SiliaQuick™
QuEChERS

Distributed by

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SiliaQuick™ QuEChERS

Food Environment

Using Silia*Prep* QuEChERS ensures the following benefits:

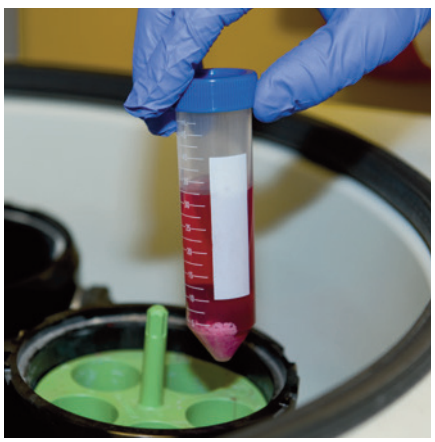
- Clean extracts from pure products.
- High recovery and lot-to-lot reproducibility.
- Great variety of QuEChERS to cover the full spectrum of food applications.
- Reduction of analysis cost.

SiliaQuick QuEChERS for Pesticide Residue Analysis

The QuEChERS technique was developed in 2003 by USDA scientists to simplify and accelerate the analysis of pesticides in various fruit and vegetable samples. The name **QuEChERS** is formed by an acronym of the properties that are observed with this technique: **Qu**ick, **E**asy, **Ch***eap* **E**ffective, **R**ugged and **S**afe. The QuEChERS method has gained in popularity to become the most valuable alternative for the determination of traces of analytes in a high throughput environment. Presently, scientists have expanded the use of this method to the analysis of a vast array of pesticides, herbicides, fungicides and other compounds present in all food and beverage matrices.

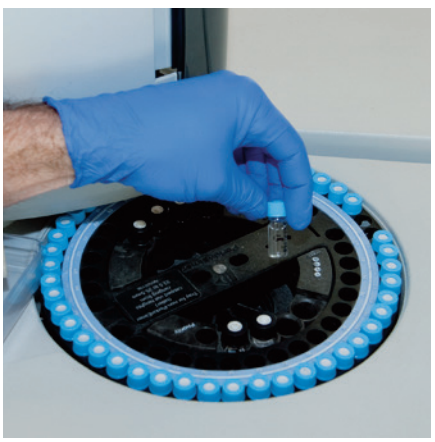
The QuEChERS technique can be summarized as a three-step methodology, starting with a liquid extraction, followed by a dispersive solid-phase extraction clean-up, and completed by a LC or GC analysis. The first step is to carry out the extraction of compounds of interest from food or beverage matrices through a solvent (*acetonitrile*). The dispersive solid-phase extraction clean-up is designed to remove specific undesired compounds such as sugars, lipids, organic acids, proteins, pigments and excess water from the final solution. The analysis step consists of a simple injection into a LC-MS/MS or GC-MS instrument to determine the analyte recovery.

Step 1
Liquid Extraction



Step 2
Dispersive SPE Clean-up

Step 3
LC or GC Analysis



SiliaQuick QuEChERS for Food Sample Treatments

SiliaQuick QuEChERS are designed to ensure the ultimate performance in pesticide analysis.

Quick: Pre-packed liquid extraction kits and dispersive solid-phase extraction clean-up kits contain the right amount of salts and/or sorbents to suit the specific food matrices, hence eliminating the sample preparation measurement step.

Cheap: No specialized equipment or glassware is required to achieve the pesticide residue analysis.

Effective: General procedure for all food and beverage matrices allowing a significant reduction of the analysis cost.

Rugged: Useful for the treatment of complex food matrices such as fish, meat or nuts without the requirement of additional treatments.

