

## **Influence of Sulphur and Zinc on Growth, Yield of Summer Green gram**

A field trial was maintained at crop research Farm, Department of Agronomy, SHUATS, Prayagraj for Zaid season 2022. The exploratory plot's soil had a sandy loam texture, a (pH 7.1) that was natural, a low in organic carbon (0.28 %), available N (225 kg/ha), available P (19.50 kg/ha) and available K (213.7 kg/ha). The Treatments consisted of 3 levels of Sulphur Levels S<sub>1</sub> (20 Kg/ha), S<sub>2</sub> (30 Kg/ha), S<sub>3</sub> (40 Kg/ha) and 3 levels of zinc (Zn<sub>1</sub>-5 kg/ha), (Zn<sub>2</sub>- 7.5kg/ha) and (Zn<sub>3</sub>-10 kg/ha). The outcome reported that the of Sulphur 40 Kg/ha + Zn 10 Kg/ha recorded maximum (Treatment-9) Plant height (63.33 cm), Number of Nodules per plant (28.00), plant dry weight (12.78 g/plant), number of pods per plant (39.61), number of seeds per pod (12.66), test weight (32.3 g), seed yield (0.868 t/ha), straw yield (2.287 t/ha) and harvest index was only found to be non-significant. Maximum Gross returns (77182.00 INR/ha), Net returns (53550.00 INR/ha) and B:C ratio (2.2) was recorded with the treatment (T<sub>9</sub>) with the application of Sulphur 40 Kg/ha + Zinc 10 Kg/ha.

**Key words:** - *Sulphur, Growth, Yield, Zinc, Zaid.*

## **INTRODUCTION**

In India, green gram, often known as mung bean or moong, is a plant species of the legume family with the scientific name *Vigna radiata*. India is its primary origin and it's substantially cultivated in

East Asia, Southeast Asia and the Indian key. It's the third important palpitatioin crop in India grown in nearly 16 percent of the total palpitatioin area of the country. It contains protein-rich seeds with 20-25 protein and occasionally the plants are cut and furrowed into the soil to enrich the soil with nitrogen, Green gram is an excellent source of high quality protein and via symbiotic nitrogen, it is able to fix atmospheric nitrogen. It can fix 50- 66 kg N /ha through a symbiotic relationship between host mung bean root nodules and soil bacteria. In India, green gram occupies 42. 38 lakh, ha area with a total product of 23. 25 lakh tonnes with a productivity of 729.1 kg/ ha and contributes 12 to the total product of beats in( 2021- 22). Sulphur is increasingly honoured as the fourth major factory nutrient after nitrogen, phosphorus and potassium. Sulphur is as essential as they bear phosphorus. Sulphur is also an element of the vitamins biotin and thiamine( B1) as well as iron- sulphur proteins called ferredoxins. Sulphur plays an important part in crop growth and development. It plays an important part in the conformation of amino acids containing S. similar as cystine( 27 S). Cysteine( 26 S), methionine( 21 S), which act as structure blocks in protein conflation. It has a part in adding the conformation of chlorophyll and abetting photosynthesis. Sulphur is known to encourage nodulation in legumes, which adds nitrogen obsession. It is also a component of free amino acids like methionine and cysteine and is essential for the fusion of proteins.

Micronutrients are also essential for factory growth. Zinc is involved in auxin metabolism, tryptophan conflation, protein conflation, nucleic acid conformation and helps in usage of nitrogen and phosphorus.

“Zinc also has a part in photosynthesis and nitrogen metabolism and helps regulate auxin attention in the factory. It supports the establishment of flowers and helps the proper development of fruits. It also helps in carbohydrate conversion and sulphur metabolism. Grain and straw yields were also significantly increased by zinc. The salutary effect of applied zinc on these growth parameters, yield characteristics and yield can be attributed to the catalytic or stimulating effect of zine on utmost physiological and metabolic processes of the factory. It also helps in the conformation of chlorophyll and plays an important part in nitrogen metabolism. thus, the operation of zinc in soil with a lack of its content bettered the overall growth and development” [Mishra et al.2022].

#### METHODOLOGY:

The trial was conducted during the Zaid 2021- 22 season. The trial was conducted in a Randomized Block Design conforming of ten treatment combinations with three replications and was arranged with different treatments aimlessly assigned in each replication. The soil of the experimental field was flaxen gault texture, slightly alkaline response( pH7.1) with low organic carbon content(0.28), available N( 225 kg/ ha). P(19.50 kg/ ha) and advanced

situations of K(92.00 kg/ ha). Treatment combinations are T1- S 20 Kg/ ha Zn 5 kg/ ha, T2- S 20 Kg/ ha Zn7.5 kg/ ha. T3- S 20 Kg/ ha Zn 10 kg/ ha, T4- S 30 Kg/ ha Zn 5 kg/ ha. T5- S 30 Kg/ ha Zn7.5 kg/ ha. T6- S 30 Kg/ ha Zn 10 kg/ ha. T7- S 40 Kg/ ha Zn 5 kg/ ha. T8- 40 Kg/ ha Zn7.5 kg/ ha. T9- 40 Kg/ ha Zn 10 Kg/ ha. Control(25-50-25 Kg/ ha).

