

図1 Bisphenol Aの検出感度に及ぼす移動相中の酢酸濃度の影響

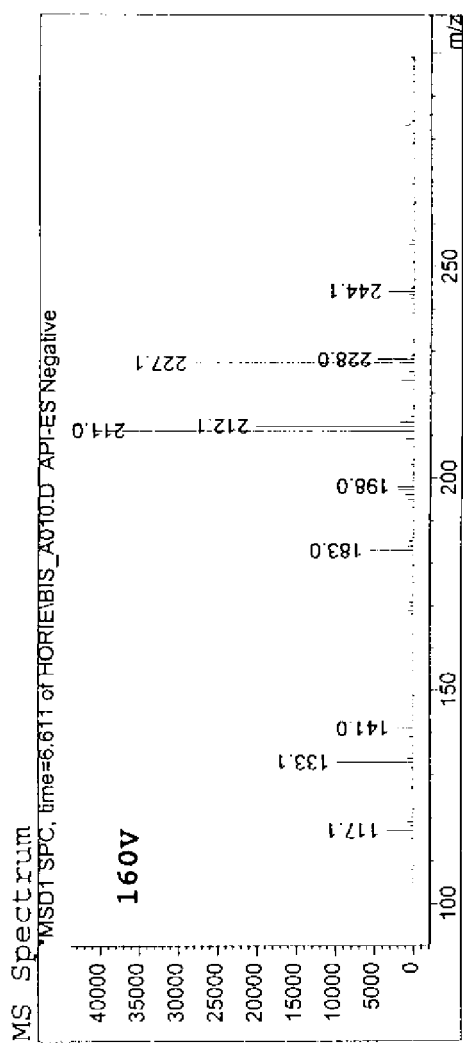
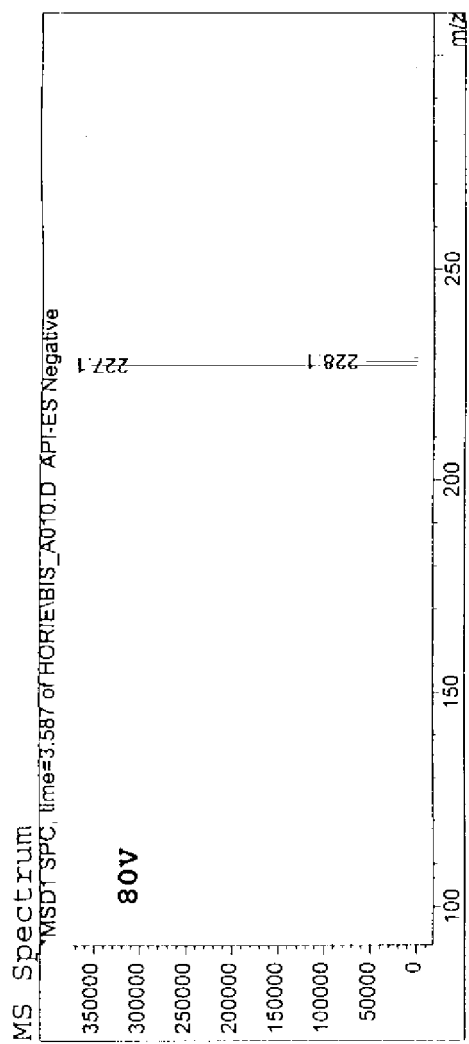


