



International Journal of Research in Agronomy

E-ISSN: 2618-0618
P-ISSN: 2618-060X
© Agronomy
NAAS Rating (2026): 5.20
www.agronomyjournals.com
2026; 9(6): 609-613
Received: 22-04-2026
Accepted: 24-05-2026

Mohit Rajput

M.Sc. (Ag.) Scholar, Department of Horticulture (Vegetable Science), Faculty of Agricultural Sciences and Allied Industries, Rama University, Mandhana, Kanpur, Uttar Pradesh, India

Jitendra Kumar

Assistant Professor, Department of Horticulture (Vegetable Science), Faculty of Agricultural Sciences and Allied Industries, Rama University, Mandhana, Kanpur, Uttar Pradesh, India

Vinay Joseph Silas

Assistant Professor, Department of Horticulture (Fruit Science), Faculty of Agricultural Sciences and Allied Industries, Rama University, Mandhana, Kanpur, Uttar Pradesh, India

Shobhit Yadav

M.Sc. (Ag.), Department of Genetics and Plant Breeding, Institute of Agriculture and Natural Sciences, Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur, Uttar Pradesh, India

Corresponding Author:

Jitendra Kumar

Assistant Professor, Department of Horticulture (Vegetable Science), Faculty of Agricultural Sciences and Allied Industries, Rama University, Mandhana, Kanpur, Uttar Pradesh, India

Effect of INM on growth, yield and quality of cauliflower (*Brassica oleracea* var. *botrytis* L.)

Mohit Rajput, Jitendra Kumar, Vinay Joseph Silas and Shobhit Yadav

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i6h.5754>

Abstract

A field experiment was conducted during rabi 2025 at Horticulture Research Farm, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur (U.P.), Kanpur. The experiment was laid out in RBD with tenth treatments each replicated thrice on the basis of one year experimentation. It is concluded that the maximum plant height (cm), number of leaves per plant, length of leaves, width of leaves, stem diameter, stem length, days to curd formation, days to marketable curd maturity, curd diameter (cm), total biomass production per plant (g), curd weight (g), curd yield per plot (kg plot⁻¹), curd yield (q ha⁻¹), TSS (°Brix) and ascorbic acid (mg/100g of juice) was significantly highest in T₈ 50% RDF + Vermicompost @ 5 t/ha. It is also recorded that T₈ gave maximum Gross Returns (INR 576220.7/ha), Net Return (INR 465450.4/ha) and Cost benefit ratio of 4.20. So, the treatment combination T₈ 50% RDF + Vermicompost @ 5 t/ha can be taken for better income of farmers and stakeholders for cauliflower cultivation in Kanpur region due to its superior growth, yield, quality, and profitability under INM conditions.

Keywords: INM, growth, yield, quality and cauliflower

Introduction

Cauliflower (*Brassica oleracea* var. *botrytis* L.) is a member of the *Brassicaceae* family. The chromosome count for cauliflower is 2n=2x=18. Its place of origin is the Mediterranean region (*cyperus*). The word cauliflower is derived from the Latin terms 'caulis' and 'floris', which translate to cabbage and flower, respectively. The ancestor of cauliflower is *Brassica cretica*. The nutrition value of cauliflower per 100g of edible portion viz, carbohydrates 4g, protein 2.6g, fat 0.4g, fibre 1.2g, Energy 30Kcal, vitamin C 56mg, Iron 1.5mg, riboflavin, potassium, sodium, calcium etc. Cauliflower is a cool season vegetable crop. Economic part of cauliflower is known as "curd". The optimum temperature for growing cauliflower is 17-20 °C. Seed rate of Cauliflower crop is 500- 600 g/ha. In India, the area under cauliflower was 459000 hectares with a production of 8800 tonnes and productivity of 19.17 tonnes/ha. India produces around 32.5% of the world's total production of cauliflower. Individually cauliflower accounts for 5.06% of vegetable production of the country. More than 20 million tonnes of cauliflower is produced annually worldwide and China and India are among the leading countries. In Madhya Pradesh, cauliflower is grown over an area of approximately 57,953.06 hectares, yielding a production of 1,297,470.2 tonnes, resulting in a productivity rate of about 22.39 tonnes per hectare (Anonymous 2021). INM denotes the integration of organic, inorganic, and biological elements aimed at enhancing crop productivity and preserving soil fertility for future generations. This process is conducted without causing any harmful effects on the physico-chemical and biological characteristics of the soil over an extended period (Gruhn *et al.*). The combined use of organic and chemical fertilizers alongside PGPR has been shown to significantly boost yield and weight in cauliflower compared to the control group (Kaushal *et al.*). Integrated applications that utilize a well-considered mix of mineral fertilizers with organic and biological nutrient sources are not only complementary but also exhibit synergistic effects, as organic inputs provide advantageous benefits (Roy *et al.* 2006). So, INM was applied to make cauliflower cultivation sustainable and to improve soil productivity and fertility.

