

## INTEGRATED NUTRIENT MANAGEMENT WITH SULPHUR BEARING FERTILIZER, F. Y. M. AND CROPRESIDUE ON THE YIELD ATTRIBUTES AND YIELD OF SESAME

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### **Abstract**

The pooled analysis revealed that maximum dry matter production, number of capsules per plant, number of seeds/capsule, thousand seed weight and seed yield were recorded at 75% of the recommended doses of N, P and K along with crop residues. Application of sulphur bearing fertilizer (SSP) improved the growth and yield of sesame as compared with the DAP application.

### **Introduction**

High cost of fertilizers and poor organic matter status of Indian soils necessitate the use of FYM and crop residues to maintain the soil fertility and to keep up the stability in yield. Incorporation of small quantity of potato haulms could supply sufficient amount of S in addition to N, P, K and organic matter to sesame (Zaidi and Khan, 1981). Highest seed yield of sesame was obtained by applying both crop residues and fertilizer rather than fertilizer alone (Chatterjee *et al.*, 1978; Grewal and Sharma, 1984; Jayaram *et al.*, 1990). Sulphur is an essential element for plant growth and sulphur manuring in combination with other fertilizers is becoming an important feature in modern agriculture. Anspok (1987) reported that in sulphur deficient soil SSP was more effective than DAP. Jayram *et al.* (1990) reported that crop residues (potato haulms) incorporation improved the rate of photosynthesis and total dry matter production of sesame. In view of such findings, an effort was made in this experiment to investigate the effect of sulphur bearing fertilizer, F. Y. M. and crop residue on the growth and yield of sesame.

### **Materials and Methods**

The experiment was conducted during summer seasons of 1990 and 1991 at 'C' Block Farm of Bidhan Chandra Krishi Viswavidyalaya, Kalyani in sandy loom soils having 0.067% total N, 15.4 kg/ha available P, 229 kg/ha

of available K, 18.7 ppm available sulphur and a pH of 7.6. The experiment was laid out in a Randomised Block Design with three replications and eight treatment combinations. The treatment combinations are :

- T<sub>1</sub>— 100% recommended doses of N, P (SSP) and K
- T<sub>2</sub>— 100% N, P (DAP) and K
- T<sub>3</sub>— 75% N, P (SSP) and K
- T<sub>4</sub>— 75% N, P (DAP) and K
- T<sub>5</sub>— 75% N, P (SSP), K + FYM @ 10 t/ha
- T<sub>6</sub>— 75% N, P (DAP), K + FYM @ 10 t/ha
- T<sub>7</sub>— 75% N, P (SSP), K + incorporation of crop residues
- T<sub>8</sub>— 75% N, P (DAP), K + incorporation of crop residues.

Potato haulms @ 23 q/ha was chopped and incorporated in soil 15 days before planting of sesame according to the treatments.

Sulphur bearing phosphatic fertilizer (SSP) and sulphur free phosphatic (DAP) were applied as basal according to the treatments to evaluate their effect on growth and development of sesame. The recommended fertilizer doses of N,P,K was 60 : 40 : 40 kg N P O<sub>5</sub> and K<sub>2</sub>O/ha. The source of N was urea and of K was mureate of potash. Crop residues @ 23 q/ha contributed 26.68 kg N, 6.67 kg P, 64.4 kg K. and 3.68 kg S per ha.

The sesame variety B 67, maturing in 100 days, was sown in last week of February and harvested in July.

Different biometrical observations were taken as per treatments. For dry matter production, five plants were cut at ground level at harvest. The dry weight of the samples were recorded after oven drying and dry matter accumulation in g m<sup>2</sup> was worked out

### Results and Discussion

*Dry matter production* : Maximum dry matter was recorded in the treatment receiving 75% of the recommended doses of N, P (through SSP), K plus incorporation of crop residues (Table 1). The treatment receiving 100% of recommended doses of N, P (SSP) and K or 75% of the recommended doses of N,P (through DAP) and K along with crop residues also produced higher dry matter of sesame. Lowest dry matter was recorded under the treatment receiving 75% of the recommended doses of N, P (through DAP) and K. Reduction in dry matter production takes place due to the deficiency of sulphur. This result corroborates with the findings of Jayaram *et al.* (1990).

*Yield components* : Number of capsules per plant differed significantly ( Table 2 ) with different treatments. Maximum number of capsules was recorded under the treatment receiving 75% of the recommended doses of N,P (through SSP), and K plus incorporation of potato haulm. It is revealed from the results (Table 2) that higher doses of fertilizer or fertilizer along with crop residues on sesame influenced the number of pods/plant which is supported by the findings of Chatterjee *et al.* (1978) and Jayaram *et al.* (1990). The minimum number of capsules per plant was recorded in the treatment receiving 75% of the recommended doses of N, P (through DAP) and K.

