



Cross Industry Oxygen Management Forum

Oxygen is not always bad in winemaking

Martin Day

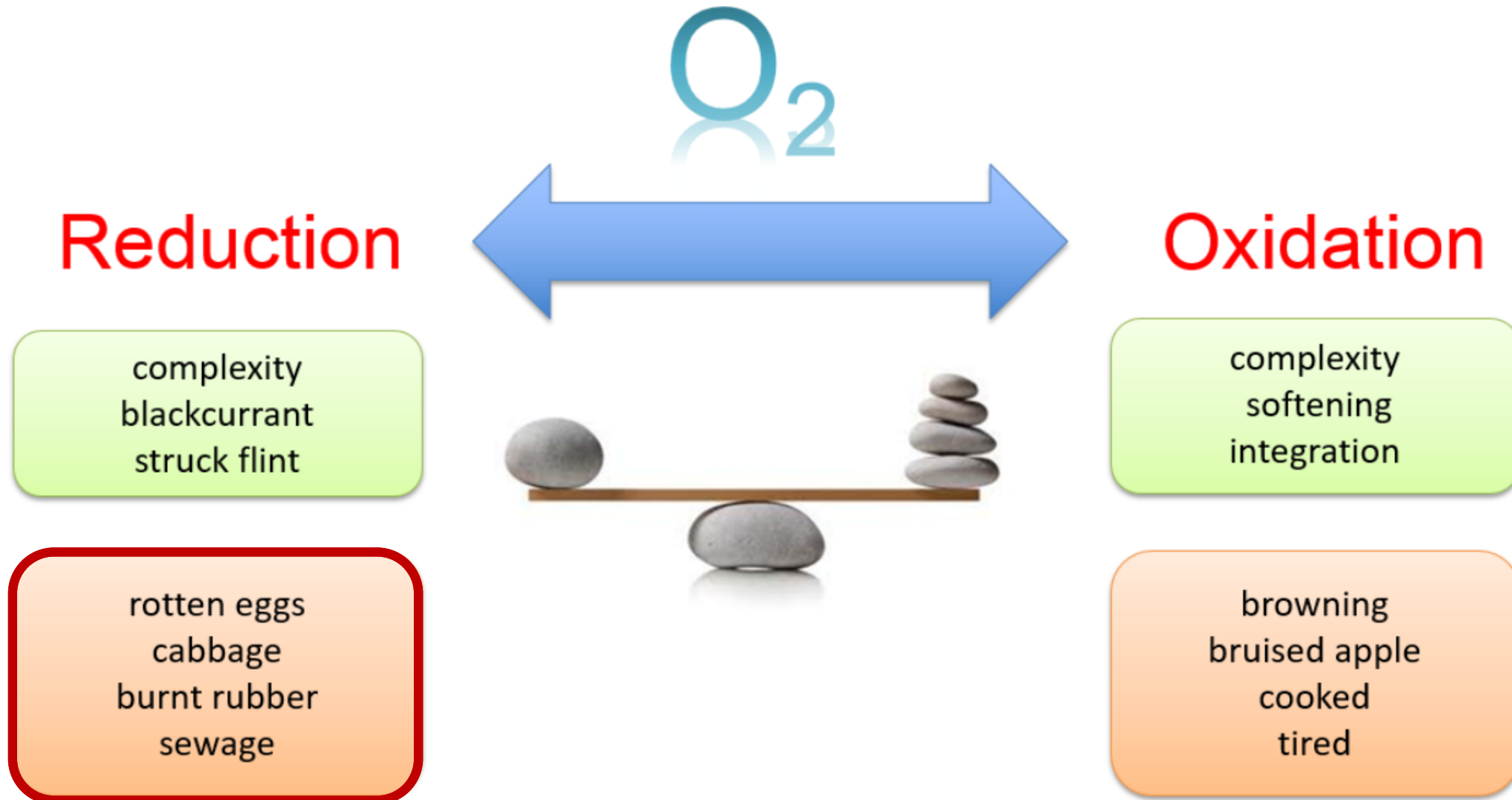
2018 WEA South Australian Conference Program
26th July 2018



Oxygen Balance – perceived effect of closure OTR



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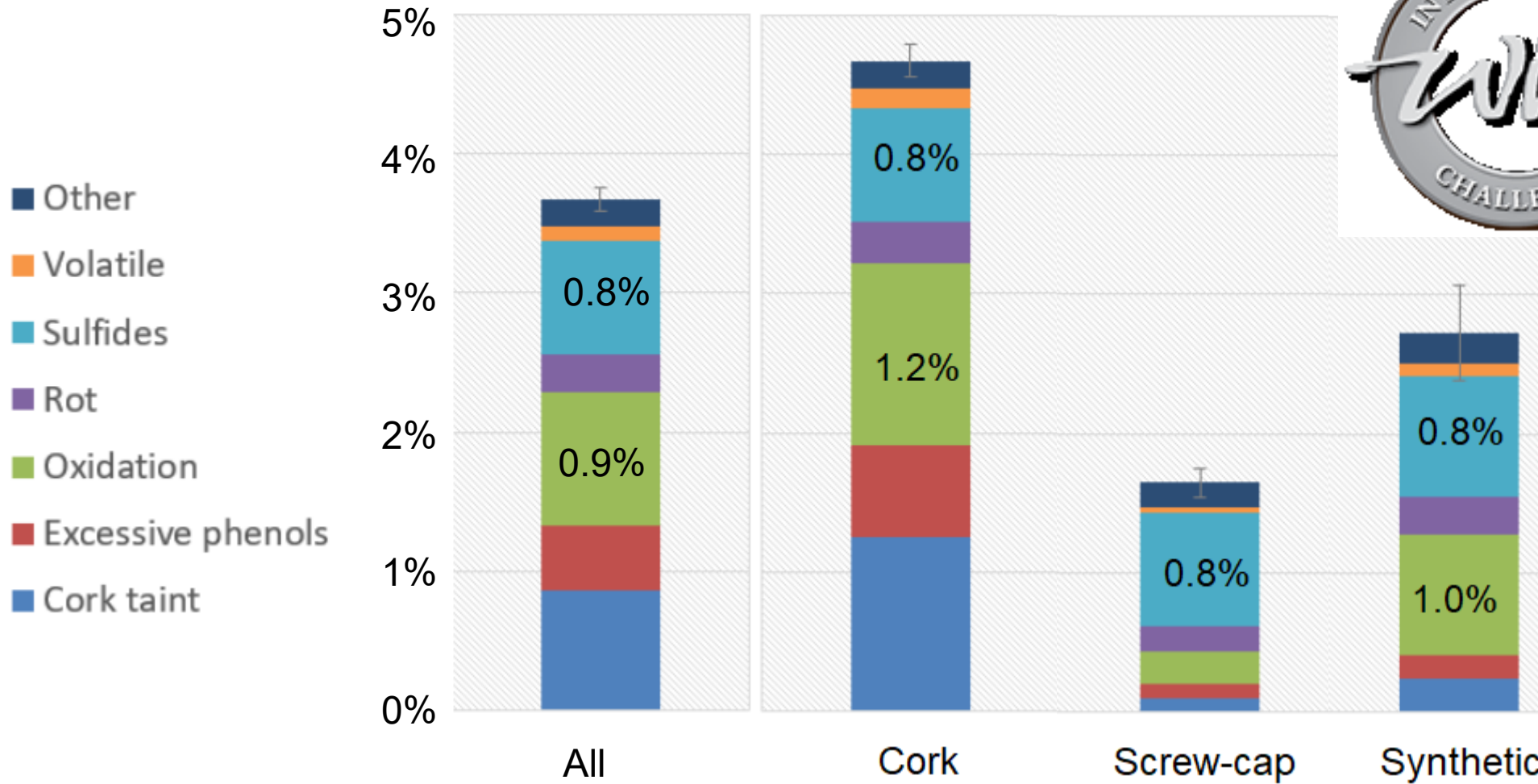


