

## How sulphur, a macro-nutrient, can influence the growth of Indian Mustard (*Brassica juncea*)?

**Abhishek Aneja**

Department of Agronomy, School of Agriculture,  
Lovely Professional University, Phagwara, Punjab  
Corresponding author: aaneja45@gmail.com

**ARTICLE ID: 003**

### Introduction

Indian mustard (*Brassica juncea*) belongs to the family *Cruciferae* (*Brassicaceae*) popularly known as sarson and is an important rabi season oilseed crop of north India and an important member of rapeseed-mustard group. India is the third largest rapeseed-mustard growing country in the world, occupying the third position in area and production after Canada and China. The estimated area, production and productivity of rapeseed-mustard in the world is 34.19 mha, 63.09 mt and 1,850 kg/ha. India account for 19.29 per cent and 10.07 per cent of the total acreage and production of rapeseed and mustard of the world (FAO Statistics, 2015). Among the nine oilseeds cultivated in India, rapeseed-mustard contributes 23.65 per cent in the total oilseeds production and ranks third after soybean and groundnut sharing 39.46 per cent and 24.58 per cent, respectively in the India's oilseed economy, whereas in the total oil production its contribution is 30.92 per cent and ranks first followed by soybean and groundnut sharing 26.62 per cent and 23.83 per cent, respectively during 2014-15 season.

Sulphur is an essential micronutrient for complete development of plant. It is denoted by 'S'. The required quantity of sulphur changes with the development and growth of plant among the species along with the variation in dry weight from 0.1 to 1.5. The decreased amount of sulphur in cysteine and methionine amino acid plays an important role in catalytic centre's and protein bridge of disulphide (Hell, 1997). As an additional factor sulphur is also essential for amino acid synthesis, protein and several other nutrients also known as secondary sulphur compounds which provide protection of plant in case of stress and pest. Sulphur (S) is a vital crop fertilizer requisite by all plants for better and optimum yield. Crops absorb and use sulphur in the sulphate ( $\text{SO}_4$  -S) form, which is similar to nitrate ( $\text{NO}_3$  -N), is very mobile in the soil and

is susceptible to leaching in soil conditions containing excess water, mainly in sandy soils. Sulphur (S) is a basic constituent of natural life on our planet. This element exists in all plants and have a vital play in crop catabolism and anabolism. Sulphur is also needed for the development of natural proteins, amino acids, some vitamins and enzymes. Maximum compound fertilisers having sulphur also have nitrogen in it, emphasising on the relationship among these two nutrients. Sulphur is an important fragment of an enzyme mandatory for taking nitrogen in and deficiency of it can harshly hinder the metabolism of nitrogen. Collectively with nitrogen, sulphur permits the production of amino acids which are the monomer required for formation of protein. It is believed that fatty acids and vitamins and has a significant influence on class and flavour or aroma of floras. Sulphur is also fundamentally involved in the process of glucose formation, overall vitality catabolism and anabolism and sugar production.



#### **Effect of sulphur levels on growth of mustard**

- All the growth parameter have higher value of their growth if we apply sulphur at the rate of 60 kg/hac
- If we increase the amount of sulphur then there will be noticeable increase in plant height  
The different level of different doses of S have better effect on attributes like vertical plant height, canopy and biological yield. It had been noticed that maximum amount dry weight accumulation was observed at a dose of 60 kg S per hectare as compare to control or with dose of 30 kg S per hectare

- The different doses of sulphur fertilizers considerably effect mustard. Highest plant height was observed with jointly dose of sulphur as basal doses and foliar spray with 80% WP at the rate of 1.25 kg/hac at 75 DAS.

#### **Effect of sulphur levels on yield attributes and seed yield of mustard**

- The increasing trend of sulphur the amount of seeds and stover from the plots was also giving an upward trend.
- The biological and economic yield of mustard plots increase significantly till the sulphur dose reaches up to 30 kg/hac.
- The plot which have sulphur at the rate of 45 kg per hectare gave maximum yield which was around 19.6 q/hac while the yield of control was 13.4 q/hac
- The dose of sulphur at the rate of 90 kg/hac gave highest quantity of seeds which was 1170 kg from one hectare and straw was around 520 kg from same piece of land.

#### **Effect of sulphur levels on nutrient content and uptake of mustard**

- The uptake of nutrients by plants keep an increasing till 60 kg sulphur per hectare and afterward it became nearly constant.
- If we compare control and treatment having sulphur at the rate of 60 kg per hectare then the difference is around 0.1 per cent which is quite noticeable.
- The test weight of seeds and protein content of seeds both showed an increasing trend as we increase the dose of sulphur and zinc. He recorded uppermost sulphur uptake which was about 35 kg/hac from the treatment having sulphur at the rate of 45 kg/hac whereas the uptake of zinc is about 160 kg/hac which came in treatment having dose of 7.5 kg zinc per hectare.
- The amount of sulphur in seeds was recorded highest in the plots having gypsum and strains inoculated by elemental sulphur. He concluded that treatments containing sulphur coated strains are significantly better than the sulphur free strain.