ozone
technologies ltd

winery solutions
barrel disinfection

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sustainable, chemical free solutions for enhanced hygiene in wine production

barrel disinfection

Ozone has long been used in wineries, in many water treatment areas. These include disinfection of rinse water prior to bottling, cold water cleaning of tanks, and reducing organic loading in waste-water, to enabling re-use for irrigation.

Why change from aqueous ozone treatment to gas for barrels?

Use of gas phase ozone in other areas of food production have shown remarkable reductions in spoilage losses, microbial control, ethylene removal, increased shelf life by an average of 30% across a wide range of foods, and improved production area environments. Following the success of these environmentally sound systems we have developed a winery specific treatment for use as a biocide, particularly for the control of brettanomyces and other contaminants in wine barrels.

Gas phase ozone treatment is an effective, swift procedure, and is added to your cleaning regime as the final step prior to barrel filling. This replaces standard treatment without affecting the wood's properties.

Ozone in the gas phase can penetrate porous surfaces and air pockets far more effectively than ozone in water, at much higher concentrations. This helps to eliminate fungal or bacterial contamination below the wood surface. The process is ideal for this specific task, with applied levels of between 300 and 1300ppm depending on barrel size, pre-treatment and time treatment applied. With a half-life of 24 hours in the gas phase, on-going sterilization occurs readily.

All traces have been noted as consumed within an hour of treatment, as organic matter or pathogens in the wood is consumed. Barrels have been filled within 20 minutes of treatment, instantly consuming any final traces of ozone & without flavour compromise or quality. The advantages of this are that the barrel is essentially sterilized at the point of filling, with no introduction of waterborne contaminants, spores or flavours with the dry treatment.

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protecting our environment

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Antimicrobial Efficacy

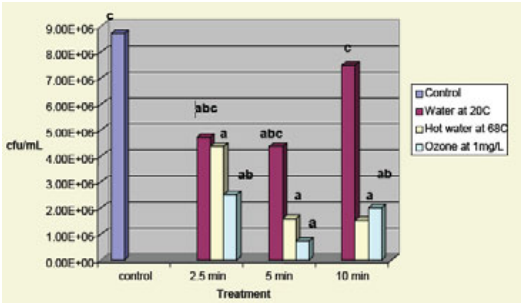
Efficacy studies conducted according to AOAC Official Method 961.02, Germicidal Spray Products as Disinfectants Test and AOAC Official Method 960.09, Germicidal and Detergent Sanitizing Action of Disinfectants (EPA formulated test and performance requirements), provided the following results using ozonated water in a washdown / spray treatment:

CT reductions in some micro-organisms, results drawn from aqueous ozone treatment:

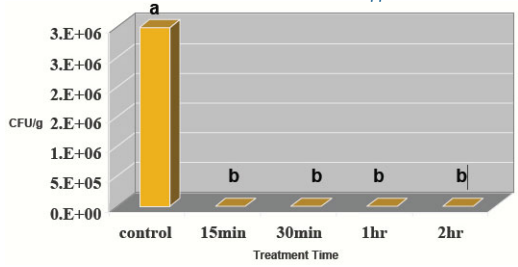
Organism	Ozone Residual	Duration	Reduction
Trichophyton mentagrophytes	1.85-2.25 PPM	30 seconds	6 log (99.9999%)
Salmonella choleraesuis	1.85-2.25 PPM	3 minutes	6 log (99.9999%)
Staphylococcus aureus	1.85-2.25 PPM	10 minutes	6 log (99.9999%)
Pseudomonas aeruginosa	1.85-2.25 PPM	5 minutes	6 log (99.9999%)
Listeria monocytogenes	1.85-2.25 PPM	3 minutes	4 log (99.99%)
Aspergillus flavus	1.85-2.25 PPM	5 minutes	4 log (99.99%)
Brettanomyces bruxellensis	1.85-2.25 PPM	3 minutes	4 log (99.99%)
Escherichia coli	2.1 PPM	30 seconds	5 log (99.999%)

Some gas phase ozone treatment results:

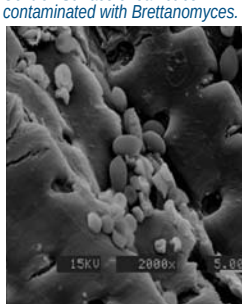
Population of Brettanomyces bruxellensis recovered from core barrel samples treated with ozonated water, hot water and water in a barrel



Time Population of Brettanomyces bruxellensis recovered from inoculated oak cubes treated with ozone at 1300 ppm



Control: Surface of oak cube contaminated with Brettanomyces.



surface of oak cube treated with ozone

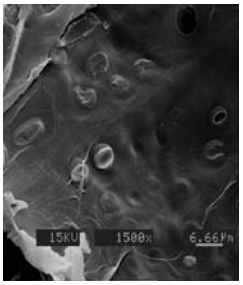
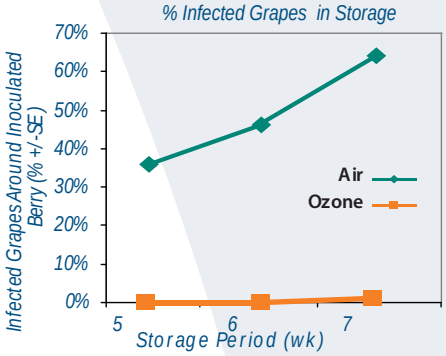


Table Grape Test Shows Reduction in Infection

% Infected Grapes in Storage



Source: 2002 study by UC Davis, UC Riverside

control grapes, no ozone

ozonated storage grapes

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sizing your treatment system barrel disinfection

System selection options for your winery, single barrel treatment:

Series: B.D.8 The Series BD8 is for single dosing applications.

