



**APPLICATION NOTE**  
# FP002-0

# Comparative study between SiliaFast FaPEX and QuEChERS for pesticide analysis in green cabbage

This study compares the SiliaFast FaPEX and the QuEChERS for pesticide analysis at different concentrations. SiliaFast FaPEX show similar or higher recoveries for all tested pesticides and are a great alternative for pesticides acting as thermal stability indicators (*Diafenthion and Ethoxyquin*), which are often degraded with other methods.

## Cartridge specification

Product Used: **SiliaFast™** FaPEX-GEN  
PN: FPX-GEN-50



SiliaFast FaPEX can be used with a SPE vacuum manifold

## Procedures

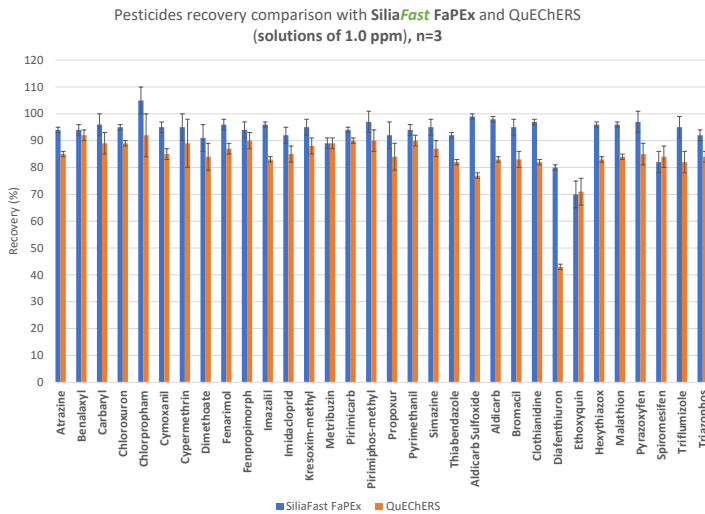
### SiliaFast™ FaPEX® General

### QuEChERS EN15662

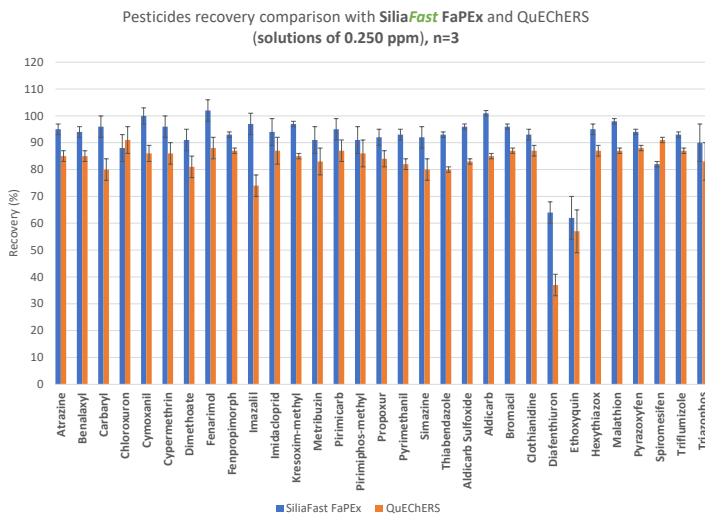
Cut the green cabbage into pieces, freeze with dry ice or liquid nitrogen and homogenize the sample.	
Add 1 g of sample in a 12 mL syringe blocked with a lock plug.	Add 10 g of grinded green cabbage in a 50 mL tube.
Add 5 mL of 1% acetic acid in acetonitrile. Shake for 15 minutes.	Add 10 mL of 1% acetic acid in acetonitrile.
Stack the syringe on the FaPEX coupled with a 0.2 mm PTFE filter and connect it to the manifold.	Add the QuEChERS extraction kit .
Apply a vacuum to the manifold to elute at 1 drop/second and collect solvent in a 10 mL volumetric flask.	Add a ceramic homogenizer and mix using a vortex for 30 seconds and centrifugate at 4,000 RPM for 5 minutes.
Rinse the FaPEX with 5 mL of 1% acetic acid in acetonitrile, apply vacuum to collect in the flask and dry the FaPEX.	Add the QuEChERS dispersive kit for the general fruits & vegetable into a centrifuge tube.
Dry the FaPEX by maintaining a vacuum in the manifold.	Transfer 6 mL of the supernatant into the centrifuge tube.
	Vortex the extract with the sorbent for 30 seconds.
	Centrifuge the tube for 5 minutes at 4,000 RPM.
	Transfer 100 µL of the solution in a 10 mL volumetric flask.
Fill the volumetric flask to the gauge line with the 1% acetic acid in acetonitrile.	
Transfer an aliquot into HPLC vial for LC-MS/MS analysis.	

