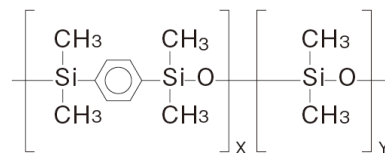
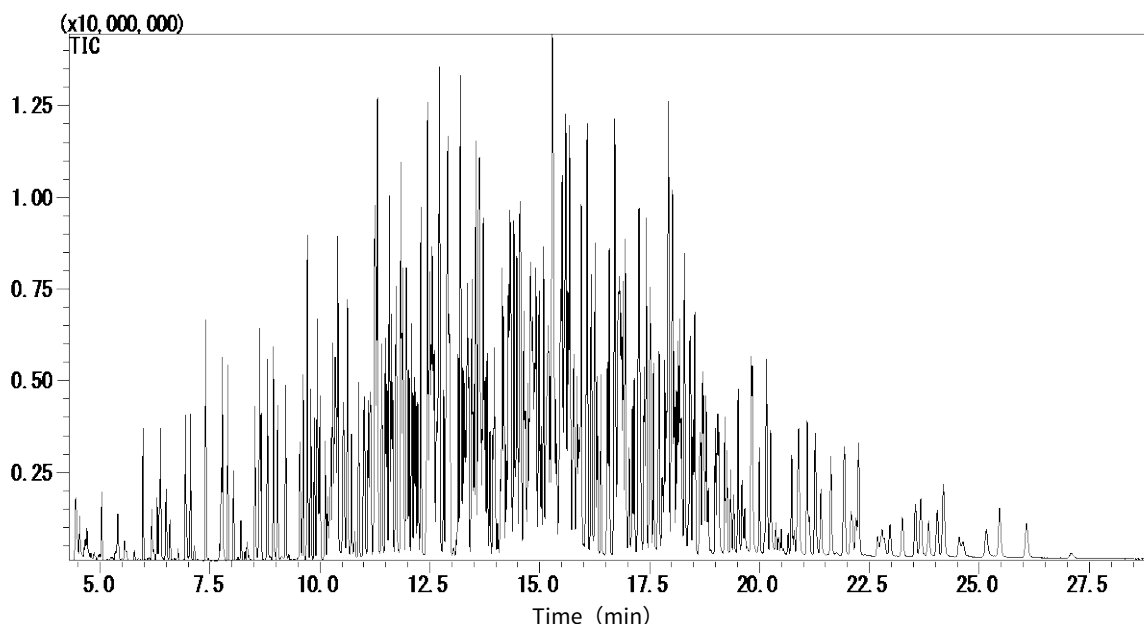


Analytical and Retention Index of Pesticide Residues in Foods – Using InertCap Pesticides

This application details the use of an InertCap Pesticides GC-capillary column to determine the retention times and retention indices of pesticide residues in food products. InertCap Pesticides is a micropolar column chemically bonded to 5 % phenyl-95% methyl polysilalene. 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 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 the InertCap Pesticides liquid phase

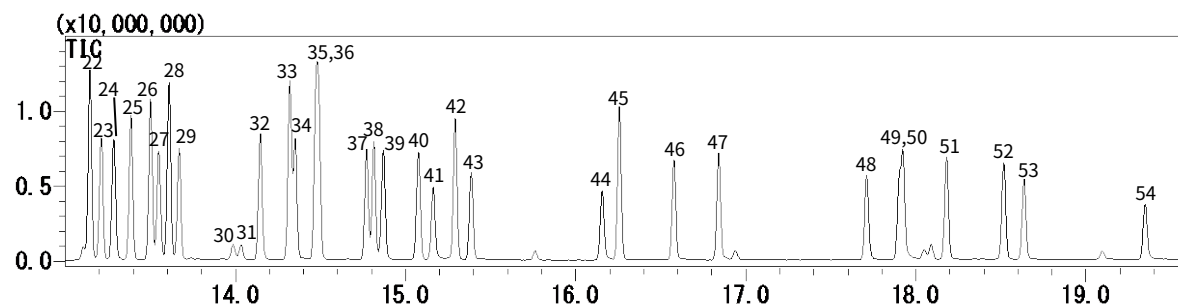
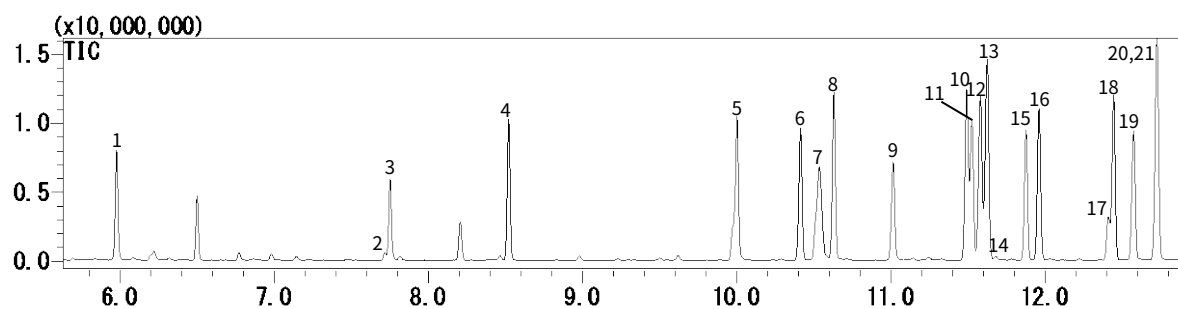


Conditions

System	: GC - MS
Column	: InertCap Pesticides 0.25 mm I.D. × 30 m, df = 0.20 μm (Cat. No. 1010-15141)
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 (<i>m/z</i> : 45-450)
Ion source	: 230 °C
Inj. Vol.	: 1 μL
Sample	: PL2005 pesticide GC/ MS MixI-VII 2 ppm

