



Predicting and anticipating malolactic fermentation start-up

► Why?

- A large number of parameters influence the development and activity of malolactic ferments in wine. Consequently malolactic fermentation (MLF) is liable to be triggered at a wide variety of moments.
- Malolactic fermentation that is spontaneously triggered too early or too late can result in qualitative and financial losses.

Key points



- **pH/SO₂ INTERACTIONS:** free SO₂ has a powerful toxic effect on lactic bacteria and even more so when the pH is low. However, total SO₂ must also be taken into account as the bacteria can dissociate the SO₂, rendering it active. Attention should also be paid to high pHs, which can lead to the development of microbial flora that is often detrimental to the quality of the wine.



- **ALCOHOL/TEMPERATURE INTERACTIONS:** bacteria are sensitive to ethanol. High temperatures (>25°C) increase the toxicity of the alcohol with regard to the bacteria. Low temperatures (<16°C) limit bacteria multiplication and also their activity.



- **INITIAL MALIC ACID CONTENT:** in very small quantities, the bacteria will have more difficulty triggering the fermentation process. Excessively high concentrations will equally be detrimental and will slow down the start-up.



- **ALCOHOLIC FERMENTATION DEVELOPMENT:** the yeast can weaken amino acid content in the medium that are required by the lactic bacteria, especially if the yeast has high nitrogen requirements, but also if there is a high level of activity during alcoholic fermentation. All the same, a sluggish alcoholic fermentation, which often generates toxins, will also penalize MLF.



- **TIMING OF INOCULATION** is decisive for triggering MLF. Please refer to practical guide n° 8 for more details.



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EVALUATING MLF FEASIBILITY

Parameters	My wine	Evaluation				Results
		1 point	2 points	8 points	10 points	
Alcohol (% vol.)		< 13	from 13 - 15	from 15 - 17	> 17	
pH		> 3,4	from 3,1 - 3,4	from 2,9 - 3,1	< 2,9	
Free SO ₂ (mg/L)		< 8	from 8 - 12	from 12 - 15	> 15	
Total SO ₂ (mg/L)		< 30	from 30 - 40	from 40 - 60	> 60	
Temperature (°C)		from 18 à 22	from 14 - 18 & from 22 - 24	from 10 - 14 & from 24 - 29	< 10 & > 29	
Yeast's nutritional requirements		Low	Medium	High	Very high	
Alcoholic fermentation development		Smoothly	Slight yeast stress	Sluggish fermentation stuck AF	Prolonged contact with the yeast	
Initial malic acid content (g/L)		from 2 à 4	from 4 - 5 & from 1 - 2	from 5 - 7 et de 0,5 - 1	> 7 & < 0,5	
Maximum speed of alcoholic fermentation (maximum loss of density points/day)		< 8	from 8 - 16	from 16 - 24	> 24	

NB : Other factors that are presently less-known and under study are to be taken into account in this estimation: dissolved oxygen content, polyphenolic content, lee setting, pesticide residue, etc.

Explanation: Carry over the result of each line into the column to the right. Add up the results from the right hand column to obtain the final result. According to the value obtained, you will have an estimation of malolactic fermentation feasibility.

< 13

de 13 à 22

de 23 à 41

> 41

→

→

→

→

Favourable

Attention to development of indigenous flora (*Brettanomyces*, contaminating bacteria, etc.)
Inoculate rapidly with selected ferments.

Moderately difficult

Choose the ferment that is adapted to your wine.
A specific bacteria nutrient can be necessary.

Difficult

Give preference to a 1-STEP® ferment that is adapted to your wine, or even a standard bacterium. Reduce obstacles in order to optimize MLF: temperature, bacterial nutrition, etc.

Extreme

It is pointless considering MLF in these conditions. It is essential to decrease the number of obstacles before inoculating: blending, deacidification, temperature, bacterial nutrition, etc.

The conditions for the malolactique fermentation are: