ThermoFisher SCIENTIFIC

QuEChERS solutions
in all your favorite flavors

thermo scientific

QuEChERS: Simple, proven, sample extraction and clean-up

Fast, easy and cost-effective, QuEChERS is a robust, reproducible approach for extracting and cleaning up pesticides and other low-level contaminants in complex matrices. It is often used as a sample preparation step prior to GC-MS or LC-MS analysis, and can be automated for higher throughput.

Originally developed in 2003 for the determination of multiple pesticide residues in food, QuEChERS applications have evolved to include:

- Pesticide residues
- Veterinary drug residues
- Pharmaceutical residues
- Environmental contaminants
- Mycotoxins
- Drugs of abuse
- Traditional Chinese medicines
- Forensic analysis

Pre-packaged, ready-weighed kits make QuEChERS easier and more convenient

Thermo Scientific™ QuEChERS kits give you reproducible results and excellent recoveries for a wide variety of analytes, and save time and money, too. Pre-packaged, ready-weighed salts, solid-phase extraction (SPE) sorbents and buffers streamline your workflow, and minimize the potential for error.

Kits are available in several formats to meet all your application requirements. Depending on your analytes of interest, your sample matrix and your preferred method—Original, AOAC or EN—you can choose the appropriate volume option, and select the right combination of salts, sorbents and consumables.

QuEChERS workflow

Sample

1. HOMOGENIZE/GRIND

Grinding

10–15 g Subsample

2. EXTRACT

Spike with pesticides

Add solvent; mix/vortex for 30 seconds

Add salts

Shake

Add internal standard

Centrifuge

Aliquot of Supernatant

3. CLEAN-UP

Add sorbents and salt

Shake

Centrifuge

Aliquot of Supernatant

4. ANALYZE

Injection (GC-MS or LC-MS)

Analytical Report

The QuEChERS workflow is typically a four-step process: sample homogenization, extraction with salts, followed by SPE clean-up, and analysis by GC-MS or LC-MS. While the basic procedure is more or less standardized, there are an increasing number of chemistry variations to meet different application requirements.

Three flavors of QuEChERS

Kits and products to support them all

Whichever QuEChERS method you're using, we've got you covered

Original
(Anastassiades et al, 2003):
developed for non-base-sensitive compounds, using sodium chloride to reduce polar interferences and enhance extraction

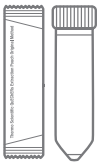
AOAC
(AOAC 2007.01):
uses sodium acetate as a buffer instead of sodium chloride and is compatible with base-sensitive compounds

European
(EN 15662):
similar to the AOAC method, but uses sodium chloride to minimize polar interferences, and sodium citrate dihydrate and disodium citrate sesquihydrate instead of sodium acetate

Original method kits

Original method extraction kits*

Extract

	Description	Capacity	Quantity	Cat. No
	Original extraction kit • Extraction salts (in pouch): 4 g $MgSO_4$, 1 g NaCl • 50 mL tubes (empty) • Ceramic homogenizers	10 g samples	50/PK	S1-10-ORIG-CH-KIT
	Original extraction kit • Extraction salts (in pouch): 4 g $MgSO_4$, 1 g NaCl • 50 mL tubes (empty)	10 g samples	50/PK	S1-10-ORIG-KIT
	Original extraction kit • Extraction salts (in pouch): 4 g $MgSO_4$, 1 g NaCl	10 g samples	50/PK	S1-10-ORIG-POT

*Original method extraction kits are also available in 15 g sample capacity.

Bulk ceramic homogenizers — all methods

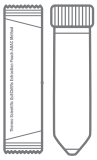
Homogenize/Grind

	Description	Quantity	Cat. No
	Ceramic homogenizers for 2 mL tubes	100/PK	60106-CH-2
	Ceramic homogenizers for 15 mL tubes	100/PK	60106-CH-15
	Ceramic homogenizers for 50 mL tubes	100/PK	60106-CH-50

AOAC method kits

AOAC method extraction kits

Extract

	Description	Capacity	Qty.	Cat. No
	AOAC extraction kit • Extraction salts (in pouches): 6 g $MgSO_4$, 1.5 g NaCl • 50 mL tubes (empty) • Ceramic homogenizers	15 g samples	50/PK	S1-15-AOAC-CH-KIT
	AOAC extraction kit • Extraction salts (in pouches): 6 g $MgSO_4$, 1.5 g NaCl • 50 mL tubes (empty)	15 g samples	50/PK	S1-15-AOAC-KIT
	AOAC extraction kit • Extraction salts (in pouches): 6 g $MgSO_4$, 1.5 g NaCl	15 g samples	50/PK	S1-15-AOAC-POT

