MILLENNIUM APPLICATION BRIEF

TOPIC: Analysis of [redacted] using Suppressed IC

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Date: 04/04/95

Introduction:

Analysis of anions in drinking water was accomplished using an Action analyzer and Alltech suppressor. As shown in figure 1, very low levels of anions can be detected. A Waters IC Pak-Anion-HR column was used for the separation in conjunction with the suppressor. The advantage this offers is that the same equipment and column technology can be used for IC analysis of anions by either suppressed or non-suppressed techniques as well as be used as a standard HPLC. Attached are two standards run at mid ppb (figure 1) and low ppm (figure2) levels.

Duplicate injections of three different levels of standards was done for the analysis of two drinking water samples. Correlation coefficients (r^2) of 0.99X with X being 8 or greater were obtained for each anion investigated. Figure 3 and 4 are the result of the two samples run. Supressor life typically was between 6-7 hours.

EXPERIMENTAL:

IC Analysis

System:	Waters [redacted]6 pump, [redacted] conductivity detector.
Data:	Waters [redacted]
Column:	Waters [redacted]HR (PN 26765)
Suppressor:	Alltech
Mobile Phase:	1.2 mM Na_2CO_3, 1.2 mM $NaHCO_3$
Flow Rate:	1.0 mL/min
Injection:	50 or 100uL

Figures:

Figure 1: Low level (ppb) standard
Figure 2: low ppm standard
Figure 3: Drinking water sample#2
Figure 4: Drinking water sample#3

Millennium Results Report		March 30, 1995			Page: 1 of 1
Report Method:	IC_Anion_Low		Version:	2.10	
For Sample:	Anion Test Mix-	Vial: 1	Injection:	1	Channel: SATIN
Proc Chan:	SATIN		Processed:	03/30/95 05:15:02 PM	
Channel Descr:	432-Conductivity				

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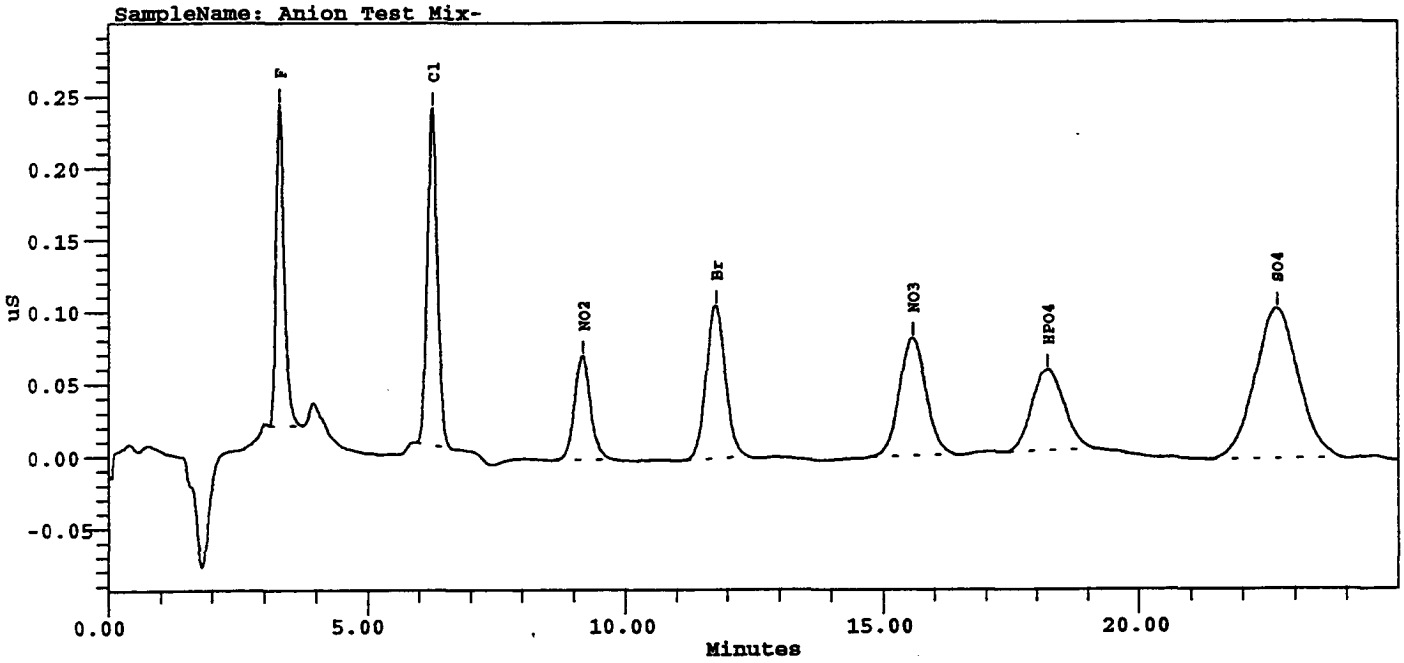
Sample Information

