Vegan rosé - lessons from Provence

With rising international demand, rosé remains one of the fastest growing wine categories. **Christophe Rossi**, rosé manager and oenologist at Laffort France, and **Alana Seabrook** and **Andrew Mariani**, from Laffort Australia, examine the latest production trends from Provence.

Worldwide rosé consumption has increased by 8% over the past 10 years, and production is following suit. At present France produces almost a third of the world Rosé volume, 42% of which is produced within the Provence region[6]. And although this growth is unparalleled in the white wine market, producers have noted that consumers are becoming more demanding of vegan/vegetarian friendly options, prompting even the most conservative of Provence rosé producers to adapt their winemaking practices. Given current global consumption and population (and assuming an annual growth of 1%) the market will need an additional 2 to 3 million hL (52-78 Mgal) of rosé wine each year (CIVP/France Agrimer). Here we aim to discuss some of the learning from the most current processing trends occurring in the global heart of rosé production.

Is it possible to make a premium quality vegan-vegetarian friendly rosé?

Yes. With such a large amount of rosé being produced in Provence, they are pioneering the way in terms of vegan rosé production. Where once casein and PVPP were heavily used, increased understanding of phenolic pick up and improved processing have led to the availability and use of more targeted vegetable fining agents such as potato protein (patatin), pea protein and combinations with PVPP.

Harvesting – does this influence what kind of fining agent used?

Every process in the harvesting and processing stage that allows phenolic compounds to oxidise, as well as the varietal in question, will impact on the type of phenolics in the must and the quantity required for removal. Critically, if these phenolics aren't removed, they can oxidise compounds responsible for:

- turning the wine brown
- oxidising key volatile aroma compounds
- consuming oxygen scavengers that protect volatile aroma compounds.

Ideally, handpicking by night would minimise the amount of grape damage and subsequent enzymatic oxidation. Obviously, this is not practical or possible in the vast majority of cases, therefore managing the different must fractions is critical. This can be done in a variety of ways including:

- handpicking and chilling the grapes down can slow down the enzymatic oxidation process
- or with machine harvested grapes, separation of the juice fraction from the whole berries in the hopper, minimising uncontrolled maceration, and the consequential extraction of phenolic compounds.

In the case of a highly oxidised fraction, a broad spectrum of fining activities in higher dosages may be required to replace

animal-based fining agents like casein or gelatine. However, for a free run fraction that has been protected from oxidation (and has lower levels of phenolic compounds available to oxidise) one vegetable-based fining agent may be sufficient.

In the press – how can I maximise colour and aroma precursors without extracting and oxidising phenolic compounds?

The more mechanical disruption and pressing the grapes undergo, the more phenolic compounds will be released into the juice. 'Saignee' technique introduces a lot of phenolic compounds via maceration, thus requiring more management of these compounds. In Provence, premium rosé production utilises a dedicated press using gentle press enzymes that will increase the amount of free run fraction and critically allow for the extraction of aroma precursors from the skin without having to mechanically force them out. The quicker these aroma precursors (specifically thiol precursors) are extracted into the juice from the skin, the more limited the oxygen pick-up and extraction of phenolic compounds. Practically and empirically speaking from experience out of Provence, if oxidation and phenolic extraction isn't managed it is possible to achieve strawberry or raspberry fruit aromas, but impossible to get delicate aromas such as flowers, white peach, grapefruit, passionfruit or even boxwood aromas from red grapes. The press cycle itself is also critical; adopting Champagne press cycles minimises rotations of the press and incrementally increases the pressure without deflating (which would promote oxidation). Common practice in Provence is to layer the fruit with compressed CO_2 pellets, enabling slow release of CO_2, and maintaining its inert environment.

Carefully harvested, pressed free run juice – do I need to bother managing phenolics?

Removal of specific phenolic compounds (namely phenolic acids) will ensure that the colour does not change, but also that aroma compounds like volatile thiols are not oxidised and lost. It is worth noting the two types of oxidation, chemical and enzymatic. SO_2 and ascorbic acid have some control over enzymatic oxidation but chemical oxidation can still happen over time. This makes it critical to remove any phenolic acid that can oxidise over time.

When to add fining agents… juice or during fermentation?

To fine in the juice stage and be effective, the fining agent would normally need to be introduced via venturi when the juice is still cold. There is a high chance of oxygen being introduced in this process, due to the process itself and the fact that at cold temperatures the juice can absorb more oxygen. Flotation can be an effective method of introducing fining agents at this stage without the subsequent ingress of oxygen. Many Provence-based winemakers add their fining agent in the first third of fermentation. This ensures optimal homogenisation at a higher temperature, utilising the dynamics of fermentation.

Does it matter which fining agent I use? Are they all the same?