Materials and Methods

The present study, titled "Effect of INM on Growth, Yield and Quality of Cauliflower (*Brassica oleracea* var. *botrytis* L.)" was conducted at the Horticulture Research Farm, Faculty of Agricultural Sciences and Allied Industries, Rama University, Kanpur (U.P.), Kanpur during the 2025. The location is positioned within the alluvial belt of the Indo-Gangetic central plain region of Uttar Pradesh, classified under agro-climatic zone-V. Generally, the climate is semi-arid, marked by hot, dry summers and moderately to severely cold winters. The average annual rainfall varies between 800 and 900 mm, with a mean annual precipitation of about 818 mm. The experiment consists of 10 treatments including control. The treatment details viz., T₁Control, T₂100% RDF (120:60:60 kg NPK/ha), T₃FYM @ 20 t/ha, T₄Vermicompost @ 5 t/ha, T₅75% RDF + FYM @ 10 t/ha, T₆75% RDF + Vermicompost @ 2.5 t/ha, T₇50% RDF + FYM @ 15 t/ha, T₈50% RDF + Vermicompost @ 5 t/ha, T₉50% RDF + Poultry manure @ 3 t/ha and T₁₀75% RDF + Biofertilizers were used. Observations were recorded plant height (cm), number of leaves per plant, leaf length, leaf width (cm), stem diameter (cm), days to curd formation, days to curd maturity, curd diameter (cm), curd length (cm), curd weight (g), total biomass production per plant (g), curd yield per plot (kg), curd yield (q ha⁻¹), TSS (°Brix) and ascorbic acid (mg/100g of juice). Statistical analysis of the data obtained in the different set of experiments was calculated as suggested by Panse and Sukhatme (1985).

Results and Discussion

The information displayed regarding growth, yield and quality in Table 1, 2 and 3 and 1, 2 and 3 distinctly indicates that notable variations resulting from the impact of INM on the growth, yield and quality of cauliflower were observed. The maximum plant height (cm) at 30, 45 and 60 days after transplanting (33.69, 46.75 and 63.48) was noted in T₈ treatment (50% RDF + Vermicompost @ 5 t/ha), which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha and T₄ Vermicompost @ 5 t/ha. Whereas the minimum plant height (cm) (16.28, 25.16 and 35.42) at 30, 45 and 60 days after sowing was found in treatment T₁ Control. The above the results are in conformity with the findings of Kumar *et al.* (2013)^[15], Pawar and Barkule (2017)^[8], Mohanta *et al.* (2018)^[12] and Kumar *et al.*, (2022)^[16]. NPK fertilizers, with their specific ratios of nitrogen, phosphorus and potassium, promote vigorous vegetative growth, root development and overall plant health, thereby enhancing these growth parameters. Poultry manure, rich in organic matter and essential nutrients, improves soil structure and fertility, providing a balanced and slow-release nutrient supply that supports steady plant growth. When used together, NPK fertilizers and poultry manure can collectively optimize nutrient availability and uptake, resulting in increased plant height, larger leaves and timely curd formation, when applied in appropriate amounts and at the right times. Similar results on effect of INM were reported by Pandey *et al.* (2008)^[9], Kumar *et al.* (2013)^[15], Jahan *et al.* (2014)^[19], Shree *et al.* (2014)^[5], Jasim *et al.* (2014)^[18], Meena *et al.* (2017)^[13], Mohanta *et al.* (2018)^[12], (Shanta *et al.*), Basnet *et al.* (2016)^[22], Gyanwali *et al.* (2022)^[20] and Narval *et al.* The maximum number of leaves per plant at 30, 45 and 60 days after transplanting (9.49, 17.45 and 22.11) was noted in T₈ treatment (50% RDF + Vermicompost @ 5 t/ha), which was statically at par with T₆ 75% RDF + Vermicompost

