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Perennial Horticulture Fact Sheet

Key Points

- Premium sparkling wine is made by a two-step fermentation process in closed bottles (*Méthode Traditionelle*)
- 'Autolytic' or 'aged' sensory characters develop in the wine over a long period of time
- Novel technologies in winemaking can enable a more rapid production of a higher quality sparkling wine

Building quality in sparkling wine

Introduction

Tasmania with its cool climate is regarded as Australia's sparkling wine capital. The quest for quality in sparkling winemaking involves a combination of tradition and innovation. Tradition lies in the expression of terroir, in other words, preservation of the grape character as a true representation of place of origin.

Sparkling wine derives its complexity from viticultural practices, base wine compositions, winemaking processes and maturation in the bottle during storage. Lengthy ageing on lees benefits the wine, and the natural break down of yeast cells (autolysis) imparts sensory attributes like toasty, bread-like and nutty aromas to the wine. However, the long ageing on lees delays the release of sparkling wine thereby adding significant cost to producers and with potential risk of reputation if wines of poorer quality are released earlier.



Sparkling wine production

The sensory characteristics perceived in sparkling wine are the products of natural flavour formation in the grape berries, base wine blends, fermentation processes and wine ageing.

The traditional method of sparkling wine production follows a two-step fermentation process. Firstly, juice from pressed grapes undergoes a primary fermentation to produce a base wine, followed by a successive addition of *liqueur de tirage* (a mixture of yeast, sugar, nutrients and adjuvant) that initiates a secondary fermentation in closed bottles stored at constant temperature. During fermentation, the yeast consume sugar and nutrients producing alcohol and carbon dioxide which increase in the wine resulting in the characteristic effervescence. At the end of the ageing period, lees are removed from the bottle in a process called disgorging.



The role of yeast in autolysis

After fermentation, yeast continues to play an important role in sparkling wine flavour development. Ms Gail Gnoinski is investigating how yeast affects sparkling wine flavour and ways that winemakers can adjust ageing conditions to build quality in Australian sparkling wine.

Together with supervisors Drs. Fiona Kerlake, Anna Crew and Dugald Close, she is analysing a process called autolysis which is believed to be vital in shaping the flavours and mouth feel of premium wines by imparting a creaminess and reducing astringency. Autolytic characters develops when wine is left in contact with lees after fermentation to age for months or years. They are testing novel methods (ultrasound, microwave and enzymes) that may hasten flavour development and reduce the time required for autolysis.

Visualising sparkling wine ageing

Scanning electron microscopy (SEM) is a rapid method to visualise alteration effects on yeast cells as wine ages. The evolution of yeast structural changes and cellular degradation of lees over sparkling wine bottle ageing periods is being investigated to establish whether long ageing on lees is responsible for producing autolytic character. This information is key to understanding the mechanisms of yeast lysis and may have a bearing on the onset of autolysis post-secondary fermentation and the degree of release of 'autolytic' compounds into sparkling wines as ageing progresses.

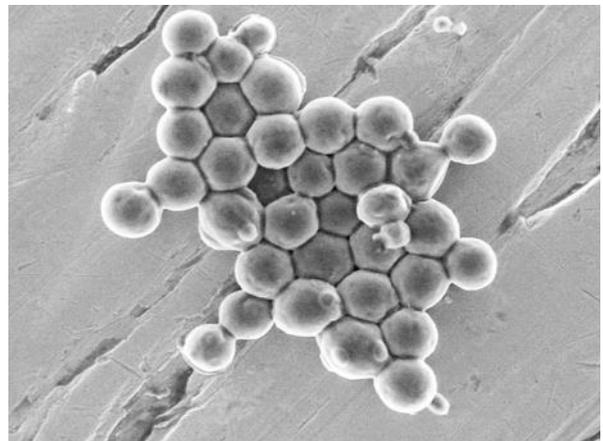
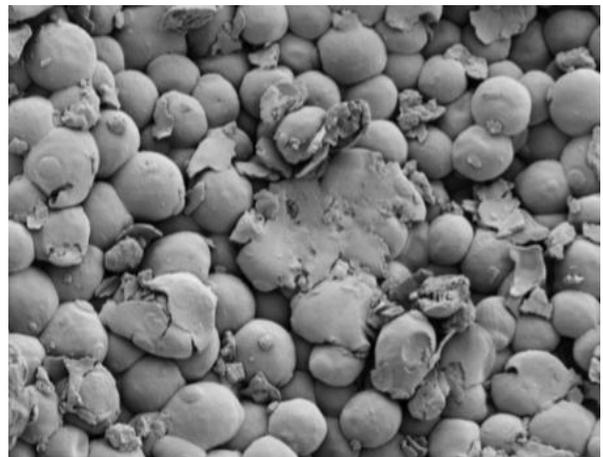


Figure 1. SEM image of *S. cerevisiae* cell colonies, showing budding scars on the mother cells.

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