LACTOBACILLUS PLANTARUM A NEW STRAIN AND A NEW CONCEPT TO INDUCE MALOLACTIC FERMENTATION IN WARM CLIMATE WINES

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CONTEXT
Global warming and the trend towards harvesting higher maturity grapes has resulted in the processing of higher pH musts. While acid reduction is a more important winemaking consideration in the cooler climate regions, microbial stability and sensory contribution as a result of the activity of lactic acid bacteria (LAB) will play a more important role in the warmer climates. Among the malolactic bacteria species Lactobacillus plantarum strains have shown most interesting results under high pH conditions, not only for their capacity to induce MLF, but also for their homo-fermentative properties for hexose sugars and their more complex enzymatic profile compared to O. oeni, which could play an important role in the modification of wine aroma.

Co-inoculation (inoculation of selected wine LAB 24 hours after the yeast) can ensure the early implantation and dominance of the selected strain. Applying a strong L. plantarum inoculum with high malolactic activity assures the early onset, as well as predictable and complete MLF in short time (during the AF) and allows an early stabilization of the wine.

TIMING OF SELECTED WINE LAB INOCULATION AND SUGAR METABOLISM OF LACTOBACILLUS PLANTARUM

Traditionally, when selected cultures of known wine LAB are used, inoculation is performed at the completion of alcoholic fermentation. Beelman and Kunkee (1985) explored the possibility of inoculating wine LAB into juice along with the yeast used to conduct alcoholic fermentation. Current thinking identifies the following times during wine production when selected wine LAB can be added (figure 1).

Wine pH is highly selective for microbial growth, and at pH below 3.5 generally only strains of Oenococcus oeni can survive and express malolactic activity, while wines with pH above 3.5 can contain various species of lactic acid bacteria. Musts, soon after crushing, may contain LAB at populations of 10^3 to 10^5 cfu/mL; the major species present at this stage include Lactobacillus plantarum strains. Direct inoculation of Lactobacillus plantarum in the freeze-dried form may be a good option, as it degrades hexose sugars by the homofermentative pathway (figure 2), which poses no risk of acetic acid production from the residual sugars that may be present in high pH wines, it is an interesting alternative to the traditional O. oeni starter culture (du Toit et al. 2011).

EFFICIENT AND FAST MLF IN HIGH pH WINES WITH A SPECIFIC STRAIN OF LACTOBACILLUS PLANTARUM

A recent L. plantarum isolate ML Prime™ has shown most interesting results, when used in co-inoculation to induce a fast MLF during alcoholic fermentation without any increase in volatile acidity. (figure 3).

Lactobacillus plantarum ML Prime™ is issued from an optimized process that promotes very high malolactic activity as soon as it is added to must. MLF is therefore completed in record time (3-7 days) during alcoholic fermentation (figure 4), without any impact on yeast vitality and alcoholic fermentation.

Aside from its good ML activity the ML-PRIME strain had been screened for enzyme-encoding genes and proved to possess a wide range of enzymes on a 2010 Cab. Sauvignon (Bartowsky & Costello, AWRI 2010)

REFERENCES