@ 2.5 t/ha and T₄ Vermicompost @ 5 t/ha. Where as the minimum number of leaves per plant (5.63, 8.81 and 11.52) at 30, 45 and 60 days after sowing was found in treatment T₁Control. The maximum length of leaves at 30, 45 and 60 days after transplanting (18.37, 38.43 and 41.27) was noted in T₈ treatment (50% RDF + Vermicompost @ 5 t/ha), which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha and T₄ Vermicompost @ 5 t/ha. Where as the minimum length of leaves (14.12, 25.76 and 30.26) at 30, 45 and 60 days after sowing was found in treatment T₁Control. The response of INM showed pronounced on the length of leaves (cm). The maximum width of leaves at 30, 45 and 60 days after transplanting (16.34, 24.13 and 28.51) was noted in T₈ treatment (50% RDF + Vermicompost @ 5 t/ha), which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha and T₄ Vermicompost @ 5 t/ha. Where as the minimum width of leaves (11.48, 15.38 and 18.28) at 30, 45 and 60 days after sowing was found in treatment T₁Control. The response of INM showed pronounced on the width of leaves (cm). The above the results are in conformity with the findings of Kumar *et al.* (2013)^[15], Pawar and Barkule (2017)^[8], Mohanta *et al.* (2018)^[12] and Kumar *et al.*, (2022)^[16]. Similar results on effect of INM were reported by Pandey *et al.* (2008)^[15], Kumar *et al.* (2013)^[15], Jahan *et al.* (2014)^[19], Shree *et al.* (2014)^[5], Jasim *et al.* (2014)^[18], Meena *et al.* (2017)^[13], Mohanta *et al.* (2018)^[12], (Shanta *et al.*), Basnet *et al.* (2016)^[22], Gyanwali *et al.* (2022)^[20] and Narval *et al.* The maximum stem diameter at 30, 45 and 60 days after transplanting (1.76, 2.73 and 3.87) was noted in T₈ treatment (50% RDF + Vermicompost @ 5 t/ha), which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha and T₄ Vermicompost @ 5 t/ha. Where as the minimum stem diameter (1.22, 2.03 and 3.03) at 30, 45 and 60 days after sowing was found in treatment T₁Control. The maximum stem length at 30, 45 and 60 days after transplanting (8.54, 15.34 and 19.75) was noted in T₈ treatment (50% RDF + Vermicompost @ 5 t/ha), which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha and T₄ Vermicompost @ 5 t/ha. Where as the minimum stem length (7.13, 10.86 and 12.42) at 30, 45 and 60 days after sowing was found in treatment T₁Control. The minimum days to curd formation (51.40) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, followed by T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha and T₇ 50% RDF + FYM @ 15 t/ha. Where as the maximum days to curd formation (62.51) was found in treatment T₁ Control. The minimum days to marketable curd maturity (64.92) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, followed by T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha and T₇ 50% RDF + FYM @ 15 t/ha. Where as the maximum days to marketable curd maturity (82.17) was found in treatment T₁ Control. The above the results are in conformity with the findings of Velmurugan *et al.* (2008)^[2], Singh, *et al.* (2018)^[4] and Kumar *et al.*, (2022)^[16]. Pandey *et al.* (2008)^[9], Kumar *et al.* (2013)^[15], Jahan *et al.* (2014)^[19], Shree *et al.* (2014)^[5], Jasim *et al.* (2014)^[18], Meena *et al.* (2017)^[13], Mohanta *et al.* (2018)^[12], (Shanta *et al.*), Basnet *et al.* (2016)^[22], Gyanwali *et al.* (2022)^[20] and Narval *et al.* The maximum curd diameter (cm) (18.65) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha, T₃ FYM @ 20 t/ha and

