Nº9 ML PRIME™: THE UNPARALLELED, UNMATCHED WINE BACTERIA

Our selected *Oenococcus oeni* wine bacteria perform malolactic fermentation (MLF) in wine with great success. With our 3 different formats, Standard, 1-Step™ and MBR™, our *Oenococcus oeni* cultures work reliably under a broad range of wine conditions (pH, alcohol, temperature). The biodiversity of indigenous lactic acid bacteria (LAB) coupled with our expertise in their selection, characterisation and production, **allowed us to develop a unique wine bacteria product, 100% pure *Lactiplantibacillus plantarum*, ML PRIME™.**

ML PRIME™ is very efficient at conducting ultra-fast MLF, with no lag phase, especially at higher pHs, which are more and more frequent due to climate change. This is the only *L.plantarum* able to execute MLF at this level. This *Under Investigation* will summarise its characteristics and show why ML PRIME™ is unique amongst all the other selected wine bacteria.

WHY IS ML PRIME™ SO EFFICIENT?

Amongst the diverse *Lactobacillus* species and strains associated with the wine en-vironment, *Lactiplantibacillus plantarum* (former *Lactobacillus plantarum*) can have the capacity to induce MLF, but in reality, very few do. So far, only our ML PRIME™ has shown that it has the capacity to perform and complete MLF.

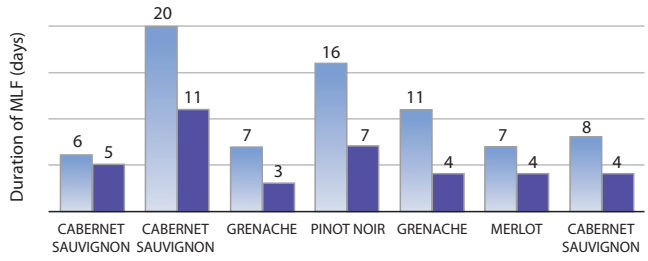
As early as 2004, our R&D team (Krieger and Bou) was the first to propose this new species to conduct a complete MLF in wine. In 2014, we launched ML PRIME™ which is used successfully by winemakers in co-inoculation during AF.

Its success is due to its highly efficient malic acid metabolism brought about by firstly its unique genetic potential, and secondly by our optimized production process specifically developed for ML PRIME™. This production process empowers the malolactic enzyme pool responsible for its very fast and reliable MLF.

NO LAG PHASE, ULTRA FAST MLF WITH NO VA PRODUCTION.

Because of these unique characteristics, **ML PRIME™ completes MLF very quickly (2-6 days) during AF without any production of volatile acidity**.

Compared to the efficacy of *O. oeni*, ML PRIME™, especially in co-inoculation has been shown to be unbeatable, and works in a wide range of winemaking conditions.



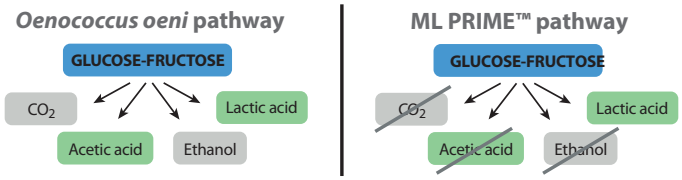
pH:	3.36	3.52	3.52	3.5	3.54	3.6	3.9
MA* (g/L):	3	3.4	2.2	2.1	2.1	3.5	1.8

* Malic acid

O. oeni *L. plantarum* (ML Prime™)

Duration of MLF in different red matrices when inoculated with *O. oeni* or *L. plantarum* (ML PRIME™)

We can guarantee that **ML PRIME™ does not produce volatile acidity (VA)** because this specific strain has a facultative heterofermentative metabolism; it will not convert sugars (glucose, fructose) into acetic acid (VA). ML PRIME™ doesn't have the capacity to metabolize citric acid into acetic acid and diacetyl. Additionally, ML PRIME™ does not produce any biogenic amines. These properties make ML PRIME™ unique versus *Oenococcus oeni* or blends of *L.plantarum* and *O.oeni*.



ML PRIME™, being a facultative heterofermentative uses the homofermentation pathway for hexoses metabolism, such that only lactic acid is produced.

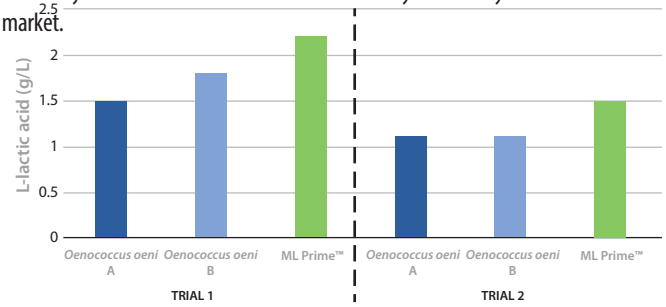
WHAT ARE THE OTHER BENEFITS OF ML PRIME™?

ML PRIME™ is versatile and achieves very fast and complete MLF under a large range of different winemaking conditions (red or white wines, pH >3.4, high sugar or alcohol content, malic acid < 3 g/L, SO_2 up to 5gL). Usually used in co-inoculation (AF and MLF together), ML PRIME™ can be used as well in sequential inoculation after AF, when ensured by a ML-Pre-lab test (consult *Under Investigation* #8). ML PRIME™ is also the solution when wine conditions are highly unfavorable (stuck MLF, high SO_2 concentration, presence of chitosan, high lactic acid concentration).

When used in co-inoculation, **ML PRIME™ is also part of a bioprotection strategy** to control the development of spoilage microorganisms such as molds, acetic acid bacteria and undesirable LAB.

ML PRIME™ helps to save energy in the winery because it will use the heat generated during AF to achieve MLF and no further heating is needed.

Wines are fresher and less harsh with the full conversion of malic acid to lactic acid. Early wine stabilization means wines are ready for an early release into the market.



Final L-Lactic acid content at the end of MLF (wine made from Barbera, Italy, 2017)

CONCLUSION: UNPARALLELED PERFORMANCES

ML PRIME™ brings several benefits to winemakers in favour of wine quality. When used according to our recommendations, ML PRIME™, 100% *Lactiplantibacillus plantarum*, is the only wine bacteria able to achieve an ultra-fast MLF with no production of volatile acidity, in many red and white winemaking conditions. Despite our many studies to select other *L. plantarum* strains or to mix with *Oenococcus oeni*, the results are never at the unique level of ML PRIME™ performance.