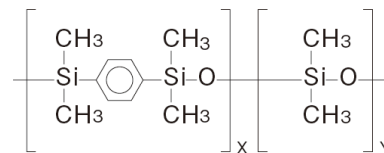


# Analytical and Retention Indicators of Pesticide Residues in Foods - Using InertCap 5MS/Sil-

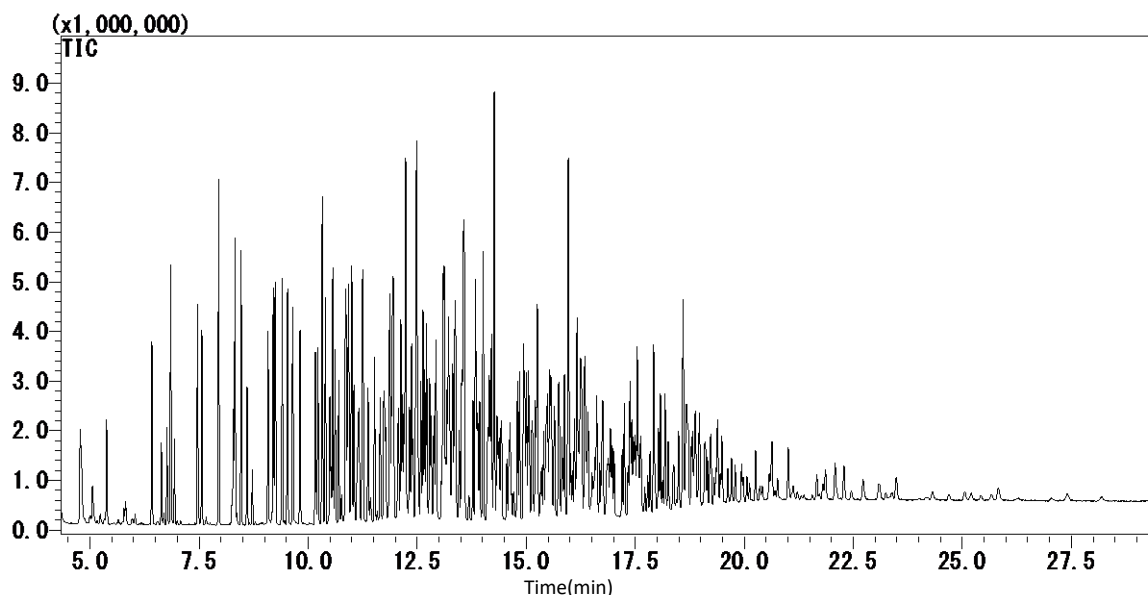
The retention time and retention index of pesticide residues in foods were determined using capillary GC with an InertCap 5 MS Sil column,

InertCap 5 MS Sil is a micropolar column chemically bonded to 5% phenyl-95% methyl polysililene. The reagents used were PL2005 agrochemicals GC/ MS Mix I, II, III, IV, V, VI, and VII of Hayashi Pure Chemical Ind., Ltd.. The Model GCMS-QP2010 Plus of SHIMADZU CORPORATION was used for the measurement. The first and second pages show the TICC(Total Ion Current Chromatogram of PL2005 pesticide GC/ MS Mix I-VII blended components, and the third and ninth pages show the TICC, retention time, and retention index for each group of PL2005 pesticide GC/ MS Mix I-VII.



Structural formula of InertCap 5 MS/Sil liquid phase.

Equivalent: DB-5ms, Rxi-5 Sil MS, VF-5ms, SLB-5ms



### Conditions

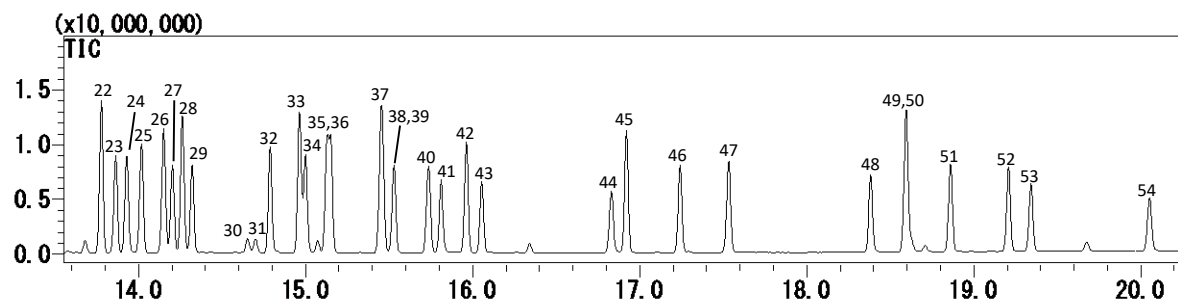
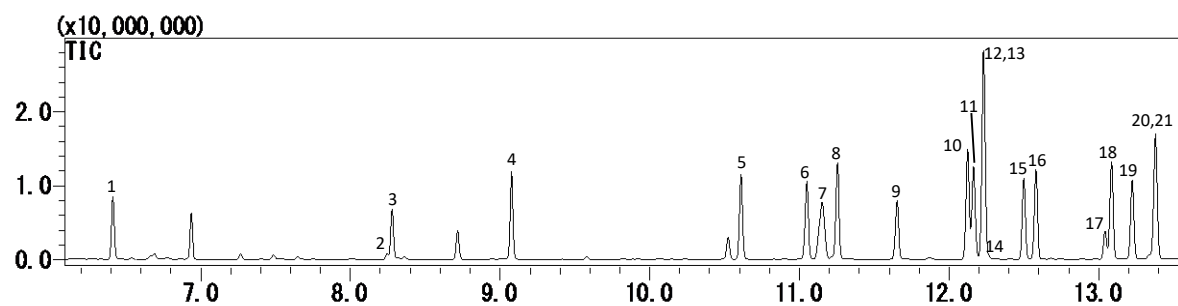
System	: GC - MS
Column	: InertCap 5MS/Sil 0.25 mm I.D. × 30 m, df = 0.25 μm (Cat. No. 1010-15142)
Col. Temp.	: 50 °C(1 min hold) - 25 °C/min-125 °C - 10 °C/min - 280 °C
Carrier Gas	: He 40 cm/sec (constant linear velocity)
Injection	: Splitless 1 min 250 °C
Liner	: Splitless liners (Cat. No. 3001-16329,5 bottles)
Interface Temp.	: 280 °C
Detection	: MS Scan (m/z : 45-450)
Ion source	: 230 °C
Inj. Vol.	: 1 μL
Sample	: PL2005 pesticide GC/ MS MixI~VII 2 ppm

# GL Sciences GC Technical Note

\*Group names of the reagents containing each component PL2005 the X part of the pesticide GC/ MS Mix X

