Effect of sulphur levels on growth and yield of Mustardvarieties

Abstract

Background: The field experiment was entitled **"Effect of sulphur levels on growth and yield of Mustardvarieties"** was conducted during *rabi*2022 at Crop Research Farm, Department of Agronomy, SHUATS, Prayagraj (U.P). The soil of experimental plot was sandy loam in texture, nearly neutral in soil reaction (pH 7.2), low in organic carbon (0.22 %), available N (171.48 kg/ha), available P (12.3 kg/ha) and available K (235.7 kg/ha). The experimentwaslaidoutinRandomizedBlockDesignwithninetreatmentswhicharereplicated thrice. Theresultsobtainedthatgrowthparametersviz.plantheight(186.80cm), Number of branches (18.00)anddryweight(39.23 g/plant) were recorded higher with the application of Varuna T - 59 + Sulphur – 25 kg/ha. Significantly maximum Yield parameters viz. number of siliquae/plant (321.12), test weight (4.86 g),numberofseeds/silique(15.60),stoveryield(3.43 t/ha)andseedyield(1.71t/ha)were recorded superior with the application of Varuna T - 59 + Sulphur – 25 kg/ha.

Comment [P1]: Stover yield and seed yield values not presented as a result in THE RESULT SECTION

Key words: *Varuna T-59, 1604, Anmol, Sulphur, yield.*

Introduction:

Rapeseed and mustard are the third most important edible oilseed crops of the world after soybean and oil palm. Sulphur is the fourth most important nutrient after nitrogen, phosphorus and zinc for Indian agriculture. Sulphur is best known for its role in the synthesis of proteins, oils, vitamins and flavoured compounds in plants. Three amino acids viz. Methionine (21%S), Cysteine (26%S), and Cystine (27%S) contain S which are the building blocks of proteins. About 90% of sulphur is present in these amino acids. Sulphur is also involved in the formation of chlorophyll, glucosides and glucosinolates (mustard oils), activation of enzymes and sulphydryl (SH-) linkages that are the source of pungency in oilseeds. Area under mustard in Bihar is 0.82 lakh hectares with 0.76 lakh tonnes production and 926 kg ha-1 productivity (FAI, 2012). Adequate sulphur is therefore very much crucial for oilseed crops. Sulphur is associated with the production of oilseed crops of superior nutritional and market quality. Soils, which are deficient in sulphur, cannot on their own provide adequate sulphur to meet crop demand resulting in sulphur deficient crops and sub-optimal yields (Chattopaddhyay*et al.,* 2012). Continuous

Comment [P2]: Give the scientific name of mustard

removal of S from soils by plant uptake has led to widespread S deficiency and soil S budget (Aulakh*et al.*, 1977) all over the world.

Sulphur content significantly affected seed, foliage yield, and sulphur uptake in mustard (Sharma *et al*., 2009). Sulphur is involved in producing crops with the highest nutritional value and market quality. Sulphur deficiency has been reported in over 70 countries around the world, including India. Sulphur deficiency in Indian soils is increasing due to agricultural intensification.

Mustard productivity is very low, mainly due to the imbalanced use of fertilizers. Most farmers are unaware of the importance and duration of use of the sulphur-containing fertilizers available at their local market. Sulphur is essential for the synthesis of proteins, vitamins, sulphur-containing essential amino acids and is also involved in nitrogen metabolism. Additionally, the use of sulphur in mustard has been reported to increase yield and oil percentage. To achieve this goal, agronomists have placed greater emphasis on improving oilseed production through proper nutrition. However, to achieve high yields, S fertilizer rates should be recommended based on available soil S and crop needs.

Material and Methods:

The experiment was conducted to know the "Effect of sulphur levels on growth and yield of Mustard varieties"Varuna T -59, 1604, Anmol was carried out at Crop Research Farm of Sam Higginbottom University, Prayagraj, Uttar Pradesh during 2022. The soil of experimental plot was sandy loam in texture, nearly neutral in soil reaction (pH 7.1), low in organic carbon (0.36 %), available N (171.48 kg/ha), available P (15.2 kg/ha) and available K (232.5 kg/ha). The experiment was laid out in a RBD consisting of Ten treatments including Control with 3 replications, with the treatment combinations T_1: Varuna T - 59 + Sulphur – 15 kg/ha, T_2: Varuna T - 59 + Sulphur – 20 kg/ha, T_3: Varuna T - 59 + Sulphur – 25 kg/ha, T_4: 1604 + Sulphur – 15 kg/ha, T_5: 1604 + Sulphur – 20 kg/ha, T_6: 1604 + Sulphur – 25 kg/ha, T_7: Anmol + Sulphur – 15 kg/ ha, T_8: Anmol + Sulphur – 20 kg/ ha,T_9: Anmol + Sulphur – 25 kg/ ha, T_{10}:Control are used.

Comment [P3]: Delete :
The method has not been sufficiently described to be reproducible. How Sulphurwas added during the production cycle?

Cite the growth and yield parameters that were measured: plant height, number of branches, stover yield, and seed yield.

Specify the method of analysis?what software was used?