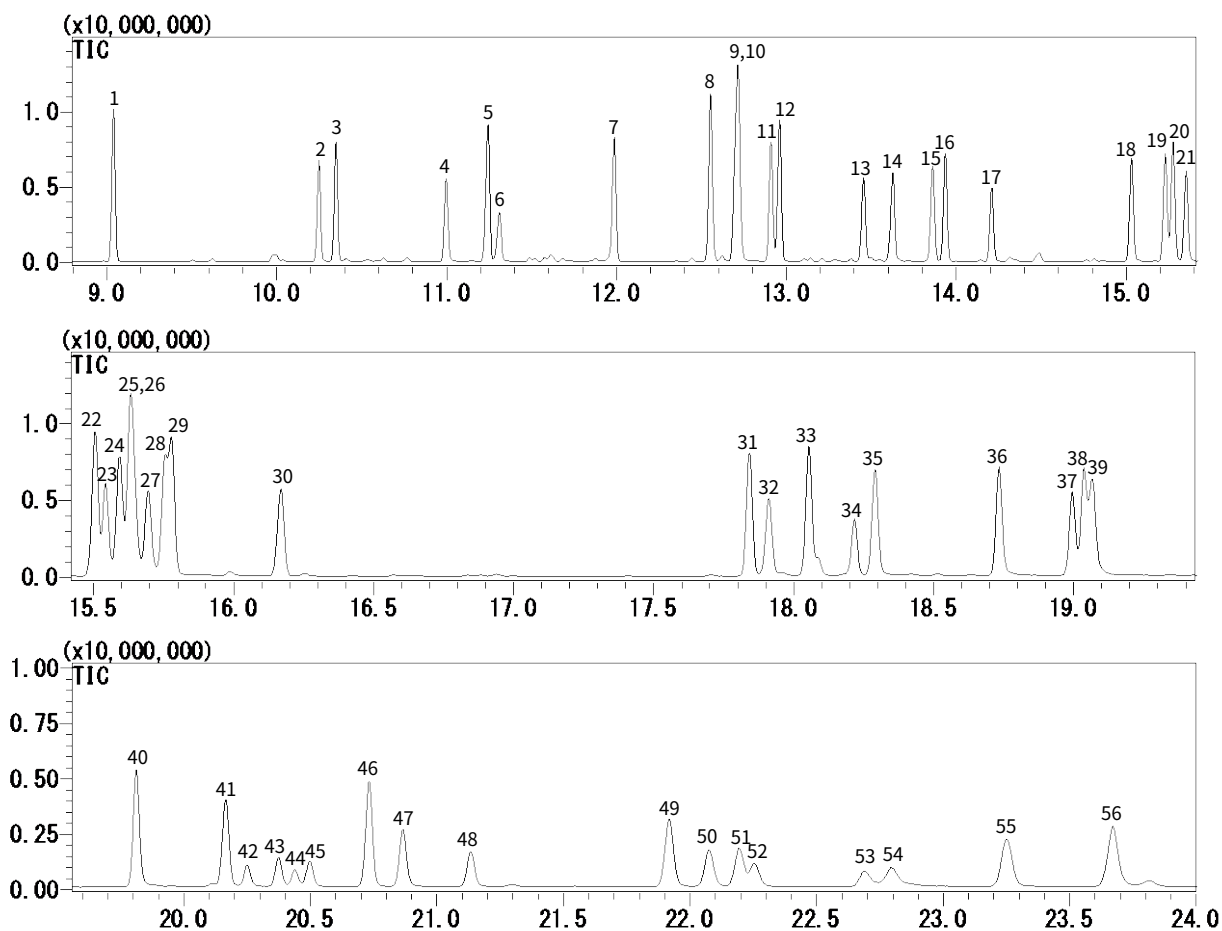
Component	Retention index	Component	Retention index	Component	Retention index	Component	Retention index
DCIP	-	IV Dimethenamide (Dimethenamide P)	1873	IV Endosulfan	2142	II Acetamiprid	2462
Clofentidine digest	1177	V Terbutcarb	1877	V Butamifos	2146	I Bromconazole-1	2465
Naphthalene-d8	1198	I.S. Propanil	1878	V Dithalimphos	2147	VI Bifenthrin	2470
Tachigaren	1199	VI Acetochlor	1881	IV Imazametabenzmethyl 1	2151	VII Phosmet	2474
Dichlorvos	1244	I Bromobutide	1883	II Flutriahole	2154	VII EPN	2477
Neristoxin	1285	VI Chlorpyrifos-methyl	1885	I Fenamiphos	2156	I Bromopropylate	2478
Dichlobenil	1347	III Metribuzin	1887	V Imazametabenzmethyl 2	2156	VII Piperophos	2480
Allyldoclor	1355	IV Oxosopconazole formyl decomposition product	1888	VI Napropamide	2159	IV Picolinaphene	2480
EPTC	1359	VI Vinclozolin	1892	III Flutolanil	2163	II Tetramethrin-2	2481
Diphenyl	1394	V Spiroxamine-1	1894	VII Hexaconazole	2168	V Chrysene-d12	2484
Mevinphos1	1424	I Cimeconazole	1897	II TCMTB	2168	VII Fenoxycarb	2488
Mevinphos2	1427	I Alachlor	1899	II Chlorfenson	2169	II Bifenazate	2489
Butyrate	1430	VI Parathion methyl	1899	I Prothiohost	2170	I Etoxazole	2491
Chlormefos	1442	VI Tolclofosmethyl	1900	I Fludioxonil	2171	V Methoxychlor	2491
Etridiazole	1455	III Simetryn	1909	V (E)-metminostrobin.	2171	IV Fenpropathrin	2496
Clothianidin	1477	VI Metalaxil (Mephenoxam)	1914	IV Pretilachlor	2172	IV Phenamidon	2502
Acenaphthene-d10	1496	I.S. Ametryn	1916	V Isoprothiolane	2177	II Tebufenpyrad	2507
Methacryfos	1501	I Cinmethylin	1918	VI Profenofos	2180	I Indanofan	2512
Chloroneb	1511	VII Phenchlorfos	1919	II Tricyclazole	2185	VII Anilophos	2512
Thiocyclam	1511	V Prometryn	1921	IV Oxadiazon	2188	III Etoxazole metabolite	2515
Crimidine	1514	VI Dithiopyr	1924	II Thifluzamide	2189	III Bifenox	2517
Orthophenylphenol	1527	VI Pirimiphos-methyl	1942	I Uniconazole (Uniconazole P)	2190	III Bromconazole-2	2518
Isoprocacarb	1540	VII 2-(1-naphthyl)acetamide	1947	VII Tribufos	2194	II Furametpyr	2526
Molinate	1549	II Terbutryn	1947	IV Frampropmethyl	2194	VII Clomeproph	2527
XMC	1566	VII Spiroxamine-2	1947	VII Myclobutanil	2198	II Phenothrin-1	2529
OMETHATE	1596	III Fenitrothion	1949	I Oxyfluorfen	2199	III Iprodione metabolite	2537
Tecnazene	1596	III Etofmesate	1953	VII Flusilazole	2201	IV Tetradifon	2542
Xylyl carb	1603	VI (E)-Dimethylvinphos	1957	I Bupirimate	2203	III Phenothrin-2	2544
Propanol	1612	IV Bromacil	1959	V Buprofezin	2203	II Pentoxazone	2551
Propoxur	1613	VII Dichlofluanid	1962	V Kresoxim	2208	II Phosalone	2555
Chlorethoxyfos	1619	VII Esprocarb	1964	IV Diclobutrazole	2209	II Leptophos	2557
Demeton-S-methyl (methyldemeton)	1627	III Malathion	1967	I Carboxin	2212	VII Azinphosmethyl	2571
Diphenylamine	1633	IV Quinoclamine	1974	II Imibenconazole debenzyl	2212	VII Cyhalothrin-1	2573
Ethoprophos	1639	I Metolachlor (S-metolachlor)	1974	IV (Z)-metminostrobin	2212	VII Pyriproxyfen	2579
Etafurarin	1650	III Chlorpyrifos	1979	I Azaconazole	2215	I Cyhalofop	2583
Fenmedifam decomposition product	1653	VI Thiobencarb	1982	III Chlorphenapil	2222	II Furametopyr metabolite	2588
Naled	1659	III (Z)-dimethylvinphos	1984	I Ciflufenamide	2225	II Mefenacet	2590
Chlorpropham	1662	II Diethofencarb	1984	IV Ciproconazole 1	2232	IV Amitraz	2595
Diclofluanide metabolite	1665	V Chlorthal-dimethyl	1989	III Isoxathione	2232	III Cyhalothrin-2	2596
Trifluralin	1666	III Fenthion	1990	I Ciproconazole 2	2236	IV Acrinathrin	2617
Flucirazole metabolite	1666	IV Fenpropimorph	1991	VI Chlorthiophos-1	2236	VI Pyrazolos	2623
Dicrotophos	1668	III Cyanazine	1991	II Phenoxanyl 1	2238	IV Fenarimol	2627
Venfluralin	1671	II Parathion	1996	I Phenoxanyl 2	2240	IV Azimphoethyl	2646
2,6-Dichlorobenzamide	1672	VI Isophenphosoxone	1997	VII Nitrofen	2243	V Dialyphos	2652
