Evolution GC-MS/MS

Transforming the best GC-MS system into something even better:

Application Note Evo610

Use of MS/MS with QuEChERS Sample Extraction

This short application discribes the use of MS/MS in combination with a quick sample extraction procedure that is described as QuEChERS in the literature (1).
Four widely used herbicides were used as markers demonstrating the effective use of this extraction procedure in combination with the power of MS/MS highly suppressing matrix effects that are observed when using single quadrupole MS systems.
All extracts were readily prepared by the customer. Sample Introduction was carried out with a split/splitles injector and a standard GC oven temperature program. (see method conditions below). The MS/MS transitions were determined during three injections of a standard solution mixture.
Table 1 lists the MRM transitions of the four test herbicides. Figures 1-3 show the traces of these herbicides under different matrix conditions and in different amounts. The customer chose a range from 10 ng/mL in bell pepper, 5 ng/mL in oats and 4 ng/mL in raisins. Allthough different matrices usually yield to different backgrounds, even in MS/MS mode all herbicides could be easily identified and automatically quantitated as well.

(1) Anastassiades, M., S. J. Lehotay, D. Stajnbaher and F. J. Schenck (2003). "Fast and easy multiresidue method employing acetonitrile extraction/partitioning" and "dispersive solid-phase extraction for the determination of pesticide residues in produce." Journal of AOAC International 86(2): 412-31.

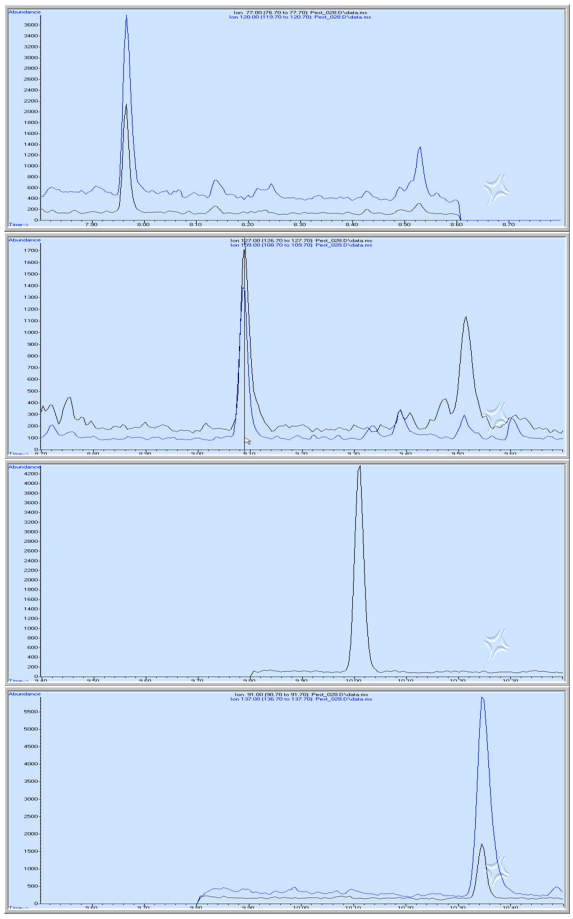

Figure 1: Extract from bell peppers. 4 herbicides each with 10 ng/ml. Propachlor, Phosphamidon, Dicofol and Tolylfluanid (top to bottom)