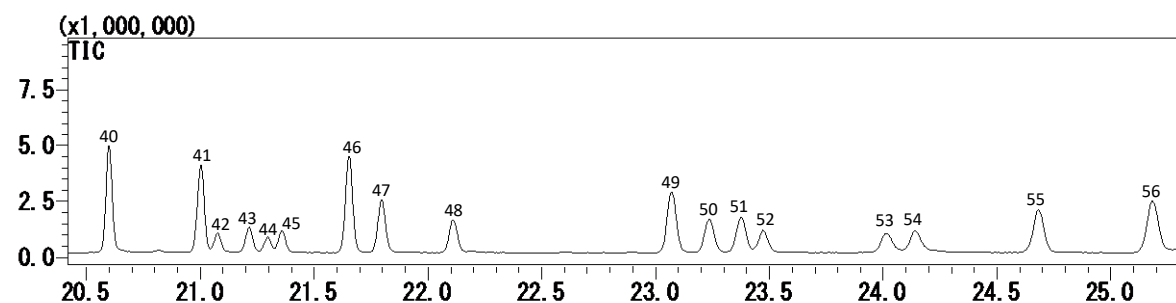
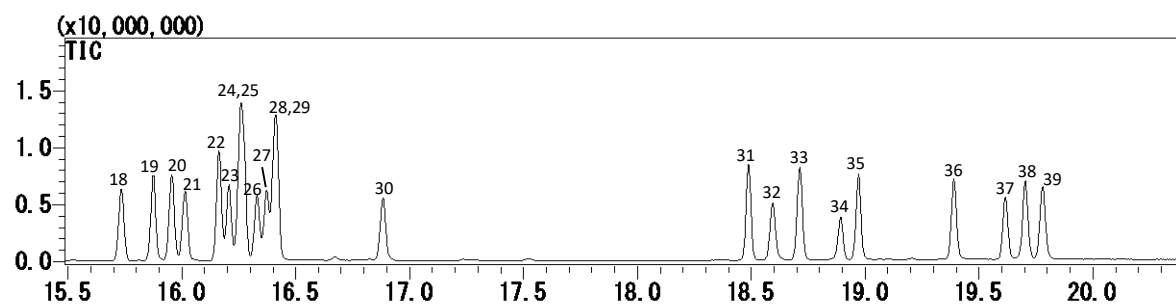
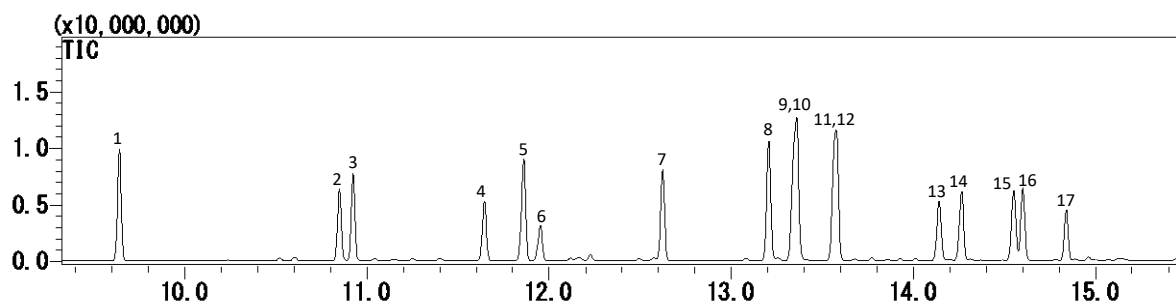
Compound	Retention index	*	Compound	Retention index	*	Compound	Retention index	*	Compound	Retention index	*
DCIP	1054	IV	Benflesete	1877	VI	Endosulfan	2149	II	Acetamiprid	2470	VII
Clofentidine digest	1180	V	Terbutcarb	1879	VI	Butamifos	2149	I	Bifenthrin	2470	II
Naphthalene-d8	1198	I.S.	Propanil	1881	V	Dithalimphos	2154	VI	Bromconazole-1	2472	V
Tachigaren	1201	VI	Acetochlor	1882	IV	Fenamiphos	2157	I	Phosmet	2481	III
Dichlorvos	1244	I	Bromobutide	1886	II	Imazametabenzmethyl 1	2158	VII	EPN	2483	I
Allyldoctor	1289	IV	Chlorpyrifos-methyl	1887	I	Flutriahole	2160	VII	Bromopropylate	2483	II
Neristoxin	1290	VI	Metribuzin	1890	V	Imazametabenzmethyl 2	2162	VII	Tetramethrin-2	2483	V
Dichlobenil	1349	III	Oxospoconazole formyl decomposition product	1892	VI	Napropamide	2163	IV	Piperophos	2483	I
EPTC	1361	VI	Vinclazolol	1894	III	Flutolanil	2164	II	Picolinaphene	2485	VII
Diphenyl	1397	V	Spiroxamine-1	1897	VII	Hexaconazole	2173	V	Fenoxycarb	2490	VI
Mevinphos1	1424	I	Cimeconazole	1899	II	Chlorfenson	2173	II	Bifenazate	2492	V
Mevinphos2	1427	I	Alachlor	1901	II	Prothiohost	2174	I	Etoxazole	2492	IV
Butyrate	1432	VI	Parathion methyl	1902	I	(E)-metminostrobin.	2174	IV	Chrysene-d12	2492	I.S.
Chlormefos	1445	VI	Tolclofosmethyl	1903	I	Pretilachlor	2174	IV	Methoxychlor	2497	VII
Etridiazole	1456	III	Simetryn	1911	V	Fludioxonil	2174	V	Fenpropathrin	2498	II
Clothianidin	1480	VI	Metalaxil (Mephenoxam)	1915	IV	TCMTB	2176	VII	Phenamidon	2508	VII
Acenaphthene-d10	1499	I.S.	Ametryn	1918	V	Isoprothiolane	2179	II	Tebufenpyrad	2509	IV
Methachryfos	1500	I	Phenclorfos	1921	II	Profenofos	2184	I	Etoxazole metabolite	2513	IV
Chloroneb	1513	VII	Prometryn	1922	IV	Oxadiazon	2188	III	Anilophos	2517	I
Thiocyclam	1516	V	Cinmethylin	1922	VI	Thifluzamide	2189	III	Bifenox	2521	II
Crimidine	1518	VI	Dithiopyr	1923	II	Uniconazole (Uniconazole P)	2194	III	Indanofan	2521	VI
Orthophenylphenol	1532	VI	Pirimiphos-methyl	1943	I	Tricyclazole	2195	VII	Bromconazole-2	2526	V
Isoprocarb	1542	VII	Terbutryn	1948	IV	Tribufos	2196	II	Furametpyr	2530	V
Molinate	1552	II	Spiroxamine-2	1950	VII	Frampropmethyl	2197	VII	Clomeprop	2531	II
XMC	1568	VII	Fenitrothion	1951	I	Oxyfluorfen	2199	III	Phenothrin-1	2533	VI
OMETHATE	1598	III	2-(1-naphthyl)acetamide	1953	VII	Myclobutanil	2200	II	Iprodione metabolite	2541	V
Tecnazene	1599	III	Etofmesate	1956	VII	Flusilazole	2203	IV	Tetradifon	2548	III
Xylyl carb	1606	VI	(E)-Dimethylvinphos	1958	I	Bupirimate	2203	III	Phenothrin-2	2548	III
Propanol	1613	IV	Bromacil	1961	V	Buprofezin	2206	II	Pentoxazone	2555	V
Propoxur	1614	VII	Esprocarb	1966	IV	Kresoxim	2208	II	Phosalone	2561	I
Chlorethoxyfos	1622	VII	Dichlofluanid	1966	V	Diclobutrazole	2214	II	Leptophos	2566	VI
Demeton-S-methyl (methyldemeton)	1628	III	Malathion	1967	I	(Z)-metminostrobin	2216	VII	Cyhalothrin-1	2573	III
Diphenylamine	1636	IV	Metolachlor (S-metolachlor)	1976	IV	Imibenconazole debenzyl	2219	VII	Azinphosmethyl	2578	I
Ethoprophos	1640	I	Quinoclamine	1980	II	Carboxin	2219	VII	Pyriproxyfen	2584	V
Etafurarin	1648	III	Chlorpyrifos	1983	IV	Azaconazole	2219	II	Cyhalofop	2584	II
Fenmedifam decomposition product	1656	VI	Diethofencarb	1983	IV	Chlorphenapil	2223	II	Furametopyr metabolite	2592	V
Naled	1662	III	Thiobencarb	1985	III	Ciflufenamide	2224	II	Cyhalothrin-2	2595	III
Chlorpropham	1662	II	(Z)-dimethylvinphos	1986	I	Isoxathione	2234	III	Mefenacet	2598	V
Trifluralin	1663	III	Chlorthal-dimethyl	1991	III	Ciproconazole 1	2237	IV	Amitraz	2599	VI
Flucirazole metabolite	1667	IV	Fenthion	1992	I	Chlorthiophos-1	2240	VI	Acrinathrin	2613	II
Dicrotophos	1668	III	Cyanazine	1992	II	Ciproconazole 2	2241	IV	Pyrazofos	2623	II
Diclofluanide metabolite	1668	V	Fenproprymorph	1994	VI	Phenoxanyl 1	2241	IV	Fenarimol	2633	II
Venfluralin	1669	II	Parathion	1998	I	Phenoxanyl 2	2243	IV	Azimphoethyl	2654	VI
2,6-Dichlorobenzamide	1676	VI	Isophenphosoxone	1999	VII	1,1-Dichloro-2,2-bis(4-ethylphenyl)ethane	2248	VII	Dialyphos	2659	VI
Sulfotepp	1677	VI	Tetraconazole	2000	IV	Nitrofen	2249	V	Pyralophos	2666	I
