

Quality characters of *Kharif* onion as affected by concentration of cycocel, intra row spacing and levels of nitrogen

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ABSTRACT

The present experiment was carried out to establish the effect of cycocel concentrations (0, 1000, 1500, 2000 ppm) intra row spacings (10, 15cm) and levels of Nitrogen (0, 80, 160, 240kg ha⁻¹) on the quality characters of *Kharif* Onion viz., TSS, Sulphur and Protein content (%) in bulbs. The results of the present experiment showed that 1500 ppm cycocel concentration produced noticeably superior results in terms of all the aforesaid characters in comparison to all the other cycocel treatments. However, 10cm intra row spacing was observed significantly in case of TSS content (%). On contrary 15cm spacing showed prominent results in terms of sulphur and protein content (%) than 10cm spacing. Moreover, 160kg N ha⁻¹ was found to be predominant superior to its counterparts. Obviously 1500 ppm cycocel, 10 cm intra row spacing and 160kg N ha⁻¹ gave sustainable increase in the characters under study and the least results were obtained under control.

Key words : *Kharif* onion, Cycocel (CCC), Protein, Intra row spacing, Sulphur

INTRODUCTION

Onion (*Allium cepa* L.) is famous as “Queen of Kitchen” is an important vegetable consumed daily by human beings and ranks 2nd in area of cultivation and third in production globally. Obviously, *Rabi* onion production being estimated expensive due to lesser moisture content in bulbs requiring more storage facilities and less shelf life, on contrary *Kharif* onion production has attained more popularity as it has proved to be more remunerative in terms of weight of bulbs, requirement of less storage facilities and more shelf life. In spite of these benefits the information regarding growing of *Kharif* Onion are meagre and need to be searched out. Nitrogen being the constituent of chlorophyll develops rapid rate growth which in turn increases the size of bulbs, shelf life of onion bulbs and induced uniformity in bulbs. However, both the deficient as well as over doses have proved to be fatal. The use of PGRs particularly cycocel has proved remunerative in terms of increasing the shelf life and size of bulbs. The judicious spacing is another vital factor governing the production of quantity of onion bulbs. Thus, keeping in view the above facts, the present investigation was carried out to evaluate the optimum dose of nitrogen and cycocel along with optimum intra row spacing for the quality production of *Kharif* onion bulbs.

MATERIALS AND METHODS

The investigation was varied out at the Horticulture Research Farm A.S. College, Lakhoati, Bulandshahr (U.P.) during the *Kharif* season of 2003 and 2004. The experiment was laid out in split plot design with treatments of four of cycocel (0, 1000, 2000 ppm), two of intra row

spacing (10, 15cm) and four levels of Nitrogen (0, 80, 160, 240 kg N ha⁻¹). Thus, in all thirty two treatments were used and replicated thrice. The soil of experimental field was sandy – loam and has pH 8.3 with 0.40 per cent organic carbon, available nitrogen was 199.0kg ha⁻¹ and available phosphorus was 13.5kg ha⁻¹. Concentration of cycocel and spacing were used as main plot treatments and nitrogen levels used as sub plot treatments. Full quantity of single super phosphate and muriate of potash were broadcast on the surface of grass plot and mixed the same in the soil one day before the transplanting. The nitrogen was supplied in the form of urea in three equal installments viz., 1/3 at transplanting, 1/3 at one month after transplanting and 1/3 at 45 days after transplanting. The seedlings of cultivar Agrifound dark red were transplanted on 25th of July in 2003 and 2004. The data for various quality characters were recorded through chemical analysis method.

