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EVALUATION OF COMBINED EFFECT OF SULPHUR AND NITROGEN DOSE ON *BRASSICA JUNCIA* UNDER THE BUNDELKHAND REGION OF MADHYA PRADESH, INDIA

S. K. Singh, H. S. Kushwaha[1], A. K. Singh[2] and K. K. Pandey

S. K. College of Agriculture and Research Station, Kawardha, District- Kabirdham (Chhattisgarh), India.
[1]M. G. Chitrakoot Gramodaya Vishwavidhyalaya, Chitrakoot, Satna (Madhya Pradesh), India.
[2]Bhoramdev College of Agriculture, Kawardha, District- Kabirdham (Chhattisgarh), India.

Abstract

Under the present study, the combined effect of sulphur and nitrogen has been taken for the *Brassica juncia* at the Research Station of M. G. Chitrakoot Gramodaya Vishwavidhyalaya, Chitrakoot, Satna (M. P.), India. Nine oil seed crops grown in India annually, out of nine caster is non-edible and rest eight are edible.India though occupies as pioneering position in oil seed area, its contribution towards world production is only 10% oil seeds occupy 14% of gross cropped area of the country and account for 5% of gross national product and 10% value of all agricultural products. In general, seed contain 35-45% oil and 22-24% protein. The fatty acid profile is the major determinant of oil quality.Mustard oil has 1-3 palmatic, 12-16% oleic, 14-16% linolaic, 4-6% eicosenoic and 40-50% erucic acid. S_{40} and N_{120} found the best treatment combination for the optimum plant growth and yield growth of the crop under the Bundelkhand region of M.P., India.

Key words : *Brasica junsia,* combined effect, yield parameters, nitrogen, sulphur.

Introduction

The oil seed crops plays on important role in India's and world economy. Nine oil seed crops grown in India annually, out of nine caster is non edible and rest eight are edible. India though occupies as pioneering position in oil seed area, its contribution towards world production is only 10% oil seeds occupy 14% of gross cropped area of the country and account for 5% of gross national product and 10% value of all agricultural products. India is largest producer of C.N. and rapseed mustard. About 14 million people are involved in the production of oil seed and one people are involved in its processing.

In 2013-14 rapseed mustard contributed to 6.5 million ha area; 7.8 million tonnes production; 1208 kg/ha nation productivity. Increases of the 1.56 million ha area; decreases of the -2.50 million tonnes production and decreases of the -4.28 kg/ha in the national productivity over the year 2012-13 (GOI).

In genral, seed contain 35-45% oil and 22-24% protein. The fatty acid profile is the major determinant of oil quality. Mustard oil has 1-3 palmatic, 12-16% oleic, 14-16% linolaic, 4-6% eicosenoic and 40-50% erucic acid. Plant protein nitrogen and sulphur as the integrated components mostly in farm of sulphur amino acids, cystine and methionine. Methionine is an essential amino acid and serues as methyl (CH_3) doner in many transmethylation reaction of metabolic significance. In mustard methionine is cursar of gluco sinolates. Thus, sulphur is not only required for protein and sulpholipid synthesis, but also required for formation and because of this requirement of sulphur for Brassica crops is much higher. It is also require for soil synthesis because its sulphydryl (mercaptan) group (-SH) serves as active centre all the enzyme fractions of synthesise complex. Thus a proper balance in the N:S ratio in these crops is essential for production and quality of crops.

In the present scenario of present day agriculture excessive use of high analysis fertilizer, decline organic matter of soil intensive cropping excessive balanced used of N P K have aggregative the deficiency of sulphur is our soil and the yield of oil seed crop is decline.

Table 1 : Effect of N and S levels on seed yield of mustard Kg ha^{-1}.

Treatment	S_0	S_{30}	S_{40}	S_{50}	Mean
N_0	917	1080	1140	1160	1074
N_{80}	1365	1505	1575	1560	1501
N_{100}	1480	1640	1820	1700	1660
N_{120}	1516	1775	1840	1807	1735
Mean	**1320**	**1500**	**1594**	**1557**	**1493**

Table 2 : Test of significance of different level of N and S and interaction (N × S) on yield.

