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Studies on the effect of integrated nutrient management on seed yield of coriander (*Coriandrum sativum* L.) cultivars under Southern Telangana

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Abstract
The present investigation entitled "Studies on the effect of integrated nutrient management on seed yield of coriander (*Coriandrum sativum* L.) cultivars under Southern Telangana" was carried out during the *rabi* season of the year 2021-2022 at College of Horticulture, Rajendranagar, Hyderabad, SKLTSHU. The field experiment was laid out in a factorial randomized block design with 8 treatment combinations, and 3 replications. The factors consists of four integrated nutrient management levels, N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}), N2 75% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5kg ha^{-1}), N3 50% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}), N4 100% RDF + FYM (10 t ha^{-1}) (Control), with two varieties V1- Sudha and V2- Susthira. The results revealed that, Among the treatments, 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}) with the variety Susthira recorded significantly maximum number of days taken to harvest, number of seeds per umbel, test weight (1000 seed), seed yield per plant, seed yield per plot, seed yield per hectare.

Keywords: Coriander, *Azospirillum*, PSB, KSB, RDF, FYM, Sudha and Susthira

Introduction
Coriander (*Coriandrum sativum* L.) is an important seed spice crop and commonly known as dhania. It originates from the Mediterranean region and is a member of Apiaceae (Umbelliferae) family with a chromosome number 2n=22 and it is an annual herbaceous cross pollinated crop. It is derived from Greek word "koris" means bed bug, which is unpleasant odour of the green unripened fruits (Pujari *et al*., 2019) [11]. Coriander is widely grown in India and other country is the largest producer, consumer and exporter of coriander in the world. Rajasthan, Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Madhya Pradesh, Bihar, Uttar Pradesh and Telangana are the principal coriander growing states in India. (Diwan *et al*., 2018) [4].

Nationally coriander is cultivated in an area of 6.4 lakh ha with a production of 8.1 lakh MT. whereas in Telangana area and production are 11,000 ha and 940 MT (National Horticulture Board, 2021) [7].

It has been discovered that long-term, continuous usage of chemical fertilizers damages the ecological equilibrium. It not only reduces the crop's quality attributes but also gives farmers low market prices. In recent years, the excess use of fertilizers and other chemicals, the natural fertility of soil has been lost, there by poisoning the soil, water and food. The chemical usage is harming the soil sustainability and decreasing its potency. Integrated nutrient management including compost, vermicompost and use of biofertilizers either in alone or in combination of chemical fertilizers not only help to curtail chemical load in the soil, but also improves soil physical conditions and augments microbial activities in the soil and thereby enhances sustainable yield potential (Gamar *et al*., 2018) [5].

Among the most significant and affordable sources of nutrients in the integrated nutrient management are biofertilizers. When applied to the seed, root, or soil, biofertilizers help in nitrogen fixation, increase nutrient availability, and support the development of microflora. Enhanced nutrient availability by the combination of organic manures and nitrogen fixing biofertilizers and phosphate solubilizing bacteria (Babaleshwar *et al*., 2017) [2].

The application of farm yard manure to soil, has supplied available nutrients status to the plants and created a favourable soil environment, which in turn increased the soil ability to

hold nutrients and water for longer period and improved the plant development and yield attributes (Nayak *et al*., 2013) [8].

Material and Methods

The experiment was carried out at College of Horticulture, Rajendranagar, Sri Konda Laxman Telangana State Horticultural university, Hyderabad, Telangana, during rabi season of 2021- 2022. The experiment was laid out in factorial randomized block design with eight treatment combinations, replicated thrice. The treatments include four integrated nutrient management levels N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}), N2 75% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5kg ha^{-1}), N3 50% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}), N4 100% RDF + FYM (10 t ha^{-1}) (Control), with two varieties V1- Sudha and V2- Susthira. Seeds were sown in the plot of 2m x 2m at spacing of 30 cm x 10 cm.

The recommended doses of N, P and K @ 40: 100: 25 kg ha^{-1} were applied in the form of urea, single super phosphate and muriate of potash, respectively. Urea was applied in the two splits, the first as basal application and the rest half was applied at 30 days after sowing. The entire dose of single super phosphate and muriate of potash were applied at the time of sowing as basal dose. The Farmyard Manure were incorporated into respective plots before sowing of seed and then slightly covered with the fine soil. *Azospirillum*, Phosphorous Solubilising Bacteria and Potassium Solubilising Bacteria were applied into the soil before sowing.

