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Effect of Different Doses and Splits of Potassium on Quality of Onion

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ABSTRACT

A field experiement entitled "Effect of different doses and splits of potassium on quality of onion" was carried out at Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during 2015-16. The experiment was laid out in Factorial Randomized Block Design with three replications and two factors i.e factor 'A' viz., K_1 - 40 kg, K_2 - 50 kg , K_3 - 60 kg and K_4 - 70 kg of K ha^{-1} and factor 'B' S_1, - 100 % at the time of transplanting , S_2 - 50 % at the time of transplanting + 50 % at 30 DAT and S_3 - 33.33 % at the time of transplanting + 33.33 % at 30 DAT + 33.33 % at 60 DAT with 12 treatment combination. The potassium level K_3 was found significantly superior in respect of neck thickness (0.97 cm), TSS of bulb (11.06 ^{O}B). The split application S_2 and S_3 was found significantly superior in respect of neck thickness (0.93 cm) and TSS of bulb (11.16) respectively. Combined effect of different levels of potassium and its split application was statistically significant like 60 kg ha^{-1} K with two split application (K3S2) and three split application of 60 kg ha^{-1} potassium (K_3S_3) and lowest were obtained from 100% at the time of transplanting with 40 kg ha^{-1}.

Key words: *Potassium, Splits, Quality, Onion.*

INTRODUCTION

Onion is indispensable commodity of masses and used as salad and cooked in various ways in curies, fried, boiled, baked and used in soup making and pickles. Besides fresh consumption, onion provides very good raw material for processing industry as it is processed in the form of dehydrated powder, rings, shreds and onion in vinegar or brine. They are highly valued for their flavor and nutritional value in supplying minor constituents such as minerals and trace elements. Potassium is unique element that plants can accumulate it in abundant amounts without any toxicity symptoms. This behavior is referred to as luxury consumption. Potassium plays a regulatory role in plant mechanism. Potassium is not a component of any organic compound in plants. It improves drought tolerance. Neutralizes organic anions and other compounds and maintains the pH of cytoplasm in the range of 7-8. Activates > 60 enzymes, including starch synthetase, potassium is responsible for the activation of nitrate reductase enzyme, enhance its quality, shelf life of fruit and vegetables, reduce lodging of crops, enhance winter hardiness and imparts disease resistance.

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Potassium plays an important role in onion production. Generally a heavy dose of fertilizer is recommended for onion cultivation. Like other tuber and root crops onion is very responsive to potassium. Among the various nutrients required to produce high yield of onion, potassium is considered to be very important element due to its influence for translocation of photosynthates, storage quality, bulb size, bulb numbers and yield per plot. Potassium is one of the three major nutrients taken up by the plant in large quantities and the adequate level of potassium increases crop resistance to various diseases, stalk and stem breakage and at stress conditions. Methods of application of potassium fertilizers have great influence on their utilization by the crop. Time of application of potassium during the growing period of onion is important in bulb formation. Satter and Haque[2] reported that split application of nitrogen and potassium gave higher weight of winter onion bulb than single application of same dose. As this crop is gaining the importance due to its high value consumptions and their pungency contain, it is necessary to study the demand of potassium to produce good quality onion. Considering this view, the study was taken under on "Effect of different doses and splits of potassium on quality of onion", during Rabi 2015-16 with following objectives.

MATERIALS AND METHODS

The research study entitled "Effect of different doses and splits of potassium on quality of onion" was carried out at the Main Garden, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth Akola, during the *rabi* season of 2015-16. The experiment consists with four levels of potassium and three split applications. The effect of these combinations on growth, yield, quality and storage of onion was recorded. Akola is situated at 307.415 meters above mean sea level and geographically situated at latitude of 220.421 and longitude of 770.021E.This place has moderate rainy season, mild winter, comparatively hot and dry summer. The meteorological data recorded at Meteorological Observatory, University Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during the experimental period of 2015-16. The experiment was laid out in Factorial Randomized Block Design with three replications and two factors i.e factor 'A' viz., K_1 - 40 kg, K_2 - 50 kg , K_3 - 60 kg and K_4 - 70 kg of K ha^{-1} and factor 'B' S_1, - 100 % at the time of transplanting , S_2 - 50 % at the time of transplanting + 50 % at 30 DAT and S_3 - 33.33 % at the time of transplanting + 33.33 % at 30 DAT + 33.33 % at 60 DAT with 12 treatment combination. The experimental plot was prepared uniformly by following proper cultural practices and mixed with well decomposed cow dung and all the fertilizers following the recommendation. Except nitrogen and potassium all other fertilizers were applied to the soil during final land preparation. Urea was applied to the soil in two equal splits. The first split was applied during land preparation and second split after 30 DAT. The 55 days old seedlings with uniform growth were transplanted in the experimental plot on 20th January, 2016 by adopting spacing of 15×10 cm. intercultural operations were done whenever required like gap filling, weeding. First irrigation was given just after transplanting and subsequent irrigations were given at weekly intervals. The insect and diseases were controlled with appropriate control measures.The neck thickness (cm), of selected five bulbs in each plot was measured after harvesting. The neck thickness of bulbs of all the observational plants were measured with the help of vernier caliper and recorded in centimeter and TSS of bulbs Scales from randomly selected bulbs were macerated for juice extraction and total soluble solids of the juice was determined by using a hand refractoemeter 0 to 32 range. The values were expressed as ($°Brix$) total soluble solids of the bulbs the data collected on various parameters of the study were statistically analyzed using OP STAT at 5 % level of significance.