図2 Bisphenol AのLC-ESI-MS スペクトルに及ぼすフラグメンター電圧の影響

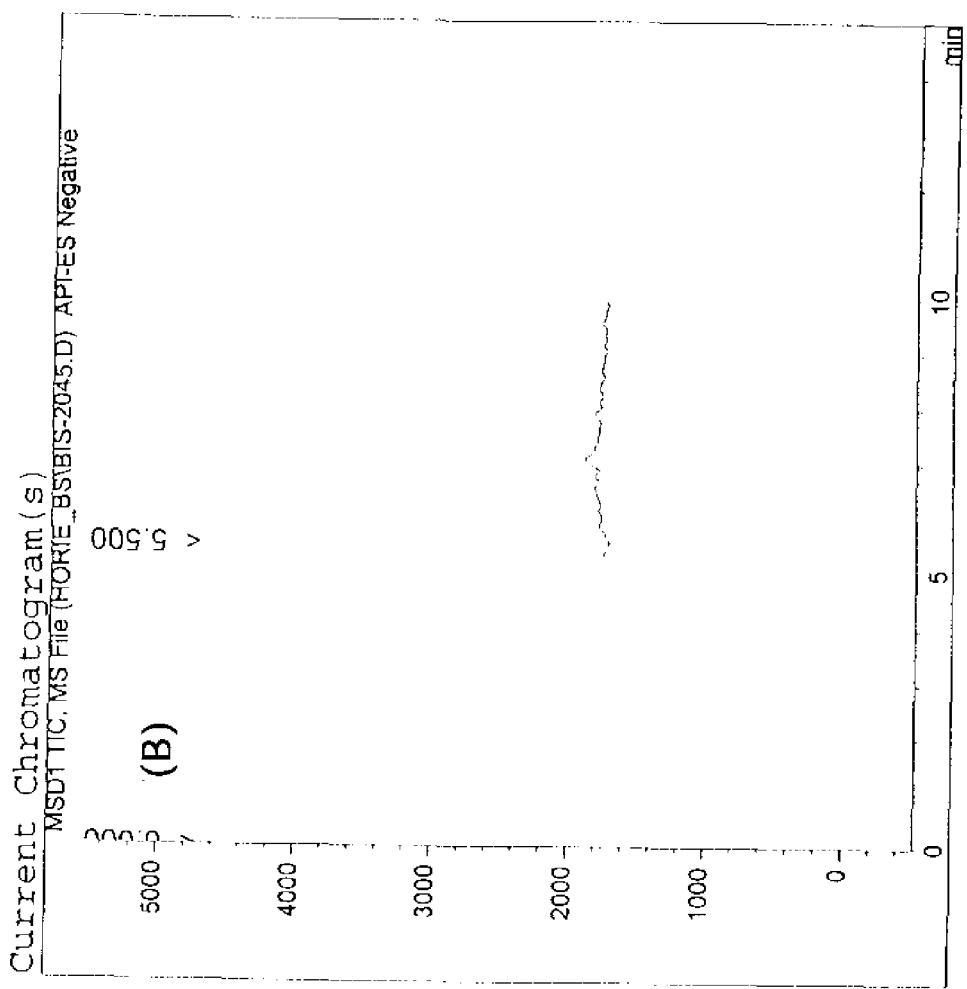
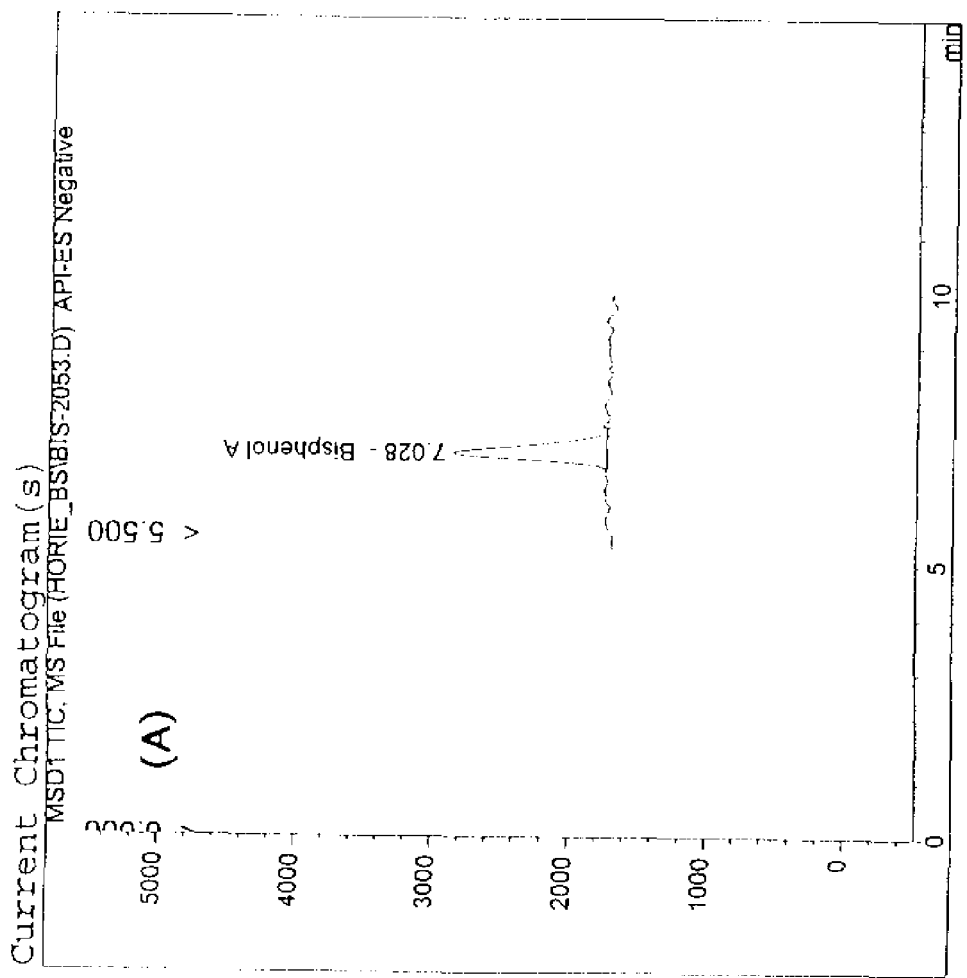


