

MEET THE GROWING DEMAND FOR ELEMENTAL SPECIATION

The Measure of Confidence

Inorganic Speciation Columns and Supplies

If you analyze inorganic contaminants (metals) in food or environmental samples, you know that simply measuring total levels is not enough. You must also evaluate the chemical form or species in which it occurs as this affects **toxicity**. For example, inorganic arsenic species such as arsenite, As (III) and arsenate As(V), are significantly more toxic and carcinogenic than organic species.

HPLC separation, followed by ICP-MS detection is well established as the analytical method of choice for many sample types. Speciation can therefore be used to determine which chemical form or species of the metals are present in the various samples. For this technique to succeed however, your column *must* be able to reproducibly separate the various chemical species.

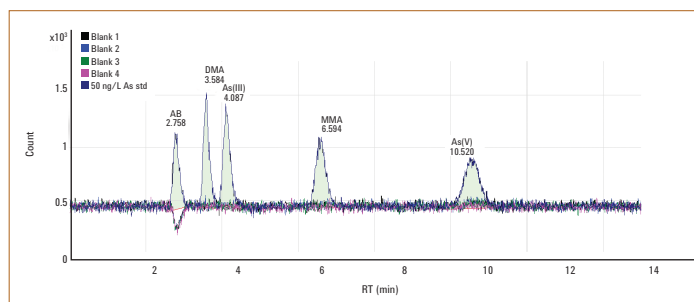
Confidently determine both *levels* and *chemical forms*

Agilent Speciation columns ensure excellent peak separation and reproducibility for the most common speciation methods – in particular:

- Arsenic in environmental waters
- Arsenic in fruit juices
- Arsenic in urine
- Arsenic in rice
- Chromium in drinking water
- Mercury in food samples
- Chromium in toys (EN71-3)

So you can avoid time-consuming rework, while ensuring analytical accuracy and compliance.

Exceptional capability for accurate low level speciation measurement



Evaluation of preparation blanks, confirming undetectable levels of As species contamination from the reagents and sample preparation filters. All four blanks are shown, overlaid with 50 ng/L (ppt) mixed As species standard.



Agilent 1290 Infinity LC System

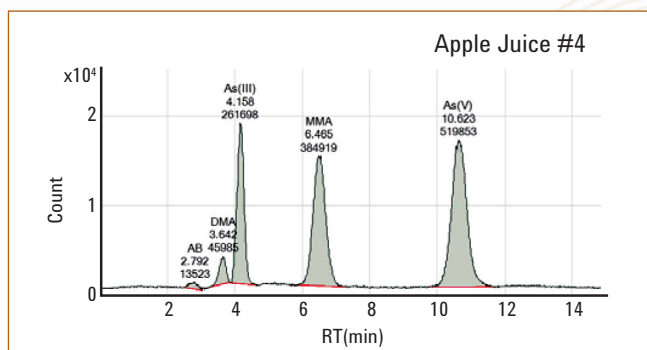
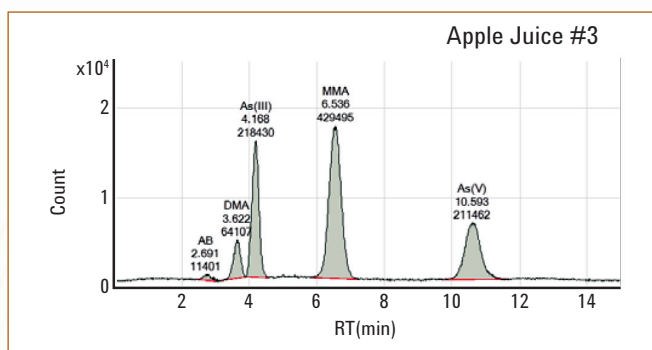
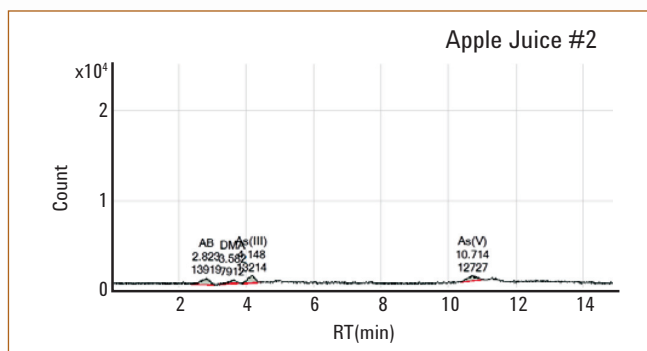
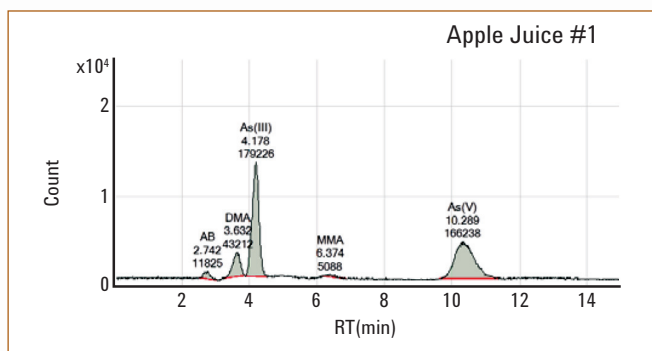
Agilent 7900 Series ICP-MS

