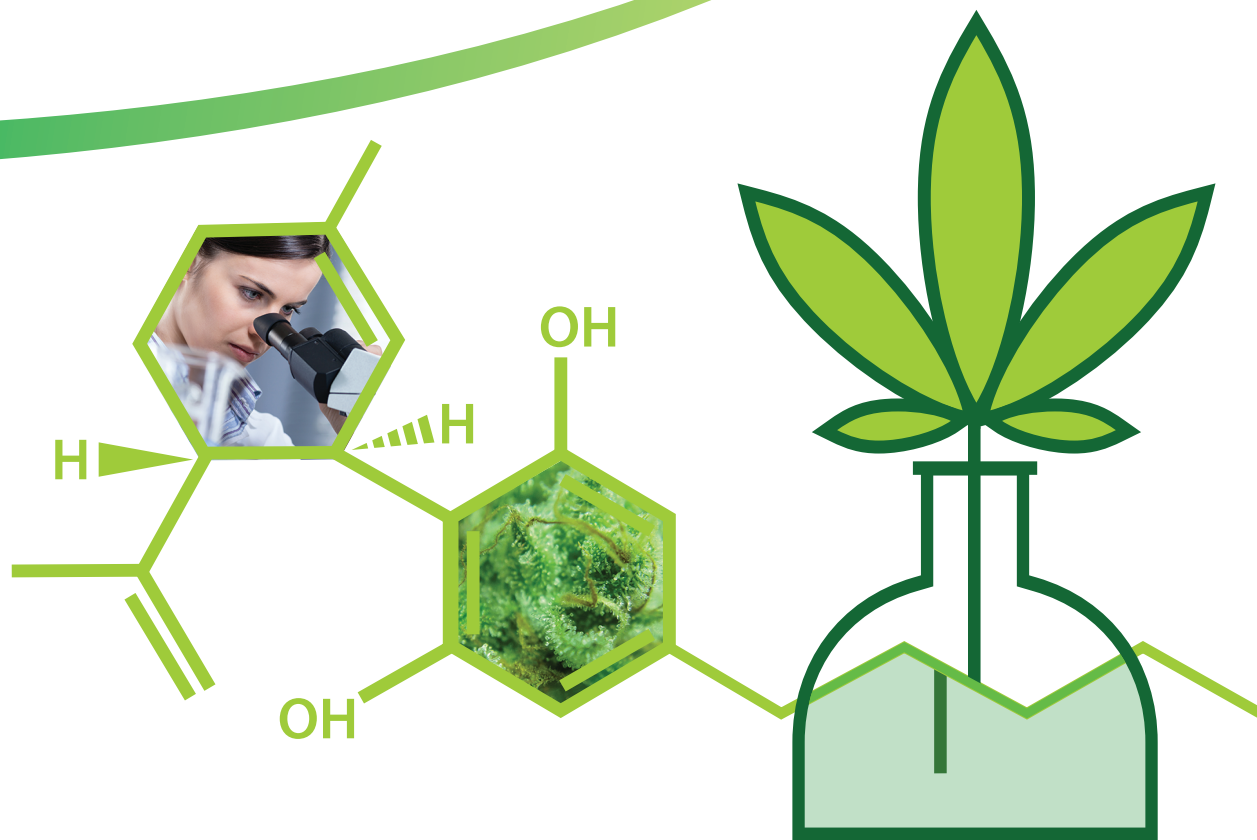




Cannabis

Growing Analytical Solutions for Cannabis Testing

**INNOVATIVE PRODUCTS AND EXPERTISE
FOR FAST, ACCURATE, RELIABLE RESULTS**



RESTEK

Pure Chromatography

www.restek.com/cannabis

Technical Expertise &

By Breaking Boundaries in Our Industry, We Help You Succeed in Yours

Restek has been helping cannabis labs establish innovative, cost-effective analytical solutions from the very beginning, and we will continue to help you manage your ever-changing analytical challenges every step of the way.

We get it. Your market is quickly changing and you need a chromatography partner that understands that. Whether you are part of a well-established safety and potency lab or starting a new lab, Restek has the products and expertise you need for successful cannabis analyses. Being an employee-owned and independent chromatography company, every employee at Restek has a vested interest in your success. We design the best solutions for your lab, regardless of the instrumentation and techniques used. In this brochure, you will find innovative LC and GC products and methodologies designed to fit your toughest analytical problems.

We've been in your shoes. That's why we understand your challenges and focus on solving them. Using our expertise to develop innovative products that help chromatographers has always been, and continues to be, Restek's top priority. We strive to develop industry-leading technologies that fit the needs of today's analysts. When setting up a laboratory for cannabis testing, we realize that you need dependable products that deliver high-quality data without considerable capital investment. We know you need to work with a company that understands the challenges of your market and supports you with tailored solutions and superior customer service.

Rxi GC COLUMNS

Lower Costs with Rugged, Long-Lasting Rxi Columns

The chemists at Restek have combined their analytical expertise and wide range of polymer chemistries to provide a solution for straightforward analysis of terpenes and residual solvents on a single Rxi column platform, streamlining workflows for busy labs. Rxi columns deliver more accurate, reliable results than any other fused silica column on the market. To ensure the highest level of performance, all Rxi capillary columns for the cannabis industry are manufactured and individually tested to meet stringent requirements for exceptional inertness, low bleed, and unsurpassed column-to-column reproducibility.



TOPAZ GC INLET LINERS

The Next Level of True Blue Performance—
State-of-the-Art Deactivation with a 100% Satisfaction Guarantee

Whether you're determining cannabinoids, residual solvents, pesticides, or terpenes by GC, the inertness of your inlet is crucial for the success of your analyses. Topaz inlet liners from Restek use a comprehensive, state-of-the-art deactivation and are the only blue liners on the market—making them an easy-to-recognize solution to common inlet problems. The innovative deactivation used for Topaz liners results in exceptional inertness for a wide range of analyte chemistries. In addition to improved data quality, you'll benefit from fewer liner changes and less downtime for maintenance.



Product Innovation



Raptor LC COLUMNS

Maximize Analytical Performance and
Minimize Your Capital Investment



Raptor LC columns combine the speed of a superficially porous particle (SPP or “core-shell”) with the separation power of optimized USLC phase chemistry. These columns are ideal for cannabis testing because they quickly separate your target compounds, providing higher sample throughput. Raptor LC columns maximize your instrument performance so you won't need to buy expensive UHPLC equipment or extend your capital investment when the sample volume increases. Build a solid analytical foundation on any instrument with fast, rugged Raptor LC columns.

Q-sep SAMPLE PREP SUPPLIES

Everything You Need for Fast, Simple Sample Prep



Cannabis products present a broad array of challenging matrices, from foods, to plant materials, to concentrates. For pesticides analysis, a fast, easy cleanup method is required to remove the matrix background for accurate, reliable results. Restek's versatile line of Q-sep QuEChERS extraction and cleanup salts allows for the development of quick, easy, and affordable sample preparation methods without capital investment in extraction equipment. The friendly experts at Restek are always willing to help with method development questions, too.

CERTIFIED REFERENCE MATERIALS (CRMs)

Get Results You Can Trust with World-Class CRMs Produced in
ISO-Accredited Labs



In order to achieve accurate results, samples must be quantified using certified reference materials. Restek is continually expanding our product line in order to meet the evolving needs of the cannabis industry. Restek's certified reference materials are manufactured and QC tested under ISO 17034 and ISO/IEC 17025 accreditations, helping ensure confidence in results and compliance with changing regulations.



Applications

PRODUCT POTENCY TESTING

Our High-Throughput LC and GC Cannabinoids Methods Produce Results Quickly without the Cost of New Equipment

When setting up a lab, often you just can't invest in the latest instrumentation, but you still need to get results fast. We understand that. That's why Restek has developed both LC and GC methods for cannabinoids that let you report potency results quickly. For LC, we created a fast analysis of 16 cannabinoids that can be performed on any LC instrument. By utilizing Raptor column technology, as shown in Figure 1, we developed a nine-minute analysis that is compatible with any HPLC instrument—so you get UHPLC speed on your existing equipment without the capital investment. Also, we specifically chose an easy-to-make mobile phase that can be

directly transferred to LC-MS, if you ever need to move to MS due to regulation changes. For labs using GC equipment, you can analyze cannabinoids in just minutes using an Rxi-35Sil MS column and the instrument conditions shown in Figure 2. We also offer a similar 35-type stationary phase on metal MXT tubing for labs using SRI GC instruments. Why did we focus on fast cannabinoid analyses? Potency testing is the cornerstone of your lab. Building a fast method means your productivity increases and you can analyze more samples per day on the same instrument, delaying the need for expensive capital investments in new equipment.

Figure 1: Raptor LC columns give you fast analysis times for cannabinoids without the expense of UHPLC equipment.

