

# Targeted UHPLC-QqQ-MS/MS metabolomics for phenol identification in grapevine and wine: Study of a Tempranillo clone with a dark-blue berry colour

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## Plant material

### Tempranillo Negro (VN21)



Intense dark black berry color  
More intense brightness of berry  
Shorter ripening cycle  
Higher sugar content

### Tempranillo Tinto (RJ43)



Widely cultivated clone in the D.O.Ca. Rioja  
Standard berry color  
Usual ripening cycle

## Phenol content in skin berry

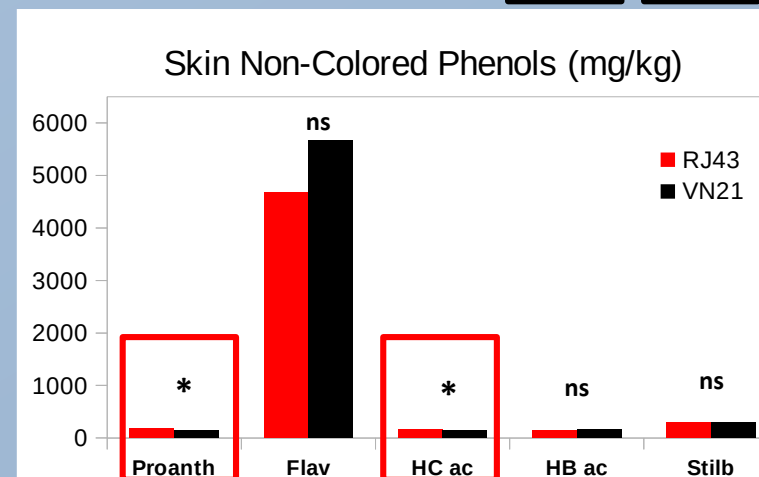
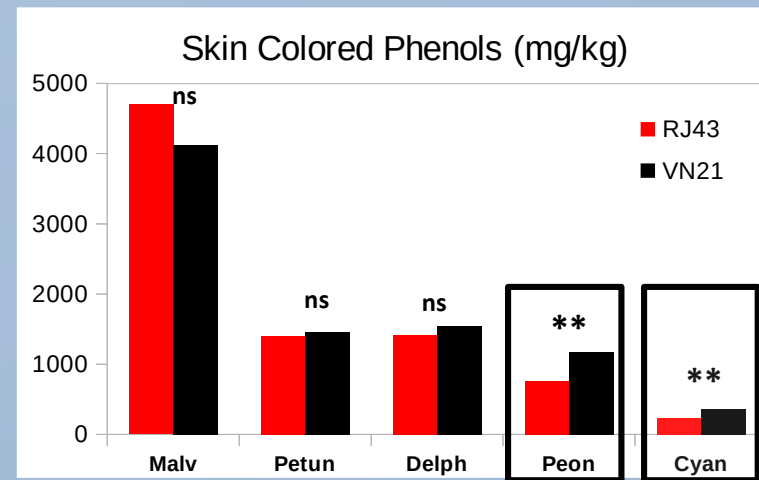
### VN21 skin detail



### RJ43 skin detail



Abbr: Malv, Malvidin; Petun, Petunidin; Delph, Delphinidin; Peon, Peonidin; Cyan, Cyanidin; Proanth, Proanthocyanidin; Flav, Flavonol; HB ac, Hydroxycinnamic acids; HC ac, Hydroxybenzoic acids; Stilbenes. Asterisks denote significant differences according to Student's t-test: \*, \*\* and \*\*\* indicate  $p < 0.05$ ,  $p < 0.01$  and  $p < 0.001$ , respectively

