

Analysis of golf course pesticides using LC-MS

Many types of pesticides are applied to keep golf courses green. While less pesticide is used on golf courses than on agricultural land, the proximity of Japanese golf courses to water sources has resulted in the regulation of some pesticides due to concerns of pesticide contamination of river and drinking water.

This data sheet illustrates an example of LC-MS analysis of pesticides prescribed for LC analysis under the official

regulation, with the mobile phase solvent changed to a buffered ammonium acetate solution. As the final pretreatment solvent is acetonitrile, analysis was conducted with a semi-micro column using a maximum injection volume of 5 μ L.

Fig.1 shows the mass chromatogram made in scan mode, and Fig.2 shows the mass spectra of asulam, thiram, and pencycuron.

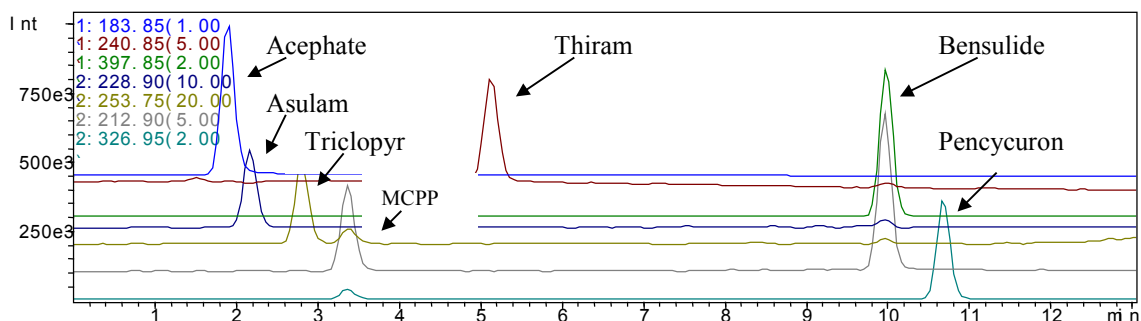
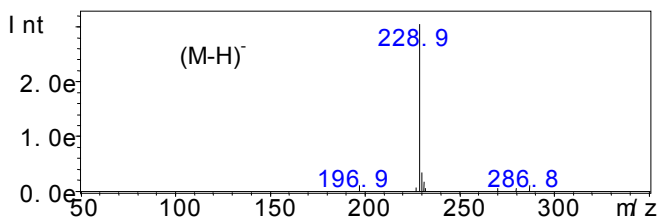
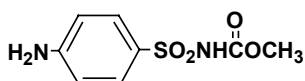
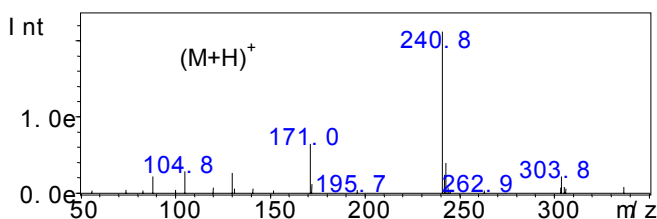
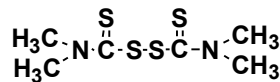


Fig. 1 Mass chromatograms of pesticides used on golf courses

Asulam MW 230



Thiram MW 240



Pencycuron MW 328

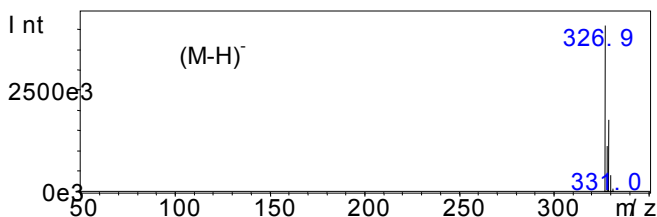
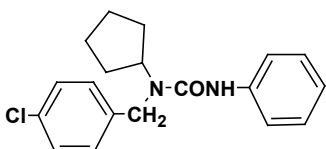


Fig. 2 Mass spectra of pesticides for golf course

Figs. 3 to 5 show the SIM chromatograms and calibration curves (n=5) of asulam, thiram, and pencycuron. Good

results for CV values from 0.5 to 1% were also obtained in this range.