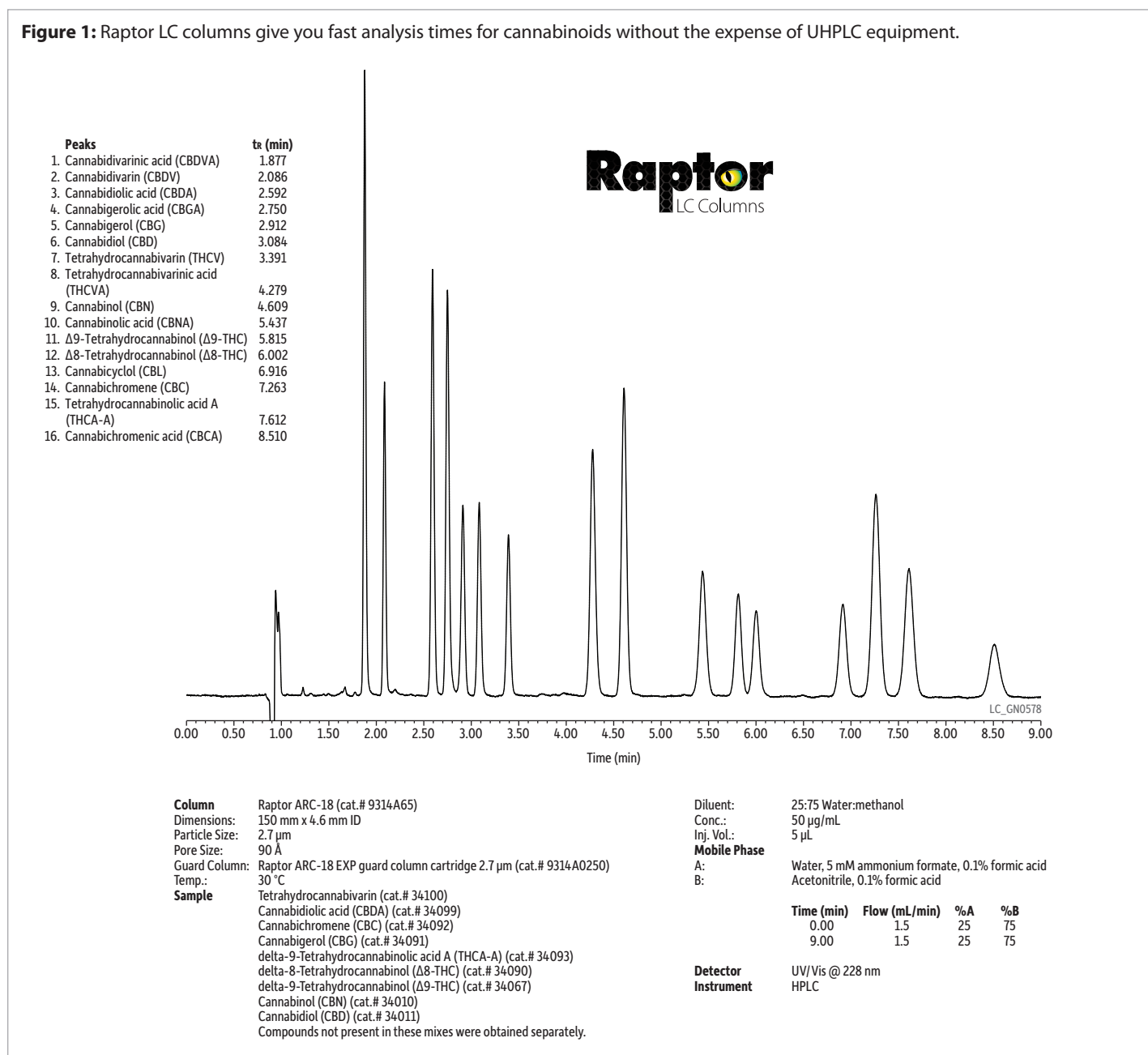
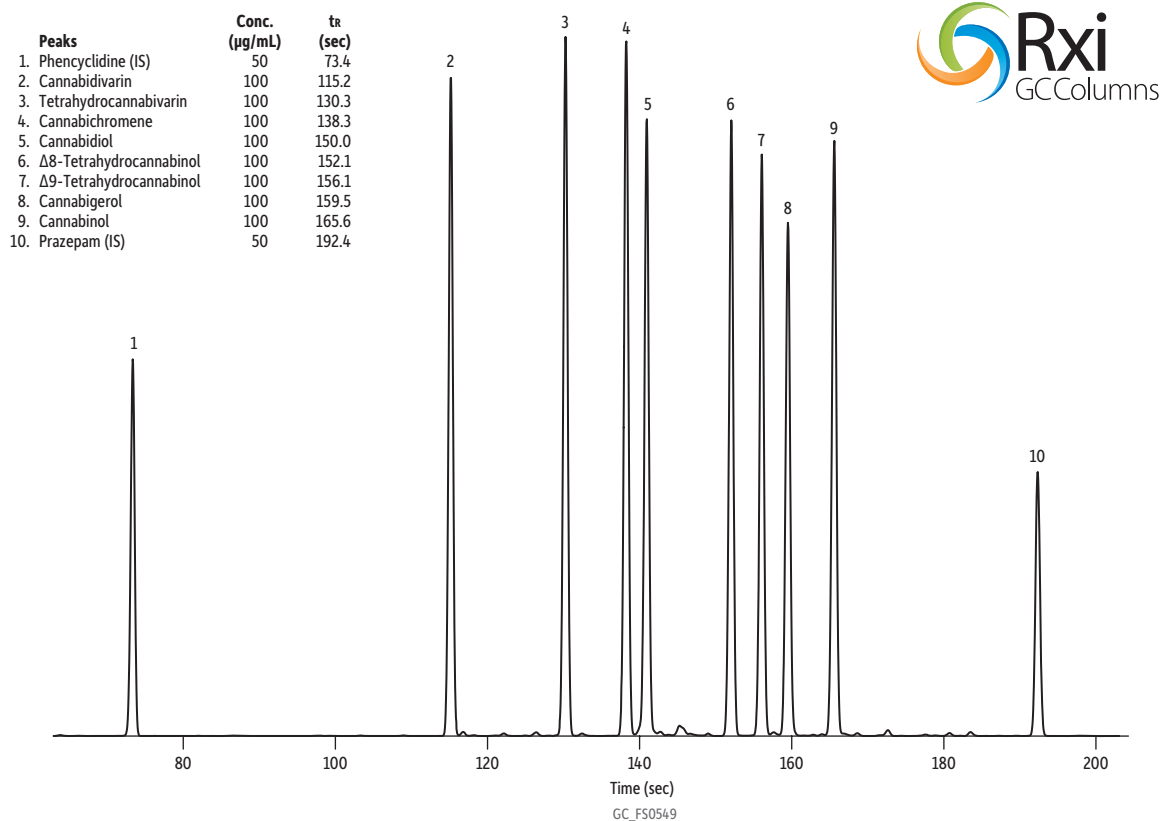


Figure 2: Determine critical cannabinoids in minutes by GC using an Rxi-35Sil MS column.



Column Rxi-35Sil MS, 15 m, 0.25 mm ID, 0.25 µm (cat.# 13820)

Sample Phencyclidine (cat.# 34027)
Cannabichromene (CBC) (cat.# 34092)
Cannabinoids standard (cat.# 34014)
delta-8-Tetrahydrocannabinol (THC) (cat.# 34090)
Cannabigerol (CBG) (cat.# 34091)
Prazepam (cat.# 34055)

Injection
Inj. Vol.: 1 µL split (split ratio 20:1)
Liner: Premium 4 mm Precision liner w/wool (cat.# 23305.5)
Inj. Temp.: 250 °C

Oven
Oven Temp.: 190 °C (hold 0.1 min) to 330 °C at 35 °C/min (hold 0.9 min)

Carrier Gas Hz, constant flow
Flow Rate: 2.5 mL/min

Detector FID @ 350 °C

Constant Column +
Constant Make-up: 50 mL/min

Make-up Gas
Type: N₂
Hydrogen flow: 40 mL/min
Air flow: 450 mL/min
Data Rate: 20 Hz

Instrument Agilent/HP6890 GC

Notes Cannabidiarin and tetrahydrocannabivarin standards were obtained from BOC Sciences.

TECH TIP

Using Thomson SINGLE StEP filter vials (www.restek.com/singlestep) is an ideal way to remove particulate matter that could clog your column.

They provide sample filtration that's economical, eco-friendly, and fast!



POTENCY TESTING PRODUCTS

Raptor ARC-18 LC Columns (USP L1)

Properties:

- Well-balanced retention profile.
- Sterically protected and acid-resistant to resist harsh, low-pH mobile phases.
- Ideal for use with sensitive detectors like mass spec.

Description	cat.#
2.7 µm Column, 150 mm, 4.6 mm ID	9314A65



Rxi-35Sil MS Columns (fused silica)

midpolarity Crossbond phase

- Provides superior separation for cannabinoids.
- Very low-bleed phase for GC-MS analysis.
- Extended temperature range: 50 °C up to 360 °C.

