

THE IMPACTS OF ION EXCHANGE ON THE VOLATILE COMPOSITION OF WINE AND THE CHARACTERIZATION OF MISSOURI WINE AROMAS

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ABSTRACT

Cation exchange is a promising tool for managing high pH/TA wines, including in Missouri where wines with this chemical profile are commonly encountered. High pH/TA wines occur due to cultivar choice, weather, soil and viticultural practices that result in grapes with high potassium concentrations at harvest. However, cation exchange has not been widely adopted due to concerns about its tendency to strip flavor and aroma, thus reducing overall wine quality. Four wines (Valvin Muscat, Chambourcin, Norton, and Syrah) were treated using ion exchange. Organic acid, potassium, sodium, Calcium, and Magnesium concentrations were monitored during treatment. Percent alcohol was determined after treatment. Differences in GC-MS chromatograms were determined using untargeted analysis software. Treated wines were distinguished by principal component analysis. The wines displayed a 50% reduction on average in tartaric, malic, and lactic acid, and a 90% reduction in potassium, sodium, calcium and magnesium during the initial stages of treatment. Only sodium and calcium concentrations remained lower than initial levels even at the end of treatment indicating that these ions may be preferentially scavenged. Percent alcohol was reduced by 0.2-0.7% overall. Unique features (85) were determined as being different between control and treatment wines in the GC-MS chromatograms. Phenolic monomers and monoterpenes were most significantly impacted by treatment.