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Near-infrared spectroscopy in grapes and wine analysis

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The world’s total production of wine falls short of the production of grapes. The two factors of paramount importance in the wine industry are rapidity and low-cost analysis. The existing methods for measurement of grapes and wine composition are insufficient, inaccurate, uneconomical, time-consuming and very complex. In order to curb these, spectroscopic methods concerned with the investigation and measurement of spectra produced when matter interacts with or emits electromagnetic radiation, such as near-infrared spectroscopy could be used. Near-infrared (NIR) spectroscopy can be used to measure the sugar composition and presence of anthocyanin in grapes as well as to identify fungal diseases. It has been reported that NIR could measure wine compositional parameters, such as alcohol content, pH, volatile acidity, organic acids (such as lactic acid, malic acid and tartaric acids), reducing sugars and sulphur dioxide. It is used to monitor wine fermentation by predicting anthocyanin concentration. In addition, wine quality grading, identification of product authenticity and type of yeast can also be performed using this spectroscopic method. All of this is achieved over a wavelength range of 400-2500 nm. Undoubtedly, NIR spectroscopy is a relevant technique in the wine industry to allow an economic and rapid method of analysis to curb the existing insufficiencies.

Keywords: NIR spectroscopy, Wine, Grapes, Composition, Spectroscopy, Fermentation

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