Description	temp. limits	qty.	cat.#
15 m, 0.25 mm ID, 0.25 µm	50 to 340/360 °C	ea.	13820

Topaz 4.0 mm ID Precision Inlet Liner w/ Wool

for Agilent GCs equipped with split/splitless inlets



ID x OD x Length	Similar to Part #	qty.	cat.#
Precision, Premium Deactivation, Borosilicate Glass with Quartz Wool 4.0 mm x 6.3 mm x 78.5 mm	Agilent 210-4004-5	5-pk.	23305

Cannabinoid Singles

Concentration is µg/mL. Volume is 1 mL/ampul.

Compound	CAS #	Solvent	Conc.	DEA-exempt?	T.K.#	cat.#
Cannabichromene (CBC)	20675-51-8	PTM	1,000	Yes	71-053	34092
Cannabidiol (CBD)	13956-29-1	PTM	1,000	Yes	71-047	34011
Cannabidiolic Acid (CBDA)	1244-58-2	ACN	1,000	Yes	85-009	34099
Cannabigerol (CBG)	25654-31-3	PTM	1,000	Yes	71-052	34091
Cannabinol (CBN)	521-35-7	PTM	1,000	Yes	71-046	34010
delta-8-Tetrahydrocannabinol (Δ^8 -THC)	5957-75-5	PTM	1,000	Yes	71-051	34090
delta-9-Tetrahydrocannabinol (Δ^9 -THC)	1972-08-3	M	1,000	Yes	71-049	34067
delta-9-Tetrahydrocannabinolic acid A (THCA-A)	23978-85-0	PTM	1,000	Yes	71-054	34093
Tetrahydrocannabivarin (THCV)	31262-37-0	M	1,000	Yes	85-010	34100

ACN = acetonitrile; M = methanol; PTM = purge-and-trap grade methanol

U.S. DEA exempted formulation—no additional customer permits are required to purchase.

Canadian Test Kit registration numbers are assigned and available on individual product pages.



Cannabinoids Standard (3 components)

Cannabidiol (13956-29-1)

Cannabinol (521-35-7)

delta-9-Tetrahydrocannabinol (Δ^9 -THC) (1972-08-3)

1,000 µg/mL each in P&T methanol, 1 mL/ampul cat.# 34014 (ea.)

DEA Exempt - Yes; T.K.# 71-048

U.S. DEA exempted formulation—no additional customer permits are required to purchase.

Canadian Test Kit registration numbers are assigned and available on individual product pages.

Prazepam

Prazepam (2955-38-6)

1,000 µg/mL in P&T methanol, 1 mL/ampul cat.# 34055 (ea.)

Phencyclidine

Phencyclidine (956-90-1)

1,000 µg/mL in P&T methanol, 1 mL/ampul cat.# 34027 (ea.)

Raptor EXP Guard Column Cartridges

To help protect your investment and further extend the life of our already-rugged LC columns, Restek offers the patent-pending guard column hardware developed by Optimize Technologies. A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other limited-sample preparation techniques.



Description	Particle Size	qty.	5 x 3.0 mm cat.#
Raptor ARC-18 EXP Guard Column Cartridge	5 µm	3-pk.	931450253

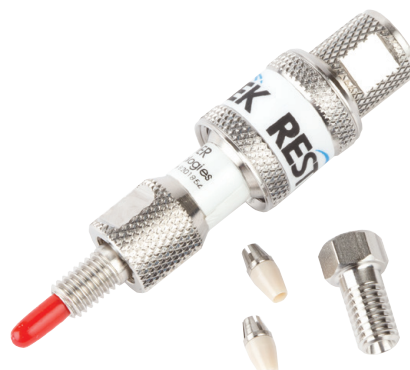
Maximum cartridge pressure: 400 bar/5,800 psi (5 µm)

EXP Direct Connect Holder

A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other limited-sample preparation techniques.

Description	qty.	cat.#
EXP Direct Connect Holder for EXP Guard Cartridges (includes hex-head fitting & 2 ferrules)	ea.	25808

Hybrid Ferrule U.S. Patent No. 8201854, EXP Holders U.S. Patent No. 8696902, EXP2 Wrench U.S. Patent No. D766055. Other U.S. and Foreign Patents Pending. The EXP, Free-Turn, and the Opti- prefix are registered trademarks of Optimize Technologies, Inc. Maximum holder pressure: 20,000 psi (1,400 bar)



Thomson SINGLE StEP Standard Filter Vials

- Recommended for samples containing less than 10% solid particulates.
- Easy-to-use vials offer fast sample filtration and require only a squeeze of your fingers.
- Minimize sample loss by eliminating multiple transfers.
- Color-coded caps allow easy identification of 0.2 µm or 0.45 µm membranes in PVDF, PTFE, PES, or nylon.
- Preslit PTFE/silicone caps help eliminate broken autosampler needles and cored septa.
- Rugged polypropylene vial houses insert with 450 µL loading capacity and low dead volume (120 µL).
- Fit most standard 12 x 32 mm autosamplers, including UHPLC instruments.

Porosity	Color	qty.	cat.#
PVDF (polyvinylidene difluoride)			
0.2 µm	red preslit cap	100-pk.	25895

Patent No. 7,790,117

Visit www.restek.com/singlestep for additional vial designs.



Simply squeeze particulates and contaminants out of your sample!

2.0 mL, 9 mm Short-Cap, Screw-Vial Closures (Polypropylene, preassembled)



Cap Color	Septa Material	Type	100-pk.	1,000-pk.
Blue	PTFE/Silicone	Screw-Thread	24485	24486

2.0 mL, 9 mm Short-Cap, Screw-Thread Vials (vial only)

Fit all 2.0 mL, 12 x 32 mm, crimp-top vial-based autosamplers.

Description	Color	100-pk.	1,000-pk.
Short-Cap Vial w/White Graduated Marking Spot	Amber	21142	21143



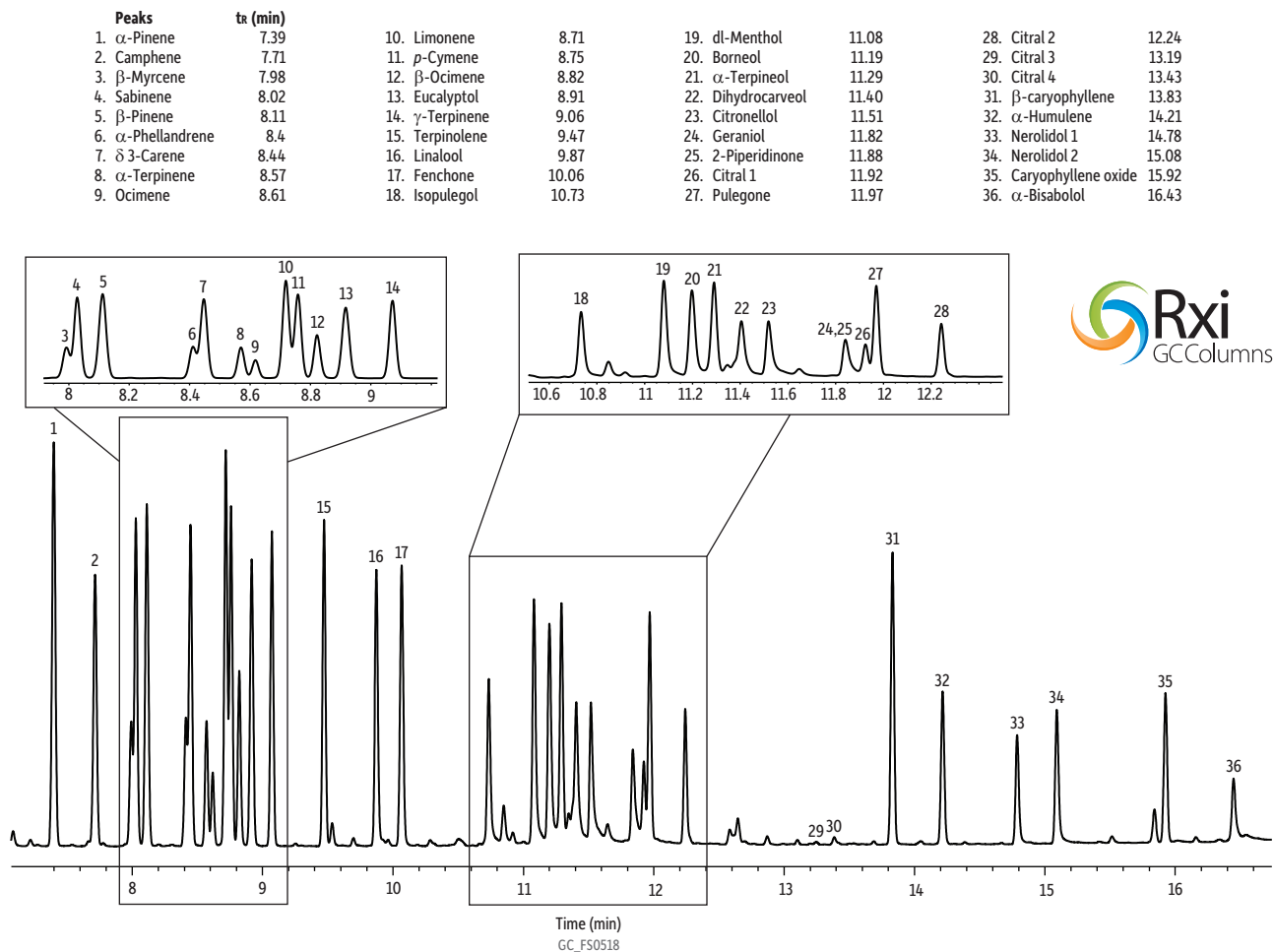
TERPENE PROFILING

Reduce Capital Investments—Analyze Terpenes by GC on the Same Setup Used for Residual Solvents

