

# Lowering SO<sub>2</sub> Additions during Winemaking

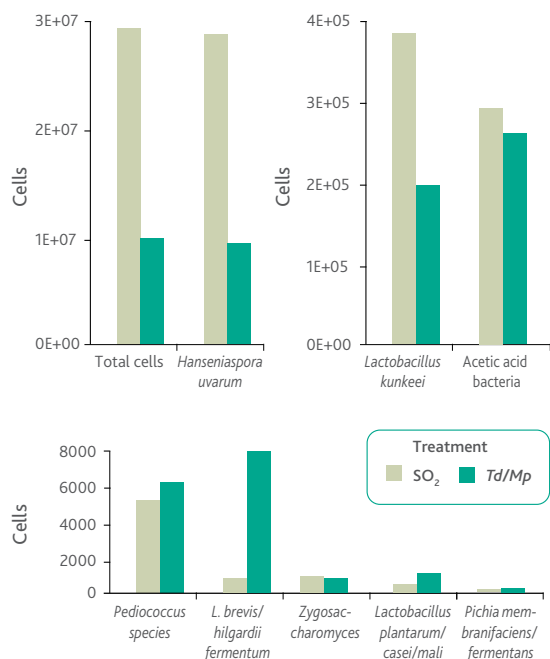
## 1 Harvest and pre-fermentation

### • BIOPROTECTION:

✓ ZYMAFLORE™ ÉGIDE<sup>TDMP</sup>: *Torulaspora delbrueckii* and *Metschnikowia pulcherrima* (with or without rehydration):

- Application on winemaking equipment in contact with grapes (harvesting machines, transportation bins, reception line etc.).
- During grape crushing and vatting (perform a thorough homogenization of the tank once it has been filled).

BIOProtection with ZYMAFLORE™ EGIDE<sup>TDMP</sup> results in superior control of spoilage microorganisms compared to the standard SO<sub>2</sub> addition.

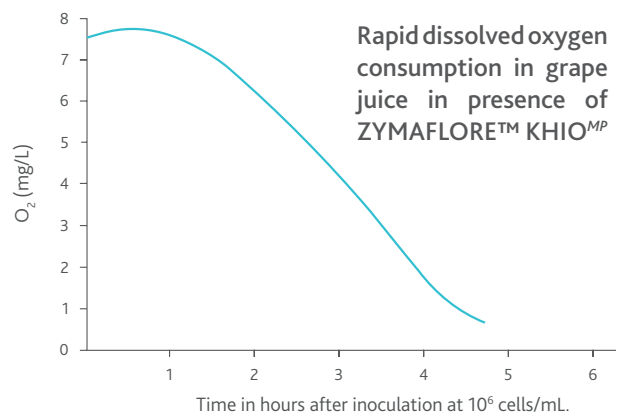


The dose of ZYMAFLORE™ ÉGIDE<sup>TDMP</sup> and ZYMAFLORE™ KHIO<sup>MP</sup> should be adjusted depending on the duration and the temperature of the pre-fermentation phase, and the microbial pressure:

- ~ Maximum dose is recommended in case of low temperatures and strong microbial pressure.
- ~ Lower doses for long pre-fermentation phases at milder temperatures.

✓ ZYMAFLORE™ KHIO<sup>MP</sup>: *Metschnikowia pulcherrima* strain (with or without rehydration):

- Protection from oxidation due to dissolved oxygen consumption.
- Control of the indigenous potentially detrimental microbiota.
- Particularly adapted for BIOProtection of grape must and juices long pre-fermentative stages at low temperatures



### PRECAUTIONS TO TAKE

- Optimal sanitary state of the grapes.
- Temperature control (lower temperatures preferred).
- Avoid berry crushing/bruising.
- Ensure maximum hygiene in the cellar.
- Protect all tanks with inert gas.



### BIOPROTECTION: ENOLOGICAL GOALS

- ✓ Control of the indigenous microflora:
  - Colonization of the equipment and grape juice/must with selected non-*Saccharomyces* yeasts.
  - Inhibited development of spoilage microorganisms.
- ✓ Protection against oxidation:
  - Rapid dissolved oxygen consumption by ZYMAFLORE™ KHIO<sup>MP</sup>.

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## 2 Grape Processing & Fermentation



### ● ENZYME ADDITION:

- √ Choose an enzyme according to the desired wine style.
  - For fast juice clarification with white & rosé must, use LAFAZYM™ CL or LAFASE™ XL EXTRACTION.
  - For fast color and tannin extraction in red must and better settling post fermentation, use LAFASE™ FRUIT, LAFASE™ HE GRAND CRU, or LAFASE™ XL EXTRACTION.