RESULTS AND DISCUSSION

The analysis of data (Table 1) clearly advocated that the TSS (%), protein and sulphur content (%) were observed higher in 2nd season (2004) than the 1st season (2003). Each increase in cycocel concentration up to 1500 ppm reflected significant increase in TSS (%), protein, sulphur content (%) in bulb over control in both the seasons. Further increase in cycocel concentration from 1500 to 2000 ppm decreased the TSS, protein and sulphur content (%) in both the seasons. Through the maximum TSS content (%) (13.90%), maximum protein content (%) (9.73) and maximum sulphur content (%) (0.62) was obtained with 1500 ppm cycocel concentration in the 2nd

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Table 1: Effect of concentration of cycocel, intra row spacing and nitrogen levels on the TSS, protein content and sulphur content in Kharif onion bulbs

Treatments	Total soluble solids (%)		Protein content (%)		Sulphur content (%)	
	2003	2004	2003	2004	2003	2004
Concentration of cycocel (ppm)						
0	10.10	10.90	9.04	9.22	0.52	0.56
1000	11.50	12.80	9.27	9.44	0.56	0.58
1500	13.50	13.90	8.58	9.73	0.59	0.62
2000	13.10	13.80	9.31	9.51	0.57	0.60
C.D. (P=0.05)	0.61	0.80	0.20	0.21	0.11	0.007
Intra-row spacing (cm)						
10	12.40	13.10	9.26	9.40	0.55	0.57
15	11.60	12.50	9.34	9.50	0.57	0.61
C.D. (P=0.05)	0.46	0.58	0.11	0.12	NS	NS.
Nitrogen (Kg ha ⁻¹)						
0	10.50	11.30	9.00	9.00	0.48	0.51
80	11.50	12.30	9.22	9.37	0.53	0.56
160	13.70	14.00	9.48	9.80	0.58	0.60
240	12.30	13.60	9.50	9.63	0.65	0.69
C.D. (P=0.05)	0.61	0.80	0.20	0.21	0.011	0.012

NS-Non significant

season of the experiment *i.e.* 2004.

Similar results have also been reported by El-Mansy *et al.* (1972), Pandita and Hooda (1979) and Shukla *et al.* (1989) in carrot and tuber crop. The protein content of the bulbs has been increased due to stimulatory effect of cycocel on the enzymatic system and metabolic activities of the plants related to the synthesis of this content (Shafeque and Pandita, 1982). Similarly TSS and sulphur content (%) of bulbs increased due to encouraging effects of cycocel on the utilization of minerals in the leaf metabolism (Pandita and Hooda, 1979).

Effect of intra row spacing :

Table 1 elucidated that 10cm spacing showed highest TSS (%) in both the seasons (year), however, 15 cm intra row spacing gave lowest TSS (%) in bulb during both the seasons *i.e.* 2003, 2004. In contrast, the 15 cm intra row spacing produced pronounced results in the tune of protein and sulphur content (%) than 10cm intra row spacing in both the crop experimentation seasons. The enhancement in the protein and sulphur content (%) might be because less than 15cm intra row spacing maximum land area was available to the individual plant which provided a chance to individual plant to absorb more nutrients from the soil. These results are in agreement with those reported by Muller and Hartmann (1985) and Shrivastava *et al.* (1995) in onion crop.

Effect of nitrogen :

Results of Table 1 inferred that the TSS (%), protein and sulphur content (%) were increased correspondingly and significantly in both the years with each increase in the level of nitrogen. However, minimum TSS (%) in bulb was recorded under the control during both the seasons. In contrast the highest protein and sulphur content (%) were obtained under the nitrogen treatment of 240kg N ha⁻¹ and the least results were manifested under the control in both the seasons. Thus the highest nitrogen level (240kg ha⁻¹) was found significantly superior to all the lower levels of nitrogen (0, 80 and 160 kg ha⁻¹) in terms of the protein and sulphur content (%) in both the seasons. The Probable cause for such increase may be the greater absorption of minerals from the soil and also because nitrogen being the constituent of amino acids and proteins. Increased supply of nitrogen, therefore, resulted in greater protein content of bulbs. These results are in line with the findings reported by Singh *et al.* (1992) and Vachhani and Patel (1993) in onion crop.

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