Mass Spectrometry and Chemometrics for the Characterization, Classification, and Authentication of Food Products

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Mass Spectrometry (MS) and chemometrics are playing nowadays an important role in the characterization, classification, and authentication of food products. Two main strategies are frequently employed: targeted and non-targeted approaches. Targeted approaches focus on the specific determination of known selected chemicals, while non-targeted approaches pretend to analyze instrumental responses without assuming any previous knowledge of relevant or irrelevant food components. Independently of the approach, the obtained food chemical data is employed as sample chemical descriptors to address food classification and authentication by means of multivariate chemometric methods. In this presentation, examples of both targeted and non-targeted LC-MS approaches (with low- and high-resolution mass spectrometry techniques) to assess food authentication issues will be presented. In addition, high-throughput strategies by removing chromatographic separation, i.e. flow-injection analysis coupled to mass spectrometry (FIA-MS and FIA-HRMS), as well as ambient mass ionization techniques (surface acoustic wave nebulization, SAWN) to solve authenticity issues will be addressed. Applications of these techniques in relevant authenticity issues involving wine, olive oil, chicken eggs, coffee, tea, nuts, and spices (red pepper) will be discussed.

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