Sulfotepp	1676	VI Tetraconazole	2000	IV 1,1-Dichloro-2,2-bis(4-ethylphenyl)ethane	2243	VII Pyraclophos	2664
Dioxabenzophos (salithione)	1677	I Triadimefon	2001	III Flufenpyrethylethyl	2255	VII Phenoxaprop ethyl (phenoxaprop P ethyl)	2672
Monocrotophos	1686	III Isocarbophos	2005	III Chlorthiophos-2	2257	VI Oryzalin	2673
Cassafos	1689	I Carbetamide	2008	VI (Z)-pyriminobackmethyl	2258	III Spirodiclofen	2686
Diarate-1	1696	VII Nitrotar isopropyl	2010	III Chloropropylate	2259	V Oxosopconazole	2686
Phorate	1697	I Fthalide	2016	II Chlorbenzylate	2260	IV Bitertanol-1	2698
α-BHC	1706	V Bromophos	2024	II Fensulfthion	2268	I Permethrin-1	2706
Diarate-2	1713	VII Diphenamid	2027	IV Endosulfan	2270	II Bitertanol-2	2712
Thiometon	1722	III Phosphatase-1	2029	I Diniconazole	2270	VI Permethrin-2	2723
Desmedipham decomposition product	1729	IV Phosphatase-2	2034	I Oxadixyl	2279	V Fluquinconazole	2724
Dicloran	1732	II Thiamethoxam decomposition product	2041	VI Ethion	2279	I Pyridaben	2727
Dimethoate	1734	I Pendimethalin	2046	III Chlorthiophos-3	2285	VI Dioxathion	2729
Furazole	1742	VII (E)-Chlorphenvinphos	2046	I Fluacrilpilim	2295	III Butafenacil	2747
Carbofuran	1745	VII Cyprodinil	2050	IV Mepronil	2312	IV Ethobenzanide	2766
Simazine	1748	IV Fipronil	2053	II Sulprofos	2316	III Caffenstrol	2768
Atrazine	1756	II Penconazole	2059	III Triazophos	2317	I Cyfluthrin-1	2778
Swep	1756	V Dimethamethrin	2061	IV Azamethifos	2329	VI Fenbuconazole	2779
Chlorbufam	1757	VII Clozolineate	2062	VII Carfentrasone ethyl	2330	IV Cyfluthrin-2	2794
Quintozene	1761	III Allethrin-1	2064	III Benaraxyl	2332	IV Cyfluthrin-3	2802
Chromazone	1761	VII Isofenphos	2065	I Isoxadiphenethyl	2332	VII Cyfluthrin-4	2808
Propazine	1761	VII Tolyfuranide	2066	V Chlornitrophen	2335	V Cypermethrin-1	2824
Dimetipine	1762	II Allethrin-2	2067	III Carbophenothion	2340	III Halfenprox	2833
Dioxathion decomposition product	1771	VI (Z)-pyrphenox	2067	III Trifloxystrobin	2342	III Cypermethrin-2	2839
β-BHC	1771	V (Z)-chlorfenvinphos	2068	I Norflurazon	2343	VII Cypermethrin-3	2846
γ-BHC (lindane)	1771	V Ethychlozate	2072	VI Cyanofenphos	2345	III Flucitrinate-1	2847
Trifluranide metabolite	1772	V Mecarbam	2073	III Propiconazole-1	2346	IV Xalofop Ethyl (Kizalofop P Ethyl)	2850
Terbufos	1779	I Allethrin-3 (vioallethrin)	2075	III Edifenphos	2348	I Cypermethrin-4	2853
Cyanophos	1782	I Allethrin-4 (vioallethrin)	2077	III Quinoxiphyene	2351	III Etofenprox	2871
Propyzamide	1787	III Diclocimet-1	2079	V (E)-pyriminobackmethyl	2354	III Flucitrinate-2	2876
Fonofos	1788	I Fentoate	2081	I Endosulfan sulfate	2354	VII Benzo(a)pyrene -d12	2883
Diazinon	1792	I Quinalphos	2082	I Pyraflufen ethyl	2360	VI Silafluofen	2890
Phosphamide-1	1793	I Captan	2087	V Propiconazole-2	2360	IV Fluridone	2904
Pyrochlorone	1795	V Procymidone	2088	III Lenacil	2362	VI Pyrimidiphene	2924
Pyrimethanil	1802	VI Triadimenol-1	2088	III Chloridazon	2371	VI Fenvalerate-1	2951
Chlorothalonil	1803	V Thiabendazole	2089	VII Hexazinone	2378	VII Flumioxazine	2953
Anthracene-d10	1809	I.S. Dimepiperate	2090	IV Tenyl chloride	2384	IV Flualinate-1	2965
Disulfoton	1813	III Zoxamide decomposition product	2092	VII Tebuconazole	2394	IV Pilacrostrobin	2968
Prohydrojasmon-1	1813	VI Methoprene	2098	V Propargitt 1	2397	V Fluvalinate-2	2975
Isazophos	1816	I Folpet	2100	V Diclofop-methyl	2397	VII Fenvalerate-2 (esfenvalerate)	2981
Tefluthrin	1818	III Ferrimzone	2102	VI Diflufenican	2399	III Fenvalerate-2 (esfenvalerate)	2981
Terbacil	1820	IV Triadimenol-2	2104	II Propargit 2	2400	V Diphenoconazole-1	3016
Etrimphos	1825	I Bromophosphoethyl	2109	VII Resmethrin-1	2403	VII Diphenoconazole-2	3025
δ-BHC	1825	V Methidathion	2113	I Piperonyl butoxide	2412	V Pyrazoxyphen	3028
Tri-allate	1827	II Diclocimet-2	2113	V Nitralin	2413	V Indoxacarb	3038
Thioethyl MCPA	1831	V Chlorbenside	2115	VII Captafol	2416	V Deltamethrin-1 (tralomethrin degradation product-1)	3059

