

## Analytical identification of wheat subspecies - A contribution to consumer protection

Magdalena Breuer<sup>1</sup>, Manfred Werteker<sup>2\*</sup> and Heinrich Grausgruber<sup>1</sup>

### Abstract

In the last years the consumer was faced with an increasing number of baking products made from neglected wheat subspecies such as spelt wheat (*Triticum aestivum* L. subsp. *spelta* (L.) Thell., *T. aestivum* L. subsp. *macha* (Dekapr. & Menabde) MacKey) and their crossbreeds.

In the interest of producers and consumers reliable analytical methods for the distinction of these subspecies from common wheat (*T. aestivum* L.) are necessary. The consumer has to be protected against fraudulent use of common wheat in spelt wheat products and the producer against dishonest competitors. Under the aspects of emerging non coeliac wheat incompatibilities in some groups of the population the purity of raw material gets also a public health dimension.

The task of this study was the development of a method for analytical distinction of wheat subspecies based on HPLC-spectra of the albumin/globulin, gliadin and glutenin fractions resulting from a modified Osborn-fractionation. The peak areas of the separated proteins were quantified and evaluated by principal component analysis. Additionally the influence of the gliadin/glutenin-ratio on the distinguishability was investigated.

From five locations of the Austrian VCU trials of 2011 three *T. aestivum*, four *T. spelta* varieties and two crossbreeds were analysed (45 samples). To increase the number of wheat samples 29 wheat samples from two locations of the VCU trials of 2012 were included in the study. Moreover, 47 samples of *T. spelta*, *T. macha* and *T. macha*×*T. spelta* from single locations in Austria, Germany and Italy, were provided by the breeding programme of the Department of Crop Sciences of the University of Natural Resources and Life Sciences, Vienna.

The best results with respect to the differentiation were obtained by the application of a standardised evaluation of the principal component analysis. In this mode the absolute magnitude of the peaks is neglected and only their relative variability is important for the alignment of the principal components. In this way the influence of small peaks is enhanced and their importance for the distinction of subspecies may be recognized. All three subspecies could be separated properly by this method, however, the detection of crossbreeds (*T. spelta*×*T. aestivum*) was not possible.

### Keywords

Food security, HPLC, principal component analysis, spelt wheat, *Triticum*

### Acknowledgments

The study was sponsored by FFG.

### References

- KESSLER W, 2007: Multivariate Datenanalyse für die Pharma-, Bio- und Prozessanalytik. Wiley-VCH Verlag GmbH Co KGaA, Weinheim.
- WIESER H, ANTES S, SEILMEIER W, 1998: Quantitative determination of gluten protein types in wheat flour by reversed-phase high performance liquid chromatography. *Cereal Chem* 75, 644-650.

<sup>1</sup> University of Natural Resources and Life Sciences, Department of Crop Sciences, Konrad Lorenz Straße 24, 3430 TULLN, Austria

<sup>2</sup> Austrian Agency for Health and Food Safety, Institute for Feed and Animal Nutrition, Spargelfeldstraße 191, 1220 VIENNA, Austria

\* Corresponding author: Manfred WERTEKER, manfred.werteker@ages.at

