ADVANTAGES OF SHORT MACERATIONS: A NEW PERSPECTIVE

Dominique DELTEIL. ICV Scientific Directeur
Institut Coopératif du Vin (ICV), la Jasse de Maurin, 34970 LATTES, France
E-mail: ddelteil@icv.fr
Internet: http://www.icv.fr/

Reserve long macerations for well defined market segments.
Since 1990, the ICV has developed a winery experimentation and validation program. The significant advantage of allowing macerations for 3 or 4 weeks, or even longer, while controlling the technical and microbiological risks for the destemmed and crushed grapes in the production of ultra-premium and personalized red wines, is now well accepted.

However, as the understanding of this technique is increasing, it also becomes evident that such maceration lengths are not suitable for the majority of grapes from the Mediterranean. The limits of long macerations are of viticultural and commercial nature. With numerous grapes, nothing is gained from long macerations. Many markets don’t expect the aroma and gustatory characteristics, which are formed during long macerations. Good quality grapes that are technically suited for long macerations can yield wines, which are better positioned in the market, if produced with short macerations.

Master short maceration techniques from A to Z
A well planned procedure is the key to success. Large volumes have to be processed steadily and safely in a short time. It is a challenge of industrial kind. It is this type of challenge which has to be tackled in order to gain a strong position on the market for mid-range wines.

Take advantage of all the know-how acquired from the ultra-premium wine range.
Long maceration R&D efforts have lead to a better understanding of the composition and role of various berry parts, as well as the diffusion and stabilisation dynamics of Mediterranean grape compounds. Applying this know-how to short macerations allows to better define the technical objectives:

♦ Rapid and complete diffusion of pigments, tannic complexes and certain polysaccharides from skins without harsh processing
♦ Rapid and complete diffusion of tannic complexes and some polysaccharides from the pulp without harsh processing
♦ Stabilisation of the wine polyphenolic system and aroma profile.

Short macerations are not vinifications where all unitary costs are minimized systematically without differentiation. Certain measures are required to consistently achieve the main objectives described above. The resulting costs are justified for adequate positioning in certain markets.

Plan the winemaking steps after draining, well ahead
For long macerations, numerous and regular oxygen supplies and wine pigment stabilisations are obviously carried out during skin contact.

For classic short macerations, by necessity, these procedures will have to take place after draining in order to retain part of their beneficial effects. Even in the absence of skins they will have to be planified and carried out after draining.

Key-procedures for short macerations
While the skin contact is short, the procedure is backed by an entire winemaking philosophy. The vinification is not abridged after devatting – on the contrary.
♦ Get organized to reach most objectives in a few days of skin contact
  - Control the quality of diffusions: destemming, crushing, enzyme addition, delestage.
These steps allow to transfer the most important elements to the juice. Tannins and other compounds responsible for harshness are not significantly extracted. Before and during maceration, harsh grape processing has to be prevented in order to avoid major extraction of herbaceous aromas. Crushing and delestages are gentle grape handling procedures.
  - Control oxygen additions during skin contact: daily delestage or active oxygen additions to the entire vat content.
Well conducted delestages introduce sufficient dissolved oxygen to the fermenting and macerating must. If cap punching is used or when working with rotofermenters, oxygen has to be supplied at least once daily. Equipment to inject exact amounts of oxygen are now available for wineries: Cliqueur® or other injectors.
  - Find the best moment for devatting: define this moment by tasting the macerating wine.
The desired wine style, the maceration know-how and the given grape maturity allow to predict a potential range of maceration lengths: for example 4 to 6 days. Then, during maceration, tastings will allow to verify the attainment of the colour, structure and aroma objectives. Once these objectives are reached, the wine is devatted. This is not a simplified vinification. Instead, it requires accurate sensory references in accordance with the objectives.
In fact, certain sensory impressions may have a daily variation of 20 to 50% around the 3rd, 4th or 5th day. These variations and their implications for the future wine style will have to be considered.

