PROBE KEY-ODORANTS IN WINE THROUGHT ONLINE GC/O RECOMBINATION WITH OLFACTOSCAN

Noëlle Béno[1], Aurélie Loison[1], Angélique Villière[2], Yves Le Fur[1] and Thierry Thomas-Danguin[1]

[1] Centre des Sciences du Goût et de l'Alimentation, AgroSup, CNRS ,INRA, UBFC, F-21000 Dijon, France

[2] ONIRIS, UMR GEPEA CNRS 6144-Équipe Flaveur, F-44307 Nantes, France

CONTEXT AND AIM

Many studies have dealt with molecular determinants of wine flavour, but it is still difficult to identify which flavour compounds drive the typicality of this complex beverage [1]. This typicality is largely influenced by the olfactory dimension so that most studies focused on the aroma of wine through deep analyses of its composition in odorants. However, the identification and quantification of the odorants in the headspace is not sufficient to understand the overall aroma of a wine. Indeed, perceptual interactions induced by the perception of odorants in mixture deeply contribute to shape the overall perception [2]. Therefore, odorant recombination approaches are required to prove that an odorant is a key-odorant of a wine aroma. This study aimed to evaluate the impact of odorants from Pinot Noir (PN) and Cabernet Franc (CF) wines when added to the aroma of a middle range typicality wine.

MATERIALS AND METHOD

Olfactoscan technique (OS) [3] [4] relies on the combination of an Olfactometer to deliver the background middle range typicality wine odour and GC/O to add separated odorants to the background odour.
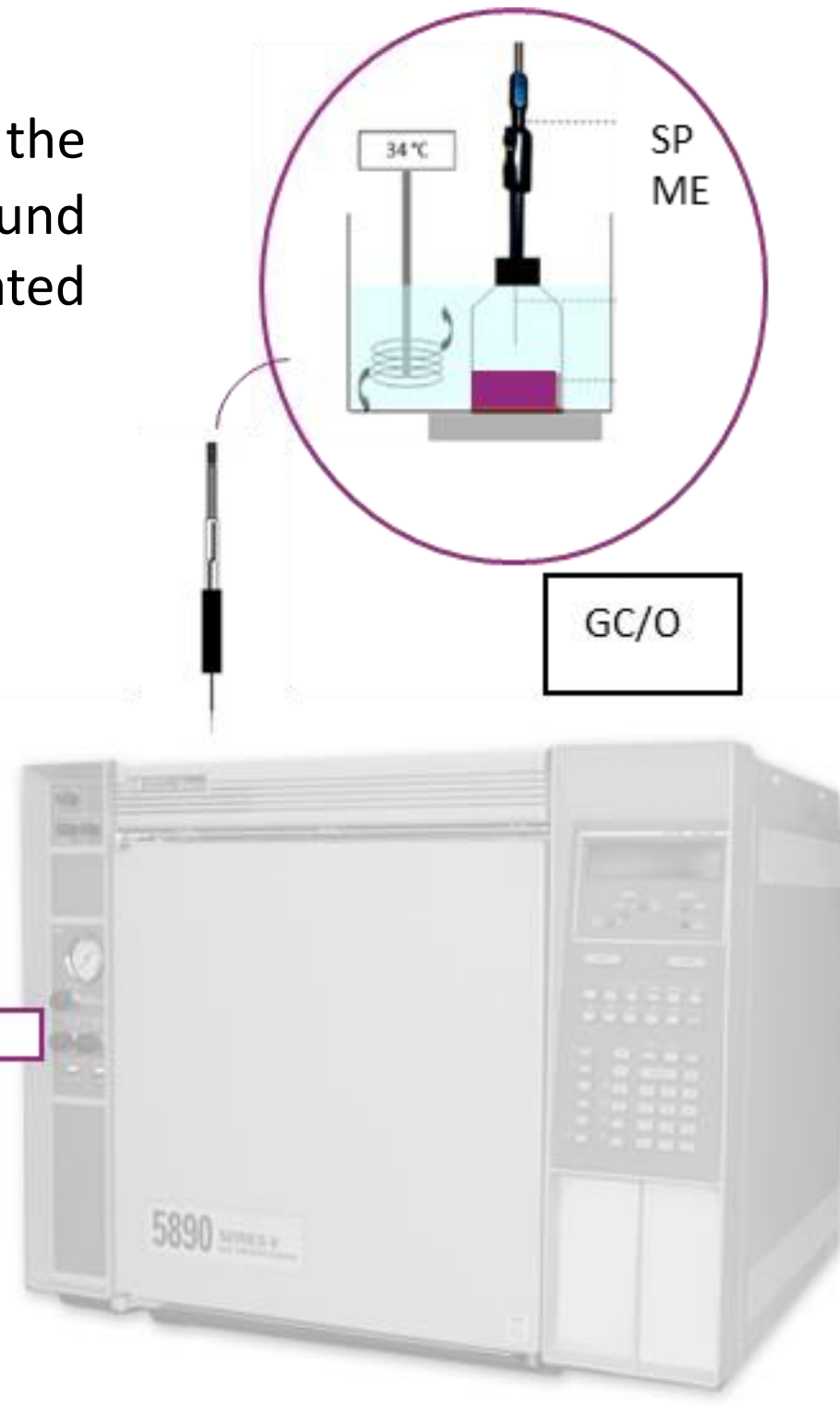
16 panelists DIJON