Selector options:

BD8 [ ] [ ] [ ] [ ] [ ]

OZONE GENERATOR : 240V, 50Hz, 1A,120W.
Air cooled, corona discharge unit, from oxygen feed gas.

- **1** Fixed ozone output (full power). Timer set 4-10 minutes.
- **2** Add variable manual control ozone output

FEED GAS OXYGEN OPTIONS: 4-5 L/min required

- **A** 5L PSA oxygen concentrator, 220-240V, 50Hz, 2A, 350 W. Oxygen at 4 lpm output, 92% ±3% ; 5 lpm output 90% ±3% with onboard air compressor, adjustable flowmeter, wheeled.
- **B** None. Requires bottled oxygen cylinder and regulator.

EQUIPMENT POSITION - FIXED OR MOBILE:

- **A** Fixed position - no frame. Wall mount ozone & control cabinet, oxygen cylinder or concentrator below.
- **B** Mobile plant, with sturdy wheeled 304SS steel frame.

BARREL DOSING LENGTH (single applicator):

- **K** Budget option for well ventilated outdoor use only. 10 metre Kynar feed line, silicon bung & hand valve. Comes with 5m kynar line for off gas, must be kept vented to outdoors.
- **5** 5 metre Xtendose* - Recommend for portable system.
- **10** 10 metre Xtendose*
- __ Specify length required in metres if different length required.

OZONE DESTRUCT #

- **A** None. Take adequate safety precautions and wear an approved carbon filter face mask while operating.
- **B** Yes. Require for indoor use with this treatment. Recommended for all gas phase treatment.

Connection to controller. *At barrel bung.*

* Xtendose Barrel Dosing

Ozone inert materials, silicone barrel bung, ozone dose and offgas line, indicator & process control wire all enclosed in a single, protective hose. Timer is activated at the operators end.

Catalytic Ozone Destruct

STEL working levels for ozone in the air are 0.1ppm for a standard 8 hour shift and 0.3ppm for short term exposure. With dosing up to 1300ppm at the barrel personnel safety is of primary importance.

With gas barrel systems, this is the only viable Ozone Destruct type to ensure removal of escaping ozone gas. Oxygen percentages are very high in this treatment type, and carbon based ozone destructs (used to remove ozone from water) cannot be used, as oxygen will self-combustion in the presence of carbon. Carulite media is made for ozone destructs, and refills are available.

Note: A G cylinder (8,000L will last around 26 hrs at 4L/min). A 5L oxygen concentrator will pay for it's purchase in 20-21 refills. Comparison excludes the ongoing service / lease charges for the cylinder hireage.

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System selection options for two or more treatments

Series: B.D.20 The Series BD20 comes with two applicators, ozone destruct and adjustable timing.

Selector options:

BD20 [ ] [ ] [ ]

OZONE GENERATOR : 240V, 50Hz, 1A,300W.
Air cooled, corona discharge unit, from oxygen feed gas.

FEED GAS OXYGEN OPTIONS: 4-9 L/min required

- **A** 10L PSA oxygen concentrator, 220-240V, 50Hz, 2A, 590 W. 2-9 lpm output, 92% ±3% with onboard air compressor, adjustable flowmeter, wheeled.
- **B** None. Requires bottled oxygen cylinder and regulator.

EQUIPMENT POSITION - FIXED OR MOBILE:

- **A** Fixed position - no frame. Wall mount ozone & control cabinet, oxygen cylinder or concentrator below.
- **B** Mobile plant, with sturdy wheeled 304SS steel frame.

BARREL DOSING LENGTH (two applicators):

- **5** 5 metre Xtendose* - Recommend for portable system.
- **10** 10 metre Xtendose*
- __ Specify length required in metres if different length required.

Series: B.D.40 The Series BD40 comes with three or four applicators, ozone destruct, adjustable timing.

Selector options:

BD40 [ ] [ ] [ ] [ ]

OZONE GENERATOR : 240V, 50Hz, 1A,300W.
Air cooled, corona discharge unit, from oxygen feed gas.

FEED GAS OXYGEN OPTIONS: 4-9 L/min required

- **A** 10L PSA oxygen concentrator, 220-240V, 50Hz, 2A, 590 W. 2-9 lpm output, 92% ±3% with onboard air compressor, adjustable flowmeter, wheeled.
- **B** None. Requires bottled oxygen cylinder and regulator.

EQUIPMENT POSITION - FIXED OR MOBILE:

- **A** Fixed position - no frame. Wall mount ozone & control cabinet, oxygen cylinder or concentrator below.
- **B** Mobile plant, with sturdy wheeled 304SS steel frame.

BARREL DOSING LENGTH (all applicators):

- **5** 5 metre Xtendose* - Recommend for portable system.
- **10** 10 metre Xtendose*
- __ Specify length required in metres if different length required.

NUMBER OF APPLICATORS:

- **A** Three applicators
- **B** Four applicators