PL2005 pesticide GC/ MS Mix I



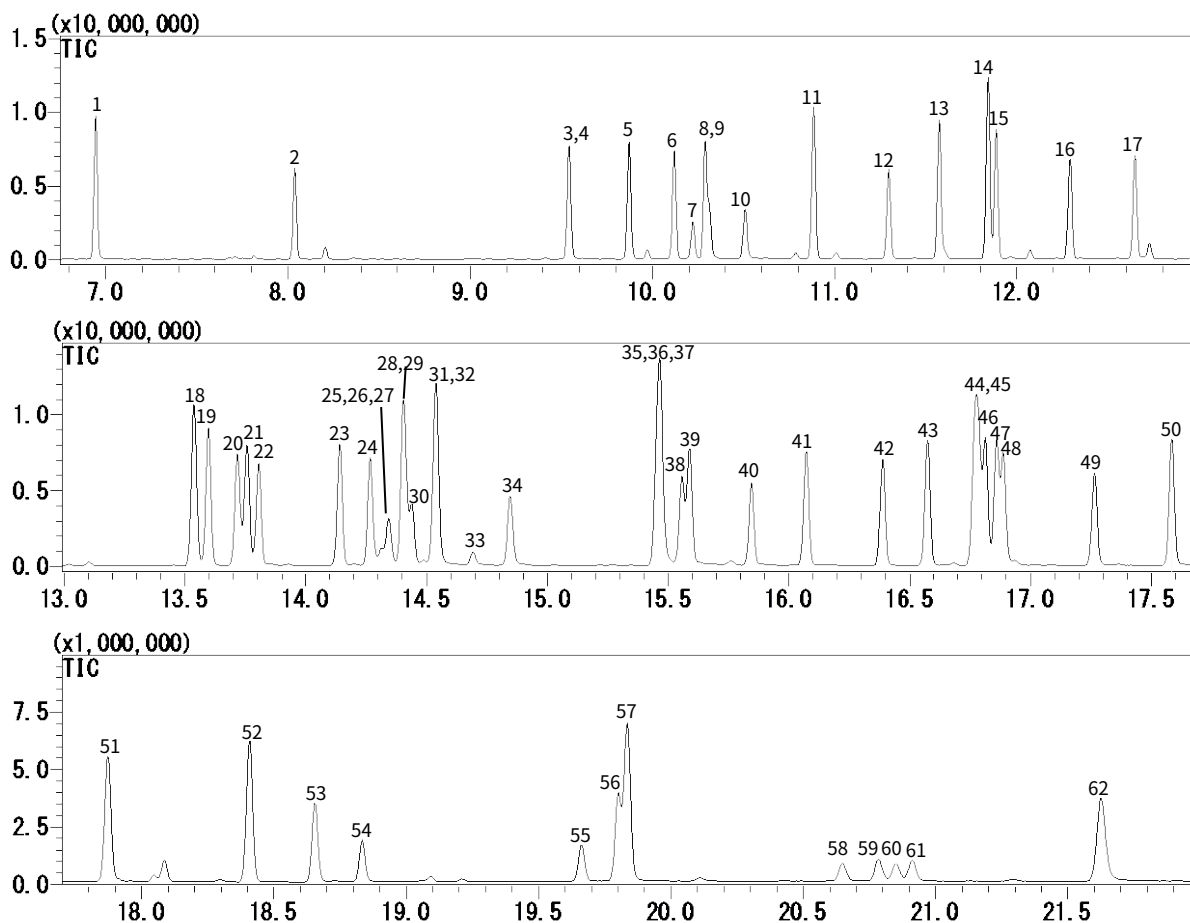
Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Dichlorvos	5.976	1244	28	Fenthion	13.609	1990
2	Mevinphos1	7.715	1424	29	Parathion	13.668	1996
3	Mevinphos2	7.751	1427	30	Phosphatase-1	13.986	2029
4	Methacryfos	8.520	1501	31	Phosphatase-2	14.034	2034
5	Ethoprophos	10.000	1639	32	(E)-Chlorphenvinphos	14.145	2046
6	Dioxabenzophos (salithione)	10.412	1677	33	Isofenphos	14.319	2065
7	Cassafos	10.536	1689	34	(Z)-chlorfenvinphos	14.351	2068
8	Phorate	10.628	1697	35	Fentoate	14.470	2081
9	Dimethoate	11.014	1734	36	Quinalphos	14.488	2082
10	Terbufos	11.490	1779	37	Methidathion	14.770	2113
11	Cyanophos	11.523	1782	38	Propafos	14.813	2118
12	Fonofos	11.580	1788	39	Tetrachlorvinphos	14.869	2124
13	Diazinon	11.622	1792	40	Butamifos	15.074	2146
14	Phosphamide-1	11.636	1793	41	Fenamiphos	15.162	2156
15	Isazophos	11.875	1816	42	Prothiohost	15.291	2170
16	Etrimphos	11.959	1825	43	Profenofos	15.384	2180
17	Phosphamide-2	12.408	1869	44	Fensulfothion	16.156	2268
18	Diclofenthion	12.443	1872	45	Ethion	16.256	2279
19	Chlorpyrifos-methyl	12.572	1885	46	Triazophos	16.578	2317
20	Parathion methyl	12.719	1899	47	Edifenphos	16.839	2348
21	Tolclofsmethyl	12.727	1900	48	Pyridaphenthion	17.708	2453
22	Pirimiphos-methyl	13.144	1942	49	EPN	17.900	2477
23	Fenitrothion	13.211	1949	50	Piperophos	17.921	2480
24	(E)-Dimethylvinphos	13.284	1957	51	Anilophos	18.180	2512
25	Malathion	13.385	1967	52	Phosalone	18.516	2555
26	Chlorpyrifos	13.500	1979	53	Azinphosmethyl	18.635	2571
27	(Z)-dimethylvinphos	13.548	1984	54	Pyraclophos	19.346	2664

