

EFFECT OF BIOFERTILIZERS IN COMBINATION OF ORGANIC AMENDMENTS OR INORGANIC FERTILIZERS ON GROWTH, YIELD AND QUALITY ATTRIBUTES OF CABBAGE (*Brassica oleracea* L. var. *capitata*)

A.K. UPADHYAY, J. SINGH, JAGDISH SINGH AND ANANT BAHADUR

See end of article for authors' affiliations

Correspondence to :
A.K. UPADHYAY
Department of Agricultural
Chemistry and Soil Science
Udai Pratap College,
VARANASI (U.P.) INDIA

Accepted : December, 2007

ABSTRACT

A field study on use of biofertilizers with organic amendments and/or with inorganic fertilizers was carried out in cabbage cv. Golden Acre at IIVR, Varanasi. The use of recommended NPK along with biofertilizers significantly enhanced the head weight and head yield; however, it did not influence the plant height and total plant weight significantly. The use of biofertilizers in combination with organic amendments significantly influenced the ascorbic acid, total carotenoids, total carbohydrate and crude fiber content in cabbage head. The maximum vitamin C, total carotenoids, total carbohydrates and crude fiber content was recorded in treatment comprising FYM 20 t ha⁻¹ + PSM (T₃). In the present study, use of inorganic fertilizers along with biofertilizers significantly reduced the vitamin C, total carotenoids and crude fiber content.

Key word : Cabbage, Biofertilizers, Organic amendments, NPK, Yield, Quality

vegetables, besides, considerable saving of inorganic fertilizers (Worthington, 2001; Bahadur *et al.*, 2004).

Cabbage (*Brassica oleracea* L. var. *capitata*) is one of the most important cole crop grown worldwide. It is low in calories, fats and carbohydrates, but has a good source of minerals, proteins and antioxidants (Singh *et al.*, 2004). It has medicinal use in treating headaches, gout, diarrhea and peptic ulcers. The protective action of cruciferous vegetables has been attributed to the presence of antioxidants phytochemicals, especially antioxidant vitamins including ascorbic acid, α -tocopherol and β -carotene (Prior and Cao, 2000). Cabbage being a leafy vegetable, is more vulnerable to the use of harmful chemical fertilizers and pesticides. There is growing concern throughout the world on indiscriminate use of inorganic fertilizers, pesticides, herbicides etc. which has adversely affected the biodiversity, soil fertility, quality of the produce and human health. It is also true that high yield of vegetable cannot be realized only with use of organic and biological origin products. Therefore, a judicious combination strategy of using chemical fertilizers, organic manures and biofertilizers may be helpful in increasing vegetable productivity. Such efforts will be effective not only in sustaining productivity and soil health but also in supplementing a part of chemical fertilizers requirement of the crops. The combined and/or sole application of organic amendments and biofertilizers increase yield and also influence quality attributes in several

MATERIALS AND METHODS

A field experiment was carried out at Indian Institute of Vegetable Research, Varanasi during 2004-05 and 2005-06. The experiment was laid out in a randomized block design with 16 treatment combinations including control in three replications. The treatments comprised of different combinations of organic amendments (FYM, digested sludge, press mud and vermicompost), inorganic fertilizers (NPK) with biofertilizers (Azospirillum, VAM and PSM). Five week old seedlings of cabbage cv. Golden Acre were inoculated in thick slurry of biofertilizers and transplanted in field immediately. For comparison, a control (recommended dose of NPK @ 150:60:80 kg ha⁻¹) treatment was also kept.

The soil of the experimental plot was sandy loam, Indo-Gangetic alluvial of Inceptisol origin (Typic Ustochrept) with pH 7.6, EC 0.42 dS m⁻¹, organic carbon 3.9 g kg⁻¹ and available N, P and K was 212.24, 18.50 and 258.76 kg ha⁻¹, respectively. The transplanting of cabbage (cv. Golden Acre) seedlings was done at a spacing 50 x 50 cm in 2 x 2.5 m² plots. The calculated amount of FYM, digested sludge, pressmud and vermicompost as per treatment was applied in well-prepared bed, one month before transplanting. In control plots, all the doses of P and K were applied as basal dose during field preparation, whereas, half dose of N was