



CRACKING



Heat treatment of white musts: What is cracking?

Review of harvest treatment techniques

One of the first techniques for treating the harvest to emerge in winemaking was **thermovinification**. Originally, the aim was to limit as far as possible oxidation of red harvests caused by *Botrytis laccase*. This also enabled improved extraction of colour and optimum winery management. Thermovinification has greatly expanded over the past ten years, particularly in large structures such as cooperative wineries, and the technique has made considerable progress. It is used for the production of quality wines with a fruity and voluptuous profile.

The standard thermovinification technique consists in heating the pressed, destemmed grapes in a tubular heat exchanger at a temperature of around 65 °C to 75 °C for a short time (30 to 40 minutes). The grapes are then pressed, and the grape juice is filtered, cooled and fermented.



In order to improve the quality of the wines obtained, alternative techniques were developed, such as

applying a period of maceration after the thermovinification operation. This is known as **hot pre-fermentation maceration**.

This operation enriches the must in aromas and tannins, thus achieving more stable colouring matter and a more complex wine.

Another important development concerning heat treatment of must is the **flash détente** method developed by INRA in Montpellier.

The technique consists in first heating the destemmed harvest, then rapidly lowering the pressure (process of release ('détente' in French)), which causes the plant cells in the grapes to burst and the temperature to drop to around 30 °C. This technique leads to increased extraction of the constituents of grape skin: tannins, anthocyanins and aromas, and hence better stabilisation of the colour and structure of wines.

A variation on flash détente is the **thermo détente** method, in which the extraction of grape compounds is increased further by applying a pressure of 5 bars followed by release.



Adaptation of heat treatments to white musts: cracking

until now, heat treatments were reserved for red harvests. In the past few years, trials have been carried out with the aim of producing white wines treated in the same way. This technique is called 'cracking'. In this case, white must is heat treated after pressing:

the grapes are first pressed, and the juice is then heated to 65-85 °C using the equipment traditionally used for red harvests. The must is stored at this temperature for several hours (2 to 20 hours depending on circumstances).

Although recent, the technique has already undergone preliminary studies that show that heat treatment of white musts has very beneficial effects on the quality of wines, but also that it can entail a certain number of drawbacks:

Benefits:

- Obtains protein stability (3) (dependent on temperature and grape variety)
- Increases aromatic intensity, fruitiness and olfactory complexity (1, 2, 3)
- Improves volume/acidity balance (3)
- Significantly decreases geosmin content in wines (1)
- Enhances the quality of wines from botrytised harvests (1, 3)

Drawbacks:

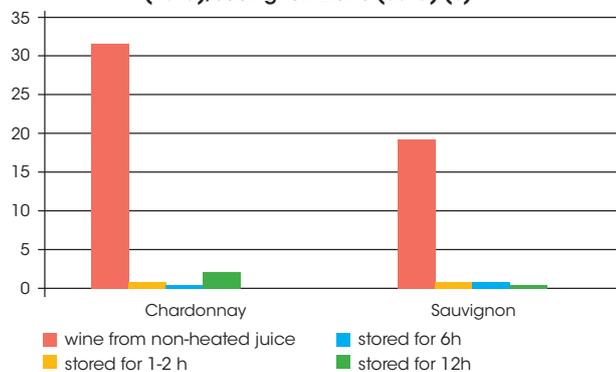
- Increases yellow colour (3)
- Increases astringency and bitterness (1, 2)

An increase in acidity (2) is also observed, which may be more or less advantageous depending on the characteristics of the harvest and on the style of wine sought.

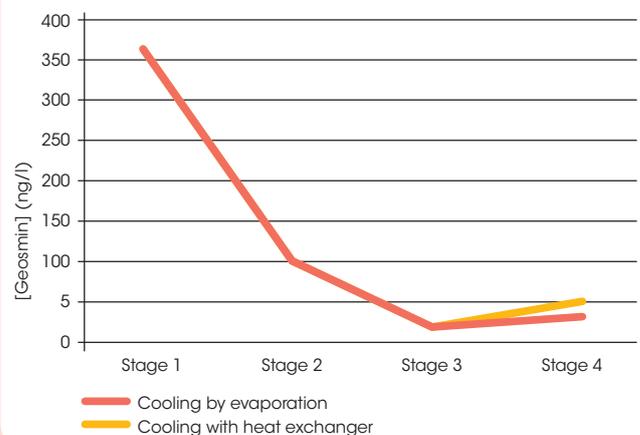
These transformations can plausibly be explained by two processes: the breakdown of molecules caused by the high temperatures (proteins, ochratoxin) and the intensive extraction of the grapes' constituents caused by the heat-treatment technique (organic acids, polyphenols, polysaccharides, aromas and aromatic precursors).

Initial data appear to indicate that best results are obtained by storing juice at relatively high temperatures of 65 to 80 °C for 12 to 18 hours. More experimental work is required to validate these conclusions, but it already appears fairly clear that the heating temperature, heating time, must turbidity and grape variety significantly affect the results.

