

# Crush symposium – 14 Nov 2017



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## Trends in Australian Winemaking Practice



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# AWRI Vineyard & Winery Practices Survey 2016



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## Purpose

- Track trends in wine industry practices

## Status

- Aggregated and plotted data
- Visited ~50 producers and suppliers to discuss data and understand context
- Working on refined plots for a report that will be distributed in 2018
- Presenting preliminary data today on just a couple of winery topics



Vineyard Practices



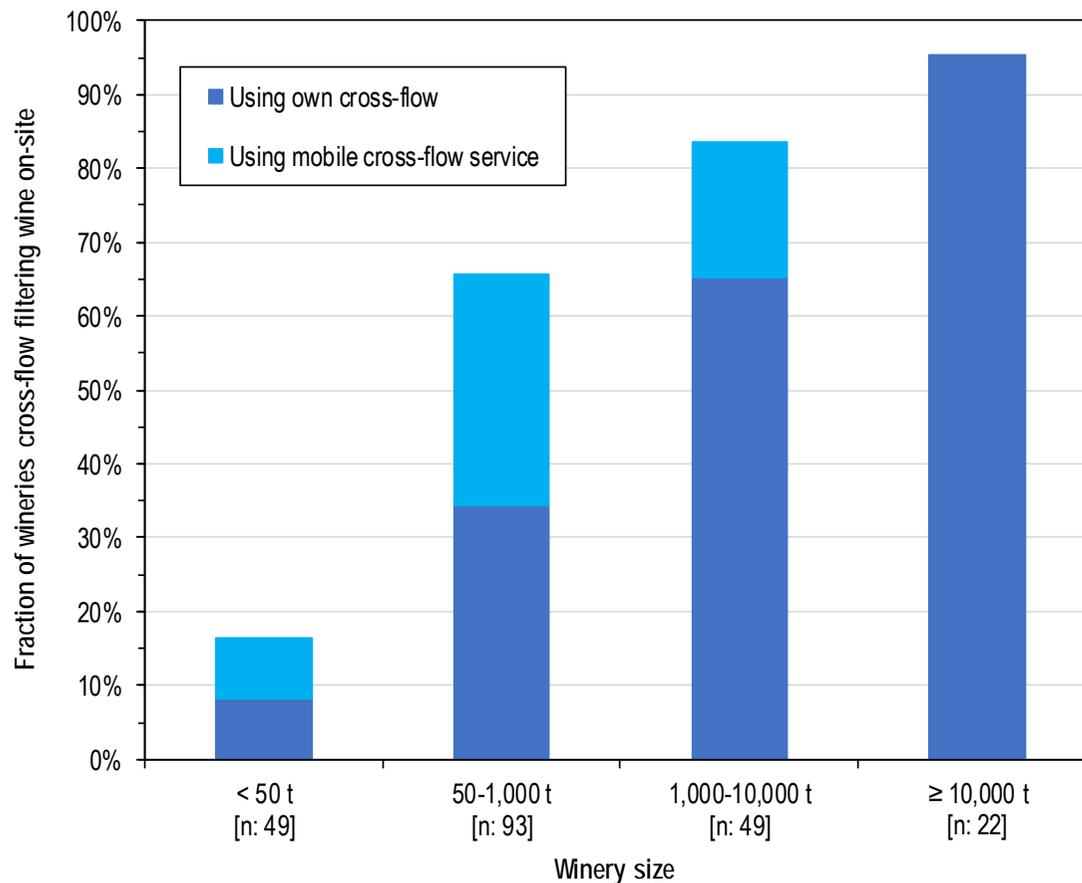
Winery Practices

464 responses	227 responses
26,000 ha	1.3 million t
(19% ha, 9% n)	(74% t, 47% n)

