

Research
Paper

Influence of Bio-organic nutrition on the performance of cabbage (*Brassica oleraceae* var. *capitata* L.) cv. PRIDE OF INDIA

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ABSTRACT

Cabbage (*Brassica oleraceae* var. *capitata* L.) belonging to the family cruciferae, is one of the most important vegetable of cole group. The cabbage leaves are eaten raw as salad and cooked as well. Literature pertaining to the production of quality cabbage heads through the use of organic nutrition is meagre. Hence, the present investigation was conducted at the Horticultural Research Farm of Ch. S. S. S. (P.G.) college Machhra, Meerut to study the influence of bio-organic nutrition on the performance of cabbage. Results revealed that significantly maximum plant height, plant spread, number of wrapper leaves, and head yield were obtained with the interaction vermicompost 10 t/ha and *Azotobacter* 5 kg/ha. While the maximum number of non-wrapper leaves and head diameter were significantly recorded highest with the combined application of vermicompost 10 t/ha and *Azotobacter* 10 kg/ha.

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Key words : Cabbage, Vermicompost, *Azotobacter*

INTRODUCTION

The indiscriminate use of chemical fertilizers during the post green revolution phase and their deteriorating effects necessitated to find out their alternatives for better yield and quality of crop products. Integration of bio-organic fertilizers (vermicompost and *Azotobacter*) in plant nutrient management opens a new way for reducing the amount of inorganic fertilizers in vegetable production. Vermicompost not only increases the growth and yield of many vegetable crops but also keeps the soil fertile and productive by improving the soil properties like water holding capacity, soil aeration and porosity. It also contains micronutrients and some latent cells of beneficial microorganisms which promote soil health (Vadiraj *et al.*, 1998). In addition *Azotobacter* inoculants fix atmospheric nitrogen accompanied by the production of growth promoting and anti-fungal substances. It also has ability to mobilize nutritionally important micro-nutrients from non-usable form to usable form through biological processes (Mishustin and Navmova, 1962). Cabbage (*Brassica oleraceae* var. *capitata* L.) is an important cole crop possessing an important position among the

vegetable crops grown in India. As the leaf head of cabbage is used as vegetable, the production of quality cabbage through organic farming is merge. Therefore, keeping the above facts in mind, the present investigation was carried out to study the response of vermicompost and *Azotobacter* on the performance of cabbage.

MATERIALS AND METHODS

The present experiment on implication of bio-organic nutrition on cabbage was conducted at the Horticultural Research Farm of Ch. S. S. S. (P.G.) College, Machhra, Meerut during 2004-2005. Soil of the experimental field was sandy loam with 0.42% organic carbon, 7.2pH and 0.052%, 0.008%, 0.019% available nitrogen phosphorous and potash, respectively. The trial was laid out by following factorial RBD with three replications. Treatments comprised of three levels of each of vermicompost (0, 5 and 10 tones/ha) and *Azotobacter* (0, 5, 10 kg/ha) supplied as basal dressing as per the treatment combinations. FYM @ 20t/ha along with half dose of recommended dose of N P K were also applied during final preparation of field to maintain the optimal soil condition. Healthy and disease

Table 1 : Influence of bio-organic nutrition on the performance of cabbage (*Brassica oleraceae* var. *capitata* L.) cv. PRIDE OF INDIA

Treatments	Plant height (cm)	Number of non-wrapper leaves per plant	Plant spread (cm)	Head diameter (cm)	Head length (cm)	Number of wrapper leaves per head	Yield per hectare (q)
V _{0t/ha} + B _{0kg/ha}	18.91	14.63	33.50	9.16	17.47	23.12	314.66
V _{0t/ha} + B _{5kg/ha}	17.25	13.59	30.16	9.28	13.76	25.56	321.33
V _{0t/ha} + B _{10kg/ha}	18.01	16.53	35.73	9.67	13.69	26.66	364.60
V _{5t/ha} + B _{0kg/ha}	18.98	14.90	34.31	9.40	12.81	26.73	396.30
V _{5t/ha} + B _{5kg/ha}	19.30	15.48	37.10	9.67	14.86	28.13	386.33
V _{5t/ha} + B _{10kg/ha}	19.41	13.55	36.79	9.89	14.60	28.01	393.33
V _{10t/ha} + B _{0kg/ha}	20.50	14.82	36.44	10.15	13.71	24.90	413.10
V _{10t/ha} + B _{5kg/ha}	20.75	16.00	40.32	10.55	14.65	26.66	451.73
V _{10t/ha} + B _{10kg/ha}	20.66	17.00	36.01	10.98	13.90	26.10	408.60
S.E. ± ⁺	0.114		1.08	0.100	0.124	0.118	9.82
C.D. (P=0.05)	0.342	NS	3.24	0.301	0.372	0.376	29.46

NS=Non-significant

free seedlings of cabbage cv. Pride of India were transplanted in the prepared plots at 40 x 40 cm spacing as per the layout of the experiment. Other recommended agronomic package of practices were followed to raise a good crop. Observations on growth and yield characters (Table 1) were recorded and average data were subjected to statistical analysis as per the method of Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

Bio-organic fertilizers possess long lasting effect on the soil properties when applied in the right amount and in turn positively influence growth and yield of crop plants. In the present investigation, it was noticed that vermicompost and *Azotobacter* exhibited a tremendous influence on the performance of cabbage. The results worked out during the experiment are being discussed hereunder.

Results summarized in Table 1 reveal that application of vermicompost in combination with *Azotobacter* influenced almost all the growth and yield characters of cabbage under investigation. Significantly the tallest plant and plant spread (20.75 cm and 40.32cm, respectively) with the application of 10t/ha vermicompost + *Azotobacter* 5kg/ha, while the number of leaves (17 leaves) were significantly recorded highest with the treatment vermicompost 10 t/ha + *Azotobacter* 10 kg/ha. The findings are in consonance with the results of Bahadur *et al.* (2004) and Kamla *et al.* (2002). Increase in various vegetative parameters of cabbage due to application of various levels of vermicompost in combination with biofertilizers was possible because of the fact that vermicompost enhances soil fertility and moisture retention

accompanied by the production of hormone like substances in plant metabolism helping in growth and development as depicted by Vadiraj *et al.* (1998). The incorporation of biofertilizer *Azotobacter* fixes the atmospheric nitrogen in soil which in turn enhanced the vegetative growth of cabbage (Mishustin and Navmora, 1962). Increased levels of vermicompost in combination with *Azotobacter* improved plant growth and thereby various yield parameters. The equatorial diameter of heads (10.98 cm), was highest with the vermicompost 10t/ha + *Azotobacter* 10 kg/ha. The findings are in line with those of Bahadur *et al.* (2004). Head length (14.65 cm) and yield per hectare (451.73 q/ha) were significantly higher under the treatment vermicompost 10t/ha + biofertilizer 5 kg/ha. The increase in yield parameters of cabbage with the increased doses of vermicompost may be due to the fact that vermicompost produces some micronutrients and growth stimulating substances released by earthworms at their casts (Najawan and Kanwar, 1959 and Vadiraj *et al.*, 1998) and the better mobilization of plant nutrients through biological processes during late stage of plant growth as stated by Mishustin and Navmova. The findings revealed that the highest dose of vermicompost (10t/ha) in combination with biofertilizer *Azotobacter* was found quite favourable in terms of enhancing performance of cabbage.

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