AOAC method clean-up kits

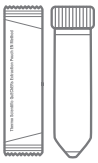
Clean-up

Description	Qty.	Cat. No
General fruits and vegetables		
AOAC Clean-up kit, prefilled 2 mL tubes with 50 mg PSA, 150 mg $MgSO_4$	100/PK	S2-2-GFV-AOAC-KIT
AOAC Clean-up kit, prefilled 15 mL tubes with 400 mg PSA, 1200 mg $MgSO_4$	50/PK	S2-15-GFV-AOAC-KIT
Pigmented fruits and vegetables		
AOAC Clean-up kit, prefilled 2 mL tubes with 50 mg PSA, 50 mg GCB, 150 mg $MgSO_4$	100/PK	S2-2-P-AOAC-KIT
AOAC Clean-up kit, prefilled 15 mL tubes with 400 mg PSA, 400 mg C18, 1200 mg $MgSO_4$	50/PK	S2-15-P-AOAC-KIT
Fruits and vegetables with fats and waxes		
AOAC Clean-up kit, prefilled 2 mL tubes with 50 mg PSA, 50 mg C18, 150 mg $MgSO_4$	100/PK	S2-2-FW-AOAC-KIT
AOAC Clean-up kit, prefilled 15 mL tubes with 400 mg PSA, 400 mg C18, 1200 mg $MgSO_4$	50/PK	S2-15-FW-AOAC-KIT
Fruits and vegetables with pigments and fats		
AOAC Clean-up kit, prefilled 2 mL tubes with 50 mg PSA, 50 mg C18, 50 mg GCB, 150 mg $MgSO_4$	100/PK	S2-2-PF-AOAC-KIT
AOAC Clean-up kit, prefilled 15 mL tubes with 400 mg PSA, 400 mg C18, 400 mg GCB, 1200 mg $MgSO_4$	50/PK	S2-15-PF-AOAC-KIT
All food types		
AOAC Clean-up kit, prefilled 2 mL tubes with 50 mg PSA, 50 mg C18, 7.5 mg GCB, 150 mg $MgSO_4$	100/PK	S2-2-ALL-AOAC-KIT
AOAC Clean-up kit, prefilled 15 mL tubes with 400 mg PSA, 400 mg C18, 45 mg GCB, 1200 mg $MgSO_4$	50/PK	S2-15-ALL-AOAC-KIT
Other foods		
AOAC Clean-up kit, prefilled 2 mL tubes with 25 mg C18, 150 mg $MgSO_4$	100/PK	S2-2-OTH-AOAC-KIT
AOAC Clean-up kit, prefilled 15 mL tubes with 150 mg C18, 900 mg $MgSO_4$	50/PK	S2-15-OTH-AOAC-KIT

EN method kits

EN method extraction kits

Extract

	Description	Capacity	Qty.	Cat. No
	EN extraction kit • Extraction salts (in pouches): 4 g $MgSO_4$, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, 1 g trisodium citrate dihydrate • 50 mL tubes (empty) • Ceramic homogenizers	10 g samples	50/PK	S1-10-EN-CH-KIT
	EN extraction kit • Extraction salts (in pouches): 4 g $MgSO_4$, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, 1 g trisodium citrate dihydrate • 50 mL tubes (empty)	10 g samples	50/PK	S1-10-EN-KIT
	EN extraction kit • Extraction salts (in pouches): 4 g $MgSO_4$, 1 g NaCl, 0.5 g disodium hydrogencitrate sesquihydrate, 1 g trisodium citrate dihydrate	10 g samples	50/PK	S1-10-EN-POT

