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Extending the Orthogonality to the Whole Analytical Process: Does it Open New Perspectives in Flavoromics?

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Modern omics disciplines (metabolomics, foodomics, flavoromics etc..) include in their investigations all constituents considered collectively (primary and secondary metabolites, compounds generated by thermal treatments and/or enzymatic activity) [1] and represent the route of choice for a comprehensive evaluation of food attributes where, in particular, sensory properties are unequivocally correlated to a specific and peculiar quali-quantitative distribution of known (or unknown) chemicals [2]. Flavor research profitably exploits the potentials of -omic approaches and two-dimensional comprehensive gas chromatography coupled to mass spectrometric detection (GC×GC-MS) represents the technique of choice for a comprehensive investigation of the aroma fingerprint of complex food samples. However, to maximize the information content for every single run, suitable sampling strategies and sample preparation approaches, should be designed and implemented.

This study presents experimental results of a flavoromic study aiming to reveal the aroma and technological blueprint of complex food samples, in particular, the advantages of a true multidimensionality, from sample preparation (direct sampling, orthogonal sampling, selective sampling, high concentration capability sampling) to separation (GC×GC and GC×GC-MS) will be emphasized and new perspectives discussed.

1. Herrero M, Simõ C, García-Cañas V, Ibáñez E, Cifuentes A. (2012) Mass Spectrometry Reviews, vol. 31(1):49-69
2. Christlbauer M, Schieberle P. (2009) Journal of Agricultural and Food Chemistry vol. 57(19):9114-22

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