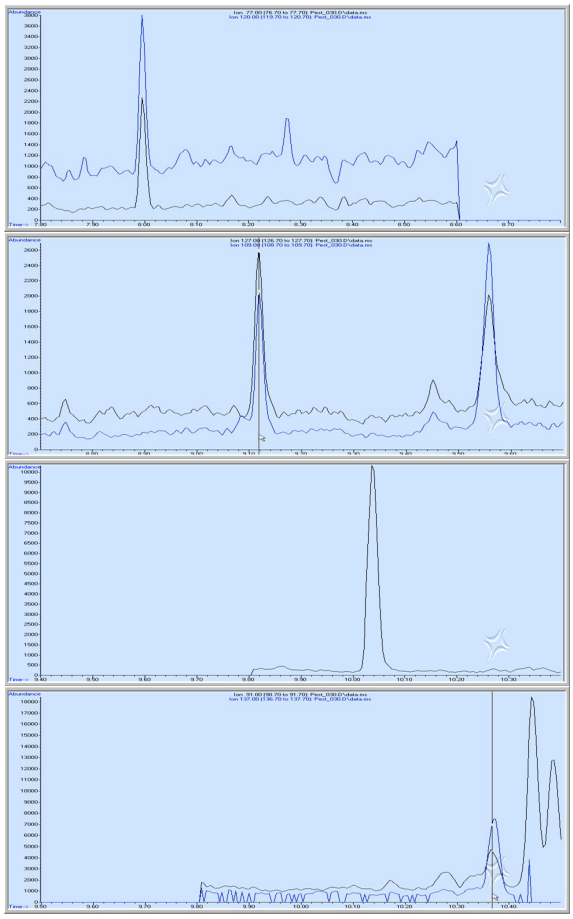

Figure 2: Extract from oats. 4 herbicides each with 5 ng/ml. Propachlor, Phosphamidon, Dicofol and Tolylfluanid (top to bottom)

Compound	RT [min]	MRM *	SIM Trace**
Propachlor	8.0	120>77, -6	77
		176>120, -6	120
Phosphamidon	9.1	264>127, -6	127
		127>109, -6	109
Dicofol	10.0	139>111, -6	111
Tolylfluanid	10.3	137>91, -6	91
		238>137, -6	137

Table 1: Retention time, transitions and SIM traces of the 4 herbicides
* Format: Q1 [m/z] > Q3 [m/z], collision energy [V]
** Automatically created SIM Trace to use TripleQuad data in MSD ChemStation Data Analysis (D.03.00).

Instrumentation:

GC Agilent 6890N:
Injector: Split/splitless 2 µL; temperature: 260 °C; liner: 4mm; single tapered, empty; mode: pulsed splitless; pulse pressure: 27 psi (1 min); purge time: 2.00 min; purge flow: 50 mL/min
Oven program: 120°C (2.25 min)>20°C/min> 280°C (3 min)
Column: Agilent 19091S-433 HP-5MS 30mx0.25mmx 0.25µm; 1.0 mL/min; constant flow, vacuum correction on.
Evolution MS/MS:
Transferline temperature: 280° C; ion source temperature: 230° C; quadrupole temperature: 150° C; ionization mode: EI; detector voltage: 1800 V; scantime: 300 ms; collision gas: argon, 1.4 mTorr (epc controlled); resolution 1.2/1.2.

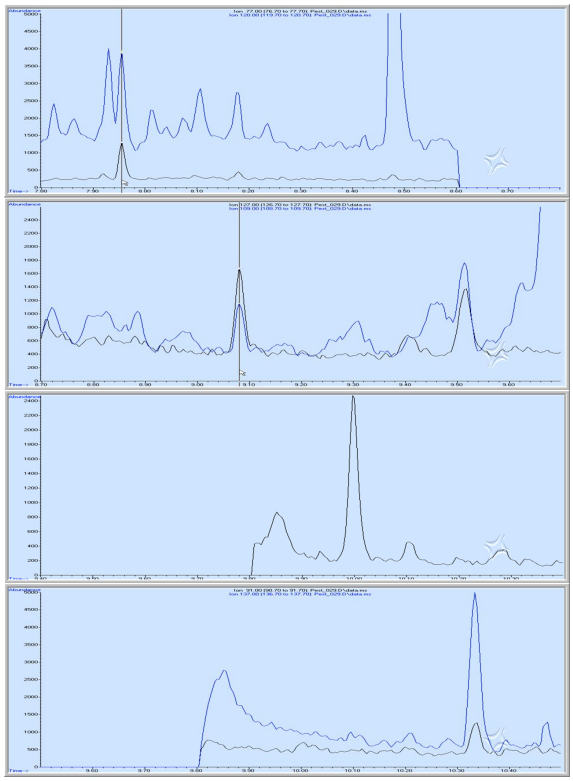

Figure 3: Extract from dried raisins. 4 herbicides each with 4 ng/ml. Propachlor, Phosphamidon, Dicofol and Tolylfluanid (top to bottom)