Solutions for winemaking
LAMOTHE-ABIET

FAQS ML BACTERIA

Malolactic fermentation (MLF) is the conversion of malic acid into lactic acid by lactic acid bacteria (LAB), particularly *Oenococcus oeni*. Wines that go through MLF become microbiologically stable as malic acid is consumed and can no longer be used by other microorganisms that can alter wine. Additionally, these wines are softer since lactic acid contributes less acidity to wine. MLF also produces organoleptic changes that result in greater aromatic complexity and stabilization of wine color

WHAT ARE THE PARAMETERS IMPACTING THE SUCCESS OF MLF?

The main wine compositional factors that determine the success of MLF are alcohol, pH, temperature, and SO_2 concentration (Molecular and Total). Each of these factors has a negative synergistic effect, making the completion of MLF increasingly difficult when combined. Additionally, vineyard sprays, initial malic acid content, yeast strain used for alcoholic fermentation, and wine polyphenol content can be stress factors. Problems can arise when pH <3.3, alcohol >14.5%, wine temperature <65°F or >80°F, total SO_2 >30 mg/L, free SO_2 >10 mg/L and/or molecular SO_2 <0.3. Commercial Lactic Acid Bacteria (LAB), such as **OENO1®** or **BACTERIA XTREM,** are selected for their resistance to high alcohol, SO_2, low temperature, and have a low pH tolerance.

SPONTANEOUS VS SELECTED BACTERIA STRAINS, WHAT ARE THE RISKS ASSOCIATED?

Certainly, MLF can occur spontaneously, but there can be problems in the resulting wine even if this occurs. Spontaneous MLF is a risk for wine quality and consumer health (high production of biogenic amines). Most indigenous LAB produce high amount of biogenic amines and possess cinnamyl esterase activity, which cleaves the (mainly tartaric) ester precursor cinnamic acid form, allowing *Brettanomyces sp.* to produce vinyl (chemical/medicinal odors) and then ethyl (horse/band-aid odors) phenols.
Controlling MLF with selected strains of *Oenococcus Oeni* helps control the speed of malic acid degradation and ensures the production of healthy, high-quality wine by preventing the production of biogenic amines and off-flavors.

WHAT ARE BIOGENIC AMINES?

Biogenic amines are a group of compounds mostly formed by lactic acid bacteria via decarboxylation of amino acids. Their production is highly dependent on the bacteria strains and their enzymatic activities. Known as a human health threat and to cause allergenic reactions, headaches, and digestion issues, biogenic amines can also be associated with off-aromas in wine such as rotten flesh, algae, and fish food. The main biogenic amines found in wine are putrescine, histamine, tyramine, and cadaverine.

WHEN MLF IS NOT DESIRED, HOW TO PREVENT IT?

Preventing MLF to happen and maintaining the wine microbiologically stable through time can be challenging, especially in high pH wines or low SO2 wines such as base wines for sparkling production when SO2 is inefficient, not enough, or cannot be used to control Lactic acid bacteria activity. In these conditions, the use of chitosan is highly recommended. 5-8 g/hL of **KILLBRETT** (pure chitosan from *Aspergillus niger*), can be used to reinforce or replace SO2 antibacterial activity and reduce the number of viable bacteria in wines.

HOW TO PREPARE AND ADD OENO1® AND BACTERIA XTREM?

OENO1® and **BACTERIA XTREM,** are freeze-dried bacteria for direct addition. You can sprinkle **OENO1®** directly into wine, and mix gently without oxygen to homogenize. You can also rehydrate **OENO1®**. In this case, use 20 times its weight of mineral water at room temperature, mix well, wait 15 minutes and add to wine.

HOW SHOULD OENO1® AND BACTERIA XTREM BE STORED?

Store in its original packaging hermetically sealed, in a cool, clean, and dry place without odors. The bacteria may withstand a few days out of the cold (maximum 4 days), at ambient temperature (< 25 °C), without loss of efficacy.
Optimal date of use (from the date of production): 36 months at -18°C, 18 months at 4°C.

ABOUT CO-INOCULATION

Co-inoculation is the practice of inoculating lactic acid bacteria lactic shortly after yeast inoculation and has many advantages:

- Secure MLF by giving bacteria a favorable environment with lower alcohol concentration, better nutrient fermentations availability, less medium-chain fatty acids (bacteria inhibitors), warmer temperatures, and better acclimation. It is a great technique to use in difficult MLF conditions.
- Limit the risk of microbial contamination and spoilage by eliminating the microbial vacuum.
- Reduce risks of oxidation.
- Lower acetaldehyde concentration, which results in less bound SO_2, more efficient sulfiting, and lower TSO_2 results.
- Produce fresh, fruity, clean, and less buttery wines with better balance and fuller body.
- Save time: blend, stabilize, and age wines earlier.
- Cost-effective: less analysis, less labor, less barrel.

With co-inoculation, it is important to address the concern of a possible production of acetic acid by acid bacteria. The yeast/bacteria couple used will have a strong impact on limiting the risk of stuck/sluggish and the production of acetic acid. Lamothe-Abiet developed a specific yeast/bacteria couple for co-inoculation: our EXCELLENCE® yeasts and **OENO1®.**

WHAT IF OENO1® OR BACTERIA XTREM GETS WARM DURING SHIPPING?

If, despite our best efforts, the ice is melted and the container is not feeling cold when your bacteria arrive, do not be alarmed. We tested the viability of our ML bacterias, simulating some weeks of shipping. Their viability is not altered and stays excellent even after 1 week at 30°C/86°F. Sealed packets can be delivered and stored for 3 weeks at ambient temperature (<25°C/77°F) without critical loss of viability. So just put the bacteria in the cooler or freezer at reception.

RESTART STUCK OR SLUGGISH MLF

The successful restart of a stuck ML fermentation depends upon three critical factors:

1. Diagnosis of the fermentation arrest causes and the degree of fermentation completion.
2. Appropriate wine treatment - 24 hours before ML inoculation
    - Adjust pH and alcohol if necessary
    - Absorb toxins and add nutrients for ML bacteria with 10 g/hL **OPTIFLORE O**
    - Remove spoilage microbes with **KILLBRETT** at 4 g/hL.
    - Rack off lees 24 hours after treatment.
3. Proper ML bacteria addition
    - Add nutrients for ML bacteria with 10 g/hL **OPTIFLORE O**
    - Add directly to wine **OENO1®** and **BACTERIA XTREM** at 1 g/hL.
    - Maintain temperature at 65-75°F and stir regularly.