T₇ 50% RDF + FYM @ 15 t/ha. Where as the minimum curd diameter (cm) (13.16) was found in treatment T₁ Control. The above the results are in conformity with the findings of Shaheen *et al.* (2007)^[6] and Kumar *et al.*, (2022)^[16]. Pandey *et al.* (2008)^[9], Kumar *et al.* (2013)^[15], Jahan *et al.* (2014)^[19], Shree *et al.* (2014)^[5], Jasim *et al.* (2014)^[18], Meena *et al.* (2017)^[13], Mohanta *et al.* (2018)^[12], (Shanta *et al.* Basnet *et al.* (2016)^[22], Gyanwali *et al.* (2022)^[20] and Narval *et al.* The maximum total biomass production per plant (g) (988.06) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha, T₃ FYM @ 20 t/ha and T₇ 50% RDF + FYM @ 15 t/ha. Where as the minimum total biomass production per plant (g) (687.87) was found in treatment T₁ Control. The above the results are in conformity with the findings of Wani *et al.* (2011)^[1], Khan *et al.* (2010)^[17] and Kumar *et al.*, (2022)^[16]. Pandey *et al.* (2008)^[9], Kumar *et al.* (2013)^[15], Jahan *et al.* (2014)^[19], Shree *et al.* (2014)^[5], Jasim *et al.* (2014)^[18], Meena *et al.* (2017)^[13], Mohanta *et al.* (2018)^[12], (Shanta *et al.* Basnet *et al.* (2016)^[22], Gyanwali *et al.* (2022)^[20] and Narval *et al.* The maximum curd weight (g) (707.18) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, which was statically at par with T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha, T₃ FYM @ 20 t/ha and T₇ 50% RDF + FYM @ 15 t/ha. Where as the minimum curd weight (g) (203.52) was found in treatment T₁ Control. The above the results are in conformity with the findings of Wani *et al.* (2011)^[1], Khan *et al.* (2010)^[17] and Kumar *et al.*, (2022)^[16]. The capacity for curd retention varies. The enhancement in yield parameters may result from the simultaneous use of various chemical fertilizers and organic manures. NPK fertilizers supply vital nutrients that promote plant growth, resulting in greater curd diameters and elevated curd weight due to improved nutrient accessibility and absorption. Whereas poultry manure is rich in organic matter and nutrients, improves soil structure and fertility, promoting vigorous plant development and higher yields. Combined use of

NPK and poultry manure enhances soil health and nutrient supply, resulting in increased yield per plot and per hectare by providing both immediate and sustained nutrient release. This integrated approach optimizes plant growth conditions, thereby maximizing overall crop productivity. The maximum curd yield per plot (kg plot⁻¹) (23.34) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, followed by T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha and T₂ 100% RDF (120:60:60 kg NPK/ha). Where as the minimum curd yield per plot (kg plot⁻¹) (6.72) was found in treatment T₁ Control. The maximum curd yield (q ha⁻¹) (261.92) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, followed by T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha and T₂ 100% RDF (120:60:60 kg NPK/ha). Where as the minimum curd yield (q ha⁻¹) (75.38) was found in treatment T₁ Control. The above the results are in conformity with the findings of Wani *et al.* (2011)^[1], Khan *et al.* (2010)^[17] and Kumar *et al.*, (2022)^[16]. The staying capacity of curd var. Pandey *et al.* (2007)^[9], Basel *et al.*, Wani *et al.* (2011)^[1], Kumar *et al.* (2013)^[15], Meena *et al.* (2017)^[13], Lodhi *et al.* (2017)^[14], Mohanta *et al.* (2018)^[12], Singh *et al.* (2018)^[4], Rawal *et al.* (2019)^[7] Neupane *et al.* (2020)^[10], Biswas *et al.* (2021)^[21] and Narval *et al.* The maximum TSS (0Brix) (5.58) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, followed by T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha and T₂ 100% RDF (120:60:60 kg NPK/ha). Where as the minimum TSS (0Brix) (3.75) was found in treatment T₁ Control. The above the results are in conformity with the findings of Shaheen *et al.* (2007)^[6] and Kumar *et al.*, (2022)^[16]. The maximum ascorbic acid (mg/100g of juice) (5.58) was noted in T₈ 50% RDF + Vermicompost @ 5 t/ha, followed by T₆ 75% RDF + Vermicompost @ 2.5 t/ha, T₄ Vermicompost @ 5 t/ha and T₂ 100% RDF (120:60:60 kg NPK/ha). Where as the minimum ascorbic acid (mg/100g of juice) (3.75) was found in treatment T₁ Control.