Fault rates in International Wines



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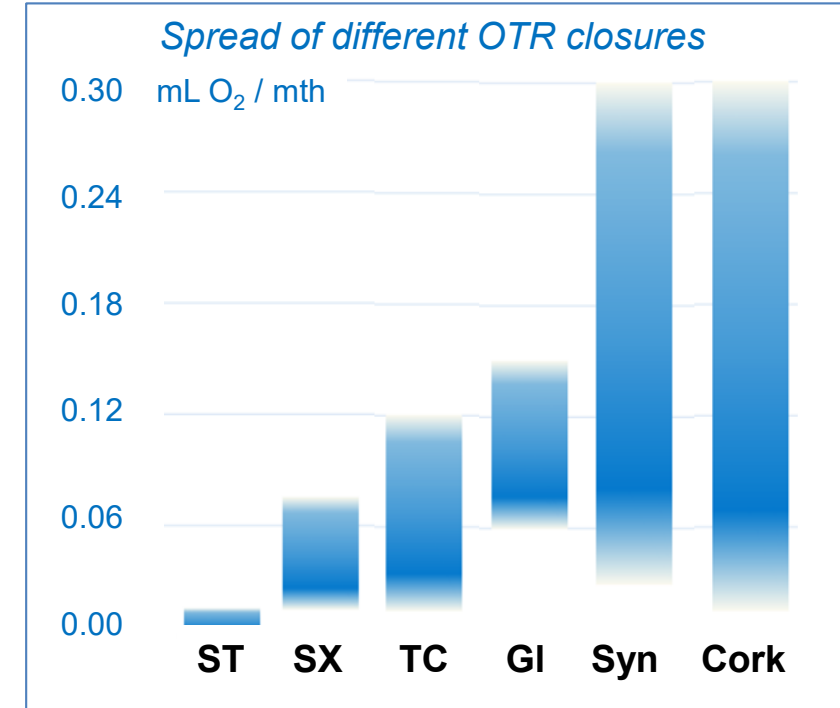
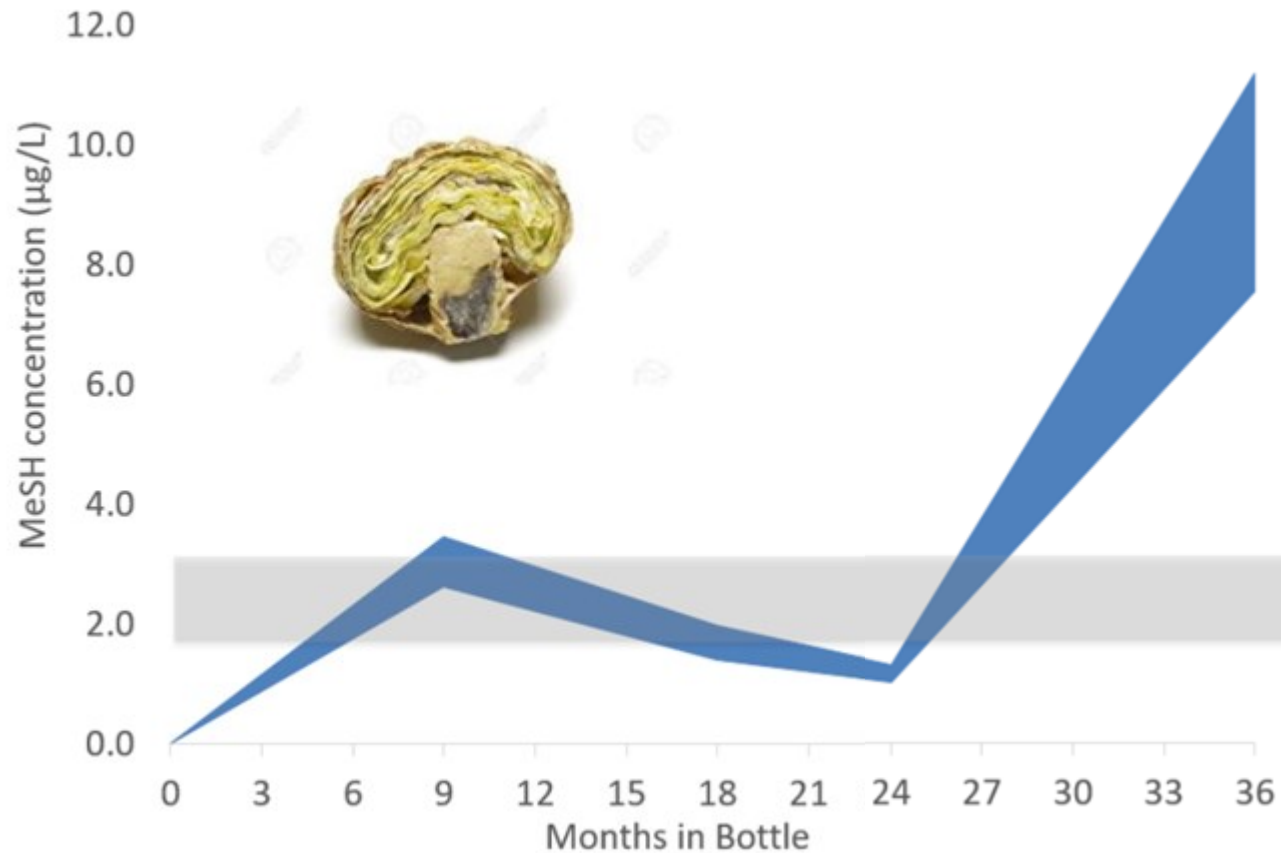
100,000 entries over 10 ye



