

表4 検討化合物の保持時間及び定量イオン

	化合物	組成式	定量イオン		保持時間 (min)
			イオン	計算精密質量 (<i>m/z</i>)	
1	2-Acetylamino-5-nitrothiazole	C ₅ H ₅ N ₃ O ₃ S	[M+H] ⁺	188.0124	7.07
2	Albendazole	C ₁₂ H ₁₅ N ₃ O ₂ S	[M+H] ⁺	266.0958	8.06
3	Altrenogest	C ₂₁ H ₂₆ O ₂	[M+H] ⁺	311.2006	10.33
4	Azaperone	C ₁₉ H ₂₂ FN ₃ O	[M+H] ⁺	328.1820	6.13
5	Benzocaine	C ₉ H ₁₁ NO ₂	[M+H] ⁺	166.0863	8.08
6	Bromacil	C ₉ H ₁₃ BrN ₂ O ₂	[M+H] ⁺	261.0233	7.97
7	Brotizolam	C ₁₅ H ₁₀ BrClN ₄ S	[M+H] ⁺	392.9571	9.07
8	Cefoperazone	C ₂₅ H ₂₇ N ₉ O ₈ S ₂	[M+H] ⁺	646.1497	6.65
9	Chlormadinone	C ₂₃ H ₂₃ ClO ₄	[M+H] ⁺	405.1827	11.37
10	Clostebol	C ₁₉ H ₂₇ ClO ₂	[M+H] ⁺	323.1772	10.43
11	Danofloxacin	C ₁₉ H ₂₀ FN ₃ O ₃	[M+H] ⁺	358.1561	5.87
12	Dexamethasone	C ₂₂ H ₂₉ FO ₅	[M+H] ⁺	393.2072	8.32
13	Diaveridine	C ₁₃ H ₁₆ N ₄ O ₂	[M+H] ⁺	261.1346	5.38
14	Dicyclanil	C ₈ H ₁₀ N ₆	[M+H] ⁺	191.1040	4.39
15	Difloxacin	C ₂₁ H ₁₉ F ₂ N ₃ O ₃	[M+H] ⁺	400.1467	6.40
16	Diflubenzuron	C ₁₄ H ₉ ClF ₂ N ₂ O ₂	[M+H] ⁺	311.0393	10.75
17	Emamectin B1a	C ₄₉ H ₇₅ NO ₁₃	[M+H] ⁺	886.5311	10.38
18	Enrofloxacin	C ₁₉ H ₂₂ FN ₃ O ₃	[M+H] ⁺	360.1718	6.00
19	Ethopabate	C ₁₂ H ₁₅ NO ₄	[M+H] ⁺	238.1074	7.65
20	Famphur	C ₁₀ H ₁₆ NO ₅ PS ₂	[M+H] ⁺	326.0280	10.05
21	Fenobucarb	C ₁₂ H ₁₇ NO ₂	[M+H] ⁺	208.1332	10.01
22	Flubendazole	C ₁₆ H ₁₂ FN ₃ O ₃	[M+H] ⁺	314.0935	8.38
23	Flumequine	C ₁₄ H ₁₂ FNO ₃	[M+H] ⁺	262.0874	8.54
24	Flunixin	C ₁₄ H ₁₁ F ₃ N ₂ O ₂	[M+H] ⁺	297.0845	9.65
25	Halofuginone	C ₁₆ H ₁₇ BrClN ₃ O ₃	[M+H] ⁺	414.0215	6.81
26	Hydrocortisone	C ₂₁ H ₃₀ O ₅	[M+H] ⁺	363.2166	7.72
27	5-Hydroxythiabendazole	C ₁₀ H ₇ N ₃ OS	[M+H] ⁺	218.0383	5.06
28	Ketoprofen	C ₁₆ H ₁₄ O ₃	[M+H] ⁺	255.1016	9.36
29	Levamisole	C ₁₁ H ₁₂ N ₂ S	[M+H] ⁺	205.0794	5.29
30	Lincomycin	C ₁₈ H ₃₄ N ₂ O ₆ S	[M+H] ⁺	407.2210	5.18
31	Mafoprozine	C ₂₂ H ₂₈ FN ₃ O ₃	[M+H] ⁺	402.2187	6.98
32	Marbofloxacin	C ₁₇ H ₁₉ FN ₄ O ₄	[M+H] ⁺	363.1463	5.57
33	Mebendazole	C ₁₆ H ₁₃ N ₃ O ₃	[M+H] ⁺	296.1030	8.10
34	Meloxicam	C ₁₄ H ₁₃ N ₃ O ₄ S ₂	[M+H] ⁺	352.0420	9.63
35	Menbutone	C ₁₅ H ₁₄ O ₄	[M+H] ⁺	259.0965	9.14
36	Methylprednisolone	C ₂₂ H ₃₀ O ₅	[M+H] ⁺	375.2166	8.20
37	Miloxacin	C ₁₂ H ₉ NO ₆	[M+H] ⁺	264.0503	7.42
38	Morantel	C ₁₂ H ₁₆ N ₂ S	[M+H] ⁺	221.1107	6.50
39	Nalidixic acid	C ₁₂ H ₁₂ N ₂ O ₃	[M+H] ⁺	233.0921	8.39
40	Ofloxacin	C ₁₈ H ₂₀ FN ₃ O ₄	[M+H] ⁺	362.1511	5.69
41	Olaquinox	C ₁₂ H ₁₃ N ₃ O ₄	[M+H] ⁺	264.0979	4.62
42	Orbifloxacin	C ₁₉ H ₂₀ F ₃ N ₃ O ₃	[M+H] ⁺	396.1530	6.12
43	Ormetoprim	C ₁₄ H ₁₈ N ₄ O ₂	[M+H] ⁺	275.1503	5.80
44	Oxibendazole	C ₁₂ H ₁₅ N ₃ O ₃	[M+H] ⁺	250.1186	7.00
45	Oxolinic acid	C ₁₃ H ₁₁ NO ₅	[M+H] ⁺	262.0710	7.46
46	Phenoxyethylpenicillin	C ₁₆ H ₁₈ N ₂ O ₅ S	[M+H] ⁺	351.1009	8.38
47	Praziquantel	C ₁₉ H ₂₄ N ₂ O ₂	[M+H] ⁺	313.1911	9.48
48	Prednisolone	C ₂₁ H ₂₈ O ₅	[M+H] ⁺	361.2010	7.65
49	Prifinium bromide	C ₂₂ H ₂₈ BrN	[C ₂₂ H ₂₈ N] ⁺	306.2216	8.35
50	Pyrantel	C ₁₁ H ₁₄ N ₂ S	[M+H] ⁺	207.0950	5.85

表4 (つづき)