Impact of heating juice on protein stability of wines Chardonnay (70°C), Sauvignon Blanc (65°C) (3)



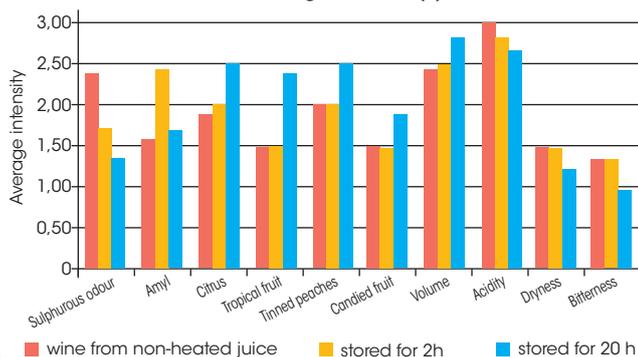
Effect of heating on geosmin content of a Folle Blanche must (1)



Stage 1: must before treatment
Stage 2: after heating to 80 °C

Stage 3: after 8 hours at 80 °C
Stage 4: after cooling

Impact of heating juice (65°C) on the organoleptic profile of a Sauvignon Blanc (3)



Bibliography:

(1) GUERIN L., 2013, Apports de la thermovinification sur l'expression aromatique des vins blancs, Communication EUROVITI 2013

(2) SERRANO E. et al., 2013, Utilisation de la technique du chauffage des mouts en vue de la production de vins blancs aromatiques et légers, <http://www.vignevin-sudouest.com>, 2013

(3) PIC L. et al., 2012, Stabulation à chaud des jus blancs et rosés : une nouvelle pratique prometteuse, RFO, n°253



MARTIN VIALATTE SOLUTIONS

Cracking can be carried out intelligently by using oenological products both to reinforce the positive effects of the technique and to diminish its negative effects.

Discover our solutions for the vinification of wines produced using the cracking technique...



The addition of an enzyme that promotes the extraction and expression of aromas during pressing makes it possible to optimise skin maceration and achieve synergy with heat treatment in order to enhance aromatic intensity.

Viazym® MP

Enzyme preparation for skin maceration

- Pectinase and β -glucosidase activity
- Extraction of aroma precursors
- Expression of aromas



The use of a second enzyme specifically for clarification is strongly recommended, and even essential if an enzyme has not been used in skin maceration.

This is because juice derived from heat treatment is extremely difficult to clarify and filter if it has not previously undergone enzyme treatment.

Careful selection of the moment when enzymes should be added, as early as possible for skin maceration enzymes, and after heating (once the temperature has fallen below 50 °C) for clarification enzymes, will enable you to benefit from optimum enzyme activity.

Viazym® Clarif Plus

Enzyme preparation for effective clarification of difficult musts

- Concentrated pectinase activity
- Rapid clarification
- Effective for static settling and flotation



To avoid excessive enhancement of yellow colour, which would give the wine too strong a tint, fining can be carried out on the juice after pressing or after settling, depending on the various methods used. Fining can be carried out using a plant protein or an animal protein.

ProVGreen Pure Must

Pea proteins selected for the clarification and treatment of musts against oxidation

- Rapid flocculation of suspended particles in must
- Reduction of yellow colour (OD420)
- Removal of oxidized or oxidizable phenolic compounds from must
- Ensures well compacted must deposits.
- Contributes to aromatic freshness and to the preservation of a yellow tint in white and rosé wines



To carry out alcoholic fermentation, an aroma-producing yeast should be used, such as **Vialatte Ferm W28®** or **So.Delight**.

Musts resulting from thermovinification are generally rich in nutrients.

A complex nutrient should be used half-way through fermentation to restart fermentation activity, should this be necessary.

Nutricell® Midferm

Complex nutrient for the reactivation of alcoholic fermentation

- Dual source of available nitrogen: mineral and organic
- Detoxifying action thanks to yeast hulls
- Reactivates fermentation halfway through AF and avoids stuck fermentation



The intensive extraction caused by heat treatment may occasionally increase astringency and bitterness in wines. The fining product that best respects wines and that is the most effective in this situation is without doubt isinglass.

Cristaline

Top quality isinglass for fining white and rosé wines

- Maturation of wines and removal of bitterness
- Gives wines clarity and brilliance.
- Improves filterability before bottling

Goal: Maximum expression of aromatic and taste potential of grapes

RECEPTION
OF HARVEST

PRESSING

SETTLING

HEATING

FINING

ALCOHOLIC
FERMENTATION

FINING



Treat with enzymes
in the press

Treat with enzymes for static
settling or flotation, regulate
according to turbidity

Heat to 65 - 85 °C

Treat with enzymes
to help clarification

Reduce yellow colour

Yeast

Enhance volume
and roundness

Enhance floral
and fresh fruity notes

Reactivate AF
(halfway through AF)

Remove bitterness and
prepare wines for bottling



VIAZYM® MP
2 to 3 g/hL



VIAZYM® CLARIF PLUS
2 to 3 g/hL



VIAZYM® CLARIF EXTREM
0.3 to 1 mL/hL



PROVGREEN
PURE MUST



VIALATTE® FERM W28
20 g/hL



NEO SWEET
5 g/hL



SUBLI FRESH
4 g/hL

2nd
day of AF



NUTRICELL® MIDFERM
30 g/hL



CRISTALINE 2 g/hL
+ SILISOL 2 cL/hL





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