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Predictive models of wine tartaric stability using fourier transform infrared spectroscopy

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Abstract

The feasibility of using Fourier Transform Infrared Spectroscopy (FT-IR) for the prediction of tartaric stability of wines was investigated (Guerrero et al., 2010; Kupina & Shrikhande, 2003; Palma & Barroso, 2002; Patz et al., 2004; Romera-Fernández et al., 2012; Soriano et al., 2007; Versari et al., 2011). The calibration set was made up of 252 white, 150 red and 38 rosé wines, representing the most diffused Italian varieties; the validation set was made up of 81 white, 33 red and 3 rosé wines. Two of the experimental approaches most commonly adopted in wine testing laboratories, the Microcontact Conductometric Test and the Cooling Test (-4°C for 5 days), were used as reference methods to evaluate the tartaric stability of the samples collected. Discriminant Analysis (DA), Artificial Neural Networks (ANN) and Partial Least Square regression (PLS) were considered for proposing new predictive models for tartaric stability, separately for white and red or rosé wines. The results demonstrated the possibility of developing new predictive models for wines, so long as tartaric stabilisation products have not been added, starting from FT-IR analysis. The best results were obtained by the models based on the Cooling Test as reference method. In particular, for white wines DA allowed to correctly classify into the right category ("stable", "unstable" or "suspect") the 84% of the calibration samples and the 73% of the validation samples, whereas ANN for red and rosé wines permitted to correctly classify the 83% of samples in both datasets. Nevertheless, also PLS for white wines and DA for red and rosé wines gave a right classification for more than 70% of samples.

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Polyphenolic profile in berry skin and wine of *Vitis vinifera* l. cv. Aglianico (Basilicata, Italy)

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Abstract

Anthocyanins are a very large group of red-blue polyphenol plant pigments, located within vacuoles of the skin cells of red grapes and characterized by a positive charge on the molecule which enables them to absorb light. These naturally occurring pigments from grapes are glycosides having a sugar bonded at the 3 position. The presence of this sugar helps the anthocyanins maintain solubility in water and allows pigments to diffuse into the must and wine during maceration, contributing to the color and antioxidant properties of red wines. The antioxidant properties, named as total antioxidant capacity (TAC) are well known and are correlated with electron transfer processes promoted by glycosylated and methoxy derivatives anthocyanins as malvidin-3-glucoside arising from the free anthocyanin fraction of the red wines. Based on the widely accepted knowledge that antioxidants are potent scavengers of free radicals and serve as inhibitors at both initiation and promotion-propagation stages of tumor promotion-carcinogenesis and protect cells against oxidative damage, it seemed of interest to investigate anthocyanin presence and composition within the grape berries of *Aglianico* (Basilicata-Italy) [1], one of the most ancient vineyards introduced from Greece in the southern Italy in pre-Roman times.