Winemakers in warm climate regions face difficulties related to the early contamination of their musts by indigenous flora as yeasts, moulds and bacteria that are able to degrade the quality potential of their wines, in a short period of time. Acetic acid can be produced by wild Oenococcus strains using sugars as carbon source, off-flavours can be released by some Lactobacillus or Pediococcus strains and biogenic amines can be produced by bacteria and moulds at this very early stage of the winemaking.

For winemakers reducing sulphur dosage or willing to produce wines without sulphur this situation is obvious: in warm climate regions it is not difficult to initiate the malolactic fermentation (MLF). The true challenge is more about how to manage correctly the MLF and this starts with answering the three following questions:

1- When will MLF start?

2- Which species of bacteria will be responsible?

3- As well as which other species of bacteria, moulds or yeasts can be present?

With Viniflora® NoVA™, MLF management is done before the alcoholic fermentation (AF) has truly started! Malic acid conversion is done before yeasts start to work thanks to a large population of a specifically selected strain of *Lactobacillus plantarum*, manufactured by the leader in lactic acid bacteria for winemaking: Chr. Hansen.

The fast conversion of malic acid by NoVA™ represents a completely novel way of looking at MLF and provides an excellent bioprotective effect in the must: no other species from the indigenous flora (unwanted yeasts, moulds, bacteria) has time to develop or degrade malic acid in the must, providing a big help to winemakers that manage their fermentations without added sulphur.

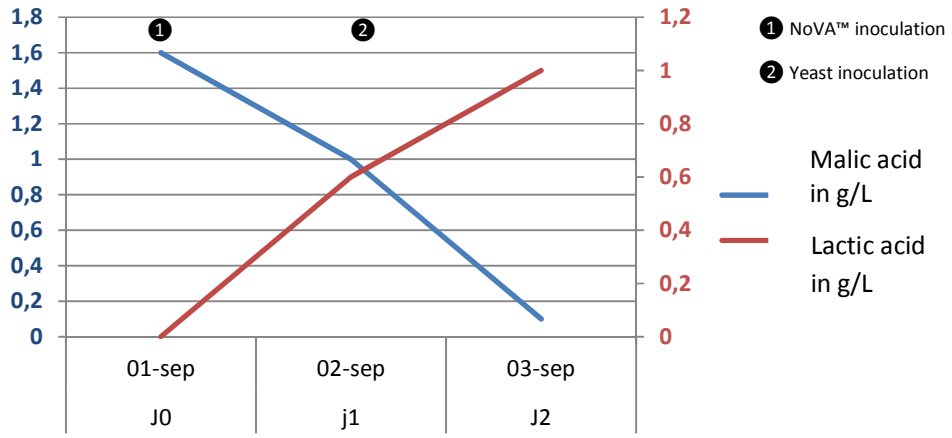
NoVA™ is therefore a new tool for winemakers producing clean label wines with no added sulphur as well as wines where sulphur is only added to store the wines or at bottling, in order to remove sulphur from the winemaking itself to ease the process.

Two examples have been extracted from our trials in Europe:

MERLOT 2014

E1: Malolactic fermentation completed 2 days after NoVA™ was inoculated into a Merlot must, 500 HL tank. Several tanks were tested in the winery, all with similar results.

RS: 243 g/L, pH 3.50, Malic Acid: 1.6 g/L, Total and Free SO_2: 0



Winemaking key features: thermovinification; liquid phase only.
Frequent pump-overs: 2 per day until Malic acid is totally degraded.
Inoculation with NoVA™ was made by direct inoculation during tank filling.
Yeasts were inoculated 24 hours after the product NoVA™.
Temperature was kept around 20°C.

In red winemaking conditions, several other trials at real scale have been managed showing similar results. The key success factors are: no alcohol in the must at inoculation, total sulphur as low as possible within the range of 0 to 15 ppm. Sulphur reduces the population of NoVA™ cells from the beginning and this will slow down MLF.

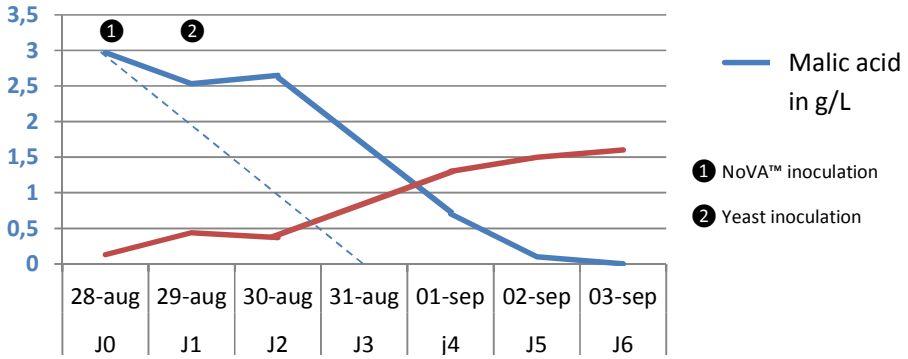
The second example helps to understand how to pilot NoVA™ in conditions where Malic acid is higher than 2 g/L. There the key factor of success is to delay the yeast inoculation. In this case, even if MLF was managed up to the end, yeast should have been inoculated 24 to 36 hours later.

As a rule of thumb, yeast should be inoculated when 50-60% of the initial malic acid has been degraded by NoVA™. Temperature should be kept in the range 17-22°C to secure NoVA™ can work in optimal conditions for lactic acid bacteria.

CHARDONNAY 2014

E2: Malolactic fermentation completed in 4 days after NoVA™ was inoculated into a Chardonnay must, 250 HL tank. Initial temperature: 16°C was too low.

RS: 229 g/L, pH 3.55, Malic acid: 3.0 g/L, Total and free SO_2: 0



Inoculation with NoVA™ was made by direct inoculation after clarification.
Yeasts were added 24h after the Lactobacillus.
MLF started before AF and was completed 4 days after NoVA™ inoculation.
The low temperature limited the speed of MLF initially, when the temperature was increased to approximatively 20°C the MLF went fine.

Wine analysis and winemakers´ feedback are well aligned, the new *Lactobacillus plantarum* which was recently launched by Chr. Hansen: NoVA™, delivers its promises: ***MLF is completed in a record time, before AF kicks-off.*** This complete change of paradigm in winemaking is the result of an intense research and development effort. Now winemakers can produce wines that are stable earlier thanks to this unique and powerful bioprotective tool: Viniflora® NoVA™.

The very first users around the world are wineries reducing added sulphur dosage or removing sulphur from their winemaking procedures. NoVA™ is the ideal tool to answer the growing demand for clean label products that also affect the wine industry now, where priority number one is the removal of sulphites.