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Wine production based on the non-destructive in vineyard grape selection by a fluorescence optical sensor

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The use of a non-destructive fluorescence sensor (Multiplex®-Force-A, Orsay, France) allowed for the selection of grapes with higher and lower phenolic content directly on the vines. The sensor detects fluorescence emitted by chlorophyll under excitation with different LED sources in the UV (375 nm) and visible (blue at 450 nm, green at 515 nm and red at 630 nm). It provides an index of anthocyanins (ANTH_RG) on the basis of their differential screening effect on different chlorophyll excitation lights. The mapping of anthocyanins (anth) content was performed just before harvest at the Fattoria di Magliano winery (South Tuscany, Italy) in mid-September 2013 on grape bunches of Cabernet Sauvignon cv. Optical measurements were performed manually on a 4 ha vineyard using a 15×15 m grid. Once calibrated against wet chemistry of berry samplings (Glories method), the ANTH_RG showed a high spatial variability of the anth content between 865 and 3000 mg/L. Based on this, the vineyard was divided in two areas with the lowest and highest anth level by segmentation according to the mean value (1670 mg/L) allowing to perform a selective harvest and consequently a separated vinification. A first sensory evaluation of wines placed in barrels showed a significant difference between the two plots for both colour and flavour intensity. The wine with the highest anth content was marked by greater complexity, persistence and quality. Our study showed the utility of a non-destructive optical sensor in precision viticulture to produce high quality wines.

Biography

Lorenza Tuccio studied Viticulture and Winemaking, and Vine and Wine Science Technologies at Pisa University, Faculty of Agriculture. She received her PhD from Pisa University in Crop Production and currently works at Applied Physics Institute-CNR located at Sesto Fiorentino (Florence, Italy). Her primary research area is Precision Agriculture: The application of non-destructive methods to assess fruits and vegetables quality components in the laboratory as well as in the field by using portable sensors; Data can be reported in geo referenced maps to evaluate heterogeneity and variability within and between fields.

Notes:

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