Table 1: Effect of INM on Growth, Yield and Quality of Cauliflower (*Brassica oleracea* var. *botrytis* L.)

No. of Treatments	Treatments details	Growth parameters					
		Plant height (cm)	Number of leaves per plant	Length of leaves (cm)	Width of leaves (cm)	Stem diameter (cm)	Stem length (cm)
T ₁	Control	35.42	11.52	30.26	18.28	3.03	12.42
T ₂	100% RDF (120:60:60 kg NPK/ha)	46.76	17.74	38.15	23.12	3.32	15.09
T ₃	FYM @ 20 t/ha	51.40	18.39	38.55	27.40	3.44	16.09
T ₄	Vermicompost @ 5 t/ha	58.66	19.66	42.23	28.18	3.72	19.07
T ₅	75% RDF + FYM @ 10 t/ha	54.76	18.82	40.23	27.57	3.59	16.55
T ₆	75% RDF + Vermicompost @ 2.5 t/ha	61.21	21.25	45.48	28.37	3.80	19.19
T ₇	50% RDF + FYM @ 15 t/ha	57.00	19.12	41.27	28.06	3.64	18.44
T ₈	50% RDF + Vermicompost @ 5 t/ha	63.48	22.11	46.33	28.51	3.87	19.75
T ₉	50% RDF + Poultry manure @ 3 t/ha	44.16	17.15	37.32	22.91	3.23	14.69
T ₁₀	75% RDF + Biofertilizers	42.01	17.44	36.15	20.42	3.14	14.70
	F-Test	S	S	S	S	S	S
	C.D. at 0.5%	2.007	0.994	1.016	0.484	0.053	0.414
	S.Ed. (+)	0.955	0.473	0.483	0.231	0.025	0.197

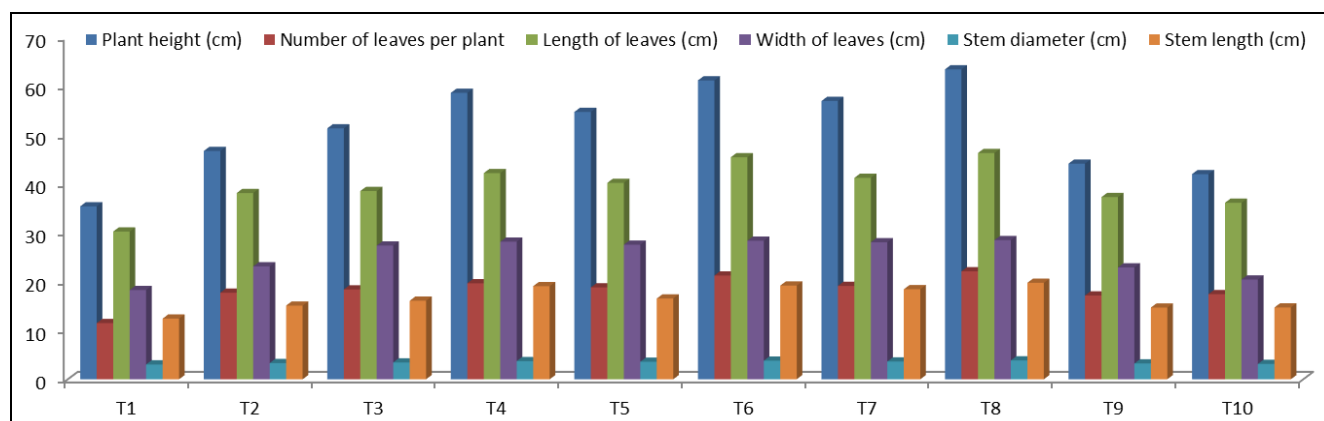


Fig 1: Effect of INM on Growth, Yield and Quality of Cauliflower (*Brassica oleracea* var. *botrytis* L.)

