Technical note

Changes in Wine Ethanol Content due to Evaporation from Wine Glasses

Introduction
It may seem obvious, but the evaporation of volatile wine components, particularly ethanol, from wine glasses exposed to air can have a significant impact on the sensory evaluation of wine. A recent study was motivated by the presumption that even small changes in the relative proportion of water and ethanol present in wine can significantly influence the perception of that wine’s sensory attributes [1,2]. We investigated the effect of evaporation by monitoring the changes in ethanol content of commercial wines in different glasses exposed to ambient conditions, over time.

The key outcomes
The ethanol concentration of wine in uncovered glasses was found to decrease significantly over time as a consequence of evaporation; with the rate of ethanol loss being strongly influenced by exposure to airflow, together with glass shape, headspace and wine volume. There was no change in wine ethanol content where glasses were covered with plastic lids, but significant reductions in wine ethanol content were observed when glasses were not covered. Losses resulted in the alcohol by volume (abv) decreasing by between 0.9 and 1.9% for wines exposed to ambient airflow for 2 hours. The rate of ethanol loss was strongly influenced by more direct exposure to airflow from the laboratory
air-conditioning unit, together with certain glass shape and wine parameters; glass headspace to wine volume in particular. These findings have important implications for the technical evaluation of wine sensory properties; in particular, informal sensory trials and wine show judging, where the use of covers on wine glasses is not standard practice. Our study showed that evaporation can also result in the loss of wine volatile compounds and can have a marked impact on wine aroma. In some instances, there is the potential for significant sample variation as a consequence of evaporation. It is possible therefore that the consistency of wine evaluation results could be significantly affected by such changes.

**Recommendations**

Not surprisingly, the larger Riedel style wine glass had the greatest headspace to wine volume ratio, so it is worth considering whether its increasing use in wine shows may exacerbate the effects of ethanol evaporation, particularly under conditions similar to those used in the current study. While this effect is unlikely to be of much concern to general consumers, professionals involved in formal wine sensory evaluation, should be aware of these phenomena. They should take care to cover the glasses prior to evaluation. If not possible, they should minimise the interval between pouring samples and tasting; use smaller XL5 glasses with greater volume of sample; and avoid draughty locations.

**Acknowledgements**

This research was conducted by the Australian Research Council Training Centre for Innovative Wine Production (www.adelaide.edu.au/tc-iwp/), which is funded as a part of the ARC’s Industrial Transformation Research Program (Project No IC130100005) with support from Wine Australia and industry partners.

**References**


**Contact**

For further information, please contact by email:
Assoc. Professor **Kerry Wilkinson**: kerry.wilkinson@adelaide.edu.au
**David Wollan**: david.wollan@adelaide.edu.au
School of Agriculture, Food & Wine,
Wine Innovation Central, Level 4
Corner of Hartley Grove and Paratoo Road,
The University of Adelaide,
Waite Campus, Urrbrae SA 5064
Phone: +618 8313 2820;
Fax: +618 8313 7116

www.adelaide.edu.au/tc-iwp