図3 (A) Bisphenol A標準溶液(2ng/ml)及び(B)血清のLC-ESI-MS SIMクロマトグラム

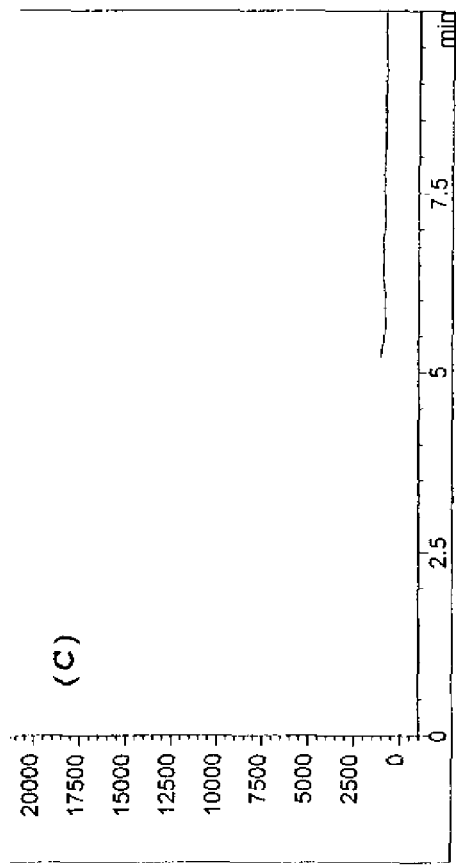
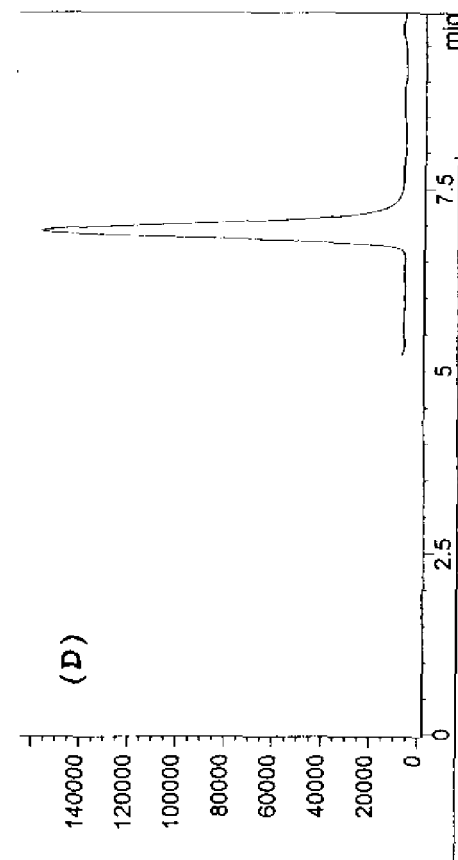
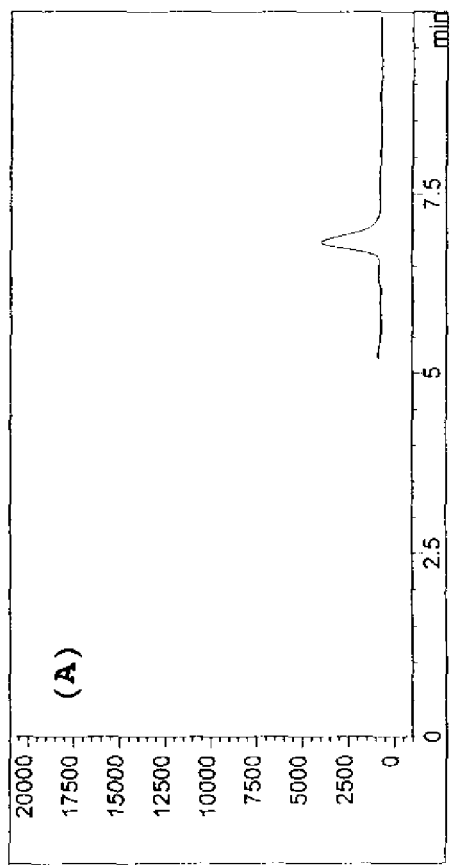
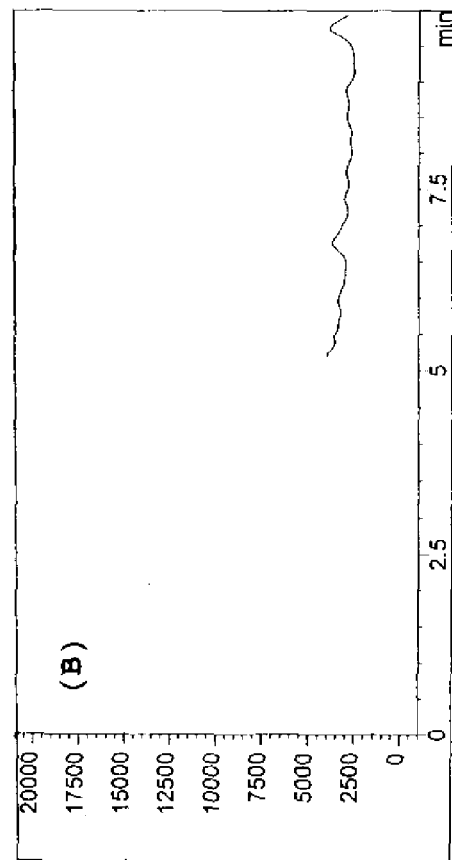