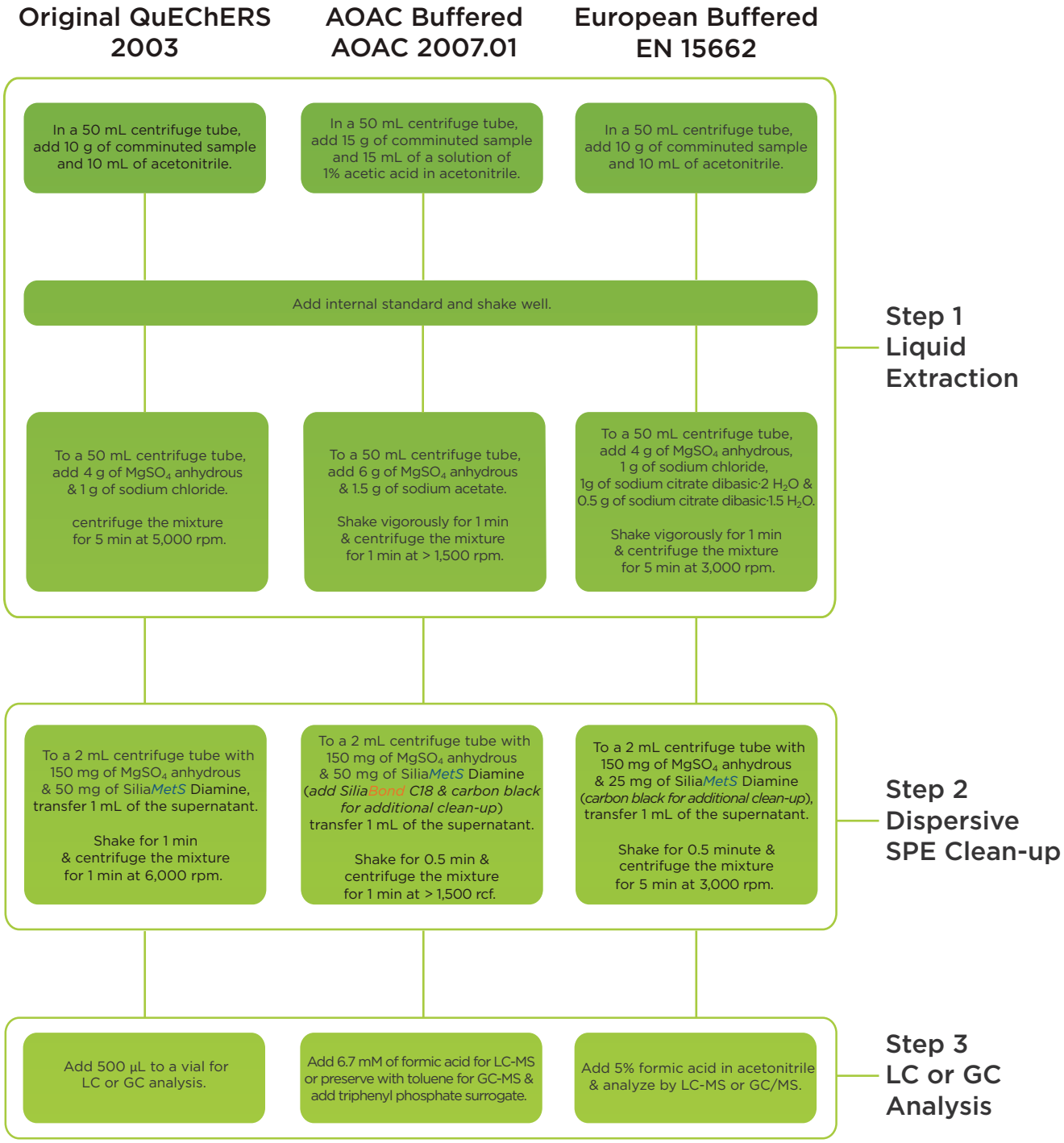
Safe: Limited time of contact with dangerous compounds and solvents.

Extraction and Dispersive Reagents

The following table presents each extraction and dispersive reagent and their specific functions in the QuEChERS technique.

Extraction and Dispersive Reagents	
Extraction Reagents	**Specific Function**
Magnesium Sulfate Anhydrous ($MgSO_4$)	Facilitates solvent partitioning.
Acetic Acid	Used for pH adjustment.
Acetonitrile	Solvent providing the best characteristics for extracting a wide variety of pesticides. Amenable for both LC and GC analysis.
Buffers	Maintain optimal pH and prevent pH degradation of sensitive analytes.
Sodium Chloride (NaCl)	Limits the amount of polar interferences.
Dispersive Reagents	**Specific Function**
SiliaMetS Diamine	Removes sugars, fatty acids, organic acids, lipids, and some pigments. Sterols and additional lipids can also be removed in combination with SiliaBond C18.
SiliaBond Amine	Removes sugars and fatty acids as well as the SiliaMetS Diamine but is less likely to catalyze degradation of base sensitive analytes.
SiliaBond C18	Removes long chain, non-polar compounds, and sterols.
Carbon Black	Removes pigments, polyphenols, and other polar compounds.
Magnesium Sulfate Anhydrous ($MgSO_4$)	Removes residual water from the organic phase.

Schematic Flow Chart of the Most Used QuEChERS Technique



How to Choose the Proper Silia*Quick* QuEChERS Kit

Step 1: For Liquid Extraction

The table below presents the Silia*Quick* QuEChERS liquid extraction kits specially pre-packed with anhydrous salts and/or sorbents to suit the QuEChERS technique of your choice.

Silia*Prep* QuEChERS Liquid Extraction Kits			
QuEChERS Method	Content	Units/box	Product Number without 50 mL Tube
Original QuEChERS	4 g magnesium sulfate anhydrous 1 g sodium chloride	100	QE-0001-50T
Buffered AOAC 2007.01	6 g magnesium sulfate anhydrous 1.5 g sodium acetate	100	QE-0002-50T
Buffered EN 15662	4 g magnesium sulfate anhydrous 1 g sodium chloride 1.5 g sodium citrate dibasic sesquihydrate 0.5 g sodium citrate tribasic dihydrate	100	QE-0003-50T

Silia*Quick* QuEChERS Troubleshooting

Poor recovery of pesticide compounds:

- Each sample has to be at the minimum 80% hydrated to perform optimal liquid extraction.
- For base sensitive compounds use buffered method.
- Always mix the sample with the solvent first to reduce the exothermic reaction between the magnesium sulfate and water.
- Add an analyte protector like toluene or sorbitol to prevent loss of thermally unstable pesticides in the GC inlet.
- Add formic acid after the dispersive SPE clean-up step to limit the degradation of base sensitive compounds prior the LC analysis.

