Analytical Methodology and removal of toxic ions in water

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July 2017

Declaration

I hereby declare that the research work titled "**Analytical Methodology and removal of toxic ions in water"** submitted by Mr Ahmed Mohmoud (me) and supervised by Dr James Barker and Dr Rosa Busquets is based on actual and original work carried out by Mr Ahmed Mohmoud. I further certify that the research work has not been published or submitted for publication.

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Acknowledgement and Dedication

I thank God for giving me the health and strength to be able to perform this study. I wish to express my gratitude and sincere appreciation to my supervisors, **Dr. James Barker**, Associate Professor and Reader of Analytical Science, Kingston University; Faculty of Science, Engineering and Computing; School of Life Science, Pharmacy and Chemistry and **Dr Rosa Busquets**, Lecturer in Analytical and Forensic Chemistry, Kingston University; Faculty of Science, Engineering and Computing; School of Life Science, Pharmacy and Chemistry, for their valuable guidance, constructive criticism and encouragement during every stage of this project. I would also like to thank **Dr Mohamed Emad**, Assistant Professor, Taibah University, for letting me use the analytical instrumentations in his laboratory. Dedication goes out to my parents, my wife and children for their kindness and great support.

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Abstract

The present work has developed analytical methodology for determining anions (nitrate, nitrite, fluoride, bromide, chloride, phosphate and sulphate) by Ion Chromatography and conductometric detection for the analysis of ground water. The methodology developed was used for monitoring the above mentioned anions in a region of particular interest, located in the outskirts of Madinah Almunawwara, in the Kingdom of Saudi Arabia (KSA). The importance of this study site lies in that the main water supply is ground water extracted from wells. The study was carried out for six months. Eight wells were investigated, and a total of 18 samples were collected from each well. The concentrations of the study anions detected in all wells were lower than the maximum control limit by the WHO for fluoride 2ppm, chloride 250ppm, nitrite 1ppm, nitrate 45ppm and sulphate 250ppm. The maximum control limits for bromide and phosphate have not been set.

Finally, a simple approach to reduce the concentration of such anions by using raw materials widely available in the study region. These raw materials included pomegranate peels, pomegranate gels and date seeds. In a batch study, the sorbent pomegranate gels removed 5.9% fluoride, 51.4% of nitrite, 1.5% bromide and 50.6% of sulphate when working with water spiked with the study anions at a concentration level of 10 mg/L. Dateseeds removed 98.2% of nitrite and 2.2% of nitrate in water spiked also at 10mg/L. In contrast, pomegranate peels were less effective, with just 13.0% removal

of nitrite. These removal capacities indicate that using natural products can be a cost-effective way of treating water.

Abbreviations

UPLC-ESI-MS	Ultra performance liquid chromatography - electron spray ionisation-mass spectrometry
USEPA	United States Environmental Protection Agency
EC	Electrocoagulation
KSA	Kingdom of Saudi Arabia
PE	Polyethylene
TDS	Total dissolved solids
IC	Ion Chromatography
SD	Standard deviation

1.0 Introduction

It is essential to have safe drinking water. The safety of metropolitan water is controlled by drinking water plants, in contrast, wells used for domestic use in rural areas may be under lower control. Since a variety of different highly mobile toxic anions can leach to ground water, a method for their analysis and removal needs to be available. Various processes of removal of toxic anions are in place *i.e*. ion exchange, adsorption, coagulation and filtration [1] but these are not generally available in households, where low-cost removal methods could be applied.

The presence of certain carcinogen ions such as bromate or chromate (VI) species in water constitutes a direct risk to humans [2], and monitoring and eliminating these ions from water is a priority [3]. It has been reported that the risk to human health by toxic ions can be, for instance, through fertilisers used in crops and the subsequent intake of locally grown vegetables, cereal crops and milk from irrigated sites with such fertilisers [4]. Furthermore, when the water is contaminated with toxic species, these ions, which are mobile, pose a serious threat to the environment and aquatic life in the receiving waters [5]. Some toxic species also accumulate throughout the food chain and may affect human beings, plants and animals alike. The increasing problem of contaminating soil and water has stimulated a search for new low cost approaches to remove these pollutants [6].

Discharge of toxic species from metal processing industries is known to have adverse effects on the environment [7]. Conventional treatment technologies for a removal method from aqueous solution are not economical and generate tonnes of toxic chemical sludge [8]. It is therefore important to have available economical solutions for the removal of toxic substances from water. The use of natural compounds as removers of polluants may emerge in the coming years due to their biodegradability (once the toxic species have been re-extracted), easy availability, low-cost and non-toxic nature [9]. It has been reported that bromate, nitrate and nitrite in drinking water in parts of Saudi Arabia have exceeded the maximum contaminant levels established by the United States Environmental Protection Agency [10].

Methodology for monitoring toxic ions in water is needed. Fast and sensitive methods for the analysis of bromate, nitrate and nitrite in drinking water using UPLC-ESI/MS with low detection limits of 0.03-0.04 µg/L (ppb) [11] is available in Saudi Arabia, however the instrumentation required is costly and therefore not available to all laboratories .

1.1 Toxicity of ions and metals in human health

The main sources of pollutants are industrial wastewater from mining, metal processing and refining, tanneries, pharmaceutical, chemical and agrochemical industry and municipal wastewater[8]. Toxic metals such as Cd or Pb can displace vital nutritional minerals from their original place, thereby, hindering their biological function. It is, however, impossible to live in an environment free of heavy metals. There are many

ways by which heavy metals can be introduced into the body such as consumption of foods, water, beverages, skin exposure, and inhaled air [8].

Faced with increased stringent regulations, heavy metals are among the environmental current list of 126 priority pollutants by the US Environmental Protection Agency. Toxic substances need to be removed from water to protect the people and the environment.

1.2 Removal of toxic species:

Recent research in the area of toxic species removal from water and sediments has focused on the development of materials with increased affinity, capacity, and selectivity for target substances. The existing methods for the removal of toxic species from the environment can be grouped into biotic and abiotic. Biotic methods are based on the accumulation by plants or microorganisms, whereas abiotic methods include physiochemical processes such as precipitation, co-precipitation and adsorption by a suitable adsorbent [2].

Current remediation techniques are categorised into physical (i.e. physisorption), chemical (chemisorption, precipitation, complexation, ion exchange, electrodeposition, and formation of amalgams) or biological techniques which include biofiltration or genetic engineering in the modification of microorganisms. The removal of bromated ions from aqueous solution by modified date seeds and granular activated charcoal has been reported [2]. In this work, the date seeds were modified with iron after a cleaning stage. The growing demand for efficient and low-cost treatment methods and the importance of adsorption has given rise to the so-called low-cost alternative adsorbents

(LCAs) [12]. Researchers are currently interested in finding the production of cheaper ways which therefore could be applied in large scale environmental problems [3]. Some examples of techniques used in the reduction of the concentration of ions from water are now detailed.

1.2.1 Electrocoagulation:

Electrocoagulation (EC) is a technique used in the earlier stages of water treatment. A value of 95% removal efficiency of aluminum using electrocoagulation has been reported. Unlike chemical treatments to remove heavy metals and suspended solids, it does not require strict control of pH or addition of important amount of chemicals. The medium used in EC was natural water containing Ca^{2+} and HCO_3^- ions [19]. EC is usually conducted by adding supporting electrolyte to the medium investigated. EC requires low maintenance, no filters and is advancing towards a reduction on the energy required.

1.2.2 Continuous free surface flow wetland/constructed wetland:

It has been reported that constructed wetland (CW)can be used for the removal of heavy metals; however, a disadvantage of free surface flow wetlands is that they require large area, it is a slow remediation process, and the plants need to be collected and generally incinerated. Removal efficiencies of the CW for ions Pb, Cd, Fe, Ni, Cr and Cu were 50%, 91.9%, 74.1%, 40.9%, 89% and 48.3% respectively [13] [14].

1.2.3 Wastewater stabilization ponds and activated sludge processes:

In the stabilization ponds, the removal efficiency of some heavy metals has been reported to be rather low (58% for Cr and less than 20% for Cd, Mn and Pb [15]), whereas the activated sludge process, which takes place by both bioaccumulation and bioadsorption, yielded higher removal efficiencies ranging from 47% for Ni to 95% for Cr, which still is insufficient given the toxicity of some heavy metals, and is dependent on the ion. In fact, activated sludge processes are mainly optimised for the removal of organic matter and have only side-benefits the removal of heavy metals.

1.2.4 Salvinia Natans – an annual floating aquatic fern:

Salvinia Natans has been studied as a species for cleaning water contaminated with toxic species [16]. When fresh biomass was replenished at definite time intervals of treatment, a gradual decrease of toxic metals content in water samples was observed. The metal accumulation in *Salvinia natans* involved rapid passive uptake through adsorption of ions onto plant surface (bio-sorption) followed by active uptake into plant cells.

1.2.5 Withania Frutescens:

The removal of nitrates and phosphates, as well as metals, from water has been reported with an adsorbent consisting of micro-particles of dried *Withania Frutescens* plant (<500 μm). The adsorption increased with contact time, and the use of

microparticles, rather than the tissue as a whole resulted in an increase in the surface area and an improvement of the kinetics and access to active sites[17]. A wide range of plants and waste products have been investigated for the removal of ions, and only few examples have been discussed here.

Hemp seeds have shown capacity to accumulate metal ions, especially cadmium and zinc [18], and it has been proposed for the phytoremediation of contaminated sites [19]. A phytohemaglutinin from Sunn hemp seeds (Crotalaria juncea) containing metals has been isolated which shows the affinity of the plant and hence its capacity to improve the quality of water [22], although the release of potential toxic ions, such as cyanuric acid, should be monitored. The capacity of pomegranate peel to adsorb lead [21], copper (II) [22] and chromium VI [23] has been proven after having been washed or mildly modified with acid. Activated carbon made from pomegranate husk has been found to be an effective low cost adsorbent for the removal of dyes [24] and Cr (VI) [25] from water.

2.0 Aims and Objectives:

The aim of this work is to develop an analytical procedure for the analysis of anions in ground water and to investigate a number of natural products that could be used to remove anions in ground water.

The objectives of this research are listed as follows. In the first place, analytical methodology based on ion chromatography was developed for the analysis of ions i.e. nitrate, nitrite, fluoride, bromide, chloride, phosphate and sulphate, in ground water. A second objective was to monitor the presence of toxic ions in ground water, within a region that depended on it, for over a period of six months in case a temporal factor affected their levels. The last objective of this work was to investigate a range of natural adsorbents widely available and with low commercial value in Saudi Arabia for the removal of a range of toxic ions.

3. Experimental Methodologies:

3.1 Chemicals and materials.

The reference standard materials sodium fluoride, sodium nitrite, potassium chloride, sodium nitrate, potassium bromide, potassium sulphate and ammonium hydrogen phosphate were all bought from ULTRA Scientific, USA, and were of analytical quality.

The salt chemicals used for the mobile phase were sodium carbonate, from Holyland, KSA, and sodium hydrogen carbonate bought from LOBA Cheme, India, both with analytical quality.

The chemical for the regeneration solution was sulphuric acid bought from LOBA Cheme, India.

All the glassware and sample bottles used for the project were first washed with detergent solutions, then rinsed with tap water and deionised water several times, soaked overnight with 2.0% HNO_3 69-72%, LOBA Chemie, and finally rinsed with deionised water several times.

3.2 Sampling

The water samples used for this project were collected from wells in Abyar Almashie, Madinah AlMunawrrah region in KSA. The water samples were collected in polyethylene (PE) bottles, placed in a fridge (Ca. $4^{o}C$) and analysed within 2 days. A total of eight wells

were monitored and three samples from each well were collected per batch collection for over six months, this gives eighteen samples per well over six months. This is a total of 144 samples for all the eight wells over the six months. The dates when the ground water samples were collected are shown in Table 1. Batch means one days' collection for samples 1 to 8. The map of KSA, including the location of Abyar Mashe is shown in Figure 1. The sampling sites are shown in Figure 2. In that figure, Sample number refers to well number:

Table 1: Dates of water sample collection per batch

Batch number	Date of collection
Batch 1	January 2016
Batch 2	February 2016
Batch 3	March 2016
Batch 4	April 2016
Batch 5	May 2016
Batch 6	Jun 2016

Table 1 is showing the dates when each batch of water samples were collected from the eight wells investigated.

Table 2: Distance between the wells and the valley, and depth of each well

Sample/Well number	Distance of the well from the valley (metres)	Depth of the well (metres)
1	900	110
2	1500	200
3	1500	180
4	800	140
5	200	40
6	250	102
7	1500	19
8	100	199

Table 2 is showing the distance from each well to the valley. The shortest distance between two wells is 100m (between wells 5 and 8). The longest distance between wells is 3000m (between wells 2 and 7). The diameter of the wells was 0.5m wide, except for well 5 (sample 5) which was 3m wide.

Figure 1: Abyar Mashe in KSA

Figure 2: Locations of sample collection

3.3 Instruments & Measurements

The analysis of water samples was carried out using the following analytical instruments. Electronic balance that was a Genus AB204-S (Mettler Toledo, Switzerland) and pH meter (HANNA, Mauritius).

Ion chromatography (IC) is a technique used for the separation and determination of ions based on their charge and interaction with the mobile phase and stationary phase. The disadvantage of the use of ion chromatography is the use of buffers and the time that it takes to equilibrate the column with respect to other types of chromatography. The detection system commonly used with IC is a conductivity detector. In this project, the ions which have been investigated are fluoride, chloride, nitrite, bromide, nitrate, phosphate and sulphate. The technique used include the parameters i.e. Metrosep A Supp7-250 anion column (4.0 mm x 250 mm), Suppressed Conductivity Detector, and type 881 Compact IC pro, both from Metrohm Ltd., Switzerland.

3.4 Development of analytical methodology for the analysis of toxic substances

3.4.1 Sensitivity

Diluted standards of different concentrations, i.e 0.05mg/L – 0.1mgL, were injected and the limit of detection (LOD) was taken as the concentration with a signal-to-noise ratio. Measuring background noise nearby the peaks from the analytes has shown to be

problematic since the baseline was very smooth. This could be due to the instrument working in the mode “Suppressed Ion Chromatography”, which is the recommended one for best sensitivity. Due to the difficulties in assessing the level of noise, standards with concentration close to the level estimated to be at the LOD were prepared and measured to confirm the LOD values given in table 3.

Table 3: Limit of detections for the studied anions,

Anion	LOD (mg/L)
Fluoride	0.05
Chloride	0.05
Nitrate	0.1
Bromide	0.05
Nitrite	0.05
Phosphate	0.05
Sulphate	0.1

Table 3 is showing the LOD for the studied anions. The lowest detection in the developed method was 0.05 mg/L. The limit of detection (LOD) can be improved in future work. The chromatograms for the study compounds at the LOD are given in Annex 7.2

3.5 Preparation of natural adsorbents

Waste agricultural food products abundant in Saudi Arabia were selected as natural adsorbents. Examples include pomegranate peels, pomegranate gels, and date seeds from consumed food products in Saudi Arabia all with low commercial value. These products were collected from vegetable markets and farms in the local zones of Madinah district. Pomegranate peels were peeled-off, washed with deionised water, dried and ground. Pomegranate gels were cut-open, peeled-off from the juice and the seed, washed with deionised water and dried. The date seeds were prepared by washing with deionised water, dried and ground into powder. 1g of each natural adsorbent was used for analysis as follows. 1g of each sorbent, (pomegranate gels, date seeds and pomegranate peels), was incubated with 100ml of deionised water separately in three separate flasks each spiked at 10mg/L of multi anion standards. The study was carried out in batch mode under gentle shaking (80rpm) for 48h.

3.6 Chemicals for preparation of mobile phase and other solvents

The mobile phase was 3.6mM sodium carbonate/ 2.4mM soidum hydrocarbonate adjusted at pH 8.5. The stock chemicals were sodium carbonate 98% (HOLYLAND, Saudi Arabia) and sodium hydrogen carbonate AR/ACS. Sulphuric acid was used for regeneration, 90-91% (from LOBA Chemie, India)

3.7 Preparation for the standard calibrations:

Initial standards were prepared by preparing stock standards from the solid salt, at the concentration indicated in Table 3, a dilution of stock with deionized water to an intermediate solution of 100 mg/L, and subsequent standards as indicated in tables 4 and 5. These standards made from the solid salts were only used for the initial analysis while developing the method.

Table 4: Anion stock standards solution prepared from solid salts.The total volume of the standards solutions was 1000ml

Stock salt	Total Stock ppm	Anions	Stock MW (g/mol)	Stock ppm (mg/L)
Potassium bromide	1934.9	Bromide	154.46	1001
Potassium chloride	2104.9	Chloride	74.55	1001.0
Sodium fluoride	2214.5	Fluoride	41.99	1002.0
Sodium nitrite	1501.2	Nitrite	69.00	1001.0
Sodium nitrate	1680.5	Nitrate	103.99	1002.0
Ammonium dihydrogen phosphate	1213.6	Phosphate	115.03	1002.0
Potassium sulphate	1815.7	Sulphate	174.26	1001.0

Table 5: Anion Stock standards made from Reference Standard

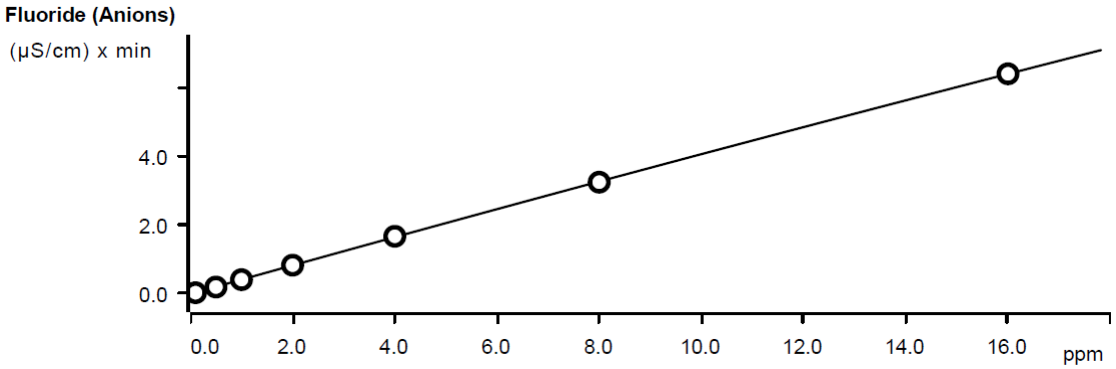
Stock solution	Intermediate standard solution (ppm)	Standard dilutions (ppm)						
		STD 1	**STD 2**	**STD 3**	**STD 4**	**STD 5**	**STD 6**	**STD 7**
Potassium bromide	100	0.1	0.5	1	2	4	8	16
Potassium chloride	100	0.1	0.5	1	2	4	8	16
Sodium fluoride	100	0.1	0.5	1	2	4	8	16
Sodium nitrite	100	0.1	0.5	1	2	4	8	16
Sodium nitrate	100	0.1	0.5	1	2	4	8	16
Ammonium dihydrogen phosphate	100	0.1	0.5	1	2	4	8	16
Potassium sulphate	100	0.1	0.5	1	2	4	8	16

Table 5 shows the standards 0.1 to 16ppm prepared from the intermediate standard of the reference materials. The intermediate standards used were prepared from pure reference materials of 1000ppm each, bought from Ultra Scientific Analytical Solutions, USA. These standard dilutions have been used for the calibration curves.

3.8 Calibration curves

The following figures 3-9 show the average standard calibration curves for the ions which have been tested in this work. Seven readings were taken.

Figure 3: Fluoride calibration curve



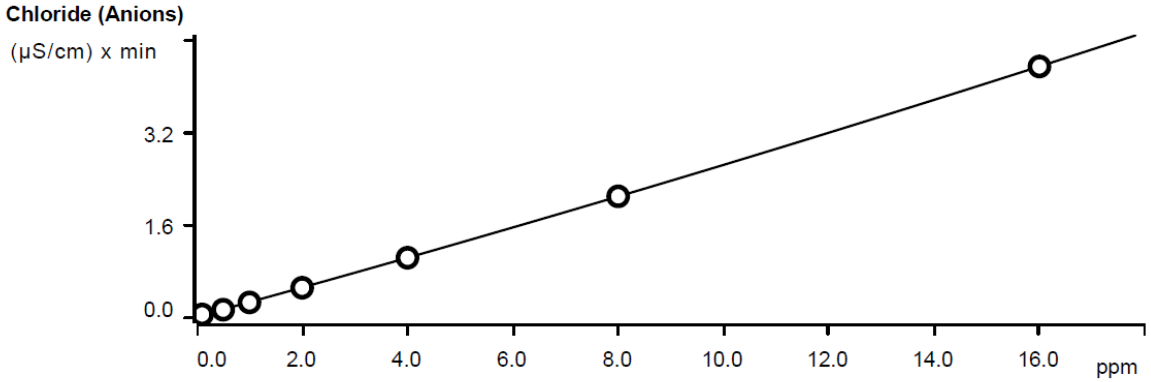
Function: . . . . . *A = 2.45989E-3 + 0.0208260× Q - 2.74139E-6× Q²*

Relative standard deviation . . . . . *0.913722 %*

Correlation coefficient *0.999982*

Sample type	Index	Conc.	Volume	Area	Ident	Date	Used
Standard 1	1	0.100	20.0	0.039	STD1	2016-01-21 11:17:52 UTC+3	used
Standard 2	1	0.500	20.0	0.203	STD2	2016-01-21 11:46:26 UTC+3	used
Standard 3	1	1.000	20.0	0.417	STD3	2016-01-21 12:15:00 UTC+3	used
Standard 4	1	2.000	20.0	0.837	STD4	2016-01-21 12:43:35 UTC+3	used
Standard 5	1	4.000	20.0	1.676	STD5	2016-01-21 13:12:11 UTC+3	used
Standard 6	1	8.000	20.0	3.245	STD6	2016-01-21 13:40:48 UTC+3	used
Standard 7	1	16.000	20.0	6.389	STD	2016-01-22 03:03:34 UTC+3	used

Figure 4: Chloride calibration curve



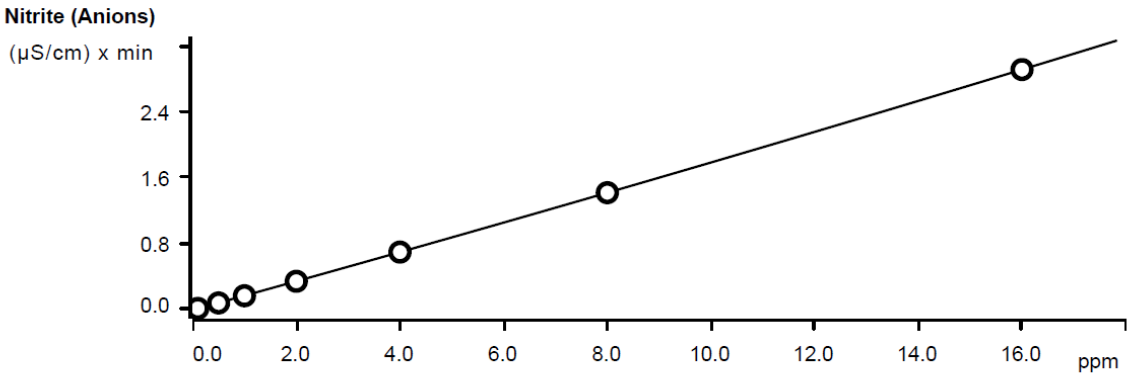
Function: . . . . . $A = 3.24021E\text{-}3 + 0.0125419 \times Q + 3.40159E\text{-}6 \times Q^2$

Relative standard deviation . . . . . *0.614673 %*

Correlation coefficient *0.999993*

Sample type	Index	Conc.	Volume	Area	Ident	Date	Used
Standard 1	1	0.100	20.0	0.040	STD1	2016-01-21 11:17:52 UTC+3	used
Standard 2	1	0.500	20.0	0.123	STD2	2016-01-21 11:46:26 UTC+3	used
Standard 3	1	1.000	20.0	0.250	STD3	2016-01-21 12:15:00 UTC+3	used
Standard 4	1	2.000	20.0	0.506	STD4	2016-01-21 12:43:35 UTC+3	used
Standard 5	1	4.000	20.0	1.029	STD5	2016-01-21 13:12:11 UTC+3	used
Standard 6	1	8.000	20.0	2.100	STD6	2016-01-21 13:40:48 UTC+3	used
Standard 7	1	16.000	20.0	4.364	STD	2016-01-22 03:03:34 UTC+3	used

Figure 5: Nitrite calibration curve



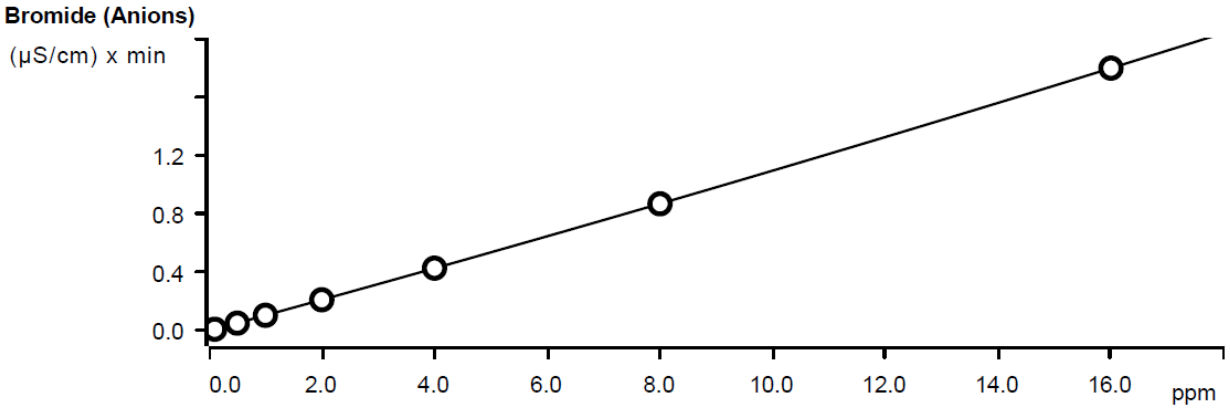
Function: . . . . . *A = - 4.15948E-3 + 8.66094E-3× Q + 1.39986E-6× Q²*

Relative standard deviation . . . . . *0.163760 %*

Correlation coefficient *0.999999*

Sample type	Index	Conc.	Volume	Area	Ident	Date	Used
Standard 1	1	0.100	20.0	0.015	STD1	2016-01-21 11:17:52 UTC+3	used
Standard 2	1	0.500	20.0	0.082	STD2	2016-01-21 11:46:26 UTC+3	used
Standard 3	1	1.000	20.0	0.169	STD3	2016-01-21 12:15:00 UTC+3	used
Standard 4	1	2.000	20.0	0.344	STD4	2016-01-21 12:43:35 UTC+3	used
Standard 5	1	4.000	20.0	0.698	STD5	2016-01-21 13:12:11 UTC+3	used
Standard 6	1	8.000	20.0	1.418	STD6	2016-01-21 13:40:48 UTC+3	used
Standard 7	1	16.000	20.0	2.911	STD	2016-01-22 03:03:34 UTC+3	used

Figure 6: Bromide calibration curve



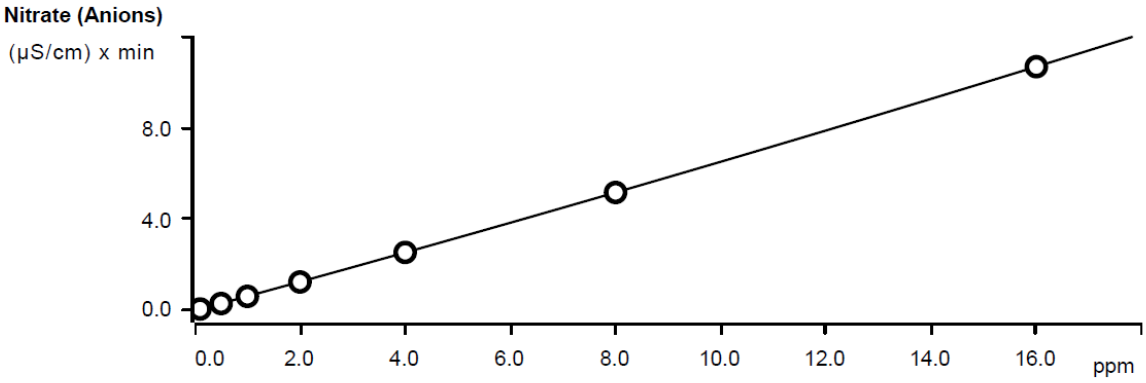
Function: . . . . . *A = - 4.21110E-4 + 5.25679E-3× Q + 1.14012E-6× Q²*

Relative standard deviation . . . . . *0.140976 %*

Correlation coefficient *1.000000*

Sample type	Index	Conc.	Volume	Area	Ident	Date	Used
Standard 1	1	0.100	20.0	0.010	STD1	2016-01-21 11:17:52 UTC+3	used
Standard 2	1	0.500	20.0	0.052	STD2	2016-01-21 11:46:26 UTC+3	used
Standard 3	1	1.000	20.0	0.105	STD3	2016-01-21 12:15:00 UTC+3	used
Standard 4	1	2.000	20.0	0.212	STD4	2016-01-21 12:43:35 UTC+3	used
Standard 5	1	4.000	20.0	0.428	STD5	2016-01-21 13:12:11 UTC+3	used
Standard 6	1	8.000	20.0	0.869	STD6	2016-01-21 13:40:48 UTC+3	used
Standard 7	1	16.000	20.0	1.799	STD	2016-01-22 03:03:34 UTC+3	used

Figure 7: Nitrate calibration curve



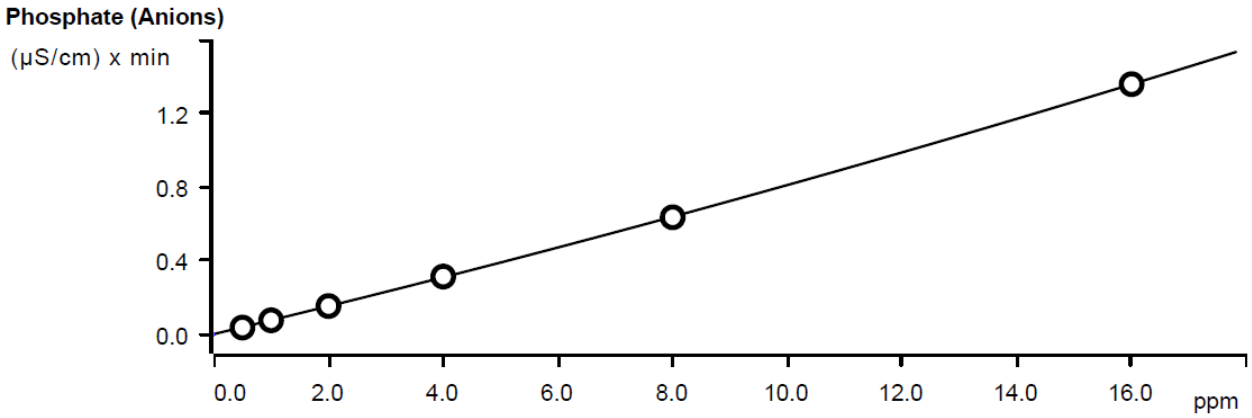
Function: . . . . . $A = - 0.0101511 + 0.0313184 \times Q + 6.56883E\text{-}6 \times Q^2$

Relative standard deviation . . . . . *0.224154 %*

Correlation coefficient *0.999999*

Sample type	Index	Conc.	Volume	Area	Ident	Date	Used
Standard 1	1	0.100	20.0	0.061	STD1	2016-01-21 11:17:52 UTC+3	used
Standard 2	1	0.500	20.0	0.301	STD2	2016-01-21 11:46:26 UTC+3	used
Standard 3	1	1.000	20.0	0.615	STD3	2016-01-21 12:15:00 UTC+3	used
Standard 4	1	2.000	20.0	1.246	STD4	2016-01-21 12:43:35 UTC+3	used
Standard 5	1	4.000	20.0	2.543	STD5	2016-01-21 13:12:11 UTC+3	used
Standard 6	1	8.000	20.0	5.169	STD6	2016-01-21 13:40:48 UTC+3	used
Standard 7	1	16.000	20.0	10.684	STD	2016-01-22 03:03:34 UTC+3	used

