

A powerful combination: the IC-MS system from Agilent and Metrohm

Why IC-MS?

The combination of the two techniques ion chromatography (IC) and mass spectrometry (MS) guarantees improved sensitivity and lower detection limits, as matrix interference is reduced to the absolute minimum. Thanks to the highly selective detection by mass spectrometry, the obtained substance peaks can be identified unambiguously. The technique can also be used for the structural analysis of larger molecules. In addition, IC-MS is suitable for element speciation and offers the possibility of differentiating between organic and inorganic compounds of one and the same element. Tandem conductivity and mass spectrometric detection provides even more comprehensive information on the samples to be analyzed.



The combined IC-MS system consisting of a Metrohm MIC-2 Advanced IC System with 838 Advanced IC Sample Processor and an Agilent MSD SL mass spectrometer.

First system component: Metrohm IC

- Automated MIC-2 Advanced IC System
- First-class modular ion chromatography system
- Easy operation, easy maintenance
- 100% solvent-compatible
- Large range of separation columns for a wide variety of applications
- Full control by Agilent ChemStation software

Second system component: Agilent MS

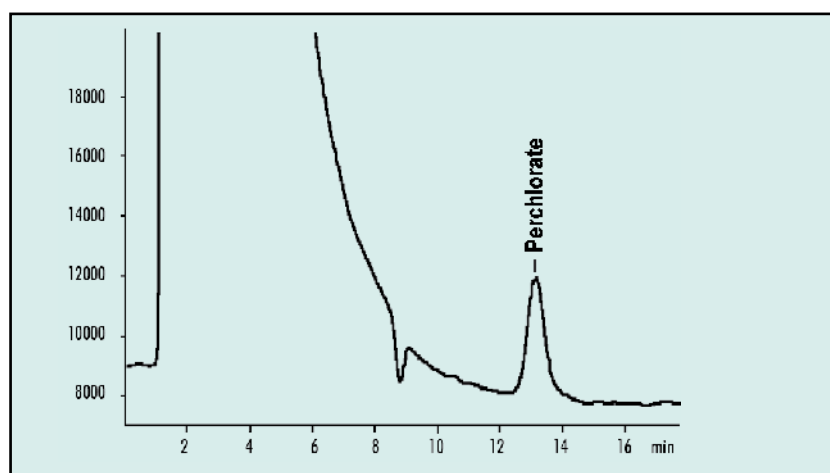
- 1100 Series MS detector
- Single-stage quadrupole mass spectrometer with electrospray ionization (ESI)
- Easy operation, easy maintenance
- Very robust thanks to orthogonal arrangement of the ion source
- Mass range $m/z = 2 \dots 3000$
- Multi-signal acquisition in one run, for example SIM⁺, SIM⁻, Scan⁺, Scan⁻
- Eluent flow rate up to 1 mL/min for columns with 2 to 4 mm inner diameter

Interesting applications

With the IC-MS system from Agilent and Metrohm even complex separation problems can be solved reliably, fully automatically and with excellent precision. The spectrum of applications ranges from the determination of 0.1 ppb perchlorate in the presence of a 10⁷-fold excess of chloride, carbonate and sulfate to the detection of aliphatic carboxylic acids in brine and to the determination of trace amounts of bromate in drinking water.



Close-up of the mass spectrometer's electrospray ionization (ESI) interface.

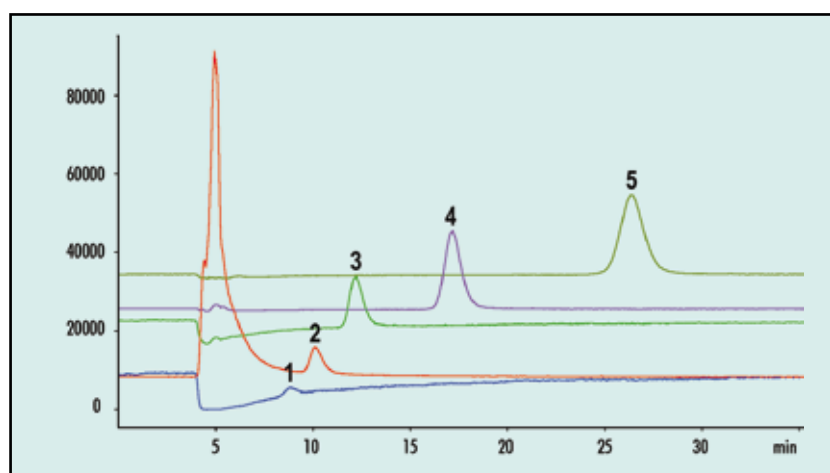


Determination of 1 ppb perchlorate in the presence of 1 g/L each of chloride, carbonate and sulfate (chromatograms in SIM⁻ mode).

Separation column: Metrosep A Supp 5 – 100 (6.1006.510)

Eluent: 30 mmol/L NaOH, 30% methanol

Flow rate: 0.8 mL/min



Determination of five aliphatic carboxylic acids in 100 g/L NaCl solution [chromatograms in SIM⁻ mode at $m/z = 59$ (1), 73 (2), 87 (3), 101 (4), 115 (5)].

Separation column: Metrosep Organic Acids – 100 (6.1005.210)

Eluent: 0.25 mmol/L oxalic acid

Flow rate: 0.4 mL/min

Post-column reagent: 300 mmol/L NH₃ (0.25 mL/min)

Sample: 100 g/L NaCl solution with 1 ppm acetate (1), propionate (2), butyrate (3); 1 ppb valerate (4), caproate (5)