Middle-range typicality wine
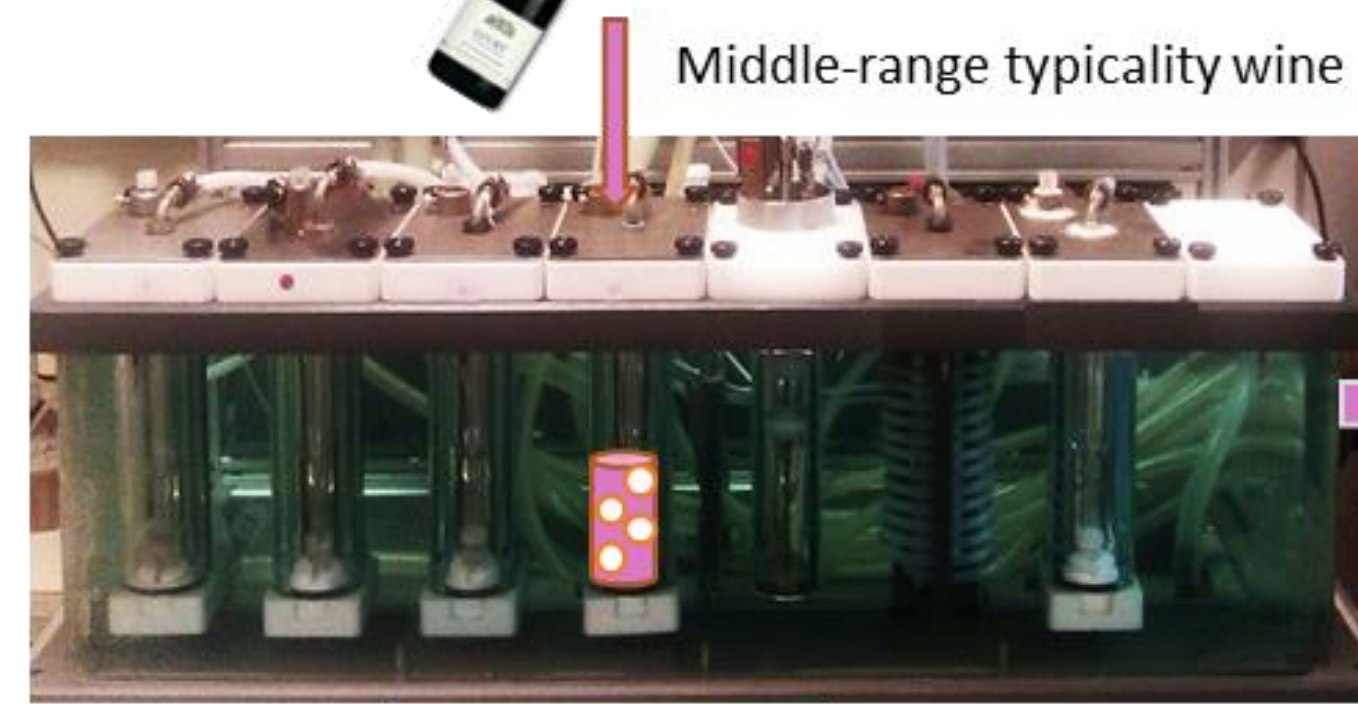
Code	Appellation	Village	Vintage	Typicality note
PN	Bourgogne	Givry	2010	4,78
CF	Saumur	Saumur	2010	6,3

