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# Smoke taint compounds and MLF

October 2020

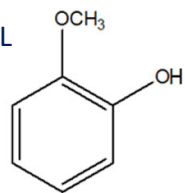


## INTRODUCTION

- › Ripening grapes are susceptible to taint, from phenolic compounds present in atmospheric smoke, arising from nearby fires
- › Fruit is most sensitive the time period 7-days post-veraison to harvest
- › Taint compounds are found in affected grapes in two forms:

### FREE FORM

e.g. GUAIACOL



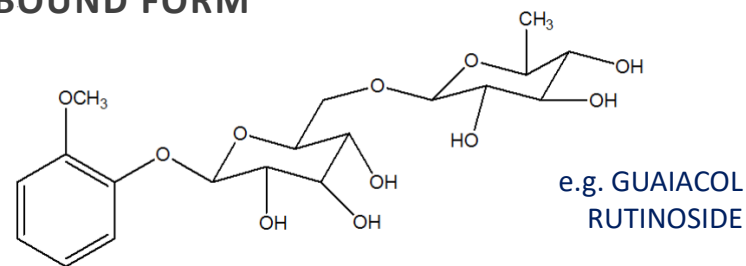
- › Volatile
- › Can give significant smoke aroma

*Conjugated  
in berries*



*Released in  
vinification*

### BOUND FORM



e.g. GUAIACOL  
RUTINOSIDE

- › Present as glycosides
- › Non-volatile
- › Contribute to 'ashy' taste

Kristic et al (2015), Review of smoke taint in wine: smoke-derived volatile phenols and their glycosidic metabolites in grapes and vines as biomarkers for smoke exposure and their role in the sensory perception of smoke taint. Aus. Journal of Grape and Wine Res. 21, 537–553

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## SMOKE TAINT & MLF

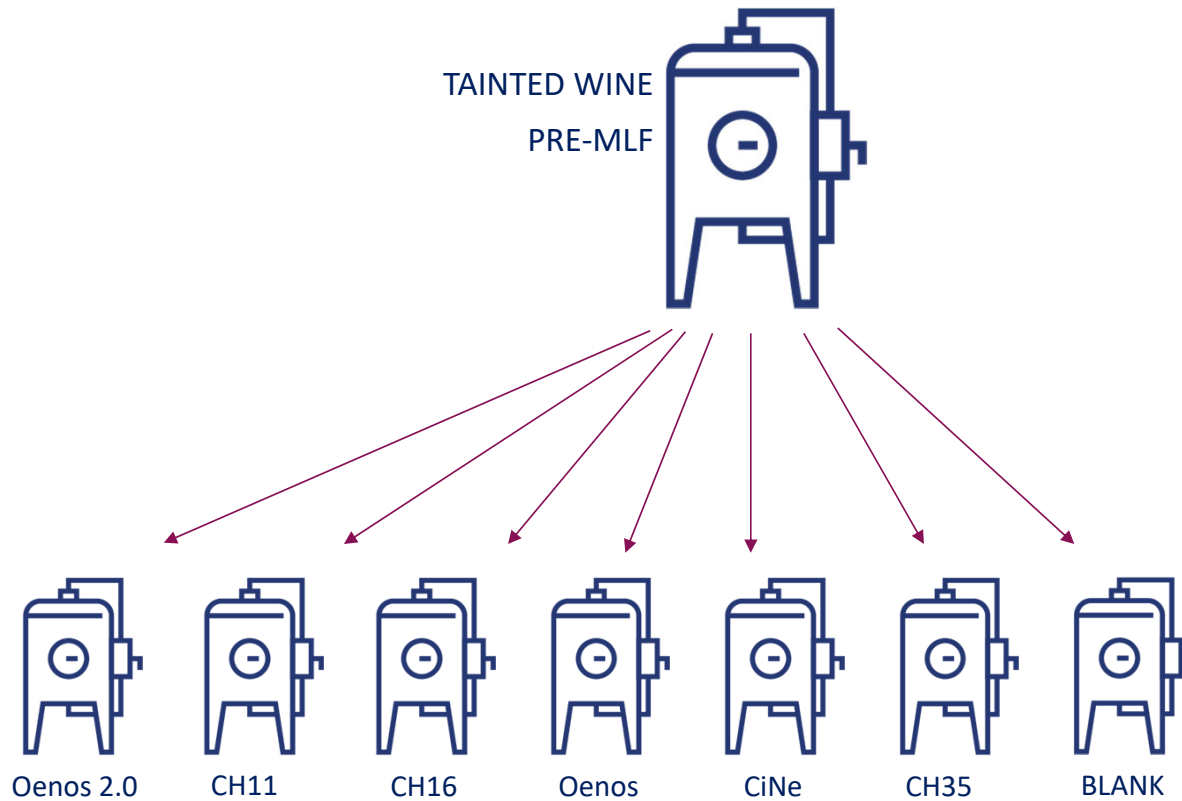
- › Minimal scientific data exists on how MLF affects smoke-tainted wine
- › Kelly et al found Viniflora CH16 did not release free taint compounds from bound glycosides in their work<sup>1</sup>
- › Some anecdotal recommendations are to avoid spontaneous MLF and strains with a high degree of glycosidic activity<sup>2</sup>

