



Efficacy of organic and inorganic fertilizers on growth and yield of coriander

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Abstract

The experiment was carried during 2024-25 at Horticultural Research Farm, School of Agricultural Sciences, Malla Reddy University, Hyderabad. The experiment was laid out in randomized block design with three replications and eight treatments. The treatments used were T₁: Check, T₂: NPK (100%), T₃: RDN (100%) + Vermicompost, T₄: N (75%) + Vermicompost + *Trichoderma*, T₅: RDN (100%) + Neem cake, T₆: N (75%) + Neem cake + *Trichoderma*, T₇: RDN (100%) + Vermicompost + Neem cake, T₈: N (75%) + Vermicompost + Neem cake + *Trichoderma*. Among all the treatments the treatment T₇: RDN (100%) + Vermicompost + Neem cake was found to be most effective in terms of growth characters such as plant height (46.9 cm), number of branches per plant (10.5) number of leaves per plant (10.6), leaf yield per plant (3.4g), umbels per plant (41.5), umbellate per umbels (7.9), seeds per umbellate (6.4), seed yield per plant (7.7g), seed yield per ha (25.8q).

Keywords: *Coriandrum sativum*, Inorganic Fertilizers, Neem Cake, *Trichoderma* and Vermicompost

Introduction

Organic farming is getting more popular these days, which accentuates shift from high volume production system to high value production system. Coriander (*Coriandrum sativum* L.) a common condiment crop in the tropics, is used in a variety of cuisines and food courts. This annual herbaceous plant is a member of the Apiaceae family. India is the world's top producer, consumer, and exporter of coriander, primarily grown in Rajasthan. In India coriander is cultivated in an area of 6.2 lakh ha with a production of 8.29 lakh MT (National Horticulture Board, 2023). The yield can vary based on region, farming practices, and weather conditions. Organic fertilizers play a crucial role in promoting the growth and yield of coriander by enhancing the soil health, increasing the nutrient uptake, improves root development, accumulation of bio mass and reduces the environmental pollution. Organic manures and biofertilizers including Farm Yard Manure (FYM), goat manure, vermicompost, and nitrogen-fixing bacteria have reduced the use of chemical fertilizers while providing higher quality products free of hazardous agrochemicals for human safety. Application of organic inputs can have a huge additive impact to improve the efficiency of fertilizer use by increasing the microbial activity of soil. (Ankush *et al.*, 2020 and Sharma S K, *et al.*, 2021) ^[1]. Several studies have reported that vermicompost can increase the growth and biomass of some medicinal plants such as chamomile (Fallahi *et al.*, 2008) ^[2]

Materials and Methods

A field experiment was conducted during rabi 2024-25 at Horticultural Research Farm, School of Agricultural Sciences, Malla Reddy University, Hyderabad. Telangana, (India). The experiment was laid out in randomized block design with eight treatments three replications, *viz.* T₁: Check (FFP), T₂: NPK (100%), T₃: RDN (100%) + Vermicompost, T₄: N (75%) + Vermicompost + *Trichoderma*, T₅: RDN (100%) + Neem cake, T₆: N (75%) +

Neem cake + *Trichoderma*, T₇: RDN (100%) + Vermicompost + Neem cake, T₈: N (75%) + Vermicompost + Neem cake + *Trichoderma*. Seeds were sown in 3 m × 1m plots with a spacing of 30 cm × 10 cm. The recommended dosages of NPK @ 30: 40: 20 kg/ha were applied in the form of urea, single super phosphate and muriate of potash respectively. Urea was applied accordingly treatment wise in first basal application and the other two doses at 25 and 50 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 vermicompost and *Trichoderma* were incorporated in to respective plots just prior to sowing of seed and then slightly covered with the fine soil. The neem cake was applied at the time of sowing. Need based cultural and plant protection operations were taken up to the leaf harvest. The experimental data recorded for growth attributes, yield parameters and economics were statistically analyzed for level of significance.