Evolution of methanethiol during bottle ageing



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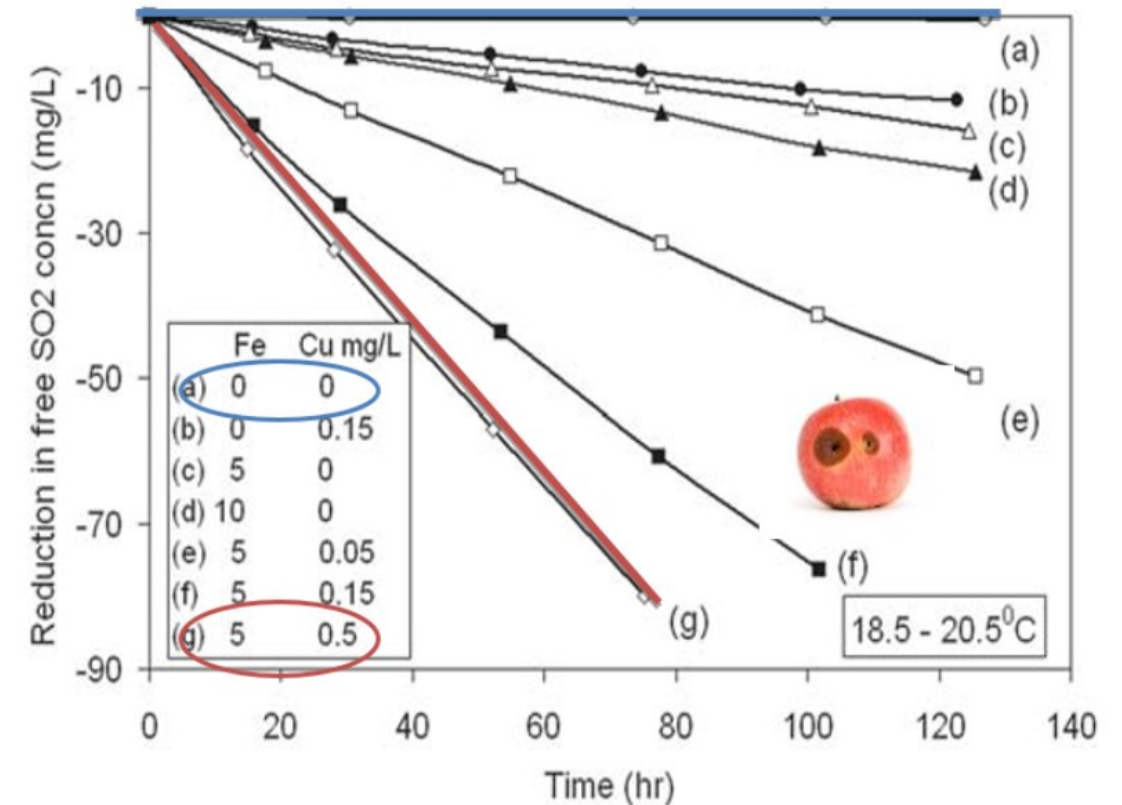
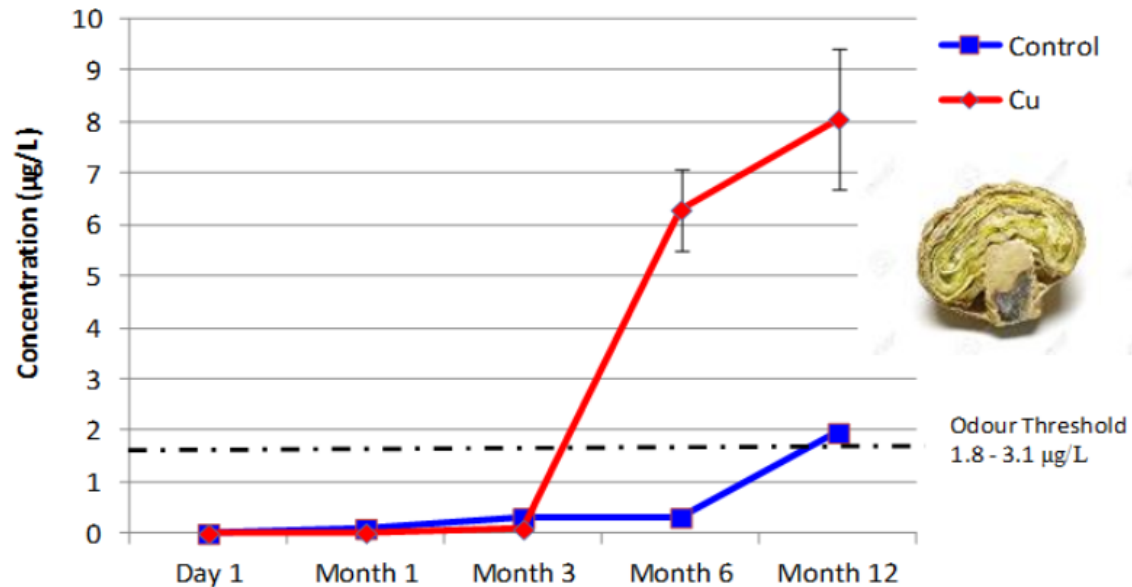
Mean increase in MeSH

Evolution of methanethiol during bottle ageing



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Shiraz - MeSH



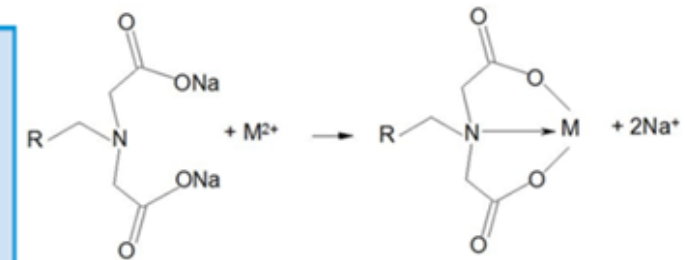
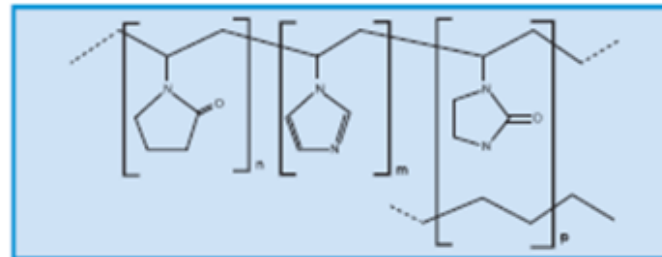
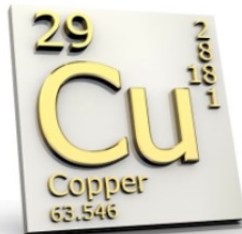
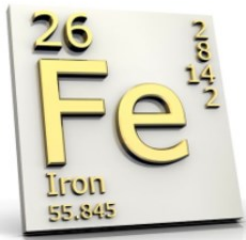
Danilewicz, J. (2007). Interaction of sulfur dioxide, polyphenols, and oxygen in a wine-model system: Central role of iron and copper. *Am. J. Enol. Vitic* vol. 58(1).