# Cross-flow filtration – most important practice change



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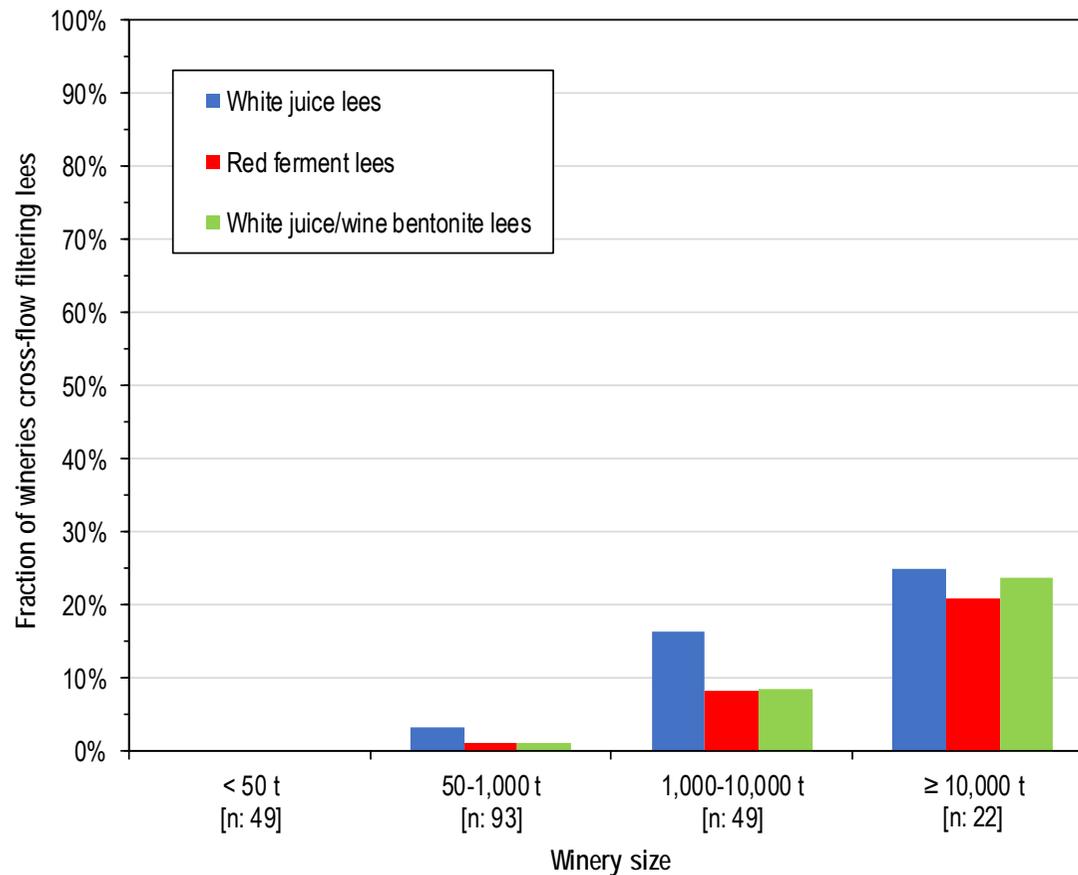
*"The biggest single advance we have made in **quality improvement** in the last 25 years"*

- Eliminates diatomaceous earth (DE) - OHS & disposal
- Reduced number of filtration stages
- **Automation:**
  - Can run for long periods unsupervised – night, etc.
- Praised by most but not everyone
  - Expensive to purchase & to replace membranes
  - Low flow rates compared to DE

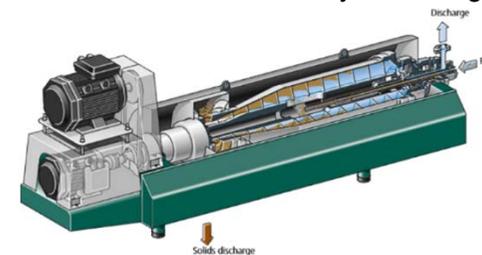
# Lees (high-solids) cross-flow filtration



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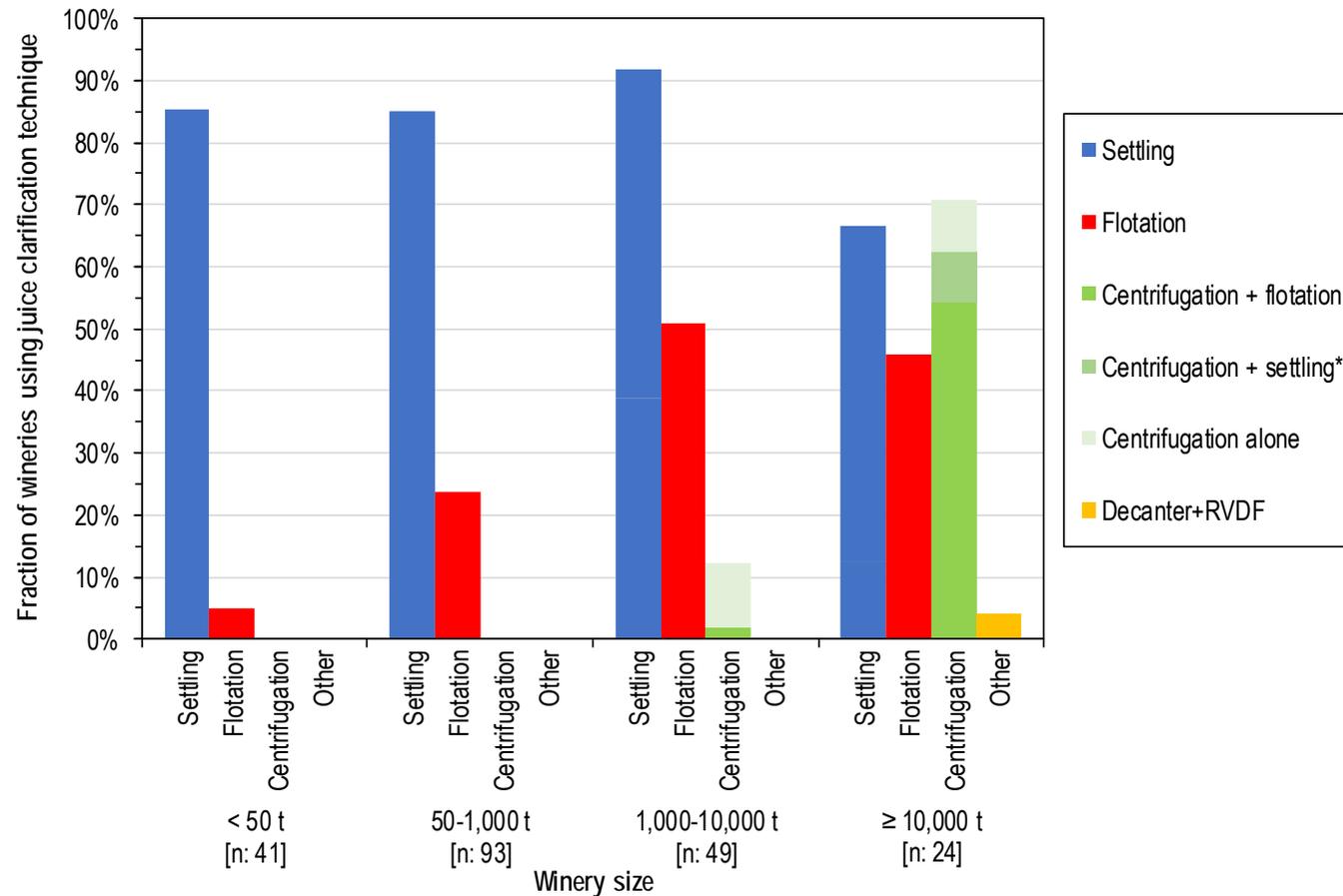
- Helps to avoid oxidation and product dilution common with rotary vacuum drum filters (RVDF)
- Issues with 1-stage lees cross-flow filtration:
  - Low flow rates
  - Ability to genuinely handle really high solids
- Many big wineries using or looking at using pre-clarification of lees by centrifugation



