Technical notes

Style-based energy content categories in Australian wine

As discussed in the August 2021 issue of *Technical Review* (Wilkes 2021), there is increasing momentum towards including the dietary energy content on labels of alcohol-containing beverages, including wine. The earlier article presented data showing that calculations of energy content for wine can reasonably be made based on measured concentrations of alcohol and sugar combined with generic values for glycerol and organic acids. The contribution of other wine components does not add substantively to the dietary energy content and can therefore be left out without compromising the accuracy of information for consumers.

Even this simplification, however, leads to a requirement for an energy value to be calculated for each wine vintage or batch and printed on the label. It could be argued that this adds significant effort, complication and cost without any real value to the consumer, as the energy differences between wines of a similar style tend to be relatively insignificant. Indeed, having a range of values on wine labels could possibly lead to misconceptions among consumers as to relative impact of different wines on dietary choices. In a number of Australia's export markets, the approach taken has been to accept a label value tolerance and to assign generic values for energy content based on wine style. This article outlines how such an approach could work for Australian wines, using sugar-based wine styles and energy calculations based on typical analytical values observed for Australian wines.

Classifying wines into style groupings for energy calculations

The most logical approach to grouping wines for energy calculations appears to be to use the relatively well understood stylistic categories of dry, semi-dry, semi-sweet and sweet. This also has the advantage of grouping the wines based on one of the core inputs for the energy calculation, namely the sugar content. Categorising wines based on variety or wine show style classifications was also considered (data not shown) but this resulted in a relatively complicated and confusing range of values, unlikely to result in an easily understood classification for consumers and industry. The sugar content-based approach gives eight categories for still wine, as shown in Table 1.

Table 1 also presents some summary statistics for sugar and alcohol content, based on almost 10,000 commercial wines submitted to AWRI Commercial Services for analysis between 2017 and 2020. It is interesting to note that 91% of red wines and 74% of whites analysed fall into the dry wine category. Less than 1% of red wines and 8% of white wines make up the semi-sweet and sweet categories. Given the size of the data set, this can be considered likely to represent the proportions of wine in each category produced in Australia.

Table 1. Typical sugar and alcohol values for wine styles categorised by sugar content. Data sourced from the AWRI Commercial Services database for finished wines submitted for analysis between 2017 and 2020. Sugar levels are measured as glucose + fructose.

	Sugar range (g/L)	n	1st quartile sugar (g/L)	median sugar (g/L)	3rd quartile sugar (g/L)	1st quartile alcohol (v/v)	median alcohol (v/v)	3rd quartile alcohol (v/v)
Dry red	0 to 4.0	5895	1.0	1.0	1.4	14.3%	14.3%	14.8%
Semi-dry red	4.1 to 12.0	523	4.8	5.7	7.1	13.4%	13.8%	14.0%
Semi-sweet red	12.1 to 45.0	35	13.7	17.2	35.1	13.4%	13.6%	13.9%
Sweet red	> 45.0	16	79.3	94.0	106.4	8.6%	9.0%	12.7%
Dry white	0 to 4.0	2328	0.8	1.5	2.4	12.0%	12.6%	13.1%
Semi-dry white	4.1 to 12.0	577	4.6	5.5	7.0	11.6%	12.3%	12.8%
Semi-sweet white	12.1 to 45.0	81	16.7	24.4	31.7	9.4%	10.3%	11.3%
Sweet white	> 45	162	79.0	102.0	154.0	7.2%	8.9%	11.1%

Calculating typical energy content for the different styles

The values in this table, in conjunction with the generic values for organic acids and glycerol from Wilkes (2021), can be used to calculate typical dietary energy content for each category, using the following formula and energy density factors from the Australia New Zealand Food Standards Code:

kJ/100 mL = (alcohol (% v/v) × 0.78924 × 29) + (sugar (g/L)/10 × 17) + generic acid contribution + generic glycerol contribution.

For red wine this gives:

kJ/100 mL = alcohol × 23 + sugar × 1.7 + 8 + 17

and for white wines:

kJ/100 mL = alcohol × 23 + sugar × 1.7 + 8 + 10

Based on this calculation, for most Australian wines with sugar content < 12 g/L, alcohol represents at least 86% of the dietary energy content, and generally quite a bit more. Energy content values for the different wine categories, calculated based on their median levels of alcohol and sugar, are summarised in Table 2, along with the change in energy content observed if 3rd quartile values are substituted for either sugar or alcohol.

Table 2. Typical dietary energy content of different wine styles based on median levels of alcohol and sugar and generic values for organic acids and glycerol (Wilkes 2021) and the percentage change in energy content if 3rd quartile values are used in the calculation instead of median values

	Sugar range (g/L)	Energy content (kJ/100 mL)	Change in energy content using 3rd quartile value for sugar	Change in energy content using 3rd quartile value for alcohol
Dry red	0 to 4.0	354	0%	3%
Semi-dry red	4.1 to 12.0	351	1%	1%
Semi-sweet red	12.1 to 45.0	366	8%	2%
Sweet red	> 45.0	391	5%	22%
Dry white	0 to 4.0	309	0%	4%
Semi-dry white	4.1 to 12.0	309	1%	4%
Semi-sweet white	12.1 to 45.0	295	4%	8%
Sweet white	> 45.0	395	22%	13%

As can be seen from Table 2, substituting the higher 3rd quartile values for sugar or alcohol into the calculation rather than the median leads to variations of 8% or less in dietary energy content for red and white wines in the dry, semi-dry and semi-sweet categories. This is significantly lower than the 20% label tolerance prescribed in several regulatory environments overseas and supports the use of generic values for these categories of wine. For the sweet categories, however, variations as high as 22% are seen when 3rd quartile values are substituted; as such, the approach of using generic values for these styles is more difficult to justify. While the sample set for these wines is much smaller than that for the dry and semi-dry categories it is generally accepted that a much wider range of sugar and alcohol values is seen in the sweet wine category (both red and white). As such, it is recommended that dietary energy content be calculated independently for sweet wines to ensure that accurate information is communicated to consumers.

Recommendations

Based on the data presented, it appears to be practical to label the vast majority of Australian wines (>98%) for dietary energy content using generic values for six major classes of wine, namely dry, semi-dry and semi-sweet red and white wines. This approach will give results within acceptable label tolerances. It also makes it easier to communicate information to consumers; for example, through webpages and apps. At the same time, it eases the burden on producers by avoiding the need for specialised chemical analysis and multiple label variations.

Across the sweet wines category (> 45.0 g/L glucose + fructose), however, variation in sugar and alcohol content is too high for this approach to provide useful information. Calculations of dietary energy content for products in this category will need to be based on individual measurement of sugar and alcohol, combined with generic values for glycerol and organic acids.

References

Australia New Zealand Food Standards Code – Schedule 11 – Calculation of values for nutrition information panel. Available from: https://www.legislation.gov.au/Details/F2021C00610

Wilkes, E. 2021. Impact of wine components on energy label calculations. AWRI Technical Review 253: 7–13. Available from: https://www.awri.com.au/information_services/publications/technical-review-technical-notes/impact-of-wine-components-on-energy-label-calculations/

Acknowledgements

This work was supported by Australia's grapegrowers and winemakers through their investment body Wine Australia, with matching funding from the Australian Government. The AWRI is a member of the Wine Innovation Cluster in Adelaide, SA. The author would like to acknowledge support from Australian Grape & Wine and the members of the Wine Industry Technical Advisory Committee.

Dr Eric Wilkes, Group Manager – Commercial Services, *eric.wilkes@awri.com.au*