INFLUENCE OF VINEYARD MANAGEMENTS ON AROMA OF MERLOT WINES

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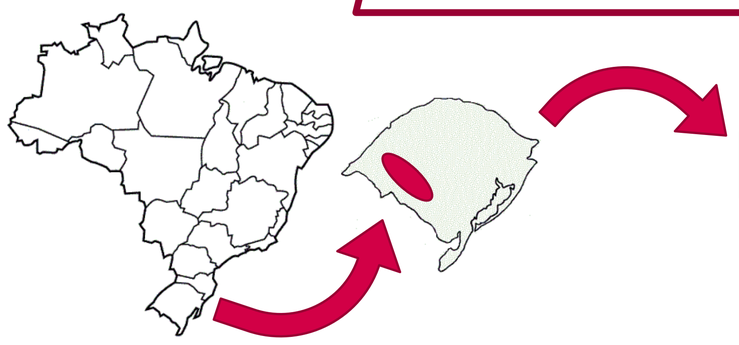
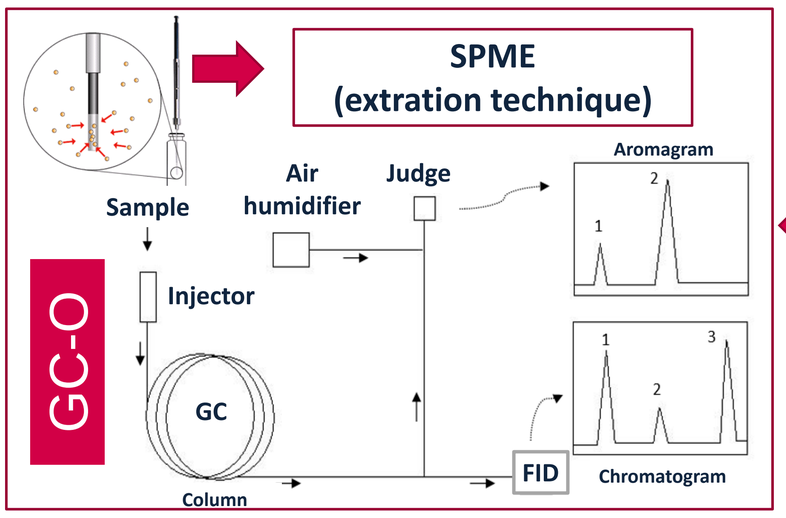
INTRODUCTION

Aroma is one of the most important factors in determining characteristics and quality of wine [1]. The reduction of canopy density can improve the enological quality of wine, because it favors the largest entry of solar radiation in the vineyard, improves biochemical maturation of the berries and reduces vegetative growth. The management of this vegetative balance may influence in volatile profile and precursors of aroma compounds of grapes used to winemaking [2]. The objective of this study is to evaluate the influence of vineyard managements on aroma of Campanha Gaúcha Merlot wines through quantitative descriptive analysis (QDA), gas chromatography–olfactometry (GC-O) and comprehensive two-dimensional gas chromatography coupled to time-of-flight mass spectrometric detection (GC×GC/TOFMS).

EXPERIMENTAL



Vineyard management



RESULTS AND DISCUSSION

- ✓ T1B2 and T1B4 were correlated with compounds that contribute positively to the aroma of wine (2-phenylethyl acetate / β-damascenone, ethyl hexanoate and ethyl octanoate).
- ✓ T2B2 and T2B4 show a higher correlation with compounds of the negative contribution to the aroma (hexanoic acid and 3-methylthio-1-propanol).
- ✓ Results have shown the importance of the combined use of GC-O and GC×GC/TOFMS for a real description of aroma active compounds of Campanha Gaúcha Merlot wines and also that the use of only one analytical technique, such as GC-O may provide misleading results.
- ✓ Results of sensory analysis are in agreement with the results of the volatile profile analysis: T1B2 and T1B4 show higher intensity of positive attributes as aroma of red fruits.

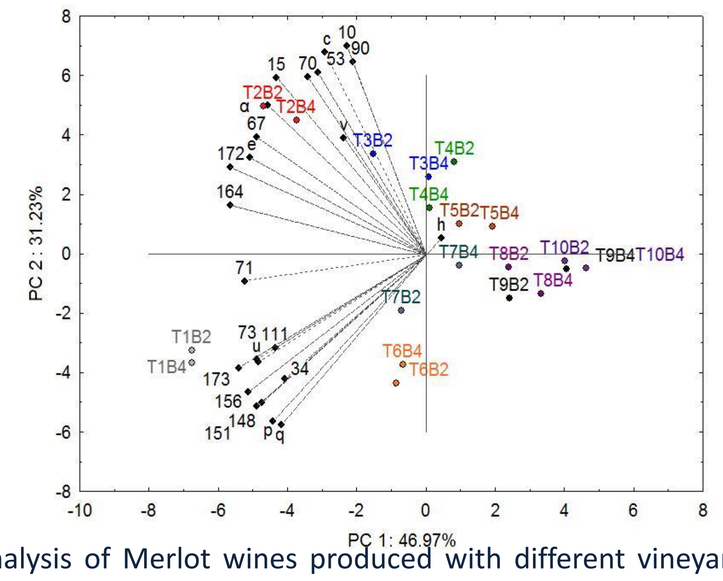


Figure 1. Principal component analysis of Merlot wines produced with different vineyard managements (T1 to T10). B2 and B4 corresponds to the experiment repetition blocks.

