

# Application Data Sheet

## No. 65

### GC-MS

Gas Chromatograph Mass Spectrometer

## GC-MS/MS analysis of residual pesticides in spinach using Scan/MRM (2)

The triple-quad GCMS-TQ8030 is equipped with a scan/MRM mode that allows simultaneous full-scan and MRM data measurements. With this mode, target compounds are selectively determined from a MRM data and unknown compounds are identified from a full-scan data, respectively. This Application Data Sheet demonstrates the effectiveness of the scan/MRM mode when analyzing residual pesticides in a vegetable after QuEChERS extraction.

### Experimental

Spinach was prepared using the QuEChERS method and spiked with 31 pesticides at the concentration of 0.02 mg/L. The spiked samples were analyzed according to the conditions shown in Table 1.

Table 1: Analytical Conditions

GC-MS	:GCMS-TQ8030		
Column	:Rxi-5Sil MS (Length 30m, 0.25mm I.D., df=0.25 μm)		
Glass Liner	:Deactivated splitless glass liner with wool (PN:221-48876-03)		
[GC]		[MS]	
Injection Temp.	:250°C	Interface Temp.	:250 °C
Column Oven Temp.	:50°C(1min)→(25°C /min)→125°C →(10°C /min)→300°C(15min)	Ion Source Temp.	:230 °C
Injection Mode	:Splitless (High Pressure Injection 250kPa, 1.5min)	Data Acquisition Mode	:Scan/MRM
Flow Control Mode	:Linear Velocity (47.2 cm/sec)	Mass Range	:m/z 45 – 500
Injection Volume	:1 μL	Scan Event Time	:0.05sec
		Scan Speed	:10,000 u/sec

#### MRM Monitoring m/z

Compound Name	Quantitative Transition		Qualitative Transition 1		Qualitative Transition 2	
	Precursor>Product	CE (V)	Precursor>Product	CE (V)	Precursor>Product	CE (V)
Dimethoate	125>79	8	125>62	8	125>93	16
Simazine	201>173	6	201>186	6	201>138	12
gamma-HCH (Lindane)	219>183	6	219>145	20	219>181	8
Diazinon	304>179	12	304>162	6	304>195	10
delta-HCH	219>183	10	219>145	22	219>147	22
Chlorpyrifos-methyl	286>271	16	286>241	26	286>93	25
Parathion-methyl	263>109	15	263>246	6	263>136	8
Fenitrothion	277>260	6	277>109	18	277>125	16
Malathion	173>127	6	173>99	15	173>145	6
Chlorpyrifos	314>258	15	314>194	30	314>166	40
Fenthion	278>109	20	278>125	20	278>169	16
Pendimethalin	252>162	12	252>191	10	252>208	5
Isofenphos	213>121	16	213>185	6	213>93	28
Procymidone	283>96	12	283>68	24	283>255	12
Tetrachlorvinphos	329>109	20	329>314	16	329>79	28
Flutolanil	173>145	16	173>125	26	173>95	28
Isoprothiolane	290>204	6	290>118	14	290>162	18
Chlorfenapyr	247>227	16	247>200	26	247>177	25
Chlorobenzilate	251>139	15	251>111	28	251>138	28
Ethion	231>129	25	231>175	14	231>203	8
Hexazinone	171>71	18	171>85	16	171>101	12
Tebuconazole	250>125	25	250>153	12	250>163	10
Bifenthrin	181>166	12	181>165	25	181>179	12
Fenpropathrin	265>210	12	265>172	14	265>89	26
Tetradifon	356>229	12	356>159	14	356>161	15
Pyraclufos	360>194	15	360>139	16	360>97	25
Cypermethrin-1	163>127	6	163>91	15	163>109	20
Cypermethrin-2	163>127	6	163>91	15	163>109	20
Cypermethrin-3	163>127	6	163>91	15	163>109	20
Cypermethrin-4	163>127	6	163>91	15	163>109	20
Imibenconazole	375>260	22	375>306	8	375>271	18

## Results

Fig. 1 shows the total ion current chromatogram (full-scan) and mass chromatograms (MRM) of a spinach sample spiked with pesticides (0.02 mg/L) measured using the scan/MRM mode. Fig. 2 shows mass chromatograms (MRM), and measured and library mass spectra of pesticides. MRM and full-scan data were obtained simultaneously.