Cannabis has a complex terpene profile, which is theorized to increase its therapeutic effects. Terpene profiling is used for both product quality testing and strain identification. These complex and sometimes problematic compounds are challenging to analyze, but the experts at Restek have developed qualitative GC methodology for

terpene profiling that fits easily into required laboratory workflows. To keep things simple, the GC terpene profile analysis in Figure 3 can be performed on the same instrument and column that we recommend for residual solvent testing (see page 10).

Figure 3: Comprehensive terpene analysis by headspace GC-FID can be done on the same instrument and GC column as residual solvents analysis, which simplifies setup and improves lab productivity.



Column Rxi-624Sil MS, 30 m, 0.25 mm ID, 1.40 μ m (cat.# 13868)
Sample Terpenes mix
Diluent: Isopropyl alcohol
Conc.: 200 ng/ μ L (0.02% wt/vol). The sample was prepared by placing 10 μ L into the headspace vial.
Injection headspace-loop split (split ratio 10:1)
Liner: Premium 1.0 mm ID straight inlet liner (cat.# 23333.1)
Headspace-Loop
Inj. Port Temp.: 250 °C
Instrument: Tekmar HT-3
Inj. Time: 1.0 min
Transfer Line Temp.: 160 °C
Valve Oven Temp.: 160 °C
Needle Temp.: 140 °C
Sample Temp.: 140 °C
Sample Equil. Time: 30.0 min

Vial Pressure: 20 psi
Loop Pressure: 15 psi
Oven
Oven Temp.: 60 °C (hold 0.10 min) to 300 °C at 12.50 °C/min (hold 3.0 min)
Carrier Gas He, constant flow
Linear Velocity: 33 cm/sec
Detector FID @ 320 °C
Make-up Gas
Flow Rate: 45 mL/min
Make-up Gas Type: N₂
Hydrogen flow: 40 mL/min
Air flow: 450 mL/min
Data Rate: 20 Hz
Instrument Agilent/HP6890 GC
Notes For qualitative purposes only.

TERPENE TESTING PRODUCTS

Rxi-624Sil MS Columns (fused silica) (midpolarity Crossbond phase)

- Low-bleed, high-thermal stability column—maximum temperatures up to 300–320 °C.
- Inert—excellent peak shape for a wide range of compounds.
- Selective—G43 phase highly selective for volatile organics and residual solvents, great choice for USP<467>.
- Manufactured for column-to-column reproducibility—well suited for validated methods.

Description	temp. limits	qty.	cat.#
30 m, 0.25 mm ID, 1.40 µm	-20 to 300/320 °C	ea.	13868



Topaz 1.0 mm ID Straight Inlet Liner for Agilent GCs equipped with split/splitless inlets



ID x OD x Length	Similar to Part #	qty.	cat.#
Straight, Premium Deactivation, Borosilicate Glass 1.0 mm x 6.3 mm x 78.5 mm	Agilent 18740-80200 (ea.), 5190-4047 (ea.)	5-pk.	23333

* 100% SATISFACTION GUARANTEE: If your Topaz inlet liner does not perform to your expectations for any reason, simply contact Restek Technical Service or your local Restek representative and provide a sample chromatogram showing the problem. If our GC experts are not able to quickly and completely resolve the issue to your satisfaction, you will be given an account credit or replacement product (same cat.#) along with instructions for returning any unopened product. (Do not return product prior to receiving authorization.) For additional details about Restek's return policy, visit www.restek.com/warranty



Headspace Crimp Vials (20 mm)

Description	Volume	Color	Dimensions	100-pk.	1,000-pk.
Headspace Vial, Flat Bottom	20 mL	Clear	23 x 75 mm	24685	24686

Vial-to-instrument compatibility is designated in instrument reference chart on the product web page.



Cannabis Terpenes Standards

Cannabis Terpenes Standard #1 (19 components)

(-)-alpha-Bisabolol (23089-26-1)	Linalool (78-70-6)
Camphene (79-92-5)	beta-Myrcene (123-35-3)
delta-3-Carene (13466-78-9)	Nerolidol (7212-44-4)
beta-Caryophyllene (87-44-5)	Ocimene (13877-91-3)
Geraniol (106-24-1)	alpha-Pinene (80-56-8)
(-)-Guaïol (489-86-1)	(-)-beta-Pinene (18172-67-3)
alpha-Humulene (6753-98-6)	alpha-Terpinene (99-86-5)
p-Isopropyltoluene (p-cymene) (99-87-6)	gamma-Terpinene (99-85-4)
(-)-Isopulegol (89-79-2)	Terpinolene (586-62-9)
d-Limonene (5989-27-5)	

2,500 µg/mL each in isopropanol, 1 mL/ampul cat.# 34095 (ea.)

Cannabis Terpenes Standard #2 (2 components)

(-)-Caryophyllene oxide (1139-30-6)
1,8-Cineole (Eucalyptol) (470-82-6)

2,500 µg/mL each in isopropanol, 1 mL/ampul cat.# 34096 (ea.)

Did you know?

You'll save money ordering from Restek because we understand the need to control costs and build efficient workflows. We develop as many analyses as possible using the same columns and consumables, so you can minimize the number of products you need to stock.

TECH TIP

Did you know that headspace analysis eliminates the possibility of column contamination from nonvolatile matrix components? This results in an extremely clean chromatogram, minimal instrument maintenance, and longer column lifetimes.

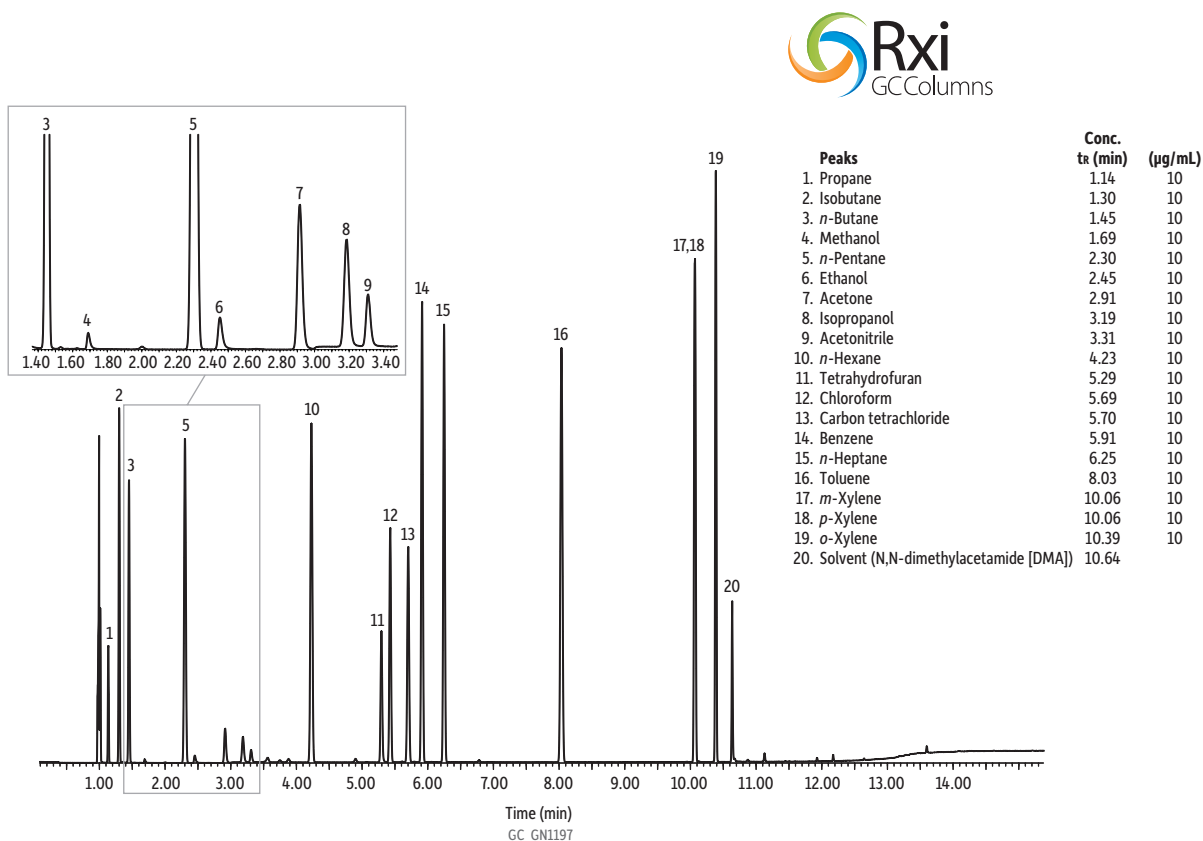
RESIDUAL SOLVENT ANALYSIS

Improve Productivity—Keep Analyzing Samples Instead of Changing Columns between Residual Solvent and Terpene Methods.

