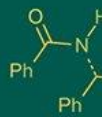


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Vivek Kumar
M.Sc. (Ag.) Horticulture
(Vegetable Science), Faculty of
Agricultural Sciences and
Allied Industries, Rama
University, Mandhana,
Kanpur, Uttar Pradesh, India

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

Alok Kumar
Ph.D. Scholar (Vegetable
Science), Faculty of
Agricultural Sciences and
Allied Industries, Rama
University, Mandhana,
Kanpur, Uttar Pradesh, India

Corresponding Author:
Jitendra Kumar
Assistant Professor,
Horticulture (Vegetable
Science), Faculty of
Agricultural Sciences and
Allied Industries, Rama
University, Mandhana,
Kanpur, Uttar Pradesh, India

Effect of Integrated Nutrient Management Practices on Growth, Yield and Quality of Cabbage (*Brassica oleracea* var. *capitata* L.)

Vivek Kumar, Jitendra Kumar and Alok Kumar

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Abstract

A field experiment was conducted to study the effect of integrated nutrient management (INM) practices on growth, yield and quality of cabbage (*Brassica oleracea* var. *capitata*) during the *rabi* season of 2025-26 at the Agriculture Research Farm, Rama University, Kanpur. The experiment was laid out in a Randomized Complete Block Design (RCBD) with different combinations of inorganic fertilizers, FYM, vermicompost and poultry manure. The treatment comprising 75% RDF + vermicompost + poultry manure recorded significantly superior growth, yield and quality parameters. Integration of organic and inorganic sources not only enhanced productivity but also improved head quality and economic returns. The study concluded that INM is an effective strategy for sustainable cabbage production.

Keywords: Cabbage, INM, vermicompost, poultry manure, head yield, quality

Introduction

Cabbage (*Brassica oleracea* var. *capitata*) is an important cool-season leafy vegetable crop belonging to the Brassicaceae family. It is valued for its high nutritional content, including vitamins (A, C, K), minerals, dietary fibre and antioxidants. Cabbage is widely used in salads, pickles, and cooked vegetables and has medicinal properties for treating digestive disorders and inflammation. India is the second-largest producer of vegetables in the world. Cabbage is a major winter vegetable crop in India, particularly in Uttar Pradesh, West Bengal, Bihar, and Odisha. Proper nutrient management is essential as cabbage is a heavy feeder crop requiring balanced supply of nitrogen, phosphorus, potassium and micronutrients for optimum head formation and yield. Integrated Nutrient Management (INM), which combines inorganic fertilizers with organic sources like FYM, vermicompost and poultry manure, improves soil fertility, nutrient use efficiency, yield and quality while maintaining environmental sustainability. The present study was undertaken to evaluate the effect of different INM practices on growth, yield and quality of cabbage.

Materials and Methods

The experiment was conducted at the Agriculture Research Farm, Faculty of Agricultural Sciences and Allied Industries, Rama University, Mandhana, Kanpur, Uttar Pradesh during the *rabi* season of 2025-26. The soil of the experimental field was sandy loam in texture with neutral to slightly alkaline pH. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Eleven treatments comprising different combinations of recommended dose of fertilizers (RDF) and organic manures were tested. Thirty-day-old seedlings of a suitable cabbage variety were transplanted at recommended spacing.

Treatment Details are- T₁: Control (no fertilizer), T₂: RDF (100:50:50 NPK kg/ha), T₃: 15 t FYM/ha, T₄: 5 t Vermicompost/ha, T₅: 5 t Poultry manure/ha, T₆: 75% RDF + 15 t FYM/ha, T₇: 75% RDF + 5 t Vermicompost + 5 t Poultry manure/ha, T₈: 75% RDF + 5 t Poultry manure/ha, T₉: 50% RDF + 15 t FYM/ha, T₁₀: 50% RDF + 5 t Vermicompost/ha, T₁₁: 50% RDF + 5 t Poultry manure/ha.

