International Journal of Forestry and Crop Improvement
December, 2011 | Volume 2 | Issue 2 | 121-123

Research Article

Growth, yield and quality parameters of sesamum (*Sesamum indicum* L.) as influenced by different levels of potash and sulphur

N.D. BHOSALE, B.M. DABHI, V.P. GAIKWAD AND A.B. CHAVAN

Abstract : A field study was conducted during *Kharif* season of 2008 at college instructional farm, Junagadh Agricultural University, Junagadh to study the influence of different levels of potash and sulphur on growth, yield and quality of sesamum (*Sesamum indicum* L). Three levels of potash and three levels of sulphur were tried. Among different potash levels, potash @ 50 Kg ha^{-1} registered significantly higher plant height (94.71cm), number of branches per plant (3.43), seed yield (813 kg ha^{-1}), stover yield (1165 kg ha^{-1}), oil content (44.89 %) and protein content (27.82 %) over control. Similarly sulphur levels also recorded significant effect in increasing all these growth, yield and quality parameters. Sulphur @ 40 kg ha^{-1} registered higher plant height (95.37 cm), number of branches per plant (3.47 g plant^{-1}), seed yield (804 kg ha^{-1}), stover yield (1146 kg ha^{-1}), oil content (45.46 %) and protein content (28.04 %) as compared to all other treatments.

Key Words : Sesamum, Potash, Sulphur, Seed yield, Stover yield, Oil content and protein content

How to cite this Article: Bhosale, N.D., Dabhi, B.M., Gaikwad, V.P. and Chavan, A.B. (2011). Growth, yield and quality parameters of sesamum (*Sesamum indicum* L) as influenced by different levels of potash and sulphur, *Internat. J. Forestry & Crop Improv.,* **2** (2) : 121-123.

Article Chronical : **Received :** *26.05.2011;* **Revised :** *10.07.2011;* **Accepted :** *01.10.2011*

INTRODUCTION

Sesamum indicum L. (Syn. *Sesamum orientale* L.), which is known variously as sesamum, til, gingelly, simsim, gergelim etc. is one of the most important oilseed crop grown extensively in India. Sesamum is the oldest indigenous oil plant with longest history of its cultivation in India. India is still the world leader with the maximum production (25.8%) from the largest area (29.3%) and highest export (40%) of sesamum in the world. India, China, Burma, Sudan, Pakistan and Mexico are the main sesamum producing countries of the world. In India, sesamum is an important edible oilseed crop, stands next to groundnut. It is cultivated in an area of about 17.2 lakh hectares with production of 8.00 lakh tonnes of seeds and productivity of 421 kg ha^{-1}. It is mainly grown in Gujarat, Uttar Pradesh, Madhya Pradesh, Karnataka, Orissa, Bihar, Jharkhand, Andhra Pradesh, Kerala and Tamil Nadu.

Fertilizers, even though comparatively a costly input of production are essential for securing higher yields. The prudent use of fertilizers with appropriate method and time of application are the prime importance in securing higher and economic yields. The potassium is one of the major plant nutrients for the growth and development of plants. The major functions are enzymes involved in photosynthesis, metabolism of carbohydrate and protein. The potassium is also improved crop quality and yield characteristics by increasing disease resistance in a number of crops. Sulphur as a plant nutrient can play a key role in augmenting the production and productivity of oilseeds in

MEMBERS OF RESEARCH FORUM

Author of the Correspondence :
N.D. BHOSALE, Department of Agronomy, B.A. College of Agriculture, Anand Agricultural University, ANAND (GUJARAT) INDIA
Email : nileshbhosale007@gmail.com

Address of the Coopted Authors :
B.M. DABHI, Department of Agronomy, College of Agriculture, Junagadh Agricultural University, JUNAGADH (GUJARAT) INDIA

V.P. GAIKWAD, Department of Agronomy, B.A. College of Agriculture, Anand Agricultural University, ANAND (GUJARAT) INDIA

A.B. CHAVAN, Department of Agricultural Chemistry and Soil Science, College of Agriculture, BAHUBALI (M.S.) INDIA

the country as it has a significant influence on quality and development of oil seeds which positively reflect the economics of the sesamum. For exploiting the potential yield of sesamum use of potash and sulphur application is necessary. Keeping in view the above facts the present investigation was therefore initiated to work out the response of potash and sulphur fertilizers on growth, yield and quality of sesamum.

