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Ambient Mass Spectrometry for Food Science and Industry

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Requiring little or no sample pretreatment, ambient mass spectrometry allows the direct characterization of raw samples at molecular levels under an open atmosphere[1]. Due to the unparalleled sensitivity and specificity, ambient mass spectrometry has been increasingly considered for wide applications in food science and industry. In virtually any type of food samples could be directly analyzed using mass spectrometry powered by one of the currently available ambient ionization techniques.

Typically, trace amounts of analytes on solid foods could be rapidly detected using either desorption electrospray ionization (DESI), direct analysis in real time (DART) or desorption atmospheric pressure chemical ionization (DAPCI)[1, 2]. Both volatile and non-volatile analytes could be detected by ambient ionization techniques for surface analysis. For more consistent results, heat, solvent extraction or gas liberation would be preferably used during the desorption/ionization process for detecting analytes of low volatility, particularly on viscous food surfaces (*e.g.*, cheese, icy meat *etc.*). Alternatively, liquids and gaseous samples could be real time monitored using extractive electrospray ionization (EESI) or its derivates[3, 4].

Rapidly revealing the chemical information inside bulk foods is of paramount importance in food science and industry. Herein internal extractive electrospray ionization mass spectrometry (iEESI-MS)[5] was developed to probe the molecules inside a 3-D bulk food sample requiring no mashing/grinding the sample or matrix clean-up. To date iEESI-MS has been applied to the qualitative characterization of various biological samples (tissues, fruits, vegetables, etc.) and accurate quantitative analysis of 6 β-agonists in bulk meat samples, opening new possibilities in food science and industry.

In this talk, the principle of ambient mass spectrometry, typical instrumental setup and applications would be systematically reviewed, the advantages and shortages of ambient mass spectrometry for food analysis would be mentioned, and the impact of ambient mass spectrometry on food industry would be briefly discussed.

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Biography:

Konstantin Chingin received his Ph.D at ETH Zurich (2010). He was a postdoc in the group of Prof. Richard N. Zare at Stanford University (2010-2011). He was a research fellow hosted by Prof. Roman Zubarev at Karolinska Institute, Stockholm (2011-2013). He is a full professor of Analytical Chemistry at East China University of Technology (2013-present). He published more than 40 peer-reviewed publications in SCI journals including *PNAS, Angew. Chem., Anal. Chem., Chem. Commun., Mol. Cell. Prot.*, *Sci. Rep.*, etc. His research is mainly focused on bioanalytical mass spectrometry.