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Mass Spectrometry & Purification Techniques

Perspective

Determination of Fourier-Transform Mass Spectrometry in Genus Capsicum

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ABOUT THE STUDY

Health-promoting substances such ascorbic acid (vitamin C), carotenoids (provitamin A), tocopherols (vitamin E), flavonoids, and capsaicinoids are abundant in bell peppers (*Genus Capsicum*). These substances are well-known for their biological effects, such as their anti-inflammatory, anticancer, and antioxidant capacities. Studies on the metabolite profile of bell peppers have been more prevalent during the past ten years. None of the direct analytical techniques, namely amino acids, sugars, polyphenols, and organic acids, were used in these compounds that belonged to more than four metabolite classes (and potential derivatives of model compounds) found in bell peppers. The performed a direct-injection study using a Fourier Transform Ion Cyclotron Resonance Mass Spectrometry (FT-ICR MS) on *Peperoni di Senise* bell peppers in an effort to profile a greater number of metabolite classes (*Capsicum annuum* L.).

These bell peppers are a common food item produced in Basilicata (Southern Italy), are protected by a Protected Geographical Indicator (PGI) quality label, and are renowned for their distinctive flavours. We converted the captured time-domain ion signal (transients) into the absorbance mode FT-ICR mass spectra in order to improve the performance of the FT-ICR MS approach. The latter was accomplished by the application of the specialised software programme AutoVectis Pro.

Mass spectral representation in absorption mode improved findings reliability by removing artefacts and identified a greater number of chemicals, resulting in a more detailed characterization of the metabolic profile of *Peperoni di Senise* PGI. The accurate technique of mass spectrometry imaging enables the *in-situ* dispersion of endogen and/or exogen small molecules. It is a technique that is quickly becoming popular for observing medicines and their metabolites inside of biological tissues. For metallodrug localization and metabolization studies, Matrix-Assisted Laser Desorption Ionization (MALDI) Mass Spectrometry Imaging (MSI) combined to high resolution power analyzer. However, it was found to have poor coverage and assignment due to a lack of sensitivity and resolution.

The usage of ultra-high resolving power analyzers, such as Fourier Transform Ion Cyclotron Resonance (FTICR), may be shown as a strategy of choice to overcome these technical constraints. High field FTICR MS offers extremely high mass accuracy and resolving power, enabling thorough molecule coverage and unambiguous molecular formula assignments. Oxaliplatin is one of several medicinal medicines used to treat cancer that are platinum compounds. To understand the hazards involved with their usage, it is critical to examine their intake, distribution, and metabolism within the organs. Lipidomics data must take into account ions with almost comparable weights, including the Type-II isotopic overlap.

Using flow injection analysis-FTMS, spike studies involving lipid species pairings from different lipid classes were examined. The first isotopic peak (M+1) and Type-II correction, together with relative isotope abundance, were both used to assess the accuracy of quantification. Without Type-II correction, isobaric peaks that were properly resolved were most accurate. Peak interference, well-known FTMS phenomena that results in distortions in mass and intensity, was seen in situations with partially resolved peaks. When determined from M+1, concentrations of the corresponding species were more precise. Additionally, certain minor species that were significantly impacted by Type-II overlap could only be measured by M+1. Surprisingly, peak interference caused Type-II correction to significantly overcorrect even entirely unresolved peaks.

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