AWRI

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Understanding the chemical and sensorial basis of bushfire smoke flavour in affected wines

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Sensory attributes of smoke affected wines from 2009

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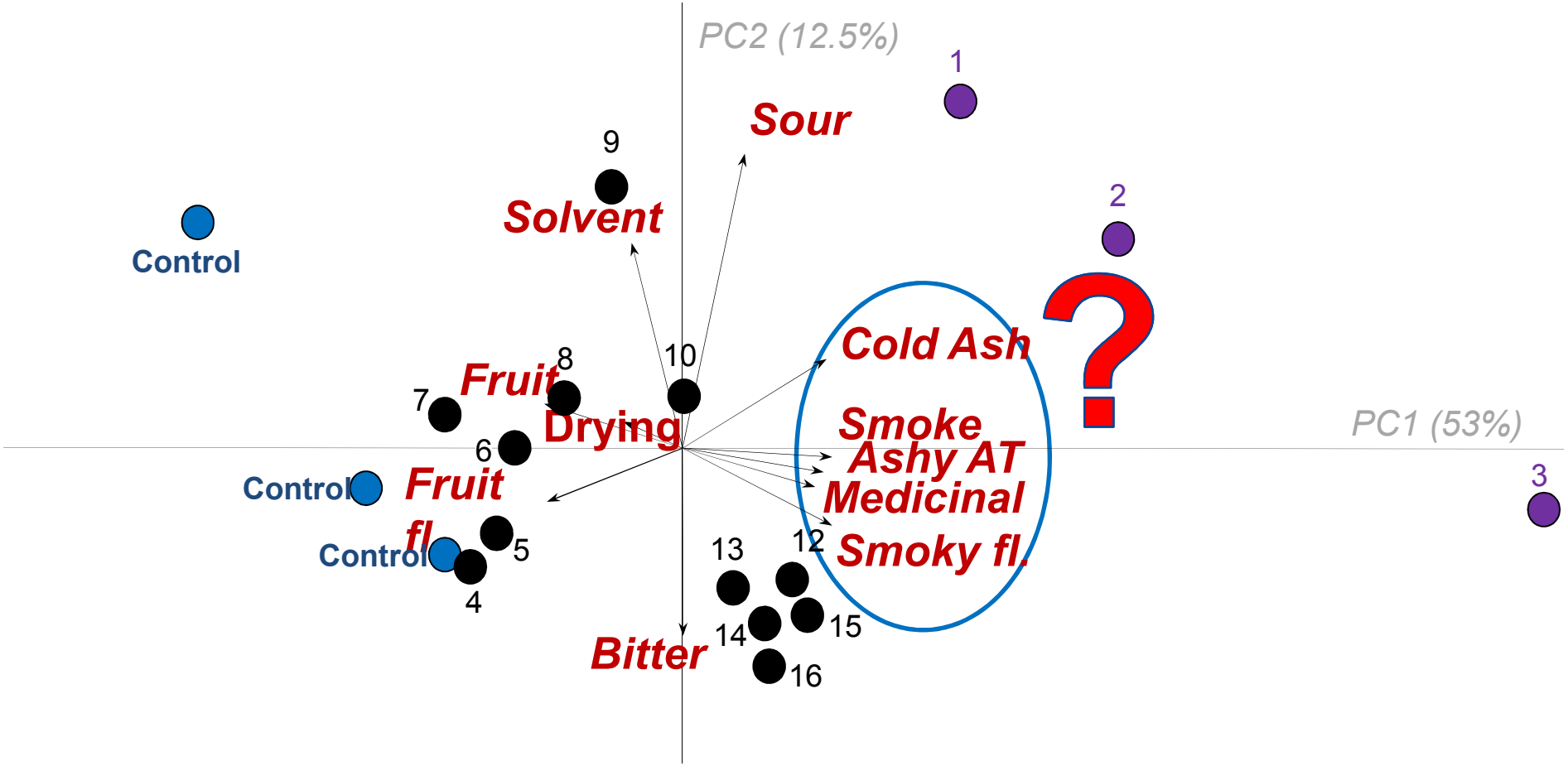

