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**Srishti Singh Parihar**  
Department of Vegetable  
Science, Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India

**Neeraj Shukla**  
Department of Vegetable  
Science, Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India

**Rajeshwari Sahu**  
Department of Vegetable  
Science, Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India

**Karuna Sahu**  
Department of Vegetable  
Science, Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India

**Corresponding Author:**  
**Srishti Singh Parihar**  
Department of Vegetable  
Science, Indira Gandhi Krishi  
Vishwavidyalaya, Raipur,  
Chhattisgarh, India

## Effect of integrated nutrient management on yield and yield attributing characters in coriander (*Coriandrum sativum* L.) var. Pant Haritima

Srishti Singh Parihar, Neeraj Shukla, Rajeshwari Sahu and Karuna Sahu

### Abstract

In India, the herb is referred to as “dhania” to distinguish the leaves from the coriander seeds. The present investigation entitled “Effect of integrated nutrient management on yield and yield attributing characters in coriander (*Coriandrum sativum* L.) var. Pant Haritima” was conducted during *Rabi* season 2020-2021 at Krishi Vigyan Kendra farm Newari, Kawardha under Indira Gandhi Krishi Vishwavidyalaya, Raipur, and Chhattisgarh. The results of the present study showed that the yield and yield attributing characters such as number of umbels per plant (47.88), number of umbellate per umbel (7.03), number of seeds per umbel (51.21), test weight of seed (12.63 g), seed weight per plant (10.27 g), seed yield per plot (2.11 kg) and seed yield per ha (23.00 q) were observed maximum under the application of 30:20:15 kg NPK/ha + VC @ 1.5 t/ha.

**Keywords:** *Coriandrum sativum* L, umbel, umbellate, integrated nutrient management, seed yield

### Introduction

Coriander (*Coriandrum sativum* L.) belongs to the family Apiaceae, having chromosome number  $2n = 22$  is a well known spice crop and cultivated all over India known as Dhania. It has very unique aroma in leaves and seeds. Coriander is little bushy spice plant and seeds are round and tannish brown coloured. Coriander is categorized into two groups, leafy and seed type. The larger types of seed are less aromatic and have even less oil content than the smaller types of seed. In chutney, soups and salads, tender shoots and leaves are used because of their good fragrance. Other than a condiment, coriander additionally has therapeutic qualities. It is said that the dry seeds have carminative, diuretic, stomach and aphrodisiac properties. Coriander leaves are rich in Vitamin C, Vitamin K and Protein. Coriander seeds produce 0.2 to 1.2 percent essential oils upon steam distillation. Coriander essential oil contains majorly Linalool (67.7 percent) followed by 1-pinene (10.5 percent) and 1-terpinin (9.0 percent), geranyl acetate (4.0 percent) and geraniolol (1.9 percent) while the minor components are 1-pinene, camphene, limonene, p-cymol, dipentene, 1-terpinene, and acetic acid esters. It helps improve skin problems and reducing cough, blood pressure, diarrhea and blood cholesterol levels.

Coriander yields depend on the soil fertility and moisture. Depending on the climatic conditions and soil types, Coriander also gives response of application of manures and fertilizers in various ways. Nitrogen, phosphorus and potassium uniquely impact the development of plants. Other major nutrients are calcium, magnesium and sulfur have been found to impact on the development and yield of coriander.

Integrated nutrient management is very important for the effective utilization of nutrient resources and for the long-term conservation of soil fertility. The combination of organic and inorganic sources of plant nutrients and bio-fertilizers will increase the sustainable production of coriander, along with the quality of the soil and the environment. (Aishwath *et al.*,<sup>[1]</sup>. Recently research is focusing on the effect of integrated nutrient management on growth and yield of coriander.

