



QuEChERS, the New Method for Multi-Residue Pesticides

QuEChERS (pronounced “Catchers”), an acronym for **Quick, Easy, Cheap, Effective, Rugged and Safe**, is a new sample preparation and clean-up method for analysis of multi-residue pesticides in fruits and vegetables samples by combination of liquid-liquid extraction and matrix dispersion SPE technique. QuEChERS offers the broad advantages over conventional SPE for multi-residue pesticides analysis

- **Quick** : high sample throughput
- **Easy** : a few easy steps
- **Cheap** : reduces reagent costs and labor costs
- **Effective** : high recoveries and accurate results
- **Rugged** : reduce glassware usage and required small and less bench space
- **Safe** : low non-chlorinated solvent usage

An Easy Operating Procedure

Operating Procedure		
1. Sample preparation	2. Liquid-Liquid Extraction	3. Dispersive SPE Clean-up
1.1. Homogenize 10g or 15g sample	2.1. load homogenized sample to 50mL extraction tube	3.1. Load aliquot 1mL or 6mL to 2mL or 15mL SPE tube
1.2. Add 15mL of 1% acetic acid in acetonitrile	2.2. Add internal standard	3.2. Shake for 1min
	2.3. Shake for 1min	3.3. Sentrifuge at >3500xg
	2.4. Centrifuge at >1500xg	3.4. Aliquot 1mL to vial for anlysis by GC/MS or LC/MS
	2.5. Aliquot* 1mL or 6mL	

*For pesticides with acidic groups (phenoxylcanoic acids), skip the dispersive SPE clean-up and analyze directly by LC/MS/MS.

Selection guide

Selection Guide for LLE (Liquid-Liquid Extraction)

Method	Sample Size	Tube Content				Tube volume	VertiPak™
		MgSO ₄	NaCl	Acetate ^a	Citrate ^b		
Original QuEChERS ¹	15g	6g	1.5g	-	-	50mL	DQ-1
Original QuEChERS	10g	4g	1g	-	-	50mL	DQ-2
AOAC 2007.01 ²	15g	6g	-	1.5g	-	50mL	DQ-3
EN 15662 ^{3,4}	10g	4g	1g	-	1g	50mL	DQ-4
For Acrylamides ^d	10g	4g	0.5g	-	-	50mL	DQ-5

^a Sodium acetate, ^b Trisodium citrate, ^c Disodium citrate, ^d In potato chips and other fried foods

Selection Guide for dSPE (Dispersive Solid Phase Extraction)

Fruits/Vegetables	Method	Tube Content				Tube volume	VertiPak™
		PSA	MgSO ₄	C18EC	GCB		
General	AOAC 2007.01	50mg	150mg	-	-	2mL	DQ-6
		400mg	1200mg	-	-	15mL	DQ-7
	EN 15662	25mg	150mg	-	-	2mL	DQ-8
		150mg	900mg	-	-	15mL	DQ-9
Fats and waxes	AOAC 2007.01	50mg	150mg	50mg	-	2mL	DQ-10
		400mg	1200mg	400mg	-	15mL	DQ-11
	EN 15662	25mg	150mg	25mg	-	2mL	DQ-12
		150mg	900mg	150mg	-	15mL	DQ-13
Pigment	AOAC 2007.01	50mg	150mg	-	50mg	2mL	DQ-14
		400mg	1200mg	-	400mg	15mL	DQ-15
	EN 15662	25mg	150mg	-	2.5mg	2mL	DQ-16
		150mg	900mg	-	15mg	15mL	DQ-17
High Pigment	AOAC 2007.01	50mg	150mg	50mg	50mg	2mL	DQ-18
	EN 15662	25mg	150mg	-	7.5mg	2mL	DQ-19
		150mg	900mg	-	45mg	15mL	DQ-20
Pigment and Fats	AOAC 2007.01	50mg	150mg	50mg	50mg	2mL	DQ-21
		400mg	1200mg	400mg	400mg	15mL	DQ-22

References:

1. M. Anastassiades, S. J. Lehotay, D. Stajnbaher, F.J. Schenck, Journal of AOAC International (JAOAC) 86, p. 412-31, 2003.
2. AOAC Official Method 2007.01, Pesticide Residues in Foods by Acetonitrile Extraction and Partitioning with Magnesium Sulfate.
3. QuEChERS: A Mini-Multiresidue Method for the Analysis of Pesticide Residues in Low-fat Products. www.quechers.com, 2009.
4. EN 15662 Version 2007-10 – 24, 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).