PL2005 pesticide GC/ MS Mix II



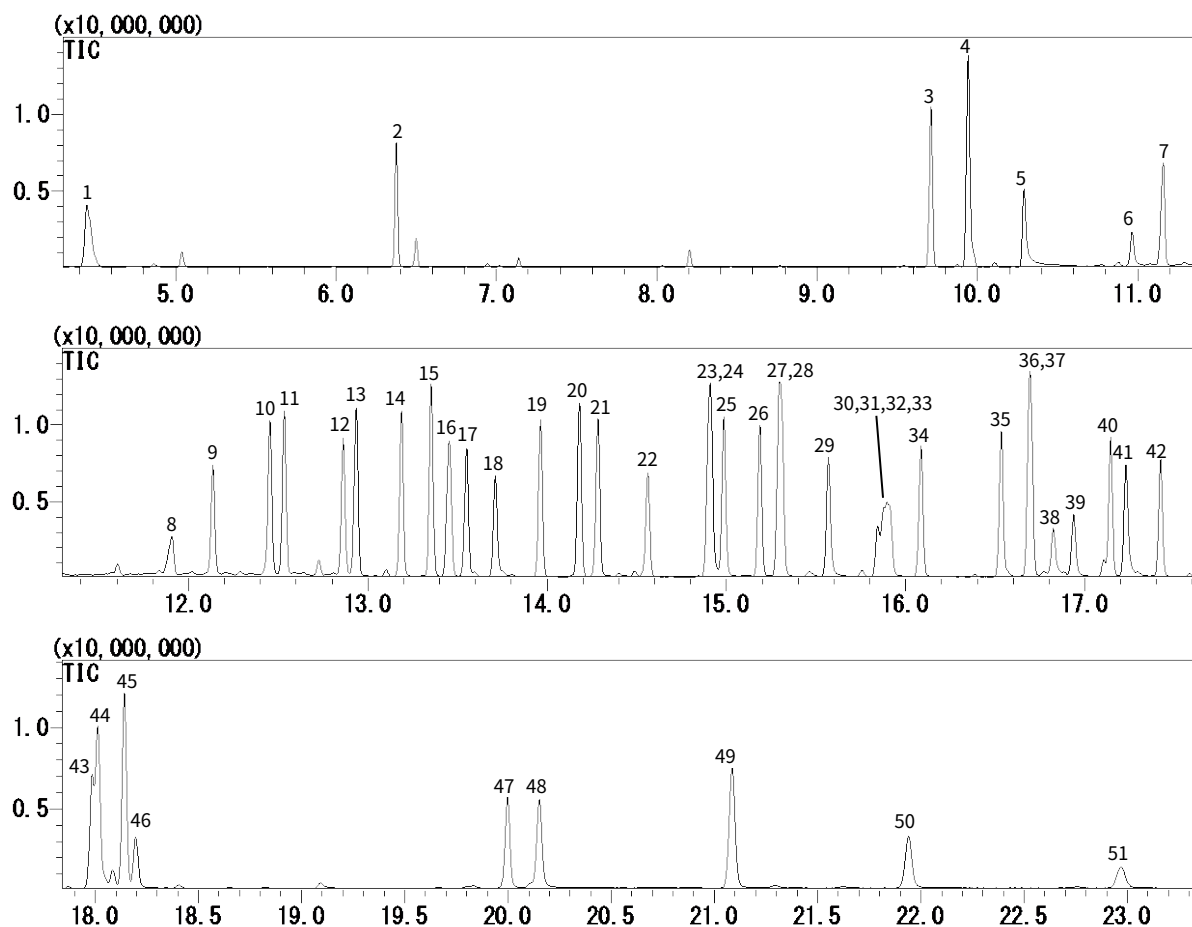
Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Molinate	9.039	1549	29	Ciflufenamide	15.778	2225
2	Chlorpropham	10.249	1662	30	Endosulfan	16.169	2270
3	Venfluralin	10.349	1671	31	Bifenthrin	17.842	2470
4	Dicloran	10.997	1732	32	Bromopropylate	17.910	2478
5	Atrazine	11.244	1756	33	Fenpropathrin	18.053	2496
6	Dimetipine	11.311	1762	34	Bifenox	18.217	2517
7	Tri-allate	11.987	1827	35	Clomeprop	18.291	2527
8	Bromobutide	12.553	1883	36	Cyhalofop	18.731	2583
9	Cimeconazole	12.698	1897	37	Acrinathrin	18.994	2617
10	Alachlor	12.715	1899	38	Pyrazofos	19.036	2623
11	Phenchlorfos	12.909	1919	39	Fenarimol	19.067	2627
12	Dithiopyr	12.960	1924	40	Fluquinconazole	19.812	2724
13	Quinoclamine	13.453	1974	41	Caffenstrol	20.165	2768
14	Cyanazine	13.626	1991	42	Cyfluthrin-1	20.249	2778
15	Fthalide	13.861	2016	43	Cyfluthrin-2	20.374	2794
16	Bromophos	13.934	2024	44	Cyfluthrin-3	20.439	2802
17	Fipronil	14.208	2053	45	Cyfluthrin-4	20.499	2808
18	Endosulfan	15.032	2142	46	Halfenprox	20.732	2833
19	Flutolanil	15.230	2163	47	Flucitriate-1	20.865	2847
20	Chlorfenson	15.276	2169	48	Flucitriate-2	21.134	2876
21	Isoprothiolane	15.353	2177	49	Fenvalerate-1	21.917	2951
22	Tribufos	15.505	2194	50	Fluvalinate-1	22.075	2965
23	Myclobutanil	15.542	2198	51	Fluvalinate-2	22.191	2975
24	Buprofezin	15.592	2203	52	Fenvalerate-2 (esfenvalerate)	22.254	2981
25	Kresoxim	15.630	2208	53	Diphenconazole-1	22.686	3016
26	Diclobutrazole	15.644	2209	54	Diphenconazole-2	22.795	3025
27	Azaconazole	15.694	2215	55	Deltamethrin-1 (tralomethrin degradation product-1)	23.252	3059
28	Chlorphenapil	15.754	2222	56	Azoxystrobin	23.670	3090