EXPERIMENTAL METHODS

A field experiment was conducted during *Kharif* season of 2008 at College instructional Farm, Junagadh Agricultural University, Junagadh to study the response of sesamum (*Sesamum indicum* L) to different levels of potash and sulphur. The soil of the experiment field was clayey in texture, medium in available nitrogen (266.5 kg ha^{-1}), medium in available phosphorus (38.3 kg ha^{-1}), available sulphur (19.85 kg ha^{-1}) and fairly rich in available potassium (232.4 kg ha^{-1}) with 7.9 pH. Nine treatment combinations comprising three potash *viz.*, Control (K_0), potash @ 25 kg ha^{-1} (K_1) and potash @ 50 t ha^{-1} (K_2) and three levels of sulphur *i.e.* Control (S_0), 20 kg S ha^{-1} (S_1) and 40 kg S ha^{-1} (S_2) were tried in factorial randomized block design with four replications. The sesamum variety Gujarat Til-2 was sown on 07 July 2008 keeping 45 cm inter-row spacing and intra-row spacing of 15 cm was maintained by thinning operation. Recommended dose *i.e.* 25:25:00 kg NPK ha^{-1} and other cultural practices were also adopted as per need of crop.

EXPERIMENTAL RESULTS AND ANALYSIS

The results obtained from the present study have been presented under following heads :

Effect on growth:

Observations on plant height, number of branches per plant at harvest were significantly influenced by potash and sulphur levels (Table 1).

Among potash levels, significantly higher plant height (94.71 cm) and number of branches per plant (3.43) were observed with application of potash @ 50 kg ha^{-1} over control. This might be due to the positive effect of potash on growth character due to augment of cell division and cell expansion. The study was in close conformity observed by Balamurugan and Venkatesan (1983) and Dasmahapatra *et al.* (1990). Among sulphur levels, application of sulphur @ 40 kg ha^{-1} recorded significantly higher plant height (95.37 cm) and number of branches per plant (3.47) and which was at par with application of sulphur @ 20 kg ha^{-1} in case of number of branches per plant. The Increase in plant height may be due to the beneficial effect of sulphur on the various metabolic activities and also due to vital role in cell division, photosynthetic process and formation of chlorophyll in leaf. The study was in close conformity observed by Radhamani *et al.* (2002) and Vaiyapuri *et al.* (2004).

Effect on yield:

The potash exerted remarkable effect on seed and

Table 1: Influence of different levels of potash and sulphur on growth, yield and quality of sesamum

Treatments	Plant height at harvest (cm)	Number of branches per plant at harvest	Seed yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Oil content (%)	Protein content (%)
Potash levels (K)						
K_0 = Control	85.00	2.76	628	958	40.34	21.91
K_1 = 25 Kg ha^{-1}	90.21	3.31	764	1102	43.08	24.58
K_2 = 50 Kg ha^{-1}	94.71	3.43	813	1165	44.89	27.82
S.E. ±	1.92	0.09	18.12	27.52	0.93	0.69
C.D. (P= 0.05)	5.59	0.25	52.89	80.32	2.72	2.01
Sulphur levels (S)						
S_0 = Control	84.82	2.77	644	973	39.62	22.19
S_1 = 20 kg S ha^{-1}	89.73	3.27	756	1105	43.23	24.08
S_2 = 40 kg ha^{-1}	95.37	3.47	804	1146	45.46	28.04
S.E. ±	1.92	0.09	18.12	27.52	0.93	0.69
C.D. (P= 0.05)	5.59	0.25	52.89	80.32	2.72	2.01
Interaction						
F x S	Sig.	Sig.	Sig.	Sig.	NS	NS
C. V. %	7.37	9.52	8.54	8.87	7.54	9.63

