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Validation of the olfactometric method for wine aroma analysis

An original approach for wine aroma recombination

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Gas chromatography coupled to mass spectrometry and olfactometry (GC-MS-O) is a method commonly used to study wine aroma. Analysis of experiments involving several judges results in a profile in which the more detected odorants are supposed to contribute most to the aroma product. While valuable, this method does not provide information on the actual impact of these compounds when they occur together in the product.

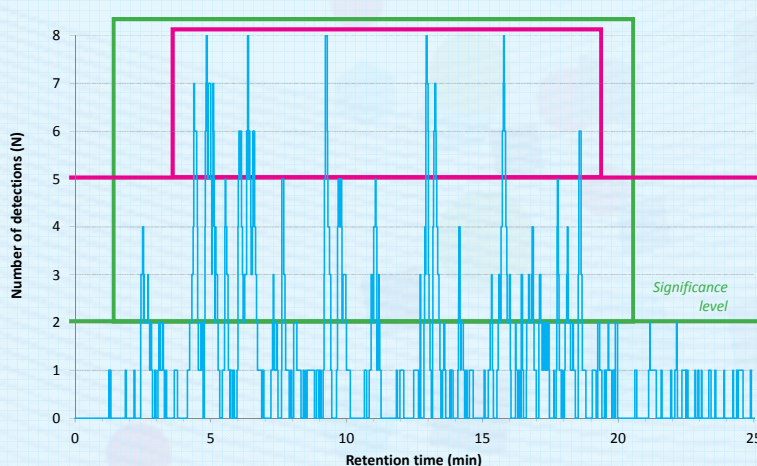
Under the InnOscent device - a laboratory-designed chromatographic system - an innovative reconstitution method was developed to evaluate the contribution to wine aroma of odorants detected by GC-O and assess the relevance of the olfactometric approach.

SPME extraction and olfactometric analysis



Car/PDMS
SPME fiber

T = 34°C
Extraction time = 1 hour

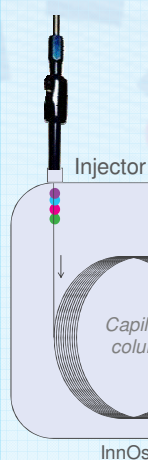


33 odorant zones were significantly detected

Compounds perceived by at least 6 judges $N \geq 6$

Compounds perceived by at least 3 judges $N \geq 3$

Recovery and assessment of bespoke aromatic extracts



Mass Spectrometer
Switching and selecting device
FID
Gas flow
InnOscent patented device

Total extract = hidden reference

All compounds

Extracts with only compounds detected by

$N \geq 3$

$N \geq 4$

$N \geq 6$

$N = 8$

Sensory testing - the similarity of the odor extracts' was assessed against the odor of a total extract

Similarity with total extract

8,2^a
7,7^a
7,4^a
7,2^a

Extracts designed with compounds significantly detected by GC-O are perceived similarly to the total extract

2,2^b

Mixture of compounds perceived by at least 6 judges is also perceived similarly to the total extract

33 odorant zones were significantly detected by GC-MS-O analysis. Evaluation of extracts designed with the InnOscent device demonstrates that the mixture of odorants detected significantly by GC-O can mimic the aroma of the wine studied. Moreover, the mixture those perceived by 75% of the judges is demonstrated to be sufficient to mimic the aroma of the wine whereas these compounds represent only around 40% of the odorants detected.

This original approach of recombination which does not require standards, enables to reinforce the relevance of GC-O to explore complexity of wine aroma.

