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RESEARCH PAPER

Impact of integrated nutrient management on the yield performance of summer tomato (*Lycopersicon esculantum* Mill.) cv. KANCHAN SPECIAL

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Abstract **:** The experiment was conducted at Horticultural Research Centre of Sardar Vallabhbhai Patel University of Agriculture and Technology; Meerut-250110 (U. P.) during spring season, 2009 with cv. KANCHAN SPECIAL. The current approach of integrated nutrient management focused on disseminating the technical know how to major stakeholders to optimize use of organic and inorganic for sustainable agriculture. The experiment consisted eight treatments during the study. The highest yield of tomato was recorded with the application of FYM and recommended dose of NPK fertilizer. The yield parameters of summer tomato like, no. of fruit /plant, fruit weight (g), fruit diameters (cm) and fruit yield (q/ha) was found significantly highest at the treatment combination T_6 (60 kg N+ 30 kg P_2O_5+ 40 kg K_2O +30 tonnes FYM/ha.) followed by other treatments.

Key Words **:** Tomato, FYM, Vermicompost, N, P and K

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INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.,) is one of the most popular fruit vegetable of the family Solanaceae, grown in the world. Tomato is universally treated as a protective food and is also a very good source of income to small and marginal farmers. It is a rich source of minerals, vitamins and organic acid (healthy acid). An adequate application of fertilizers and optimum plant population assume great importance in yield maximization of a particular crop. Major component of organic farming are organic manures, biofertilizers and biopesticides (Asokan *et al*., 2000). Organic manures not only balance the nutrient supply but also improve the physical and chemical properties of soil (Nair and Peter, 1990). During the decades, the concept of integrated nutrient management aims at efficient and judicious use of all major sources of plant nutrients in an integrated manner so as to get maximum economic yield without any deleterious effect on physiological and biological properties of the soil. The organic manuring has positive influence on soil texture and water holding capacity. In this connection to give more emphasis on organic vegetable, production, which minimizes cost of production, increase quality of product and maintain the soil fertility.

MATERIALS AND METHODS

The present investigation was carried out on summer tomato cultivar Kanchan Special during the year 2009 at Horticultural Research Centre of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut-250110 (U. P.). The experiment was conducted in Randomized Block

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Design. All the treatments were randomly distributed among the plots and replicated 3 times. All the organic manures were applied and spread thoroughly all over the experimental plot and rests of the inorganic fertilizers were also applied as per principles. The half dose of nitrogen and full dose of phosphorus and potassium were applied as basal dressing before transplanting and remaining half dose of nitrogen was applied into two spilt doses at 30 days and 45 days after transplanting. The desired amounts of fertilizers as per treatment were mixed thoroughly and the mixture was placed in the line marked for transplanting of seedlings. After placement of fertilizer mixture, the seedlings were transplanted on the marked places. After preparation of field and demarcation of beds, the seedlings of uniform size were transplanted on 17 February, 2009 during evening hours. Just after transplanting a light irrigation was done.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

No. of fruit/plant:

The data in Table 1 revealed that the integrated nutrient management showed significant effects with the respect of number of fruit/plant during the investigation. The maximum number of fruit/plant (21.33) was recorded under T_6 (60 kg N+ 30 kg P_2O_5+ 40 kg K_2O +30 tonnes FYM/ha) treatment followed by T_4 (60 kg N+ 30 kg P_2O_5+ 40 kg K_2O+5 tonnes V.C./ha) treatment (18.66). While, the minimum number of fruit/plant (10.93) were recorded under the control. The increase in number of fruit owing to this treatment might be due to the greater availability of mineral nutrient from nitration of vermicompost and farm yard manures to the plants .These results are in conformity with the finding of Patil *et al*. (2004), Kumar and Srivastav (2006) and Dass *et al*. (2008).

Fruit weight (g):

The fruit weight depicted in Table 1 show that the maximum fruit weight (49.26g) was recorded under the treatment combination T_6 (60 kg N+ 30 kg P_2O_5+ 40 kg K_2O + 30 tonnes FYM/ha.) followed by T_4. While, the lowest value of fruit weight (40.00g) was recorded under control. The increasing fruit weight with the application of integrated nutrient management due to the fact of balanced supply of nitrogen, phosphorus and potassium through chemical fertilizers and macro and micro nutrients from farm yard manures and vermicompost increased the availability of nutrient to the plant. The results are in close conformity of the study carried out by Patil *et al*. (1998).

Fruit diameters (cm):

The data presented in Table 1 revealed that application integrated nutrient management significantly increased the fruit diameters at a constant level. The highest value of fruit diameter (5.24 cm) was recorded at the treatment combination T_6 (60 kg N+ 30 kg P_2O_5+ 40 kg K_2O +30 tonnes FYM/ha) followed by T_4. While, the lowest value of fruit diameters (4.77 cm) was recorded under control. The fruit diameters increased might be due to the better photosynthetic activity also. Since, nitrogen is one of the basic minerals associated with synthesis of amino acid. Similar result was also obtained by Dademal and Dongale (2004).

Fruits yield (q/ha):

The fruit yield increased significantly with the application of integrated nutrient management (Table 1). The maximum yield (261.51 q/ha.) was recorded with T_6 treatment followed by T_4 treatment. While, the minimum yield (132.17 q/ha.) was recorded under control. The increased yield with integrated nutrient management application may be due to the fact that plant supplied with abundant NPK which assimilate higher photosynthetic and batter translocation of foods (assimilates) from source to sink resulting increased

Table 1 : Impact of integrated nutrient management on the yield parameters

Treatments	Notation	No. of fruit/plant	Fruit weight (g)	Fruit diameters (cm)	Fruit yield (q/ha)
120 kg N +60 kg P_2O_5+80 kg K_2O/ha	T_1	13.40	46.33	4.98	168.59
150 kg N+75 kg P_2O_5+100 kg K_2O/ha	T_2	14.20	47.06	5.05	175.00
90kg N+45 kg P_2O_5+60 kg K_2O+2 tonnes V.C./ha	T_3	15.66	47.73	5.10	190.13
60 kg N+30 kg P_2O_5+40 kg K_2O +5 tonnes V.C./ha	T_4	18.66	48.70	5.20	224.91
90 kg N+45 kg P_2O_5+60 kg K_2O+ 15 tonnes FYM /ha	T_5	18.00	48.26	5.11	214.39
60 kg N+30 kg P_2O_5+40 kg K_2O+ 30 tonnes FYM/ha	T_6	21.33	49.26	5.24	261.51
10 tonnes FYM/ha	T_7	13.80	46.80	5.02	171.78
Control	T_8	10.93	40.00	4.77	132.17
C.D. (P=0.05)		1.36	0.90	0.11	6.09
S.E. (±)		0.44	0.29	0.03	1.99

yield of the tomato. These results are in close conformity with the study carried out by Patil *et al*. (1998), Dademal and Dogale (2004).

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