BOOK OF ABSTRACTS

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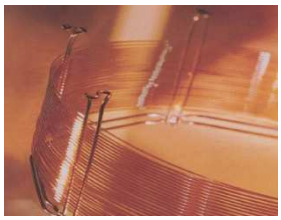

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L43*
MULTIDIMENSIONAL CHROMATOGRAPHIC TECHNIQUES (LC–GC–GC–GC–PREP) FOR THE COLLECTION OF PURE VOLATILE COMPONENTS FROM COMPLEX SAMPLES

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The present research describes the development of a new versatile multidimensional gas chromatographic preparative system (MDGC–prep), coupled to an LC pre-separation step operated under normal phase conditions, depending on the complexity of the sample analysed. The system was demonstrated to be capable to collect volatile molecules in a wide range of concentrations, in a short time period, while maintaining a high degree of purity for the selected components. Furthermore, the LC dimension allows the injection of higher sample amounts with respect to a conventional split/splitless injector as well as the transfer of simplified samples to the MDGC–prep system. With respect to the configurations already described in recent papers, the current configuration was developed by adding two electronically controlled switching valves both in the first and second dimension. The valves allow the collection of pure components directly in each of these dimensions without any hardware modification reducing the total collection time for the components already resolved in the first or second wide bore column. Furthermore, in such a configuration, the generation of co-elutions coming from the multi-cutting of many components is also avoided. The new system was applied to the isolation of multiple components from different complex samples namely carrot seed oil, and Vetiver and Patchouli essential oils.

Keywords: *gas chromatography, essential oils, multidimensional*

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L44*
PROTON-TRANSFER-REACTION MASS SPECTROMETRY FOR THE STUDY OF THE PRODUCTION OF VOLATILE COMPOUNDS AND THE EFFECT OF FLOUR, YEAST AND THEIR INTERACTION DURING THE BREAD-MAKING PROCESS

Salim Makhoul[1*], Andrea Romano[2], Vittorio Cappozzi[3], Giuseppe Spano[4], Eugenio Aprea[5], Jean Guzzo[6], Hanna El-Nakat[7], Franco Biasioli[8]

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Bread is one of the most consumed products all over the world, which gives it an important socio-economic status in human nutrition and justifies the continuous research and development activities on how to improve its sensory, chemical and industrial characteristics [1]. Volatile organic compounds (VOCs) play a key role in this regard because they take shape during the leavening process and are enhanced upon baking. They help in increasing the volume and producing the shape and the crumb texture, as well as defining the taste of the final product [2]. In this project, Proton Transfer Reaction Mass Spectrometry (PTR-MS), coupled to a time-of-flight mass analyzer (ToF) was applied [3], for the first time, in order to assess the release of VOCs during bread-making and the production of VOCs by different bakery starters. The system included a multifunctional autosampler which permitted the follow-up of the leavening process on a small scale with a typical throughput of 500 distinct data points in sixteen hours. This set-up allowed for a fast, automated and real-time monitoring of the leavening process of bread. The overall course of the reaction was reproducible and enabled us to track the evolution of the production or depletion of a large number of VOCs as well as to discriminate between the different types of yeast preparations. This technique also allowed to tentatively identify major VOCs related to yeast metabolic activity or arising upon baking and more importantly, to point out differences in terms of volatile producti on and evolution kinetics either with time, between yeasts, and even before and after baking [1]. Furthermore, PTR–ToF-MS was successfully applied to analyze the effects of Saccharomyces cerevisiae strains as well as the type of wheat flour used in the bread-making process on VOCs production. The results showed a greater impact of yeast strains over the expected flour influence. This observation was confirmed when the leavened dough samples were baked and the volatile profiles determined. However, the peak-by-peak monitoring followed by a tailored developed statistical approach revealed not only the effect of changing ingredients, but also different kinds of yeast/flour interaction, shedding a new light on the selection of ingredients for each bread recipe depending on the desired volatile profile of the baked product and on the potential of PTR-MS in being a fast high-throughput tool able to analyze protechnological microbes/matrix interaction during food fermentations.

[1] S. Makhoul, A. Romano, L. Cappellin, G. Spano, V. Capozzi, E. Benozzi, T.D. Märk, E. Aprea, F. Gasperi, H. El-Nakat, J. Guzzo, F. Biasioli, Journal of Mass Spectrometry, 49, 850-859 (2014).
[2] I. Cho, D. Peterson, Food Science and Biotechnology, 19, 575-582 (2010). [3] F. Biasioli, F. Gasperi, C. Yeretzian, T.D. Märk, Trends in Analytical Chemistry, 30, 968-977 (2011).

Keywords: *bread-making, VOCs, PTR-MS, aroma, interaction*

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