**International Journal of Research Studies in Agricultural Sciences (IJRSAS)**
*Volume 4, Issue 5, 2018, PP 8-10*
*ISSN No. (Online) 2454–6224*
*DOI: http://dx.doi.org/10.20431/2454-6224.0405002*
*www.arcjournals.org*

# Influence of Sulphur and Potassium Levels on Yield and Yield Attribute of Sesame (Sesamum indicum L.)

**Farhan Ahmad, Junaid Ahmad, Haq Nawaz, Muhammad Waseem Abbas, Minhaj Ali Shah, Sarmad Iqbal, Zahid Mehmood, Mehran Ali**

*Department of Agronomy, Faculty of Crop production, University of Agriculture Peshawar, Pakistan*

***Corresponding Author:** ***Farhan Ahmad,*** *Department of Agronomy, Faculty of Crop production, University of Agriculture Peshawar, Pakistan.*

**Abstract:** *A field experiment on influence of sulphur and potassium levels on yield and yield attributes of sesame was conducted in Agronomy Research Farm, University of Agriculture Peshawar, Khyber Pakhtunkhwa (KP) during Kharif season, 2017.Varying levels of sulphur (0, 25, 50 and 75 kg ha$^{-1}$) and potassium (0, 25, 50 and 75 kg ha$^{-1}$) were applied to experimental plots. The results revealed that sesame significantly responded to the application of sulphur and potassium up to 50 kg ha$^{-1}$ for growth, quality, yield and yield attributes of sesame. The taller plant (76.83 cm), maximum number of branches per plant (3.87), more number of capsules per plant (43.82), more number of seeds per capsules (59.36), maximum seed yield (673 kg ha$^{-1}$), maximum stover yield (1078 kg ha$^{-1}$), more oil content (48.76 %) and maximum oil yield (291.7 kg ha$^{-1}$) were noticed where 50 kg ha$^{-1}$sulphur treated. On the contrary taller plant(76.97cm), maximum number of branches per plant (3.93), more number of capsules per plant(42.77), more number of seeds per capsules (59.36), maximum seed yield (617 kg ha$^{-1}$), maximum stover yield(1043 kg ha$^{-1}$), more oil content(48.65 %) and maximum oil yield(286.6 kg ha$^{-1}$) were recorded from 50 kg ha$^{-1}$ potassium treatments.*

## 1. Introduction

Sesame (Sesamumindicum L.) is main oilseed crop in Pakistan, India and sub-continent followed by groundnut and rapeseed. Sesame is considered as the oldest oil yielding plant famous to human being. In the area and production of sesame India ranks first all over the world. India is still the world leader with the higher production (25.8 per cent) from the largest area (29.3 per cent) and highest export (40 per cent) of sesame in the world (Duhoon, 2004). Sulphur and potassium both play energetic role in the nutrition of plants. Sulphur play a key role in plant metabolism, indispensable for the synthesis of essential oils, chlorophyll formation, required for development of cells and it also increase cold resistance and drought hardiness of crops especially for oil seeds crops (Patel et al. 1995). Mostly these nutrients are lacking in the soils. The soils of Pakistan, India are lacking sulphur and medium to high in the potassium. Therefore, chemical fertilizers usage become necessary to advance the crop yield. More over no proper work has been done on the outcome of sulphur and potassium on yield and quality of sesame crop in this regions. Keeping this in vision, the current field trial was carried out to evaluate the influence of sulphur and potassium on yield and yield attributes of sesame crop.

## 2. Materials and Methods

A field test was carried outat Agronomy Research Farm, Agricultural University Peshawar. The experiment was laid out in Randomized Complete Block Design, with three replications using sesame cv. G.TIL- 2. Total treatment were 16 consisting of four levels of S (0, 25, 50 and 75 kg ha$^{-1}$ applied as elemental sulphur and four levels potassium i.e. $K_2O$ (0, 25, 50 and 75 kg $K_2O$ ha$^{-1}$ applied as Murate of potash).The half dosage of nitrogen (6.5 kg ha$^{-1}$) and full dose $P_2O_5$ of (25 kg ha$^{-1}$) were added though urea and DAP as basal application in each plot. The remaining half dose of nitrogen (6.5 kg ha$^{-1}$) was applied at 50 days after sowing. The treatment wise sulphur and potassium were applied though elemental sulphur and Murate of potash, respectively as basal. The crop was raised with everyday package of observations and practices. The given data such as grain yield, fodder yield, plant height, number of branches per plant, number of capsules per plant, length of capsule, number of seeds per capsule and thousand seeds weight were noted after the harvesting of crop at its maturity stage and after the sun dryness.

