

Thermo Scientific  
HyperSep Dispersive  
SPE Products



*Efficient sample preparation and clean-up  
using the QuEChERS Method*

The QuEChERS method overcomes the problems associated with time consuming, expensive and labor intensive multiresidue methods (MRM).



## benefits

QuEChERS stands for Quick, Easy, Cheap, Effective, Rugged and Safe. The method, developed in 2003 by Anastassiades and Lehotay, is becoming the method of choice by many for food analysis.

- High sample throughput
- Determination of a large number of pesticide compounds
- No laborious steps and no need for automation
- Less solvent usage than conventional MRM's
- Detection of wide pesticide range (polar, pH-dependent compounds)
- Extraction in acetonitrile – GC and LC amenable
- High recovery levels and accurate results



Our comprehensive range of Dispersive SPE products contain the proper sorbents for optimum extraction, clean-up and separation of analytes from complex matrices such as food using QuEChERS methods.

- Save valuable time in preparation – products are supplied pre-prepared
- Reduced variability due to consistency in products and rigorous quality control
- Cleaner extracts from cleaner, pre-prepared products
- Lower peak counts as a result of using pre-prepared products



**For non-base sensitive compounds, such as bendiocarb and diuron using the original QuEChERS method:**

- 1 Add 15mL of acetonitrile to QuEChERS centrifuge tube
- 2 Shake to mix contents.
- 3 Add surrogate or internal standards if necessary\*
- 4 Add 15g of homogenised hydrated sample and shake for 1 minute
- 5 Centrifuge tube for 1 minute at 3700 rcf
- 6 Add an aliquot of the supernatant to the appropriate clean-up tube (and shake for 1 minute)
- 7 Centrifuge for 1 minute at 3700 rcf
- 8 Analyse extract

## QuEChERS methods

## products used

- 50mL PP centrifuge tube: 60105-211
- 2mL or 15mL clean-up tubes: 60105-202  
60105-203  
60105-204  
60105-205  
60105-206  
60105-223  
60105-224  
60105-225  
60105-226



**For base sensitive compounds such as folpet and fungicides using the AOAC 2007.01 QuEChERS method:**

- 1 Add 15mL of 1% acetic acid in acetonitrile to QuEChERS centrifuge tube
- 2 Shake to mix contents
- 3 Add surrogate or internal standards if necessary\*
- 4 Add 15g of homogenised hydrated sample and shake for 1 minute
- 5 Centrifuge tube for 1 minute at 3700 rcf
- 6 Add an aliquot of the supernatant to the appropriate clean-up tube and shake for 1 minute
- 7 Centrifuge for 1 minute at 3700 rcf
- 8 Analyse extract

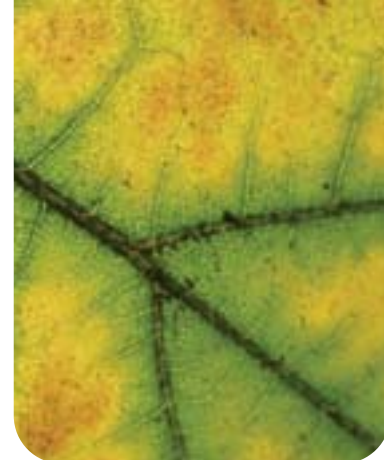
- 50mL PP centrifuge tube: 60105-210
- 2mL or 15mL clean-up tubes: 60105-202  
60105-203  
60105-204  
60105-205  
60105-206  
60105-223  
60105-224  
60105-225  
60105-226



**For non-base sensitive compounds using the European EN15662 Method:**

- 1 Weigh 15g of homogenised (hydrated at least 80%) sample in a 50mL centrifuge tube
- 2 Add 15mL acetonitrile (or 1:1 acetone/hexane, ethyl acetate) and IS
- 3 Shake briefly
- 4 Add 6g anhydrous magnesium sulfate, 1.5g sodium chloride, 1.5g sodium citrate Tribasic dihydrate, 0.75g sodium citrate dibasic
- 5 Shake by hand for 1 minute
- 6 Centrifuge at 5,000 rpm for 5 minutes
- 7 Transfer a portion of supernatant to a QuEChERS clean up tube
- 8 Shake for 30 seconds
- 9 Centrifuge for 1 minute at 6,000 rpm

- 50mL PP centrifuge tube: 60105-212  
60105-216
- 2mL or 15mL clean-up tubes: 60105-215  
60105-217  
60105-218  
60105-219  
60105-221  
60105-222  
60105-227