Smoke and free volatiles

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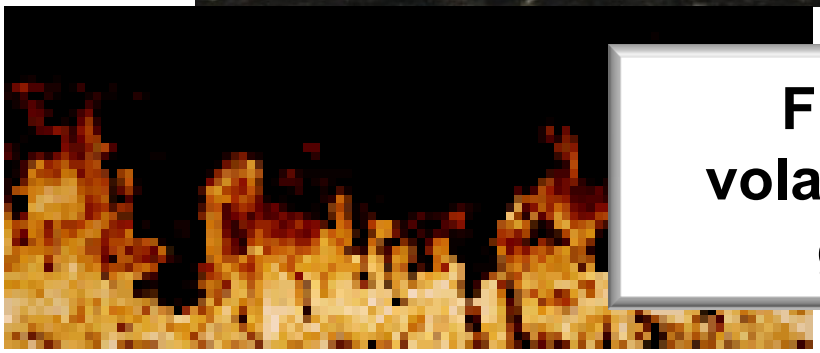
Smoke Volatiles in grapes and the resulting wine

Smoke volatiles in air around vineyard



Fire event → volatile compounds generated

Volatile phenols in smoke tainted wine

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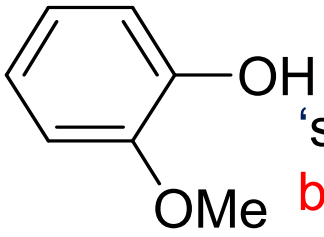
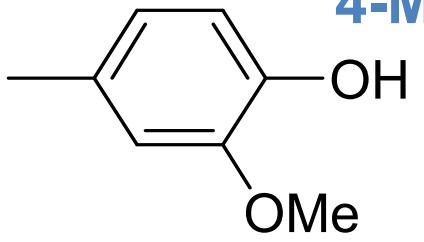


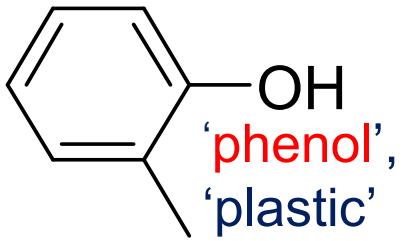
Guaiacol

'smoky', 'smoky bacon', 'sweet'



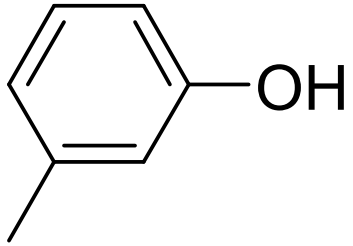
4-Methylguaiacol

'smoky', 'spicy'



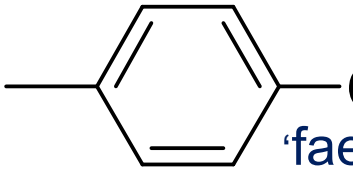
'phenol', 'plastic'

o-Cresol



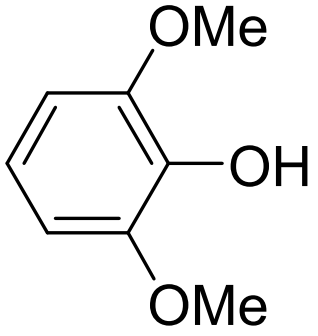
'smoky, phenolic', 'smoky band-aid', 'faecal, plastic'

m-Cresol



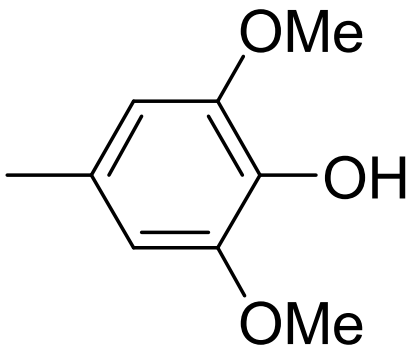
'faecal, horse stable-like', 'medicinal'

p-Cresol



Syringol

'smoky', 'charry'



4-Methylsyringol

'smoky', 'charry'

