Potential Of NIR Spectroscopy For The Prediction Of Soluble Solids Content And Discriminating Among Different Cultivars

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**Abstract.** Strawberries, as other berries fruits, are widely produced and consumed because of their characteristic flavor, appearance and high nutritive value. Due to their richness in antioxidants, vitamins, minerals and fibre, they play an essential part in a healthy diet and are recommended on the intake of fruits and vegetables. In general, the qualitative analysis of strawberry (as of other vegetables and fruits) are performed with analytical techniques that have the advantage of being fast and repeatable, but the big disadvantage to be destructive, requiring much fruits to obtain a significant result. On the other hand, Near Infrared (NIR) spectroscopy is a rapid, low-cost and non-destructive technique. In addition, it allows to measure several quality attributes at once and it is already widely used in the sector of fresh horticultural products. One of the most important parameter for the assessment of strawberry quality and fruit harvest date is soluble solids content (SSC). This is because SSC contributes to indirect estimations of fruit maturity and quality and is also related to taste and consumer acceptability.

As a consequence, this study will investigate the rapid assessment of SSC of strawberry fruits. To this aim, four cultivars were selected and the fruits were cultivated and collected using a four completely randomized blocks as experimental design. After harvesting, all of the samples were immediately shipped to the lab and were analyzed by means of NIR spectroscopy using a Fourier Transform (FT) NIR spectrophotometer. Later, the fruits were frozen separately and after few days, analyzed for SSC. Principal Component Analysis (PCA) was applied to search for spectral differences among the cultivars and for a separation/trend according to the SSC. As last, Partial Least Squares regression (PLS) technique was computed in order to predict the SSC parameter. The results are promising and showed the possibility to use PCA as a tool for looking at the spectral similarity between different genotypes, also according to the degree of the SSC. This is particular relevant as it could speed up the process of selection and genetic improvement. In addition, this study demonstrated the feasibility to use FT-NIR technique coupled with PLS for the prediction of SSC of strawberry fruits allowing the rapid and non-destructive quality control of the product.

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