	化合物	組成式	定量イオン		保持時間 (min)
			イオン	計算精密質量 (<i>m/z</i>)	
51	Pyrimethamine	C ₁₂ H ₁₃ ClN ₄	[M+H] ⁺	249.0902	6.84
52	Robenidine	C ₁₅ H ₁₃ Cl ₂ N ₅	[M+H] ⁺	334.0621	9.01
53	Sarafloxacin	C ₂₀ H ₁₇ F ₂ N ₃ O ₃	[M+H] ⁺	386.1311	6.33
54	Sulfabenzamide	C ₁₃ H ₁₂ N ₂ O ₃ S	[M+H] ⁺	277.0641	7.63
55	Sulfabromomethazine	C ₁₂ H ₁₃ BrN ₄ O ₂ S	[M+H] ⁺	357.0015	8.63
56	Sulfacetamide	C ₈ H ₁₀ N ₂ O ₃ S	[M+H] ⁺	215.0485	4.92
57	Sulfachlorpyridazine	C ₁₀ H ₉ ClN ₄ O ₂ S	[M+H] ⁺	285.0208	6.80
58	Sulfadiazine	C ₁₀ H ₁₀ N ₄ O ₂ S	[M+H] ⁺	251.0597	5.34
59	Sulfadimethoxine	C ₁₂ H ₁₄ N ₄ O ₄ S	[M+H] ⁺	311.0809	7.75
60	Sulfadimidine	C ₁₂ H ₁₄ N ₄ O ₂ S	[M+H] ⁺	279.0910	6.23
61	Sulfadoxine	C ₁₂ H ₁₄ N ₄ O ₄ S	[M+H] ⁺	311.0809	7.05
62	Sulfaethoxypyridazine	C ₁₂ H ₁₄ N ₄ O ₃ S	[M+H] ⁺	295.0859	7.07
63	Sulfamerazine	C ₁₁ H ₁₂ N ₄ O ₂ S	[M+H] ⁺	265.0754	5.85
64	Sulfamethoxazole	C ₁₀ H ₁₁ N ₃ O ₃ S	[M+H] ⁺	254.0594	7.04
65	Sulfamethoxypyridazine	C ₁₁ H ₁₂ N ₄ O ₃ S	[M+H] ⁺	281.0703	6.25
66	Sulfamonomethoxine	C ₁₁ H ₁₂ N ₄ O ₃ S	[M+H] ⁺	281.0703	6.61
67	Sulfapyridine	C ₁₁ H ₁₁ N ₃ O ₂ S	[M+H] ⁺	250.0645	5.61
68	Sulfaquinoxaline	C ₁₄ H ₁₂ N ₄ O ₂ S	[M+H] ⁺	301.0754	7.76
69	Sulfathiazole	C ₉ H ₉ N ₃ O ₂ S ₂	[M+H] ⁺	256.0209	5.50
70	Sulfatroxazole	C ₁₁ H ₁₃ N ₃ O ₃ S	[M+H] ⁺	268.0750	7.13
71	Temephos	C ₁₆ H ₂₀ O ₆ P ₂ S ₃	[M+H] ⁺	466.9970	12.76
72	Thiabendazole	C ₁₀ H ₇ N ₃ S	[M+H] ⁺	202.0433	5.49
73	Tiamulin	C ₂₈ H ₄₇ NO ₄ S	[M+H] ⁺	494.3299	8.21
74	Tolfenamic acid	C ₁₄ H ₁₂ ClNO ₂	[M+H] ⁺	262.0629	11.47
75	β-Trenbolone	C ₁₈ H ₂₂ O ₂	[M+H] ⁺	271.1693	8.87
76	Trichlorfon	C ₄ H ₈ Cl ₃ O ₄ P	[M+H] ⁺	256.9299	6.32
77	Trimethoprim	C ₁₄ H ₁₈ N ₄ O ₃	[M+H] ⁺	291.1452	5.58
78	Tripelennamine	C ₁₆ H ₂₁ N ₃	[M+H] ⁺	256.1808	6.66
79	Tylosin	C ₄₆ H ₇₇ NO ₁₇	[M+H] ⁺	916.5264	7.85
80	Valnemulin	C ₃₁ H ₅₂ N ₂ O ₅ S	[M+H] ⁺	565.3670	8.49
81	Warfarin	C ₁₉ H ₁₆ O ₄	[M+H] ⁺	309.1121	9.95
82	Xylazine	C ₁₂ H ₁₆ N ₂ S	[M+H] ⁺	221.1107	6.27

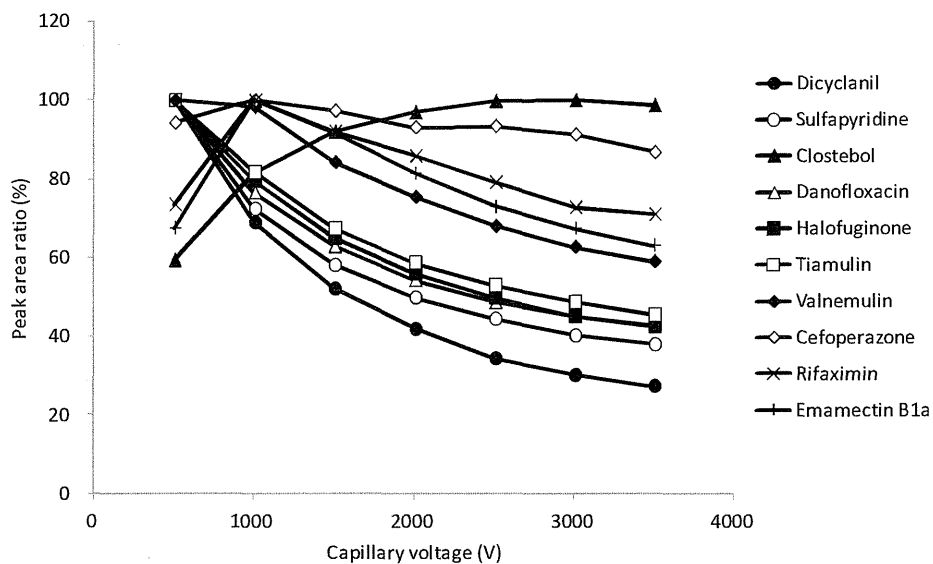


図 8 各化合物のピーク面積に対するキャピラリー電圧の影響

ピーク面積の最大値を 100%として示した。各条件 2 回測定し、平均値を示した。
 コーン電圧 20 V、コリジョンエネルギー 5 eV

dicyclanil ($[M+H]^+$, m/z 191.1040)、sulfapyridine ($[M+H]^+$, m/z 250.0645)、altrenogest ($[M+H]^+$, m/z 311.2006)、danofloxacin ($[M+H]^+$, m/z 358.1561)、halofuginone ($[M+H]^+$, m/z 414.0215)、tiamulin ($[M+H]^+$, m/z 494.3299)、valnemulin ($[M+H]^+$, m/z 565.3670)、cefoperazone ($[M+H]^+$, m/z 646.1497)、rifaximin ($[M+H]^+$, m/z 786.3596)、emamectin B1a ($[M+H]^+$, m/z 886.5311)

