

# Pesticides

## Ultra Aqueous C18

Sample: multicomponent pesticide standard  
 Inj.: 10µL  
 Conc.: 1ppb each pesticide  
 Sample diluent: acetonitrile

Column: Ultra Aqueous C18  
 Cat. #: 9178312  
 Dimensions: 100mm x 2.1mm  
 Particle size: 3µm  
 Pore size: 100Å

Conditions:  
 Instrument: Shimadzu Prominence® UFLCxx  
 Mobile phase:  
 A: 10 mM NH<sub>4</sub>OAc in water  
 B: 10 mM NH<sub>4</sub>OAc in methanol

Time (min.)	%B
0.0	20
8.0	90
12.0	100
14.8	100
14.9	20

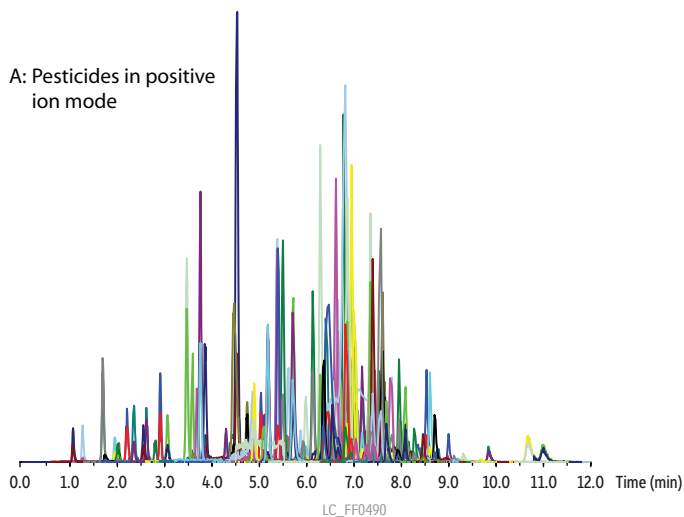
Flow: 500µL/min  
 Temp.: 35°C

Det.: Applied Biosystems 4000 QTRAP® LC/MS/MS system

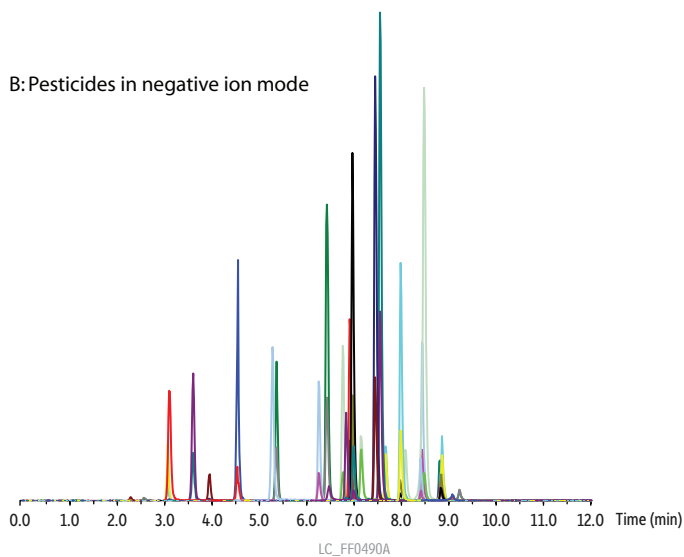
Ion Source: TurboIonSpray®  
 A & C: ESI+  
 B: ESI-

IonSpray Voltage: 5kV (ESI+), -4.2kV (ESI-)  
 Gas 1: 50psi  
 Gas 2: 60psi  
 Source Temp.: 600°C

