Practical aspects of LC-MS in organic trace analysis

Practical advices, test procedures, tips and tricks

NERLIENS MESZANSKY #

Prof. Michael Oehme has more than 20 years of experience in GC-MS covering a broad range of fields including environmental, food, process and industrial processes ranging from routine to highly sophisticated trace analysis. He is authors of several books and about 200 publications. Moreover, he works with practical aspects of quality assurance and is an international expert for chemical waste remediation with authorities, chemical industry and environmental organizations as clients.

The content is manufacturer independent. A course compendium (book) in English of more than 110 pages will be delivered. The course language will be Norwegian or English depending on the background of the participants.

1. Ionisation mechanisms

- General requirements of API ion sources
- Ionisation mechanisms of electrospray and atmospheric chemical ionisation, influence of parameters
- Further useful ionisation techniques: Ion coordination ionisation, electron capture ionisation, no-discharge APCI
- Relation between structure and ionisation technique

2. Mass separation and MS/MS techniques. Benefits and drawbacks

- Quadrupoles
- Classical and linear ion traps
- Time of flight systems
- Electrostatic ion traps (“orbitraps”)
- MS/MS and MSn techniques with quadrupoles and ion traps
- Combination quadrupole/ion trap
- Ion focussing elements: Why and how?

3. Practical problems

- HPLC-related problems: Purity of gradient water and solvents, degassing yes/no
- Contaminants from pumps and gradient systems
- Too large dead volumes, a never ending story
- Background from column bleeding and analyte adsorption
- Troubles by transfer and spray capillaries
- MS-related problems: Ion suppression and test procedures
- Flow-dependence of ionisation
- Distortions by ion-molecule adducts

4. Quantification

- Application of internal standards
- Linearity tests calibration
- Disturbance of sample matrix on different types of quantification methods
- Optimisation of selectivity
- Selection criteria for fragmentation reactions (“MRMs”)
- Influence of structure on Ionisation yield