Pinot Noir (PN)			
Code	Appellation	Vintage	Typicality note
PN1	Bourgogne	2010	5,78
PN2	Bourgogne	2010	4,54
PN3	Bourgogne	2009	4,19
PN4	Bourgogne hautes côtes de Beaune	2010	4,48
PN5	Savigny les beaune village	2010	4,38
PN6	Maranges	2010	6,01
PN7	Côte de Nuits villages	2010	6,21
PN8	Ladoix	2010	6,26

Cabernet Franc (CF)			
Code	Appellation	Vintage	Typicality note
CF1	Bourgueil	2010	6,25
CF2	Chinon	2010	3,26
CF3	Chinon	2009	6,49
CF4	St Nicolas de Bourgueil	2010	6,35
CF5	Bourgueil	2010	6,54
CF6	Bourgueil	2010	3,84
CF7	Bourgueil	2010	7,12
CF8	Saumur Rouge	2010	4,09

GC/O] [5] Volatile compounds were extracted in wine headspace, during 10 min by Solid Phase Micro Extraction (SPME).
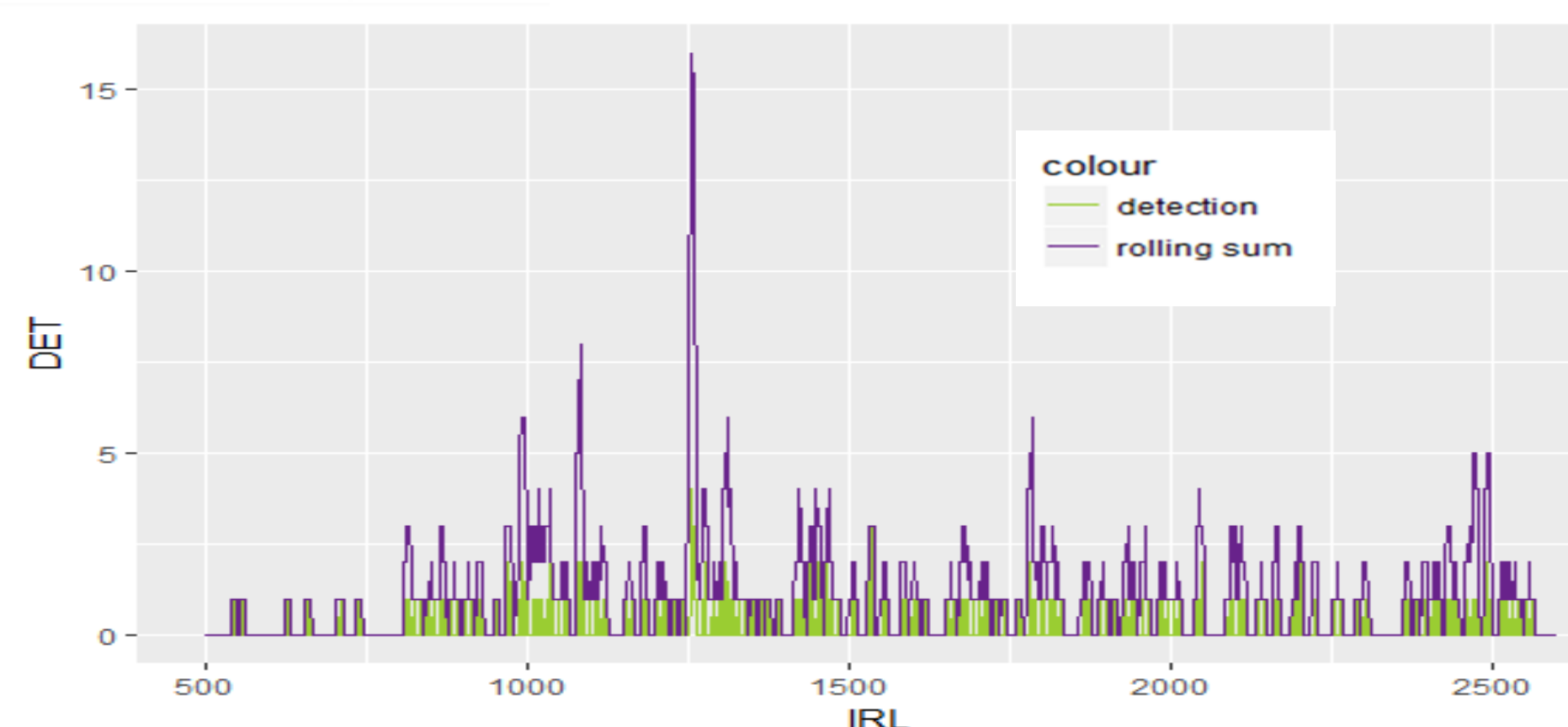
8 panelists NANTES