Cross-linked polymers



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Attribute	CLP1	CLP2
Type	Cation exchange	Chelating agent
Particle size (mean)	80-100 μm	300-600 μm
Functional group	N-vinyl-imidazole	Iminodiacetic acid (Na^+)
Matrix	N-vinylpyrrolidinone	Polystyrene
Operating pH range	3 - 5	1.5 - 9



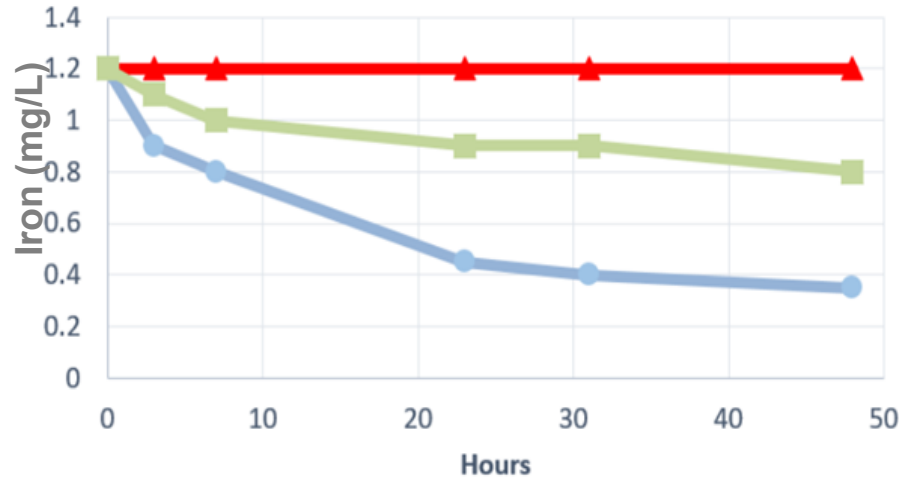
Copper & iron scavenging

CLP1 = N-vinyl imidazole
CLP2 = Iminodiacetic acid (Na⁺)

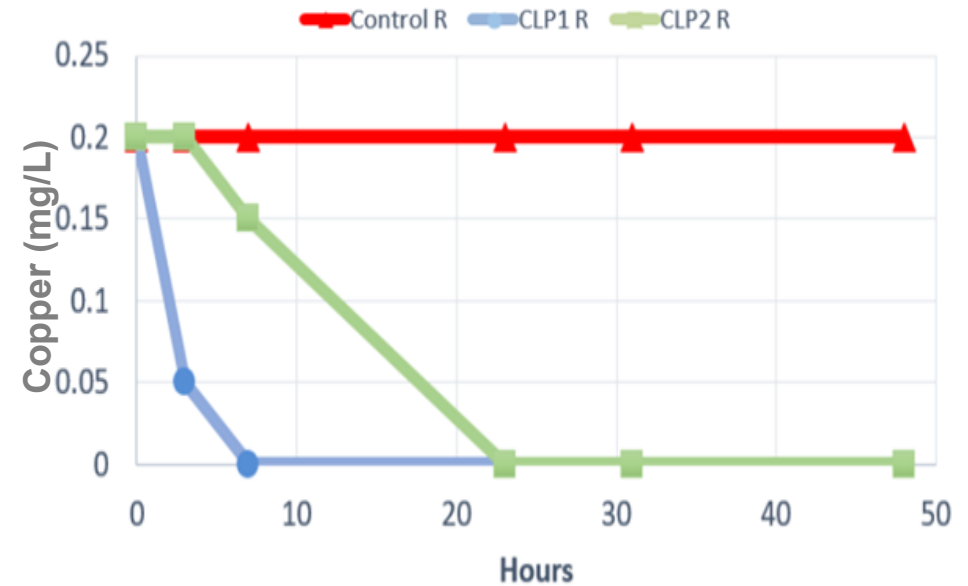
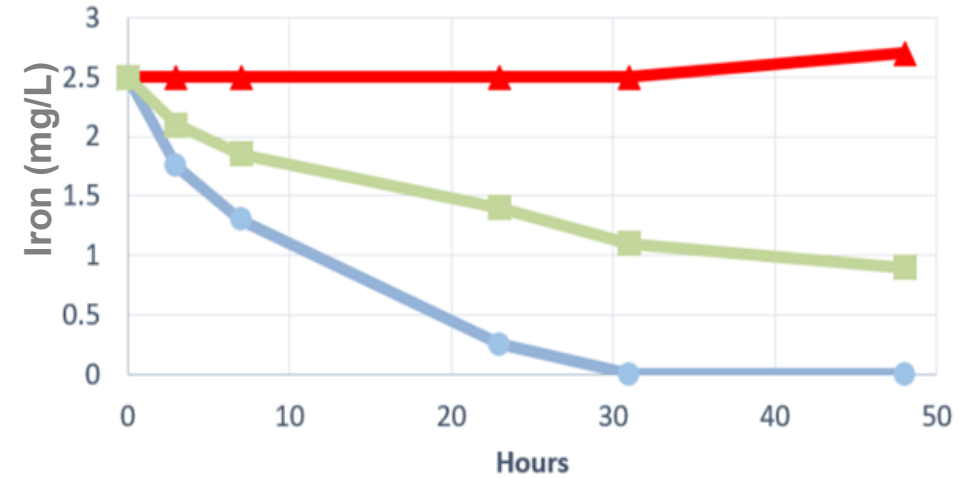