Figure 8: Phosphate calibration curve



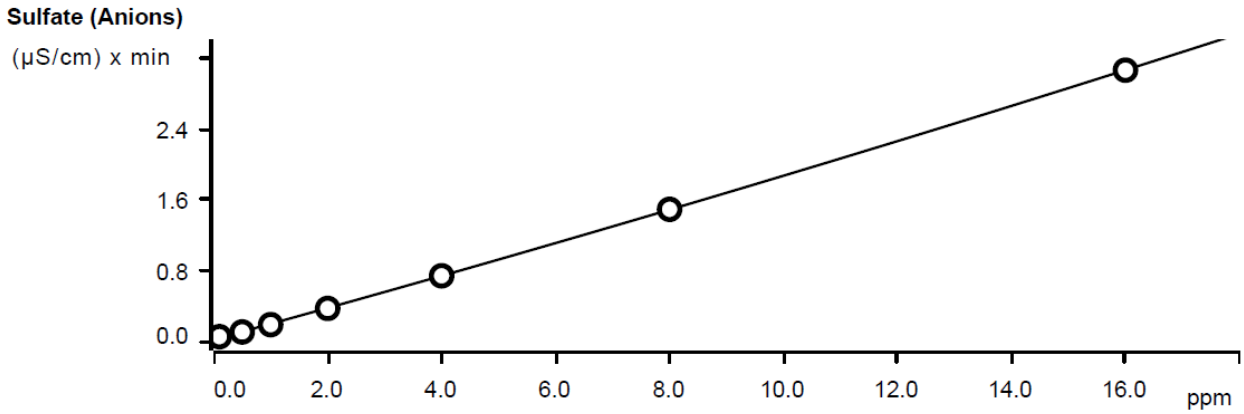
Function: . . . . . *A = 1.51711E-3 + 3.73468E-3× Q + 1.60825E-6× Q²*

Relative standard deviation . . . . . *0.742524 %*

Correlation coefficient *0.999988*

Sample type	Index	Conc.	Volume	Area	Ident	Date	Used
Standard 1	1	0.100	20.0	n. d.	STD1	2016-01-21 11:17:52 UTC+3	used
Standard 2	1	0.500	20.0	0.037	STD2	2016-01-21 11:46:26 UTC+3	used
Standard 3	1	1.000	20.0	0.077	STD3	2016-01-21 12:15:00 UTC+3	used
Standard 4	1	2.000	20.0	0.154	STD4	2016-01-21 12:43:35 UTC+3	used
Standard 5	1	4.000	20.0	0.315	STD5	2016-01-21 13:12:11 UTC+3	used
Standard 6	1	8.000	20.0	0.637	STD6	2016-01-21 13:40:48 UTC+3	used
Standard 7	1	16.000	20.0	1.362	STD	2016-01-22 03:03:34 UTC+3	used

Figure 9: Sulphate calibration curve



Function: . . . . . *A = 0.0150920 + 8.82897E-3× Q + 2.16687E-6× Q²*

Relative standard deviation . . . . . *1.084692 %*

Correlation coefficient *0.999976*

Sample type	Index	Conc.	Volume	Area	Ident	Date	Used
Standard 1	1	0.100	20.0	0.047	STD1	2016-01-21 11:17:52 UTC+3	used
Standard 2	1	0.500	20.0	0.100	STD2	2016-01-21 11:46:26 UTC+3	used
Standard 3	1	1.000	20.0	0.183	STD3	2016-01-21 12:15:00 UTC+3	used
Standard 4	1	2.000	20.0	0.367	STD4	2016-01-21 12:43:35 UTC+3	used
Standard 5	1	4.000	20.0	0.735	STD5	2016-01-21 13:12:11 UTC+3	used
Standard 6	1	8.000	20.0	1.488	STD6	2016-01-21 13:40:48 UTC+3	used
Standard 7	1	16.000	20.0	3.061	STD	2016-01-22 03:03:34 UTC+3	used

Figures 3-9 show the calibration curves for the anion standards 0.1ppm-16.0ppm, the equation of the lines was y=mx+c, where m was the gradient and c was the intercept. The relative standard deviations percent for the ions differed, with fluoride 0.91, chloride 0.61, nitrite 0.16, bromide 0.14, nitrate 0.22, phosphate 0.74, and sulphate 1.08. The correlation coefficient (R^2) for the ions were all greater than 0.99

4.0 Results and Discussion

4.1 Wells in specific region monitored

Total dissolved solids (TDS) and the pH were measured to characterise the water samples other than the concentration of the study anions. Out of the eight wells where the water samples were collected, well 5 is used for drinking and domestic use; well 7 is for wildlife animals; and all other wells are used for farming. Hence, directly or indirectly, the water quality in these wells can affect human health. Table 6 gives the TDS and pH results of the water samples.

Table 6: Monitoring of the TDS and pH in ground water. The amount of water taken from every well was 4L. The study was carried out in 2016

Well number	TDS (ppm)						pH						Depth of well (m)
	January	February	March	April	May	June	January	February	March	April	May	June	
1	600	690	550	650	620	700	7.2	7.7	7.1	7.2	7.2	7.0	110
2	650	830	680	780	760	760	6.8	7.2	6.9	7.5	7.3	7.2	200
3	790	1070	830	980	940	920	6.9	7.2	6.8	7.0	7.0	6.9	180
4	600	750	600	680	710	400	6.7	7.1	6.8	6.8	6.8	6.8	140
5	300	330	280	290	270	280	6.9	7.7	7.1	7.1	7.1	6.8	40
6	230	250	200	250	240	240	6.8	7.5	7.1	7.0	7.0	6.9	102
7	440	530	510	1010	990	1030	7.2	8.0	7.4	7.7	7.6	7.5	19
8	310	490	480	200	160	160	6.9	8.2	7.8	6.9	7.1	6.8	199

February, March, and April 2016 were rainy months, and this was a factor leading to high TDS in some wells i.e. wells 3 and 2. Overall the concentration of particles was within a relatively narrow range, well 7 showing a greater variation between the lowest and the highest level of particles. The pH was between neutral and moderately alkaline. Soil pH affects the bioavailability of nutrients and the activity of microorganisms. A pH above 7.8 indicates that the soil and water are expected to be rich in Ca and Mg, although these cations were not measured in this study. Furthermore, acidic pH, (which is not the case), favors heavy metal contamination in aquifers.

Examples of chromatograms of the study anions in the 8 wells are shown in Annex 7.3 and the concentrations of the analytes in the study wells are detailed in Tables 1, 2, 6, 7, 8 and 9 within the results and discussion section.

The following tables (7-9) show the monitoring of the eight wells of ground water over the six months' period. Although seven anions were studied and a method for detecting these anions was set, only three anions were detected in the wells. Here you will find the mean (three samples for each month), the average concentrations, standard deviations and range levels for chloride, nitrate and sulphate over the six months' period.

Table 7: Chloride concentration (mg/L), average, standard deviation and range from January-June 2016

	January	February	March	April	May	June	Average concentration	Average SD
Well 1 (mean ±SD)	272.4±26.9	241.7±24.6	279.7±0.9	272.6±0.6	286.8±1.9	276.9±0.6	271.7	15.6
Well 2 (mean ±SD)	458.4±13.8	372.9±25.1	547.2±1.3	528.4±1.0	549.6±1.6	554.1±0.2	501.8	72.5
Well 3 (mean ±SD)	694.2±37.8	533.4±50.4	841.1±0.8	664.2±1.3	699.5±0.2	742.0±0.5	695.7	100.7
Well 4 (mean ±SD)	359.9±11.3	294.5±12.5	369.6±0.1	328.0±0.5	433.2±0.6	87.8±0.4	312.2	119.3
Well 5 (mean ±SD)	33.0±1.6	23.6±3.1	37.3±0.2	29.7±0.2	22.8±0.5	27.8±1.1	29	5.6
Well 6 (mean ±SD)	19.1±0.7	13.1±1.2	20.6±1.4	12.0±0.1	11.9±0.4	16.0±0.1	15.5	3.8
Well 7 (mean ±SD)	121.8±11.6	88.9±5.9	136.8±1.6	286.0±0.3	306.0±1.1	298.1±1.0	206.3	100.5
Well 8 (mean ±SD)	73.3±3.8	71.9±57.6	154.6±1.0	6.8±0.1	4.5±0.1	4.1±0.1	52.5	60

Table 8: Nitrate concentration (mg/L), average, standard deviation and range from January-June 2016

	January	February	March	April	May	June	Average concentration	Average SD
Well 1 (mean ±SD)	23.3±1.5	14.0±1.0	17.5±0.2	16.7±0.0	18.7±0.3	17.9±0.1	18	3
Well 2 (mean ±SD)	16.7±0.4	9.5±0.5	13.5±0.1	13.1±0.1	14.0±0.1	14.4±0.1	13.5	2.4
Well 3 (mean ±SD)	34.3±1.5	22.2±2.0	42.6±0.1	42.2±0.1	43.2±0.0	46.0±0.1	38.4	8.9
Well 4 (mean ±SD)	54.7±1.8	38.6±1.6	50.2±0.2	43.9±0.1	54.3±0.1	13.0±0.1	42.4	15.7
Well 5 (mean ±SD)	10.3±0.3	3.7±0.3	5.7±0.1	5.5±0.0	5.3±0.0	5.4±0.1	6	2.3
Well 6 (mean ±SD)	7.8±0.1	<LOD	3.4±0.1	3.6±0.0	4.2±0.0	4.3±0.0	3.9	2.5
Well 7 (mean ±SD)	12.9±0.5	5.3±0.3	7.9±0.2	3.6±0.0	3.9±0.0	3.7±0.0	6.2	3.7
Well 8 (mean ±SD)	<LOD	<LOD	<LOD	3.8±0.1	<LOD	<LOD	0.6	1.5

LOD for nitrate is 0.1mg/L

Table 9: Sulphate concentration (mg/L), average, standard deviation and range from January-June 2016

	January	February	March	April	May	June	Average concentration	Average SD
Well 1 (mean ±SD)	248.1±23.5	176.3±69.6	260.9±0.3	<LOD	95.6±3.2	172.0±78.1	158.8	98.1
Well 2 (mean ±SD)	300.3±12.2	133.9±7.7	340.3±0.4	<LOD	139.2±4.9	177.8±3.9	181.9	123.6
Well 3 (mean ±SD)	801.0±42.8	600.1±56.5	977.5±1.7	<LOD	429.8±12.1	540.0±4.5	558.1	336.1
Well 4 (mean ±SD)	341.8±10.3	249.6±78.2	362.2±0.7	<LOD	229.6±5.3	82.8±32.3	211	143.4
Well 5 (mean ±SD)	67.4±3.3	24.5±4.2	76.5±0.3	<LOD	22.9±0.5	29.4±0.7	36.8	29.2
Well 6 (mean ±SD)	41.5±1.7	15.0±2.3	32.8±19.9	<LOD	15.1±0.4	20.4±0.2	20.8	14.6
Well 7 (mean ±SD)	223.5±8.8	110.2±9.0	171.4±101.9	<LOD	493.7±4.9	544.3±5.2	257.2	216.6
Well 8 (mean ±SD)	128.7±7.3	64.7±34.6	208.8±86.3	<LOD	5.9±0.1	8.1±0.1	69.4	84.4

LOD for sulphate is 0.1mg/L

The SD ranges in wells 3, 4 and 7 for sulphate, nitrate and chloride, tables (7-9) were included as a way to measure the dispersion of the results across months, and high dispersion has been found, which is dependent on the analyte and well, but not related with the analytical determination itself.

All anions studied in this work have not been found to be contained in the ground water samples tested. The anions, sulphate, nitrate and chloride, found in the study area are probably due to the leaching of the rocks and sand in the area. Other anions are not reported in this data since they were not detected in the eight wells investigated. In April, sulphate has not been detected in the studied region due to experimental error for this month. Although once the samples are collected, the samples are analysed on the same day or the day after. However, for the month of April, the samples were tested a week later. This could be the problem with detecting sulphate on this month.

In a previous study by Khan et al [11], the levels of nitrite, nitrate and bromate in ground water from Saudi Arabia (unknown sites) were 0.56-3.46 mg/L; 0.97-9.65 mg/L; and 3.60-10.2 mg/L, respectively. These are levels that would have been detectable by the developed method based on Ion Chromatography. Indeed, the levels found for nitrate in the study wells were in many of them higher than the ones found by Khan et al. Furthermore, these levels were greater than the concentration set by the EPA as Maximum Contaminant Level (MCL) forNO_3^-: at 10mg/L, but complies with the guideline set by the WHO and European Commission at 50mg/L with the exception of some samples from Well 4 (Table 8). This can be due to the degradation of organic matter in

our study region. In contrast, nitrite fluoride, bromide, and phosphate were not detected in our study region. Also bromate has not been investigated in this region.[26][27][28]

4.2 Removal of anions with low-cost sorbents

The following results (presented in Tables 10-12) show the tests carried out with the natural products as low-cost sorbents with spiked water samples.

Table 10: Test with pomegranate gels. 1g of pomegranate was incubated with 100ml of ultrapure water spiked at 10 mg/L of multi-anions standard. The study was carried out in batch mode under gentle shaking (80 rpm) for 48h.

Spiked Anion	Initial concentration without Pomegranate gels mg/L	Final concentration with Pomegranate gels mg/L	Difference mg/L (final-initial)
Fluoride	10.09	9.49	-0.59
Chloride	9.55	14.07	4.52
Nitrite	9.85	4.80	-5.06
Bromide	9.78	9.63	-0.15
Nitrate	2.17	2.54	0.37
Phosphate	4.97	12.16	7.19
Sulphate	9.65	4.77	-4.88

The results shown in table 10 show that the sorbent, pomegranate gels, released chloride, nitrate, and phosphate anions, this was also observed in a blank. Only fluoride, nitrite, bromide and sulphate have been removed by pomegranate gels with adsorptive capacities of 0.06 mg/g sorbent, 0.5 mg/g sorbent, 0.015 mg/g sorbent and 0.49 mg/g sorbent, respectively. Sulphate is a relatively inert ion that would be expected to decrease when the sorbent had metals with affinity for sulphur.

Table 11: Test with Dateseed. 1g of Dateseed was incubated with 100ml of water. The study was carried out in batch mode under gentle shaking (80 rpm) for 48h. The water was incubated with dataseeds spiked at 10 mg/L

Anion	Individual concentration with dateseed in replicates mg/L			Average concentration mg/L	Difference from spiked 10mg/L
	1	2	3		
Fluoride	10.75	11.01	9.11	10.29	0.29
Chloride	43.39	43.37	42.56	43.11	33.11
Nitrite	0.22	0.19	0.12	0.18	-9.82
Bromide	10.16	10.55	10.13	10.28	0.28
Nitrate	11.11	11.04	7.21	9.78	-0.22
Phosphate	13.88	13.32	7.44	11.55	1.55
Sulphate	9.84	9.83	10.75	10.14	0.14

Table 11 is showing the concentration of anions removed from the spiked water. Only nitrite and nitrate have been removed by the sorbent, date seeds, with 0.98mg/g sorbent, and 0.022 mg/g sorbent removal respectively. However, the rest of the anions have increased in concentration and this could be due to these leaching from the natural sorbent.

Table 12: Test with Pomegranate peels. 1g of Pomegranate peels were incubated with 100ml of water. The study was carried out in batch mode under gentle shaking (80 rpm) for 48h. The water incubated with Pomegranate peels was spiked at 10 mg/L

Anion	**Spiked concentration mg/L**	**Individual Concentration with pomegranate peels in replicate mg/L**			**Average concentration mg/L**	**Difference from spiked mg/L**
		1	**2**	**3**		
Fluoride	10	11.68	11.90	11.98	11.85	1.85
Chloride	10	19.96	20.30	20.36	20.21	10.21
Nitrite	10	8.68	8.66	8.77	8.70	-1.30
Bromide	10	9.93	10.09	10.10	10.04	0.04
Nitrate	10	10.16	10.28	10.28	10.24	0.24
Phosphate	10	15.34	15.61	15.89	15.61	5.61
Sulphate	10	11.40	11.80	12.13	11.78	1.78

Table 12 is showing the amount of anions removed from the spiked water. 100ml of deionised water has been spiked with 10mg/L of multi-anion standard and tested with 1g of Pomegranate peels. Only nitrite has been removed by pomegranate peels with 0.13 mg/g pomegranate peels. Hence, pomegranate peel is not a good sorbent for the removal of a broad range of anions.

5.0 Conclusion

A main goal of this work was to develop an analytical method for the analysis of anions in ground water. A methodology which would be used to investigate the presence of anions in the water in a specific region in Saudi Arabia, Abya Almashi village, where ground water is the main source of drinking water. A separation of the study anions was achieved with ion chromatography in 25 min with LODs in the range of 0.05-0.1 mg/L.

A monitoring study of the ions, fluoride, chloride, nitrite, bromide, nitrate, phosphate and sulphate, was carried out over six months (from January to June 2016), showed that all the anions investigated were under the maximum control limit (MCL) with some exceptional, i.e. sulphate was detected higher concentration than the MCL (250mg/L) for wells 3 and 7. Also, chloride showed higher concentration than the MCL (250mg/L) for wells 2 and 3. The range of concentrations obtained for study anions was <LOD-1.2 mg/L for fluoride, 4.1-841.6 mg/L for chloride, sulphate 5.9-979.1 mg/L and nitrate 3.4-56.4 mg/L. The higher level of chloride and sulphate, can be due to soil leaching during the rainy season, however, when the water settles in the wells, the concentration of the anions decrease. Nitrite, bromide and phosphate have not been detected in the studied water samples. TDS was also found to increase in the rainy period. When it rains the water flow fills up the wells and hence increasing the TDS, and when the water settles in the wells the TDS decreases.

A second goal was to find suitable natural products i.e. pomegranate peels, pomegranate gels and date seeds, with low commercial cost for the removal of anions

in water, which could be used in households. Pomegranate gels removed 5.9% fluoride, 51.4% nitrite, bromide 1.5% and 50.6% sulphate from ultrapure water spiked at 10 mg/L and with a waster: sorbent mass ratio of 1g:100ml. Date seeds removed 98.2% nitrite and 2.2% nitrate. Pomegranate peels removed 13.0% nitrite. These explored sorbents can be applied to reduce level of sulphate in ground water used by households, as sulphate was one of the ions found in relative high levels there. However, leaching of other substances from the waste materials such as CN^- from seeds should be analysed before proposing their use. The advantage of this method is cost-effective; however, further research is required for improving the removal of toxic ions and ensuring its safety.

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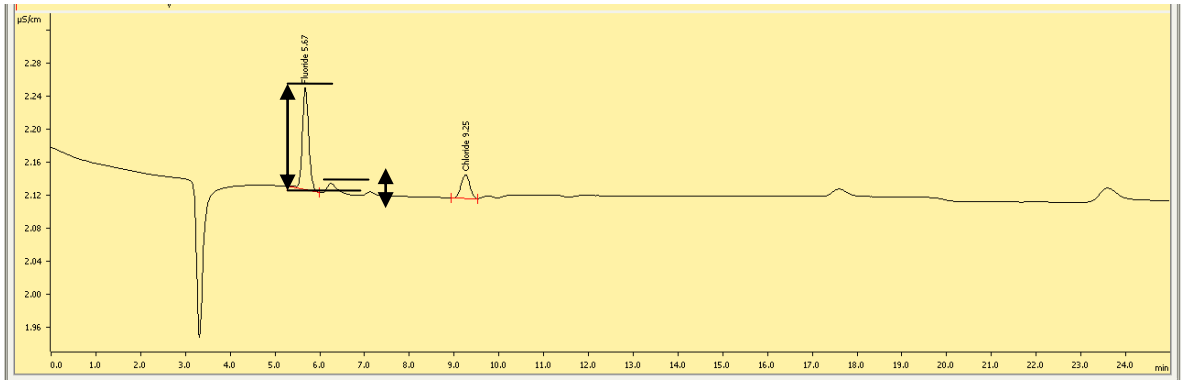
7.0 Annex:

7.1 Signal to noise ratio:

In order to check the signal-to-noise ratio, low concentrations have been injected, some of which are lower than the lowest concentration used for the calibration curves. Most of the anion standards did not show any signs of background noise, this could be due to the instrument being a “Suppressed Ion Chromatography” which means that it reduces the background noise, so only what is in the sample/standard can be seen.

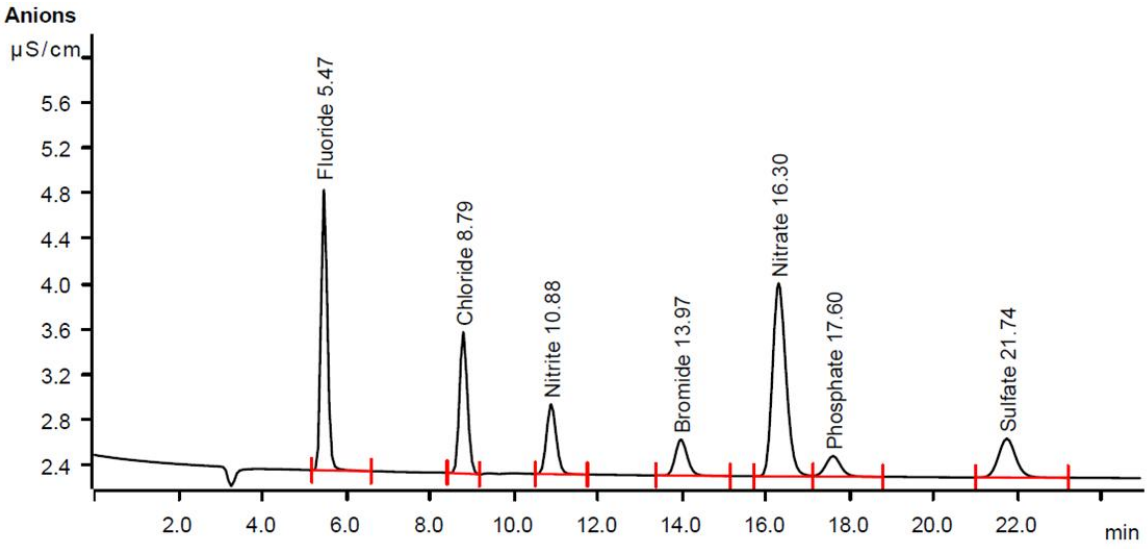
Fluoride:



This chromatogram shows a 0.05ppm fluoride, which is 10 times less than the lowest concentration (Std1 = 0.5ppm) used for the calibration curves. The signal-to-noise ratio is 1:13. There is second peak which is Chloride. Chloride is present in the salt solid which has been used to make up for this Fluoride solution.

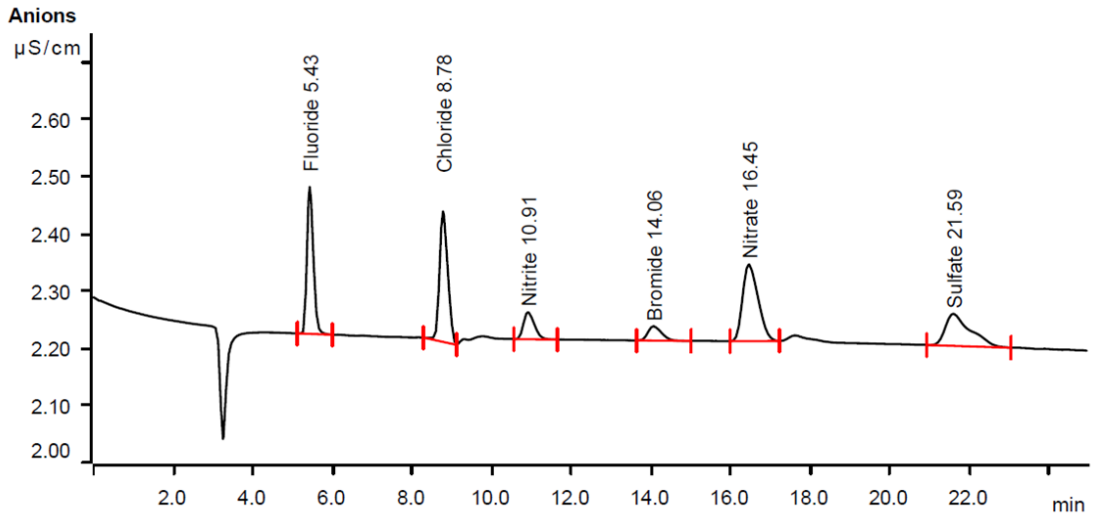
7.2 Limit of detections for the studied anions

The following chromatograms show the limit of detections for Fluoride, Chloride, Nitrite, Bromide and phosphate, all of which were detected at 0.05ppm.



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.473	0.4356	2.470	0.052	Fluoride
2	8.790	0.2718	1.246	0.053	Chloride
3	10.883	0.1649	0.615	0.053	Nitrite
4	13.973	0.1048	0.318	0.052	Bromide
5	16.302	0.6313	1.701	0.436	Nitrate
6	17.597	0.0761	0.181	0.053	Phosphate
7	21.735	0.1632	0.344	invalid	Sulfate

The following is showing the limit of detection for nitrate and sulphate which are detected at 0.1ppm



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	5.432	0.0476	0.257	0.108	Fluoride
2	8.778	0.0544	0.228	0.204	Chloride
3	10.908	0.0150	0.047	0.110	Nitrite
4	14.058	0.0099	0.025	0.098	Bromide
5	16.452	0.0604	0.134	0.113	Nitrate
6	21.585	0.0407	0.056	0.145	Sulfate

7.3 Individual chromatograms for all the samples in six months of study anions

The following pages (54-174) show the individual chromatograms of the water samples from the monitored eight wells. Triplicate water samples were taken from eight wells for over six months, this gives us (3 samples * 8 wells * 6 months), 144 chromatograms. Example on 31/01/2016 sample 1a, 1b and 1c refers to well 1 for the first month, and the rest follows. The data and their details are mentioned in the results and discussion section, summarized in tables 7-9.

MagIC Net

2016-01-31 11:48:59

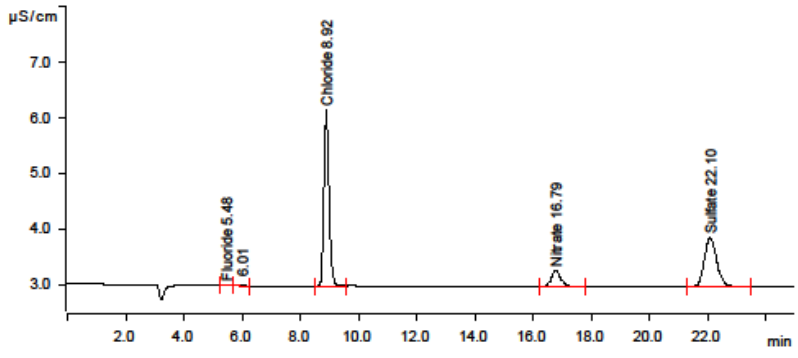
Sample data

Ident	WK7 Sample 1a
Sample type	Sample
Determination start	2016-01-21 15:06:41 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.30	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.482	0.0032	0.021	0.000	Fluoride
2	6.008	0.0057	0.029	invalid	
3	8.915	0.6345	3.157	2.425	Chloride
4	16.792	0.1011	0.286	0.216	Nitrate
5	22.098	0.4211	0.876	2.224	Sulfate

Metrohm

MagIC Net

2016-01-31 11:49:15

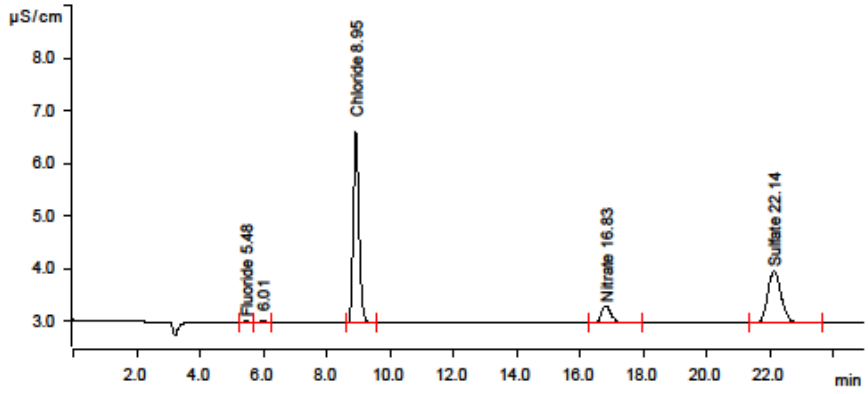
Sample data

Ident	WK7 Sample 1b
Sample type	Sample
Determination start	2016-01-21 15:35:20 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	5.478	0.0035	0.022	0.000	Fluoride
2	6.005	0.0063	0.033	invalid	
3	8.948	0.7387	3.626	2.819	Chloride
4	16.833	0.1150	0.324	0.237	Nitrate
5	22.140	0.4790	0.985	2.536	Sulfate

Metrohm

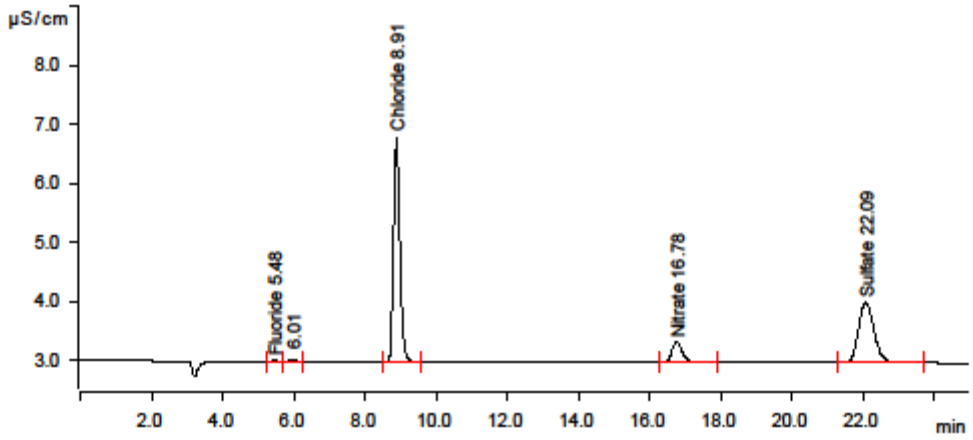
Sample data

Ident	WK7 Sample 1c
Sample type	Sample
Determination start	2016-01-21 16:04:00 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	5.478	0.0036	0.023	0.000	Fluoride
2	6.005	0.0095	0.049	invalid	
3	8.908	0.7686	3.792	2.932	Chloride
4	16.778	0.1212	0.340	0.246	Nitrate
5	22.087	0.5065	1.026	2.684	Sulfate

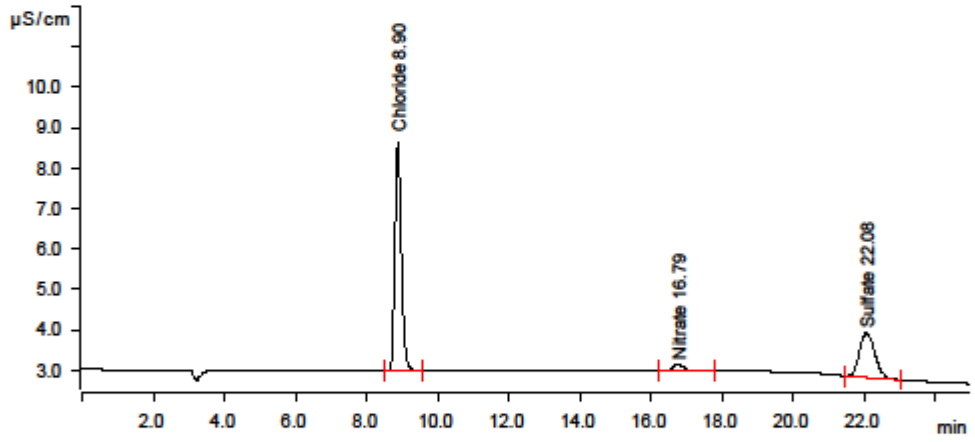
Sample data

Ident	WK7 Sample 2a
Sample type	Sample
Determination start	2016-01-21 16:32:41 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.903	1.1646	5.662	4.440	Chloride
2	16.785	0.0665	0.185	0.164	Nitrate
3	22.080	0.5413	1.111	2.872	Sulfate

