

Zinc In Fluids

Fluid fertilizers are an ideal means of providing needed zinc (Zn) for crops. Solid Zn sources tend to segregate in bulk blends and the relatively high analysis of many solid products, combined with low rates of Zn application, results in poor distribution and poor plant use. Higher rates of Zn application do address the problem, however, and benefit residual Zn levels in the soil. This scenario of poor distribution with low rates of Zn application occurs even when the solid Zn product is highly water soluble.

Fluid Zn sources are easily adapted for inclusion in starter fertilizers with specific placement close to the young plants and uniform distribution in the row. Recent research on highly Zn deficient soils in Australia has dramatically emphasized this point and provided strong evidence of the superiority of fluid Zn applications even when the chemical forms of Zn were identical (see Holloway, et al. in Fall 2006 FJ).

Both inorganic and organic sources of Zn for fluids are effective sources of this nutrient. Both banded and broadcast applications are effective, but applications banded close to the seedlings are the most economical and effective.

Foliar fertilization with fluid sources of Zn is another effective practice, particularly for vegetables and established tree crops. Foliar Zn should be applied as soon as a deficiency is detected and repeated applications may be necessary.

Deficiency symptoms

The most typical Zn deficiency symptoms include severe chlorosis (lack of chlorophyll) of new leaves, stunted plants, and deformed growing points/leaf edges. Dry beans, corn, flax, rice, pecans, and onions are particularly sensitive and responsive to Zn fertilization, while soybeans, barley, wheat, potatoes,

and sugar beets are moderately sensitive and responsive to Zn fertilization. Overall, Zn deficiency leads to lower yields and lower profit potential. Observations with zinc deficient plants suggest that they are deficient in growth control regulators and frequently stunted with shortened internodes.

P/Zn interactions

Large amounts of plant available phosphorus (P) can intensify problems of Zn deficiency and hinder plant uptake of Zn that is available. This P-Zn interaction is a well recognized phenomenon in many crops and places additional emphasis on providing supplemental Zn in starter fertilizers, even when soil tests indicate only marginally low levels of soil Zn. Very high residual P levels from prior fertilization practices can also result in problems with Zn uptake. Soil testing is a major tool in determining when these conditions exist.

Metabolic roles

Zinc is well recognized as one of the essential micronutrients for plants. In its metabolic roles, Zn exerts influence on reactions that subsequently affect energy production in plants. Zinc also affects protein synthesis and in conjunction the production of amino acids, including tryptophan, which in turn is involved in the production of the growth control compound indoleacetic acid.

Summing up

Zinc application in fluid fertilizers allows specific and effective placement of even low rates of Zn close to the developing plants. Zinc needs should be detected by soil testing and plant analysis. A good soil Zn application program is foundational but foliar applications can help in emergency situations.