Analysis of Pasta using the Diode Array 7250 Analyzer

Introduction

In pasta manufacturing production costs and pasta quality can be improved and controlled by using fast measurements of moisture content and other nutritional parameters in the produced pasta.

The Near Infrared Reflectance (NIR) technology is highly suitable for these purposes. NIR is an indirect analytical method, were the relationship between reference values and the spectra of the samples are related using multivariate calibrations. Instead of the time consuming and labor intensive traditional wet chemistry methods, with NIR the multi component analysis is done in seconds. The latest technology and software developments allows the benefits to be even further exploited with easy to use instrument and operation handling.

DA 7250 NIR Analyzer

The DA 7250 is a Near Infrared Reflectance (NIR) instrument designed for optimal use on food products. Using novel Diode Array technology, the DA 7250 is unique in its measurement speed, versatility and accuracy.

In only 6 seconds samples are measured in flexible open dishes and the instrument is handled by an intuitive touch screen interface. Most sample types can be measured as they are without any preparation or as an alternative be grinded and measured as powder or coarse meal. Pre-installed NIR Calibration models are available for a wide range of products and parameters.

The DA 7250 instrument is IP 65 rated and available in sanitary design version, allowing it to be used in the lab as well as in the production environment.

Method

More than 300 pasta samples from multiple pasta producers were measured on DA 7250 instruments. The samples encompassed different shapes such as stars, ribbons, nests, needles, pipes, screws etc. Each sample was analyzed with two repacks with the measurement results averaged.

The samples were analyzed as received, without grinding or other sample preparation.

The samples compositions of moisture, protein, ash, ash, wet gluten and fat were determined using wet chemistry reference methods.

Calibration models were developed to model the relationships between the instruments NIR spectra and the reference chemistry results. Model development were done using scatter correcting spectra pre-treatments and multivariate PLS regression.

Results and Discussion

Table 1 summarizes statistics of developed calibrations. Correlation strength is denoted R and range the chemical variability of each parameter. Figure 1 displays the Reference vs NIR calibration graph for moisture

The accuracy of measurements using the DA 7250 was similar to the reproducibility of the reference methods.

Parameter	Range %	Samples	R
Moisture	9.3 – 16.8	280	0.99
Protein, as is	9.3 – 15.3	70	0.97
Ash, as is	0.35 – 1.25	160	0.96
Gluten	22.8 – 37.6	70	0.96
Fat, as is	3.8 – 6.2	20	0.98

Table 1

Repeatability of measurements using the DA 7250 instrument was generally lower than reference method repeatability.

In summary, it is concluded that the DA 7250 accurately can analyze unground pasta in a few seconds using large open rotating sample dishes.

Moisture

This moisture calibration has an accuracy around 0.2% across the wide measurement range. It is as accurate for fresh pastas as it is for the dried product, and makes the DA 7250 an excellent analytical tool for moisture control in pasta production.

Predicted vs. Reference