

Effects of Zinc Sulphate Spray on Quality, Yield and Yield Components of Rapeseed (*Brassica napus*)

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INTRODUCTION

Among the micronutrients, Zn deficiency is most widespread on a wide range of soils in cold and warm climates (Cakmak et al. 1996). The role of Zn in subsoil nutrition is particular interesting because of its importance in maintaining membrane integrity of root cells (Welch 1995). In rapeseed, root growth was impaired and seed yield was severely depressed when Zn was omitted from the subsoil (Grewal et al. 1997). The aim of this study was to evaluate the effects of foliar Zn application on yield, yield components, oil and protein percentage in seeds of rapeseed.

METHODS

This study was conducted at Zabol University in Zabol, Iran on a silty, clay soil. Each plot was 3 x 7m². Prior sowing, triple superphosphate was mixed into the top 0.25m of the soil. To assure adequate available N, NH₄NO₃ was added, half prior to sowing and the other half after thinning. In this study, we used the rapeseed (*Brassica napus*) cultivar RGS003. The experiment consisted of four ZnSO₄ levels (control, 3, 6 and 9 kg ha⁻¹) in a complete block design with four replicates. Grain yield, yield components, oil and protein percentage were measured after harvesting. The data from this study were assessed by analysis of variance (ANOVA).

RESULTS AND DISCUSSION

The Zn-treated rapeseed plants exhibited a significant increase in yield and yield components compared to controls (Table 1). Reliy et al. (2000) reported similar increases in wheat and oilseed yield. It is evident that this element plays an important role in plants (Marschner 1995). The increase in yield induced by Zn treatments will markedly affect plant growth and development. Yield increased about 34.8% from control to 9 kg Zn ha⁻¹ in this study (Table1). The results also show a close relationship between Zn treatments, yield and yield components. The number of pods per plant and the number of seeds per pod increased with Zn treatments. From control to 9 kg Zn ha⁻¹, the number of pods per plant and the number of seeds per pod increased about 31.6 and 33.7%, respectively (Table1). Zinc application had no significant effect on length of pod and 1000 seeds weight.

Table 1: Effects of Zn-foliar application (kg/ha) on yield and yield components of rapeseed

Zn kg ha ⁻¹	Yield kg ha ⁻¹	No.pod per plant	No.seed per pod	Length pod cm	HI %
0	988.01b	70.8b	14.2b	4.5a	14.3b
3	1125.4ab	79.3ab	17.3ab	4.6a	18.5ab
6	1131ab	87.7ab	18.3ab	4.3a	24.2ab
9	1531.7a	103.7a	21.4a	4.8a	31.4a

The oil and protein content of the seeds increased with Zn application. Zinc had a bigger effect on oil than on protein content (%). In the 9 kg Zn ha⁻¹-treatment, the oil content (%) increased about 2 times compared to the control (Fig. 1). Relyi et al. (2000) reported similar increases in oil and protein content in oilseed.

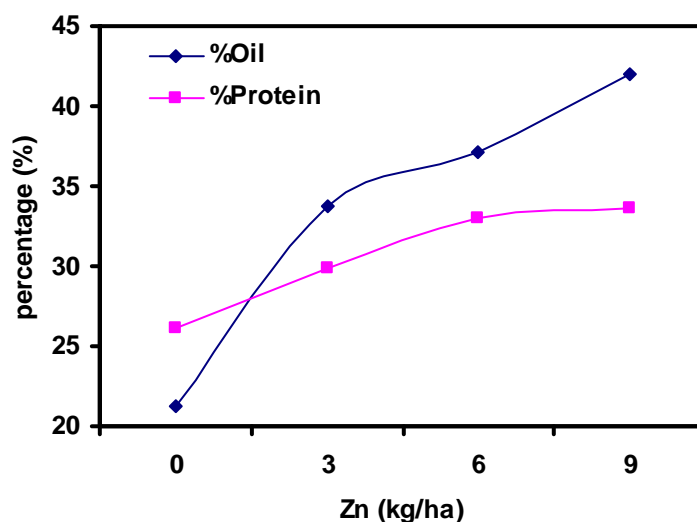


Fig. 1. Effects of Zn- foliar application (kg/ha) on seed oil and protein

CONCLUSIONS

We concluded that Zn treatments can affect growth, yield and quality parameters of rapeseed (oil and protein). The number of seeds per pod, the number of pods per plant and the harvest index increased significantly with increasing Zn applications from control to 9 kg Zn ha⁻¹.

ACKNOWLEDGEMENTS

We thank Dr Ghanbari and Dr Alipanah for their cooperation.

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