Appendix C

Results

Table C1

Retention time and peak area of 20 μmol L^{-1} parabens when used 0.075 mol L^{-1} SDS and 0.025 mol L^{-1} CTAB as mobile phase at flow rate of 0.75 mL min^{-1}

Mobile phase	MP		EP		PP		BP	
	t_1	A_1	t_2	A_2	t_3	A_3	t_4	A_4
SDS	1.376	791.523	2.081	293.469	2.614	100.004	3.318	50.9851
CTAB	4.675	193.737	6.312	196.986	8.415	190.527	10.538	208.508

t_0 = 0.200 min; t_R: retention time (min); A: peak area (mAU*s)

Table C2

Retention time and capacity factor of parabens at various concentrations of SDS in the range of 0.025-0.150 mol L^{-1}

[SDS] (mol L^{-1})	t_0 (min)	MP		EP		PP		BP	
		t_1	k_1	t_2	k_2	t_3	k_3	t_4	k_4
0.025	0.16	2.16	12.57	3.87	23.33	6.27	38.44	8.97	55.44
0.050	0.16	1.54	8.80	2.37	14.10	3.46	21.02	4.73	29.11
0.075	0.15	1.22	7.05	1.74	10.52	2.43	15.06	3.21	20.23
0.100	0.16	1.12	6.14	1.43	8.10	1.92	11.22	2.50	14.95
0.125	0.15	0.90	5.05	1.19	7.05	1.58	9.68	2.06	12.89
0.150	0.15	0.80	4.46	1.04	6.10	1.36	8.28	1.75	10.88

[SDS]: concentration of SDS in mobile phase

t_R: retention time (min)

k: capacity factor

Table C3

The reciprocal value of capacity factors of parabens and concentration of micelle in mobile phase

[SDS] (mol L^{-1})	[M][a] (mol L^{-1})	$1/k_{MP}$	$1/k_{EP}$	$1/k_{PP}$	$1/k_{BP}$
0.025	0.017	0.08	0.04	0.03	0.02
0.050	0.042	0.11	0.07	0.05	0.03
0.075	0.067	0.14	0.10	0.07	0.05
0.100	0.092	0.16	0.12	0.09	0.07
0.125	0.117	0.20	0.14	0.10	0.08
0.150	0.142	0.22	0.16	0.12	0.09

[a] [M] = [SDS] - CMC; CMC_{SDS} = 0.0083 mol L^{-1}

[SDS]: concentration of SDS in mobile phase

[M]: concentration of surfactant as micelle foam in mobile phase

t_R: retention time (min)

k: capacity factor

Table C4

Calculation of simplex optimization

Exp.	mol L^{-1}	mL min^{-1}	min		Resolution factor (R_S)				a = 1	min	b = 5	c = 1	CRF
	SDS	Flow rate	T_1	T_L	R_1	R_2	R_3	Total R	L	T_A	T_A-T_L	c(T_1-T_0)	
1	0.040	0.500	1.793	9.80	2.82	3.18	2.44	8.44	4	7.0	-2.8	0.593	-2.153
2	0.070	1.000	0.619	3.00	1.89	2.07	1.64	5.60	4	7.0	4.0	-0.581	-9.819
3	0.100	0.750	0.577	2.90	1.54	1.96	1.67	5.17	4	7.0	4.1	-0.623	-10.707
4	0.078	0.750	0.654	3.50	1.80	2.26	1.83	5.89	4	7.0	3.5	-0.546	-7.064
5	0.064	0.813	0.708	3.90	1.95	2.35	1.83	6.13	4	7.0	3.1	-0.492	-4.878
6	0.065	0.703	0.895	4.50	1.96	2.28	1.79	6.03	4	7.0	2.5	-0.305	-2.165
7	0.058	0.707	0.827	4.80	2.22	2.52	1.98	6.72	4	7.0	2.2	-0.373	0.093
8	0.041	0.554	1.324	8.40	2.65	3.08	2.35	8.08	4	7.0	-1.4	0.124	4.956
9	0.060	0.761	0.839	4.40	2.19	2.36	1.83	6.38	4	7.0	2.6	-0.361	-2.259
10	0.045	0.565	1.355	7.80	2.51	2.84	2.18	7.53	4	7.0	-0.8	0.155	7.375
11	0.051	0.633	0.985	6.00	2.63	2.75	2.13	7.51	4	7.0	1.0	-0.215	6.725
12	0.054	0.645	1.098	5.60	2.31	2.46	1.92	6.69	4	7.0	1.4	-0.102	3.792
13	0.045	0.576	1.538	7.70	2.52	2.68	2.06	7.26	4	7.0	-0.7	0.338	7.422
14	0.042	0.540	1.727	8.70	2.60	2.75	2.10	7.45	4	7.0	-1.7	0.527	2.423