図4 缶飲料のLC-ESI-MS SIM クロマトグラム  
 (A) 標準溶液 (5ng/ml), (B) コーヒー缶飲料, (C) 紅茶缶飲料,  
 (D) コーヒー缶飲料 (BPA 152ng/ml 検出)

**表 1 Operating Conditions of LC-MS**

Apparatus: HP1100 Series LC/MSD (Hewlett Packard)

MS Conditions	HPLC Conditions
Ionization Mode : ESI, Negative Mode	Column : Zorbax XDB-C18 (150 x 2.1 mm)
Fragmentor : 80 V	Eluent : 0.01% acetic acid-MeCN (60:40)
Nebulizer : N <sub>2</sub> (35 psi)	Flow rate : 0.2 mL/min
Drying gas : N <sub>2</sub> (10L/min, 350°C)	Oven temp. : 40°C
V-cap : 4250 V	Injection size : 10 μL
SIM ion : m/z 227	

表2 添加回收実験

Sample	Added (ng/ml)	Recovery(%)
Serum	5	79.5 ± 7.3
Coffee (milk)	10	85.7 ± 3.9
Tea (milk)	10	91.2 ± 2.5
Fruit drink	10	86.3 ± 3.1

Values are mean ± S.D. (n=5)

表3 血清及び血漿中のBisphenol A濃度

試料	Bisphenol A (ng/ml)
Serum (No.1)	<0.1
Serum (No.2)	<0.1
Serum (No.3)	<0.1
Serum (No.4)	<0.1
Serum (No.5)	<0.1
Serum (No.6)	<0.1
Serum (No.7)	<0.1
Plasma (No.1)	0.11(?)
Plasma (No.2)	0.47(?)
Plasma (No.3)	0.40(?)

