

*XVII Italian-Hungarian Symposium
on Spectrochemistry*

Current approaches in Health and Environmental Protection

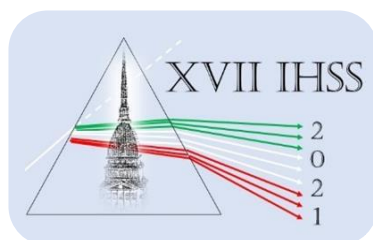
Turin (Italy), 14-18 June, 2021



Programme & Book of Abstracts

XVII ITALIAN-HUNGARIAN SYMPOSIUM ON SPECTROCHEMISTRY CURRENT APPROACHES IN HEALTH AND ENVIRONMENTAL PROTECTION

June 14 – 18, 2021, Turin, Italy



Under the patronage of
Istituto Superiore di Sanità



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Italian National
Research Council



Publisher: Istituto di Ricerca sulle Acque del Consiglio Nazionale delle Ricerche (IRSA-CNR)

ISBN: 9788897655084 (online); ISBN: 9788897655077 (print)

FOOD RELATED VOCs ANALYSIS BY DIRECT INJECTION MASS SPECTROMETRY: A TRADE-OFF BETWEEN SENSITIVITY/TIME RESOLUTION AND SPECIFICITY

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Keywords: Volatile compounds; Proton transfer reaction mass spectrometry; Direct injection mass spectrometry

Volatile metabolites play a relevant role in food science and technology in most steps of the production chain. They are, *e.g.*, important for plant ecology and physiology [1], they are drivers and products of fruit changes during ripening and storage [2], and they control to a large extent the way we perceive food before (odour), during (flavour, aroma), and after (aftertaste) consumption [3]. Moreover, being spontaneously and continuously released, their measurement can be used as a non-invasive and rapid tool for the control of food samples [4] and the real-time monitoring of biological and technological processes [5].

For these reasons, the analysis of food volatile metabolites is of interest if, mostly in an omic approach, it can rely on: *i*) high sensitivity and large dynamic range because volatile compounds can produce biological or sensory effects at different, possibly very low, concentrations; and *ii*) fast and non-invasive measurements both to allow the screening of large sample sets and the monitoring of rapid processes.

These issues can be efficiently addressed by different Direct Injection Mass Spectrometry (DIMS) methods developed for volatile compound analysis, Proton Transfer Reaction Mass Spectrometry (PTR-MS) in particular [6]. The lack of specificity of these techniques, as compared with chromatographic ones, is compensated by the high time resolution, the non-invasive analysis and the very high sensitivity even without sample pre-treatment or concentration.

This contribution, after a short description of a prototypical DIMS set-up based on PTR-MS developed for agroindustrial applications, aims at pointing out DIMS pros and cons in food volatilomics by describing few selected applications investigated at the Sensory Quality unit at FEM: from industry quality control to nose-space analysis. Furthermore, health and environmental applications are shortly discussed as well as some recent developments, which increase specificity of PTR-MS based methods without compromising on sensitivity and time resolution.

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