Table C4 (Continued)

Exp.	mol L^{-1}	mL min^{-1}	min		Resolution factor (R_S)				a = 1	min	b = 5	c = 1	CRF
	SDS	Flow rate	T_1	T_L	R_1	R_2	R_3	Total R	L	T_A	T_A-T_L	$c(T_1-T_0)$	
15	0.041	0.551	1.707	8.60	2.66	2.72	2.07	7.45	4	7.0	-1.6	0.507	2.943
16	0.044	0.588	1.570	7.30	2.54	2.60	1.98	7.12	4	7.0	-0.3	0.370	9.250
17	0.046	0.612	1.439	7.00	2.59	2.55	2.15	7.29	4	7.0	0.0	0.239	11.051
18	0.049	0.637	1.314	6.40	2.54	2.50	1.93	6.97	4	7.0	0.6	0.114	7.856
19	0.047	0.616	1.331	6.80	2.73	2.65	2.02	7.40	4	7.0	0.2	0.131	10.269
20	0.048	0.651	1.322	6.50	2.59	2.49	1.92	7.00	4	7.0	0.5	0.122	8.378
21	0.047	0.632	1.352	6.90	2.58	2.55	1.97	7.10	4	7.0	0.1	0.152	10.448

CRF = chromatographic response function

For example (vertex 1); $CRF = \sum_{i=1}^{L} R_i + L^a - b \mid T_A - T_L \mid + c\,(T_1 - T_0)$

$= (2.82 + 3.18 + 2.44) + (4)^1 - 5 \mid 7 - 9.80 \mid + 1\,(1.793 - 1.2)$

$= - 0.967$

Table C5

Variable size simplex optimization

Vertex number	Vertex[a]	[SDS] (mol L^{-1})	Flow rate (mL min^{-1})	CRF[b]
1	I	0.040	0.500	-2.153
2	I	0.070	1.000	-9.819
3	I	0.100	0.750	-10.707
4	Cw	0.078	0.750	-7.064
5	Cw	0.064	0.813	-4.878
6	Cw	0.065	0.703	-2.165
7	Cw	0.058	0.707	0.093
8	Cr	0.041	0.554	4.956
9	R	0.060	0.761	-2.259
10	Cw	0.045	0.565	7.375
11	Cw	0.051	0.633	6.725
12	R	0.054	0.645	3.792
13	Cw	0.045	0.576	7.422
14	Cr	0.042	0.540	2.423
15	R	0.041	0.551	2.943
16	R	0.044	0.588	9.250
17	E	0.046	0.612	11.051
18	R	0.049	0.637	7.856
19	Cr	0.047	0.616	10.269
20	R	0.048	0.651	8.378
21	Cr	0.047	0.632	10.448

[a] I = initial vertex

R = relection vertex

C_R = contraction vertex on the reflection side

C_W = contraction vertex on the worse side

[b] CRF = chromatographic response function

Table C6

Peak area of parabens at various concentrations in the range of 1-100 μmol L^{-1}

