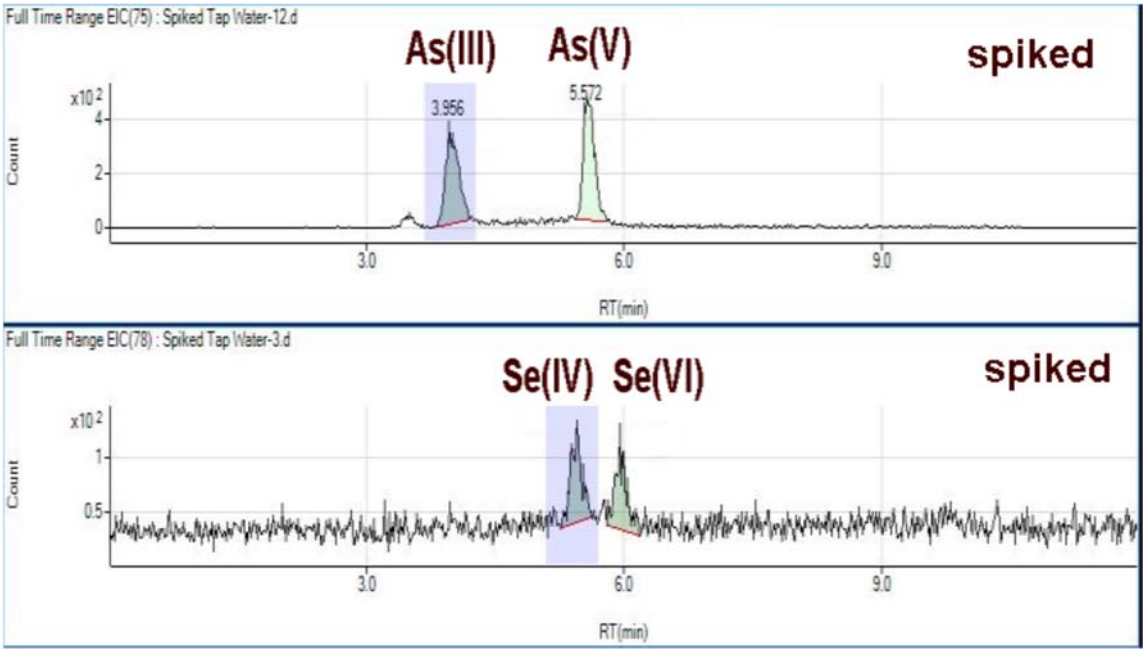
IC Application Note M–10

Determination of arsenic and selenium species in drinking water applying IC-ICP/MS



Inorganic arsenic and selenium species should not be present in drinking water above the maximum contaminant level (MCL) of 10 and 50 ppb, respectively. As each element occurs in two oxidation states, a separation step is required before ICP/MS detection. This Application Note shows the simultaneous determination of As(III) (arsenite), As(V) (arsenate), Se(IV) (selenite), and Se(VI) (selenate). The separation is performed on a Metrosep Dual 3 - 100/4.0 column.

Results

	As(III) [µg/L]	As(V) [µg/L]	Se(IV) [µg/L]	Se(VI) [µg/L]
Dinking water	0.04	0.05	0.21	0.24
Dinking water spiked	0.55	0.58	0.63	0.73

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Sample

Drinking water spiked with 0.5 µg/L of each ion

Sample preparation

None

Columns

Metrosep Dual 3 - 100/4.0	6.1006.120
Metrosep RP 2 Guard/3.5	6.1011.030

IC Solutions

Eluent A	5.0 mmol/L ammonium nitrate
Eluent B	50 mmol/L ammonium nitrate 2% methanol, pH = 8.7

Parameters

Flow rate	1.0 mL/min
Injection volume (MiPT)	100 µL
P_{max}	7 MPa
Recording time	12 min

Parameters ICP/MS

RF power	1450 W
Plasma gas flow rate	15 L/min
Auxiliary gas flow rate	1.12 L/min
Sampling depth	6.8 mm
Spray chamber temperature	5 °C
Ion lens setting Optimized for best sensitivity using	10 mg/L Li, Ce, Y, Tl in 2% (w/w) HNO_3 solution
Acquisition mode	Spectrum and time resolved analysis
Monitoring mass As	75
Monitoring mass Se	79

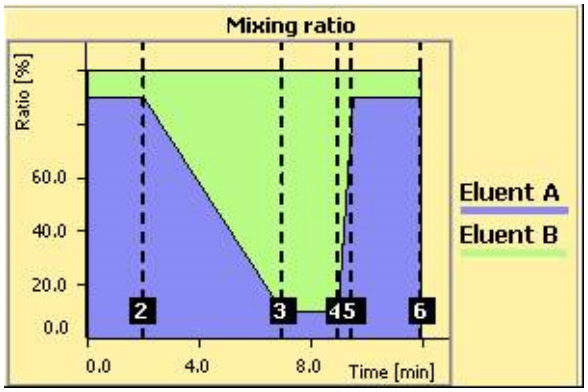
Analysis

ICP/MS detection

Instrumentation

940 Professional IC Vario ONE/HPG	2.940.1140
ICP-MS Agilent 7700	
858 Professional Sample Processor	2.858.0020
Remote box	6.2148.010
Remote cable Professional IC - MS-Detector (Agilent)	6.2141.380

Gradient



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