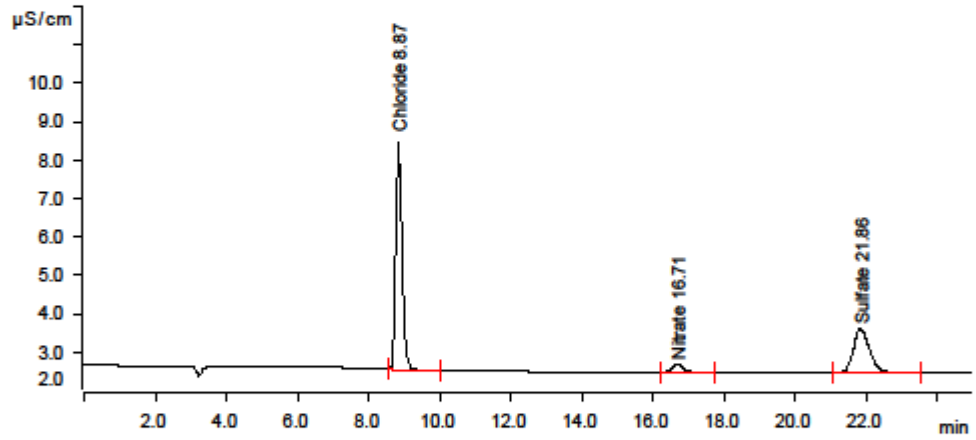
Sample data

Ident	WK7 Sample 2b
Sample type	Sample
Determination start	2016-01-21 17:01:21 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.868	1.2056	5.891	4.597	Chloride
2	16.707	0.0684	0.191	0.166	Nitrate
3	21.860	0.5692	1.139	3.023	Sulfate

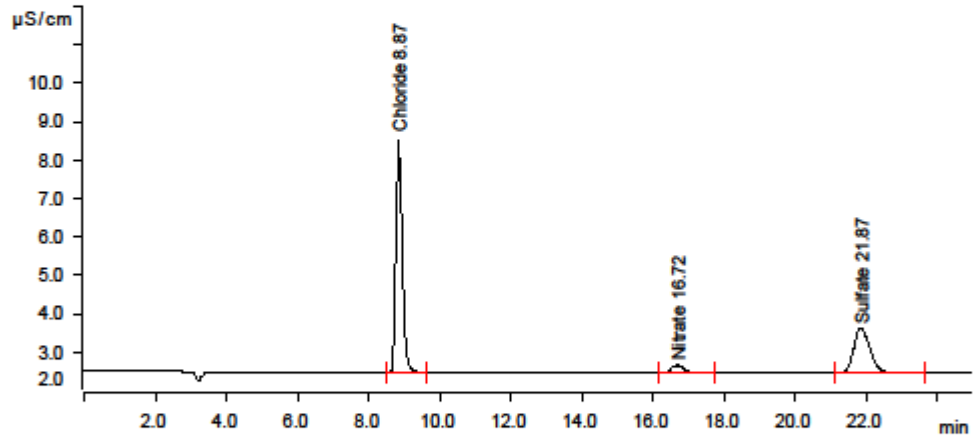
Sample data

Ident	WK7 Sample 2c
Sample type	Sample
Determination start	2016-01-21 17:30:03 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.873	1.2368	6.010	4.716	Chloride
2	16.718	0.0723	0.200	0.172	Nitrate
3	21.867	0.5859	1.160	3.113	Sulfate

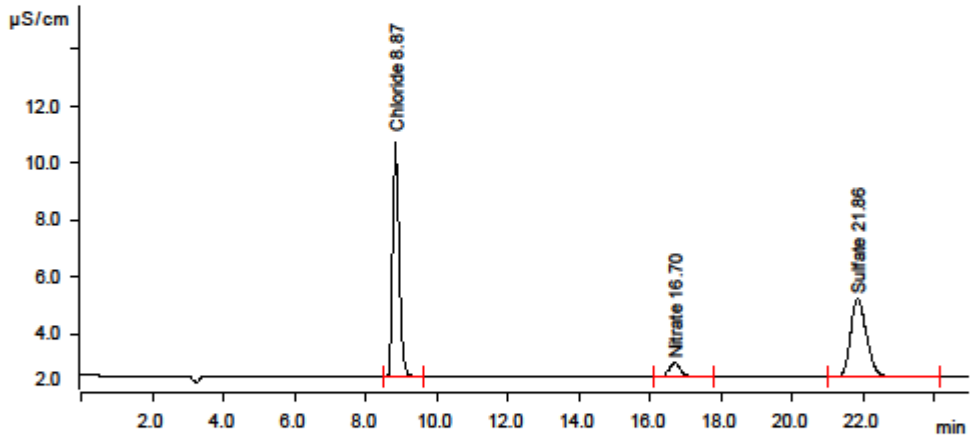
Sample data

Ident	WK7 Sample 3a
Sample type	Sample
Determination start	2016-01-21 17:58:45 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.867	1.7256	8.238	6.600	Chloride
2	16.702	0.1763	0.488	0.329	Nitrate
3	21.858	1.4095	2.765	7.628	Sulfate

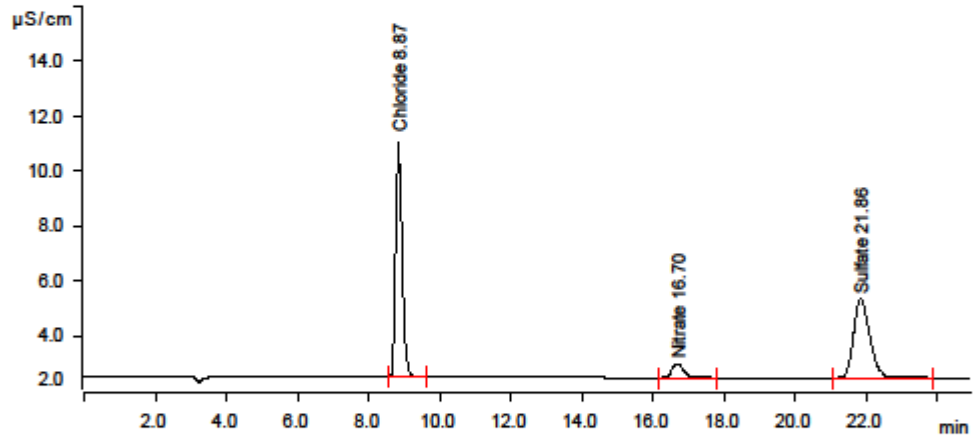
Sample data

Ident	WK7 Sample 3b
Sample type	Sample
Determination start	2016-01-21 18:27:28 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.867	1.7970	8.570	6.877	Chloride
2	16.703	0.1838	0.507	0.341	Nitrate
3	21.857	1.4637	2.858	7.929	Sulfate

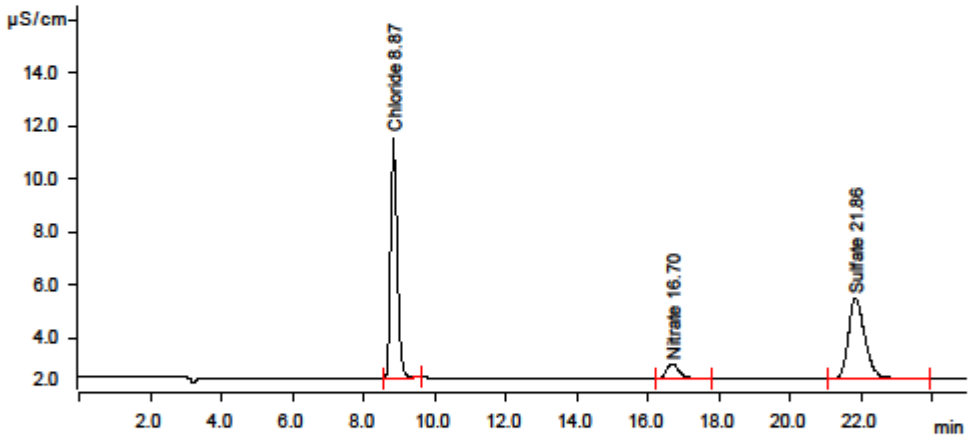
Sample data

Ident	WK7 Sample 3c	
Sample type	Sample	
Determination start	2016-01-21 18:56:11 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.867	1.9182	9.061	7.348	Chloride
2	16.703	0.1957	0.536	0.359	Nitrate
3	21.855	1.5611	3.011	8.473	Sulfate

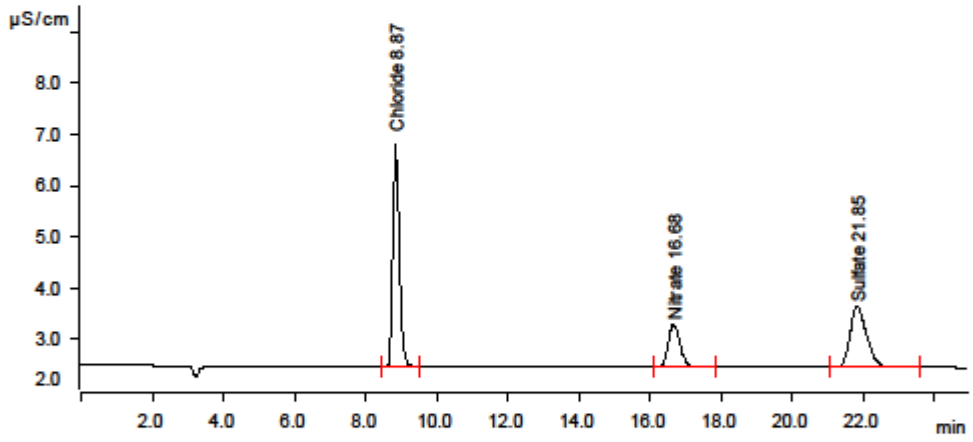
Sample data

Ident	WK7 Sample 4a
Sample type	Sample
Determination start	2016-01-21 19:24:56 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.873	0.9101	4.337	3.470	Chloride
2	16.683	0.3084	0.838	0.529	Nitrate
3	21.845	0.6206	1.177	3.301	Sulfate

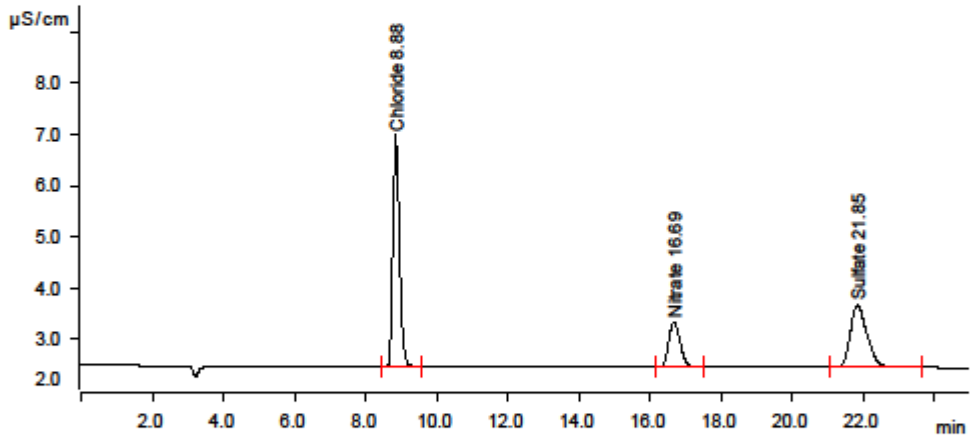
Sample data

Ident	WK7 Sample 4b	
Sample type	Sample	
Determination start	2016-01-21 19:53:41 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.877	0.9567	4.539	3.647	Chloride
2	16.690	0.3220	0.875	0.549	Nitrate
3	21.852	0.6501	1.220	3.461	Sulfate

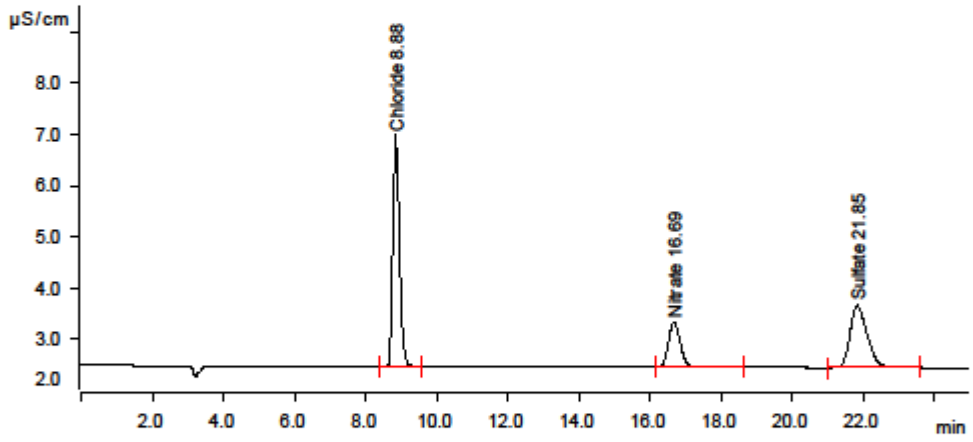
Sample data

Ident	WK7 Sample 4c
Sample type	Sample
Determination start	2016-01-21 20:22:25 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.875	0.9653	4.542	3.679	Chloride
2	16.688	0.3317	0.882	0.564	Nitrate
3	21.845	0.6560	1.214	3.493	Sulfate

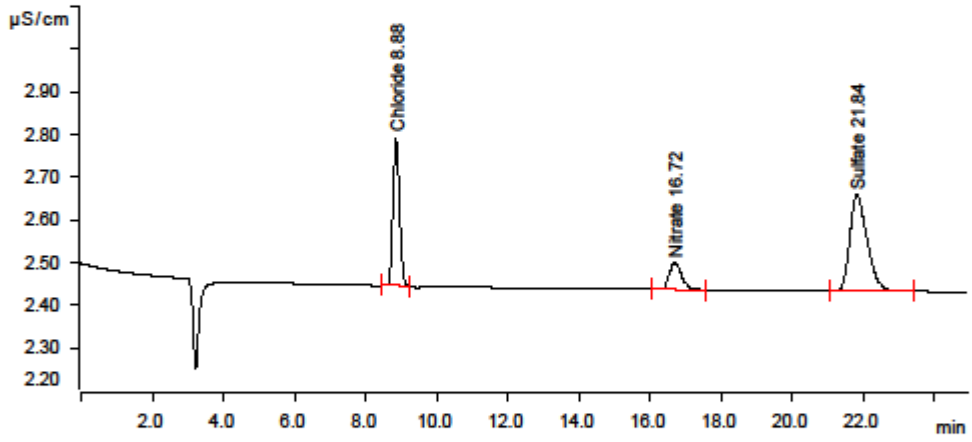
Sample data

Ident	WK7 Sample 5a
Sample type	Sample
Determination start	2016-01-21 20:51:09 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.882	0.0716	0.345	0.312	Chloride
2	16.717	0.0246	0.065	0.100	Nitrate
3	21.838	0.1242	0.225	0.636	Sulfate

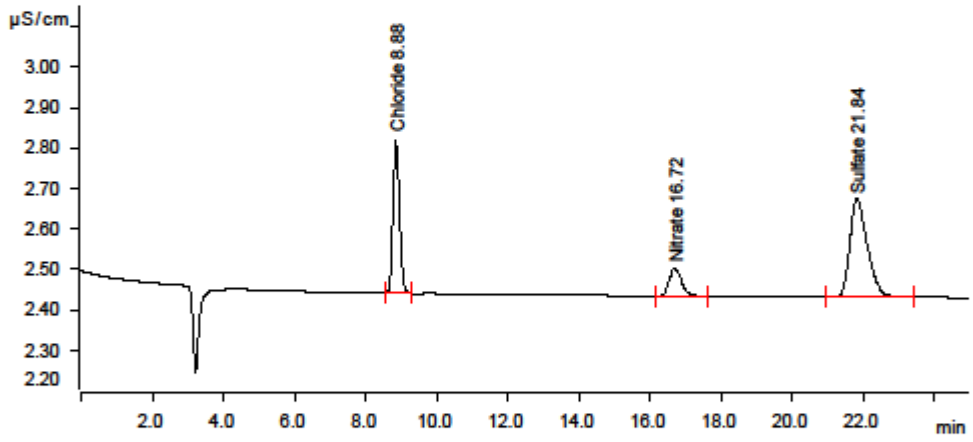
Sample data

Ident	WK7 Sample 5b	
Sample type	Sample	
Determination start	2016-01-21 21:19:52 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.882	0.0782	0.375	0.336	Chloride
2	16.720	0.0268	0.070	0.104	Nitrate
3	21.838	0.1341	0.241	0.688	Sulfate

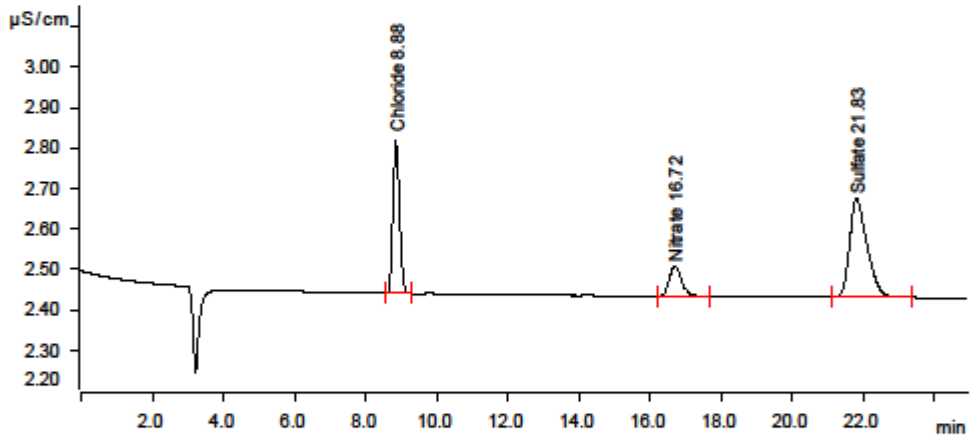
Sample data

Ident	WK7 Sample 5c
Sample type	Sample
Determination start	2016-01-21 21:48:34 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.880	0.0796	0.379	0.341	Chloride
2	16.715	0.0283	0.073	0.106	Nitrate
3	21.830	0.1359	0.243	0.698	Sulfate

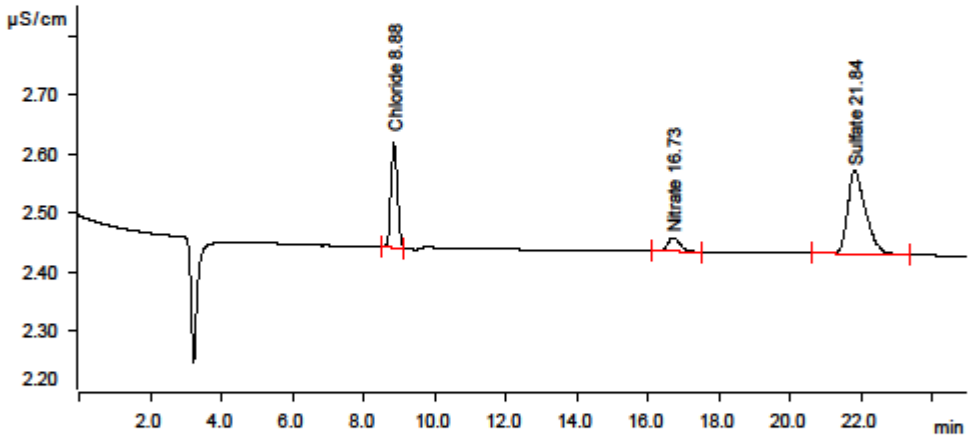
Sample data

Ident	WK7 Sample 6a
Sample type	Sample
Determination start	2016-01-21 22:17:16 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.882	0.0374	0.178	0.184	Chloride
2	16.730	0.0091	0.023	0.077	Nitrate
3	21.835	0.0794	0.140	0.397	Sulfate

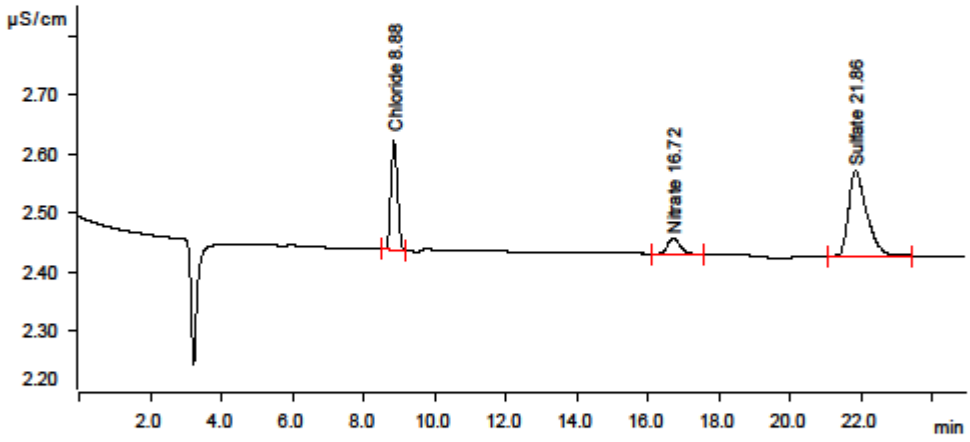
Sample data

Ident	WK7 Sample 6b
Sample type	Sample
Determination start	2016-01-21 22:45:57 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.880	0.0395	0.187	0.192	Chloride
2	16.720	0.0102	0.026	0.079	Nitrate
3	21.857	0.0829	0.144	0.416	Sulfate

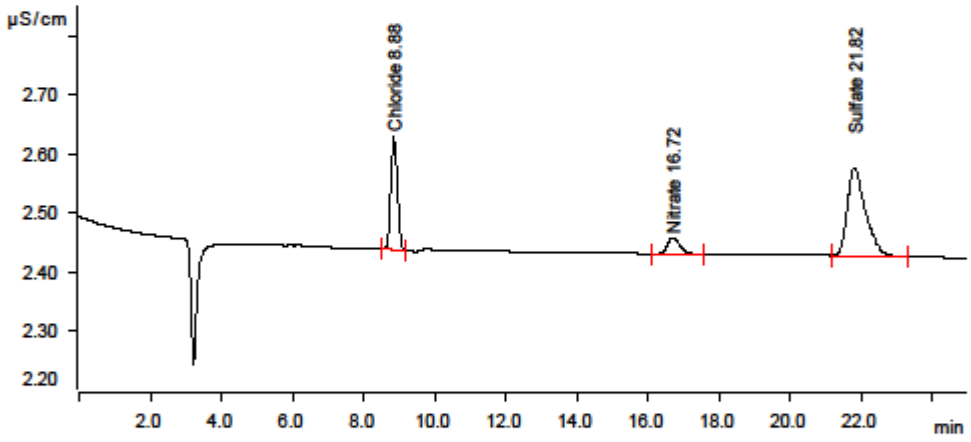
Sample data

Ident	WK7 Sample 6c
Sample type	Sample
Determination start	2016-01-21 23:14:37 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.877	0.0411	0.192	0.198	Chloride
2	16.715	0.0105	0.027	0.079	Nitrate
3	21.823	0.0858	0.149	0.431	Sulfate

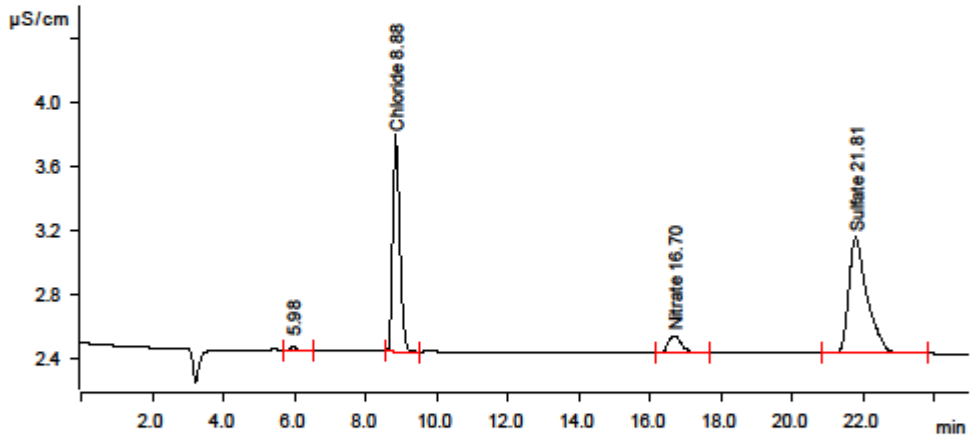
Sample data

Ident	WK7 New Sample a
Sample type	Sample
Determination start	2016-01-22 01:09:10 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.982	0.0055	0.024	invalid	
2	8.875	0.3059	1.352	1.188	Chloride
3	16.702	0.0431	0.107	0.128	Nitrate
4	21.807	0.4248	0.725	2.244	Sulfate

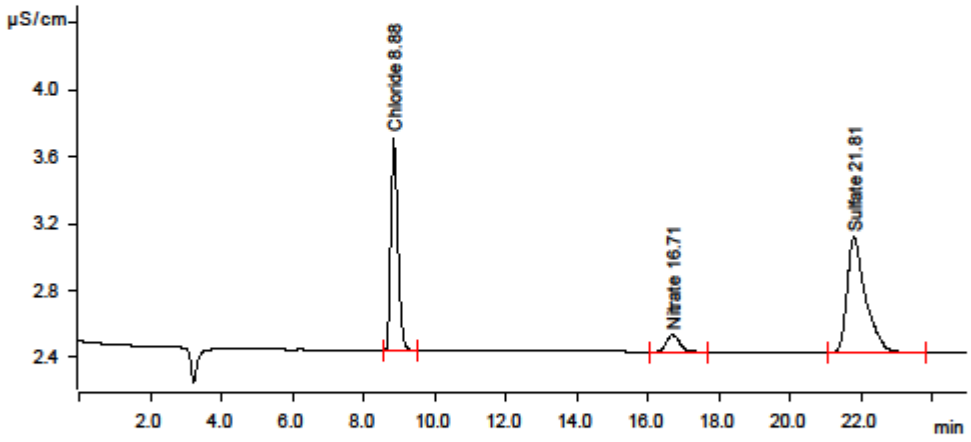
Sample data

Ident	WK7 New Sample b
Sample type	Sample
Determination start	2016-01-22 01:37:47 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.64	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.878	0.2876	1.269	1.119	Chloride
2	16.705	0.0412	0.101	0.125	Nitrate
3	21.813	0.4060	0.690	2.143	Sulfate

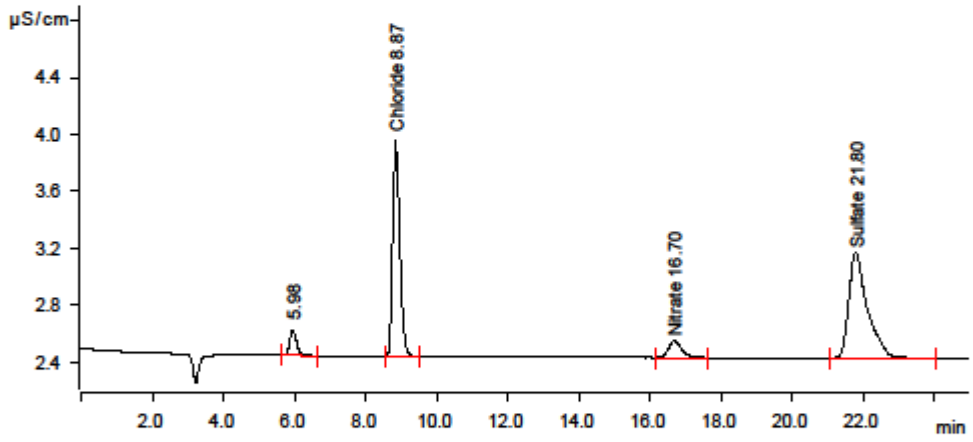
Sample data

Ident	WK7 New Sample c
Sample type	Sample
Determination start	2016-01-22 02:06:22 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.980	0.0397	0.178	invalid	
2	8.873	0.3479	1.520	1.346	Chloride
3	16.698	0.0471	0.115	0.134	Nitrate
4	21.803	0.4388	0.739	2.319	Sulfate

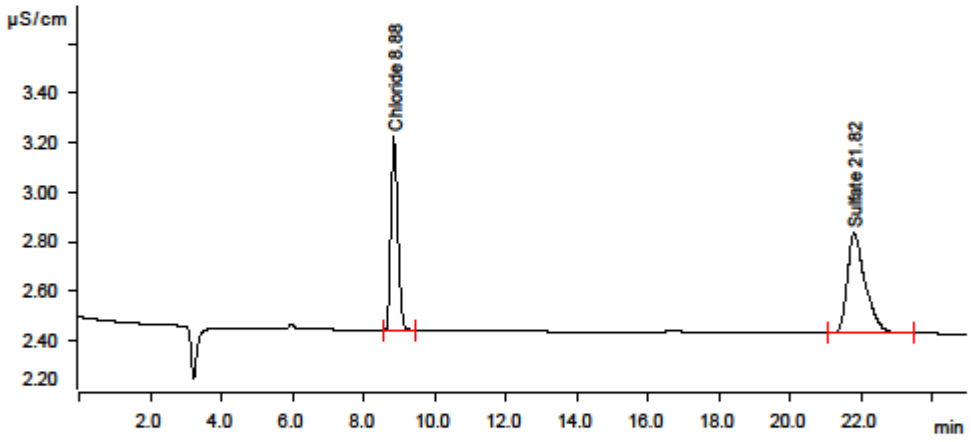
Sample data

Ident	WK7 Sample 8a
Sample type	Sample
Determination start	2016-01-21 23:43:16 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.64	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.880	0.1737	0.782	0.693	Chloride
2	21.822	0.2321	0.402	1.211	Sulfate

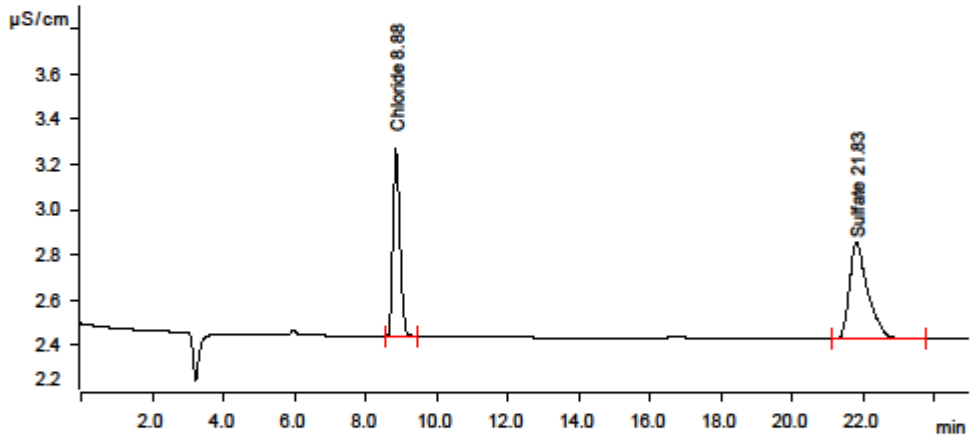
Sample data

Ident	WK7 Sample 8b
Sample type	Sample
Determination start	2016-01-22 00:11:55 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.882	0.1856	0.832	0.737	Chloride
2	21.825	0.2473	0.425	1.293	Sulfate

