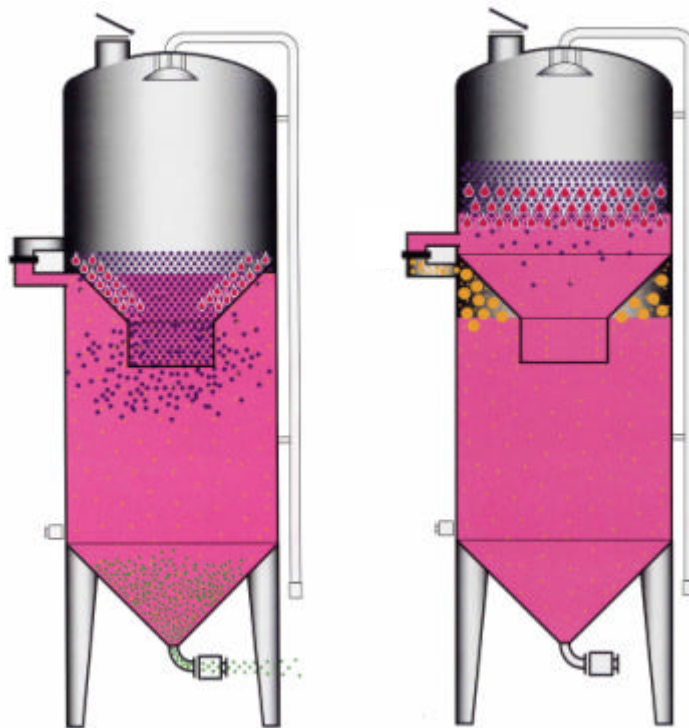




metodo  Ganimede®



“SOME REMARKS ON DELESTAGE”

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SOME REMARKS ON DELESTAGE

I was recently asked to hold a lecture for the students of a technical school on the topic:

“The use of delestage to encourage extraction and diffusion in the must-wine of the substances found in grape berries”

To prepare this work, I gathered a lot of materials, documents, studies and analyses on the method of delestage and I started to compare them with the practical experiences and observations I have made during my long professional life, both in Italy and abroad.

The result of all this is a work dealing with the aspects and characteristics of this stage of winemaking I consider as interesting. In particular, this study has shown that **a successful delestage needs strict procedures and times, a task which is not always easily carried out in a winery.**

Before assessing and examining the characteristics of this method, I wish to submit to your attention an article on delestage by Dominique Delteil, the scientific director of ICV in Montpellier, extracted from the website www.icv.fr.

ICV's Technical Procedures: Delestage

Delestage is a technical procedure carried out on grape juice or wine.

It helps optimize exchanges between the liquid and solid phases during maceration. The delestage developed by ICV is far superior to the traditional methods of pumping over.

The number of delestages is determined in collaboration with your winemaking consultant, and takes into account production objectives and tasting results.