表 4 Concentration of bisphenol A in canned coffee drinks and result of migration test

No.	Sample	Brand	Content(g)	Can		Bisphenol A		Migration data(ng/ml)	
				Material	Type	Concentration(ng/ml)	Total( $\mu$ g/can)	95°C, 30min	121°C, 15min
1	Coffee(milk)	A	250	Steel	Old	7.1	1.8	0.10	1.50
2	Coffee(milk)	A	190	Steel	Old	7.3	1.4	0.06	2.50
3	Coffee(milk)	B	170	Steel	Old	17.8	3.0	0.07	2.90
4	Coffee(milk)	B	170	Steel	Old	10.9	1.8	0.11	2.25
5	Coffee(milk)	C	190	Steel	Old	59.5	11.3	1.05	27.70
6	Coffee(milk)	C	190	Steel	Old	58.5	11.1	0.72	21.20
7	Coffee(milk)	C	190	Steel	Old	31.9	6.1	0.33	15.40
8	Coffee(milk)	D	190	Steel	Old	212.1	40.2	0.30	14.00
9	Coffee(milk)	D	190	Steel	Old	193.3	36.7	0.88	14.80
10	Coffee(milk)	D	190	Steel	Old	152.1	28.9	0.63	10.70
11	Coffee(black)	D	190	Steel	Old	169.5	32.2	1.31	20.00
12	Coffee(milk)	D	250	Steel	Old	145.2	36.3	0.51	14.00
13	Coffee(milk)	E	190	Steel	Old	3.9	0.7	0.08	3.10
14	Coffee(milk)	F	190	Steel	Old	N.D.	-	<0.05	0.15
15	Coffee(milk)	F	250	Steel	Old	5.3	1.3	0.08	0.85
16	Coffee(milk)	G	250	Steel	Old	73.7	18.4	0.53	16.60
17	Cafe au lait	H	190	Steel	Old	5.0	1.0	<0.05	1.08
18	Coffee(milk)	I	190	Steel	New	N.D.	-	<0.05	<0.05
19	Coffee(milk)	I	190	Steel	New	N.D.	-	<0.05	<0.05
20	Coffee(milk)	I	190	Steel	New	N.D.	-	<0.05	<0.05
21	Coffee(milk)	I	190	Steel	New	N.D.	-	<0.05	<0.05
22	Coffee(milk)	I	190	Steel	New	N.D.	-	<0.05	<0.05
23	Coffee(milk)	J	190	Steel	New	N.D.	-	<0.05	0.08
24	Coffee(milk)	K	250	Aluminum	-	N.D.	-	<0.05	0.85
25	Coffee(black)	K	185	Aluminum	-	N.D.	-	<0.05	<0.05
26	Coffee(black)	D	900	PET	-	N.D.	-	-	-

N.D. : Not detected (<2ng/ml)



表 5 Concentration of bisphenol A in canned tea drinks and result of migration test

No.	Sample	Brand	Content(g)	Can		Bisphenol A		Migration data(ng/ml)	
				Material	Type	Concentration(ng/ml)	Total( $\mu$ g/can)	95°C, 30min	121°C, 15min
1	Tea(black)	A	340	Steel	Old	1.0	0.3	0.87	4.20
2	Tea(milk)	A	340	Steel	Old	70.0	23.8	0.42	14.50
3	Tea(milk)	B	280	Steel	Old	15.0	4.2	<0.05	2.45
4	Tea(milk)	B	340	Steel	Old	15.2	5.2	0.11	2.50
5	Tea(lemon)	B	340	Steel	Old	4.7	1.6	1.00	17.30
6	Japanese tea	B	340	Steel	Old	11.0	3.7	<0.05	1.10
7	Tea(milk)	C	340	Steel	Old	129.2	43.9	0.33	8.40
8	Tea(black)	C	340	Steel	Old	12.9	4.4	<0.05	2.50
9	Tea(milk)	C	340	Steel	Old	N.D.	-	<0.05	1.00
10	Tea(milk)	D	280	Steel	Old	14.7	4.1	0.21	1.50
11	Tea(milk)	A	280	Steel	New	N.D.	-	<0.05	<0.05
12	Japanese tea	C	340	Steel	New	N.D.	-	<0.05	<0.05
13	Japanese tea	C	340	Steel	New	N.D.	-	<0.05	<0.05
14	Tea(milk)	E	280	Steel	New	N.D.	-	<0.05	<0.05
15	Japanese tea	E	340	Steel	New	N.D.	-	<0.05	<0.05
16	Healthy tea	F	340	Steel	New	N.D.	-	<0.05	<0.05
17	Healthy tea	G	340	Steel	New	N.D.	-	<0.05	<0.05
18	Healthy tea	H	340	Steel	New	N.D.	-	<0.05	<0.05
19	Chinese tea	I	340	Steel	New	N.D.	-	<0.05	<0.05
20	Japanese tea	J	340	Steel	New	N.D.	-	<0.05	<0.05
21	Tea(milk)	A	500	PET	-	N.D.	-	-	-
22	Tea(black)	A	500	PET	-	N.D.	-	-	-
23	Tea(milk)	C	500	PET	-	N.D.	-	-	-
24	Japanese tea	J	500	PET	-	N.D.	-	-	-

