

# QuEChERS MiniKits

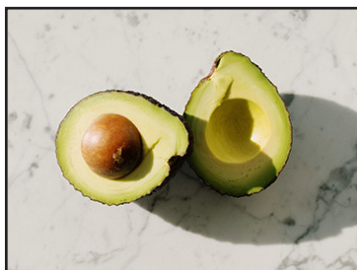
Everything you need in one box.



**MiniKits offer everything you need to do 10 tests in one box.**

- 10 extraction salt packets,
- 10 extraction centrifuge tubes (50mLs)
- 10 sorbent cleanup centrifuge tubes (either 2mL or 15mL.)

**Just take a box off the shelf and get started.**



## **AOAC 2007.01 QuEChERS MiniKits**

General Fruits and Vegetables  
 Fruits and Vegetables with Fats and Waxes  
 Pigmented Fruits and Vegetables  
 Fruits and Vegetables with Pigments and Fat



## **EN 15662 QuEChERS MiniKits**

General Fruits and Vegetables  
 Fruits and Vegetables with Fats and Waxes  
 Pigmented Fruits and Vegetables  
 Highly Pigmented Fruits and Vegetables



## **Original Method 2003 QuEChERS MiniKits**



## QuEChERS Sample Preparation

**QuEChERS (Quick, Easy, Cheap, Effective, Rugged, and Safe)** is a sample preparation method developed in 2003 by the USDA for analyzing drugs in food and pesticide residue analysis in plant materials. The QuEChERS method has grown into a sample preparation technique used on many different sample matrices and includes a multitude of analytes analyzed by GC or LC methods.

The QuEChERS sample preparation technique extracts comminuted samples with a solvent (acetonitrile) mixed with various salts to promote the extraction of analytes from the sample matrix into the solvent. An aliquot of the solvent is then typically mixed with a combination of sorbents used to cleanup the sample extract before analysis.

Applied Separations offers complete **QuEChERS Mini Kits** containing pre-weighed salt and buffer packets, 50mL centrifuge tubes for extraction and sorbent cleanup tubes packaged in either a 2mL or 15mL centrifuge tubes. The QuEChERS Mini Kits provide 10 extraction salt packets, 10 extraction centrifuge tubes (50mLs), and 10 sorbent cleanup centrifuge tubes (either 2mL or 15mL.)

The complete QuEChERS Mini Kits are grouped based upon the QuEChERS method you select, your fruit or vegetable matrix type, and sample size required.

Simply select your QuEChERS method which defines the extraction salts and buffers that are contained in preweighed packets. Next, select your fruit or vegetable matrix type which determines the preferred sorbent cleanup compositions and finally select the size of your sample and extract required for your analysis. The selection of sample size (10 or 15 grams) determines the amount of extraction salts contained in a salt packet and the extract size (1, 6, or 8mLs) determines the amount of sorbents contained in convenient 2 or 15mL centrifuge tubes.

**Applied Separations QuEChERS Mini Kits make it simple to prepare your fruit and vegetable samples for residue analysis and provide you with:**

**High recoveries, Accurate results, Minimal solvent use, Lower costs, and Rapid sample preparation!**

**The QuEChERS Mini Kits provide a convenient, inexpensive alternative to QuEChERS kits that require an analyst to purchase a minimum of 50 to 100 tests per kit that cost thousands of dollars. Why break your budget and have excess inventory sitting on the shelf?**

**The Applied Separations Mini Test Kits allow you to purchase 10 tests at a time for AOCS 2007.01, EN 15662, or the original 2003 QuEChERS methods.**

## Quechers Methods

### 1. ORIGINAL 2003 – not buffered

The original QuEChERS method was developed in 2003 for the determination of pesticide residues in fruits and vegetables by Michelangelo Anastassiades and Steven J. Lehotay. The original method used sodium chloride to reduce polar interferences and enhance extraction dynamics. The analytical scope of this method covers a wide spectrum of pesticides and also a wide spectrum of sample matrix pH values.

### 2. AOAC 2007.01 – buffered

Steven J. Lehotay and his co-workers developed the AOAC 2007.01 Method. They modified the original 2003 method by the addition of acetate buffers. This change allowed for the analysis of sensitive pesticides that may degrade at the pH of the sample matrix without buffering.

AOAC Official Method 2007.01

Pesticide Residues in Foods by Acetonitrile Extraction and Partitioning with Magnesium Sulfate.