Project Name:	IC_Water		
SampleName:	Anion Test Mix-5 uL		
Vial:	1	Sample Type:	Standard
Injection:	1	Volume:	5.00
Channel:	SATIN	Run Time:	25.0 min
Date Acquired:	03/30/95 09:40:25 AM	Date Processed:	03/30/95 05:15:02 PM
Scale Factor:	1.00	Dilution:	1.00000
Acq Meth Set:	IC		
Processing Method:	Anion_all		



Peak Results

#	Name	Retention Time (min)	Area (uV*sec)	Height (uV)	Amount	Units
1	F	3.300	23464.00	2232	0.050	ppm
2	Cl	6.267	32464.64	2342	0.100	ppm
3	NO2	9.183	15487.00	714	0.200	ppm
4	Br	11.783	27471.50	1052	0.200	ppm
5	NO3	15.583	28848.31	809	0.200	ppm
6	HPO4	18.217	24338.00	553	0.300	ppm
7	SO4	22.667	59677.10	1032	0.200	ppm

Figure 1

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Report Method: IC_Anion_High Version: 2.10

For Sample: Anion Test Mix- Vial: 1 Injection: 1 Channel: SATIN

Proc Chan: SATIN Processed: 03/30/95 05:08:53 PM

Channel Descr: 432-Conductivity

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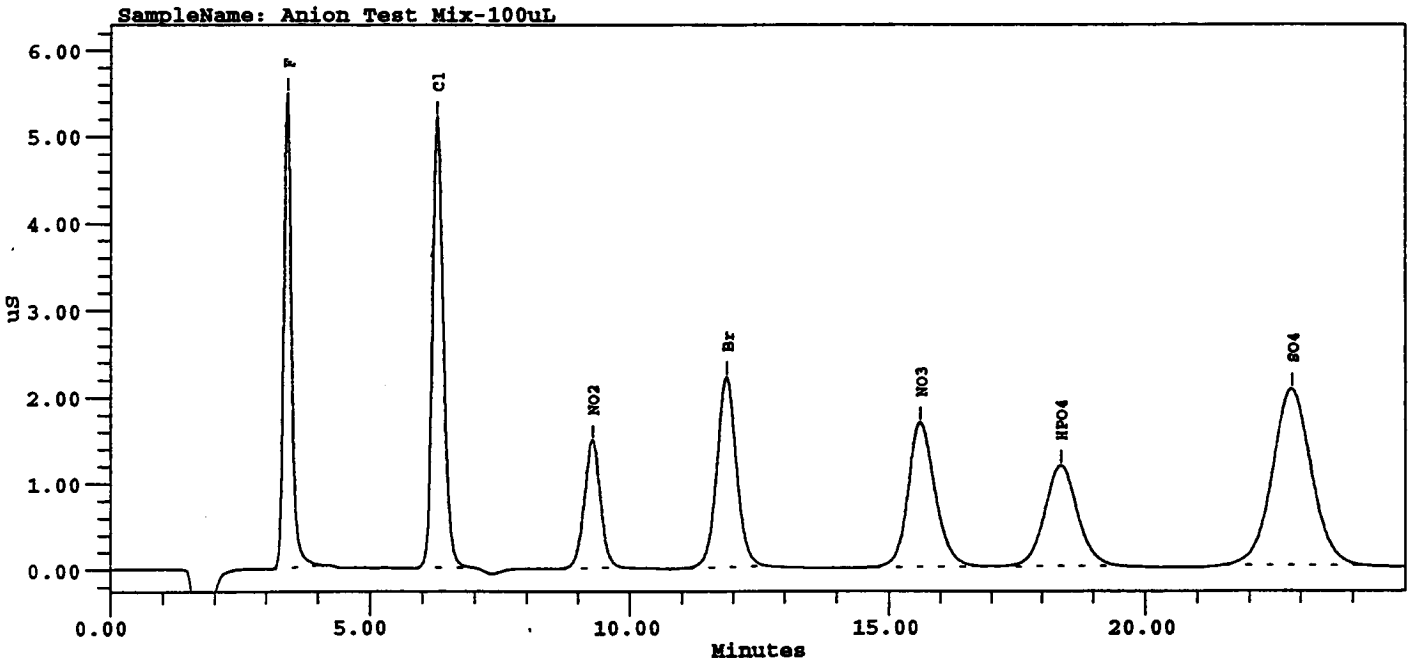
Sample Information