[parabens]	A_{MP}		A_{EP}		A_{PP}		A_{BP}	
(μmol L^{-1})	AV	SD	AV	SD	AV	SD	AV	SD
1	17.97	2.07	13.79	1.21	20.41	2.22	19.27	1.31
5	88.64	7.12	86.88	3.36	93.52	3.59	83.93	10.47
10	193.75	20.24	198.54	14.19	202.15	4.96	193.85	12.62
20	355.99	10.65	358.17	16.22	379.94	19.45	372.55	15.93
30	540.25	26.32	554.34	22.61	567.66	33.29	562.41	11.16
40	711.73	37.26	730.34	31.40	779.43	31.07	741.26	24.60
50	905.07	51.14	923.54	42.19	987.31	43.39	944.55	29.87
75	1311.53	69.79	1352.02	61.51	1444.90	56.37	1379.06	42.92
100	1789.77	119.78	1841.02	106.19	1962.58	84.17	1871.53	64.69

A: peak area (mAU*s); AV: average; SD: standard deviation (n=3)

Table C7

Repeatability of standard parabens at concentration of 10 μmol L^{-1} (n=10)

Repeat	MP		EP		PP		BP	
	t_1	A_1	t_2	A_2	t_3	A_3	t_4	A_4
1	1.20	141.88	2.37	162.27	4.01	186.46	6.07	183.33
2	1.22	142.46	2.38	162.02	4.03	185.85	6.08	184.58
3	1.26	143.72	2.40	163.37	4.05	185.28	6.09	185.04
4	1.25	145.37	2.42	164.21	4.06	187.30	6.10	187.93
5	1.27	147.17	2.43	164.06	4.08	185.86	6.11	190.75
6	1.28	148.86	2.45	165.47	4.10	187.53	6.12	187.61
7	1.30	150.74	2.47	165.97	4.11	188.71	6.14	189.42
8	1.32	151.51	2.49	166.50	4.13	191.29	6.15	188.02
9	1.34	154.07	2.51	167.87	4.14	189.67	6.15	184.62
10	1.34	153.16	2.51	167.18	4.14	188.01	6.15	184.57

Table C7 (Continued)

Repeat	MP		EP		PP		BP	
	t_1	A_1	t_2	A_2	t_3	A_3	t_4	A_4
AV	1.28	147.89	2.44	164.89	4.08	187.60	6.12	186.59
SD	0.05	4.45	0.05	2.02	0.05	1.89	0.03	2.48
%RSD	3.76	3.01	2.08	1.23	1.13	1.01	0.51	1.33

t_R: retention time (min); A: peak area (mAU*s)

AV: average; SD: standard deviation; RSD: relative standard deviation (n=10)

Table C8

Reproducibility of parabens in sample number 6, 50 and 60 (n=7)

Sample number	Repeat	Weight (g)	Parabens (mg Kg^{-1})			
			MP	EP	PP	BP
6	1	0.1222	744.12	-	882.60	-
	2	0.1365	730.86	-	824.88	-
	3	0.1506	731.62	-	864.95	-
	4	0.1422	766.14	-	886.34	-
	5	0.1465	759.33	-	869.50	-
	6	0.4999	769.28	-	882.58	-
	7	0.4999	735.52	-	868.87	-
		AV	748.13	-	868.53	-
		SD	16.55	-	20.94	-
		%RSD	2.21	-	2.41	-
50	1	0.1056	993.03	-	1085.81	-
	2	0.1098	988.02	-	1080.77	-
	3	0.1019	970.68	-	1078.47	-
	4	0.1108	971.18	-	1079.65	-
	5	0.1055	992.87	-	1087.49	-
	6	0.5081	967.73	-	1053.45	-

Table C8 (Continued)

Sample number	Repeat	Weight (g)	Parabens (mg Kg^{-1})			
			MP	EP	PP	BP
50	7	0.5081	961.08	-	1059.08	-
		AV	977.80	-	1074.96	-
		SD	13.16	-	13.28	-
		%RSD	1.35	-	1.24	-
60	1	0.1046	154.61	17.06	10.91	59.12
	2	0.1214	155.67	17.13	11.28	58.76
	3	0.0937	152.41	17.95	10.93	62.06
	4	0.1204	153.75	17.06	11.18	59.28
	5	0.1270	152.05	17.54	11.55	59.43
	6	0.5184	158.27	17.31	11.33	61.88
	7	0.5184	149.80	17.17	10.69	58.76
		AV	153.79	17.32	11.12	59.90
		SD	2.74	0.33	0.29	1.44
		%RSD	1.78	1.89	2.65	2.40