# Results

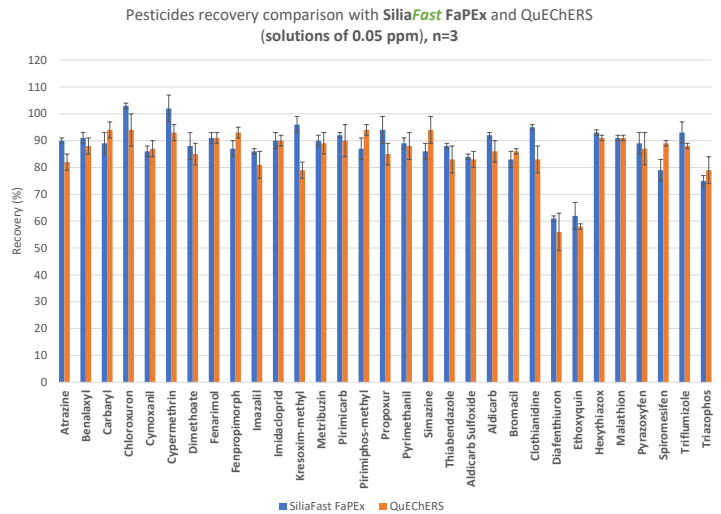
**Figure 1:**



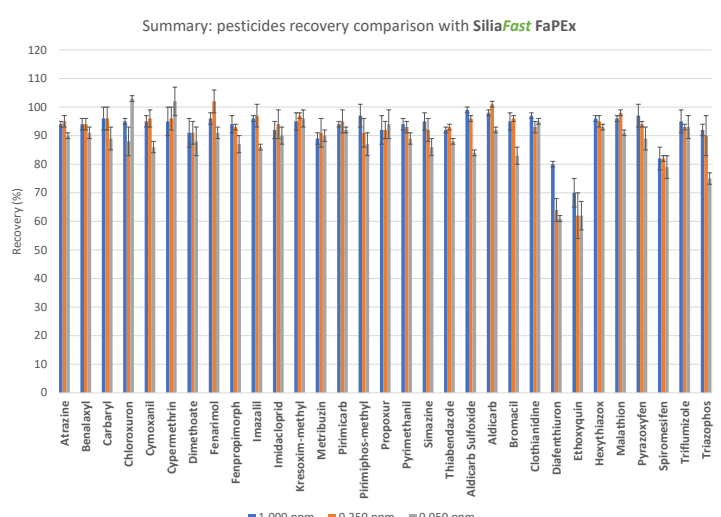
**Figure 2:**



**Figure 3:**



**Figure 4:**



The present study demonstrates that the **SiliaFast FaPEX** sample preparation approach worked well for a variety of pesticides in green cabbage. As shown in Figures 1-3, average analyte recoveries are better using **SiliaFast FaPEX** than **QuEChERS**, with the added advantage of being method of choice for heat sensitive pesticides. Reproducibility, as determined by % RSD for n=3 replicates, is also excellent. Finally, as shown in Figure 4, **SiliaFast FaPEX** can be used at various concentrations without significant recovery variation.

## Analytical Conditions (HPLC)

**Column:** SiliaChrom dt C18, 3.0 x 50 mm, 2.5 μm (PN: H141802E-H030)

**Mobile Phase (HPLC Grade):**

**Mobile phase A (MPA):** 1 mM ammonium formate in 95 / 5 (Water / Methanol), 0.1% Formic acid (v/v)

**Mobile phase B (MPB):** 1 mM ammonium formate in 5 / 95 (Water / Methanol), 0.1% Formic acid (v/v)

Time (min)	MPA (%)	MPB (%)
0.01	80	20
7.50	0	100
10.00	0	100
10.01	80	20
15.00	80	20

**Flow Rate:** 0.500 mL/min

**Column Temperature:** 35°C

**Autosampler Temperature:** Room Temperature

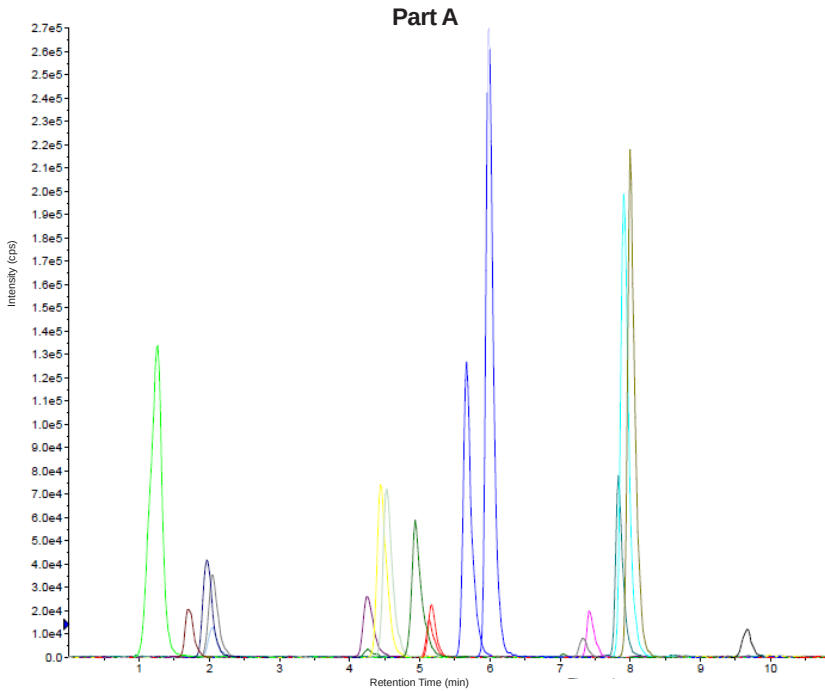
**Instrument:** Agilent Technologies HPLC 1100