# White juice clarification technologies



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## Flotation:

*(2<sup>nd</sup> most important process change nominated)*

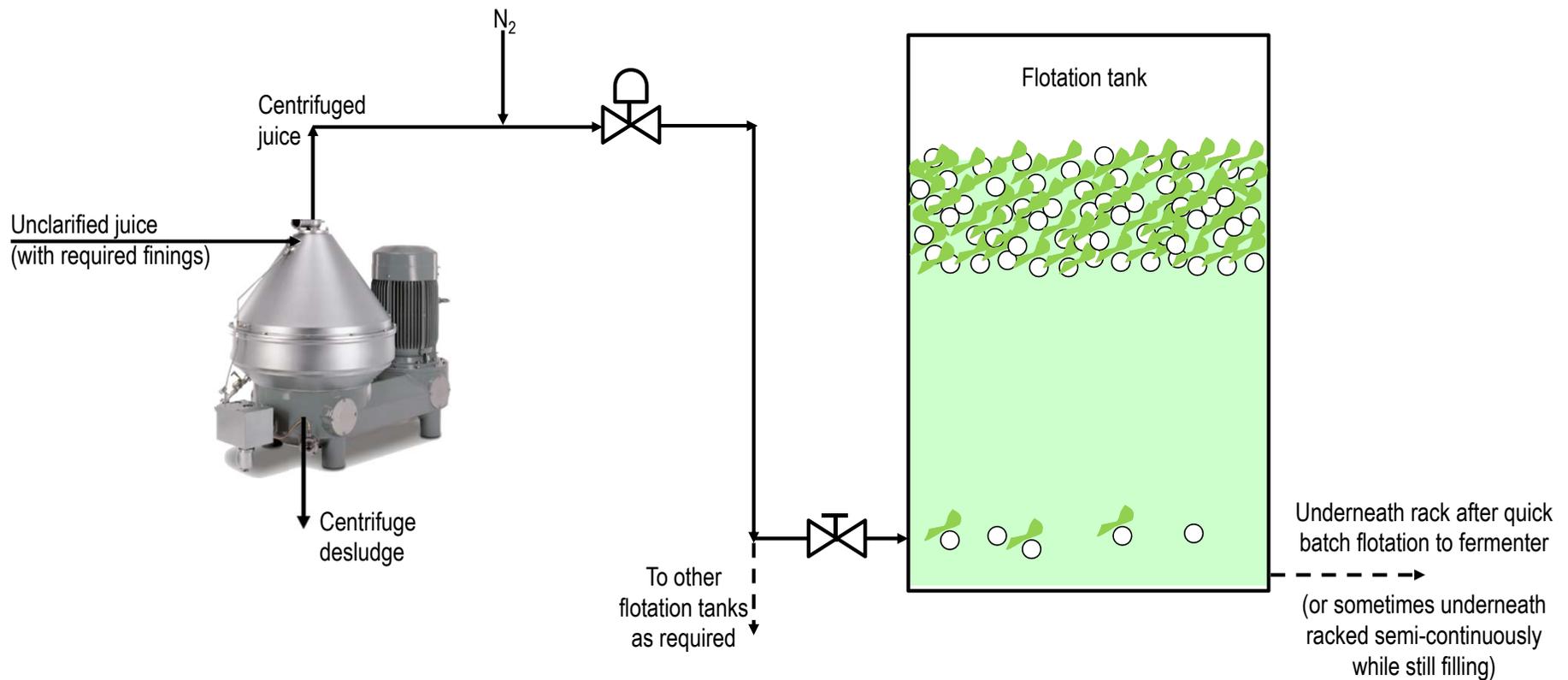
- Faster than cold settling
- Less cooling required
- Less juice in float lees than cold settled lees
- Batch systems very cheap

\*Wineries will not always use the second process – e.g. may skip flotation when clarifying juice for higher solids chardonnay ferments.