**For polar aromatic (planar) compounds such as matrix plant pigments using the Schenck Method:**

- 1 Pre-rinse the cartridge with 5mL of toluene
- 2 Add an aliquot of the supernatant to the cartridge
- 3 Start collection
- 4 Elute with 6-12mL of 3:1 acetone:toluene
- 5 Concentrate for GC/MS analysis - or -
- 6 Concentrate to dryness and reconstitute in mobile phase for LC analysis

- 6mL columns: 60105-207  
60105-208  
60105-209

\* Surrogate or internal standards may be required if subsequent analysis is required. We offer a complete range of standards – visit [www.thermoscientific.com](http://www.thermoscientific.com) for more information



## Considerations in Method Development

1. Determine the properties of the sample matrix:

Matrix Type	Examples	Sorbent Requirements
General Matrices	Apples • Cucumber • Melon	MgSO <sub>4</sub> , PSA
Fatty Matrices	Milk • Cereals • Fish	MgSO <sub>4</sub> , PSA, C18
Pigmented Matrices	Lettuce • Carrot • Wine	MgSO <sub>4</sub> , PSA, C18, GCB
High Pigmented Matrices	Spinach • Red Peppers	MgSO <sub>4</sub> , PSA, C18, GCB

2. Determine the properties of the pesticides of interest:

**Base sensitive** | **pH dependent** | **Non-base sensitive**

## Troubleshooting

Problem	Causes	Recommended Solutions
Loss of planar pesticides	Presence of GCB may result in a loss of planar compounds	<ul style="list-style-type: none"> <li>• Use a product with less GCB</li> <li>• Use the Dual Phase QuEChERS product</li> </ul>
Loss of acidic compounds e.g. 2,4-D from starting matrix	Presence of PSA will extract acidic compounds from matrix	<ul style="list-style-type: none"> <li>• Use a product containing MgSO<sub>4</sub> and C18</li> </ul>
Loss of compounds during subsequent analysis	Some compounds are unstable and can break down during analysis	<ul style="list-style-type: none"> <li>• Use an analyte protectant e.g. toluene or sorbitol</li> </ul>
Addition of sample to QuEChERS Extraction tube containing sorbent causes an exothermic reaction	Exothermic reaction between water in sample and MgSO <sub>4</sub>	<ul style="list-style-type: none"> <li>• Add the sample to the tube, then the solvents, then the sorbent materials</li> </ul>
Poor recovery of pesticide compounds	<ul style="list-style-type: none"> <li>• Sample not in appropriate homogenisation state</li> <li>• Wrong products used in method</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure sample is hydrated to 80% or higher</li> <li>• Verify nature of pesticides e.g. are base sensitive compounds present</li> </ul>

Thermo Scientific HyperSep Dispersive SPE products are available in a range of sorbent material combinations. Each of the sorbent materials is used to remove different interferences from the starting sample. The table below shows the different sorbent materials used and the compounds they are used to target.

Extraction Tubes				
Size	Contents	Application	Quantity	Part No.
50mL	6g Anhydrous Magnesium Sulfate, 1.5g Anhydrous Sodium Acetate	This product is listed in the AOAC for the extraction of pesticide residues using the QuEChERS method. Primarily designed to preserve base sensitive compounds such as chlorothalonil, dichloofluanid, tolyfluanid, folpet, captafol, captan from non-acidic matrices.	250 per pack	60105-210
	4g Anhydrous Magnesium Sulfate, 1g Sodium Chloride	This product is used for the extraction of pesticide residues using the QuEChERS method. It is preferred when base sensitive compounds are not present or are not of analytical interest. Eliminating the buffer allows a cleaner extract, and sodium chloride aids in the extraction of the analytes.		60105-211
	6g Anhydrous Magnesium Sulfate, 1.5g Sodium Chloride, 1.5g Sodium Citrate Tribasic Dihydrate, 750mg Sodium Citrate Dibasic Sesquihydrate	This product is the European version of 60105-210 and is used for the extraction of pesticide residues. It is preferred when base sensitive compounds are not an issue.		60105-212
	4g Anhydrous Magnesium Sulfate, 1g Sodium Chloride, 1g Sodium Citrate Tribasic Dihydrate, 500mg Sodium Citrate Dibasic Sesquihydrate			60105-216

Columns				
Size	Contents	Application	Quantity	Part No.
6mL	200mg graphitized carbon on top, 400mg PSA on bottom, separated by a Teflon frit	Used in the Schenck variation of QuEChERS, this product removes pigments, polar organic acids, some sugars and lipids from an aliquot of extract.	30 per pack	60105-207
	250mg graphitized carbon on top, 500mg PSA on bottom, separated by a Teflon frit	Schenck variation of QuEChERS, but with a different quantity of sorbents. When in doubt, use 60105-208.		60105-208
	500mg graphitized carbon on top, 500mg PSA on bottom, separated by a Teflon frit			60105-209

*The Schenck variation of QuEChERS introduces the use of PSA and graphitized carbon block to remove high levels of chlorophyll and plant sterols in the final extract without loss of planar pesticides using an acetone : toluene solvent mix (3:1).*



### LC Columns and Consumables

As a leader in HPLC column technology including silica manufacturing, bonded phase production and column packing, you can rely on Thermo Scientific HPLC products. For over 30 years our innovation has pioneered the market with advanced products such as our Hypersil GOLD columns offering outstanding peak shape and consistent results.