### 3. EN 15662 – buffered

Michelangelo Anastassiades and co-workers developed the EN 15662 method. This method modified the original 2003 method with the use of sodium citrate dihydrate and disodium citrate sesquihydrate buffers. The method also uses sodium chloride to minimize polar interferences. These changes allowed for the analysis of pH sensitive pesticides and other residues from various sample matrices.

Foods of Plant Origin—Determination of Pesticide Residues Using GC-MS and/or LC-MS/MS Following Acetonitrile Extraction/Partitioning and Clean-up by Dispersive SPE (QuEChERS-method).

<https://www.quechers.eu/pdf/reality.pdf>

<https://www.quechers.eu/pdf/cleanup.pdf>

## How to Select the Appropriate Method

All the QuEChERS methods give excellent results with high recoveries (98%) and RSD's of 10%. The original 2003 method which is unbuffered may not recover a few base sensitive pesticides that degrade when the sample pH is high. See original procedure for details.

### Step #1

Select the extraction method based on the analytes of interest and their pH stability

Analytes	Example	Method
Acid Sensitive	Acephate, Acrinathrin, Carbaryl, Chlorothalonil, Diclorvos, Dimethoate, Mevinphos, Phosmet, Pymetrozine	Original 2003 <ul style="list-style-type: none"> <li>• Simple extraction</li> <li>• Clean baselines</li> </ul>
Base Sensitive	Captan, Chlorothalonil, Dichlofluanid, Dicofol, Folpet, Tolyfluanid	AOAC 2007.01 <ul style="list-style-type: none"> <li>• Extraction solvent with sodium acetate buffer</li> <li>• Less effective matrix removal</li> </ul>
Acid and Base Sensitive		EN 15662

### Step #2 Select the appropriate sample matrix

Determine the sample matrix type that best describes your sample. This selection will then determine the best sorbent composition in the cleanup tubes for your sample type.

Sample Matrix Type	Matrix Examples	Methods
General fruits and vegetables	Celery, head lettuce, cucumber, melon	EN AOAC
Pigmented fruits and vegetables	Strawberries, sweet potatoes, tomatoes	EN AOAC
Fruits and vegetables with fats and waxes	Cereals, avocado, nuts, seeds, and dairy	EN AOAC
Fruits and vegetables with pigments and fats	Wide range of commodities, curry spices, baby food, fish	AOAC
Highly pigmented fruits and vegetables	Red peppers, spinach, blueberries	EN

### Step #3 Choose your complete QuEChERS Mini Kit

Find the method you selected (AOAC, EN, or Original 2003) together with the appropriate sample matrix type (general, pigmented, etc.) and then select your kit based upon the size of the cleanup tubes required (2mL or 15mL).

*If you require only 1mL for your analysis pick the 2mL cleanup tubes. If you require 6mLs of extract for the EN method or 8mLs for the AOAC method then choose the 15mL cleanup tubes.*

# AOAC 2007.01 QuEChERS Mini Kits

## General Fruits and Vegetables

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22032	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub>  50 mg PSA	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps	Quantity
22033	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	1200 mg MgSO <sub>4</sub>  400 mg PSA	10

# AOAC 2007.01 QuEChERS Mini Kits

## Fruits and Vegetables with Fats and Waxes

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22034	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub>  50 mg PSA  50mg C18	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps containing:	Quantity
22035	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	1200 mg MgSO <sub>4</sub>  400 mg PSA  400 mg C18	10

# AOAC 2007.01 QuEChERS Mini Kits

## Pigmented Fruits and Vegetables

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22036	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub>  50 mg PSA  50mg GCB	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps containing:	Quantity
22037	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	1200 mg MgSO <sub>4</sub>  400 mg PSA  400 mg GCB	10

# AOAC 2007.01 QuEChERS Mini Kits

## Fruits and Vegetables with Pigments and Fat

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22038	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub>  50 mg PSA  50 mg C18  50 mg GCB	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps containing:	Quantity
22039	6 g MgSO <sub>4</sub>  1.5 g NaOAC	50mL empty extraction centrifuge tubes w/caps	1200 mg MgSO <sub>4</sub>  400 mg PSA  400 mg C18  400 mg GCB	10



## AOAC 2007.01 Procedure

The AOAC 2007.01 procedure stabilizes sample pH by using buffers and helps to prevent degradation of pH sensitive pesticides. (See AOAC 2007.01 method for details)

### Extraction

1. HOMOGENIZE or grind hydrated sample using a blender.
2. WEIGH 15 g of homogenized sample into a 50mL tube
3. ADD 15mL of Acetic acid/Acetonitrile (1:99) and internal standard.
4. Add contents of salt packet
5. SHAKE vigorously by hand for 1 minute.
6. CENTRIFUGE for 5 minutes @ 4000 rpm, make certain that the liquid layer forms over the top of the solids.