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White wine



Red wine

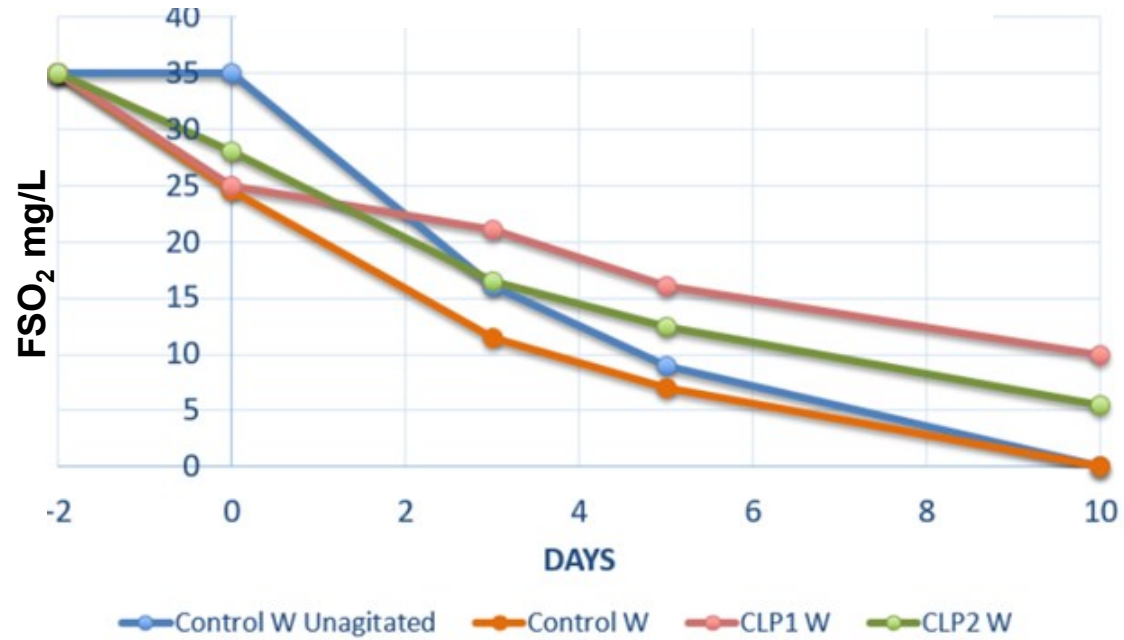


Free SO₂ depletion

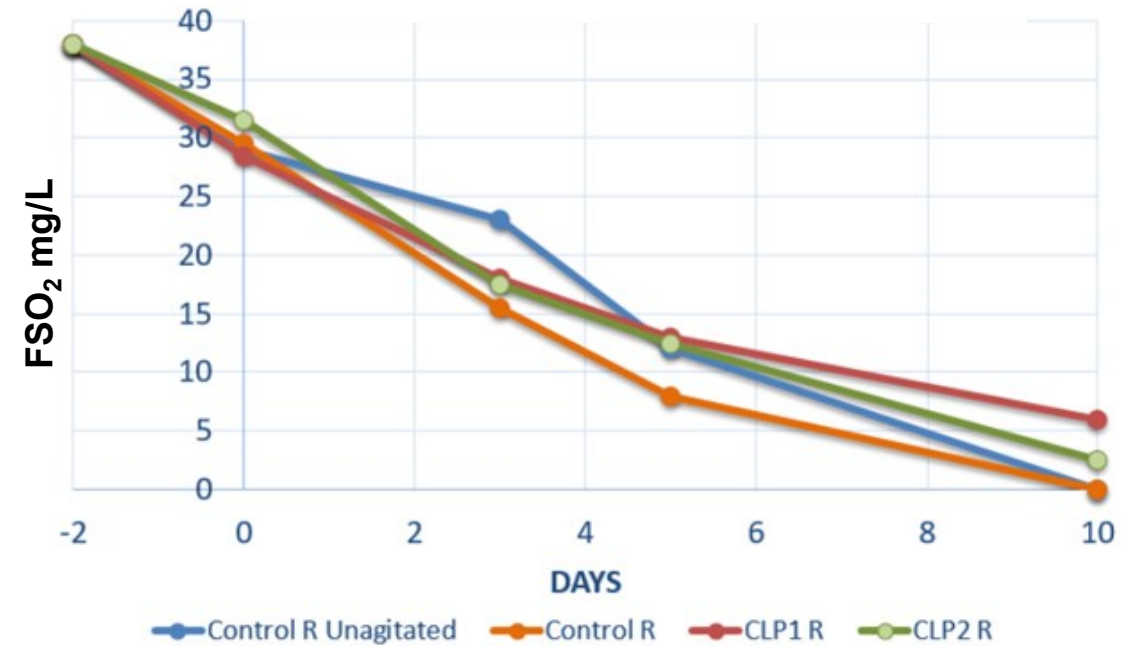


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White wine



Red wine



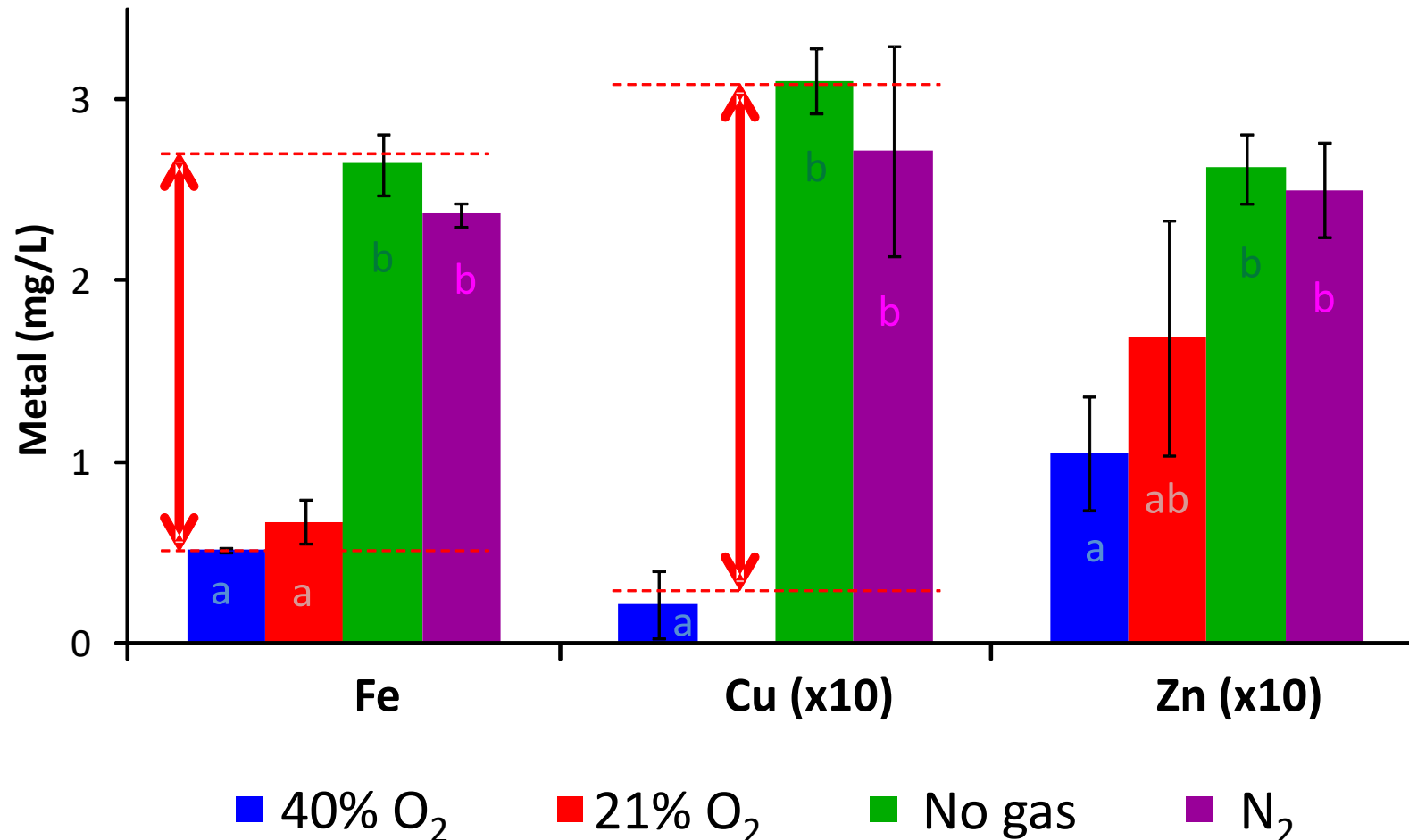
Metal concentrations after red ferment aeration



