



# Potassium & Sulfur in Plants

Potassium and sulfur are essential elements vital to many plant functions. SOP is an excellent fertilizer because it supplies these two plant nutrients necessary for profitable crop production.

## **POTASSIUM**

Nearly every aspect of plant growth is dependent upon an adequate supply of K. Potassium helps to improve plant yield, quality, disease resistance, tolerance to water stress, winter hardiness, tolerance to crop pests, N use efficiency, and efficiency of other purchased inputs.

### ***Potassium is required for the following major plant functions:***

**Enzyme activation:** Potassium in the cell is directly involved in more than 60 enzyme systems which regulate the rates of major plant growth reactions.

**Efficient use of water:** The process of opening and closing of leaf pores (stomates) is regulated by the K concentration in cells surrounding these pores. A shortage causes the pores to partially open and to be slower in closing. This intensifies stress from weather-related factors such as wind and heat, causing inefficient use of water.

**Photosynthesis:** The process by which chlorophyll converts sunlight, carbon dioxide and water into sugars is dependent upon K. Potassium helps to regulate the production of high energy compounds needed to drive other metabolic processes.

**Transport of sugars:** Adequate K keeps sugars moving out of the leaves, allowing photosynthesis to move ahead at full speed. It helps the movement of sugars and other compounds to root for storage and reuse.

**Water and nutrient movement:** Potassium activates systems which lead to better movement of water and nutrients within the plant. It also increases root growth and resistance to drought.

**Protein synthesis:** Potassium is required for every major step in the formation of plant protein.

**Starch formation:** Potassium activates the enzyme responsible for starch formation and speeds the relocation of starch for storage in roots or for use in building plump grains.

**Crop quality:** Potassium improves crop physical condition, resistance to diseases, harvestability, feed value of grain and crop market appeal and value.

## **SULFUR**

Sulfur fulfills several important functions in the plant. There can be no protein without S. This nutrient is needed to make chlorophyll, enzymes, vitamins and other essential compounds in the plant.

### ***The primary plant functions of S for optimum production include:***

- Production of protein
- Formation of vitamins
- Chlorophyll formation
- Activity of certain enzyme systems
- Fat and oil formation
- Carbohydrate formation
- Phosphorus (P) use efficiency
- N use efficiency
- Seed development.

Sulfur is present in SOP in the plant-available  $\text{SO}_4$  form. The  $\text{SO}_4$  is metabolized by the plant, and the S becomes an integral part of plant compounds and is vital to plant metabolism.

Sulfur deficiency is similar to and often mistaken for N deficiency. However, N deficiencies occur on older leaves first while an early S deficiency would appear on younger leaves. Sulfur-deficient plants are often uniformly chlorotic, stunted, thin-stemmed and spindly. More often, the economic losses caused by S deficiency are associated with “hidden hunger” which occurs before deficiency symptoms appear. This is especially true of forages where S deficiency seriously affects quality and animal performance.

Sulfur is most needed on coarse textured soils, soils low in organic matter or soils in humid climates. Sulfur deficiencies are becoming more widespread.