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Malolactic fermentation and ageing in oak wood barrels: Impact on ellagitannin and anthocyanin content, volatile composition and sensory profile of red wines

Kleopatra Chira

Institut des Sciences de la Vigne et du Vin, France

Chemical composition, aromatic profile and sensory attributes of wines lie in the grape variety, winemaking procedure, maturation and ageing. Traditional red wine production usually consists of performing both alcoholic and malolactic fermentations in the same tank, and then, ageing in oak barrels for a variable period of time, ranging from a few months to over a year. In an attempt to obtain particular quality wines with their own personality and a higher organoleptic complexity, alternative production technologies, such as carrying out the malolactic fermentation (MLF) in the same oak barrels where ageing will take place, are being introduced in the wineries in an increasingly widespread way. The present research compares ellagitannin and anthocyanin profiles, woody volatile composition and sensory properties of wines in which malolactic fermentation (MLF) takes place in tanks prior to 12-months ageing or in oak barrels themselves. Three different barrel toasting (medium toast, MT; medium toast with watering, MTAA; noisette) were considered for ageing of each wine modality. Sensory analyses (triangle and rating tests) were also performed. Two-way ANOVA of the raw experimental data revealed that the toasting method and the container where MLF took place, as well as the interaction between both factors, have a significant influence on ellagitannin, anthocyanin and woody volatile profiles of Cabernet Sauvignon wines. Barrel-fermented wines generally presented 1.2-fold higher total phenolics, whereas tank-fermented wines exhibited 1.1 and 1.2-fold greater total proanthocyanidin and anthocyanin contents, respectively. Concerning the ellagitannin composition, barrel toasting effect seemed to be more important than differences due to MLF-container. Certain woody and fruity volatiles varied significantly depending on whether MLF occurred in barrels or tanks. Barrel-fermented wines were preferred in mouth, while olfactory preference depended on barrel toasting.

kleopatra.chira@u-bordeaux.com