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Efficacy of organic manure and biofertilizer concentrates on growth, yield and economics of coriander (*Coriandrum sativum* L.) under Dehradun valley of Uttarakhand

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Abstract
Present experiment was carried during 2021-22 at Horticulture Research Block, School of Agriculture Sciences, SGRRU, Dehradun, Uttarakhand to find out the "Efficacy of organic manure and biofertilizer concentration on growth, yield and economics of Coriander (*Coriandrum sativum* L.) under Dehradun Valley of Uttarakhand". The experiment was laid out in randomized block design with three replications and ten treatments. The treatments comprised following levels of different organic manures with different concentrations *viz*. T_1 (Control), T_2 (Vermicompost@ 5t/ha), T_3 (FYM@ 10t/ha), T_4 (Vermiwash @ 50%), T_5 (Cow urine @ 50%), T6 (Rhizobium @ 500ml/ha), T_7 (VC @ 2.5t/ha + FYM @ 5t/ha), T8 (VC @ 2.5t/ha + FYM @ 5t/ha + Vermiwash 25%), T_9 (VC @ 2.5t/ha + FYM @ 5t/ha + Vermiwash 25% + Cow urine 25%) and T10 (VC @ 2.5t/ha + FYM @ 5t/ha + Vermiwash @ 25% + Cow urine @ 25% + Rhizobium 250ml/ha). The sowing of coriander cultivar "Italian Hero" was done on 27/11/2021. The first harvesting of leaf was done at 15/01/22 and final harvest at 05/04/2021. Observations on various attributes *viz.* growth, yield and economics were recorded at 30, 60 DAS and at final harvest. The results revealed that treatment T_{10} (VC @ 2.5t/ha + FYM @ 5t/ha + Vermiwash @ 25% + Cow urine @ 25% + Rhizobium @250ml/ha) was found to be most effective in terms of growth characters such as number of leaves (11), plant height (16.58cm), leaf Length (2.81cm), fresh weight of per plant (6.55g), fresh weight of leaves (6.07), dry weight of leaves (2.41g), root length (6.95cm), leaf yield g/plot (810g), leaf yield kg/plot (0.810Kg), leaf yield t/ha (8.1 t/ha) and T_9 (VC @ 2.5t/ha + FYM @ 5t/ha + Vermiwash @ 25% + Cow urine @ 25%) leaf diameter (3.17cm) was found to be most effective. Net profit of leaf (Rs 3,68,925) whereas B:C ratio (1:16.32) and net profit of seed (Rs 1,96,725) whereas B:C ratio (1:9.17) was recorded in T6 (Rhizobium @ 500ml/ha).

Keywords: Organic manure, randomized, vermicompost, cow urine, FYM, Vermiwash

Introduction
Coriander (*Coriandrum sativum* L.) is an annual herb that belongs to the family Apiaceae possessing spice, aromatic, nutritional as well as medicinal properties (Mc Ausland *et. al*., 2020) [11]. It is basically a cool season crop. It can be grown on a variety of soil and prefers light, well drained, moist, loamy soil and can also grow on heavy black soil (Bhat *et al.*, 2014) [4]. Coriander is also a good melliferous plant and studies indicated that coriander can be used for honey bee production (Bhalchandra *et. al*., 2014; Abou-Shaara, 2015) [5, 1]. Furthermore, leaves and fruits of coriander have significant quantities of protein, fat, carbohydrate, calcium, phosphorous, sodium, zinc, carotene, thiamine, riboflavin, niacin, tryptophane, vitamin B6, Folate, vitamin A, vitamin D, vitamin B-12, vitamin C and vitamin E (Bhat *et. al.*, 2014 and USDA, 2016) [4, 20]. On the other hand, coriander fruit contain significant amount of fatty oil rich in Petroselinum acid, linoleic acid, oleic acid, palmitic acid and stearic acid (Beyzi *et. al*., 2017) [3]. Additionally, the remaining oil cake contains protein, fat, nitrogen free extract, cellulose and ash that can potentially be used as animal feed (Kadiri *et. al.*, 2017) [8]. Despite coriander is a promising spice, herb, aromatic, medicinal and industrial application potentials; it is considered as underutilized and neglected crop (Kalidasu *et. al.*, 2015) [7].
Organic agriculture has a significant role to play in addressing two of the world's biggest and most urgent issues i.e., climate change and food security. The sustainability of the agricultural system has become a global concern. Although the growth driven by green revolution technology has significantly contributed to making India self-sufficient in food production, the sustainability of the agricultural system has become debatable due to its adverse impact on the

environment. Organic farming has become an alternative farming system to improve agricultural sustainability, yet farmers hesitate to adopt it. The uninterrupted use of inorganic fertilizers and pesticides in the cultivation of horticulture crops have caused decreased soil fertility as well as physical and chemical properties of soil. Solid and liquid organic manures play a vital role in restoring the soil fertility and stabilizing crop productivity. Therefore, the application of plant nutrients through organic sources like vermicompost, FYM, vermiwash, cow urine and biofertilizer like rhizobium remains the alternate choice for maintaining sustainable production. Vermicompost improves the physical, chemical and biological properties of the soil as well contributes to organic enrichment (Chauhan and Singh 2013) [6]. Application of FYM into soil increases organic carbon stock. Soil organic matter (SOM) has a large number of exchange sites that ultimately result in higher cation exchange capacity (Scotti *et. al.*, 2015) [15]. Vermiwash plays an important role in the plant growth and development, contribute to initiation of rooting, root growth, plant development, promotion growth rate and improvement in crop production increasing the soil organic matter and increase in nutrient content which are readily available for the plants, resulting in good crop yield. Vermiwash and vermiprotein for wide use in agro-ecosystem, aquaculture and poultry (Sundararasu, 2016) [18]. Cow's urine was known as 'GOMYTRA' as many advantages in curing several diseases. Use of fermented cow urine enhances the soil fertility and it can also be turned into liquid fertilizer as pesticide for crops. Liquid manure from cow urine is easy to make and is good for Plants in comparison to artificial fertilizer (Kumar *et. al.*, 2018). Among the biofertilizers, Rhizobium fixes the atmospheric nitrogen through the process of biological nitrogen fixation and makes it available to plant in an easily assailable and utilizable form. It is Harmless, Eco-friendly, and low cost a grow-input. Add nutrients to the soil and make them available to the crop. It also secretes certain growth promoting substances which helps the plant growth (Kaleem *et. al.*, 2016) [9].

