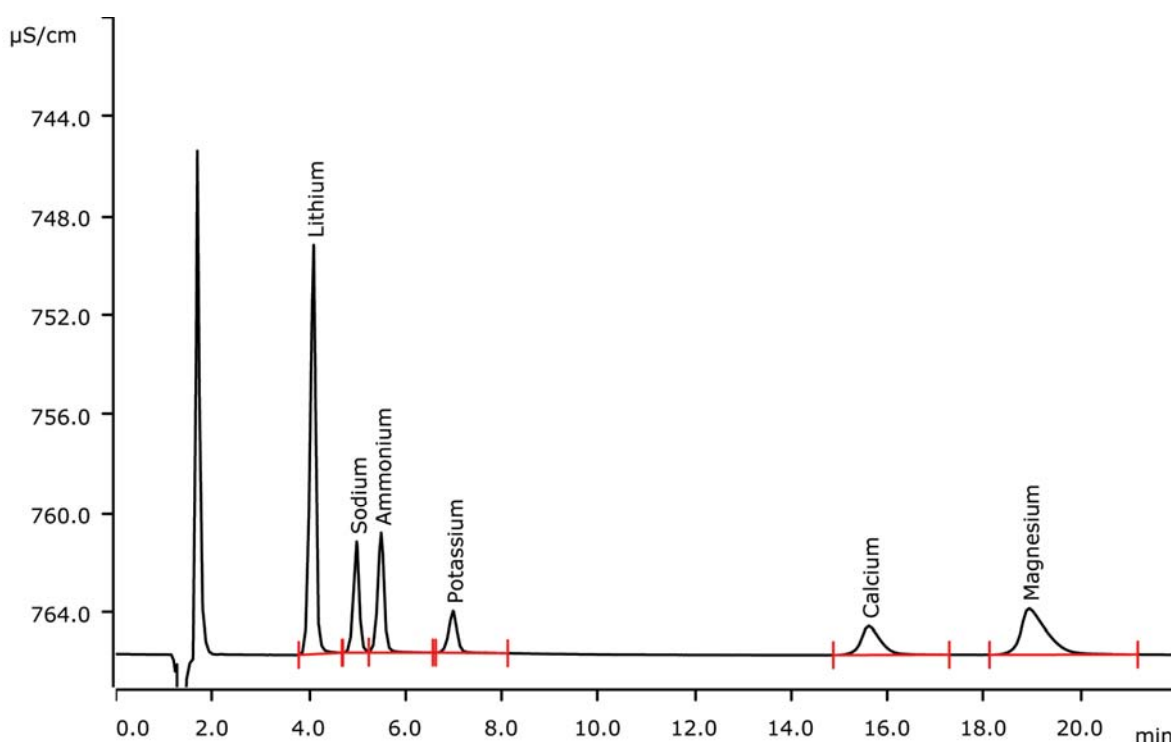


Metrohm Inline Dilution Technique – get dilution factors up to 10'000 with two intelligent dilution steps



Sample dilution belongs to the laborious daily routine tasks in the analytical lab. An automatic two-step dilution offers a maximum dilution factor of 10'000. This intelligent dilution is rooted in the possibility of MagIC Net to calculate the essential dilution steps and the dosing properties of the 800 Dosino and the Liquid Handling Station. The Application Note shows statistical results of a 1: 10'000 dilution.

Results

Cation (standard chromatogram)	Conc. [mg/L]
Lithium, sodium, ammonium, potassium, calcium, magnesium	5.0

Sample

Standard solution, artificial brine

Sample preparation

Metrohm Inline Dilution

Columns

Metrosep C 4 - 150/4.0	6.1050.420
Metrosep C 4 Guard/4.0	6.1050.500

Solutions

Eluent	1.7 mmol/L nitric acid 0.7 mmol/L dipicolinic acid
Dilution Solution	Ultrapure water

Analysis

Direct conductivity detection

Parameters

Flow rate	0.9 mL/min
Injection volume	10 μ L
P _{max}	20 MPa
Recording time	22 min
Column temperature	30 °C

Instrumentation

930 Compact IC Flex Oven/Deg	2.930.2160
IC Conductivity Detector	2.850.9010
858 Professional Sample Processor	2.858.0020
800 Dosino	2.800.0010
741 Magnetic Stirrer	2.741.0010
IC Equipment: Inline Dilution	6.5330.120