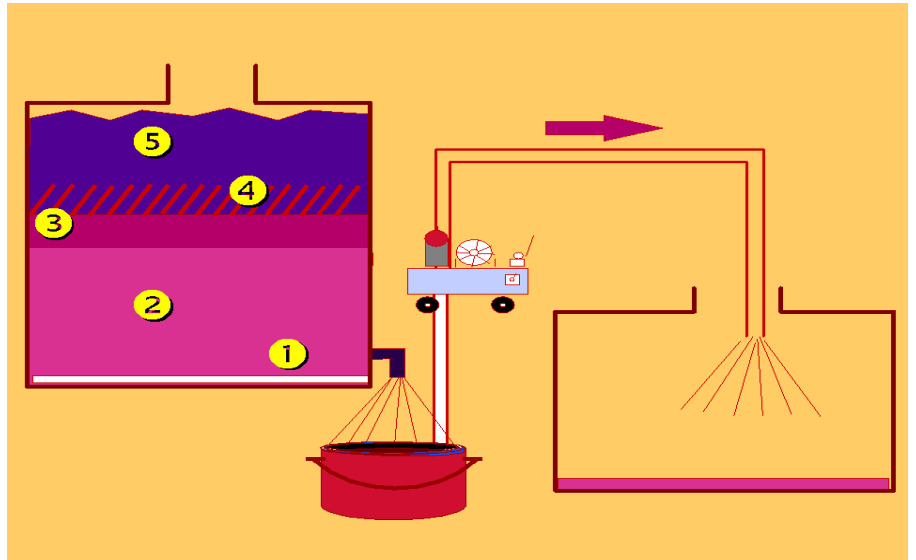
Caption

- 1. Yeasts on the vat's floor.** These stationary and tightly stacked yeasts don't contribute to fermentation. Under these conditions, there is a high risk that sulphur composites expressing unpleasant smells and tastes will be produced and released.
- 2. Fermenting mass of juice.** This juice is hardly in contact with the cap.
- 3. Juice situated directly under the cap.**
- 4. Juice saturating the pomace.** The juices under and in the pomace are highly saturated in composites diffused from the grape. With this excessive concentration, those juices are bad agents of dissolution and of stabilization of the cap's soluble composites: pigments, tannins, polysaccharides.
- 5. The pomace.** The major part of the pomace isn't in contact with the juice. The spreading isn't optimized. Highly risky microflora can develop, protected from the competition of the fermenting juice's *Saccharomyces*.

First step:

The beginning of the first step

Emptying the vat while properly airing the juice and while sending it into another vat

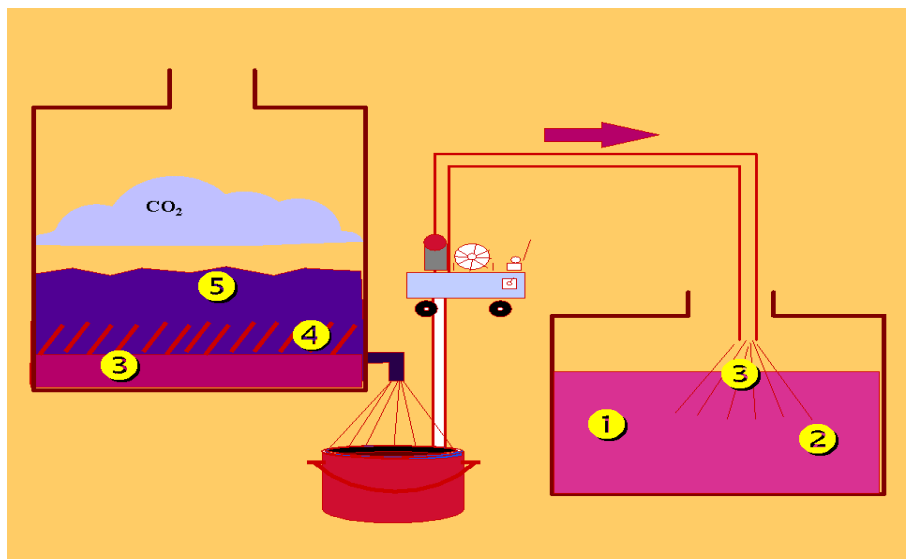


ICV Graph

Comments: To carry out a delestage, a reception vat is required as well as means of transferring juice (shafts and pumps) which are conform with standards of hygiene. Delestage can start once there is a pomace cap formed. The initial vat is entirely emptied and oxygen is added to the juice. An open jet in a tub ensures real oxygenation of the juice (transfer of 2-4 mg/liter of dissolved oxygen). Other methods are just as equally efficient: direct injection of oxygen in the juice reception vat (cliqueur) or the insertion of a porous stainless steel coupler on the pipes used for pumping.

First step:

