Abstract

The prediction of the optimal harvest date of apples is of high importance as it controls the fruit quality after long-term storage in cooled and modified atmosphere conditions. As the present methodology to determine these dates is very time-consuming, the use of visible and near infrared (VIS-NIR) spectroscopy was examined to speed up the measurements. The root mean square error of prediction (RMSEP) of the near-infrared calibration models for the prediction of the optimal harvest date of individual fruit ranged, depending on the cultivar, from 5 to 9 days. In practice, the average prediction values of sample batches are used to predict optimal harvest dates of individual orchards rather than on a per fruit basis, and the accuracy of the calibration models then increases considerably. The accuracy of the calibration models to predict the optimal harvest date relative to the natural variability of the maturity of individual fruit has been assessed based on an analysis of the per fruit Streif index, a maturity index. The standard deviation of the physiological maturity defined as the days until the optimal picking date ranged from 2 to 8 days in 1999 and from 5 to 12 days in 2000 and was, therefore, of the same order of magnitude as the RMSEP of the VIS-NIR calibration models. As expected, the accuracy of the calibration models was better when the natural variability of the maturity between fruit was small and vice versa. The calibration models for Streif index were not very accurate, even after applying a logarithmic transformation.