ABSTRACT

'Forelle' pears are prone to mealiness, a dry textural disorder characterised by loss of free juice and development of a floury texture when fruit softens. There is currently no method of determining mealiness in intact fruit and no instrumental index which correlates with mealiness. Presently, mealiness determination is done by sensorial panels on cut fruit. This study investigated physicochemical attributes associated with mealiness and the potential of Fourier transform-near infrared (FT-NIR) spectroscopy for non-destructive detection of mealiness in 'Forelle' pears. Spectra were acquired on 400 fruit harvested from four farms over two seasons, stored for 8 weeks at -0.5°C and then for 7 d shelf life at 20°C. Physicochemical measurements were taken using standard destructive techniques. Mealiness was evaluated on each individual fruit by a panel of three trained evaluators and confirmed using the confined compression test. Principal component analysis (PCA) was done on physicochemical parameters to identify parameters that relate to mealiness. Orthogonal partial least squares discriminant analysis (OPLS-DA) of FT-NIR spectra was used to discriminate mealy from non-mealy fruit. PCA results showed high positive correlations between mealiness and total soluble solids (TSS). The results showed potential for discriminating between mealy and non-mealy fruit using FT-NIR spectroscopy. Classification accuracies for the two-class OPLS-DA models ranged from 51-95%. Through discriminant analysis, FT-NIR was shown to be a potential non-destructive method for determining mealiness and for the first time TSS was shown to be linked with mealiness.