Title	Sorting of fruit using near infrared spectroscopy: application to a range of fruit and vegetables for soluble solids and dry matter content
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Abstract

The performance of a single instrumentation platform, incorporating the use of a tungsten halogen light source, body transmittance optics and a silicon photodiode array detector, and uniform chemometric approach is reported for the application of assessment of determination of soluble solids and dry mater content of a range of fruit. Spectra were acquired at integration times of 30 ms or less, with integration time varied between fruit types to achieve a similar signal level. Calibration performance was compared in terms of root mean standard error of cross validation (*RMSECV*), regression coefficient (*R*), and he *SDR* (*SDR* = *SD/RMSECV* (*SD* is standard deviation). The technology was well suited to sorting on soluble solids content (*SSC*) in apple (*RMSECV* 0.22%, *SDR* > 5; *R* 0.98), and useful, in decreasing order of accuracy, for sorting of stone fruit, mandarin, banana, melons, onions, tomato and papaya (*RMSECV* 1.1%, *SDR* 1.6, *R* 0.79). The technology also performed well in sorting on dry matter content in kiwifruit (*RMSECV* 0.38%, *SDR* > 3, *R* 0.95), and useful, in decreasing order of accuracy, for sorting of banana, mango, avocado, tomato and potato (*RMSECV* 1.0%, *SDR* 1.7, *R* 0.79). The limitations of the application of the technology to fruit sorting is discussed in terms of fruit type ("skin" thickness) and population range. For example, calibration *RMSECV* was only 0.20% on tomato *SSC*, but as population variation was low (*SD* 0.30%), a poor *R* (0.77) and *SDR* (1.5) was obtained.