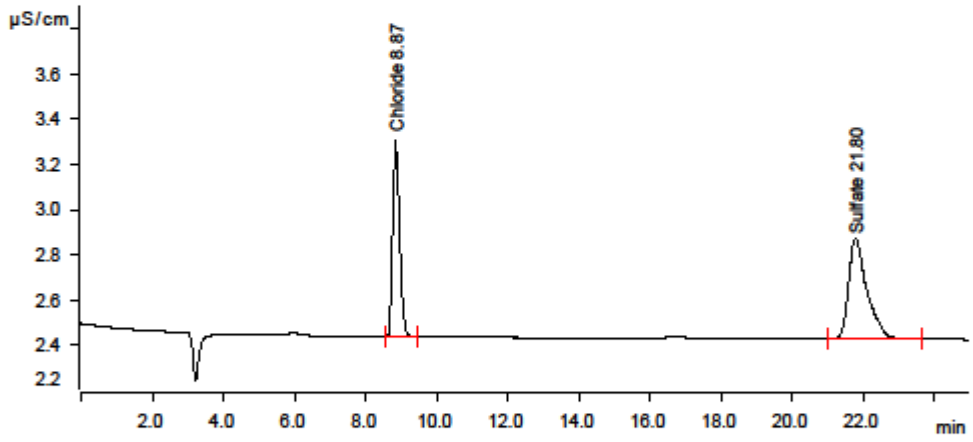
Sample data

Ident	WK7 Sample 8c
Sample type	Sample
Determination start	2016-01-22 00:40:33 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.873	0.1941	0.867	0.769	Chloride
2	21.802	0.2594	0.445	1.357	Sulfate

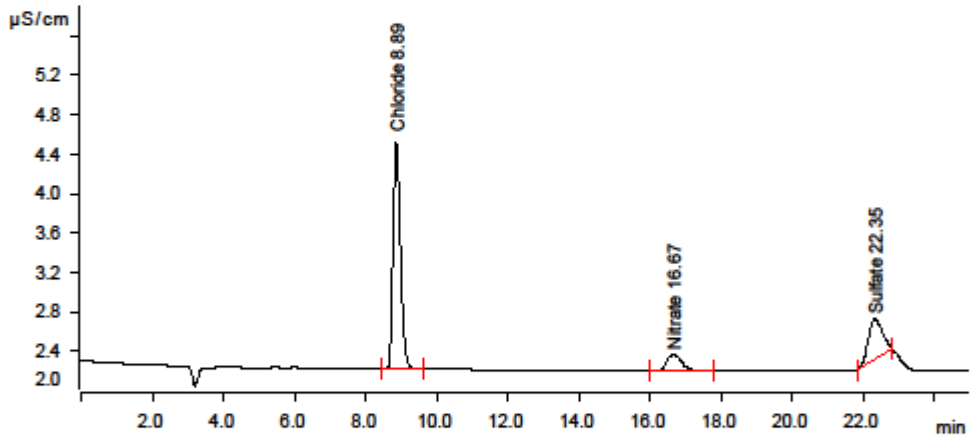
Sample data

Ident	WK8 sample 1a
Sample type	Sample
Determination start	2016-02-22 12:34:54 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.887	0.5454	2.307	2.137	Chloride
2	16.673	0.0725	0.166	0.132	Nitrate
3	22.352	0.1873	0.408	0.971	Sulfate

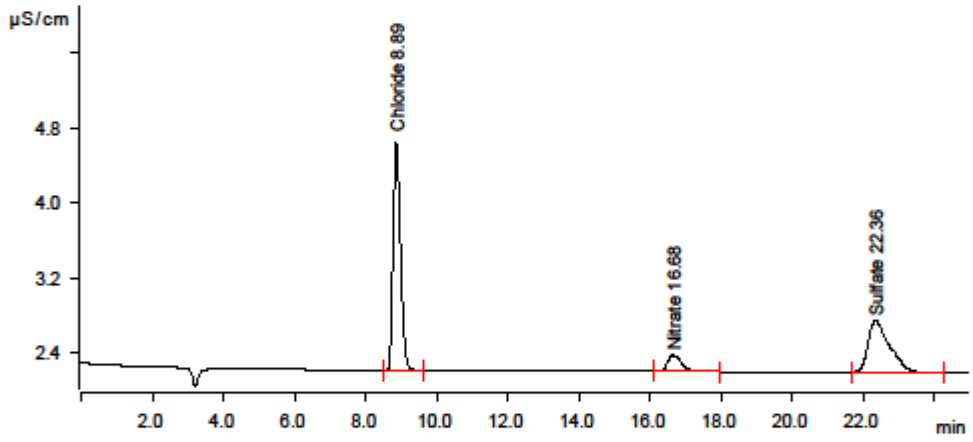
Sample data

Ident	WK8 sample 1b
Sample type	Sample
Determination start	2016-02-22 13:03:29 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.888	0.5770	2.436	2.260	Chloride
2	16.680	0.0763	0.174	0.138	Nitrate
3	22.362	0.3791	0.556	2.041	Sulfate

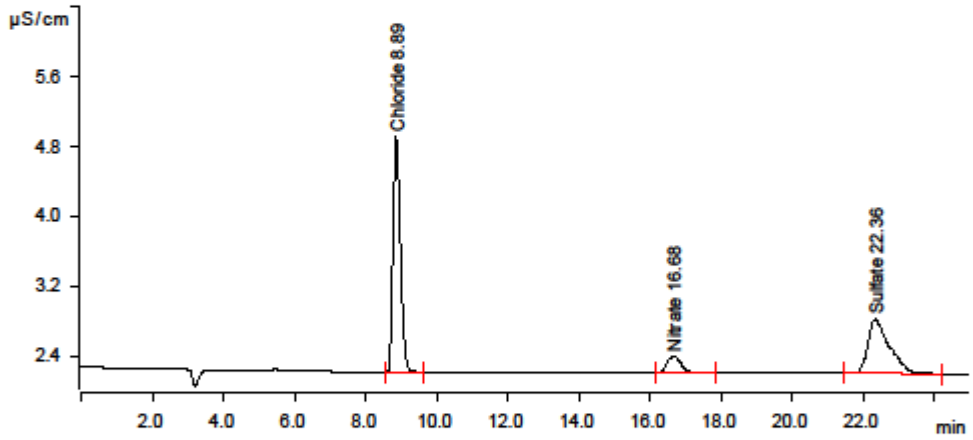
Sample data

Ident	WK8 sample 1c
Sample type	Sample
Determination start	2016-02-22 13:32:03 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.887	0.6426	2.695	2.514	Chloride
2	16.675	0.0845	0.193	0.151	Nitrate
3	22.358	0.4218	0.620	2.278	Sulfate

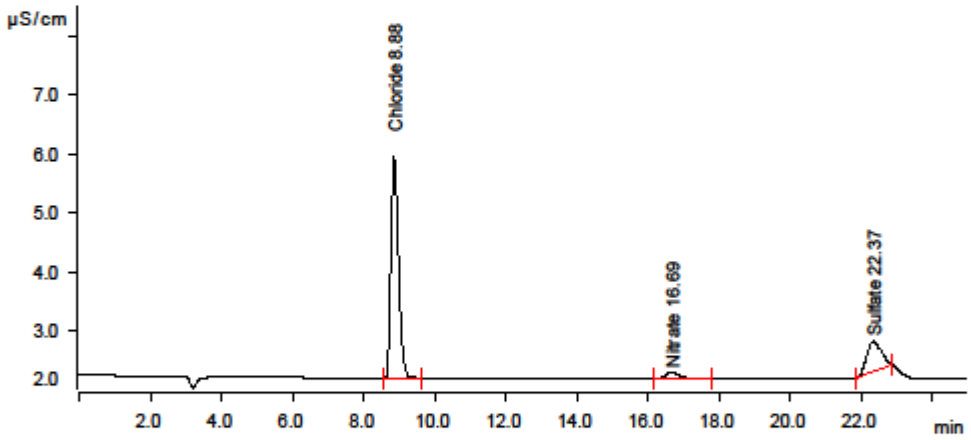
Sample data

Ident	WK8 sample 2a
Sample type	Sample
Determination start	2016-02-22 14:00:38 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.883	0.9054	3.750	3.529	Chloride
2	16.685	0.0470	0.107	0.091	Nitrate
3	22.365	0.2425	0.512	1.280	Sulfate

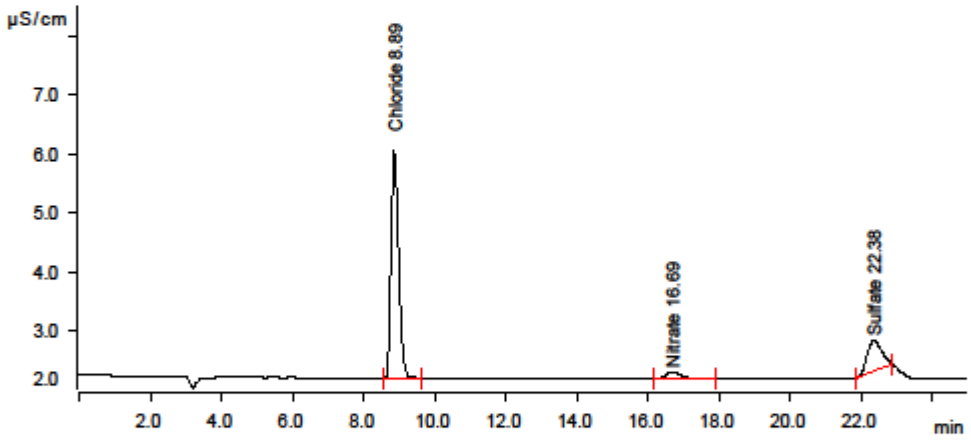
Sample data

Ident	WK8 sample 2b
Sample type	Sample
Determination start	2016-02-22 14:29:14 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.887	0.9360	3.840	3.646	Chloride
2	16.693	0.0483	0.109	0.093	Nitrate
3	22.375	0.2482	0.528	1.312	Sulfate

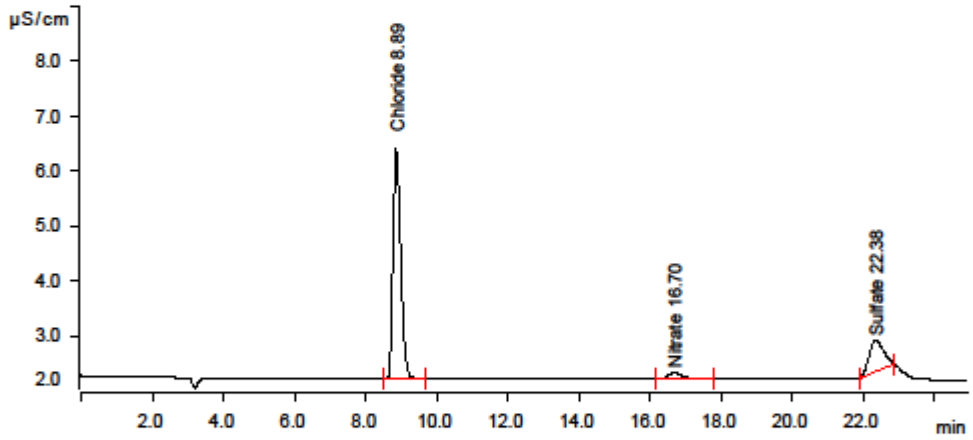
Sample data

Ident	WK8 sample 2c
Sample type	Sample
Determination start	2016-02-22 14:57:50 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.887	1.0312	4.177	4.011	Chloride
2	16.695	0.0535	0.120	0.101	Nitrate
3	22.380	0.2686	0.575	1.426	Sulfate

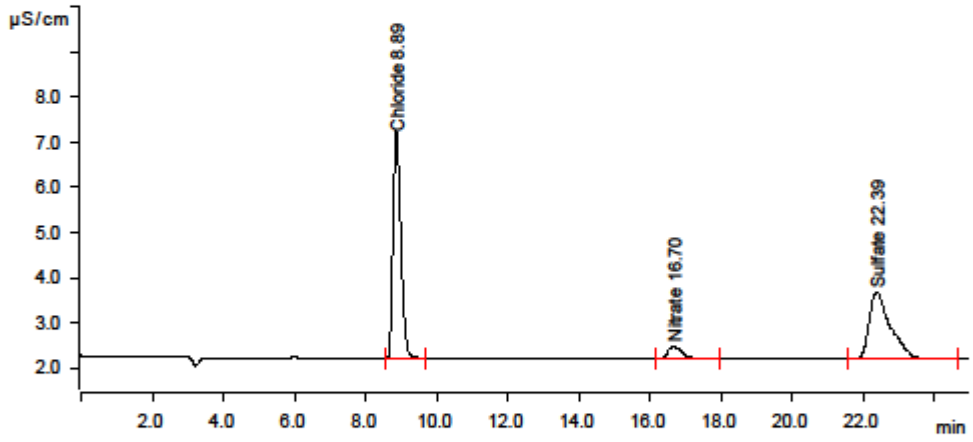
Sample data

Ident	WK8 sample 3a	
Sample type	Sample	
Determination start	2016-02-22 15:26:27 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.888	1.2566	5.047	4.868	Chloride
2	16.695	0.1174	0.262	0.204	Nitrate
3	22.390	1.0085	1.484	5.478	Sulfate

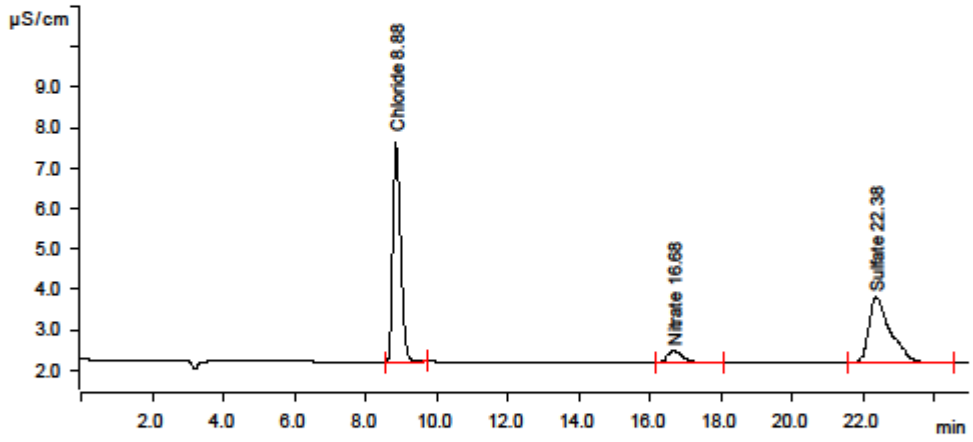
Sample data

Ident	WK8 sample 3b
Sample type	Sample
Determination start	2016-02-22 15:55:05 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.882	1.3613	5.411	5.264	Chloride
2	16.682	0.1276	0.282	0.220	Nitrate
3	22.383	1.0920	1.604	5.926	Sulfate

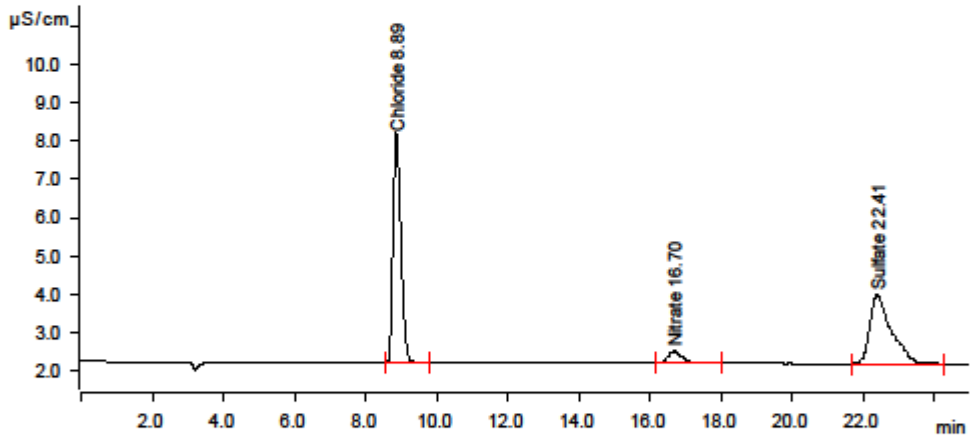
Sample data

Ident	WK8 sample 3c	
Sample type	Sample	
Determination start	2016-02-22 16:23:43 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.888	1.5222	5.984	5.869	Chloride
2	16.695	0.1424	0.314	0.243	Nitrate
3	22.408	1.2182	1.789	6.600	Sulfate

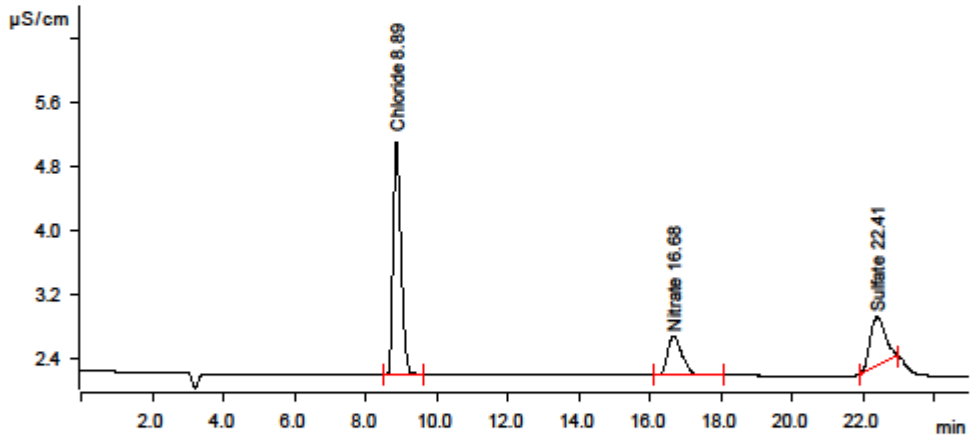
Sample data

Ident	WK8 sample 4a
Sample type	Sample
Determination start	2016-02-22 16:52:22 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.890	0.7271	2.907	2.842	Chloride
2	16.677	0.2236	0.491	0.373	Nitrate
3	22.405	0.2987	0.618	1.594	Sulfate

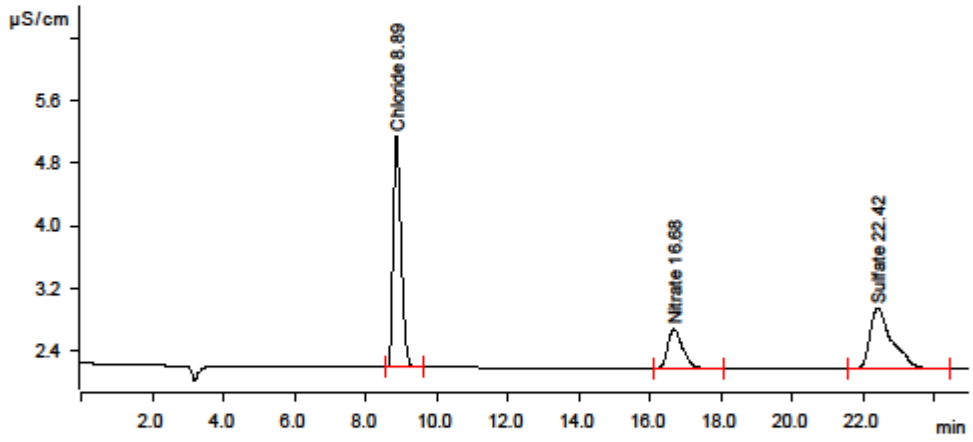
Sample data

Ident	WK8 sample 4b
Sample type	Sample
Determination start	2016-02-22 17:21:02 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.59	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.892	0.7447	2.955	2.910	Chloride
2	16.683	0.2286	0.499	0.381	Nitrate
3	22.417	0.5353	0.775	2.905	Sulfate

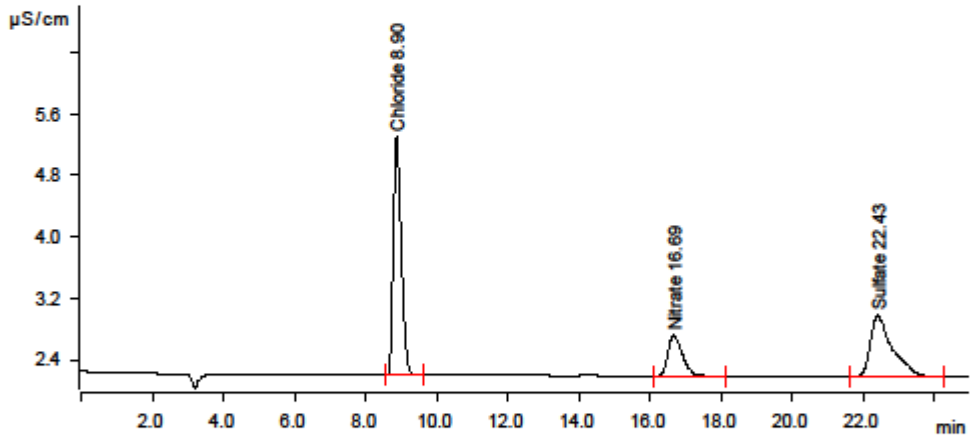
Sample data

Ident	WK8 sample 4c
Sample type	Sample
Determination start	2016-02-22 17:49:43 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.895	0.7897	3.096	3.084	Chloride
2	16.687	0.2425	0.525	0.403	Nitrate
3	22.428	0.5505	0.795	2.988	Sulfate

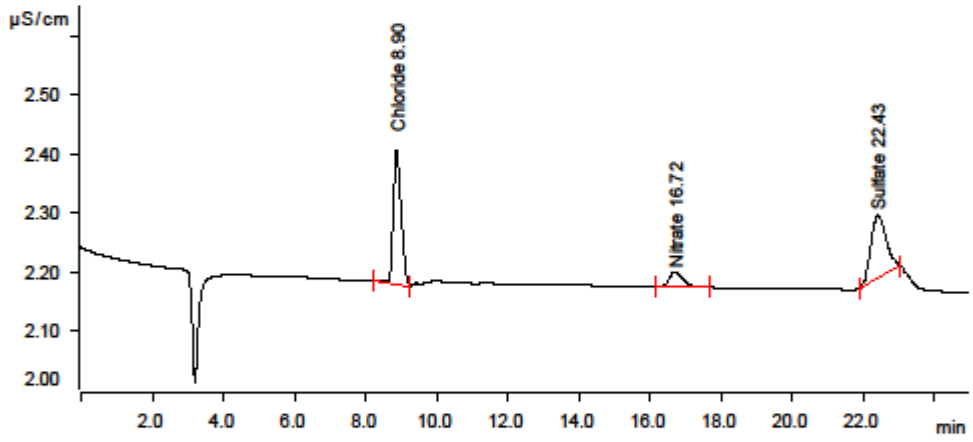
Sample data

Ident	WK8 sample 5a	
Sample type	Sample	
Determination start	2016-02-22 18:18:24 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.898	0.0572	0.227	0.215	Chloride
2	16.722	0.0115	0.024	0.035	Nitrate
3	22.430	0.0529	0.108	0.214	Sulfate

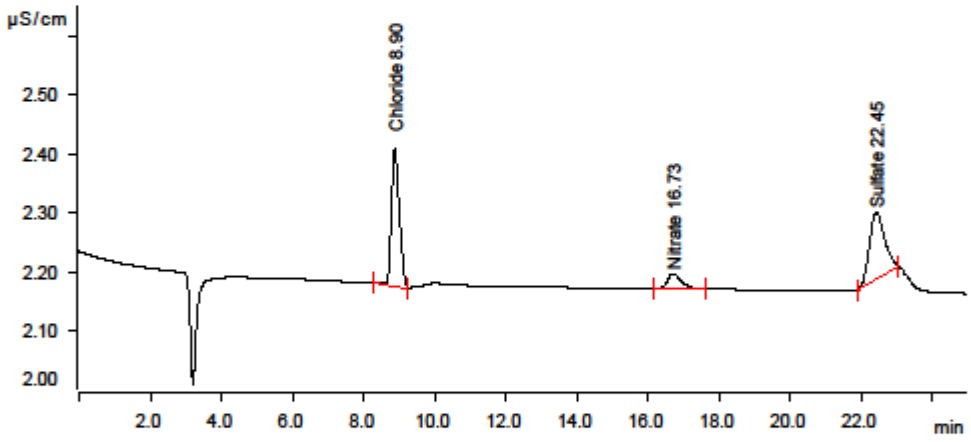
Sample data

Ident	WK8 sample 5b
Sample type	Sample
Determination start	2016-02-22 18:47:06 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.902	0.0590	0.233	0.222	Chloride
2	16.725	0.0119	0.025	0.035	Nitrate
3	22.447	0.0553	0.112	0.227	Sulfate

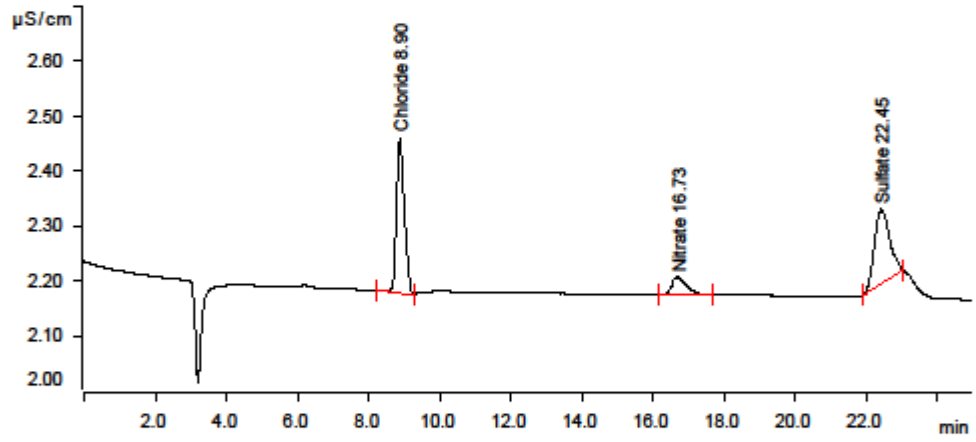
Sample data

Ident	WK8 sample 5c
Sample type	Sample
Determination start	2016-02-22 19:15:49 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.902	0.0714	0.281	0.271	Chloride
2	16.725	0.0150	0.032	0.040	Nitrate
3	22.447	0.0669	0.136	0.293	Sulfate

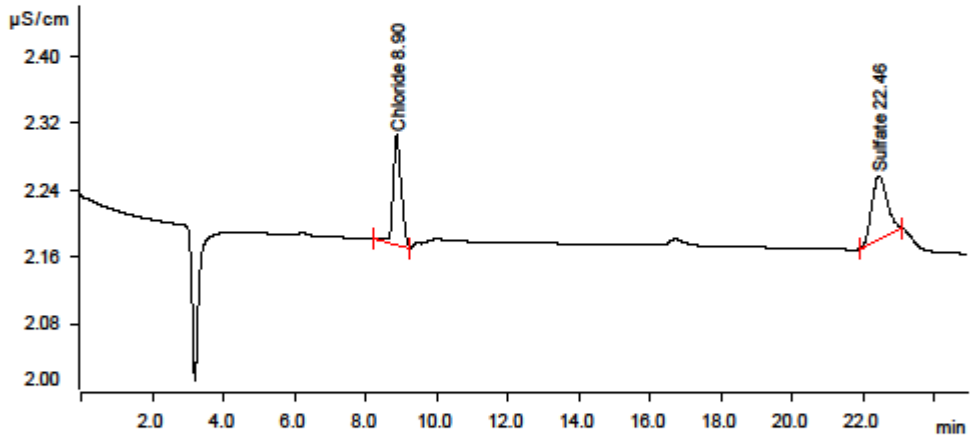
Sample data

Ident	WK8 sample 6a
Sample type	Sample
Determination start	2016-02-22 19:44:32 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.898	0.0339	0.131	0.122	Chloride
2	22.458	0.0381	0.077	0.130	Sulfate

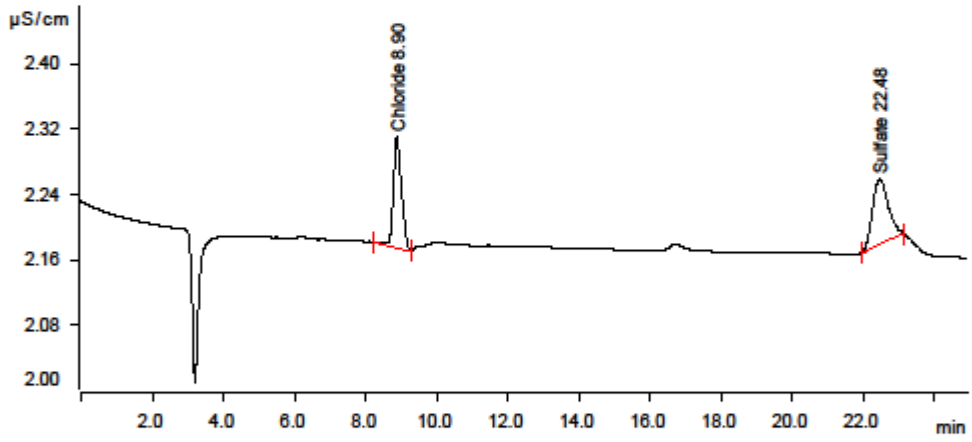
Sample data

Ident	WK8 sample 6b	
Sample type	Sample	
Determination start	2016-02-22 20:13:16 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.903	0.0352	0.136	0.127	Chloride
2	22.483	0.0408	0.081	0.145	Sulfate

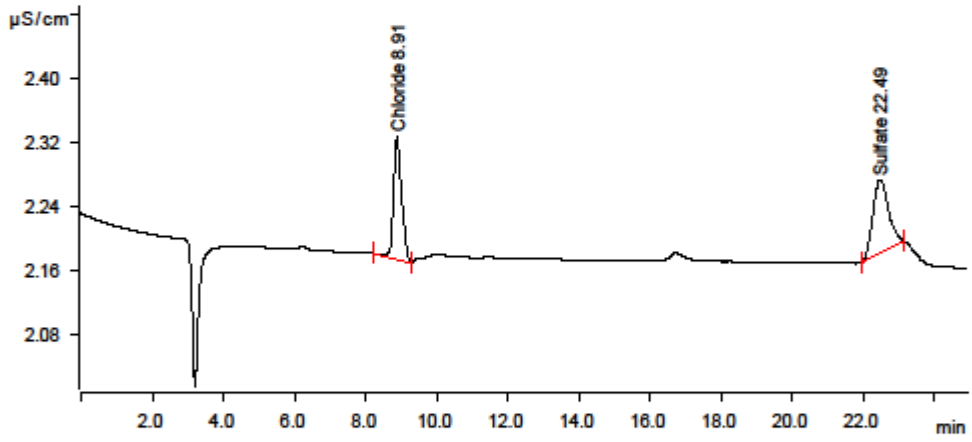
Sample data

Ident	WK8 sample 6c
Sample type	Sample
Determination start	2016-02-22 20:42:01 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.907	0.0397	0.152	0.145	Chloride
2	22.488	0.0463	0.092	0.176	Sulfate

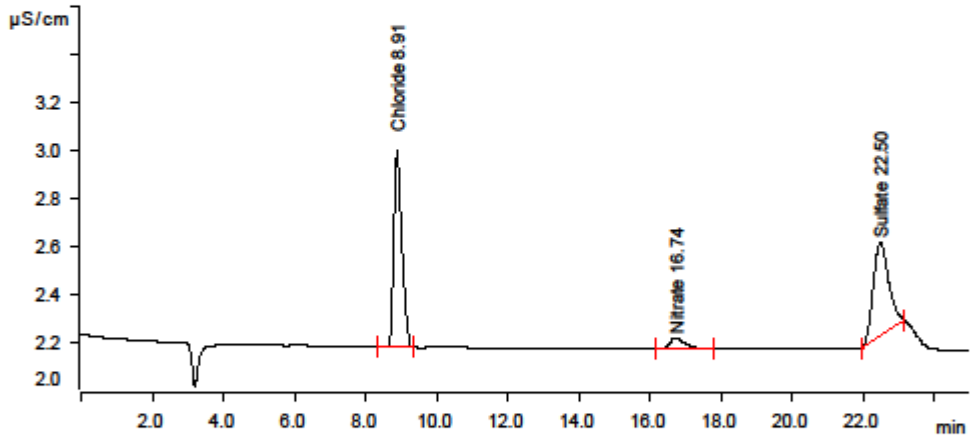
Sample data

Ident	WK8 sample 7a
Sample type	Sample
Determination start	2016-02-22 21:10:47 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.908	0.2110	0.821	0.825	Chloride
2	16.740	0.0209	0.044	0.050	Nitrate
3	22.495	0.1936	0.389	1.006	Sulfate