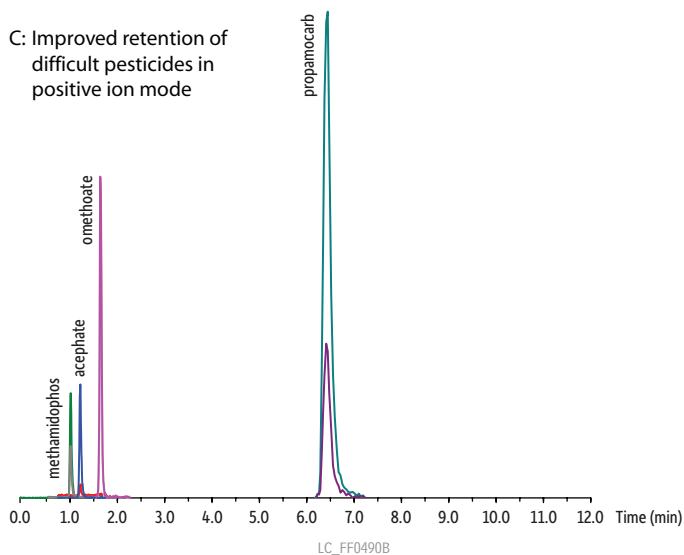
A: Pesticides in positive ion mode



B: Pesticides in negative ion mode



C: Improved retention of difficult pesticides in positive ion mode



See tables on next two pages for compound identifications and MS details.

