# Copper

*Micronutrient Profile*

Copper (Cu) is an essential micronutrient for crop production. However, it is only needed in minimal quantities. The normal range of copper in plant tissue is somewhere between 3-10 ppm. Despite the low amount needed, Cu is still essential, and both excesses and deficiencies can hurt crop growth and quality.

## Copper's Function in Supporting Plant Growth

Copper supports many important plant functions, like photosynthesis and lignin biosynthesis. It's also part of several enzyme systems and intensifies the flavor and color of vegetables. Some of the plant systems impacted by Cu are:

Photosynthesis

Pollen Formation

Carbohydrate Production

Lignification

Chlorophyll Synthesis

To attain peak crop production, growers must ensure that plants have sufficient copper and that it's in balance with other micronutrients. Let's look at what can affect Cu availability.

## Factors That Impact Copper Availability

Copper uptake can be impacted by different variables, like soil pH, carbon and nitrogen residue, and organic soils, including heavily manured fields. Organic soils are most susceptible to Cu deficiency, because organic matter binds copper more tightly than any other micronutrient, making Cu inaccessible to crops. In contrast, heavy, clay-based soils are the least likely to induce a Cu deficiency.

Factors such as climate conditions and interactions with other nutrients can also make the soil copper deficient. Other causes of Cu deficiency include sandy soil and soil with a high pH. Thus, it's advisable to check the soil for Cu deficiency when the pH is over 7.5.

## Impact of Copper Deficiency on Crop Yield

Severe copper deficiency can halt plant growth. However, not all crops are sensitive to Cu deficiencies. For example, corn is only mildly affected by copper deficiencies, while vegetable crops like onions and carrots are impacted more severely. This makes onions and carrots more likely to respond positively to copper fertilization. Likewise, Cu deficiency in almonds (less than 2 ppm in leaves) is often overlooked and impairs nut development.

## Common Signs of Copper Deficiency

Copper deficiencies differ across crop species, but some commonalities can help with identifying deficiencies. Since Cu is immobile, its effects will be seen in new leaves. Plants with insufficient copper may have small, curled leaves, appear more compact, and be lighter in color than usual. In severe cases, growth may stop altogether. Therefore, especially in acidic or sandy soils, testing is recommended to ensure that copper is available in necessary quantities.

Fruit Scarring

Chlorosis

Stem Gumming

## Promoting Crop Health by Correcting Copper Deficiency

It's recommended that growers test both the soil and the crops to check for copper deficiencies. It doesn't take much to go from copper deficiency to excess, and too much Cu can result in toxicity. Since Cu toxicity can persist for extended periods of time, precision in your fertilization is important. With that in mind, you have a few options to treat Cu deficiencies.

Common copper deficiency remedies include:

- Soil application with acid fertilizers on calcareous soils
- Liming of acidic soils to increase pH levels
- Foliar fertilization – perhaps using a complete micronutrient fertilizer to ensure balance

While copper deficiency isn't common, it can impact essential plant functions. Growers must be especially watchful with high pH and sandy soils and take care not to overdo the application of Cu, as this can result in toxicity. When adding Cu to a fertility program, growers must consider the cause of the Cu deficiency and the type of crop to determine whether a soil treatment or foliar application is their best option.

Our agronomists are available to consult on your fertilizer application needs. Experienced with both applications in conventional and organic soils, they can help you apply the right solution at the right time for optimal crop performance. Contact us.

qualitechco.com | 318 Lake Hazeltine Drive | Chaska, MN 55318-1093 | o. 952.448.5151