

MALOLACTIC FERMENTATION NOTES

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Since we live in a cool climate wine making region, where grapes are high in acidity, and the ratio of malic acid, in relationship to other acids is also high, we face the prospect of ameliorating these malic acids, in particular. A malolactic fermentation, brought about by the addition of certain bacteria, converts the malic acid to a softer lactic acid thereby reducing the malic (harsher) acid presence.

Malolactic fermentation, desired in many red wines and a few white wines, follows the original sugar fermentation and aside from the malic reduction it also generates complexity in the resulting wine but will reduce fruitiness so it is seldom used in whites. It is often promoted in Chardonnay as it stimulates buttery notes and some cold climate winemakers attempt to duplicate this in local white grapes but generally malo is not employed in whites.

The malolactic bacteria also consumes citric acid which it transforms to acetic acid, which can be distinctly unpleasant. Consequently, should acid additions be required, for example to reduce pH, citric acid should not be used. Tartaric is a much better source.

The malolactic fermentation is a microbiological instability factor which must be taken into account during wine processing. Either the wine should proceed with malo and become stable in this respect, or measures should be undertaken to prevent it. Most wine writers explain how to initiate malo by first explaining how to prevent it and then suggest that the opposite approaches will encourage the result.

To inhibit malo fermentation, the following measures may be

undertaken:

- 1) **Early racking** after yeast fermentation reduces growth nutrients.
- 2) **Early fining** and or filtering also works in this regard.
- 3) **SO₂ additions** of at least 30 ppm free should be added.
- 4) **The pH** should be lower than 3.3 for red wine and 3.1 for white. At low pH the malo growth is almost completely inhibited.
- 5) **Keeping and storing** the wine, up until bottling, at temperature below 14 degrees C.
- 6) **At bottling**, membrane filtering at 0.45 micron size, should be employed to assure that malo fermentation will not start in the bottle.
- 7) **Chemical inhibition**, which is very effective ,by fumaric acid at concentration of 300 – 500 mg / L.(This is a risky approach and must be carefully evaluated.)

If all or part of these measures are practiced, there is a very good chance that malolactic fermentation will not take place.

In order to encourage it, all the opposite measures should be undertaken. Consequently:

- A) A warm temperature around 20 degrees C.
- B) Alcohol levels below 14%.
- C) A pH above 3.5.
- D) An SO₂ level well below 50 ppm.
- E) Presence of dead yeast or fruit pulp as a nutrient source for the bacillus.

It should be added to wine while it is still fermenting or as early after yeast fermentation as is possible. Note: Malolactic fermentation is very gentle and one should note the tiny, slowly rising bubbles as compared to the larger and faster ones of yeast fermentation.

Adding the Culture:

If using Lallamand's "Bacchus" it is best to rehydrate a package in 20 degree C water for about 5 – 10 minutes- then add it to the wine but do not stir it in. Recommended dosage is 1 package per 23 L. It may work by adding the powder culture directly to the wine but there will be an increased lag time before it takes off. Cost is about \$ 8.95 per package plus shipping from Vines to Vintages in Ontario.

If adding "Vintners Choice Malolactic Cultures" by Wyeast Laboratories of California, which is in liquid form in a sealed plastic or foiled bag, the contents may be added directly to the wine. Each bag is sufficient to accomplish malo in 5 US Gallons or 23 L. Available from Nobel Grape at about \$8.95

Both of these products should be stored in a refrigerator although the first named may be placed in the freezer.

Future considerations may involve the use of ML-01 which is a Generically Modified yeast and culture that automatically proceeds to malo when it finishes the yeast fermentation. Furthermore, it does not maintain a presence in the winery and therefore does not contaminate the winery or other wines unless poor cellar practices are evident. Consequently, it is believed that special protection of white wines, in particular, is not a requirement, as it is with other such cultures.

ML – 01 is available only from California in 500 gram packages at a cost of \$87.50 plus shipping of about \$ 50.00. There are special requirements in obtaining this culture as it is a GM product.

Measuring Results

Most researchers agree that measuring the TA and pH is not a

reliable method of keeping track of malolactic fermentation. Paper chromatography is probably the preferred method of following the course of activity but most home winemakers use pH as a guide as the course followed by commercial wineries is quite complex. By measuring pH prior to inoculation with the culture and comparing that to measurements during the malo activity any increase will confirm that malo is taking place. However, it will not indicate when malo is complete, as paper chromatography will.

Other Considerations

Use of sorbate in wines that have undergone malo is not recommended. Off odours, often referred to as “geranium” smell, may become prevalent where the two processes are mixed.

References

- 1) Winery Technology & Operations – Dr. Yair Margalit
- 2) Modern Winemaking – Philip Jackisch
- 3) Making Better Wines – Ted Underhill