

Effect of zinc and phosphorus on yield and quality parameters of soybean

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SUMMARY

A field experiment was conducted at STRU farm Dr. PDKV, Akola during the *kharif* 2005 to study the effect of zinc and phosphorus on yield, oil and protein content of soybean. The experiment was conducted in FRBD with twelve treatments of three levels of zinc (0, 10 and 20 kg Zn ha⁻¹) and four levels of phosphorus (0, 50, 75 and 100 kg P₂O₅) on yield and quality of soybean. The sources of zinc and phosphorus were zinc oxide and diammonium phosphate, respectively. Application of zinc @ 10 kg ha⁻¹ recorded significant increase in oil and protein per cent. Phosphorus @ 75 kg P₂O₅ ha⁻¹ recorded significantly increase in oil and protein per cent. Also grain and straw yield was maximum with application of 10 kg Zn and 75 kg P₂O₅ ha⁻¹.

Key words : Zinc, Phosphorus, Soybean.

Soybean require all the sixteen plant nutrients but its requirement for zinc is large than other oil seed crops which play a special role in oil seed crops to activate the enzymes for biosynthesis of oil. Sometimes deficiency causes marked decrease in number and size of pods and boldness of seed (Tisdale *et al.*, 1985).

P being constituent of carbohydrates, protein, fats, nucleic acid etc. also enhances root development, nodulation, flowering and pod formation in plants. Phosphorus has been found to be limiting factor in yield production of legumes.

Earlier reports showed that combined application of zinc and phosphorus caused significant results in respect of grain yield and protein content of soybean crop (Gupta and Vyas, 1994). Therefore, keeping this in view present study on effect of zinc and phosphorus on yield, oil and protein content of soybean crop was undertaken.

MATERIALS AND METHODS

The experiment comprising of three levels of zinc (0,10 and 20 kg Zn ha⁻¹) and four levels of phosphorus (0,50,75 and 100 kg P₂O₅ ha⁻¹) were tested in factorial randomized block design with three replications with soybean JS-335 as test crop during the *kharif* 2005. The soil of experimental plot was clay and had pH 7.6, electrical conductivity 0.33 dSm⁻¹, organic carbon 3.8 g kg⁻¹, available nitrogen 206.97 kg ha⁻¹, available phosphorus 20.5 kg ha⁻¹, available potassium 319.87 kg ha⁻¹, available zinc 0.79 mg kg⁻¹. Rainfall received during crop period was 370 mm. The source of zinc and phosphorus was zinc oxide and diammonium phosphate, respectively.

RESULTS AND DISCUSSION

Data regarding effect of zinc and phosphorus on grain yield and quality of soybean resulted (Table 1) in review that application of zinc @ 10 kg ha⁻¹ recorded maximum grain yield (15.15 q ha⁻¹) and straw yield (26.75 q ha⁻¹) of soybean followed by application of zinc @ 20 kg ha⁻¹. These treatments found *at par* with each other. The present results are on the line of Balusamy *et al.*, (1996). Application of phosphatic fertilizer @ 75 kg ha⁻¹ registered maximum grain and straw yield of soybean *i.e.* 16.81 q ha⁻¹ and 27.64 q ha⁻¹, respectively followed by 50 kg ha⁻¹. This treatment which is equal to level significance to phosphorus application @ 75 kg ha⁻¹. Umale *et al.* (2002) also reported that application of phosphatic fertilizer does not showed significant effect in respect of grain and straw yield of soybean.

Results in respect of quality of soybean (oil and protein) showed that application of zinc @ 10 kg ha⁻¹ recorded significantly maximize the oil and protein content of soybean *i.e.* 21.92% and 41.20%, respectively. Application of zinc @ 20 kg ha⁻¹ also recorded *at par* effect in respect of oil and protein content with treatment of application of zinc @ 10 kg ha⁻¹. These results are in conformity with the results of Jha and Chandel (1987). Application of phosphatic fertilizer @ 100,75,50 and 0 kg ha⁻¹, caused no significant effect in respect of oil content in soybean crop. Where as protein content was (40.53%) followed by @ 100 kg P₂O₅ ha⁻¹ (40.13%). Similar results reported by Umale *et al.* (2002). However interaction effect between zinc and phosphorus in respect of oil and protein content was found to be non significant.

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