

AUTHENTICATION OF ORGANIC TOMATOES, WHEAT, AND RELATED PRODUCTS

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There is an increasing consumer demand for food cultivated by organic farming practices. Because of higher price of these products, there is a need for development and validation of analytical methods, which allow discrimination between organic and conventional food products. This contribution concerns with one of the novel methods of food analysis, the metabolomic fingerprinting/profiling by the ambient mass spectrometry employing Direct Analysis in Real Time (DART) ion source coupled with Orbitrap mass spectrometer.

The method based on metabolomics for organic food authenticity was evaluated. In this study, a wide set of wheat and wheat products samples from both organic and conventional production was analyzed (whole wheat, flour and pasta grown in four different localities in Italy, including eight varieties of wheat). For extraction, aqueous methanol and cyclohexane were chosen as the best solvents to obtain a broad spectrum of polar and nonpolar metabolites, respectively. Tomatoes and respective tomato sauces was also analyzed in this study. Tomatoes were grown under both organic and conventional conditions (two Italian localities, three varieties). Instrumental analysis was performed using DART-Orbitrap-MS. In addition to metabolomic fingerprinting, identification of some markers has been conducted. In an organic fraction, triacylglycerols were the main group of identified analytes, while in an aqueous fraction, predominantly organic acids, amino acids and sugars were identified. Samples were classified using sophisticated chemometric tools like Principal component analysis (PCA) and Partial least squares-Discriminant analysis (PLS-DA). This research was carried out within the AuthenticFood project (FP7 ERA-Net project no. 249667, CORE Organic II).

Key words: *Tomatoes, Wheat, Organic and conventional production, DART-MS, Metabolomic fingerprinting*

Acknowledgement: *This study was partially supported by Ministry of Agriculture of the Czech Republic*