The end of the first step

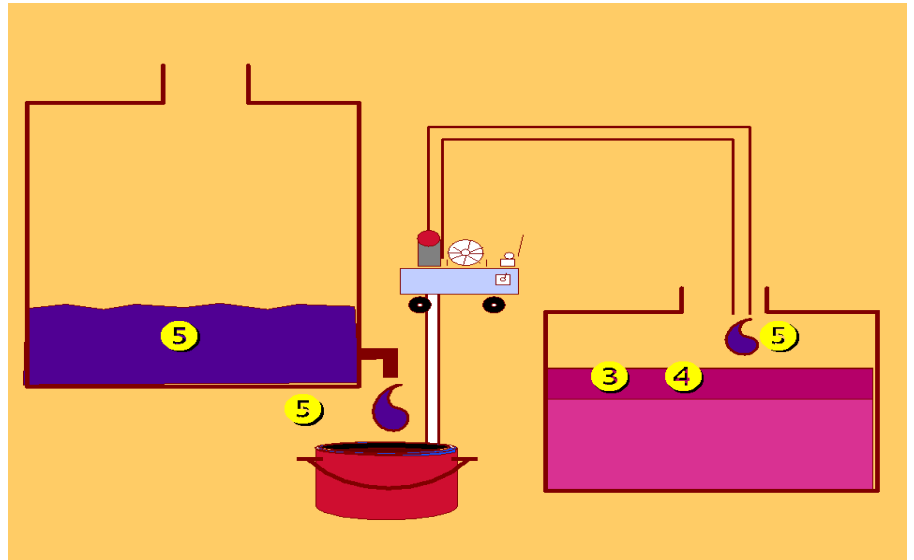


ICV Graph

Comments: Emptying all of the juice is a key factor in successfully carrying out a delestage. It ensures that the juice that is the most concentrated in polyphenols receives oxygen. This juice is located directly under the cap. The suspension of all yeasts and their oxygenation is one of the key elements to an alcoholic fermentation. NB. The juice under the cap is not completely renewed by a traditional pumping over ; A punching of the cap renews this juice, but doesn't add oxygen to it during fermentation.

2nd step:

Thoroughly draining the pomace at the bottom of the vat for 1 to 2 hours

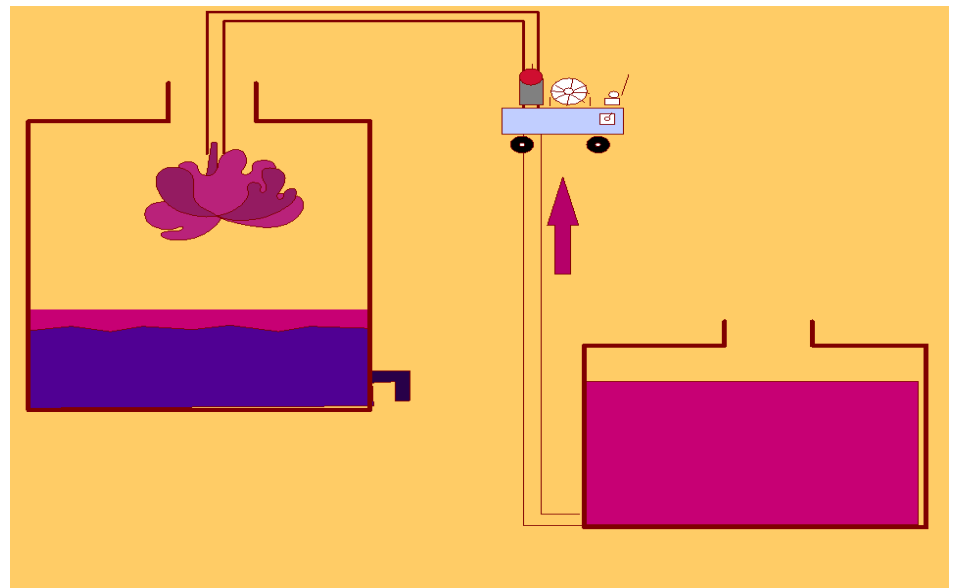


ICV Graph

Comments: Complete draining of the pomace helps achieve a better diffusion of the grapes' valuable elements: pigments, tannins, the pulp's and the zone under the skin's polysaccharides. Complete airing of the juice is a safe way of ensuring stabilization, of coating tannins and of preventing sulphited smells.

3rd step:

Pumping over the juice again by spraying the pomace with a freely flowing, low pressure jet