As the popularity of cannabis grows, so does concern over the safety of the drug products. Cannabis concentrates can contain residual solvents left over from manufacturing that can be harmful to human health. Because of this risk, many states will require residual solvent testing of cannabis concentrates. Due to their high volatility, residual

solvents can only be analyzed using GC techniques. The chemists at Restek have developed a quick and easy method that allows for residual solvent analysis (Figure 4) and terpene profiling (Figure 3) on the same column and instrument platform with minimal sample preparation (see page 6 for terpene profiling).

Figure 4: Improve productivity and reduce downtime for column changes—this sensitive headspace GC-FID analysis of residual solvents can be accomplished on the same instrument and Rxi-624Sil MS column that is used in Restek’s terpenes profiling method.



Column Rxi-624Sil MS, 30 m, 0.25 mm ID, 1.40 µm (cat.# 13868)
Sample
 Diluent: Deionized water
 Conc.: 10 µg/mL
Injection
 Inj. Vol.: 500 µL headspace-syringe split (split ratio 100:1)
 Liner: Topaz 0.75 mm ID straight/SPME inlet liner (cat.# 23434)
 Inj. Temp.: 280 °C
Headspace-Syringe
 Split Vent Flow Rate: 3 mL/min
 Instrument: PAL RTC
 Syringe Temp.: 135 °C
 Sample Temp.: 85 °C
 Sample Equil. Time: 2 min
 Inj. Speed: 500 µL/sec
Oven
 Oven Temp.: 30 °C (hold 3 min) to 85 °C at 15 °C/min (hold 2 min) to 250 °C at 35 °C/min (hold 2 min)

Carrier Gas He, constant flow
 Flow Rate: 2.0 mL/min
 Linear Velocity: 51 cm/sec
Detector HES-MS
 Scan Program:

Group	Start Time (min)	Scan Range (amu)	Scan Rate (scans/sec)
1	0	29-450	6.4

 Transfer Line Temp.: 280 °C
 Analyzer Type: Quadrupole
 Source Type: HES
 Aperture Size: 6 mm ID
 Source Temp.: 350 °C
 Quad Temp.: 200 °C
 Electron Energy: 70 eV
 Solvent Delay Time: 0 min
 Tune Type: PFTBA
 Ionization Mode: EI
Instrument Agilent 7890B GC & 5977B MSD

RESIDUAL SOLVENT TESTING PRODUCTS

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(midpolarity Crossbond phase)

- Low-bleed, high-thermal stability column—maximum temperatures up to 300–320 °C.
- Inert—excellent peak shape for a wide range of compounds.
- Selective—G43 phase highly selective for volatile organics and residual solvents, great choice for USP<467>.
- Manufactured for column-to-column reproducibility—well suited for validated methods.

Description	temp. limits	qty.	cat.#
30 m, 0.25 mm ID, 1.40 µm	-20 to 300/320 °C	ea.	13868



Topaz 1.0 mm ID Straight Inlet Liner

for Agilent GCs equipped with split/splitless inlets



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Headspace Crimp Vials (20 mm)

Description	Volume	Color	Dimensions	100-pk.	1,000-pk.
Headspace Vial, Flat Bottom	20 mL	Clear	23 x 75 mm	24685	24686

Vial-to-instrument compatibility is designated in instrument reference chart on the product web page.



Residual Solvents - Class 1 (5 components)

Benzene (71-43-2), 10 mg/mL	1,1-Dichloroethene (75-35-4), 40 mg/mL
Carbon tetrachloride (56-23-5), 20 mg/mL	1,1,1-Trichloroethane (71-55-6), 50 mg/mL
1,2-Dichloroethane (107-06-2), 25 mg/mL	
In dimethyl sulfoxide, 1 mL/ampul	cat.# 36279 (ea.)

Residual Solvents Class 2 - Mix A (2013 Rev)

(16 components)

Acetonitrile (75-05-8), 2.05 mg/mL	Methanol (67-56-1), 15 mg/mL
Chlorobenzene (108-90-7), 1.8 mg/mL	Methylcyclohexane (108-87-2), 5.9 mg/mL
Cyclohexane (110-82-7), 19.4 mg/mL	Methylene chloride (dichloromethane) (75-09-2), 3 mg/mL
<i>cis</i> -1,2-Dichloroethene (156-59-2), 4.675 mg/mL	Tetrahydrofuran (109-99-9), 3.6 mg/mL
<i>trans</i> -1,2-Dichloroethene (156-60-5), 4.675 mg/mL	Toluene (108-88-3), 4.45 mg/mL
1,4-Dioxane (123-91-1), 1.9 mg/mL	<i>m</i> -Xylene (108-38-3), 6.51 mg/mL
Ethylbenzene (100-41-4), 1.84 mg/mL	<i>o</i> -Xylene (95-47-6), 0.98 mg/mL
Isopropylbenzene (cumene) (98-82-8), 0.35 mg/mL	<i>p</i> -Xylene (106-42-3), 1.52 mg/mL
In dimethyl sulfoxide, 1 mL/ampul	cat.# 36012 (ea.)

Residual Solvents Class 3 Standards

Residual Solvents Class 3 - Mix A (24 Components)

Acetone (67-64-1)	Isobutyl acetate (110-19-0)
Anisole (100-66-3)	Isopropyl acetate (108-21-4)
1-Butanol (71-36-3)	Methyl acetate (79-20-9)
2-Butanol (<i>sec</i> -butyl alcohol) (78-92-2)	3-Methyl-1-butanol (isoamyl alcohol) (123-51-3)
2-Butanone (MEK) (78-93-3)	4-Methyl-2-pentanone (MIBK) (108-10-1)
Butyl acetate (123-86-4)	Methyl- <i>tert</i> -butyl ether (MTBE) (1634-04-4)
Diethyl ether (ethyl ether) (60-29-7)	<i>n</i> -Pentane (C5) (109-66-0)
Dimethyl sulfoxide (DMSO) (67-68-5)	1-Pentanol (71-41-0)
Ethanol (64-17-5)	1-Propanol (71-23-8)
Ethyl acetate (141-78-6)	2-Propanol (isopropanol) (67-63-0)
Ethyl formate (109-94-4)	Propyl acetate (109-60-4)
<i>n</i> -Heptane (C7) (142-82-5)	
Isobutanol (2-Methyl-1-propanol) (78-83-1)	
5,000 µg/mL in N,N-Dimethylformamide, 1 mL/ampul	cat.# 36013 (ea.)

Ethylene Oxide

Ethylene oxide (75-21-8)	
500 µg/mL in dimethyl sulfoxide, 1 mL/ampul	cat.# 36005 (ea.)
50 mg/mL in methylene chloride, 1 mL/ampul	cat.# 30620 (ea.)

Ethylene oxide is available in other solvents and concentrations. Request your custom formulation at www.restek.com/solutions

Did you know?