AV: average; SD: standard deviation; RSD: relative standard deviation (n=7)

Table C9

Recovery study of parabens in placebo

Added (µmol L^{-1})	Found (µmol L^{-1})				%Recovery			
	MP	EP	PP	BP	MP	EP	PP	BP
5	4.87	5.05	4.82	4.97	97.46	100.94	96.41	99.43
10	9.59	10.17	9.68	10.08	95.91	101.74	96.77	100.80
20	20.40	20.58	20.32	20.13	101.98	102.88	101.62	100.63
40	38.42	39.15	38.10	38.74	96.05	97.89	95.25	96.84
60	57.84	57.65	57.40	59.35	96.40	96.09	95.66	98.92
80	79.28	79.27	78.15	80.62	99.10	99.09	97.69	100.77

Table C10

Recovery study of parabens in sample number 6, 17, 50 and 60

Sample number	Added (µmol L^{-1})	Found (µmol L^{-1})				%Recovery			
		MP	EP	PP	BP	MP	EP	PP	BP
6	10	10.53	9.76	10.23	9.31	105.31	97.59	102.33	93.08
	20	21.58	18.81	20.39	18.58	107.90	94.07	101.94	92.90
	30	32.76	28.40	29.85	27.72	109.19	94.68	99.50	92.40
	40	42.99	38.57	39.81	36.98	107.47	96.42	99.53	92.44
	50	54.50	51.07	51.16	49.60	109.01	102.13	102.33	99.20
17	10	10.35	10.00	9.91	9.96	103.52	100.03	99.14	99.57
	20	19.62	19.75	19.63	20.20	98.12	98.74	98.16	101.02
	30	29.35	29.63	29.91	29.83	97.84	98.76	99.69	99.43
	40	38.82	40.04	40.34	39.88	97.05	100.10	100.84	99.69
	50	48.42	50.83	51.42	51.48	96.85	101.66	102.83	102.97
50	10	10.04	10.18	9.80	9.98	100.35	101.77	97.98	99.84
	20	20.06	19.49	19.73	19.59	100.28	97.46	98.64	97.97
	30	31.14	30.29	31.47	30.80	103.81	100.96	104.90	102.66
	40	41.80	40.77	41.77	41.54	104.49	101.93	104.44	103.85
	50	51.78	50.49	51.50	50.65	103.57	100.98	103.00	101.29
60	10	9.85	9.88	10.24	10.05	98.50	98.77	102.38	100.47
	20	19.53	19.92	20.17	20.71	97.64	99.58	100.85	103.53
	30	30.06	30.50	30.43	30.99	100.20	101.67	101.42	103.32
	40	39.95	40.55	41.20	41.26	99.88	101.37	102.99	103.15
	50	49.73	50.58	50.90	51.75	99.47	101.16	101.80	103.50

Table C11

Peak area ratio of perchlorate and internal standard at various injection volumes

Loop (µL)	ClO_4^- (0.005 mg L^{-1})		ClO_4^- (0.02 mg L^{-1})		ClO_4^- (1.00 mg L^{-1})	
	Peak area	Peak area ratio[a]	Peak area	Peak area ratio[a]	Peak area	Peak area ratio[a]
10	0	0	0	0	660375	1.2391
20	0	0	25707	0.0482	1355202	2.5429
30	0	0	32513	0.0610	1848141	3.4679
40	0	0	36325	0.0682	2271169	4.2617
50	9146	0.0172	42957	0.0806	2450724	4.5986
60	16666	0.0313	54882	0.1030	2633146	4.9409
70	28741	0.0539	68418	0.1284	2970932	5.5747
80	20931	0.0393	75736	0.1421	3225252	6.0519
90	15765	0.0296	84699	0.1589	3383087	6.3481
100	29118	0.0546	98533	0.1849	3706942	6.9558