Make sure you're getting the full story
from your inorganic contaminants analysis.
Go to: agilent.com/chem/speciation2



Agilent Technologies

Excellent peak shape: Arsenic speciation in apple juice



A series of calibration curves for various As species (not shown), allowed us to determine the concentration of each species in different commercial samples of apple juice. All were below the EPA limit for As in drinking water. The chromatograms are all shown on the same intensity scale, to highlight the different relative concentrations of each species. The analyses used the As speciation column for urine and food, column P/N G3288-80000.

Why use ICP-MS for speciation detection?

For speciation applications, ICP-MS detection offers these unique advantages:

- Superior elemental sensitivity
- Absolute specificity and quantitation
- Quantification without species-specific standards
- Quantification by isotope dilution

Agilent ICP-MS systems deliver unparalleled accuracy in high-matrix samples, with features such as a revolutionary 4th generation cell design – the Octopole Reaction System, ORS⁴.



Additional LC column options for speciation analysis

No matter how specialized your speciation application may be, **Agilent LC columns** can help you determine quantity and chemical species with confidence.

They deliver:

- Greater productivity: Advances such as sub-2 μm particles and superficially porous Poroshell 120 columns increase speed and resolution
- Flexibility and method scalability from lab to lab and around the world
- Unbeatable chromatographic performance: ZORBAX silica is pure, strong, and uniform
- The broadest range of phases and column configurations

As a leader in GC/HPLC chromatographic systems and columns, and ICP-MS instrumentation, Agilent is at the forefront of hyphenated ICP-MS research and development. We have the hardware, software, and applications expertise to support all your speciation analysis needs.



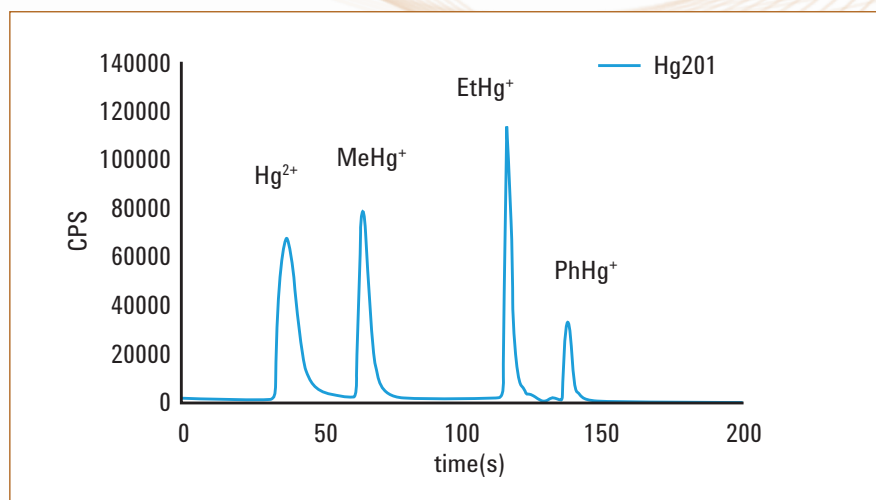
The right hyphenated ICP-MS method for your application is just a few clicks away

Agilent's FREE handbook of hyphenated ICP-MS methods sets the standard in defining speciation analysis and hyphenated ICP-MS applications. Explore the latest applications based on separation technique and target analyte — and find expert guidance from contributed Application Notes which cover suggested columns, method parameters, sample prep, and more.