Results and Discussion

Effect of Integrated Nutrient Management on Growth Parameters

The treatment T₉ (75% RDF + 25% FYM + Biofertilizers) recorded the highest plant height (25.56 cm), number of leaves per plant (13.98), leaf length (25.12 cm), leaf width (18.64 cm), and plant spread (45.12 cm). This was closely followed by T₄ (75% RDF + 25% Nitrogen through Vermicompost). The superior vegetative growth under these

treatments was due to the balanced and sustained availability of nutrients from the integration of inorganic fertilizers, organic manures, and biofertilizers, which improved soil microbial activity and nutrient uptake. These findings are in agreement with Kalabandiet *et al.* (2007) [3], Choudhary *et al.* (2012) [1], and Mahala *et al.* (2011) [4], who reported significant improvement in growth parameters of cabbage and broccoli under integrated nutrient management involving vermicompost, FYM, and biofertilizers.

Table 1: Effect of INM on Growth Parameters of Cabbage

Treatments	Plant Height (cm)	No. of Leaves/Plant	Leaf Length (cm)	Leaf Width (cm)	Plant Spread (cm)
T ₁	17.68	10.46	18.34	16.01	38.82
T ₂	21.66	11.64	21.65	17.12	41.54
T ₃	24.42	13.52	24.44	18.18	44.64
T ₄	24.84	13.74	24.78	18.48	44.88
T ₅	23.76	13.18	24.08	18.02	44.18
T ₆	22.94	12.56	23.46	17.66	43.28
T ₇	23.28	12.87	23.87	17.86	43.72
T ₈	22.42	12.28	22.64	17.48	42.68
T ₉	25.56	13.98	25.12	18.64	45.12
T ₁₀	21.32	11.48	21.04	16.94	40.44
T ₁₁	20.65	11.14	20.42	16.65	39.65
C.D.	2.034	1.28	2.34	0.83	1.83
SEm (±)	0.79	0.44	0.79	0.28	0.62

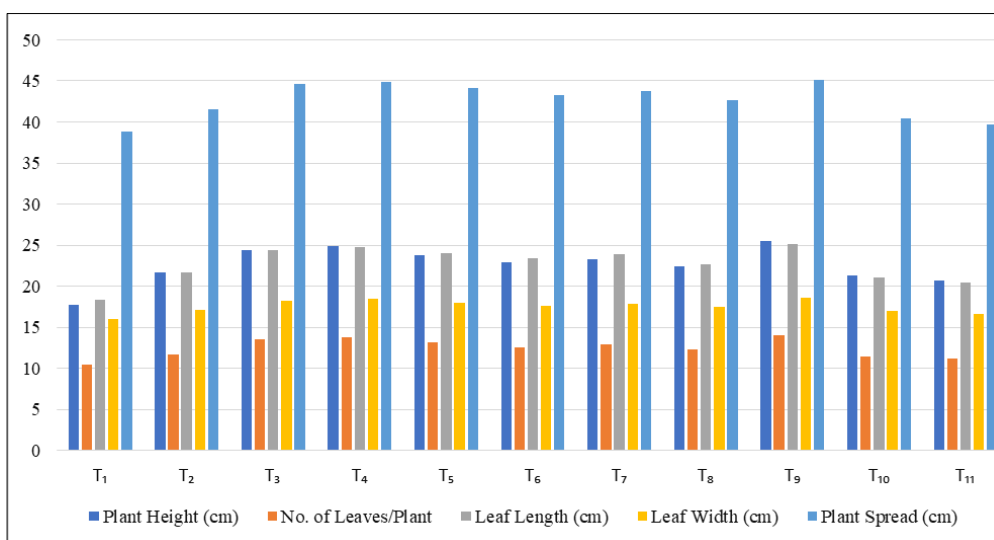


Fig 1: Effect of INM on Growth Parameters of Cabbage

Effect of INM on Head Initiation, Maturity and Yield Attributes

The earliest head initiation (43.00 days) and head maturity (68.00 days) were recorded in T₉. The highest head diameter (13.54 cm), average head weight (1.64 kg), and head yield per hectare (56.62 t/ha) were also recorded in T₉. These improvements were due to better nutrient synchronization