Dioxabenzophos (salithione)	1680	II	Triadimefon	2003	III	Flufenpyrethylethyl	2256	VII	Phenoxaprop ethyl (phenoxaprop P ethyl)	2675	V
Monocrotophos	1685	III	Isocarboxiphos	2007	III	(Z)-pyriminobackmethyl	2259	III	Oryzalin	2675	VII
Cassafos	1690	I	Nitrotar isopropyl	2009	III	Chlorthiophos-2	2262	VI	Oxospoconazole	2694	VI
Diarate-1	1699	VII	Carbetamide	2010	VI	Chlorpropylate	2263	V	Spirodiclofen	2694	VI
Phorate	1699	I	Fthalide	2022	II	Chlorbenzylate	2263	IV	Bitertanol-1	2703	V
α-BHC	1711	V	Bromophos	2027	II	Fensulfothion	2272	I	Permethrin-1	2708	III
Diarate-2	1716	VII	Diphenamid	2030	IV	Diniconazole	2277	VI	Bitertanol-2	2717	V
Thiometon	1724	III	Phosphatase-1	2033	I	Endosulfan	2278	II	Permethrin-2	2725	III
Desmedipham decomposition product	1729	IV	Phosphatase-2	2037	I	Ethion	2282	I	Fluquinconazole	2729	III
Dicloran	1736	II	(E)-Chlorphenvinphos	2047	II	Oxadixyl	2285	V	Pyridaben	2732	III
Dimethoate	1737	I	Thiamethoxam decomposition product	2047	VI	Chlorthiophos-3	2290	VI	Dioxathion	2735	VI
Furirazole	1745	VII	Pendimethalin	2048	III	Fluacripilim	2292	III	Butafenacil	2746	IV
Carbofuran	1747	VII	Fipronil	2052	II	Mepronil	2314	IV	Ethobenzanide	2771	IV
Simazine	1749	IV	Cyprodinil	2052	IV	Triazophos	2319	I	Caffenstrol	2772	II
Atrazine	1756	II	Dimethamethrin	2062	IV	Sulprofos	2320	II	Cyfluthrin-1	2779	II
Sweep	1758	V	Penconazole	2062	III	Carfentrasone ethyl	2330	IV	Fenbuconazole	2785	V
Chlorbufam	1759	VII	Allethrin-1	2064	III	Benaraxyl	2336	IV	Cyfluthrin-2	2794	II
Propazine	1763	VII	Isofenphos	2065	I	Azamethifos	2336	VI	Cyfluthrin-3	2802	II
Quintozene	1765	III	Clozolate	2065	VII	Isoxadiphenethyl	2336	VI	Cyfluthrin-4	2808	II
Dimetipine	1765	II	Zoxamide decomposition product	2065	VII	Trifloxystrobin	2340	III	Cypermethrin-1	2825	III
Chromazone	1765	VII	Allethrin-2	2066	III	Chlornitrophen	2341	V	Halfenprox	2834	II
Dioxathion decomposition product	1775	VI	(Z)-chlorfenvinphos	2069	I	Carbophenothion	2344	III	Cypermethrin-2	2839	III
Trifluranide metabolite	1775	V	(Z)-pyriphenox	2070	III	Norflurazon	2349	VII	Cypermethrin-3	2847	III
β-BHC	1776	V	Tolyfluranide	2070	V	Cyanofenphos	2349	III	Flucitrinate-1	2847	II
γ-BHC (lindane)	1776	V	Mecarbam	2074	III	Propiconazole-1	2349	IV	Cypermethrin-4	2853	III
Terbufos	1781	I	Allethrin-3 (vioallethrin)	2074	III	Edifenphos	2354	I	Xalofop Ethyl (Kizalofop P Ethyl)	2856	VI
Cyanophos	1785	I	Allethrin-4 (vioallethrin)	2077	III	(E)-pyriminobackmethyl	2354	III	Etofenprox	2873	IV
Propoxamide	1788	III	Ethychlozate	2077	VI	Quinoxyphe	2356	II	Flucitrinate-2	2876	II
Fonofos	1791	I	Fentoate	2083	I	Pyraflufen ethyl	2361	VI	Silafluofen	2892	V
Diazinon	1791	I	Diclocimet-1	2083	V	Propiconazole-2	2363	IV	Benzo(a)pyrene -d12	2892	I.S.
Phosphamide-1	1794	I	Quinalphos	2085	I	Endosulfan sulfate	2365	VII	Fluridone	2908	VII
Pyrochlorone	1800	V	Procymidone	2090	III	Lenacil	2370	VI	Pyrimidiphene	2925	III
Pyrimethanil	1806	VI	Triadimenol-1	2091	III	Chloridazon	2380	VI	Fenvalerate-1	2952	II
Chlorothalonil	1808	V	Captan	2094	V	Hexazinone	2385	VII	Flumioxazine	2954	IV
Anthracene-d10	1809	I.S.	Dimepiperate	2094	IV	Tenyl chloride	2389	IV	Fluvalinate-1	2964	II
Tefluthrin	1815	III	Thiabendazole	2097	VII	Diffufenican	2399	III	Pilacrostrobin	2973	VI
Disulfoton	1815	III	Methoprene	2097	V	Tebuconazole	2399	IV	Fluvalinate-2	2975	II
Prohydrojasmon-1	1815	VI	Ferrimzone	2104	VI	Propargitt 1	2400	V	Fenvalerate-2 (esfenvalerate)	2982	II
Isazophos	1817	I	Triadimenol-2	2106	III	Diclofop-methyl	2401	VII	Fenvalerate-2 (esfenvalerate)	2985	VI
Terbacil	1821	IV	Folpet	2107	V	Propargit 2	2403	V	Diphenconazole-1	3018	II
Etrimpfos	1825	I	Bromophosphoethyl	2113	VII	Resmethrin-1	2406	VII	Diphenconazole-2	3026	II
Tri-allate	1829	II	Diclocimet-2	2117	V	Piperonyl butoxide	2413	V	Pyrazoxyphene	3031	V
δ-BHC	1830	V	Metidathion	2117	I	Nitralin	2415	V	Indoxacarb	3036	IV
Thioethyl MCPA	1834	V	Propafos	2118	I	Resmethrin-2 (bioresmethrin)	2418	IV	Deltamethrin (a tralomethrin decomposition product)	3059	II
Tebupirimphos	1839	VI	Chlorbenside	2123	VII	Resmethrin-2 (bioresmethrin)	2421	VII	Full microrack pentyl	3083	VII