***Chr. Hansen therefore set out to determine which of their MLF cultures is most suited for running MLF in tainted wine***

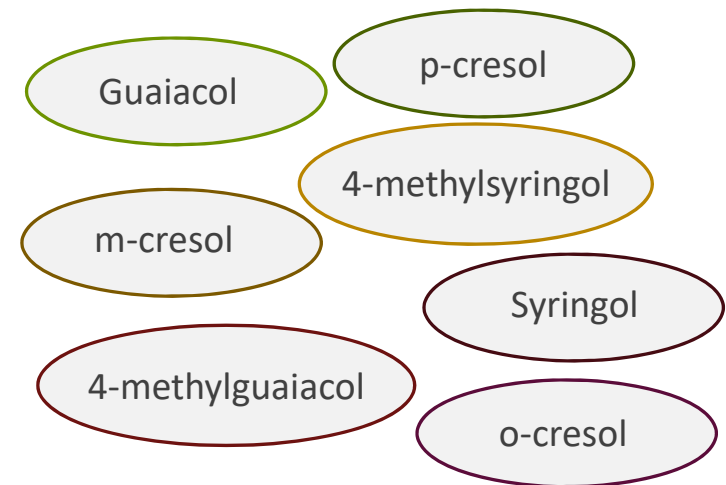
<sup>1</sup>Kelly et al (2014), Winemaking practice affects the extraction of smoke-borne phenols from grapes into wines. Aus. Journal of Grape and Wine Res. 20, 386–393

<sup>2</sup><http://vinpro.co.za/wp-content/uploads/2016/01/Guidelines.compressed.pdf>

# EXPERIMENTAL DESIGN



- › Tainted wine pre-MLF was put through MLF with six different MLF cultures
- › 250ml ferments, run in duplicate
- › Free and conjugated concentrations of seven taint compound was measured before and after MLF (using GC-MS):