PL2005 pesticide GC/ MS Mix III

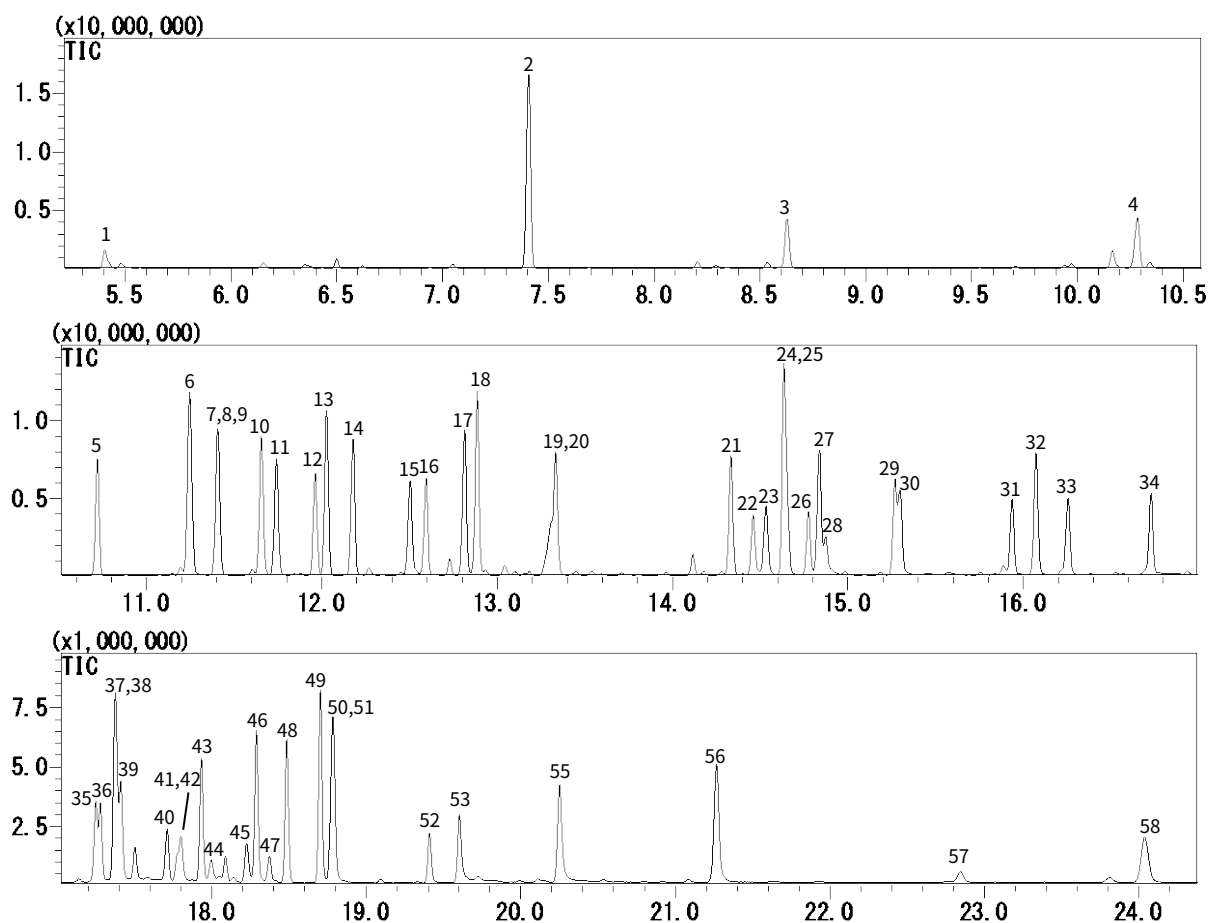


Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Dichlobenil	6.945	1347	32	Triadimenol-1	14.543	2088
2	Etridiazole	8.037	1455	33	Triadimenol-2	14.691	2104
3	OMETHATE	9.543	1596	34	(E)-Pyriphenox	14.845	2121
4	Tecnazene	9.543	1596	35	Oxadiazon	15.454	2188
5	Demeton-S-methyl (methyl demeton)	9.872	1627	36	Thifluzamide	15.466	2189
6	Etalfurarin	10.119	1650	37	Uniconazole (Uniconazole P)	15.471	2190
7	Naled	10.222	1659	38	Oxyfluorfen	15.557	2199
8	Trifluralin	10.289	1666	39	Bupirimate	15.588	2203
9	Diclotophos	10.313	1668	40	Isoxathione	15.845	2232
10	Monocrotophos	10.509	1686	41	(Z)-pyriminobackmethyl	16.071	2258
11	Thiometon	10.886	1722	42	Fluacrilipilim	16.389	2295
12	Quintozone	11.297	1761	43	Sulprofos	16.573	2316
13	Propyzamide	11.574	1787	44	Carbophenothion	16.769	2340
14	Disulfoton	11.842	1813	45	Trifloxystrobin	16.786	2342
15	Tefluthrin	11.886	1818	46	Cyanofenphos	16.813	2345
16	Formothion	12.292	1857	47	Quinoxiphen	16.860	2351
17	Vinclozolin	12.647	1892	48	(E)-pyriminobackmethyl	16.887	2354
18	Thiobencarb	13.537	1982	49	Diflufenican	17.266	2399
19	Chlorthal-dimethyl	13.597	1989	50	Pyributicarb	17.585	2438
20	Triadimefon	13.717	2001	51	Phosmet	17.873	2474
21	Isocarboxiphenox	13.757	2005	52	Tetradifon	18.408	2542
22	Nitrotar isopropyl	13.805	2010	53	Cyhalothrin-1	18.655	2573
23	Pendimethalin	14.140	2046	54	Cyhalothrin-2	18.833	2596
24	Penconazole	14.265	2059	55	Permethrin-1	19.662	2706
25	Allethrin-1	14.314	2064	56	Permethrin-2	19.800	2723
26	Allethrin-2	14.340	2067	57	Pyridaben	19.836	2727
27	(Z)-pyriphenox	14.344	2067	58	Cypermethrin-1	20.647	2824
28	Mecarbam	14.403	2073	59	Cypermethrin-2	20.785	2839
29	Allethrin-3 (violetalithrin)	14.415	2075	60	Cypermethrin-3	20.851	2846
30	Allethrin-4 (violetalithrin)	14.438	2077	61	Cypermethrin-4	20.913	2853
31	Procymidone	14.536	2088	62	Pyrimidiphene	21.624	2924

