

Enhanced capability of a purge-and-trap, thermal desorption and GC×GC-MS methodology for aroma profiling

Flavio Antonio Franchina, Delphine Zanella, Eliane Lazzari, Pierre-Hugues Stefanuto, and Jean-François Focant

University of Liege, MolSys Research Unit, Liege, Belgium, B-4000

Headspace gas chromatography has been frequently used for aroma profiling because of its ability to naturally exploit the volatility of aroma compounds, and also to provide information on the composition of the sample [1]. Its main practical advantages are its simplicity, no use of solvent, amenability to automation, and the cleanliness of the extract.

In the present contribution, the most effective sampling (dynamic sampling), separation (multidimensional gas chromatography) and detection (mass spectrometry) techniques are combined, showing their potential in unravelling aroma profiles in beverages.

In addition, a neat workflow for data analysis is discussed and used for the successful characterization and identification of different beer flavors, if the steps in the analytical process are properly controlled. From the technological viewpoint, this is the first time that a purge-and-trap (P&T), comprehensive 2D gas chromatography (GC×GC), and mass spectrometry (MS) are exploited in combination. A newly-thought flow modulation approach allowed for multidimensional 2D gas chromatography, with the full eluate transfer onto the second dimension and the MS detector with no need to divert the flow, making the overall method highly sensitive and selective [2-3].

References:

- [1] Marsili R., Flavor, Fragrance, and Odor Analysis, Marcel Dekker, 2002, 25-54.
- [2] Tranchida, P.Q., Franchina F.A., Dugo P., Mondello L. J. Chromatogr. A. 2014, 1359, 271-276.
- [3] Franchina F.A., Maimone M., Tranchida, P.Q., Mondello L. J. Chromatogr. A. 2016, 1441, 134-139.