

Title Non-destructive measurement of firmness and soluble solids content in bell pepper using NIR spectroscopy

Author Pathompong Penchaiya, Els Bobelyn, Bert E. Verlinden, Bart M. Nicolai and Wouter Saeys

Citation Journal of Food Engineering, Volume 94, Issues 3-4, October 2009, Pages 267-273

Keywords Near infrared; Reflectance; Non-destructive method; Soluble solids content; Firmness; Bell pepper; Vegetable; Fruit

Abstract

The potential of near infrared (NIR) reflectance spectroscopy over the range 780–1690 nm was investigated to measure the soluble solids content (SSC) and firmness of bell pepper fruit. Partial least squares (PLS) calibration models were constructed based on a calibration dataset which included data from two cultivars (Solution and Ferrari) and two harvest times (2005 and 2006). The effect of Savitzky–Golay second derivative preprocessing and extended multiplicative signal correction (EMSC) on the accuracy of the calibration models was investigated and the best results were obtained with the former. The SECV were equal to 5.9 N and 0.59 °Brix for firmness and SSC, respectively. When the model was applied to an external data set including data from cv. Solution and a different harvest season, the satisfactory SEP values of 4.49 N and 0.7 °Brix were obtained, but for firmness a bias of 5.6 N was observed. From these results it can be concluded that NIR spectroscopy can be used as a non-destructive technique for measuring the SSC in bell pepper, but that further research is needed to make it robust for firmness prediction.