



42nd International
Symposium
on Capillary
Chromatography
and
15th GCxGC
Symposium

Chairman
Prof. L. Mondello

13 - 18 May, 2018

*Palazzo dei Congressi,
Riva del Garda
Italy*

ABSTRACT BOOK

INFORMATION

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The Forum on Microcolumn Separations

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Publisher: Chromaleont S.r.L.

Via Leonardo Sciascia snc

Coop. Fede pal. B

Ex Via Torrente San Licandro

98168 Messina, Italy

Edited by: L. Mondello and P. Dugo

ISBN: 978-88-941816-1-6

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COMBINATION OF STABLE ISOTOPE RATIOS OF H, C, N, O AND S WITH $\delta^{15}\text{N}$ AND $\delta^{13}\text{C}$ OF AMINOACIDS FOR THE DIFFERENTIATION OF ORGANICALLY AND CONVENTIONALLY GROWN TOMATOES

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Organically grown vegetables and fruits claim for a much higher price compared to conventional products. Up to now, there is a lack of analytical methods able to distinguish products grown under different farming systems. Stable isotope ratios determined in bulk samples and/or in derived specific compounds, have been successfully used for the traceability of different food commodities. In this study the analysis of the stable isotope ratios of H, C, N, O and S, performed using Isotope Ratio Mass Spectrometry, of bulk tomatoes was considered for distinguishing organic from conventional tomatoes grown in different Italian regions and in different harvest years. Furthermore, a gas chromatography–combustion–isotope ratio mass spectrometry method for the analysis of C and N isotope ratios in amino acids derived from tomatoes (Ala, Val, Ileu, Leu, Gly, Pro, Thr, Glx and Phe) was developed and applied on the same samples subjected to the bulk analysis.

Of the bulk isotope ratios, $\delta^{15}\text{N}$ was confirmed to be the most significant parameter. In some cases, the other isotopic ratios were influenced by the farming system, but year and regions also had a strong impact.

By combining $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ of the different amino acids with the bulk data it was possible to achieve a complete separation between organic and conventional tomatoes, regardless the production years and regions. Compound-specific stable isotope analysis of amino acids can represent a novel analytical tool for the support and verification of the certification and control procedures in the tomatoes organic sector.