[a] peak area of perchlorate / peak area of internal standard

Table C12

Calibration equations of perchlorate at various injection volumes

Loop (µL)	Calibration equations		
	Slope	Intercept	R^2
50	4.6072	0.0087	1
60	4.9354	0.0054	1
70	5.5529	0.0218	1
80	6.0368	0.0152	1
90	6.3334	0.0150	1
100	6.9228	0.0331	1

Table C13

Retention time and peak area ratio of perchlorate and IS at various %methanol

MeOH (%)	ClO_4^-		Cl^-		SO_4^{2-}		PO_4^{3-}	
	t_R[a]	Area ratio[b]	t_R	Area ratio	t_R	Area ratio	t_R	Area ratio
0	2.73	13.92	1.95	92.09	2.66	156.41	2.18	52.63
5	2.33	19.98	1.95	135.96	2.27	211.36	2.01	108.13
10	2.15	23.26	1.93	170.65	2.05	322.90	1.91	143.83
15	2.05	1.88	1.84	40.93	1.95	76.62	1.90	19.29
20	2.00	1.00	1.79	21.21	1.93	28.42	1.86	7.83

[a] retention time (min); [b] peak area of anion / peak area of internal standard

Table C14

Retention time and peak area ratio of perchlorate and IS at various %acetic acid

Acetic acid (%)	ClO_4^- (0.05 mg L^{-1})		ClO_4^- (0.10 mg L^{-1})		ClO_4^- (0.20 mg L^{-1})	
	t_R[a]	Area ratio[b]	t_R	Area ratio	t_R	Area ratio
0.00	1.21	10.35	1.25	21.42	1.21	42.34
0.05	2.19	7.67	2.21	13.62	2.22	27.87
0.10	2.22	3.28	2.21	6.27	2.21	11.10

[a] retention time (min); [b] peak area of perchlorate / peak area of internal standard

Table C15

Calibration equations of perchlorate at various %acetic acid

Acetic acid (%)	Calibration equations		
	Slope	Intercept	R^2
0.00	212.69	0.1088	0.9998
0.05	135.77	0.5471	0.9982
0.10	51.59	0.8624	0.9970

Table C16

Retention time and peak area ratio of perchlorate and IS at various concentrations of ion-pairing reagent in mobile phase

[IPR]	ClO_4^- (10 µg L^{-1})		ClO_4^- (30 µg L^{-1})		ClO_4^- (50 µg L^{-1})	
(µmol L^{-1})	t_R[a]	Area ratio[b]	t_R	Area ratio	t_R	Area ratio
5	1.25	0.42	1.23	1.14	1.24	1.66
10	1.21	0.47	1.22	1.38	1.21	2.07
20	1.16	0.43	1.15	0.87	1.16	1.38
30	1.15	0.35	1.14	0.78	1.14	1.11
40	1.14	0.19	1.12	0.55	1.13	0.90
80	1.12	0.17	1.10	0.42	1.11	0.69

[a] retention time (min); [b] peak area of perchlorate / peak area of internal standard

IPR: ion-pairing reagent

Table C17

Calibration equations of perchlorate at various concentrations of ion-pairing reagent in mobile phase

[IPR] (µmol L^{-1})	Calibration equations		
	Slope	Intercept	R^2
5	0.0310	0.1442	0.9924
10	0.0400	0.1090	0.9938
20	0.0238	0.1804	0.9984
30	0.0190	0.1766	0.9933
40	0.0176	0.0166	0.9998
80	0.0130	0.0392	0.9987