### Materials and Methods

The field investigation was conducted during *Rabi* season 2020-21 at Krishi Vigyan Kendra farm Newari, Kawardha under Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. The Kawardha has the tropical climate. It comes under the CG Plains agro-climatic zone. It is located at North latitude of 22.32° to 22.28° and 80.48° to 81.25° East longitude and an altitude of 353 meters above mean sea level (MSL). The soil of experimental field is clayey in texture, with soil pH 7.88, low in availability of nitrogen (277.5 kg/ha), medium in Phosphorus (10.72

kg/ha) and high in potassium status (595.9 kg/ha). The experiment was conducted in a RBD with 10 treatments and replicated thrice. The net plot size was 3.6 m<sup>2</sup> (2 m × 1.8m).

The experimental data was analyzed statistically by the method of analysis of variance as out lined by (Panse and Sukhatme [6].

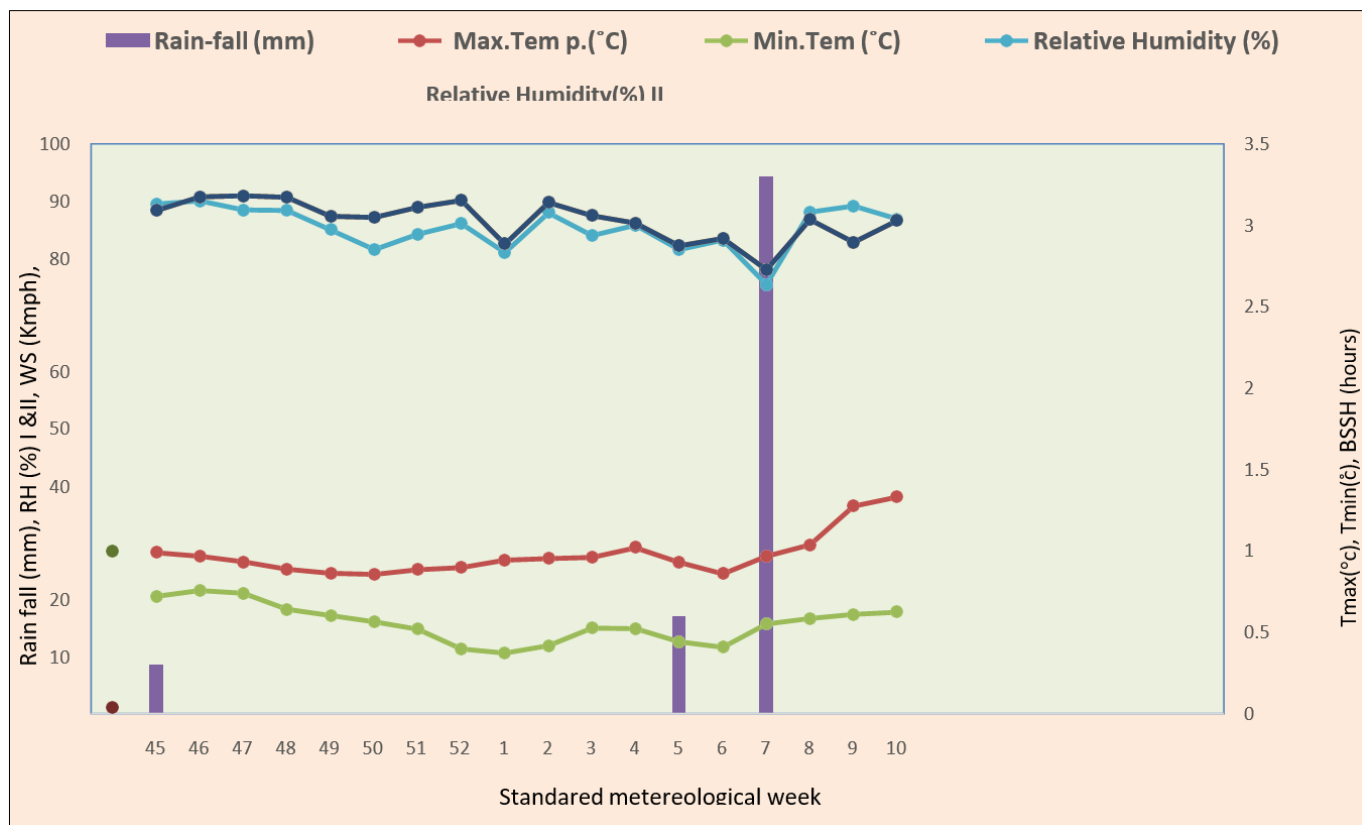


Fig 1: Weekly meteorological parameters during crop growth period

Table 1: Treatment Details

S. No.	Treatment no.	Description
1	T <sub>1</sub>	Absolute control
2	T <sub>2</sub>	100% RDF(60:40:30 kg NPK /ha)
3	T <sub>3</sub>	VC @ 3 t/ha
4	T <sub>4</sub>	FYM@ 10 t/ha
5	T <sub>5</sub>	(30:20:15 kg NPK/ha) + VC @ 1.5 t/ha
6	T <sub>6</sub>	(30:20:15 kg NPK/ha) + FYM @ 5 t/ha
7	T <sub>7</sub>	VC @ 1.5 t/ha + FYM @ 5 t/ha
8	T <sub>8</sub>	(60:40:30 kg NPK/ha) + Azotobacter + PSB
9	T <sub>9</sub>	VC @ 3 t/ha + Azotobacter + PSB
10	T <sub>10</sub>	FYM @ 10 t/ha + Azotobacter + PSB

- RDF- Recommended dose of fertilizers.
- VC- Vermi compost.
- FYM- Farm yard manure.
- PSB- Phosphate solubilizing bacteria (5 gm/kg seed as seed inoculation + 5 kg/ha as soil application).
- Azotobacter- (5 gm/kg seed as seed inoculation + 5 kg/ha as soil application).

**Results and Discussion**

The data on yield and yield attributing parameters were presented in Table 2 and Table 3. The maximum number of umbels per plant (47.88) was recorded under T<sub>5</sub> (30:20:15 kg NPK/ha + VC @ 1.5 t/ha) followed by treatment T<sub>6</sub> (30:20:15 kg NPK/ha + FYM @ 5 t/ha) (43.49), while minimum number of umbels per plant (30.22) was recorded under T<sub>1</sub> (absolute control). The maximum number of umbels per plant may be due to production of more branches resulted good

