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Storability of Onion (*Allium cepa* L.) as Influenced by Sources and Levels of Sulphur

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A B S T R A C T

The field experiment was conducted at ICAR- National Institute on Abiotech Stress Management, Baramati to study the effect of different sources and levels of sulphur on soil nutrient availability, yield, quality and nutrient uptake of bellary onion. The experiment consists of 14 treatments replicated thrice in randomized block design. The treatment combinations of sources of sulphur *viz*: elemental sulphur, potassium schoenite ammonium sulphate and three levels of sulphur @ 30, 45 and 60 kg ha^{-1} applied as soil application and nutripellet pack in presence of *Thiobacillus thiooxidans* with recommended dose of fertilizer (100:40:60 kg ha^{-1} N,P_2O_5 & K_2O + 15t ha^{-1} FYM). The source of phosphorus was used as diaammonium phosphate. The onion bulb was stored after harvesting in ambient condition, the storage study was carried out at 30, 60, 90 and 120 days after harvest. The periodical physical loss in weight was significantly lower in treatment RDF + S @ 45 kg ha^{-1} as elemental sulphur + *Thiobacillus thiooxidans* nutripellet pack at 30, 60, 90 and 120 days after harvest (2.32, 6.98, 8.99 and 14.99 percent respectively) and RDF + S@ 60 kg ha^{-1} as potassium schoenite nutripellet pack at 60, 90 and 120 days after harvest (7.22, 9.42 and 15.64 percent respectively). The sulphur sources of potassium schoenite @ 45 and 60 kg ha^{-1} nutripellet pack are beneficial for storability of onion.

Introduction

Sulphur is recognized as the fourth major plant nutrient after nitrogen, phosphorus and potassium in crops. Sulphur requirement of crop is almost similar to that of phosphorus. Sulphur deficiency affects nitrogen metabolism and protein synthesis in plants. This results in accumulation of non protein nitrogen in the plant parts due to partial utilization of nitrogen. At lower sulphur supply the %S in cell walls was reduced. Bulbs grown at low sulphur supply had reduced firmness and pungency. Therefore storage may be adversely affected at low sulphur supply. Sulphur nutrition has also been shown to affect the bulb firmness and dry weight of onion bulbs. Lancaster *et al.,* (2001) showed low sulphur supply reduced the sulphur in cell walls and also decreased the bulb hardness and the storage life of onion bulbs. Qureshi and Lawande (2006) also reported that the storage losses were decreased with application of sulphur. Chalak and Bhalekar (2016) studied the effect of sources and levels of sulphur on growth, yield and storage of onion responded to sulphur levels significantly. Application of elemental sulphur recorded highest bulb yield with reduction in storage losses.

Sulphur fertilization is required for increasing the dry matter production. In the recent years there has been an increased concern about the role of sulphur application as a soil amendment and as a factor of increasing fertilizer use efficiency. Sulphur has a positive effect on onion and other crops. Application of sulphur has several effects such as reducing pH, improving soil water retention and increasing availability of nutrients. In the past, sulphur need of soil and crop was satisfied by use of seemingly incidental means like use of sulphur bearing superphosphate, ammonium sulphate, potassium sulphate sulphur based pesticides, atmospheric So_2 and manures etc. But in recent years, the trend to use high analysis fertilizers and pesticides which are sulphur free, has resulted in sulphur deficient soils. It is necessary to estimate onion response to sulphur fertilization on sulphur deficient