Materials and method

The present research work was carried out at Horticulture Research Block, Department of Horticulture, School of Agricultural Sciences, Shri Guru Ram Rai University, Dehradun, Uttarakhand during the rabi season of 2021–22. The experiment was laid out in Randomized Block Design (RBD) and replicated thrice. Total ten treatments were tried namely T1 (control), T2 (Vermicompost @5t/ha), T3 (FYM @10t/ha), T4 (Vermiwash @50%/ha), T5 (cow urine @50%/ha + T6 (Rhizobium @500ml/ha), T7 (Vermicompost @2.5t/ha + FYM @5t/ha), T8 (Vermicompost
@2.5t/ha + FYM @5t/ha + Vermiwash @25%/ha), T9 (Vermicompost @ 2.5t/ha + FYM @5t/ha
+ Vermiwash @25%/ha+ Cow urine @25%/ha) and T10 (Vermicompost @ 2.5t/ha + FYM @5t/ha
+ Vermiwash @25%/ha + Cow urine @25%/ha + Rhizobium @250ml/ha). The soil of the research field was sandy loam in texture having pH of 7.12 with available nitrogen (220.04%), available phosphorus (9.1 kg ha- 1) and available potassium (18.1 kg ha). The coriander cultivar "Italian Hero" was choosen for research purpose. Organic manures i.e., Vermicompost, FYM, Vermiwash, Cow urine as well as biofertilizer i.e., Rhizobium were incorporated in experimental field as per the treatments at the time of final field preparation. The seed were sown on 27/11/2021. All the cultural practices were done at regular intervals as per the requirement of crop during the course of research work. During the experimentation, from each replication, randomly selected five plants were used for recording various observations on growth and yield promoting parameters during
whole of the cropping period at 30, 60 days after sowing and at final harvest. The economics of coriander crop was calculated as per the fundamental market prices of the input and produced during the year 2022. The obtained data were statistically analyzed with using standard statistical method as suggested by Gomez and Gomez (1996).

Table 1: Treatment details

No. of Treatment	Combinations	Concentration
T1	Control	-
T2	Vermicompost	@10t/ha
T3	FYM	@5t/ha
T4	Vermiwash	@50%/ha
T5	Cow urine	@50%/ha
T6	Rhizobium	@500ml/ha
T7	VC + FYM	@5/ha + @2.5/ha
T8	VC + FYM + Vermiwash	@5/ha + @2.5/ha + @25%/ha
T9	VC + FYM + Vermiwash + Cow urine	@5/ha + @2.5/ha + @25%/ha + @25%/ha
T10	VC + FYM + Vermiwash + Cow urine + Rhizobium	@5/ha + @2.5/ha + @25% + @25% + 250ml/ha

Result and discussion

The various growth as well as yield parameters *viz.* number of leaves per plant, plant height (cm), leaf length (cm), leaf diameter (cm), total fresh weight of per plant (g), total fresh weight of leaves per plant (g), total dry weight of leaves per plant (g), root length (cm), leaf yield (g/plot), leaf yield (kg/plot) and leaf yield (t/ha) were significantly influenced by different doses of solid and liquid organic manures as compared to control during the course of investigation. The data presented in Table-1, 2 and 3 were showed that the significant improvement was noticed when applied different combinations of organic manures on coriander economics as compared to control. The findings of the present investigation were recorded and are thoroughly discussed below:

Number of leaves (cm)

The observation of number of leaves, recorded at 30, 60 DAS and at Final harvest was presented in Table 2 and Fig.1 revealed significant differences among the treatments. At 30 DAS number of leaves per plant ranged from 5.07 to 7.23. On the basis of mean the maximum number of leaves per plant was counted in T10 (7.23) which was par with T5 (6.83). However significant difference was observed with treatment T9 (6.73), T8 (6.70), T7 (6.27), T6 (6.63), T4 (5.60), T3 (6.30), T2 (6) while the minimum number of leaves per plant was recorded in the treatment T1 (5.07). At 60 DAS the maximum number of leaves was obtained in treatments T10 (10.13). However, significant difference was observed with treatment T9 (9.47) T7 (9.27), T6 (9.07), T3 (8.67), T4 (8.47), T2 (8.47) and T5 (8.20) while, minimum number of leaves was obtained in the treatment T1 (7.20). At final harvest the number of leaves was maximum in T10 (11) which was at par with T9 (10.90). However, significant difference was

observed with treatment T7 (10.23) T8 (9.90), T5 (9.40), T4 (8.97), T3 (8.97) and T2 (8.80) while, minimum number of leaves was obtained in the treatment T1 (7.67). The probable reasons for enhanced a greater number of leaves, may be due to promotive effect of macro and micro nutrients on vegetative growth ultimately led to more photosynthetic activities. This result was supported by Yogesh *et. al.,* (2016) and Rania *et. al.,* (2022) [14].

Plant height (cm)

The observation of plant height, recorded at 30, 60 DAS and at Final harvest was presented in Table 2 and Fig.2 revealed significant differences among the treatments. At 30 DAS the maximum plant height was recorded in treatment T10 (5.12cm) and it was at par with T9 (4.92cm) and T8 (4.89cm). However, significant differences were observed with treatment T6 (4.71cm), T7 (4.72cm), T5 (4.63cm), T3 (4.53cm), T4 (4.47cm), T2 (4.29cm). The minimum plant height was recorded in T1 (3.91 cm) under control condition. At 60 DAS the maximum plant height (12.38cm) was recorded in T8 with which was at par with T10 (12.21cm) and T9 (12.09cm). The significant difference was recorded with treatment T5 (11.75cm), T7 (11.63cm), T4 (11.31cm), T6 (11.25cm), T3 (10.74cm) and T2 (10.08cm). The minimum plant height was recorded in T1 (9.02cm) under control condition. At final harvest, the plant height was maximum in T10 (16.58cm) which was at par with T9 (16.24cm). However, significant difference was observed with treatment T8 (15.08cm), T7 (14.87cm), T6 (14.51cm), T5 (14.05cm), T4 (13.95cm), T3 (13.63cm) and T2 (13.45cm) and
while, minimum plant height was obtained in the treatment T (13.11cm). This variation might be due to continuous availability and adequate supply of nutrients, including micronutrients due to compost application, may have helped achieve maximum height in compost besides a good physical soil condition due to the addition of organic matter to soil through compost. The results are in line with the findings of (Rania *et. al.,* 2022) [14].

Leaf length (cm)

The observation of leaf length, recorded at 30, 60 DAS and at Final harvest was presented in Table 2 and Fig.3 revealed significant differences among the treatments. At 30 DAS the maximum leaf length of coriander was recorded in treatment T9 (1.95cm), which was at par with the treatment T10 (1.91cm), T8 (1.91cm), T6 (1.90cm). However, the significant difference was observed with treatment T7 (1.83cm), T5 (1.85cm), T4 (1.73cm), T3 (1.73cm), T2 (1.54cm) while, the minimum leaf length was recorded under the treatment T1 (1.48cm) under control condition. At 60 DAS the maximum leaf length was obtained in treatments T10 (2.32cm), which was at par with the treatments T8 (2.26cm) and T9 (2.24cm). The significant difference was observed with treatment T7 (2.24cm), T5 (2.11cm), T4 (2.23cm), T3 (2.23cm), T6 (2.24cm) and T2 (2.15cm). The minimum leaf length was recorded in T1 (1.99cm) under control condition. At final harvest the leaf length was maximum in T10 (2.81cm) which were comparable with T9 (2.80cm) and T8 (2.75cm) however, significant difference was observed with treatment T7 (2.74cm), T6 (2.72cm), T4 (2.64cm), T3 (2.60cm), T5 (2.59cm) and T2 (2.49cm) while, minimum leaf length was obtained in the treatment T1 (2.15cm). Maximum leaf length was due to application of balanced fertilizer which increased leaf length. Similar result was reported by (Priyadarshini *et. al.,* 2017) [13].