growth of plants. The results of the present investigation are in agreement by Godara *et al.* [3] and Dadiga *et al.* [2] in coriander.

The maximum number of umbelletes per umbels (7.03) was recorded under T<sub>5</sub> (30:20:15 kg NPK/ha + VC@ 1.5 t/ha) followed by treatment T<sub>6</sub> (30:20:15 kg NPK/ha + FYM @ 5 t/ha) (6.68) while minimum number of umbelletes per umbel (5.56) was recorded under T<sub>1</sub> (absolute control). This may be attributed due to better growth and nutrient availability resulting in more number of umbels per plant which leads to more number of seeds per plant and higher test weight of seed which ultimately gave maximum seed yield per plant. The influence of fertilizers with N, P, K and Vermicompost was more pronounced than individual type of fertilizer. The results of the present investigation are in agreement by Godara *et al.* [3] and Dadiga *et al.* [2] in coriander.

The maximum number of seeds per umbel (51.21) was recorded under T<sub>5</sub> (30:20:15 kg NPK/ha + VC @ 1.5 t/ha) followed by treatment T<sub>6</sub> (30:20:15 kg NPK/ha + FYM @ 5 t/ha), T<sub>8</sub> (60:40:30 kg NPK/ha + Azotobacter + PSB), T<sub>7</sub> (VC @ 1.5 t/ha + FYM @ 5 t/ha) and T<sub>2</sub> 100% RDF (60:40:30 kg NPK/ha) which were at par with each other. The minimum number of seeds per umbel was recorded under T<sub>1</sub> (absolute control). Finding indicated that all the experiment have the inorganic fertilizers alone or with organic fertilizer were recorded more number of seeds per umbel and it may be due to quick response of NPK from inorganic form resulted better performance of crop. Whereas combinations with organic fertilizers which slow release the nutrient maintain the status of soil. These findings are quite similar findings to that of present findings were reported by Dadiga *et al.* [2] in coriander.