♦ Get organized to follow the proper vinification strategies after devatting
  - Ensure the quality of rackings: eliminate rapidly the vegetal lees.
A racking carried out one day after devatting will greatly contribute to colour stability and the taste and aroma expression.
This is true when the must is still fermenting. The racking allows to finish fermentation without vegetal particles stemming from devatting or from the press. In practice, the enzymes which had been added to the grapes allow an efficient separation of the vegetal sediments. This technical procedure is very beneficial, requires as much effort as a delestage and is contrary to many of the usual liquid handling habits.
  - Control the oxygen additions after devatting: Plan the rackings with aeration and microoxygenations.
Before MLF and as long as the wine has a considerable yeast biomass in suspension, the additions of dissolved oxygen by aerated rackings are advantageous. A complementary technique would be to commence a continuous microoxygenation right after devatting.
  - Manage MLF: inoculate with bacteria in order to control the course and effects of the malolactic fermentation.
In trials with short macerations confirmed in wineries, the importance of inducing MLF rapidly after racking was shown. More recently, the positive effect of certain bacterial strains on the sensory profile of wines has been evidenced. The active control of MLF has been an additional improvement to ensure a good market positioning.
  - Manage ageing: continue colour stabilization and favour development of aroma and taste qualities
The winemaking steps after MLF are planned according to the wine profile and structure, and its commercial placement. The type and frequency of oxygen additions and rackings will be tailored to these objectives. From this moment on, the vinification protocols can vary greatly
depending on the wine. Regular tastings focussed on predefined sensory indicators allow to adjust the vinification approach. With Syrah, for example, the principal indicators may be the following: absence of vegetal and sulphur aromas, weak astringency and absence of bitterness in the finish. The wine should already display this profile before MLF and afterwards, during tank ageing, these characters (vegetal and sulphur aromas, astringency, bitterness) should not develop, either. It is the original grape potential, which will then define the positive wine qualities.

**An experimental example**
The Merlot grapes were evenly distributed in two tanks of equal capacity.

- **Short maceration vinification protocol:**
  - Destemming – Crushing – Enzyme addition (1 g/hl with selected enzymes) – 5 g/hl sulfite addition – 20 g/hl yeast (ICV-GRE) addition - Temperature control to max. 28°C – One delestage daily – Devatting 4 days after cap formation and 4 delestages – Combination of free run and first pressings – Aerated racking 24 hours after devatting – Aerated racking 48 hours after the initial racking – Direct inoculation with selected lactic acid bacteria – Aerated racking 24 hours after completion of MLF – 3 g/hl sulfite addition.

- **Vinification protocol with systematic cost reduction:**
  - No destemming – Crushing – No enzyme addition – 8 g/hl sulfite addition – 10 g/hl yeast (ICV-K1) – Temperature control to max. 30°C – Pumping over 1/3 of tank volume daily – Devatting after completion of alcoholic fermentation (corresponding to 7 days of maceration) - Combination of free run and first pressings – No racking before MLF - Direct inoculation with selected lactic acid bacteria - Aerated racking 24 hours after completion of MLF – 3 g/hl sulfite addition.

n.b. for experimental reasons, both batches were treated in the same way after MLF. In practice however, the wine made with the reduced cost protocol would have had to wait for a spontaneous MLF to happen. In this case, the differences shown below would have been even more pronounced, not mentioning the risk of microbial spoilage.

![Image of comparison chart](image)

**Figure 1:** Comparison of a well managed short maceration with a systematic cost reduction vinification. Effects on the wine polyphenol profile after ageing. Merlot.

**Discussion of Figure 1**
After ageing and at the moment of commercialization of the product, the analytical differences were very important. The wine made by an optimized short maceration protocol clearly displayed stronger colour intensity (95% higher) and clearly more red colour (hue inferior to 25%). The data shows that the colour diffusion and stabilization objectives were reached. The
increase of total tannin extraction was weaker (13% increase). This is the result of the selective extraction of stabilized pigments and total tannins of the method.

The two wines were clearly different regarding their sensory properties.

The wine made with the optimized short maceration protocol was characterized by the variety-typical fruit and liquorice aroma profile. Its aroma profile was dominated by good volume in the attack, high tannin intensity followed by little astringency and dryness, and absence of bitterness. A profile that responds well to many of today’s varietal wine markets.

The aroma profile of the wine made with the systematic cost reduction protocol was determined by sulphur odours (garlic, caoutchouc) and vegetal aromas (hay, cooked pepper). The natural fruity aromas of the grape were not expressed. Its aroma profile was dominated by an attack with little volume, low tannin intensity with acidic tannins, followed by a relatively high astringency, and a drying finish with bitterness. A profile, which does not please the majority of consumers in this category.

In order to complete the sensory description, the wines were presented to a merchant expert with these wine types. His comments were:

- First wine: “This is an interesting Merlot”.
- Second wine: “This wine is faulty, whatever its denomination”

An interesting tool for the management of certain varieties

Especially if the grapes are not perfectly balanced and ripe, a well managed short maceration is advantageous.

This may be the case for grapes affected by rot, raisined grapes, and grapes with high polyphenol concentrations but insufficient polyphenolic and cellular maturities.

- With these grapes, selective extraction becomes essential: take the best, and leave the rest in the cap. The short maceration is well suited to reach these objectives.
- Low cost vinifications, or those with too long macerations, produce diluted wines revealing the grape imbalance.
- The correction of wines made from such grapes with fining agents, such as tannin powders, most often leads to an intensification of these faults.