Table 2: Effect of INM on yield parameters of Cauliflower (*Brassica oleracea* var. *botrytis* L.)

No. of Treatments	Treatments details	Yield parameters						
		Days to curd formation stage	Days to marketable curd maturity	Curd diameter (cm)	Total biomass production per plant (g)	Curd weight (g)	Curd yield per plot (kg plot ⁻¹)	Curd yield (q ha ⁻¹)
T ₁	Control	62.51	82.17	13.16	687.77	203.52	6.72	75.38
T ₂	100% RDF (120:60:60 kg NPK/ha)	58.34	76.00	16.65	853.89	482.28	15.92	178.62
T ₃	FYM @ 20 t/ha	57.43	74.53	17.20	893.78	388.14	12.81	143.76
T ₄	Vermicompost @ 5 t/ha	53.36	69.02	18.33	970.06	609.41	20.11	225.71
T ₅	75% RDF + FYM @ 10 t/ha	56.45	73.23	17.40	875.61	408.10	13.47	151.15
T ₆	75% RDF + Vermicompost @ 2.5 t/ha	52.43	66.98	18.50	981.99	627.87	20.72	232.55
T ₇	50% RDF + FYM @ 15 t/ha	54.49	70.71	17.62	908.11	421.33	13.90	156.05
T ₈	50% RDF + Vermicompost @ 5 t/ha	51.40	64.92	18.65	988.06	707.18	23.34	261.92
T ₉	50% RDF + Poultry manure @ 3 t/ha	59.30	77.63	16.24	832.07	402.96	13.30	149.24
T ₁₀	75% RDF + Biofertilizers	60.69	79.57	15.42	823.44	373.77	12.33	138.43
	F-Test	S	S	S	S	S	S	S
	C.D. at 0.5%	0.486	0.486	0.311	3.897	5.611	0.185	2.078
	S.Ed. (+)	0.231	0.231	0.148	1.855	2.671	0.088	0.989

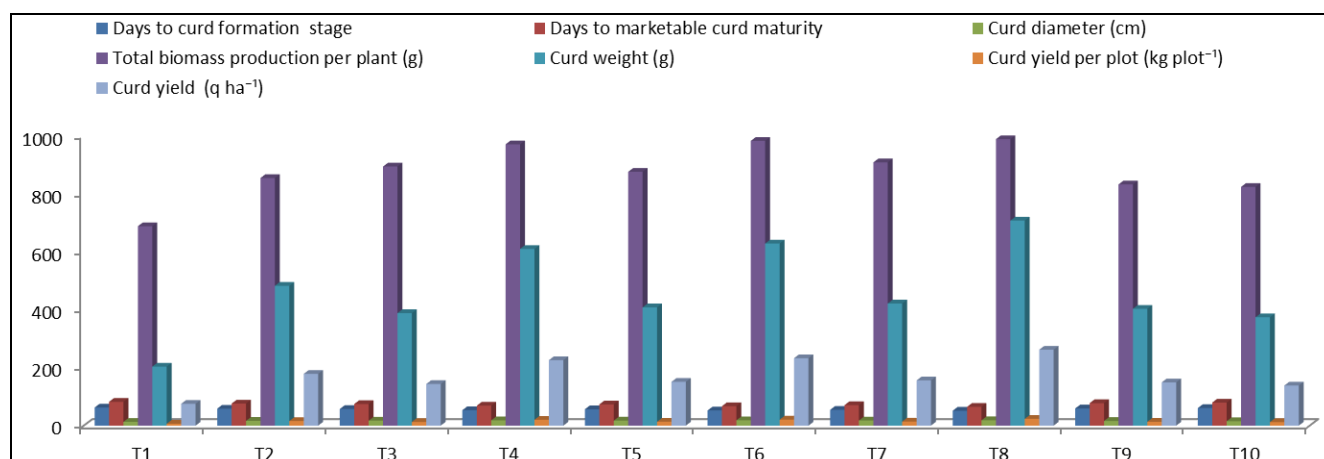


Fig 2: Effect of INM on yield parameters of Cauliflower (*Brassica oleracea* var. *botrytis* L.)

