

QuEChERS MiniKits

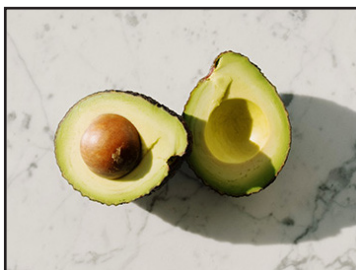
Everything you need in one box.



MiniKits have everything you need to do 15 tests in one box.

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

The QuEChERS Mini Kits provide:

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

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 15 tests at a time for AOCS 2007.01, EN 15662, or the original 2003 QuEChERS methods.

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

1. Select the QuEChERS method
2. Select your fruit or vegetable matrix type
3. Select the size of your sample and extract required for your analysis.

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!**

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 - Simple extraction - Clean baselines
Base Sensitive	Captan, Chlorothalonil, Dichlofluanid, Dicofol, Folpet, Tolyfluanid	AOAC 2007.01 - Extraction solvent with sodium acetate buffer - Less effective matrix removal
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

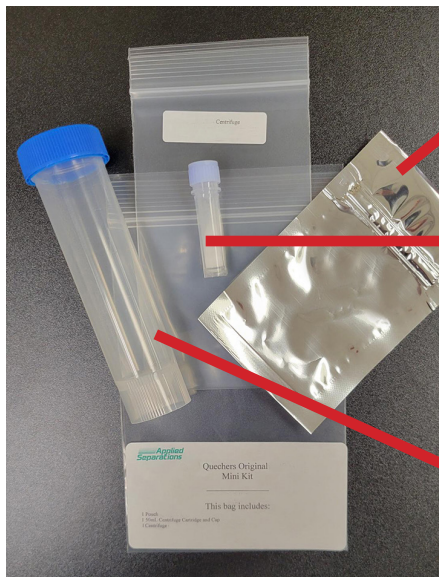
Find the method you selected (AOAC, EN, or Original 2003) together with the appropriate sample matrix type (general, pigmented, etc.) and then select your kit based upon the size of the cleanup tubes required (2mL or 15mL).

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



(1) Packet Containing Extraction Salts

6 g MgSO₄ and 1.5 g NaOAC

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO₄ and 50 mg PSA

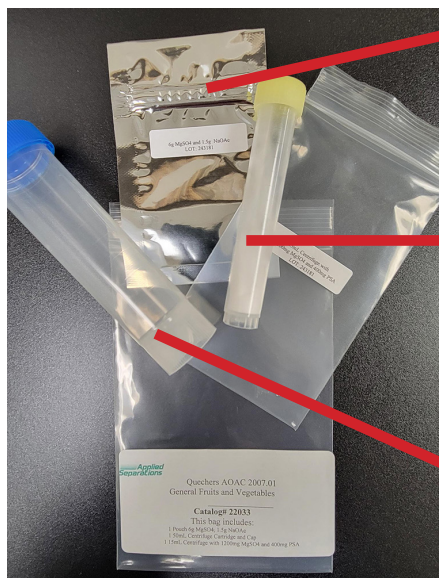
Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22032 15 Test Kits per box \$106.50

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

6 g MgSO₄ and 1.5 g NaOAC

(1) 15mL cleanup tube w/cap containing:

1200 mg MgSO₄ and 400 mg PSA

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

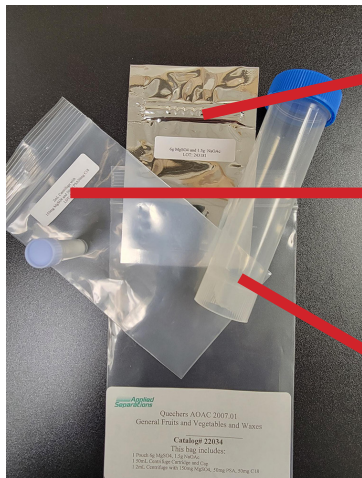
One Test Kit

#22033 15 Test Kits per box \$122.10

AOAC 2007.01 QuEChERS Mini Kits

Fruits and Vegetables with Fats and Waxes

Extraction Salts and 2mL Cleanup Tubes



(1) Packet Containing Extraction Salts

6 g MgSO₄ and 1.5 g NaOAC

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO₄, 50 mg PSA, and 50mg C18

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22034 15 Test Kits per box \$103.35

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

6 g MgSO₄ and 1.5 g NaOAC

(1) 15mL cleanup tube w/cap containing:

