

# FLOUR PARTICLE SIZE DETERMINATION.



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

- Identification and measurement of particle size of powder 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: Quality control of particle size in flour fines

Measurement of the flour particle size 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

Wheat flour was sieved and separated in fractions of different sizes from  $0.25\ \mu\text{m}$  to  $<0.125\ \mu\text{m}$  that were packaged in plastic bags and their spectra were acquired with Visum Palm.

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

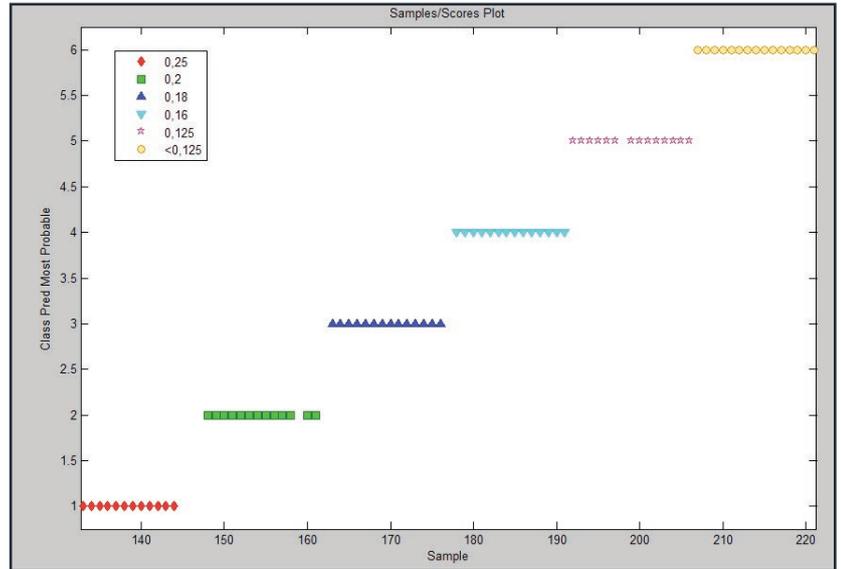


Fig. PLS-DA of flour fractions with different particle sizes. No sample is erroneously classified.

In addition, a number of plastic bags with different amounts of the smallest flour fraction ( $<0.125\ \mu\text{m}$ ) were prepared and their spectra were acquired with Visum Palm. A quantitative model (PLS) was successfully developed to predict the content of particles with a size  $<0.125\ \mu\text{m}$  in each bag.

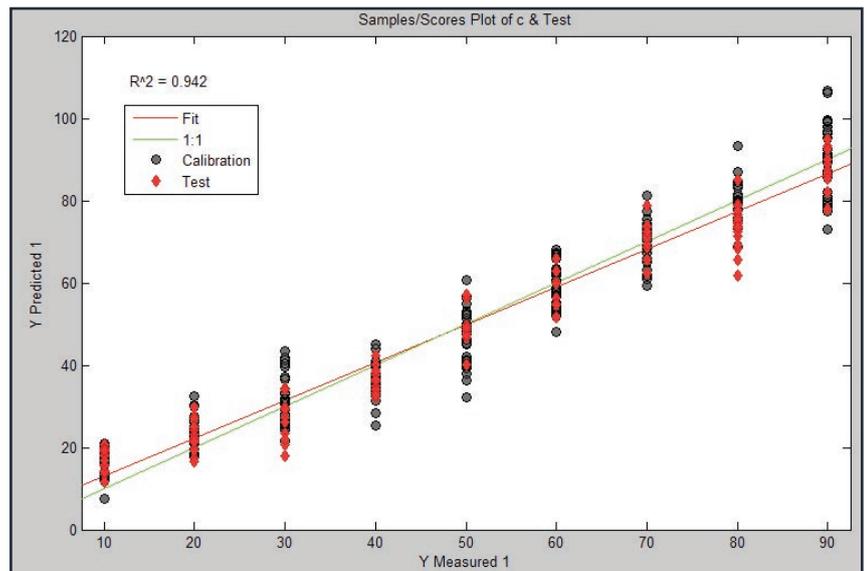


Fig. PLS calibration of the content of particles with a size  $<0.125\ \mu\text{m}$  in each bag

## Conclusions

The VISUM PALM analyser is capable to determine the particle size distribution of flour samples, detecting even variations lower than a 6.5% in the smallest particle size fraction of flour ( $<0.125\ \mu\text{m}$ ), by measuring directly through their plastic bags in less than 5 seconds.