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8 x 10 L/min for 60 mins / 540 kg Shiraz; 2 months after bottling

Mean of 3 fermenters; error bars \pm SE

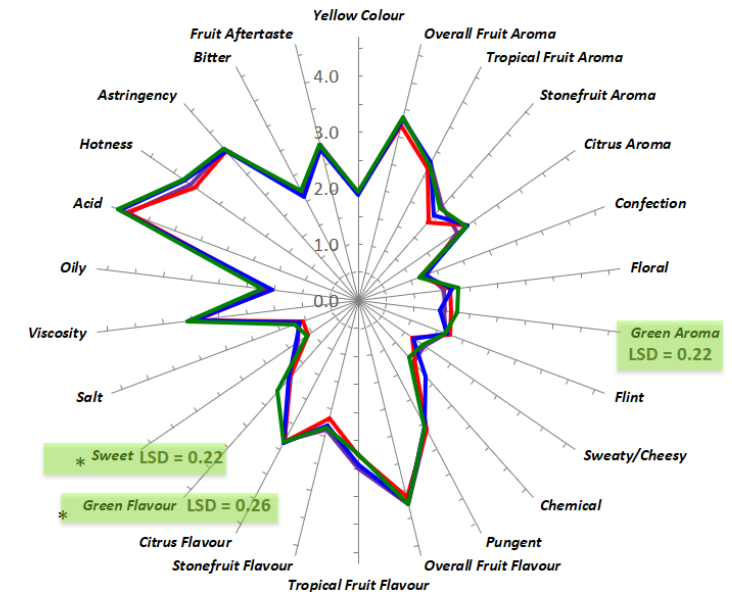
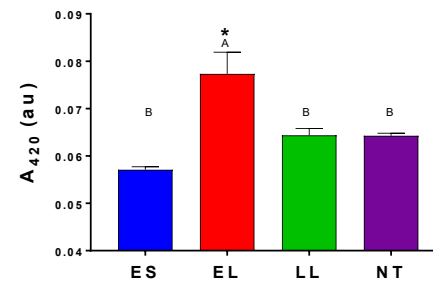
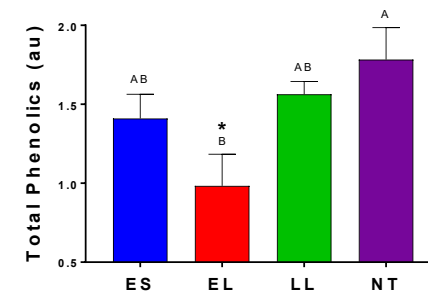
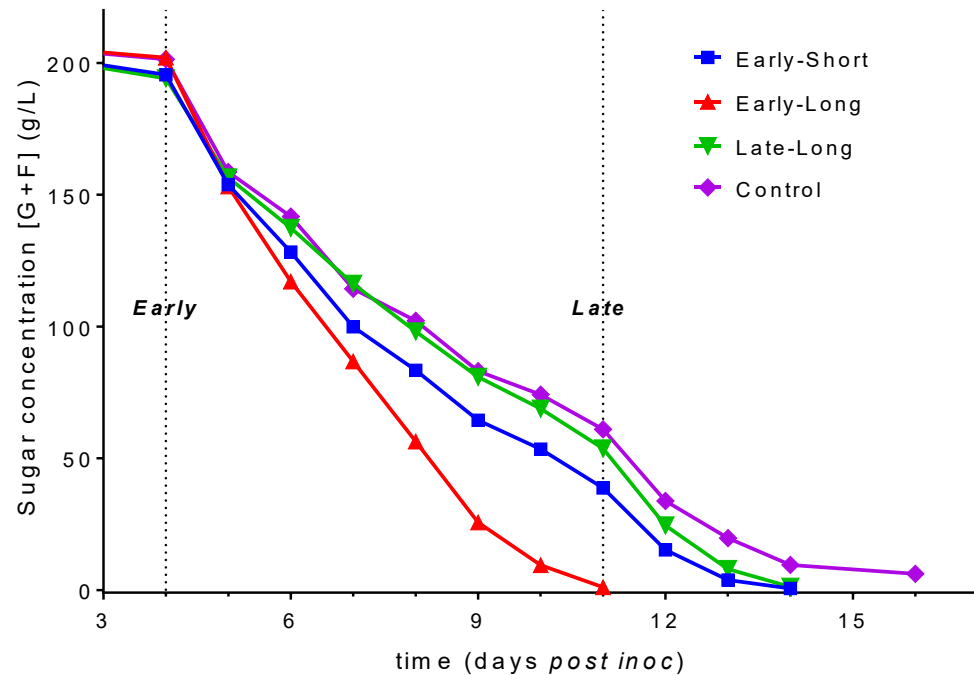


Timing or dose-related **efficiency** effects of oxygen use in whites during ferment



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Barossa CHA, 2015



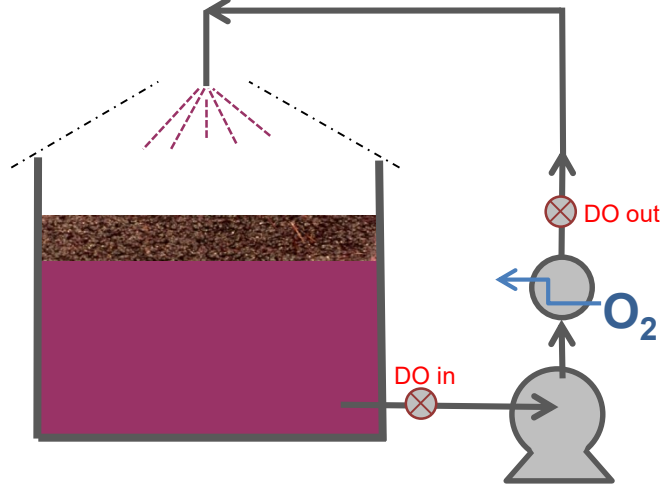
* indicates significant difference compared to 'No treatment' using Dunnett t (P = 0.05) *post-hoc* test