Leaf diameter (cm)

The observation of leaf diameter, recorded at 30, 60 DAS and at Final harvest was presented in Table 2 and Fig.4 revealed significant differences among the treatments. At 30 DAS after sowing, the maximum leaf diameter of coriander was recorded in treatment T9 (1.76cm) which were par with T10 (1.75cm), T6 (1.71cm) however, significant difference was observed with treatment T7 (1.67cm), T5 (1.61zm), T4 (1.58cm), T3 (1.57cm), T2 (1.41cm) was recorded under the treatment T1 (1.35cm). At 60 DAS the maximum number of leaf diameter was obtained in treatments T10 (2.65cm), which were at par with the treatments T6 (2.57cm) and T9 (2.55cm). The significant difference was observed with treatment T7 (2.53cm), T4 (2.53cm), T3 (2.52cm), T5 (2.40cm) and T2 (2.41cm). The minimum leaf diameter was recorded in T1 (2.21cm) under control condition. At final harvest the leaf diameter was maximum in T9 (3.17cm) which were at par with the treatment T10 (3.13cm) and T6 (3.11cm) however, significant difference was observed with treatment T7 (3.08cm), T8 (3.05cm), T4 (2.95cm), T5 (2.91cm), T3 (2.88cm) and T2 (2.72cm) while, minimum leaf diameter was obtained in the treatment T1 (2.44cm). Maximum leaf diameter was due to the balanced fertilizer application increased leaf diameter which might be due to the availability of all nutrients in the rhizosphere (Priyadarshini *et. al.,* 2017) [13].

Total fresh weight per plant (g)

The observation of total fresh weight per plant was recorded at Final harvest and was presented in Table 3 and Fig.5. The maximum total fresh weight of per plant (6.55g) was recorded in T10 with (Vermicompost @5t/ha + FYM @10t/ha + Vermiwash @25% /ha + Cow urine @25%/ha + Rhizobium @250 ml). The minimum total fresh weight per plant was recorded in control T1 (2.15g) under control. The increase in fresh weight might be due to increased supply of major plant nutrients that are required in huge quantities for growth and development of the plant. This finding is comparable with (Abhishek *et. al.,* 2020).

Total fresh weight of leaves per plant (g)

The observation of total fresh weight of leaves per plant was recorded at Final harvest and was presented in Table 3 and Fig.6. The maximum total fresh weight of leaves (6.12g) was observed in treatment T10 (Vermicompost @ 5t/ha + FYM @10t/ha + Vermiwash @25% + Cow urine
@25% + Rhizobium @250ml) whereas the minimum total fresh weight of leaves per plant was recorded in control T1 (1.78g) under control condition. The increase in total fresh weight of leaves may be due to the excellence of high level of organic manures was producing good growth of coriander plants which show higher total fresh weight of leaves. This result is supported by Duwal *et. al.,* (2019).

Total dry weight of leaves per plant (g)

The observation of total dry weight of leaves per plant was recorded at Final harvest and was presented in Table 3 and Fig.7. The maximum total dry weight of leaves per plant was recorded in T10 (2.41g) (Vermicompost @5t/ha + FYM @10t/ha + Vermiwash @25%/ha + Cowurine @25%/ha +

Rhizobium @250ml/ha). The minimum total dry weight of leaves per plant was recorded in T1 (0.86g) under control condition. The decrease in dry weight of the leaf may be due to the removal of moisture contain from leaf. These results were supported by Pratap Amgoth *et. al.*, (2019).

Root length (cm)

The observation of root length was recorded at Final harvest and was presented in Table 3 and Fig.8. The maximum root length (6.97 cm) was recorded in T10 with (Vermicompost @5t/ha + FYM @10t/ha + Vermiwash @25%/ha + Cowurine @25%/ha + Rhizobium @250ml/ha) which was at par with T9 (6.57 cm). The minimum root length of plant was recorded in control T1 (5.82 cm). The results show significant differences between the treatments. The increase in root length in compost treatment may be attributed to the easy penetration of roots to deeper layers due to the good physical condition of soil improved by the action of compost upon decomposition. These results were supported by Sakthivel *et. al.*, (2020) [16] and Anchal *et. al.*, (2021), who used organic fertilizers for coriander cultivation, align with the present findings.

Leaf yield (g/plot)

The observation of leaf yield (g/plot) was recorded at Final harvest and was presented in Table 3 and Fig.9. The maximum leaf yield (g/plot) was recorded T10 (810 g) with (Vermicompost @5t/ha+ FYM @10t/ha + Vermiwash @25%/ha + Cowurine @25%/ha + Rhizobium @250ml/ha) whereas the minimum leaf yield (g/plot) was recorded in T1 (290 g) under control condition. The increase in vegetative yield may be due to the continuous availability of nutrients during the mineralization of compost, increasing uptake of nutrients by coriander due to the timely availability of nutrients upon decomposition and improvements in soil characteristics, the elevation of pH, and maintenance of plant hormones production that stimulate plant development. Similar results were also obtained by Priyadarshini *et. al.*, (2017) [13], Tamilarasi *et. al.*, (2020) [19] and Sakthivel *et. al.*, (2020) [16] where they suggested that organic manuring has a positive effect on yield of coriander crop.

Leaf yield (kg/plot)

The observation of leaf yield (Kg/plot) was recorded at Final harvest and was presented in Table 3 and Fig.10. The maximum leaf yield was recorded in T10 (0.810 Kg/plot) with (Vermicompost @5t/ha + FYM @10t/ha + Vermiwash @25%/ha + Cowurine @25%/ha + Rhizobium @ 250ml/ha). While the minimum leaf yield was recorded in T1 (0.290 Kg/plot) under control conditions. The increase in leaf yield may be due to the plant height, numbers of leaves per plant, improvements in soil and adequate pH of soil. Similar results were also obtained by Tamilarasi *et. al.*, (2020) [19].

Leaf yield (t/ha)

The observation of leaf yield (t/ha) was recorded at Final harvest and was presented in Table 3 and Fig.11. The maximum leaf yield was recorded T10 (8.10 t/ha) with (Vermicompost @ 5t/ha + FYM @10t/ha + Vermiwash @25%/ha + Cowurine @25%/ha + Rhizobium @250ml/ha). The minimum leaf yield was recorded T1 (2.90 t/ha) under control conditions. The increase in leaf yield may be due to the proper irrigation, increasing uptake of nutrients by coriander due to the timely availability of nutrients upon decomposition and improvements in soil characteristic. Similar results were also obtained by Priyadarshini *et. al.*, (2017) [13], Tamilarasi *et. al.*, (2020) [19] and Sakthivel *et. al.*, (2020) [16].

Economic

The net profit per hectare were ranges from Rs -1,07,895 to Rs 3,68,925. The maximum net profit per hectare was recorded under the treatment T6 (Rs 3,68,925). Whereas, during net profit of T4 maximum obstructive loss was recorded (Rs -1,07,895) as compared to other treatments. The benefit cost ratio ranged from 1:0.73 to 1:16.32 depending on different treatments. It was found to be highest (1:16.32) under the treatments T6 (Rhizobium @ 500ml/ha) and lowest (1:0.73) under the treatment T4 (Vermiwash @50%/ ha).