**Table I** Peak list for pesticides in positive ion mode (continued on next page).

Compound ID	Retention Time (min)	Transition 1	Transition 2	Compound ID	Retention Time (min)	Transition 1	Transition 2
Acephate	1.27	184.1 → 143	184.1 → 143	EPN	6.72	324 → 157.1	324 → 296
Acetamiprid	4.44	223.2 → 126.1	223.2 → 99.1	Epoxiconazole	7.65	330 → 121	330 → 101
Acibenzolar-S-methyl	7.22	211 → 136	211 → 140	Etaconazole	7.57	328.2 → 159.1	328.2 → 123
Alanycarb	7.91	400.1 → 238.2	400.1 → 91.1	Ethiofencarb	5.58	226.1 → 106.9	226.1 → 164.1
Aldicarb	4.49	208.2 → 116.1	208.2 → 89.1	Ethiofencarbsulfoxid	3.48	242 → 107	242 → 185.1
Aldicarb-sulfone	2.03	223.1 → 86.1	223.1 → 148	Ethion	7.9	385 → 199	385 → 171
Aldicarb-sulfoxide	2.2	207.1 → 132.1	207.1 → 89.1	Ethiprole	6.62	397.3 → 351	397.3 → 255.5
Ametryn	6.96	228.1 → 186.1	228.1 → 96	Ethofenprox	9.66	394.1 → 107.1	394.1 → 177.2
Aminocarb	5.37	209.1 → 137.1	209.1 → 152.1	Ethofumesate	6.54	304 → 121	304 → 161
Avermectin B1a	11.2	890.5 → 305	890.5 → 145	Ethoprophos	5.98	243 → 131	243 → 97
Avermectin B1b	11.4	876.5 → 291	876.5 → 145	Ethoxyquin	7.4	218.1 → 174	218.1 → 160
Azoxystrobin	6.78	404.1 → 372.1	404.1 → 344.1	Etoazole	9	360.1 → 141	360.1 → 57.2
Benalaxyl	7.78	326.2 → 148.2	326.2 → 91.1	Famoxadone	7.72	392 → 331	392 → 238
Bendiocarb	5.1	224.2 → 109.2	224.2 → 167.2	Fenamidon	6.65	312.1 → 92.1	312.1 → 65
Benfuracarb	8.33	411.2 → 195.1	411.2 → 252.1	Fenamiphos	7.5	304.2 → 217.1	304.2 → 202.1
Benthiavalicarb	6.87	382.1 → 116	382.1 → 180.1	Fenarimol	7.3	331 → 268	331 → 81
Benthiavalicarb-isopropyl	6.87	382.1 → 196.8	382.1 → 179.9	Fenazaquin	9.91	307 → 161	307 → 147
Benzoaximate	7.98	364 → 199	364 → 105	Fenbuconazole	7.57	337 → 125	337 → 70
Bitertanol	7.98	338 → 70	338 → 269	Fenhexamid	7.04	302 → 97	302 → 55
Boscalid	6.98	343 → 307	343 → 140	Fenitrothion	6.4	278 → 125.2	278 → 109
Bromuconazole (isomer 1)	7.36	378 → 159.1	378 → 161	Fenoxycarb	7.53	302.2 → 88.1	302.2 → 116.2
Bromuconazole (isomer 2)	8.05	378.1 → 159.1	378.1 → 161	Fenpropimorph	9.84	304 → 147	304 → 117
Bufencarb	5.18	222.2 → 95.1	222.2 → 71	Fenpyroximate	9.29	422 → 366.1	422 → 135.1
Bupirimate	7.65	317 → 166	317 → 108	Fenthion	6.9	278.9 → 169	278.9 → 246.9
Buprofezin	8.53	306.2 → 201.1	306.2 → 116.2	Fenuron	3.85	165.1 → 72.1	165.1 → 46
Butafenacil	7.08	492.2 → 331.1	492.2 → 180.1	Flonicamid	2.25	230.1 → 203.1	230.1 → 174
Butocarboxim	4.4	191.1 → 75	191.1 → 116	Flucarbazone	2.81	397.1 → 130.1	397.1 → 115
Butocarboxim-sulfoxid	2.1	207 → 74.9	207 → 90	Flufenacet	7.17	364.1 → 152.2	364.1 → 194.2
Butoxycarboxim	1.95	223.1 → 106	223.1 → 166	Flufenoxuron	8.98	489.1 → 158.2	489.1 → 141.2
Carbaryl	5.63	202.1 → 145	202.1 → 127	Fluometuron	5.98	233.1 → 72.1	233.1 → 46
Carbendazim	4.52	192.2 → 160.2	192.2 → 132.1	Fluopicolid	7.2	385 → 174.8	385 → 173
Carbetamide	4.74	237 → 192	237 → 118	Fluoxastrobin	7.34	459.2 → 427.2	459.2 → 188
Carbofuran	5.18	222.2 → 123.1	222.2 → 165.2	Fluquinconazole	7.31	376 → 349	376 → 307
Carboxine	5.61	236 → 143	236 → 87	Flusilazole	7.6	316 → 247	316 → 165
Carfentrazone-ethyl	7.53	412 → 346	412 → 366	Flutolanil	6.81	341.1 → 242.1	341.1 → 262.1
Chlorflazauron	9.18	540 → 158	540 → 383	Flutriafol	5.99	302 → 123	302 → 109
Chloroxuron	7.53	291 → 72	291 → 218	Fonophos	5.9	247 → 183	247 → 201
Chlorpyrifos	8.35	350 → 198	350 → 96.9	Forchlorfenuron	6.37	248 → 93.1	248 → 165.1
Chlorpyrifos-methyl	7.88	324 → 125.1	322 → 125.1	Formetanate	4.48	222 → 165.1	222 → 120
