

Role of organic fertilizers in enhancing the growth attributes, yield and nutritional quality of knolkhol (Kohlarabi)

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SUMMARY

The cultivation of knolkhol (kohlarabi) in India is not very popular except in Kashmir, West Bengal. The tubers of Knolkhol were used as vegetables which contains appreciable amount of vitamins and minerals. Knolkhol (Kohlarabi) was cultivated at Nanded with the application of organic fertilizers (FYM, vermicompost, biofertilizers) to observe the influence of organic fertilizers on growth attributes, yield and nutritional parameter. The results indicated that the growth attributes such as stem diameter, plant height, number of leaves/plant and spread of plant were significantly higher under application of organic fertilizers, than control plot. Yield/ha and maximum nutritional contents were found in organic fertilizer treated plots. Application of vermicompost was found to be most beneficial in increasing the yield and nutritional quality of knolkhol.

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The cultivation of knolkhol (Kohlarabi) in India is not very popular except in Kashmir, West Bengal and some parts of the south. Knolkhol is characterized by the formation of tuber which arises as thickening of the stem tissue above the cotyledons.

This tuber develops entirely above the ground. It is this portion which is used for vegetables, though young leaves are also used in some parts. The tuber (knob) contains appreciable amount of vitamin A and minerals. The knobs may be boiled in water, after adding salt and salt water is drained. The knobs are cut into four pieces, cooled and added with salt and vinegar and served as salad (Rai and Yadav, 2005). Knolkhol is one of the cole crops, which is rich source of vitamin C (ascorbic acid) and vitamin A (B-carotene) (Bose *et al.*, 2002). The large scale use of chemical fertilizers, soil is affected, continuous and steadily use of it, the fertility of soil is decreased. Subbarao and Ravisankar (2001) concluded that maximum fruit yield and dry matter production was found by application of FYM + vermicompost in case of brinjal. Patil (2007) found that highest grain yield was obtained with application of vermicompost in combination with biofertilizer in case of jowar. By considering above

aspects, present paper assess the effect of various organic fertilizers on yield, growth attributing characters and nutritional quality of knolkhol.

MATERIALS AND METHODS

Cole crop like knolkhol (*Brassica caulera* v. Sungrow white) was cultivated at the bank of Godavari river in Nanded city for two consecutive two years 2006 and 2007. Experiments were carried out in Randomized Block Design (RBD).

Two doses of organic fertilizers like FYM- T₂ (11.3t/ha), vermicompost-T₃ (11.3t/ha), T₄ -mixture of biofertilizers (Azab+ PSB+ VAM) *Azotobacter*- Azab, PSB- phosphate solubilizing bacteria (Durga) and VAM-vesicular arbuscular mycorrhiza (Trishul), Karnataka Agrochemicals @ 3kg/ha were applied to knolkhol ; T₁ – control, in control plot no one fertilizer was used.

The sowing of seeds was done in nursery beds. Healthy seedlings were selected and transplanted on one side of ridges in the plots at a spacing of 30 x 30cm (Bose *et al.*, 2002). After establishment of the seedlings, fertilizer treatments were given. Fertilizers were applied twice, at 20 days interval after transplantation. The crop was raised under irrigation and weeding was done whenever required. Morphological observations (growth attributes) were recorded on 30, 45, 60 days after transplantation such as stem diameter, height of plant, number of leaves and spread of plant.

After harvest, fresh weight of each edible tubers

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(knobs), and total yield was recorded and expressed as t/ha. These tubers were chopped into small pieces and 100g sample dried in oven at 60°C ± 5°C. This was dry matter ground into fine powder.

Protein content was estimated by Lowry's, and carbohydrate content by DNSA method (Plummer, 2006), vitamin C (Ascorbic acid) was estimated by following Sadasivam and Manickam (2008), and Calcium content by following A.O.A.C.(1970). Data were statistically analysed following Panse and Sukhatme (1967) and Mungikar(1997).

RESULTS AND DISCUSSION

The results obtained on morphological parameters (growth attributes) are presented in Table 1. There was significant increase in stem diameter (1.87cm), height of the plant (33.6 cm), number of leaves per plant (19.7), spread of plants (5067cm²) due to the treatment of

vermicompost.

Maximum tuber weight (486g) and yield (22t/ha) were recorded due to vermicompost treatment, there was no significant difference in tuber weight (478g) and yield (21.7t/ha) recorded under T₂ (FYM) treatment (Table 2). The increase in growth attributes, photosynthetic potential and consequently the yield. The reason for increased yield attributes might be solubilization effect of plant nutrients by the addition of vermicompost and FYM as evidenced by increase in the uptake of N, P, K, Ca, Mg etc. The another reason for increased plant growth and yield might be due to the improvement in soil physical condition. These results are in accordance with those reported by Nair and Peter (1990) and Shinde (1998).