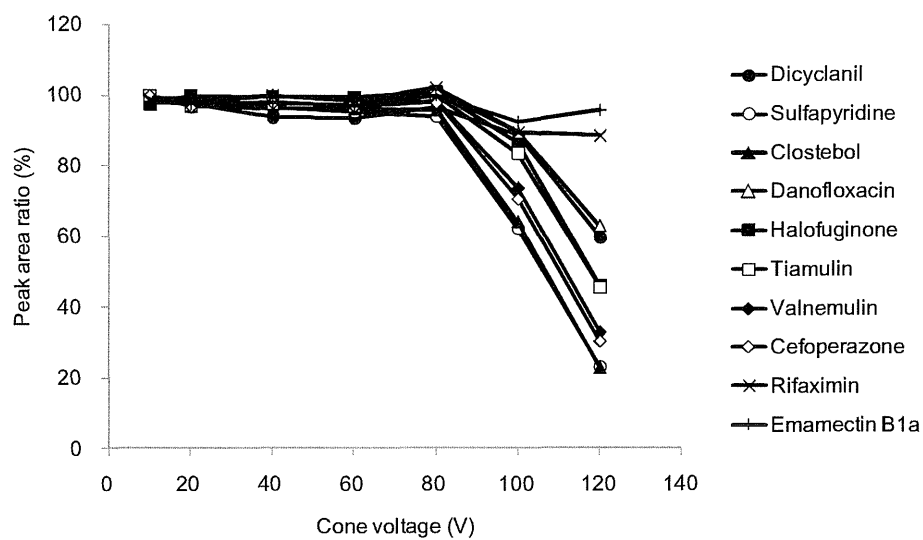


図9 各化合物のピーク面積に対するコーン電圧の影響

ピーク面積の最大値を100%として示した。各条件2回測定し、平均値を示した。
 キャピラリー電圧 1000 V、コリジョンエネルギー 5 eV

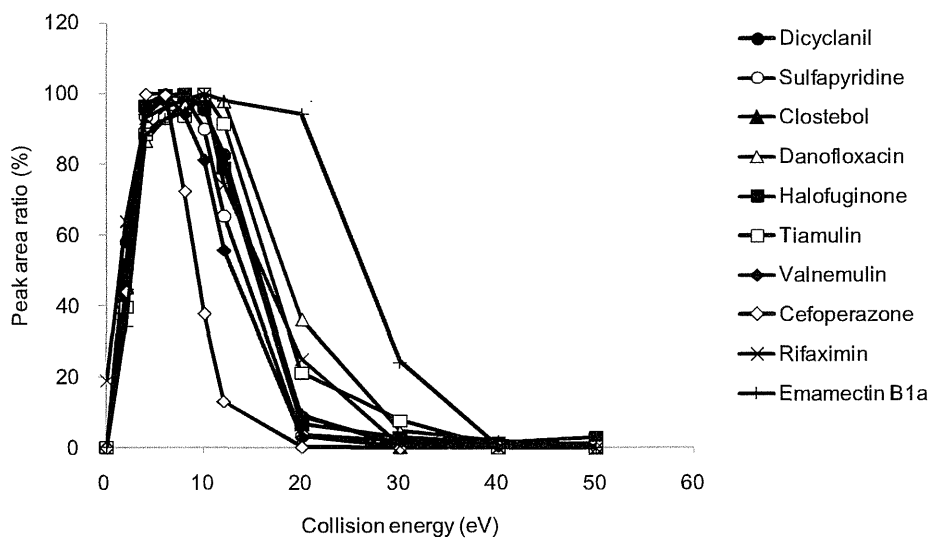


図 10 各化合物のピーク面積に対するコリジョンエネルギーの影響

ピーク面積の最大値を 100% として示した。各条件 2 回測定し、平均値を示した。
 キャピラリー電圧 1000 V、コーン電圧 20 V

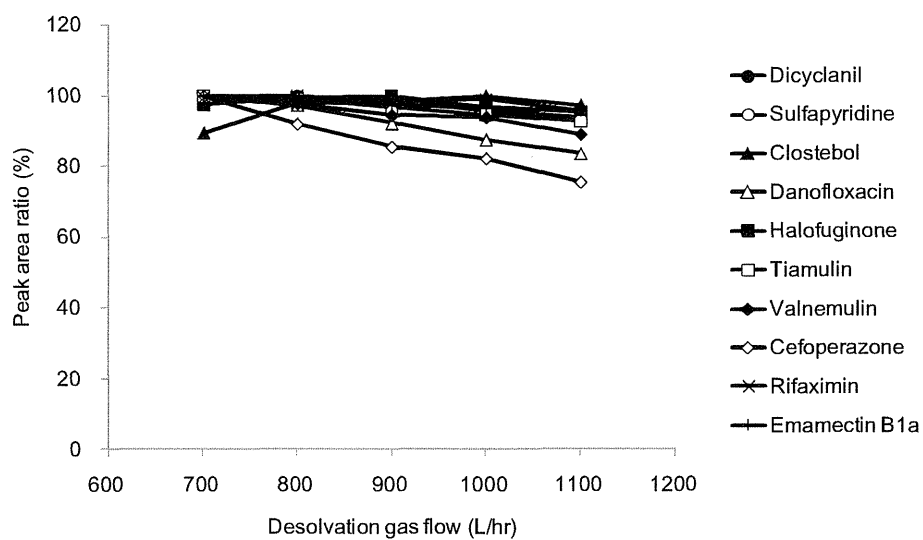


図 11 各化合物のピーク面積に対する脱溶媒ガス流量の影響

ピーク面積の最大値を100%として示した。各条件2回測定し、平均値を示した。
 キャピラリー電圧 1000 V、コーン電圧 20 V、コリジョンエネルギー 5 eV

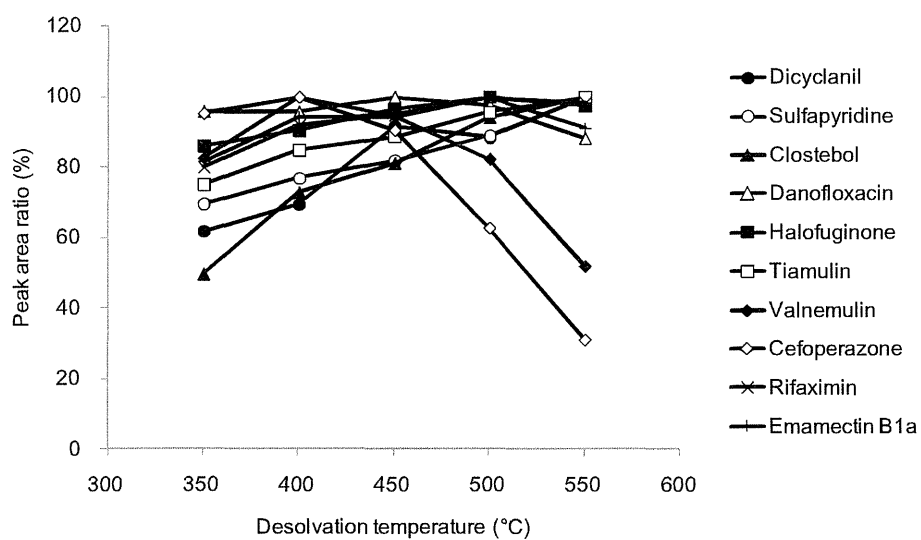


図 12 各化合物のピーク面積に対する脱溶媒ガス温度の影響

ピーク面積の最大値を 100% として示した。各条件 2 回測定し、平均値を示した。
 キャピラリー電圧 1000 V、コーン電圧 20 V、コリジョンエネルギー 5 eV

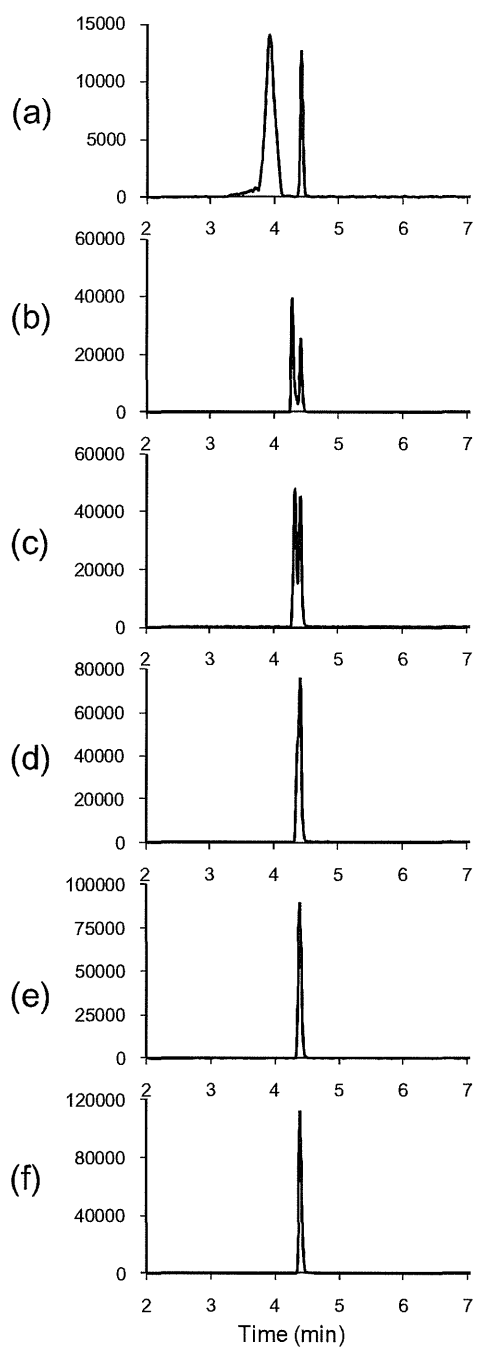


図 13 dicyclanil の抽出イオンクロマトグラム

注入量 2 μ L、注入溶媒 (a)アセトニトリル/0.1 vol%ギ酸(100:0)、(b)アセトニトリル/0.1 vol%ギ酸(50:50)、(c)アセトニトリル/0.1 vol%ギ酸(40:60)、(d)アセトニトリル/0.1 vol%ギ酸(30:70)、(e)アセトニトリル/0.1 vol%ギ酸(25:75)、(f)アセトニトリル/0.1 vol%ギ酸(20:80)