Materials and Methods

A field experiment was conducted on during *rabi*, 2018 and 2019 in the experimental plot of the National Institute on Abiotic Stress Management (ICAR-NIASM), Malegaon Kurd, Baramati, Pune, Maharashtra. The alkaline (pH 8.2) soil of the experimental field was clay loam in texture, low in organic carbon 3.2 g kg^{-1} and available N, P, K, content were 110, 15, 220 kg ha^{-1} respectively for secondary nutrients for Ca, Mg, and sulphur content were 611, 53, 6.3 ppm respectively. The experiment was laid out in randomized block design with three replications. Panse and Sukhatme, 1989. There were fourteen treatments including control along with four doses of sulphur i.e. 0, 30, 45 and 60 kg ha^{-1} from three sources. Individual plot size was 3 x 4 m and plant spacing was 15 x 10 cm. a uniform recommended dose of N: P_2O_5: K_2O (110:40:60 kg ha^{-1}) was applied to all the plots except control. The sources of nitrogen, phosphorus and potassium were Urea, Dia ammonium phosphate and Murate of potash respectively. The sources of sulphur were elemental sulphur contain 80% sulphur (Bentonite Clay), potassium schoenite contain 21.5% sulphur and ammonium sulphate contain 24% sulphur. Full dose of phosphorus and potassium and $1_{/3}$ dose of nitrogen was also applied before transplanting. The remaining $2_{/3}$ dose of nitrogen was applied in two equal splits at 30 and 45 days after transplanting. Onion cultivar Bhima Kiran was grown as study material. Transplanting of onion was done on 20th January, 2018. Regular irrigations and weeding was done and plant protection measures were taken as needed. The crop was harvested at 120 days after transplanting on 20th May, 2018. The observations on various traits were recorded from five randomly selected competitive plants in each treatments and replication. Data on physiological weight loss were taken in laboratory. The onion bulbs @ 20 kg from each treatment in three replications were stored in perforated plastic crates under top and bottom ventilated storage structure under ambient condition. Storage losses were recorded at 30, 60, 90, and 120 days after harvest. The parameters, physiological loss of weight was assessed and expressed in percentage. The data on all storage studies were tabulated and subject to statistical analysis. The total variation of different treatments was tested for significance by "F" test using analysis of variance technique.

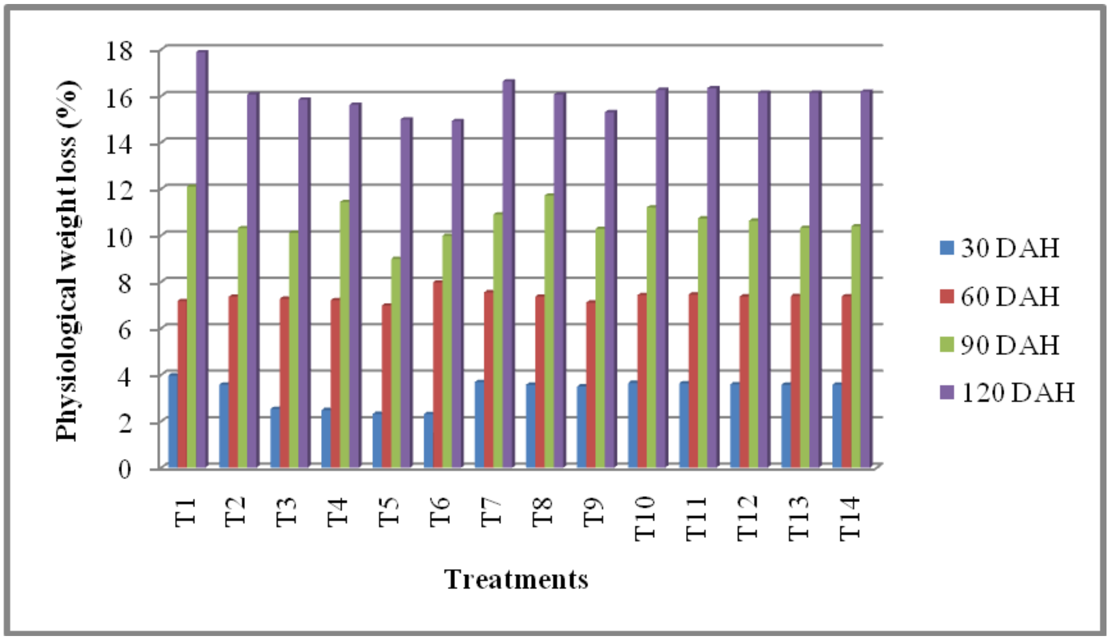
Results and Discussion

The physiological loss in weight and storage losses are the main causes to reduce the storability of onion however sulphur application nutrition to onion reduce the physiological loss in weight and storage losses and increased the storability and maintain the quality of onion during storage after harvest. The periodical physiological loss in weight at 30,60,90 and 120 days after harvest was recorded significantly less in treatment RDF + S @ 45 kg ha^{-1} as elemental sulphur + *thiobacillus thiooxidant* Nutripellet pack (2.32, 6.98, 8.99 and 14.99 percent respectively). The less physiological loss in weight might be because of sulphur nutrition to onion protect the onion bulb from fungal infection as inherently absorbed sulphur during growth period. The absorbed sulphur act as fungicide in onion bulb to arrest the fungus infection. The periodical storage losses at 60, 90 and 120 days after harvest was significantly lower in treatment RDF + S @ 60 kg ha^{-1} as potassium schoenite Nutripellet pack (7.22, 9.42 and 15. 64% respectively) and statistically on par with RDF + S @ 45 kg ha^{-1} as potassium schoenite Nutripellet pack (7.23, 9.98 and 15.67 % respectively). The potassium schoenite is source of sulphur as well as potassium both the elements plays crucial role in plant metabolic activities. The Potassium alone activate more than 65 enzymes, transfer the photosynthes from source to sink, enhance the resistance against pest, diseases and water stress. The sulphur Involves in chlorophyll, protein, amino acid synthesis in plant. This might be reflected in reduced losses of onion. Similar observations were reported by (Tripathy *et al.*, 2016).

