

Research note :

## Yield and quality of mustard as influenced by different levels of phosphorus and sulphur

R.S. FAUJDAR, A.K. MATHUR AND A.K. VERMA

See end of the article for authors' affiliations  
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Correspondence to :

**R.S. FAUJDAR**

Department of Agricultural Chemistry and Soil Science, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA

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### ABSTRACT

Field experiment was conducted on clay loam soil having true density  $2.63 \text{ mg m}^{-3}$ , apparent density  $1.42 \text{ mg m}^{-3}$ , pH 8.3 and organic carbon 0.73% during *rabi* season of 2003-04. The treatments consisted of four levels of phosphorus (0, 20, 40 and  $60 \text{ kg P}_2\text{O}_5 \text{ ha}^{-1}$ ) and four levels of sulphur (0, 20, 40 and  $60 \text{ kg S ha}^{-1}$ ). The experiment was laid out in randomised block design with three replications. Application of both phosphorus and sulphur proved beneficial in increasing seed and stover yield, oil content and oil yield, protein content, chlorophyll content and S-containing amino acids in seed.

**Key words :** Sulphur, Phosphorus and Mustard, Yield.

Mustard (*Brassica juncea* (L.) (Czem and coss)) being considered as cash oil seed crop in India and occupies a prime place amongst all oil seed crops. With use of high yielding varieties for intensive agriculture requires more balanced nutrition but due to low fertility status of Indian soils mainly phosphorus and sulphur may cause low productivity of mustard against the potential productivity (Luthra *et al.*, 1983). To bridge the gap between control and potential yield could be achieved due to use of recommended dose of phosphorus and sulphur fertilizers. Phosphorus plays a vital role in crop nutrition for photosynthesis, respiration, better root growth and energy transfer in the living cells by high energy phosphate bond of ATP. Sulphur plays an outstanding role for the formation of amino acids, synthesis of proteins, chlorophyll and oil in oil seed crops. The present study therefore, has been taken to find out the effect of phosphorus and sulphur on yield and quality of mustard.

A field experiment was conducted during *rabi* season of 2005-04 at Instructional Research Farm at RCA, Udaipur. The soil was clay loam in texture with pH 8.3 and organic carbon 0.73%. The available nitrogen, phosphorus, potash and Sulphur were 317.3, 19.2, 354.5  $\text{Kg ha}^{-1}$  and 8.9 ppm, respectively. Mustard variety 'Pusa Bold' was sown on October 18, 2003 with four levels of each phosphorus and sulphur (Table 1) were tested in

randomized block design with 3 replications. As per treatments, sulphur through gypsum was broadcasted uniformly and phosphorus through DAP was drilled in soil before sowing. A uniform dose of  $60 \text{ kg N ha}^{-1}$  (half as basal through DAP + Urea) and remaining half in form of urea at the time of first irrigation was applied to all the plots. The rows were kept at 30 cm distance and plants at 15 cm distance.

Application of  $40 \text{ kg P}_2\text{O}_5 \text{ ha}^{-1}$  remained *at par* with  $60 \text{ kg P}_2\text{O}_5 \text{ ha}^{-1}$  recorded significantly higher seed, oil yield, oil, protein and chlorophyll content in leaves over control and  $20 \text{ kg P}_2\text{O}_5 \text{ ha}^{-1}$ . However stover yield remained *at par* with  $20 \text{ kg P}_2\text{O}_5 \text{ ha}^{-1}$  increasing levels of phosphorus significantly increased the S-containing amino acids *i.e.* cystine, cysteine and methionine upto  $40 \text{ kg P}_2\text{O}_5 \text{ ha}^{-1}$  but remained *at par* with  $60 \text{ kg P}_2\text{O}_5 \text{ ha}^{-1}$ . The favourable effect of phosphorus fertilization on seed, Stover, oil yields and chlorophyll content in leaves might be due to its key role in energy transformation under various metabolic processes. These results are in line with that of Tomer *et al.* (1992).

Sulphur fertilization at  $40 \text{ kg S ha}^{-1}$  remained *at par* with  $60 \text{ kg S ha}^{-1}$  and significantly increased the seed, Stover yield, oil, protein and chlorophyll content in leaves as compared to control and  $20 \text{ kg S ha}^{-1}$ . The per cent increased in seed and stover yield was registered to the tune of 26.2 and 12.4 and 18.5 and 8.5 respectively over control and  $20 \text{ kg S ha}^{-1}$ . Application of sulphur upto  $60$