

Potential mitigation of smoke taint in wines by post-harvest ozone treatment of grapes

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In recent years, due to climate change, hot and dry summers are increasing and consequently the number of bushfires also in specific areas where viticulture is widely diffused (e.g. California, Australia). When fires occur in proximity of vineyards grapes are exposed to smoke and a range of changes in the chemical composition and sensory characteristic of grapes and wines, occurs. Smoke taint is the term used to describe the smoky, medicinal, and ashy characters exhibited in wines following grapes exposure to bushfire smoke, which have been attributed to the presence of smoke-derived volatile phenols and its glycoconjugate forms. The taint is an issue of increasing interest since there are significant difficulties in the production of high-quality wine from smoke affected berries. The main goal of this study is to investigate the feasibility of using post-harvest ozone (O₃) treatments to mitigate the smoke taint in wine. Smoke trails have been carried out exposing vines (*Vitis vinifera* L. cv Cabernet Sauvignon) to high density smoke for one hour seven days after veraison. Four weeks after the smoke treatment harvested grapes were treated with gaseous O₃ as follow: 1 ppm for 6, 12 and 24 hours and 3 ppm for 6, 12 and 24 hours. The grapes were then processed to make wines. The extent of smoke taint in grapes and in the resultant wines was determined by quantification of glycoconjugate and volatile phenols, responsible for the smoke taint, and by descriptive sensory analysis. High amount of volatile phenols was observed in wines made from smoke-affected grapes. The amount of these compounds was significantly lower in the wine from smoke-affected and ozone-treated grapes. Furthermore, this wine showed a less intense smoke-related sensory attributes. Our results point out the effectiveness of post-harvest ozone treatment in mitigate the smoke taint characters of wines.

Keywords: wine grapes, Cabernet Sauvignon, volatile phenols, glycoconjugate phenols, smoke.