

Defining and exploiting the indigenous microflora of grapes

Project ID: ICHDR12

Uninoculated fermentations that use resident grape and wine microflora have seen a dramatic resurgence in winemaking. Previously, fear of spoilage saw resident microbes suppressed by addition of a selected strain and SO₂, but now these resident non-*Saccharomyces* yeasts are being encouraged. The spoilage risk remains, but the reward is an increased flavour complexity arising from extensive competition for and sharing of metabolites and cell-cell interactions. Distinct local populations or 'microbial terroirs' have been demonstrated in recent studies (Knight *et al* 2015). This project will use the unique resource of a single block of many grape varieties on the same soil, encountering the same climatic conditions, to define the impact of grape variety only on microbial terroir. Different varieties, phenology, skin thicknesses, grape and bunch architecture, attractiveness to animal and insect pests, etc are expected to lead to different microbial populations.

The project seeks to identify novel yeast and lactic acid bacteria (for use as pure cultures) and an understanding of vine and grape attributes that favour particular species. Knowledge gained about the grape population that inoculates the fermentation will help winemakers better steer the microbes and fermentation to a desired outcome.

We seek a highly motivated PhD candidate with a high level Honours or Masters qualification or equivalent in microbiology, oenology, molecular biology or similar. The project will be based at the Waite campus of The University of Adelaide. The candidate will develop skills/techniques in design and execution of field and laboratory-based trials; traditional microbial isolation, sequence based identification and physiological characterisation will be core to the work. In addition the student will develop skills in data collection management, scientific communication (ideally via peer-reviewed publications and international conferences) whilst working in a large molecular microbiology research group.

References

- > Knight *et al* (2015) Regional microbial signatures positively correlate with differential wine phenotypes: evidence for a microbial aspect to terroir. *Scientific Reports* **5**:14233.

Related Reading

- > Sumbly KM, Grbin PR, Jiranek V (2014) Implications of new research and technologies for malolactic fermentation in wine. *Applied Microbiology and Biotechnology* **98**:8111-8132.
- > Haggerty *et al* (2015) Optimisation and validation of a high-throughput semi-quantitative solid-phase microextraction method for analysis of fermentation aroma compounds in metabolomic screening studies of wines. *Australian Journal of Grape and Wine Research* **22**:3-10.

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