Results and Discussion Yield parameters

Yield parameters such as number of days taken to harvest, number of seeds per umbel, test weight (1000 seed), seed yield per plant, seed yield per plot, seed yield per hectare showed a significant difference between integrated nutrient management levels and varieties.

Among the treatment combinations, N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}) with the variety V2- Susthira recorded significantly minimum number of days taken to harvest (88.79 days), maximum number of seeds per umbel (36.38), test weight (1000 seed) (14.83 g).

Similarly, maximum seed yield per plant (5.25 g), seed yield per plot (630.00 g) and seed yield per hectare (1575.00 kg) was significantly recorded in the same treatment combination.

The least number of days taken to harvest was found in the treatment N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}), which might be due to the minimum number of days taken to flowering recorded in same treatment compared to others.

The more number of seeds per umbel was registered in N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}) which was due to the maximum number of umbels per plant and more number of umbellate per umbel. The present investigation was in consistent with other reports of Kusuma *et al*., (2019) [6] in fennel, reported that the increased plant growth provided greater sites for photosynthesis and diversion of photosynthates towards sink (umbel to seed). These findings are agreement with that of Singh (2014) [12] in coriander.

The highest test weight (1000 seed) was registered in N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}). This could be due to more number of seeds per umbel recorded in same treatment. Which might be due to the availability of balanced essential nutrients throughout the life cycle of crop resulting in better nourishment of plants and the formation of bold grains, ultimately increased the test weight (Sahu *et al*., 2014) [13] in coriander. Similar results were observed by Choudhary *et al*., (2011) [3] in fenugreek.

The maximum seed yield per plant was registered in N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}) might be due to more number of umbels per plant, umbellate per umbel, seeds per umbel and maximum test weight (1000 seed) compared to other treatments. Results accordance with that of Nisarata *et al*., (2020) [9] in coriander, which stated that due to *Azospirillum*, PSB and KSB were responsible for improvement of physical, chemical and biological properties of the soil. It enhances the availability and uptake of essential nutrients which consequently increase the number of seeds per plant. The results are in close conformity with the findings of Aishwath *et al*., (2012) [1], Singh (2014) [12], Patidar *et al*., (2016) [10] in coriander.

The highest seed yield per plot was recorded in N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}) which was due to the same treatment registered higher seed yield per plant than other treatments.

The highest seed yield per hectare was registered in N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}) which was due to same treatment recorded maximum seed yield per plant and seed yield per plot compared to other treatments. The results are in accordance with that of Kusuma *et al*., (2019) [6] in fennel, who reported that increased yield due to practicing of integrated nutrient management improved the soil nutrient status and stimulated plant physiological processes that lead to an increased yield attributing characteristics and their combined effect resulted in enhanced seed yield. The result of present finding agrees with the reports of Singh (2014) [12] in coriander.

Table 1: Effect of integrated nutrient management on number of days taken to harvest (days) and number of seeds per umbel in coriander cultivars

Treatments / INM levels (N)	Number of days taken to harvest (days)			Number of seeds per umbel		
	Varieties (V)					
	V1	V2	Mean	V1	V2	Mean
N1	91.63b	88.79a	90.21a	32.66b	36.38a	34.52a
N2	97.02d	92.13c	94.58b	29.15d	32.09c	30.62b
N3	102.24g	101.92fg	102.08d	23.69h	24.12g	23.91d
N4	100.67ef	98.06e	99.37c	26.75f	28.55e	27.65c
Mean	97.89b	95.23a		28.06b	30.29a	
	SEm ±	CD at 5%		SEm ±	CD at 5%	

INM (N)	0.50	1.52		0.37	1.12	
Varieties (V)	0.35	1.07		0.26	0.8	
(N X V)	0.71	2.15		0.52	1.59	

Table 2: Effect of integrated nutrient management on test weight (1000 seed) (g) and seed yield per plant (g) in coriander cultivars

Treatments / INM	Test weight (1000 seed) (g)			Seed yield per plant (g)		
	V1	V2	Mean	V1	V2	Mean
N1	13.91b	14.83a	14.37a	4.19b	5.25a	4.72a
N2	13.02d	13.37c	13.20b	3.75d	4.11c	3.93b
N3	10.69h	11.53g	11.11d	3.06h	3.26g	3.16d
N4	11.70f	12.62e	12.16c	3.22f	3.60e	3.41c
Mean	12.33b	13.09a		3.55b	4.06a	
SEm ±		CD at 5%		SEm ±	CD at 5%	
INM (N)	0.20	0.61		0.05	0.16	
Varieties (V)	0.14	0.43		0.04	0.11	
(N X V)	0.29	0.87		0.08	0.23	