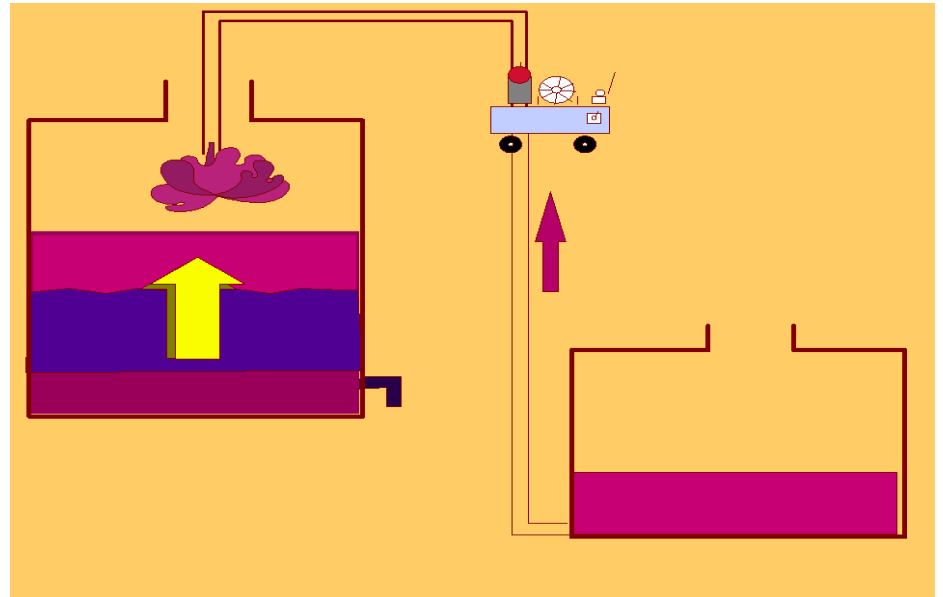


ICV Graph

Comments: Pumping of juice or wine again over the pomace using a flowing, but low pressure jet, limits the mechanical grinding up of the pomace. It isn't necessary to wash all of the pomace's surface: either the pomace is completely covered with juice when the pressure is sufficient or the cap disintegrates and mixes well with the juice.

4th step:

Rising up of the cap to the juice's or the wine's surface



ICV Graph

Comments: *When the pomace remains intact, it rises up through the juice or wine, permitting thorough exchanges between the pomace and the liquid without however grinding up the marc and the liquid. In other situations involving the pomace and the vat, it disintegrates resulting in equally intense non aggressive exchanges.*

Article extracted from the website www.icv.fr

Author : Dominique DELTEIL. Scientific Director at ICV Montpellier

Caption

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- 5. The pomace.** The major part of the pomace isn't in contact with the juice. The spreading isn't optimized. Highly risky microflora can develop, protected from the competition of the fermenting juice's *Saccharomyces*.

The article above shows clearly that delestage must follow some key steps. Only this way, the method will be successful and produce the following advantages:

- 1. The must will be thoroughly oxygenated, especially the part of it under the cap, and the action of the yeasts will be encouraged.**
- 2. The cap will be drained (for 1-2 hours) and this will help the substances found in the grapes (pigments, tannins, polysaccharides) to diffuse in the must and the juice to be thoroughly aerated.**
- 3. The product (juice and marc) will be made homogeneous by pumping the juice over the cap.**
- 4. The juice and marc will interact when the cap rises to the surface.**

THE CAP OF MARC.

To help you understand how delestage works, it is convenient to dwell some more on the features of the cap of marc. In fact, delestage is meant to exploit the cap to the full.

When dealing with maceration and fermentation, the most difficult task for a winemaker is to help obtain a good exchange between the juice and the solid elements of the must, and this is objectively quite difficult to do.

As soon as fermentation begins, CO₂ bubbles start to push to the surface the solid parts in the must (skins, seeds, remains of leaves and stalks, etc.).

While fermentation goes on, the CO₂ bubbles generated by alcoholic fermentation will press the marc toward the surface, while this will be simultaneously pushed back down by the force of gravity. These phenomena contribute to harden and press the floating mass, and the resulting hard cap will find it hard to release its elements to the juice. In a short time, all the berries become compact and dehydrated and – as Dominique Delteil has illustrated so well in the article above – only the lower part of the cap is conveniently wet so that it can contribute successfully to extraction.

Only a progressive dilution of the cap, through a replacement of this oversaturated juice with some less concentrated juice, will produce an ideal extraction from the marc.

The same thing happens when a tea bag is brewed in boiling water. When water is poured onto the bag, we can see that the substances in the bag come out fast, but the process will be more intense and rapid if we stir the bag, so that the liquid found closer to the bag (more concentrated water) is replaced with some new water (extraction is faster thanks to progressive dilution). Also, if the water is boiling, the bubbles produce a stirring action and encourage further extraction.

Let's get back to the cap of marc. Remember that if the cap is hard only a part of the marc will contribute to the process, while most of the layers of marc will remain totally excluded from extraction.

In the fermenters available in the market today, the cap of marc remains virtually dry for most of the time.

During pumping-over, pressing, rotation, etc. the cap is flooded by the liquid poured from above – which should guarantee that the solid parts get conveniently wet – for a short time only. Even if the liquid is fairly homogeneously distributed, it is clear that falling from above it will take the easiest way to percolate downwards (force of gravity). This means the juice will always flow where the least resistance is found (preferential paths) and so it will affect only a marginal part of the marc. This implies that pumping-over and pressing cannot guarantee a successful extraction of the cap of marc, and this can generate a loss of up to 50% of the product.