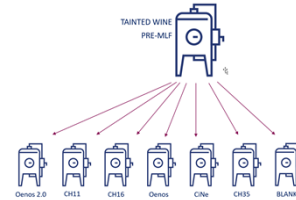


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# WINES SUPPLIED FOR STUDY

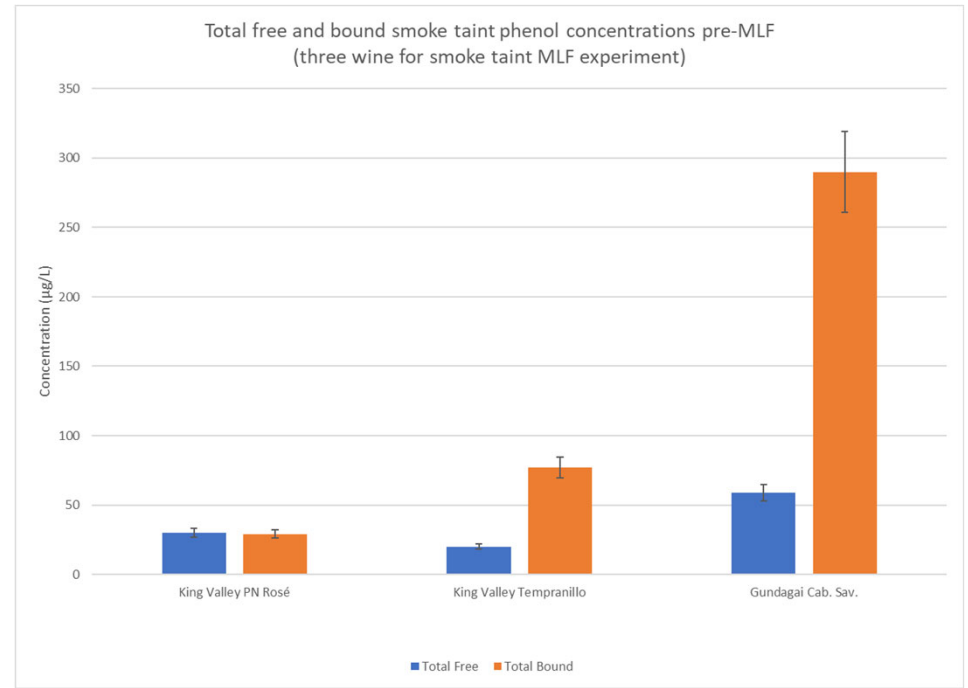
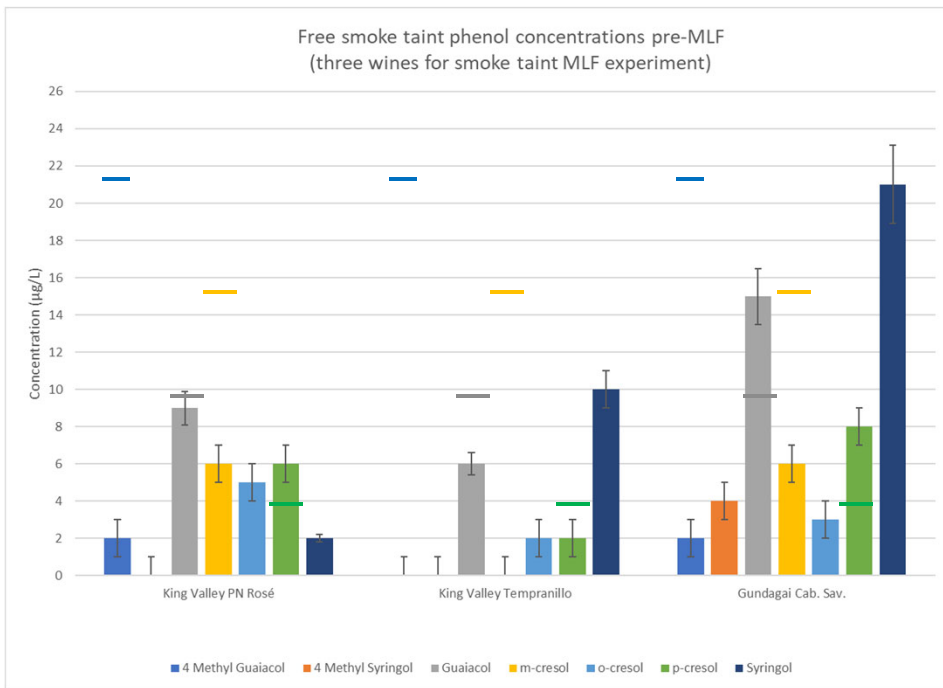
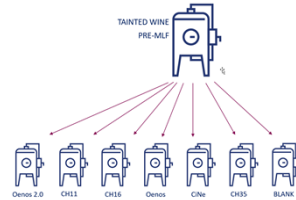
*All three wines affected by some degree of smoke taint*