Further red wine trials V16

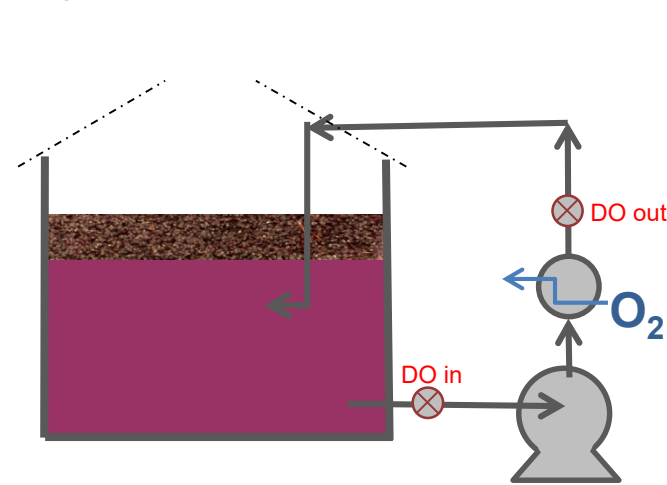


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Stage 1: Cap irrigation (3 mins)



Stage 2: sub-cap recirculation to set DO



Treatments:

- 'Daily' x4
- When TSS dropped by 20% ('Early')
- When TSS dropped by 80% ('Late')
- No sub-cap air addition ('No Trtmt')
- Post-press on 'No Trtmt'

Descriptive Sensory Analysis



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Chemical differences --

decrease with 'Daily':

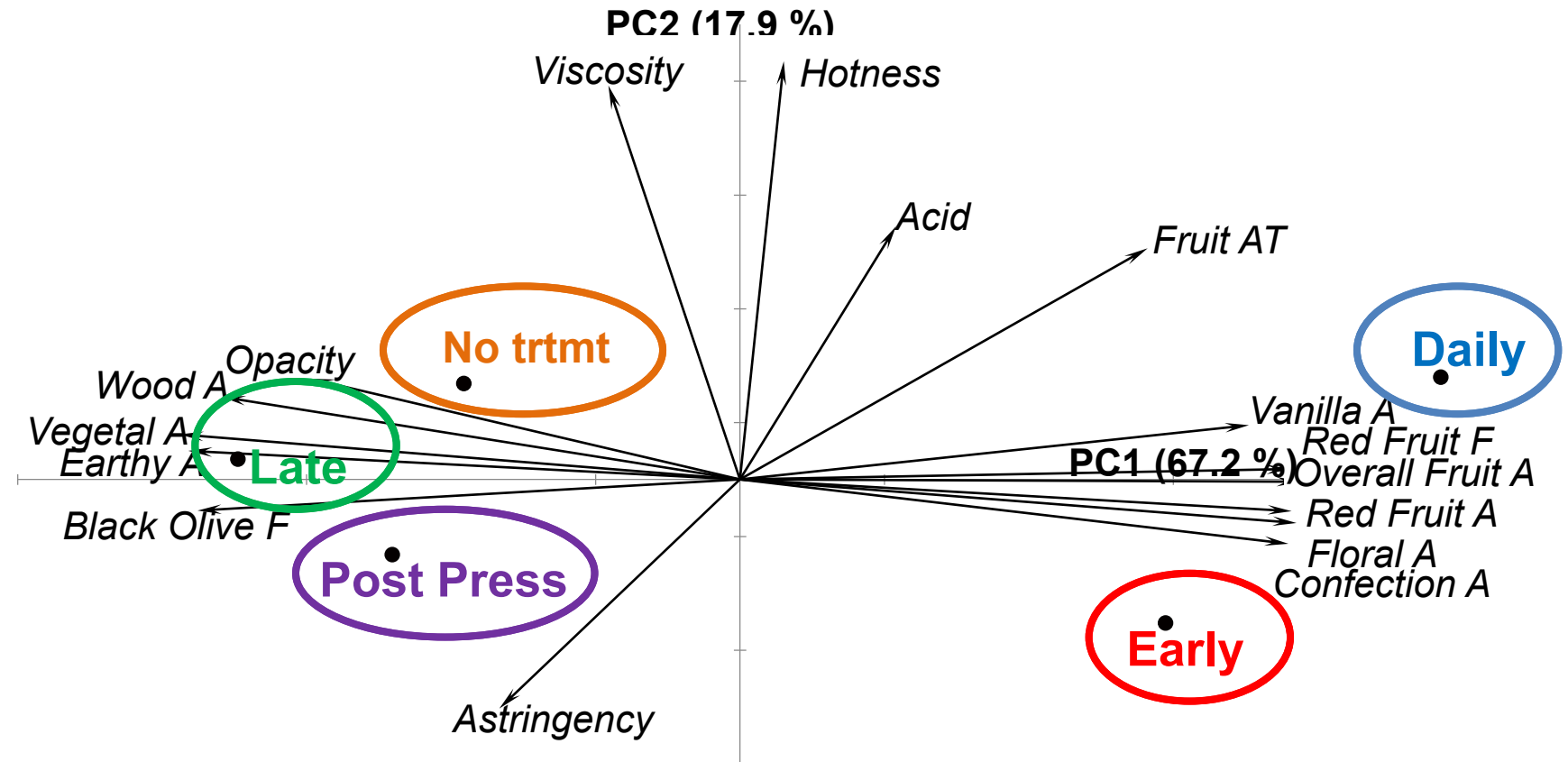
- Total phenolics
- Mean degree of polymerisation
- Total free anthocyanins
- Wine colour density

decrease with 'Early' & 'Daily'

- Hydrogen sulphide

disappearance with 'Daily'

- Methyl thioacetate



Measuring dO_2 using LDO

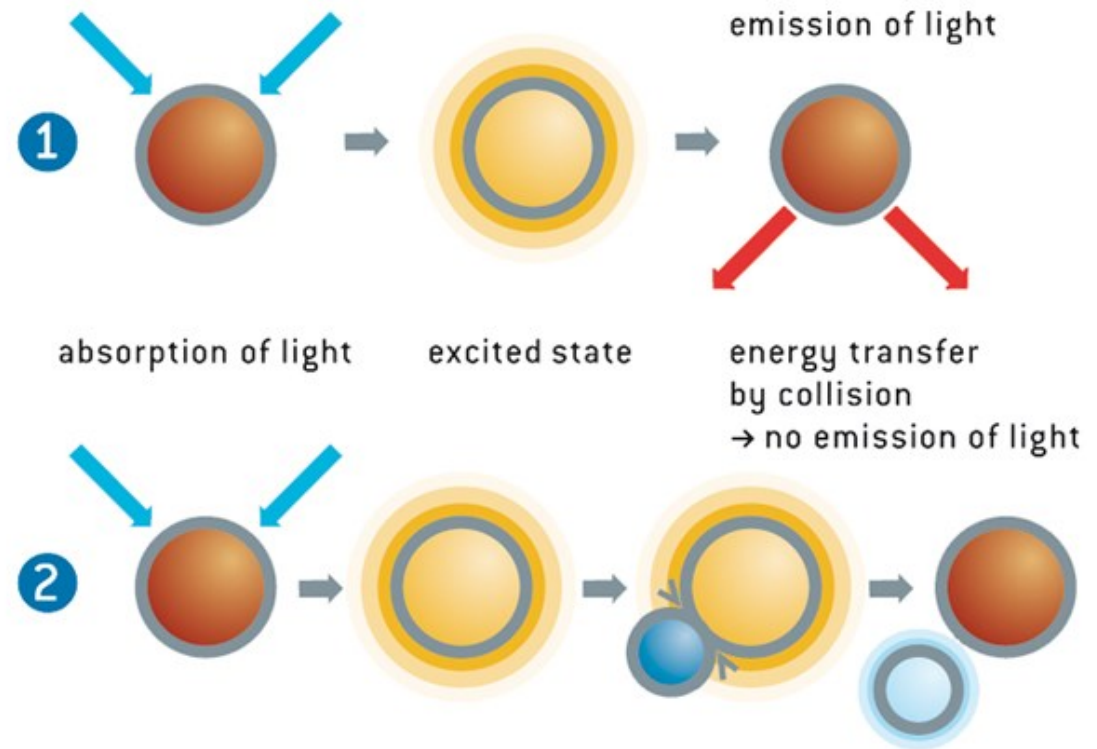


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Hand-held meters:
tank drop-in