## **RESULTS AND DISCUSSION**

### **A. Growth Attributes:**

At 45 DAS, the maximum plant factory height( 63.33 cm) was recorded in treatment No. 9 with S 40 kg/ ha Zn 10 kg/ ha operation, which significantly exceeded all other treatments and the S 40 kg/ ha Zn 7.5 kg operation treatment ha(61.53 cm) is statistically at the same position as the treatment operation S 40 kg/ ha Zn 10 kg/ ha. At 45 DAS, the dry matter per factory was observed in S 40 kg/ ha Zn 15 kg/ ha(12.78), which was significantly advanced than other treatments and treatments with S 40 kg/ ha Zn operation.7.5 kg/ ha(12.12), which was statistically at the operation position of S 40 kg/ ha Zn 10 kg/ ha. At 45 DAS, the maximum number of nodules( 28.00) was recorded with S 40 kg/ ha Zn 10 kg/ ha operation, which significantly exceeded all other treatments and the S 40 kg/ ha Zn 7.5 kg/ ha treatment.(26.27) is statistically at the same position as treatment( T9) with the operation of S 40 Kg/ ha Zn 15 kg/ ha, Probable reasons for the advanced growth attributes at 45 DAS may be due to the fact that it may be due to the known part of sulphur in the stimulation of cell division, the process of photosynthesis and also the conformation of chlorophyll. It also promotes root nodulation in legumes, making further sulphur available during the growing season for factory growth and development. These results are harmonious with those of Srivastava et al

### **Yield Attributes :**

The treatment with the application of S 40 Kg/ha + Zn 15 Kg/ha recorded the maximum number of pods per plant (39.61), which significantly exceeded all others and the treatment with the application of S 40 Kg/ha + Zn 7.5 Kg/ha ( 37. 81), which was statistically at the level of the application treatment with S 40 kg/ha + Zn 15 kg/ha. Treatment with application of S 40 kg/ha + Zn 15 kg/ha recorded the maximum number of seeds per pod (12.66 ), which was significantly better than all

others and treatment with application of S 40 kg/ha + Zn 7.5 kg/ha ( 12.61). The application treatment of S 40 Kg/ha + Zn 15 Kg/ha recorded the maximum test weight (32.87 g) which was significantly better than all others and the application treatment of S 30 Kg/ha + Zn 5 Kg/ha (31.83 ). which was statistically at the treatment level of application of S 40 kg/ha + Zn 15 kg/ha. The application treatment with S 40 Kg/ha + Zn 15 Kg/ha recorded the maximum seed yield (0.868 t/ha), which was significantly better than the others and the application treatment with S 30 Kg/ha + Zn 5 Kg/ha ( 0.822) and S 30 Kg/ha + Zn 5 Kg/ha (0.800), which was statistically at the treatment level of application S 40 Kg/ha + Zn 15 Kg/ha. The application treatment with S 40 Kg/ha + Zn 15 Kg/ha recorded the maximum aggregate yield (2.098 t/ha), which was significantly better than the others and the application treatment with S 30 Kg/ha + Zn 10 Kg/ha (2.078 t/ha ), which was statistically on par with treating applications S 40 kg/ha + Zn 10 kg/ha.

Treatment with the application of S 20 kg/ha + Zn 7.5 kg/ha recorded the maximum harvest index (37%) and the minimum with the application of S 30 kg/ha + Zn 10 kg/ha (21.7%). There are no significant differences between treatments. A similar result found in the increase of yield properties can be caused by the application of zinc by increasing the enzymatic and physiological activities and the performance of many catalytic functions in the plant system, in addition to the transformation of carbohydrates, chlorophyll and protein synthesis. The increase in yield was mainly due to the increased rate of photosynthesis and carbohydrate metabolism influenced by sulphur application. The results obtained are consistent with the findings reported by Surendra Ram et.al.

## CONCLUSION

On the basis of one-season experimentation, it can be stated that the application of S 40 kg/ha + 10 kg/ha was found to be more productive (0.868 t/ha) and more economically viable (2.1). The conclusions drawn are based on only one season of data, which requires further confirmation for recommendations.