IPR: ion-pairing reagent

Table C18

Peak area ratio of perchlorate and IS between Full and SIM mode

$[ClO_4^-]$ (mg L^{-1})	Full		SIM	
	Peak area ratio[a]	SD[b]	Peak area ratio[a]	SD[b]
0.1	0.13	0.02	0.07	0.02
0.5	5.18	0.26	2.36	1.75
1.0	13.10	0.68	4.75	3.61
3.0	35.12	1.12	18.41	0.99
5.0	55.08	1.19	28.93	0.88

[a] average peak area of perchlorate / peak area of internal standard

[b] SD: standard deviation (n=3)

Table C19

Calibration equations of perchlorate between Full and SIM mode

Scanning mode	Calibration equations		
	Slope	Intercept	R^2
Full	11.1676	0.2797	0.9964
SIM	6.0095	0.6359	0.9972

Table C20

Peak area of parent and daughter ions of perchlorate at various collision energies

CE (%)	Parent ion (*m/z* 301)		Daughter ion (*m/z* 242)		Daughter ion (*m/z* 187)		Daughter ion (*m/z* 128)	
	AV	SD	AV	SD	AV	SD	AV	SD
26.0	3343342	100222	244269	32650	95772	6796	22176	3741
26.5	2960731	62388	396985	13420	121862	21344	71797	12982
27.0	2521154	98091	602242	52123	184262	8162	115059	13407
27.5	1891893	62014	856683	90010	257980	8470	162790	11338
28.0	1563050	31235	1019834	60048	306283	29660	227605	24531
28.5	1278141	58334	1086733	45713	341319	42194	237330	15922
29.0	739863	49426	1160322	37017	367780	18567	262813	43416
29.5	373050	31817	1217445	58358	343076	14261	319562	22192
30.0	157066	6749	1240504	17876	324649	10578	331070	10747
30.5	72148	8823	1208010	8781	299835	28947	333008	19504
31.0	37703	580	1173584	78692	279755	25574	343096	19587
31.5	30036	3460	1141348	36823	277182	10483	345614	8981
32.0	16061	3191	1078687	25212	276952	33603	358721	28182
32.5	7579	1020	1046253	97658	250243	17616	382842	7810
33.0	4839	791	1015446	23660	234481	22637	372997	26824
33.5	0	0	986162	36862	219429	19520	362416	44190
34.0	0	0	944882	22349	215532	15233	351197	25335
34.5	0	0	883696	70127	202703	20903	341174	17594
35.0	0	0	838257	32605	176449	8416	321138	20713

CE: collision energy; AV: average peak area; SD: standard deviation (n=3)

Table C21

Peak area ratio of perchlorate and internal standard at various concentrations

$[ClO_4^-]$ (mg L^{-1})	Peak area ratio[a]	SD[b]
0.004	0.1949	0.0099
0.005	0.2801	0.0054
0.01	0.4889	0.0113
0.02	1.1655	0.0327
0.04	2.2710	0.0157
0.06	3.2024	0.0219
0.08	4.8685	0.0568
0.1	6.0165	0.0283
0.2	11.5657	0.5319
0.4	23.3583	0.1754
0.6	36.5663	0.0593
0.8	48.6840	1.0058
1	60.3178	0.0648
3	134.4467	0.2527
5	187.9793	1.5218
10	290.8654	3.0655
20	386.6100	2.5755
50	459.7450	3.9067

[a] average peak area of perchlorate / peak area of internal standard

[b] SD: standard deviation (n=3)

Table C22

Peak area ratio of perchlorate and internal standard at concentration of 4-50 µg L^{-1}

$[ClO_4^-]$ (µg L^{-1})	Peak area ratio[a]	SD[b]
4	0.0370	0.0044
10	0.1671	0.0495
20	0.4130	0.0347
30	0.7026	0.0757
40	0.9510	0.0270
50	1.2308	0.0505

[a] average peak area of perchlorate / peak area of internal standard

[b] SD: standard deviation (n=3)

Table C23

Repeatability of perchlorate in real samples (Soil-1 and Water-1)