**Detection:** LC-MS/MS system

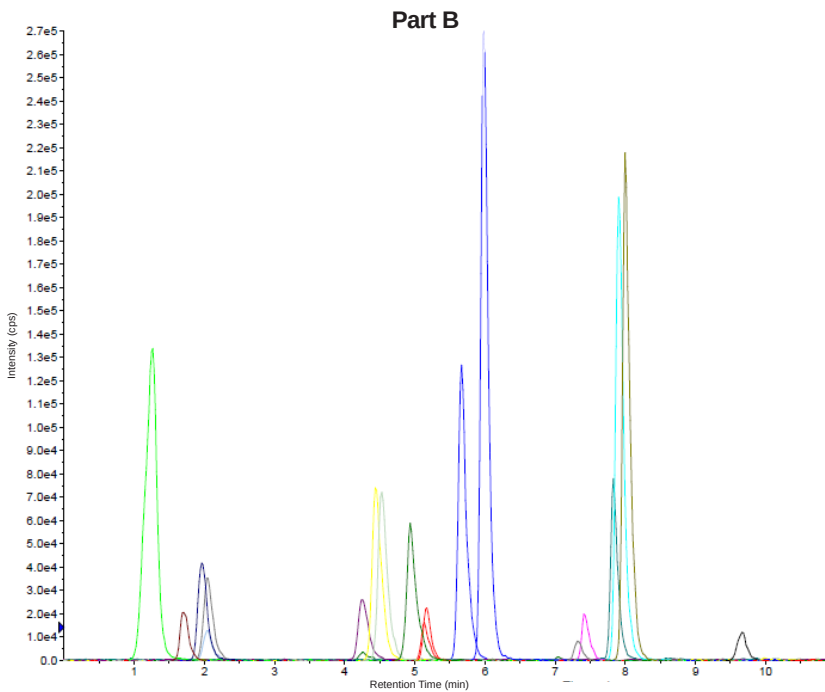
- Instrument: Sciex API 3000
- Ion source: Turbolon Spray, ESI+
- IonSpray Voltage, ESI voltage: 5.5 kV (ESI+)
- Nebulizer Gas: 12 psi
- Source Temperature: 375°C
- MS Splitting ratio: 0.200 mL / min

# Chromatograms & Mass Transition

**Figure 5:**  
Total ion current (TIC) chromatogram for different pesticides



Pesticide	Retention Time (min)	Mass Transition
Atrazine	5.66	216.0 → 174.1
Benalaxyl	7.99	326.2 → 148.2
Carbaryl	5.13	202.0 → 127.0
Chloroxuron	7.06	290.8 → 72.1
Cymoxanil	2.04	199.0 → 128.1
Cypermethrin	9.57	433.1 → 191.2
Dimethoate	2.04	229.9 → 125.0
Fenarimol	7.41	331.1 → 268
Fenpropimorph	5.98	304.2 → 147.3
Imazalil	5.16	299.2 → 160.8
Imidacloprid	1.69	256.1 → 209.1
Kresoxim-methyl	7.83	314.1 → 206.1
Metribuzin	4.25	215.0 → 186.9
Pirimicarb	1.96	239.1 → 182.2
Pirimiphos-methyl	7.90	306.1 → 164.1
Propoxur	4.44	210.1 → 111.2
Pyrimethanil	4.93	200.1 → 106.9
Simazine	4.52	202.1 → 132.0
Thiabendazole	1.25	202.1 → 175.2



Pesticide	Retention Time (min)	Mass Transition
Aldicarb	3.21	208.1 → 116.0
Aldicarb Sulfoxide	0.88	206.9 → 132.0
Triazophos	7.28	314.1 → 161.2
Diafenthiuron	9.50	385.2 → 329.2
Ethoxyquin	4.50	218.1 → 174.1
Triflumizole	8.37	345.9 → 278.0
Pyriproxyfen	8.00	403.0 → 105.0
Hexythiazox	9.18	353.3 → 228.1
Clothianidine	1.82	249.9 → 132.0
Spiromesifen	9.34	371.1 → 273.3
Bromacil	4.45	262.9 → 207.0
Malathion	7.05	331.1 → 127.0

**LEARN MORE** about SiliaFast™ FaPEX Cartridges in our brochure “Solutions For Sample Preparation.”



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