

## The Australian Indigenous Fermented Bush Food Culture

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### INTRODUCTION & AIM

#### Introduction

The 'bush tucker diet' is the heritage of Australian Aboriginal people and signifies an essence of their identity, culture and a way of healthy eating. Indigenous Australians are considered to be the world's first bakers as the stones used for grinding the seeds into flour date back to 65000 years old (Varela et al., 2023). Still, the indigenous population has been ascribed to limited food supplies, lack of affordability of quality produce, nutritional education and non-accessibility of traditional bush foods (Zeanah et al., 2015) which is evidenced to be a significant contributor to health gap among the Aboriginal communities in Australia (Christidis et al., 2015).

**Aim:** This review aims to assess the current evidence that Australian Indigenous population knew the art of fermentation and included many fermented drinks and foods using leaves, seeds, saps, flowers, roots and grasses in their diet. The fermented foods and drinks have nutritional and microbiological benefits hence this review seeks to identify the current evidence about the indigenous fermented foods and drinks. Such diets can offer sustainable nutritional benefits and health outcomes. Therefore, this review aims to collect evidence about the Australian Indigenous fermentation foods and their microbial composition.

### METHOD

A non-systematic search on databases and governmental reports was conducted (PubMed, Web of Science, and Google Scholar) using the following key terms: 'Australian Aboriginal fermented foods', fermented foods in Indigenous Australian culture/history and 'Indigenous fermented foods'. Two authors independently reviewed the published articles during the last 5 years. Paucity of data allowed only a narrative synthesis and to our knowledge this is the first narrative review in this area of study.

### RESULTS & DISCUSSION

The Australian Aboriginal people lived in harmony with the bush and used the land to grow food sustainably. The literature shows that their food culture and history was enriched with fermented drinks prepared from native flora (Foley, 2005).

#### Fermented drinks and Foods produced by Indigenous Australian:

**A: Way-a-linah**, a fermented drink from Tasmanian cider gum -*Eucalyptus gunii*

**B: Mangaitch**, fermented drink prepared from the flowering cones of Banksia in Western Australia.

**C: Tuba**, 'fermented coconut milk' made from palm toddy or coconut palm and was fermented in a clay-stoppered pots (Varela et al., 2023).

**D: Kambuda** fermented drink from the spiral crushed nuts of the palm-like Pandanus tree in the Northern Territory. The nuts are roasted on fire when ripe and red in colour, then crushed and soaked for 2 days in the bark dish and then it is fermented to form low-alcoholic product with mood-altering effects. It is also documented that the traditional indigenous drinks of Australia were mild and low in alcohol but only after the colonization, the Aboriginal people tasted the stronger alcohols (Brady, 2008).

### RESULTS & DISCUSSION

**E: Damper**, bread with seeds from various species of *Acacia* such as *A. coriaca*, *A. aneura*, *A. cowleana*, *A. tenuissima* (Zeanah et al., 2015), utilizing fermented drink 'culture' that served the purpose of yeast. Warlpiri and Anmatyerr people identified around 20 different edible wattle seeds, a dozen grass seeds, and about ten other species with edible seeds (Curran et al., 2019).

**Microbial composition of fermented drinks:** Very few indigenous fermented drinks and foods of Australia have been tested for microbial composition. The sap of *Eucalyptus gunni* which is the key ingredient for making *way-a-linah* when analysed using HPLC, was observed to contain sugars, organic acids, glycerol, ethanol. Variety of bacterial and fungal species were found to be present in this sap, mainly Acetic acid bacteria (AAB) *Gluconobacter* and *Acetobacter*. The most abundant fungal classes were *Saccharomycetes*, *Dothideomycetes* and *Leotiomyces*. However, *S. cerevisiae* and *S. uvarum* that are mainly needed for wine making were found to be present at very low concentration in these samples (Varela et al., 2020). Another fermented drink *Tuba* is reported to have diverse microflora profile: *Aureobasidium pullulans*, several species of *Candida*, *Hanseniaspora* sp., *Meyerozyma*, *Saccharomycetes*, *Dothideomycetes*, *Tremellomycetes*, *Leotiomyces* and *Sordariomycetes* (Varela et al., 2023).

**Nutritional and Health benefits of bush foods:** Various components of the rich flora (fruits, seeds, leaves, bark, twigs, roots, flowers and stems) are experimentally shown to have antioxidative, antimicrobial and enzyme-inhibitory potential. For example., *Santalum spicatum*, *Acacia ligulata*, *Beyeria leshnaultii*, *Acacia kempeana* and *Euphorbia drumondii* (Gulati et al., 2012). The species have also been reported in cell-based studies to have good anti-diabetic, anti-obesity, anti-cancer potential with no toxicity (Gulati et al., 2015).

### CONCLUSION

The review highlights the rich history of fermented drinks and foods of Australian Aboriginals; however, data on microbial diversity, biological activities and chemical profiling needs to be investigated. The extent of their nutritional and health benefits need to be explored further to have far-reaching benefits beyond the gut.

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