# LC-MS based Metabolomics Discriminates Premium from Varietal Chilean Cabernet Sauvignon cv. wines

Vania Sáez[a], Doreen Schober [b], Alvaro Gonzalez[b], Panagiotis Arapitsas[a].

[a]Department of Food Quality and Nutrition, Research and Innovation Centre, Fondazione Edmund Mach (FEM), San Michele all´Adige, Italy.

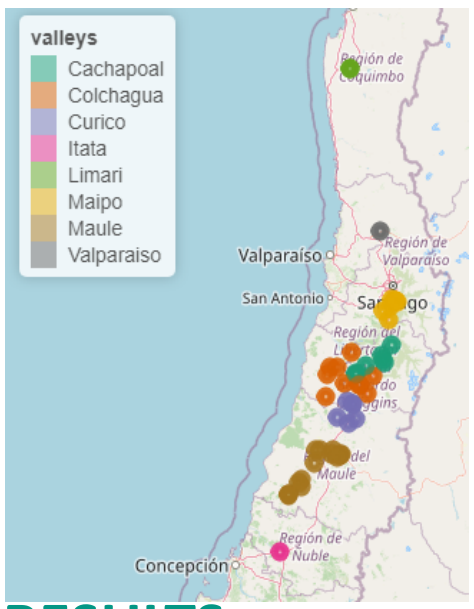
[b]Center for Research and Innovation (CRI), Viña Concha y Toro, Pencahue, Región del Maule, Chile.

## INTRODUCTION

Cabernet Sauvignon an "international variety" originally from Bordeaux covers aproximated the 4% of the area under vines [1], Chile concentrates the 13% of the production area [2] from 30°S to 36°S covering an approximated of 1300 km of extension with different terroir which drive different characteristic to the produced wines impacting their perceived quality. The Aim of the study was to investigate the metabolomic differences between Chilean Cabernet Sauvignon wines, divided according to their quality in two main groups: "Varietal" and "Premium", and to point out metabolites tentative markers of their chemical signature and quality.

## METHODOLOGY

**Grapes origin and winemaking process of Cabernet Sauvignon Experimental wine samples**




- Standardized semi-industrial winemaking
- 50 wines samples
- Wine clasification

**Premium**

- P1 Superpremium (7)
- P2 Premium (18)

**Varietal**

- V1 Quality Standar (10)
- V2 standar (15)

**LC-MS Data acquisition**

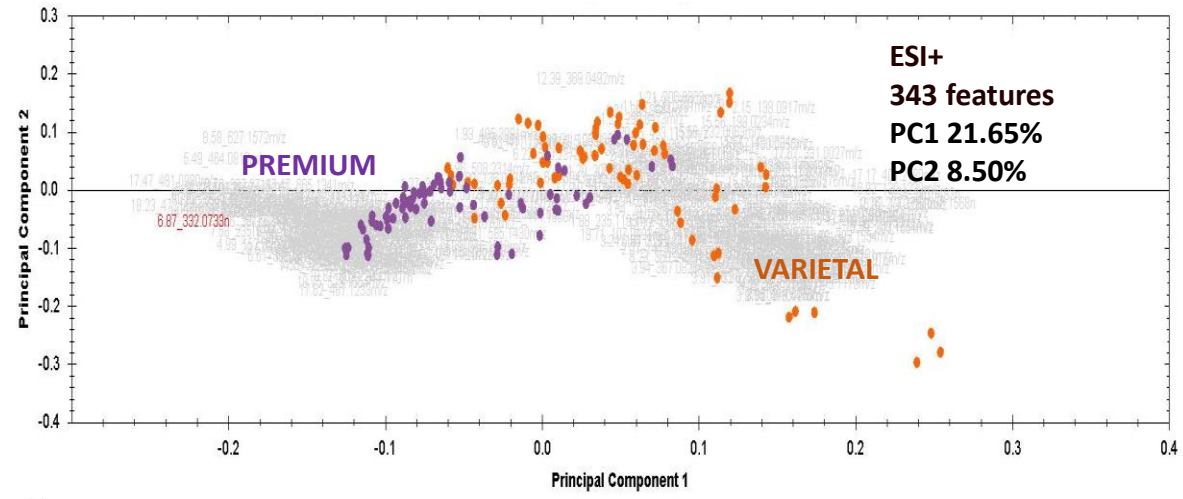
- 150 wine experimental samples (50x3)
- Open at inert enviorment N2(g)
- Quality Control
- LC-MS Untargeted protocol [3]
- ESI+ / ESI-
- Principal Component Analysis (PCA) for ensure data quality

