Rapid screening of chemical (drug and pesticide) residues in food using ToF-MS - results and challenges.

Matthew Sharman, Jonathan Tarbin and Richard Fussell

The Food and Environment Research Agency
Sand Hutton, York YO41 1LZ, UK.

Abstract

One of the major concerns of European governments, food producers and consumers is the presence of chemical residues in food that may be harmful to health. Of particular concern are residues resulting from the use of veterinary medicines and pesticides. There is therefore an ongoing need for Regulatory Authorities and food control laboratories to develop analytical methods that are capable of the rapid and simultaneous detection of multiple chemical residues at low (µg/kg – mg/kg) concentrations in food. In addition, any method should be capable of correctly identifying whether regulatory limits (e.g. Maximum Residue Limits/Levels) have been exceeded.

One possible solution to the above issue is the use of Time of Flight - Mass Spectrometry (ToF-MS). In this presentation the challenges associated with the use of this technology in the routine screening of chemical residues will be reviewed. This will include a number of factors that can affect the quality and efficacy of the final ToF-MS data such as:

1. Sample preparation (i.e. extraction and purification),
2. The use of Ultra Performance Liquid Chromatography / Rapid Resolution Chromatography,
3. Data handling for both “known “and “unknown” residues.

Data from the use of ambient ionization coupled to ToF-MS will also be presented. In this type of ionization the ions are formed outside the mass spectrometer without the need for conventional sample preparation or separation. This technique has the potential to analyse /screen samples within seconds, rather than minutes associated with systems based on chromatography coupled to ToF-MS.