Table 2: Effect of organic manures on number of leaves, plant height, leaf length and leaf diameter of coriander at different harvest intervals

Treatment	Number of leaves				Plant height (cm)				Leaf length (cm)				Leaf diameter (cm)			
	30 DAS	60 DAS	At Final Harvest	Mean	30 DAS	60 DAS	At Final Harvest	Mean	30 DAS	60 DAS	At Final Harvest	Mean	30 DAS	60 DAS	At Final Harvest	Mean
T1	5.07	7.20	7.67	6.64	3.91	9.02	13.11	8.68	1.48	1.99	2.15	1.87	1.35	2.21	2.44	2.00
T2	6.00	8.47	8.80	7.75	4.29	10.08	13.45	9.27	1.54	2.15	2.49	2.06	1.41	2.41	2.72	2.18
T3	6.30	8.67	8.97	7.98	4.53	10.74	13.63	9.63	1.73	2.23	2.60	2.18	1.57	2.52	2.88	2.32
T4	5.60	8.47	8.97	7.68	4.47	11.31	13.95	9.91	1.73	2.23	2.64	2.20	1.58	2.53	2.95	2.35
T5	6.83	8.20	9.40	8.14	4.63	11.75	14.05	10.14	1.85	2.11	2.59	2.18	1.61	2.40	2.91	2.31
T6	6.63	9.07	9.90	8.53	4.71	11.25	14.51	10.16	1.90	2.24	2.72	2.28	1.71	2.57	3.11	2.46
T7	6.27	9.27	10.23	8.59	4.72	11.63	14.87	10.41	1.83	2.24	2.74	2.27	1.67	2.53	3.08	2.43
T8	6.70	9.47	9.90	8.69	4.89	12.38	15.08	10.78	1.91	2.26	2.75	2.31	1.75	2.53	3.05	2.44
T9	6.73	9.47	10.90	9.03	4.92	12.09	16.24	11.08	1.95	2.24	2.80	2.33	1.76	2.55	3.17	2.49
T10	7.23	10.13	11.00	9.45	5.12	12.21	16.58	11.30	1.91	2.32	2.81	2.35	1.75	2.65	3.13	2.51
C.D.(P=0.05)	0.60				0.94				0.13				0.12			
SE(m) ±	0.20				0.31				0.04				0.04			
SE(d) ±	0.28				0.44				0.06				0.06			
C.V.	4.21				5.36				3.36				2.99			

Table 3: Influence of different organic manure on total fresh weight per plant, total fresh weight of leaves, total dry weight of leaves, root length, leaf yield (g/plot), leaf yield (Kg/plot) and leaf yield (t/ha) of coriander at final harvest

Treatment	Total fresh weight per plant (g)	Total fresh weight of leaves per plant (g)	Total dry weight of leaves per plant (g)	Root length (cm)	Leaf yield (g/plot)	Leaf yield (Kg/plot)	Leaf yield (t/ha)
T1	2.15	1.78	0.86	5.82	290	0.290	2.90
T2	3.76	3.39	1.31	6.09	505	0.505	5.05
T3	3.70	3.25	1.49	6.55	525	0.525	5.23
T4	3.86	3.51	1.53	6.18	505	0.505	5.05
T5	3.83	3.48	1.47	6.15	490	0.490	4.90
T6	4.73	4.39	1.61	6.37	655	0.655	6.55
T7	5.11	4.66	1.45	6.44	660	0.660	6.60
T8	5.37	4.99	1.76	6.51	675	0.675	6.75
T9	5.82	5.41	1.96	6.57	715	0.715	7.15
T10	6.55	6.07	2.41	6.97	810	0.810	8.10
C.D.(P=0.05)	0.66	0.66	0.30	0.49	76.67	0.08	0.76
SE(m) ±	0.22	0.22	0.10	0.16	25.60	0.03	0.25
SE(d) ±	0.31	0.31	0.14	0.23	36.21	0.04	0.36
C.V.	8.45	9.34	11.11	4.47	7.61	7.61	7.55

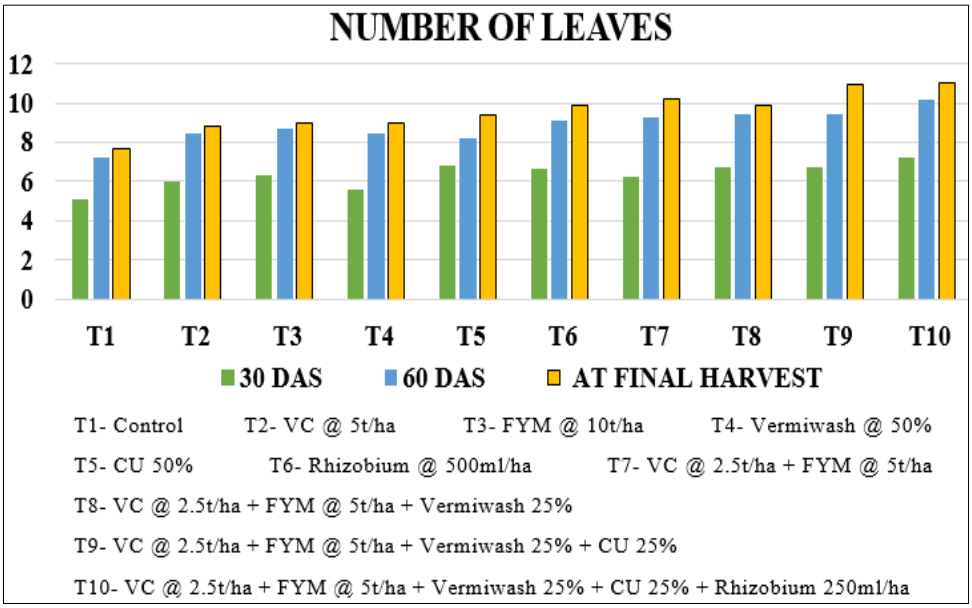

Fig 1: Influence of different organic manures on number of leaves of coriander at different harvesting intervals

