# NIR based sensometric approach for consumer preference evaluation

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## Abstract

Climate change has had a global impact on grape production, and as a result, developing table grape varieties that can withstand climate-related threats has become a significant goal. However, it is equally important to ensure that these new grape varieties meet the preferences of consumers. To achieve this goal, a procedure has been developed that combines sensory analysis with spectroscopic data collected in the NIR region. Each sample was analyzed using both traditional analytical techniques and non-destructive NIR spectroscopy. The FT-NIR spectrophotometer used for this purpose is a TANGO (Bruker, Germany). The chemometric analyses were performed using the statistical software R version 4.1.2. The hedonic testing was performed using a 9-point hedonic scale which is the most widely used scale for measuring food acceptability. The NIR data sets were combined with the chemical, textural, and sensorial data to create multivariate models using interval partial least squares (iPLS) regressions or artificial neural networks (ANNs). The models produced in this way are applied to the spectra of samples that have undergone sensory analysis to predict their composition. This procedure enables non-destructive sensory analysis of new samples, as a single NIR spectrum is sufficient to quantify consumer appreciation and determine the chemical and physical characteristics of each berry. This information can then be used to identify the most suitable combinations for each target panel. Consumers could access this information via a QR code on the grape box, allowing them to select the perfect grape for their preferences.

**Keywords:** *Vitis vinifera*, NIR machine learning; prediction model, sensory analysis.