and enhanced physiological processes under integrated application of organic and inorganic sources. These results are supported by Dalalet *et al.* (2010) [2], Rai *et al.* (2013) [6], and Mohapatra *et al.* (2013) [5], who reported significant enhancement in head yield and earliness in cabbage under INM practices.

Table 2: Effect of INM on Head Initiation, Maturity, Diameter, Weight and Yield

Treatments	Days to Head Initiation	Days to Head Maturity	Head Diameter (cm)	Avg. Head Weight (kg)	Head Yield (t/ha)
T ₁	51.65	79.65	9.08	1.02	36.56
T ₂	47.14	75.14	11.40	1.34	41.62
T ₃	45.12	71.12	12.88	1.52	51.84
T ₄	44.00	70.00	13.24	1.58	54.84
T ₅	45.68	72.68	12.54	1.48	49.42
T ₆	46.72	74.72	11.96	1.42	45.28
T ₇	46.24	73.24	12.18	1.45	47.76
T ₈	46.88	73.88	11.68	1.37	42.94
T ₉	43.00	68.00	13.54	1.64	56.62

T ₁₀	47.62	75.62	10.74	1.26	41.24
T ₁₁	48.58	76.58	10.32	1.15	39.87
C.D.	1.70	3.59	1.22	0.54	5.30
SEm (±)	0.58	1.22	0.41	0.18	1.80

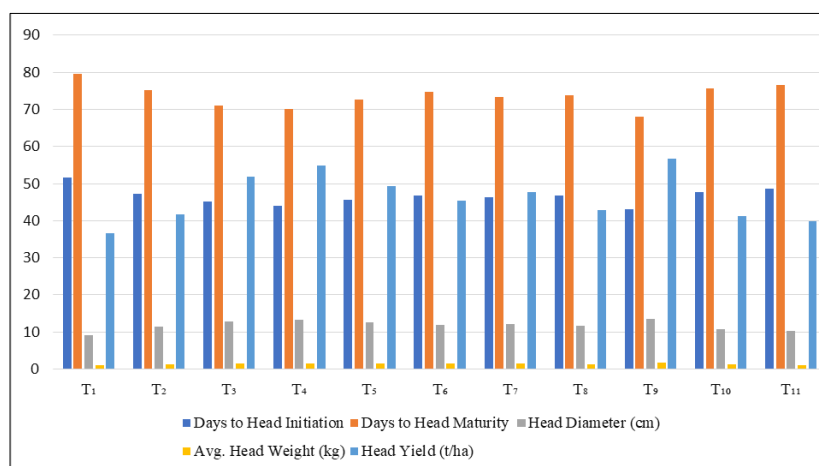


Fig 2: Effect of INM on Head Initiation, Maturity, Diameter, Weight and Yield

Effect of INM on Quality Parameters

The treatment T₉ recorded the highest ascorbic acid (35.54 mg/100g), moisture content (95.64%), and TSS (7.68 °Brix). Improved quality was due to better nutrient balance and

enhanced metabolic activities from organic sources. These findings are in conformity with Choudhary *et al.* (2012) ^[1], Sharma and Sharma (2020) ^[7], and Singh *et al.* (2021) ^[8].