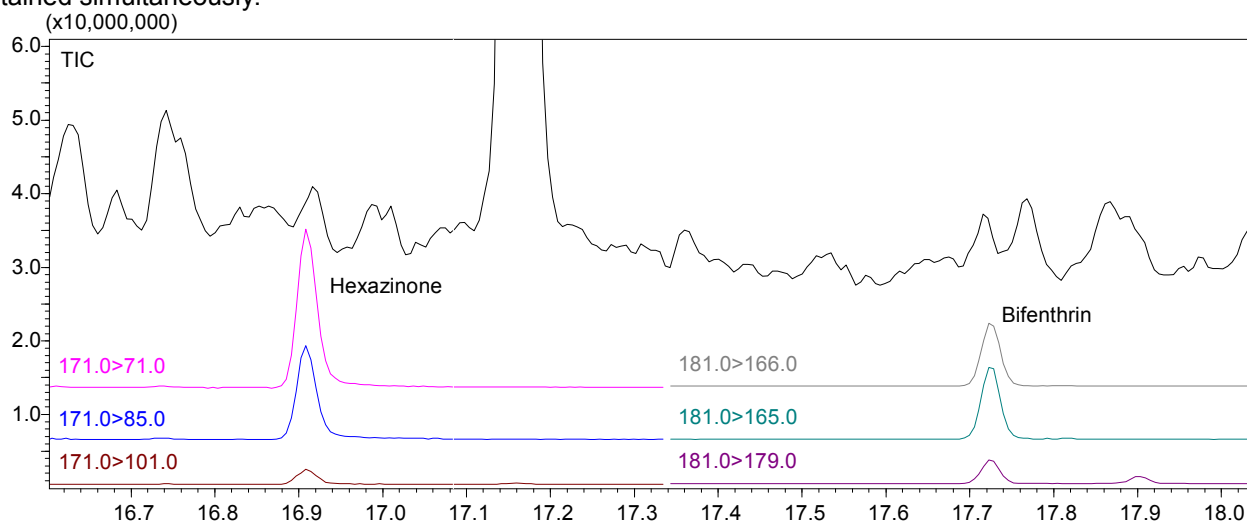


Fig. 1: Total Ion Current Chromatogram (Full-scan) and Mass Chromatogram (MRM) of Spinach Sample Spiked with Pesticides

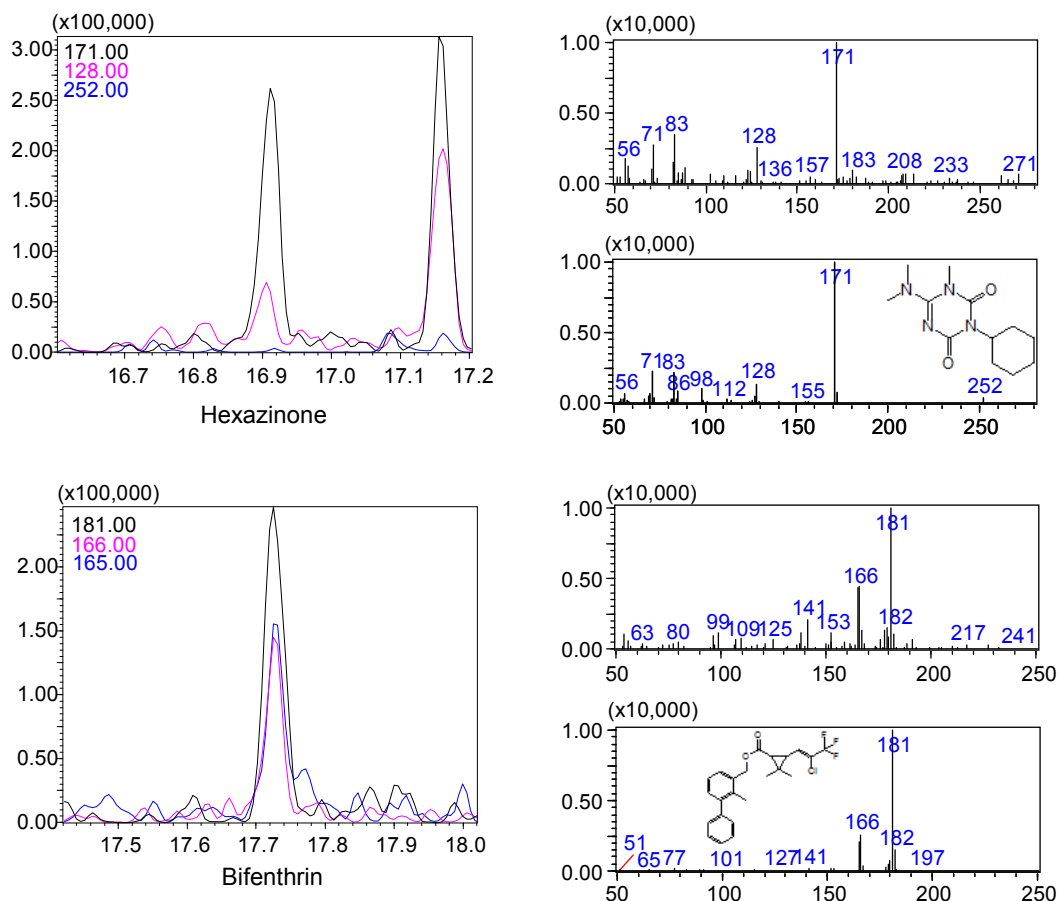


Fig. 2: Mass Chromatograms (MRM) and Mass Spectra of Pesticides  
(Upper: Measured Mass Spectra Lower: Mass Spectra of Mass Spectral Library)