Maximizing Control of the Aging Process with MicroOx and Oak Alternatives

Matt Wilson, Application Specialist

Guest: **Hamish Elmslie, Wine Grenade**

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WEBINAR SPECIFICS

How it works:

- 60 minutes total time
  - 45 minutes presentation
  - 15 minutes Q & A at the end of presentation
- Have a paper and pencil handy for notes
- Hold all questions until after the presentation
- Recording in progress!
- Downloadable content

Agenda

Micro-Oxygenation Principles

- What is micro-oxygenation?
- Appropriate opportunities to apply treatment
- What analysis and sensory parameters should be monitored?

Oak Alternatives

- Transitioning from barrels to oak alternatives
- Product options for best results of application
- Application with micro-oxygenation

Enartis Micro-Oxygenation Experience

- History of support
- Developing towards the future

Wine Grenade System

- Company Overview
- How it works
- Benefits and Specifications

What is Micro-Oxygenation?

- Micro-oxygenation is a technique that involves the addition of controlled amounts of oxygen into wines.
- The goal is to simulate the effects of barrel-ageing in a controlled way and lower production costs through reduction of barrel requirements and maintenance.
- Micro-oxygenation is a technique widely used around the world in combination with tannins and oak alternatives, as a way to improve stability and the organoleptic qualities of wine.
- Micro-oxygenation induces oxidation reactions with phenolic compounds. These reactions lead to the formation of stable color pigments while improving mouthfeel and structure.
- The key factor of micro-oxygenation is to allow small doses of oxygen to slowly be consumed through polymerization reactions, thus avoiding oxygen accumulation.

Opportunities to Apply Micro-Oxygenation

1. Juice

- Can dramatically decrease phenolic content, reduce astringency and bitterness
- Technically considered Hyper-Oxidation, so a discussion for another time

2. Fermentation

- Stimulates production of long chain fatty acids and sterols by yeast
- Supplement oxygen depleted by yeast as it consumes sugar, producing CO_2 and alcohol
- Improves overall yeast health and fermentation kinetics

3. Color Stabilization between Alcoholic Fermentation and Malo-Lactic Fermentation

- Stabilizes color compounds, improves structure, minimized herbaceous and reductive characters
- Application produces acetaldehyde, which in turn acts as a bridge in polymerization reactions of tannins with free anthocyanins, producing more stable condensed color compounds
- Can develop and improve structure while decreasing reductive and herbaceous character
- Tannin polymerization with anthocyanin creates less astringency in mouthfeel, effectively softening tannin perception

Opportunities to Apply Micro-Oxygenation

4. Maturation

- Improve mouthfeel, develop and integrate flavors as well as aromas.
- Specify a highly contolled amount of oxygen with oak alternatives to precisely mimic barrel aging.
- Define protocols for repeated success across vintages for customer appreciation and brand loyalty.

5. Prior to Bottling

- Last minute adjustments, tannin integration, open up tight wines

Opportunities, Dosage and Duration

Timing of Treatment	O_2 Dosage	Typical Duration
During Fermentation @ 1/3 Sugar Depletion thru 2/3 Sugar Depletion	1 – 3 mg/L/Day 10 – 15 mg/L Total	Apply for 60 – 240 minutes 1-4 times during fermentation
Between AF - MLF	1 – 3 mg/L/Day	4 – 10 Days
Post MLF	0.5 – 3 mg/L/Month 0.5 – 2 mg/L/Month 0.5 – 1 mg/L/Month	1 – 3 Months 3 – 6 Months 6 – 12 Months

Opportunities to Apply Micro-Oxygenation

No SO_2

Fermentation

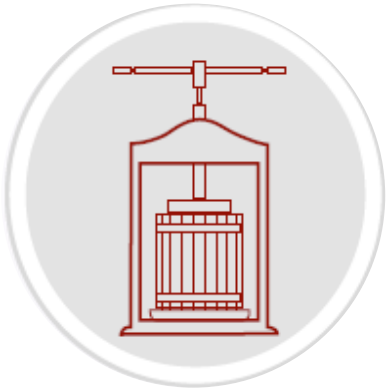
Dosage: 3-4 mg/L Daily
10-15 mg/L Total

Timing: 1/3 Sugar Depletion
2/3 Sugar Depletion

Analysis: YAN
Malic Acid
Volatile Acidity

No SO_2

Color Stability



Dosage: 1-3 mg/L Daily
< 15 mg/L Total

Timing: After AF Complete
Prior to MLF

Analysis:

