

Title Project, development and experimentation of a new NIR portable system for the prediction of internal quality of fruits

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Abstract

Portable systems for determination of the commercial quality of fruits and vegetables constitute a profitable tool for applications both inside the packing house as well as in the harvest field and can promote proper decision making for growers. A new portable system, based on NIR technology, for non destructive determination of soluble solids content ($^{\circ}$ Brix). Firmness (N) and acidity of fruits (g/l) was developed and subsequently tested on various fruits (apples, peaches, grape). The principal objective of this project was to emphasize the ergonomic aspects so as to be able to usefully manage the operations of all workers in the fruit and vegetable market. For the creation of every single model of prediction, numerous spectral measures (range between 400 and 1100 nm) are performed first followed by relative destructive tests (in the season 2005/06). Subsequently this data is then elaborated mathematically with the use of specific software. For the generation of multivariate regression models, the method of partial least squares (PLS) was used and the models have been classified based on their predictive capability, using standard statistical parameters (r, SEC, SEP, Bias). The models, calibrated and validated, have been applied to realize different tests in actual working conditions of production, simultaneously appraising the operational performances of the portable system in terms of autonomy of job and ease of use by a single operator. The results are promising considering the ease of use, speed of measurement and the prediction error levels.