PlasmaQuant MS in Food and Agricultural Analysis

Recommended configurations

Industry requirements

- Robust and reliable performance
- Matrix tolerance
- Easy operation
- Start-up routine
- Pre-defined methods
- Wide detection range
- Less maintenance
- QC samples and automated response

Regulations

National and global food safety regulations

Instrument characteristics

- Sensitivity with detection limits down to pg/l
- Robust performance <3 % RSD over 5 hours
- Throughput typically 20-30 samples per hour with standard sample introduction
- >80 samples per hour with discrete / fast sample introduction
- Automated QC response

The characterization and control of food samples is a growing field for ICP-MS. Food safety is in the focus of many national and international organizations and is therefore increasingly regulated. The range of matrices covers beverages requiring only dilution, to emulsions and solid samples requiring a digestion procedure.
The analysis of food and agricultural samples is typically done in governmental institutions, contract labs, universities and industrial QC labs.

Sample types

- Beverages – pure or diluted water, fruit juice, wine, beer
- Digested food stuffs incl. milk and milk powder, tea leaves, bread, meat...
- Digested cereals, seeds, plant materials, soils and fertilizer

Recommended instruments

PlasmaQuant MS Q ist the most suitable instrument for food and agricultural applications. It provides the fast and reliable solution with low running costs for the characterization of samples with moderate matrix.

PlasmaQuant MS Elite S can be recommended whenever sensitivity and even lower limits of detection matter or when smallest single particles are to be detected.

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Application	Sample Introduction Kit	Sheath Gas / Aerosol Dilution	Nitrox	FAST Sample Introduction	Cones	PlasmaQuant MS		PlasmaQuant MS Elite	
							Q	S	
Beverages	Standard	Optional	Optional N_2	Optional	Nickel	✓	✓		
Extractables	Standard	Optional	Optional N_2	Optional	Nickel	✓	✓		
Species identification (As,Se,Hg)	Standard	No	Optional O_2	No	Nickel / Platinum	✓	✓		
Cereals, seeds, plant materials	Standard	Optional	Optional N_2	Optional	Nickel	✓	✓		
Soils and fertilizer	Standard	Optional	No	Optional	Nickel	✓	✓		

When to choose which instrument

Rule of thumb:

- Medium matrix loads and moderate to high sample throughput → PlasmaQuant MS Q
- Lowest detection limits or single particle detection at moderate throughput → PlasmaQuant MS Elite S

In combination with HPLC all PlasmaQuant MS models guarantee fast and reliable speciation analysis far below current international limits.
Furthermore all models allow the characterization of natural and artificial single particles. For diameters <20 nm the PlasmaQuant MS Elite S is recommended.

Recommended basic configuration

- PlasmaQuant MS model
- Autosampler
- Chiller
- Kit Internal Standards

Upgrades and accessories

- Fast/discrete sample introduction
- Aerosol Dilution
- Nitrox
- HPLC, e.g. PQ LC
- Microwave digestion, e.g. TOPwave
- Mechanical homogenization, e.g. SpeedMill PLUS

Benefits of upgrades and accessories

Autosampler: automated sample introduction provides the user with time for other activities. Combined with QC samples and defined response actions the automated sequence can run unattended or over night.

Fast/discrete sample introduction: autosampler upgrade that reduces sample or rinse delay times by 80 %, significantly increasing sample throughput.

Aerosol dilution: software controlled aerosol dilution option allowing the on-line dilution of samples such as beer, wine and other beverages during sample introduction.

Nitrox: allows the addition of nitrogen or oxygen to the plasma. Nitrogen improves the sensitivity towards arsenic and selenium in high matrix samples. Oxygen guarantees stable instrument performance when analyzing organic solvents.

HPLC: coupling of a PQ LC HPLC or others for chromatographic separation of element species for speciation analysis of elements such as As, Se, Cr, and others using LC-ICP-MS.

Microwave or mechanical digestion: systems for microwave assisted acid digestion of samples, e.g. the speedwaveXPERT, or mechanical digestion, e.g. SpeedMill PLUS, guarantee a complete digestion of samples and thus the basis for complete ionization of all components and high reproducibility.

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