RESULT AND DISCUSSION

Neck thickness of bulb

Potassium levels exerted significant decrease in neck thickness was recorded with (0.97 cm) K_3 i.e. 60 Kg per ha which is at par with K_4 (0.98 cm) i.e. 70 Kg potassium per hectare, whereas maximum neck thickness (1.12 cm) was recorded with the K_1 i.e. 40 Kg ha^{-1} respectively (Table 1). Similar findings have been reported from Uikey *et al.* (2015).The split application of potassium, significantly minimum neck thickness (0.93 cm) was recorded with S_2 i.e. Three split application of potash. Whereas, maximum neck thickness (1.18 cm) was recorded with the basal application of potassium i.e. 100% at the time of transplanting .The recorded neck thickness after harvesting indicated that, the neck thickness was positively influenced by split application of potassium. Onion is fairly long duration crop and by split application potash was made available to the plants when they needed it most and thus the nutrients were utilized more effectively. The interaction effect due to potash levels and split application on neck thickness was found significant. The minimum neck thickness (0.84 cm) was recorded with the treatment K_3S_2 i.e. 60 Kg of potassium with two split application. Whereas maximum neck thickness (1.39 cm) was recorded with treatment K_1S_1 respectively.

Table 1: Interaction effect of levels of potash and its split application on neck thickness of bulb

Treatment	**Neck thickness of Bulb (cm)**			
Levels of Potash	**Split application of potash**			
	S_1	**S_2**	**S_3**	**Mean**
K_1	1.39	1.01	0.98	1.12
K_2	1.29	1.00	1.04	1.11
K_3	1.06	0.84	1.02	0.97
K_4	0.99	0.88	1.11	0.98
Mean	1.18	0.93	1.03	
	K	S	KxS	
F test	Sig	Sig	Sig	
SE(m) ±	0.020	0.017	0.034	
CD at 5%	0.058	0.050	0.034	

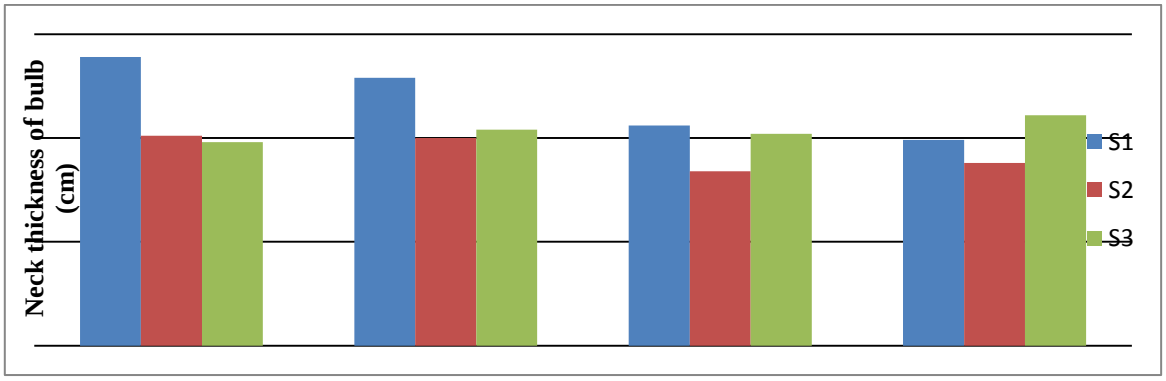

Fig. 1: Interaction effect of different levels of potassium and split application on neck thickness of bulb

TSS of bulb

Potassium levels exerted significant increase in total soluble solid (11.06 °B) for treatment K_3 i.e. 60 Kg ha-1 which was at par with K_2 i.e. 50 Kg of potassium per hectare. Whereas minimum total soluble solid (10.79 °B) was

recorded with the treatment K_1 i.e. 40Kg ha^{-1}. Application of potassium might have enhanced the availability of minerals and accumulation of soluble solids in onion bulbs which resulted in more TSS (Table 2). Similar findings were reported from Uikey *et al.*[5], Singh *et al.*[4], Poornima *et al.*[1] and Siddiquee *et al*[3].