表 5 真度・精度(溶媒検量線法)

No.	分析対象化合物	0.1 ppm						0.01 ppm					
		牛肉			牛乳			牛肉			牛乳		
		真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)
1	2-Acetylaminio-5-nitrothiazole	93	4	11	96	4	5	86	16	16	95	10	10
2	Albendazole	94	1	8	102	0.5	3	90	3	4	102	1	4
3	Altrenogest	75	3	4	84	2	3	58	4	12	84	3	8
4	Azaperone	99	2	14	97	1	6	107	4	5	109	4	5
5	Benzocaine	70	2	6	71	8	9	64	7	8	61	5	6
6	Bromacil	98	4	11	104	3	3	88	3	8	106	5	11
7	Brotizolam	102	2	7	106	2	5	118	4	10	106	1	3
8	Cefoperazone	76	2	7	95	3	3	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
9	Chlormadinone	74	3	15	98	2	5	62	7	7	100	3	6
10	Clostebol	92	2	7	104	1	4	91	6	6	105	3	5
11	Danofloxacin	81	5	24	53	8	13	53	14	32	40	13	28
12	Dexamethasone	103	9	14	101	3	3	89	13	14	100	7	7
13	Diaveridine	75	2	11	81	2	11	66	4	5	74	3	23
14	Dicyclanil	75	2	8	94	1	4	73	4	8	91	2	8
15	Difloxacin	83	5	15	86	3	10	77	5	9	67	13	13
16	Diflubenzuron	65	2	33	103	1	5	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
17	Emamectin B1a	97	1	10	97	4	5	86	9	10	97	5	5
18	Enrofloxacin	93	7	19	67	4	10	69	3	13	53	16	17
19	Ethopabate	91	2	8	108	1	2	101	5	8	109	3	6
20	Famphur	93	1	6	107	1	4	98	2	5	107	2	6
21	Fenobucarb	65	5	8	64	5	9	72	8	10	65	11	11
22	Flubendazole	98	1	7	111	2	5	109	4	10	108	1	3
23	Flumequine	94	4	18	96	2	5	98	6	12	86	9	9
24	Flunixin	87	2	6	104	1	3	97	3	8	102	2	3
25	Halofuginone	70	3	6	85	2	6	60	8	8	66	8	16
26	Hydrocortisone	97	2	7	106	1	3	91	4	11	106	2	4
27	5-Hydroxythiabendazole	68	6	9	102	2	7	57	14	37	100	3	4
28	Ketoprofen	91	1	6	106	2	3	100	4	5	106	2	6
29	Levamisole	92	2	8	100	1	7	90	3	5	94	2	6
30	Lincomycin	76	4	9	99	1	4	71	7	7	93	4	5
31	Mafoprozine	101	1	7	108	1	6	105	3	5	105	1	3
32	Marbofloxacin	67	6	27	52	5	13	47	25	28	33	13	33
33	Mebendazole	100	1	7	105	1	3	108	5	8	108	1	3
34	Meloxicam	83	3	6	88	3	3	88	6	6	88	3	4
35	Menbutone	94	4	7	107	2	4	90	5	5	107	2	4
36	Methylprednisolone	99	3	10	103	2	3	99	11	12	107	5	5
37	Miloxacin	80	10	12	74	6	14	81	11	19	61	10	27
38	Morantel	71	3	7	76	3	7	79	4	8	73	3	5
39	Nalidixic acid	100	3	12	97	3	6	103	5	14	86	10	10
40	Ofloxacin	79	2	26	59	7	8	53	9	10	41	21	29
41	Olaquinox	12	8	44	33	14	27	9	6	75	39	10	21
42	Orbifloxacin	89	2	10	99	4	5	72	5	8	74	8	8
43	Ormetoprim	91	1	7	107	1	6	92	2	4	96	4	4
44	Oxibendazole	97	1	7	106	1	3	99	3	4	105	1	2
45	Oxolinic acid	87	12	20	66	4	21	76	9	15	63	14	28
46	Phenoxymethylpenicillin	97	3	9	78	12	12	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
47	Praziquantel	100	1	6	108	1	3	111	4	6	110	1	3
48	Prednisolone	89	3	6	107	1	2	92	7	10	108	3	6
49	Prifinium bromide	93	2	8	94	1	2	91	2	4	91	1	3
50	Pyrantel	84	2	7	88	1	3	87	4	5	86	2	3

表5 (つづき)

No.	分析対象化合物	0.1 ppm						0.01 ppm					
		牛肉			牛乳			牛肉			牛乳		
		真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)
51	Pyrimethamine	86	2	7	102	1	3	91	3	3	100	1	3
52	Robenidine	76	3	7	85	3	5	76	1	17	84	11	12
53	Sarafloxacin	52	8	17	73	5	10	55	12	30	59	10	12
54	Sulfabenzamide	66	6	9	92	2	3	62	6	12	87	2	7
55	Sulfabromomethazine	78	6	6	95	3	6	67	9	10	84	3	7
56	Sulfacetamide	25	14	25	82	4	5	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
57	Sulfachlorpyridazine	75	5	8	87	4	6	74	12	14	82	7	7
58	Sulfadiazine	61	5	8	41	4	16	38	18	24	38	6	66
59	Sulfadimethoxine	76	7	7	95	3	6	67	7	14	87	3	7
60	Sulfadimidine	72	3	6	88	3	7	70	6	7	78	5	9
61	Sulfadoxine	76	7	7	95	3	6	67	7	14	87	3	7
62	Sulfaethoxypyridazine	76	5	7	84	5	7	76	8	13	77	5	9
63	Sulfamerazine	81	4	7	90	4	11	75	7	8	79	5	9
64	Sulfamethoxazole	77	6	7	93	3	6	71	6	8	88	3	7
65	Sulfamethoxypyridazine	74	4	7	90	4	7	58	6	22	75	5	10
66	Sulfamonomethoxine	84	4	6	91	4	6	76	6	8	84	5	7
67	Sulfapyridine	76	2	5	157	4	13	64	6	7	92	5	17
68	Sulfaquinoxaline	77	5	7	80	9	10	72	7	9	77	5	6
69	Sulfathiazole	80	2	9	84	4	7	80	38	40	74	6	10
70	Sulfatroxazole	80	5	7	96	2	4	86	6	10	87	4	6
71	Temephos	71	7	13	99	3	14	57	4	8	94	6	11
72	Thiabendazole	91	1	8	106	2	3	83	4	4	104	9	9
73	Tiamulin	96	2	7	107	1	11	98	2	3	99	1	4
74	Tolfenamic acid	75	3	8	91	3	7	66	5	6	89	3	7
75	β-Trenbolone	89	1	7	102	2	6	73	2	3	96	2	5
76	Trichlorfon	71	2	10	82	1	5	60	7	7	78	5	17
77	Trimethoprim	83	1	6	121	2	6	80	3	4	94	2	12
78	Tripelennamine	98	3	14	92	2	8	104	5	6	93	4	6
79	Tylosin	90	5	8	89	10	17	89	9	17	83	16	17
80	Valnemulin	89	2	11	103	1	2	86	7	8	101	3	3
81	Warfarin	91	2	6	106	1	2	81	4	12	106	2	4
82	Xylazine	81	2	6	95	3	4	81	3	5	86	8	8

a) 感度不足

表6 真度・精度(マトリックス検量線法)

