The Effect of Grape Temperature at Pressing on Phenolic Extraction and Evolution in Méthode Cap Classique Wines Throughout Winemaking

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Phenolic compounds are important quality indicators of wine. Their composition in wine is determined by various factors, including grape variety, terroir, viticultural practices and oenological practices. There is very little extraction of colour compounds and, generally, very little phenolic content is expected and desired during traditional sparkling wine (TSW) vinification. Since phenolics are thought to reduce ageing capacity (Zoecklein, 2002), and are linked to browning in TSW (Ibern-Gómez *et al*., 2000), winemakers try to keep phenolic concentrations low throughout winemaking. This study investigated the effect of grape temperature at pressing on the phenolic extraction in Méthode Cap Classique (MCC) wines and the evolution of the phenolics throughout winemaking. MCC wines were made by the traditional method over two vintages (2014 and 2015) using Chardonnay and Pinot Noir grapes harvested from two regions (Robertson and Darling) and stored at 0°C, 10°C, 25°C and 30°C. MCCs made from grapes stored at lower temperatures (0°C and 10°C) were found to have lower total phenolic content, colour intensity and total hydroxycinnamates than wines made from grapes stored at higher temperatures (25°C and 30°C). This shows that there was greater phenolic extraction at higher temperatures. No changes in the phenolic content were observed throughout winemaking.

INTRODUCTION

The grape cultivar, clone, viticultural practices and vinification all affect the composition and concentration of phenolic compounds in wine (Singleton *et al*., 1983; Spigno *et al*., 2007; Kerslake *et al*., 2013). The phenolic composition and concentration of the grape berry are good indicators of what ultimately goes into the wine itself. Traditional sparkling wine (TSW) winemakers do not desire a high phenolic content, as high phenolic levels are thought to have negative effects on the processing of sparkling wine (Zoecklein, 2002). Early harvesting when the phenolic maturity is low, light pressing of the grapes and a lack of skin contact are used to obtain juice with low phenolic concentrations (Zoecklein, 2002). Due to these viticultural and vinification practices, the phenolic content of TSWs comprises mainly non-flavonoids (Andrés-Lacueva *et al*., 1996; Ibern-Gómez *et al*., 2000).

TSWs have a lower phenolic concentration compared to table wines (Zoecklein, 2002; Chamkha *et al*., 2003). Grape-derived phenolic compounds can be categorised into two main groups, namely non-flavonoids (hydroxybenzoic/phenolic acids and hydroxycinnamates) with lower molecular weight and flavonoids (anthocyanins, flavan-3-ols and tannins) with higher molecular weight (Fernandéz de Simon *et al*., 1992; Pozo-Bayón *et al*., 2003; Monagas *et al*., 2005). Non-flavonoids are located throughout the berry, but are more concentrated in the flesh and hence are extracted into the juice upon pressing during TSW vinification (Ribéreau-Gayon, 1982).

Two studies on the evolution of phenolics throughout TSW winemaking found differing results. A study on cava TSW made using Spanish cultivars showed a decrease throughout winemaking, and the total phenolic content was higher than that of champagne made from Chardonnay and Pinot Noir cultivars (Martínez-Lapuente *et al*., 2013). The phenolic concentrations of champagne were lower than those reported for cava and in addition showed no change throughout winemaking (Chamkha *et al*., 2003). These differences may have been due to the differences in grape cultivars used. These studies used high-performance liquid chromatography diode-array detection (HPLC-DAD) to quantify total and individual proanthocyanidins, flavonols and hydroxycinnamates and found that the total

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