Each fining agent has a different specificity. Figure 1 is a gel of different fining agents and the different sizes of the fining

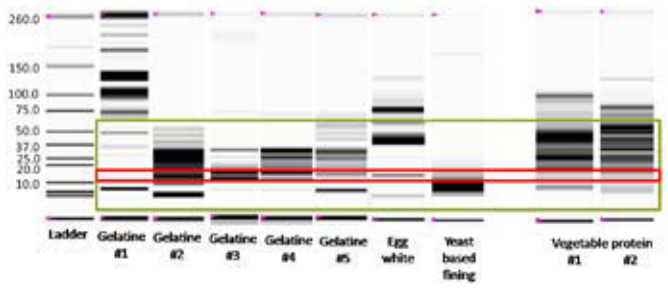

Figure 1. Electrophoresis gel with a range of animal, yeast and vegetable based fining agents which demonstrate the different sizes and quantity of the various protein fractions and importantly which ones will interact with polyphenol compounds in wine (data ex-SARCO laboratory).

agents. The furthest to the left is a ladder giving an indication of size. The green box depicts protein fractions that are able to interact with polyphenols in wine[4], whilst the red box at approximately 14kDa indicates proteins that will interact with polymerised tannins[5]. The darker the bar, the greater the quantity. Fractions of different fining agents may be selected for particular applications. Combinations of proteinaceous fining agents may be used in conjunction with PVPP to remove the entire spectrum of phenolics that could oxidise both colour and aroma. When only using vegan-friendly products, it is important to choose a broad spectrum of agents ideally including PVPP. Casein and PVPP complexes become critical when the juice has oxidised and turned colour towards the

orange spectrum. This makes it critical to ensure all handling prior to is minimising oxygen pickup if the producer prefers to only use vegan/vegetarian-friendly products. Many Provence based producers are using PVPP and vegetable combinations (Figure 3) in high rates in the fermentation on free run fractions to ensure that the removal of all phenolic compounds that could cause damage. If the appropriate amount is used there is usually no requirement for further fining in the wine as this can be quite stripping on the flavour and aroma.

What are the factors critical to making a premium rosé full of aromatic compounds?

High quality fruit is important in the production of premium rosé. Interestingly, red varietals can have as many thiol precursors as premium Sauvignon Blanc grapes[3]. In red wines however, these thiols tend to be bound immediately by phenolics and rendered non-volatile. In rosé, if these phenolics are taken away and the precursors are extracted from the grape, thiols may be converted by thiol-producing yeast and preserved in the wine. Depending on the precursor in question, these precursors may be found predominantly in the skin or pulp of the grape[2]. Esters can be modulated by enzymes produced by yeast, making them a function of the yeast strains that conduct primary fermentation. In short, grape quality, absence of oxidised and oxidisable phenolics and choice of yeast strains can all affect the aromatic and flavour profile of the finished rosé.

How can I increase mouthfeel and aroma in my rosé?

Processes like stabulation in the whole juice phase (keeping the whole juice cold at 0°C for seven to 14 days and circulating the lees with dry ice pellets or nitrogen twice a day) can increase the amount of polysaccharides present in the wine, subsequently impacting its mouthfeel[1]. Press cycles, use of press enzymes and yeast strain selection can also impact flavour production. The press cycle and enzyme used will mostly determine the level of aroma precursors and total phenolic compounds extracted from the skin. Different yeast strains fermented at different temperatures will produce more or less yeast modulated aroma compounds such as thiols (Zymflore®X5 and Zymflore®Delta are high thiol producers whilst Zymflore®X16 is more ester driven, Figure 2) and their enzymatic activities may also contribute to ester production and terpene liberation.

All rosé changes colour after time doesn't it?

If all phenolic compounds responsible for the oxidation of aroma and colour compounds are removed, there should be nothing left to oxidise. If these aren't removed, over time compounds responsible for colour may oxidise and become brown/orange.

How can I manage colour in my rosé wine?

It cannot be underestimated how important the management of colour is in rosé winemaking as it dramatically impacts the style and aesthetics of the final product. Colour will vary depending on:

- variety
- fining products used
- starting SO_2 concentrations
- harvesting conditions
- processing methods including use of enzyme
- crushing/destemming and/or lack thereof.

It is typical in Provence to have a number of different tanks with varying levels of colour in them, which will all have been treated with varied combinations of fining agents. Consequently, after fermentation and final stabilisation processes all these tanks will have different levels of stable colour within the wine. These can then be used as blending components to achieve the winemaker's optimum spectrum without destabilising the colour.

Protein and tartrate stabilisation – what practices do they use in Provence and would it work for Australian rosé?

Sodium bentonite is primarily used (Microcol®Alpha), added during fermentation at a rate of approximately 200ppm. After filtration and blending, the wines are usually checked for the presence of heat unstable proteins and have a second addition of sodium bentonite as required.

Celstab® (Cellulose gum) is widely used in Provence to cold stabilise rosé, approved for winemaking in Australia in 2011. If the wine has been adequately fined during fermentation there should be no interaction between CMC and colouring matter.