NS=Non-significant

stover yields of sesamum. Significantly the highest seed (813 kg ha^{-1}) and stover (1165 kg ha^{-1}) yields were recorded with the application of potash @ 50 kg ha^{-1} over control. This might be due to improvement in growth characters that favorably modified the yield attributes reflected significant and positive correlation with seed and stover yield. The positive effect of potash on seed and stover yield might have been due to its requirement in carbohydrates synthesis, the pronounced role in photosynthesis and cell elongation. The present results are line with those reported by Dasmahapatra *et al.* (1990) and Mandal *et al.* (1990). The results further reported that treatment receiving sulphur @ 40 kg ha^{-1} produced significantly the highest seed (804 kg ha^{-1}) and stover (1146 kg ha^{-1}) yields over control. The bioactivities of sulphur might have played important role in improving yield attributes like capsules per plant, length of capsule and there by seed yield per plant ultimately increase in seed and stover yield. These findings are in online with those of Vaiyapuri *et al.* (2004) and Raja *et al.* (2007).

Effect on quality:

It is evident from Table 1 observed that significantly the higher oil content (44.89 %) and protein content (27.82) were recorded with the application of potash @ 50 kg ha^{-1} over control. This was indicated that increase in oil content due to increase in application of potash found up to 50 kg K_2O ha^{-1}. This trend might be attributed to the fact that the soil under experiment was medium in available potash and response restricted to 50 kg K_2O ha^{-1}. This findings is in analogous with those reported by Balamurugan and Venkatesan, (1983); Dasmahapatra *et al.* (1990) and Mandal *et al.* (1996). Similarly higher oil content was recorded with the application of sulphur @ 40 kg ha^{-1} being at par with sulphur @ 20 kg ha^{-1}. Significantly highest oil content (45.46 %) and protein content (28.04) was recorded with the application of sulphur @ 40 kg ha^{-1} over control. This might be due to sulphur play an important role in synthesis of essential amino acids like Cysteine, Cystine, Methionine and certain vitamins like Biotin, Thiamine, Vitamin B_1 as well as formation of ferodoxin an iron-containing plant protein that acts as an electron carrier in the photosynthetic process and chlorophyll which required for the production of oil. Similar results were also obtained by Tiwari *et al.* (2000) and Raja *et al.* (2007).

REFERENCES

Balamurugan, C. and Venkatesan, G. (1983). Response of sesamum (*Sesamum indicum* L.) to potassium and manganese. *Madras Agric. J.*, **70** (10): 673-677.

Dasmahapatra, A. N., Mondal S. S., Pradhan B. K. and Pan, P. K. (1990). Response of sesamum to potassium nutrition. *J. Potassium Res.*, **6**(3): 124-128.

Mandal, S.S., Das, S. K., Goswami, S.B. and Pradhan, B.K. (1990). Yield and yield attributes of sesamum as influenced by potassium nutrition and plant density. *Indian Agriculturist,* **34**(2): 99-102.

Mandal, S.S. and Pramanik, C.K. (1996). Integrated fertilizer management with potassium in soybean and sesamum under different cropping systems. *J. Potassium Res.,* **12**(3): 298-304.

Radhamani, S., Balasubramanian, A. and Chinnusamy, C. (2002). Effect of sulphur application and foliar spray of nutrient and growth regulators on seed yield and oil content of sesamum. *Madras Agric. J.*, **88** (10-12): 732-733.

Raja, A., Hattab, K.O., Gurusamy, L., Vembu, G. and Suganya, S. (2007). Sulphur application on growth and yield and quality of sesame varieties. *Internat. J. Agric. Res.*, **2**(7): 599-606.

Tiwari, R.K., Namdeo, K.N.; Jha, Girish and Jha, G. (2000). Effect of nitrogen and sulphur on growth, yield and quality of sesamum (*Sesamum indicum*) varieties. *Res. Crops*, **1** (2) : 163-167.

Vaiyapuri,V., Amudha,A, Sriramachandrasekharan, M. and Imayavaramban,V. (2004). Effect of sulphur levels and organics on growth and yield of sesamum. *Adv. Plant Sci.*, **17**(2): 681-685.

****