Chlortoluron	6.31	213.1 → 72.2	213.1 → 46.2	Fuberidazole	5.5	185 → 157	185 → 65
Cinidon-ethyl	8.71	394.1 → 348.1	394.1 → 107	Furalaxyl	6.62	302.1 → 95.1	302.1 → 242.1
Clethodim	5.81	360 → 164	360 → 268	Furathiocarb	8.42	383.2 → 195.2	383.2 → 252.2
Clofentezine	8.27	303 → 138	303 → 102	Hexaconazole	7.95	314 → 70	314 → 159
Clomazone	7.04	240.1 → 125	240.1 → 89.1	Hexaflumuron	8.42	461.1 → 158.2	461.1 → 141.1
Clothianidin	3.35	250 → 169.1	250 → 132	Hexythiazox	8.77	353 → 228	353 → 168
Cyanazine	5.51	241.2 → 214.2	241.2 → 104.1	HydramethylInon	9.2	495.2 → 323.1	495.2 → 151
Cyazofamid	7.4	325 → 108	325 → 261	Imazalil	8.1	297.1 → 159.2	299.1 → 161.2
Cycluron	6.71	199.1 → 89.1	199.1 → 89	Imazapyr	7.3	262.2 → 217.2	262.2 → 202.2
Cymoxanil	3.91	199 → 128	199 → 111	Imidacloprid	3.82	256.2 → 209	256.2 → 175.2
Cyproconazole (isomer 1)	7.45	292.2 → 70.2	292.2 → 125.2	Indoxacarb	8.03	528 → 203	528 → 56
Cyproconazole (isomer 2)	7.44	292.1 → 70.2	292.1 → 125.2	Ipconazole	8.33	334.2 → 70	334.2 → 125
Cyprodinil	8.15	226 → 93	226 → 77	Iprodion	7.6	330.1 → 244.9	332.1 → 247
Cyromazine	2.63	167.2 → 85.1	167.2 → 68.25	Iprovalicarb	6.98	321.2 → 119	321.2 → 203.2
Demeton-S-methyl	2.9	230.9 → 89.1	230.9 → 61	Irgarol	7.72	254.2 → 198.1	254.2 → 83.2
Demeton-S-methyl-sulfon	5.6	262.9 → 108.9	262.9 → 169	Isofenphos	6.66	314 → 120	314 → 162.1
Desethyl-atrazine	3.9	188.1 → 146.2	188.1 → 104.1	Isoprocab	5.87	194.2 → 95.1	194.2 → 137.2
Desisopropyl-atrazine	3.2	174.1 → 104.1	174.1 → 96.1	Isoproturon	6.42	207.2 → 72.1	207.2 → 46.1
Desmedipham	6.23	318 → 182	318 → 136	Isoxaflutole	5.87	360.1 → 251.1	360.1 → 220.1
Desmethyl-pirimicarb	5.11	225 → 72	225 → 168.1	Kresoxim-methyl	7.53	314 → 116	314 → 206
Diazinon	7.88	305.1 → 169.2	305.1 → 97	Lenacil	6.5	235.3 → 153.2	235.3 → 136.2
Dichlorvos	5.36	221 → 109.1	223.1 → 109.1	Linuron	6.99	249.1 → 160	249.1 → 182.1
Diclobutrazol	7.58	328 → 70	328 → 160	Lufenuron	8.83	511.1 → 158.1	511.1 → 141.2
Dicrotophos	3.47	238 → 112	238 → 193	Malathion	6.83	331 → 99.1	331 → 127.1
Diethofencarb	6.56	268 → 226	268 → 180	Mandipropamid	6.81	412.1 → 328.1	412.1 → 355.9
Difenoconazole (isomer 1)	8.35	406.2 → 251.1	408.2 → 253.1	Mefenacet	7.35	299 → 148.1	299 → 120.1
Difenoconazole (isomer 2)	8.35	406.1 → 251.1	408.1 → 253.1	Mepanipyrim	7.57	224 → 106	224 → 77
Difenoxuron	6.78	287.2 → 123.2	287.2 → 72	Mepronil	6.86	270.1 → 119.1	270.1 → 228
Diffubenzuron	7.62	311 → 158.2	311 → 141.2	Metalaxyl	6.13	280.2 → 220.2	280.2 → 192.3
Dimethenamide	6.9	276.2 → 244.1	276.2 → 168.3	Metconazole	8.01	320 → 70	320 → 125
Dimethoate	3.58	230 → 125	230 → 199.1	Methabenzthiazuron	6.56	222.1 → 165.2	222.1 → 150.3
Dimethomorph	7.22	388.2 → 301.1	388.2 → 165.2	Methamidophos	1.06	142 → 94	142 → 125
Dimoxystrobin	7.6	327.1 → 205	327.1 → 116	Methiocarb	6.82	226.1 → 169.2	226.1 → 121.1
Diniconazole	8.07	326 → 70	326 → 159	Methomyl	2.62	163.1 → 88.1	163.1 → 106
Dinotefuran	2.02	203.1 → 114.1	203.1 → 129	Methoprotryne	6.95	272.2 → 240.2	272.2 → 198
Dioxacarb	3.68	224 → 123	224 → 167.1	Methoxyfenozide	6.9	369 → 149	369 → 133
Diphenylamin	7.03	170.1 → 93	170.1 → 92	Metobromuron	6.22	259 → 170.2	259 → 148.2
Disulfoton	6.08	275.1 → 89	275.1 → 61	Metolachlor	7.5	284.2 → 252.2	284.2 → 176.2
Diuron	6.7	233.1 → 72	235.1 → 72.1	Metoxuron	5.1	229 → 72.1	229 → 156.1
Edifenphos	6.66	311 → 283	328 → 283	Metribuzin	5.14	215.1 → 187.2	215.1 → 84.1