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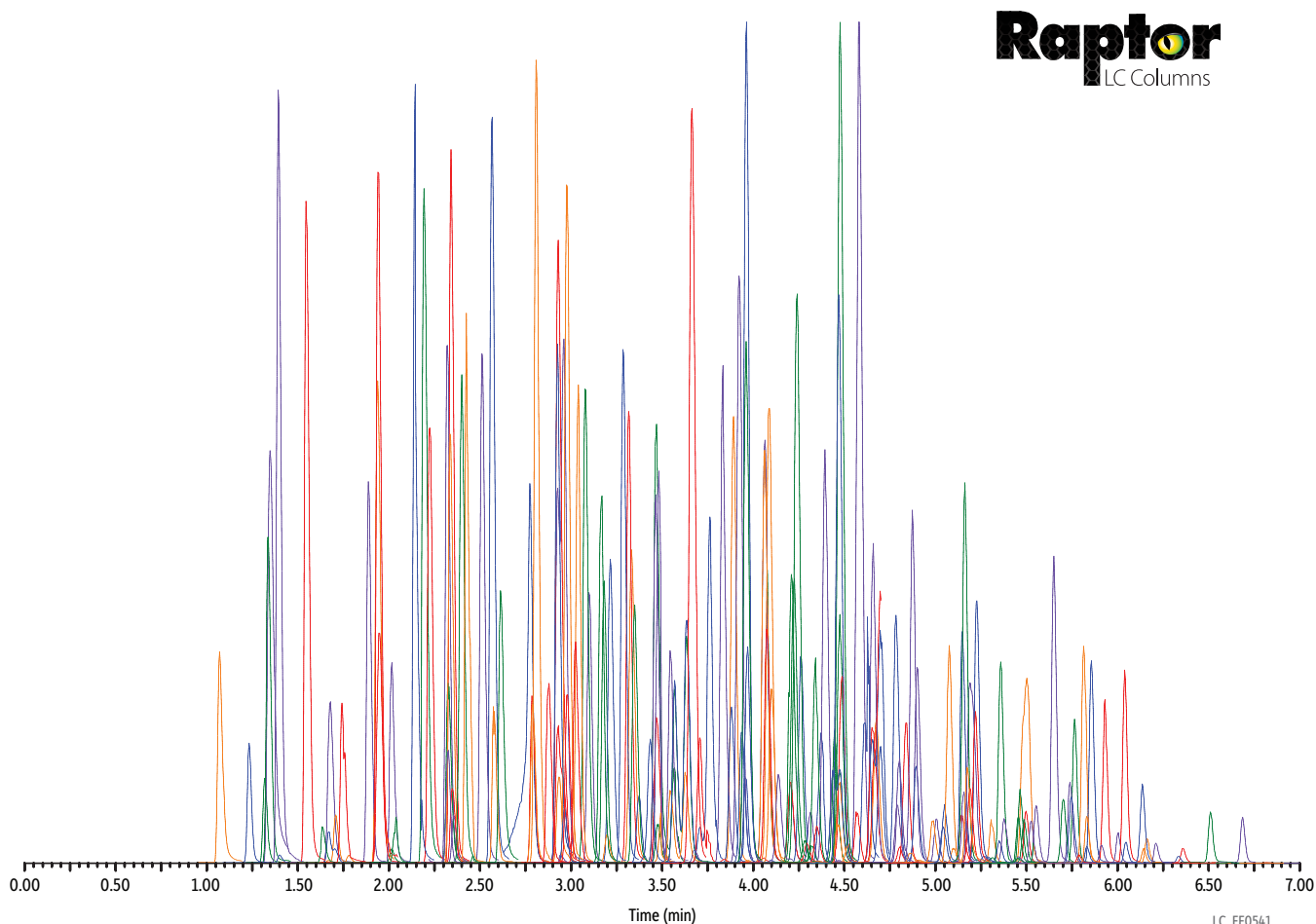
PESTICIDE ANALYSIS

Ensure Product Safety with Fast, Selective Multiresidue Pesticide Analysis

In addition to residual solvents, cannabis products can contain residues of pesticides that were applied to cannabis plants during growth in order to control agricultural pests. These pesticides can be analyzed by LC-MS/MS, GC-MS/MS, and GC-MS. Regardless of the technique used, lists of target compounds can be extensive, so column selectivity is an important factor in achieving good separations. Both Raptor ARC-18 LC columns (Figure 5) and Rxi-5ms

GC columns (Figure 6) provide the selectivity needed for accurate and reliable multiresidue pesticides analysis. Removing matrix interferences while also recovering the analytes of interest is also crucial for a successful pesticide analysis using either LC or GC, and Restek's Q-sep QuEChERS products allow for fast, easy, adaptable cleanup of a wide variety of matrices.

Figure 5: A high-throughput separation of 204 pesticides by LC-MS/MS can be achieved in only 7 minutes with the Raptor ARC-18 column.

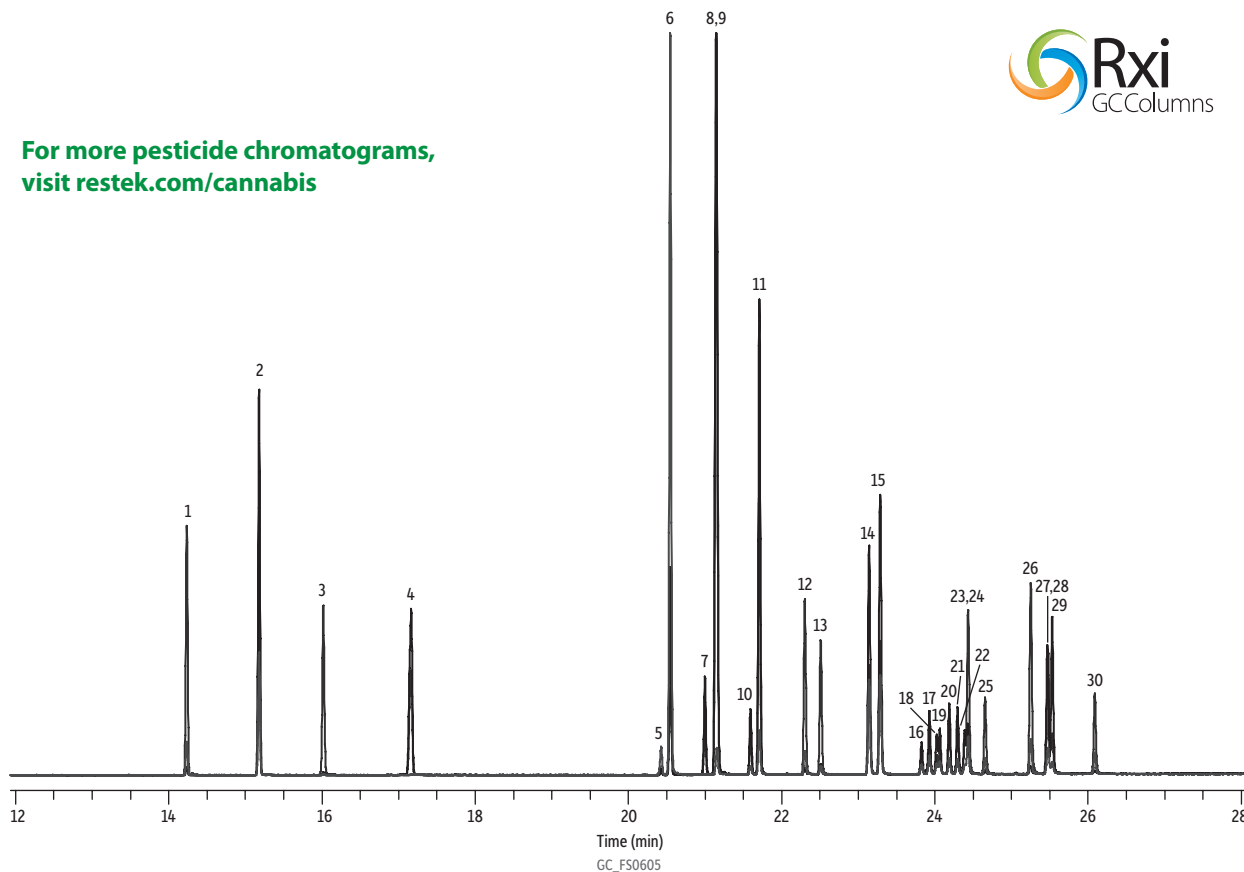


Column: Raptor ARC-18 (cat.# 9314A12), Dimensions: 100 mm x 2.1 mm ID, Particle Size: 2.7 μ m, Temp.: 50 $^{\circ}$ C; **Sample:** LC multiresidue pesticide kit (cat.# 31971), Diluent: Water, Conc.: 20 ng/mL, Inj. Vol.: 5 μ L; **Mobile Phase:** A: Water + 2 mM ammonium formate + 0.2% formic acid, B: Methanol + 2 mM ammonium formate + 0.2% formic acid; **Gradient (%B):** 0.00 min (5%), 2.00 min (60%), 4.00 min (75%), 6.00 min (100%), 7.00 min (100%), 7.01 min (5%), 9.50 min (5%); **Flow:** 0.4 mL/min; Max Pressure: 525 bar; **Detector:** Waters Xevo TQ-S, Ion Source: Waters Zspray ESI, Ion Mode: ESI+, Mode: MRM, **Instrument:** Waters ACQUITY UPLC I-Class; **Notes:** When combining a large number of compounds with different chemical functionalities, mix stability can be an issue. In formulating our LC multiresidue pesticide standard kit (cat.# 31971), we extensively studied the 204 compounds involved, then grouped them into as few mixes as possible while still ensuring maximum long-term stability and reliability. Several of these compounds are isomeric and separation of the isomers accounts for 216 peaks in the chromatogram compound list. For quantitative analysis, we recommend analyzing each mix separately to ensure accurate results for every compound.

Figure 6: Rxi-5ms GC columns reliably separate many commonly used pesticides.