## PL2005 pesticide GC/ MS Mix I



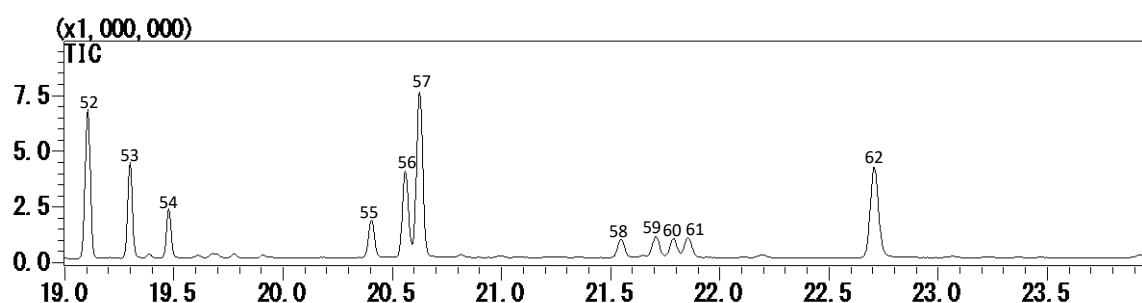
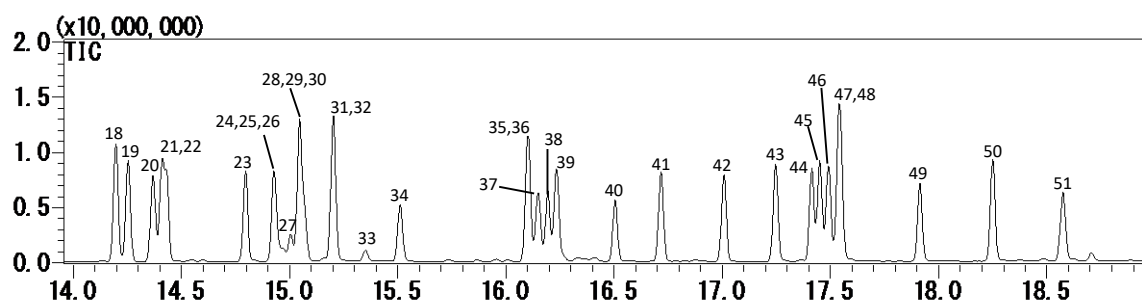
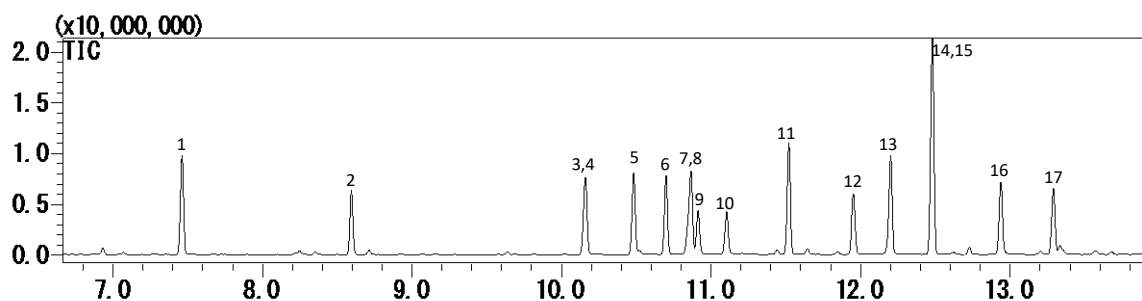
Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Dichlorvos	6.413	1244	28	Fenthion	14.261	1992
2	Mevinphos1	8.245	1424	29	Parathion	14.319	1998
3	Mevinphos2	8.279	1427	30	Phosphatase-1	14.651	2033
4	Methacryfos	9.076	1500	31	Phosphatase-2	14.697	2037
5	Ethoprophos	10.610	1640	32	(E)-Chlorphenvinphos	14.786	2047
6	Dioxabenzophos (salithione)	11.049	1680	33	Isofenphos	14.962	2065
7	Cassafos	11.151	1690	34	(Z)-chlorfenvinphos	14.998	2069
8	Phorate	11.254	1699	35	Fentoate	15.126	2083
9	Dimethoate	11.653	1737	36	Quinalphos	15.151	2085
10	Terbufos	12.123	1781	37	Methidathion	15.447	2117
11	Cyanophos	12.162	1785	38	Propafos	15.459	2118
12	Fonofos	12.229	1791	39	Tetrachlorvinphos	15.529	2126
13	Diazinon	12.230	1791	40	Butamifos	15.735	2149
14	Phosphamide-1	12.263	1794	41	Fenamiphos	15.810	2157
15	Isazophos	12.500	1817	42	Prothiohost	15.962	2174
16	Etrimphos	12.580	1825	43	Profenofos	16.054	2184
17	Phosphamide-2	13.041	1870	44	Fensulfothion	16.830	2272
18	Diclofenthion	13.084	1874	45	Ethion	16.920	2282
19	Chlorpyrifos-methyl	13.222	1887	46	Triazophos	17.242	2319
20	Parathion methyl	13.373	1902	47	Edifenphos	17.533	2354
21	Tolclofosmethyl	13.382	1903	48	Pyridaphenthion	18.381	2457
22	Pirimiphos-methyl	13.777	1943	49	EPN	18.590	2483
23	Fenitrothion	13.861	1951	50	Piperophos	18.597	2483
24	(E)-Dimethylvinphos	13.928	1958	51	Anilophos	18.861	2517
25	Malathion	14.016	1967	52	Phosalone	19.209	2561
26	Chlorpyrifos	14.149	1980	53	Azinphosmethyl	19.342	2578
27	(Z)-dimethylvinphos	14.201	1986	54	Pyraclophos	20.051	2666

