
LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY IN FOOD SAFETY

Yolanda Picó (1), Marinella Farré, Cristina Blasco (1), Pablo Vazquez-Roig (1) and Damià Barceló (2,3)

(1) Laboratori de Bromatologia i Toxicologia, Facultat de Farmàcia, Universitat de València, Av. Vicent Andrés Estellés s/n, 46100 Burjassot, Valencia, Spain, Yolanda.Pico@uv.es

(2) IIQAB-CSIC, Department of Environmental Chemistry, Jordi Girona 18-26, Barcelona 08034, Spain

(3) Institut Català de Recerca de l'Aigua (ICRA), Parc Científic i Tecnològic de la Universitat de Girona, Pic de Peguera, 15, 17003 Girona, Spain

In today's global marketplace, the quality of food is of increasing concern for consumers, governments, and producers alike. Issues relating to food safety and the public's perception of wholesomeness have become increasingly imperative for food commodities. The use of powerful mass spectrometric detectors in combination with liquid chromatography has played a fundamental role to solve many troubles related to food safety. In view of the fact that this technique is especially well suited for, but not restricted to, the analysis of food contaminants within the food safety area, this presentation will be focused on providing an insight into this field. The basic legislation in different parts of the world is discussed with a focus on the situation within the European Union (EU) and why it will favour the use of liquid chromatography-mass spectrometry (LC-MS). Main attention in the presentation will be on the achievements that have been possible because of the latest advances and novelties in mass spectrometry and how these progresses have influenced the best control of food allowing an increase in the food safety and quality standard. Furthermore, the potential and pitfalls of the different LC-MS approaches will be emphasized as well as in its possibilities to address current hot issues in food safety, such as the development of large scale multi-residue methods and the identification of non-target and unknown compounds. Last but not least, future perspectives and potential directions will also be outlined highlighting prospects and achievements. Triple quadrupole (QqQ) mass spectrometry has been the cornerstone technique for screening and confirmation of food contaminants and residues. The majority of current LC-MS/MS based contaminants and residue analysis relies on the high sensitivity and selectivity of the selected reaction monitoring (SRM) mode of QqQ-MS/MS. Liquid chromatography time-of-flight mass spectrometry (LC-TOF-MS) has also been established as a valuable technique for the routine control of the wholesomeness of food. In this sense TOF techniques can record an accurate full-scan spectrum throughout the acquisition range, and have resulted in an excellent tool for the unequivocal target and non-target identification and confirmation of food contaminants. Recently introduced tandem mass spectrometers, combining both features, such as linear ion trap (LTQ), quadrupole linear ion trap (Q-trap), quadrupole time-of-flight (Q-TOF) etc., have allowed the development of several new methods for contaminants detection.

This presentation addresses the contribution of the different LC-MS techniques to different hot issues in food safety with selected examples on pesticide and veterinary drug residues, perfluorinated compounds and migrating food contact materials, developed mostly in our laboratory, with particular emphasis on the most recent advances in applications of LC-MS/MS for the detection and characterization of food contaminants.