Table 1. Twenty four compounds were set by Fisher ration to characterize the volatile profile of Merlot wine through GC×GC.

		Compounds	C_{T1B2} (ug/L)	C_{T1B4} (ug/L)	C_{T2B2} (ug/L)	C_{T2B4} (ug/L)	Aroma
GC-O and GCxGC	c	hexanoic acid	1689.50	1702.37	**> 2160**	**> 2160**	pungent
	e	1-propanol	215.05	217.44	**236.23**	**222.61**	fruity
	h	2,3-butanodiol	> 450	> 450	> 450	> 450	fruity
	p	ethyl hexanoate	**26.22**	**36.26**	7.94	4.01	fruity
	q	ethyl octanoate	**19.66**	**22.74**	12.87	12.18	fruity
	u	phenylethyl acetate	**19.44**	**19.19**	11.10	16.21	roses
	v	diethyl hexanodioate	76.55	33.14	**364.91**	**613.30**	floral
	a	3-methylthio-1-propanol	236.08	225.99	**258.26**	**274.28**	cooked vegetable
GCxGC/TOFMS	10	octanoic acid	> 540	> 540	> 540	> 540	cheese
	15	dodecanoic acid	12.69	12.58	**19.92**	**16.89**	fat
	34	1-hexanol	**435.36**	**436.40**	315.73	405.98	floral
	53	benzyl alchool	48.48	48.62	**121.54**	**70.94**	floral
	67	benzeneacetaldehyde	188.68	176.97	177.50	185.12	floral
	70	3-(2,6,6-trimethyl-1-ciclohexen-1-il)-2-propenal	< 4.5	< 4.5	8.58	8.70	nf
	71	hexadecanal	< 4.5	< 4.5	< 4.5	< 4.5	nf
	73	ethyl acetate	> 110	> 110	> 110	> 110	pineapple
	90	isoamyl lactate	8.21	11.10	**28.39**	**27.39**	fruity
	111	2,3,5-trimethyl furan	**102.25**	**93.63**	15.36	15.62	nf
	148	eucalyptol	**95.12**	**103.48**	36.42	12.41	herbaceous
	151	o-ocimene	**39.92**	**34.67**	19.27	8.28	citric
	156	linalool	**7.04**	**7.13**	6.14	6.24	floral
	164	α-terpineol	7.21	7.23	7.36	7.21	anise
	172	sabinol	6.41	6.44	6.51	6.50	nf
	173	β-damascenone	**120.64**	**128.88**	88.23	52.73	roses

Coeluted in ^1D and separed in ^2D

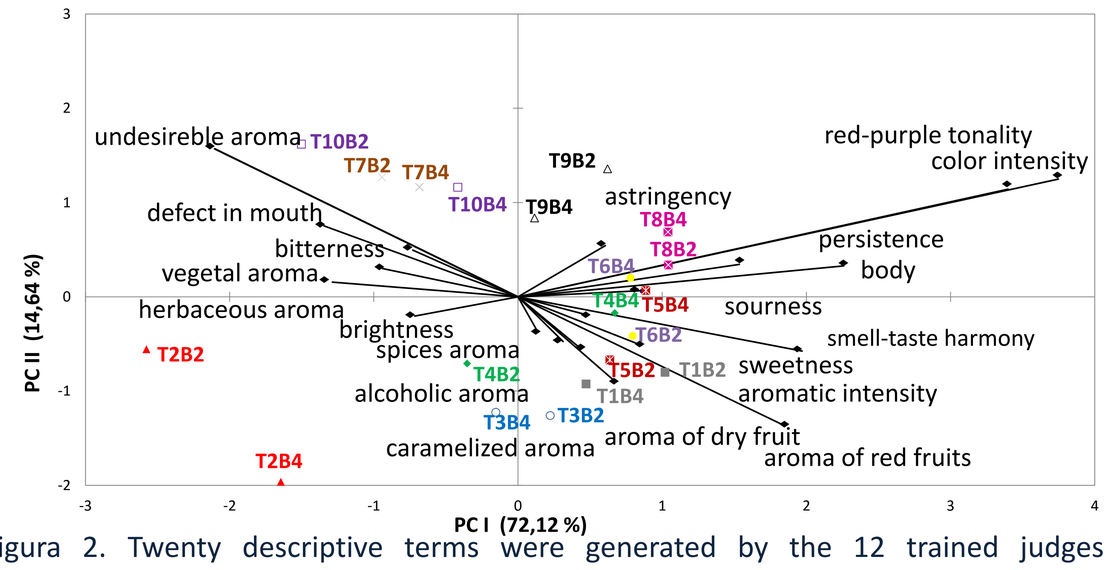


Figura 2. Twenty descriptive terms were generated by the 12 trained judges to characterize the sensory profile of Merlot wine through QDA.

CONCLUSIONS

This study shows that a vineyard management can influence the quality of the wine and that the treatment with less buds per plant is a suitable choice to increase the enological quality.

REFERENCES

[1] Clarke, R. J. and Bakker, J. Wine Flavour Chemistry. Blackwell Publ., Oxford, UK, 2004, 120 p.
[2] Silveira, S. V.; dos Santos, H.P.; Miele, A.; Mardelli, F.; Ritschel, P. S. Implantação e Manejo de Vinhedos de Base Ecológica. Embrapa Uva e Vinho, 2011

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