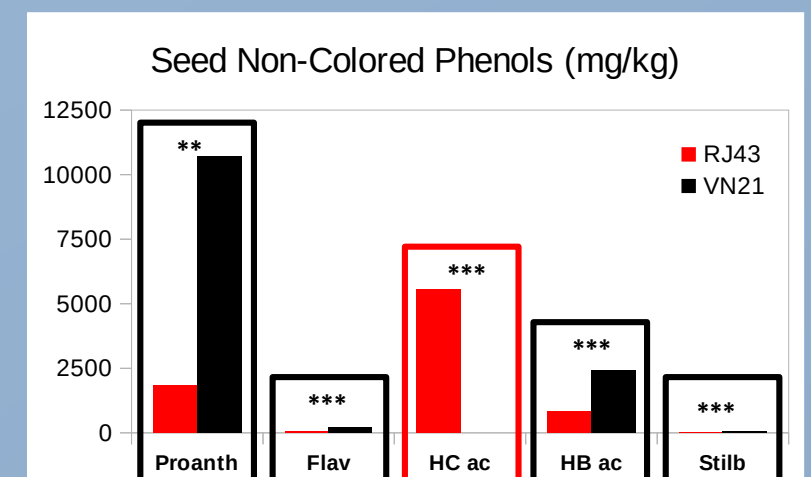
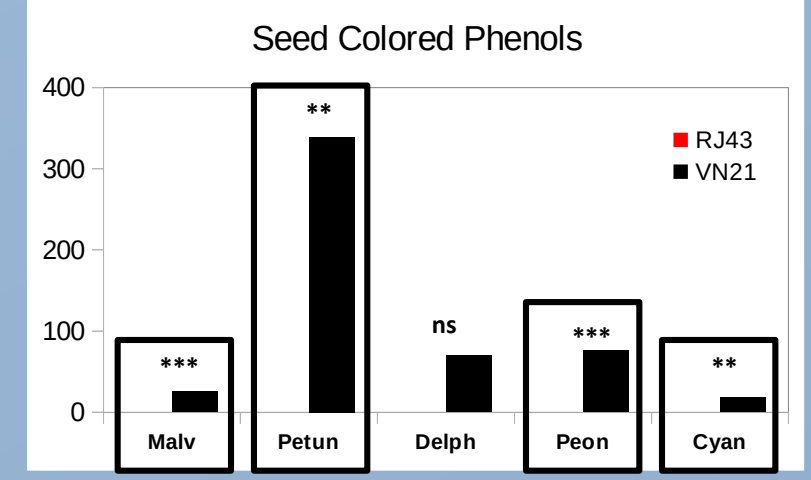


