

MaloLactic Fermentation

First what wines should go through malolactic fermentation? All red wines and typically Chardonnay is the answer. There maybe a few more depending on what style of wine one is trying to achieve. MLF reduces that "hybrid flavor" of most French American Hybrid wines, and in all wines, red or white, it reduces the sharp acid taste and makes the wine more supple, with a rounder mouth feel. Wine stability is also increased as well, so that MLF won't occur in the bottle.

Malolactic fermentation (MLF, also known as ML or M-L) is a means of reducing the malic acid concentration found in unripe grapes. Grapes contain two main acids tartaric acid (H_2T) and malic acid (H_2M). As the grapes ripen, the H_2T concentration remains nearly constant while the H_2M concentration continues to fall to a very low value. However, in a very cool growing season the H_2M concentration can be very high at harvest making the total acid of the fruit high. Normal acid reducing techniques using calcium carbonate or potassium carbonate will only reduce the H_2T concentration of the juice.

In MLF, the malolactic bacteria converts the malic acid (H_2M) a dibasic acid to lactic acid (HL) a monobasic acid, thereby reducing this fraction of the total acidity in half.

MLF is started with malolactic cultures, that are available at many wine supply shops. For successful results, follow the manufacturers' instructions. Some manufacturers recommend adding specific nutrients, for their cultures.

Steps to Successful MaloLactic Fermentation

What are the critical conditions for malolactic fermentation? Wine pH, selection of primary fermentation yeast or yeasts, and selection of malolactic bacteria, free SO_2 levels, timing, and temperature are the ones we will address.

pH:

Why is it important to know the pH of your wine? To make a better selection of malolactic bacteria and if need be to correct the pH. In general malolactic bacteria work best in wines with a pH between 3.3 to 3.5. It would be best if you were to correct the pH in the juice. See our web page below for a paper on Acid Testing and Adjustment.

Selection:

There are at least two selections to make. In order, they are yeast selection and malolactic bacteria selection. The reason for yeast selection being important, is there are some yeast strains that enhance the onset of malolactic fermentation and others that inhibit it. I would suggest checking our links page to research which yeasts they are. In general any yeast that is known as a "killer yeast" may inhibit MLF. Remember what we said about pH and keep in mind the style of wine you are making, when selecting the malolactic bacteria. We would recommend a direct add bacteria (unless you are a practicing microbiologist) or a simple rehydrate and add bacteria. Remember do not use chlorinated water to rehydrate yeast or bacteria. Where do you find these malolactic bacteria? Go to <http://www.nys-homewine.info/LinksNYSHWC.html> for some wine shops that sell malolactic cultures.

Free SO₂:

If your fruit for your red wine is clean, then you don't need any potassium metabisulfite. However, one can use 0.25 teaspoon per 30-35 pounds of grapes at crush and typically not have a problem starting MLF, due to free SO₂ levels. Purchased grape juice usually has 80 ppm free SO₂ before primary fermentation, but it will drop to acceptable levels after a complete primary fermentation. Typically, when the free SO₂ is under 20 ppm MLF will proceed well.

Timing:

When should you add the malolactic bacteria? You would add malolactic culture after a complete primary fermentation. There are some who add it in the waning days of a primary fermentation. This is not bad, but do not co-ferment primary yeast (sugar) fermentation and MLF. This can cause competition for glucose, which could lead to a stuck primary (yeast/sugar) fermentation. Also the liberated CO₂ of the primary fermentation will scrub the wine of the free SO₂, making the wine more MLF friendly.

Temperature:

Malolactic bacteria like to work around 68 degrees F. So make sure your wine is near that temperature. Alright, at least get close to that temperature. How? A "brewers belt" will work nicely. It is made to bring and maintain a 5 gallon carboy to 70 degrees F. That will be close enough. Make sure it is around the bottom of the carboy and in good contact with the carboy, to facilitate heating of all of the wine. A common heating pad can also be used. There are some malolactic bacteria that will work at lower temperatures, but it is more reliable to do it at the correct temperature.

<i>Parameter</i>	<i>Favorable Values</i>	<i>Difficult Values</i>
pH	3.3 to 3.5	below 3.2
SO ₂ Free	less than 5 mg/L	greater than 10 mg/L
Temperature	over 18 degrees C but under 24 C	under 15 degrees C
Alcohol	less than 12%	greater than 13.5%

Post MLF:

Remember to bring the free SO₂ up to 40 to 50 ppm right after MLF is finished. We don't want any other microbes flourishing in your wine and making all of those nasty aromas and flavours. How do you know that MLF is done? Generally, when the slow bubbling stops, then so has MLF. However, one can check it with a paper chromatograph kit. On our links page, <http://www.nys-homewine.info/LinksNYSHWC.html> you can find suppliers of these kits. Remember to follow the instructions.

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