Relationship between chemical parameters of tannins and in-mouth attributes of grape phenolic fractions

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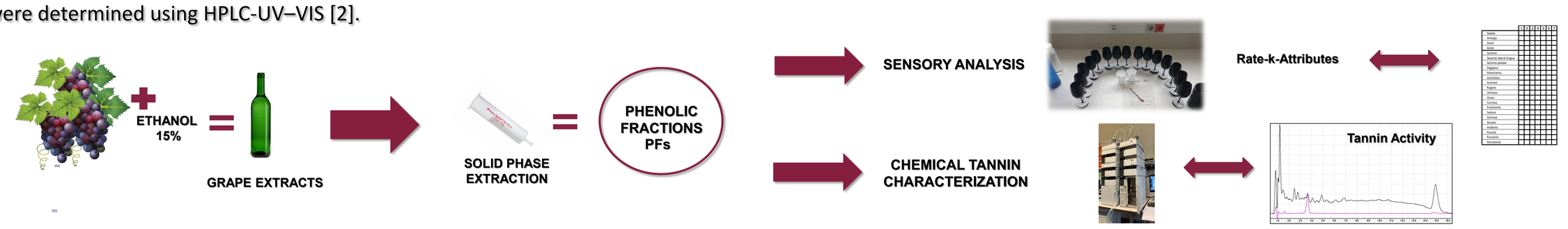
INTRODUCTION

Winemakers and researchers agree about the importance of sensory and chemical characterization of wine grapes to infer grape quality potential. However, classical sensory assessment of grapes presents some limitations such as lack of simple representativeness or consistency. The presented approach tries to overcome such drawbacks and to establish relationships between taste and mouthfeel properties of grapes and tannin-related chemical parameters

MATERIAL AND METHODS

Five and eight vineyards of Tempranillo Tinto and Garnacha Tinta grapes were harvested in different dates; each sample collection date was separated by one week aim to reach a wide range of diversity, in the sample composition.

Grapes were destemmed and macerated in 15% of ethanol for one week. The extracts were submitted to solid phase extraction on C18 cartridges and recovered with ethanol. The phenolic fractions (PFs) obtained, were reconstituted in wine model and their taste and mouthfeel properties were sensory characterized by a panel of experts following rate-K-attributes methodology [1]. In parallel, concentration (TC) and activity (TAc) of tannins as well as the concentration of tannins linked to anthocyanins (T-A) were determined using HPLC-UV–VIS [2].



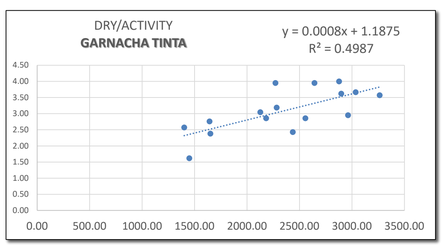
RESULTS

Different patterns have been observed depending on the variety. Higher score values for all sensory attributes have been reached for Tempranillo, while Garnacha variety presents higher discriminatory ability, allowing a better characterization.

For Garnacha Tinta samples, results show that 6 of the 23 terms rated were significantly different among samples, “Dry” ($F=3.214$; $P<0.0001$), “Coarse” ($F=2.994$; $P<0.001$), “Sticky” ($F=2.194$; $P<0.005$), “Watery” ($F=1.764$; $P<0.05$), “Bitter” ($F=1.728$; $P<0.05$) and “Dry on the Tongue” ($F=1.565$; $P<0.1$).

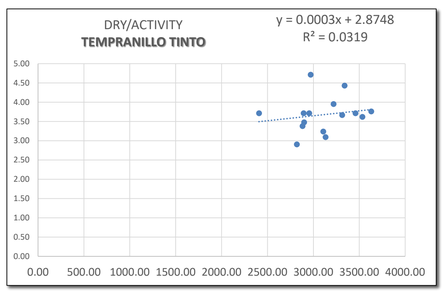
Meanwhile, Tempranillo Tinto sensory results, show that four of them were significantly different among samples, “Coarse” ($F=1.831$; $P<0.05$) and “Dusty” ($F=1.802$; $P<0.05$) as well as “Burning” ($F=1.657$; $P<0.1$) and “Bitter” ($F=1.580$; $P<0.1$).

Garnacha PFs, TAc and TC present significant and positive correlations with the three dry-related terms evaluated (i.e.: “dry”, “dry on the tongue side” and “dry palate



Linear relationship, established for Garnacha variety, between tannin activity and drying sensation $r=0.71$, $P>0.002$)

Tempranillo PFs do not present significant sensochemical correlations, which could be attributed to the fact that the chemical parameters of the PFs evaluated present a small variability inducing none significant sensory differences.



Tempranillo variety presents a low range of diversity in its composition, but with higher values of activity and concentration of tannins, which did not allow to stablish a good relation, possibly due to participants could not discriminate between samples.

	ACTIVITY	DRY ATTRIBUTE
GARNACHA TINTA		
MAX	3264	4.00
MIN	1401	1.62
Difference	1863	2.38
TEMPRANILLO TINTO		
MAX	3630	4.71
MIN	2408	2.90
Difference	1222	1.81

CONCLUSIONS

The presented strategy, has demonstrated:

- To be an interesting tool, to obtain phenolic fraction representing grape diversity in terms of taste and mouthfeel.
- To be able to establish significant correlations between taste and mouthfeel terms and measured chemical parameters of tannins of Garnacha grapes.
- To overcome the main drawbacks of current methodologies aimed to characterize grape sensory features such as low number of panelists or lack of sample representativeness.

References

[1] Sáenz-Navajas et al (2020) Food Res Int. 131, 108945

[2] Revelette et al (2014) J. Agric. Food Chem 62, 6626−6631.

Acknowledgements

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