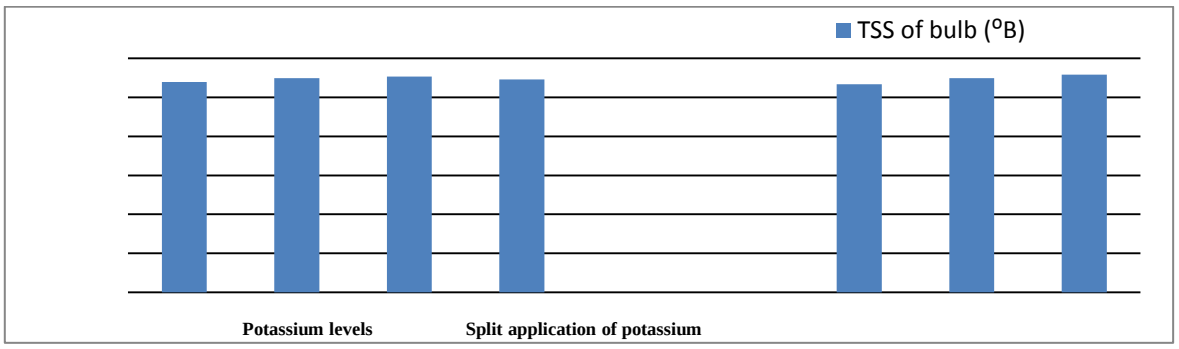

Fig. 2: Effect of different levels of potassium and its split application on TSS of onion bulb

As regards to effect of split application of potassium, total soluble solid (11.16 °B) was recorded with S_3 i.e. three split application of potassium. Whereas, minimum total soluble solids (10.67 °B) was recorded with the basal application of potassium i.e. 100% at the time of transplanting. The recorded total soluble solid indicated that, the total soluble solid was positively influenced by split application of potassium. Split application of potassium was superior to its basal application. The interaction effect of different levels of potassium levels and split application was found to be non significant.

Table 2: Effect of different levels of potassium and its split application on TSS of bulb

Treatments	TSS of Bulbs (°B)
Potassium levels	
K1	10.79
K2	10.98
K3	11.06
K4	10.92
F test	Sig
SE(m)±	0.040
CD at 5%	0.119
Split application	
S1	10.67
S2	10.98
S3	11.16
F test	Sig
SE(m)±	0.035
CD at 5%	0.103
Interaction	
F test	NS
SE(m)±	0.070
CD at 5%	-

CONCLUSION

As regards to potassium levels, the treatment K_3 was found to be record significantly minimum neck thickness and maximum TSS of bulb.The split application of potassium treatment S_2 i.e. two split application of

potassium recorded significantly minimum neck thickness and S_3 i.e three split application recorded the maximum TSS. The treatment combination K_3S_2 i.e. 60 Kg of potassium in two split application recorded significantly minimum neck thickness and K_3S_3 i.e. 60 Kg of potassium in three split application recorded maximum TSS of bulb.

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REFERENCES

1. Poornima, K.S., N. Mamatha and H.S. Ramesh, Effect of potassium and sulphur on quality parameters of onion and chilli intercrops in a vertisol. Advance Research *Journal of Crop Improvement.*, **6(2):** 166-169 (2015).
2. Satter, M.A. and Haque, M.A., Effect of different levels of nitrogen and potash on the yield of onion. Bangladesh Hort., **3(2):** 33-36 (1975).
3. Siddiquee, M.S.H., Rahim, M.A. and Mohiuddin, Effects of potassium on growth and yield of two summer onion varieties. *J. Agrofor. Environ.* **2(1):** 1-6 (2008).
4. Singh, S.P. and Verma, A.B., Response of onion to potassium application. Indian *Journal of Agronomy.*, **46(1):** 182-185 (2001).
5. Uikey, D., Chittora, A., Birla, D. and Thamba, K.N., Effect of potassium and sulphur on growth, yield and quality of onion. *Annals of Plant and Soil Research,* **17(4):** 356-361 (2015).