You can also find troubleshooting tips for your LC, GC, and ICP-MS systems to help resolve problems and achieve optimum performance.

Request yours now at agilent.com/chem/speciation2

Complete separation of 4 mercury species under gradient conditions



Here, a ZORBAX Extend-C18 1.8 μm column delivered excellent peak separation in under 3 minutes using an optimized gradient elution method. Recoveries for measurement of total and methyl mercury in 2 fish CRM samples ranged from 94%-101% validating this technique for speciation of mercury in food samples.

Ordering Information

Speciation Columns

Arsenic in environmental waters (Application Note: *G3154-90011)

Description	Part Number
Speciation anion exchange guard column	G3154-65002
As speciation column (for waters)	G3154-65001

*The As Speciation Analysis Handbook, G3154-90011, is available for purchase

Arsenic in fruit juices (Application Note: 5991-0622EN)

Description	Part Number
Speciation anion exchange guard column	G3154-65002
As speciation column (for urine/food)	G3288-80000

Arsenic in urine (Application Note: 5989-8399EN)

Description	Part Number
Speciation anion exchange guard column	G3154-65002
As speciation column (for urine/food)	G3288-80000

Chromium in drinking water (Application Note: 5990-9366EN)

Description	Part Number
Cr speciation column (for waters)	G3268-80001

Mercury in food samples (Application Note: 5991-0066EN)

Description	Part Number
ZORBAX Extend-C18 column, 4.6 x 50 mm, 1.8 µm, 600 bar	727975-902

Chromium in toys (EN71-3) (Application Note: 5991-2878EN)

Description	Part Number
Bio WAX, anion exchange column, non-porous, 4.6 x 10 mm, 5 µm, PEEK guard	5190-2488

Make sure you're getting the full story from your inorganic contaminants analysis.

- Order Agilent speciation columns and supplies at agilent.com/chem/store
- Learn more at agilent.com/chem/speciationcolumns
- Find the right hyphenated ICP-MS application for your analysis at agilent.com/chem/speciation2
- Search for Application Notes by publication number at agilent.com/chem/library

LC Interface Supplies

Description	Part Number
Comprehensive LC connection kit*	
Comprehensive pack of tubing and connectors required to set up LC-ICP-MS. Includes sample tubing, peristaltic pump tubing, tee joints, union joints, PTFE nuts, front and back ferrules, peristaltic pump tubing adapters, APG remote cable, gender changer connector D9S-FF, and manual/setup guide	G1833-65200
Basic LC connection kit*	
Includes sample tubing, union joints, PEEK fingertight fittings, APG remote cable, and gender changer connector D9S-FF	G1820-65541
Capillary LC interface kit*	
Interface kit for use with the 7900, 7700 ICP-MS and Agilent Capillary HPLC (Cap-LC) systems. Includes total consumption nebulizer, single pass spray chamber, capillary tube, ferrules and nuts for capillary, APG remote cable, and capillary LC interface kit manual	G3680A
Total consumption nebulizer for capillary LC interface	G3280-80602
Single pass spray chamber for capillary LC interface	G3280-80603

*View full kit contents at agilent.com/chem/speciationcolumns

GC Interface Supplies for 7700/7900/8800 Series

Description	Part Number
Transfer line for GC interface	G3158-80060
Injector assembly for GC interface	G3158-80050
Torch for GC interface	G3158-80074
Pre-heating pipe with connector, stainless steel, 1/16 in	G3158-80080
Stainless steel pipe, 1/16 in (Sulfinert, 1.05 m)	G3158-80081
Vespel/Graphite reducing ferrule (1/8 in to 1/16 in, VG1, 10/pk)	0100-1344
Vespel/Graphite ferrule (1/4 in, VG1, 10/pk)	0100-1331
Vespel/Graphite ferrule for 320 µm columns (0.5 mm, VG1, 10/pk)	5062-3506
Vespel/Graphite ferrule (1/16 in, VG2, 10/pk)	0100-1379
PFA tubing, 1/8 in, 2 m	G3158-60010
3-way manual valve	G3158-80024
SwageLok plug, stainless steel, 1/8 in	0100-0071
Nut with pipe	G3158-80009
Stainless steel tee for O ₂ gas mix, 1/8 in	0100-0542



This information is subject to change without notice.

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