

Assessing the Accumulation of Flavonols in Pinot Blanc Berries in Alpine Vineyards by a Non-Destructive Fluorescence Approach

Authors : Selena Tomada, Giovanni Agati, Enrico Serni, Valentina Lazazzara, Ulrich Pedri, Peter Robatscher, Florian Haas

Abstract : The *Vitis vinifera* cultivar Pinot blanc is one of the most important white grape variety in the European Alpine viticulture. It is a neutral variety which tends to reflect the features of the growing site. In Alpine regions, the cv. Pinot blanc has showed a great potential to produce high-quality wines, however the knowledge about this cultivar is still limited. So far, the effects of vineyard growth altitudes on the synthesis of berry flavor have been mainly explored on red berry varieties growing under particular climate conditions (e.g. monsoon-climate and oceanic-climate). The aim of the present study, part of 'PinotBlanc' project (European Regional Development Fund, ERDF 2014-2020), was to assess the grape berry phenolic maturity of the white grape variety Pinot blanc and to deeper investigate the climate effects of the Alpine wine growing areas on it. Different altitudes were investigated, particularly eight Pinot blanc vineyards located between 223 and 730 meters above sea level in four South Tyrolean wine growing areas were chosen. The seasonal climate data such as temperature and sun exposure have been collected. The evolution of phenolic accumulation in grape berry skin, from veraison to ripeness, was assessed using a commercial fluorescence-based optical device (Multiplex ® 3.6, Force-A) by multiple measurements, in two consecutive vintages. The flavonols (FLAV) and chlorophyll (SFR) indices were considered to evaluate the berry phenolic maturity. To calibrate the FLAV index for Pinot blanc, samples of berries were collected on different days throughout a growing season. The correlation between FLAV index and berry skin flavonols concentration was determined using High Performance Liquid Chromatography-Diode Array Detection (HPLC-DAD). Based on these data a FLAV index calibration curve for Pinot blanc flavonols estimation has been proposed. During the ripening time a decrease of SFR and a parallel increase of FLAV, for all the growing areas under investigation, has been observed. At harvest, significant differences in FLAV between the growing areas were found. The bunch sun-exposures between row side and vineyards located at different altitudes can explain the observed differences in flavonols accumulation patterns. A slight effect of the thermal regimes was observed. The present study improved the knowledge of flavonols accumulation in white grape berries under different growing conditions. Moreover, the achieved results showed the potential of fluorescence-based portable sensors to improve the production of high quality grapes and wine and to promote precision viticulture in the Alps. Nevertheless, further investigation will be necessary to correlate berry phenolic maturity to aromatic potential in white grape cultivars.

Keywords : altitude, flavonols, multiplex, pinot blanc

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