# Flotation in the wine industry – after centrifugation



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- Flotation post-centrifugation has been used in Australia since at least 1983  
(Chan 1984 describes a process similar to above but with  $N_2$  injection in the centrifuge bowl – trying to get definitive references on earliest use)

# Flotation in the wine industry – continuous systems

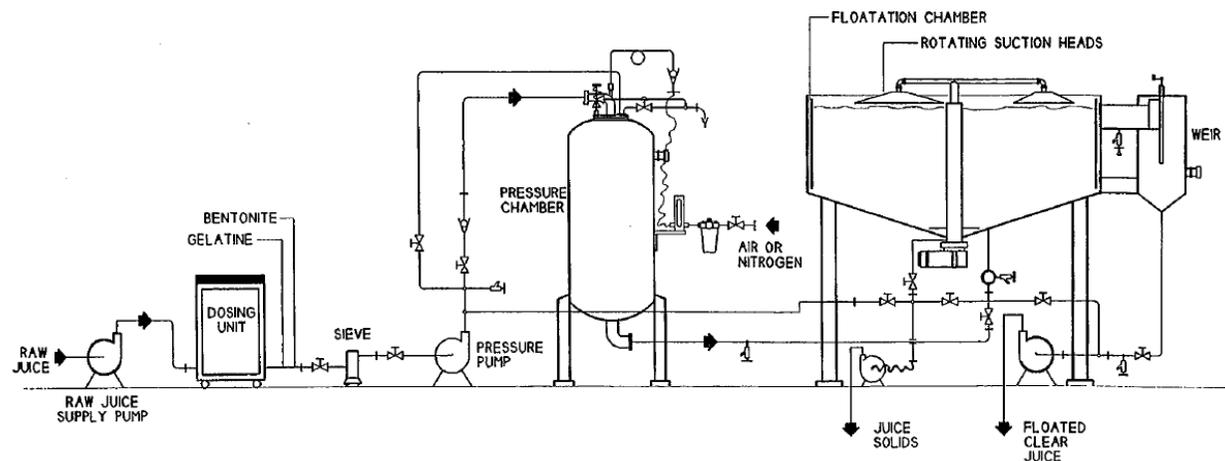


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- Early 1990s: many large scale single-stage continuous flotation plants installed around the world, including (only?) one winery in Australia
  - Often used in conjunction with hyperoxidation (appears was popular at the time in Europe)
  - Systems used in conjunction with gelatin & bentonite and sometimes silica-sol & carbon
  - Only suitable for very high throughputs and parcel sizes



Continuous separation basin with rotating suction heads to remove floats – new installation (2017)



Example schematic - Falkenberg (1996) – ASVO proceedings

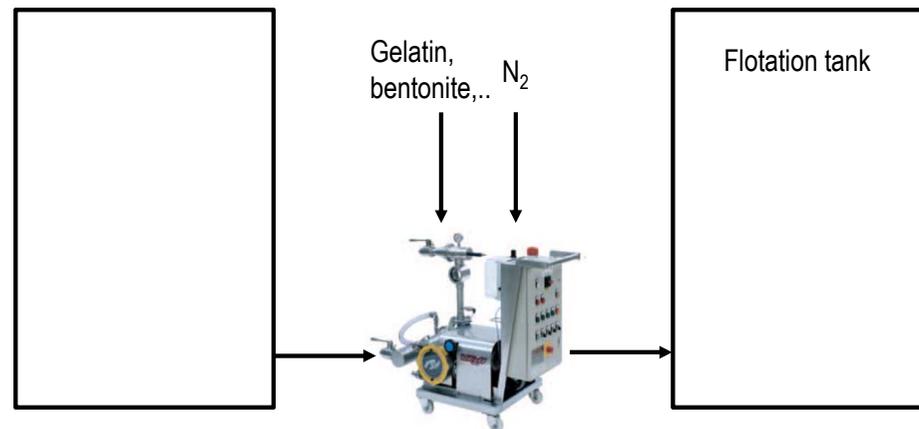
# Flotation in the wine industry – batch systems



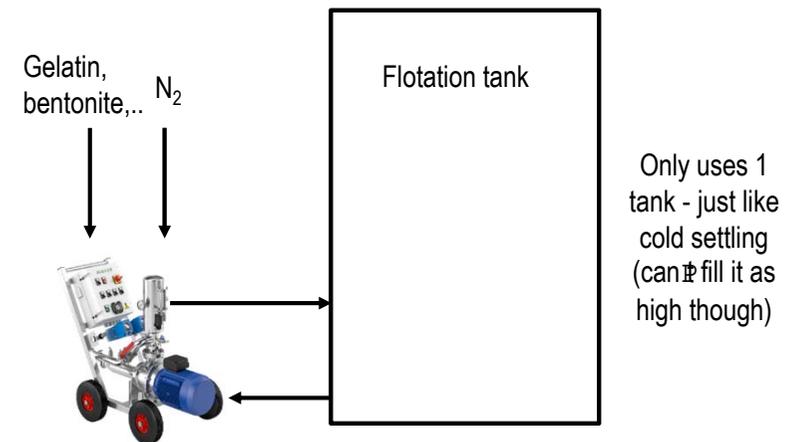
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- Compact cheap batch systems that work without large pressure chambers or specialised separation basins appear to have led to widespread uptake and acceptance of flotation – mainly in last ~7 years
- Smallest recirculation system costs only ~\$6,500 and can even use the pump separately outside vintage
- Lots of continuous systems now being installed in large Aust. wineries (because of batch experience?)
- Survey: Nitrogen most common gas used by every survey respondent using flotation