EN method clean-up kits

Clean-up

Description	Qty.	Cat. No
General fruits and vegetables		
EN Clean-up kit, prefilled 2 mL tubes with 150 mg $MgSO_4$, 25 mg PSA	100/PK	S2-2-GFV-EN-KIT
EN Clean-up kit, prefilled 15 mL tubes with 900 mg $MgSO_4$, 150 mg PSA	50/PK	S2-15-GFV-EN-KIT
Pigmented fruits and vegetables		
EN Clean-up kit, prefilled 2 mL tubes with 150 mg $MgSO_4$, 25 mg PSA, 2.5 mg GCB	100/PK	S2-2-P-EN-KIT
EN Clean-up kit, prefilled 15 mL tubes with 900 mg $MgSO_4$, 150 mg PSA, 15 mg GCB	50/PK	S2-15-P-EN-KIT
Highly pigmented fruits and vegetables		
EN Clean-up kit, prefilled 2 mL tubes with 150 mg $MgSO_4$, 25 mg PSA, 7.5 mg GCB	100/PK	S2-2-HP-EN-KIT
EN Clean-up kit, prefilled 15 mL tubes with 900 mg $MgSO_4$, 150 mg PSA, 45 mg GCB	50/PK	S2-15-HP-EN-KIT
Fruits and vegetables with fats and waxes		
EN Clean-up kit, prefilled 2 mL tubes with 150 mg $MgSO_4$, 25 mg PSA, 25 mg C18	100/PK	S2-2-FW-EN-KIT
EN Clean-up kit, prefilled 15 mL tubes with 900 mg $MgSO_4$, 150 mg PSA, 150 mg C18	50/PK	S2-15-FW-EN-KIT

What is the purpose of the chemicals?

- **$MgSO_4$:** removes residual water, and induces phase separation between water content in sample and acetonitrile layer
- **NaCl:** removes residual water, and induces phase separation between water content in sample and acetonitrile layer
- **NaOAc:** buffers the sample to stabilize pH
- **Disodium hydrogencitrate sesquihydrate:** buffers the sample to stabilize pH
- **Trisodium citrate dihydrate:** buffers the sample to stabilize pH
- **PSA:** removes free fatty acids and other acidic co-extractives
- **C18:** removes fats, sterols, and other non-polar interferences from sample
- **GCB:** removes pigment (not recommended for use with planar pesticides)

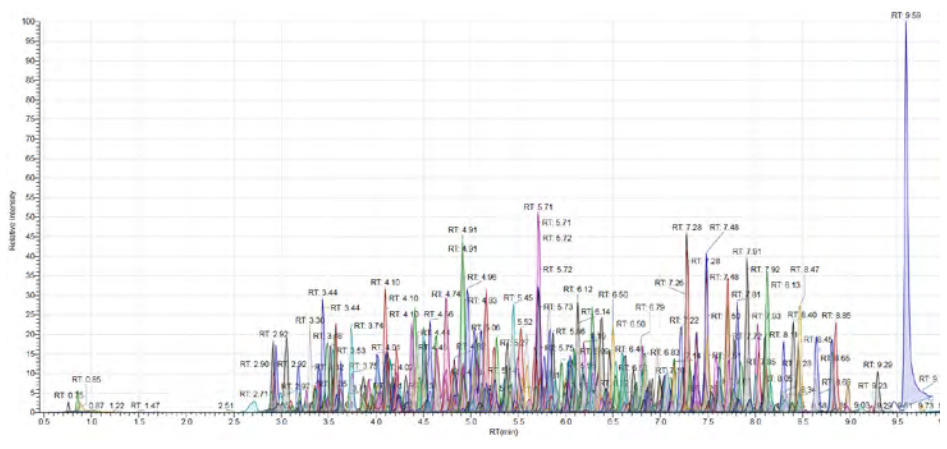
Thermo Scientific Pesticide Explorer

Productivity, robustness and regulatory compliance for pesticide residues analysis

Thermo Scientific™ Vanquish™ Flex Binary UHPLC system with a Thermo Scientific™ TSQ Quantis™ triple quadrupole mass spectrometer.

The Thermo Scientific™ Pesticide Explorer™ LC-MS/MS analytical workflow delivers robust, sensitive quantitation in compliance with global regulatory requirements.