The maximum seed weight per plant (10.27 g) was recorded under T<sub>5</sub> (30:20:15 kg NPK/ha + VC @ 1.5 t/ha) which was at par with all the tested treatments except T<sub>1</sub> (absolute control), while minimum seed weight per plant was recorded under T<sub>1</sub> (absolute control). Dadiga *et al.* [2] also reported higher seed

weight per plant in coriander which might due to higher number of branches and umbels per plant.

The maximum test weight of 1000 seeds (12.63 g) was recorded under T<sub>5</sub> (30:20:15 kg NPK/ha + VC @ 1.5 t/ha) followed by treatment T<sub>6</sub> (30:20:15 kg NPK/ha + FYM @ 5t/ha), while minimum test weight of 1000 seeds was recorded under T<sub>1</sub> (absolute control). These findings are quite similar findings to that of present findings were reported by Dadiga *et al.* [2] in coriander. An increase in the test weight of 1000 seeds might be due to increased supply of major plant nutrients.

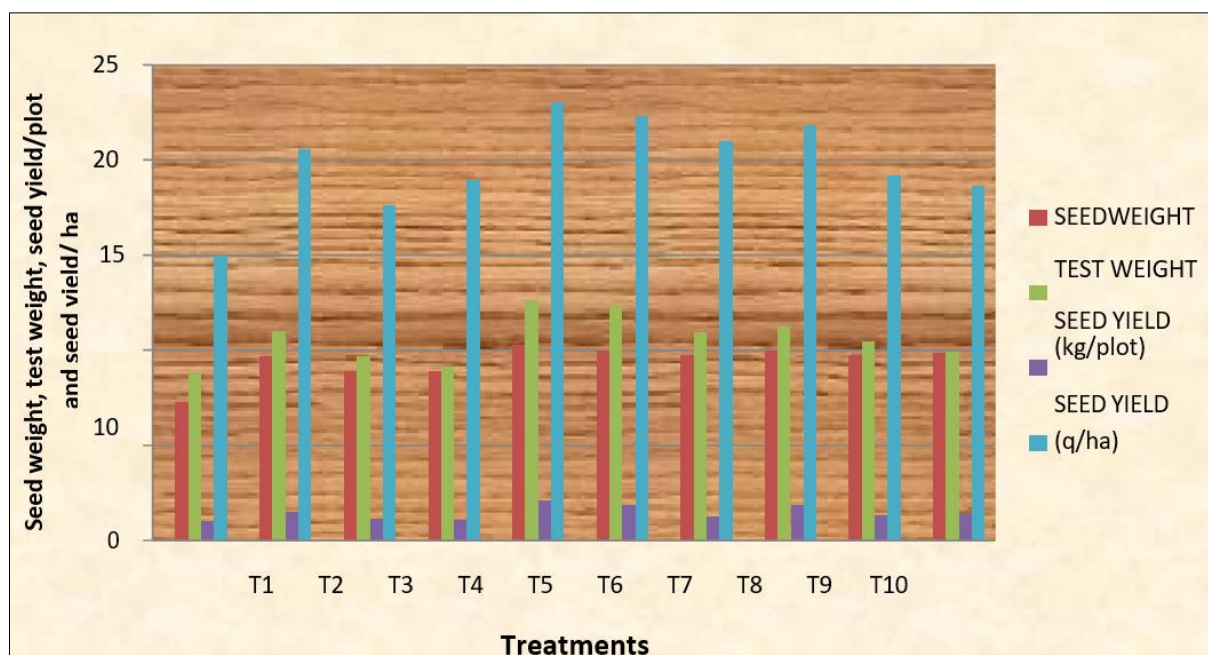
The maximum seed yield per hectare (23.00 q) was recorded under T<sub>5</sub> (30:20:15 kg NPK/ha + VC @ 1.5 t/ha) which was at par with all the tested treatments except T<sub>1</sub> (absolute control) and T<sub>3</sub> (VC @ 3 t/ha), while lowest seed yield per hectare was recorded under T<sub>1</sub> (absolute control). The possible reasons that appear to be responsible for higher seed yield may be due to the higher nutrient availability, which has resulted in production of more seed yield. Impact of vermicompost application on yield of coriander is also supported by previous findings obtained by Godara *et al.* [3] and Dadiga *et al.* [2].

