ROS INCREASES VINEYARD YIELD BY 50%

During the 2023 growing season, Mr. Steven Deitz, a research consultant with Sawtooth Ag Research (Selma, CA) conducted a field study using a new ROS mineral oxychloride disinfectant, JC 9465, to control sour rot in mature (6 years old) wine grapes (cv. French Columbard) vineyard. The test site (vineyard) had a history of virus infections that showed symptomology late in the season when under stress. The study was designed to monitor sour rot and crop yields with four applications during the growing season (March to September). The applications consisted of 1) control, 2) soil irrigation, 3) foliar spray, 4) soil irrigation/foliar spray. For the soil irrigation, they used a 78 mg/l of JC 9465. For the foliar spray, they used 390 mg/l of JC 9465. Treatment occurred on April 26, May 18, June 16, and July 14, 2023.

The results of the study demonstrated a 50% drop in sour rot compared to the control and 50% increase in crop yield using JC 9465 in a foliar application. Using the ROS, mineral oxychloride chemistry, JC 9465, we observed an increase in yield of harvestable clusters per vine (control-60 clusters per 2 vines vs JC 9465-73 clusters per 2 vines) for the foliar application.

Applications	Sour Rot (Removal)*	Clusters/Vine	LBS/2 Vines	Dosage (oz/gal)
Control	0	60	51	0
Foliar	25	73 (+21.7%)	76 (+49.0%)	0.05 oz/gal
Soil	25	67 (+11.7%)	67 (+31.4%)	0.01 oz/gal
Foliar/Soil	50	69 (+15.0%)	71 (+39.2%)	Foliar/Soil

- The higher the number represents the reduction sour rot presence in the study.

Using four applications of JC 9465 as a foliar spray, it appears to have increased flow in the xylem and phloem in the plant. This resulted in an increase in water flow and nutrients to improve the plant's development. Using JC 9465 in the drip system, we added the benefit of changing microbiological composition of the soil to support accelerated root development and plant development.

JC 9465 is a mineral oxychloride disinfectant that is EPA FIFRA registered, USDA NOP certified and USEPA Water approved. Mineral oxychloride chemistry generates a high concentration of reactive oxygen species (ROS).

JC 9465 is currently being tested in several agricultural areas in the US and other countries. The initial results have been like what is being observed in this study. Crop yield varies from 30% to 60%. For more information, email us at charles@jenfitch.com or visit our website, www.jenfitch.com.

What is ROS?

With the introduction of molecular oxygen (O_2) into our atmosphere by O_2-evolving photosynthesis organisms early in the evolution of aerobic life, reactive oxygen species (ROS) have become an integral part of life. The activation or reduction of oxygen gives rise to reactive ROS that includes the singlet oxygen ($^1O_2$), superoxide (O_2^-), hydrogen peroxide (H_2O_2) and hydroxyl radical (HO^-). Plants and other living organisms in the oxidizing environment constantly produce ROS in chloroplasts, mitochondria, peroxisomes and other sites of the cell because of their metabolic processes such as photosynthesis and respiration.

REAGENT NAME	FORMULA	ELECTROCHEMICAL POTENTIAL (Volts)
Fluorine	F^2	3.06
Mineral Oxychloride	$M_xO_yCl_z$	2.8–2.9
Hydroxyl Radical	OH^-	2.8
Oxygen Ion	O^-	2.42
Ozone	O_3	2.07
Hydrogen Peroxide	H_2O_2	1.78
Perihydroxil Radical	HO_2	1.7
Chlorine Dioxide	ClO_2	1.57
Hypochlorous Acid	HOCl	1.49
Chlorine Gas	Cl_2	1.36
Oxygen (Molecule)	O_2	1.23
Hypochlorite Ion	OCl^-	0.94
Sodium Hypochlorite	NaOCl	0.94
Hydroperoxide Anion	HO_2^-	-0.88
Superoxide Radical	O_2^-	-2.4

The generation of ROS in plants is triggered by different kinds of environmental stresses, such as high light, high or low temperatures, salinity, drought, nutrient deficiency and pathogen attack. Plants and other living organisms have evolved a host of antioxidants and anti-oxidative enzymes and other small molecules to harmlessly dissipate ROS. Imbalance between ROS production and their detoxification by enzymatic and non-enzymatic reactions causes oxidative stress. As a result of higher net ROS formation, there is photooxidative damage to DNA, proteins and lipids and ultimately cell death. ROS can also act as a signaling molecule involved in growth and developmental processes, pathogen defense responses such as hypersensitive reaction and systemic acquired resistance, stress hormones production, acclimation and programmed cell death. In a controlled application of JC 9465, we can achieve and harness the power of ROS to stimulate and support healthy plant development and higher yields.