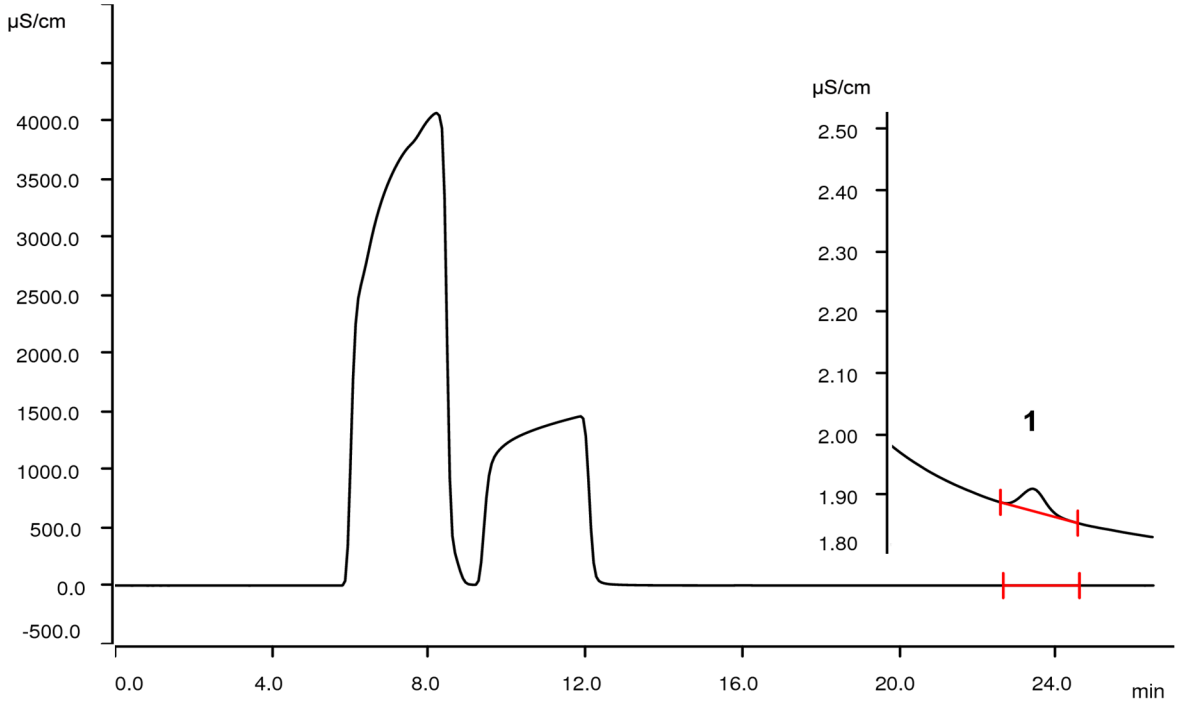
IC Application Note S–367

# Ultratrace-level perchlorate in water containing 3000 mg/L of total dissolved solids (US EPA method 314.0) applying Inline Ultrafiltration




Perchlorate is known as a potential contaminant in drinking water. Besides very few natural sources, it mainly originates from disinfectants, bleaching, propellants, etc. EPA method 314.0 requires to reach a method detection limit of 0.5 µg/L for perchlorate in reagent water. But also water with a very high content of total dissolved solids needs to be analysed by this method. Making use of the Metrosep A Supp 7 - 250/4.0 column fulfills all requirements of this method.

## Results

| Anion | Conc. meas. [µg/L] | RSD [%, n = 3] | Recovery [%] |
|---|---|---|---|
| 1 Perchlorate | 2.13 | 1.8 | 103.3 |

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## Sample

MTC 5: 2 µg/L perchlorate in water, background 1 g/L chloride, carbonate, and sulfate each

## Sample preparation

Injection after Metrohm Inline Ultrafiltration

## Columns

| | |
|---|---|
| Metrosep A Supp 7 - 250/4.0 | 6.1006.630 |
| Metrosep A Supp 5 Guard/4.0 | 6.1006.500 |

## Solutions

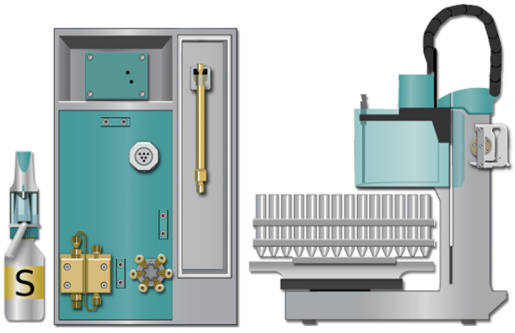
| | |
|---|---|
| Eluent | 9.6 mmol/L sodium carbonate<br>3.0 mmol/L sodium hydrogen carbonate<br>25% acetonitrile |
| Suppressor regenerant | 250 mmol/L phosphoric acid<br>10% acetonitrile |
| Rinsing solution | STREAM |

## Parameters

| | |
|---|---|
| Flow rate | 0.8 mL/min |
| Injection volume | 1250 µL |
| $P_{max}$ | 15 MPa |
| Recording time | 28 min |
| Column temperature | 50 °C |

## Analysis

Conductivity detection after sequential suppression




## Instrumentation

| | |
|---|---|
| 930 Compact IC Flex Oven/SeS/Deg | 2.930.2460 |
| IC Conductivity Detector | 2.850.9010 |
| 858 Professional Sample Processor | 2.858.0020 |
| 800 Dosino | 2.800.0010 |
| IC equipment: Dosino Regeneration | 6.5330.190 |
| IC equipment: Inline Ultrafiltration | 6.5330.110 |
| MSM Rotor A | 6.2832.000 |
| Adapter sleeve for Suppressor Vario | 6.2842.020 |

## Calculation of Percent Difference of Area Height Ratio ($PD_{A/H}$)

| Sample ID | $PD_{(A/H)}$ |
|---|---|
| MCT 5 (3000 ppm) - n=5 | 9.74 |
| MCT 4 (1500 ppm) - n=5 | 9.29 |
| MCT 3 (750 ppm) - n=5 | 7.18 |
| MCT 2 (300 ppm) - n=5 | 4.95 |
| MCT 1 (150 ppm) - n=5 | 2.36 |

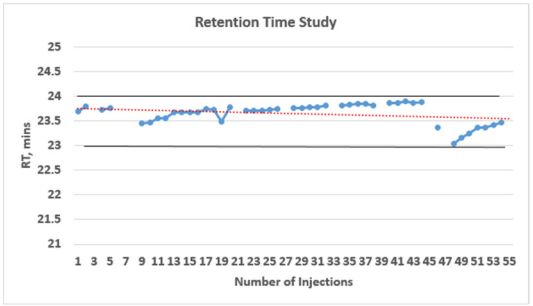
$PD_{(A/H)}$ should not exceed 20%.

MTC = Maximum Conductivity Threshold

## Deviation of Retention time

Retention time is monitored to observe

- column capacity
- resolution of matrix and target analyte
- secondary eluent effect due to increase in matrix ions




During entire analysis time of 35 hours, as expected RT drift is about 0.5 minutes.

Missing data points in graph is due to blank DI water injections.

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