## 3. Results And Discussion

### 3.1. Influence of Sulphur on Sesame Yield and its Attributes

With the increase in level of sulphur up to 50 kg $ha^{-1}$ the yield attributing characters like plant height, number of branches per plant, number of capsules per plant, length of capsule, number of seeds per capsule, thousand seed weight of sesame increased significantly. The application of 50 kg S $ha^{-1}$ gave maximum capsule number per plant, capsule length and seeds number per capsule. While, thousand seed weight was recorded significantly highest with application of 75 kg S $ha^{-1}$. The increase in growth characters of plant might be due to the beneficial effect of sulphur on the various metabolic activities (Tandon, 1986) and also play important role in cell division, photosynthetic process and formation of chlorophyll in leaf. Similar findings were observed by Mondal et al. (1993), Sarkar and Banik (2002) in Sesame. The seed and stover yields of sesame were significantly affected by categorized levels of sulphur. The higher significant seed yields (673 kg $ha^{-1}$) of sesame was noticed with the sulphur level of 50 kg S $ha^{-1}$. The highest Stover yield (1078 kg $ha^{-1}$) was notedin50 kg S $ha^{-1}$ treatment level. These results are in line with the findings of Mondal et al. (1993) and Yadav et al. (1996) who noticed that the seed and stover yield of sesame significantly increased with increasing levels of sulphur. Sulphur application increased significantly the oil yieldand oil content in seed of sesame. The more oil content and more oil yield were counted with application of 50 kg S $ha^{-1}$.Due to beneficial effect of sulphur in synthesis of essential amino acid (Cysteine, Cystine, Methionine) and certain vitamins (Biotin, Thiamine, Vitamin Bl) as well as formation of ferodoxin an iron-containing plant protein that acts as an electron carrier in the photosynthetic process and chlorophyll increase oil content and oil yield (Beaton and Fox, 1971). The same findings were also obtained by Raju and Sreemannarayana (1998) and Tiwari et al. (2000) in sesame crop.

### 3.2. Influence of Potassium on Sesame Yield and its Attributes

The findings in the below mentioned table show that potassium level significantly increased the yield attributing characters like plant height, number of branches per plant, number of capsules per plant, length of capsule, number of seeds per capsule, 1000 seed weight of sesame. The application of potassium i.e. 50 kg $K_2O$ $ha^{-1}$ contributed higher number of capsules (42.77) per plant, length of capsule (2.18 cm) and thousand seed weight (2.97 g). These findings are also in line with accordance with the results of Majumdar et al. (1987) and Dasmahapatra et al. (1990). Potassium application gave significant outcome on seed and stover yields of sesame. The higher seed (617 kg $ha^{-1}$) and stover yield (1043 kg $ha^{-1}$) of sesame were obtained with 50 kg $K_2O$ $ha^{-1}$ of potassium level. The progressive effect of potassium on yields may be due to the pronounced role of potassium in carbohydrates synthesis, photosynthesis and cell elongation. The present results are also strongly agreed with Dasmahapatra et al. (1990) and Mandal et al. (1993). However with 50 kg $K_2O$ $ha^{-1}$ produced significantly higher oil content and oil yield. Dasmahapatra et al. (1990) and Mandal et al. (1993) also finds comparable results.