Results and Discussion

1. Growth Parameters

Growth parameters such as plant height, number of branches per plant and number of leaves showed significant variation with different doses of fertilizers and biofertilizers at 90 days after sowing. The results revealed that the effect of different nutrient sources combination significantly affected the growth parameters (Table and Fig. 1). The maximum plant height (46.9 cm), number of leaves (10.6), number of branches (10.5) were obtained at 90 days after sowing with the treatment combination where 100% RDN was given through inorganic sources (Vermicompost and Neem cake) which was at par with the treatment *i.e.*, T₈. The significant differences in herbage and seed yield may be attributed to the higher levels of nutrients besides growth stimulating substances (enzymes, antibiotics and growth hormones) available in vermicompost (Vadiraj *et al.* 1998) ^[9]. It was due to the application of vermicompost and neem cake

enhanced the nitrogen and other nutrients availability, resulted in increased vegetative growth. Similar results were also reported by Sahu *et al.*, (2014)^[6], Tripathi *et al.*, (2013)

^[8] and Hnamte *et al.*, (2013) in coriander who stated that synergistic effect of inorganic and organic fertilizer increased plant height.

Table 1: Effect of organic and inorganic fertilizers effect on growth parameters

Treatment	Plant height (90 DAS)	Number of branches/plant (90 DAS)	Number of leaves/plant (90 DAS)
T ₁	27.5	7.4	8.1
T ₂	28.7	7.7	8.3
T ₃	32.8	7.9	8.5
T ₄	37.3	9.4	9.3
T ₅	32.0	8.5	8.2
T ₆	33.5	9.1	8.8
T ₇	46.9	10.5	10.6
T ₈	43.7	9.9	9.9
SEm ±	0.65	0.10	0.06
CD at 5%	3.19	0.31	0.21

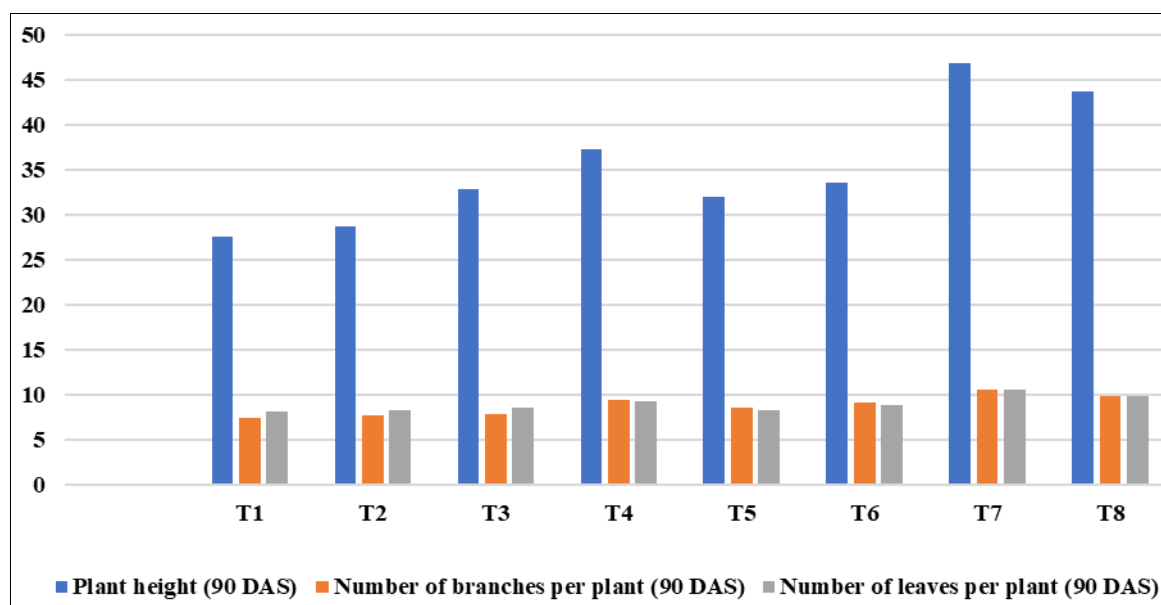


Fig 1: Effect of organic and inorganic fertilizers effect on growth parameters

2. Yield Parameters

Yield attributes are one of the most important factors for evaluating productivity under field conditions and are presented in Table 2 and Fig. 2. The highest leaf yield per plant (3.4), umbels per plant (41.5), umbellate per umbels (7.9), seeds per umbellate (6.4), seed yield per plant (7.74) and seed yield per hectare (25.8q) was reported with the treatment in which 100 % recommended dose of nitrogen was given through inorganic sources (Vermicompost and Neem cake) whereas lowest yield component was reported in control. The increase in growth and yield attributing characters due to biofertilizer inoculation along with organic

and inorganic Nitrogen may be due to beneficial effect of biofertilizer on nitrogen fixation, production of phytohormone like substances and increase in uptake of nutrients such as nitrogen. (Govindan and Purushothaman, 1984)^[3]. The combined effect of inorganic source and vermicompost played a very important role due to their synergistic effect. Application of vermicompost increased the supply of easily assimilated major as well as micronutrients to plants besides mobilizing unavailable nutrients into available form. Choudhary and Jat (2004) also reported similar findings in coriander.