No.	分析対象化合物	0.1 ppm						0.01 ppm					
		牛肉			牛乳			牛肉			牛乳		
		真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)
1	2-Acetyl-amino-5-nitrothiazole	101	5	8	102	4	6	105	6	11	99	12	12
2	Albendazole	97	1	6	107	1	3	95	2	4	103	1	4
3	Altrenogest	85	3	8	87	3	4	95	2	5	86	4	6
4	Azaperone	110	2	19	101	2	8	114	2	3	108	4	8
5	Benzocaine	79	2	5	72	9	9	72	4	8	61	6	12
6	Bromacil	101	2	6	109	3	6	108	4	6	104	6	9
7	Brotizolam	101	1	6	105	2	4	107	1	4	104	2	6
8	Cefoperazone	77	7	11	102	6	6	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
9	Chlormadinone	110	3	11	109	2	3	117	7	8	107	4	7
10	Clostebol	100	2	7	108	1	3	106	4	6	105	2	7
11	Danofloxacin	82	6	19	71	6	16	62	9	11	52	22	25
12	Dexamethasone	103	2	7	108	1	6	112	8	8	104	6	9
13	Diaveridine	93	3	8	109	2	3	92	3	5	96	2	17
14	Dicyclanil	107	2	4	104	1	2	105	3	5	100	2	6
15	Difloxacin	101	1	14	94	2	7	86	3	7	75	14	14
16	Diflubenzuron	106	8	12	106	2	2	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
17	Emamectin B1a	98	2	6	100	1	4	94	7	13	90	9	13
18	Enrofloxacin	96	2	19	88	3	9	74	6	8	65	18	18
19	Ethopabate	104	2	5	111	2	3	110	3	3	104	2	5
20	Famphur	103	2	5	110	2	3	111	2	7	108	3	8
21	Fenobucarb	69	8	10	64	6	6	81	9	9	63	10	15
22	Flubendazole	103	1	5	112	1	2	109	1	5	107	1	5
23	Flumequine	100	4	8	103	1	2	95	6	8	94	9	9
24	Flunixin	95	2	7	107	1	2	99	3	6	104	2	6
25	Halofuginone	78	5	8	100	2	4	67	7	7	79	8	18
26	Hydrocortisone	100	2	4	111	2	2	60	18	25	107	3	5
27	5-Hydroxythiabendazole	82	6	7	106	2	5	49	20	38	103	4	4
28	Ketoprofen	98	2	7	107	1	2	107	2	8	107	4	9
29	Levamisole	99	2	6	106	1	3	100	4	4	99	2	5
30	Lincomycin	88	5	15	107	1	2	78	5	7	96	6	10
31	Mafoprazine	107	1	8	111	1	3	106	2	5	107	1	6
32	Marbofloxacin	82	3	19	79	8	15	70	7	10	58	20	29
33	Mebendazole	105	1	7	111	1	3	109	1	6	108	1	8
34	Meloxicam	90	2	6	90	3	3	90	3	8	91	2	11
35	Menbutone	100	2	9	107	1	3	106	8	8	107	2	12
36	Methylprednisolone	101	3	7	106	3	4	115	6	7	109	4	6
37	Miloxacin	92	11	17	86	6	16	85	5	14	90	15	18
38	Morantel	72	2	8	74	1	3	76	3	3	74	4	9
39	Nalidixic acid	99	2	7	102	2	4	94	7	8	89	10	10
40	Ofloxacin	85	4	19	79	7	14	65	5	8	59	21	27
41	Olaquinox	38	8	22	45	9	10	37	26	30	41	14	24
42	Orbifloxacin	92	2	10	100	2	4	77	3	7	78	8	9
43	Ormetoprim	98	2	10	107	1	5	96	2	4	102	2	4
44	Oxibendazole	104	1	7	109	1	2	104	1	3	106	1	6
45	Oxolinic acid	98	7	13	91	4	7	91	7	11	80	8	19
46	Phenoxymethylpenicillin	92	3	10	82	10	10	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
47	Praziquantel	103	2	6	109	1	2	109	2	5	107	2	9
48	Prednisolone	102	4	9	110	3	4	110	4	6	107	3	6
49	Prifinium bromide	95	2	5	94	1	3	96	2	5	92	1	8
50	Pyrantel	85	1	7	88	1	3	86	2	2	87	2	7

表6 (つづき)

No.	分析対象化合物	0.1 ppm						0.01 ppm					
		牛肉			牛乳			牛肉			牛乳		
		真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)	真度 (%)	併行精度 (RSD%)	室内精度 (RSD%)
51	Pyrimethamine	97	2	11	107	1	2	97	1	2	104	1	5
52	Robenidine	79	7	9	89	4	7	70	3	12	84	12	12
53	Sarafloxacin	80	6	10	85	4	8	70	5	20	72	13	13
54	Sulfabenzamide	81	5	12	95	3	4	88	3	12	87	1	11
55	Sulfabromomethazine	86	5	7	95	3	5	84	7	12	87	4	11
56	Sulfacetamide	87	6	14	97	5	7	- ^a	- ^a	- ^a	- ^a	- ^a	- ^a
57	Sulfachlorpyridazine	83	4	10	91	4	9	87	3	7	77	6	18
58	Sulfadiazine	86	3	6	90	3	15	88	3	9	72	2	33
59	Sulfadimethoxine	88	4	6	97	2	5	87	4	8	86	5	10
60	Sulfadimidine	88	3	7	89	4	8	88	4	4	75	7	12
61	Sulfadoxine	88	4	6	97	2	5	87	4	8	86	5	10
62	Sulfaethoxypyridazine	85	2	7	85	5	8	84	4	8	73	7	12
63	Sulfamerazine	88	3	6	92	5	9	89	3	6	77	5	12
64	Sulfamethoxazole	89	4	7	98	2	5	87	3	8	85	4	6
65	Sulfamethoxypyridazine	89	2	6	83	4	9	88	4	6	73	7	9
66	Sulfamonomethoxine	93	4	6	95	3	8	89	5	8	81	6	6
67	Sulfapyridine	91	3	5	87	4	8	87	5	5	75	9	19
68	Sulfaquinoxaline	86	4	6	85	7	9	85	4	12	75	7	7
69	Sulfathiazole	80	4	11	88	4	7	78	16	36	72	6	9
70	Sulfatroxazole	88	4	7	97	3	5	91	4	10	85	4	8
71	Temephos	77	5	11	67	3	11	68	4	18	72	7	25
72	Thiabendazole	99	1	6	105	2	2	103	1	3	98	1	7
73	Tiamulin	100	1	5	104	1	3	106	1	6	100	1	4
74	Tolfenamic acid	91	6	11	97	2	5	91	3	9	94	1	5
75	β-Trenbolone	94	1	5	98	3	3	103	3	5	96	3	4
76	Trichlorfon	102	2	5	105	2	3	105	3	3	95	4	13
77	Trimethoprim	96	2	7	106	1	4	96	2	4	100	2	6
78	Tripeleennamine	100	2	12	89	1	6	101	3	3	94	5	8
79	Tylosin	83	5	11	85	5	7	88	8	12	83	13	16
80	Valnemulin	90	3	7	103	2	2	86	3	5	99	4	4
81	Warfarin	100	2	7	109	1	3	111	3	7	104	2	4
82	Xylazine	90	2	5	93	3	3	86	6	6	86	9	9