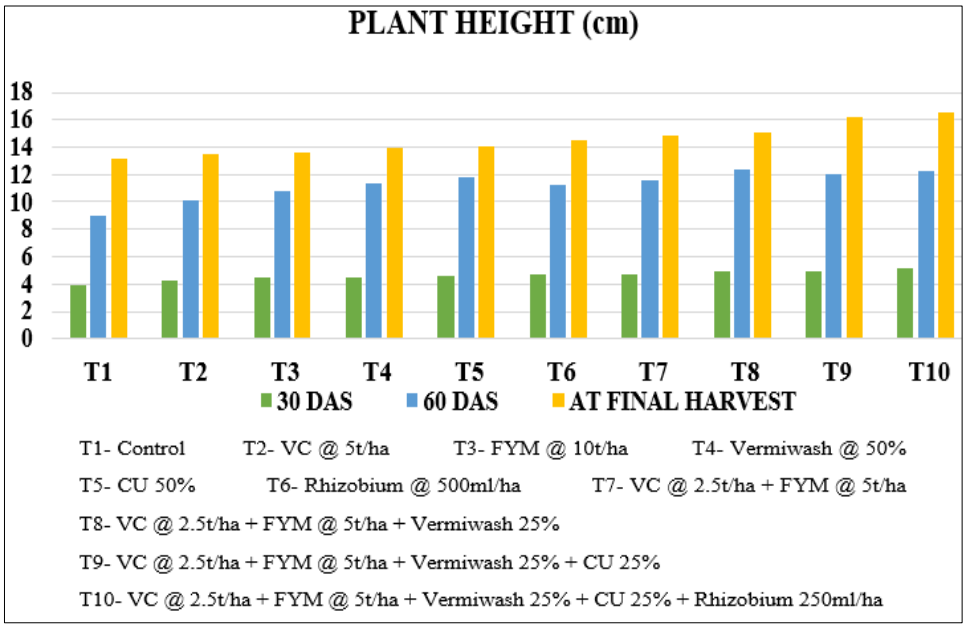

Fig 2: Influence of different organic manures on plant height (cm) of coriander at different harvesting intervals

Table 4: Effect of different organic manures on net return and B:C ratio of Coriander

Treatment	Net return (Rs ha-1)	B:C ratio
T1	1,50,460	1:7.39
T2	2,52,710	1:6.02
T3	2,36,760	1:4.07
T4	- 1,07,895	1:0.73
T5	2,960	1:1.01
T6	3,68,925	1:16.32
T7	3,32,335	1:6.22
T8	1,40,710	1:1.53
T9	30,960	1:1.07
T10	87,693	1:2.19

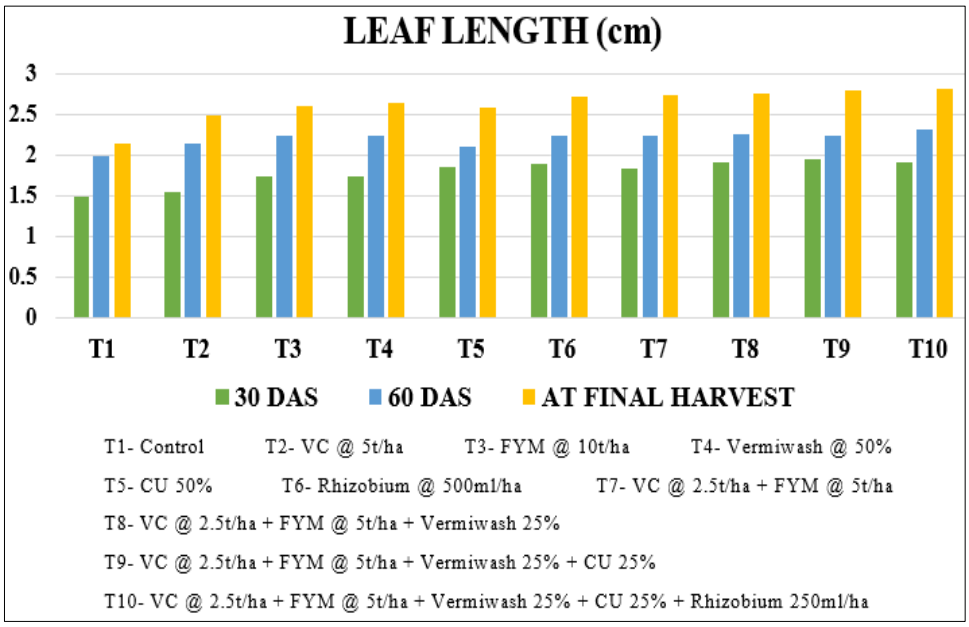

Fig 3: Influence of different organic manures on leaf length (cm) of coriander at different harvesting intervals

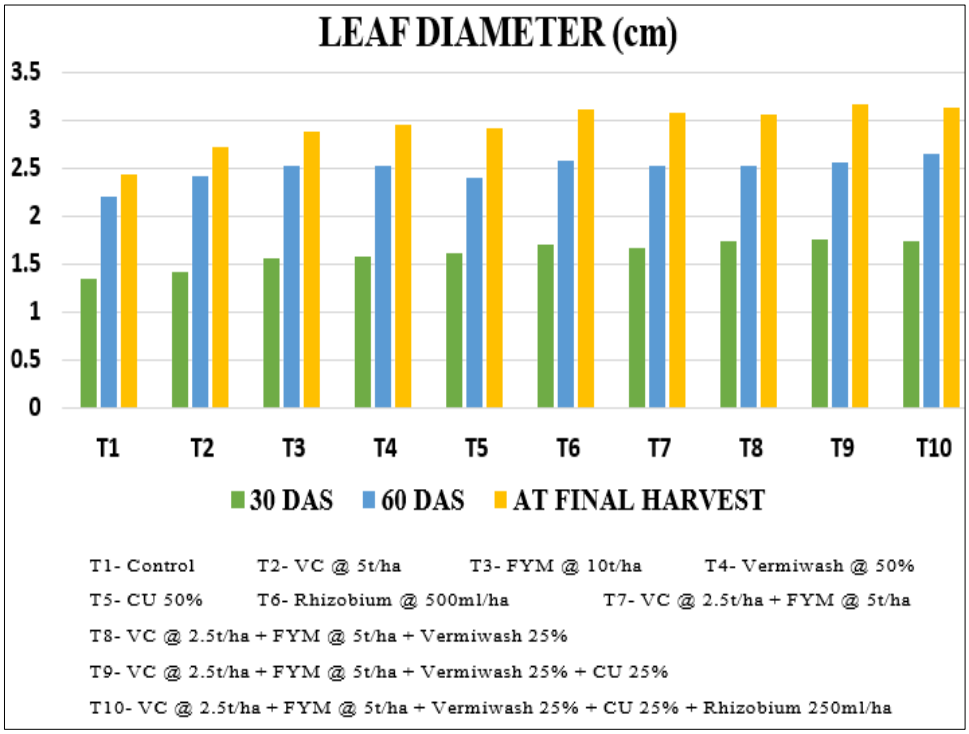

Fig 4: Influence of different organic manures on leaf diameter (cm) of coriander at different harvesting intervals