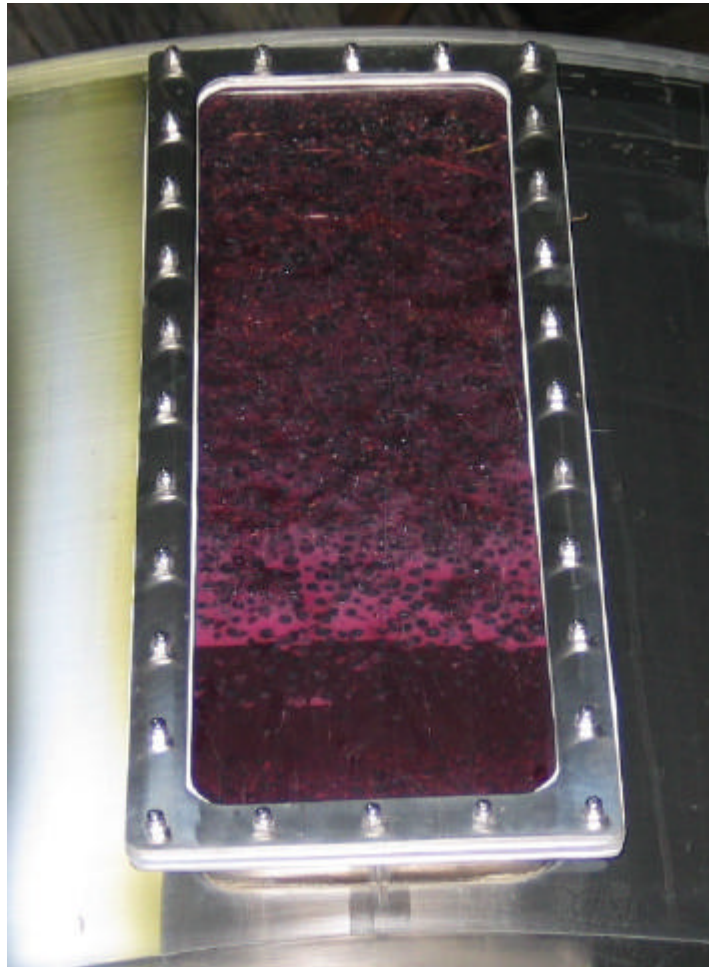
We should also remember that using any pumps, or pistons or blades to stir up the cap, however they are shaped and operated, will almost always produce some grinding effect. This undesirable damage to the cap is even greater while fermentation goes on. The action by the enzymes, the solvent action by alcohol and carbon dioxide will also weaken the skin structure and so any aggressive intervention will cause sizable damage, i.e. lees to form and undesirable substances characterised by bitter and astringent flavours and herbaceous aromas to dissolve in the juice, often in an irreversible way.

If (thick and/or fine) floating lees can be removed later, the undesirable substances dissolved in the juice have a lasting effect, unfortunately.

With Ganimede[®], the cap of marc is not difficult to handle: the bubbles bursting out through the neck of the diaphragm when the bypass is opened will keep the cap always well split, soft and soaked in the liquid. Moreover, this will happen with no need to use mechanical tools, or pumps, or similar aggressive devices which, as we have seen before, always have a negative impact on the finished wine.

«Château des Sours» France - 2003 Harvest

The cap of marc seen through the Plexiglas window of Ganimede® fermenter.



The picture above helps assess the characteristics of the cap of marc in a Ganimede® fermenter. You can clearly see that **all the cap** is flooded by a lot of liquid and the skins are deep in the juice. We are here at the stage of fermentation and the bypass is closed.

The area below the diaphragm is saturated with the carbon dioxide generated during fermentation and the excess gas under pressure will flow out through the neck of the diaphragm and rise rapidly to the surface, dragging a large amount of liquid along the way.

These flows of gas and juice keep the whole cap thoroughly “**soaked**” in the liquid.

This way, the juice is found not only in the central part of the cap (the part most affected by the action of large bubbles) but also, as seen in the picture, in the peripheral parts, which are closer to the sides of the vat.

This happens simply because of the **physical principle of the communicating vessels**. Because of this physical principle, then, the presence of floating liquid in every part of the cap guarantees that the liquid will affect the whole mass.

THE USE OF DELESTAGE IN GANIMEDA®.

The remarks above about the cap of marc make it clear that the cap in Ganimede® fermenter is entirely different from what happens in the traditional fermenters we have been used to work with for years. However, saying that the cap in Ganimede® is well-split and the marc is soaked in the juice would mean judging only one stage of Metodo Ganimede®, and namely the one where the skins release their components into the juice. As we have read above in the article by Delteil, if the juice remaining at close contact with the skin is always the same lot, over-saturation will soon cause the process of extraction to stop.

