

## Effect of nitrogen and sulphur application on grain yield, nutrient uptake and quality of sunflower oil (*Helianthus annuus* L.) in Inceptisol

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### ABSTRACT

A field experiment was conducted for consequent two years in significant yield response to N and S was observed upto 80KgN and 60kgS/ha. Total N and S uptake was also increased significantly with applied nutrients. Sole application of N decreased oil content in sunflower seed, whereas oil content increased significantly with sole application of S up to 60kg ha<sup>-1</sup>. Protein content increased significantly with increased each successive dose of N and S. The maximum protein content was recorded at 120kgN and 60kgS ha<sup>-1</sup>. Nitrogen seems to play a vital role in increasing the proportion of proteins which is a major factor determining the quality of sunflower oil.

**Key words :** Sunflower, Grain yield, N and S uptake, Oil and protein content

### INTRODUCTION

Sunflower is a potentially remunerative oilseed crop because of its wide adaptability and photo-insensitive nature. Nitrogen and sulphur play an important role in nutrition of oilseed crops. It was reported that for every 15 parts of nitrogen, and 1 part of sulphur is necessary for oilseed crops to produce optimum yields (Dijkshorn and Vanwijk, 1967). When sunflower is grown on soils which are deficient in both nitrogen and sulphur, N:S balance is likely to suffer leading to low yields. Since the information on interrelationship of nitrogen and sulphur and their effect on yields of sunflower is meager, present study was conducted on a hybrid sunflower to investigate the response to applied N and S on an alluvial low fertility soil under subtropical climate.

### MATERIALS AND METHODS

Field trials were conducted for two consequent years in at the University Research Farm at Allahabad Agricultural Institute- Deemed University Allahabad. The soil was sandy loam with 62.18% sand, 24.19% silt and 13.63% clay. It had pH 7.9 O.C 0.28%, EC 0.31dS/m and available N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and S were 289.15, 21.98, 147.96 and 8.79 kg/ha, respectively. The treatment comprised 4 levels of N viz., 0, 40, 80 and 120kg/ha and 4 levels of S viz., 0, 20, 40 and 60 kg/ha were tested in a Factorial Randomized Block Design, replicated thrice and test crop was taken for study. Nitrogen was applied as urea in 3 splits at sowing, bud formation and flowering stages and sulphur as gypsum at the time of sowing. Phosphorous and potassium were applied uniformly to all plots through triple super phosphate and muriate of potash,

respectively.

### RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

#### Grain yield :

The result revealed the seed yield increased significantly by the application of N over control. A significant increase in seed yield was recorded at 120kgN ha<sup>-1</sup> (14.78q ha<sup>-1</sup>) that was statistical at par with 80kgN ha<sup>-1</sup> (14.58qha<sup>-1</sup>). The seed yield increased due to N application @ 40, 80 and 120kg ha<sup>-1</sup> was 30.13, 55.77 and 56.73 per cent over control, respectively. Similarly increasing levels of S application, seed yield increased significantly. The maximum was obtained at 60kgS ha<sup>-1</sup> was 14.43q ha<sup>-1</sup>. The magnitude of increase in seed yield due to S application @ 20, 40 and 60kg ha<sup>-1</sup> was 16.76, 21.59 and 25.44 per cent over control, respectively. Interaction effect of N and S also observed significant with respect to the seed yield. The maximum seed yield 15.95q ha<sup>-1</sup> was recorded at N<sub>120</sub>S<sub>60</sub> treatment combination that was statistical at par with N<sub>80</sub>S<sub>40</sub>, N<sub>80</sub>S<sub>60</sub> and N<sub>120</sub>S<sub>40</sub> treatments, respectively (Table 1). Similar results were recorded by Singh and Singh (2000)

#### Total N and S uptake:

The N uptake recorded at flowering was significantly by both N and S Application. The N and S uptake value at flowering stage ranged from 19.20 (N<sub>0</sub>S<sub>0</sub>) to 71.37 kg ha<sup>-1</sup> (N<sub>120</sub>S<sub>60</sub>) and from 3.69 (N<sub>0</sub>S<sub>0</sub>) to 9.88kg ha<sup>-1</sup> (N<sub>120</sub>S<sub>60</sub>), respectively (Table 2). The increase in N and

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