AWRI Australian Wine Research Institute

Fact Sheet
WINEMAKING

How to calculate wine energy values for wine exported to the European Union

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Introduction

The European union (EU) has introduced new laws that require wines produced after 8 December 2023 to display an energy value on-label. This fact sheet outlines steps to calculate the energy value required for the EU market. The new EU laws stipulate that the energy value can be calculated from the known energy values of the ingredients/constituents or calculated from generally established and accepted data. The relevant conversion factors are mandated by article 31 of EU Regulation 1169/2011 and set out in Annex XIV of EU Regulation 1169/2011. Note that conversion factors for EU energy value can differ from those for the Australian domestic market and US market.

Components of wine that contribute to the EU energy value

The alcohol, sugar, glycerol and organic acid content of wine contribute to the EU energy value. No consideration of the protein, fat, salatrims or fibre content is needed for the purpose of wine energy calculations. These components are not typically present in wine or are present at concentrations that do not significantly affect the total energy value (Wilkes 2023). The energy conversion factors from Annex XIV of EU Regulation 1169/2011 are reproduced in Table 1. Relevant constituents for the purpose of calculating the EU energy value appear in bold.

Table 1. Conversion factors from European regulations for use in energy calculations.

Constituent	kJ/g	kcal/g
Alcohol (ethanol)	29	7
Carbohydrate (sugars) (except polyols)	17	4
Polyols (includes glycerol)	10	2.4
Organic acids	13	3
Protein	17	4
Fat	37	9
Salatrims	25	6
Fibre	8	2
Erythritol	0	0

AWRI survey data of glycerol and organic acid concentrations in typical Australian wines suggests that the normal variation of these constituents does not significantly change the total energy value. The use of standard values for the energy contribution of glycerol and organic acids in red or white wine is therefore likely to be appropriate.

Calculating wine energy values for the EU market

Individual energy contributions from each are added together for the total EU energy value. Note that 4.18 kJ is equal to 1 kcal.

Alcohol
The measured alcohol concentration by volume (% v/v) must first be converted to percentage by weight (% w/v). This is performed by multiplying by the density of ethanol, 0.789 kg/L. The result is equivalent to grams of ethanol per 100 mL of wine, which can be multiplied by the energy conversion factors (Table 1) to determine the kJ per 100 mL of wine. To simplify, the energy contribution from alcohol (% v/v) can therefore be obtained by multiplying by a factor of 23 to obtain the kJ per 100 mL of wine.

Carbohydrate (sugars)
Sugar results from either enzymatic or reducing sugars methods can be used for this calculation, as small differences due to the analysis method do not make a practical difference when calculating the EU energy values. Sugar concentrations in wine are expressed in g/L. Before multiplying by the energy conversion factors (Table 1), the g/L is divided by 10 to express as grams per 100 mL of wine.

Polyols (includes glycerol)
It is reasonable to assume a standard glycerol concentration of 10 g/L for all red wines and 5 g/L for all white wines, based on established AWRI survey data (Wilkes 2021). For red wines, the energy contribution from glycerol per 100 mL of wine can assumed to be 10 kJ. For white wines, the energy contribution from glycerol can assumed to be 5 kJ.

Organic acids
It is reasonable to assume a standard organic acids concentration of 6 g/L for both red and white wines, based on established AWRI survey data (Wilkes 2021). The energy contribution from organic acids can be assumed to be 8 kJ per 100 mL of wine.

Commercial wine laboratories including Affinity Labs also offer determination of energy values as an analytical service.

Formulas

Formulas to calculate the EU energy values for typical Australian wines can be simplified to:

EU energy value in kJ/100 mL
Red wine EU energy value (kJ/100 mL) = (alcohol % (v/v) x 23) + (sugar g/L x 1.7) + 8* + 10*

White wine EU energy value (kJ/100 mL) = (alcohol % (v/v) x 23) + (sugar g/L x 1.7) + 8* + 5*

EU energy value in kcal/100 mL
kJ/100 mL ÷ 4.18 = kcal/100 mL.

*Standard energy values for organic acids and glycerol, for red and white wine, derived from AWRI survey data.

Example calculation

A red wine is determined through laboratory analysis to have an alcohol concentration of 14% (v/v) and a sugar concentration of 12 g/L.

EU energy value in kJ/100 mL
Red wine EU energy value (kJ/100 mL) = (Alcohol % (v/v) x 23) + (sugar g/L x 1.7) + 8 + 10
= (14 x 23) + (12 x 1.7) + 8 + 10
= 360 kJ/100mL

EU energy value in kcal/100 mL
kJ/100 mL ÷ 4.18 = kcal/100 mL
360 kJ/100 mL ÷ 4.18 = 86 kcal/100 mL

Format of EU energy value

Energy values can be denoted by the symbol 'E' and must be expressed as kilojoules (kJ) and kilocalories (kcal) per 100 mL of wine, in that order. The energy value must appear on the wine label in clear text where the 'x-height' is 1.2 mm or greater.

References and resources

Wilkes, E. 2023. Typical values for fats, proteins and salt in Australian wine for nutritional labelling. *AWRI Tech. Rev.* 266.

Wilkes, E. 2021. Impact of wine components on energy label calculations. *AWRI Tech. Rev.* 253.

Wine Australia. EU nutrition and ingredient labelling webinar (29 August 2023). Available from: https://www.wineaustralia.com/whats-happening/events/eu-nutrition-labelling-webinar

Wine Australia. Compulsory energy, nutrition and ingredient labelling in the European Union from December 2023. Wine Australia guidance document for exporters.

Contact

For further information on energy calculations, please contact the AWRI helpdesk team.

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