**Table I** Peak list for pesticides in positive ion mode (continued from previous page).

Compound ID	Retention		Transition 2	Compound ID	Retention		Transition 2
	Time (min)	Transition 1			Time (min)	Transition 1	
Mevinphos	4.29	225 → 127	225 → 193	Pyrethrin II	8.3	373.1 → 160.9	373.1 → 308.9
Mexacarbate	7.02	223.2 → 166.2	223.2 → 151	Pyridaben	9.33	365 → 147	365 → 309
Milbemectin A3	10.3	546.4 → 511.3	546.4 → 493.3	Pyridaphenthion	7.8	341 → 189	341 → 205
Milbemectin A4	10.5	560.4 → 525.4	560.4 → 55.2	Pyrimethanil	7.24	200 → 107	200 → 82
Molinatate	7.3	188.2 → 126.2	188.2 → 55.1	Pyriproxyfen	8.72	322 → 96	322 → 185
Monocrotophos	2.9	224 → 127	224 → 98	Quinalphos	6.7	299 → 147	299 → 163
Monolinuron	5.93	215.1 → 126.1	215.1 → 99	Quinoxifen	9.12	308 → 197	308 → 162
Monuron	5.7	199.2 → 72.2	199.2 → 126.3	Rotenone	7.61	395 → 213	395 → 192
Myclobutanil	7.17	289 → 70	289 → 125	Secbumeton	6.85	226.2 → 170.1	226.2 → 100
Neburon	7.65	275 → 88	275 → 114	Siduron	6.55	233.3 → 137.2	233.3 → 94
Nitenpyram	2.55	271.2 → 126.1	271.2 → 237.2	Simetryn	6.36	214 → 124	214 → 144
Novaluron	8.38	493 → 158.1	493 → 141.1	Spinosyn A	11.3	732.6 → 142.1	732.6 → 98
Nuarimol	6.7	315 → 252	315 → 81	Spinosyn D	11.6	746.6 → 142.1	746.6 → 98
Omethoate	1.69	214 → 124.9	214 → 182.8	Spirodiclofen	8.96	411.3 → 313.2	411.3 → 213.1
Oxadixyl	4.85	279.2 → 219.2	279.2 → 132.1	Spiromesifen	8.8	371.3 → 273	371.3 → 255
OxamyI	2.35	237.1 → 72.1	237.1 → 90.1	Spiroxamine (isomer 1)	10.7; 11	298.4 → 144.2	298.4 → 100.2
Oxydemeton-methyl	3.1	247 → 169	247 → 109	Spiroxamine (isomer 2)	10.7; 11	298.3 → 144.2	298.3 → 100.2
Paclobutrazol	6.82	294 → 70	294 → 125	Sulfentrazone	4.77	387 → 307.1	387 → 146
Parathion-ethyl	6.7	292.1 → 236.2	292.1 → 94.1	Sulfotep-ethyl	7	323 → 115	323 → 171.1
Parathion-methyl	7.6	263.9 → 232.1	263.9 → 125	Sulprofos	7	323 → 219	323 → 247
Penconazole	8.01	284 → 159	284 → 70	Tebuconazole	7.8	308 → 70	308 → 125
Pencycuron	8.1	329.1 → 125.1	331.2 → 127	Tebufenozide	7.39	353.1 → 133.1	353.1 → 297.1
Phenmedipham	6.35	301.1 → 136	301.1 → 168.1	Tebufenpyrad	8.56	334 → 117	334 → 145
Phenthoate	7	321 → 163	321 → 79	Tebuthiuron	5.71	229.2 → 172.4	229.2 → 116.1
Phosmet	6.7	318 → 160	318 → 133	Teflubenzuron	8.81	381.1 → 141.2	381.1 → 158.2
Phoxim	7.9	299.1 → 129.1	299.1 → 77.1	Terbufos	6.5	289 → 103	289 → 57
Picoxystrobin	7.44	368 → 145	368 → 205	Terbumeton	6.84	226 → 170	226 → 114
Pinoxaden	7.99	401.3 → 317.2	401.1 → 57	Terbutryn	7.57	242.2 → 186.1	242.2 → 68.1
Piperonyl butoxide	8.62	356.2 → 177.2	356.2 → 119	Tetraconazole	7.3	372 → 159	372 → 70
Pirimicarb	6.29	239.2 → 72.1	239.2 → 182.2	Thiabendazole	5.71	202.1 → 175.1	202.1 → 131.2
Pirimicarb-desmethylformamido	6.4	253.2 → 72.1	253.2 → 225.3	Thiacloprid	4.89	253.1 → 126.1	253.1 → 99.1
Pirimiphos-ethyl	7.48	334 → 198.1	334 → 182.1	Thiamethoxam	3.06	292 → 211	292 → 181
Prochloraz	8.29	376.1 → 308	376.1 → 70.1	Thidiazuron	5.18	221.2 → 102.1	221.2 → 127.9
Promecarb	6.86	208.2 → 109.1	208.2 → 151.1	Thiobencarb	8.09	258.1 → 125	258.1 → 89
Prometon	6.86	226.1 → 142.1	226.1 → 86	Thiofanox	5.7	219 → 57.1	219 → 60.9
Prometryn	7.4	242.2 → 200.1	242.2 → 158.1	Thiofanoxsulfon	3.4	251.1 → 75.9	251.1 → 57
Propachlor	6.2	212.2 → 170.1	212.2 → 94.1	Thiofanoxsulfoxid	3.6	235.1 → 104.1	235.1 → 57
Propamocarb	6.61	189.2 → 102.2	189.2 → 73.9	Thiophanate-methyl	5.1	343 → 151	343 → 192
Propargite	8.79	368 → 231	368 → 175	Tolclofos-methyl	8	301 → 175	301 → 268.9
Propazine	6.9	230.1 → 146.1	230.1 → 188.1	Topramezone	1.73	364.1 → 334.1	364.1 → 125
Propham	5.78	180 → 138	180 → 120	Triadimefon	6.94	294 → 197	294 → 225
Propiconazole	7.98	342.1 → 159.1	342.1 → 69.1	Triadimenol	7.04	296.1 → 70.1	296.1 → 227.2
Propoxur	5.03	210.1 → 111	210.1 → 168.1	Tricyclazole	5.18	190 → 163	190 → 136
Prosulfocarb	8.5	252.3 → 91.1	252.3 → 128.1	Trifloxystrobin	8.09	409 → 186	409 → 206
py Cinerin I	9	317.2 → 149	317.2 → 106.9	Triflumizole	8.47	346 → 278	346 → 73
py Cinerin II	8.2	361.2 → 149	361.2 → 106.9	Triflumuron	7.94	359.1 → 156.2	359.1 → 139
Pymetrozin	3.61	218 → 105	218 → 78	Triticonazole	7.38	318 → 70	318 → 125
Pyracarbolid	5.4	218.2 → 125	218.2 → 97	Uniconazole	7.4	292.2 → 70.1	292.2 → 43
Pyraclostrobin	7.95	388 → 194	388 → 163	Vamidithion	3.75	288 → 146	288 → 118
Pyrazophos	7.8	374 → 222	374 → 194	Zoxamide	7.7	336.1 → 186.9	338.1 → 188.7
Pyrethrin I	8.9	329.2 → 160.9	329.2 → 132.9				