Responses were collected at the sniffing port during 24 min with the Acquisniff® software.

Rolling sum scored the number of detections in a 10 IRL range. Sum strictly higher than 2 have been retained.
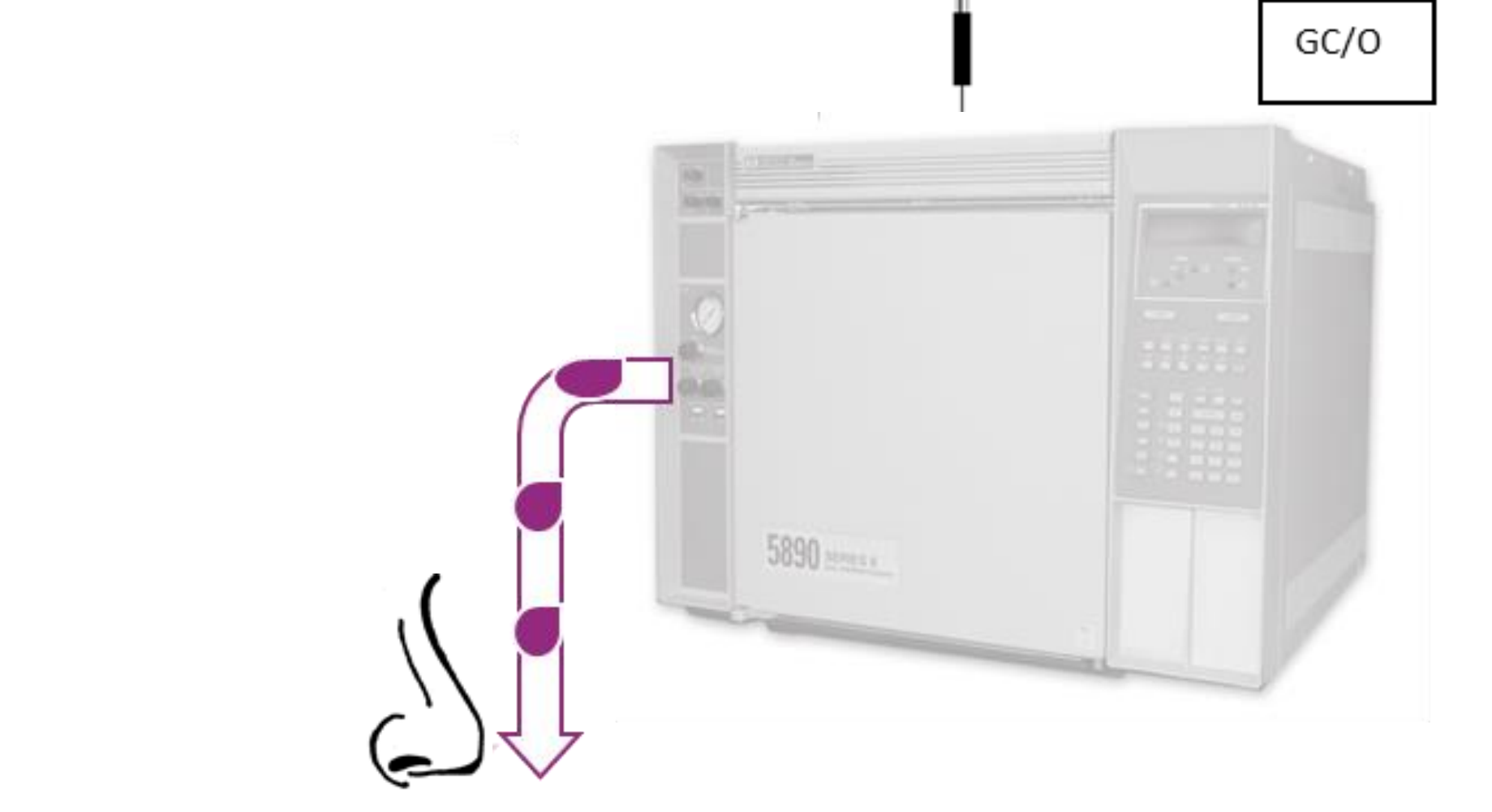
Responses were collected at the sniffing port during 24 min with the Olfactometric software [5].

