



Determination of the possible contribution to aroma using odor activity values of volatile compounds of wines analyzed by comprehensive two dimensional gas chromatography

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Volatile compounds play a significant role in wine aroma. However, not all compounds present in wine contribute to aroma. The influence of a volatile compound to the final aroma depends on its concentration in wine and on the perception threshold of this specific compound. Odor activity value (OAV) is obtained from the ratio between the concentration of an individual compound and its perception threshold¹. A volatile compound contributes to aroma when its concentration in wine is above the perception threshold, therefore, odorants with $OAV > 1$ can be perceived. The aim of this study was to use the HS-SPME-GC × GC/TOFMS to quantify volatile compounds of wines produced with Chardonnay grapes in Serra Gaúcha region, Brazil and determine their possible contribution to aroma through the determination of OAV for each tentatively identified compound. The use of GC × GC/TOFMS resulted in the tentative identification of 243 compounds, 42 of these compounds co-eluted in the first dimension and 34 of them were separated in the second dimension, while the others (8) were resolved by spectral deconvolution, which indicates that the conventional ID-GC/MS may result in misleading results in the case of Chardonnay volatiles. Forty-seven volatile compounds showed $OAV > 1$, indicating potential to contribute to wine aroma. The compounds with highest OAV were ethyl octanoate (OAV = 130, sweet, fruity or pear aroma), ethyl hexanoate (OAV = 48.2, fruity, green apple or wine-like aroma), ethyl butanoate (OAV = 38, strawberry or apple aroma), β-damascenone (OAV = 20, honey or sweet aroma), octanoic acid (OAV = 16, fatty or rancid aroma) and isoamyl acetate, OAV = 9.6, banana, fruity or sweet aroma). β-Damascenone was the fourth compound with highest OAV and this C13-norisoprenoid co-eluted with (Z)-2-methyl-2-butenoic acid in both first and second dimension. Mass spectral deconvolution was quite useful in this case, whenever chromatographic selectivity was not enough to achieve separation. The odor of (Z)-2-methyl-2-butenoic acid is described as spicy, pungent, while β-damascenone positively contributes to aroma, as already mentioned. The quantitative determination and OAV calculation resulted in a reduced number of target compounds to focus on, as only 47 volatiles were considered relevant to aroma. This type of approach may facilitate data treatment of complex wine volatiles and the implementation of a simpler quality control considering a smaller number of important compounds.

Palabras clave: Comprehensive two-dimensional gas chromatography, Odor activity value, OAV, wine, Chardonnay wine.

¹Guth H. 1997. *Journal of Agricultural and Food Chemistry*, 45, 3027–3032.

²Juan S. et al. 2012. *Journal of Agricultural and Food Chemistry*, 60, 5045–5056.