



ARC Training Centre for Innovative Wine Production

Technical note

CHANGES IN WINE DURING ALCOHOL CONTENT REDUCTION

Introduction

Over the last 30 years, a steady increase in wine alcohol content has been observed around the world, possibly arising from warmer climates, compressed vintages and preferences for riper wine flavours [1]. Higher levels of alcohol can have health and social implications, attract higher duties for producers, reduce yeast activity during fermentation causing stuck and slow fermentations, and alter wine sensory profile. For these reasons, the international interest in lower-alcohol wine production and consumption has grown [2,3].

A desirable sensory profile is a major consumer driver for wine acceptability and should be considered during the production of reduced-alcohol wines. Although various viticultural practices and microbiological approaches show promising results, separation technologies such as membrane filtration, in particular reverse osmosis and evaporative perstraction, in addition to vacuum distillation, represent the most common commercial methods for producing reduced-alcohol wine. However, alcohol removal from wine can result in a significant loss of desirable volatile compounds such as esters (e.g. ethyl octanoate, ethyl acetate, isoamyl acetate) that contribute positively to the overall perceived aroma. These losses can potentially reduce the acceptability of wine to consumers and decrease their willingness to purchase wines that have been alcohol adjusted. The change in aroma attributes as a result of the ethanol removal processes is influenced by a number of factors, such as the type of alcohol reduction process; the chemical-physical properties (volatility, hydrophobicity, steric hindrance) of the aroma compounds; the retention properties of the wine non-volatile matrix and the alcohol level [4].



The key outcomes

Although a number of strategies have been implemented for reducing wine alcohol content, membrane-based technologies (reverse osmosis, evaporative perstraction and pervaporation) and vacuum distillation (spinning cone column) have been adopted to the greatest extent by the wine industry. Despite losses of important aroma compounds occurring during alcohol removal from wine, reductions in alcohol of up to 2% v/v do not appear to alter consumer liking, which is important for wine producers who are looking to make fruit-forward, ripe wine styles.

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