## Tank-to-tank operation



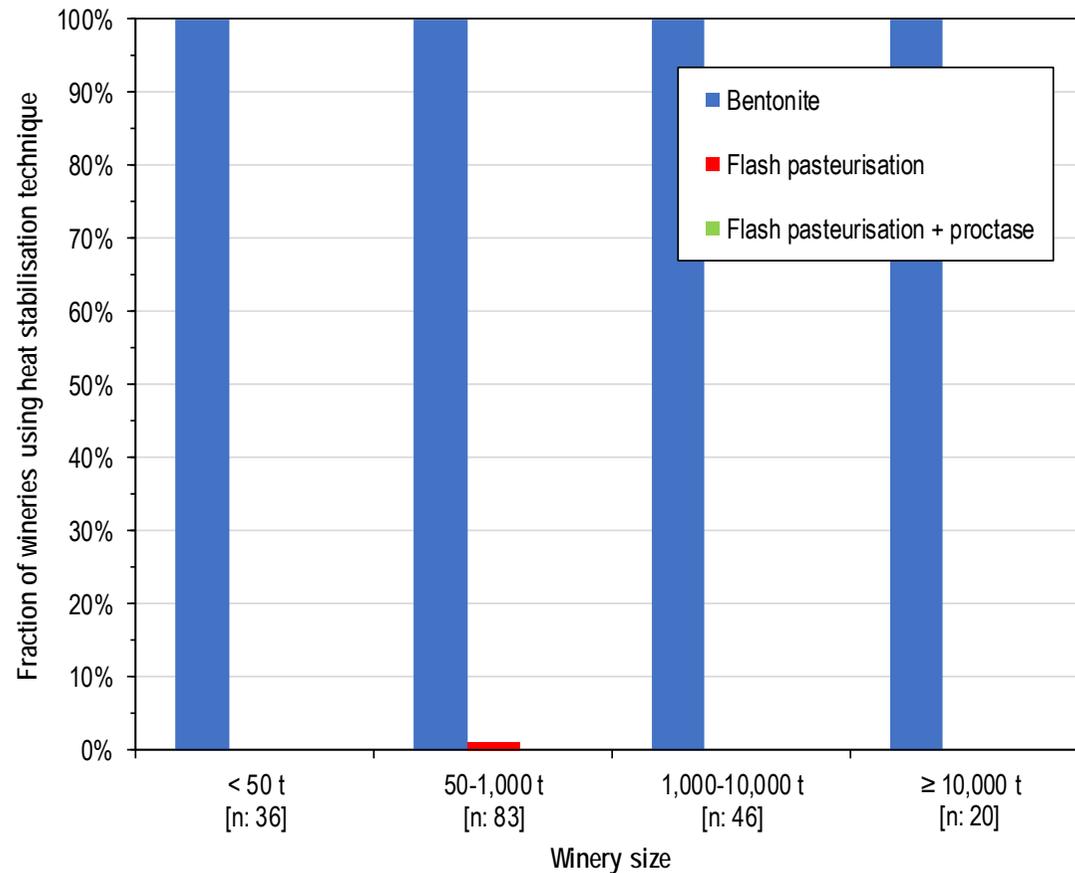
## Recirculation operation



# Heat stabilisation - method



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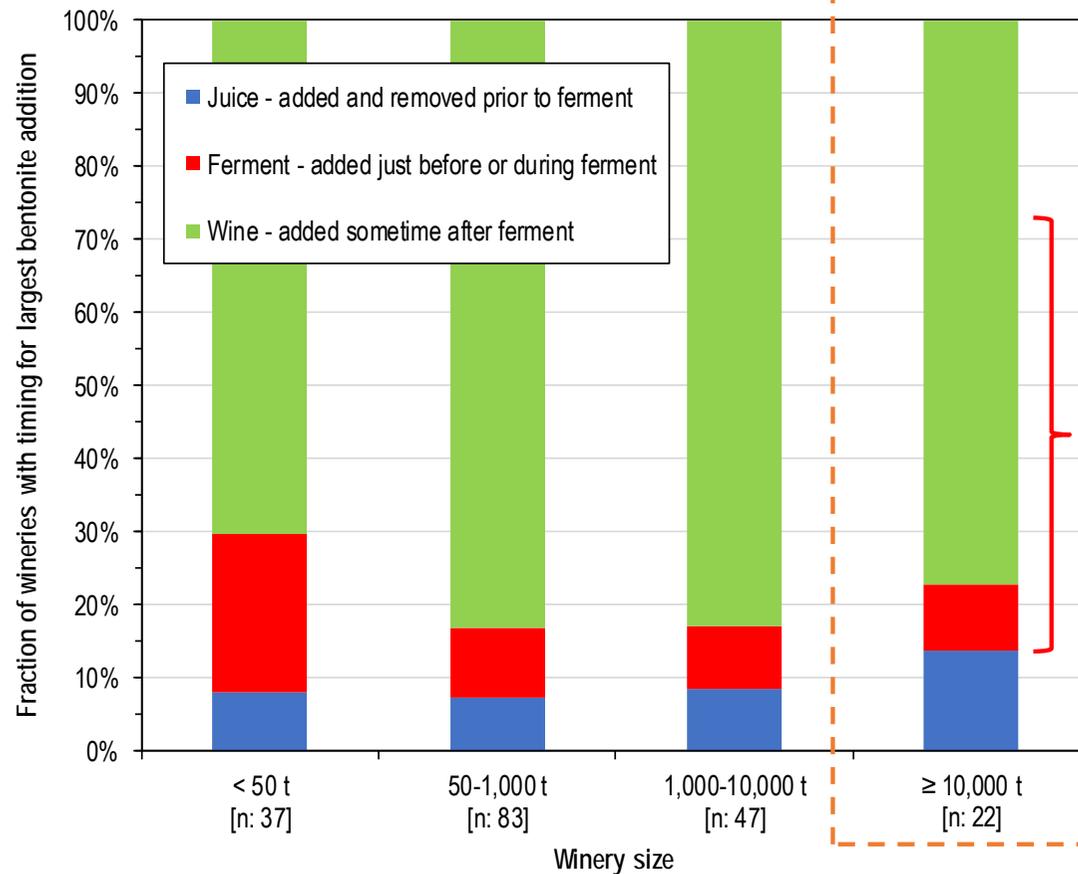
## Bentonite:

- Only method really being used for heat stabilisation by industry
- Large lees volumes
  - Juice/wine losses/downgrades
- Possible sensory impacts

# Timing of largest bentonite addition



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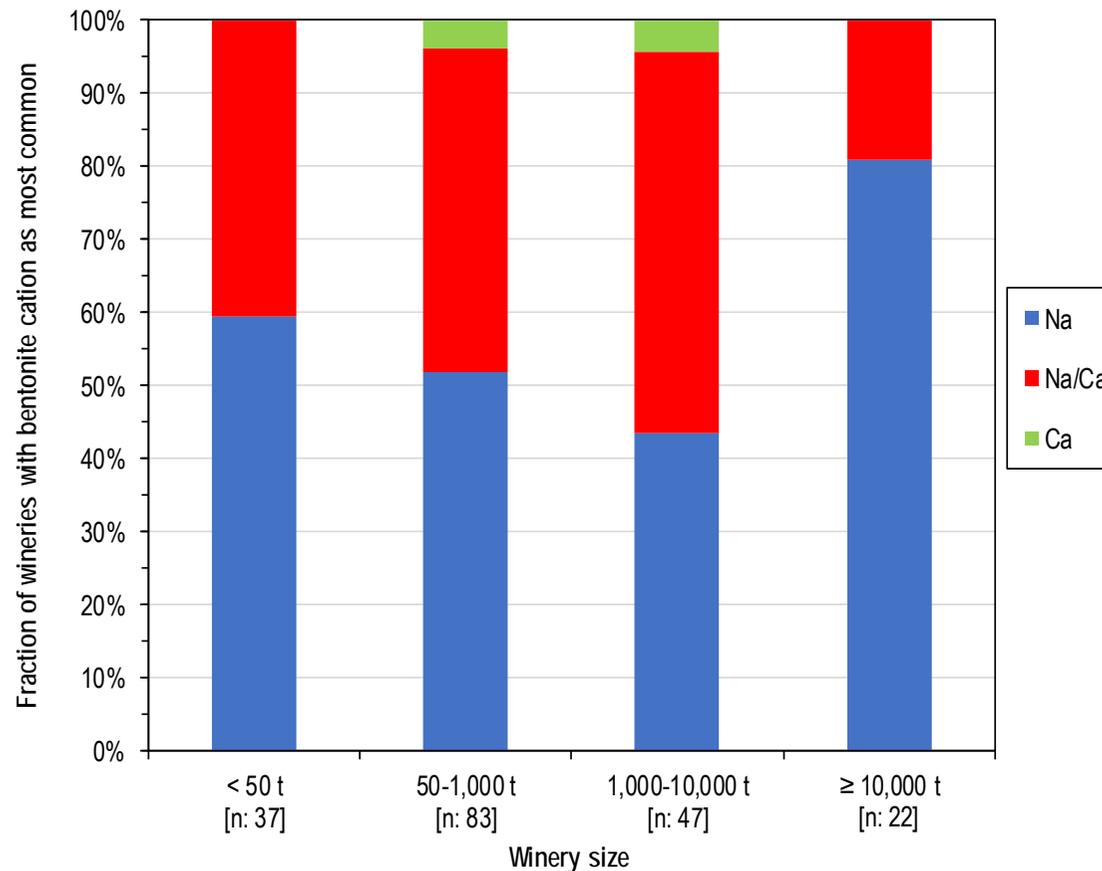


- ~60% of large wineries add and remove bentonite with their gross yeast lees for part of their production (often added post-ferment, sometimes after lees mixing period)
  - Combines steps and possibly reduces overall lees / increases wine clarity
- ~30% of large wineries are using centrifugation during their major bentonite clarification
  - Reduced lees & no need to recover
- ~20% of large wineries are in-line dosing bentonite on the way to a centrifuge
  - Combines steps, can rack-fine if desired
- Flotation: Bentonite use during flotation may be having an effect on bentonite lees volumes across wineries of all sizes?