For more pesticide chromatograms,
visit restek.com/cannabis



Peaks	ta (min)				
1. Tefluthrin	14.23	12. lambda-Cyhalothrin	22.30	23. Cypermethrin 4*	24.43
2. Transfluthrin	15.18	13. Acrinathrin	22.51	24. Flucythrinate 1*	24.43
3. Anthraquinone	16.02	14. cis-Permethrin	23.14	25. Flucythrinate 2*	24.66
4. Bioallethrin	17.17	15. trans-Permethrin	23.29	26. Fenvalerate 1*	25.25
5. Resmethrin 1*	20.43	16. Cyfluthrin 1*	23.83	27. tau-Fluvalinate 1*	25.47
6. Resmethrin 2*	20.55	17. Cyfluthrin 2*	23.93	28. Fenvalerate 2*	25.48
7. Tetramethrin 1*	21.00	18. Cyfluthrin 3*	24.02	29. tau-Fluvalinate 2*	25.53
8. Tetramethrin 2*	21.14	19. Cyfluthrin 4*	24.06	30. Deltamethrin	26.09
9. Bifenthrin	21.15	20. Cypermethrin 1*	24.19		
10. Phenothrin 1*	21.59	21. Cypermethrin 2*	24.30		
11. Phenothrin 2*	21.71	22. Cypermethrin 3*	24.39		

*Isomers numbered according to elution order.

Column: Rxi-5ms, 30 m, 0.25 mm ID, 0.25 µm (cat.# 13423); **Sample:** GC multiresidue pesticide standard #6-SPP (cat.# 32568); **Diluent:** Toluene; **Conc.:** 100 µg/mL; **Injection:** Inj. Vol.: 1 µL split (split ratio 50:1); **Liner:** Premium 4.0 mm ID Precision inlet liner w/wool (cat.# 23305.1); **Inj. Temp.:** 250 °C; **Oven:** 90 °C (hold 1 min) to 330 °C at 8.5 °C/min (hold 5 min); **Carrier Gas:** He, constant flow; **Flow Rate:** 1.4 mL/min; **Detector:** MS; **Mode:** Scan; **Start Time:** 5 min; **Scan Range:** 55-550 amu; **Scan Rate:** 7 scans/sec; **Transfer Line Temp.:** 290 °C; **Analyzer Type:** Quadrupole; **Source Temp.:** 325 °C; **Electron Energy:** 70 eV; **Solvent Delay Time:** 5 min; **Ionization Mode:** EI; **Instrument:** Thermo Scientific TSQ 8000 Triple Quadrupole GC-MS; **Notes:** Bioallethrin isomers are only slightly resolved with this method, so they are treated as one peak. Chromatogram is reconstructed from select ions.

TECH TIP

Struggling with matrix interferences or high backpressures? Contact Restek’s Technical Service team at support@restek.com for guard column recommendations.

PESTICIDE ANALYSIS PRODUCTS

Extraction

Q-sep QuEChERS Extraction Salts

- Free-flowing salts transfer easily and completely.
- Easy-open packets eliminate the need for a second empty tube for salt transfer.
- Convenient slim packets fit perfectly into tubes to prevent spills.
- Ready-to-use tubes, no glassware required.
- Pre-weighed, ultra-pure extraction salts.

QuEChERS methods are fast, easy, and cost-effective, and Restek Q-sep products make QuEChERS procedures even easier. No specialized glassware is required when you're using Q-sep extraction packets and tubes. Free-flowing extraction salts and salt packets that fit easily into the extraction tubes make transferring the salts to your sample mess-free and easy.

Description	Method	Material	qty.	cat.#
Q-sep QuEChERS Extraction Kit	AOAC 2007.01	6 g MgSO ₄ , 1.5 g NaOAc with 50 mL Centrifuge Tube	50 packets & 50 tubes	25852
Q-sep QuEChERS Extraction Salt Packets Only	AOAC 2007.01	6 g MgSO ₄ , 1.5 g NaOAc	50 packets	25851

TSCD – trisodium citrate dihydrate

DHS – disodium hydrogen citrate sesquihydrate

NaOAc – sodium acetate



Cleanup

Q-sep QuEChERS dSPE Tubes for Extract Cleanup

Fast, Simple Sample Prep for Multiresidue Pesticide Analysis

Packaged in foil subpacks of 10 for enhanced protection and storage stability.

Multiple sorbents are used to extract different types of interferences.

MgSO₄—removes excess water.

PSA—removes sugars, fatty acids, organic acids, and anthocyanine pigments.

C18-EC (end-capped)—removes nonpolar interferences.

Method	Material	Volume	qty.	cat.#
General purpose (wide variety of sample types, including fatty and pigmented fruits and vegetables)	900 mg MgSO ₄ , 300 mg PSA, 300 mg C18-EC, 45 mg GCB	15 mL	50-pk.	26245

PSA—primary and secondary amine

Note: No entry in the Method column refers to dSPE formulations not specifically included in one of the cited references. These products can be used to accommodate the various needs of specific matrices not directly met by the cited references.



Pesticide Residue Cleanup SPE Cartridges

- Convenient, multiple adsorbent beds in a single cartridge.
- For use in multiresidue pesticide analysis to remove matrix interferences.
- Excellent for cleanup of dietary supplement extracts.

SPE Cartridge	qty.	cat.#
6 mL Combo SPE Cartridge Packed with 500 mg CarboPrep 90/500 mg PSA, Polyethylene Frits	30-pk.	26194

PSA—primary and secondary amine



Visit www.restek.com/quechers for our centrifuge, manifolds, and other equipment

PESTICIDE ANALYSIS PRODUCTS (CONT.)

Analysis



Raptor ARC-18 LC Columns (USP L1)

Properties:

- Well-balanced retention profile.
- Sterically protected and acid-resistant to resist harsh, low-pH mobile phases.
- Ideal for use with sensitive detectors like mass spec.

Description	cat.#
2.7 μ m Column, 100 mm, 2.1 mm ID	9314A12

For guard cartridges, visit our website at www.restek.com/raptor



Rxi-5ms Columns (fused silica)

low-polarity phase; Crossbond diphenyl dimethyl polysiloxane

- General-purpose columns for semivolatiles, phenols, amines, residual solvents, drugs of abuse, pesticides, PCB congeners (e.g., Aroclor mixes), solvent impurities.
- Most inert column on the market.
- Tested and guaranteed for ultra-low bleed; improved signal-to-noise ratio for better sensitivity and mass spectral integrity.
- Equivalent to USP G27 and G36 phases.

Description	temp. limits	qty.	cat.#
30 m, 0.25 mm ID, 0.25 μ m	-60 to 330/350 $^{\circ}$ C	ea.	13423



QuEChERS Performance Standards Kit

- Kit contains organochlorine, organonitrogen, organophosphorus, and carbamate pesticides commonly used on fruits and vegetables.
- Ideal for initial method evaluations and ongoing method performance validations.
- Analytes are divided into three ampuls based on compatibility for maximum stability and shelf life.*
- Precise formulations improve data quality and operational efficiency; spend more time running samples and less time sourcing and preparing standards.

Contains 1 mL each of these mixtures.

31153: QuEChERS Performance Standard A

31154: QuEChERS Performance Standard B

31155: QuEChERS Performance Standard C

300 μ g/mL each in acetonitrile/acetic acid (99.9:0.1), 1 mL/ampul.

Blend equal volumes of all three ampuls for a 100 μ g/mL final solution.

cat.# 31152 (kit)



kit

*When combining compounds with different functionalities, chemical stability can be an issue. The analytes in this kit are separated into three mixes to ensure maximum long-term storage stability. For analysis, a fresh working standard should be prepared by combining the three kit mixes in a 1:1:1 ratio to prepare a 100 μ g/mL working standard solution. Once blended, Restek does not recommend storing working standards or subsequent dilutions for future use.



Contains
1 mL each of
these mixtures.
cat.# 31971 (kit)

LC Multiresidue Pesticide Kit

- Accurately detect and quantify pesticides of global food safety concern in a wide range of fruits, vegetables, and other commodities by LC-MS/MS.
- Full kit contains 204 compounds of interest, covering many LC-determined pesticides listed by government agencies; individual ampoules also sold separately.
- Formulated and grouped for maximum long-term stability* and well-balanced chromatographic performance, even for early eluting compounds.
- Quantitatively tested to confirm composition; detailed support documentation provided.
- Optimized multiresidue pesticide method is offered free of charge; downloadable XLS file includes conditions and transition tables.
- Certified reference material (CRM) manufactured and QC-tested in Restek's ISO-accredited labs satisfies your ISO requirements.