	WINE #1	WINE #2	WINE #3
Description	<p><b>King Valley Pinot Noir Rosé</b></p> <ul style="list-style-type: none"> <li>› pH 3.49</li> <li>› 5.29g/L L-malic acid</li> </ul>	<p><b>King Valley Tempranillo</b></p> <ul style="list-style-type: none"> <li>› pH 3.32</li> <li>› 1.95g/L L-malic acid</li> </ul>	<p><b>Gundagai Cabernet Sauvignon</b></p> <ul style="list-style-type: none"> <li>› pH 3.37</li> <li>› 1.03g/L L-malic acid (before correction).</li> </ul>
Treatments before MLB inoculation	<ul style="list-style-type: none"> <li>+ 10ppm SO<sub>2</sub></li> <li>+ 120ppm Bactiv-Aid</li> </ul>	<p>Treated at 86°F / 72hrs to eliminate background flora</p> <ul style="list-style-type: none"> <li>+ 10ppm SO<sub>2</sub></li> <li>+ 120ppm Bactiv-Aid</li> </ul>	<p>Treated at 86°F / 72hrs to eliminate background flora</p> <ul style="list-style-type: none"> <li>+ 1g/L L-malic acid</li> <li>+ 10ppm SO<sub>2</sub></li> <li>+ 120ppm Bactiv-Aid</li> </ul>

