

Title Classification of high acid fruits by partial least squares using the near infrared transmittance spectra of intact Satsuma mandarins

Author Kumi Miyamoto, Miyuki Kawauchi and Toshitaka Fukuda

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Abstract

The feasibility of on-line measurement of citric acid content using NIR transmittance spectroscopy was investigated. The citric acid content was determined by titration with NaOH. The second derivative absorption values of transmittance spectra through the fruit equator were auto scaled by mean-centring and weighing by $1/S.Dev$. The data were analysed by PLS1 using the UNSCRAMBLER software. The spectra of peeled fruits measured by a NIR System Model 6250 were analysed, and the model composed of 12 factors provided the highest accuracy; $R = 0.93$, Bias = -0.013% and $SEP = 0.146\%$. In the next step, the citric acid content in intact Satsuma mandarins was regressed by the same method using an on-line instrument. The model composed of five factors explained 68.2% of total Y variation. The accuracy of prediction result was rather low; $R = 0.83$, Bias = 0.024% and $SEP = 0.147\%$. But, it was possible to classify non-destructively the high acid fruits with about a 20% error rate. The absorption bands of citric acid contributed heavily to this PLS model.