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# Grape cell-wall polysaccharides: Influence on the interaction between salivary proteins and tannins

E. Brandão<sup>a</sup>, M. Silva<sup>a</sup>, I. García-Estévez<sup>a</sup>, A. Fernandes<sup>a</sup>, P. Williams<sup>b</sup>, N. Mateus<sup>a</sup>, T. Doco<sup>b</sup>, V. de Freitas<sup>a</sup> and S. Soares<sup>a,\*</sup>

(\*) susana.soares@fc.up.pt

<sup>a</sup>REQUIMTE/LAQV, Departamento de Química e Bioquímica, Faculdade de Ciências da Universidade do Porto, Porto, Portugal

<sup>b</sup>INRA Joint Research Unit 1083, Sciences for Enology, Montpellier, France

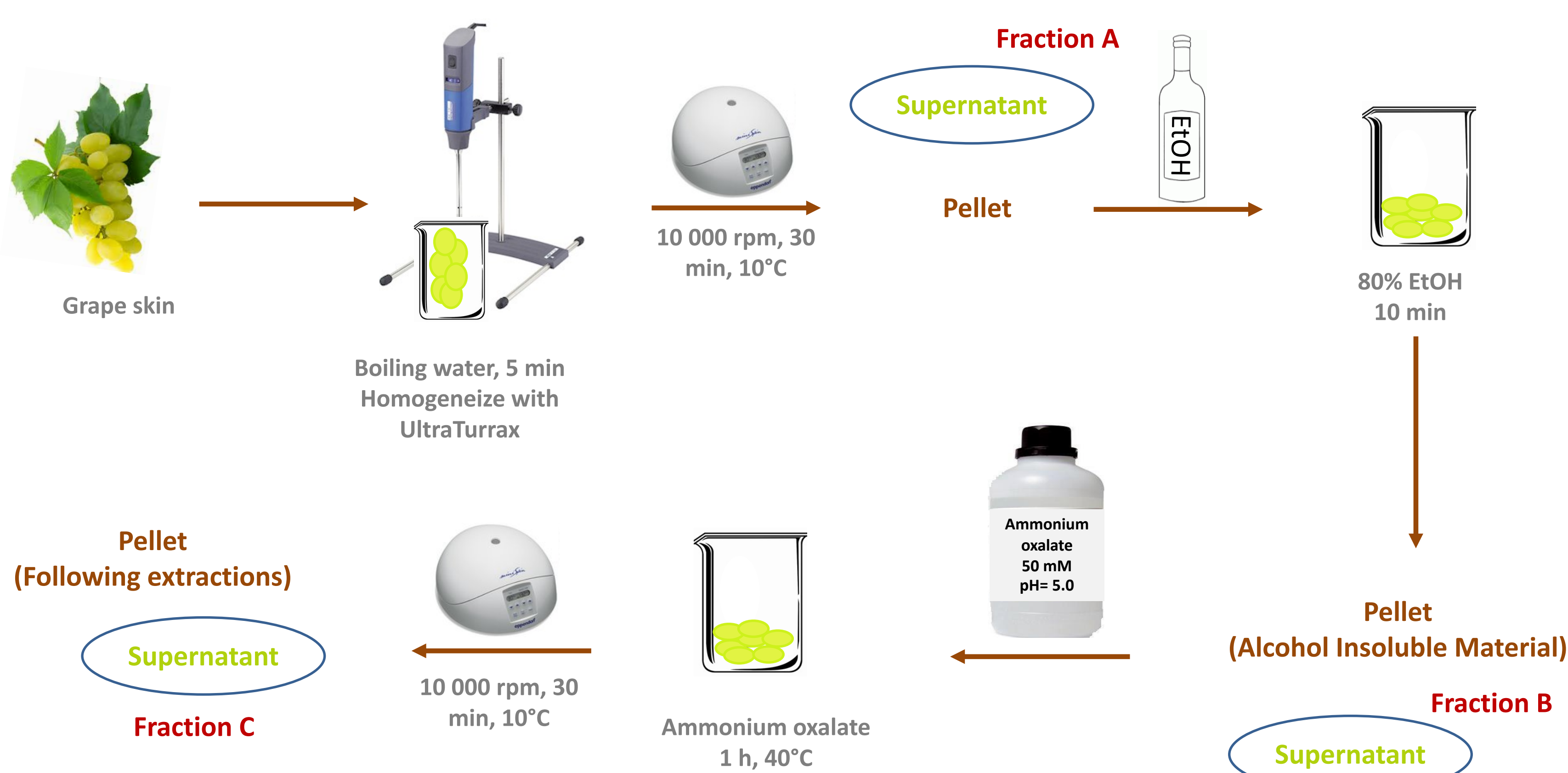


## INTRODUCTION

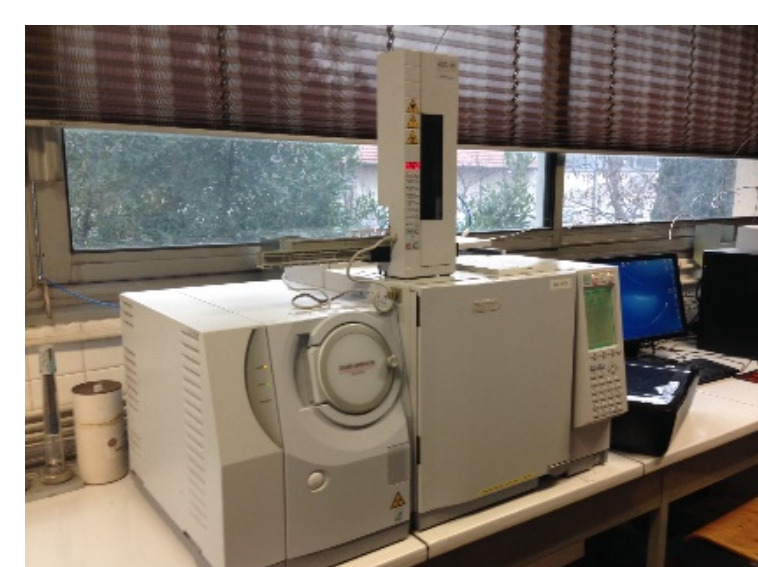
