NIR research at Campden & Chorleywood Food Research Association

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Near infrared (NIR) spectroscopy is widely used for the routine analysis of cereals. More recently, the research and commercial applications of the technique have been extended to include the prediction of parameters relating to functionality rather than basic quality. In some cases this has also facilitated the development of on or at-line approaches for the technique. This presentation will summarise the work carried out at CCFRA in a number of NIR-related areas with particular emphasis on its use for wheat and derived products.

The performance and management of NIR calibrations is a fundamental aspect of the use of the technique. Increasingly, however, the resources required to develop and monitor robust calibrations lie outside those available within industry. To counteract this, CCFRA has managed a programme of calibration development and annual updates for the UK flour milling industry's trade body, **nabim** (The National Association of British and Irish Millers). This work covers key parameters for the assessment of ground wheat and flour and benefits from samples collected since 1996. To facilitate calibration management by a range of different instruments, standardisation approaches have been applied to full spectral and filter instruments alike.

In addition to calibrations derived for analysis of basic quality parameters, a programme of work was undertaken in conjunction with ARVALIS – Institut du Végétal to develop NIR calibrations describing wheat functionality in respect of bread production. Calibrations were developed using established SE-HPLC parameters which are now included in new harvest screening of individual wheat varieties in the UK.

NIR has also been applied at CCFRA to investigate one of the main stages of bakery processing: mixing. The technique has been used to collect information on the chemical changes which occur during dough and batter mixing and the mixing traces thus derived have been related to physical changes in the dough as well as aspects of baked product quality.

About the speaker

Dr Sam Millar is the Head of Cereals & Milling at Campden & Chorleywood Food Research Association (CCFRA) and leads a team which performs research and contract work in support of the global cereals and related industries. Prior to his current role, Sam was the Baking Technology Manager in the Department of Baking and Cereals Processing at CCFRA. He has wide experience in the application of near infrared (NIR) spectroscopy to the assessment of cereals and their products with a particular interest in wheat and flour protein quality prediction and assessment of dough mixing performance.

Sam completed his BSc in Food Science at the Queen's University of Belfast in 1991 and obtained his PhD in 1994 for the thesis 'The effect of ionising radiation on the appearance of meat'. He then worked as a post-doctorate research associate with l'Institut National de la Recherche Agronomique (INRA) in Nantes, France until joining CCFRA. This post was part of a European Union funded project where an NIR approach for the control of extrusion cooking processes was developed.