Title Determination of soluble solids and firmness of apples by Vis/NIR transmittance

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Abstract

Firmness and soluble solids content (SSC) of Red Fuji apples were examined by Vis/NIR transmittance to find out factors to be considered in online detection. Four arrangements of light source and fruit-orientation were investigated. The wavelength range of 650–920 nm was selected and two types of data pre-processing were used to enhance the precision of calibration models based on partial least square (PLS). The results show the precision of determination can be improved by using second derivate. The best fruit-orientation was the stem–calyx axis was vertical and the fruit surface was illuminated from the upper side. The precision of determination was enhanced by using multi lamps. According to the high grade of apple to export (SSC $\geqslant$ 14 °Brix, firmness $\geqslant$ 8.0 kg/cm^2), the classifying correctness was 86%. Validation models for SSC and firmness had a r^2 of 0.9532 and 0.8136, as well as, SEP of 0.3838 and 0.5344, respectively.