Table 3: Effect of INM on quality parameters of Cauliflower (*Brassica oleracea* var. *botrytis* L.)

No. of Treatments	Treatments details	Quality parameters	
		TSS (0Brix)	Ascorbic acid (mg/100g of juice)
T ₁	Control	3.75	38.73
T ₂	100% RDF (120:60:60 kg NPK/ha)	5.03	49.00
T ₃	FYM @ 20 t/ha	5.06	51.13
T ₄	Vermicompost @ 5 t/ha	5.34	56.95
T ₅	75% RDF + FYM @ 10 t/ha	5.17	52.29
T ₆	75% RDF + Vermicompost @ 2.5 t/ha	5.45	58.47
T ₇	50% RDF + FYM @ 15 t/ha	5.25	54.63
T ₈	50% RDF + Vermicompost @ 5 t/ha	5.58	61.52
T ₉	50% RDF + Poultry manure @ 3 t/ha	4.86	46.96
T ₁₀	75% RDF + Biofertilizers	4.75	45.26
	F-Test	S	S
	C.D. at 0.5%	0.083	1.083
	S.Ed. (+)	0.039	0.516

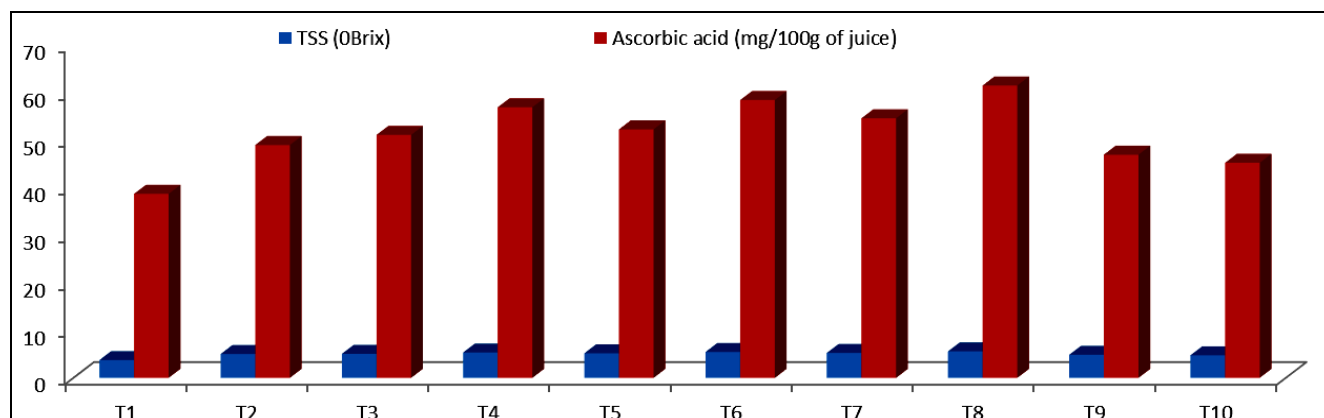


Fig 3: Effect of INM on quality parameters of Cauliflower (*Brassica oleracea* var. *botrytis* L.)

Conclusion

Based on the current investigation, it is concluded that the maximum plant height (cm), the number of leaves per plant, leaf length, leaf width, stem diameter, stem length, days to curd formation, days to marketable curd maturity, curd diameter (cm), total biomass production per plant (g), curd weight (g), curd yield per plot (kg plot^{-1}), curd yield (q ha^{-1}), TSS ($^{\circ}\text{Brix}$), and ascorbic acid (mg/100g of juice) were significantly highest in T₈ 50% RDF + Vermicompost @ 5 t/ha. Therefore, the treatment combination of T₈ 50% RDF + Vermicompost @ 5 t/ha is recommended for enhancing the income of farmers and stakeholders involved in cauliflower cultivation in the Kanpur region, owing to its superior growth, yield and quality under Integrated Nutrient Management (INM) conditions.

