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Response of integrated nutrient management on the growth, yield and quality of *Kharif* onion (*Allium cepa* L.)

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ABSTRACT : The field experiment of study the "Effect of fertility levels on growth, yield and quality of *Kharif* onion" was conducted at Horticulture farm, S.K.N. College of Agriculture, Jobner during *Kharif* 2001 and 2002. The experiment comprising 8 fertility levels (Control, 75%, 100% and 125%) recommended dose of NPK vermicompost 2.5 t ha^{-1} with 25 per cent, 50 per cent and 75 per cent recommended dose of NPK. The application of 50 per cent recommended dose of NPK + vermicompost 2.5 t ha^{-1} significantly improved the plant height, number of leaves at harvest, equatorial diameter thickness of scale, volume of bulb, yield and TSS, vitamin "C" and allyl propyl disulphide content.

KEY WORDS : Recommended dose of NPK, Vermicompost, Yield

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Onion is cultivated in rabi season but early *Kharif* and late *kharif* crops are also thaken in various parts of India, During October – November there is shortage of onion in the market, which lends to heavy prices. Therefore, production of onion in *Kharif* season is more important for continuous supply of onion round the years. Integrated nutrient supply approach is not only the liable way for obtaining fairly high productivity with substainal fertilizer economy but a concept of ecological soundness leading to sustainable agriculture (Swaminathan, 1988). Use of vermicompost in conjunction with chemical fertilizer has been found to be promising not only in maintaining and sustaining higher productivity but also providing stability in crop production. The information on the balanced use of chemical fertilizers along with vermicompost for *Kharif* season onion in the state in very scare. Hence, an experiment was conducted to determine best level of inorganic and organic fertilizer for enhancing the growth, yield and quality of *Kharif* onion.

RESEARCH METHODS

An experiment was conducted during *Kharif* seasons of 2001 and 2002 at horticulture farm, S.K.N. College of Agriculture, Jobner in split plot design with four replication. To obtain good quality of onion sets they are prepared at there and variety N-53 were taken. The seeds were sown in well prepared nursery bed in the first week of February at closer spacing. Then sets were lifted in the first week of May from the nursery beds and tops were removed and graded. The fertility treatment were like as: control, 75 per cent, 100 per cent and 125 per cent recommended dose of NPK, vermicopsost dose of NPK. The recommended dose of NPK was 100 kg N, 50 kg P_2O_5 and 100 kg Murate Of Potash and calculated according to treatment wise. The full dose of phosphorus and potash and half dose of nitrogen were given at the time of transplanting of sets,

and remaining half dose of nitrogen was given 30 days after transplanting and vermicompost was supplied before the planting of sets. The sets were planted 45 x 10 cm distance and both sides of ridges in Aug. month. All the observation were taken and harvesting was determined with the help of hand refractometer at the time of harvesting of bulb. The vitamin "C" content of bulb was determined by diluting the known volume of onion juice with 3 per cent meta-phosphoric acid and titrating with 2, 6 dichloro phenyl indophenols solution (A.O.A.C., 1960), till the faint pink colour was obtained. Allyl propyl disulphide content in onion bulb was determined as pyruvic acid (Hort and Fisher, 1971).

RESEARCH FINDINGS AND DISCUSSION

It is revealed from the data (Table 1) that the plant height, number of leaves plant^{-1} at harvest of onion were significantly affected with different fertility levels. The maximum plant height (5.11 cm), with maximum number of leaves (11.91) were obtain with 50 per cent recommended dose of NPK along with vermicompost 2.5 t ha^{-1} which was at par with 75 per cent recommended dose NPK along with vermicopost 2.5 t ha^{-1}. The improvement in plant height, number of leaves with the application of vermicompost might be due to better moisture holding capacity and supply and availability of major and micro nutrient due to favourable soil condition (Reddy *et al.,* 1998). In case of vermicompost the earthworm carts helps in improvement the soil fertility and availability and nutrients besides some growth stimulating substances excreted by earthworm into their carts. (Senapati *et al.,* 1985).