Project Name:	IC_Water		
SampleName:	Anion Test Mix-100uL		
Vial:	1	Sample Type:	Standard
Injection:	1	Volume:	100.00
Channel:	SATIN	Run Time:	25.0 min
Date Acquired:	03/30/95 11:01:39 AM	Date Processed:	03/30/95 05:08:53 PM
Scale Factor:	1.00	Dilution:	1.00000
Acq Meth Set:	IC		
Processing Method:	Anion_all		



Peak Results

#	Name	Retention Time (min)	Area (uV*sec)	Height (uV)	Amount	Units
1	F	3.417	572363.00	54846	1.000	ppm
2	Cl	6.283	759969.50	52168	2.000	ppm
3	NO2	9.283	329123.00	14917	4.000	ppm
4	Br	11.883	588290.00	22069	4.000	ppm
5	NO3	15.617	613368.03	16833	4.000	ppm
6	HPO4	18.367	520113.97	11691	6.000	ppm
7	SO4	22.833	1068366.00	20395	4.000	ppm

figure 2

Millennium Results Report		April 3, 1995		Page: 1 of 1
Report Method:	IC_Anion		Version: 2.10	
For Sample:	Water#2-Tap	Vial: 6	Injection: 1	Channel: SATIN
Proc Chan:	SATIN		Processed: 04/03/95 10:00:51 AM	
Channel Descr:	432-Conductivity			

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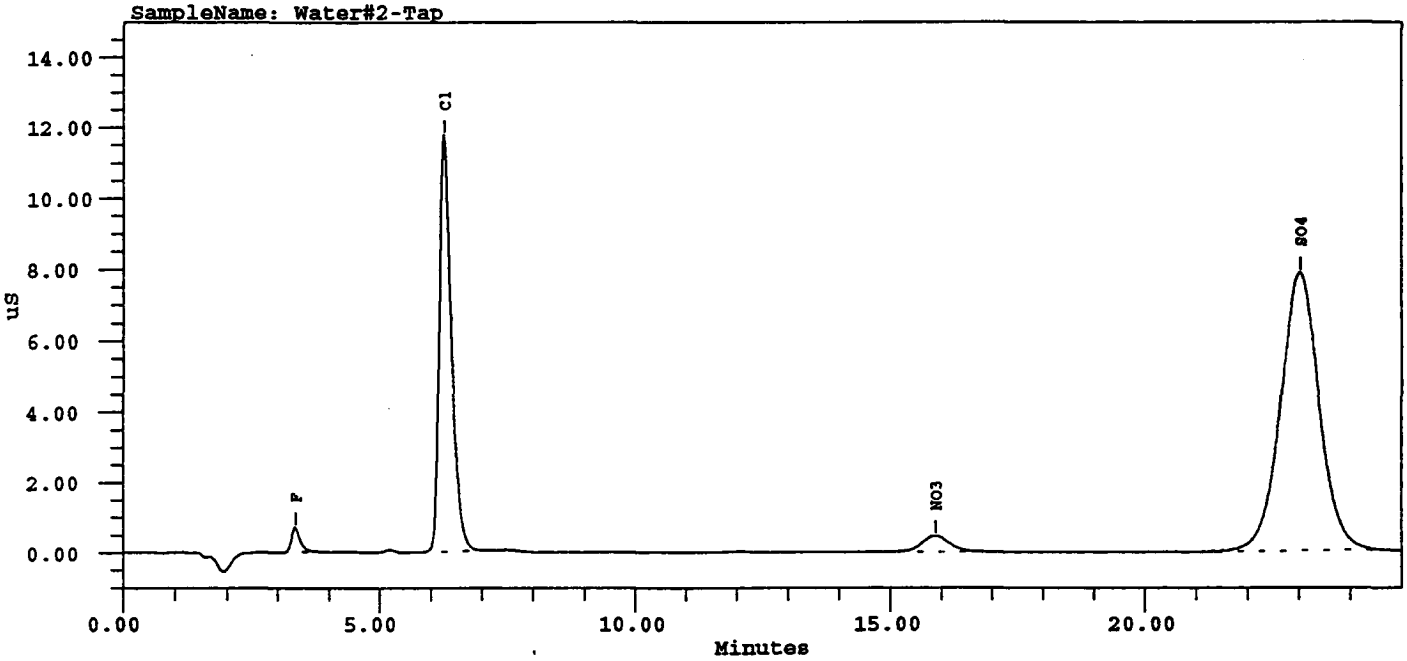
Sample Information

Project Name:	IC_Water		
SampleName:	Water#2-Tap		
Vial:	6	Sample Type:	Unknown
Injection:	1	Volume:	50.00
Channel:	SATIN	Run Time:	25.0 min
Date Acquired:	03/30/95 04:30:00 PM	Date Processed:	04/03/95 10:00:51 AM
Scale Factor:	1.00	Dilution:	1.00000
Acq Meth Set:	IC		
Processing Method:	Anion_02		



