

# Zinc and Sulfur in Row Starter... Why Do You Need it?

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Due to the high cost of inputs this year, many farmers are re-examining their farming practices and trying to cut corners where they can. Because of the cost of row starter, many are under the assumption that if their soil fertility is good the benefits of the liquid fertilizer won't outweigh the cost. If they do spend the money for the starter, necessary micronutrients might not be added. What does the added expense of micronutrients such as zinc and sulfur offer anyway?

Sulfur is a water soluble, mobile nutrient. Heavy spring rains can easily cause sulfur to leach out of the top 2-4 inches of soil and into the lower root zone. The reduction in emissions brought on by the clean air act means that this same heavy rainfall is not replacing the leached sulfur that was once found in the atmosphere. When corn germinates, the radicle emerges from the corn seed and acts as the primary root system for the first two weeks after emergence. As the corn plant continues to develop, the radicle deteriorates and is replaced by seminal roots coming off the first node of the corn plant. These seminal roots are initially very shallow (1/2 inch or less) and then they grow deeper. Therefore, during the transition period from the radicle to the seminal roots, the lack of nutrients in the upper 2 to 4 inches becomes a problem. Other factors that contribute to sulfur deficiencies are minimum and no-till practices that increase the surface residue, the lack of tillage that mixes shallow soil layers with nutrients deeper in the soil profile, marginal to low soil pH, and sandy soils. Increasing surface residue means that the soil will be cooler for a longer period in the shallow root zone, therefore slowing the root growth and reducing the efficiency of the uptake of the nutrients. The lack of tillage also causes a differential in sulfur concentrations between the shallow and deeper soils. The soils deeper in the profile become more concentrated than the top 2-4 inches.

Sulfur is necessary for the production of chlorophyll and amino acids within the corn plant. Sulfur is not mobile once in the plant, so the "new" leaves are affected. Mild sulfur deficiencies show up as interveinal chlorosis of the leaves emerging from the whorl, and growth of the plant and roots is stunted. As the plant ages, the symptoms become more pronounced with the entire leaf turning yellow with slightly greener veins.

Soil sampling is the best way to find out sulfur levels in the soil. If sulfur is moderately to severely deficient, a dry fertilizer containing sulfur will have to be used. For growers who have a lot of surface residue, who plant into cool soils, or have extremely sandy soils, adding sulfur in your row starter is strongly recommended. As a general rule, for each day that sulfur is deficient past the first 21 days after emergence there is a loss of 1 to 2 bushels.

Zinc is essential for plant growth because it controls the synthesis of indoleacetic acid, which dramatically regulates plant growth. Zinc also plays an important part in many enzymatic reactions and is necessary for chlorophyll synthesis and carbohydrate formation. Zinc is rarely found to be deficient in soybeans, but more common in corn, especially corn on corn situations because the zinc demand exceeds the soil's ability to supply it. Zinc deficient soils are usually neutral to alkaline in pH, and are often high in phosphorous. (If the phosphorous source is from manure, zinc deficiency should not be a problem.) High phosphorous levels in plants restrict zinc movement within the plant resulting in accumulation at the roots and deficiencies in the tops.

Zinc deficiencies appear as yellow striping of the leaves. Areas of the leaf near the stalk may develop a white to yellow discoloration. In severe deficiencies, the plants have shortened internodes and the lower leaves show a reddish or yellowish streak about one-third of the way from the leaf margin.

Plant tissue tests are the best way to diagnose a need for zinc, but soil tests can also be performed. There are several sources of zinc including dry fertilizers and foliar fertilizers, but soil applied zinc at planting time is the most effective.