Sensory detection tresholds

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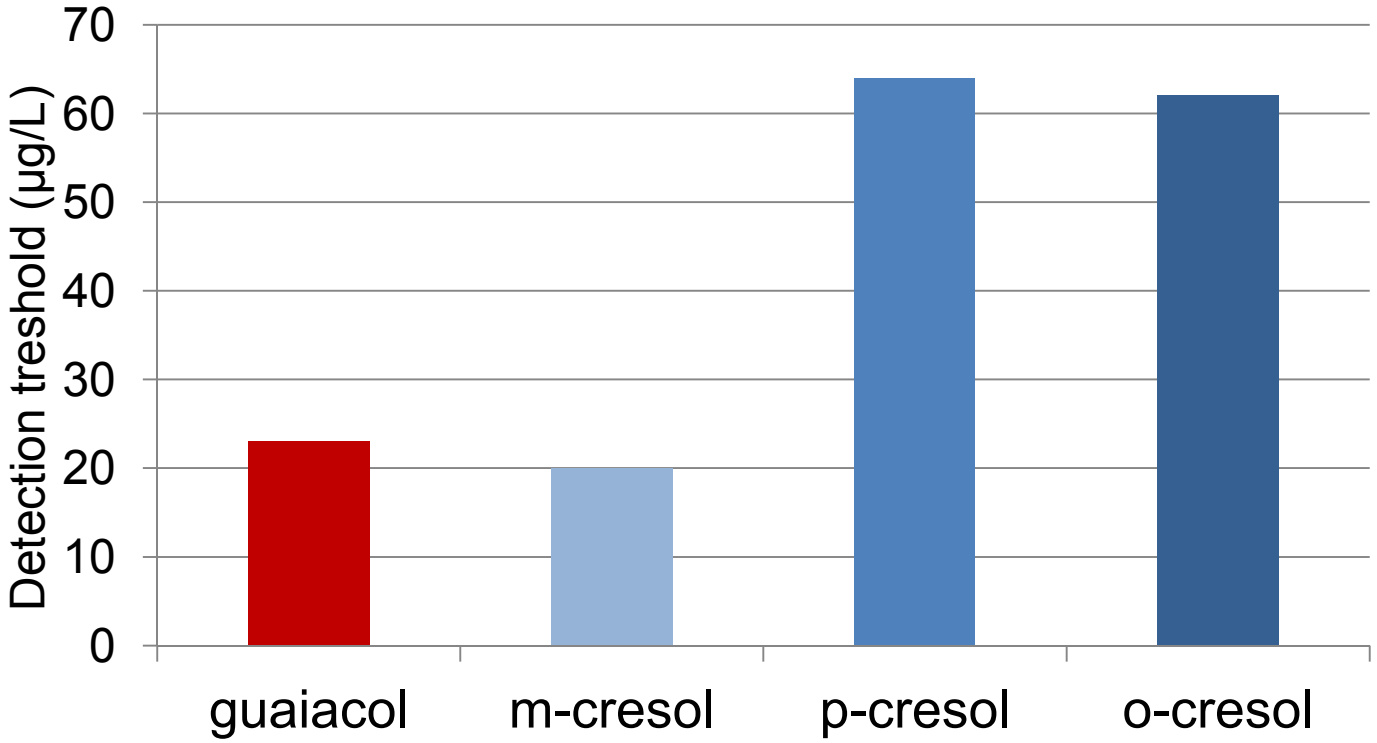

Smoke and bound volatiles

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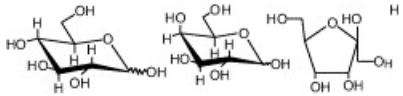
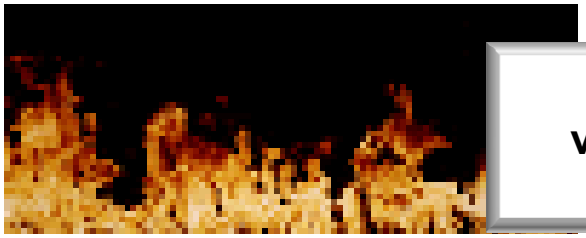
Biotransformation of volatiles to glycoconjugates



Smoke Volatiles in grapes and the resulting wine

Smoke volatiles in air around vineyard



Fire event → volatile compounds generated

Glycoconjugates of guaiacol in smoke tainted grapes

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High concentrations of glycoconjugates in berries can lead to high concentrations of volatiles in wine

Glycoconjugates in smoke tainted wine

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Can glycoconjugates contribute to the flavour when consuming wine??

