

EVALUATION OF THE GRAPE VOLATILE COMPOSITION MATURITY BY HS-SPME ANALYSIS DURING RIPENING

Elisabete Coelho¹, Sílvia M. Rocha¹, António S. Barros¹, António Dias-Cardoso², Ivonne Delgadillo¹ and Manuel A. Coimbra¹

¹ Departamento de Química, Universidade de Aveiro, 3810-193 Aveiro

² Estação Vitivinícola da Bairrada, Apartado 7, 3781 Anadia Codex

The varietal volatile compounds of 'Fernão-Pires' white grape berries were followed during ripening by headspace – solid phase microextraction (HS-SPME). A preliminary step, in which the grapes were crushed and macerated before HS-SPME analyses, was used. The crushed grapes were analyzed at 40°C for 1 h to promote the transference of the compounds from the sample to the headspace, followed by 1 h of exposure of the fused silica fibre, partially cross-linked with 65 µm Carbowax-divinylbenzene (CW-DVB). This adsorbent fibre, containing macro (> 500 Å), meso (20-500 Å) and micro porous (2-20 Å), seems to be adequate for the analysis of complex matrix such as grapes. Furthermore, adsorbent fibres are good for trace level extractions.

The sampling started at *véraison* (physiological moment where starts grape ripening), and was carried on during 6 weeks in two different vineyards (Tav and Ped). This methodology allows to obtain in the grapes headspace a fraction of the free volatile components from the skin and pulp plus the compounds arising from the reactions that may take place by the acidic conditions used (pH of the grapes ca. 3.2) and by the endogenous enzymatic activity. The compounds detected under these conditions were named "varietal and pre-fermentative related volatile compounds". Sixteen

terpenoids, two C₁₃ norisoprenoids, two aromatic alcohols, three C₆ alcohols, and two C₆ aldehydes were identified in grapes. The amount of varietal and pre-fermentative related volatile compounds increased since *véraison* until day 20 and, from that day, a sharp decrease was observed. According to the chemical parameters determined for the grapes (sugar and titratable acidity), the maximum amount of varietal volatile compounds was coincident with the harvesting day for white wine production. Several studies carried out on grapes characterization recognized a relationship between the wine varietal character and the grape and musts volatile and semi-volatile compounds, namely monoterpenoids, C₁₃ norisoprenoids and aromatic alcohols. The grape volatile maturity is correlated to the wine aroma properties. This methodology seems to be suitable for evaluation of grapes volatile composition and establishment of its volatile maturity, allowing the definition of the harvest day. Future studies must be done to confirm this tendency in other vintages.

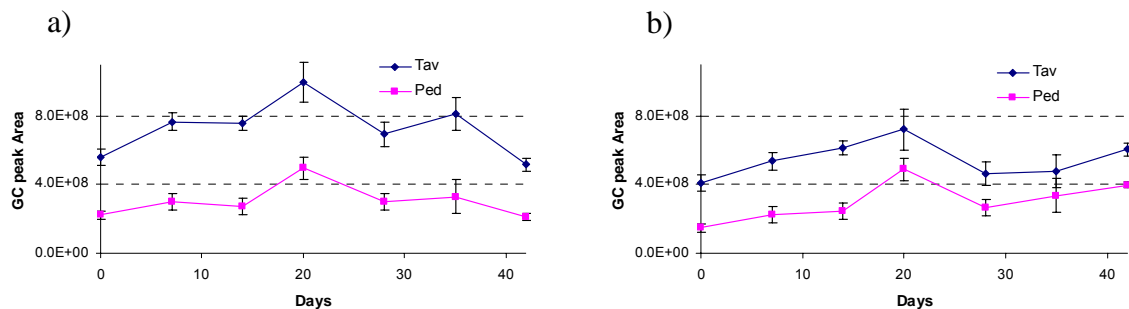


Figure 1- GC peak area of: a) C₆ compounds (aldehydes and alcohols), and b) monoterpenoids, C₁₃ norisoprenoids and aromatic alcohols.

Concluding Remarks: Even though this methodology only shows the volatile compounds released to the grape headspace and not all potential volatile compounds, it is a suitable methodology for the determination of grapes volatile composition maturity, which should be close to the harvesting day. The knowledge of this moment for the different grape varieties could be decisive to achieve a better wine aroma quality.

Acknowledgements: This work was supported by AGRO, project N° 38.