

EDTA vs. Sugar-based Chelates

The following information applies to AgriGuardian brand sugar-based chelated nutrients. AgriGuardian cannot represent that this information applies to other sugar-based chelated products available in the market-place. AgriGuardian has been manufacturing and marketing sugar-based chelated nutrients since 2005.

Soil Application

EDTA (ethylene diamine tetraacetic acid) has been the standard chelating agent since the early 1940's. It is more effective when applied to soils with high pH (>7.3) compared to sugar-based chelates. EDTA-chelates are still used because they are relatively inexpensive and well known. Again, they are most suited to high pH soil and tank mixes. Sugar-based chelates are effective with soils as well, but perform better when soil and tank mixes have neutral to low pH (<7.3). With soil applied chelates, the nutrients must be taken into the plant, usually through roots, before they can be used. Plant uptake considerations are described under "Plant Application".

Plant Application

Sugar-based chelates are much more effective when applied directly to plants than are EDTA-chelates. Direct application can be as foliar spray, root dip, soil or growing medium drenches, and whenever the chelates come into direct contact with the plant tissues. EDTA molecules are much larger than sugar-based chelates, making EDTA-chelates slower to be absorbed by the plants tissues (leaves, stems, fruits and roots). Sugar-based chelated nutrients (Cu, Fe, Mn, Zn, etc.) can penetrate the waxy (cutin) layer on leaves and other plant surfaces much faster than EDTA-chelated nutrients, give a more rapid response.

Once inside plant tissues, Sugar-based chelated require much less energy and time to become available to the plant than do EDTA-based chelates. With EDTA-chelates, the nutrients must be separated from the EDTA molecule before they can be used by the plant. The nutrients are then bound to a sugar molecule before it can move within the vascular system of the plant. The plant must use energy to make the sugar molecule that is bound to the EDTA-chelated nutrient. Also, the process of converting the nutrient from an EDTA chelate into a sugar-bound nutrient also takes the plant's energy. Using sugar-based chelate nutrients eliminates both of these steps, thus conserving the energy by the plant to support growth.

The other benefit is the speed by which the nutrients are available for the plant to use. With sugar-based chelated nutrients, once inside plant, the nutrients are immediately available to move within the plant to where the nutrients are needed. Sugar-base chelated nutrients can be available to the plant in a matter of a few minutes to a few hours. With sugar-based foliar applied nutrients, it is common to see visual benefits in less than a day after application. Growers routinely report a better response with sugar-based chelates compared to EDTA-chelated nutrients, especially when foliar or plant applied.

Compatibility with glyphosate and other chemicals

AgriGuardian sugar-based chelates are compatible with most chemicals, including glyphosate and glyphosinate herbicides. These herbicides are strong chelating agents themselves, stronger than EDTA. What this means is that if EDTA-chelates are tank mixed with these herbicides, then the nutrients bound to the EDTA chelate will be removed from the EDTA chelate by the stronger herbicides. Also, the herbicides are deactivated, and the nutrients are unavailable for the crop to use. This results in poor weed kill with the herbicides, and the benefit of the nutrient bound to the EDTA chelate is lost. Using AgriGuardian sugar-based chelated nutrients, problems with chemical tank mixes rarely occur. As for tank-mixing all chemicals, conducting a jar test to ensure compatibility is recommended.