## Phenol content in seed berry

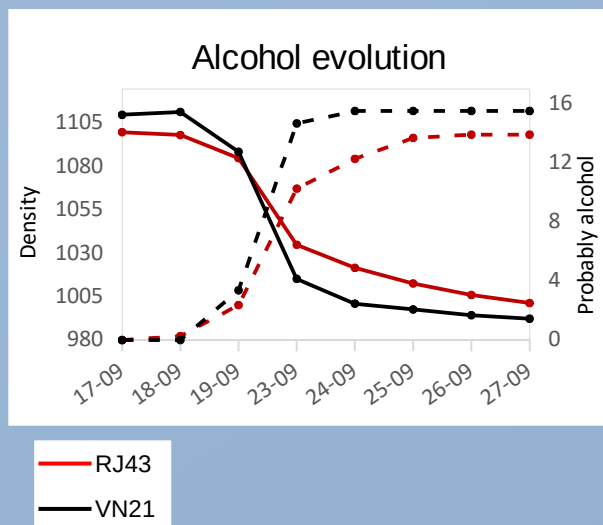
### VN21 seeds detail



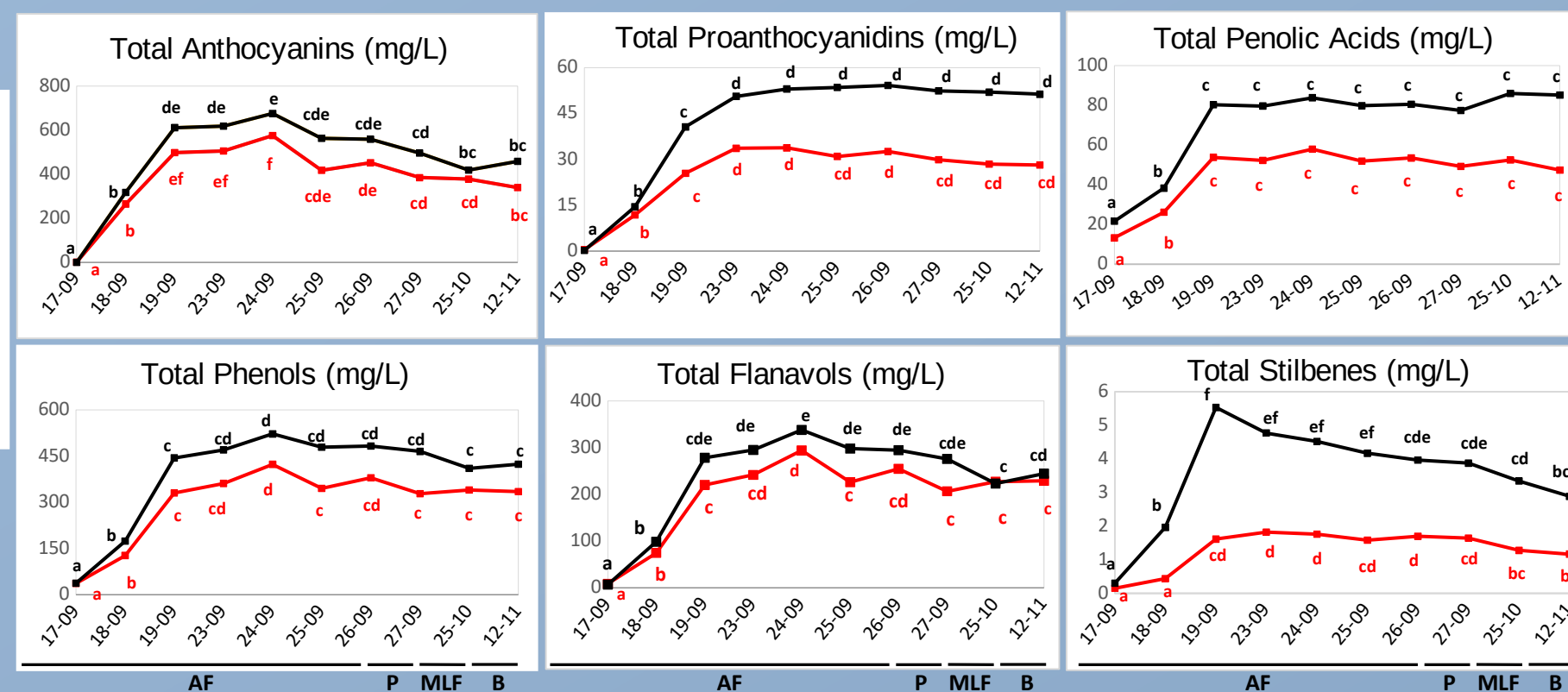
### RJ43 seeds detail



## Phenol content in fermenting wines



Abbr: AF, alcoholic fermentation; P, pressing; MLF, malolactic fermentation; B, bottling. The letters indicate statistical differences ( $P < 0.05$ ) between fermenting wines within the same clone (red line: RJ43; black line: VN21).



## Conclusions

- Higher concentration of peonidin and cyanidin (blue-reddish derivatives) in VN21 skin cloud to explain the singular black color berries.
- Accumulation of anthocyanins was observed in VN21 seeds and absence in RJ43.
- Non-colored phenols showed increased concentrations in VN21 seeds.
- Differences in berries and seed were enhanced in VN21 fermenting wines, with higher concentrations of colored and non-colored phenols.
- Highlight the importance of clone genotype diversity in the phenolic composition of wine and the usefulness of semi-target phenol chromatographic analyzes to characterize these spontaneous somatic variants to grapevine clonal selection.

## Acknowledgements:

This work was partially supported by project BIO2017-86375-R from the Spanish Ministry of Economy and Competitiveness (co-funded by the European Social Fund, European Union), an "Ayudas incorporación a escalas científicas CSIC, 2018" (Reference 2018701129) and a training grant research from Government of La Rioja.

## Reference:

Royo, C., Ferradás, Y., Martínez-Zapater, J.M., Motilva, M.J. (2021). Characterization of Tempranillo negro (VN21), a high phenolic content grapevine Tempranillo clone, through UHPLC-QqQ-MS/MS polyphenol profiling. Food Chemistry. <https://doi.org/10.1016/j.foodchem.2021.130049>.