PL2005 pesticide GC/ MS Mix II



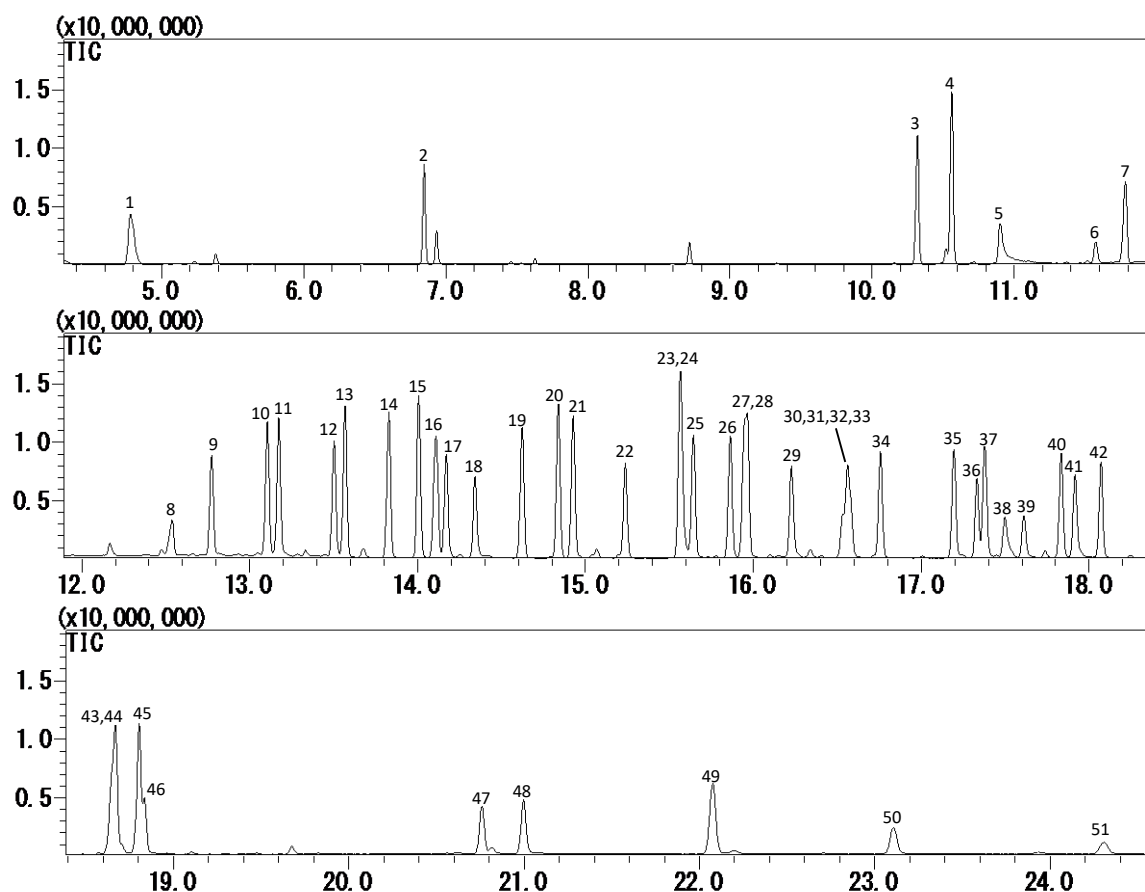
Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound name	Retention time (min)	Retention index
1	Molinatate	9.640	1552	29	Ciflufenamide	16.417	2224
2	Chlorpropham	10.848	1662	30	Endosulfan	16.883	2278
3	Venfluralin	10.924	1669	31	Bifenthrin	18.488	2470
4	Dicloran	11.644	1736	32	Bromopropylate	18.593	2483
5	Atrazine	11.861	1756	33	Fenpropathrin	18.714	2498
6	Dimetipine	11.952	1765	34	Bifenox	18.892	2521
7	Tri-allate	12.622	1829	35	Clomeprop	18.970	2531
8	Bromobutide	13.205	1886	36	Cyhalofop	19.388	2584
9	Cimeconazole	13.340	1899	37	Acrinathrin	19.615	2613
10	Alachlor	13.361	1901	38	Pyrazofos	19.703	2623
11	Phenchlorfos	13.561	1921	39	Fenarimol	19.778	2633
12	Dithiopyr	13.579	1923	40	Fluquinconazole	20.598	2729
13	Quinoclamine	14.140	1980	41	Caffenstrol	21.003	2772
14	Cyanazine	14.265	1992	42	Cyfluthrin-1	21.076	2779
15	Fthalide	14.550	2022	43	Cyfluthrin-2	21.214	2794
16	Bromophos	14.599	2027	44	Cyfluthrin-3	21.295	2802
17	Fipronil	14.838	2052	45	Cyfluthrin-4	21.360	2808
18	Endosulfan	15.734	2149	46	Halfenprox	21.652	2834
19	Flutolanil	15.875	2164	47	Flucitriate-1	21.796	2847
20	Chlorfenson	15.957	2173	48	Flucitriate-2	22.109	2876
21	Isoprothiolane	16.015	2179	49	Fenvalerate-1	23.071	2952
22	Tribufos	16.163	2196	50	Fluvalinate-1	23.235	2964
23	Myclobutanil	16.206	2200	51	Fluvalinate-2	23.376	2975
24	Buprofezin	16.256	2206	52	Fenvalerate-2 (esfenvalerate)	23.474	2982
25	Kresoxim	16.272	2208	53	Diphenconazole-1	24.009	3018
26	Diclobutrazole	16.330	2214	54	Diphenconazole-2	24.138	3026
27	Azaconazole	16.372	2219	55	Deltamethrin (a tralomethrin decomposition product)	24.681	3059
28	Chlorphenapil	16.405	2223	56	Azoxystrobin	25.183	3090