Table 3: Effect of integrated nutrient management on seed yield per plot (g) and seed yield per hectare (kg) in coriander cultivars

Treatments / INM levels (N)	Seed yield per plot (g)			Seed yield per hectare (kg)		
	Varieties (V)					
	V1	V2	Mean	V1	V2	Mean
N1	502.40b	630.00a	566.20a	1256.00b	1575.00a	1415.50a
N2	450.40d	492.80c	471.60b	1126.00d	1232.00c	1179.00b
N3	366.80h	391.60g	379.20d	917.00h	979.00g	948.00d
N4	386.40f	432.40e	409.40c	966.00f	1081.00e	1023.50c
Mean	426.50b	486.70a		1066.25b	1216.75a	
	SEm ±	CD at 5%		SEm ±	CD at 5%	
INM (N)	6.41	19.44		16.03	48.61	
Varieties (V)	4.53	13.75		11.33	34.37	
(N X V)	9.07	27.50		22.66	68.75	

Conclusion

In the present study the treatment combination N1 100% RDF + FYM (10 t ha^{-1}) + *Azospirillum* (5 kg ha^{-1}) + PSB (5 kg ha^{-1}) + KSB (5 kg ha^{-1}) with the variety V2- Susthira proved to be best treatment for seed yield of coriander cultivars under southern Telangana.

References

1. Aishwath OP, Lal G, Kant K, Sharma YK, Ali SF, Naimuddin. Influence of biofertilizers on growth and yield of coriander (*Coriandrum sativum* L.) under Typic Haplustepts. International Journal of Seed Spices. 2012;2(2):9-14
2. Babaleshwar SB, Shetty GR, Shivakumar HJ, 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.
3. 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 pearlmillet (*Pennisetum glaucum*). Indian J Agronomy. 2011;59(3):189-195.
4. Diwan G, Bisen BP, Maida P. Effect of nitrogen doses and row spacing on growth and seed yield of coriander (*Coriandrum sativum* L.). International Journal of Chemical Studies. 2018;6(4):2768-2772.
5. Gamar PB, Mevada KD, Ombase KC, Dodiya CJ. Response of drilled Rabi fennel (*Foeniculum vulgare* Mill.) to integrated nutrient management practices. International Journal of Agriculture Sciences. 2018;10(2):4995-4998.
6. Kusuma MV, Venkatesha J, Ganghadarappa PM, Hiremath JS, Mastiholi AB, Manjunatha G. Effect of integrated nutrient management on growth and yield of fennel (*Foeniculum vulgare* Mill.). International Journal of Current Microbiology and Applied Sciences. 2019;8(1):2782-2794.
7. National Horticulture board. National Horticulture Database. Ministry of Agriculture and Farmers Welfare, Government of India, Guargon, India; c2021.
8. Nayak BR, Samanta PK, Dash AK. Growth and yield of coriander (*Coriandrum sativum* L.) as influenced by different levels of farm yard manure, nitrogen and plant spacings. An Asian Journal of Soil Science. 2013;8(2):198-201.
9. Nisarata NV, Patel KM, Muniya SS, Chaudhari GI, Chauhan ZY. Influence of organic and inorganic sources of nutrients on growth and yield of coriander (*Coriandrum sativum* L.). International Journal of Current Microbiology and Applied Sciences. 2020, ISSN: 2319-7706.
10. Patidar L, Ranjan JK, Singh B, Mishra BK, Aiswath OP, Kant K, *et al*. Influence of integrated supply of AM, PSB, Azotobacter and inorganic fertilizer on growth, yield and quality in coriander (*Coriandrum sativum* L.) and micro-flora population in the soil. Indian Journal of Agricultural Sciences. 2016;86(9):40-44
11. Pujari R, Sunanda BB, Kurubar AR, Narayan Jayaprakash, Chetan T, Kale Sathish. Collection and evaluation of coriander varieties for growth and seed purpose in UKP command area. International Journal of Current Microbiology and Applied Sciences. 2019;8(6):3125-3130.
12. Singh SP. Effect of bio-fertilizer *Azospirillum* on growth and yield parameters of coriander (*Coriandrum sativum*

L.) cv. Pant Haritima. International Journal Seed Spices. 2014;4(2):73-76.
13. Sahu RL, Sahu H, Kumar S. Effect of application of inorganic fertilizers and biofertilizers on growth components and yield traits of coriander (*Coriandrum sativum* L.). Progressive Horticulture. 2014;46(1):102-106.