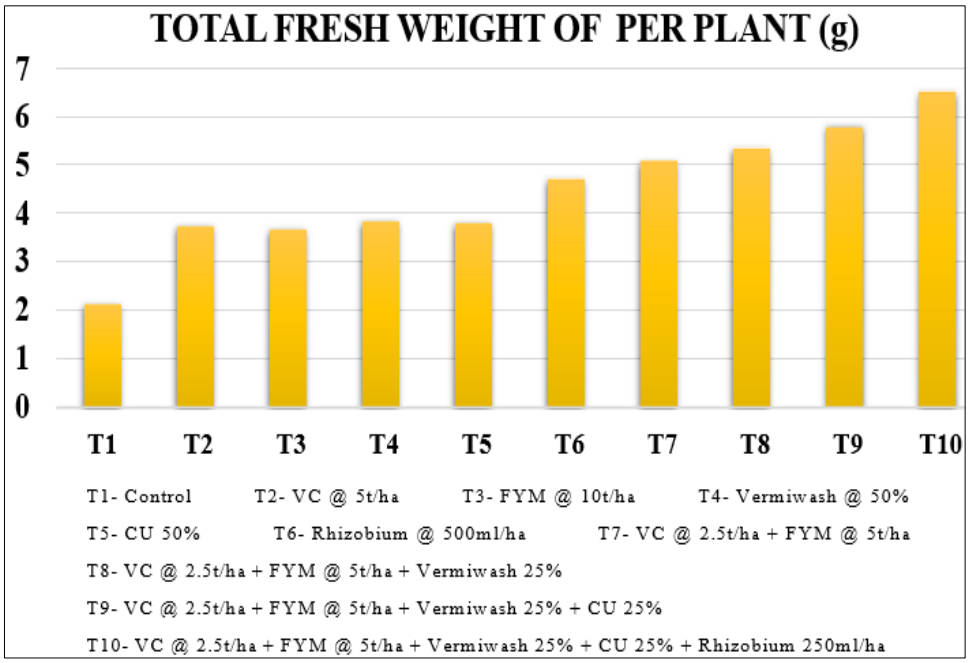

Fig 5: Influence of different organic manures on total fresh weight (g) of coriander at final harvest

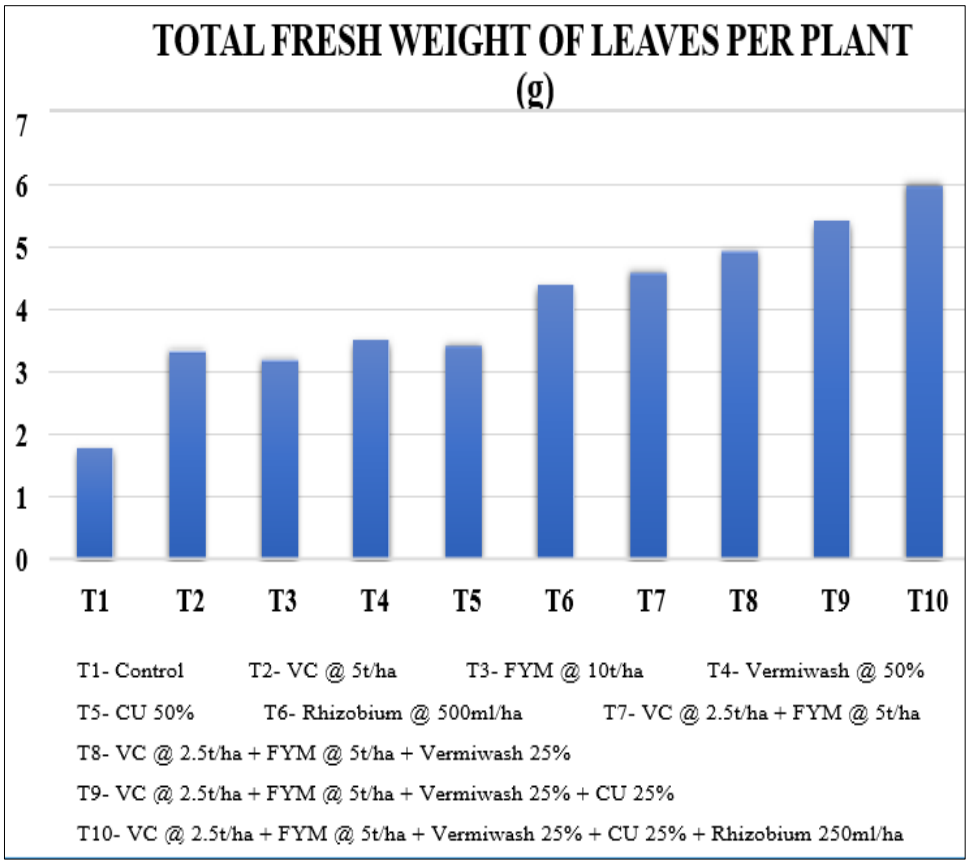

Fig 6: Influence of different organic manures on total fresh weight of leaves per plant (g) of coriander at final harvest

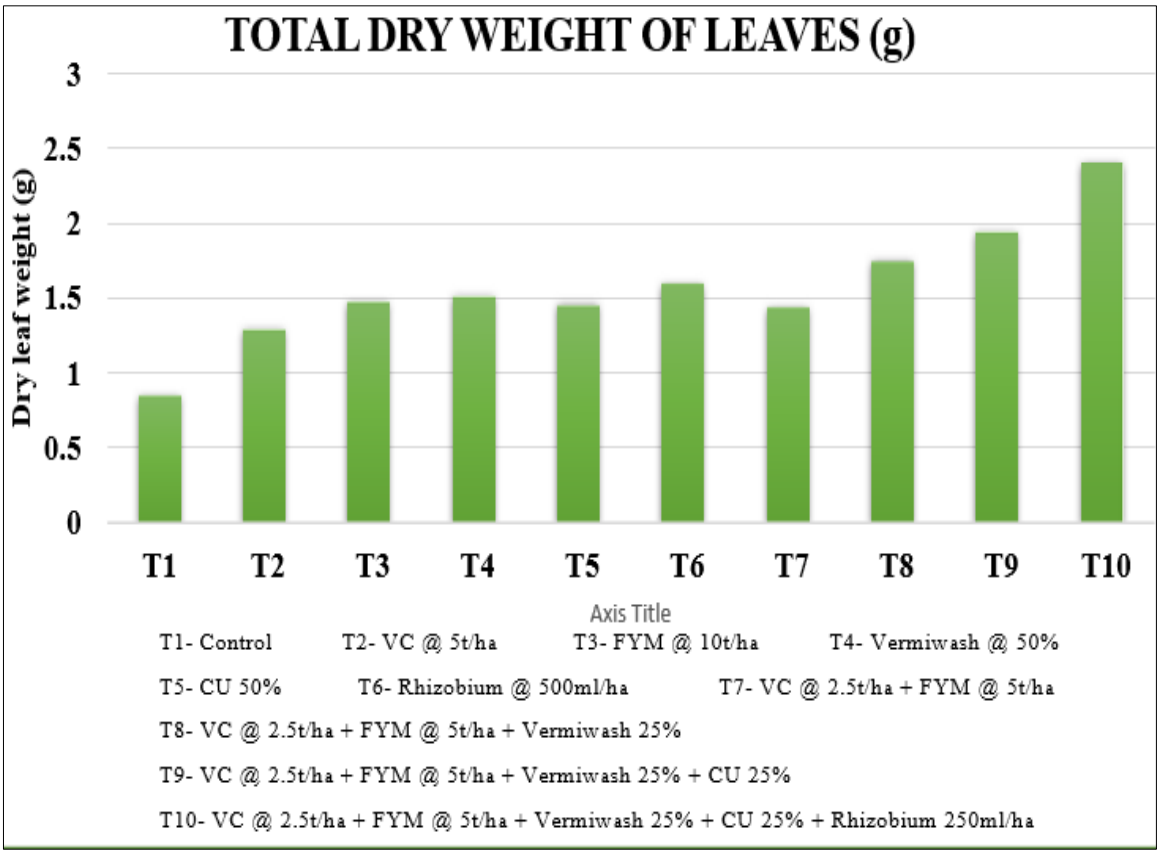

Fig 7: Influence of different organic manures on total dry weight of leaves (g) of coriander at final harvest