# Most common bentonite type



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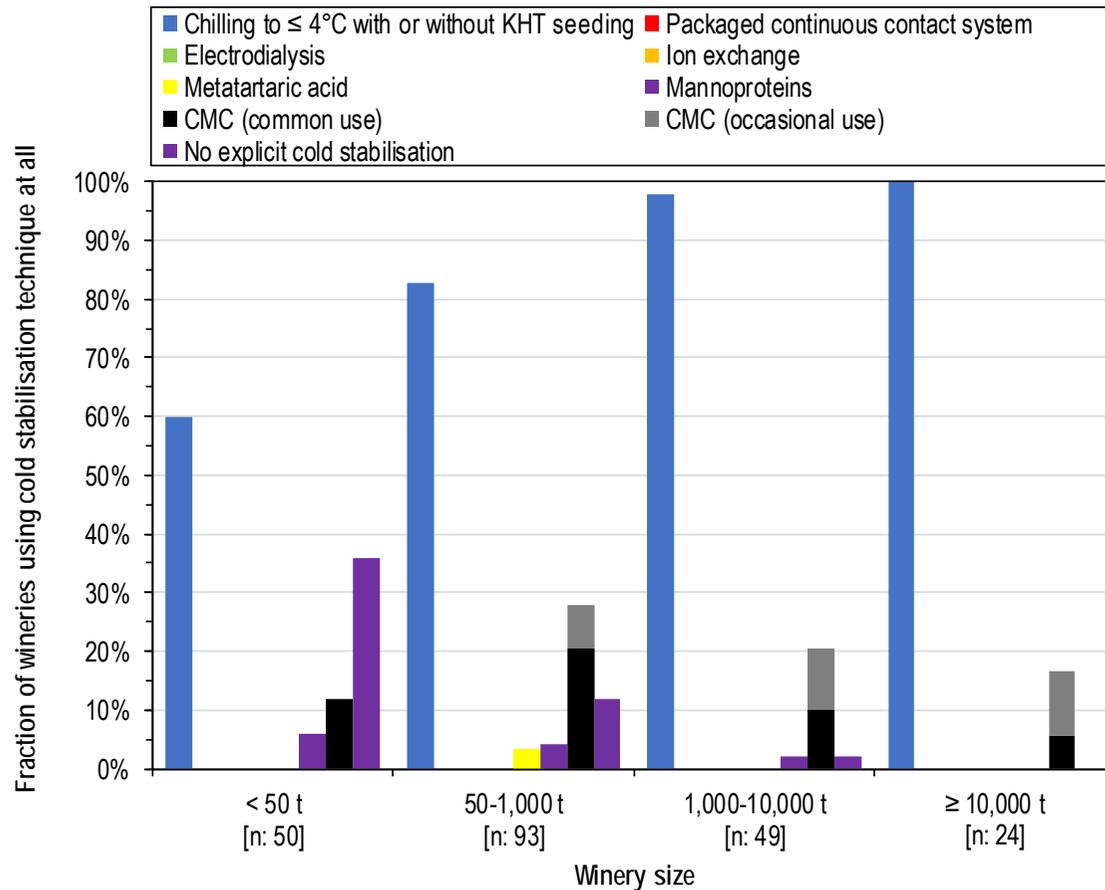
Na-bentonite	Na/Ca-bentonite
Cheaper per kg	Smaller lees
Lower doses	Easier to prepare

- Largest wineries typically use Na-bentonite
  - Cheaper dose for stability and they have lees recovery equipment (RVDF, centrifuges, lees X-flows)
  - But they still sometimes use Na/Ca for smaller volume premium products
- Not captured in the survey explicitly, but there are a lot of flotation specific fining agents being used (e.g. Flottobent, Flottogel, Bent'up, Gel'up)
  - Relative performance? (don't know)