This is why it is essential to replace the juice in the cap. To do so, the skins need to be drained. With delestage, draining is operated by emptying the vat and leaving the skins to drain for 1-2 hours. In Ganimede® there is no need to empty the fermenter.

Let us see the process step by step.

- 1- When the bypass is closed and the gap below the diaphragm is saturated with the CO₂ generated by fermentation, the excess gas gets out in big bubbles and drags a large amount of liquid along. This way, the cap of marc will continue macerating in the juice (fig. 2).
- 2- When the bypass is opened, all the gas below the diaphragm flows onto the juice above. Pushed by the gas, the juice will flood the floating mass of marc and stir it up thoroughly, so that the liquid saturated with the elements extracted before will be replaced in the cap. Moreover, the seeds will fall and gather at the bottom of the tank (fig. 3).
- 3- After the gas has escaped, the gap left empty is filled by must. This causes the level to lower and the cap of marc to sink and settle on the diaphragm, where a phase of static drainage takes place. Before the gap below the diaphragm can be saturated by CO₂ again (in a time varying between 30 and 90 minutes), the cap will continue to drain, so that all the juice in it will release its elements. This juice is very rich in elements, because these are held within the skins (fig. 4 and 5). When the gap is filled with CO₂ again, the bubbles will bring some "more diluted" new juice into the cap. This way, an ideal extraction is guaranteed and **all is encouraged by a dynamic effect, which is a distinguishing feature in Metodo Ganimede®**.

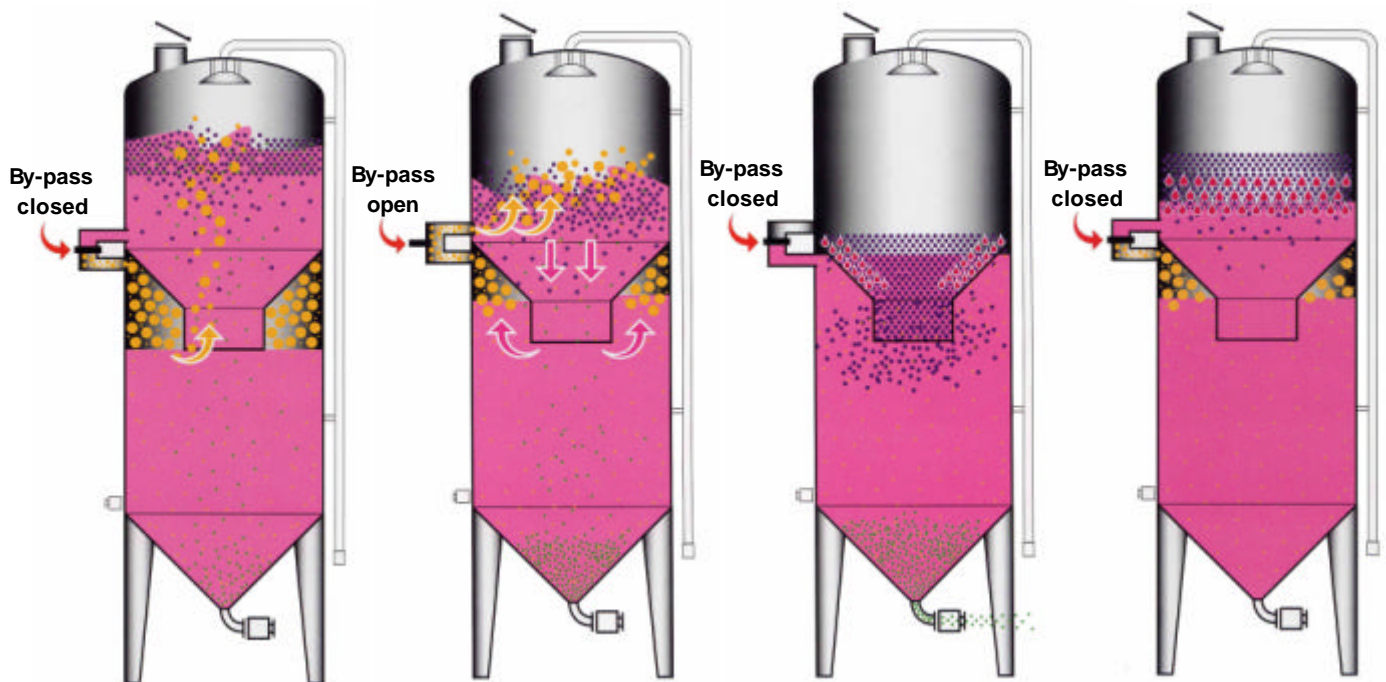


FIGURE 2

FIGURE 3

FIGURE 4

FIGURE 5

So, the repetition of the steps above offers the successful results of delestage in a simple and fast way (you only need to set up Ganimede® from the control board).