**Table 2:** Effect of various treatments on no. of umbels, no. of umbelletes and no. of seeds

Treatments	No. of umbels	No. of umbelletes	No. of seeds
T <sub>1</sub> Absolute Control	30.22	5.56	34.51
T <sub>2</sub> 100% RDF (60:40:30 kg NPK/ha)	39.88	6.53	44.61
T <sub>3</sub> VC @ 3 t/ha	32.05	5.63	36.48
T <sub>4</sub> FYM @ 10 t/ha	32.44	6.03	36.28
T <sub>5</sub> (30:20:15 kg NPK/ha) + VC @ 1.5 t/ha	47.88	7.03	51.21
T <sub>6</sub> (30:20:15 kg NPK/ha) + FYM @ 5 t/ha	43.49	6.68	50.96
T <sub>7</sub> VC @ 1.5 t/ha + FYM @ 5 t/ha	39.16	6.11	46.26
T <sub>8</sub> (60:40:30 kg NPK/ha) + Azotobacter + PSB	40.47	6.66	47.95
T <sub>9</sub> VC @ 3 t/ha + Azotobacter + PSB	34.16	6.27	42.19
T <sub>10</sub> FYM @ 10 t/ha + Azotobacter + PSB	34.27	6.15	38.41
C.D.	5.77	0.88	7.21
SE(m)	1.92	0.29	2.41
SE(d)	2.72	0.41	3.40
C.V.	8.93	8.17	9.73

**Table 3:** Effect of various treatments on seed weight of plant, test weight, and seed yield (q/ha)

Treatments	Seed weight (gm)	Test weight (gm)	Seed yield (q/ha)
T <sub>1</sub> Absolute Control	7.30	8.86	15.00
T <sub>2</sub> 100% RDF (60:40:30 kg NPK/ha)	9.69	11.00	20.56
T <sub>3</sub> VC @ 3 t/ha	8.90	9.70	17.63
T <sub>4</sub> FYM @ 10 t/ha	8.88	9.16	18.91
T <sub>5</sub> (30:20:15 kg NPK/ha) + VC @ 1.5 t/ha	10.27	12.63	23.00
T <sub>6</sub> (30:20:15 kg NPK/ha) + FYM @ 5 t/ha	9.97	12.30	22.33
T <sub>7</sub> VC @ 1.5 t/ha + FYM @ 5 t/ha	9.75	10.93	21.00
T <sub>8</sub> (60:40:30 kg NPK/ha) + Azotobacter + PSB	9.99	11.23	21.83
T <sub>9</sub> VC @ 3 t/ha + Azotobacter + PSB	9.74	10.43	19.16
T <sub>10</sub> FYM @ 10 t/ha + Azotobacter + PSB	9.88	9.93	18.66
C.D.	1.66	2.36	4.55
SE(m)	0.55	0.79	1.52
SE(d)	0.78	1.11	2.15
C.V.	10.22	12.89	13.29



**Fig 1:** Effect of various treatments on Seed weight of plant, test weight seed yield (kg/ha) and seed yield (q/ha)

### Conclusions

It can be concluded from this study that for sustainable production and soil health point of view the combined application of 50% RDF through chemical fertilizers + 50% RDF through organic manures (vermin compost) gave maximum seed yield (23.00 q ha<sup>-1</sup>) of coriander and fetched maximum net returns (Rs. 115000/ha).

### Author's Contribution

Conceptualization of research (NS, RS); Designing of the experiments (NS, RS); Contribution of experimental materials (SSP, KS); Execution of field/lab experiments and data collection (SSP, KS); Analysis of data and interpretation (SSP); Preparation of manuscript (SSP, NS).

### Declaration

The authors declare that they have no conflict of interest.

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