Replicate	Soil-1[a]	Water-1[b]
	Peak area ratio	Peak area ratio
1	0.08	0.65
2	0.09	0.63
3	0.07	0.53
4	0.08	0.46
5	0.08	0.44
6	0.08	0.52
7	0.08	0.44
8	0.08	0.61
9	0.08	0.51
10	0.06	0.44
AV	0.08	0.52
SD	0.01	0.08
%RSD	9.80	15.54

[a] spiked with 10 µg L^{-1} ClO_4^-; [b] spiked with 50 µg L^{-1} ClO_4^-

Table C24

Reproducibility of perchlorate in real samples (Soil-1 and Water-1)

Replicate	Soil-1[a]	Water-1[b]
	Peak area ratio	Peak area ratio
1	0.06	0.53
2	0.06	0.40
3	0.09	0.39
4	0.07	0.38
5	0.05	0.37
6	0.06	0.37
7	0.08	0.52
8	0.06	0.58
9	0.07	0.56
10	0.05	0.58
AV	0.07	0.47
SD	0.01	0.09
%RSD	15.57	19.77

[a] spiked with 10 µg L^{-1} ClO_4^-; [b] spiked with 50 µg L^{-1} ClO_4^-

Table C25

Recovery study of perchlorate in real samples

Samples	Non-treatment			SPE treatment		
	Added	Found	%Recovery	Added	Found	%Recovery
Soil-1	1.23	0.16	12.68	1.27	0.46	35.91
Water-1	1.23	0.25	19.99	1.27	0.46	36.08
Water-5	0.48	0.41	86.59	-	-	-
Water-6	0.48	0.38	80.10	-	-	-

Table C26

Effect of phosphate on perchlorate detection

Bottles	$[ClO_4^-]$ (mg L^{-1})	$[PO_4^{3-}]$ (mg L^{-1})	Peak area[a]	SD[b]
1	0.01	0	399834	23129
2	0.01	0.01	437495	44309
3	0.01	0.05	465826	18509
4	0.01	0.1	466706	22470
5	0.01	0.3	464904	31551
6	0.01	0.5	438875	35883
7	0.01	1	529729	51864
8	0.01	5	552194	34120
9	0.01	10	668833	73186
10	0.01	20	736786	1221
11	0.01	50	445848	856
12	0.01	100	254861	37319

[a] average peak area of perchlorate

[b] SD: standard deviation (n=3)

Table C27

Effect of sulphate on perchlorate detection

Bottles	$[ClO_4^-]$ (mg L^{-1})	$[SO_4^{2-}]$ (mg L^{-1})	Peak area[a]	SD[b]
1	0.01	0	366433	42800
2	0.01	0.01	341043	53391
3	0.01	0.05	366178	37243
4	0.01	0.1	409219	7181
5	0.01	0.3	420055	21378
6	0.01	0.5	482385	46492
7	0.01	1	524106	63098
8	0.01	5	906353	65023
9	0.01	10	938593	13085
10	0.01	20	813170	70154
11	0.01	50	636694	23459
12	0.01	100	579019	45329

[a] average peak area of perchlorate

[b] SD: standard deviation (n=3)

Table C28

Tolerant limit of sulphate with SPE treatment

Bottles	$[ClO_4^-]$ (mg L^{-1})	$[SO_4^{2-}]$ (mg L^{-1})	Peak area	SD[a]
1	0.03	0	276648	22758
2	0.03	10	322156	15994
3	0.03	50	249979	20267
4	0.03	100	213946	5586
5	0.03	150	158935	5771

[a] SD: standard deviation (n=4)

Table C29

Peak area of perchlorate obtained from solid phase extraction (dry and wet elution)

No.	Fraction (number of mL)	Dry		Wet	
		Peak area[a]	SD[b]	Peak area	SD
1	No SPE	342934	33071	402415	12560
2	1-3	114939	19506	173294	14398
3	4-5	141932	5511	403061	3880
4	6-7	225368	9748	402789	29714
5	8-9	183518	26806	375826	39821
6	10-11	127600	14277	421939	28296
7	12-13	-	-	421954	12364

[a] average peak area of perchlorate

[b] SD: standard deviation (n=3)