

Characterization of Phenolic Compounds from Carménère Wines during Aging with Oak Wood (Staves, Chips and Barrels)

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Abstract : Wine is an important source of polyphenols. Red wines show important concentrations of nonflavonoid (gallic acid, ellagic acid, caffeic acid and coumaric acid) and flavonoid compounds [(+)-catechin, (-)-epicatechin, (+)-gallocatechin and (-)-epigallocatechin]. However, a significant variability in the quantitative and qualitative distribution of chemical constituents in wine has to be expected depending on an array of important factors, such as the varietal differences of *Vitis vinifera* and cultural practices. It has observed that Carménère grapes present a differential composition and evolution of phenolic compounds when compared to other varieties and specifically with Cabernet Sauvignon grapes. Likewise, among the cultural practices, the aging in contact with oak wood is a high relevance factor. Then, the extraction of different polyphenolic compounds from oak wood into wine during its ageing process produces both qualitative and quantitative changes. Recently, many new techniques have been introduced in winemaking. One of these involves putting new pieces of wood (oak chips or inner staves) into inert containers. It offers some distinct and previously unavailable flavour advantages, as well as new options in wine handling. To our best knowledge, there is not information about the behaviour of Carménère wines (Chilean emblematic cultivar) in contact with oak wood. In addition, the effect of aging time and wood product (barrels, chips or staves) on the phenolic composition in Carménère wines has not been studied. This study aims at characterizing the condensed and hydrolyzable tannins from Carménère wines during the aging with staves, chips and barrels from French oak wood. The experimental design was completely randomized with two independent assays: aging time (0-12 month) and different formats of wood (barrel, chips and staves). The wines were characterized by spectrophotometric (total tannins and fractionation of proanthocyanidins into monomers, oligomers and polymers) and HPLC-DAD (ellagitannins) analysis. The wines in contact with different products of oak wood showed a similar content of total tannins during the study, while the control wine (without oak wood) presented a lower content of these compounds. In addition, it was observed that the polymeric proanthocyanidin fraction was the most abundant, while the monomeric fraction was the less abundant fraction in all treatments in two sample. However, significative differences in each fractions were observed between wines in contact from barrel, chips, and staves in two sample dates. Finally, the wine from barrels presented the highest content of the ellagitannins from the fourth to the last sample date. In conclusion, the use of alternative formats of oak wood affects the chemical composition of wines during aging, and these enological products are an interesting alternative to contribute with tannins to wine.

Keywords : enological inputs, oak wood aging, polyphenols, red wine

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