Consider that, with Ganimede®, depending on the fermentation activity, you can set 3 to 12 cycles per day (1 cycle corresponds to steps 1 to 3).

Moreover, no staff will be needed to empty the vat and pump the juice back into it. It is sufficient to set Ganimede® fermenter according to the times fixed by the winemaker and check how the wine develops with daily tasting sessions. This way, you will reduce the use of staff (who will operate in totally safe conditions) and be able to focus on the wine only.

We have not dealt with oxygenation yet. In his article, Delteil highlights that delestage causes the juice to be oxygenated when it is poured in the spare tub.

With Ganimede®, as the juice is not poured off the vat, oxygenation will not happen. However, the use of oxygen and other technical gases in Ganimede® is certainly simple, successful and above all more scientific than that.

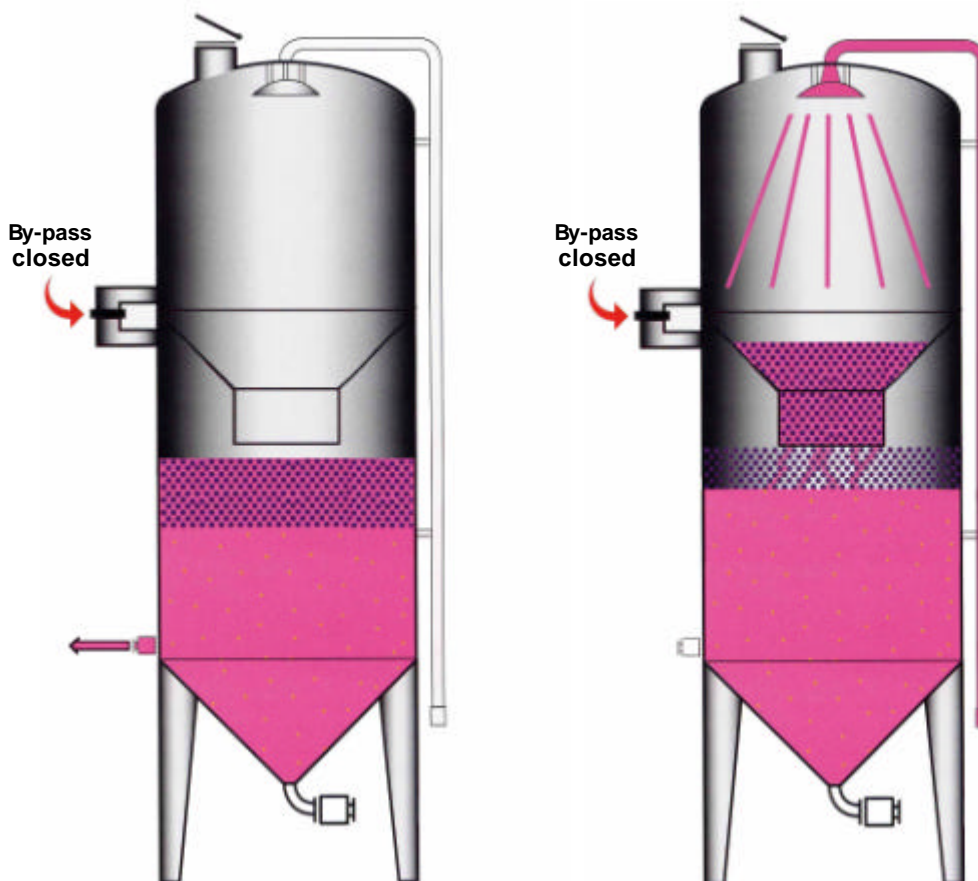
For further details on the use of oxygen, please read the booklet “**Use of oxygen and technical gases with Ganimede®**”. You will find all the information and explanations you need to understand that Ganimede® allows to use gases in a successful, measurable and repeatable way, which is quite a different thing if compared to what other fermentation systems can offer. The possibility to inject oxygen makes Ganimede® a simple and rational tool: you only need to set the time of gas injection and the fermenter will operate with no need of further interventions.

