NIR - a Tool for Evaluation of Milling Procedure

SZILVESZTER GERGELY - LIDIA HANDZEL - ANDREA ZOLTÁN - ANDRÁS SALGÓ

Department of Biochemistry and Food Technology, Budapest University of Technology and Economics, Műegyetem rkp. 3., Budapest, H-1111, Hungary

Micro-scale test methods are producing small-sample size where the conventional physical and chemical tests can not be used (high standard deviation, uncertain sampling conditions, low repeatability). Different small-scale test methods were developed recently for determination of physico-chemical, functional, rheological properties of wheat or wheat dough using miniaturised instruments with sophisticated sample preparation/handling and mechanics (RVA, 2 g mixograph, micro-Z-arm mixer, small-scale noodle maker, micro-baking method etc.).

The small-scale methodologies can be used as basic research tools or as technology supported measurements and can be also essential in the early selection for quality traits in breeding programs.

The milling as a sample preparation step is essential procedure providing good quality flour or semolina samples from small amount of grain (5-10 g) in a reproducible and reliable way. The aim of present study was to use NIR as quality control tool, and to evaluate the recently developed and manufactured micro-scale lab mill (FQC-2000) produced by Inter-Labor Co. Ltd., Hungary. The milling characteristics of the new instrument were compared to other laboratory mills and the effects of milling action on the chemical composition of fractions were analysed.

The fractions were tested with both chemical and near infrared spectroscopic methods. The micro-scale milling resulted significantly different yields, particle size distributions and different fractions from compositional point of view.

The near infrared spectra were sensitive enough to distinguish the fractions obtained by different milling procedures.

Quantitative NIR calibration equations were developed and tested in order to measure the chemical composition of characteristic milling fractions.

Special qualification procedure the PQS (Polar Qualification System) method was used for detecting the differences between fractions obtained by macro and micro-milling procedures. The results and the limitations of PQS method in this application will be discussed.