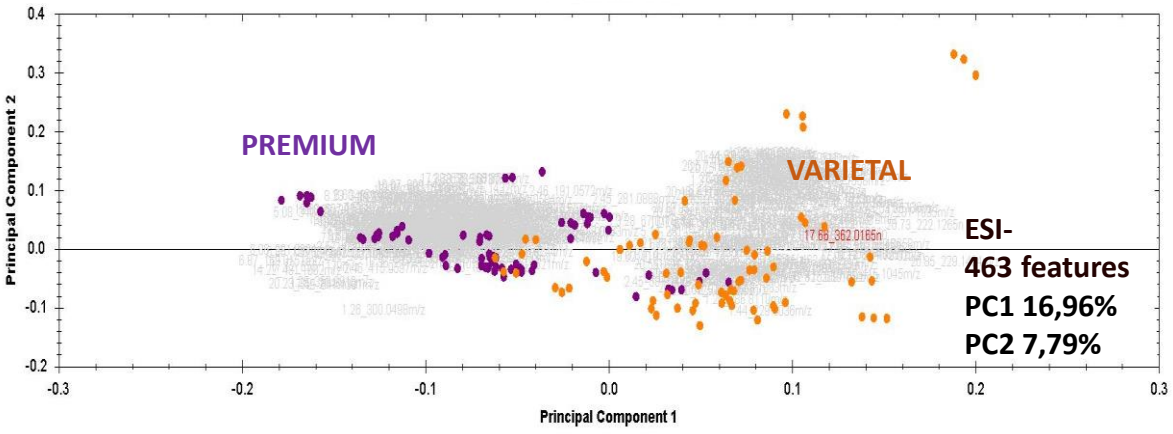
**Data analysis and interpretation**

- Basic enological analysis
- Biomarker discovery
- Annotation [4]
- Data interpretation

