Impact of oenological tannins on microvinifications affected by downy mildew

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Introduction

Vine diseases are still responsible for economic losses. Previous study in our laboratory, have shown effects of oenological tannins against *Botrytis cinerea*[1,2]. Indeed, they permitted to reduce the oxidation of phenolic compounds and the degradation of wine color by reducing the laccase activity and/or by precipitating the laccase enzymes. **According to this, the aim was to evaluate the wine protection by oenological tannins against another disease, the downy mildew.**

Material and Methods

Experimentation

Merlot

Alcoholic Fermentation

10 modalities:

- 2 control
- 2 grape tannins (30 g/hL)
- 2 quebracho tannins (30g/hL)
- 2 gallic tannins (30 g/hL)
- 2 ellagic tannins (30g/hL)

Malolactic Fermentation

Bottling: 1, 3 and 6 months

Polyphenols and antioxidant capacity

Tannins		Anthocyanins	Antioxidant capacity
Total Polyphenols Index	DPm	Total anthocyanins	DPPH
Folin-Ciocalteu index	Molecular tannins	Molecular tannins	CUPRAC
Bate-Smith	Crown tannins	CIElab	ORAC
MEC			

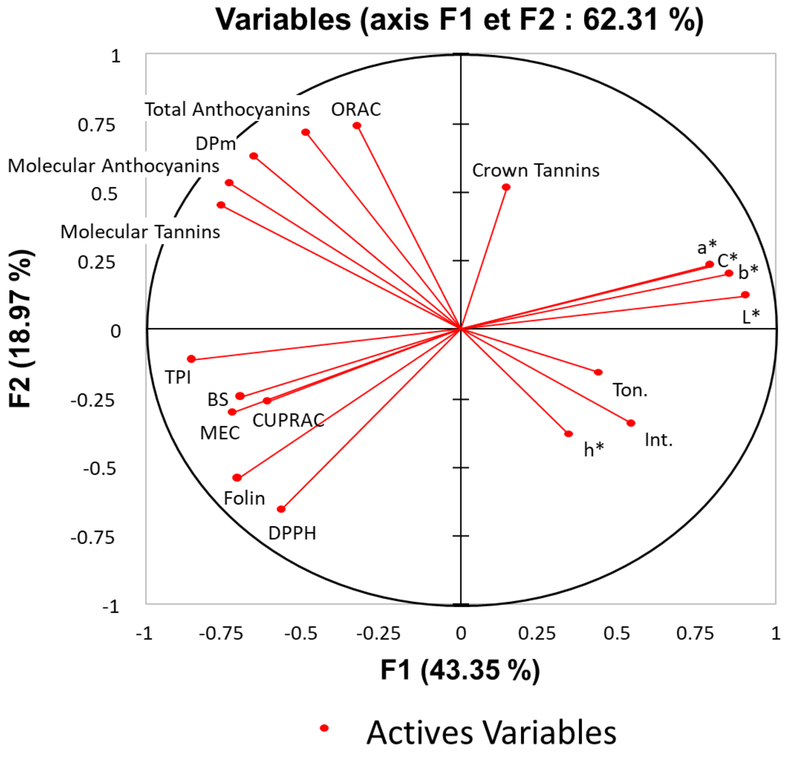
Tasting

❖ **Ranking test**

1 2 3 4 5

❖ **Profile test**

Results and Discussions



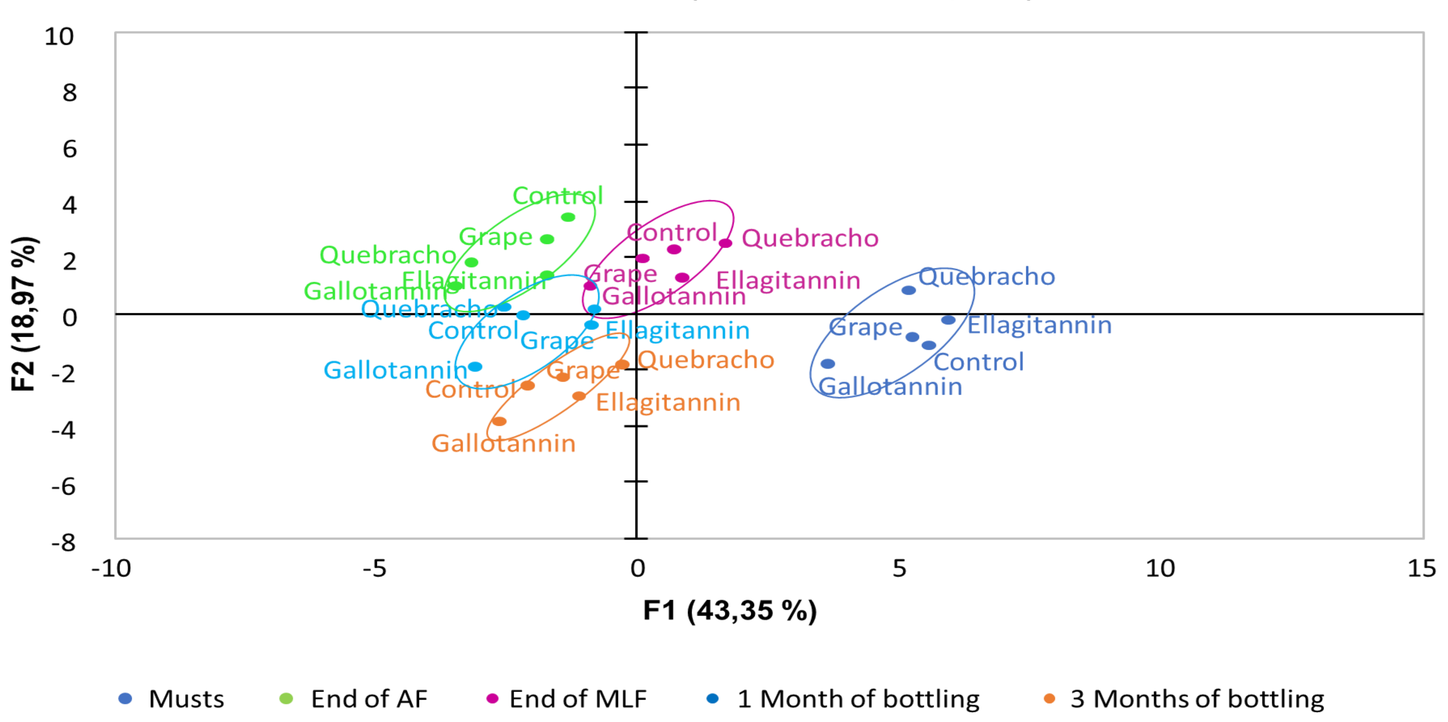


Fig. 1 : PCA of the wines added by oenological tannins in function of the different methods used and time vinification

❖ The majority of the differences were due to the time of vinification (musts, end of AF, end of MLF, 1 month and 3 months), instead of the added tannins (grape, quebracho, gallotannin, ellagitannin

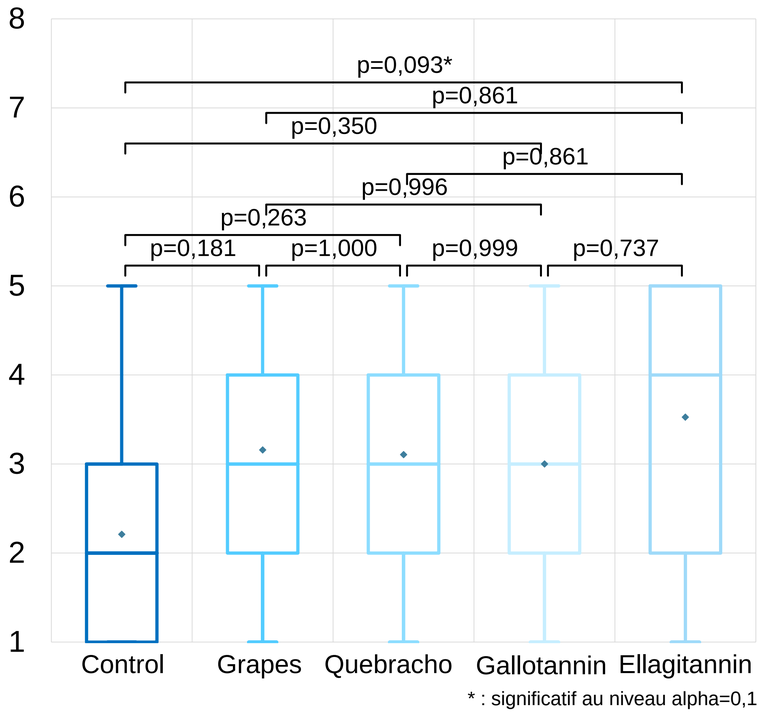


Fig. 2 : Box plot of the wines after 3-months bottling

Table 1 : Obtained score for each descriptors in function of the wine