PL2005 pesticide GC/ MS Mix III



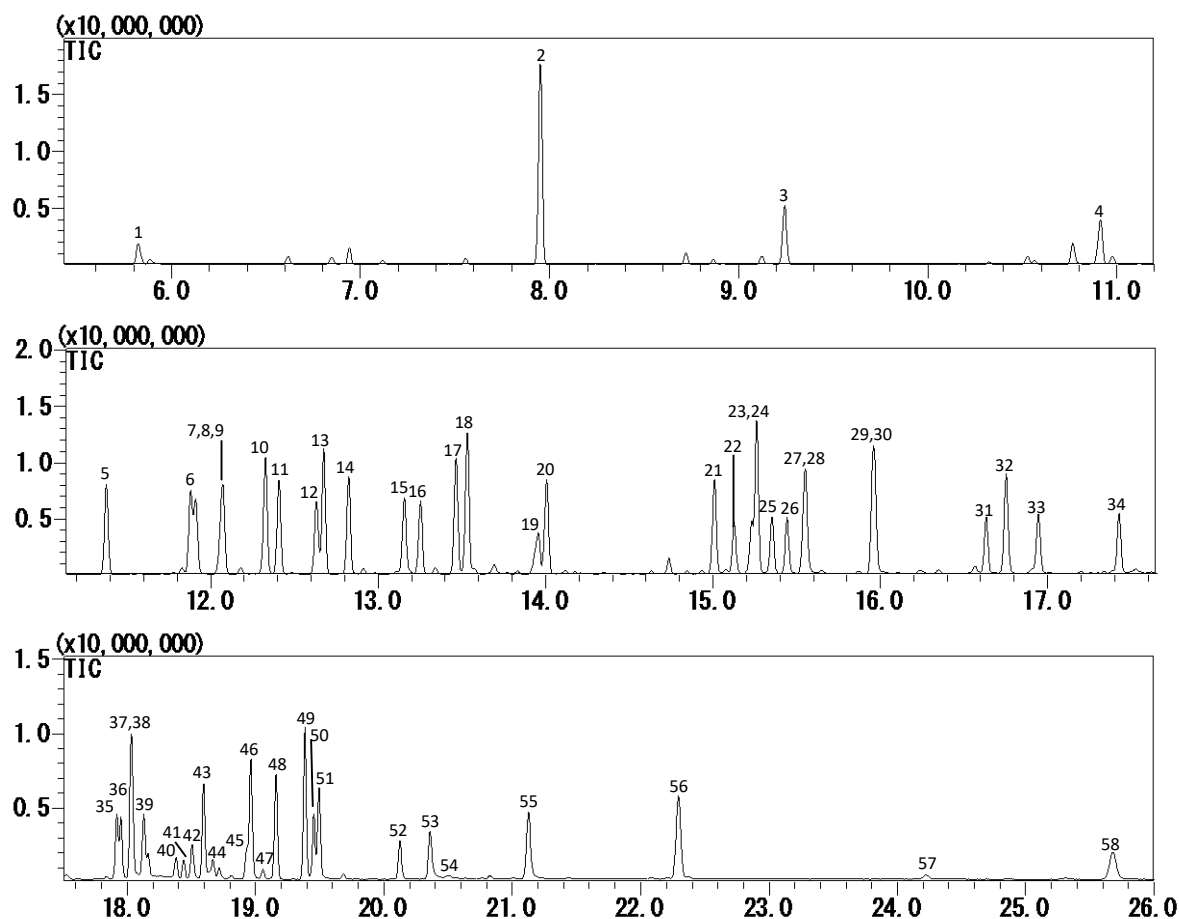
Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Dichlobenil	7.461	1349	32	Triadimenol-1	15.202	2091
2	Etridiazole	8.594	1456	33	Triadimenol-2	15.350	2106
3	OMETHATE	10.150	1598	34	(E)-Pyriphenox	15.510	2124
4	Tecnazene	10.161	1599	35	Oxadiazon	16.097	2188
5	Demeton-S-methyl (methyl demeton)	10.482	1628	36	Thifluzamide	16.105	2189
6	Etalfurarin	10.698	1648	37	Uniconazole (Uniconazole P)	16.148	2194
7	Naled	10.844	1662	38	Oxyfluorfen	16.193	2199
8	Trifluralin	10.865	1663	39	Bupirimate	16.233	2203
9	Diclotophos	10.912	1668	40	Isoxathione	16.505	2234
10	Monocrotophos	11.104	1685	41	(Z)-pyriminobackmethyl	16.716	2259
11	Thiometon	11.519	1724	42	Fluacripilim	17.008	2292
12	Quintozene	11.950	1765	43	Sulprofos	17.245	2320
13	Propyzamide	12.200	1788	44	Trifloxystrobin	17.414	2340
14	Tefluthrin	12.479	1815	45	Carbophenothion	17.451	2344
15	Disulfoton	12.479	1815	46	Cyanofenphos	17.491	2349
16	Formothion	12.938	1860	47	(E)-pyriminobackmethyl	17.537	2354
17	Vinclozolin	13.288	1894	48	Quinoxiphen	17.548	2356
18	Thiobencarb	14.196	1985	49	Diflufenican	17.913	2399
19	Chlorthal-dimethyl	14.253	1991	50	Pyributicarb	18.250	2441
20	Triadimefon	14.368	2003	51	Phosmet	18.575	2481
21	Isocarbophos	14.410	2007	52	Tetradifon	19.106	2548
22	Nitrotar isopropyl	14.431	2009	53	Cyhalothrin-1	19.299	2573
23	Pendimethalin	14.796	2048	54	Cyhalothrin-2	19.476	2595
24	Penconazole	14.927	2062	55	Permethrin-1	20.406	2708
25	Allethrin-1	14.945	2064	56	Permethrin-2	20.561	2725
26	Allethrin-2	14.969	2066	57	Pyridaben	20.626	2732
27	(Z)-pyriphenox	15.004	2070	58	Cypermethrin-1	21.552	2825
28	Mecarbam	15.046	2074	59	Cypermethrin-2	21.707	2839
29	Allethrin-3 (vioallethrin)	15.046	2074	60	Cypermethrin-3	21.788	2847
30	Allethrin-4 (vioallethrin)	15.068	2077	61	Cypermethrin-4	21.858	2853
31	Procymidone	15.200	2090	62	Pyrimidiphene	22.707	2925

## PL2005 pesticide GC/MS Mix IV



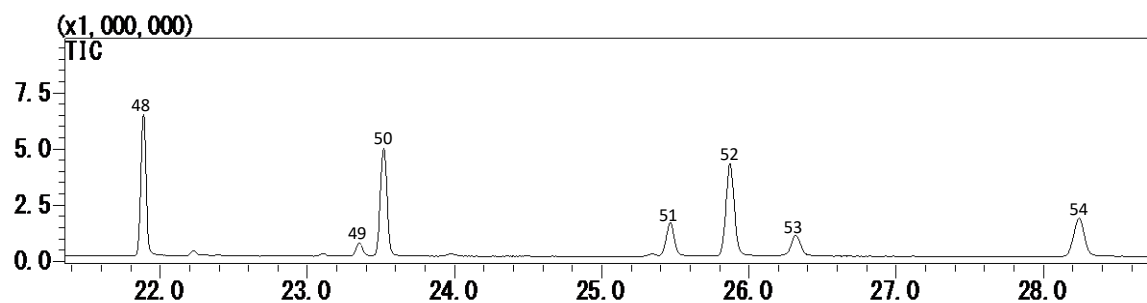
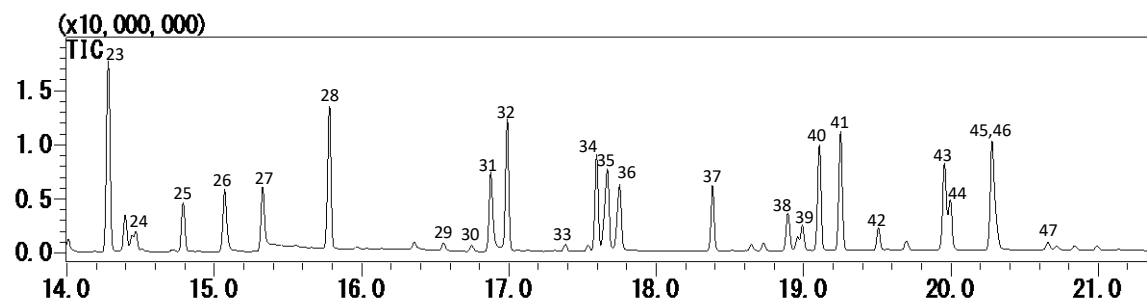
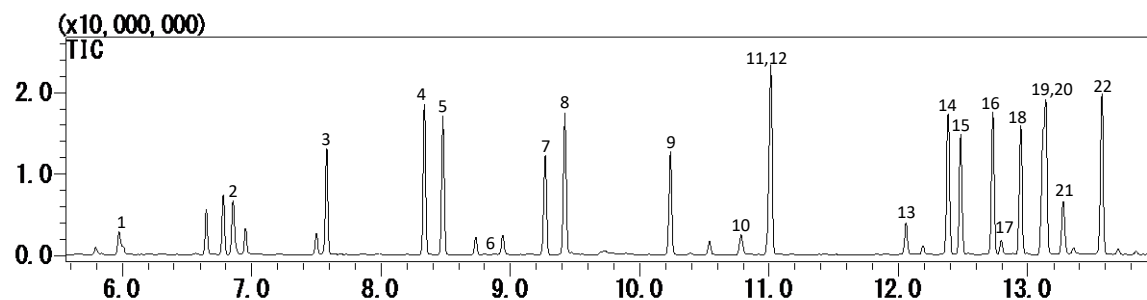
Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	DCIP	4.779	1054	27	(E)-metminostrobin.	15.963	2174
2	Allyldochlor	6.847	1289	28	Pretilachlor	15.965	2174
3	Propanol	10.319	1613	29	Flusilazole	16.226	2203
4	Diphenylamine	10.561	1636	30	Ciproconazole 1	16.530	2237
5	Flucirazole metabolite	10.901	1667	31	Ciproconazole 2	16.559	2241
6	Desmedipham decomposition product	11.575	1729	32	Phenoxanyl 1	16.565	2241
7	Simazine	11.783	1749	33	Phenoxanyl 2	16.576	2243
8	Terbacil	12.538	1821	34	Chlorbenzylate	16.757	2263
9	Iprobenfos	12.773	1843	35	Mepronil	17.195	2314
10	Dimethenamide (Dimethenamide P)	13.106	1876	36	Carfentrasone ethyl	17.331	2330
11	Acetochlor	13.174	1882	37	Benaraxyl	17.379	2336
12	Metalaxil (Mephenoxam)	13.503	1915	38	Propiconazole-1	17.496	2349
13	Prometryn	13.568	1922	39	Propiconazole-2	17.611	2363
14	Terbutryn	13.829	1948	40	Tenyl chloride	17.833	2389
15	Esprocarb	14.006	1966	41	Tebuconazole	17.916	2399
16	Metolachlor (S-metolachlor)	14.109	1976	42	Resmethrin-2 (bioresmethrin)	18.071	2418
17	Diethofencarb	14.171	1983	43	Fenoxycarb	18.647	2490
18	Tetraconazole	14.341	2000	44	Etoxazole	18.670	2492
19	Diphenamid	14.623	2030	45	Tebufenpyrad	18.804	2509
20	Cyprodinil	14.838	2052	46	Etoxazole metabolite	18.836	2513
21	Dimethamethrin	14.926	2062	47	Butafenacil	20.760	2746
22	Dimepiperate	15.237	2094	48	Ethobenzanide	20.997	2771
23	Butachlor	15.562	2130	49	Etofenprox	22.077	2873
24	Pacllobutrazol	15.572	2131	50	Flumioxazine	23.104	2954
25	Fenothiocarb	15.643	2139	51	Indoxacarb	24.307	3036
26	Napropamide	15.863	2163				