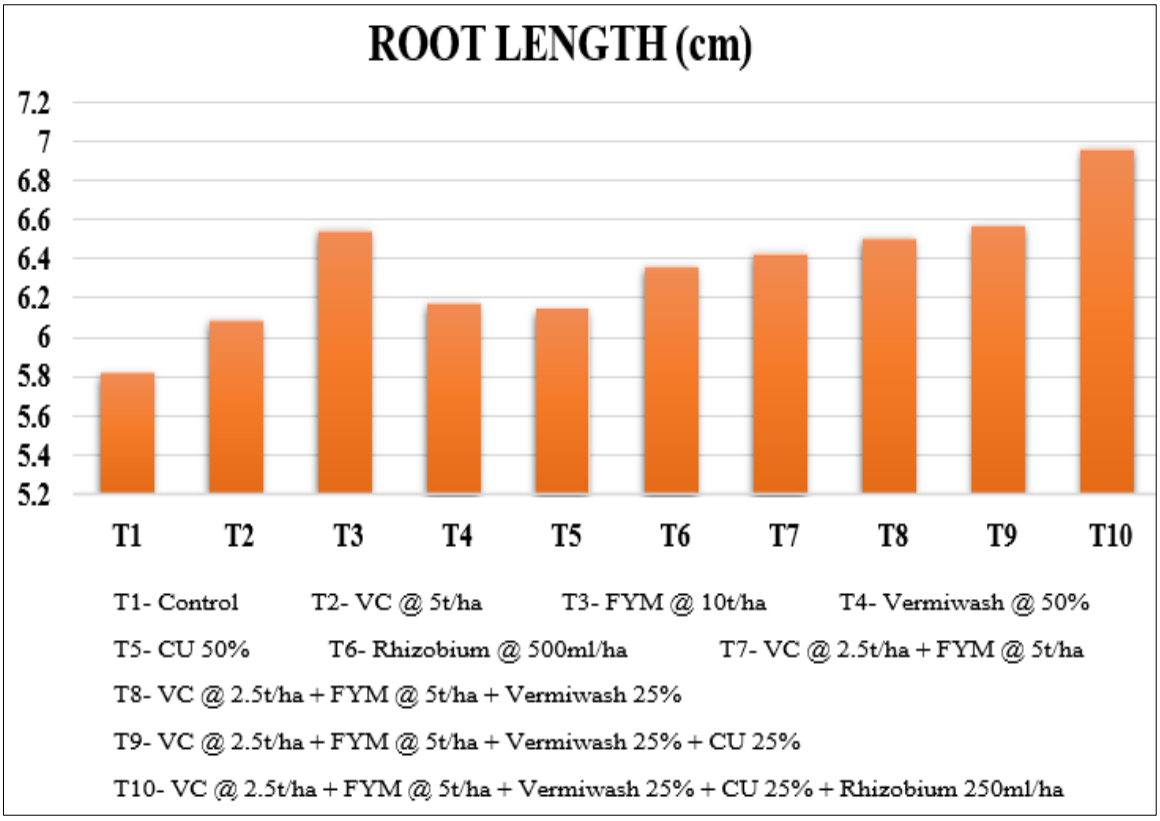

Fig 8: Influence of different organic manures on root length (g) of coriander at final harvest

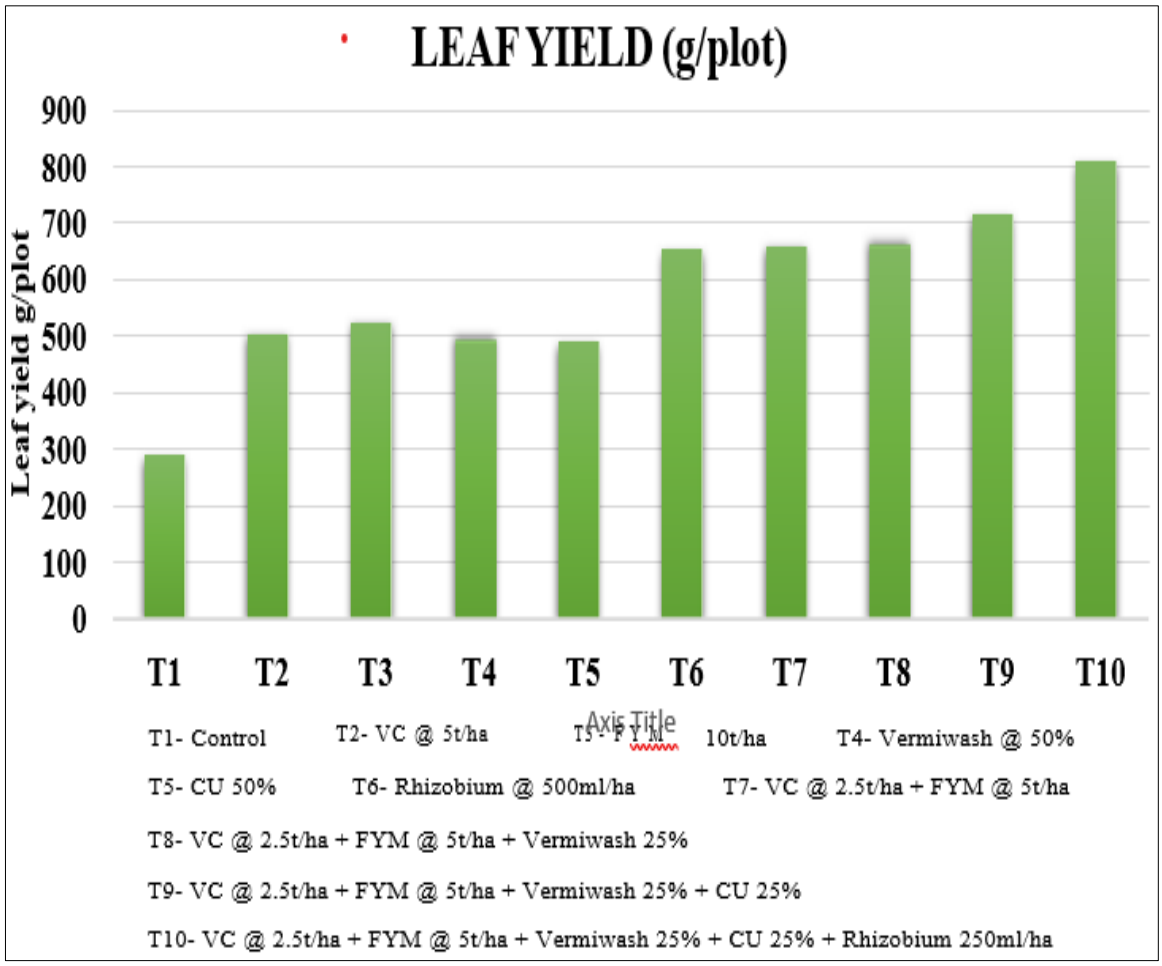

Fig 9: Influence of different organic manures on leaf yield (g/plot) of coriander at final harvest

