A W R I

The Australian Wine Research Institute

Managing Wine Faults and Taints

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The Australian Wine Research Institute

Wine Faults and Taints

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- Barnyard
- Smoke
- Plastic
- Musty

Brettanomyces – Introduction

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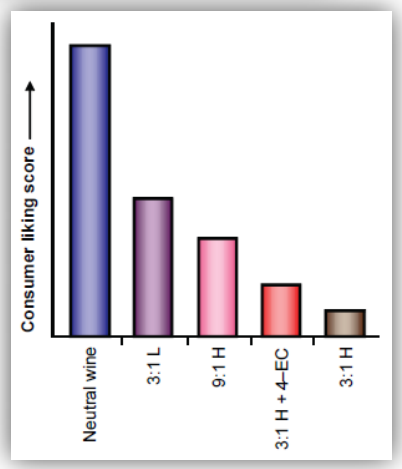
- Barnyard, wet animal, medicinal, band-aid
- Occurrences:

- Low sugar requirements
- Is it truly a fault?
  - Negative if greater than threshold



Brettanomyces – Compounds

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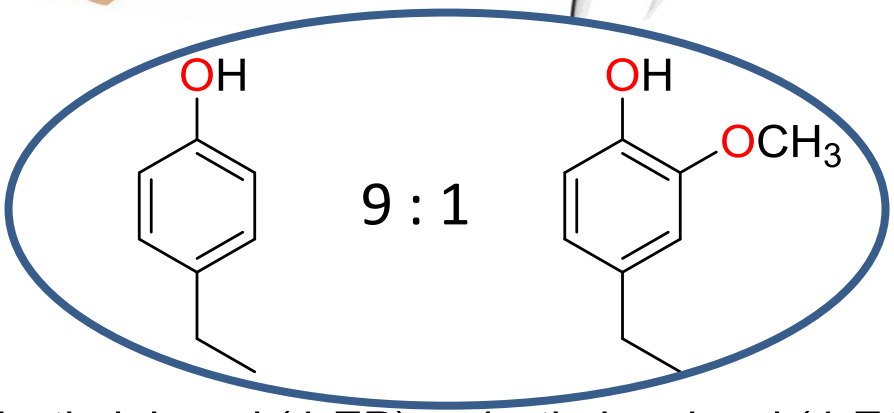

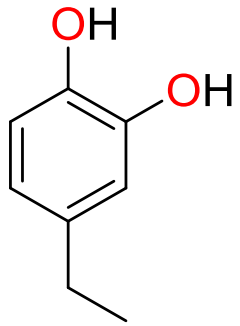

	4-ethylphenol (4-EP)	4-ethylguaiacol (4-EG)	4-ethylcatechol (4-EC)
Threshold	368 µg/L	158 µg/L	774 µg/L
Descriptor	band aid, medicinal	smoky, bacon	horsey, sweaty

Glass 27

4-EP 500 µg/L +
4-EG 56 µg/L

How can you minimise the population?

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SO_2 additions

Addition at harvest, crusher + post-MLF

Reduces microbiological risk

Post-MLF Molecular SO_2 > 0.625 mg/L

General sanitation

Reduce food sources (organic materials)

Prevent cross-contamination

Check microbial status of wine entering winery + top-up wine

Barrel sanitation

Highest risk MLF → aging

Range of solutions: steam, ozone, ultrasonics...

Brettanomyces – What else can you do?

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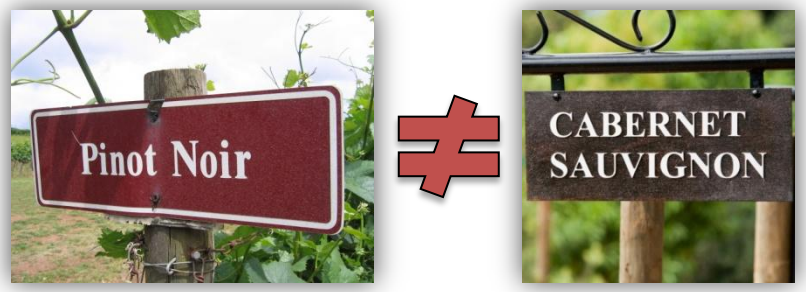
- Best practice fermentation
- Lighter wine styles – lower threshold