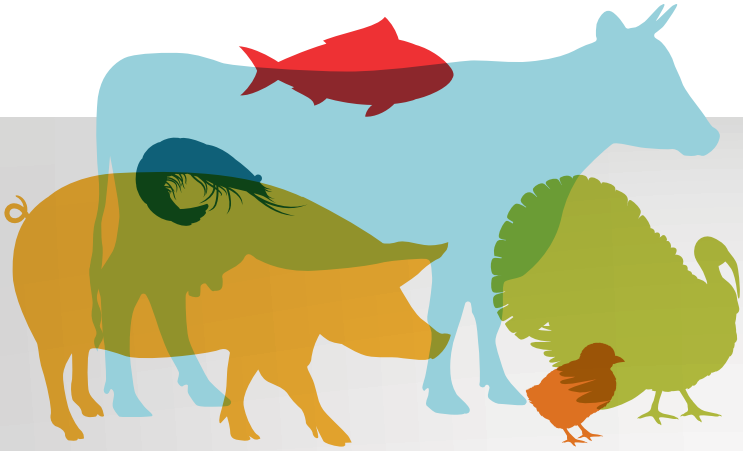
With a pre-tested and validated multi-residue pesticides method for over 400 analytes in different matrices, the workflow allows food safety monitoring and testing laboratories to increase their productivity and reduce cost per sample, while ensuring regulatory compliance. The sample-to-result solution includes all the workflow components needed—consumables, hardware, software and built-in instrument and data processing methods—all from a single, trusted supplier.



Extracted ion chromatogram of over 200 pesticides in baby food at 10 ng/g shown in Thermo Scientific™ TraceFinder™ software.

Thermo Scientific VetDrugs Explorer

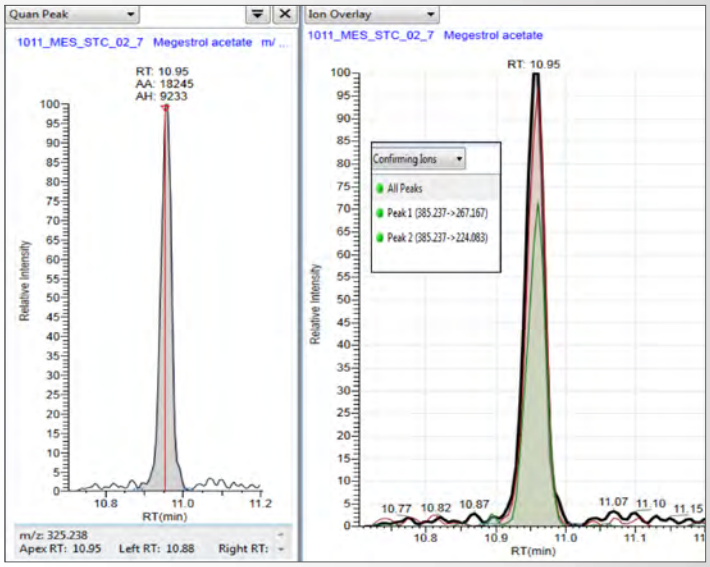
High-confidence quantitation workflow for veterinary drug residues



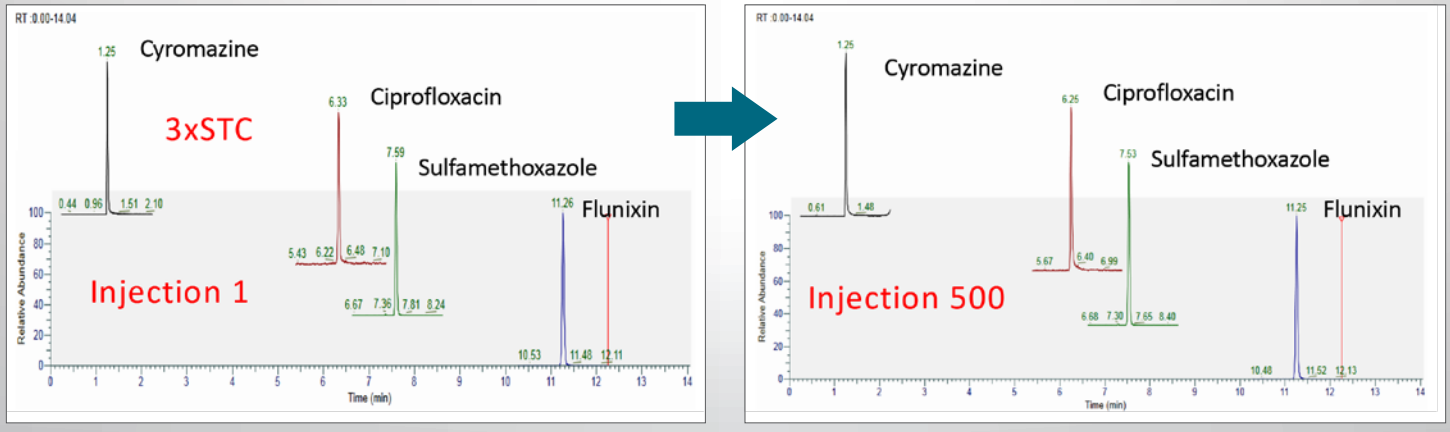
Designed to meet the needs of food safety laboratories aiming for the highest confidence and ultimate sensitivity, the **Thermo Scientific™ VetDrugs Explorer collection** is a validated multi-residue veterinary drug analysis solution that addresses global regulatory requirements.