a) 感度不足

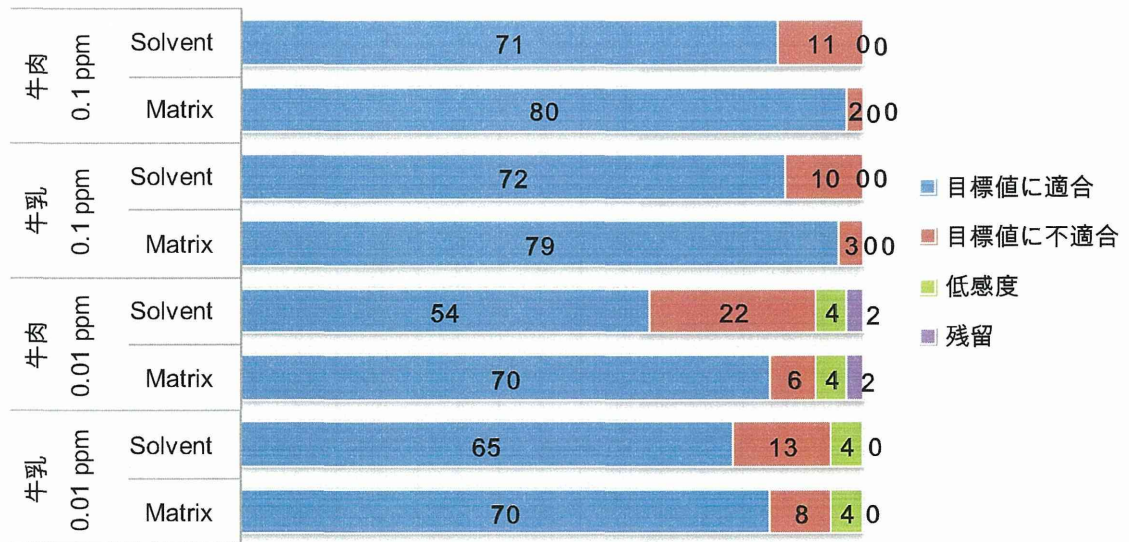


図 14 妥当性評価試験結果の概要

(数字は化合物数)

Solvent: 溶媒検量線法により定量、Matrix: マトリックス検量線法により定量

目標値(真度・精度): 添加濃度 0.1 ppm: 真度 70~120%、併行精度 RSD 25%未満、室内精度 RSD 30%未満、添加濃度 0.01 ppm: 真度 70~120%、併行精度 RSD 15%未満、室内精度 RSD 20%未満

表 7 牛乳マトリックス存在下での ODS ミニカラムからの回収率

化合物	回収率 (%)
Benzocaine	70
Danofloxacin	40
Enrofloxacin	60
Fenobucarb	46
Marbofloxacin	64
Ofloxacin	64
Olaquinox	54
Temephos	36

表 8 GC-TOF-MS 法の検討農薬の保持時間、定量イオン及び確認イオン

	Compound	Retention time (min)	Quatification (<i>m/z</i>)	Confirmation (<i>m/z</i>)
1	Acetochlor	13.65	146.0970	223.0764
2	Acrinathrin	20.05	181.0653	208.0762
3	Alachlor	13.83	160.1126	188.1075
4	Aldrin	14.76	262.8564	293.9346
5	Ametryn	13.98	227.1205	212.0970
6	Anilofos	19.28	226.0457	124.9826
7	Aramite	16.76, 16.95	185.0039	334.1006
8	Atrazine	12.31	200.0703	215.0938
9	Azaconazole	16.80	216.9823	172.9561
10	Azinphos methyl	19.72	160.0511	132.0449
11	Azoxystrobin	23.79	344.1035	388.0934
12	Benfluralin	11.40	292.0545	264.0232
13	Benfuresate	13.54	163.0759	256.0769
14	Benoxacor	13.35	120.0449	259.0167
15	α -BHC	11.87	182.9349	218.9116
16	β -BHC	12.36	182.9349	218.9116
17	γ -BHC	13.10	182.9349	218.9116
18	δ -BHC	12.55	182.9349	218.9116
19	Bifenox	19.29	340.9858	342.9831
20	Bifenthrin	18.94	181.1017	166.0783
21	Bitertanol	20.69	170.0732	171.0766
22	Bromobutide	13.70	232.1701	119.0861
23	Bromofos	15.07	330.8781	328.8804
24	Bromophos ethyl	15.86	358.9094	302.8468
25	Bromopropylate	19.03	340.9000	182.9446
26	Bupirimate	16.67	273.1021	208.1450
27	Buprofezin	16.72	172.1034	105.0579
28	Butachlor	16.03	176.1075	160.1126
29	Butafenacil	21.00	331.0097	179.9852
30	Butamifos	16.19	286.1031	200.0113
31	Cadusafos	11.64	158.9703	157.9625
32	Cafenstrole	21.19	100.0762	188.1188
33	Cafentrazone ethy	17.77	312.0596	340.0909
34	Chlorbenside	15.94	125.0158	127.0129
35	Chlordane (cis)	16.22	372.8254	374.8225
36	Chlordane (trans)	15.96	372.8254	374.8225
37	Chlorfenapyr	16.85	247.0483	59.0497
38	Chlorfenson	16.39	301.9571	176.9777
39	Chlorfenvinphos (E)	15.25	266.9381	323.0007
40	Chlorfenvinphos (Z)	15.46	266.9381	323.0007
41	Chlorobenzilate	17.21	251.0031	138.9951
42	Chlorpropham	11.31	127.0189	213.0557
43	Chlorpyrifos	14.62	313.9574	196.9202
44	Chlorpyrifos methyl	13.69	285.9261	287.9232
45	Chlorthal dimethyl	14.72	300.8629	298.8836
46	Chlozolate	15.39	258.9803	331.0014
47	Clomazone	12.41	204.1025	125.0158
48	Clomeprop	19.39	288.0791	120.0813
49	Coumaphos	20.87	362.0145	210.0084
50	Cyanazine	14.67	212.0703	225.0656

表 8 (つづき)

	Compound	Retention time (min)	Quatification (<i>m/z</i>)	Confirmation (<i>m/z</i>)
51	Cyanophos	12.60	243.0119	109.0081
52	Cyflufenamid	16.87	412.1210	294.0780
53	Cyfluthrin	21.25, 21.35, 21.44, 21.46	163.0081	206.0606
54	Cyhalothrin	19.73,19.91	181.0653	197.0345
55	Cypermethrin	21.59, 21.69, 21.76, 21.79	181.0653	163.0081
56	Cyproconazole	17.02	222.0434	138.9951
57	Cyprodinil	15.29	224.1188	225.1266
58	pp'-DDD	17.40	235.0081	237.0048
59	pp'-DDE	16.59	246.0003	247.9970
60	op'-DDT	17.45	235.0081	237.0048
61	pp'-DDT	18.11	235.0081	237.0048
62	Deltamethrin	23.56	252.9051	250.9071
63	Di-allate	11.73, 11.92	234.0719	86.0606
64	Diazinon	12.70	304.1011	179.1184
65	Dichloran	12.11	205.9650	123.9954
66	Dieldrin	16.75	262.8564	264.8535
67	Diethofencarb	14.62	267.1471	225.1001
68	Diflufenican	18.34	266.0429	394.0741
69	Dimethametryn	15.38	212.0970	255.1518
70	Dimethenamid	13.59	230.0406	154.0690
71	Dimethoate	12.09	124.9826	87.0143
72	Dimethylvinphos (E)	14.38	294.9694	296.9666
73	Dimethylvinphos (Z)	14.65	294.9694	296.9666
74	Disulfoton	12.96	88.0347	274.0285
75	Dithiopyr	14.06	354.0587	286.0473
76	Edifenphos	17.96	310.0251	172.9826
77	Endosulfan sulfate	18.06	271.8102	386.8400
78	α -Endosulfan	16.23	240.9030	194.9480
79	β -Endosulfan	17.35	240.9070	194.9480
80	Endrin	17.16	262.8564	264.8535
81	EPN	19.00	156.9877	185.0190
82	Epoxiconazole	18.60	192.0329	165.0220
83	Esprocarb	14.49	222.0953	162.1283
84	Ethion	17.37	230.9737	153.0139
85	Ethoprophos	11.09	157.9625	200.0095
86	Etofenprox	21.94	163.1123	183.0810
87	Etoazole	19.10	141.0152	300.1200
88	Fenarimol	20.18	138.9951	219.0325
89	Fenchlorphos	14.04	284.9309	286.9280
90	Fenitrothion	14.31	277.0174	260.0146
91	Fenoxanil	17.02	188.9874	293.1057
92	Fenpropathrin	19.13	181.0653	265.0739
93	Fenpropimoph	14.76	128.1075	129.1107
94	Fenvalerate	22.6, 22.85	125.0158	167.0628
95	Fipronil	15.31	366.9435	368.9406
96	Flamprop methyl	16.60	105.0340	77.0391
97	Flucythrinate	21.76, 21.96	199.0935	157.0465
98	Fludioxonil	16.37	248.0397	154.0531
99	Fluquinconazole	20.89	340.0401	342.0377
100	Flutolanil	16.31	173.0214	145.0265