Wines	Aromatic Intensity	Fresh Fruits	Jam Fruits	Oxidized	Vegetal	Acidity	Bitterness	Astringency	Tannin Quality
Control	**84**	61	54	**41**	29	**70**	**83**	**85**	**44**
Grape Tannin	68	67	37	27	26	70	73	79	70
Quebracho Tannin	70	56	45	30	36	57	67	75	59
Gallotanin	84	54	51	23	29	65	68	77	69
Ellagitanin	**62**	64	45	**18**	35	**61**	**77**	**73**	**60**

❖ The wine added by oenological ellagitannin was significantly preferred by the panel to the control wine without oenological tannins (**Fig. 2**)

❖ The wine added by oenological ellagitannin was preferred due to a lower oxidation, acidity, bitterness, astringency and a higher quality of the tannins (**Table 1**)

Conclusions

In conclusion, the tannin and anthocyanins content were not impacted by the addition of oenological tannins. Nevertheless, the wine added by ellagitannin was significantly preferred to the control and presented a higher antioxidant capacity at 3-months of bottling, indicating the ability to this tannin to protect the wine against downy mildew.

1) Vignault, A.; Pascual, O.; Jourdes, M.; Moine, V.; Fermaud, M.; Roudet, J.; Canals, J.M.; Teissedre, P-L.; Zamora, F (2019). Impact of enological tannins on laccase activity, *53*, 27–38.
2) Vignault, A.; Gombau, J.; Jourdes, M.; Moine, V.; Canals, J.M.; Fermaud, M.; Roudet, J.; Zamora, F.; Teissedre, P-L (2020). Oenological tannins to prevent Botrytis cinerea damage in grapes and musts: kinetics and electrophoresis characterization of laccase. Food chemistry, 316, 126334
3) Vignault, A., González-Centeno, M. R., Pascual, O., Gombau, J., Jourdes, M., Moine, V., Iturmendi, N., Canals, J.M., Zamora, F., and Teissedre, P-L (2018). Chemical characterization, antioxidant properties and oxygen consumption rate of 36 commercial oenological tannins in a wine model solution. Food Chemistry, 268, 210-219