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Effect of Potassium and Sulphur on Quality of Sesame (*Sesamum indicum* L.)

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A B S T R A C T

A field experiment was conducted at Agronomy farm, S.K.N. College of Agriculture, Jobner (Rajasthan) during *kharif* 2014 on loamy sand soil. The experiment consisted of 16 treatment combinations of four levels each of potassium (0, 25, 50 and 75 kg ha^{-1}) and sulphur (0, 20, 40 and 60 kg ha^{-1}). The results showed that progressive increase in level of potassium up to 50 kg K_2O ha^{-1} and sulphur 40 kg S ha^{-1} significantly increased the quality of sesame.

Introduction

Sesame is called as 'the queen of oils' because of extra being a short duration crop, fit well into various cropping sequences/systems. Globally, sesame is grown on 6.57 million hectares with production of 2.94 million tonnes with productivity of 448 kg ha^{-1}. In India, it is cultivated on 17 lakh hectares and the total production of 7.48 lakh tones with productivity of 439 kg ha^{-1} (Anonymous, 2013). Potassium plays an important role in activation of enzymes and resistance to cold, disease, water stress and other adverse conditions. Sulphur an essential plant nutrient can play a key role in augmenting the production and productivity of oilseeds in the country as it has a significant influence on quality and development of oil seeds and best known for its role in the synthesis of proteins, oils and vitamins. Keeping this in view, the investigation was carried out to study the effect of potassium and sulphur on growth, yield attributes and yield of sesame crop.

Materials and Methods

A field was conducted at the Agronomy farm, S.K.N. College of Agriculture, Jobner (Raj.) in a randomized block design, with four replication using sesame cv. RT-46.There were 16 treatments consisting of four levels of K (0,25,50 and 75 kg K_2O/ha applied as gypsum) and four levels of S (0,20,40 and 60 kg S/ha applied as sulphate of potash) experimental soil was loamy sand in texture with high infiltration rate (22.4 cm hr^{-1}) and saturated hydraulic conductivity 10.20 cm hr^{-1}. The soil was low in organic carbon (0.21%), low available nitrogen (125.64 kg N ha^{-1}), medium in available phosphorus (18.43 kg

P_2O_5 ha^{-1}) and in available potassium (178.05 kg K_2O ha^{-1}) while the soil was deficient in available sulphur (7.95 mg kg^{-1}). The soil was non saline with a reaction 8.2. All the treatments *i.e.* levels of sulphur after adjusting sulphur received from potassium sulphate applied through gypsum 21 days before sowing and potassium as per treatments were applied prior to sowing and incorporated manually in top 15 cm soil. The recommended dose of N and P in the form of urea and DAP were applied through broadcasting before sowing. The crop was raised with standard package of practices. The crop was harvested at maturity and plot wise fodder and grain yield recorded after sundry as well as plant height, number of branches per plant, number of capsule per plant, number of seed per capsule and 1000 seed test weight were also recorded.

Results and Discussion

Quality

Effect of potassium

Oil and protein content in sesame has a great bearing and it determines market price for farmers. The oil and protein content of the crop were significantly influenced with the application of potassium. The significantly maximum oil and protein content were observed with the application of potassium @ 50 kg K_2O ha^{-1} (Table 1).

The increase in oil yield and protein content with the application of potassium is consequence of the increase in oil content and protein content and grain yield (Mondal *et al.*, 1997). There was a spectacular increase in oil and protein content under balanced fertilization (Brar *et al.*, 2010).

Effect of sulphur

Data presented in table 1 showed that application of sulphur to sesame significantly enhanced the oil content and protein content. The significantly highest oil and protein content of sesame were observed with application of 40 kg S ha^{-1}. Sonia *et al.*, (2014) also reported that significant improvement in oil and protein content of the crop with the higher rates of application of sulphur.

Table.1 Effect of potassium and sulphur on protein content, oil content and oil yield of sesame

Treatments	Protein content (%)	Oil content (%)	Oil yield (kg ha^{-1})
Potassium levels			
K0	17.92	39.20	259.56
K25	21.29	43.06	332.01
K50	23.20	46.82	394.64
K75	23.64	46.99	404.27
SEm+	0.69	1.25	7.39
CD (P=0.05)	1.98	3.61	21.35
Sulphur levels			
S0	18.25	39.11	254.20
S20	21.31	43.01	335.53
S40	22.94	46.75	394.82
S60	23.56	47.21	405.91
SEm+	0.69	1.25	7.39
CD (P=0.05)	1.98	3.61	21.35

The increase in oil and protein content might be due to more sulphur storage in the plant. Sulphur is the integral part of biological molecules like cyteine and methionine which cause variation in oil and protein content. This may also be due to higher availability of sulphur in the root zone of the crop which might have resulted in enhanced sulphur storage which involved in oil and protein formation (Tahir *et al.,* 2014).

Based on the experimental results, it was concluded that better quality of sesame crop can be obtained by the application of potassium @ 50 kg K_2O ha^{-1} and sulphur @ 40 kg S ha^{-1}.

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