Total SO_2	VA
pH	Malic Acid
DO	Lactic Acid

Color Profile (CIELab)
Acetaldehyde
Absorbance 280/420/520/620

20-30 ppm SO_2

Maturation

Dosage: 0.5-2 mg/L Monthly
New Barrel – 30 mg/L/year
Neutral Barrel – 10 mg/L/year

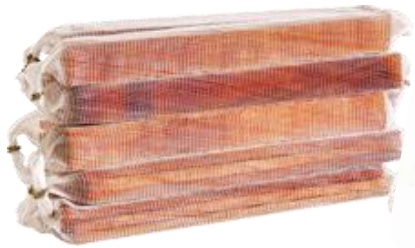
Timing: After MLF
Based on barrel program

Analysis:

FSO_2 & TSO_2	VA
pH	Malic Acid
DO	Lactic Acid

Color Profile (CIELab)
Redox Potential
Absorbance 280/420/520/620

Transitioning from Barrels to Alternatives



- History and Tradition
- Pre Stainless Steel Tanks
- Gradual Oxygen Transfer
- Inconsistencies of Nature
- Flavor Enrichment
- Aroma Enrichment
- Color Enrichment

- High Precision
- Tank Application
- Design your Oxygen Transfer
- Consistency by Manufacturing
- Flavor Enrichment
- Aroma Enrichment
- Color Enrichment

Transitioning from Barrels to Alternatives

Why shift away from barrels?

$$$$ - $6.00-$50.84 per gallon

- Inefficient use of facility space compared to tanks
- Significant maintenance requirements:
  - Topping
  - Leak repairs
  - SO2 additions
  - Stacking/Unstacking
- Labor Costs
- Long time period to integrate
- Disposal – Table?

Why shift into oak alternatives?

$ - $0.03-0.80 per gallon (@ 1-10 g/L)

- Applied to any tank size, large or small
- Incanto N.C. completely soluble
- Incanto Chips can be easily recycled
- Incanto Staves can also be made into a table ☺
- Integrate flavors quickly or gradually based on product choice

Oak Alternative Contribution of Oxygen

Barrel Type	O_2 Contribution
New Barrel	20-36 mg/L Annually
1 Yr Barrel	15-20 mg/L Annually
2 Yr Barrel	8-12 mg/L Annually

No O_2 Contribution

Dosage Rate	O_2 Contribution
1 g/L	0.2 mg/L
3 g/L	0.6 mg/L
5 g/L	1.0 mg/L
10 g/L	2.0 mg/L

O_2 typically released over 2-3 weeks, 6 weeks total contact

Dosage Rate	O_2 Contribution
1 g/L	0.9 mg/L
3 g/L	2.6 mg/L
5 g/L	4.3 mg/L
10 g/L	8.6 mg/L

O_2 typically released over 4-6 weeks, 3 month total contact

Oak Alternative Application Method

- Added prior to micro-oxygenation
- Allow two weeks for internal wood pores to expel oxygen and sink before initiating oxygen treatment
- Complete complimentary analysis for dissolved oxygen, SO_2, VA levels recommended
- Oxygen application for two weeks, noting shift in flavor and aroma
- After two weeks, adjust oxygen application to match traditional barrel program
- Oak flavor will be fully integrated after 6 weeks
- Add more oak if needed, continue oxygen application to match typical barrel program

- Requires no hydration time for integration
- Can be applied throughout production, from fermentation to right prior to bottling
- Benefits color stabilization when added between AF and MLF
- Increases complexity of wine during maturation micro-oxygenation additions
- Perfect for last minute adjustments prior to packaging

Converting Barrel Program to Micro-Oxygenation

How Much Oxygen?

$Q_a = Percentage\ New\ American\ Barrels$ $Q_f = Percentage\ New\ French\ Barrels$ $Q_n = Percentage\ Neutral\ Barrels$ $A_{month} = Oxygen\ Addition\ per\ month$

$$A_{month} = \left(\frac{(Q_a \times \frac{30mg}{L}) + \left(Q_f \times \frac{20mg}{L}\right) + (Q_n \times \frac{10mg}{L})}{100} \right) \div 12months$$

20% New American 10% New French 70% Neutral

Example:

$$\left(\frac{(\mathbf{20} \times 30mg) + (\mathbf{10} \times 20mg) + (\mathbf{70} + 10mg)}{100} \right) \div 12$$

$$A_{month} = 1.25mg/L$$

History of Support

2007 – Development of Enartis branded micro-oxygenation device in Italy

2009 – Enartis USA established

2011 – Enartis USA begins selling micro-oxygenation as a way for wineries to integrate oak alternatives and tannins

2012 – Installed device at University of California Davis for ongoing research and production.