Table.1 Effect of sources and levels of sulphur on physiological weight loss (PWL) (%) in bellary onion (Mean of three replications)

Treatments		DAH			
		30	**60**	**90**	**120**
T_1	Control	3.97	7.17	12.1	17.88
T_2	RDF + elemental S @ 30 kg ha^{-1} soil application + FYM@ 15 t ha^{-1}	3.58	7.36	10.31	16.07
T_3	RDF +S@45kg ha^{-1} as elemental S+ *Thiobacillus thiooxidans* -Soil application	2.53	7.27	10.11	15.84
T_4	RDF +S@ 60kg ha^{-1} as elemental S + *Thiobacillus thiooxidans*- Soil application	2.48	7.21	11.44	15.62
T_5	RDF +S@ 45kg ha^{-1} as elemental S + *Thiobacillus thiooxidans*–Nutripellet Pack	2.32	6.98	8.99	14.99
T_6	RDF +S@ 60kg ha^{-1} as elemental S+ *Thiobacillus thiooxidans*–Nutripellet Pack	2.31	7.97	9.98	14.92
T_7	RDF +S@ 45 kg ha^{-1} as Potassium schoenite-Soil application	3.69	7.55	10.9	16.63
T_8	RDF +S@ 60 kg ha^{-1} as Potassium schoenite-Soil application	3.57	7.36	11.71	16.06
T_9	RDF +S@ 45 kg ha^{-1} as Potassium schoenite – Nutripellet Pack	3.5	7.11	10.28	15.30
T_{10}	RDF +S@ 60 kg ha^{-1} as Potassium schoenite –Nutripellet Pack	3.65	7.43	11.2	16.26
T_{11}	RDF +S@ 45 kg ha^{-1} as Ammonium sulphate -Soil application	3.63	7.45	10.73	16.33
T_{12}	RDF +S@ 60 kg ha^{-1} as Ammonium sulphate –Soil application	3.59	7.37	10.63	16.14
T_{13}	RDF +S@ 45 kg ha^{-1} as Ammonium sulphate – Nutripellet Pack	3.57	7.39	10.32	16.14
T_{14}	RDF +S@ 60 kg ha^{-1} as Ammonium sulphate - Nutripellet Pack	3.58	7.38	10.39	16.19
	SEd	**0.08**	**0.07**	**0.08**	**0.063**
	CD (p = 0.05)	**0.16**	**0.15**	**0.17**	**0.144**

Fig.1 Effect of sources and levels of sulphur on PWL physiological weight loss in bellary onion



References

Bhalekar, S., S. Chalak, and K. Bhangre. 2016. "Effect of Plant Growth Regulators and Nutrients on Growth and Yield of Green Top Onion (Vegetable purpose)." *Journal of Agriculture Research and Technology* 41 (1):44.

Jaggi, R., and S. Dixit. 1999. "Onion (Allium cepa) responses to sulphur in representative vegetable growing soils of Kangra Valley of Himachal Pradesh." *Indian journal of agricultural science* 69 (4):289-291.

Kumar, R., S. Singh, and S. Smriti. 2002. "Effect Of Sulphur And Boron-Nutrition On Growth, Yield And Quality Of Onion."

Panse, V. G. and Sukhatme, P. V. 1989. *Statistical Methods for Agricultural Workers*. Indian Council of Agricultural Research, New Delhi.

Qureshi A. A., and Lawande K. E., 2006. Response of onion (*Allium cepa*) to sulphur application for yield, quality and its storability in S-deficient soils. *Indian Journal of Agricultural Sciences*.76(9):535-7.

Tripathy, P., B. Sahoo, D. Patel, and D. Dash. 2016. "Efficacy of sulphur on growth, yield and bulb quality in onion (*Allium cepa* L.)." *Journal of Spices and Aromatic Crops* 25 (1):60-64.

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