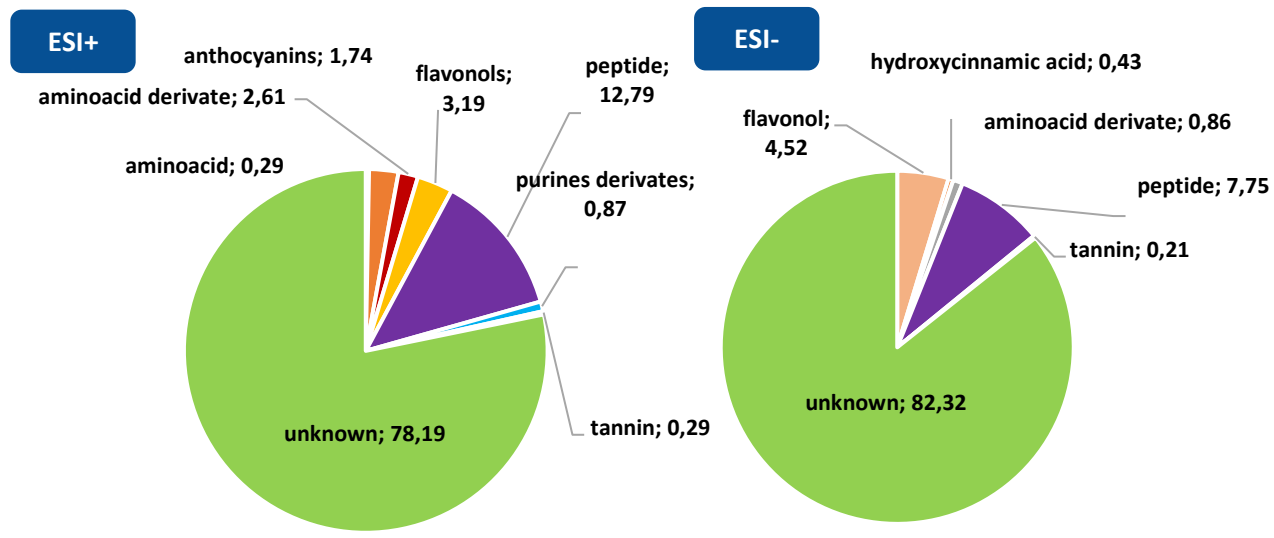
## RESULTS

**PCA plot for features with p<0,01 and max fold >2**

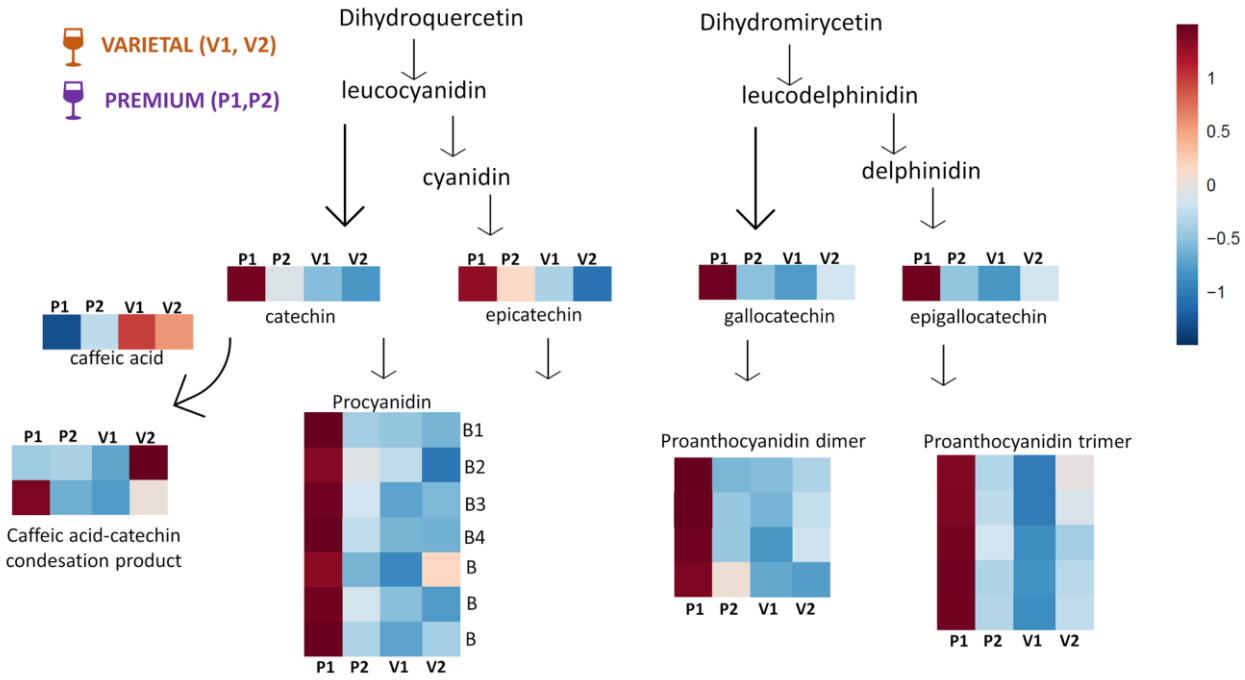



**Class of annotated compounds (%) for discrimate wine quality**




**Differences on flavanols flux according wine quality**




## CONCLUSIONS

→Nitrogen containg compounds (peptides) are good candidate to discriminate Premium from Varietal Cabernet Sauvignon Chilean wines from differents origins (valleys).

→Polyphenols biosynthesis was more expresed on the higher quality of Premium wines.

→ Premium wines has more epicatechin in comparison of Varietal wines.

## REFERENCES

[1] International Organisation of vine and wine (OIV), Distribution of the world's grapevine varieties, 2017.
[2] Anderson, K.; Nelgen, S. Which winegrape varieties are grown where?, 2020.
[3]Arapitsas P., Mattivi, F., *Humana Press*, 2018. ISBN 978-1-4939-7643-0
[4] Sumner et al., 2007., Metabolomicshttps://doi.org/10.1007/s11306-007-0082-2.

## ACKNOWLEDGMENT

Beca Chile (CONICYT-ANID, 74190033, 2018, Chile),
Center for Research and Innovation, Viña Concha y Toro, Chile
ADP 2019-2020 funded by the Autonomous Province of Trento (Italy).