

## Effect of Integrated Nutrient Management on Quality of Radish (*Raphanus sativus* L.) cv. Japanese White

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**ABSTRACT:** The present investigation entitled “Effect of Integrated Nutrient Management on quality of Radish (*Raphanus sativus* L.) cv. Japanese White” was carried out the Horticultural Research Farm-1, Department of Horticulture, Babasaheb Bhimrao Ambedkar University (A central university) Vidya Vihar, Raebareli Road, Lucknow (UP) during the season, 2022-2023. The experimental materials for the present investigation was consisted of 10 treatment combinations laid out in Randomized Block Design and replicated thrice. The ascorbic acid of radish were ranged from significantly higher ascorbic acid of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5 followed by T7 with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum ascorbic acid of radish in T1. T.S.S. of radish were ranged from significantly higher T.S.S. of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5 followed by T7 with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum T.S.S of radish in T1. The total sugars in radish exhibited a considerable range, with a notably higher concentration observed when applying NPK 50% + Vermicompost at a rate of 2 tons/ha in T5. Following this, T7, with the application of NPK (50%) + Poultry Manure (50%) at 1.5 tons/ha, also displayed a significantly elevated total sugar content. Conversely, the minimum total sugars in radish were recorded in T1.

**Keywords:** Integrated Nutrient Management, quality, Vermicompost, Poultry Manure, NPK.

### INTRODUCTION

Radish (*Raphanus sativus* L.) is a root crop which is belong from the Brassicaceae family and is native to Europeor Asia. It is the most popular root crop grown all over the world. In India, it is grown in one or the other part of the country throughout the year. It is grown for its young fleshy tuberous roots which are eaten raw or as a salad or cooked. Radish is a cool-season crop and is broadly divided into two groups: European or temperate and Asiatic or Tropical. Asiatic types produce roots and seeds under tropical climates, whereas, European types varieties produce roots under sub-tropical and tropical climates. However, seed production of European types is possible only under temperate conditions in hills since these require chilling temperatures for seed production. The Asiatic varieties although are higher yielders yet poor in quality attributes, whereas, European varieties are small in size, mild in pungency, early in maturity and rich in quality parameters.

Radish is one of the most ancient vegetables. It is cultivated in India over an area of 2,09,210 ha with an annual production of 33,46,690 metric tonnes (Anonymous, 2021), the largest area under this crop in India, West Bengal 41.36 thousand hectares with a production of 548.77 thousand MT followed by

Haryana 27.735 thousand hectares with a production of 550.070 thousand MT.

It is a good source of Vitamins C and minerals like calcium, potassium and phosphorus. The chemical composition of per 100 g radish is as follows; Energy-16kcal, Carbohydrates-3.4g, Sugar-1.86g, Dietary fiber-1.6g, Fat-0.1g, Protein-0.68g, Thiamine-0.012 mg, Riboflavin-0.039 mg, Niacin-0.254 mg, Pantothenic acid-0.165 mg, Vitamin B<sub>6</sub>-0.071 mg, Folate-25g Vitamin C-14.8 mg, Calcium-25 mg, Iron-0.34 mg, Magnesium-10 mg, Manganese-0.069 mg, Phosphorus-20mg, Potassium-233 mg, Zinc-0.28 mg.

### MATERIAL AND METHODS

The field experiment entitled “Effect of Integrated Nutrient Management on quality of Radish (*Raphanus sativus* L.) cv. Japanese White” was carried out to at the Horticultural Research Farm-I of the Department of Horticulture, School of Agriculture Science & Technology, Babasaheb Bhimrao Ambedkar University, Lucknow during the *rabi* season, 2022-2023. The details of the materials used and methods employed in the experimental work have been elaborated as under: Experimental site and climate condition:

## RESULTS AND DISCUSSION

### Effect of INM on quality parameters:

**Ascorbic acid(mg/100g):** Ascorbic acid of different combinations of INM treatments are given in Table 1 showed that ascorbic acid of radish were ranged from 6.35(mg/100g) to 9.46(mg/100g). The significantly higher ascorbic acid of radish was observed with the application of NPK50% +Vermicompost @2 tons/ha in T8 (9.46mg/100g) followed by T6(8.91mg/100g) with the application of NPK (50%) + Poultry Manure (50%)-1.5tons/ha and the minimum ascorbic acid of radish in T1(6.35mg/100g).

**T.S.S. (°Brix):** T.S.S of different combinations of INM treatments are given in Table 1 showed that T.S.S of radish were ranged from 2.45(°Brix) to 4.88(°Brix). The significantly higher T.S.S of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5 (4.88°Brix) followed by T7 (4.12°Brix) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum T.S.S of radish in T1(2.45°Brix).

**Total sugars (%):** Total sugars of different combinations of INM treatments are given in Table 1 showed that Total sugars of radish were ranged from 13.92(%) to 21.85(%). The significantly higher Total sugars of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5(21.85%) followed by T7 (20.10%) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum Total sugars of radish in T1 (13.92%).

