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Ambient Ionization with Plasmas and Charged Droplets

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Ambient ionization techniques were firstly introduced by Cooks and co-workers from the concept of the philosophy of taking mass spectrometry out of the vacuum and doing it more natural under open air at atmospheric conditions. The difference between atmospheric pressure ionization and ambient mass spectrometry is that ambient does not mean the enclosures that are typically used and allow analysing samples directly from the surface or with minimal sample manipulation.

Since the introduction of DESI and DART in 2004, many distinct ambient mass spectrometry techniques have been described and their classification is still a controversial subject. Categorizing ambient techniques basing on the desorption and/or evaporation principles, they can be classified as spray-(DESI, EASI, nano-DESI, ELDI, etc.), plasma- (DART, LTP, DAPCI, etc.) and laser- (ELDI, LAESI, MALDESI, etc.) based techniques. Even the large number of ambient techniques described, most of them have been used for academic purposes and the main techniques which are commercially available are DESI, DART and LAESI.

The range of applications of ambient ionization techniques is extraordinarily wide and covers many scientific fields. In this conference, the capabilities of ambient ionization techniques were presented in different application fields, including multimodal biological tissue imaging, rapid metabolome fingerprinting, rapid detection of counterfeit drugs, and three-dimensional robotic surface sampling.

Lipidomics Based On High Resolution Mass Spectrometry: A Novel Strategy Employed In Food And Nutrition Research

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Lipidomic approaches are attractive for authentication purposes and also to investigate the lipid fraction of complex matrices containing lipids. The new generations of high resolution mass spectrometers have experienced significant advantages in resolving power, sensitivity, robustness, easier mass calibration and tandem mass capabilities making it an attractive and useful tool to the food metabolomics community.

Although GC-HRMS and LC-HRMS methods have been implemented for authentication purposes, very recently, direct MS analysis has been established as an alternative tool for metabolomics on food. In this conference, the applicability of DART-HRMS was described for the authentication and classification of olive oils with different geographic origin (Spanish and Italian). To perform the classification, possible biomarkers had to be found to distinguish between the olive oils since a lot of lipids are common for all samples. Although a satisfactory classification was obtained by using both UHPLC-HRMS and DART-HRMS methods, 54 hours were necessary to perform the analysis by the chromatographic method while only 2.5 hours were spend to analyse the entire samples by DART-HRMS.

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