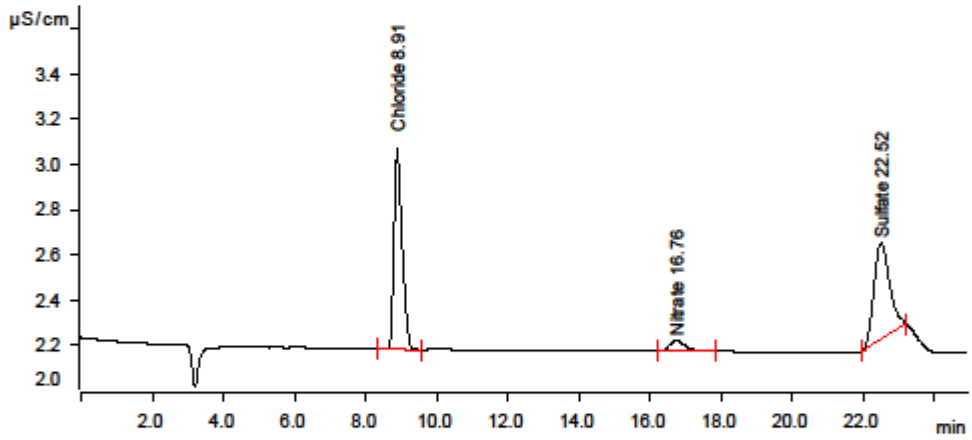
Sample data

Ident	WK8 sample 7b
Sample type	Sample
Determination start	2016-02-22 21:39:32 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.913	0.2301	0.889	0.900	Chloride
2	16.755	0.0232	0.048	0.053	Nitrate
3	22.518	0.2134	0.427	1.117	Sulfate

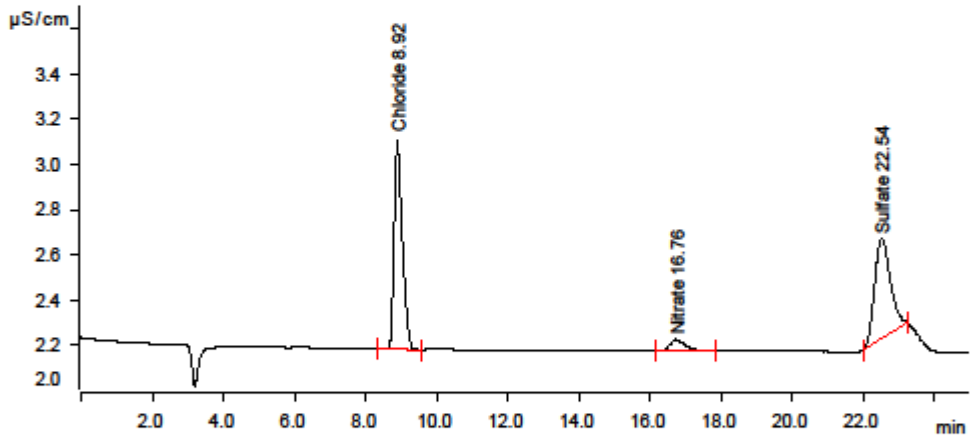
Sample data

Ident	WK8 sample 7c
Sample type	Sample
Determination start	2016-02-22 22:08:16 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.42	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.917	0.2407	0.924	0.942	Chloride
2	16.758	0.0245	0.051	0.055	Nitrate
3	22.537	0.2255	0.448	1.184	Sulfate

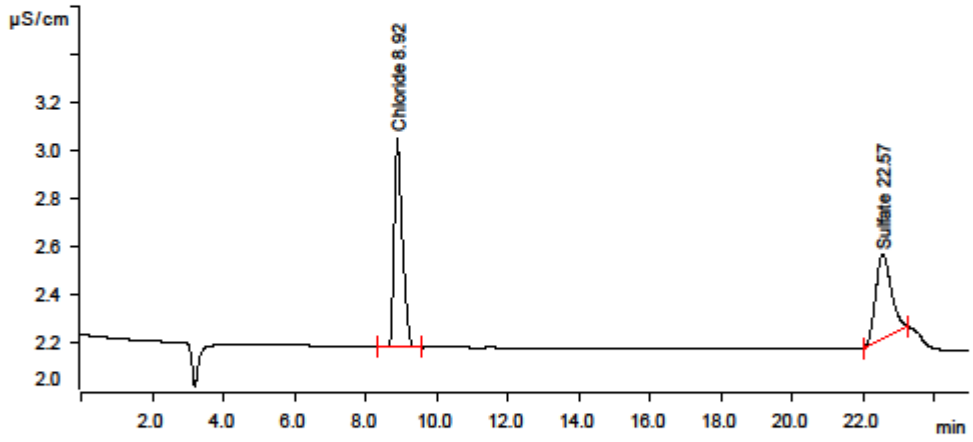
Sample data

Ident	WK8 sample 8a	
Sample type	Sample	
Determination start	2016-02-22 22:37:00 UTC+3	
Method	Multi Anion STDs	
Operator		

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.47	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.918	0.2261	0.868	0.884	Chloride
2	22.565	0.1777	0.351	0.917	Sulfate

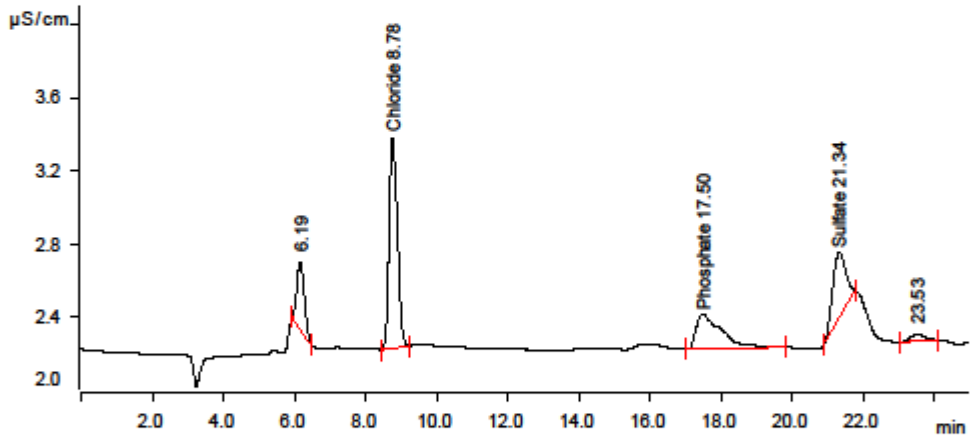
Sample data

Ident	WK8 sample 8b
Sample type	Sample
Determination start	2016-02-23 10:27:22 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.53	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	6.187	0.0859	0.361	invalid	
2	8.780	0.3046	1.152	1.194	Chloride
3	17.497	0.1556	0.191	2.028	Phosphate
4	21.340	0.1509	0.358	0.766	Sulfate
5	23.530	0.0172	0.035	invalid	

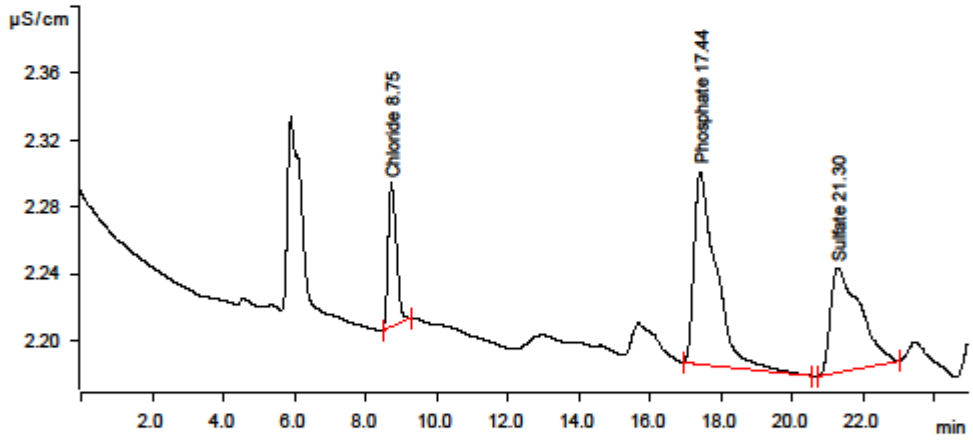
Sample data

Ident	WK8 sample 8c
Sample type	Sample
Determination start	2016-02-23 10:56:06 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.70	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.752	0.0231	0.087	0.079	Chloride
2	17.435	0.0831	0.115	1.082	Phosphate
3	21.303	0.0606	0.063	0.257	Sulfate

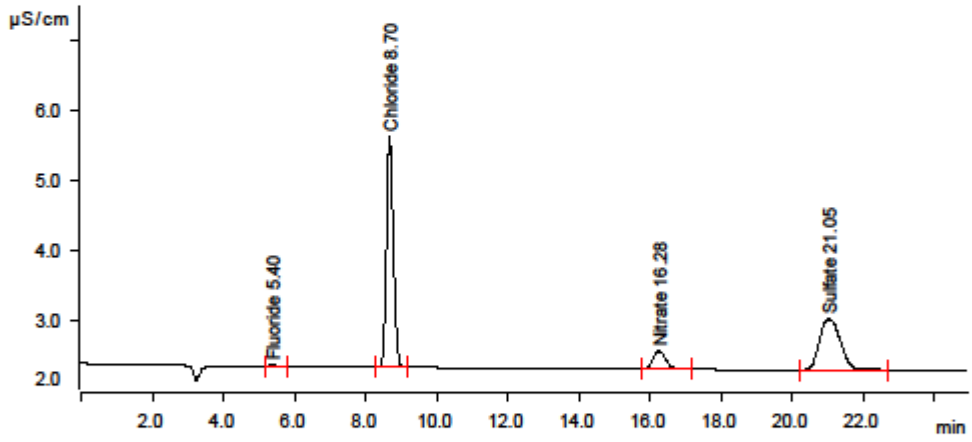
Sample data

Ident	wk9 sample 1a
Sample type	Sample
Determination start	2016-03-28 11:35:47 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	5.398	0.0036	0.021	0.003	Fluoride
2	8.702	0.7135	3.314	2.789	Chloride
3	16.277	0.1010	0.257	0.177	Nitrate
4	21.052	0.4817	0.727	2.609	Sulfate

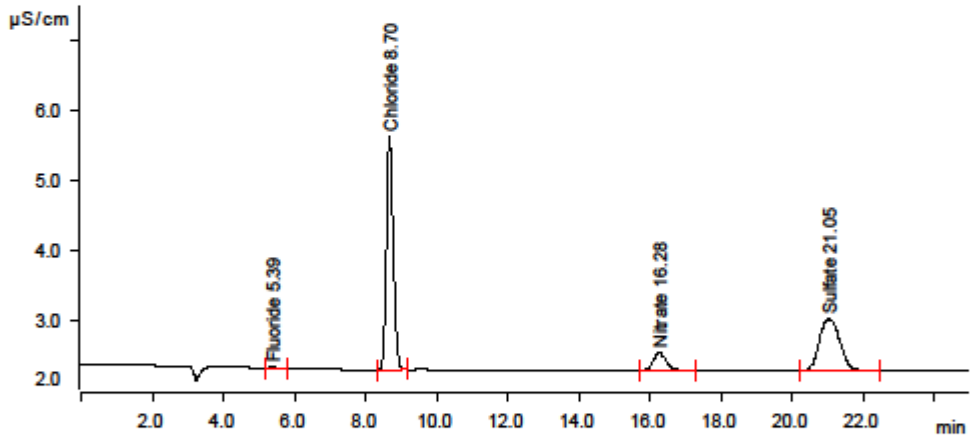
Sample data

Ident	wk9 sample 1b
Sample type	Sample
Determination start	2016-03-28 12:04:20 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	5.393	0.0035	0.021	0.002	Fluoride
2	8.698	0.7150	3.349	2.795	Chloride
3	16.275	0.0998	0.255	0.175	Nitrate
4	21.045	0.4812	0.735	2.606	Sulfate

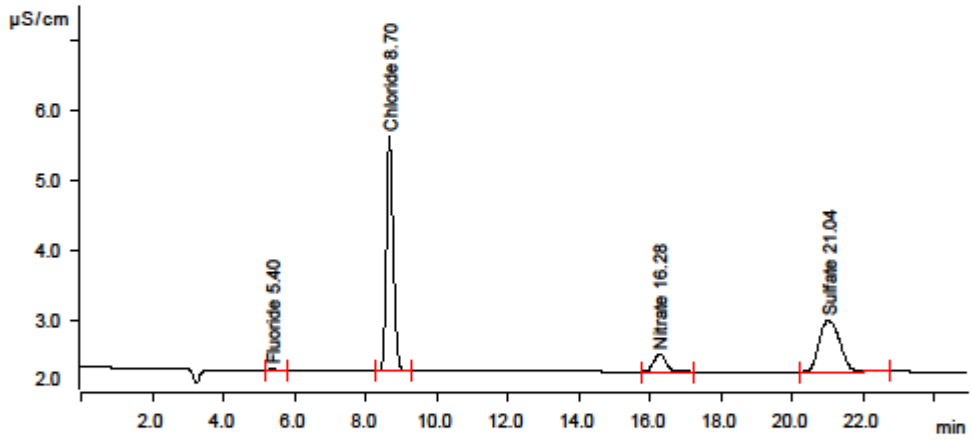
Sample data

Ident	wk9 sample 1c
Sample type	Sample
Determination start	2016-03-28 12:32:54 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	5.395	0.0036	0.021	0.003	Fluoride
2	8.698	0.7177	3.355	2.806	Chloride
3	16.275	0.0986	0.253	0.173	Nitrate
4	21.042	0.4821	0.735	2.611	Sulfate

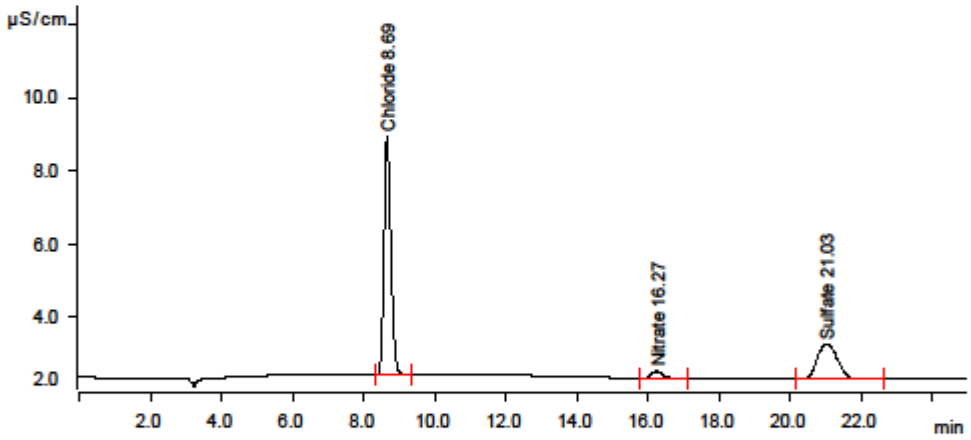
Sample data

Ident	wk9 sample 2a
Sample type	Sample
Determination start	2016-03-28 13:01:29 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.687	1.4125	6.508	5.457	Chloride
2	16.270	0.0738	0.192	0.134	Nitrate
3	21.033	0.6257	0.960	3.401	Sulfate

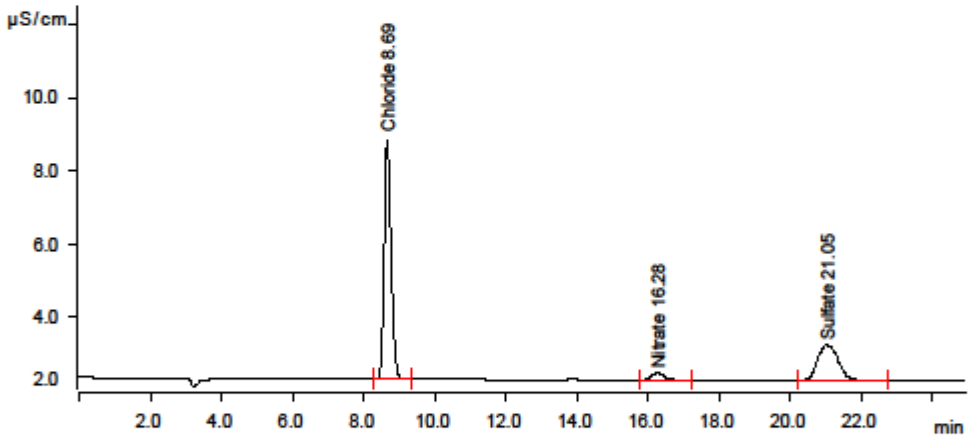
Sample data

Ident	wk9 sample 2b
Sample type	Sample
Determination start	2016-03-28 13:30:04 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.690	1.4176	6.552	5.476	Chloride
2	16.282	0.0745	0.192	0.135	Nitrate
3	21.048	0.6255	0.962	3.400	Sulfate

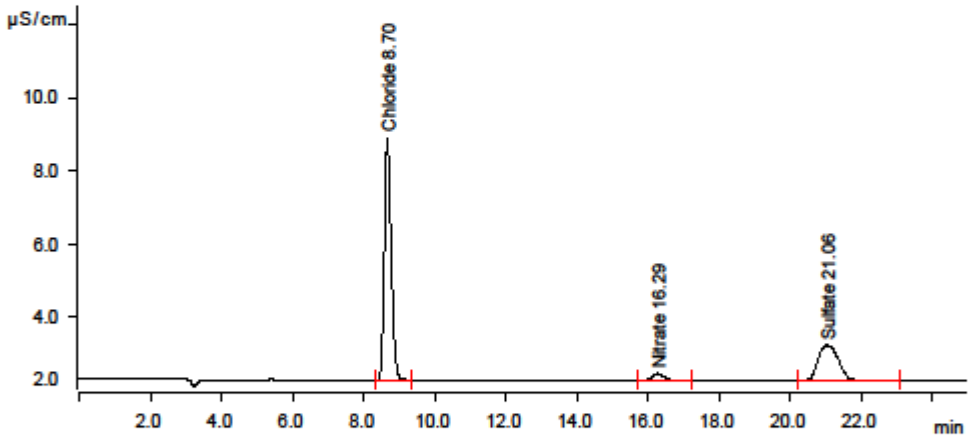
Sample data

Ident	wk9 sample 2c
Sample type	Sample
Determination start	2016-03-28 13:58:41 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.695	1.4195	6.587	5.483	Chloride
2	16.287	0.0748	0.193	0.136	Nitrate
3	21.062	0.6269	0.970	3.408	Sulfate

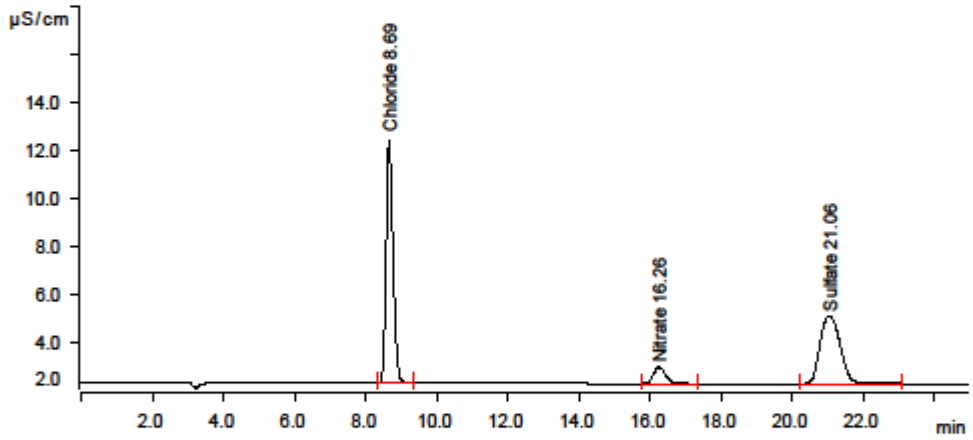
Sample data

Ident	wk9 sample 3a
Sample type	Sample
Determination start	2016-03-28 14:27:18 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.81	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.687	2.2105	10.087	8.416	Chloride
2	16.260	0.2570	0.671	0.426	Nitrate
3	21.057	1.8207	2.835	9.758	Sulfate

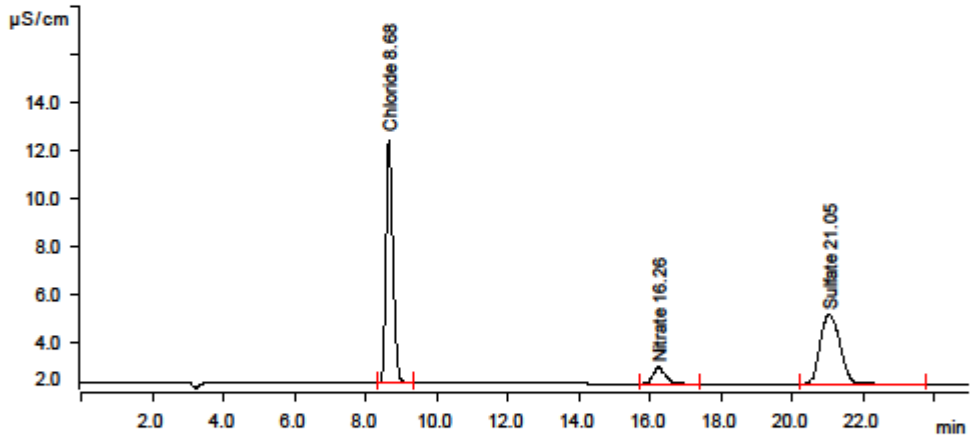
Sample data

Ident	wk9 sample 3b
Sample type	Sample
Determination start	2016-03-28 14:55:55 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.683	2.2107	10.116	8.416	Chloride
2	16.255	0.2579	0.674	0.427	Nitrate
3	21.053	1.8272	2.858	9.791	Sulfate

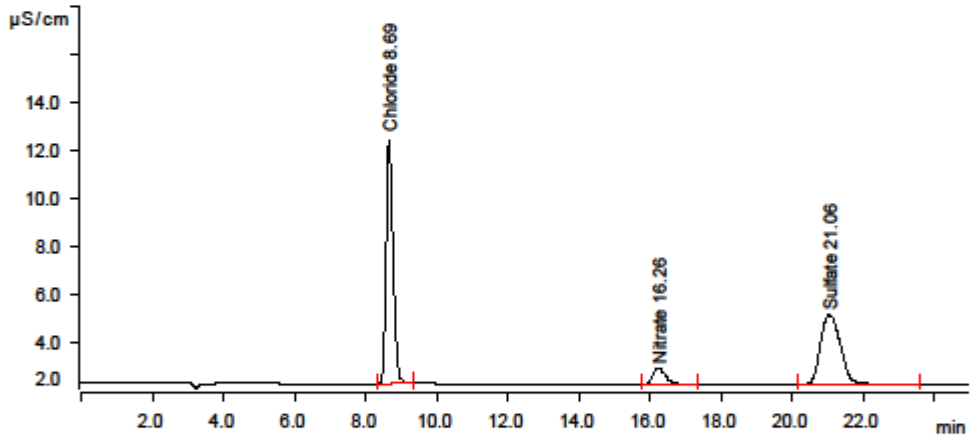
Sample data

Ident	wk9 sample 3c
Sample type	Sample
Determination start	2016-03-28 15:24:33 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.81	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.687	2.2068	10.134	8.402	Chloride
2	16.262	0.2565	0.675	0.425	Nitrate
3	21.060	1.8239	2.870	9.775	Sulfate

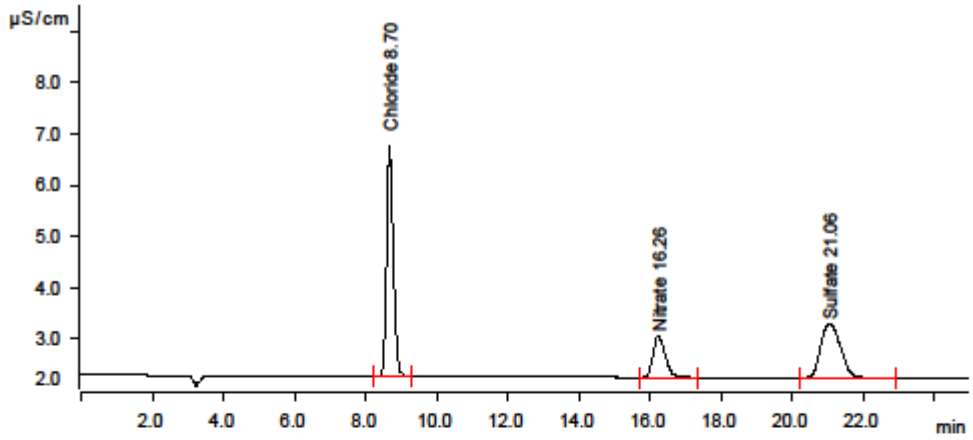
Sample data

Ident	wk9 sample 4a
Sample type	Sample
Determination start	2016-03-28 15:53:13 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.81	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.700	0.9486	4.487	3.695	Chloride
2	16.257	0.3039	0.801	0.500	Nitrate
3	21.063	0.6660	1.049	3.622	Sulfate

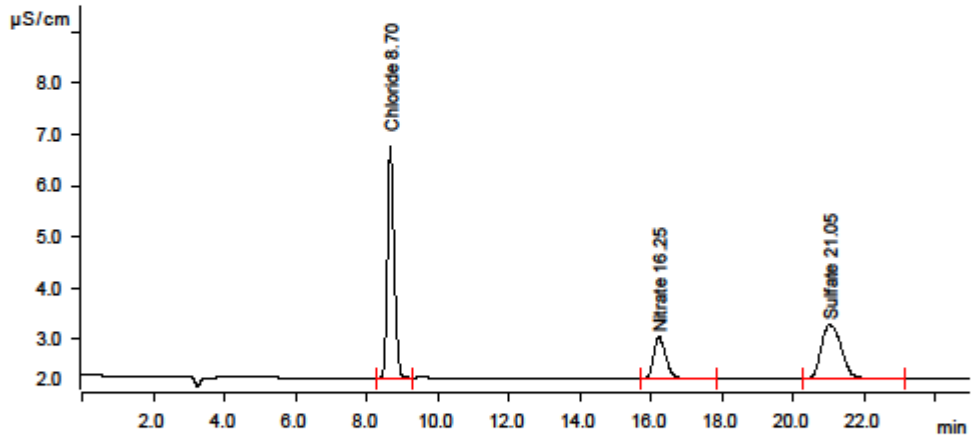
Sample data

Ident	wk9 sample 4b
Sample type	Sample
Determination start	2016-03-28 16:21:52 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.695	0.9490	4.505	3.696	Chloride
2	16.247	0.3063	0.805	0.504	Nitrate
3	21.052	0.6673	1.055	3.629	Sulfate

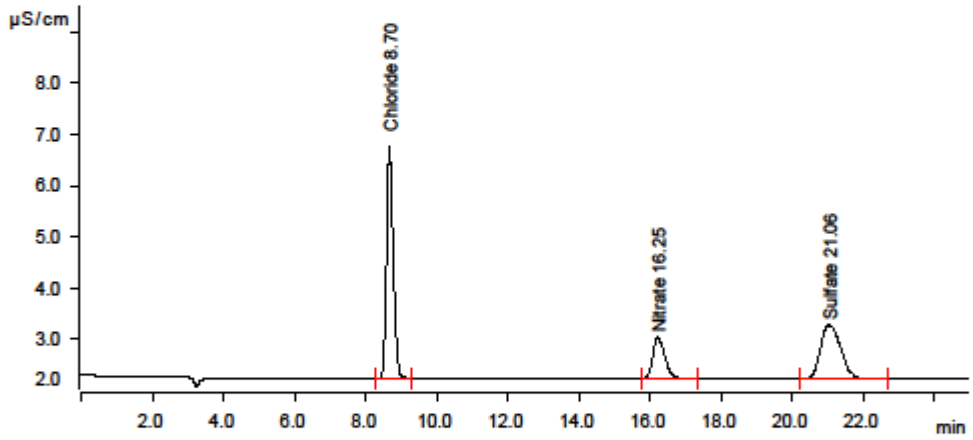
Sample data

Ident	wk9 sample 4c
Sample type	Sample
Determination start	2016-03-28 16:50:33 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.81	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.697	0.9488	4.506	3.696	Chloride
2	16.250	0.3042	0.804	0.501	Nitrate
3	21.057	0.6647	1.055	3.615	Sulfate

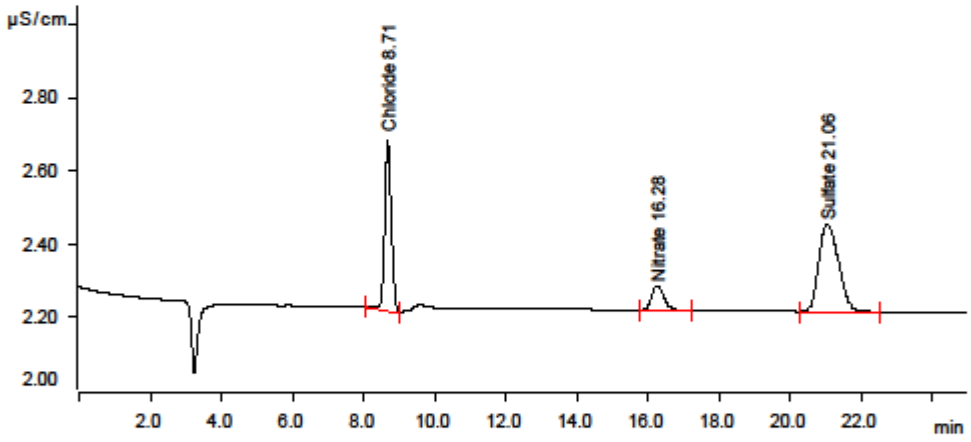
Sample data

Ident	wk9 sample 5a
Sample type	Sample
Determination start	2016-03-28 17:19:14 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.707	0.0977	0.465	0.376	Chloride
2	16.282	0.0254	0.066	0.057	Nitrate
3	21.055	0.1513	0.237	0.768	Sulfate

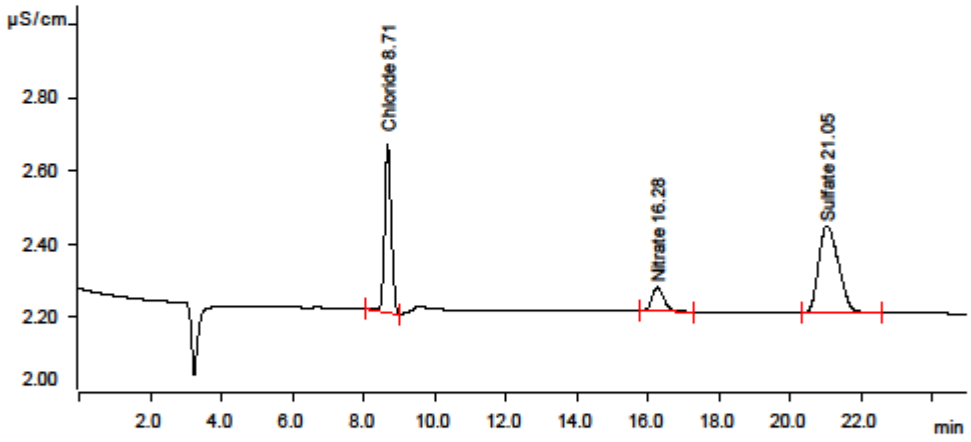
Sample data

Ident	wk9 sample 5b
Sample type	Sample
Determination start	2016-03-28 17:47:56 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.705	0.0967	0.461	0.372	Chloride
2	16.278	0.0251	0.065	0.056	Nitrate
3	21.048	0.1506	0.237	0.765	Sulfate