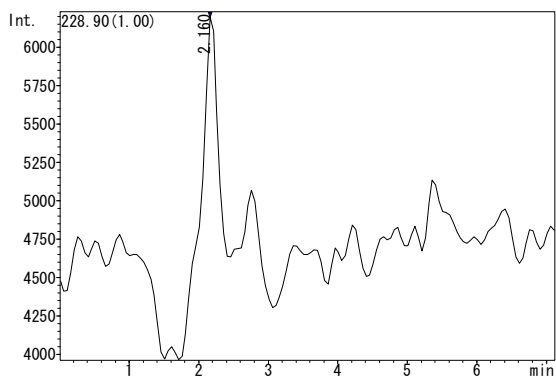


Fig. 3 SIM chromatogram (50ppb) and calibration curve of Asulam

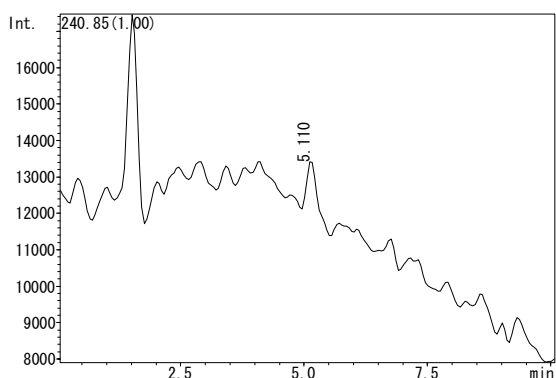
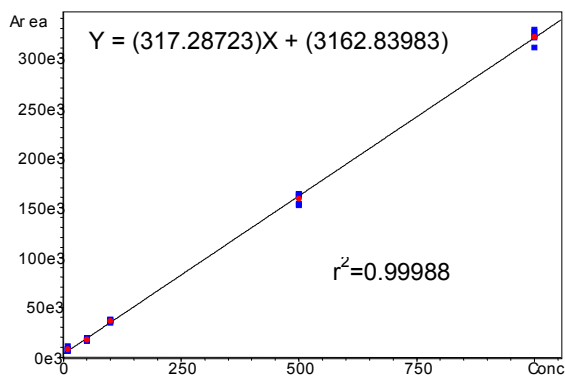


Fig. 4 SIM chromatogram (50ppb) and calibration curve of Thiram

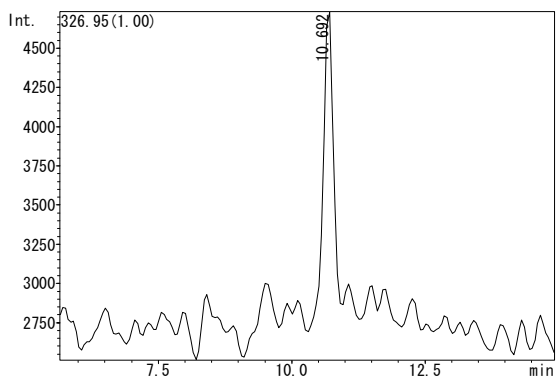
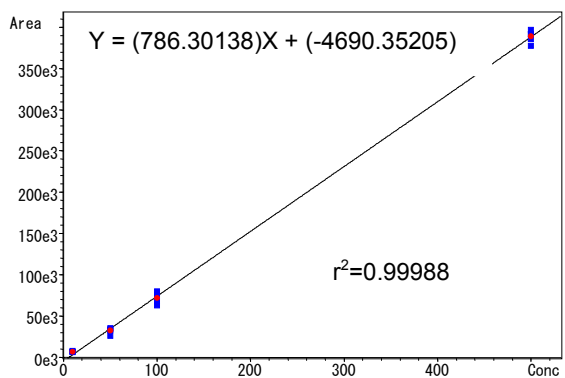


Fig. 5 SIM chromatogram (10ppb) and calibration curve of pencycuron

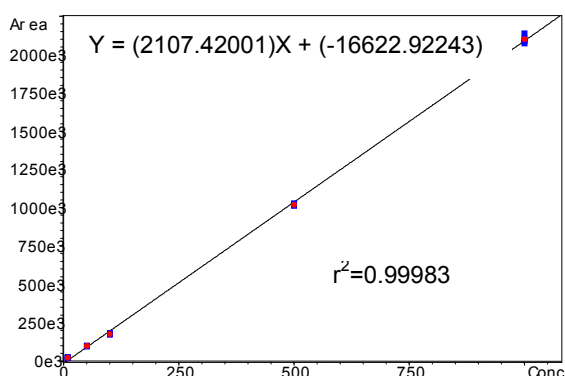


Table 1 Analytical conditions for LC-MS

Column	: Shimadzu VP-ODS (2.0 mmI.D. x 150 mm)		
Mobile phase A	: water containing 10mM ammonium acetate adjusted to pH4 with acetic acid		
Mobile phase B	: acetonitrile		
Gradient program	: 50% B – 100%B (10-15min)		
Flow rate	: 0.2 mL/min		
Injection volume	: 5 uL		Column temperature : 40 °C
Probe voltage	: +4.5 kV (ESI-Positive mode) -3.0 kV (ESI-Negative mode)		Block Heater temperature : 200 °C
CDL temperature	: 200 °C		
Nebulizing gas flow	: 4.5 L/min		
CDL voltage	: -15 V (ESI-Positive mode) +15 V (ESI-Negative mode)		
Q-array DC voltage	: Scan mode	Q-array RF	: 150
Scan range	: m/z 50 – 600 (1.5 sec/scan)		

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