2016 – Provided capability to micro-oxygenate 120 tanks a facility with 3m gallon capacity

2016 – Began development of WIN-IQ system to provide a USA manufactured system.

2017 – Continued development and growth of support to beverage industry.

2018 – Became exclusive North America distributor for Wine Grenade MOX system

Developing Towards the Future

WIN-IQ System

- Wide range of dosage applications
  - 0.1 – 8.0 mg/L
- Small volume or large volume of wine
  - 1,000 – 100,000 gallons
  - **2019** – Up to 500,000 gallons
- Network connection
  - WiFi or LAN
- Remote operation from office PC, tablet or phone
- **2019** – Creating specialized dosing program
- **2020** – Development of additional programs, analytical features and probe integration

Wine Grenade

Presenter: Hamish Elmslie

www.enartis.com

Company overview

History of Wine Grenade

- Founded in 2014
- Headquarters in New Zealand
- USA branch in Sausalito
- Customers in 7 countries
- 1 Product
- 2 Global patents
- 3 Awards

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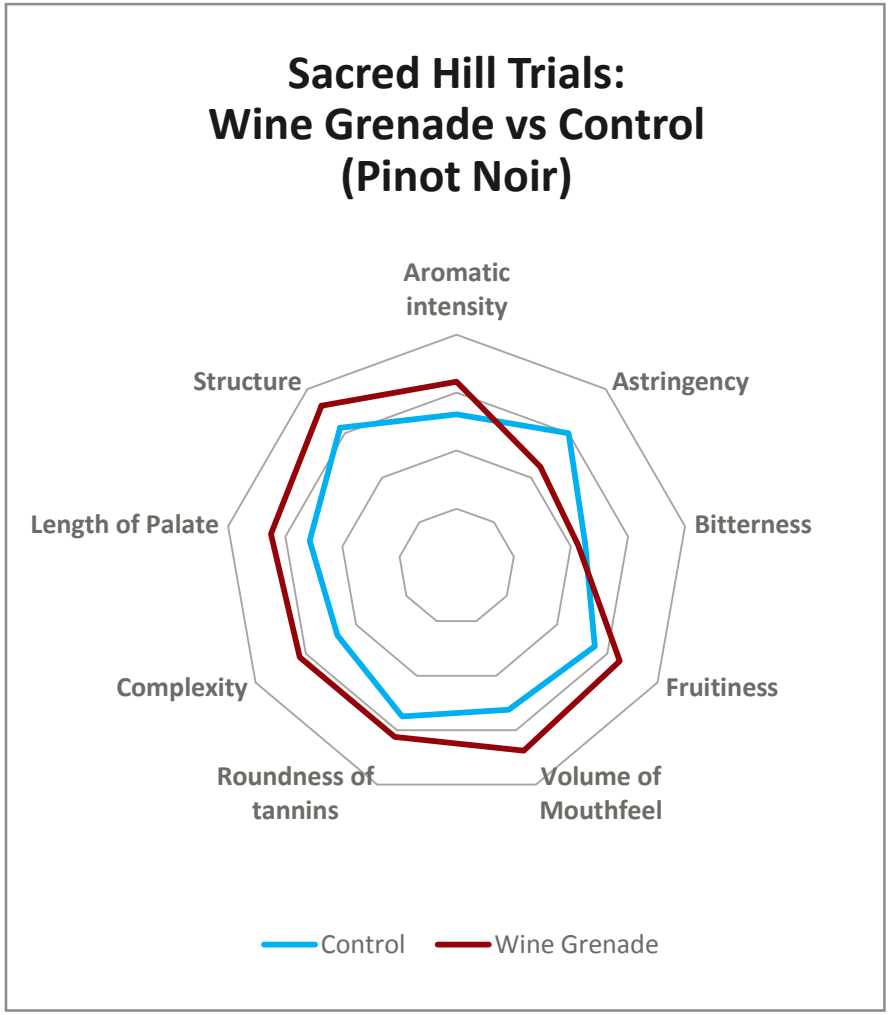
Company overview

Winemaker's dilemma

- Oxygen + oak alternatives = powerful combination
- Most micro-ox systems are designed for large-scale wineries

Challenges with micro-ox

- Upfront Cost
- Complexity
- Cleaning
- Risk



Poll Question

Company overview

Product vision

To advance micro-ox technology by utlizing membrane diffusion, sensor technology, and internet connectivity. To be accessible to all winemakers, regardless of size.