## PL2005 pesticide GC/ MS Mix V



Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Clofentedine digest	5.823	1180	30	Fludioxonil	15.967	2174
2	Diphenyl	7.951	1397	31	Nitrofen	16.631	2249
3	Thiocyclam	9.243	1516	32	Chloropropylate	16.751	2263
4	Diclofluanide metabolite	10.913	1668	33	Oxadixyl	16.944	2285
5	$\alpha$ -BHC	11.376	1711	34	Chlornitrophenene	17.426	2341
6	Swep	11.878	1758	35	Propargitt 1	17.919	2400
7	Trifluranide metabolite	12.058	1775	36	Propargitt 2	17.950	2403
8	$\beta$ -BHC	12.072	1776	37	Piperonyl butoxide	18.029	2413
9	$\gamma$ -BHC (lindane)	12.072	1776	38	Nitralin	18.041	2415
10	Pyrochlorone	12.326	1800	39	Captafol	18.129	2426
11	Chlorothalonil	12.407	1808	40	Iprodione	18.381	2457
12	$\delta$ -BHC	12.631	1830	41	Tetramethrin-1	18.440	2464
13	Thioethyl MCPA	12.674	1834	42	Bromconazole-1	18.506	2472
14	Oxabetrinyl	12.824	1848	43	Tetramethrin-2	18.595	2483
15	Propanil	13.157	1881	44	Bifenazate	18.667	2492
16	Metribuzin	13.253	1890	45	Bromconazole-2	18.931	2526
17	Simetryn	13.465	1911	46	Furametpyr	18.963	2530
18	Ametryn	13.531	1918	47	Iprodione metabolite	19.055	2541
19	Bromacil	13.957	1961	48	Pentoxazone	19.160	2555
20	Dichlofluanid	14.006	1966	49	Pyriproxyfen	19.384	2584
21	Tolylfuranide	15.009	2070	50	Furametopyr metabolite	19.453	2592
22	Diclocimet-1	15.126	2083	51	Mefenacet	19.495	2598
23	Captan	15.231	2094	52	Phenoxaprop ethyl (phenoxaprop P ethyl)	20.122	2675
24	Methoprene	15.261	2097	53	Bitertanol-1	20.359	2703
25	Folpet	15.353	2107	54	Bitertanol-2	20.493	2717
26	Diclocimet-2	15.442	2117	55	Fenbuconazole	21.127	2785
27	Trichloride	15.543	2128	56	Silafluofen	22.291	2892
28	Quinomethionate	15.552	2129	57	Pyrazoxyphene	24.225	3031
29	Hexaconazole	15.954	2173	58	Famoxadone	25.675	3116