# DEGREE OF TAIN IN TRIAL WINES

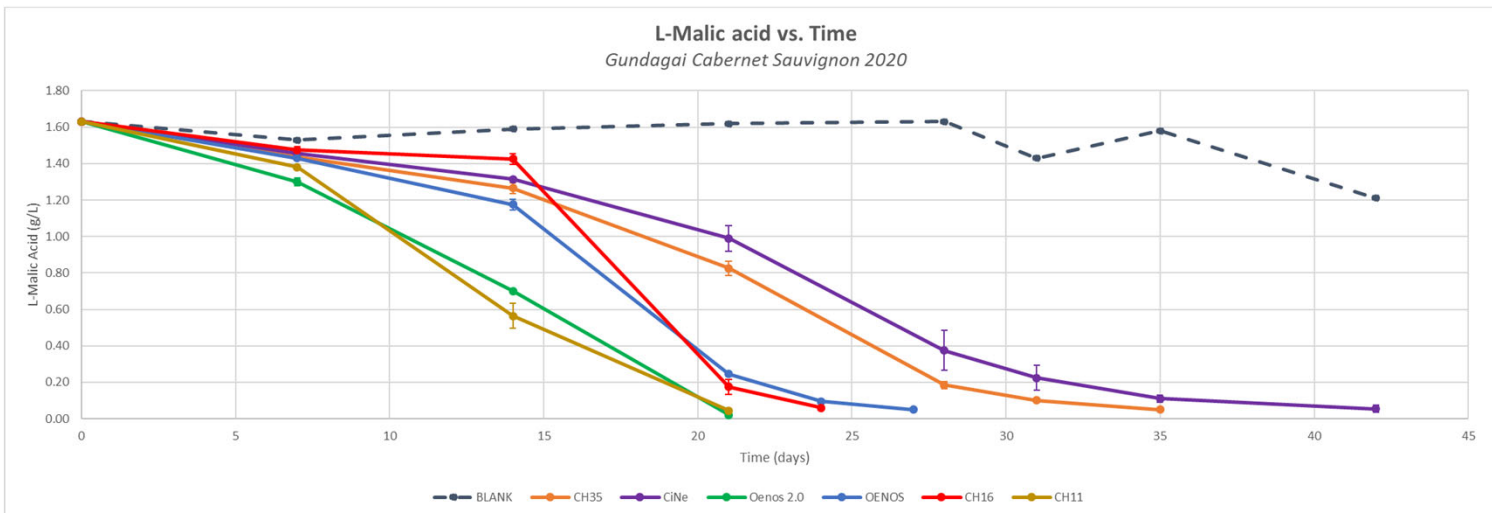
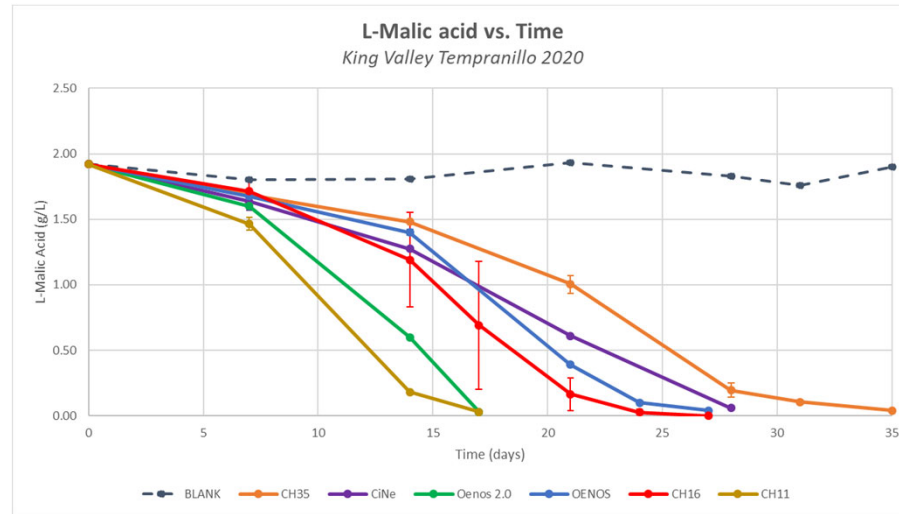
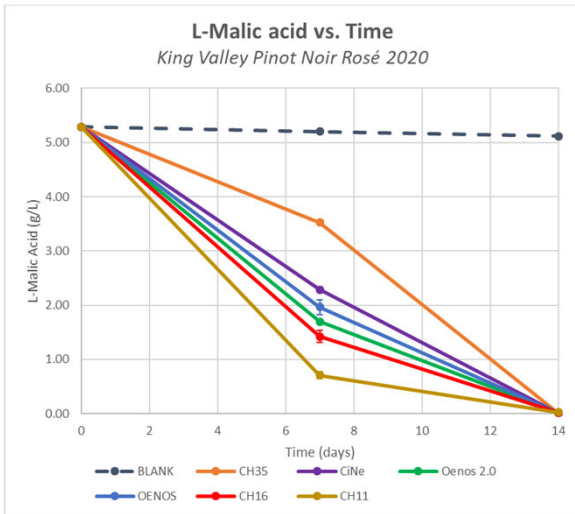
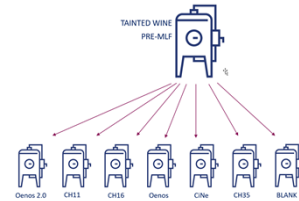
*Free taint phenolic concentrations and total taint levels pre-MLF*