Table 3: Effect of INM on Quality Parameters

Treatments	Ascorbic Acid (mg/100g)	Moisture (%)	TSS (°Brix)
T ₁	32.62	90.65	5.96
T ₂	33.74	93.54	6.48
T ₃	34.98	95.18	7.38
T ₄	35.28	95.38	7.52
T ₅	34.66	94.88	7.22
T ₆	34.18	94.24	6.98
T ₇	34.42	94.62	7.14
T ₈	34.04	93.96	6.82
T ₉	35.54	95.64	7.68
T ₁₀	33.62	92.68	6.24
T ₁₁	33.26	92.04	6.08
C.D.	1.47	1.78	0.71
SEm (±)	0.50	1.61	0.06

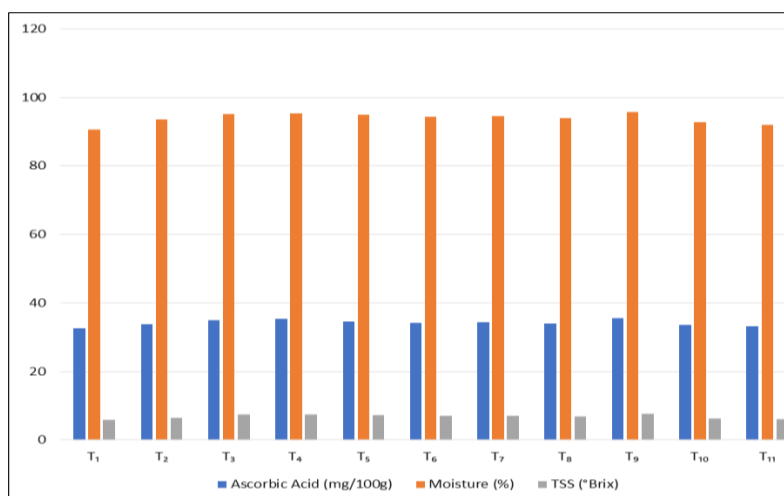


Fig 3: Effect of INM on Quality Parameters

Effect of INM on Economics

The treatment T₉ recorded the highest benefit-cost ratio (2.16), followed by T₄ (2.04). Higher economic returns were

mainly due to significantly higher yield with moderate input cost.

Table 4: Effect of INM on Cost Benefit Ratio

Treatments	Cost Benefit Ratio
T ₁	0.98
T ₂	1.36
T ₃	1.92
T ₄	2.04
T ₅	1.78
T ₆	1.54
T ₇	1.62
T ₈	1.44
T ₉	2.16
T ₁₀	1.28
T ₁₁	1.14

References

- Choudhary S, Sharma R, Kumar V. Effect of organic and inorganic sources of nutrients on growth, yield and quality of sprouting broccoli (*Brassica oleracea* var. *italica*). Indian J Hortic. 2012;69(2):234–239.
- Dalal R, Singh A, Yadav RK. Effect of organic and inorganic sources of nitrogen on growth and yield of cabbage (*Brassica oleracea* var. *capitata* L.). J Veg Sci. 2010;37(1):45–50.
- Kalabandi BK, Singh SP, Kumar R. Effect of organic and inorganic fertilizers on growth and yield of cabbage (*Brassica oleracea* var. *capitata* L.) cv. Pride of India. Vegetable Sci. 2007;34(2):156–160.
- Mahala P, Singh R, Kumar S. Integrated nutrient management in sprouting broccoli (*Brassica oleracea* var. *italica*) cv. Fiesta. Indian J Hortic. 2011;68(3):378–383.
- Mohapatra S, Das A, Behera TK. Integrated nutrient management in sprouting broccoli. Ann Hortic. 2013;6(1):45–52.
- Rai N, Kumar S, Singh V. Effect of vermicompost on growth, yield and quality of cabbage (*Brassica oleracea* var. *capitata* L.). J Veg Sci. 2013;40(2):112–118.
- Sharma A, Sharma S. Effect of integrated nutrient management on nutritional quality of cole crops. J Appl Hortic. 2020;22(2):112–118.
- Singh V, Sharma R, Gupta P. Effect of organic manures on quality parameters of broccoli and cabbage. Indian J Hortic. 2021;78(1):67–74.