Release of volatiles from glycoconjugates in mouth

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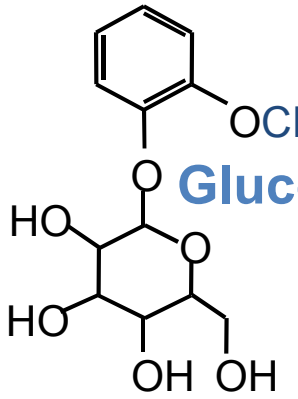
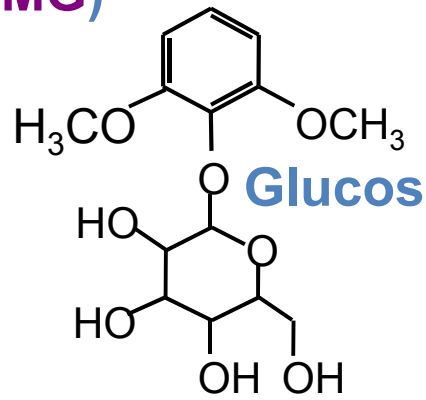
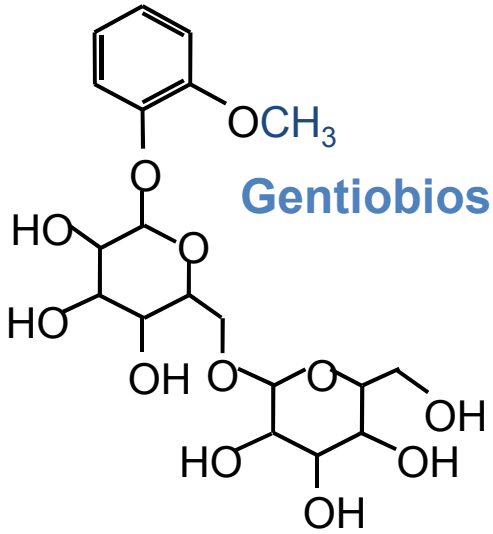


Glucoside (**MG**)



Glucoside (**MG**)



Gentiobioside (**GG**)

Release of volatiles from glycoconjugates in mouth

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- Release measured for
  - Glycoconjugates of different volatile phenols
  - different glycoconjugates of the same phenol
- Release affected by alcohol and sugar concentration
- Great variability between individuals
  - 4-68% release

Reconstitution of smoke tainted wine

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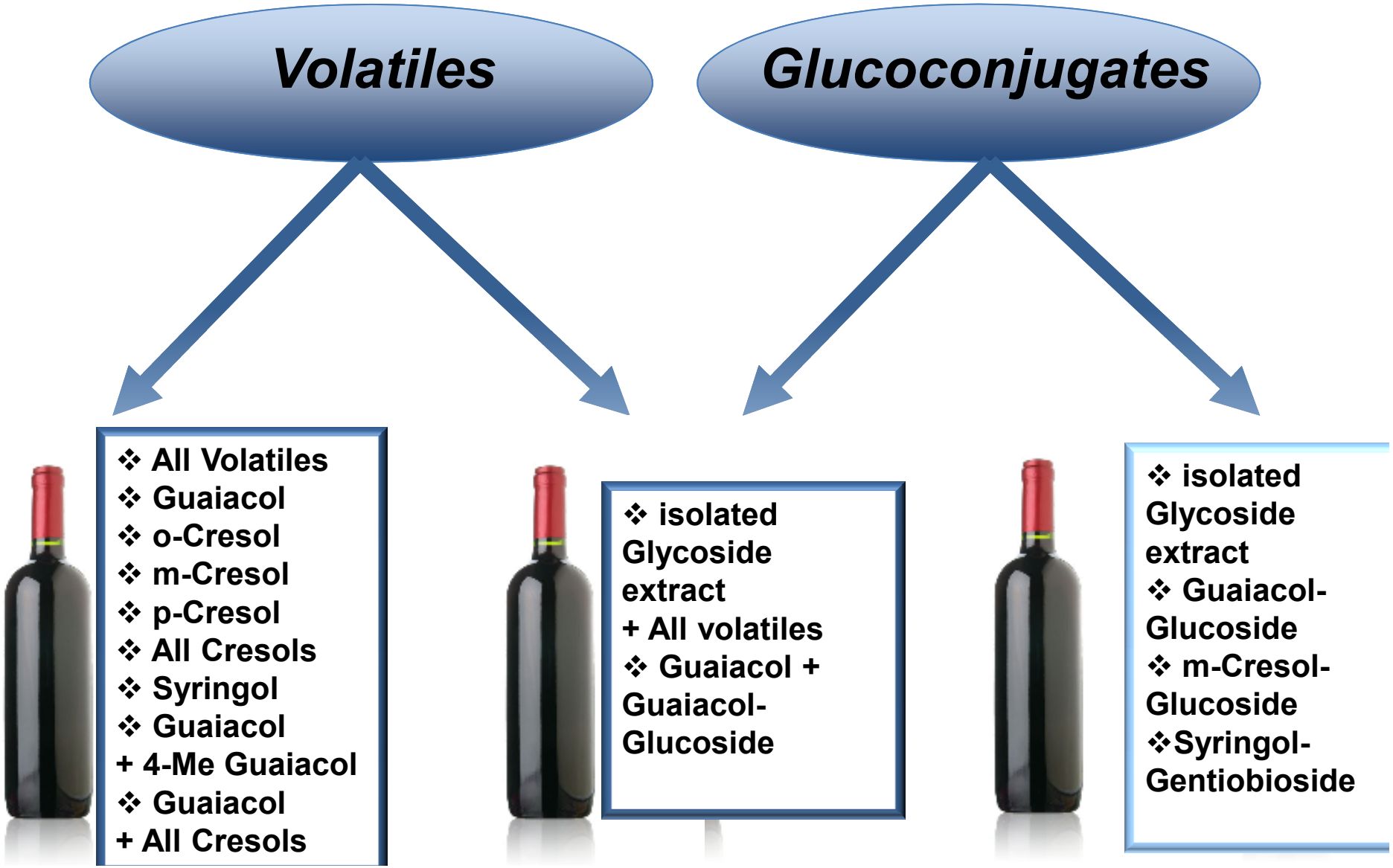