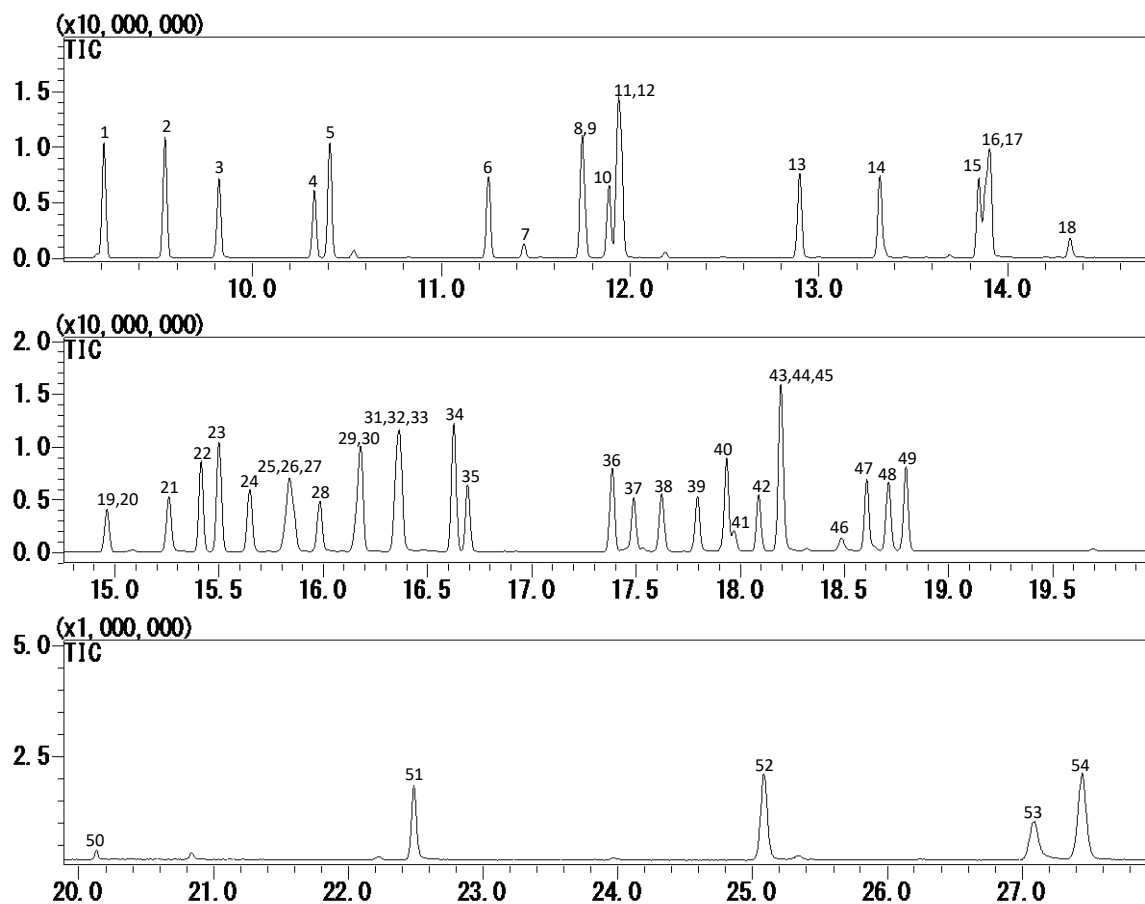
PL2005 pesticide GC/ MS Mix VI



Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Tachigaren	6.005	1201	28	Dithalimphos	15.781	2154
2	Neristoxin	6.856	1290	29	Chlorthiophos-1	16.556	2240
3	EPTC	7.580	1361	30	Chlorthiophos-2	16.746	2262
4	Butyrate	8.335	1432	31	Diniconazole	16.875	2277
5	Chlormefos	8.478	1445	32	Chlorthiophos-3	16.988	2290
6	Clothianidin	8.853	1480	33	Azamethifos	17.383	2336
7	Crimidine	9.269	1518	34	Pyraflufen ethyl	17.594	2361
8	Orthophenylphenol	9.421	1532	35	Lenacil	17.666	2370
9	Xyllyl carb	10.237	1606	36	Chloridazon	17.750	2380
10	Fenmedifam decomposition product	10.783	1656	37	Clomethoxyphene (Clomethoxynyl)	18.381	2457
11	2,6-Dichlorobenzamide	11.004	1676	38	Indanofan	18.893	2521
12	Sulfotepp	11.014	1677	39	Phenothrin-1	18.991	2533
13	Dioxathion decomposition product	12.057	1775	40	Phenothrin-2	19.106	2548
14	Pyrimethanil	12.383	1806	41	Leptophos	19.249	2566
15	Prohydrojasmon-1	12.480	1815	42	Amitraz	19.507	2599
16	Tebupirimphos	12.728	1839	43	Azimphoethyl	19.956	2654
17	Prohydrojasmon-2	12.793	1845	44	Dialyphos	19.995	2659
18	Ethyl MCPB	12.945	1860	45	Oxospoconazole	20.276	2694
19	Benflesete	13.115	1877	46	Spirodiclofen	20.277	2694
20	Terbucarb	13.138	1879	47	Dioxathion	20.658	2735
21	Oxospoconazole formyl decomposition product	13.272	1892	48	Xalofop Ethyl (Kizalofop P Ethyl)	21.887	2856
22	Cinmethylin	13.573	1922	49	Pilacrostrobin	23.352	2973
23	Fenpropimorph	14.282	1994	50	Fenvalerate-2 (esfenvalerate)	23.518	2985
24	Carbetamide	14.440	2010	51	Dimethomorph-1	25.460	3105
25	Thiamethoxam decomposition product	14.787	2047	52	Tolfenpyrad	25.870	3126
26	Ethychlozate	15.070	2077	53	Dimethomorph-2	26.319	3148
27	Ferrimzone	15.327	2104	54	Flutiacet methyl	28.243	3235



## PL2005 pesticide GC/ MS Mix VII



Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Chloroneb	9.213	1513	28	TCMTB	15.982	2176
2	Isoprocarb	9.536	1542	29	Tricyclazole	16.158	2195
3	XMC	9.822	1568	30	Frampropmethyl	16.179	2197
4	Propoxur	10.328	1614	31	(Z)-metminostrobin	16.346	2216
5	Chlorethoxyfos	10.409	1622	32	Imibenconazole debenzyl	16.367	2219
6	Diarate-1	11.249	1699	33	Carboxin	16.369	2219
7	Diarate-2	11.437	1716	34	1,1-Dichloro-2,2-bis(4-ethylphenyl)ethane	16.626	2248
8	Furirazole	11.744	1745	35	Flufenpyrethylethyl	16.691	2256
9	Carbofuran	11.758	1747	36	Isoxadiphenethyl	17.385	2336
10	Chlorbufam	11.887	1759	37	Norflurazon	17.489	2349
11	Propazine	11.934	1763	38	Endosulfan sulfate	17.623	2365
12	Chromazone	11.952	1765	39	Hexazinone	17.794	2385
13	Benoxachol	12.899	1856	40	Diclofop-methyl	17.934	2401
14	Spiroxamine-1	13.323	1897	41	Resmethrin-1	17.970	2406
15	Spiroxamine-2	13.846	1950	42	Resmethrin-2 (bioresmethrin)	18.089	2421
16	2-(1-naphthyl)acetamide	13.881	1953	43	Zoxamide	18.192	2433
17	Etofmesate	13.905	1956	44	Mefenpyrdiethyl	18.192	2433
18	Isophenphosoxone	14.331	1999	45	Epoxiconazole	18.199	2434
19	Clozolate	14.962	2065	46	Acetamiprid	18.486	2470
20	Zoxamide decomposition product	14.963	2065	47	Picolinaphene	18.606	2485
21	Thiabendazole	15.258	2097	48	Methoxychlor	18.710	2497
22	Bromophosphoethyl	15.412	2113	49	Phenamidon	18.794	2508
23	Chlorbenside	15.499	2123	50	Oryzalin	20.126	2675
24	Disulfotone sulfone	15.646	2139	51	Fluridone	22.485	2908
25	Imazametabenzmethyl 1	15.817	2158	52	Full microrack pentyl	25.080	3083
26	Flutriahole	15.837	2160	53	Imibenconazole	27.082	3186
27	Imazametabenzmethyl 2	15.858	2162	54	Cinidone ethyl	27.448	3204

The retention index is a relatively representative index of the retention ratio of straight-chain alkanes in the target compounds based on the number of carbon, and is extremely useful information for qualitative analysis.

The retention index can be determined because in isothermal analysis the logarithm of the retention ratio for straight-chain alkanes is linearly related to the number of carbons and the retention ratio is also linear to the number of carbons in thermal rise analysis  
In the case of temperature programming...

Because the retention ratio of straight-chain alkanes is linearly related to the number of carbons, the retention index is given by the following equation.

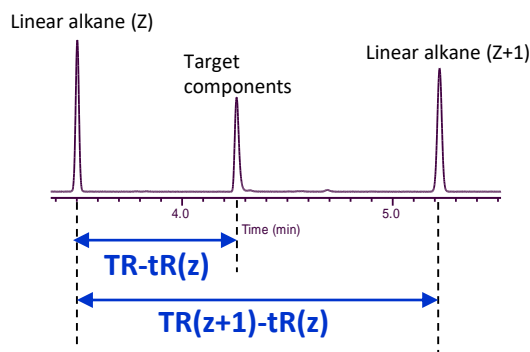
$$\text{Retention index } I = 100 \times \frac{\text{TR} - \text{tR}(Z)}{\text{TR}(Z+1) - \text{tR}(Z)} + 100 \times Z$$

TR = retention time of the target component

TR(Z) = retention time of straight-chain alkanes that precede the components of interest

TR(Z+1) = retention time of straight-chain alkanes emerging after the components of interest

Z = number of carbons in straight-chain alkanes with a retention time tR(Z)



#### Reference

Věra Pacáková and Ladislav Feltl, Chromatographic retention indices an aid to identification of organic compounds(1992)ELLIS HORWOOD LIMITED



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