



## Electronic nose evaluation of Cabernet Sauvignon fruit maturity

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- Berry weight, Brix, pH, TA, malic acid, and color, are some of the indices commonly used to evaluate grape maturity - even if they are not always strongly correlated with quality. Another approach is to evaluate aroma development with methods such as the analysis of volatile terpenes, analysis of total and free glycosides, chromatographic methods, or simply tasting grapes in the vineyard. These, however, can be expensive, restricted to high-terpene varieties, too dependent on sampling technique, or subjective. Bottom line, there is a need for a simple, objective, and reliable technique to evaluate grape maturity.
- The electronic nose seems to be here to help! A combination of various polymer-based sensors that respond strongly to volatile compounds, the electronic nose has been used successfully to assess maturity in fruits such as bananas, mandarins, nectarines, peaches, and pears. The goal of this study was to evaluate the ability of an electronic nose to differentiate Cabernet Sauvignon fruit of various levels of maturity.
- The electronic nose used is called *Cyranose 320* and is a combination of 32 sensors. The authors conducted “electronic sniffs” in the lab and in the field. To measure grapes *in the lab*, they placed 20 berries picked at 18, 19, and 20 weeks post-bloom in a jar for 30 min at 21°C, and inserted the electronic nose needle through the rubber seal to measure the headspace. To measure grapes *in the field*, they randomly selected 16 clusters at 18, 19 and 20 weeks post-bloom, wrapped them in polyethylene bags while still attached to the vines, and measured the headspace inserting the needle through the bag. The authors then conducted several analyses of the various grape maturity groups in the lab to see how well that data correlated with the electronic nose measurements.
- Using a special statistical analysis, the authors were able to visualize in a plot how the various measurements clustered together, that is, whether grape samples from a given maturity group could be clearly distinguished from those belonging to a different maturity group.
- **Results .**
  - 1) In 2005, in which the physico-chemical analyses were found to be different among the three sampling dates, the electronic nose was also able to separate grapes based on sampling date.
  - 2) In 2006, in which the physico-chemical analyses failed to show a clear separation between sampling dates, the electronic nose was still able to differentiate samples of different maturity.
  - 3) In 2006, when the authors decided to compare grapes picked from either the east or the west side of N-S oriented rows, the physico-chemical analyses failed to distinguish between grapes coming from different sides of the canopy, but the electronic nose was able to distinguish them.

These results demonstrate to the authors the potential for the electronic nose technology to be used as a rapid, objective, and non-destructive tool to evaluate grape maturity in the near future.

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