The sample is now ready for cleanup using the cleanup centrifuge tubes. If no further cleanup is desired, the top liquid layer can be removed and analyzed.

### Cleanup

1. TRANSFER 1mL of supernatant into a 2mL tube or 8mL of the supernatant into a 15mL tube, respectively (see Applied Separations sorbent cleanup kits).
2. SHAKE vigorously by hand for 30 seconds.
3. CENTRIFUGE for 5 minute @ 4000 rpm to separate solids from the liquid layer.
4. Analyze supernatant by GC/MS or LC-MS/MS

### References

1. Anastassiades et al. J. AOAC International. Vol. 86, No 2, 2003.
2. AOAC Official Method 2007.01, Pesticide Residues in Foods by Acetonitrile Extraction and Partitioning with Magnesium Sulfate.

# EN 15662 QuEChERS Mini Kits

## General Fruits and Vegetables

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22040	4 g MgSO <sub>4</sub> 1 g NaCl 0.5 g disodium hydrogencitrate sesquihydrate 1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub> 25 mg PSA	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps containing:	Quantity
22041	4 g MgSO <sub>4</sub> 1 g NaCl 0.5 g disodium hydrogencitrate sesquihydrate 1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	900 mg MgSO <sub>4</sub> 150 mg PSA	10

# EN 15662 QuEChERS Mini Kits

## Fruits and Vegetables with Fats and Waxes

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22042	4 g MgSO <sub>4</sub>  1 g NaCl  0.5 g disodium hydrogencitrate sesquihydrate  1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub>  25 mg PSA  25 mg C18	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps containing:	Quantity
22043	4 g MgSO <sub>4</sub>  1 g NaCl  0.5 g disodium hydrogencitrate sesquihydrate  1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	900 mg MgSO <sub>4</sub>  150 mg PSA  150 mg C18	10

# EN 15662 QuEChERS Mini Kits

## Pigmented Fruits and Vegetables

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22044	4 g MgSO <sub>4</sub>  1 g NaCl  0.5 g disodium hydrogencitrate sesquihydrate  1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub>  25 mg PSA  2.5 mg GCB	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps containing:	Quantity
22045	4 g MgSO <sub>4</sub>  1 g NaCl  0.5 g disodium hydrogencitrate sesquihydrate  1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	900 mg MgSO <sub>4</sub>  150 mg PSA  15 mg GCB	10

# EN 15662 QuEChERS Mini Kits

## Highly Pigmented Fruits and Vegetables

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22046	4 g MgSO <sub>4</sub>  1 g NaCl  0.5 g disodium hydrogencitrate sesquihydrate  1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	150 mg MgSO <sub>4</sub>  25 mg PSA  7.5 mg GCB	10

### Extraction Salts and 15mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	15mL cleanup tubes w/caps containing:	Quantity
22047	4 g MgSO <sub>4</sub>  1 g NaCl  0.5 g disodium hydrogencitrate sesquihydrate  1 g trisodium citrate dihydrate	50mL empty extraction centrifuge tubes w/caps	900 mg MgSO <sub>4</sub>  150 mg PSA  45 mg GCB	10

## EN 15662 procedure

(See EN 15662 method for details)

### Extraction

1. HOMOGENIZE or grind hydrated sample using a blender.
2. WEIGH 10 g of homogenized sample into a 50mL tube.
3. ADD 10mL of Acetonitrile and internal standard
4. SHAKE vigorously by hand for 1 minute.
5. Add contents of salt packet and shake for 1 minute
5. CENTRIFUGE for 5 minutes @ 4000 rpm, make certain that a liquid layer forms over the top of the solids.

### Cleanup

1. TRANSFER 1mL of supernatant into a 2 ml cleanup centrifuge tube or 6mL of the supernatant into a 15mL cleanup centrifuge tube, respectively .
2. SHAKE vigorously by hand for 30 seconds.
3. CENTRIFUGE for 5 minute @ 4000 rpm to separate solids from the liquid layer.
- 4.. Analyze supernatant by GC/MS or LC-MS/MS

### References

1. European Standard EN 15662, Foods of Plant Origin- Determination of Pesticide Residues Using GC/MS and/or LC/MS/MS Following Acetonitrile Extraction/

## Original Method 2003 QuEChERS Mini Kits

Note the original 2003 method uses MgSO<sub>4</sub> and PSA cleanup tubes for all sample matrices. Select your sample size and cleanup tube size to determine the appropriate kit.

