

# FLOUR PARTICLE SIZE DETERMINATION.



## A portable NIR analyser to determine particle size of flour in routine quality control

- Identification and measurement of particle size of powder and milled products
- Detection and quantification of counterfeit raw materials as well as quantification of quality parameters
- Accurate measurements even through plastic bags
- Portable device to be used in the warehouse or outdoor
- Very easy to use with intuitive user interface and touch screen



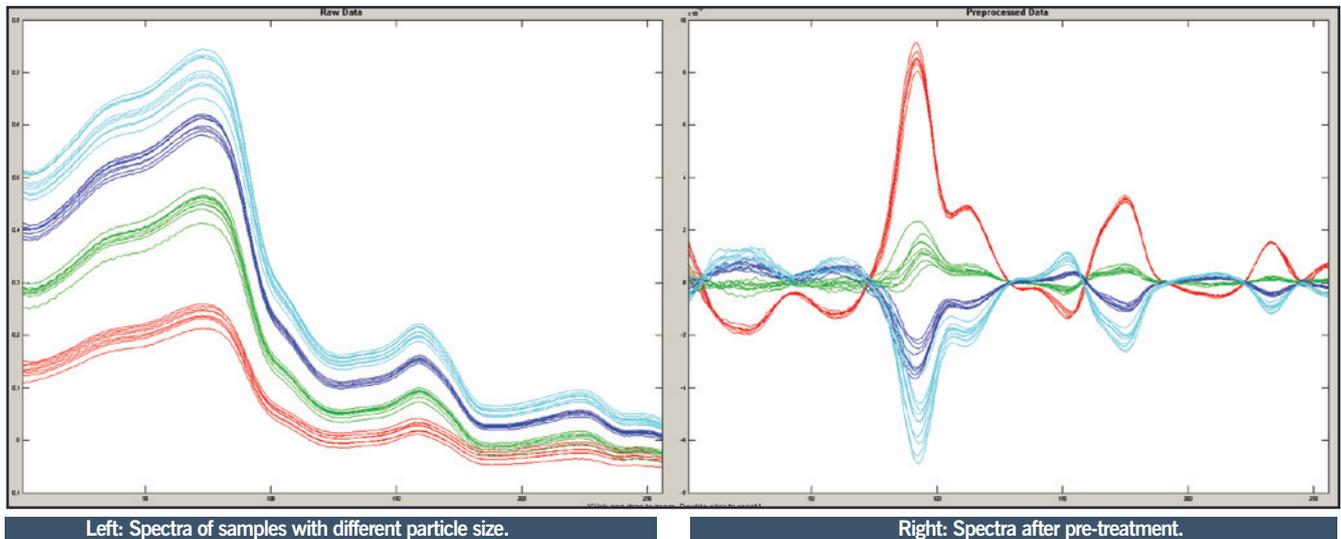
## VISUM PALM: Particle size determination for quality control in powder foodstuff

Measurement of the particle size of flours and ground wheats is a key mean for evaluating flour quality. Traditionally, these measurements have been carried out by means of sieve analysis, microscopy, sedimentation or laser diffraction. In some cases, they involve cumbersome procedures or expensive equipment. On the contrary, NIR reflectance spectra

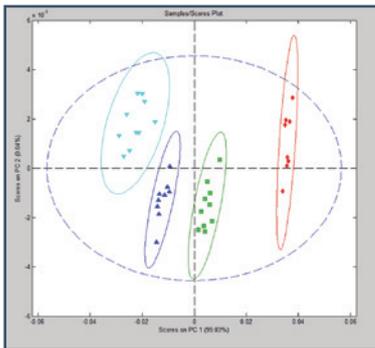
are very sensitive to the particle size of powder samples and, complementarily, this novel method offers the advantages of rapid, non-destructive analysis and easier routine operation as well as the possibility to be implemented online for both automated process control and quality control in the miller.

## Case study

The spectra of a number of plastic bags with samples of semolina flour with different particle sizes are acquired by means of the VISUM PALM analyser directly through the bags. The NIR spectral “fingerprint” is different for each sample while relevant differences among some of the samples cannot be detected by the naked human eye.



The repetitive shape features are due to the specific chemical composition of the samples; the most relevant differences are due to different particle sizes



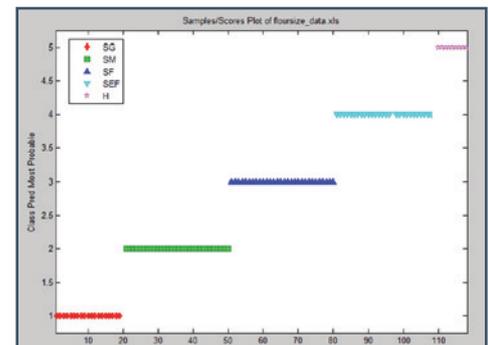
PCA model of semolina/flour samples with different particle sizes

After developing a chemometric model (PCA) to classify the samples according to their particle sizes the particle size of the samples, a clear differentiation of the samples is easily achieved.

Complementarily, different fractions from wheat grain milling process with different particle size distributions were also packaged and their spectra were acquired with Visum Palm.



A chemometric model (PLS-DA) is developed to classify the samples according to their respective particle size distributions with a 95% of confidence.



PLS-DA Classification of samples with different particle size distributions. No sample is erroneously classified

## Conclusions

“The VISUM PALM analyser is capable to identify wheat semolina/flour samples according to their particle sizes or their particle size distributions by measuring directly through their plastic bags in less than 5 seconds.”