

A JOURNEY FROM SOIL TO WINE

Ali Lowrey Ph.D. candidate – School of Chemical Sciences
Supervisors A/Prof Bruno Fedrizzi and A/Prof Gordon Miskelly

OBJECTIVES

To assess elemental profiling for chemical traceability in vineyard soil, bark, leaves, juice and wine from Hawke's Bay & Marlborough, New Zealand.

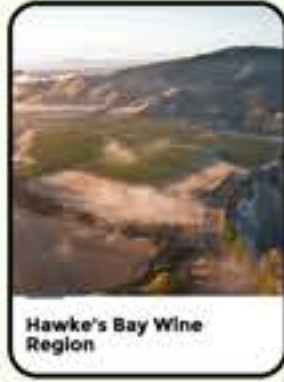
RESEARCH SIGNIFICANCE

The research novelty is the comparison of two NZ winemaking regions in how region could influence elemental concentrations from soil to wine. This research increases knowledge in how the vineyard may influence elements in wine, which could improve wine quality & demarcation.

MATERIALS & METHODS

STEP 1. Study Sites

All samples collected from the same 24 vineyard sites [1]



Marlborough Wine Region

Hawke's Bay Wine Region

PN = Marlborough, Merlot = Hawke's Bay, SB = Both regions [2]



STEP 2. Sampling

Soil - 500g at 20cm deep

Bark & Leaves- 500g from grapevines

Juice - Collected at grape pressing stage

Wine - Made by PFR



Hawke's Bay sampling of bark & leaves

STEP 3. ICP-MS Prep

Soil, Bark & Leaves

- Ground into fine powder
- Acidic digestion HCl/HNO₃/H₂O₂
- Microwave digestion
- Diluted with type 1 water and 2% HNO₃



Juice & Wine

- Thawed and centrifuged 6000 rpm 10 mins
- Diluted with 2% HNO₃

STEP 4. ICP-MS Analysis

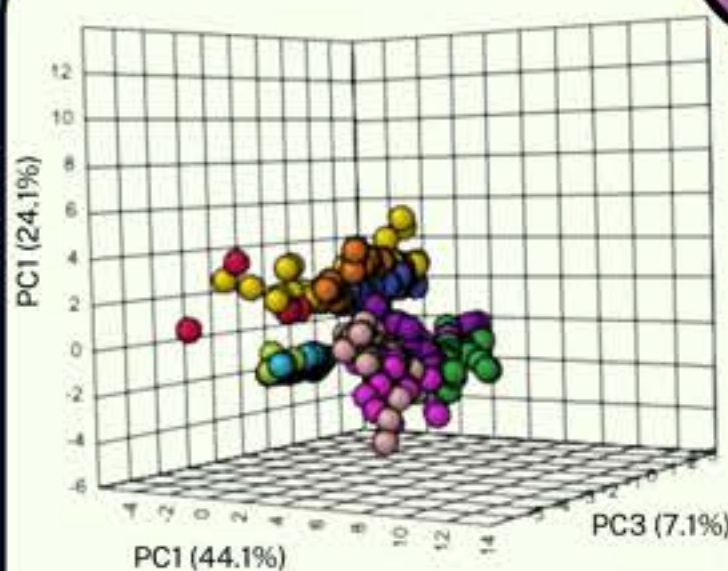
All samples analysed by ICP-MS (Agilent 7700). Output is the concentration of 15 chemical elements:

B, Na, Mg, Al, P, K, Ca, Ti, Mn, Fe, Cu, Zn, Rb, Sr, & Ba.

Concentration data analysed by R & MetaboAnalyst [3].

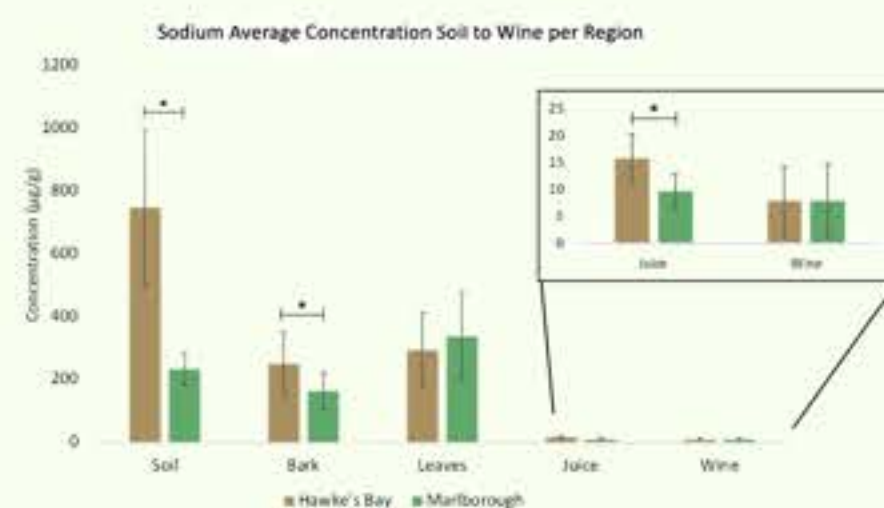


RESULTS & CONCLUSIONS



3 clusters: soil, bark & leaves, juice & wine.

- H Soil
- M Soil
- H Bark
- M Bark
- H Leaves
- M Leaves
- H Juice
- M Juice
- H Wine
- M Wine



(*) Significant difference p -value < 0.05

- Hawke's Bay soil, bark, and juice samples have higher sodium than Marlborough
- Sodium concentrations in juice and wine is significantly different in Hawke's Bay but not in Marlborough

FUNDING

Vineyard Ecosystems Programme Research Collaboration



SCIENCE



REFERENCES

- [1] New Zealand Winegrowers. NZ Wine 2022 [Available from: <https://www.nzwine.com/>].
- [2] Wine Folly. Colours of Wines 2022 [Available from: <https://winefolly.com/>].
- [3] Xia J, Sinelnikov IV, Han B, Wishart DS. MetaboAnalyst 3.0 – making metabolomics more meaningful. Nucleic Acids Research. 2015;43(W1):W251-W7.