BRANDT® EnzUp® Zn at Planting on Specialty Annual Crops

When growing vegetables, potatoes, or other specialty annual crops, good plant establishment early in the season is critical to season-long success. Producing a strong root system early in the season will allow the plant to take full advantage of soil nutrients applied during or prior to planting. Good root growth will also make the plant more resilient to both biotic and abiotic stresses that may occur during the season. Early season vegetative vigor will help crops outcompete any weeds that are present, and help get specialty crops to market sooner.

Spring planted specialty crops may have difficulties getting off to a good start in years where soil temperatures remain cold and/or saturated into the growing season. Low soil temperatures reduce availability of many essential nutrients, decrease activity of beneficial soil microbes and inhibit early root growth. Soil application of **BRANDT EnzUp Zn** at planting can help promote early season root growth and vegetative vigor.

BRANDT EnzUp Zn is a combination of EDTA chelated zinc with two soil-active enzymes. Enzymes are specialized proteins produced by all living organisms that act as catalysts to bring about a specific biochemical reaction. In the soil environment, enzymes perform several important functions including nitrogen fixation and conversion, mineralization of organic nutrients, pesticide degradation and organic matter decomposition. While some enzymes are secreted by plant roots, most soil enzymes are produced by fungi and bacteria. Through the secretion of enzymes, these beneficial microbes increase availability of nutrients not only for themselves but also for plant species. Measurement of soil enzymes can be a general indicator of soil health (USDA National Resources Conservation Service).

The two enzymes present in BRANDT EnzUp Zn are *mannanase* and *lipase*. Mannanase breaks down large complex polysaccharides like cellulose and hemicellulose that are present in the soil, and similar structures in root exudates. Lipase breaks down lipid structures in the soil. The activity of both these enzymes creates smaller, more digestible carbon structures that help feed beneficial microbes in the soil. This stimulates rapid microbial growth and activity that leads to increased plant available nutrients in addition to enhancing root growth. The enzymes in BRANDT EnzUp Zn also directly mineralize nitrogen and phosphorus that are in these organic structures, making them plant available.

The zinc present in BRANDT EnzUp Zn is 100% EDTA chelated. This means that it will remain in solution and won't be tied up in the soil. Early plant availability of zinc has been shown to be a key driver in rapid plant establishment of a variety of crops. The zinc in BRANDT EnzUp Zn also plays a role in activating the enzymes in the formulation. Many enzymes require metallic cofactors in order to perform their biochemical reactions. The most common of these cofactors is zinc.

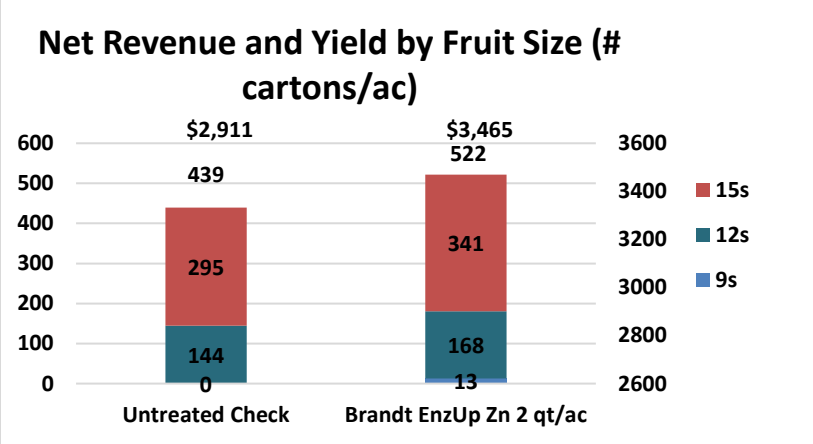
There are several advantages of applying activated enzymes over a living biological product. Enzymes are immediately active in the soil, regardless of temperature, soil moisture or other physical conditions. Biologicals have to establish themselves in the rhizosphere before they can begin to provide any benefits to the plant. This means they will have adapt to local conditions and displace native species that are already present.

BRANDT EnzUp Zn can be applied at planting to a variety of specialty annual crops. In direct-seeded vegetables, it can be applied with liquid starter blends or soil applied insecticides. These can be shanked into the soil or applied as a band over the seed line. For vegetable transplants, applying BRANDT EnzUp Zn in the transplant water or through the first irrigation are both good options. With potatoes, in-furrow applications with a fungicide have worked well.

Trial Data

BRANDT EnzUp Zn Trial on Oro Rico Cantaloupe conducted in Merced, CA in 2020.

- Application Info:
  - Application: May 30, 2020
  - Harvested: August 3 and August 10, 2020



BRANDT EnzUp Zn Trial on Broccoli conducted in Hollister, CA in 2020.

- Application Info:
  - Application: July 28, 2020
  - Harvested: October 28 and November 6, 2020