69(1):94-97.
12. Raiyani VN, Kathiriya RK, Thummer VM, Rupareliya VV. Effect of FYM and biofertilizers on growth, yield attributes and yield of fenugreek (*Trigonella foenum-graecum* L). International Journal of Chemical Studies, 2018;6(4):746-748.
13. Sharma DK, Dashora LK, Sen LN. Influence of phosphorus rich organic manure (PROM), PSB and Rhizobium inoculation on growth and yield of fenugreek (*Trigonella foenum-graecum* L.) cv. Rmt-1. The Orissa J Hort 2006;34(1):52-58.