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(Article begins on next page)

New trends in the analysis of coffee volatile fraction

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Aroma is an important ‘signature’ of coffee and one of the primary hedonic aspect in coffee evaluation playing a fundamental role in coffee choice [1]. The cup tasting is nowadays the most used criteria to define coffee quality also in the industry, although it requires a well-trained and aligned panel.

The fundamental studies on the chemical composition of an aroma are nowadays based on the molecular sensory science/sensomics approach, i.e. a discipline that objectifies aroma and taste of a food on a molecular basis and still is the reference method adopted to identify and quantify the molecules responsible in general for a food flavor, and/or in particular for its aroma.¹ This approach is however too time-consuming to be used in routine control, also in view of meeting the ever-increasing demand of controls the industry requires. A method complementary to sensomics has been introduced, sensometrics, which has the aim to provide an objective tool complementary to sensory evaluation mainly for routine use. Sensometrics is a bridge linking sensory properties to chemical information behind them, trying to correlate the sensory characteristics of a food aroma to its chemical composition via chemo-metric methods. Sensometrics is based on fast and automatic Total Analysis Systems (TAS) in combination with suitable statistical tools (unsupervised and supervised) affording the screening of a high number of samples that is mandatory to define representatively the diagnostic pattern of the aroma of a complex food matrix such as coffee. It makes possible a correlation between the scores of sensory analysis and the chemical profile or fingerprint of a matrix obtained by on-line combining automatic high concentration capability sampling techniques with separative GC-MS (HS-SPME-GC-MS) or non-separative (HS-SPME-MS) platforms.

The effectiveness of the sensometric approach has here critically been studied to define a correlation between the sensory results obtained by a professional panel and the results of chemical analyses with the above platforms on a set of coffee characterized by highly different scores within each investigated sensory note (acid, bitter, woody, flowery, nutty, spicy)^{2,3}. The two approaches can only be compared by considering their substantial differences, but the coherent results achieved in terms of representative compounds indicated the sensometric approach as a valid complementary and additional tool for the characterization of coffee through their aroma.

References

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