By its efficacy and user-friendliness, **Metodo Ganimede®** has proved in 23 countries worldwide to be a versatile and reliable system, capable of processing both small amounts (3 tons) and large volumes (200 tons) and producing both young wines and great wines meant for long ageing, efficient both for fermentation and before and after fermentation with white and red wines alike.

A lot is talked about a new method: “Making wine with deferred extraction of anthocyanins”.

For your information, we will add that you can also carry out the method of “deferred extraction of anthocyanins” successfully and easily. This method has been studied at the Istituto Sperimentale per l'Enologia in Asti (prof. Rocco Di Stefano, Dott.ssa Antonella Bosso) and implies a limited contact of must with the skins at an early stage, while pressing or delestage are intensified only after the must reaches 5-6° alcohol degrees. This target must be reached in a fast way and with no excessive grinding of the skins. With the standard fermenters available in the market, this method is not easily carried out. In fact, as the cap should be kept adequately moist during the early stages of fermentation, it is quite difficult during harvest time to dose the correct amount of juice to prevent the cap from hardening and at the same time prevent anthocyanins to be released prematurely.

If the cap hardens too much at this stage, a later stage of extraction may be compromised and the work done till this stage may be made consequently vain. With **Metodo Ganimede**[®], the application of this technique is easy and above all successful, because the second stage – where the juice and the skins must be at close contact (so that 100% of the skins may be conveniently tapped) – is carried out in the correct way and with no grinding of the skins. As a matter of fact, even if the cap gets very hard during the first stage, it is sufficient to draw off some juice to make the marc fall beneath the diaphragm. **Refilling the liquid from the top**, the level will rise again and the large mass of marc will rise through the small neck of the diaphragm little by little (berry by berry), so that it is entirely sprayed and flooded by the juice. This way, all the potential available in the skins will be tapped thoroughly and gently.



Note: to understand the process better, please visit the website www.metodoganimede.com and watch the films.

CONCLUSIONS

To conclude, I wish to invite you to think about the importance of the operations you choose to make during the process of fermentation.

A fermenter is an essential tool and should help the winemaker work in an efficient and repeatable way, depending on the raw material, the year and the wine to be made.

We have prepared this study, along with other studies we have offered you before (use of technical gases with Ganimede[®], Dynamic Skin Contact with Ganimede[®], etc.), with an aim to examining in detail the potential and efficiency of Metodo Ganimede[®].

The key element in all these studies is always the same: the diaphragm of Metodo Ganimede[®], which offers the winemaker the right conditions to interact with the must-wine, at any time and depending on his/her specific needs.

Either with technical gases, or delestage, or differed extraction of anthocyanins, or cold prefermentation maceration, the diaphragm guarantees successful operation and sure results.

We have not only said that you can do anything with Ganimede[®].

We have also explained how you can do it, to help you understand that the applications of Metodo Ganimede[®] are not empirical operations, but they are always efficient because they have a scientific foundation guaranteeing that this fermenter is reliable. We can do it because we have a long experience in this field. We are today in 23 countries worldwide and have been working for 7 years with both small producers and large cooperative wineries, and with different types of grapes (there are more than 1000 Ganimede[®] working worldwide!).

We have not talked about delestage and the other methods because we wanted to convince you to use one or the other technique. The winemaker is the one who will choose, time after time, what are the most suitable techniques to meet his/her targets. Our work is to build a vat, Ganimede[®] fermenter, and do so with the greatest care so that it will be a successful and versatile tool (as it is the most important tool in a winery).

Innovation is the engine that drives the evolution of all sectors of production, bringing wealth and success, and reducing and/or simplifying work.

Real tradition is capable of innovating while sticking to its origins but also looking into the future, to improve and take up the new challenges in the Market.

The winemaking sector, though affected by several developments and innovation, has often been anchored to tradition, and especially so in the area of fermentation. However, this tradition is often reduced to a mere unreasonable repetition of procedures and “customs” of the past, while these – though useful and essential for the cultural background of any good oenologist – should be re-elaborated and adapted to the concrete reality of each harvest (the quality of the grapes, which is ever different; the characteristics of the wine required by the customers, whose tastes are always evolving and often linked to fashion, etc.).

This is meant to be a small contribution to help you understand and to illustrate in a clearer and more scientific way the use of winemaking methods, overcoming all rigid prejudices that some would call tradition, while they do not realise that the best way to respect tradition is to innovate it.

Because Ganimede[®] is so versatile and efficient, I consider it as the winning solution in fermentation, a precious help for the winemaker in this delicate and essential stage of making grapes into wine.

Ganimede[®]: the future of tradition.

Francesco Marin, oenologist