1200 mg MgSO₄, 400 mg PSA, 400 mg C18

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

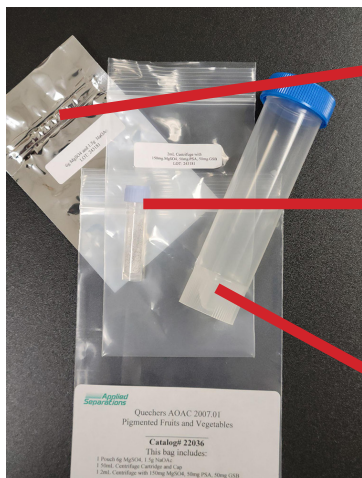
One Test Kit

#22035 15 Test Kits per box \$147.30

AOAC 2007.01 QuEChERS Mini Kits

Pigmented Fruits and Vegetables

Extraction Salts and 2mL Cleanup Tubes



(1) Packet Containing Extraction Salts

6 g MgSO_4 and 1.5 g NaOAc

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO_4 , 50 mg PSA, and 50mg GCB

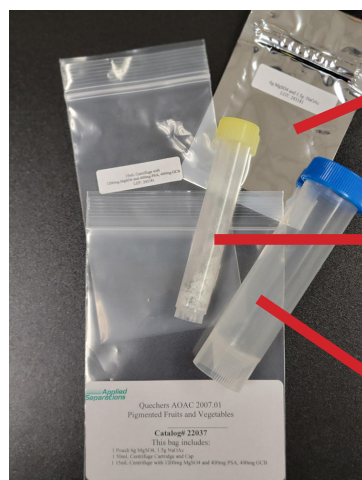
Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22036 15 Test Kits per box \$108.30

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

6 g MgSO_4 and 1.5 g NaOAc

(1) 15mL cleanup tube w/cap containing:

1200 mg MgSO_4 , 400 mg PSA, and 400 mg GCB

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22037 15 Test Kits per box
\$162.45

AOAC 2007.01 QuEChERS Mini Kits

Fruits and Vegetables with Pigments and Fat

Extraction Salts and 2mL Cleanup Tubes



(1) Packet Containing Extraction Salts

6 g MgSO_4 and 1.5 g NaOAC

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO_4 , 50 mg PSA, 50 mg C18, and 50mg GCB

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22038 15 Test Kits per box \$118.20

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

6 g MgSO_4 and 1.5 g NaOAC

(1) 15mL cleanup tube w/cap containing:

1200 mg MgSO_4 , 400 mg PSA, 400 mg C18, and 400 mg GCB

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22039 15 Test Kits per box \$236.10

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

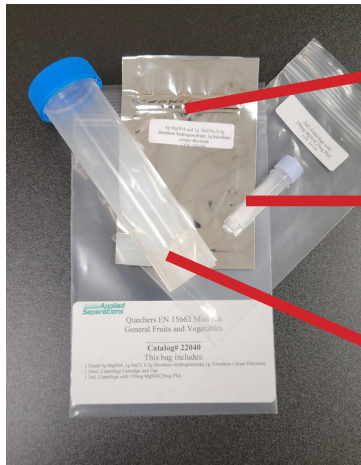
References

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



(1) Packet Containing Extraction Salts

4 g MgSO₄, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO₄, 25 mg PSA

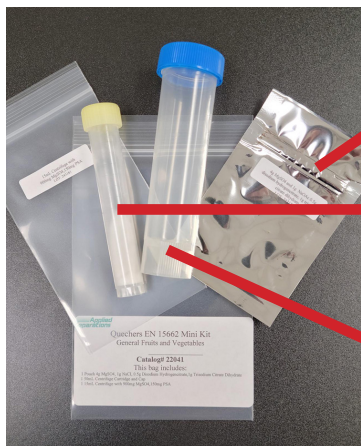
Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22040 15 Test Kits per box \$106.50

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

4 g MgSO₄, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 15mL cleanup tube w/cap containing:

900 mg MgSO₄, 150 mg PSA

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22041 15 Test Kits per box \$122.70

EN 15662 QuEChERS Mini Kits

Fruits and Vegetables with Fats and Waxes

Extraction Salts and 2mL Cleanup Tubes



(1) Packet Containing Extraction Salts

4 g MgSO_4 , 1 g NaCl , 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO_4 , 25 mg PSA, and 25 mg C18

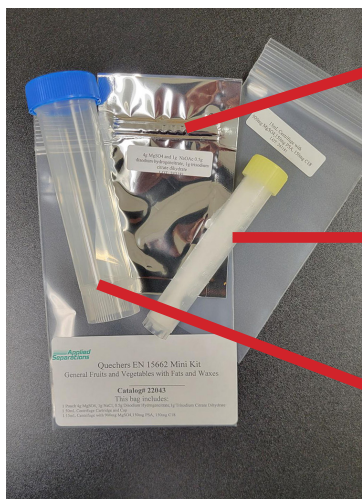
Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22042 15 Test Kits per box \$101.85