PL2005 pesticide GC/ MS Mix IV

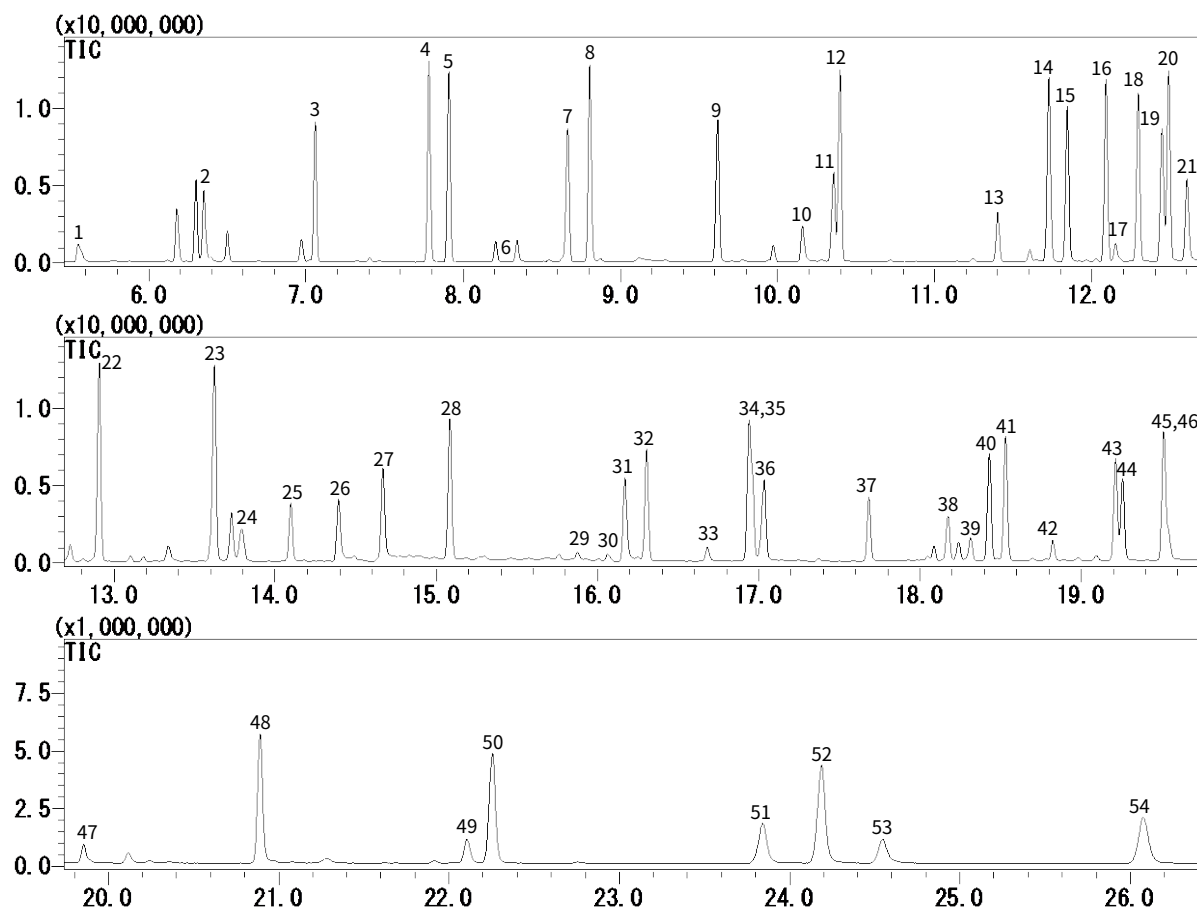


Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	DCIP	4.445		27	(E)-metminostrobin.	15.300	2171
2	Allyldochlor	7.023	1355	28	Pretilachlor	15.310	2172
3	Propanol	9.711	1612	29	Flusilazole	15.568	2201
4	Diphenylamine	9.942	1633	30	Ciproconazole 1	15.844	2232
5	Flucirazole metabolite	10.290	1666	31	Ciproconazole 2	15.872	2236
6	Desmedipham decomposition product	10.964	1729	32	Phenoxanyl 1	15.898	2238
7	Simazine	11.159	1748	33	Phenoxanyl 2	15.910	2240
8	Terbacil	11.906	1820	34	Chlorbenzylate	16.087	2260
9	Iprobenfos	12.135	1842	35	Mepronil	16.535	2312
10	Dimethenamide (Dimethenamide P)	12.454	1873	36	Carfentrasone ethyl	16.685	2330
11	Acetochlor	12.533	1881	37	Benaraxyl	16.700	2332
12	Metalaxil (Mephenoxam)	12.861	1914	38	Propiconazole-1	16.823	2346
13	Prometryn	12.935	1921	39	Propiconazole-2	16.937	2360
14	Terbutryn	13.188	1947	40	Tenyl chloride	17.144	2384
15	Esprocarb	13.353	1964	41	Tebuconazole	17.228	2394
16	Metolachlor (S-metolachlor)	13.453	1974	42	Resmethrin-2 (bioresmethrin)	17.422	2418
17	Diethofencarb	13.551	1984	43	Fenoxycarb	17.983	2488
18	Tetraconazole	13.711	2000	44	Etoazole	18.012	2491
19	Diphenamid	13.964	2027	45	Tebufenpyrad	18.142	2507
20	Cyprodinil	14.181	2050	46	Etoazole metabolite	18.197	2515
21	Dimethamethrin	14.285	2061	47	Butafenacil	19.997	2747
22	Dimepiperate	14.562	2090	48	Ethobenzanide	20.152	2766
23	Paclobutrazol	14.897	2127	49	Etofenprox	21.086	2871
24	Butachlor	14.914	2129	50	Flumioxazine	21.939	2953
25	Fenothiocarb	14.986	2137	51	Indoxacarb	22.969	3038
26	Napropamide	15.187	2159				



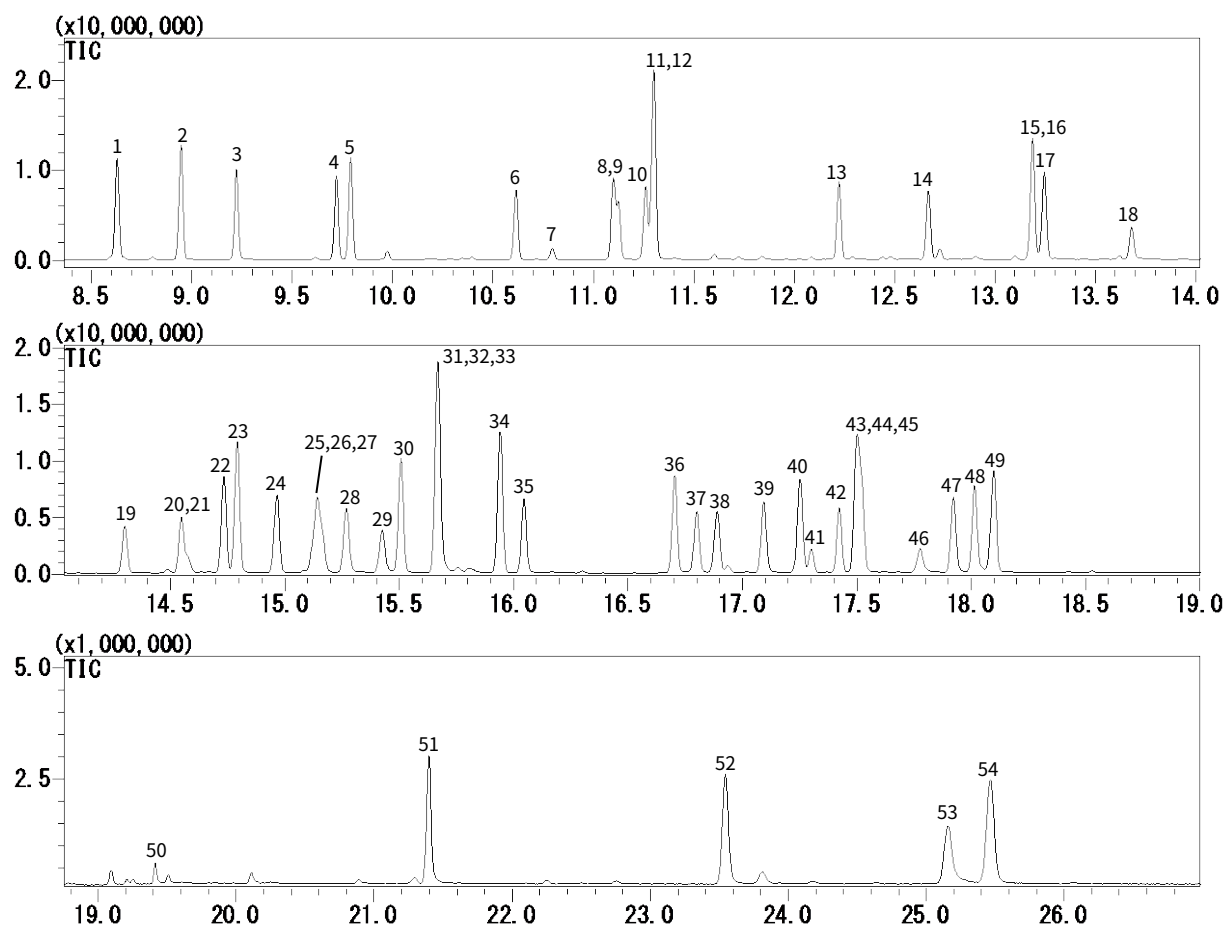
Peak No.	Component	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Clofentedine digest	5.403	1177	30	Fludioxonil	15.298	2171
2	Diphenyl	7.406	1394	31	Nitrofen	15.936	2243
3	Thiocyclam	8.628	1511	32	Chloropropylate	16.073	2259
4	Diclofluanide metabolite	10.283	1665	33	Oxadixyl	16.255	2279
5	α -BHC	10.719	1706	34	Chlornitrophenene	16.728	2335
6	Swep	11.245	1756	35	Propargitt 1	17.249	2397
7	β -BHC	11.404	1771	36	Propargit 2	17.278	2400
8	γ -BHC (lindane)	11.404	1771	37	Piperonyl butoxide	17.369	2412
9	Trifluranide metabolite	11.411	1772	38	Nitralin	17.380	2413
10	Pyrochlorone	11.654	1795	39	Captafol	17.409	2416
11	Chlorothalonil	11.740	1803	40	Iprodione	17.709	2454
12	δ -BHC	11.961	1825	41	Tetramethrin-1	17.773	2462
13	Thioethyl MCPA	12.025	1831	42	Bromconazole-1	17.799	2465
14	Oxabetrinyl	12.178	1846	43	Tetramethrin-2	17.931	2481
15	Propanil	12.503	1878	44	Bifenazate	17.996	2489
16	Metribuzin	12.594	1887	45	Bromconazole-2	18.223	2518
17	Simetryn	12.814	1909	46	Furametpyr	18.287	2526
18	Ametryn	12.885	1916	47	Iprodione metabolite	18.373	2537
19	Bromacil	13.304	1959	48	Pentoxazone	18.484	2551
20	Dichlofluanid	13.332	1962	49	Pyriproxyfen	18.702	2579
21	Tolylfuranide	14.333	2066	50	Furametopyr metabolite	18.773	2588
22	Diclocimet-1	14.458	2079	51	Mefenacet	18.787	2590
23	Captan	14.533	2087	52	Phenoxaprop ethyl (phenoxaprop P ethyl)	19.407	2672
24	Methoprene	14.635	2098	53	Bitertanol-1	19.602	2698
25	Folpet	14.652	2100	54	Bitertanol-2	19.716	2712
26	Diclocimet-2	14.775	2113	55	Fenbuconazole	20.250	2779
27	Quinomethionate	14.837	2120	56	Silafluofen	21.266	2890
28	Trichloride	14.873	2124	57	Pyrazoxyphene	22.846	3028
29	Hexaconazole	15.268	2168	58	Famoxadone	24.036	3114