Step 2: For Dispersive Solid-Phase Extraction Clean-Up

The following table presents the Silia*Quick* QuEChERS dispersive solid-phase extraction clean-up kits to match your food matrices. It is recommended to use the 2 mL dispersive tube for an extract volume of 1 mL and the 15 mL dispersive tube for extract volumes higher than 3 mL.

Silia*Quick* QuEChERS Dispersive Solid-Phase Extraction Kits

Matrix	Method	Tube (mL)	Units/ box	Content (mg)				Product Number
				$MgSO_4$	PSA	CB	C18	
General Fruits & Vegetables	AOAC 2007.01	2	100	150	50	-	-	QD-1000-2T
	EN 15662	2	100	150	25	-	-	QD-1001-2T
	AOAC 2007.01	15	50	1,200	400	-	-	QD-2000-15T
	EN 15662	15	50	900	150	-	-	QD-2001-15T
Pigmented Fruits & Vegetables	AOAC 2007.01	2	100	150	50	50	-	QD-1002-2T
	EN 15662	2	100	150	25	2.5	-	QD-1003-2T
	AOAC 2007.01	15	50	1,200	400	400	-	QD-2002-15T
	EN 15662	15	50	900	150	15	-	QD-2003-15T
Highly Pigmented & Fatty Fruits and Vegetables	AOAC 2007.01	2	100	150	50	50	50	QD-1004-2T
	EN 15662	2	100	150	25	7.5		QD-1005-2T
	AOAC 2007.01	15	50	1,200	400	400	400	QD-2004-15T
	EN 15662	15	50	900	150	45		QD-2005 -15T
Fatty and Waxed Fruits & Vegetables	AOAC 2007.01	2	100	150	50	-	50	QD-1006-2T
	EN 15662	2	100	150	25	-	25	QD-1007-2T
	AOAC 2007.01	15	50	1,200	400	-	400	QD-2006-15T
	EN 15662	15	50	900	150	-	150	QD-2007-15T

$MgSO_4$ = Magnesium sulfate anhydrous, PSA = Silia*MetS* Diamine, CB = Carbon Black, and C18 = Silia*Bond* C18

Choose your Silia*Quick* QuEChERS Dispersive SPE Clean-Up Kit by Food Type

The Silia*Quick* QuEChERS dispersive solid-phase extraction clean-up kits are assembled to match food matrices to the right method.

SiliaQuick QuEChERS Dispersive Solid-Phase Extraction Kits				
Food Matrices	**General Fruits & Vegetables**	**Pigmented Fruits & Vegetables**	**Highly Pigmented and Fatty Fruits & Vegetables**	**Fatty and Waxed Fruits & Vegetables**
Root and Tuber Vegetables				
Beets	✓			
Carrot	✓			
Radish	✓			
Potato	✓			
Fruiting Vegetables				
Eggplant	✓			
Cucumber	✓			
Pepper (*green or red*)		✓		
Pumpkin		✓		
Tomato	✓			
Cabbage				
Broccoli	✓	✓		
Brussels sprouts	✓			
Cauliflower	✓			
Stem Vegetables				
Aparagus	✓			
Celery	✓			
Leek	✓			
Rhubarb	✓	✓		
Leafy Vegetables				
Lettuce		✓		
Basil		✓		
Parsley		✓		
Spinach		✓		
Leek Plants				
Garlic	✓			✓
Onion	✓			✓
Shallot	✓			

Choose your Silia*Quick* QuEChERS Dispersive SPE Clean-Up Kits by Food Types (*con't*)

SiliaQuick QuEChERS Solid-Phase Extraction Kits				
Food Matrices	General Fruits & Vegetables	Pigmented Fruits & Vegetables	Highly Pigmented and Fatty Fruits & Vegetables	Fatty and Waxed Fruits & Vegetables
Small Fruits				
Blackberry		✓		
Blueberry		✓		
Grapes (*red*)		✓		
Cranberry		✓		
Strawberry		✓		
Pome Fruits				
Apple	✓			
Pear	✓			
Quince	✓			
Citrus Fruits				
Grapefruit				✓
Lemon & Lime				✓
Orange				✓
Tangerine				✓
Stone Fruits				
Apricot	✓			
Cherry	✓			
Peach	✓			
Plum	✓			
Other Fruits				
Avocado			✓	✓
Banana	✓			✓
Mango	✓	✓		
Pineapple	✓			
Other				
Cereals (*wheat, corn, rice*)				✓
Coffee beans		✓	✓	
Tea Leaves		✓		