**Table1.** *Effect of sulphur and potassium on sesame yield attributes*

| Treatments | Plant height (cm) | No. of branches Per plant | No. of capsules per plant | Length of capsules | Seeds per |
|---|---|---|---|---|---|
| **Sulphur (kg $ha^{-1}$)** | | | | | |
| S 1 = 0 | 67.48 | 2.43 | 35.44 | 2.07 | 50.53 |
| S 2 = 25 | 71.98 | 3.10 | 38.53 | 2.12 | 56.12 |
| S 3 = 50 | 76.83 | 3.87 | 43.82 | 2.19 | 59.36 |
| S 4 = 75 | 70.08 | 3.51 | 39.03 | 2.15 | 56.37 |
| **Potassium (kg $ha^{-1}$)** | | | | | |
| K 1 = 0 | 66.65 | 2.34 | 31.54 | 2.00 | 53.35 |
| K 2 = 25 | 73.17 | 3.30 | 36.53 | 2.12 | 54.56 |
| K 3 = 50 | 76.97 | 3.93 | 42.77 | 2.18 | 59.66 |
| K 4 = 75 | 72.24 | 3.36 | 38.91 | 2.12 | 57.80 |

**Table2.** *Effect of sulphur and potassium on sesame yield attributes*

| Treatments | Thousand seed Weight (g) | Seed yield (kg ha-1) | Stover yield (kg ha-1) | Oil content (%) | Oil yield (kg ha-1) |
|---|---|---|---|---|---|
| **Sulphur (kg ha$^{-1}$)** | | | | | |
| S 1 = 0 | 2.21 | 476 | 790 | 40.39 | 187.5 |
| S 2 = 252.51 | 565 | 997 | 45.54 | 245.9 | |
| S 3 = 502.91 | 6731 | 078 | 48.76 | 291.7 | |
| S 4 = 752.93 | 587 | 99845.61 | | 265.5 | |
| **Potassium (kg ha$^{-1}$)** | | | | | |
| K 1 = 0 | 2.06 | 412 | 723 | 41.75 | 192.1 |
| K 2 = 252.67 | | 56792 | 244.33 | 224.8 | |
| K 3 = 502.97 | 617 | 104 | 348.65 | 286.6 | |
| K 4 = 752.90 | 578 | 98745.77 | | 245.2 | |

## REFERENCES


[1] Beaton, K. and H.D. Fox. (1971). Effect of sulphur on the protein and oil content of oil seed crops in dry farming area of Rajasthan. J. Oilseeds Res. 2(3): 163-169.

[2] Dasmahapatra, A.N., S.S. Monda1, B.K. Pradhan and P.K. Pan. (1990). Response of sesame to potassium nutrition. J. Potassium Res. 6 (3): 124-128.

[3] Duhoon,S.S. (2004). Annual Progress Report on Sesame and Niger. ICAR, JNKV Campus, Jabalpur.

[4] Majumdar, S.K., K.C. Barik, P.S. Bera and D.C. Ghosh. (1987). Path co-efficient analysis in sesame (Sesamumindicum L.) with varying levels of nitrogen and potassium. Indian Agriculturist, 31 (3): 165-169.

[5] Mondal, S., K. Sengupta, D. Maity and P.K. Jana. (1993). Sulphur boosts the yield of summer sesamum. Indian Farming. 43(5): 17-18.

[6] Raju, A.S. and B. Sreemannarayana. (1998). Sulphur in crop production in Southern Telangana zone of Andhra Pradesh. Fertilizer News. 43(3): 47-56

[7] Sarkar, R.K. and P. Banik. (2002). Effect of planting geometry, direction of planting and sulphur application on growth and productivity of sesame (Sesamumindicum). Indian J. agric. Sci. 72 (2):70- 73.

[8] Tandon, H.L.S. (1986). Sulphur research and agri. production in India (2nd Edn.) Fertilizer Development and Consultation Organization, New Delhi.

[9] Tiwari, R.K., K.N. Namdeo, Girish and G. Jha. (2000). Effect of nitrogen and sulphur on growth, yield and quality of sesame (Sesamumindicum) varieties. Res. Crops. 1(2):163-167

[10] Yadav, N.P.S., Singh, Vinay, V.S. Mehta and V. Singh. (1996). Effect of different levels and sources of sulphur on yield, quality and uptake of sulphur by sesame. J. Oilseeds Res. 13(1): 2225.


**Citation:** *Ahmad, F .(2018). Influence of Sulphur and Potassium Levels on Yield and Yield Attribute of Sesame (Sesamumindicum L.). International Journal of Research Studies in Agricultural Sciences (IJRSAS), 4(5), pp.8-10, http://dx.doi.org/10.20431/2454-6224.0405002*