Statistics on brine dilutions

Lithium n = 5	Conc. [g/L]	RSD [%]	Recovery [%]	Potassium n=5	Conc. [g/L]	RSD [%]	Recovery [%]
10 000	2.69	2.0	107.5	10 000	5.25	1.4	105.0
7 500	2.67	1.1	106.9	7 500	5.09	1.8	101.9
5 000	2.61	1.3	104.3	5 000	4.98	1.1	99.6
4 900	2.60	0.4	104.0	4 900	5.01	0.4	100.3
3 750	2.64	0.6	105.5	3 750	5.04	1.1	100.7
2 500	2.63	2.5	105.3	2 500	5.03	2.6	100.6
2 400	2.68	1.8	107.0	2 400	5.12	1.9	102.5
500	2.53	0.4	101.3	500	4.92	0.7	98.4
490	2.53	0.6	101.3	490	4.90	0.5	98.0
200	2.53	0.6	101.3	200	4.87	0.9	97.4
100	2.45	2.8	98.0	100	4.74	2.8	94.7
average	2.60	1.27	103.87	average	4.99	1.39	99.90

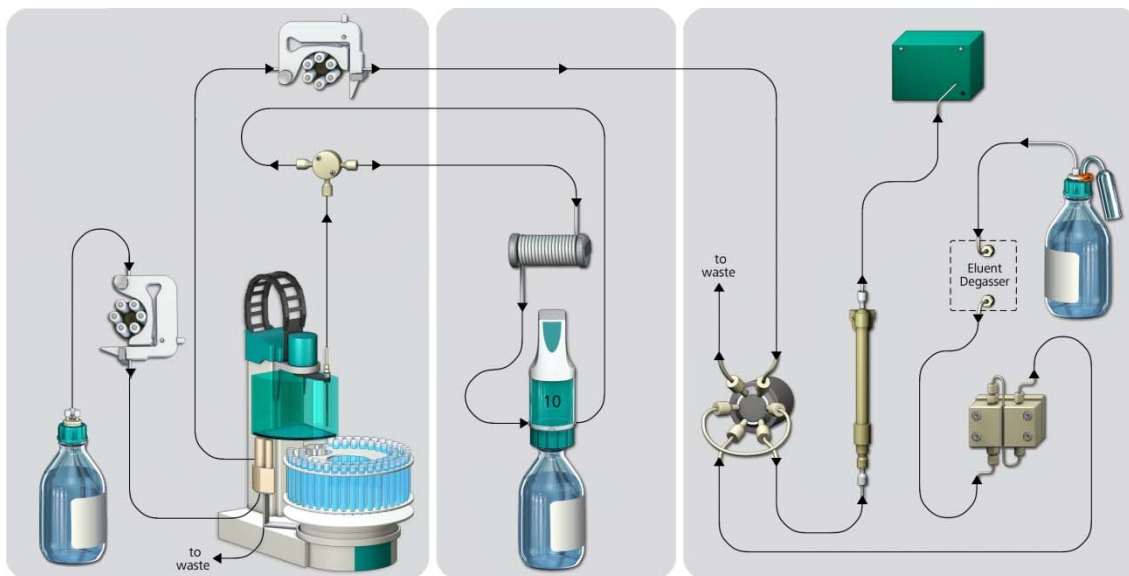
Sodium n=5	Conc. [g/L]	RSD [%]	Recovery [%]
10 000	5.21	2.9	104.3
7 500	5.30	1.4	106.1
5 000	5.19	1.0	103.7
4 900	5.20	0.5	103.9
3 750	5.28	1.1	105.6
2 500	5.30	1.9	105.9
2 400	5.36	1.5	107.2
500	5.10	0.3	101.9
490	5.10	0.6	101.9
200	5.11	0.3	102.2
100	4.97	2.6	99.3
average	5.19	1.28	103.82

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Flow chart for Inline Dilution

Function: The 800 Dosino aspirates the required sample volume to the buffer tubing, which is then dispensed into the Liquid Handling Station. After diluting with the respective volume of ultrapure water and mixing, the required volume for the second dilution step is again aspirated to the buffer tubing. Now, the sample needle and the Liquid Handling Station are rinsed with ultrapure water (800 Dosino using port on the right side). Subsequently, the second dilution is performed before the final sample solution is injected.



Nested time program

A nested time program consists of four parts. The sample preparation of the next sample is done during the analysis time. In this setup, the dilution of sample 2 is performed while chromatography of sample 1 is running.