- No miracle solution
  - Well performed filtration
  - Careful racking
  - Blending
  - Reverse Osmosis/Yeast Hulls
    - Up to 25% 4-EP/4-EG removal
- AWRI winery Brett audits

Smoke Taint – Introduction

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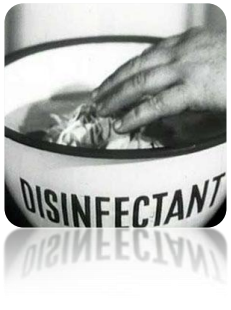
- Financial impact of 2009 Victoria bushfires
  - $368 million
  - 40% of production



Smoke Taint – Introduction

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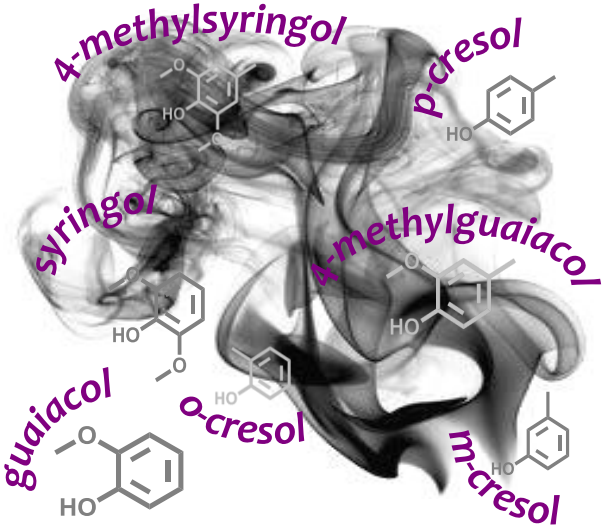

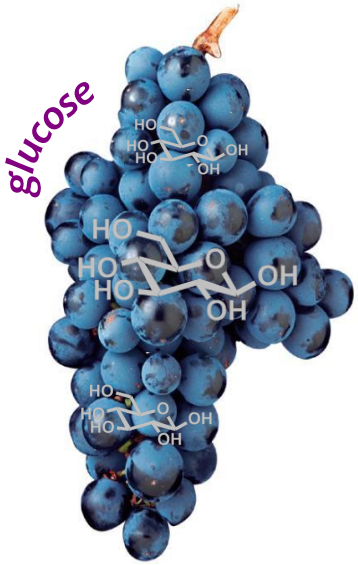

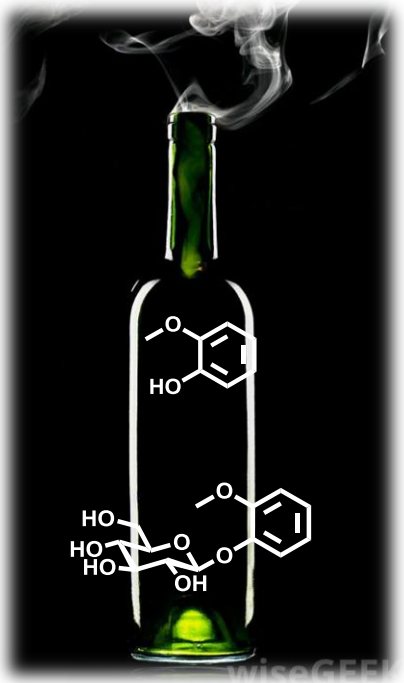

- Sleeping giant within wine
  - Phenolic compounds released during winemaking/ageing
  - And in mouth!

