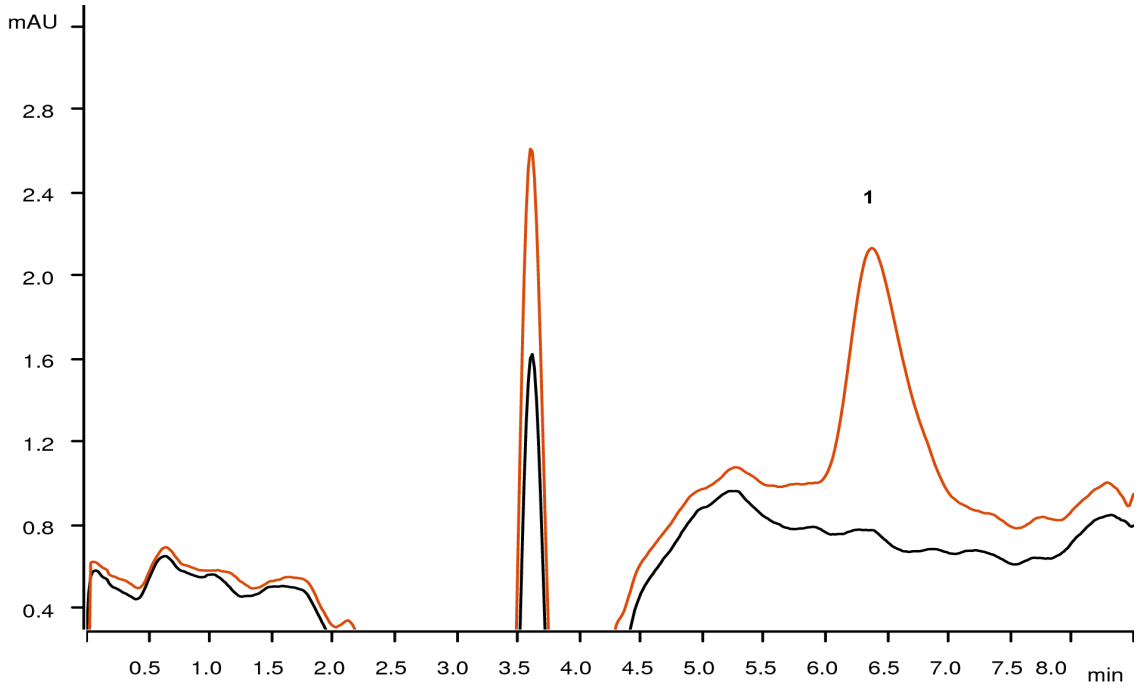
IC Application Note U–51

Trace bromate in drinking water

Determination according to ISO 11206 applying triiodide post-column derivatisation and subsequent UV detection



Bromate is a disinfection byproduct generated by ozonation during drinking water purification. It is undesirable, because it is a suspected human carcinogen. Water suppliers as well as manufacturers of bottled and mineral water need to comply with the limit values set by the respective public authority. The World Health Organization (WHO) sets the maximum contamination level for public water systems at 10 µg/L. In Europe the maximum acceptable concentration of bromate in mineral waters is set to 3 µg/L. Further lowering of these values are under discussion. ISO 11206 describes the determination of bromate in drinking water by IC with UV detection after post-column reaction. Bromate oxidizes iodide in acid solution to iodine. The excess iodide forms with the iodine the triiodide ion (I_3^-), which absorbs at 352 nm. The present application allows quantification of bromate down to 1 µg/L and below.

Results

Drinking water spiked	Bromate
1 Spike: 1.0 µg/L	1.015 µg/L

Metrohm

Method description

Sample

Drinking water, mineral water

Sample preparation

Direct injection

Column

Metrosep A Supp 16 - 150/4.0	6.1031.420
Metrosep A Supp Guard/4.0	6.1031.500

Solutions

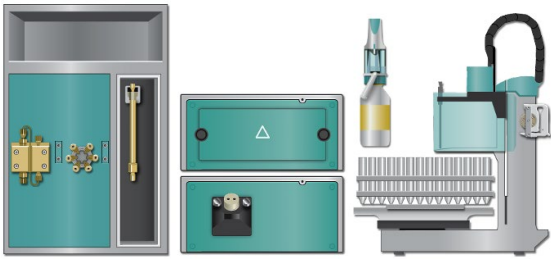
Eluent	100 mmol/L H_2SO_4 / 19.3 µmol/L ammonium heptamolybdate
Post-column reagent	0.27 mol/L KI

Analysis

UV detection	352 nm

Instrumentation

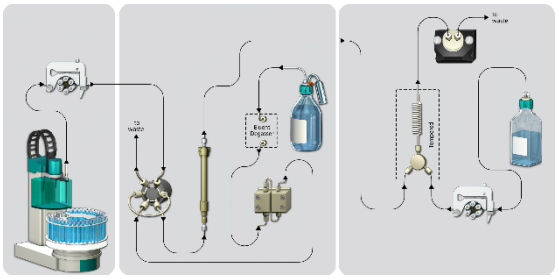
940 Professional IC Vario ONE	2.940.1100
858 Professional Sample Processor	2.858.0020
943 Professional Reactor Vario	2.943.0110
944 Professional UV/VIS Detector Vario	2.887.0010
886 Professional Reactor	2.886.0110
800 Dosino	2.800.0010
IC equipment: PCR with dosing unit	6.5330.400



Parameters

Flow rate column	0.8 mL/min
Flow rate PCR	0.2 mL/min
Injection volume	1325 µL
P_{max}	20.0 MPa
Recording time	9 min
Column temperature	45 °C
PCR temperature	45 °C

System setup



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