**Table II** Peak list for pesticides in negative ion mode.

Compound ID	Retention		Transition 2
	Time (min)	Transition 1	
Acrinathrin	9.09	540 → 372	540 → 372
Chlorflazuron	9.24	539.9 → 356.8	539.9 → 356.8
Clothianidin	3.63	249.9 → 58	247.9 → 59
Diffubenzuron	7.68	309 → 156.1	310 → 288.9
Diuron	6.78	230.9 → 185.8	230.9 → 149.8
Fluazinam	7.99	462.5 → 415.8	462.5 → 397.9
Fludioxonil	6.93	246.9 → 179.9	246.9 → 125.9
Forchlorfenuron	6.44	246 → 126.9	246 → 91.2
Hexaflumuron	8.45	459 → 438.8	459 → 174.9
Imibenconazol	8.82	409 → 250.9	411 → 253
Lufenuron	8.87	509 → 325.9	509 → 175
Metaflumizon	8.5	505.1 → 301.9	505.1 → 140.9
Metamitron	3.97	201 → 184.8	201 → 116.9
Methoxyfenozid	6.98	366.9 → 104.9	366.9 → 148.9
Nitenpyram	2.59	269.2 → 221.6	269.2 → 100.8
Novaluron	8.42	491.1 → 470.7	493.1 → 472.7
Profoxydim	7.57	464.3 → 277.9	464.3 → 126.8
Propoxycarbazon	3.09	396.9 → 156	396.9 → 112.9
Prothioconazol	7.16	342 → 100.1	343.9 → 99.9
Tebufenozid	7.46	350.9 → 149	350.9 → 105
Teflubenzuron	8.85	378.6 → 338.8	378.6 → 195.9
Tepraloxymid	4.57	340 → 248	340 → 220.1
Terbacil	5.38	214.9 → 158.9	216.9 → 160.9
Tralkoxydim	6.28	328.1 → 253.8	328.1 → 281.8
Triadimefon	7.01	292 → 67.9	292 → 234.9
Triflumuron	8	356.9 → 153.8	358.9 → 155.9