— — — — — Aroma thresholds in water<sup>1</sup>

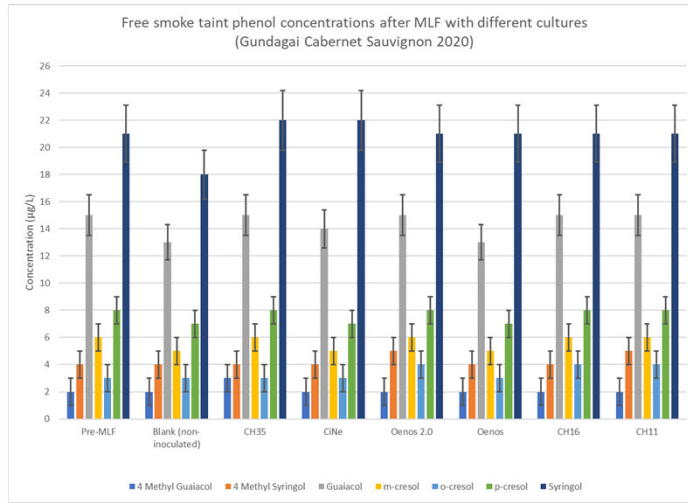
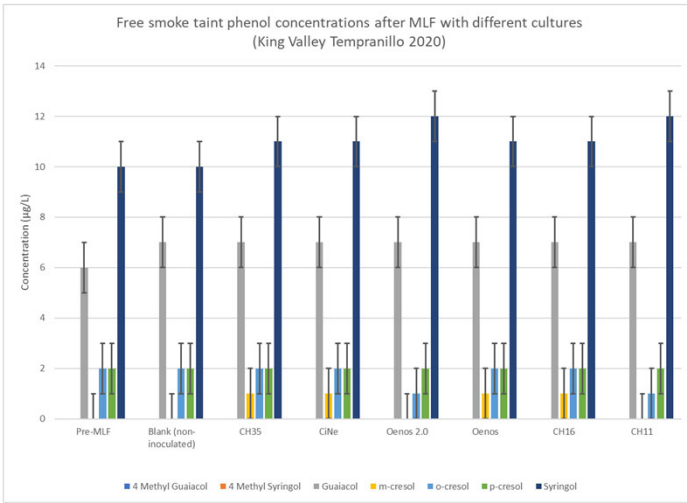
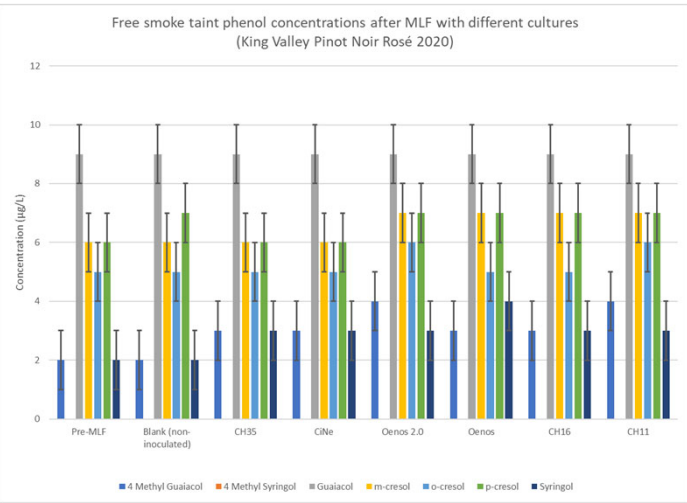
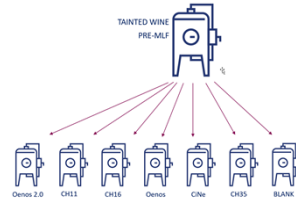
<sup>1</sup><https://www.awri.com.au/wp-content/uploads/2020/02/Sensory-impact-of-smoke-exposure.pdf>

# PROGRESSION OF MLF



- › MLF completed efficiently in all wines
- › 2-6 wks to <0.07g/L MA (depending on strain and wine)
- › Same relative speed for each strain across wines