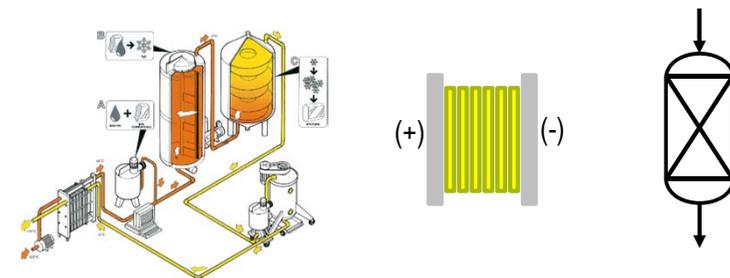
# Cold stabilisation methods



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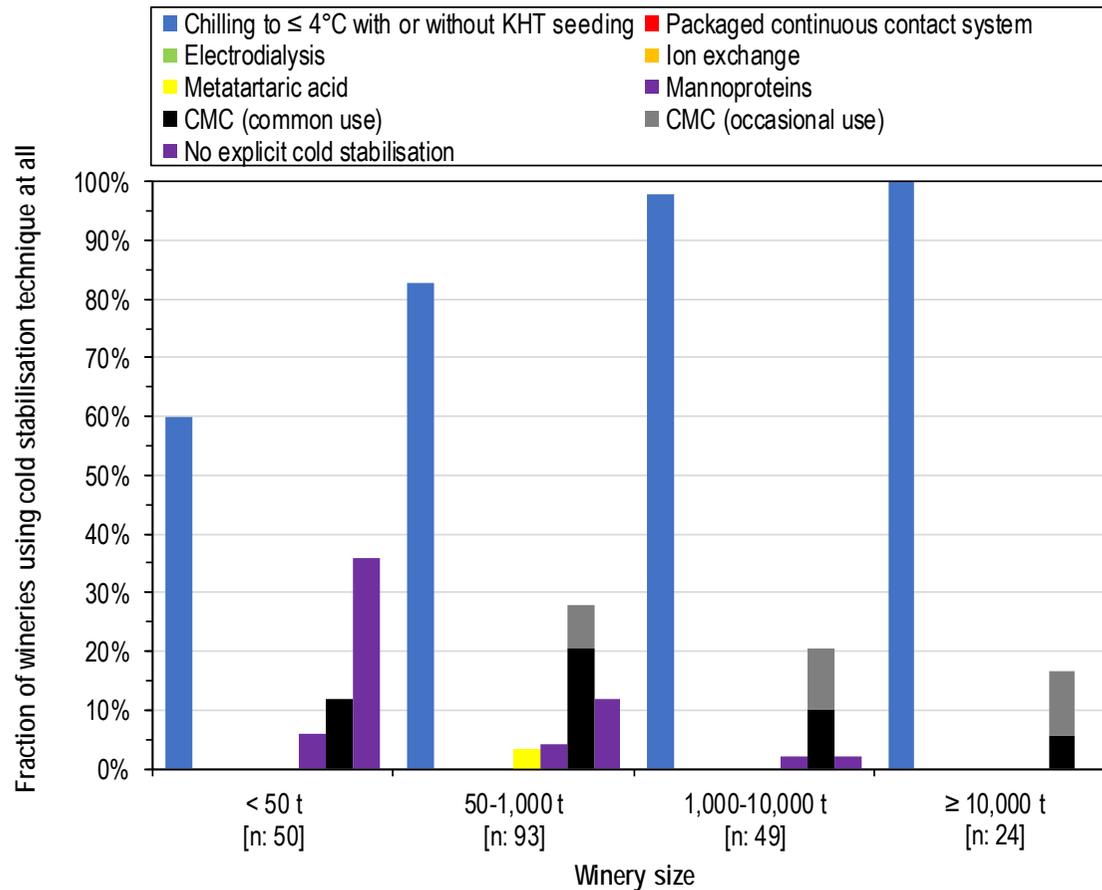
- Chilling with or without KHT seeding is the most common method of cold stabilising in wineries of all sizes
- Smaller wineries do less explicit cold stabilisation because they make more red wine, have higher average price points & longer periods of cold ambient holding pre-bottling (large wineries do similar for their premium reds)
- Packaged continuous contact, electro dialysis and ion exchange not used by any respondent



# Cold stabilisation methods – CMC



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- Promoted by suppliers as saving a lot of cooling/electricity, being cheap and rapid
  - Current common users seem positive about CMC
- ~20% of wineries using it at all, but only 1 large winery has really adopted as common practice
- Occasional users:
  - Wine needed at short notice
  - Base wines were stable but blend is not
  - Didn't want to drop wine acid with chilling
  - Small white wine volumes
- Wineries not using:
  - Long-term stability questioned
  - Might need to still pre-chill some wines
  - Problems if is later blended
  - Clauses in sales contracts
  - Not allowed in all export markets
  - Filtration concerns
  - Don't mind dropping wine acid
  - Negative sensory impacts of CMC
  - Haven't done sufficient trial work yet

# Conclusions



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- Were some preliminary excerpts of the survey data
- Will distribute a full report next year
- Will include data on the prevalence of other techniques – yeast types, direct vs. propagation, stuck ferments, YAN measurements, pressing equipment, hyperox, fining agents, timing of malo inoculation, sorting equipment, closures, etc. and vineyard practices
- Hope to repeat something similar every ~5 years
  - Have an independent summary of practices that producers can use for benchmarking and can see how things are changing over time at an aggregate level.

# Acknowledgements



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- Grape and wine producers who filled out the survey and allowed me to visit/phone
- Suppliers who have provide information
- Grape and wine associations that helped with survey promotion
- Colleagues at AWRI, including Maria Calabrese, Tadro Abbott, Geoff Cowey, Ella Robinson, Con Simos and Eric Wilkes.
- Vinitech-Sifel who sponsored a survey lucky draw prize of a trip to their equipment trade show in Bordeaux (congratulations to Sheena High who won the trip)