**Reducing sugar (%):** Reducing sugar of different combinations of INM treatments are given in Table 1 showed that reducing sugar of radish were ranged from 2.29(%) to 3.19(%). The significantly higher reducing sugar of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5 (3.19%) followed by T7 (2.89%) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum reducing sugar of radish in T1(2.29%).

**Non-reducing sugar(%):** Non-reducing sugar of different combinations of INM treatments are given in Table 1 showed that non-reducing sugar of radish were ranged from 11.04(%) to 17.72(%). The significantly higher non-reducing sugar of radish was observed with the application of NPK50% +Vermicompost @2tons/ha in T5 (17.72%) followed by T7(16.34%) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum non-reducing sugar of radish in T1 (11.04%).

**Effect of INM on quality parameters:** Quality parameters of the radish root was studied with respect to ascorbic acid (mg/100g), T.S.S. (°Brix), total sugar (%), reducing sugar (%) and non-reducing sugar of radish roots after harvesting.

**Ascorbic acid(mg/100g):** Ascorbic acid of different combinations of INM treatments are

given in Table 1 showed that ascorbic acid of radish were ranged from 6.35(mg/100g) to followed by 9.46(mg/100g). The significantly higher ascorbic acid of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T8(9.46mg/100g) followed by T6 (8.91mg/100g) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum ascorbic acid of radish in T1(6.35mg/100g). The similar result also found in Pervez *et al.* (2004) in Radish.

**T.S.S(°Brix):** T.S.S of different combinations of INM treatments are given in Table 1 showed that T.S.S of radish were ranged from 2.45(°Brix) to 4.88(°Brix). The significantly higher T.S.S of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5 (4.88°Brix) followed by T7 (4.12°Brix) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum T.S.S of radish in T1(2.45°Brix). The similar result also found in Pawar *et al.* (2017) in Radish.

**Total sugars (%):** Total sugars of different combinations of INM treatments are given in Table 1 showed that Total sugars of radish were ranged from 13.92(%) to 21.85(%). The significantly higher Total sugars of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5(21.85%) followed by T7 (20.10%) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum Total sugars of radish in T1 (13.92%). The similar result also found in Pathak *et al.* (2018) in Radish.

**Reducing sugar (%):** Reducing sugar of different combinations of INM treatments are given in Table 1 showed that reducing sugar of radish were ranged from 2.29(%) to 3.19(%). The significantly higher reducing sugar of radish was observed with the application of NPK 50% + Vermicompost @2 tons/ha in T5 (3.19%) followed by T7 (2.89%) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum reducing sugar of radish in T1(2.29%). The similar result also found in Parmar *et al.* (2019) in Radish.

**Non-reducing sugar(%):** Non-reducing sugar of different combinations of INM treatments are given in Table 1 showed that non-reducing sugar of radish were ranged from 11.04(%) to 17.72(%). The significantly higher non-reducing sugar of radish was observed with the application of NPK50% +Vermicompost @2tons/ha in T5 (17.72%) followed by T7(16.34%) with the application of NPK (50%) + Poultry Manure (50%) -1.5 tons/ha and the minimum non-reducing sugar of radish in T1 (11.04%). The similar result also found in Yadav *et al.* (2018); Warda *et al.* (2004), in Radish.

**Table 1.**

Treatment	Treatment Details				Reducing sugar (%)
		Ascorbic acid (mg/100g)	T.S.S (°Brix)	Total sugars(%)	
T1	NPK(RDF)–50:60:80kg/ha.	6.35	2.45	13.92	2.29
T2	Vermicompost@4tons/ha.	7.52	3.56	15.03	2.38
T3	FYM@15tons/ha.	7.32	3.78	15.55	2.54
T4	PoultryManure@3tons/ha.	6.82	3.66	17.46	2.35
T5	NPK50%+Vermicompost@2tons/ha.	8.09	4.88	21.85	3.19
T6	NPK(50%)+FYM(50%)-7.5tons/ha.	8.91	3.91	16.74	2.61
T7	NPK (50%) + Poultry Manure(50%) -1.5 tons/ha.	8.18	4.12	20.10	2.89
T8	Vermicompost(50%)+FYM(50%)	9.46	3.88	15.92	2.59
T9	Vermicompost(50%)+Poultry Manure (50%)	7.45	3.79	17.2	2.51
T10	Poultry Manure(50%)+FYM(50%)	6.89	3.11	14.43	2.32
<b>SEm±</b>		0.11	0.06	0.26	0.03
<b>CD (P=005)</b>		0.34	0.20	0.79	0.11

## CONCLUSIONS

On the basis of result obtained from the present investigation it can be concluded that foliar application of NPK 50% + Vermicompost @2tons/ha. was found most effective with respect to vegetative growth maximum and root yield of radish can be recommended to farmers for commercial cultivation of radish (*Raphanus sativus* L.) cv. Japanese White under the Lucknow condition.

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**Conflict of Interest.** None.

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