There is no reference cited

Results

At Harvest, there was significant difference among the treatments. significantly higher plant height was recorded with the Varuna T - 59 + Sulphur – 25 kg/ha (186.80 cm) and minimum was recorded in control (176.00 cm). However, treatment with Varuna T - 59 + Sulphur – 20 kg/ha (186.00cm) and Varuna T - 59 + Sulphur – 15 kg/ha (185.00 cm)werestatisticallyatparwithT3.

Comment [P4]: The presentation of the results and their comparison concerned only T1, T2 and T3 with the controls.How about the results of the other treatments T4, T5, T6, T7, T8 and T9?

Table 1 should be in the results section and be clearly mentioned

What are the results on stover yield and seed yield cited in the abstract of this article?

significantly higher number of branches was recorded with the Varuna T - 59 + Sulphur – 25 kg/ha (18.00) and minimum was recorded in control (13.33). However, treatment with Varuna T - 59 + Sulphur – 20 kg/ha (17.33) wasstatisticallyatparwithT3.

Further at harvest, significantly higher dry weight was recorded with the Varuna T - 59 + Sulphur – 25 kg/ha (39.23 gm) and minimum was recorded in control (35.10 gm). However, treatment with Varuna T - 59 + Sulphur – 20 kg/ha (39.11 gm) and Varuna T - 59 + Sulphur – 15 kg/ha (38.59 gm)werestatisticallyatparwithT3.

The number of siliquae per plant was significantly influenced due to different treatment combinations. Number of siliquae per plant was recorded significantly with the Varuna T - 59 + Sulphur – 25 kg/ha (321.12) and minimum was recorded in control (294.23). However, treatment with Varuna T - 59 + Sulphur – 20 kg/ha (320.98) and Varuna T - 59 + Sulphur – 15 kg/ha (317.50) werestatisticallyatparwithT3. The number of seeds per siliqua was significantly influenced due to different treatment combinations. Number of seeds per siliqua was recorded significantly with the Varuna T - 59 + Sulphur – 25 kg/ha (15.60) and minimum was recorded in control (9.20). However, treatment with Varuna T - 59 + Sulphur – 20 kg/ha (15.10)wasstatisticallyatparwithT3. The test weight was significantly influenced due to different treatment combinations. Number of seeds per siliqua was recorded significantly with the Varuna T - 59 + Sulphur – 25 kg/ha (4.86 g) and minimum was recorded in control (3.98 g). However, treatment with Varuna T - 59 + Sulphur – 20 kg/ha (4.79 g)wasstatisticallyatparwithT3.

Discussions:

Chattopadhyay and Ghosh (2012) reported that S concentrations in cereals and mustard seeds increased significantly with increasing S values up to 60 kg S ha, irrespective of the S source. Results indicated that crops responded to S application because not enough S was available in the soil. The S concentrations of mustard seeds and mustard greens ranged from 0.69 to 0.89 and 0, respectively, with graded S values of 18 and 0.36 percent. Total intake of S continued to increase as S levels increased, regardless of the source of intake.Yadav *et al*. (2010) reported that a slight decrease in pH and EC and an increase in organic carbon, available nitrogen, phosphorus, potassium and sulphur were recorded after must harvest with sulfur application to 40 kg ha.Gangwar*et al*., (2011) conducted a field experiment and found that different levels of sulphur significantly improved the growth, yield as well as uptake of nutrients by seeds and straw of mustard. Seed inoculation with PSB significantly increased yield, uptake by seed and straw and availability of nutrients in soil. Combined effect of 50 kg P2O5 and 40 kg S ha-1 with seed inoculation with PSB gave higher seed and straw yield as well as nutrient content in seed and straw which resulted in higher nutrient uptake by mustard grown in loamy sand of North Gujarat.

Comment [P5]: Discussion is in singular and not in plural

The discussion should explain the results obtained in this work and compare them with the results obtained by other authors.

Comment [P6]:
So, you did not use even half of the recommendeddoses?

Table 1:Effect of Sulphur and Varieties on growthof mustard.

Treatments	Plant Height	Number of branches per plant	Dry weight	No. of siliqua/plant	No. of seeds/siliqua	Test weight (g)
T1	185.00	16.36	38.59	317.50	14.80	4.73
T2	186.60	17.33	39.11	320.98	15.10	4.79
T3	186.80	18.00	39.23	321.12	15.60	4.86
T4	179.50	13.00	35.71	308.17	12.20	4.35
T5	183.20	15.00	36.66	316.10	14.00	4.58
T6	184.00	16.33	37.74	317.00	14.70	4.64
T7	178.20	13.00	35.59	299.61	11.10	4.20
T8	180.00	14.00	35.82	313.70	12.70	4.43
T9	181.70	15.00	36.59	314.20	13.50	4.49
T10 (Control)	176.00	13.33	35.10	294.23	9.20	3.98
F– Test	S	S	S	S	S	S
S.Em(±)	1.84	0.32	0.72	3.23	0.17	0.07
CD(p=0.05)	5.48	0.96	2.15	9.60	0.50	0.23

Comment [P7]: To be in the Result section

References:

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Comment [P8]:
Improve the bibliography by citing other articles apart from those published in an Indian journal only