Data regarding all nutritional parameter of knolkhol are presented in Table 3, the data clearly indicate that dry matter 8.49%, protein 1.98%, carbohydrate 5.03%, vitamin C 123.33 mg/100 g, and calcium 31.9 mg/100 g

Table 1 : Effect of organic fertilizers on growth attributes of knolkhol at 30, 45, 60 days after transplantation

Treatments	Stem diameter (cm)			Plant height (cm)			Number of leaves/ plant			Spread of plant (cm ²)		
	30	45	60	30	45	60	30	45	60	30	45	60
T ₁ - Control	0.78	1.07	1.48	14.5	22.7	26.3	10.2	14.6	16.7	1465	2554	3627
T ₂ - FYM	0.81	1.25	1.69	16.8	24.2	30.4	11.8	16.9	19	1663	3377	4470
T ₃ - Vermicompost	0.96	1.69	1.87	17.4	27.8	33.6	13.9	16.3	19.5	1737	3587	5067
T ₄ - Mixture of biofertilizers	0.87	1.54	1.67	16.5	24.4	28.8	11.9	17.5	19.6	1634	3343	4072
C.D.(P=0.05)	0.03	0.05	0.02	0.4	1.5	0.9	0.8	1.44	1.44	103	221	217

Table 2 : Effect of organic fertilizers on productivity of knolkhol

Treatments	Tuber weight (g)	Yield (t/ha)
T ₁	333	15
T ₂	478	21.7
T ₃	486	22
T ₄	370	16.7
C.D. (P= 0.05)	16.9	0.76

contents were found maximum in vermicompost treated plots than control treatment, followed by FYM and biofertilizers treatment which were more or less at par with each other. It was thus concluded that vermicompost is beneficial for increasing yield and nutritional quality of knolkhol, though application of FYM, and mixture of biofertilizers were also found beneficial.

Table 3: Effect of organic fertilizers on nutritional parameters of knolkhol

Treatments	Dry matter (%)	Protein (%)	Carbohydrate(%)	Vitamin C (mg/100g)	Calcium (mg/100g)
T ₁	7.27	1.1	3.6	84.23	19.2
T ₂	8.03	1.48	4.13	92.2	26.36
T ₃	8.49	1.98	5.03	123.33	31.9
T ₄	8.08	1.48	4.29	97.53	28.83
C.D. (P=0.05)	0.08	0.13	0.17	8.12	0.67

REFERENCES

- A.O.A.C.(1970). Official methods of analysis, 11th Ed. Association of official analytical chemists, Washington, D.C.
- Bose, T.K., Kabir, J., Maity, T.K., Parthasarthy, V.A. and Som, M.G. (2002). *Vegetable crops*, vol.1, Naya Prakash, Kolkatta.

- Mungikar, A.M.(1997). *An introduction to biometry*, Saraswati Printing Press, Aurangabad (M.S.).
- Nair, M. and Peter, K.V. (1990). Organic, inorganic fertilizers and their combinations on yield and storage life of chilli. *Veg. Sci.*, **17**(1): 7-10.
- Panse, V.G and Sukhatme, P.V. (1978). *Statistical methods for agricultural workers*, IV Ed. I. C. A. R., New Delhi.
- Patil, N.N. (2007). Effect of *Arbuscular mycorrhizae* and Vermicompost on yield and nutrient content of Jowar (*Sorghum vulgare* Pers.). *Bioinfolet*, **4** (2): 112-113.
- Plummer, D.T. (2006). *An introduction to practical biochemistry*, IIIrd Ed. Tata Macgraw Hill, New Delhi. Press, Aurangabad (M.S.).
- Rai, N. and Yadav, D.S. (2005). *Advances in vegetable production*. Archobook centre, New Delhi.
- Sadasivam, S. and Manickam (2008). *Biochemical methods*. IIIrd Ed. New age International Publishers, New Delhi.
- Shinde, S.G. (1998). Effect of FYM, cisty compost and Vermicompost on yield and quality of tomato in inceptisol. M. Sc. (Ag.) Thesis, Mahatma Phule Krishi Vidyapeeth, Rahuri (M.S.).
- Subbarao, T.S.S. and Ravisankar (2001). Effect of organic manures on growth and yield of Brinjal. *South Indian J. Hort.*, **49** (special): 288-289.