### Extraction Salts and 2mL Cleanup Tubes

Catalog #	Extraction Salts (Prepacked in pouches)	Extraction centrifuge tubes w/caps	2mL cleanup tubes w/caps containing:	Quantity
22048 10 gr sample	4 g MgSO <sub>4</sub> 1 g NaCl	50mL empty centrifuge tubes w/ caps	150 mg MgSO <sub>4</sub> 50 mg PSA	10
22049 15 gr sample	6 g MgSO <sub>4</sub> 1.5 g NaCl	50mL empty centrifuge tubes w/ caps	150 mg MgSO <sub>4</sub> 50 mg PSA	10

### Original 2003 procedure

Caution: when analyzing sample matrices with high pH values there is a risk of losing some of the base-sensitive pesticides. It is therefore advisable to adjust the pH of such samples to a level below 4 to minimize degradation of these pesticides. There is no need to increase the pH of samples with low pH in order to achieve good recoveries for basic pesticides. (see original 2003 method for details)

### Extraction

1. HOMOGENIZE hydrated sample using a blender.
2. Weigh 10 g or 15 g of homogenized sample into a clean 50mL tube
3. Add 10mL of acetonitrile to a 10 g sample or 15mL of acetonitrile to a 15 g sample.  
Add internal standard.Shake.
4. Mix contents of salt packet into the 50mL tube containing homogenized sample.
5. SHAKE the tube by hand for 1 minute.
6. CENTRIFUGE for 5 minutes @ 5000 rpm, making sure that the solids are at the bottom of the tube and a liquid layer rises over the top of the solids.

## Cleanup

1. Transfer 1mL aliquot of supernatant to a 2mL cleanup tube for 10 or 15 gram samples. Transfer 6 mls of supernatant to a 15 ml cleanup tube for 10 gram samples. Transfer 8 mls of supernatant to a 15 ml cleanup tube for 15 gram samples.
2. Shake for 1 minute
3. Centrifuge for 1 minute at 6000 rpm
4. Transfer 0.5mLs supernatant for GC or LC analysis.

## References

1. Anastassiades, M., S. Lehotay, D. Stajnbaher and F. Schenck (2003). Fast and easy multiresidue method employing acetonitrile extraction/partitioning and "dispersive solid-phase extraction" for the determination of

## Water Addition for Low Water Content Samples

Sample Type	Weigh	Water	Comment
Cereals	5	10	Water can be added during comminution step. 12.5 g homogenate is used for analysis
Dried fruits	5	7.5	
Fruits and vegetables >80% water content	10	-	
Fruits and vegetables 25-80% water content	10	x	x= 10g - water amount in 10g sample
Honey	5	10	
Spices	2	10	

*Note: samples with low water content must be hydrated to recover pesticides at acceptable levels.*

<https://www.quechers.eu/pdf/reality.pdf>



## Materials

The following materials contained in quechers kits are used to improve the extraction of analytes or improve the cleanup of the extract as follows:

SALT, BUFFER, SORBENT	Purpose
Acetonitrile	organic solvent used to extract analytes from the sample
Acetic acid	acidify the extraction solvent
MgSO <sub>4</sub>	removes water from the sample
NaCl	promotes phase separation of the water and acetonitrile layers
NaOAc - Sodium Acetate	buffer for pH stabilization
Trisodium citrate	buffer for pH stabilization
Disodium Citrate Sesquihydrate	buffer for pH stabilization
PSA- Primary Secondary Amine	removes polar interferences and free fatty acids
C18- Octadecyl silica	removes non-polar compounds from sample
GCB- Graphitized carbon black	removes pigments (do not use when analyzing for planar pesticides)

## Miscellaneous Items

### 6mL SPE Cartridge with PTFE Frits

Cat #	Sorbents	SPE cartridge	Qty	Method
22050	200 mg GCB, 400 mg PSA	6mL	30	Schenck variation
22051	250 mg GCB, 500 mg PSA	6mL	30	Schenck variation
22052	500 mg GCB, 500 mg PSA	6mL	30	Schenck variation

Cat #	Description	Qty
22030	Empty 50mL Centrifuge Tube w/ cap	50