The yield attributes of onion was significantly influenced with different fertility level. The maximum equatorial diameter (5.62 cm), thickness of scales (0.274 cm), volume of bulb (56.03 cc) and yield (224.29 q ha^{-1}) were recorded with 50 per cent recommended dose of NPK alongwiht vermicompost 2.5 t ha^{-1}. However neck length (6.40 cm) and fresh weight of bulb (95.14 g) were maximum in 75 per cent recommended dose NPK plus vermicompost 2.5 t ha^{-1} but it was at par with (T_7). The present trend of increase in bulb yield and yield attributes with 5 per cent recommended dose of NPK along with vermicompost 2.5 t ha^{-1} is in close conformity with findings of Mahendran and Kumar (1997) and Patil *et al.* (2002), Application of organic manure n the form of vermicompost increased the yield attributes and yield. Such increase may be due to release of macro and

Table 1 : Response of integrated nutrient management on growth, yield and quality of *Kharif* onion

Treatments	Plant height (cm)	Number of leaves per plant at harvest	Neck thickness (cm)	Equatorial diameter (cm)	Thickness of scale (cm)	Fresh weight of bulb (g)	Volume of bulb (cc)	Yield (q per ha)	T.S.S. (%)	Allylpropyl disulphide	Vitamin C (mg/ 100g)
Control	3842	6.61	5.73	4.07	0.188	56.59	41.63	128.76	12.04	6.57	9.20
75% recommended dose of NPK	52.29	9.80	5.81	4.80	0.212	69.27	48.05	158.51	12.09	6.67	9.23
100% recommended dose of NPK	52.96	10.67	5.94	5.34	0.248	79.53	53.74	182.03	12.15	6.95	9.58
125% recommended dose of NPK	52.82	10.36	6.08	5.25	0.229	76.39	53.50	174.97	12.20	6.81	9.44
Vermicompost 2.5 t ha^{-1}	52.47	10.08	6.21	5.15	0.221	71.11	51.18	161.27	12.22	6.74	9.36
25% recommended dose of NPK+ vermicompost 2.5 t ha^{-1}	52.99	11.17	6.28	5.43	0.263	86.48	54.37	198.10	12.27	7.01	9.62
50% recommended dose of NPK+ vermicompost 2.5 t ha^{-1}	53.11	11.91	6.32	5.62	0.274	94.78	56.03	224.29	12.32	7.23	9.66
75% recommended dose of NPK+ vermicompost 2.5 t ha^{-1}	53.16	11.63	6.40	5.60	0.272	95.14	55.15	214.54	12.36	7.07	9.68
S.E.±	0.654	0.121	0.067	0.054	0.0024	0.439	0.664	2.605	0.083	0.067	0.067
C.D. (P=0.05)	1.832	0.338	0.187	0.153	0.0066	1.230	1.860	7.301	0.232	0.187	0.188

micronutrient, during the course of microbial decomposition (Singh and Ram, 1982). The beneficial response of FYM vermicompost to yield might also be attributed to availability of sufficient amount of plant nutrients throughout the growth period of crop uptake, plant vigour and yield (Brar and Pasricha, 1998).

The data presented in Table 1 revealed that application of 75 per cent recommended dose of NPK alongwith vermicompost 2.5 t ha^{-1} affected the TSS, (12.16), Allyl propyl disulphide (7.23) and vitamin "C" (9.68mg/100 g) content but it was at par with 50 per cent recommended dose of NPK plus vermicompost 2.5 t ha^{-1}. An increased in NPK significantly vitamin "C" content, which was due to helped in vigorous vegetative growth and imparted green colour to foliage which favoured photosynthetic activity of plant so there was greater accumulation of food material. The similar results have been also been reported by Singh *et al.* (1989); Thabet *et al.* (1994) and Singh *et al.* (1996).

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