

## THE IMPACT OF SECONDARY MACRO NUTRIENTS ON CROP PRODUCTION

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### **ABSTRACT**

*Secondary macronutrients are less commonly yield limiting than the primary macronutrients (N, P, and K), yet are required by crops in relatively large amounts. Sulfur (S), calcium (Ca), and magnesium (Mg) are considered secondary macronutrients because they are less commonly yield limiting than the primary macronutrients (N, P, and K), yet are required by crops in relatively large amounts. Sulfur is the fourth major nutrient and it is essential for plant growth. It is essential for the formation of certain amino acids, proteins, and oils; is a structural component of protoplasm. Calcium, a structural component of plant cell walls, is most abundant in plant leaves. It is involved in cell growth, both at the plant terminal and at the root tips, and apparently enhances uptake of nitrate-N. Mg plays a critical role in nearly all parts of plant metabolism and protein synthesis, and is an essential constituent of chlorophyll. Mg is less required by Plants than Ca. Plant growth will take place normally until it is restricted by the supply of an essential nutrient. A deficiency of any essential nutrient cannot be corrected by the addition of other crop inputs. Excess of one plant food element may cause deficiency of another. Excess of N causes K starvation in certain crops. Short supply of any nutrient leads to adverse cellular metabolism, growth and development of plants. Such plants bear abnormal symptoms termed as visual deficiency symptoms. Toxic conditions such as excessive soil acidity may prevent plant roots from growing or perhaps nutrients are simply in low supply. Nutrients are essential for the metabolism of crop plants hence growth and yield as well as can be considered as an important component in plant-disease interactions.*

**KEYWORDS:** *Secondary Macronutrients, Sulfur (S), Calcium (Ca), and Magnesium (Mg), Toxic, Nutrients*