表 8 (つづき)

	Compound	Retention time (min)	Quatification (<i>m/z</i>)	Confirmation (<i>m/z</i>)
101	Fluvalinate	22.71, 22.79	250.0610	209.0841
102	Fosthiazate	15.09	195.0119	283.0466
103	Fthalide	15.01	242.8752	240.8782
104	Indoxacarb	23.32	203.0219	150.0111
105	Iprobenfos	13.27	204.0010	91.0548
106	Isazophos	12.96	161.0356	256.9791
107	Isofenphos	15.43	213.0317	255.0786
108	Isofenphos oxon	14.79	229.0266	200.9953
109	Isoprocarb	9.97	121.0653	136.0888
110	Isoprothiolane	16.44	290.0647	117.9911
111	Isoxadifen ethyl	17.78	294.1130	222.0919
112	Isoxathion	16.94	105.0340	313.0538
113	Kresoxim methyl	16.69	116.0500	131.0735
114	Lenacil	18.01	153.0664	136.0399
115	Malathion	14.46	173.0814	127.0395
116	Mecarbam	15.50	131.0041	159.0354
117	Mefenacet	19.87	192.0119	120.0813
118	Mefenpyr diethyl	18.60	252.9935	254.9907
119	Mepronil	17.61	119.0497	269.1416
120	Metalaxyl	13.97	206.1181	249.1365
121	Methidathion	15.88	145.0072	85.0402
122	Methoxychlor	19.11	227.1072	228.1106
123	Metolachlor	14.59	238.0999	162.1283
124	Myclobutanil	16.65	179.0310	150.0111
125	Oxadiazon	16.55	174.9592	258.0327
126	Oxadixyl	17.34	163.0997	233.0926
127	Paclobutrazol	16.04	236.0591	125.0158
128	Parathion	14.77	291.0330	109.0055
129	Parathion methyl	13.81	263.0017	247.0068
130	Penconazole	15.39	248.0955	158.9768
131	Pendimethalin	15.27	252.0984	281.1376
132	Permethrin	20.74, 20.87	183.0810	163.0081
133	Phenothrin	19.4, 19.51	183.0810	123.1174
134	Phenthoate	15.57	273.9887	245.9938
135	Phosalone	19.63	182.0009	366.9869
136	Phosmet	18.96	160.0399	161.0477
137	Phosphamidon	13.50	264.1001	127.0160
138	Piperonyl butoxide	18.46	176.0837	177.0916
139	Pirimiphos methyl	14.24	290.0728	276.0572
140	Pretilachlor	16.43	238.0999	176.1075
141	Procymidone	15.66	283.0167	96.0575
142	Profenofos	16.51	338.9643	336.9663
143	Prometryn	14.02	241.1361	184.0657
144	Propaphos	15.90	219.9959	304.0898
145	Propiconazole	17.94, 18.05	259.0293	172.9561
146	Propoxur	10.77	110.0368	152.0837
147	Propyzamide	12.67	172.9561	174.9532
148	Prothiofos	16.43	308.9940	266.9470
149	Pyraflufen ethyl	17.99	412.0205	414.0178
150	Pyrazophos	20.11	221.0800	232.1086

表 8 (つづき)

	Compound	Retention time (min)	Quatification (m/z)	Confirmation (m/z)
151	Pyributicarb	18.68	108.0449	165.0664
152	Pyridaben	20.93	147.1174	309.0828
153	Pyridafenthion	18.78	340.0647	199.0871
154	Pyrifenox (E)	15.96	262.0065	264.0037
155	Pyrifenox (Z)	15.46	262.0065	264.0037
156	Pyrimethanil	12.82	198.1031	199.1110
157	Pyriminobac methyl (E)	17.95	302.1141	256.0722
158	Pyriminobac methyl (Z)	17.15	302.1141	256.0722
159	Pyriproxyfen	19.77	136.0762	226.0994
160	Quinalphos	15.60	146.0480	157.0766
161	Quinoxifen	17.99	237.0590	272.0278
162	Quintozene	12.44	236.8413	248.8413
163	Silafluofen	22.09	179.0892	286.1189
164	Simeconazole	13.83	121.0454	195.0641
165	Tebuconazole	18.35	250.0747	125.0158
166	Tebufenpyrad	19.24	318.1373	333.1608
167	Tecnazene	10.64	202.8803	214.8803
168	Tefluthrin	12.97	177.0327	197.0345
169	Terbufos	12.61	230.9737	153.0139
170	Tetrachlorvinphos	15.98	328.9304	330.9276
171	Tetraconazole	14.81	336.0527	338.0501
172	Tetradifon	19.52	355.8814	158.9671
173	Thenylchlor	18.27	288.1058	127.0218
174	Thiobencarb	14.66	100.0762	125.0158
175	Tolclofos methyl	13.85	264.9855	266.9827
176	Tolfenpyrad	24.21	383.1401	171.0325
177	Triadimefon	14.83	208.0278	57.0704
178	Triallate	13.12	268.0330	270.0300
179	Triazophos	17.64	257.0024	161.0589
180	Tribuphos	16.55	258.0336	314.0962
181	Trifloxystrobin	17.84	116.0500	145.0265
182	Trifluralin	11.34	306.0702	264.0232
183	Uniconazole P	16.61	234.0434	236.0407
184	Vinclozolin	13.75	284.9960	212.0034

表9 マトリックス標準溶液のピーク面積の再現性(試料中濃度 0.005 ppm 相当、n=5)及び検出限界
(下線(赤字): 試料中濃度 0.05 ppm 相当)

