CON-THE-031

CONFIRMATORY METHODS
Liquid Chromatography-MS coupling

• Context

Liquid Chromatography coupled to mass spectrometry is the current confirmatory method of choice for measuring many classes of residues and contaminants in biological matrices, mainly because of the wide application range offered by the atmospheric pressure ionisation interfaces, the possibility of reduced sample preparation, the unnecessary derivatisation step prior to injection (even if these two last consideration have to be discussed). The very significant recent technological improvements on this type of instruments (last generation of HPLC and/or mass filter) also participate to this observed success and implementation of these techniques in control laboratories. In addition to the main technical parameters to consider regarding the pure mass spectrometric aspects, this type of coupling indroduces supplemental specificities linked to chromatographic considerations and/or associated ionisation interfaces.

• General objective(s)

The first objective of this theoretical session is to describe the basic principles of liquid chromatography-MS coupling technologies, i.e. fundamental aspects of liquid chromatography which have a direct impact and/or are of crucial importance when coupled to MS, main sources of potential troubleshootings associated to these techniques (matrix effect, ion suppression, crosstalk…). The second objective is to detail several real-case examples of application of LC-MS related techniques for the analysis of various classes of residues in order to illustrate and comment their main advantages and limitations.

• Main items

HPLC / Fast-LC / LC-MS and LC-MS^n / Ion Supression / Application examples: steroids, beta-agonists, corticosteroids, antibiotics, growth hormone, pesticides…

• Pedagogical objectives

✓ To understand the link between chromatographic resolution and MS acquisition rate (dwell-time)
✓ To be aware about the last generation of ultra-resolutive chromatographic systems (fast LC)
✓ To know the 2 main causes and 3 main possible solutions to solve/minimise ion suppression phenomenons

• Pedagogical tools

✓ PowerPoint slide show (+ paper printout and PDF file copy)

• Duration

✓ 2 hours

• Pre-requisite

✓ Knowledge of the chemistry of contaminants of interest (REG-THE-010)
✓ Basics of MS (CON-THE-010, CON-THE-020)