Identification of Wheat Varieties Using Matrix-assisted Laser Desorption/Ionisation Time-of-flight Mass Spectrometry and an Artificial Neural network

A novel tool for variety identification of wheat (Triticum aestivum L.) has been developed: an artificial neural network (ANN) is used to classify the gliadin fraction analysed by matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOFMS). The robustness of this novel method with respect to various experimental parameters has been tested. The results can be summarised: (i) With this approach 97% of the wheat varieties can be classified correctly with a corresponding correlation coefficient of 1.0, (ii) The method is fast since the time of extracting gliadins from flour can be reduced to 20 min without significant decrease in overall performance, (iii) The storage of flour or extracts under standard conditions does not influence the classification ability (i.e. the generalisation ability) of the method, and (iv) The classification obtained is not influenced by the identity of the operator making the analysis. This study demonstrates that a combination of an ANN and MALDI-TOFMS analysis of the gliadin fraction provides a fast and reliable tool for the variety identification of wheat. Copyright (C) 1999 John Whey & Sons, Ltd.