The end-to-end analytical workflow includes:

- Quality control (QC) and reference standard mixes
- QuEChERS kit with sample preparation procedure
- Industry-leading triple quadrupole mass spectrometer with state of the art UHPLC and columns
- Data acquisition and processing methods, with an extensive compound database—tested and validated by industry thought leaders in multiple laboratories



Confident quantitation. Steroid hormone megestrol acetate in milk sample at 0.04 ng/g, quantitation peak (left) with confirming ions (right).



High throughput robustness. Stable peak shape and response over 500 injections in bovine muscle extract.

Today's most comprehensive portfolio
of analytical instrumentation

Thermo Scientific™ TSQ series triple quadrupole mass spectrometers

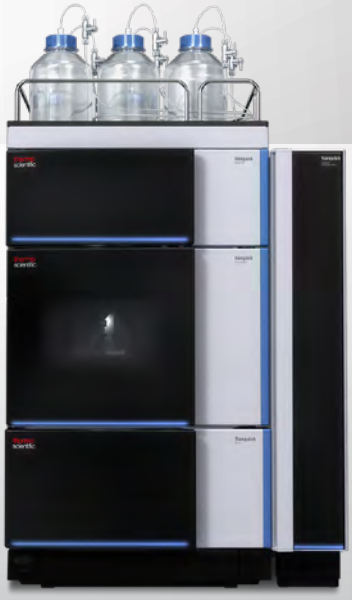
Best-in-class sensitivity and speed, plus outstanding robustness and reliability provide fast, accurate quantitationof hundreds of analytes in a variety of matrices.

Thermo Scientific™ TSQ Altis™ triple quadrupole mass spectrometer

Thermo Scientific™ Orbitrap™ Exploris™ GC 240 mass spectrometer

Thermo Scientific™ Orbitrap™ mass analyzers for GC-MS, LC-MS and MS/MS

High-resolution accurate-mass (HRAM) data allows confident trace-level screening and quantitation of pesticides and identification of unknowns.



Thermo Scientific™ Vanquish™ Horizon UHPLC system

Thermo Scientific™ Vanquish™ UHPLC systems

Today's food safety scientists need a robust system that can support their regulatory analyses. The Vanquish systems improve performance and repeatability with no trade-offs in quality, robustness, or ease-of-use. This innovative, simple-to-operate, and easy-to-maintain platform delivers confident separations of complex food matrices.

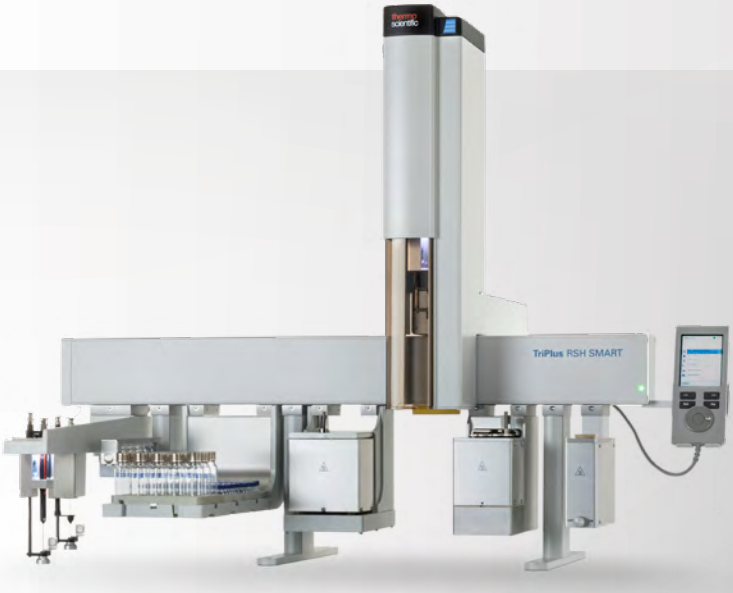
Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS)

Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS)

Proven, industry-leading software streamlines workflows from chromatography to routine quantitative MS analysis on IC, GC, LC, GC-MS/MS and LC-MS/MS systems by delivering superior instrument control, automation, data processing, and more.