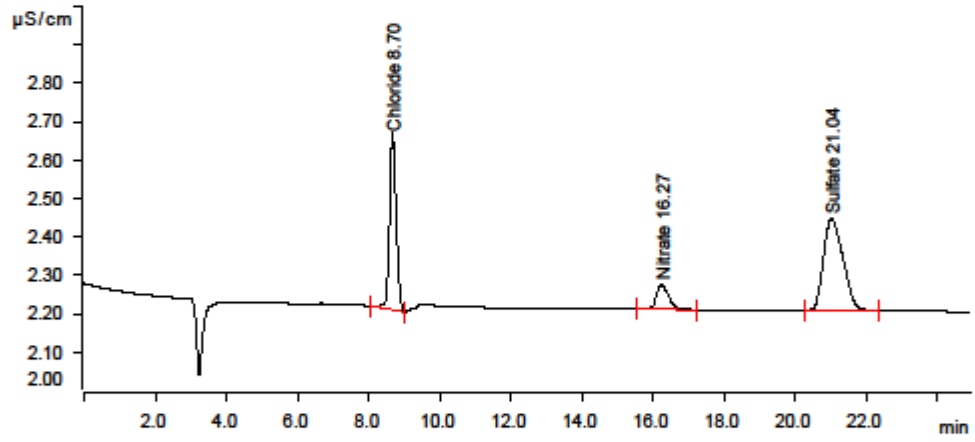
Sample data

Ident	wk9 sample 5c
Sample type	Sample
Determination start	2016-03-28 18:16:39 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.702	0.0966	0.461	0.372	Chloride
2	16.270	0.0255	0.066	0.057	Nitrate
3	21.035	0.1504	0.238	0.763	Sulfate

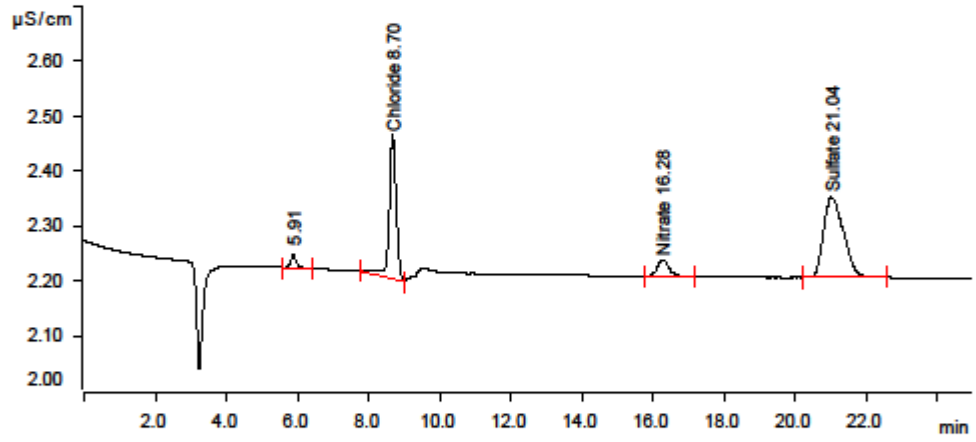
Sample data

Ident	wk9 sample 6a
Sample type	Sample
Determination start	2016-03-28 18:45:23 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.81	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.907	0.0048	0.023	invalid	
2	8.703	0.0587	0.263	0.221	Chloride
3	16.275	0.0116	0.030	0.035	Nitrate
4	21.038	0.0936	0.146	0.443	Sulfate

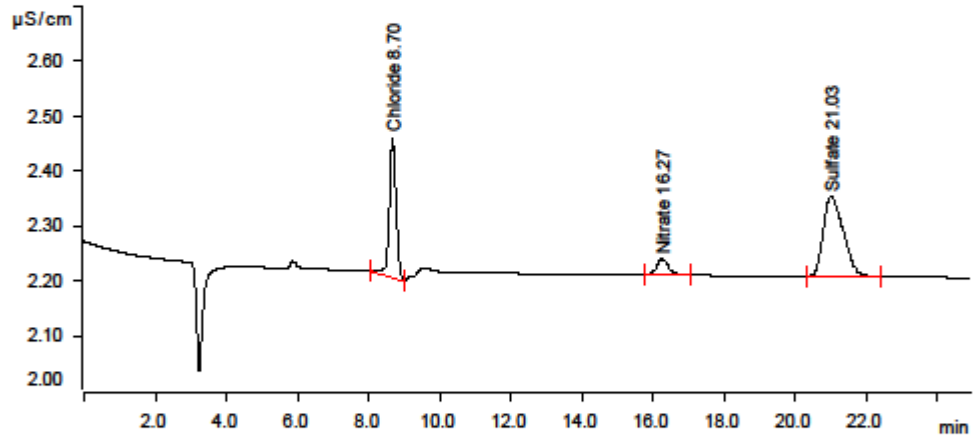
Sample data

Ident	wk9 sample 6b
Sample type	Sample
Determination start	2016-03-28 19:14:07 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.702	0.0547	0.254	0.205	Chloride
2	16.270	0.0114	0.029	0.034	Nitrate
3	21.025	0.0936	0.146	0.444	Sulfate

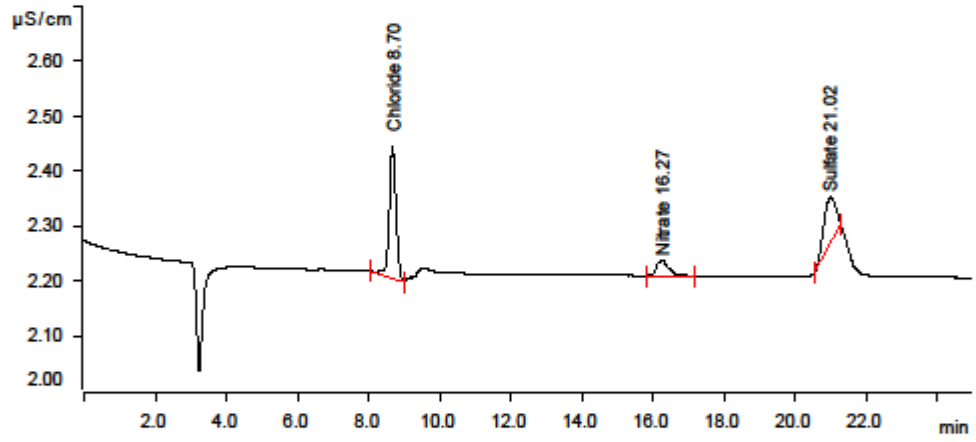
Sample data

Ident	wk9 sample 6c
Sample type	Sample
Determination start	2016-03-28 19:42:52 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.700	0.0517	0.241	0.193	Chloride
2	16.267	0.0109	0.028	0.034	Nitrate
3	21.020	0.0325	0.083	0.098	Sulfate

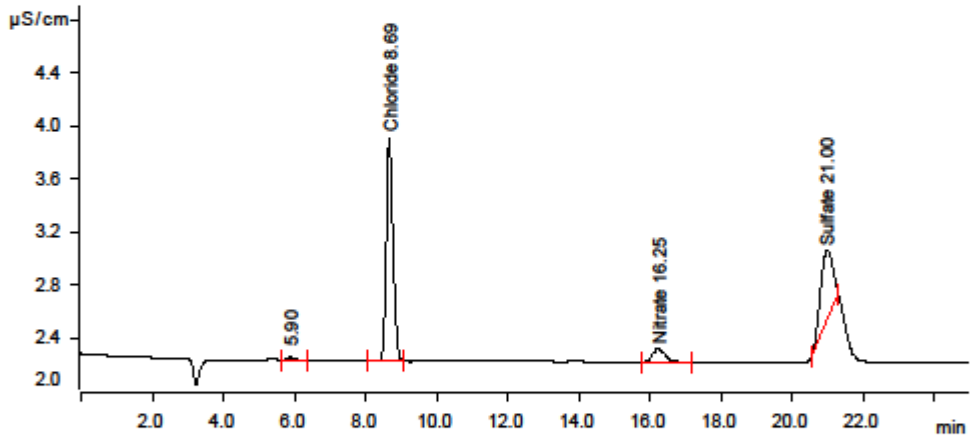
Sample data

Ident	wk9 sample 7a
Sample type	Sample
Determination start	2016-03-28 20:11:38 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.900	0.0051	0.024	invalid	
2	8.692	0.3526	1.684	1.383	Chloride
3	16.253	0.0399	0.104	0.080	Nitrate
4	21.003	0.2085	0.532	1.089	Sulfate

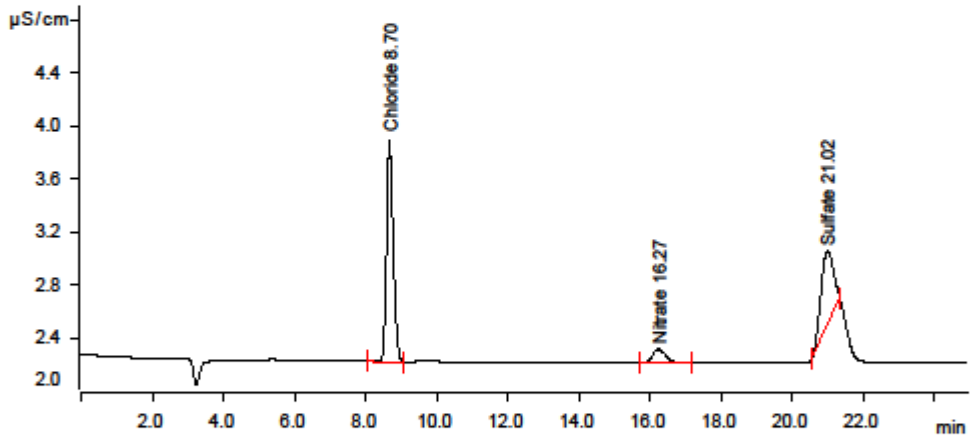
Sample data

Ident	wk9 sample 7b
Sample type	Sample
Determination start	2016-03-28 20:40:23 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.697	0.3490	1.664	1.368	Chloride
2	16.265	0.0398	0.103	0.080	Nitrate
3	21.015	0.2218	0.560	1.164	Sulfate

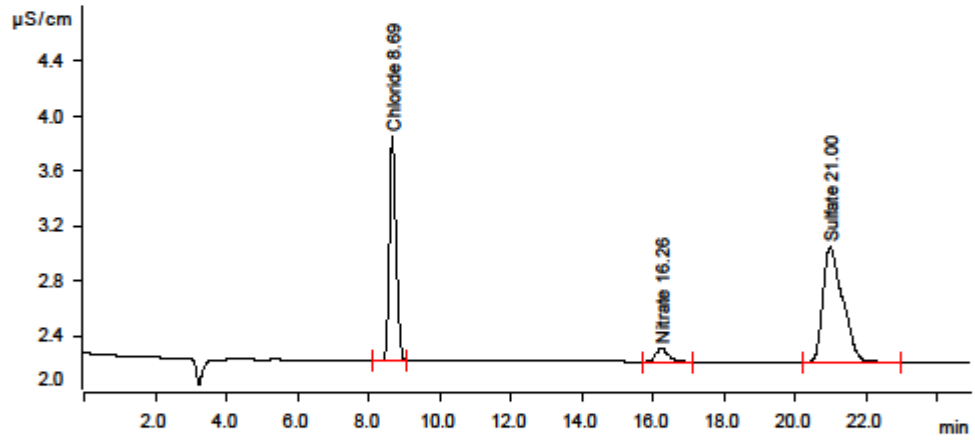
Sample data

Ident	wk9 sample 7c
Sample type	Sample
Determination start	2016-03-28 21:09:07 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.693	0.3447	1.636	1.352	Chloride
2	16.255	0.0383	0.098	0.077	Nitrate
3	20.998	0.5326	0.837	2.890	Sulfate

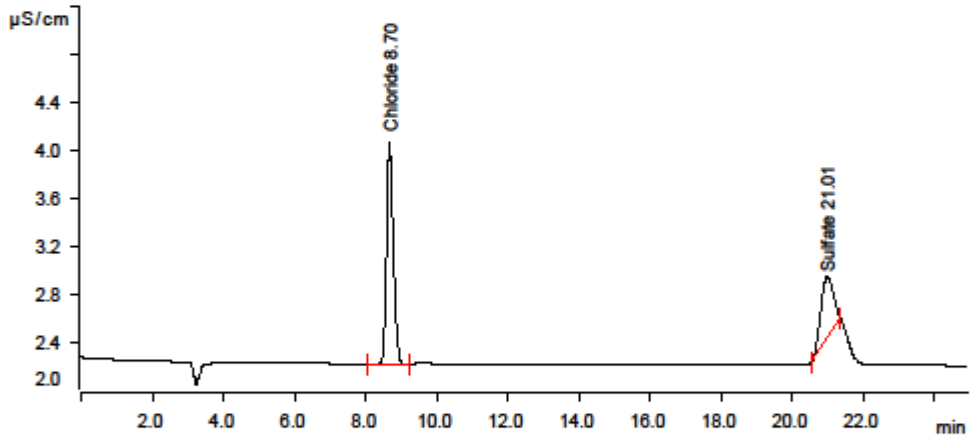
Sample data

Ident	wk9 sample 8a
Sample type	Sample
Determination start	2016-03-28 21:37:50 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.698	0.3925	1.843	1.539	Chloride
2	21.008	0.2089	0.520	1.092	Sulfate

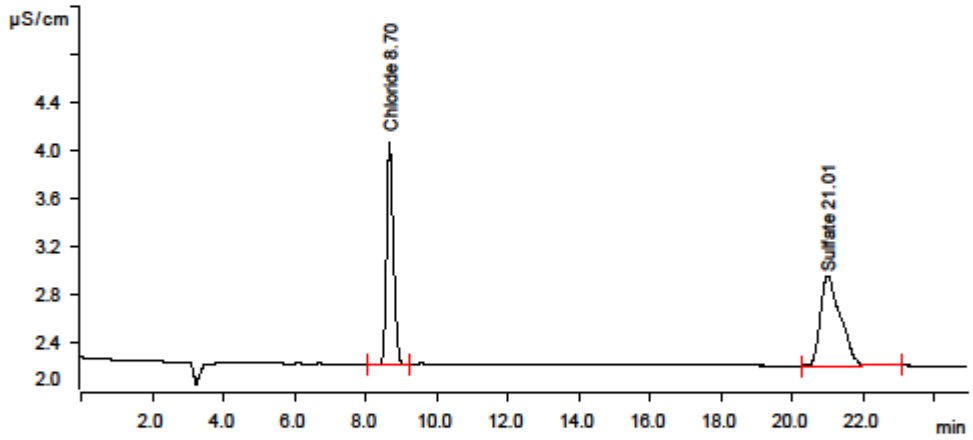
Sample data

Ident	wk9 sample 8b
Sample type	Sample
Determination start	2016-03-28 22:06:33 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.698	0.3961	1.858	1.553	Chloride
2	21.013	0.4790	0.749	2.594	Sulfate

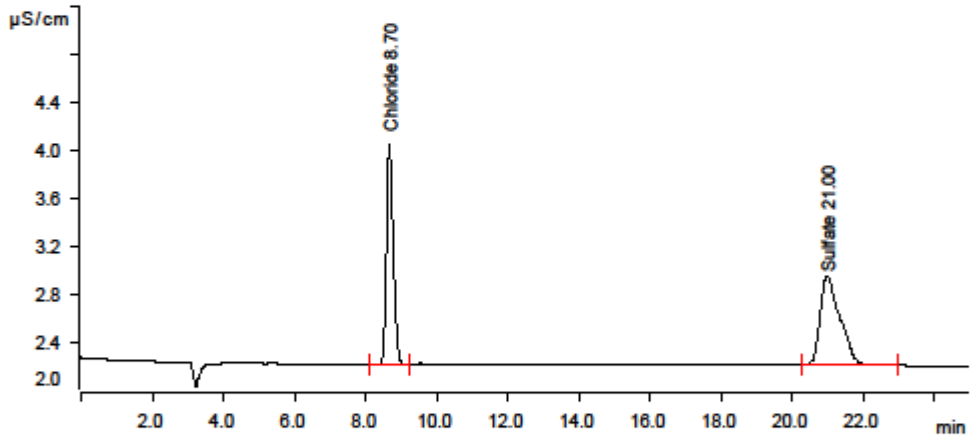
Sample data

Ident	wk9 sample 8c
Sample type	Sample
Determination start	2016-03-28 22:35:15 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.695	0.3936	1.841	1.543	Chloride
2	21.003	0.4763	0.745	2.579	Sulfate

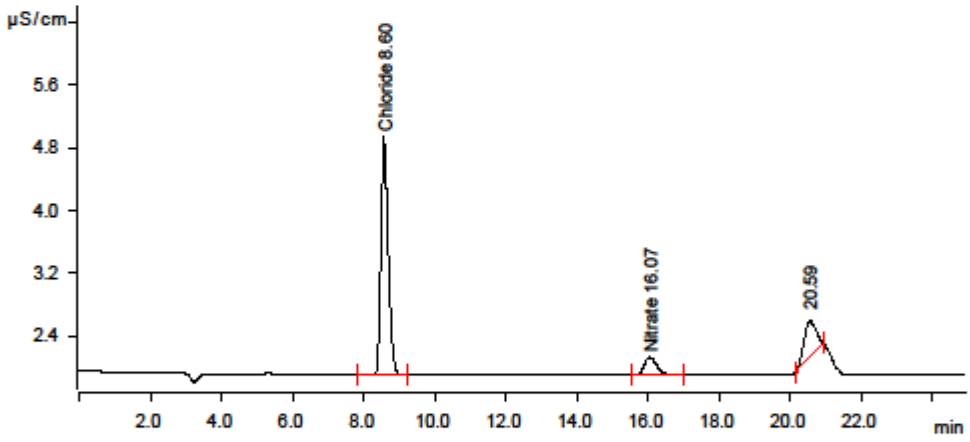
Sample data

Ident	wk10 Sample 1a
Sample type	Sample
Determination start	2016-05-05 14:52:05 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.600	0.6968	3.034	2.725	Chloride
2	16.070	0.0943	0.228	0.167	Nitrate
3	20.588	0.1768	0.460	invalid	

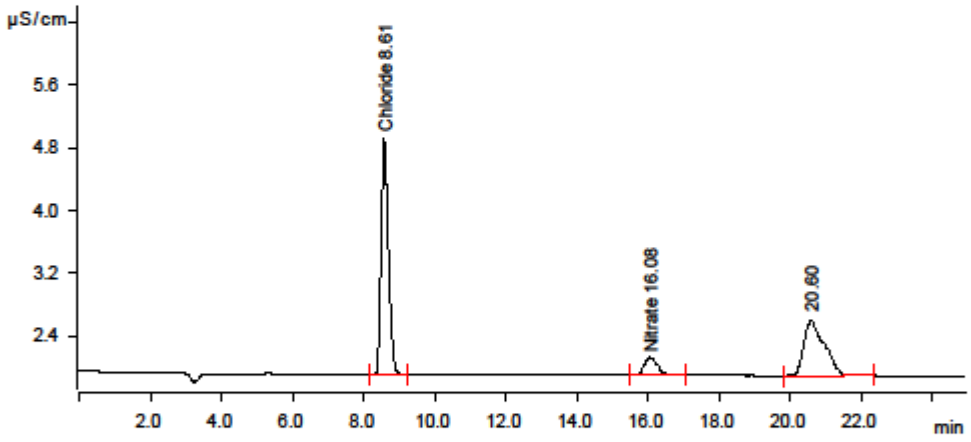
Sample data

Ident	wk10 Sample 1b
Sample type	Sample
Determination start	2016-05-05 15:20:39 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.09	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.605	0.6986	3.018	2.732	Chloride
2	16.080	0.0948	0.227	0.167	Nitrate
3	20.598	0.4569	0.693	invalid	

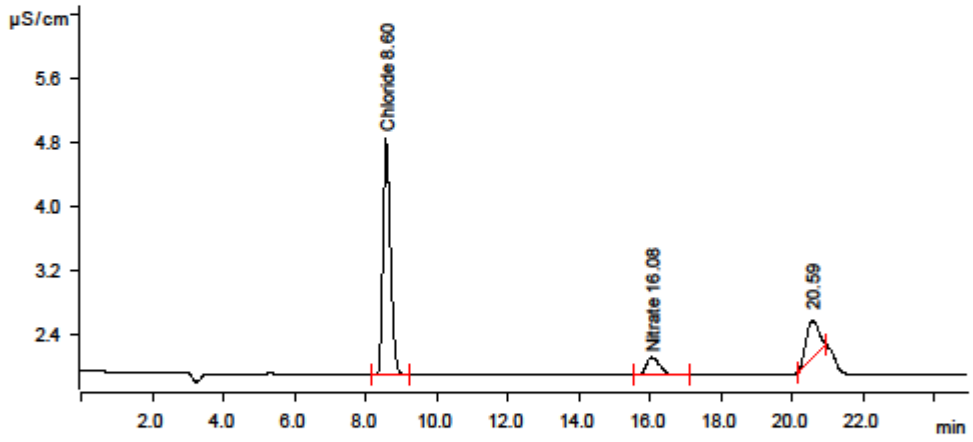
Sample data

Ident	wk10 Sample 1c
Sample type	Sample
Determination start	2016-05-05 15:49:13 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.603	0.6960	2.953	2.721	Chloride
2	16.077	0.0946	0.223	0.167	Nitrate
3	20.593	0.1856	0.467	invalid	

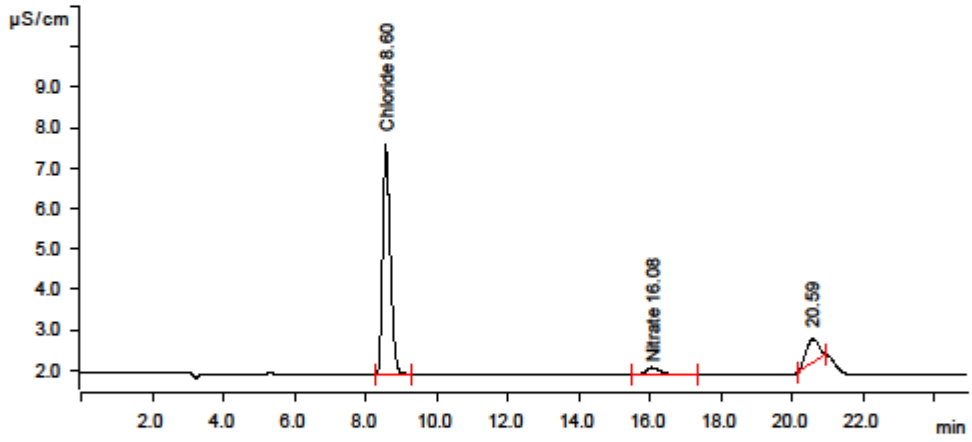
Sample data

Ident	wk10 Sample 2a
Sample type	Sample
Determination start	2016-05-05 16:17:49 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.597	1.3661	5.681	5.282	Chloride
2	16.077	0.0723	0.168	0.132	Nitrate
3	20.590	0.2425	0.605	invalid	

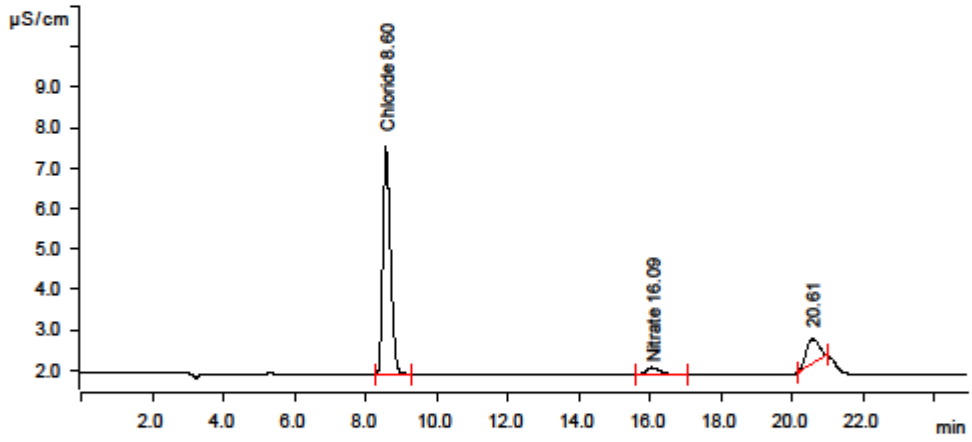
Sample data

Ident	wk10 Sample 2b
Sample type	Sample
Determination start	2016-05-05 16:46:24 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.602	1.3645	5.647	5.276	Chloride
2	16.087	0.0718	0.166	0.131	Nitrate
3	20.605	0.2480	0.614	invalid	

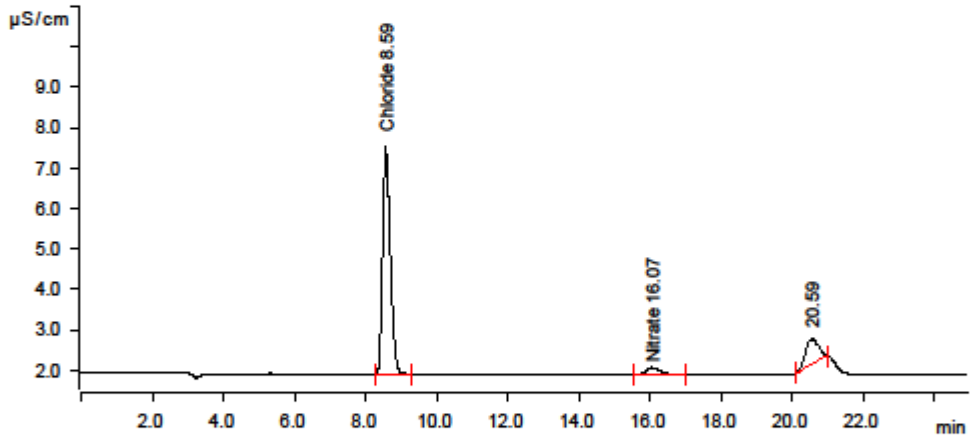
Sample data

Ident	wk10 Sample 2c
Sample type	Sample
Determination start	2016-05-05 17:15:01 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.15	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.593	1.3696	5.616	5.295	Chloride
2	16.072	0.0721	0.166	0.131	Nitrate
3	20.585	0.2589	0.633	invalid	

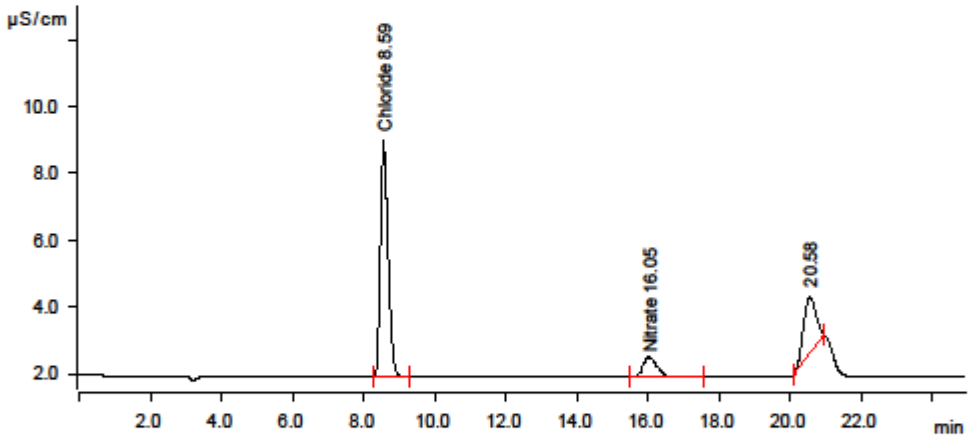
Sample data

Ident	wk10 Sample 3a
Sample type	Sample
Determination start	2016-05-05 17:43:38 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.588	1.7332	7.049	6.656	Chloride
2	16.047	0.2551	0.586	0.423	Nitrate
3	20.575	0.6892	1.698	invalid	

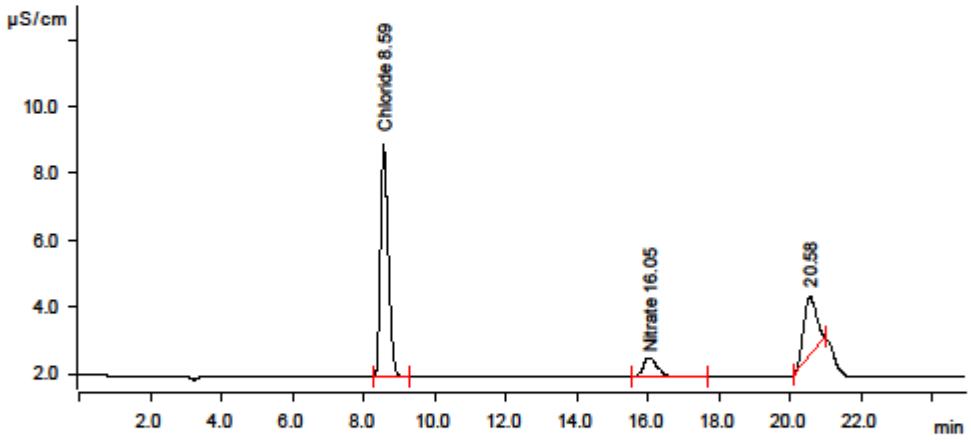
Sample data

Ident	wk10 Sample 3b
Sample type	Sample
Determination start	2016-05-05 18:12:16 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.09	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.590	1.7260	6.970	6.630	Chloride
2	16.052	0.2545	0.579	0.422	Nitrate
3	20.580	0.7177	1.749	invalid	

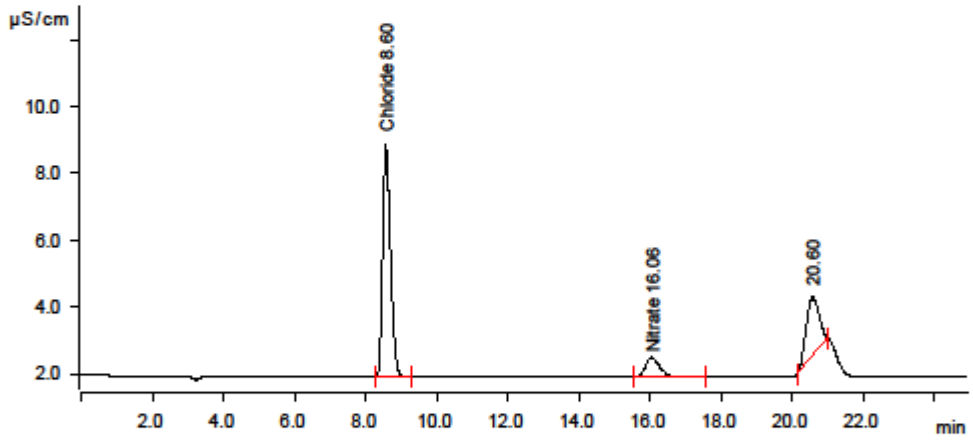
Sample data

Ident	wk10 Sample 3c
Sample type	Sample
Determination start	2016-05-05 18:40:54 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.15	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.595	1.7288	6.978	6.640	Chloride
2	16.063	0.2545	0.579	0.422	Nitrate
3	20.595	0.7318	1.775	invalid	

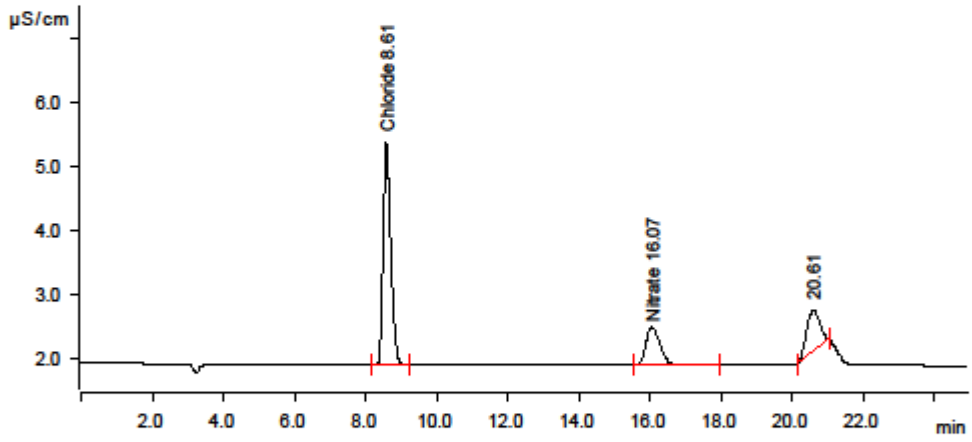
Sample data

Ident	wk10 Sample 4a
Sample type	Sample
Determination start	2016-05-05 19:09:34 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.09	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.608	0.8416	3.465	3.284	Chloride
2	16.070	0.2659	0.604	0.440	Nitrate
3	20.612	0.2712	0.650	invalid	