VertiPak™ DQ



- High purity packings to yield accurate results
- Pre-packed extraction kits and dispersive SPE kits are assembled to suit specific food types and screening protocols
- Dispersive SPE are supplied in 2mL or 15mL centrifuge tubes, for 1 mL, 6 mL aliquot volumes as specified by the various QuEChERS methodologies

Ordering Information

Description	QTY	Part No.
VertiPak™ DQ for QuEChERS, LLE		
DQ-1, 6g MgSO ₄ , 1.5g NaCl, 50mL	50	0163-01C5
DQ-2, 4g MgSO ₄ , 1g NaCl, 50mL	50	0163-02C5
DQ-3, 6g MgSO ₄ , 1.5g Sodium acetate, 50mL	50	0163-03C5
DQ-4, 4g MgSO ₄ , 1g NaCl, 1g Trisodium citrate, 0.5g Disodium citrate, 50mL	50	0163-04C5
DQ-5, 4g MgSO ₄ , 0.5g NaCl, 50mL	50	0163-05C5
VertiPak™ DQ for QuEChERS, dSPE		
DQ-6, 50mg PSA, 150mg MgSO ₄ , 2mL	100	0163-06A6
DQ-7, 400mg PSA, 1200mg MgSO ₄ , 15mL	50	0163-07B5
DQ-8, 25mg PSA, 150mg MgSO ₄ , 2mL	100	0163-08A6
DQ-9, 150mg PSA, 900mg MgSO ₄ , 15mL	50	0163-09B5
DQ-10, 50mg PSA, 150mg MgSO ₄ , 50mg C18EC, 2mL	100	0163-10A6
DQ-11, 400mg PSA, 1200mg MgSO ₄ , 400mg C18EC, 15mL	50	0163-11B5
DQ-12, 25mg PSA, 150mg MgSO ₄ , 25mg C18EC, 2mL	100	0163-12A6
DQ-13, 150mg PSA, 900mg MgSO ₄ , 150mg C18EC, 15mL	50	0163-13B5
DQ-14, 50mg PSA, 150mg MgSO ₄ , 50mg GCB, 2mL	100	0163-14A6
DQ-15, 400mg PSA, 1200mg MgSO ₄ , 400mg GCB, 15mL	50	0163-15B5
DQ-16, 25mg PSA, 150mg MgSO ₄ , 2.5mg GCB, 2mL	100	0163-16A6
DQ-17, 150mg PSA, 900mg MgSO ₄ , 15mg GCB, 15mL	50	0163-17B5
DQ-18, 50mg PSA, 150mg MgSO ₄ , 50mg C18EC, 50mg GCB, 2mL	100	0163-18A6
DQ-19, 25mg PSA, 150mg MgSO ₄ , 7.5mg GCB, 2mL	100	0163-19A6
DQ-20, 150mg PSA, 900mg MgSO ₄ , 45mg GCB, 15mL	50	0163-20B5
DQ-21, 50mg PSA, 150mg MgSO ₄ , 50mg C18EC, 50mg GCB, 2mL	100	0163-21A6
DQ-22, 400mg PSA, 1200mg MgSO ₄ , 400mg C18EC, 400mg GCB, 15mL	50	0163-22B5
VertiPak™ PSA/GCB for Schenck Variation of QuEChERS		
250mg PSA, 500mg GCB, 6mL	30	0135-0654
500mg PSA, 500mg GCB, 6mL	30	0135-0954
Bulk Sorbent for QuEChERS		
Magnesium sulfate	100g	0133-0052
Sodium chloride	100g	0133-0053
Sodium acetate	100g	0133-0054
Trisodium citrate	100g	0133-0055
Disodium citrate	100g	0133-0056
PSA (Primary and Secondary Amine)	100g	0133-0050
C18EC	100g	0133-0031
GCB (Graphitized Carbon Black), Carboglyph™	100g	0133-0041
Ceramic homogenizers		
Ceramic homogenizers for tube 2 ml	200	0163-25A7
Ceramic homogenizers for tube 15 ml	100	0163-26B6
Ceramic homogenizers for tube 50 ml	100	0163-27C6