µSPE Clean-up solution for Thermo Scientific™ TriPlus™ RSH SMART autosampler

Micro solid-phase extraction (µSPE) clean-up solution for the TriPlus RSH SMART autosampler offers a fully automated on-line approach for clean-up of QuEChERS extracts, and replaces the dispersive SPE manual procedure. The TriPlus RSH SMART autosampler is available as a standalone instrument or can be fully integrated with GC-MS or LC-MS systems.



Thermo Scientific™ TriPlus™ RSH SMART autosampler

Recommended consumables

Description	Quantity	Cat. No
GC Method		
QuEChERS GC µSPE Cartridge for use with TriPlus RSH SMART autosampler µSPE, QuEChERS Blend for GC, 45 mg ($MgSO_4$, PSA, C18EC, Carbon)	108/PK	60101-45GC
2 mL clear Snap-It glass vial, 11 mm wide opening	100/PK	C4011-5
11 mm AS Snap-It Seal Star pre-slit caps	100/PK	C4011-59
LC Method		
QuEChERS LC µSPE Cartridge for use with TriPlus RSH SMART autosampler µSPE, QuEChERS Blend for LC, 30 mg (Z-Sep, C18, CarbonX)	108/PK	60101-30LC
2 mL clear Snap-It glass vial, 11 mm wide opening	100/PK	C4011-5
11 mm AS Snap-It Seal Star pre-slit caps	100/PK	C4011-59

Everything else you'll need for QuEChERS success

In addition to convenient, ready-to-run QuEChERS kits, you'll find all the other ingredients for productive QuEChERS analysis—including pipettors and pipette tips, syringe filters, and industry standard Thermo Scientific™ Sorvall™ benchtop centrifuges. And, of course, a full selection of lab-proven chromatography consumables.

Chromatography consumables

Product Description	Method	Application	Cat. No
Columns			
Thermo Scientific™ LinerGold™: Siltek six baffle PTV liner	GC*	Pesticide residues	453T2120
SSL splitless liner, single taper, deactivated	GC*	Pesticide residues	453A1925-UI
Thermo Scientific™ TraceGOLD™ TG-5SIL MS (30 m x 0.25 mm i.d. x 0.25 µm)	GC*	Pesticide residues	26096-1420
Thermo Scientific™ Accucore™ aQ (100 × 2.1 mm, 2.6 µm)	LC	Pesticide residues	17326-102130
Thermo Scientific™ Acclaim™ Trinity P1 (anionic pesticides) (100 × 3.0 mm, 3.0 µm)	LC	Pesticide residues	071387
Thermo Scientific™ Accucore™ RP-MS (100 × 2.1 mm, 2.6 µm)	LC	Vet drug residues	17626-102130
Thermo Scientific™ Accucore™ aQ (100 × 2.1 mm, 2.6 µm)	LC	Mycotoxins	17326-102130
Vials and caps			
2 mL clear screw thread glass vial	GC/LC	All	6ASV9-1P
2 mL clear screw thread PP vial (recommended for polar pesticides)	GC/LC	All	6PSV9-1PP
2 mL amber screw thread glass vial	GC/LC	All	6ASV9-2P
Screw cap for 2 mL screw thread vial. White silicone/red PTFE septa	GC/LC	All	6ASC9ST1R
Solvents and reagents			
Thermo Scientific™ UHPLC-MS grade acetonitrile	GC/LC	All	A956-1
Thermo Scientific™ UHPLC-MS grade methanol	GC/LC	All	A458-1
Thermo Scientific™ UHPLC-MS grade water	GC/LC	All	W8-1
Fisher Chemical Optima LC-MS grade formic acid	GC/LC	All	A117
Thermo Scientific™ Chromplete™ acetonitrile for HPLC and GC	GC/LC	All	T00101400
Optima Methylene Chloride for HPLC and GC-MS	GC/LC	All	D151-4
Optima 95% n-Hexane for HPLC and GC-MS	GC/LC	All	H306-4
Sodium sulfate anhydrous	GC/LC	All	S415-500

*For the complete list of GC consumables for these applications, please refer to our GC Consumables Selection Guide

Find out more at **thermofisher.com/quechers**