DEVELOPMENT OF A METHODOLOGY TO ANALYZE LEAVES FROM Prunus dulcis VARIETIES USING NEAR INFRARED SPECTROSCOPY

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Introduction

The appearance of varietal mixtures is an important problem in the nursery plants field. Traditional methods to deal with this problem are based on genetic analysis, but they are expensive and complex. Near-infrared spectroscopy (NIRS) could be a faster and cheaper alternative to traditional methods.

Objective

The aim of this work was to investigate how sampling of vegetal material affects the collection of NIR spectra for building a multivariate discriminant model for Prunus dulcis varietal classification.

Material and Methods

- Three varieties of Prunus dulcis (Avijor, Guara, and Pentacebas)
- Principal component analysis (PCA)
- Partial least-squares discriminant analysis (PLS-DA)
- ANOVA simultaneous component analysis (ASCA)
- Antaris II FT-NIR analyzer (Thermo Scientific, USA)

Experimental Results

Variability between trees from the same variety

Variability between leaves from the same variety

Conclusions

The results indicated that variety was the most important factor for classification. The spectral pre-treatment that provided the best results was a combination of standard normal variate (SNV), Savitzky-Golay first derivative, and mean-centering methods. With regard to the type of processed sample, the highest percentages of correct classifications were obtained with fresh and dried powdered leaves at both the training set and test set validation levels.

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