N.D. : Not detected (<0.5ng/ml)

**表 6 Concentration of bisphenol A in canned fruit soft drinks and result of migration test**

No.	Sample	Brand	Content(g)	Can		Bisphenol A		Migration data(ng/ml)	
				Material	Type	Concentration(ng/ml)	Total( $\mu$ g/can)	95°C, 30min	121°C, 15min
1	Fruit drink	A	225	Steel	Old	N.D.	-	<0.05	17.10
2	Fruit drink	A	225	Steel	Old	N.D.	-	0.45	12.70
3	Fruit drink	A	225	Steel	Old	N.D.	-	0.15	10.95
4	Fruit drink	A	225	Steel	Old	N.D.	-	<0.05	7.70
5	Fruit drink	A	225	Steel	Old	N.D.	-	0.17	11.30
6	Fruit drink	B	190	Steel	Old	N.D.	-	<0.05	9.70
7	Fruit drink	C	225	Steel	Old	N.D.	-	0.30	8.00
8	Carbonated drink	C	350	Steel	Old	N.D.	-	<0.05	2.55
9	Carbonated drink	C	350	Steel	Old	N.D.	-	3.35	60.50
10	Fruit drink	D	190	Steel	Old	N.D.	-	0.08	27.85
11	Vitamin drink	E	350	Steel	Old	N.D.	-	0.02	3.10
12	Orange juice	F	190	Steel	Old	N.D.	-	0.15	12.50
13	Fruit juice	F	190	Steel	New	N.D.	-	2.27	88.30
14	Apple juice	F	190	Steel	New	N.D.	-	5.70	62.50
15	Carbonated drink	G	340	Steel	New	N.D.	-	<0.05	0.15
16	Carbonated drink	G	340	Steel	New	N.D.	-	<0.05	0.10
17	Carbonated drink	G	340	Steel	New	N.D.	-	<0.05	0.20
18	Carbonated drink	H	350	Steel	New	N.D.	-	<0.05	0.20
19	Carbonated drink	H	350	Steel	New	N.D.	-	<0.05	0.20
20	Sports drink	H	350	Steel	New	N.D.	-	<0.05	0.30
21	Carbonated drink	I	350	Aluminum	-	N.D.	-	<0.05	1.20
22	Fruit drink	I	350	Aluminum	-	N.D.	-	<0.05	0.80
23	Sports drink	J	340	Aluminum	-	N.D.	-	0.17	0.80
24	Fruit drink	K	350	Aluminum	-	N.D.	-	<0.05	0.43
25	Fruit drink	L	245	Aluminum	-	N.D.	-	<0.05	0.65
26	Fruit drink	L	280	Aluminum	-	N.D.	-	0.10	3.30
27	Beer	M	350	Aluminum	-	0.7	0.2	0.07	2.70
28	Beer	M	500	Aluminum	-	0.6	0.3	0.10	3.00
29	Beer	N	350	Aluminum	-	N.D.	-	<0.05	2.35
30	Beer	N	500	Aluminum	-	N.D.	-	<0.05	0.30

N.D. : Not detected (<0.5ng/ml)