	S.Ed.	C.D. (P=0.50)
N	8.446	17.998
S	8.446	17.998
N × S	17.340	36.952

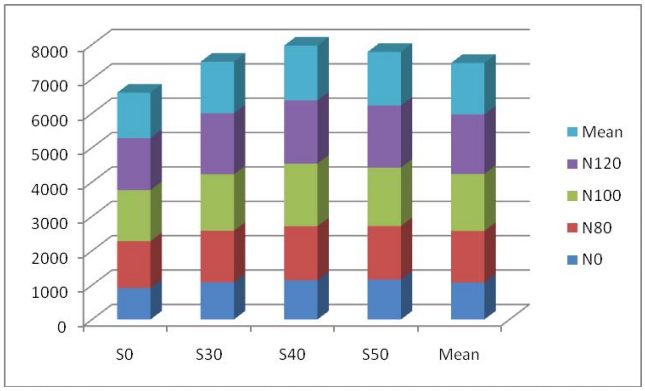

Fig. 1 : Effect of N and S levels on seed yield of mustard kg ha^{-1}.

Table 3 : Effect of N and S levels on Stover yield of mustard Kg ha^{-1}.

Treatment	S_0	S_{30}	S_{40}	S_{50}	Total
N_0	2270	2680	2838	2870	2665
N_{80}	3390	3570	3622	3715	3562
N_{100}	3685	3780	3990	4240	3924
N_{120}	3780	4150	4270	4410	4153
Total	**3281**	**3533**	**3680**	**3809**	**3576**

Table 4 : Test of significance of different level of N and S and interaction (N × S) on yield.

	S.Ed.	C. D. (P=0.50)
N	18.442	39.321
S	18.442	39.321
N × S	39.241	83.622

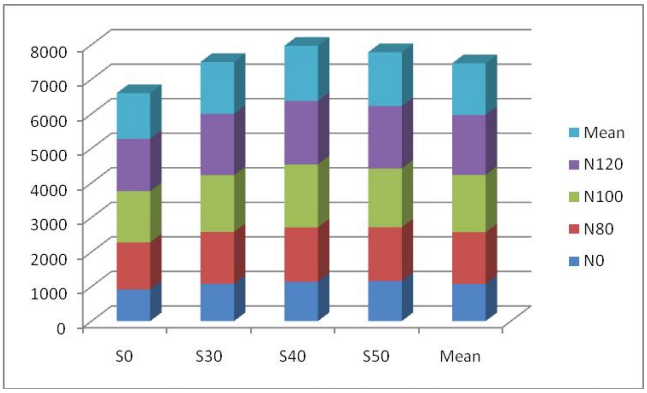

Fig. 2 : Effect of N and S levels on stover yield of mustard kg ha^{-1}.

Materials and Methods

An experiment has been conducted at Experimental Field Rajola of M.G.C.G.V.V, Chitrakoot, Satna (M.P.) during *rabi* 2010-11. The soil of experimental field has been found under the sand 52%, silt 25-33%, clay 21.97%. Four dose of nitrogen and four dose of sulphur has been N_0 (0 kg N ha^{-1}), N_{80} (80 kg N ha^{-1}), N_{100} (100 kg N ha^{-1}), N_{120} (120 kg N ha^{-1}) and S_0 (0 kg S ha^{-1}), S_{30} (30 kg S ha^{-1}), S_{40} (40 kg S ha^{-1}), S_{50} (50 kg S ha^{-1}), respectively. The experiment has been conducted under factorial Randomized Block Design (FRCBD) with 16 treatment combinations and three replication in 15 & 15 cm distance in *rabi* season for pusa bold variety.

The data recorded in different growth parameters seed yield and stover yield for the crop at different days after sowing.

Statistical analysis

The ANOVA of FCRCBD used for testing validation of result by the Panse and Sukhatme (1967).

