

BOOK OF ABSTRACTS

11th International Symposium on **RECENT ADVANCES IN FOOD ANALYSIS**

November 5-8, 2024
Prague, Czech Republic

Jana Pulkrabová, Monika Tomaniová, Stefan van Leeuwen, Michele Suman,
Michel Nielen and Jana Hajšlová
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LECTURES

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CHALLENGES IN QUANTITATIVE VOLATILOMICS OPEN NEW OPPORTUNITIES IN FOOD QUALITY ASSESSMENT: THE ROLE OF MULTIDIMENSIONAL ANALYTICAL PLATFORMS

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Effective investigation of food volatilome using comprehensive two-dimensional gas chromatography with parallel detection by mass spectrometry and flame ionization detector (GC×GC-MS/FID) provides valuable insights related to industrial quality. However, the lack of accurate quantitative data hinders the transferability of results over time and across laboratories. This study employs quantitative volatilomics using multiple headspace solid phase microextraction (MHS-SPME) on a large selection of hazelnut samples (*Corylus avellana* L.) representative of the top-quality selection desired by the confectionery industry. Through untargeted and targeted fingerprinting based on image pattern recognition robust classification models validate the significance of chemical patterns strongly correlated with quality parameters such as botanical and geographical origin, post-harvest practices, and storage time and conditions. By quantifying marker analytes, Artificial Intelligence (AI) tools are developed, including augmented smelling based on sensomics with blueprints related to key-aroma compounds and spoilage odorants; decision-makers for rancidity levels and storage quality; and origin tracers. Reliable quantification allows AI to be applied confidently, potentially driving industrial strategies.

Keywords: comprehensive two-dimensional gas chromatography, accurate odorants quantitation, Artificial Intelligence decision-makers, quantitative fingerprinting, aroma blueprint