Smoke Taint – Compounds

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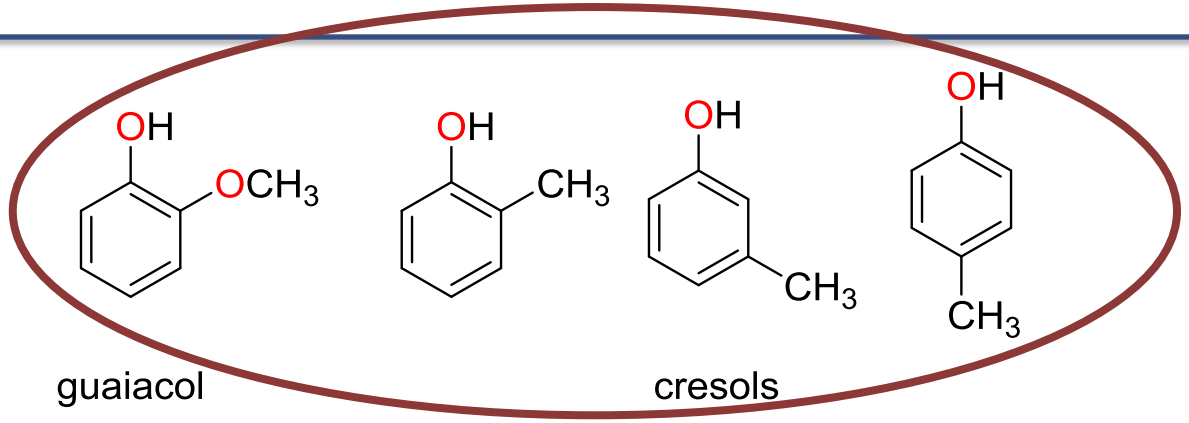
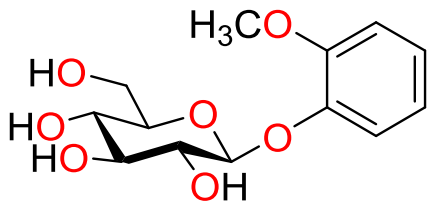
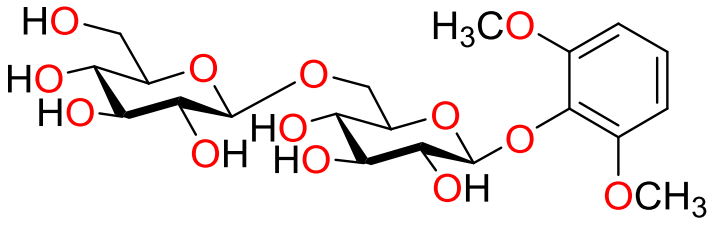


	guaiacol	cresols		
Threshold	23 μg/L	62 μg/L	20 μg/L	64 μg/L
Descriptor	smoky	phenolic, medicinal, faecal		



guaiacol glucoside



syringol gentiobioside

Glass 28

guaiacol 37.5 μg/L +
cresols 27.5, 15, 27.5 μg/L

Smoke Taint – In the Vineyard

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- Key vulnerability stages for smoke exposure:

Low → Low to Medium → High


10 cm shoots


Flowering


Berries pea size


Onset of véraison


7 days post véraison


Harvest

- How much smoke creates an effect?
  - Single heavy exposure for 30 min
  - Lower exposure at sensitive stage
  - Repeated exposures accumulate taint

Smoke Taint – Control

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- AWRI diagnostic analysis – volatiles and non-volatiles
  - Grapes, leaves, juice or wine

  A scientific assessment for decision-making
- Techniques for reducing taint:

- Exclude leaf material

- Hand harvest, sample, test

- Avoid long macerations

- Cool – process at 10 °C

- Oak chips/tannin additions

- Separate press fractions

- Reverse Osmosis – up to 1/3 removal, but smoke will return

- Successful blending is difficult to achieve due to low thresholds
- This problem isn't going away

Bushfire potential ↑ 4-25% (2020); ↑ 15-70% (2050)

Chlorophenol – Introduction

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- Primarily anthropogenic wine taint
- Descriptors:

- $10 million loss from contaminated tartaric acid
- Sources:
  - Chlorine-based sterilising agent treatment
  - Chlorinated biocides from cork processing
  - Disinfected pallets, transport containers

