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The detection of melamine in soybean meal by near infrared microscopy

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Near infrared microscopy (NIRM) offers the opportunity to explore not only what kinds of chemical species are present at micro-scale level but also where the chemical species would be present. This study investigates the feasibility of using NIRM to detect melamine in soybean meal. Pre-arranged sample artificially and mixed sample in laboratory was used to obtain NIRM data cubes. NIRM data cubes were processed by the different preprocessing of data, including baseline correction, derivative, reducing noising. This paper described two different methods for extracting melamine information from NIRM data cubes. Univariate analysis (e.g. single wavelength image and peak integration image) and multivariate analysis (e.g. factor analysis such as PCA and clustering techniques such as correlation analysis) were used to extract information of interest. Discriminant analysis with



particle statistic investigation was utilized to measure the cluster size of the melamine in soybean meal. The results showed that the band at 6805 cm⁻¹ is very sensitive for melamine but not for soybean meal. By revealing the spectral and spatial information, the technique can identify and localize the melamine. Chemical images of melamine in soybean meal can be generated by either extracting pure melamine information from the samples, using techniques such as PCA reconstruction, or by knowledge and reference to pure melamine spectra, using techniques such as single wavelength image and correlation analysis. From the results presented, NIRM has been shown to be a useful tool for detecting the melamine in soybean meal.

Keywords Near infrared microscopy (NIRM);soybean meal;melamine;univariate analysis;multivariate analysis;cluster size

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