Table 2: Effect of organic and inorganic fertilizers effect on yield parameters

Treatment	Leaf yield/plant (g)	Umbels/plant	Umbellate/umbels	Seeds/umbellate	Seed yield/plant (g)	Seed yield (q/ha)
T ₁	2.3	32.8	4.5	4.3	1.3	4.2
T ₂	2.4	34.6	5.2	4.6	1.5	5.0
T ₃	2.6	37.4	5.8	5.3	4.6	15.3
T ₄	2.7	37.9	6.5	5.1	4.5	14.9
T ₅	2.6	35.6	5.8	5.5	3.5	11.5

T ₆	2.6	37.5	6.0	5.3	4.2	13.9
T ₇	3.4	41.5	7.9	6.4	7.7	25.8
T ₈	3.1	39.4	7.4	5.8	6.9	23.0
SEm ±	0.05	0.19	0.08	0.07	0.07	0.24
CD at 5%	0.17	0.59	0.26	0.21	0.22	0.74

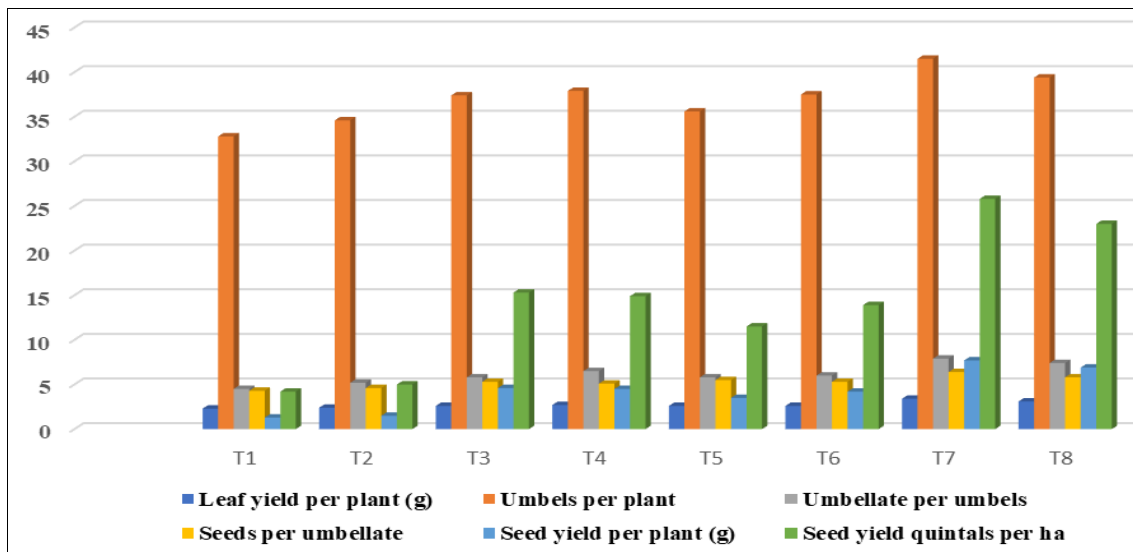


Fig 2: Effect of organic and inorganic fertilizers effect on yield parameters

Conclusion

It is clear from the present study that vermicompost, neem cake and Trichoderma successfully manipulate the growth and yield of coriander. Based on the experimental results it can be concluded that the application of 100% RDN through inorganic sources (Vermicompost and Neem cake) showed superior performance over other treatments which was at par with the treatments in which 75% recommended dose of nitrogen was provided through inorganic fertilizers and organic sources along with biofertilizer (Trichoderma). In addition to enhancing soil health the application of organic based fertilizers in an integrated manner with chemical fertilizers can substitute the fertilizer which will can be helpful in the development and production of coriander.

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