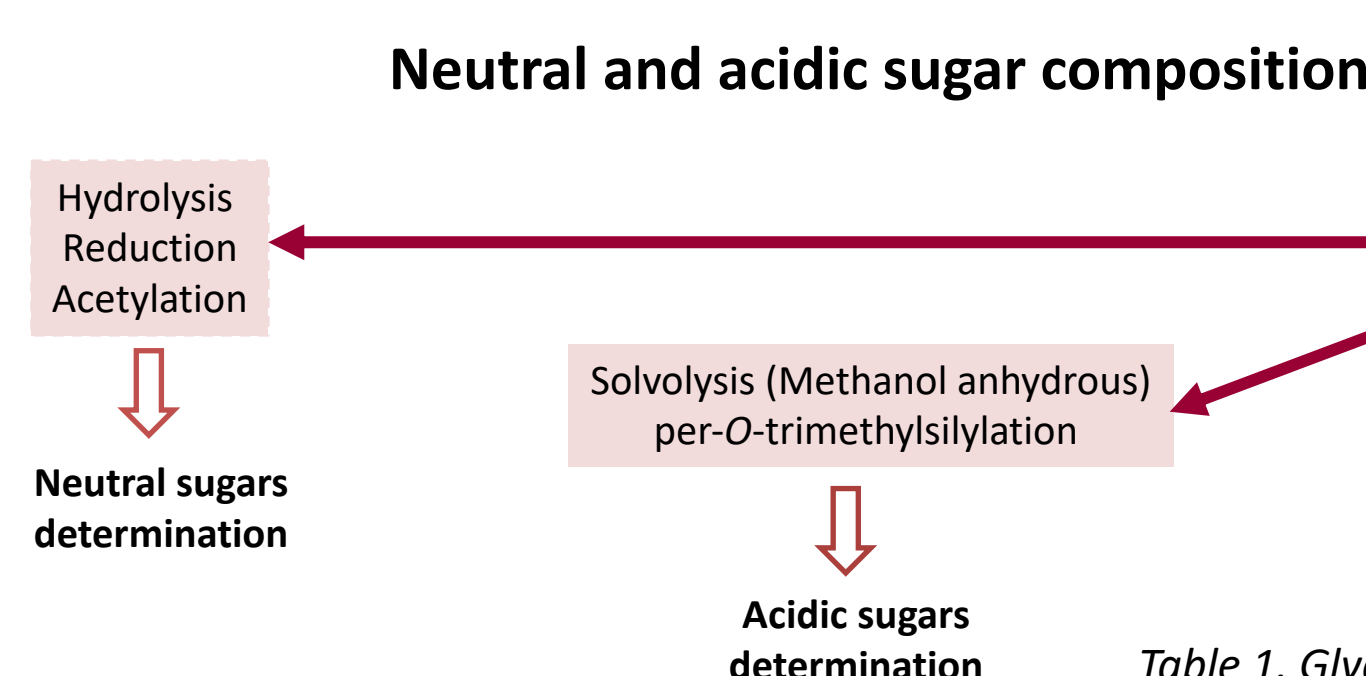
Polyphenols are secondary metabolites from plants widely present in vegetables, fruits and derived products (e.g. red wine and green tea) being responsible for their major organoleptic properties (color and taste attributes such as bitterness and astringency) [1]. Polyphenols' ability to precipitate salivary proteins (SP) is at the origin of the well-known astringency sensation which is characterized by the dryness, tightening, shrinking and puckering sensations perceived in the oral cavity. Different SP families have been reported to interact with tannins, namely proline-rich proteins (PRPs), statherin, P-B peptide and cystatins [1,2].

