

FIELD STUDY • AGRICULTURE • 2023 GROWING SEASON

ROS Increases Vineyard Yield by 50%

An independent field study shows DZ 9966 mineral oxychloride disinfectant cut sour rot in half and boosted harvestable yield by nearly 50% in mature wine grapes.



Mature French Colombard wine grapes — trial site, California

+49%

HARVESTABLE YIELD (FOLIAR APPLICATION)

50%

REDUCTION IN SOUR ROT

4

APPLICATIONS ACROSS THE SEASON

During the 2023 growing season, a research consultant with an independent agricultural research firm in California conducted a field study using DZ 9966 — a new ROS mineral oxychloride disinfectant — to control sour rot in a mature (6-year-old) wine grape vineyard (cv. French Colombard). The site had a history of virus infections that showed symptomology late in the season under stress. The study monitored sour rot and crop yield across four applications during the growing season (March–September): (1) control, (2) soil irrigation, (3) foliar spray, and (4) soil irrigation with foliar spray. Soil irrigation used 78 mg/L of DZ 9966; foliar spray used 390 mg/L. Treatments occurred on April 26, May 18, June 16, and July 14, 2023.

The results demonstrated a **50% drop in sour rot** versus the control and a **50% increase in crop yield** from a foliar application of DZ 9966. Harvestable clusters per vine rose from 60 (control) to 73 with the foliar treatment.

— Field study results

APPLICATION	SOUR ROT REMOVAL*	CLUSTERS / VINE	LBS / 2 VINES	DOSAGE
Control	0	60	51	—
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

*A higher number represents a greater reduction in sour rot presence in the study.

— How it works

Across four applications of DZ 9966 as a foliar spray, the treatment appears to have increased flow in the plant's xylem and phloem — improving the movement of water and nutrients that drive development. Applied through the drip system, DZ 9966 added the further benefit of shifting the microbiological composition of the soil to support accelerated root and plant development.

DZ 9966 is a mineral oxychloride disinfectant that is **EPA FIFRA registered, USDA NOP certified, and USEPA water approved**. Its mineral oxychloride chemistry generates a high concentration of reactive oxygen species (ROS).

WHY MINERAL OXYCHLORIDE

On the oxidation-potential scale, mineral oxychloride chemistry ranks second only to fluorine — far above ozone, chlorine dioxide, and chlorine — delivering exceptional disinfecting power at low dosage.

— What is ROS?

With the introduction of molecular oxygen (O_2) into our atmosphere by O_2 -evolving photosynthetic organisms early in the evolution of aerobic life, reactive oxygen species (ROS) became an integral part of life. The activation or reduction of oxygen gives rise to reactive ROS — including singlet oxygen (1O_2), superoxide (O_2^-), hydrogen peroxide (H_2O_2), and hydroxyl radical ($HO\bullet$). Plants and other living organisms constantly produce ROS in chloroplasts, mitochondria, and peroxisomes through metabolic processes such as photosynthesis and respiration.

ROS generation in plants is triggered by environmental stresses — high light, temperature extremes, salinity, drought, nutrient deficiency, and pathogen attack. Organisms have evolved antioxidants and anti-oxidative enzymes to harmlessly dissipate ROS. An imbalance between ROS production and detoxification causes oxidative stress, which can damage DNA, proteins, and lipids.

ROS also act as signaling molecules involved in growth and development, pathogen-defense responses, stress-hormone production, and acclimation. A controlled application of DZ 9966 harnesses the power of ROS to stimulate and support healthy plant development and higher yields.

OXIDATION POTENTIAL OF COMMON OXIDANTS

REAGENT	FORMULA	VOLTS
Fluorine	F_2	3.06
Mineral Oxychloride	$M_xO_yCl_z$	2.8–2.9
Hydroxyl Radical	$OH\bullet$	2.80
Oxygen Ion	O^-	2.42
Ozone	O_3	2.07
Hydrogen Peroxide	H_2O_2	1.78
Perhydroxyl Radical	HO_2	1.70
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^-	-2.40

EPA FIFRA Registered

USDA NOP Certified

USEPA Water Approved

DZ 9966 is currently being tested across several agricultural regions in the U.S. and abroad, with early results consistent with this study — crop-yield gains ranging from 30% to 60%. To learn more, contact us at deepak@dz-worldwide.com or visit www.dz-worldwide.com.