## Reference:

Dhanushkodi V, Kannathasan M, Jamespichai G, Indirani R. Influence of sulfur on growth, yield and quality attributes of irrigated blackgram (*Vigna mungo*) in Alfisols of Thoothukudi district in Tamilnadu, *Madras Agric J* 2009; **96**:116-120

- Patil, P. A. (2006). Effect of zinc application on yield characters and dry matter of stover. *Madras Agric. J.*,**57**(6): 473-475.
- Reddy, T. Yellamanda and G. H. Reddy Sankara (2005). Principle of Agronomy. *Kalyani Publishers*, Rajinder Nagar, Ludhiana, pp. 251
- Surendra Ram (2018): Response of sulphur and zinc nutrition on yield attributes, yield of mungbean (*Vigna radiata L.*) under partially reclaimed saline sodic soils in eastern U.P, *plant archives* vol. 18, special issue (ICAAAS-2018), 2018 pp. 177-181.
- Srivastava, A. K.; Tripathi, P. N.; Singh, A. K. and Singh, R. (2006). Effect of rhizobium, sulphur and zinc levels on growth, yield, nutrient uptake, and quality of summer green gram (*Phaseolus radiatus L.*). *International Journal of Agriculture Science*, **2** (1):190-192
- Mishra PK, Singh R, Indu T. Effect of Nitrogen and Zinc levels on Growth and Yield of Mustard (*Brassica juncea L.*). *The Pharma Innovation Journal* 2022; 11(4): 454-456

**Table.1 Impact of Sulphur and zinc levels on growth attributes of summer Greengram.**

<b>Treatments</b>	<b>Plant height (cm)</b>	<b>Dry weight (g/plant)</b>	<b>Nodules /Plant (no)</b>
1.Sulphur 20Kg/ha + Zinc 5kg/ha	55.81	9.55	21.67
2.Sulphur 20Kg/ha + Zinc 7.5kg/ha	59.67	9.68	22.90
3.Sulphur 20Kg/ha+ Zinc 10kg/ha	59.21	10.56	23.33
4.Sulphur 30Kg/ha + Zinc 5Kg/ha	58.73	10.07	24.13
5.Sulphur 30 Kg/ha + Zinc 7.5kg/ha	57.00	10.13	23.47
6.Sulphur 30Kg/ha + Zinc 10Kg/ha	54.00	10.24	24.03
7.Sulphur 40Kg/ha + Zinc 5Kg/ha	58.00	11.31	24.93
8.Sulphur 40Kg/ha + Zinc 7.5Kg/ha	61.53	12.12	26.27
9.Sulphur 40Kg/ha+ Zinc 10Kg/ha	63.33	12.78	28.00
10. N-P-K 25-50-25 Kg/ha (Control)	52.02	8.85	21.03
F test	<b>S</b>	<b>S</b>	<b>S</b>
S Ed (±)	1.36	0.35	0.82
CD (P=0.05)	2.88	0.73	1.73

Treatments	Pods/	seeds/	Test	Seed	Straw	Harvest
	Plant(no)	pod	Weight(g)	Yield (t/ha)	yield (t/ha)	index(%)
1.Sulphur 20Kg/ha + Zinc 5kg/ha	29.39	8.20	26.54	0.550	1.039	34.0
2.Sulphur 20Kg/ha + Zinc 7.5kg/ha	33.33	9.83	30.27	0.560	0.921	37.0
3.Sulphur 20Kg/ha+ Zinc 10kg/ha	32.65	8.37	29.63	0.629	1.800	25.8
4.Sulphur 30Kg/ha + Zinc 5Kg/ha	34.97	9.87	31.83	0.800	1.702	31.0
5.Sulphur 30 Kg/ha + Zinc 7.5kg/ha	32.64	8.27	27.21	0.822	1.706	32.0
6.Sulphur 30Kg/ha + Zinc 10Kg/ha	36.94	11.87	30.24	0.577	2.078	21.7
7.Sulphur 40Kg/ha + Zinc 5Kg/ha	35.87	11.64	28.98	0.598	1.718	34.0
8.Sulphur 40Kg/ha + Zinc 7.5Kg/ha	37.81	12.61	31.04	0.657	1.702	27.8
9.Sulphur 40Kg/ha+ Zinc 10Kg/ha	39.61	12.66	32.87	0.868	2.098	29.2
10. N-P-K 25-50-25 Kg/ha (Control)	25.02	8.10	25.03	0.510	0.910	35.0
F test	S	S	S	S	S	NS
S Ed ( $\pm$ )	0.88	0.36	0.73	0.06	0.11	---
CD (P=0.05)	1.8	0.76	1.5	0.13	0.24	---

**Table.2 Impact of plant growth regulators and zinc levels on yield attributes and yield of greengram**