Take home points critical for rosé production in Provence

1. **Protection against oxidation** - to avoid the oxidation of polyphenols into quinones and to protect aromas, it is essential to implement all available techniques: evaluation of good practices in wineries (avoid air outlets, check the gaskets fittings, etc.), rigorous process checks and use of inert gases.
2. **Refrigeration and cooling capacity** - cold conditions limit enzyme activity in terms of colour extraction and oxidation by polyphenol oxidases. It is therefore essential to work on these pre-fermentation phases as quickly as possible at low temperature.
3. **Pressing** - the objective is to ensure that rosé wines are pressed quickly and achieve a qualitative release of juices to obtain the best aromas without extracting colour. It is strongly recommended that enzymes are used during the filling of the press.
4. **Fermentation** - the choice of yeast strain and nutrition both help to create and optimise the aromatic profile of a wine according to the style desired by the winemaker.
5. **Fining** - early fining of rosé wines on must or during alcoholic fermentation helps act on the phenolic compounds that trap aromas, and allows wine colour to develop and modify wine structure. An appropriate fining agent will help you produce high quality rosé wines.
6. **Stabilisation** - at the end of the process, certain choices can alter the aromatic profile or colour of wines; therefore, it is essential to understand the stabilisation options available that respect the wine.

For further information visit www.laffort.com/en/protocols-and-itineraries

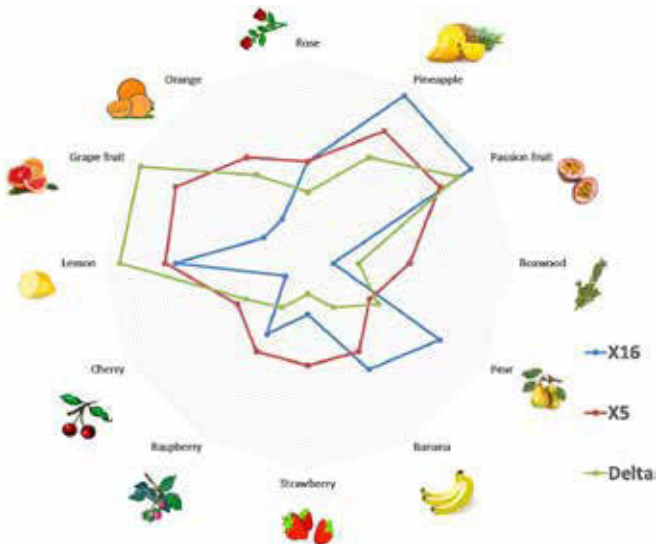

Figure 2. Variation between yeast strains in terms of aroma production.

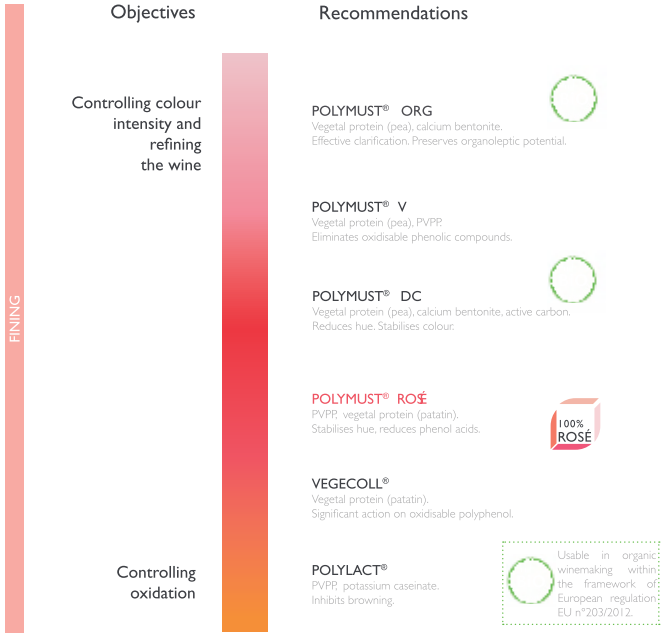

Figure 3. Rosé colour chart - fining agent recommendation based on the colour of the juice.

References

[1]Seabrook, A. and van der Westhuizen, T. (2018) Stabulation - seriously rosé or Sauvignon Blanc? Australian and New Zealand Grapegrower and Winemaker 649:59.

[2]des Gachons, C.P. ; Tominaga, T. and Dubourdieu, D. (2002) Localization of S-cysteine conjugates in the berry: effect of skin contact on aromatic potential of *Vitis vinifera* L. cv. Sauvignon Blanc must. American Journal of Enology and Viticulture 53(2):144-146.

[3]Tominaga, T. ; Peyrot des Gachons, C. and Dubourdieu, D. (1998) A new type of flavor precursors in *Vitis vinifera* L. cv. Sauvignon Blanc: S-Cysteine Conjugates. Journal of Agricultural and Food Chemistry 46(12):5215-5219.

[4]Sarni-Manchado, P.; Cheynier, V. and Moutounet, M. (1999) Interactions of grape seed tannins with salivary proteins. Journal of Agricultural and food Chemistry 47(1):42-47.

[5]Maury, C.; Sarni-Manchado, P.; Lefebvre, S.; Cheynier, V. and Moutounet, M. (2001) Influence of fining with different molecular weight gelatins on proanthocyanidin composition and perception of wines. American journal of enology and viticulture 52(2):140-145.

[6]www.bkwine.com/news/worlds-biggest-rose-producing-countries GW