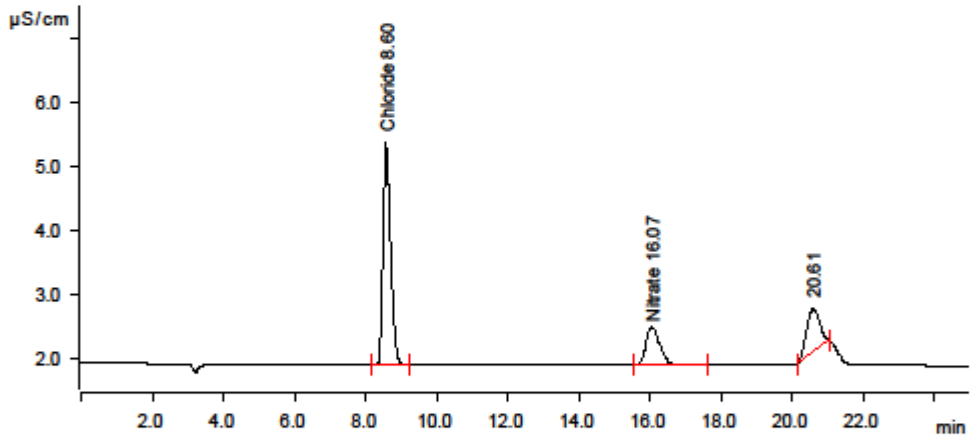
Sample data

Ident	wk10 Sample 4b
Sample type	Sample
Determination start	2016-05-05 19:38:14 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.603	0.8406	3.474	3.280	Chloride
2	16.065	0.2650	0.606	0.438	Nitrate
3	20.607	0.2785	0.672	invalid	

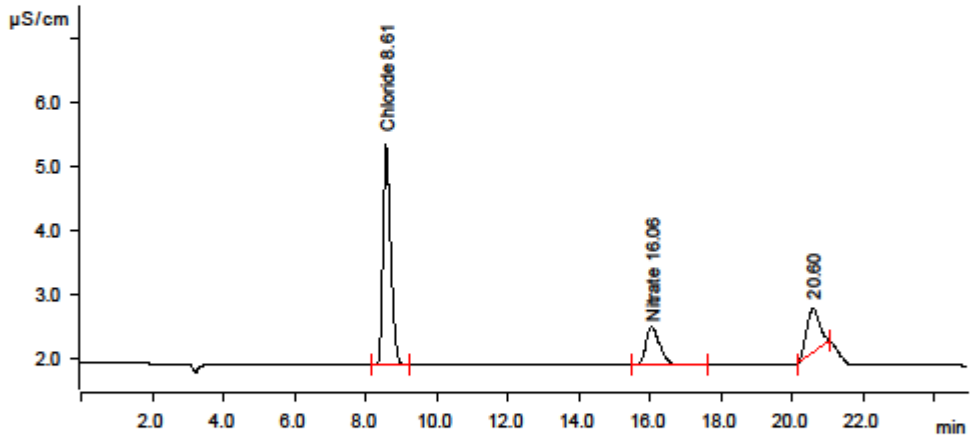
Sample data

Ident	wk10 Sample 4c
Sample type	Sample
Determination start	2016-05-05 20:06:55 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.605	0.8394	3.450	3.275	Chloride
2	16.063	0.2650	0.601	0.438	Nitrate
3	20.602	0.2869	0.684	invalid	

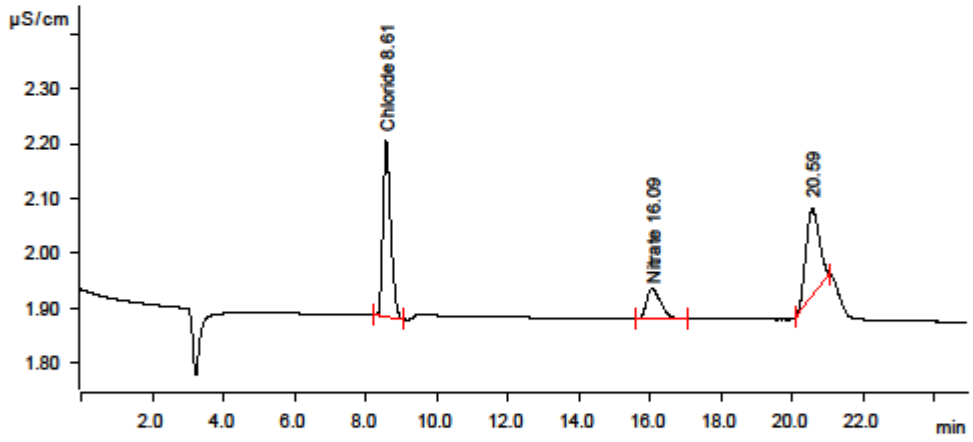
Sample data

Ident	wk10 Sample 5a
Sample type	Sample
Determination start	2016-05-05 20:35:36 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.09	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.605	0.0783	0.322	0.299	Chloride
2	16.087	0.0245	0.055	0.055	Nitrate
3	20.590	0.0692	0.161	invalid	

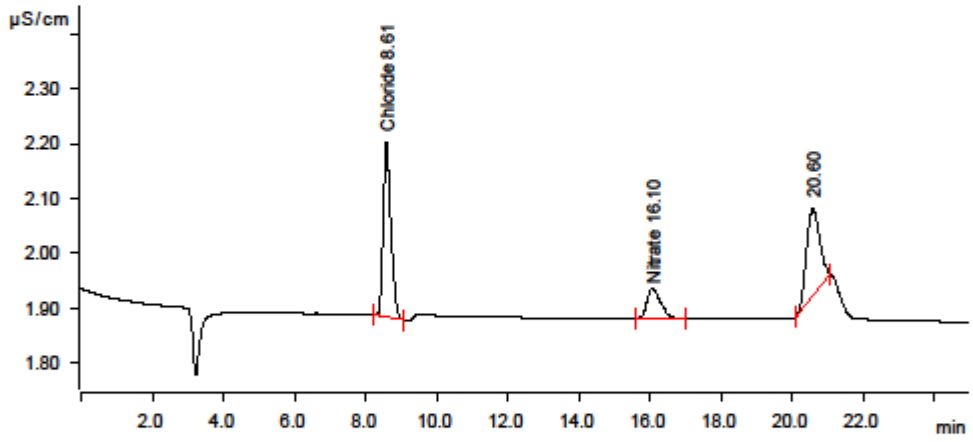
Sample data

Ident	wk10 Sample 5b
Sample type	Sample
Determination start	2016-05-05 21:04:18 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time	Area	Height	Concentration	Component name
	min	(µS/cm) x min	µS/cm	ppm	
1	8.610	0.0775	0.319	0.296	Chloride
2	16.098	0.0243	0.055	0.055	Nitrate
3	20.603	0.0695	0.162	invalid	

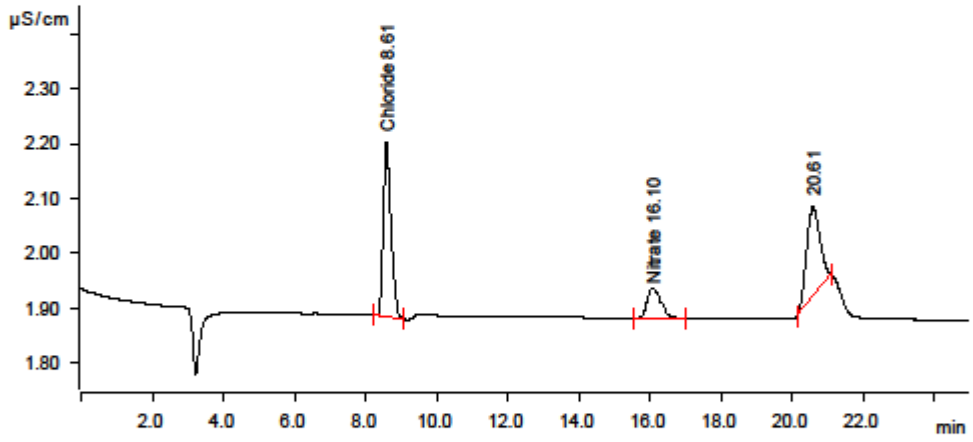
Sample data

Ident	wk10 Sample 5c
Sample type	Sample
Determination start	2016-05-05 21:33:01 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.613	0.0779	0.319	0.297	Chloride
2	16.098	0.0242	0.054	0.055	Nitrate
3	20.608	0.0705	0.163	invalid	

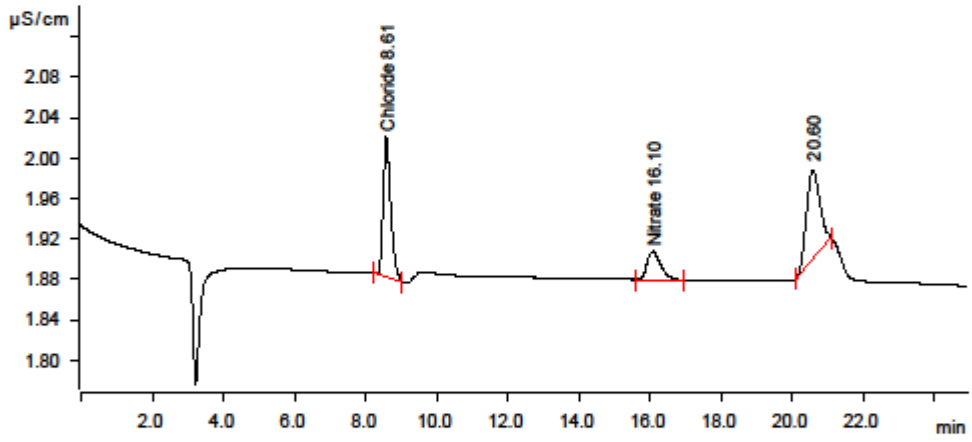
Sample data

Ident	wk10 Sample 6a
Sample type	Sample
Determination start	2016-05-05 22:01:45 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.09	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.608	0.0332	0.138	0.120	Chloride
2	16.102	0.0124	0.028	0.036	Nitrate
3	20.603	0.0380	0.088	invalid	

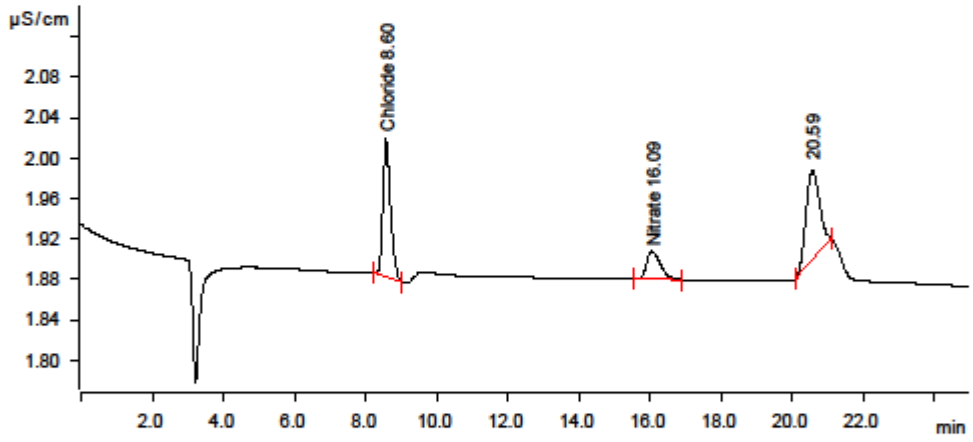
Sample data

Ident	wk10 Sample 6b
Sample type	Sample
Determination start	2016-05-05 22:30:29 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.15	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.602	0.0331	0.137	0.119	Chloride
2	16.085	0.0124	0.028	0.036	Nitrate
3	20.590	0.0387	0.089	invalid	

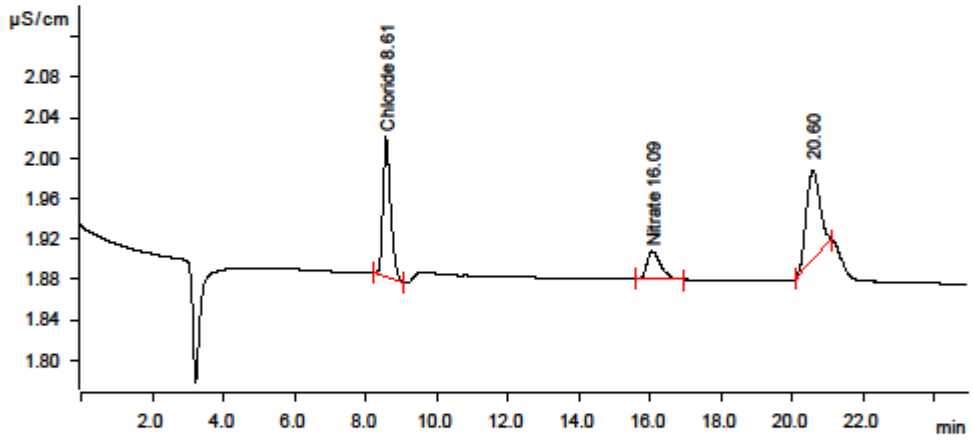
Sample data

Ident	wk10 Sample 6c
Sample type	Sample
Determination start	2016-05-05 22:59:14 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.605	0.0333	0.137	0.120	Chloride
2	16.092	0.0124	0.028	0.036	Nitrate
3	20.598	0.0390	0.089	invalid	

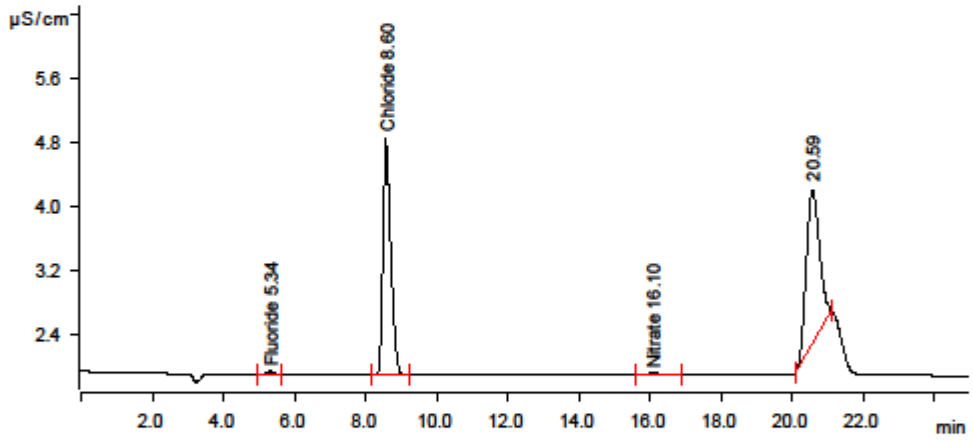
Sample data

Ident	wk10 Sample 7a
Sample type	Sample
Determination start	2016-05-05 23:28:00 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.26	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.343	0.0068	0.036	0.010	Fluoride
2	8.602	0.7298	2.949	2.853	Chloride
3	16.095	0.0123	0.027	0.036	Nitrate
4	20.593	0.8214	1.910	invalid	

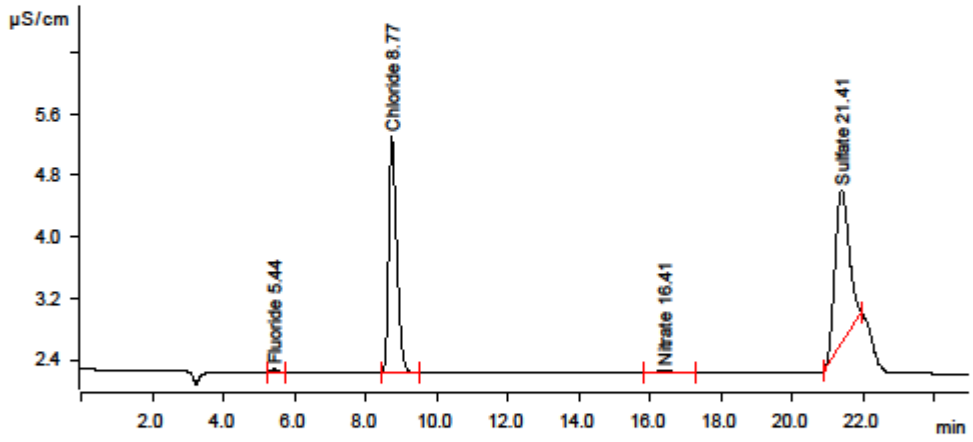
Sample data

Ident	wk11 Sample 7b
Sample type	Sample
Determination start	2016-05-25 23:58:41 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.442	0.0073	0.038	0.012	Fluoride
2	8.765	0.7805	3.081	3.048	Chloride
3	16.413	0.0143	0.031	0.039	Nitrate
4	21.410	0.9056	2.009	4.924	Sulfate

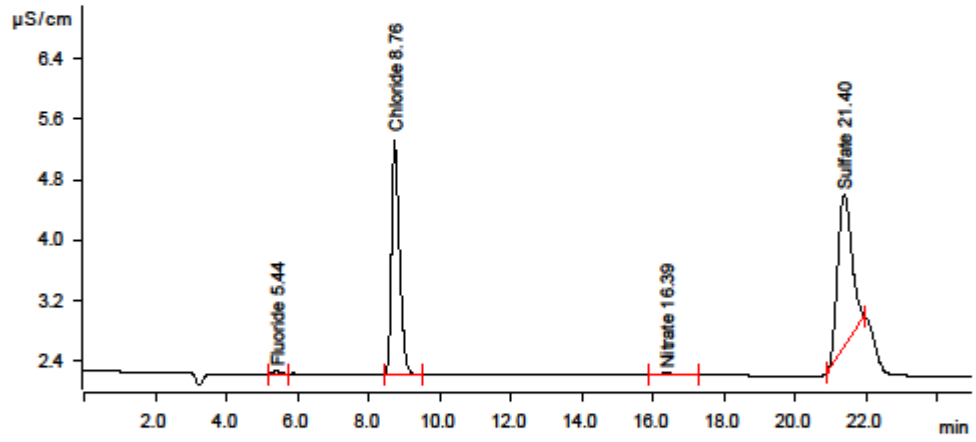
Sample data

Ident	wk11 Sample 7c
Sample type	Sample
Determination start	2016-05-26 00:27:26 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.437	0.0074	0.039	0.012	Fluoride
2	8.760	0.7857	3.106	3.068	Chloride
3	16.393	0.0143	0.031	0.039	Nitrate
4	21.400	0.9177	2.035	4.990	Sulfate

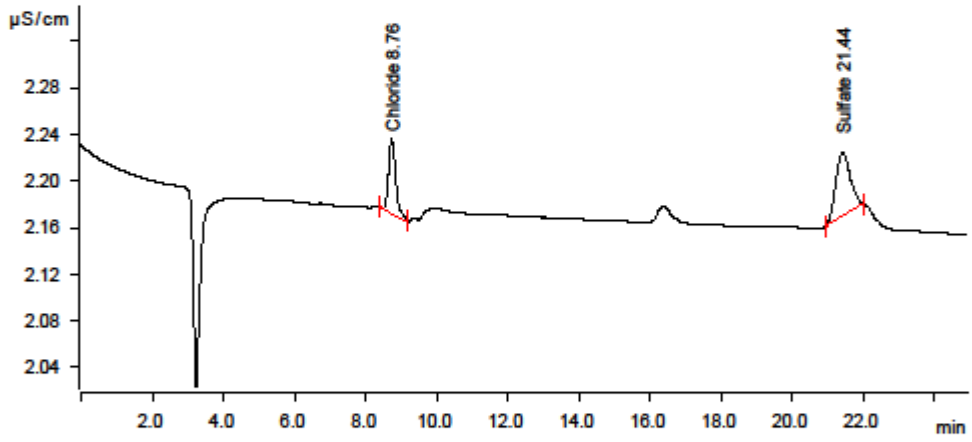
Sample data

Ident	wk11 Sample 8a
Sample type	Sample
Determination start	2016-05-26 00:56:11 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.762	0.0148	0.064	0.046	Chloride
2	21.435	0.0255	0.054	0.059	Sulfate

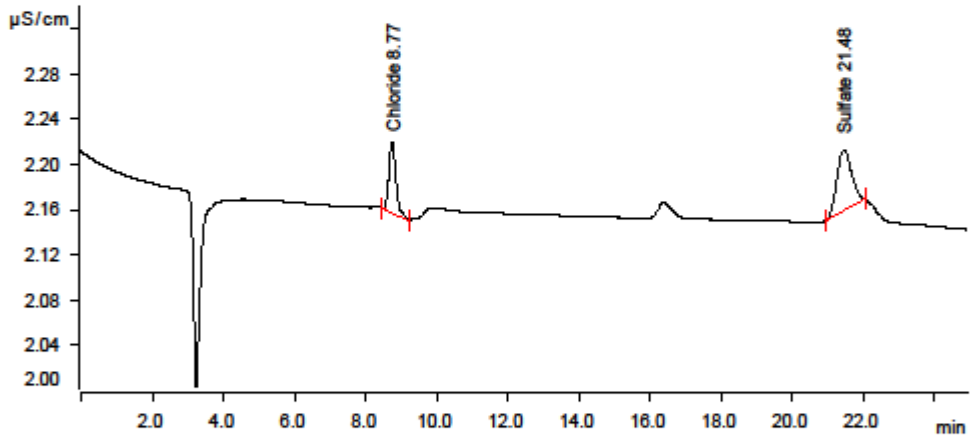
Sample data

Ident	wk11 Sample 8b
Sample type	Sample
Determination start	2016-05-26 01:24:54 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.87	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.770	0.0143	0.063	0.044	Chloride
2	21.475	0.0255	0.054	0.059	Sulfate

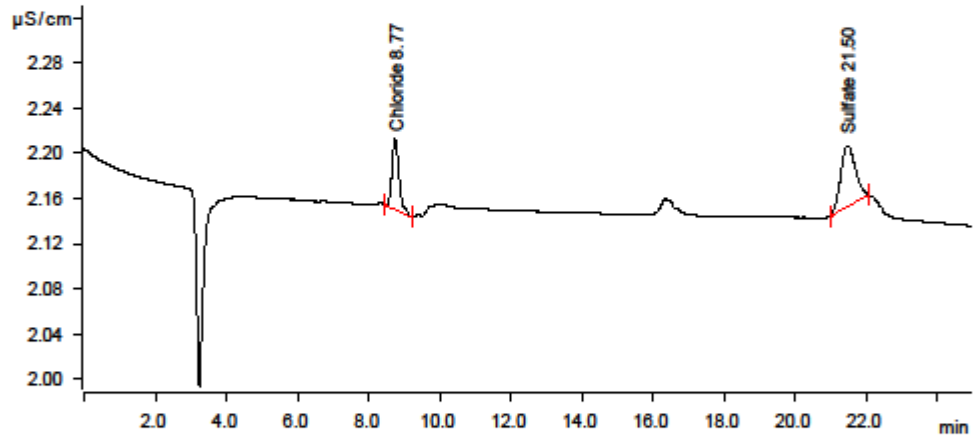
Sample data

Ident	wk11 Sample 8c
Sample type	Sample
Determination start	2016-05-26 01:53:36 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.81	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.773	0.0143	0.063	0.044	Chloride
2	21.500	0.0258	0.054	0.060	Sulfate

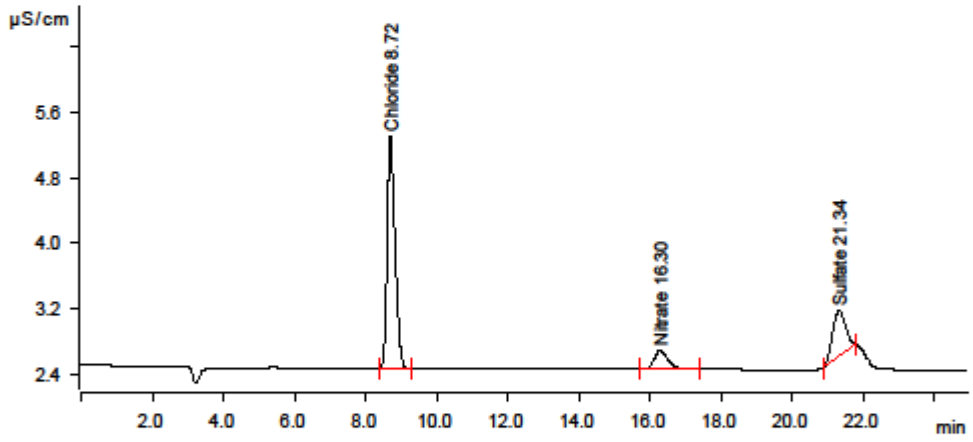
Sample data

Ident	wk12 sample 1a
Sample type	Sample
Determination start	2016-06-02 12:29:28 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.723	0.7069	2.851	2.764	Chloride
2	16.295	0.1018	0.228	0.179	Nitrate
3	21.335	0.2369	0.557	1.249	Sulfate

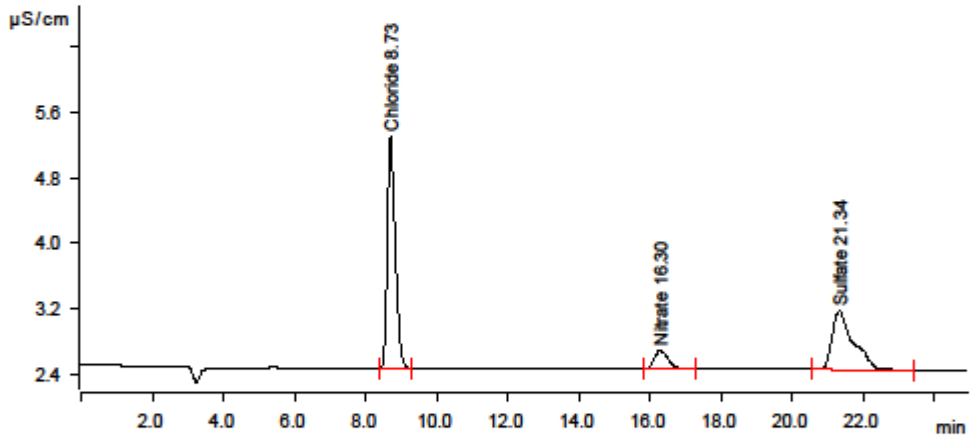
Sample data

Ident	wk12 sample 1b
Sample type	Sample
Determination start	2016-06-02 12:58:03 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.727	0.7084	2.842	2.769	Chloride
2	16.300	0.1015	0.226	0.178	Nitrate
3	21.338	0.4841	0.713	2.622	Sulfate

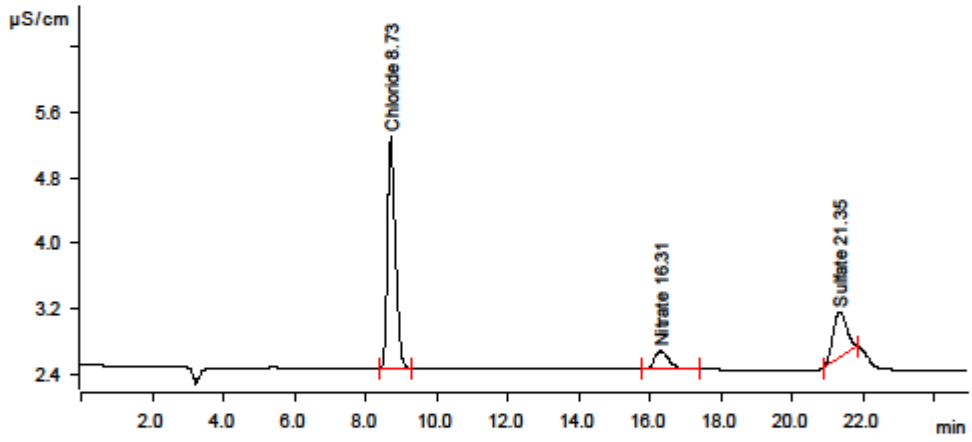
Sample data

Ident	wk12 sample 1c
Sample type	Sample
Determination start	2016-06-02 13:26:38 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.732	0.7098	2.845	2.775	Chloride
2	16.312	0.1018	0.227	0.179	Nitrate
3	21.352	0.2443	0.565	1.290	Sulfate

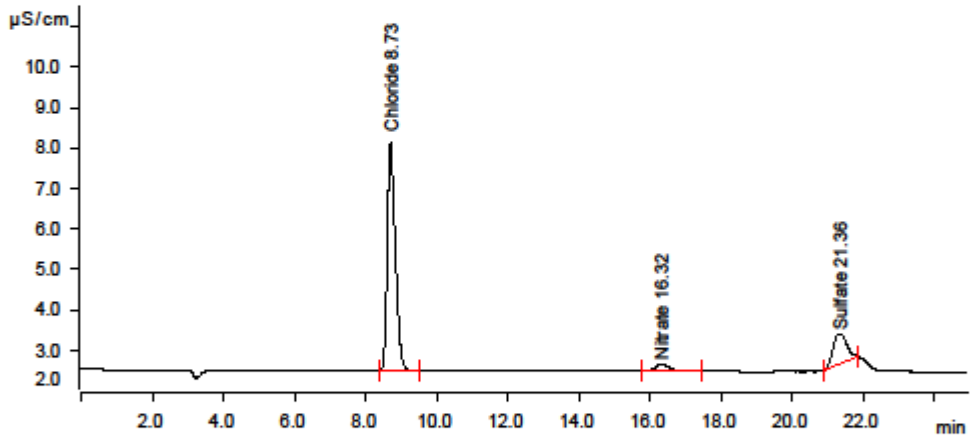
Sample data

Ident	wk12 sample 2a
Sample type	Sample
Determination start	2016-06-02 13:55:13 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.725	1.4344	5.635	5.539	Chloride
2	16.320	0.0804	0.179	0.144	Nitrate
3	21.355	0.3262	0.753	1.747	Sulfate

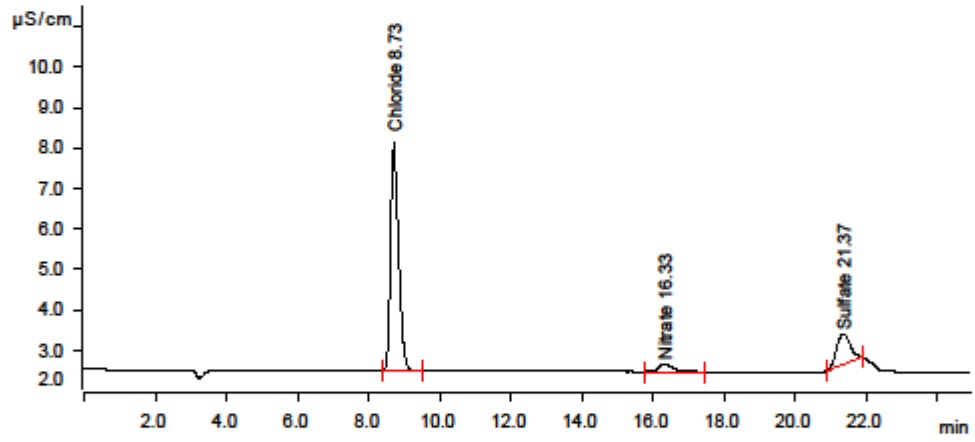
Sample data

Ident	wk12 sample 2b
Sample type	Sample
Determination start	2016-06-02 14:23:49 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.732	1.4353	5.632	5.542	Chloride
2	16.332	0.0806	0.178	0.145	Nitrate
3	21.370	0.3295	0.755	1.765	Sulfate