However, SP-tannin interactions appear to be inhibited or reduced by the presence of some polysaccharides [3]. The main polysaccharides from wine can be originated from grape cell walls including arabinogalactan-proteins (AGPs) and rhamnogalacturonan type II (RGII), or from yeast cell walls, such as mannoproteins [4]. In this work it was intended to study, at molecular level, how SP-tannin interaction could be affected by the presence of some of wine polysaccharides. So, we focused on: a) isolate different families of SP, b) isolate tannins with different molecular structures (procyanidin B2, commonly present in red wine and punicalagin, an abundant ellagitannin present in pomegranate), c) isolate and characterize different grape skin fractions of polysaccharides, and d) study the interaction between SP, tannins and polysaccharides by High-Performance Liquid Chromatography (HPLC).

## ISOLATION OF GRAPE CELL WALL POLYSACCHARIDES



## CHARACTERIZATION OF FRACTION C OF POLYSACCHARIDES

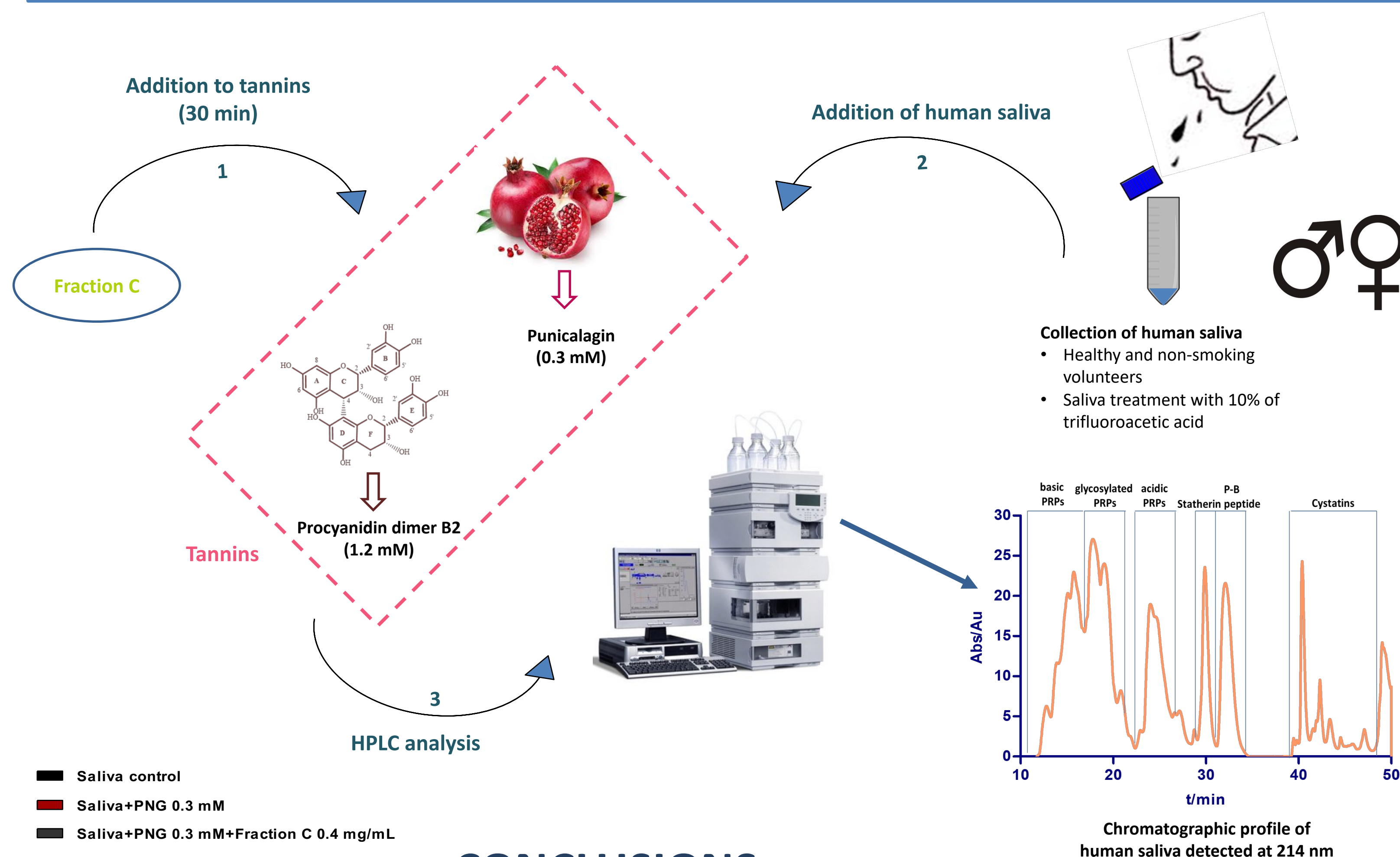


GC-MS analysis

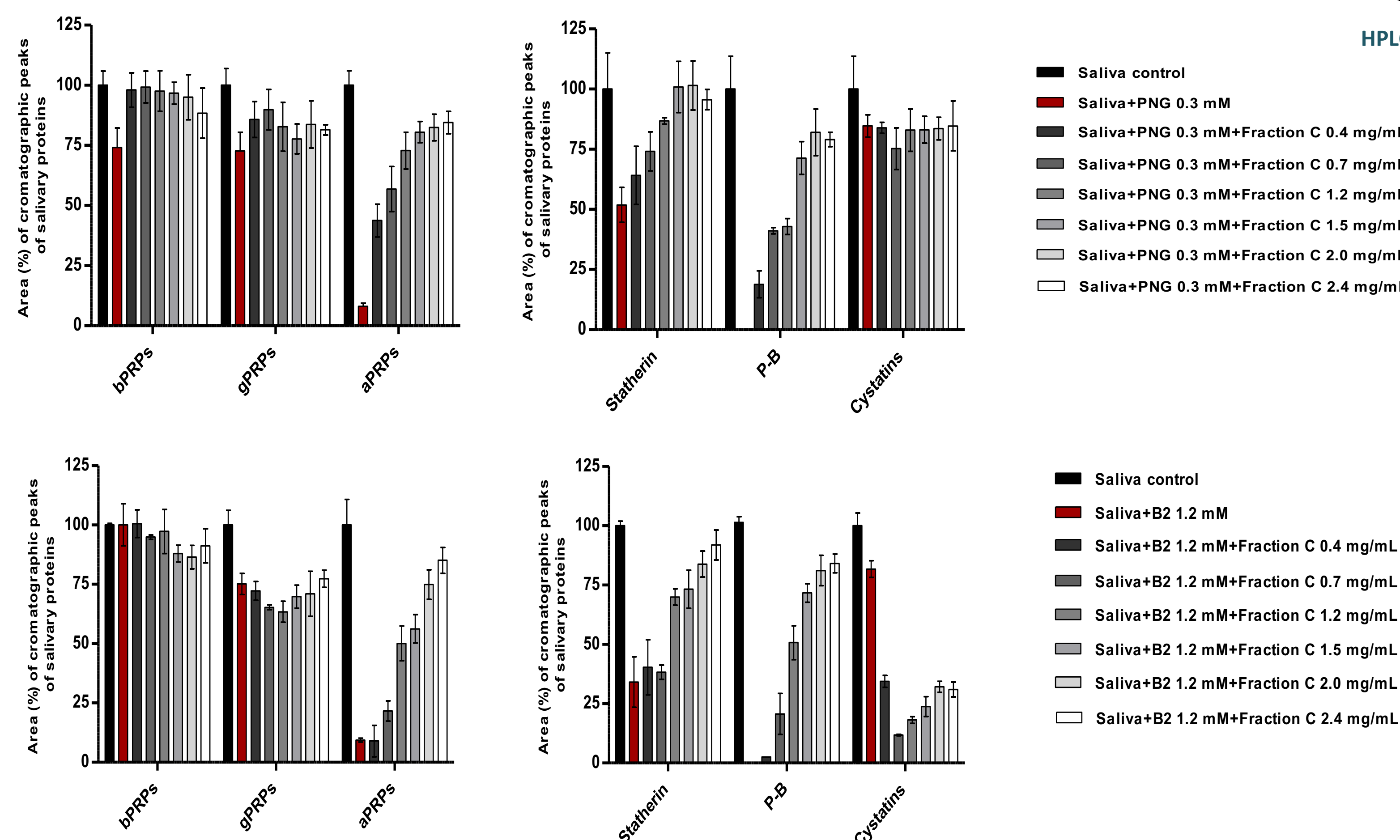
Table 1. Glycosyl and methyl residues composition (% Moles) of Polysaccharides of Fraction C

Glycosyl/Methyl Residue	% Moles
Arabinose	22.8
Rhamnose	2.9
Galactose	12.2
Glucose	6.5
Mannose	2.1
Xylose	12.3
Galacturonic acid	37.8
Glucuronic acid	2.6

## INFLUENCE OF FRACTION C OF POLYSACCHARIDES ON SALIVARY PROTEIN-TANNIN INTERACTION



## HPLC RESULTS



## CONCLUSIONS

- ❖ Different fractions of cell-wall polysaccharides can be obtained from grape skin using different solvents for extraction;
- ❖ Fraction C of polysaccharides is mainly rich in galactose, arabinose and galacturonic acid residues;
- ❖ In presence of both tannins and in the absence of Fraction C of polysaccharides, only the chromatographic peaks of acidic PRPs, statherin and P-B peptide presented a decrease over 50% of the initial value;
- ❖ Fraction C of polysaccharides seemed to be effective to cause a recovery of the chromatographic peaks of aPRPs, statherin and P-B peptide;
- ❖ In the case of cystatins interaction with procyanidin B2, the addition of Fraction C of polysaccharides caused a decrease of the chromatographic peak of this protein;
- ❖ Fraction C of polysaccharides could be used to modulate the interaction SP-polyphenols of wine and other foodstuffs.

## References

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- [3] Soares, S. et al. *Journal of Agricultural and Food Chemistry* **2012**, 60, 3966-3972.
- [4] Vidal, S. et al. *Carbohydrate Polymers* **2003**, 54, 439-447

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