Odorant zones detected by at least 3 out of 8 panelists were reported

RESULTS

The detection's number obtained by 16 panelists with olfactoscan (OS) are compared to the detection's number obtained by 8 panelists whith classical GC-Olfactometry (GC/O) [6].
Percentages were calculated by (OS/16 - GCo/8)x100. Selected results are visible in the 2 tables below . In the olfactoscan mode some odors were revealed (green), masked (pink) or still percieved within the wine background odor (yellow). A cutt-off score at 43,75% indicate that 20 odors are masked and 5 are revealed in Pinot Noir wines, and 27 are masked and 2 are revealed in Cabenet Franc wines.

Wines	LRI 1061	LRI 1082	LRI 1216	LRI 1255	LRI 1309	LRI 1450	LRI 1746	LRI 2112
PN1	-87,5	50	-100	100	-12,5	-75	-37,5	62,5
PN2	-100	62,5	-100	56,25	6,25	-100	12,5	0
PN3	-100	0	-100	56,25	-12,5	-100	0	0
PN4	-100	18,75	-100	62,5	-6,25	-87,5	-18,75	0
PN5	-100	31,25	-81,25	31,25	6,25	-100	-25	0
PN6	-62,5	0	-100	43,75	43,75	-100	-12,5	0
PN7	-100	0	-100	50	25	-100	-12,5	0
PN8	-100	0	-100	31,25	25	-87,5	-12,5	18,75

Wines	LRI 984	LRI 1061	LRI 1076	LRI 1216	LRI 1223	LRI 1241	LRI 1250	LRI 1437
CF1	18,75	-100	-43,75	-100	43,75	-75	25	-25
CF2	0	-75	-56,25	-100	50	-87,5	56,25	-50
CF3	37,5	-87,5	-56,25	-100	37,5	-100	0	-31,25
CF4	43,75	-100	-100	-100	25	-75	37,5	-25
CF5	43,75	-100	-43,75	-100	31,25	-75	56,25	-25
CF6	0	-75	-31,25	-100	31,25	-75	25	-25
CF7	25	-75	-68,75	-100	31,25	-50	37,5	-43,75
CF8	25	-100	-43,75	-68,75	0	-75	50	-50