### ● TANNIN ADDITION TO RED GRAPES:

- √ Using TANIN GALALCOOL™ for whites, and TANIN VR SUPRA™ or VR SUPRA™ ELEGANCE for reds can replace traditionally used SO<sub>2</sub> for anti-oxidation activity. Tannins are especially important in the case of rot and subsequent laccase activity.

### ● ADJUST ACIDITY:

- √ Acidulate must or juice to lower pH and limit the growth of spoilage microorganisms.

### ● ACTIVE DRY YEAST:

- √ Select strains producing low SO<sub>2</sub>.
- √ ZYMAFLORE™ XPURE.
  - For highly aromatic red wines, with black fruit aromas, release of Hsp12 and very low SO<sub>2</sub> production.
- √ ZYMAFLORE™ XORIGIN.
  - For elegant and balanced white and rosé wines, respect of the varietal character and terroir.

Add NOBILE® FRESH GRANULAR 24M (2 g/L)

- Enhances complexity and roundness, preserving the fruit – can be used during fermentation phases.

### ● FINING OF WHITE AND ROSÉ MUST DURING FERMENTATION:

- √ Remove oxidizable phenolics to prevent browning or pinking of wine during aging and preserve aromatic potential.
- √ POLYMUST™ PRESS (300 – 500 ppm)
  - PVPP, Vegetable Protein (patatin), & bentonite, non-allergenic, GMO-free.
- √ VEGECOLL™ (20 – 100 ppm)
  - Vegetable Protein (patatin), non - allergenic, GMO-free.

### ● ADDITION OF GLUTATHIONE:

- √ FRESHAROM™ provides glutathione, a powerful anti-oxidant for whites and rosé wines (200-300 ppm).

### PRECAUTIONS TO TAKE

- Manage temperature carefully.
- Conduct strict cellar hygiene.
- Protect tanks with inert gas before AF.
- Minimize wine movement.



### ENOLOGICAL GOALS

- Protection against oxidation. Use inert gas cover for all juice and wine movements.
- Color extraction and protection with reds.
- White/Rosé juice clarification and fining.
- Excellent oxygen/aeration management.
- Minimize the time gap between AF - MLF to avoid undesirable microbial proliferation.

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- **Co - INOCULATION OR SEQUENTIAL INOCULATION WITH *OENOCOCCUS OENI*:**

- √ LACTOENOS™ 450 PREAC or LACTOENOS™ B7 DIRECT

- Bacteria highly effective for direct inoculation, active over a wide pH, alcohol, and temperature range.

## 3 Aging in Cellar

- **PROTECT WINES FROM OXYGEN:**

Slow down oxygen consumption in the wine with POWERLEES™ LIFE:

- Yeast-derived rich in reducing compounds (additions of 10 to 20 ppm every month or for each transfer, along the entire ageing period).

- **TANNIN ADDITIONS – PROTECT WINES FROM OXYGEN:**

- √ QUERTANIN™ Range (additions of 10 to 20 ppm every month, during the entire aging period).

- TANFRESH™ specifically formulated for white and rosé wines. Dosage: 10 - 30 ppm.

- **MICROBIAL CONTROL – PROTECT WINES FROM MICROBIAL SPOILAGE:**

- Preventive treatments

- √ MICROCONTROL™ (100 ppm)

- Chitosan and inactivated yeasts.
  - Reduces the overall pressure of spoilage microorganisms (yeasts and bacteria).

- Curative or Preventive treatments

- √ OENOBRETT™ (100 ppm) or OENOBRETT ORG (100ppm)

- OENOBRETT™ is Chitosan and *β-glucosidase* enzyme.
  - OENOBRETT™ ORG is 100% chitosan.
  - Both products can decrease spoilage organisms such as *Brettanomyces*.

- **PREPARE WINE FOR EARLY BOTTLING - BUILD MOUTHFEEL AND FINESSE:**

- √ POWERLEES™ ROUGE (200 ppm)

- Specific formulation of inactive yeast and *β-glucanase* used for wine fining and building mid-palate weight and sweetness perception in the wine. Use during fermentation or aging on all wine types.

- √ MANNOFEEL™ (30 - 150 mL/hL)

- Mannoprotein in liquid form for smoothing tannins or astringency and building mid-palate weight.
  - Can be used during aging or just before bottling on all wine types.



### PRECAUTIONS TO TAKE

- Implement thorough wine chemistry analysis on regular basis with a close watch on VA numbers.
- Taste wines often watching for signs of oxidation.
- Limit wine transfers to the minimum possible.
- Constant wine protection with inert gas.
- Regular topping program for cooperage and tanks.



### ENOLOGICAL GOALS

- Excellent oxygen management.
- Microbiological control and management.
- Shape wine to be ready for bottling early.
- Fining treatments, clean racking, mannoprotein additions.
- Consider early bottling and commercial release of the wine.