

Does the type or origin of bottle glass affect boron isotope-ratios used for wine authentication?



AWRI

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Background

- ❖ Results from the AWRI provenance project show that the boron isotope ratio contributes to the effective analytical determination of whether a wine is produced in Australia.
- ❖ The boron-11 ratio tested in approximately 300 Australian wines is significantly higher than that found in nearly 100 wines produced overseas.
- ❖ Before this finding is integrated into a decision tree, other hypotheses need to be tested to rationalise this difference.

Hypotheses and aim

- ❖ Bottle glass influences $\delta^{11}\text{B}$ of wine because recycled glass (cullet) is used in varying proportions
- ❖ Contamination of cullet with borosilicate glass alters boron-11 values in wine (however, cullet composition is carefully controlled, at least in Australia)
- ❖ Flint glass is different from antique green, as cullet cannot be used in its production
- ❖ **Aim:** to assess the effect of bottle glass on boron-11 of commercial packaged wine

Results

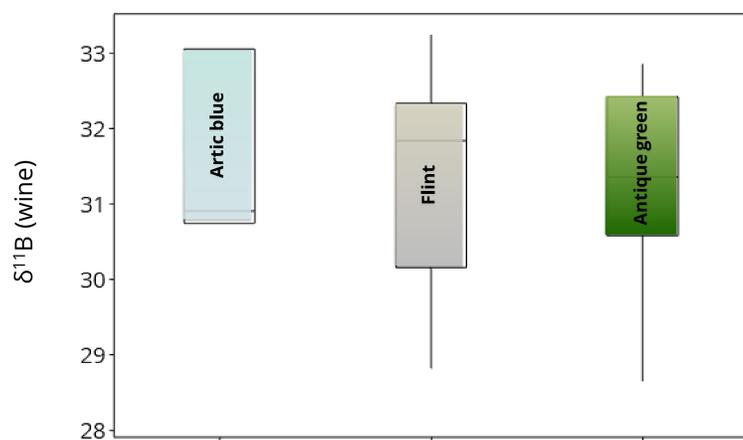


Figure 1. Boron-11 values for a test wine stored for five months in bottles manufactured in different countries

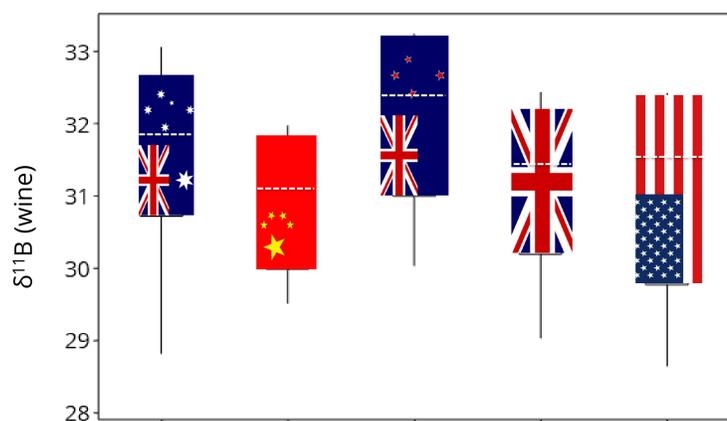


Figure 2. Boron-11 values for a test wine stored in bottles of different colour/type

Method

- ❖ New 750 mL wine bottles (antique green and flint bottles) filled with a red wine
- ❖ Stored for five months at 15 °C
- ❖ Boron-11 isotope ratio ($\delta^{11}\text{B}$) was determined on three bottles per glass type using multi-collector ICP-MS at CSIRO, Waite.
- ❖ Bottle sources: Australia, China, New Zealand, UK, USA

Conclusions

- ❖ No differences were seen between wines stored in glass of different colour or origin.
- ❖ The hypotheses were rejected at the 95% confidence interval.
- ❖ Other sources of variation might still be influential, potentially water source, which should be tested.



The Australian Wine Research Institute

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