Chlorophenol – Compounds

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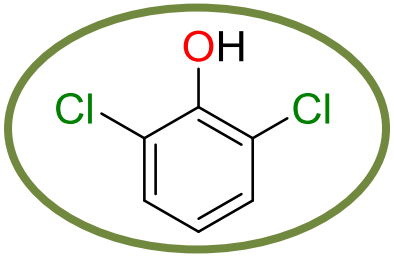
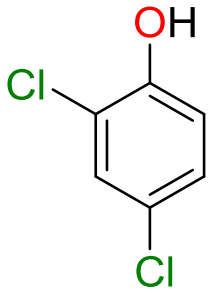
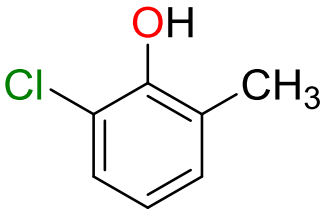


2,6-dichlorophenol



2,4-dichlorophenol



6-chloro-*o*-cresol

	2,6-dichlorophenol	2,4-dichlorophenol	6-chloro-*o*-cresol
Threshold	32 ng/L	896 ng/L	32 ng/L
Descriptor	plastic, paint	plastic, paint	antiseptic, plastic

Glass 29

75 ng/L

Can you smell it?

Chlorophenol – Prevention and Control

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- Recommendations
  - No chlorine in winery
  - Smell new barrels
  - Quarantine new additives
- If suspect taint
  - AWRI analysis
  - Not a permitted additive
    - Only solution is distillation!

Tribromoanisole – Introduction

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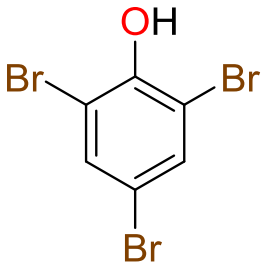
- Potent cousin of TCA
- ~5% of musty taint analyses
- Formed from TBP
  - Fungicide, fire-retardant, wood preservative
- Moulds/bacteria detoxify TBP→TBA



2,4,6-Tribromophenol (TBP)

- Sources:
  - Tainted corks
  - Bungs, plastics
  - Wood structures
  - Barrels

Tribromoanisole – Compound

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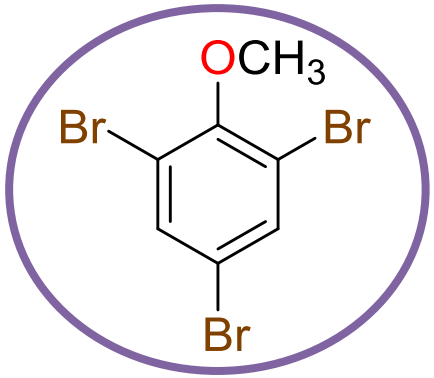
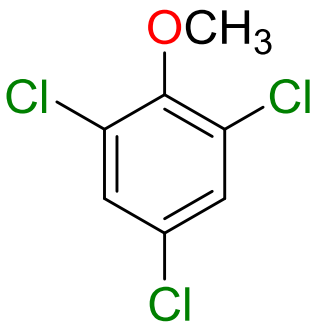


2,4,6-Tribromoanisole (TBA)



2,4,6-Trichloroanisole (TCA)

Threshold	3.4 ng/L	1.4 ng/L
Descriptors	musty, mouldy (newspaper)	

Glass 30

7.5 ng/L

Tribromoanisole – Prevention and Control

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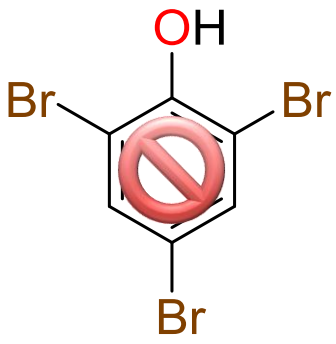
- Avoid wood, plastics etc sprayed with TBP
- Screen prior to use
- Be aware – they migrate through air!



- If you suspect a taint
  - AWRI analysis
  - Blending is a risk
  - Low conc. – special filter pads
  - High conc. – Reverse osmosis, Yeast hulls

Conclusions

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- Chemical knowledge crucial
- Save the industry large sums
- We can
  - Avoid processing tainted grapes
  - Demonstrate taint-free wine
  - Protect producers
  - Protect Brand Australia

- Further information
  - www.awri.com.au
  - Reference list – AWRI WineTech stand

Acknowledgements

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