SCADA/
Process-integrated

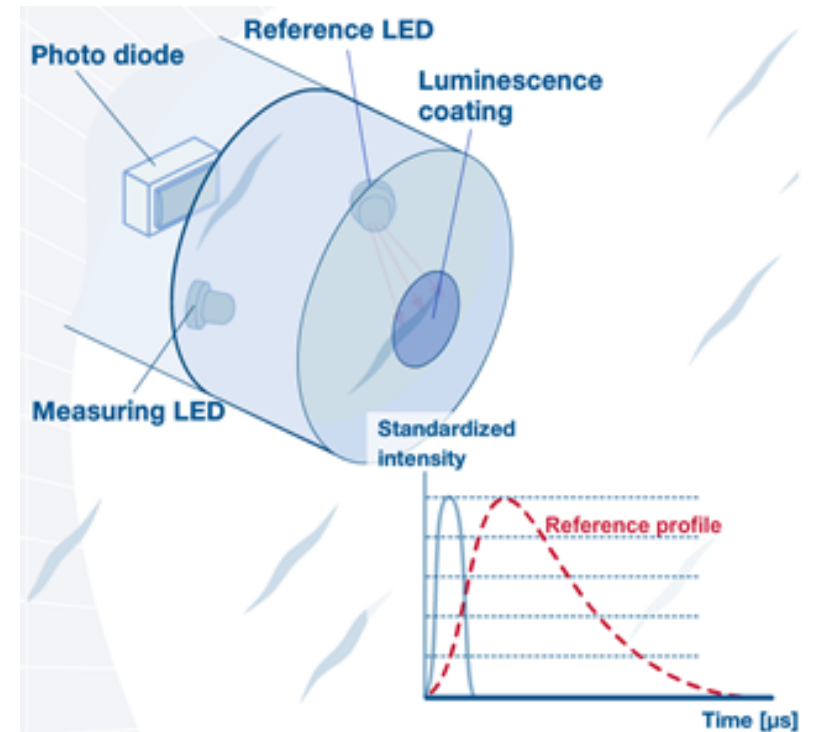
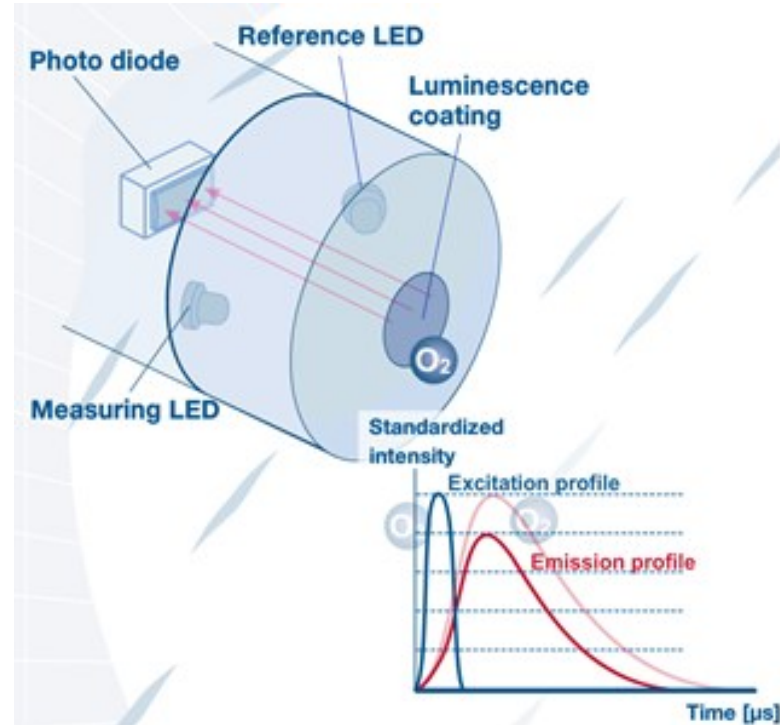
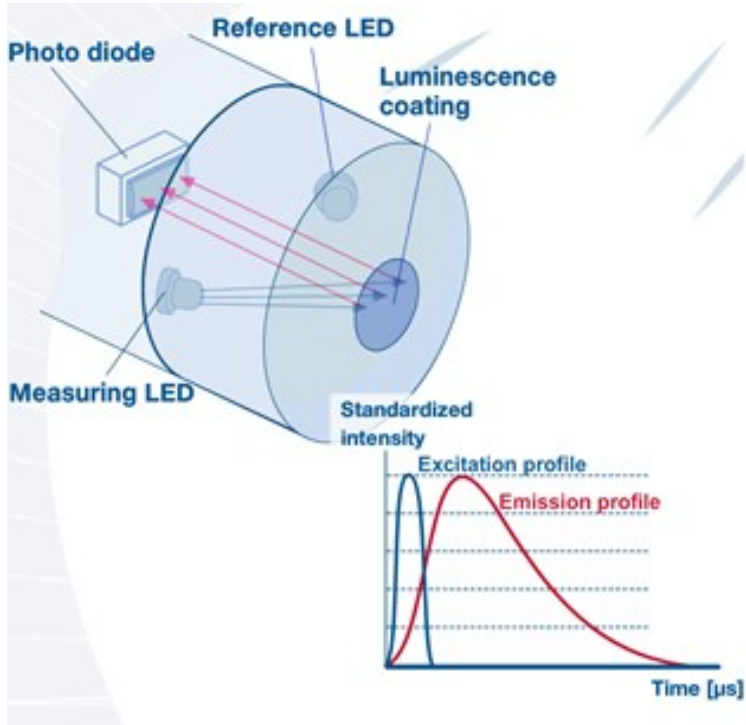


www.presens.de/fileadmin/user_upload/basics/web_O2_Measurement_Principle.jpg

Measuring dO₂ using LDO



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Acknowledgements



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Neil Scrimgeour & AWRI Commercial Services Project Team



YALUMBA
FAMILY VIGNERONS c. 1849

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