LRI	Odorant	Wine
984	No peak	CF
1061	Ethyl 2-methylbutanoate	CF/PN
1076	Ethyl 3-methylbutanoate	CF
1082	no peak	PN
1216	3-Methyl-1-butanol	CF/PN
1223	no peak	CF
1241	Ethyl hexanoate	CF
1250	no peak	CF
1255	no peak	PN
1309	1-Octen-3-one	PN
1437	3-Isopropyl-2methoxypyrazine	CF
1450	Acetic acid	PN
1746	no peak	PN
2112	Unknown	PN

masked by wine odor background

revealed by wine odor background

still percieved within the wine odor background

Ascending Hierarchical Classification (AHC) was performed for olfactoscan and GC/O data. In either case the 8 different Cabernet Franc wines were in the same group, while Pinot Noir were classified in 4 groups by OS technique and   in only 2 by GC/o.
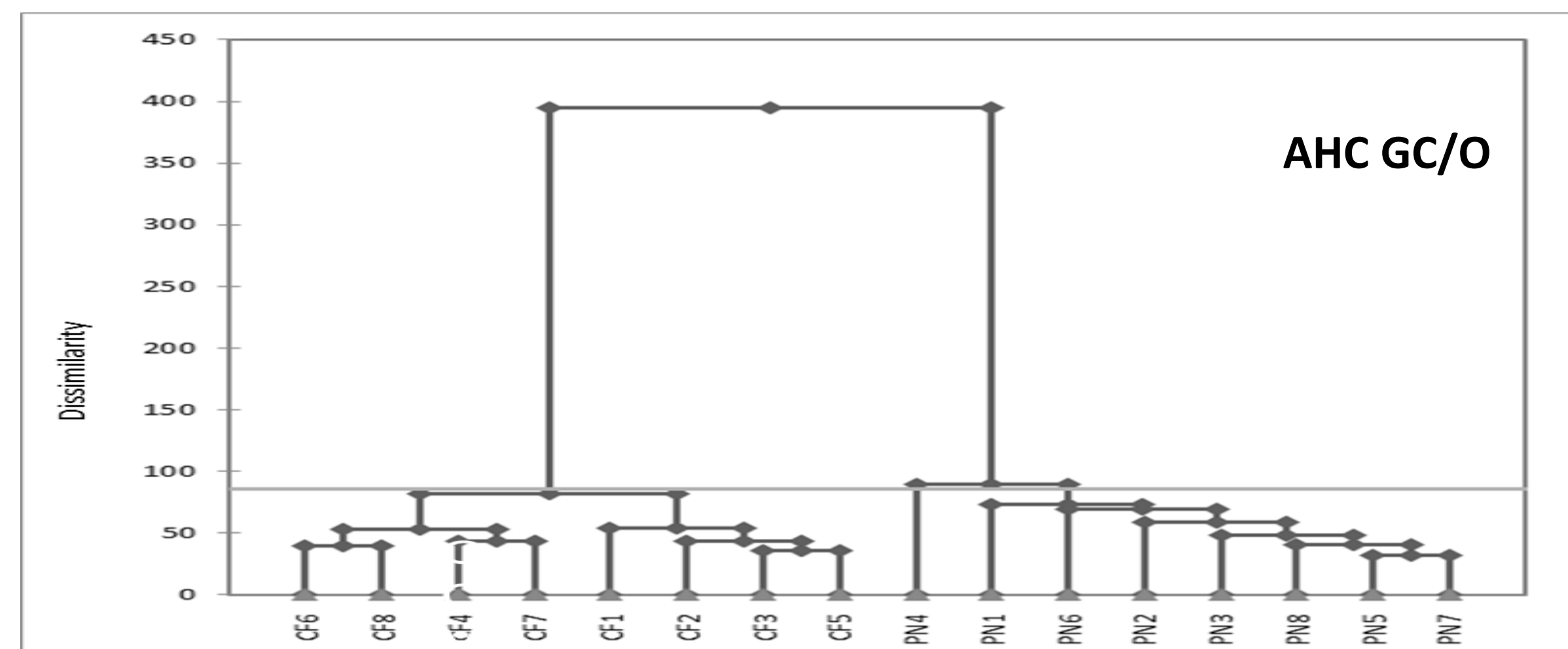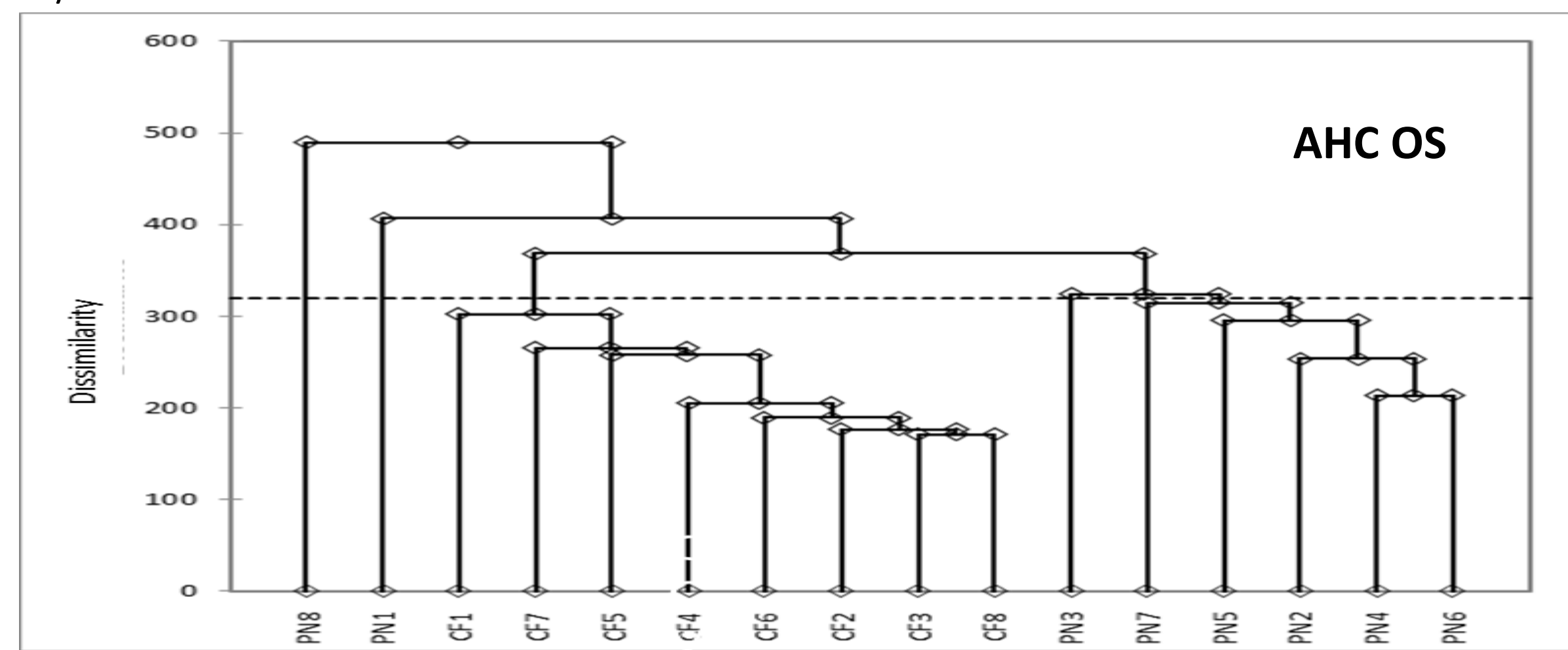
CONCLUSION

The results showed that the odorants that influenced the middle range typicality wine odour did not fully superpose with those identified as key-odour compounds in a classical GC/O approach. Odour masking and synergy effects were observed owing to the Olfactoscan technique and new potential keys-odorants were revealed. In conclusion, our findings indicate that the Olfactoscan technique is efficient to probe key-odorants once embedded in an aromatic buffer and confirm the critical influence of perceptual interactions in the perception of wine aroma.

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