Aroma descriptors used in the sensory analysis

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AROMA

- Overall fruit intensity
- ***Red fruit***
- Dark fruit
- ***Fresh green***
- ***Musty/dusty***
- ***Woody***
- ***Earthy***
- ***Smoky***
- ***Medicinal***
- ***Alcohol***

PALATE

- ***Overall fruit flavour***
- ***Woody***
- ***Smoky***
- ***Burnt rubber***
- ***Medicinal***
- ***Bitterness***
- ***Astringency***
- ***Burnt/ashy aftertaste***

Sensory attributes of reconstituted wines

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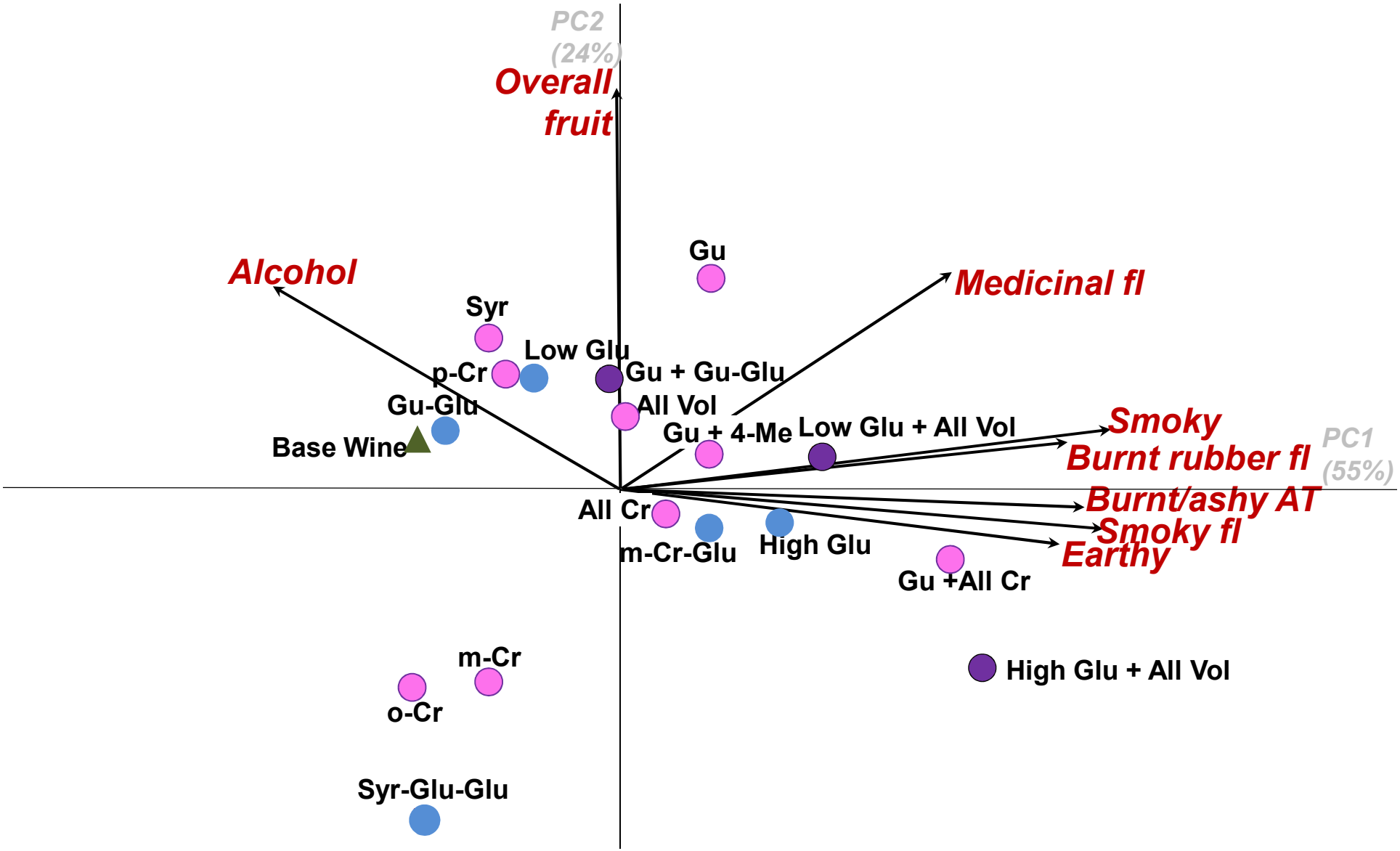