Results and Discussion

The result have positive & significance plant height, leaves/plant, dry matter/plant, root length and branches/ plant in various level of N and S (main effect)and their interactions were also positive and significant.

The result varied from 917 Kg ha^{-1} (N_0S_0) to 1840 Kg^{-1} ($N_{120}S_{40}$). The main effect of N has been found linear and significant increase in nitrogen level from N_0 to N_{120}. The percent increase 32.35%, 54.56% and 61.55% respectively with N_{80}, N_{100} and N_{120} over N_0 control. Sulphur level there occurred a significant increase in seed yield except that the yield has been found significantly lower at S_{50} than that of S_{40}. The corresponding increase in percentage has 13.64, 20.76

and 17.96 for S_{30}, S_{40} and S_{50} respectively over control S_0 (table 1).

Stover yield

The stover yield has been found under the range between 2270 kg ha^{-1} (N_0S_0) and 4410 Kg ha^{-1} ($N_{120}S_{50}$). The same trend has found in Stover yield of variations as reported in seed yield. The increase percent has been found 33.58, 47.24 and 55.83%, respectively similarly S_{30}, S_{40} and S_{50} resulted in corresponding increase of 7.68, 14.20 and 16.00% over control.

The magnitude of increment has higher in nitrogen that of sulphur. N × S has been founded also positive and significant (Singh and Kushwaha, 2012).

Our result in the line of increase the yield with increased levels of P and S up to 39.3 to 45 kg ha^{-1} (Kumar and Yadav, 2007). The yield increases in Fuenentic Dystochrept application of sulphur at the rate of 45 kg S ha^{-1} gave high highest yield of seed and Stover over rest of the doses (0, 15, 30 and 60 Kg S ha^{-1}), (Basmatary and Talukdar, 2011). Longkumar and Gohan (2012) reported that maximum number of branches, number of capsules $plant^{-1}$, number of seed $capsules^{-1}$, test weight stover and seed yields was recorded at 60 Kg S ha^{-1}. The effect of nitrogen and sulphur level and the intraction of N × S on growth yield attributes seed and straw yield of mustard (Saraswat and Singh, 2007). Basmurthy *et al*. (2006) reported that the improvement in quality characteristics of rapeseed due to application of organic and inorganic sources of sulphur.

References

Basumatary, A. and M. C. Talukdar (2011). Integrated effect of sulphur and farm yard manure on yield of crop and nutrient status under rapseed rice cropping system in Flauventic Dystrochrept. *Journal of the Indian Society of Soil Science*, **59(4)** : 397-400.

Basumatary, A., P. Das, A. M. Barualm and R. C. Borah (2006). Integrated effect of inorganic and organic sources of Sulphur on quality characteristics of rapseed. *Indian Journal Agric. Biochem.*, **19** : 59-62.

Kumar, H. and D. S. Yadava (2007). Effect of phosphorus and sulphur levels on growth, yield and quality of Indian mustard (*Brassica juncea*) cultivar. *Indian S. Agro*., **33(3)** : 295-248.

http://indiabudget.nic.in/es2013-14/echap-08.pdf

Longkumar, I. T . and T. Gohain (2012). Effect of Sulphur and Calcium on growth and yield of sesame under rainfed condition of Nagaland. *Ann. Pl. Soil Res*., **14(1)** : 58-60.

Panse, V. G. and P. V. Sukhatme (1967). *Statistical methods for agricultural workers*, 2d enl. ed. New Delhi : Indian Council of Agricultural Research.

Saraswat, B. L. and B. P. Singh (2007). Effect of Biofertilizers, Sulphur and Nitrogen on growth and Yield of Mustard. *Ann. Pl. Soil Res*., **9(1)** : 69-71.

Singh, A. K. and H. S. Kushwaha (2012). A Study on the Effect of Nitrogen and Sulphur on Productivity of Mustard (*Brassica juncea*) under Irrigated Condition of Kymore Plateau. *M.Sc. (Ag.) Agronomy Thesis*, M.G. Chitrakoot Gramodaya Vishwavidhyalaya, Chitrakoot, Satna (M. P.).