

## Plenary lecture PL2.01

### Strategy and techniques of analysis of the volatile fraction as a tool for food control and characterization.

Carlo Bicchi, Chiara Cordero, Erica Liberto

Dipartimento di Scienza e Tecnologia del Farmaco, University of Torino, Torino, Italy

The volatile fraction of a food and in particular its aroma is an important "signature" not only playing a fundamental role in food choice but also in its characterization, quality assessment and genuineness. Sensory analysis is still the reference criterion to define food quality; nevertheless, it still is a critical step because of i) the rather limited number of expert tasters, ii) time and number of experiments required, and iii) the limited number of daily-processable samples.

The introduction of Metabolomics in 1998 [1] and Molecular Sensory Science or Sensomics, in 2011 [2] and of the derived strategies and methods have also substantially influenced the approach to flavor analysis. In analytical terms, these disciplines imply a comprehensive and quantitative analysis of the largest possible array of low molecular weight components (<1,000 Da) in the investigated samples [3]. The application of the metabolomics strategies in the food field has involved the development of dedicated analytical approaches, the best known being Fingerprinting and Profiling, and the untargeted and targeted methods derived from them. The aim is therefore to develop inclusive instrumentation where the "sample preparation-analysis-data elaboration" sequence are on-line merged into a single step, the so-called "Total Analysis Systems" (TAS) [4]. The food volatile fraction analysis with TAS requires an automatic single-step sample preparation technique on-line combined with GC-MS system to obtain diagnostic patterns suitable for on-line data processing. This contribution discusses the strategies to study the food volatile fraction in view of routine quality control and examples concerning cocoa, coffee and tea taken by the authors' everyday experience.

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#### References

- [1] S.G. Oliver, M.K. Winson, D.B. Kell, F. Baganz, *Trends Biotechnol.* 1998, 16, 373-378
- [2] P. Schieberle, T. Hofmann, (2011), *Food Flavors*, CRC Press: 413-438
- [4] J.L. Wolfender et al. *Current Medicinal Chemistry*, 2013, 1056-1090
- [5] A. Manz, N. Graber, H. M. Widmer, *Sensors and Actuators: B. Chemical*, 1990, 1(1-6), 244-248