

Effect of sulphur sources and their rates on yield, growth parameters, uptake of nutrients and quality of sunflower

SHUBHANGI J. DHAGE AND POONAM A. PATIL

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ABSTRACT

A field experiment was conducted to study the effect of different levels (0.20, 40 and 60 kg S ha⁻¹) and sources of sulphur (Gypsum and Gromor Sulphur Pastilles) on yield, growth parameter, nutrient uptake and quality of sunflower in sulphur deficient soil. The study revealed that the highest grain yield of 1282.80 kg ha⁻¹ was obtained with the treatment including NPK + 60 kg ha⁻¹ S Bentonite which was significantly different from all other treatments but was at par with (NPK + 40 kg S Bentonite). The growth parameters *i.e.* diameter of Sunflower head and number of seeds per flower were recorded highest with the treatment NPK+60 kg ha⁻¹ Beutonite. The highest nutrient uptake of N,P,K and S as well as the quality parameter *i.e.* oil content and oil yield were obtained in with the treatment containing NPK + 60 kg ha⁻¹ Beutonite and significantly superior over control. Hence, sulphur in form of Gypsum or Gromor Sulphur Pastilles (Bentonite) improves the oil content and oil yield of Sunflower.

See end of the article for authors' affiliations

Correspondence to :

SHUBHANGI J. DHAGE

Department of Soil
Science and Agricultural
Chemistry, Marathawada
Agricultural University,
PARBHANI (M.S.) INDIA

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India occupies a distinct position not only in terms of area under oilseeds but also in terms of diversity in cultivation of oilseeds. However, the productivity of oilseed crop in India is lowest in the world except in case of Castor.

Edible oil consumption in the country is continuously rising and has sharply increased in the last couple of years touching roughly 12.4 kg/head/year. Which is lower than the required. Sulphur plays a vital role in the production of oilseeds crops. Therefore, the present study was undertaken to evaluate the effects of sulphur and their sources on sunflower yield.

MATERIALS AND METHODS

The field experiment was conducted during *khari* season 2005 with Sunflower cultivar SCH-35 on clay soil at Agricultural College Farm, Department of Soil Science and Agricultural Chemistry, M.A.U., Parbhani. The experimental soil had pH 8.11, EC 0.29 dSm⁻¹, organic carbon 5.6 g kg⁻¹, available nitrogen 168 kg ha⁻¹, available phosphorous 22 kg ha⁻¹ and available potassium 300 kg ha⁻¹. The experiment was laid out in Randomized Block Design with seven treatments (Table 1) and four replications, consisting of four levels of S (0,20,40 and 60 kg S ha⁻¹) and two sources of Sulphur *i.e.* Gypsum and Bentonite sulphur and control. Nitrogen, Phosphorous and Potassium were applied in the form of Urea, Single Super Phosphate and Muriate of Potash, respectively. The basal doses of fertilizer (60:40:30 NPK kg ha⁻¹) and sulphur application as Gypsum and Bentonite was done before dibbling of Sunflower seeds. Three plants were randomly

selected from the net plot and were marked by fixing the peg near each plant. The grain and straw samples were analyzed for 'N' content by Kjeldahl's method and for 'P' content by Vanadomolybdo yellow colour method.

RESULTS AND DISCUSSION

Yield

The grain and Stover yield data reveal that sunflower responded significantly to different levels and sources of 'S' application (Table 1). There was linear increase in grain and stover yields with increasing rates of 'S' from both sources. All the treatments recorded significantly higher grain and stover yields over control. The highest grain yield of 1282.80 kg ha⁻¹ was obtained at T₇ (NPK + 60 kg S Bentonite) which was significantly different from all other treatments but was at par with T₆ (NPK + 40 kg S Bentonite) while lowest grain yield of 834.25 kg ha⁻¹ was recorded at control.

Higher efficiency of Bentonite sulphur for supply of S in 'S' deficient soil could be due to its immediately available content of soluble sulphate. Gangadhara *et al* (1990) obtained significant increase in seed and stover yields of sunflower with application of 10 kg ha⁻¹ elemental sulphur along with NPK. Agrawal and Verma (2000) reported that the application of S and P at four levels increased the seed and stover yield of sunflower up to highest levels of phosphorous and sulphur application but were significant up to 60 kg P₂O₅ ha⁻¹ and 40 kg S ha⁻¹.

The Straw yields data present a comparable picture with that of grain yield. Highest straw yield of 2857.80 kg ha⁻¹ was observed at T₇ which was at par with T₆