Peak Results

#	Name	Retention Time (min)	Area (uV*sec)	Height (uV)	Amount	Units
1	F	3.350	82761.00	7130	0.181	ppm
2	Cl	6.267	1935670.00	117423	4.750	ppm
3	NO3	15.883	165166.00	4563	0.979	ppm
4	SO4	23.033	4113430.00	78363	13.905	ppm

figure 3

Millennium Results Report		April 3, 1995			Page: 1 of 1
Report Method:	IC_Anion		Version:	2.10	
For Sample:	Water#3-DF	Vial: 7	Injection:	1	Channel: SATIN
Proc Chan:	SATIN		Processed:	04/03/95 10:01:25 AM	
Channel Descr:	432-Conductivity				

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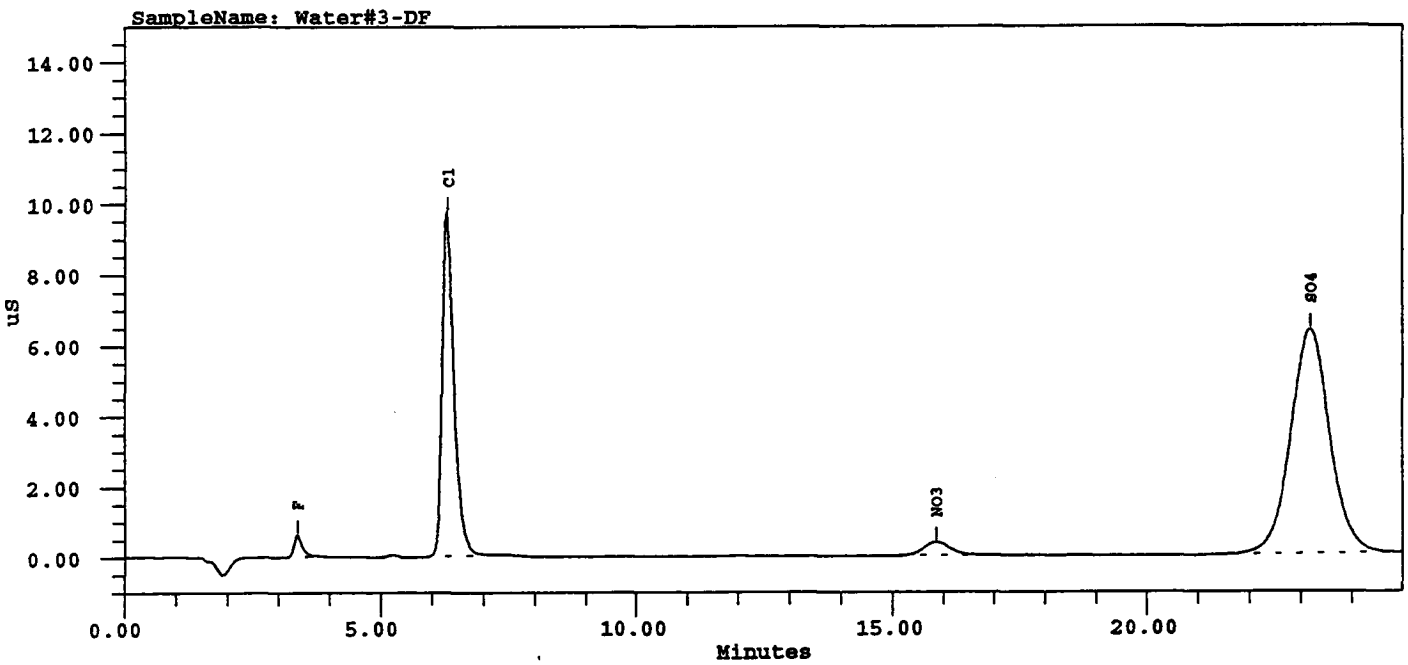
Sample Information

Project Name:	IC_Water		
SampleName:	Water#3-DF		
Vial:	7	Sample Type:	Unknown
Injection:	1	Volume:	50.00
Channel:	SATIN	Run Time:	25.0 min
Date Acquired:	03/30/95 05:23:54 PM	Date Processed:	04/03/95 10:01:25 AM
Scale Factor:	1.00	Dilution:	1.00000
Acq Meth Set:	IC		
Processing Method:	Anion_02		



Peak Results

#	Name	Retention Time (min)	Area (uV*sec)	Height (uV)	Amount	Units
1	F	3.367	69779.50	6201	0.161	ppm
2	Cl	6.300	1571745.00	97390	3.965	ppm
3	NO3	15.850	134162.00	3785	0.808	ppm
4	SO4	23.183	3369601.00	63506	11.566	ppm

figure 4