

## Stability in quantitative analysis of residual agricultural chemicals in food by GC-MS/MS

### - Stability verification of pesticides in spinach extract -

Product: JMS-TQ4000GC GC-MS/MS System

#### Introduction

As "food safety" is recognized as an increasingly important issue on a global scale, many nations have their own regulations on residual agricultural chemicals in food. In Japan, the positive list system, which was enforced at the end of May 2006, stipulates a uniform standard of 10 ppb as a quantity that is considered safe for human health. Under the positive list system, more agricultural chemicals need to be examined, and as a result, techniques capable of accurately and collectively analyzing residual agricultural chemicals in food are in increasing demand. While mass spectrometry (MS) is known for its high detection sensitivity, MS/MS is becoming the mainstream of pesticide analysis for its superior sensitivity and selectivity.

The JMS-TQ4000GC, JEOL's latest GC-MS/MS, has a unique ion storage/ejection mechanism within the MS/MS collision cell and incorporates new firmware to support MS/MS analysis with up to 36,000 transitions. In this work, we report the stability of 8 pesticides that were added to spinach extract.

#### Experiment

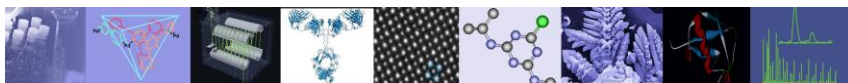
For the sample, 15 g of spinach was processed by using AOAC 2007.01 extraction method, and the resulting extraction solution was mixed with an 8 component 100 ppb standard solution at 9:1. Table 1 shows the measuring conditions used for the analysis.

Table 1. Measurement conditions

System	JMS-TQ4000GC (JEOL)
Ionization mode	El+: 70eV, 50μA
GC column	VF-5ms, 30m x 0.25mm, 0.25μm
Oven temp.	50°C (1min)→25°C/min→125°C →10°C/min→300°C
Inlet temp.	250°C
Inlet mode	Splitless, 2μL
He flow	1.0mL/min (Constant Flow)
MS/MS mode	Peak Dependent SRM



GC-MS/MS, JMS-TQ4000GC



## Results and discussions

Fig. 1 shows the reproducibility (n = 50) of the SRM chromatographic peak area of the 8 pesticides (10 ppb) added to the spinach extract. And Fig.2 shows overlaid SRM chromatogram for all 50 injections. The peak area reproducibility for each pesticide was less than CV10%, thus showing strong measurement stability. These results confirmed that the JMS-TQ4000GC shows highly reproducible results for agricultural chemicals.

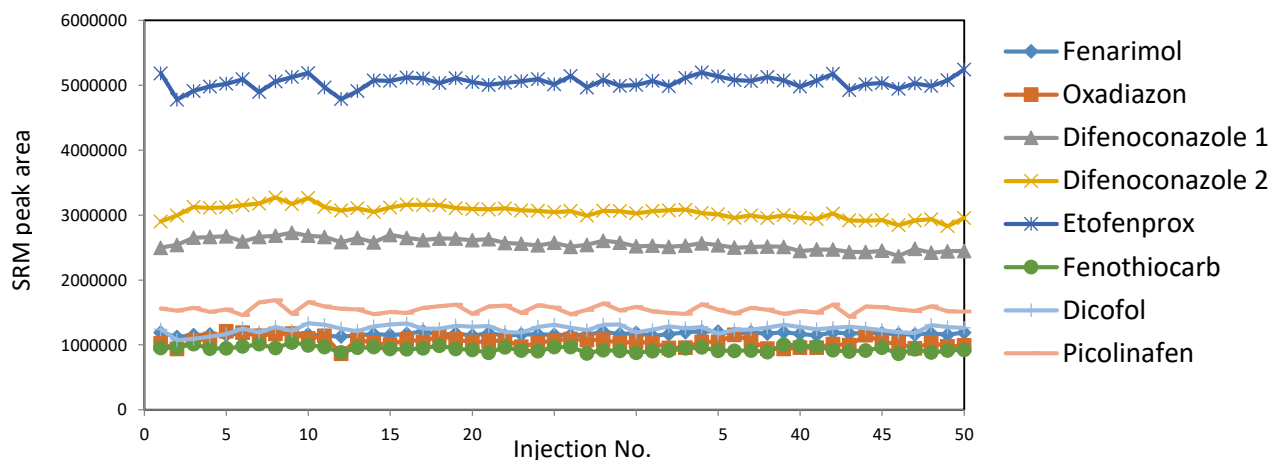


Fig.1 Reproducibility of SRM chromatographic peak area for the 8 pesticides in spinach extract solution

Compound	SRM peak area average	CV (%)
Fenarimol	1168018	1.7
Oxadiazon	1047475	7.1
Difenoconazole 1	2558083	3.4
Difenoconazole 2	3047319	3.2
Etofenprox	5045185	1.9
Fenothiocarb	938218	4.3
Dicofol	1247254	4.6
Picolinafen	1547959	3.8

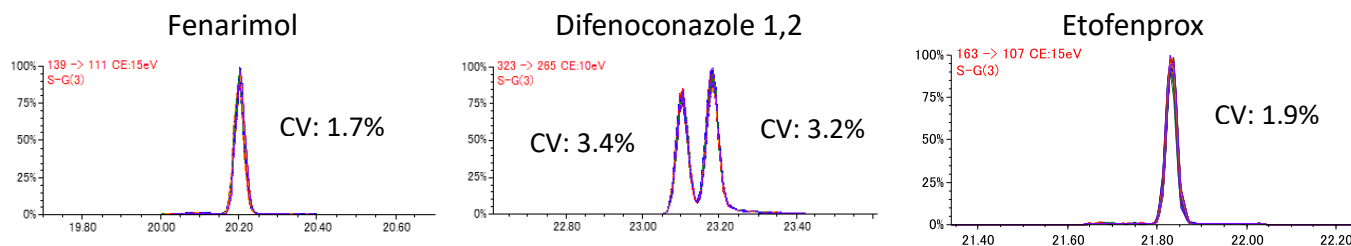


Fig.2 Overlaid of the 50 SRM chromatograms in spinach extract solution

11 Dearborn Road, Peabody, MA 01960  
 Tel: (978) 535-5900 • Fax: (978) 536-2205  
 ms@jeol.com • www.jeolusa.com