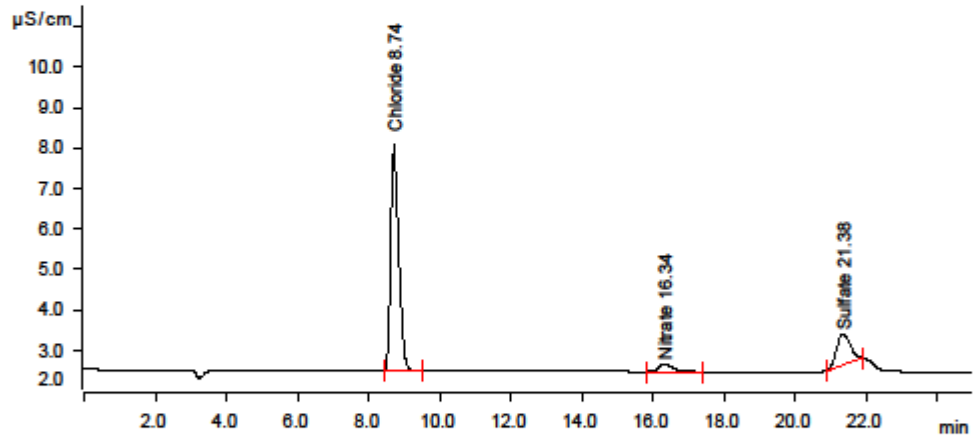
Sample data

Ident	wk12 sample 2c
Sample type	Sample
Determination start	2016-06-02 14:52:26 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.735	1.4349	5.589	5.541	Chloride
2	16.335	0.0801	0.177	0.144	Nitrate
3	21.377	0.3395	0.769	1.821	Sulfate

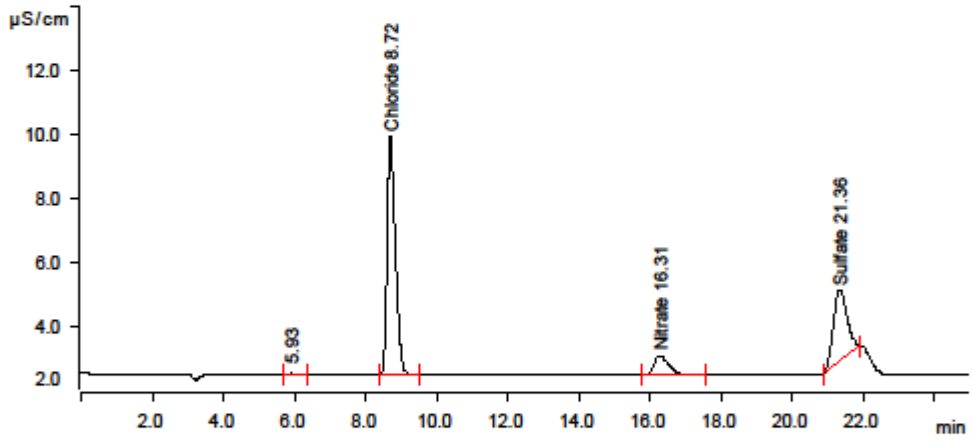
Sample data

Ident	wk12 sample 3a
Sample type	Sample
Determination start	2016-06-02 15:21:03 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.930	0.0099	0.044	invalid	
2	8.722	1.9391	7.473	7.419	Chloride
3	16.305	0.2786	0.613	0.460	Nitrate
4	21.360	0.9851	2.234	5.353	Sulfate

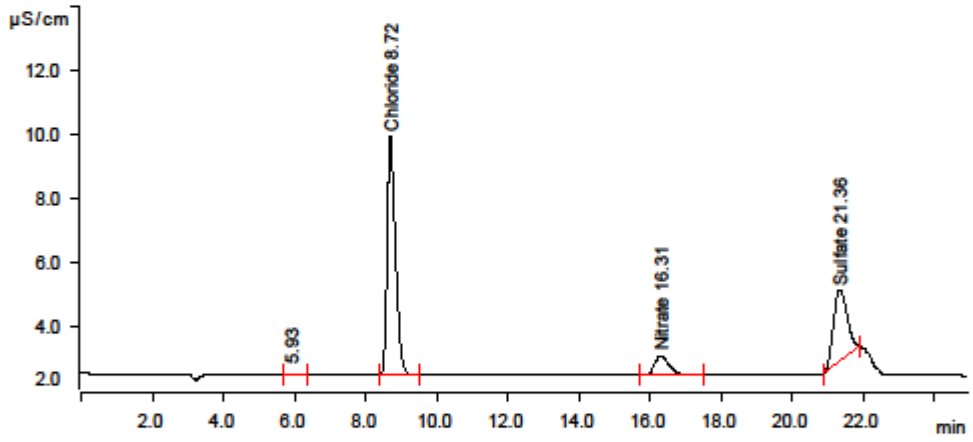
Sample data

Ident	wk12 sample 3b
Sample type	Sample
Determination start	2016-06-02 15:49:42 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.928	0.0072	0.033	invalid	
2	8.723	1.9410	7.458	7.426	Chloride
3	16.310	0.2792	0.614	0.461	Nitrate
4	21.363	0.9948	2.248	5.405	Sulfate

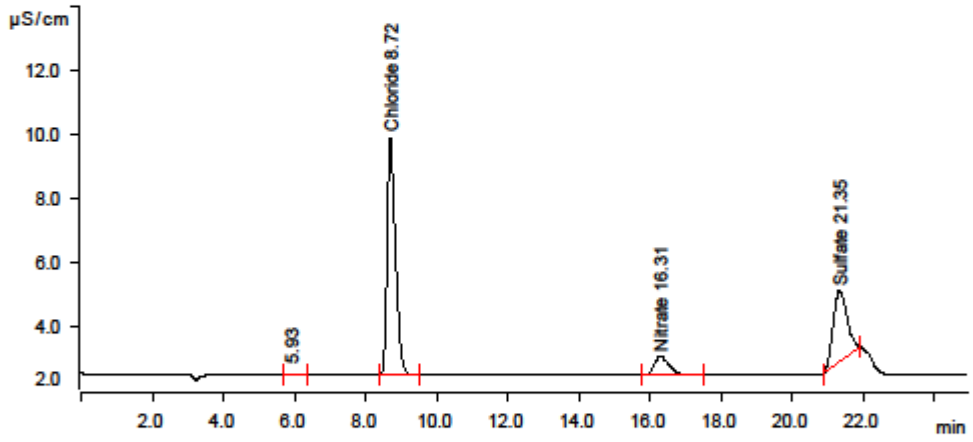
Sample data

Ident	wk12 sample 3c
Sample type	Sample
Determination start	2016-06-02 16:18:21 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.930	0.0072	0.032	invalid	
2	8.722	1.9382	7.407	7.416	Chloride
3	16.305	0.2788	0.609	0.460	Nitrate
4	21.353	1.0018	2.244	5.443	Sulfate

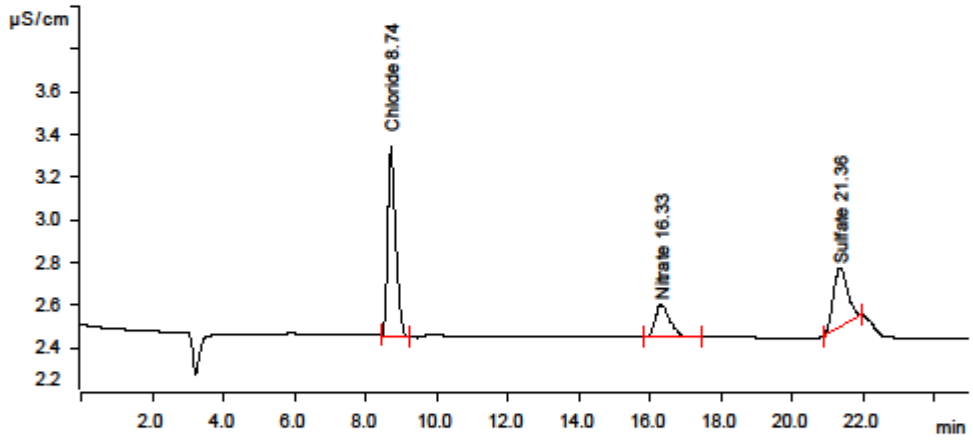
Sample data

Ident	wk12 sample 4a
Sample type	Sample
Determination start	2016-06-02 16:47:01 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.09	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.738	0.2236	0.891	0.874	Chloride
2	16.332	0.0707	0.154	0.129	Nitrate
3	21.363	0.1270	0.278	0.632	Sulfate

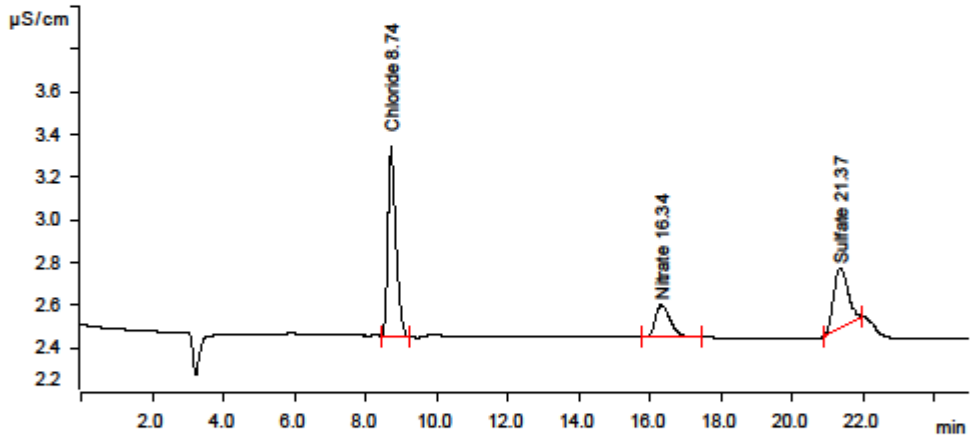
Sample data

Ident	wk12 sample 4b
Sample type	Sample
Determination start	2016-06-02 17:15:41 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.743	0.2247	0.891	0.879	Chloride
2	16.338	0.0715	0.154	0.130	Nitrate
3	21.373	0.1303	0.282	0.650	Sulfate

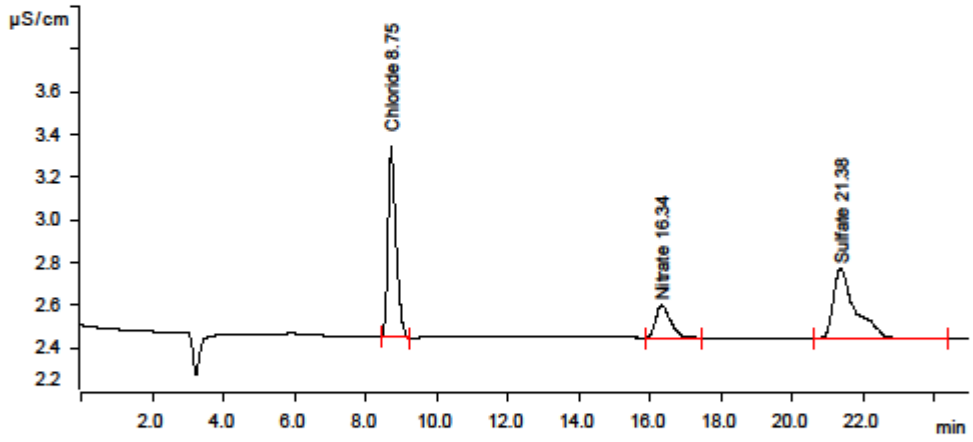
Sample data

Ident	wk12 sample 4c
Sample type	Sample
Determination start	2016-06-02 17:44:22 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.09	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.747	0.2254	0.892	0.881	Chloride
2	16.342	0.0710	0.153	0.130	Nitrate
3	21.378	0.2284	0.329	1.201	Sulfate

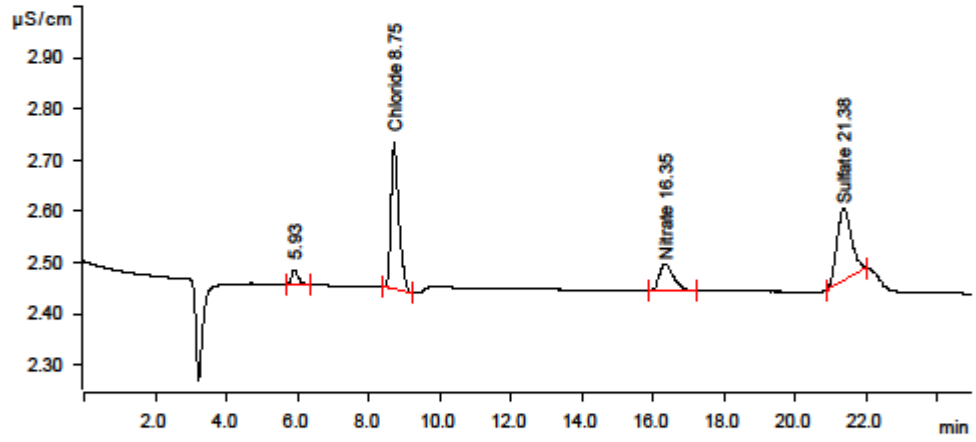
Sample data

Ident	wk12 sample 5a
Sample type	Sample
Determination start	2016-06-02 18:13:04 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.930	0.0066	0.029	invalid	
2	8.745	0.0714	0.287	0.272	Chloride
3	16.353	0.0240	0.052	0.054	Nitrate
4	21.382	0.0660	0.141	0.288	Sulfate

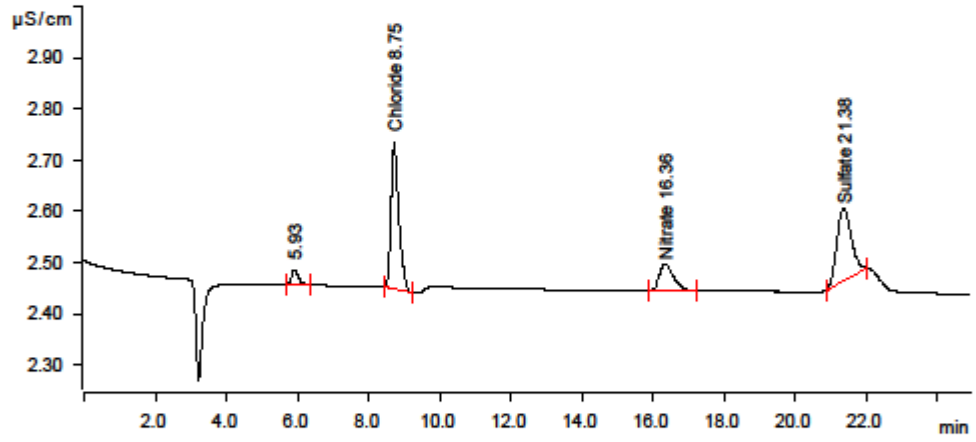
Sample data

Ident	wk12 sample 5b
Sample type	Sample
Determination start	2016-06-02 18:41:47 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.15	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.930	0.0065	0.029	invalid	
2	8.745	0.0712	0.287	0.271	Chloride
3	16.355	0.0239	0.052	0.054	Nitrate
4	21.380	0.0667	0.142	0.292	Sulfate

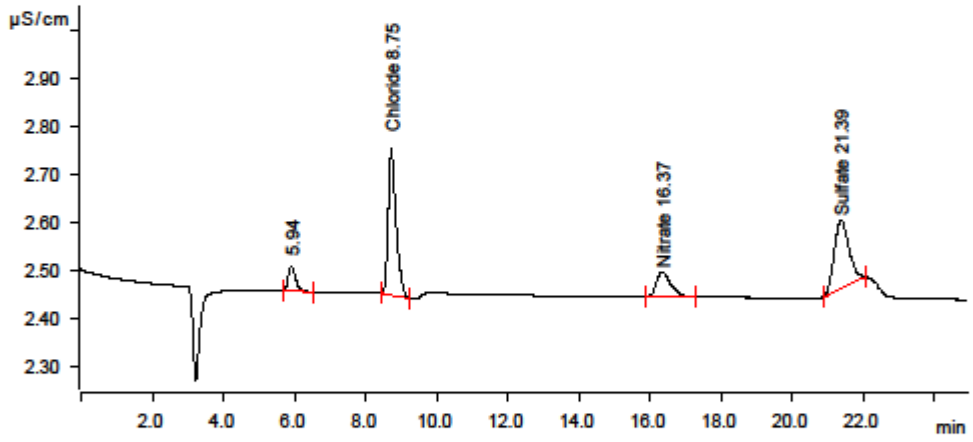
Sample data

Ident	wk12 sample 5c
Sample type	Sample
Determination start	2016-06-02 19:10:30 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.92	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.935	0.0120	0.052	invalid	
2	8.750	0.0765	0.305	0.291	Chloride
3	16.365	0.0241	0.052	0.055	Nitrate
4	21.393	0.0684	0.143	0.301	Sulfate

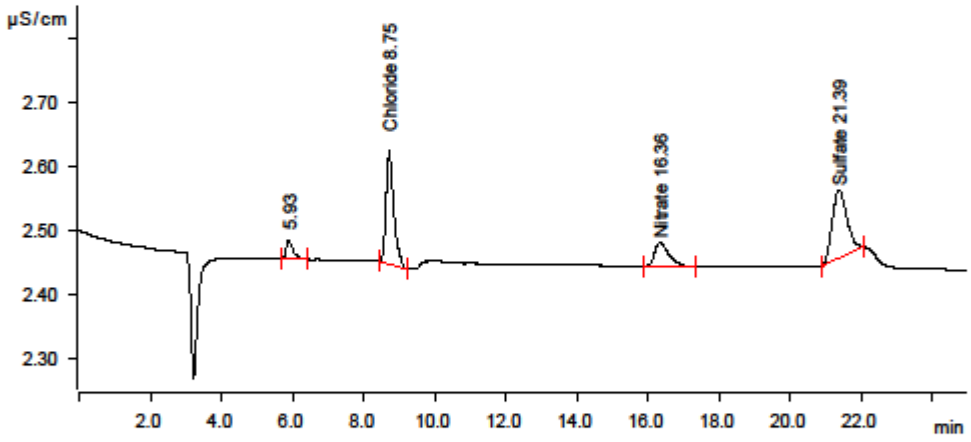
Sample data

Ident	wk12 sample 6a
Sample type	Sample
Determination start	2016-06-02 19:39:15 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.15	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.928	0.0067	0.030	invalid	
2	8.745	0.0434	0.177	0.160	Chloride
3	16.358	0.0169	0.036	0.043	Nitrate
4	21.387	0.0509	0.107	0.203	Sulfate

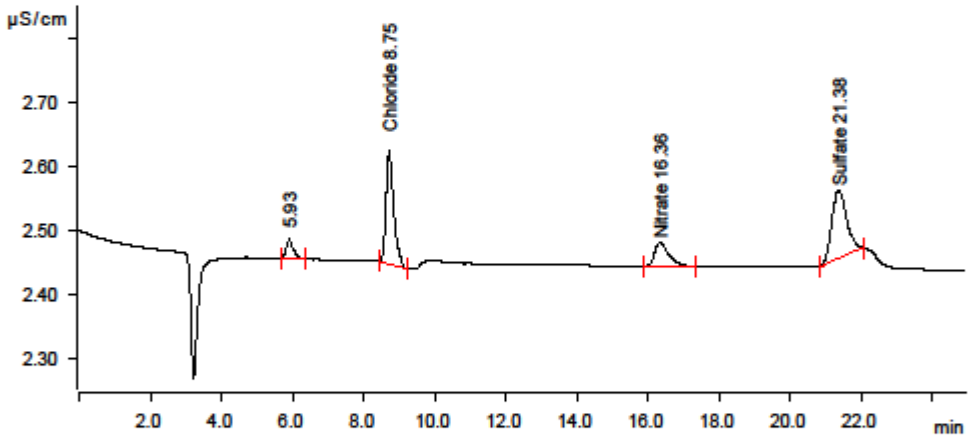
Sample data

Ident	wk12 sample 6b
Sample type	Sample
Determination start	2016-06-02 20:07:59 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.930	0.0069	0.031	invalid	
2	8.745	0.0435	0.178	0.160	Chloride
3	16.357	0.0167	0.036	0.043	Nitrate
4	21.380	0.0515	0.108	0.206	Sulfate

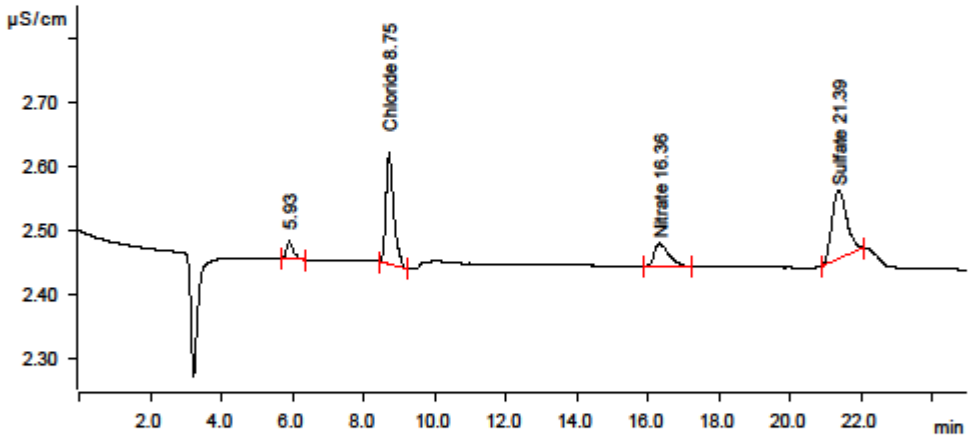
Sample data

Ident	wk12 sample 6c
Sample type	Sample
Determination start	2016-06-02 20:36:45 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	11.98	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.932	0.0066	0.029	invalid	
2	8.745	0.0432	0.175	0.159	Chloride
3	16.362	0.0167	0.036	0.043	Nitrate
4	21.387	0.0514	0.107	0.206	Sulfate

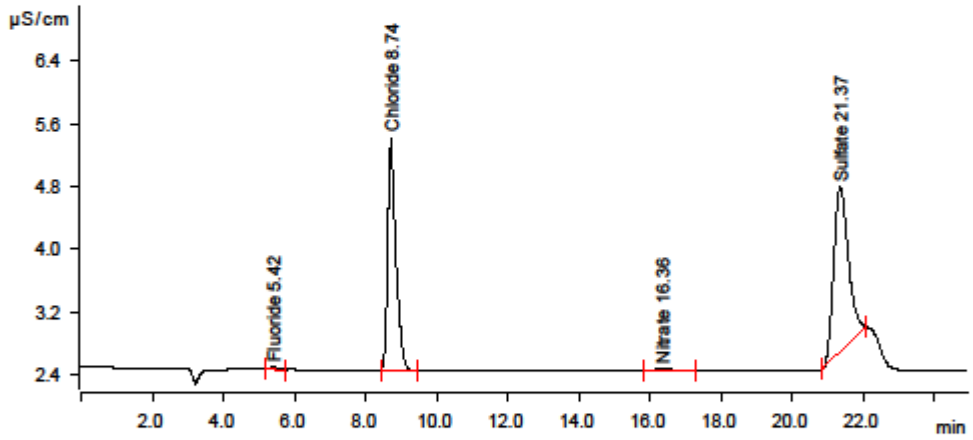
Sample data

Ident	wk12 sample 7a
Sample type	Sample
Determination start	2016-06-02 21:05:31 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.422	0.0074	0.038	0.012	Fluoride
2	8.735	0.7608	2.948	2.972	Chloride
3	16.358	0.0130	0.028	0.037	Nitrate
4	21.373	0.9919	2.105	5.389	Sulfate

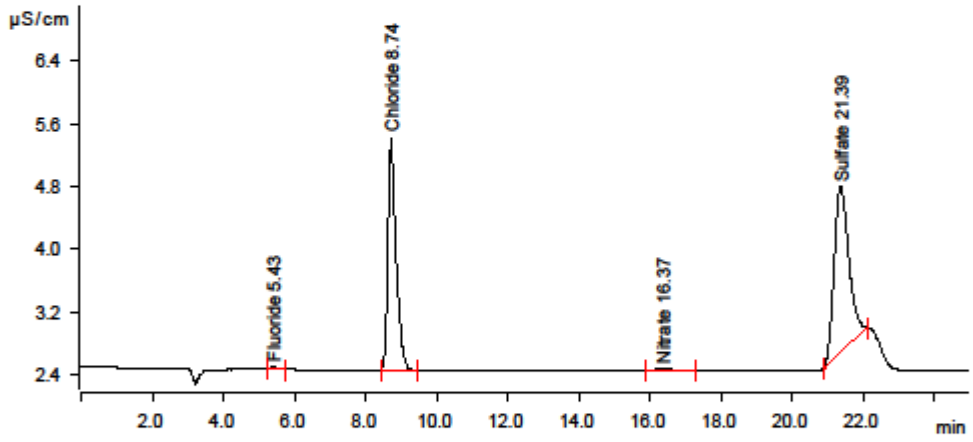
Sample data

Ident	wk12 sample 7b
Sample type	Sample
Determination start	2016-06-02 21:34:17 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.427	0.0074	0.038	0.012	Fluoride
2	8.740	0.7627	2.950	2.979	Chloride
3	16.365	0.0131	0.028	0.037	Nitrate
4	21.385	1.0028	2.120	5.448	Sulfate

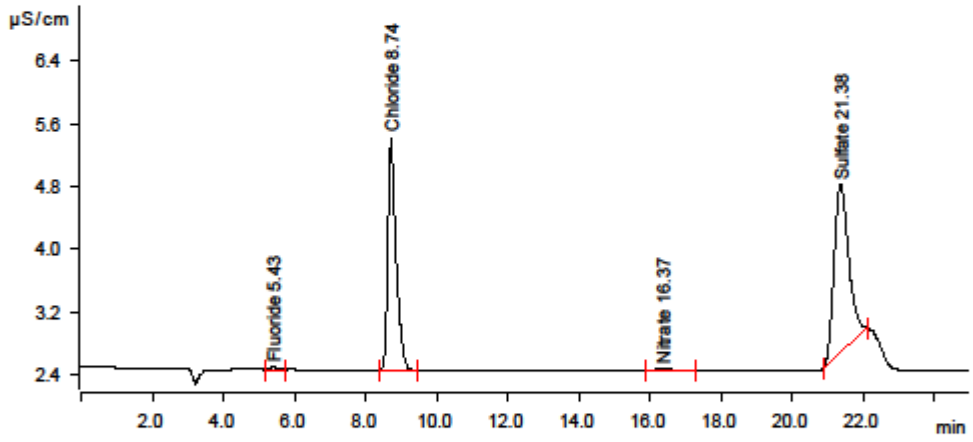
Sample data

Ident	wk12 sample 7c
Sample type	Sample
Determination start	2016-06-02 22:03:03 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	5.425	0.0074	0.038	0.012	Fluoride
2	8.740	0.7658	2.962	2.992	Chloride
3	16.370	0.0131	0.028	0.037	Nitrate
4	21.382	1.0113	2.138	5.493	Sulfate

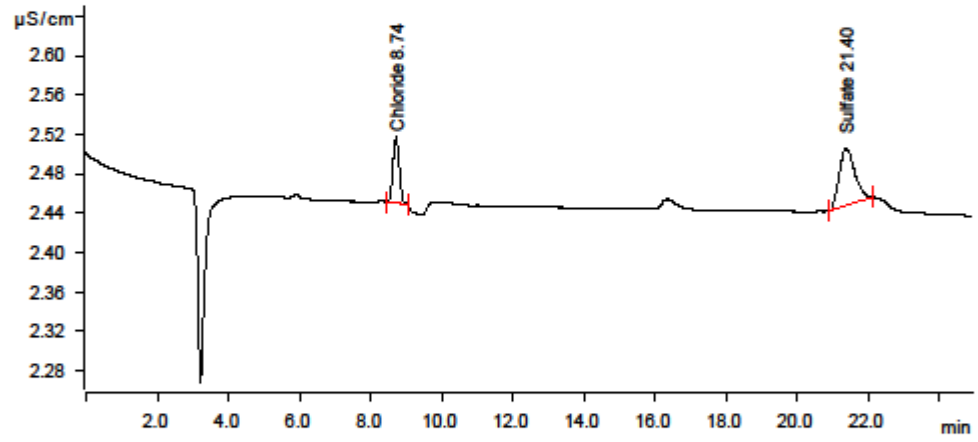
Sample data

Ident	wk12 sample 8a
Sample type	Sample
Determination start	2016-06-02 22:31:47 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.742	0.0138	0.068	0.042	Chloride
2	21.398	0.0292	0.059	0.080	Sulfate

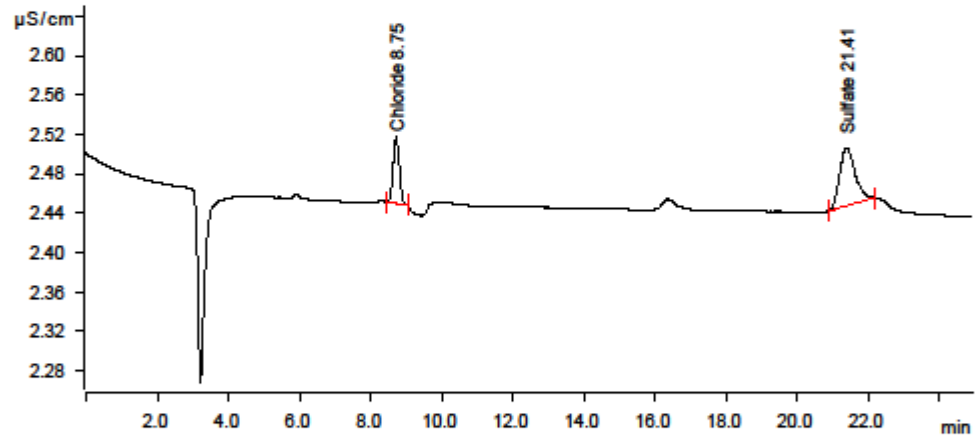
Sample data

Ident	wk12 sample 8b
Sample type	Sample
Determination start	2016-06-02 23:00:30 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.04	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.745	0.0136	0.067	0.041	Chloride
2	21.410	0.0294	0.059	0.081	Sulfate

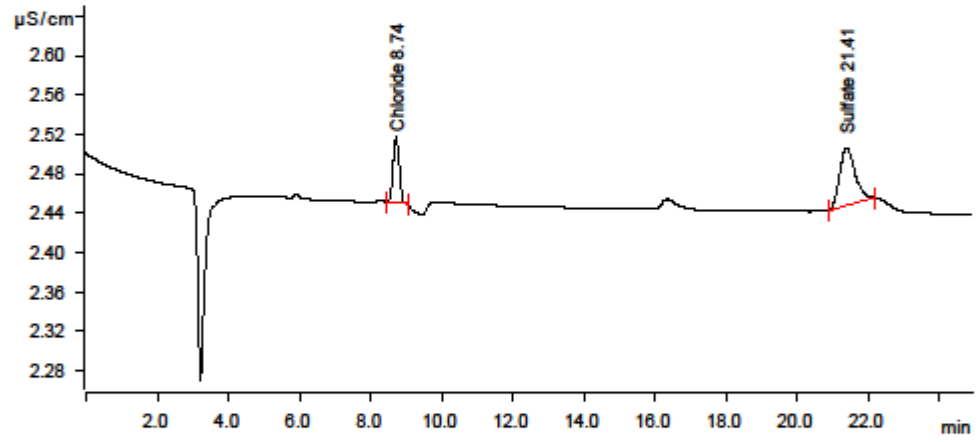
Sample data

Ident	wk12 sample 8c
Sample type	Sample
Determination start	2016-06-02 23:29:13 UTC+3
Method	Multi Anion STDs
Operator	

Anions

Data source	Conductivity detector 1 (881 Compact IC pro 1)	
Channel	Conductivity	
Recording time	25.0	min
Integration	Automatically	
Column type	Metrosep A Supp 7 - 250/4.0	
Eluent composition	Anion mobile Phase - 3.6 mM Na2CO3 (0.77 g in 2 liter)	
Flow	0.800	mL/min
Pressure	12.15	MPa
Temperature	45.0	°C

Anions



Peak number	Retention time min	Area (µS/cm) x min	Height µS/cm	Concentration ppm	Component name
1	8.742	0.0135	0.067	0.041	Chloride
2	21.407	0.0295	0.059	0.081	Sulfate