	Compound	Spinach					Brown rice				
		RSD%				LOD [®] (ppb)	RSD%				LOD [®] (ppb)
		10mDa	20mDa	50mDa	100mDa		10mDa	20mDa	50mDa	100mDa	
1	ACETOCHLOR	7	6	3	4	<1	5	5	5	— ^b	1
2	ACRINATHRIN	6	6	6	12	1	<u>8</u>	<u>8</u>	<u>8</u>	<u>6</u>	25
3	ALACHLOR	4	5	5	5	1	1	1	1	6	<1
4	ALDRIN	1	1	1	1	<1	3	3	3	3	1
5	AMETRYN	3	3	3	3	<1	4	4	4	4	1
6	ANILOFOS	6	7	7	7	1	9	9	9	8	1
7	ARAMITE	6	6	6	5	1	4	4	4	5	1
8	ATRAZINE	3	3	3	3	<1	3	3	4	3	1
9	AZACONAZOLE	5	5	5	7	1	6	6	6	8	1
10	AZINPHOS METHYL	11	11	11	9	2	9	9	9	9	1
11	AZOXYSTROBIN	91	11	11	11	2	13	10	10	10	1
12	BENFLURALIN	6	6	6	6	1	4	4	4	4	1
13	BENFURESATE	2	2	2	1	<1	4	3	3	3	<1
14	BENOXACOR	9	8	8	5	1	2	2	2	— ^b	<1
15	BHC (α)	2	2	2	2	<1	2	2	2	2	<1
16	BHC (β)	4	4	4	4	1	3	3	3	3	<1
17	BHC (γ)	5	5	5	5	1	4	4	4	4	1
18	BHC (δ)	3	3	3	3	1	3	4	4	4	1
19	BIFENOX	<u>20</u>	<u>4</u>	<u>8</u>	<u>3</u>	13	14	14	14	14	2
20	BIFENTHRIN	5	5	5	5	1	6	6	5	5	1
21	BITERTANOL	11	11	11	15	2	11	11	11	26	2
22	BROMOBUTIDE	3	3	3	3	<1	66	66	66	— ^b	10
23	BROMOPHOS	5	5	5	5	1	4	4	4	4	1
24	BROMOPHOS ETHYL	4	5	5	5	1	4	4	4	4	1
25	BROMOPROPYLATE	7	6	6	6	1	6	6	6	6	1
26	BUPIRIMATE	4	4	4	4	1	4	4	4	4	1
27	BUPROFEZIN	4	5	5	5	1	<u>9</u>	<u>3</u>	<u>3</u>	<u>3</u>	16
28	BUTACHLOR	6	6	6	8	1	3	3	3	16	1
29	BUTAFENACIL	6	9	9	9	1	8	8	8	8	1
30	BUTAMIFOS	11	11	11	11	2	6	6	6	6	1
31	CADUSAFOS	4	4	4	4	1	3	3	3	3	<1
32	CAFENSTROLE	8	8	8	— ^a	1	6	6	8	7	1
33	CARFENTRAZONE ETHYL	7	8	8	8	1	6	7	5	5	1
34	CHLORBENSIDE	6	6	6	6	1	4	4	4	10	1
35	CHLORDANE (α)	4	3	3	3	<1	9	2	2	2	<1
36	CHLORDANE (γ)	2	3	3	3	<1	3	3	3	3	<1
37	CHLORFENAPYR	3	3	3	3	<1	7	6	5	8	1
38	CHLORFENSON	— ^c	— ^c	6	6	1	4	4	4	4	1
39	CHLORFENVINPHOS (E)	8	7	7	7	1	9	9	9	9	1
40	CHLORFENVINPHOS (Z)	8	8	8	8	1	8	8	8	8	1
41	CHLOROBENZILATE	6	6	6	6	1	4	4	4	3	1
42	CHLORPROPHAM	3	3	3	2	<1	3	3	3	7	<1
43	CHLORPYRIFOS	5	5	5	5	1	4	4	4	4	1
44	CHLORPYRIFOS METHYL	5	4	4	4	1	4	4	4	4	1
45	CHLORTHAL DIMETHYL	— ^c	— ^c	3	3	<1	— ^c	— ^c	3	3	1
46	CHLOZOLINATE	4	4	4	4	1	2	2	2	2	<1
47	CLOMAZONE	2	2	2	2	<1	3	3	3	3	<1
48	CLOMEPROP	7	8	8	8	1	7	7	7	7	1
49	COUMAPHOS	18	10	10	10	2	9	9	9	9	1
50	CYANAZINE	7	6	6	6	1	6	5	4	4	1

表9 (つづき)

	Compound	Spinach					Brown rice				
		RSD%				LOD [®] (ppb)	RSD%				LOD [®] (ppb)
		10mDa	20mDa	50mDa	100mDa		10mDa	20mDa	50mDa	100mDa	
51	CYANOPHOS	3	3	3	3	<1	4	4	4	4	1
52	CYFLUFENAMID	64	8	8	8	1	4	4	4	4	1
53	CYLUTHRIN	7	7	7	8	11*	7	7	7	8	12*
54	CYHALOTHRIN	6	6	6	8	1*	6	6	6	6	13*
55	CYPERMETHRIN	8	8	7	4	2*	7	7	7	8	11*
56	CYPROCONAZOLE	5	5	5	7	1	5	5	5	13	1
57	CYPRODINIL	5	6	4	4	1	3	3	3	6	<1
58	p,p'-DDD	3	3	3	3	<1	4	4	4	4	1
59	p,p'-DDE	3	3	3	3	<1	4	4	4	4	1
60	o,p'-DDT	9	9	9	9	1	4	4	4	4	1
61	p,p'-DDT	8	8	8	8	1	7	7	7	7	1
62	DELTA METHRIN	10	10	10	10	2	10	10	10	10	1
63	DI-ALLATE	4	4	4	4	1*	3	3	3	3	1*
64	DIAZINON	3	3	3	4	<1	3	3	3	3	<1
65	DICHLORAN	12	12	12	12	2	5	5	5	5	1
66	DIELDRIN	1	1	1	1	<1	3	3	3	3	<1
67	DIETHOFENCARB	5	5	5	5	1	3	3	3	3	<1
68	DIFLUFENICAN	6	6	5	5	1	6	5	5	5	1
69	DIMETHAMETRYN	3	3	3	3	1	3	3	3	4	<1
70	DIMETHENAMID	3	2	3	3	<1	3	2	3	3	<1
71	DIMETHOATE	7	6	5	8	1	3	5	4	4	1
72	DIMETHYLVINPHOS (E)	6	6	6	6	1	4	4	4	4	1
73	DIMETHYLVINPHOS (Z)	8	8	8	7	1	5	5	5	4	1
74	DISULFOTON	4	4	4	4	1	5	6	4	4	1
75	DITHIOPYR	2	2	2	2	<1	3	4	4	4	1
76	EDIFENPHOS	6	7	6	6	1	9	7	8	6	1
77	ENDOSULFAN SULFATE	5	6	6	6	1	5	5	5	5	1
78	ENDOSULFAN (α)	8	4	4	4	1	6	5	5	5	1
79	ENDOSULFAN (β)	6	4	4	4	1	7	6	6	6	1
80	ENDRIN	9	9	9	9	1	4	4	4	4	1
81	EPN	8	8	8	6	1	7	7	7	7	1
82	EPOXICONAZOLE	4	4	6	11	1	5	5	5	4	1
83	ESPROCARB	2	6	2	2	<1	3	7	9	10	1
84	ETHION	6	6	6	6	1	5	5	5	5	1
85	ETHOPROPHOS	4	4	4	4	1	3	3	3	3	<1
86	ETOFENPROX	8	8	8	8	1	15	15	15	7	2
87	ETOXAZOLE	5	5	5	5	1	5	5	5	5	1
88	FENARIMOL	7	7	7	7	1	9	9	9	9	1
89	FENCHLORPHOS	4	4	4	4	1	5	5	5	5	1
90	FENITROTHION	15	15	15	15	2	4	5	5	5	1
91	FENOXANIL	4	4	4	9	1	3	3	3	3	1
92	FENPROPATHRIN	7	7	7	9	1	6	6	6	4	1
93	FENPROPIMORPH	3	3	3	3	<1	3	3	3	3	1
94	FENVALERATE	18	10	10	8	2*	8	12	11	10	2*
95	FIPRONIL	6	7	7	7	1	7	7	7	7	1
96	FLAMPROP METHYL	2	2	2	4	<1	4	4	4	4	1
97	FLUCYTHRINATE	6	7	8	8	2*	17	17	17	17	3*
98	FLUDIOXONIL	6	5	6	8	1	7	6	7	7	1
99	FLUQUINCONAZOLE	25	8	8	8	1	9	8	8	8	1
100	FLUTOLANIL	6	6	6	6	1	4	4	4	4	1