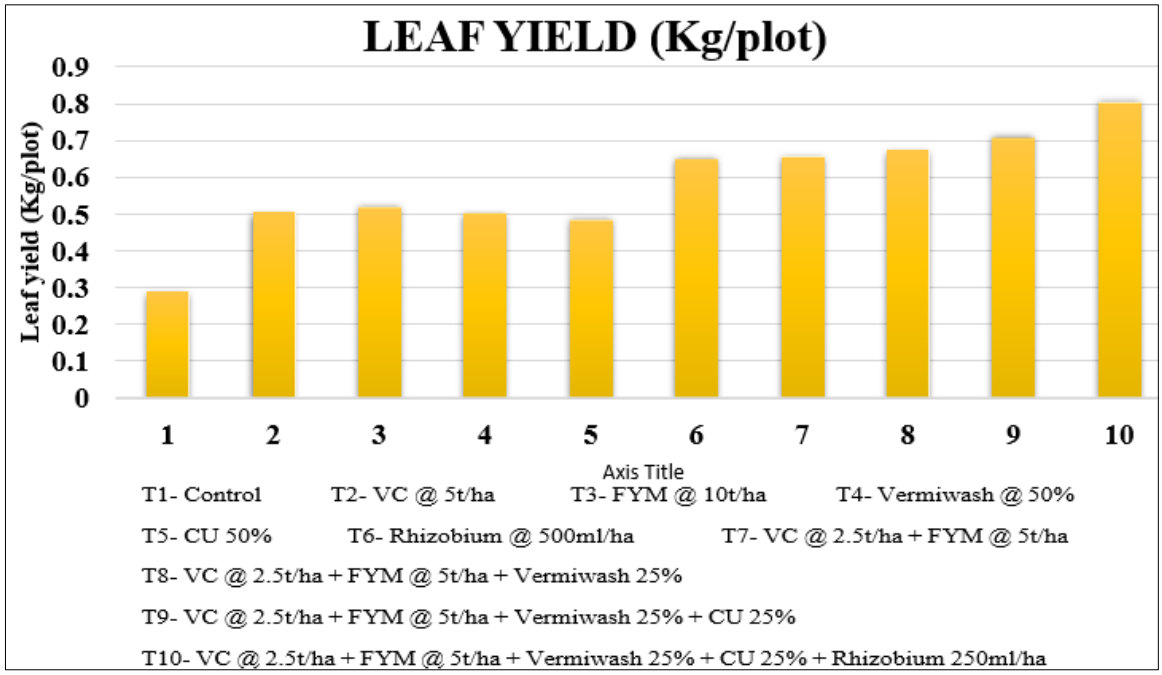

Fig 10: Influence of different organic manures on leaf yield (Kg/plot) of coriander at final harvest

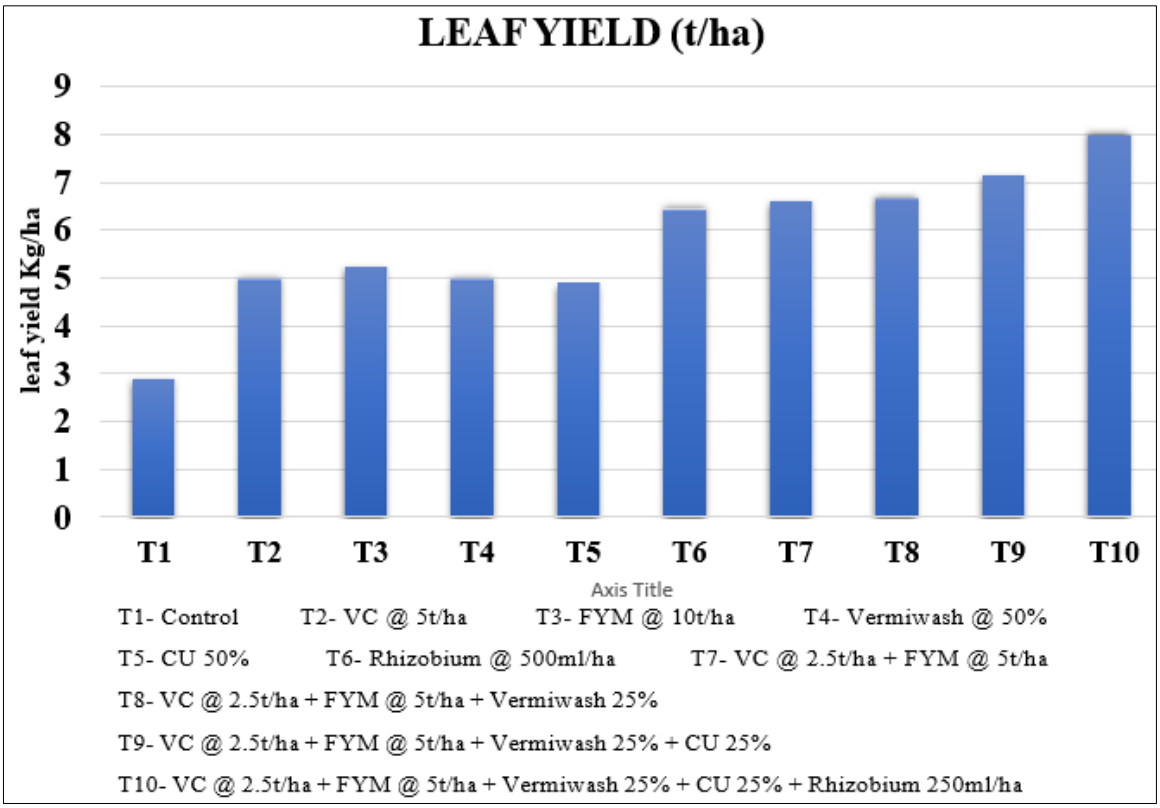

Fig 11: Influence of different organic manures on leaf yield (t/ha) of coriander at final harvest

Conclusion

On the basis of present experimental research on "Effect of organic manure on growth, yield and economics of Coriander (*Coriandrum sativum* L.) under Dehradun Valley of Uttarakhand" in cultivar "Italian Hero", it can be concluded that among different organic manures treatments, the combination of (Vermicompost @2.5t/ha + FYM @5t/ha + Vermiwash @25%/ha + Cow urine @25%/ha + Rhizobium @250ml/ha) i.e. T10 was found to be most effective in terms of vegetative characters such as number of leaves (11), plant height (16.58cm), leaf Length (2.81cm), total fresh weight of per plant (6.55g), total fresh weight of leaves per plant (6.07g), total dry weight of leaves per plant (2.41g), root length (6.95cm), leaf yield (g/plot) (810g), leaf yield (Kg/plot) (0.810 Kg), leaf yield (t/ha) (8.1 t/ha) and T9 (Vermicompost @2.5t/ha + FYM @5t/ha + Vermiwash @25%/ha+ Cow urine @25%/ha) was found to be most effective in leaf diameter (3.17cm). However, net profit of leaf (Rs 3,68,925) as well as B:C ratio of leaf (1:16.32) were recorded maximum in T6 (Rhizobium @ 500ml/ha).

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