



Wine style alters the sensory impact of 'Brett' flavour compounds in red wines

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INTRODUCTION

It is well known that 4-ethylphenol (4-EP) and 4-ethylguaiacol (4-EG), products of *Dekkera/Brettanomyces* yeast metabolism, are the major contributors to 'Brett' aroma. However, limited information is available regarding the specific sensory impact of these compounds - and of the related compound 4-ethylcatechol (4-EC) - in different styles of red wine. This study sought to determine the aroma thresholds of the 'Brett' compounds in three commercial Cabernet Sauvignon wines of different styles. In addition, the study aimed to assess sensory attributes and consumer preference associated with 'Brett' compounds in the presence of oak and green/herbaceous flavour.

AROMA THRESHOLDS IN THREE WINES

A 30 member panel was used to determine aroma detection thresholds for 'Brett' compounds in wine (ASTM method E 679 - 04). Each compound was tested in three different 2005 Cabernet Sauvignon wines: a relatively neutral flavoured multi-region blend; a greener style wine from the south-east of South Australia, and a wine given extensive oak treatment prior to bottling.

Aroma thresholds for 4-EP (Figure 1) were lower than previously reported (605 µg/L, Chatonnet et al 1992) and for all compounds the wine style had a marked effect on the threshold values, with the strongly oaked wine having the highest thresholds. 4-EC had a relatively high threshold, above the concentration of this compound reported in red wines to date, indicating that it may not be an important contributor to 'Brett' flavour.

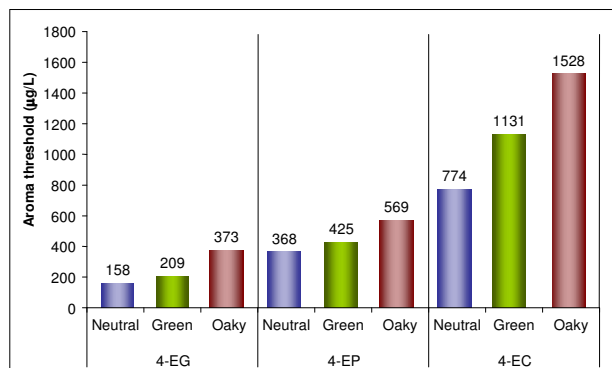
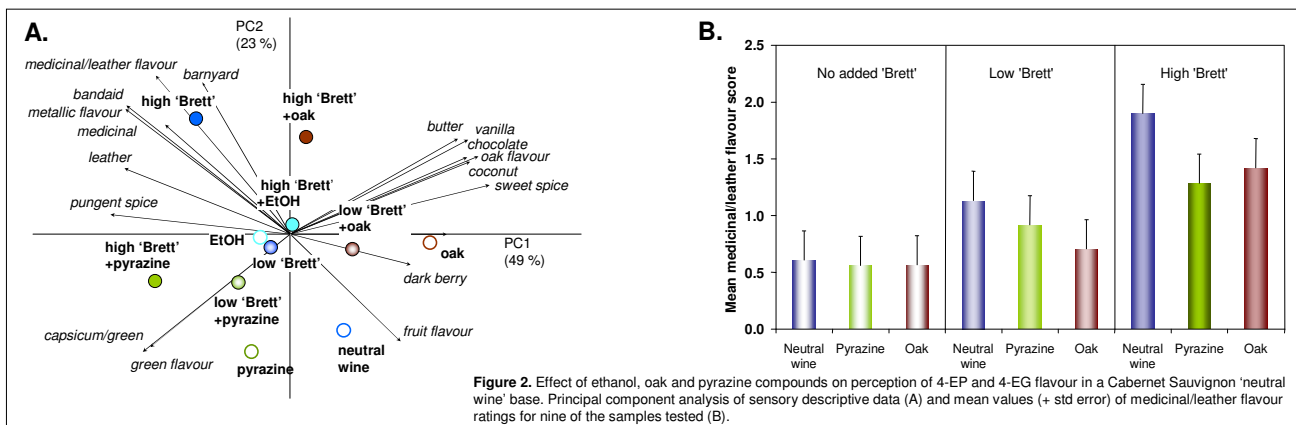


Figure 1. Aroma thresholds of 4-ethyl guaiacol (4-EG), 4-ethyl phenol (4-EP), and 4-ethyl catechol (4-EC) in three different Cabernet Sauvignon wines.

SENSORY DESCRIPTIVE ANALYSIS AND CONSUMER PREFERENCE

A sensory panel rated the intensity of aroma and flavour attributes of 11 samples in triplicate. The samples included a base wine – the 2006 vintage of the 'neutral' wine used in threshold testing – to which 4-EP and 4-EG had been added at a 9:1 ratio at low (600 µg/L 4-EP + 67 µg/L 4-EG) and high (1200 µg/L 4-EP + 133 µg/L 4-EG) levels based on the threshold testing results. In addition, samples with added oak volatiles (oak lactone, vanillin, guaiacol, and 4-methylguaiacol), isobutyl methoxypyrazine, and ethanol (2% v/v) were evaluated. 112 Adelaide red wine consumers assessed a subset of the samples and rated liking for each sample presented one-by-one on a nine-point hedonic scale (dislike extremely to like extremely).



The neutral base wine was rated highest in *dark berry* aroma and *fruit flavour* (Figure 2A). The high 'Brett' sample was rated highest in *banyard*, *bandaid*, *medicinal*, *leather*, and *pungent spice* aroma, and *medicinal/leather* and *metallic* flavour, with the low 'Brett' wine intermediate in these attributes, and both were lower in *fruit* flavour than the base wine. The presence of pyrazine, elevated ethanol or oak flavour compounds reduced the intensity of 'Brett' flavour attributes (Figure 2A and B).

From the consumer data (Figure 3), the most liked wine was the base neutral wine, whilst the least preferred was the high 'Brett' wine. Consumers liked the wine with added oak flavour less than the base wine, but scored the wine containing both high 'Brett' and oak similarly to the base wine, indicating that the mutual suppressing effect of oak and 'Brett' flavour produced a more palatable wine than either component separately.

CONCLUSION

This study has confirmed that wine style has a substantial effect on the sensory threshold of 4-EP, 4-EG and 4-EC and on perception and consumer liking of 'Brett' flavours.

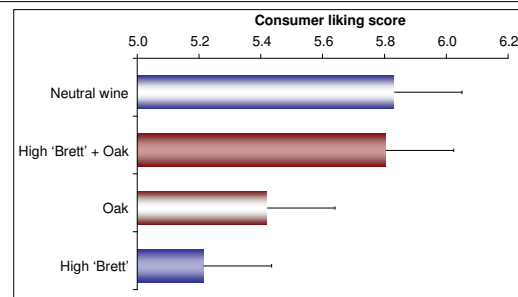


Figure 3. Mean Adelaide consumer liking scores (+ std error) for a subset of samples (n=112).

REFERENCES

Chatonnet, P. et al. (1992) *J Sci. Food Agric.*, 60, 165-178.
ASTM Method E679-04, (2004) Standard practice for determination of odor and taste thresholds by a forced-choice ascending concentration series method of limits, ASTM International, PA, USA.



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