### GC Columns and Consumables

Thermo Scientific TRACE GC Columns offer high temperature stability and exhibit low bleed and long lifetimes. From general purpose non-polar to polar columns, many of which are MS-compatible, TRACE™ GC columns provide excellent quality and performance, with guaranteed results.



### Reagents and Standards

We offer a wide range of high quality GC/HPLC reagents and solvents, which include:

- Silylation, Alkylation and Acylation reagents for GC derivatisation
- HPLC/GC Grade Solvents
- HPLC detection reagents for pre- and post-chromatographic techniques. All compounds and formulations are purified for chromatography, minimizing artefact formation

Clean-Up Tubes						
Size	Contents	Application		Quantity	Part No.	
15mL	900mg Anhydrous Magnesium Sulfate, 300mg PSA & 150mg Carbon	Removing polar organic acids, some sugars and lipids. This product will cause the loss of planar pesticides.	Designed for use with a 10mL aliquot of supernatant	50 per pack	60105-205	
	900mg Anhydrous Magnesium Sulfate, 300mg PSA & 150mg endcapped C18	Removing polar organic acids, sterols, some sugars and lipids.			60105-206	
	750mg Anhydrous Magnesium Sulfate, 250mg PSA, 250mg endcapped C18 & 250mg Carbon				60105-213	
	900mg Anhydrous Magnesium Sulfate & 300mg PSA				60105-214	
	900mg Anhydrous Magnesium Sulfate & 150mg PSA				60105-215	
	900mg Anhydrous Magnesium Sulfate, 150mg PSA & 45mg Carbon	Removing polar organic acids, some sugars and lipids which may cause some loss of planar pesticides.			60105-217	
	900mg Anhydrous Magnesium Sulfate, 150mg PSA & 15mg Carbon				60105-218	
	1200mg Anhydrous Magnesium Sulfate & 400mg PSA	Removing polar organic acids, some sugars and lipids.			60105-224	
	1200mg Anhydrous Magnesium Sulfate, 400mg PSA & 400mg endcapped C18	Removing polar organic acids, sterols, some sugars and lipids.			60105-225	
	1200mg Anhydrous Magnesium Sulfate, 400mg PSA, 400mg endcapped C18 & 400mg Carbon				60105-226	
	900mg Anhydrous Magnesium Sulfate, 150mg				60105-227	
	150mg Anhydrous Magnesium Sulfate, 50mg PSA & 50mg Carbon	Removing polar organic acids, some sugars and lipids which may cause some loss of planar pesticides.			60105-230	
	900mg Anhydrous Magnesium Sulfate, 300mg PSA & 150mg ChloroFiltr	Removal of chlorophyll.			60105-231	
2mL	150mg Anhydrous Magnesium Sulfate & 25mg PSA	Removing polar organic acids, some sugars and lipids. aliquot of supernatant	Designed for use with a 2mL aliquot of supernatant	50 per pack	60105-219	
	150mg Anhydrous Magnesium Sulfate, 25mg PSA & 25mg endcapped C18	Removing polar organic acids, sterols, some sugars and lipids.			100 per pack	60105-220
	150mg Anhydrous Magnesium Sulfate, 25mg PSA & 2.5mg Carbon	Removing polar organic acids, some sugars and lipids which may cause some loss of planar pesticides			60105-221	
	150mg Anhydrous Magnesium Sulfate, 25mg PSA & 7.5mg Carbon				60105-222	
	150mg Anhydrous Magnesium Sulfate, 50mg PSA, 50mg endcapped C18 & 50mg Carbon	Removing polar organic acids, sterols, some sugars and lipids.			60105-223	
	150mg Anhydrous Magnesium Sulfate, 50mg PSA & 50mg Carbon	Removing polar organic acids, some sugars and lipids which may cause some loss of planar pesticides.			60105-202	
	150mg Anhydrous Magnesium Sulfate, 50mg PSA	Removing polar organic acids, some sugars and lipids.			60105-203	
	150mg Anhydrous Magnesium Sulfate, 50mg PSA & 50mg endcapped C18	Removing polar organic acids, sterols, some sugars and lipids.			60105-204	

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