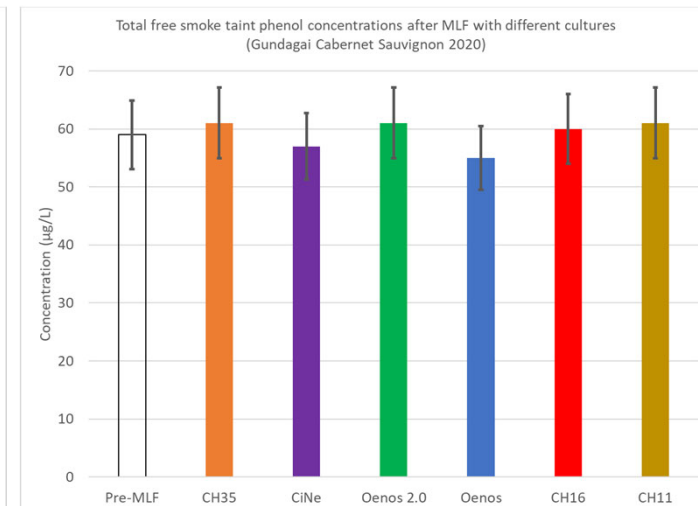
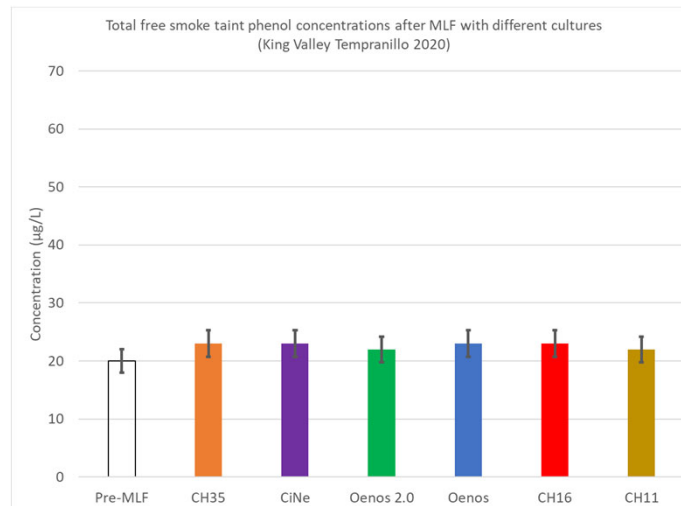
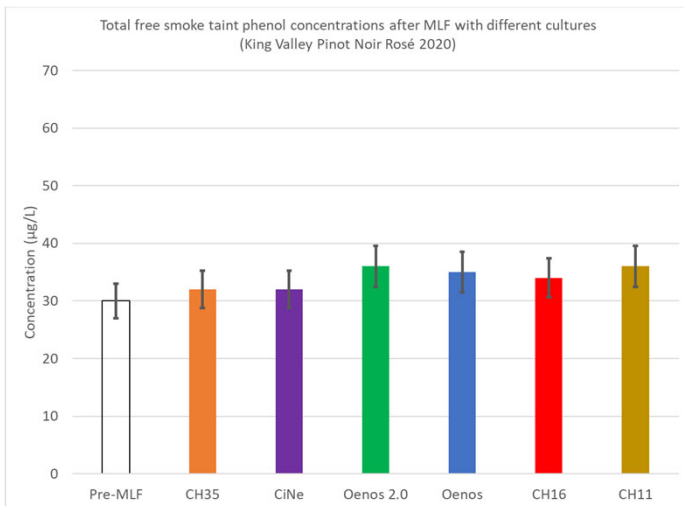
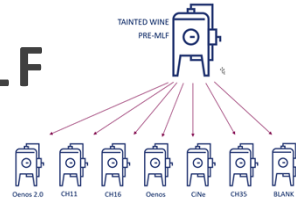
# RESULTS: FREE TAINT PHENOLS PRE & POST MLF



- › Minimal variation across same wine for different treatment
- › Difficult to draw any conclusion when looking at individual phenols



# RESULTS: TOTAL FREE TAINT PHENOLS PRE & POST MLF



- › Plotting the sum of free phenols concentrations for each treatment gives a clearer picture
- › No significant increase in free phenols from MLF from any of the six cultures



## CONCLUSIONS

- › No increase in any of the seven free taint phenols seen in any of the wines put through MLF, with any of the six cultures
- › This supports the work of Kelly et al, which only studied CH16
- › Any of the six cultures can be used on affected wines in the confidence they will not increase free taint concentrations

***We set out to determine which MLF cultures is most suited for running MLF in tainted wine, and found any of the six Viniflora® Oenococcus oeni cultures are compatible***

Kelly et al (2014), Winemaking practice affects the extraction of smoke-borne phenols from grapes into wines. Aus. Journal of Grape and Wine Res. 20, 386–393

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## ACKNOWLEDGEMENTS

- › Lorenzo Peyer for the collaboration on the trial design
- › The wineries who supplied the wines to be studied, and E.E. Muir & Sons for facilitating





# Disclaimer

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