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

4 g MgSO_4 , 1 g NaCl , 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 15mL cleanup tube w/cap containing:

900 mg MgSO_4 , 150 mg PSA, 150 mg C18

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

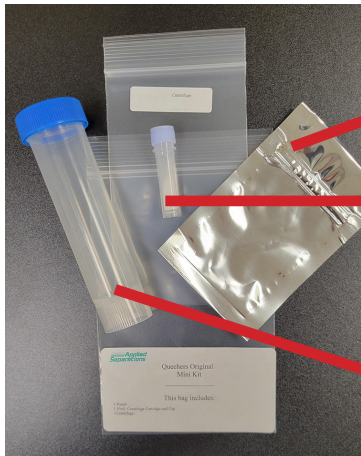
One Test Kit

#22043 15 Test Kits per box \$125.40

EN 15662 QuEChERS Mini Kits

Pigmented Fruits and Vegetables

Extraction Salts and 2mL Cleanup Tubes



(1) Packet Containing Extraction Salts

4 g MgSO₄, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO₄, 25 mg PSA, 2.5 mg GCB

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22044 15 Test Kits per box \$108.90

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

4 g MgSO₄, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 15mL cleanup tube w/cap containing:

900 mg MgSO₄, 150 mg PSA, and 15 mg GCB

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

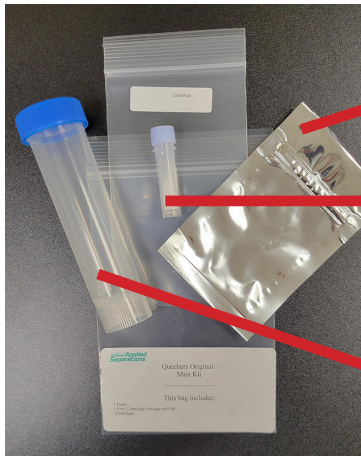
One Test Kit

#22045 15 Test Kits per box \$132.90

EN 15662 QuEChERS Mini Kits

Highly Pigmented Fruits and Vegetables

Extraction Salts and 2mL Cleanup Tubes



(1) Packet Containing Extraction Salts

4 g MgSO₄, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO₄, 25 mg PSA, and 7.5 mg GCB

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22046 15 Test Kits per box \$111.30

Extraction Salts and 15mL Cleanup Tubes



(1) Packet Containing Extraction Salts

4 g MgSO₄, 1 g NaOAC, 0.5 g disodium hydrogencitrate sesquihydrate, and 1 g trisodium citrate dihydrate

(1) 15mL cleanup tube w/cap containing:

900 mg MgSO₄, 150 mg PSA, and 45 mg GCB

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22047 15 Test Kits per box \$130.50

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

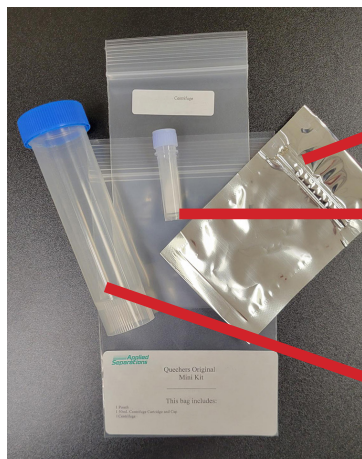
References

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 MgSO₄ and PSA cleanup tubes for all sample matrices. Select your sample size to determine the appropriate kit.

Extraction Salts and 2mL Cleanup Tubes - 10g sample



(1) Packet Containing Extraction Salts

4 g MgSO₄, 1 g NaCl

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO₄, 50 mg PSA

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22048 15 Test Kits per box \$98.25

Extraction Salts and 2mL Cleanup Tubes - 15g sample



(1) Packet Containing Extraction Salts

6 g MgSO₄, 1.5 g NaCl

(1) 2mL cleanup tube w/cap containing:

150 mg MgSO₄, 50 mg PSA

Extraction centrifuge tube w/cap

(1) 50mL empty extraction centrifuge tube w/cap

One Test Kit

#22049 15 Test Kits per box \$101.85

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	Sample (grams)	Water (grams)	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 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 ₄	removes water from the sample
NaCl	promotes phase separation of the water and acetonitrile layers
NaOAC - Sodium Acetate	buffer for pH stabilization
Trisodium Citrate Dihydrate	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)

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