Mean ratings of the attribute smoky flavour

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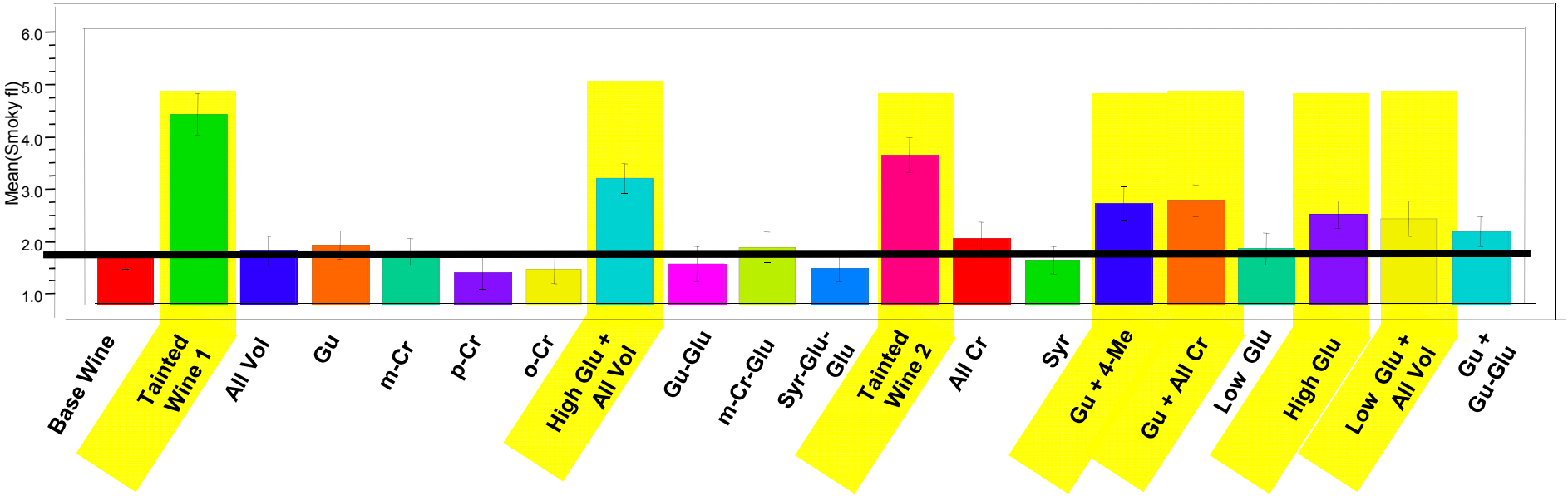

Conclusion

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- Understanding the role of volatile phenol compounds in smoke taint
  - guaiacol, m-cresol of greatest importance
- Glycoconjugates can act as precursors for volatile phenols
  - Released during winemaking and in mouth
- Reconstitution experiments showed that a combination of volatile phenols and their glycosidically bound forms mimics smoke taint

Acknowledgements

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  - Smoke team — Dr Yoji Hayasaka, Mango Parker, Gayle Baldock, Patricia Williamson, Belinda Bramley, Adrian Coulter, Con Simos, Dr Cory Black, Kevin Pardon, Dr Leigh Francis, Dr Markus Herderich
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  - Treasury Wine Estates
  - Yarra Valley winemakers
  - Victorian winemakers
- University of Adelaide
  - Dr Kerry Wilkinson & team

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