

CHANGES IN THE COMPOSITION AND EXTRACTABILITY OF FLAVONOIDS IN CABERNET SAUVIGNON: INFLUENCE OF SITE, CLIMATE AND VINE WATER STATUS

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Abstract

The purpose of the study was to monitor berry development as a function of site, vine water status and climate in order to improve our understanding of the role played by climate change on secondary metabolites relevant to wine quality. 35 wineries, consisting of 75 vineyard blocks, mainly located within the Napa Valley were monitored throughout the 2015 growing season. Across the studied sites, there was a large difference in climatic conditions, ranging up to 700 growing degree days. This large difference in heat accumulation profiles, as well as heat events, in the local area allowed us to better understand the change in phenolic concentration, composition and extraction profiles over a range of pedoclimatic areas. Vine water status was measured throughout the season using sap flow sensors within the berry sampling area. For each site, berry samples were collected at five times between veraison and commercial harvest. Skin and seed exhaustive extractions (2:1 acetone:water) were done after the pulp was removed from the berry and the skin separated from the seed. Partial extractions of berries was done on crushed whole berries in a 16% v/v ethanol solution containing 100 mg/kg of SO₂ in order to develop an understanding of phenolic extractability over the space-time-climate continuum. Extracted phenolics were monitored using four separate HPLC methods in order to provide information on low molecular mass phenolics as well as tannin concentration, composition and activity. A discussion of climate change impact on premium wine production regions is given in the context of the variation in phenolic chemistry observed in this study.

Keywords: *Cabernet Sauvignon, terroir, vine water status, viticulture, climate*