References

- Wani AJ, Narayan R, Ahmed N, Singh AK, Chattoo MA, Narayan S. Influence of nutrient sources on cauliflower growth and quality. *Environment and Ecology*. 2011;29:1941-1947.
- Velmurugan M, Balakrishnamoorthy G, Rajamani K, Sunderam P, Gnanam R. Effect of organic manure and biofertilizers on cauliflower. *Crop Research*. 2008;35(1-2):42-45.
- Singh SD, Singh K, Singh P, Singh SA, Pratap T. Effect of INM on cauliflower. *Bulletin of Environment, Pharmacology and Life Sciences*. 2018;7(3):8-11.
- Singh G, Sarvanan S, Kerketta A, Rajesh J. Effect of fertilizers on broccoli cv. Green Magic. *International Journal of Pure and Applied Bioscience*. 2018;6:1338-1342.
- Shree S, Singh VK, Kumar R. Effect of INM on cauliflower. *The Bioscan*. 2014;9:1053-1058.
- Shaheen AM, Fatma AR, Omama MS, Ghoname AA. Bio-inoculants and nitrogen fertilizer effects on okra. *Australian Journal of Basic and Applied Sciences*. 2007;1(3):307-312.
- Rawal G, Mishra SR, Khanal S, Pant KK. Effects of nutrient sources on cauliflower and soil properties. *Farming Management*. 2019;4:87-91.
- Pawar R, Barkule S. Effect of INM on cauliflower. *Journal of Applied and Natural Science*. 2017;9(1):520-525.
- Pandey M, Solanki VPS, Singh O. Effect of INM on cabbage and soil fertility. *Annals of Plant and Soil Research*. 2007;9:159-161.
- Neupane B, Aryal K, Chhetri LB, Regmi S. Effects of INM in early cauliflower production. *Journal of Agriculture and Natural Resources*. 2020;3:353-365.
- Narwal L, Kumar S, Chauhan M, Kumar R, Kumar A. Effect of INM practices on cauliflower. *International Journal of Research in Agronomy*. 2024;7(6):582-586.
- Mohanta R, Nandi AK, Mishra SP, Pattnaik A, Hossain MM, Padhiary AK. Effects of INM on sprouting broccoli. *Journal of Pharmacognosy and Phytochemistry*. 2018;7:2229-2232.
- Meena K, Ram RB, Meena ML, Meena JK, Meena DC. Effect of organic manures and biofertilizers on broccoli. *Chemical Science Review and Letters*. 2017;6:2153-2158.
- Lodhi P, Singh D, Tiwari A. Effect of inorganic and organic fertilizers on yield and economics of broccoli. *International Journal of Current Microbiology and Applied Sciences*. 2017;6(8):562-566.
- Kumar S, Singh JP, Ram RN, Mohan BHK, Kumar D. Influence of INM on growth and yield of cauliflower. *International Journal of Agricultural Sciences*. 2013;9(2):747-749.
- Kumar S, Chauhan R, Abha R, Yadav A, Singh V. Effect of INM on growth, yield and quality of cauliflower cv. *Brassica oleracea* var. *botrytis* Pusa Snowball-16. *The Pharma Innovation Journal*. 2022;11(12):2482-2485.
- Khan N, Srivastava JP, Singh SK. Effect of biofertilizer on growth potential of cauliflower. *Annals of Horticulture*. 2010;2(1):122-123.
- Jasim AH, Wassan M, Al-Timmen AA. Effect of mulch and fertilizers on oxidants and antioxidants of broccoli. *Journal of Agricultural Science*. 2014;2:124-130.
- Jahan FN, Shafahjalal ATM, Paul AK, Mehraj H, Uddin AFMJ. Efficacy of vermicompost and conventional compost on growth and yield of cauliflower. *Bangladesh Research Publications Journal*. 2014;10:33-38.
- Gyanwali P, Singh KP, Pathak R, Bhattarai BP. Effect of INM approach on growth, yield and economics of cauliflower. *Nepalese Horticulture*. 2022;16:45-54.
- Biswas A, Upadhyay D, Rathiya PS. Effect of inorganic fertilizer and organic manures on growth and yield of broccoli (*Brassica oleracea* var. *italica*). *The Pharma Innovation Journal*. 2021;10:1000-1003.
- Basnet M, Shakya SM. Effect of different organic fertilizers on economic yield of cauliflower (*Brassica oleracea* var. *botrytis*). *Nepalese Horticulture*. 2016;11:7-15.