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Short Communication

Response of Mustard (*Brassica juncea* L. Czem and Coss) to Sulphur and Growth Regulators

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In India, rapeseed and mustard are grown over an area of 6.3 million ha with annual production of 5.36 million tonnes (Anon., 1994). The average yield of rapeseed and mustard in our country is 904 kg ha^{-1}, which is very low compared to the productivity in other countries like France (2724 kg ha^{-1}) and Poland (2282 kg ha^{-1}). Among the probable reasons leading to low productivity, poor nourishment due to imbalanced use of fertilizers is the single largest factor. Keeping this in view the present experiment was conducted to find out the suitable dose of sulphur and effect of growth regulators on mustard.

The experiment was conducted at SKN College of Agriculture, Jobner (Jaipur), during winter season of 1993-94. Treatments comprised four levels of sulphur (0, 50, 100 and 150 kg ha^{-1}) and four levels of growth regulators (Spray without regulator, Triacontanol, Mixtalol and Cycocel). Thus, 16 treatment combinations were replicated four times in Randomized Block Design. The soil of experimental site was loamy sand in texture with pH 8.4, organic carbon 0.216%, available N, P, K 132, 21, 152 kg ha^{-1}, respectively, and Sulphate sulphur 0.0036%. A basal application of 30 kg N and 40 kg P_2O_5 ha^{-1} through urea and DAP, respectively, was made uniformly just before sowing. Sulphur was applied through gypsum as per treatment. The sowing was done in rows 30 cm apart, using 4.0 kg seed ha^{-1} by hand plough.

Application of sulphur significantly increased the plant height, dry matter accumulation and number of branches per plant, wherein each graded dose of sulphur upto 150 kg ha^{-1} produced significantly taller plants, more dry matter and number of branches compared to its preceding dose (Table 1). Application of sulphur resulted in increasing availability of sulphur and also increased the availability of applied nitrogen and phosphorus. Thus, the increased nutrient availability resulted in increasing vegetative growth. Further, application of sulphur upto 150 kg ha^{-1} also increased the test-weight, seed and straw yield, and oil content over control (Table 1). The increased test weight and seed yield might be due to the fact that mustard being a long duration crop and being indeterminate in nature, the favorable effect of sulphur in improving nutritional environment extended over a long duration, favored both the grain formation and grain

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Table 1. Effect of sulphur and growth regulators on growth and yield of mustard

Treatment	Plant height (cm)	Dry matter at harvest (g)	Primary branches/ plant	Secondary branches/ plant	Oil content (%)	Seed yield (kg ha^{-1})	Straw yield (kg ha^{-1})	Test weight (g)
Sulphur levels (kg ha^{-1})								
0	130.72	32.40	6.82	11.75	33.75	1305	4224	3.65
50	140.80	35.92	7.78	13.25	35.06	1521	4842	3.80
100	150.20	38.72	8.47	14.50	36.19	1672	5328	3.92
150	158.40	41.22	8.93	15.60	37.24	1789	5692	3.98
CD (P=0.05)	8.18	2.42	0.52	1.01	1.00	103	327	0.22
Growth regulators								
Control	141.01	33.03	7.36	12.88	34.70	1412	4715	3.60
Triacontanol	156.65	41.56	8.47	14.21	36.33	1673	5350	3.96
Mixtalol	152.29	38.32	7.96	13.94	35.67	1614	5195	3.85
Cycocel	130.25	35.35	8.21	14.07	35.55	1588	4830	3.93
CD (P=0.05)	8.08	2.40	0.50	1.04	1.00	103	327*	0.21

development. The increased supply of sulphur to sulphur-deficient soils might also be a reason for the increased yield of mustard. The increased straw yield might be due to the consequence of increased vegetative growth and dry-matter accumulation. The higher oil content could be due to the fact that sulphur is an integral part of mustard oil and the increased sulphur availability might have favorably influenced the synthesis of essential metabolites responsible for higher oil content. Similar results were also reported by Mahapatra and Jee (1992).

Foliar application of growth regulators, viz., Traiacontanol and Mixtalol, significantly increased plant height, dry matter yield and number of branches over water spray (control) while Cycocel significantly reduced the plant height (Table 1). Differential behavior of these compounds could be attributed to their composition of formulation itself. The Triacontanol and Mixtalol acting as keys capable of unlocking the growth processes and the favorable effect of these on growth may be ascribed partly to increase in metabolic activities leading to better growth and development. Cycocel checked the excessive growth. These results are in conformity with the findings of Jain and Salim (1984). Application of all growth regulators produced higher seed yield, straw yield, test weight and oil content over control.

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