Discovering the indigenous microbiota associated with Australian Aboriginal and Torres Strait Islander fermentations

Cristian Varela1,2, Lucien Alperstein2, Joanna Sundstrom2, Kathleen Cuijvers1, Maggie Brady3, Vladimir Jiranek2, Anthony Borneman1

1 The Australian Wine Research Institute, PO Box 197, Glen Osmond (Adelaide) SA 5064, Australia
2 Department of Wine and Food Science, University of Adelaide, PMB 1 Glen Osmond, SA 5064, Australia
3 Centre for Aboriginal Economic Policy Research, College of Arts and Social Sciences, The Australian National University, Acton, ACT 2601, Australia

Corresponding author’s email: Cristian.Varela@awri.com.au

Background
In Australia before the arrival of the first Europeans, Aboriginal people produced several fermented drinks including *mangaitch* from flowering cones of a banksia plant and *way-a-linah* from Eucalyptus tree sap. In the Torres Strait, Islanders learned from Filipinos how to make a fermented drink *Tuba* from coconut palm syrup.

Methodology
Microbial populations in soil, bark and sap samples from the cider gum in Tasmania were evaluated by amplicon-based ITS phylotyping. Individual isolates from cider gum samples and from flowers, fruits and palm trees from Erub Island in the Torres Strait were identified. These isolates were then screened for tolerance to stress conditions found in high sugar environments and enzymatic activities potentially relevant to these.

Key findings
Numerous microbial species were found in Tasmanian cider gum samples, with fungal species differing greatly from those associated with other high sugar environments such as grape juice (data not shown).

Similarly, many different yeast species were identified from plants, flowers and fruits from Erub Island. Yeast isolates displayed different tolerances to a range of stress conditions and showed several enzymatic activities.

---

Figure 1. Yeast populations in cider gum
A. Classification according to taxonomy level. Circle size indicates relative abundance. Main classes highlighted by colour.
B. Most prevalent yeast genera.

Figure 2. Screening of 393 individual isolates from Tasmanian cider gum and Erub island flowers and trees
Isolates were screened for growth under anaerobic conditions, low temperature, increasing ethanol concentrations, osmotic stress and for urease and beta glucosidase activity. Grey indicates no yeast growth.