PL2005 pesticide GC/ MS Mix VI



Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Tachigaren	5.573	1199	28	Dithalimphos	15.084	2147
2	Neristoxin	6.349	1285	29	Chlorthiophos-1	15.875	2236
3	EPTC	7.059	1359	30	Chlorthiophos-2	16.059	2257
4	Butyrate	7.782	1430	31	Diniconazole	16.169	2270
5	Chlormefos	7.907	1442	32	Chlorthiophos-3	16.303	2285
6	Clothianidin	8.269	1477	33	Azamethifos	16.679	2329
7	Crimidine	8.665	1514	34	Pyraflufen ethyl	16.936	2360
8	Orthophenylphenol	8.805	1527	35	Lenacil	16.959	2362
9	Xyllyl carb	9.618	1603	36	Chloridazon	17.033	2371
10	Fenmedifam decomposition product	10.158	1653	37	Clomethoxyphene (Clomethoxynyl)	17.682	2450
11	2,6-Dichlorobenzamide	10.356	1672	38	Indanofan	18.175	2512
12	Sulfotepp	10.396	1676	39	Phenothrin-1	18.313	2529
13	Dioxathion decomposition product	11.399	1771	40	Phenothrin-2	18.430	2544
14	Pyrimethanil	11.725	1802	41	Leptophos	18.530	2557
15	Prohydrojasmon-1	11.843	1813	42	Amitraz	18.823	2595
16	Tebupirimphos	12.088	1837	43	Azimphoethyl	19.212	2646
17	Prohydrojasmon-2	12.150	1843	44	Dialyphos	19.256	2652
18	Ethyl MCPB	12.295	1858	45	Spirodiclofen	19.510	2686
19	Benflesete	12.445	1872	46	Oxospoconazole	19.510	2686
20	Terbucarb	12.488	1877	47	Dioxathion	19.853	2729
21	Oxospoconazole formyl decomposition product	12.605	1888	48	Xalofop Ethyl (Kizalofop P Ethyl)	20.890	2850
22	Cinmethylin	12.908	1918	49	Pilacrostrobin	22.105	2968
23	Fenpropimorph	13.623	1991	50	Fenvalerate-2 (esfenvalerate)	22.255	2981
24	Carbetamide	13.785	2008	51	Dimethomorph-1	23.842	3102
25	Thiamethoxam decomposition product	14.097	2041	52	Tolfenpyrad	24.188	3123
26	Ethychlozate	14.392	2072	53	Dimethomorph-2	24.545	3145
27	Ferrimzone	14.668	2102	54	Flutiacet methyl	26.072	3231

PL2005 pesticide GC/ MS Mix VII



Peak No.	Compound	Retention time (min)	Retention index	Peak No.	Compound	Retention time (min)	Retention index
1	Chloroneb	8.626	1511	28	TCMTB	15.268	2168
2	Isoproc carb	8.944	1540	29	Tricyclazole	15.426	2185
3	XMC	9.221	1566	30	Frampropanil	15.507	2194
4	Propoxur	9.720	1613	31	Carboxin	15.666	2212
5	Chlorothoxyfos	9.790	1619	32	Imibenconazole debenzyl	15.666	2212
6	Diarate-1	10.614	1696	33	(Z)-metminostrobin	15.669	2212
7	Diarate-2	10.794	1713	34	1,1-Dichloro-2,2-bis(4-ethylphenyl)ethane	15.941	2243
8	Furazale	11.098	1742	35	Flufenpyrethylethyl	16.044	2255
9	Carbofuran	11.125	1745	36	Isoxadiphenethyl	16.704	2332
10	Chlorbufam	11.260	1757	37	Norflurazon	16.800	2343
11	Chromazone	11.298	1761	38	Endosulfan sulfate	16.889	2354
12	Propazine	11.303	1761	39	Hexazinone	17.093	2378
13	Benoxachol	12.224	1851	40	Diclofop-methyl	17.251	2397
14	Spiroxamine-1	12.669	1894	41	Resmethrin-1	17.302	2403
15	2-(1-naphthyl)acetamide	13.187	1947	42	Resmethrin-2 (bioresmethrin)	17.423	2418
16	Spiroxamine-2	13.188	1947	43	Epoxiconazole	17.496	2427
17	Etofmesate	13.246	1953	44	Zoxamide	17.500	2428
18	Isophenphosoxone	13.680	1997	45	Mefenpyr diethyl	17.521	2430
19	Clozolate	14.299	2062	46	Acetamiprid	17.777	2462
20	Thiabendazole	14.548	2089	47	Picolinaphene	17.921	2480
21	Zoxamide decomposition product	14.576	2092	48	Methoxychlor	18.014	2491
22	Bromophosphoethyl	14.733	2109	49	Phenamidon	18.098	2502
23	Chlorbenside	14.792	2115	50	Oryzalin	19.412	2673
24	Disulfotone sulfone	14.965	2134	51	Fluridone	21.397	2904
25	Imazametabenzmethyl 1	15.119	2151	52	Full microrack pentyl	23.546	3081
26	Flutriahole	15.142	2154	53	Imibenconazole	25.159	3182
27	Imazametabenzmethyl 2	15.164	2156	54	Cinidone ethyl	25.467	3201

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 carbon number, the retention index is given by the following equation.

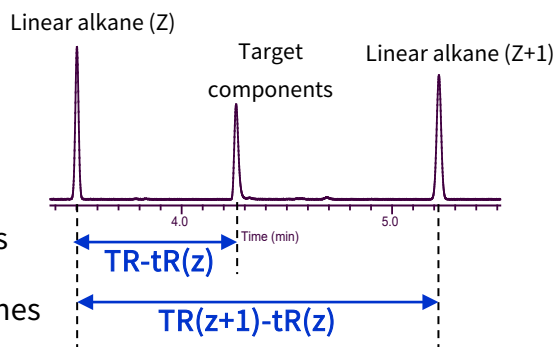
$$\text{Retention index } I = 100 \frac{TR - tR(Z)}{TR(Z+1) - tR(Z)} + 100 \times Z$$

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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GL Sciences Inc. Japan

22-1 Nishishinjuku 6-chome
Shinjuku-ku, Tokyo
163-1130, Japan

Phone: +81-3-5323-6620
Fax: +81-3-5323-6621
Email: world@glsc.co.jp
Web: www.glsciences.com

GL Sciences Inc. USA

4733 Torrance Blvd. Suite 255
Torrance, CA 90503
USA

Phone: +1-310-265-4424
Fax: +1-310-265-4425
Email: info@glsciencesinc.com
Web: www.glsciencesinc.com

GL Sciences B.V.

Dillenburgstraat 7C
5652AM, Eindhoven
The Netherlands

Phone: +31-40-254-9531
Email: info@glsciences.eu
Web: www.glsciences.eu

GL Sciences (Shanghai) Limited

Tower B, Room 2003
Far East International Plaza
No.317 Xianxia Road, Changning District
Shanghai, China 200051

Phone: +86-21-62782272
Email: contact@glsciences.com.cn
Web: www.glsciences.com.cn



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