It is revealed from the data in Table 2 that there was no significant variation among the number of seeds per capsule of sesame. Apparently highest number of seeds/capsule was recorded under the treatment receiving 75% of the recommended doses of N, P (through SSP) and K along with crop residues while it was lowest when the crop received 75% of the recommended doses of N, P (through DAP) and K.

Test weight ( 1000 seed weight ) of sesame varied significantly with different fertilizer treatments ( Table 2 ). Highest test weight was recorded under the treatment receiving 75% of the recommended doses of N, P (through SSP) and K along with incorporation of crop residues ( potato haulm ). The test weight under treatments receiving 100% recommended dose

TABLE 1. Total dry matter accumulation in sesame ( $g/m^2$ )

Treatment (kg/ha N, P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O)	Dry Weight ( $g/m^2$ ) days after sowing	
	60	90
100% N, P (SSP) and K (60 : 40 : 40)	329.33	684.17
100% N, P (DAP) and K (60 : 40 : 40)	287.33	629.17
75% N, P (SSP) and K	252.33	546.00
75% N, P (DAP) and K	217.83	497.33
75% N, P (SSP) and K + FYM @ 10 t/ha	304.17	658.33
75% N, P (DAP) and K + FYM @ 10 t/ha	273.00	598.50
75% N, P (SSP) and K + Crop residues (@ 23 q/ha)	368.83	735.17
75% N, P (DAP) and K + Crop residues (@ 23 q/ha)	350.67	723.00
S. Em $\pm$	3.24	3.92
C. D. at 5% P	9.86	11.96

TABLE 2. Yield components of sesame under different nutrient management practices

Treatment (kg/ha as N, P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O)	No of capsules/ plant	No. of seeds/ capsule	1000 seed weight(g)
100% N, P (SSP) and K (60 : 40 : 40)	21.27	67.20	2.842
100% N, P (DAP) and K (60 : 40 : 40)	20.93	63.20	2.842
75% N, P (SSP, and K	20.20	61.87	2.723
75% N, P (DAP) and K	16.53	61.07	2.742
75% N, P (SSP) and K + FYM @ 10 t/ha	21.27	64.53	2.842
75% N, P (DAP) and K + FYM @ 10 t, ha	20.73	64.13	2.851
75% N, P (SSP, and K + Crop residues (@ 23 q/ha)	27.60	69.07	2.887
75% N, P (DAP) and K + Crop residues (@ 23 q/ha)	23.60	68.00	2.842
S. Em ±	1.41	3.19	0.02
C. D. at 5% P	4.30	N.S.	0.062

TABLE 3. Seed yield of sesame (q/ha) under different management practices

Treatment (kg/ha as N, P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O)	Seed yield (q/ha)
100% N, P (SSP) and K (60 : 40 : 40)	13.60
100% N, P (DAP) and K (60 : 40 : 40)	11.90
75% N, P (SSP) and K	10.50
75% N, P (DAP) and K	9.00
75% N, P (SSP) and K + FYM @ 10 t/ha	14.00
75% N, P (DAP) and K + FYM @ 10 t/ha	10.90
75% N, P (SSP) and K + Crop residues (@ 23 q/ha)	13.50
75% N, P (DAP) and K + Crop residues (@ 23 q/ha)	11.60
S. Em ±	0.19
C. D. at 5% P	0.59

of N, P ( through SSP or DAP ) and K or 75% of the recommended dose of N, P ( through SSP ) and K along with FYM or crop residues were statistically at par with the highest value recorded.

*Seed yield* : Significantly highest seed yield was recorded under the treatment receiving 75% of the recommended doses of N, P ( through SSP ) and K plus FYM @ 10 t/ha, which was closely followed by the treatment receiving 75% of the recommended dose of N, P ( through SSP ) and K plus incorporation of crop residues as well as by the treatment receiving 100% of the recommended dose of N, P ( through SSP ) and K ( Table 3 ). Lowest seed yield was recorded in the treatment receiving 75% of the recommended dose of N, P ( through DAP ) and K.

Potato haulm and FYM supplied sufficient amount of 'S' in addition to N, P, K and organic matter to sesame. Sulphur and organic matter produced high yield under the treatments where FYM or crop residues ( potato haulm ) was incorporated. This result corroborates with the findings of Zaidi and Khan (1981), Jayaram *et al.* (1990) and Mondal *et al.* (1985).

**Literature cited**

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