

Elemental profiles of New Zealand Pinot Noir and other red wines

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Most previous studies investigating links between the trace metal content of wines and their geographical origins have involved a limited number of regions or have examined wines from regions where traditional winemaking techniques dominate. Regional classification of wines is expected to be more difficult as the number of regions under comparison increases and when wine is prepared using a variety of techniques.

Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) was used to analyse 122 single-region red wines of New Zealand origin, including 87 Pinot Noir wines. Wines from seven of the major New Zealand wine-growing areas could be classified with 80.8 % accuracy using leave-one-out linear discrimination. A higher classification accuracy of 94.4% was achieved when only North Island, Nelson, and South Island other than Nelson were used for classification. The North Island and South Island other than Nelson were almost separable just by considering the Sr and Rb content of the wines, although this grouped Nelson with the North Island.

A smaller dataset of 27 wines from the Hawkes Bay region showed that the Gimblett Gravels Winegrowing District (which is based on a specific soil type) could be discriminated from the remainder of the Hawkes Bay wines with a high degree of accuracy using Ba, Cs, Rb, and Pb.

Rare earth elements (REE) were included in the analysis, since they have been proposed for use in wine provenance [1], although REE concentrations in white wines have been reported to increase when bentonite is used for wine fining [2]. The REE were of limited use even for red wines due to their low and variable concentrations, and possible use of bentonite fining with some red wines.

Limitations on the use of ICP-MS profiling of wines will be discussed, especially when winemaking is not constrained by traditional methodology. Under such circumstances, regional consistency can only arise from the soil, water, and atmospheric contents with which the grapes are contacted.

References

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