Design principles

- Smart – uses sensors and IoT connectivity
- Simple – easy to install and operate
- Affordable – $999 for a device
- Effective – delivers superb results

Animation

How it works

10 minute install

- Place device near your tank
- Connect the unit to WiFi
- Use app to get started

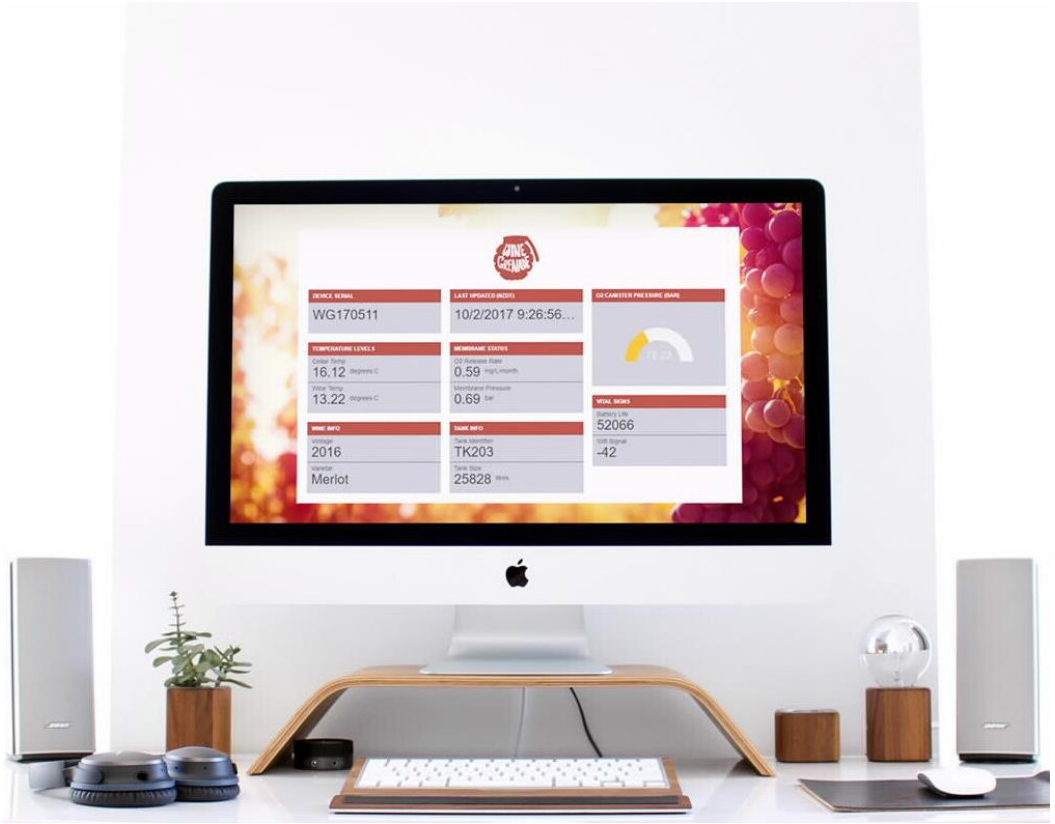
Active float ™

- Moves tubing through the tank
- Leads to even distribution of O2
- Prevents over-oxygenation

Benefits & Specifications

Key benefits

- Device cost $999
- Very simple user experience
- No cleaning & maintenance
- Portable & mountable
- Automated alerts
- Remote control & monitoring
- Over-the-air software updates



Benefits & Specifications

Technical Specifications	
Tank size	550 – 10,000 gallons
Tank height	6 feet or more
O2 dose rate	Up to 5mg/L/month
Oxygen format	Single-use canister
Power	Battery and mains power
Battery life	3-4 weeks between charges
Connectivity	WiFi only
Control	PC or smartphone
Environment	Indoors or undercover

Thank you for your participation!!

Please fill out our quick survey after leaving the room!

NOW Q&A

www.enartis.com

Matt.Wilson@Enartis.com

Hamish@Winegrenade.com