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Response of sulphur, zinc and iron nutrition on yield components and economics of safflower (*Carthamus tinctorius* L.)

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ABSTRACT

A field experiment was conducted to study the response of sulphur, zinc and iron nutrition on growth, yield and certain quality parameters of safflower in vertisol under irrigated conditions during *rabi* 2002-03 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. The results of the investigation indicate that levels of sulphur and their combination with micronutrients had significant influence on the yield components and economics of the safflower. The treatment receiving 30 kg S per ha registered the highest yield components (number of capsules, seed weight per head, 1000-seed weight and seed yield) with higher B:C ratio of 4:2, total cost of Rs. 6,094 and net returns of Rs. 19,531. The highest net returns of Rs. 21,521 was recorded in treatment receiving 30 kg S per ha + Fe + Zn foliar spray.

Key words : Sulphur, Zinc, Iron, Yield, Safflower.

Scant attention has been paid to the importance of secondary and micronutrients in plant nutrition. The deficiency of secondary and micronutrients is wide spread in many parts of the country due to cultivation of high yielding varieties, intensive agriculture and increasing use of sulphur free fertilizer in large quantities with concomitant decrease in use of organic manures, which necessitate rational application of these elements as they have becoming limiting factor for obtaining higher yields of several crops. In the present study, attempt was made to study the effect of sulphur alongwith Zn and Fe application on yield components and economics of safflower, an important oilseed crop grown in winter season in the Deccan *rabi* zone.

MATERIALS AND METHODS

The field experiment was conducted on safflower var. Annigeri-I, under irrigated condition during *rabi* season 2002-03 in Vertisol of Main Agricultural Research Station, University of Agricultural Sciences, Dharwad (Karnataka). The soil of the experimental field was neutral (soil pH 7.35) with low organic carbon (0.45%). The available N, P, K, S, Zn and Fe contents of the soil were 332, 11.90, 297.60, 10.95 kg per ha, 0.63 (ppm) and 4.45 (ppm), respectively. The treatments consisted of four levels of sulphur (0, 10, 20 and 30 kg/ha) and their micronutrient combination, where as sulphur was applied in the form of ammonium sulphate, zinc and iron were foliar sprayed taken at 30 and 65 DAS in the form of zinc chloride and ferric chloride, respectively. The experiment was laid out in a randomized block design having thirteen treatments replicated thrice. Calculated quantity of N was applied in the form of urea, P in the form of diammonium phosphate and K in the form of muriate of potash. A uniform of basal dose of N and P_2O_5 @ 75 kg per ha each and 40 kg per ha K_2O was applied seeds were sown at the rate of 8 kg per ha and a spacing of 60 x 30 cm was maintained.

RESULTS AND DISCUSSION

Yield attributes:

The result indicates that the application of 30 kg S per ha recorded the highest number of capsules per plant (32.2), seed weight per head (0.84 g), 1000-seed weight (61.6 g) and seed yield (1553 kg/ha) and it was significantly superior over 20 kg S per ha, 10 kg S per ha and control. This might be due to higher yield components. The result of this investigation agree with the findings of Reddy and Reddy (2001) in soybean and Venkatesh *et al.* (2002) in safflower (Table 1).

Combined application of sulphur and micronutrients had profound influence on yield components. The highest number of capsules (37.1) per plant, seed weight per head (0.96 g), 1000-seed weight (68.2 g) and seed yield (1765 kg/ha) were recorded in the treatment receiving 30 kg S per ha + Fe + Zn foliar spray and it was significantly superior over other treatments. This might be due to favourable conditions and well balanced supply of nutrients to the crop.

Economics:

Economic analysis of safflower was influenced by