Cat.# 31972: LC Multiresidue Pesticide Standard #1 (13 components)

Organophosphorus Compounds
100 µg/mL each in acetonitrile
Acephate (30560-19-1)
Carbaryl (Sevin) (63-25-2)
Dicrotophos (141-66-2)
Dimethoate (60-51-5)
Dimethomorph (110488-70-5)
Isocarbophos (24353-61-5)
Methamidophos (10265-92-6)
Mevinphos (7786-34-7)
Monocrotophos (6923-22-4)
Omethoate (1113-02-6)
Temephos (Abate) (3383-96-8)
Trichlorfon (Dylox) (52-68-6)
Vamidothion (Vamidoate) (2275-23-2)

Cat.# 31973: LC Multiresidue Pesticide Standard #2 (16 components)

Carbamate/Uron Compounds
100 µg/mL each in acetonitrile
Alanycarb (83130-01-2)
Aldicarb (116-06-3)
Aldicarb sulfone (1646-88-4)
Aldicarb sulfoxide (1646-87-3)
Benfuracarb (82560-54-1)
Butocarboxim (34681-10-2)
Butoxycarboxim (34681-23-7)
Ethiofencarb (29973-13-5)
Furathiocarb (65907-30-4)
Methabenzthiazuron (18691-97-9)
Methiocarb (2032-65-7)
Methomyl (16752-77-5)
Oxamyl (23135-22-0)
Tebuthiuron (34014-18-1)
Thiazuron (51707-55-2)
Thiophanate-methyl (23564-05-8)

Cat.# 31974: LC Multiresidue Pesticide Standard #3 (38 components)

Carbamate/Uron Compounds
100 µg/mL each in acetonitrile
Bendiocarb (22781-23-3)
Bifenazate (149877-41-8)
Carbofuran (1563-66-2)
Chlorfluazuron (71422-67-8)
Chloroxuron (1982-47-4)
Chlorlortoluron (15545-48-9)
Cycluron (2163-69-1)
Diethofencarb (87130-20-9)

Diflufenzuron (35367-38-5)
Dioxacarb (6988-21-2)
Diuron (330-54-1)
Fenobucarb (BPMC) (3766-81-2)
Fenoxycarb (79127-80-3)
Fenuron (101-42-8)
Flufenoxuron (101463-69-8)
Fluometuron (2164-17-2)
Forchlorfenuron (68157-60-8)
Hexaflumuron (86479-06-3)
3-Hydroxycarbofuran (16655-82-6)
Indoxacarb (173584-44-6)
Iprovalicarb (140923-17-7)
Isoprocarb (2631-40-5)
Isoproturon (34123-59-6)
Linuron (330-55-2)
Lufenuron (103055-07-8)
Metobromuron (3060-89-7)
Monolinuron (1746-81-2)
Neburon (555-37-3)
Novaluron (116714-46-6)
Pirimicarb (23103-98-2)
Promecarb (2631-37-0)
Propham (122-42-9)
Propoxur (Baygon) (114-26-1)
Pyraclostrobin (175013-18-0)
Siduron (1982-49-6)
Teflubenzuron (83121-18-0)
Thiobencarb (28249-77-6)
Triflumuron (64628-44-0)

Cat.# 31975: LC Multiresidue Pesticide Standard #4 (63 components)

Organonitrogen Compounds
100 µg/mL each in acetonitrile
Abamectin (71751-41-2)
Acetamiprid (135410-20-7)
Ametryn (834-12-8)
Amitraz (33089-61-1)
Azoxytrobin (131860-33-8)
Benalaxyl (71626-11-4)
Benzoximate (29104-30-1)
Boscalid (188425-85-6)
Butafenacil (134605-64-4)
Carbetamide (16118-49-3)
Carfentrazone-ethyl (128639-02-1)
Chlorantraniliprole (500008-45-7)
Clofentazine (74115-24-5)
Cymoxanil (57966-95-7)
Cyprodinil (121552-61-2)
Cyromazine (66215-27-8)
Dimoxystrobin (149961-52-4)
Dinotefuran (165252-70-0)
Doramectin (117704-25-3)

Eprinomectin (123997-26-2)
Famoxadon (131807-57-3)
Fenazaquin (120928-09-8)
Fenhexamid (126833-17-8)
Fenpyroximate (111812-58-9)
Flonicamid (158062-67-0)
Fluazinam** (79622-59-6)
Fluoxazinilol (131341-86-1)
Fluoxastrobin (361377-29-9)
Flutolanil (66332-96-5)
Furalaxyl (57646-30-7)
Halofenozide (112226-61-6)
Imazalil (35554-44-0)
Imidacloprid (138261-41-3)
Ivermectin (70288-86-7)
Kresoxim-methyl (143390-89-0)
Mandipropamid (374726-62-2)
Mepanipyrim (10235-47-7)
Mepropril (55814-41-0)
Metaflumizone (139968-49-3)
Metalaxyl (57837-19-1)
Methoxyfenozide (161050-58-4)
Moxidectin (113507-06-5)
Myclobutanil (88671-89-0)
Nitenpyram (120738-89-8)
Pyraclostrobin (374726-62-2)
Oxadixyl (77732-09-3)
Picoxystrobin (117428-22-5)
Piperonyl butoxide (51-03-6)
Prochloraz (67747-09-5)
Prometon (1610-18-0)
Pymetrozine (123312-89-0)
Pyracarbolid (24691-76-7)
Pyrimethanil (53112-28-0)
Pyriproxyfen (95737-68-1)
Quinoxifen (124495-18-7)
Rotenone (83-79-4)
Secbumeton (26259-45-0)
Spiroxamine (118134-30-8)
Tebufenozide (112410-23-8)
Tebufenpyrad (119168-77-3)
Terbumeton (33693-04-8)
Triadimefon (43121-43-3)
Trifloxystrobin (141517-21-7)
Zoxamide (156052-68-5)

Cat.# 31976: LC Multiresidue Pesticide Standard #5 (30 components)

Organonitrogen Compounds
100 µg/mL each in acetonitrile
Acibenzolar-S-methyl (135158-54-2)
Bupirimate (41483-43-6)
Buprofezin (69327-76-0)
Carboxin (5234-68-4)

Clethodim (99129-21-2)
Clothianidin (210880-92-5)
Cyazofamid (120116-88-3)
Ethiprole (181587-01-9)
Ethofumesate (26225-79-6)
Fenamidon (161326-34-7)
Fipronil (120068-37-3)
Flubendiamide (272451-65-7)
Flufenacet (Fluthiamide) (142459-58-3)
Hexythiazox (78587-05-0)
Mefenacet (73250-68-7)
Mesotrione (104206-82-8)
Methoprotrotrine (841-06-5)
Metribuzin (21087-64-9)
Prometryne (7287-19-6)
Mandipropamid (374726-62-2)
Prothioconazole (178928-70-6)
Pyridaben (96489-71-3)
Simetryn (1014-70-6)
Sulfentrazone (122836-35-5)
Terbutryn (886-50-0)
Moxidectin (113507-06-5)
Thiacloprid (111988-49-9)
Thiamethoxam (153719-23-4)
Thiofanox (39196-18-4)
Tricyclazole (Beam) (41814-78-2)

Cat.# 31977: LC Multiresidue Pesticide Standard #6 (28 components)

Organonitrogen Compounds
100 µg/mL each in acetonitrile
Baycor (Bitertanol) (55179-31-2)
Bromuconazole (116255-48-2)
Cyproconazole (113096-99-4)
Diclobutrazol (75736-33-3)
Difenoconazole (119446-68-3)
Diniconazole (83657-24-3)
Epoconazole (133855-98-8)
Etaconazole (60207-93-4)
Ethirimol (23947-60-6)
Etoazoxazole (153233-91-1)
Fenarimol (60168-88-9)
Fenbuconazole (114369-43-6)
Fluquinconazole (136426-54-5)
Flusilazole (85509-19-9)
Flutriafol (76674-21-0)
Fuberidazole (3878-19-1)
Hexaconazole (79983-71-4)
Ipconazole (125225-28-7)
Metconazole (125116-23-6)
Nuarimol (63284-71-9)
Paclobutrazol (76738-62-0)
Penconazole (66246-88-6)

Propiconazole (Tilt) (60207-90-1)
Tebuconazole (107534-96-3)
Tetraconazole (112281-77-3)
Triadimenol (55219-65-3)
Triflumizole (68694-11-1)
Triticonazole (131983-72-7)

Cat.# 31978: LC Multiresidue Pesticide Standard #7 (7 components)

Organonitrogen Compounds
100 µg/mL each in acetonitrile
Emamectin-benzoate (155569-91-8)
Fenpropimorph (67564-91-4)
Spirodiclofen (148477-71-8)
Propargite (2312-35-8)
Spirotetramat (203313-25-1)
Spinetoram (J&L) (187166-40-1)
Spiromesifen (283594-90-1)

Cat.# 31979: LC Multiresidue Pesticide Standard #8 (7 components)

Organonitrogen Compounds
100 µg/mL each in acetonitrile
Hydrimethylnon (67485-29-4)

Cat.# 31980: LC Multiresidue Pesticide Standard #9 (7 components)

Carbamate/Uron Compounds
100 µg/mL each in acetonitrile
Aminocarb (2032-59-9)
Desmedipham (13684-56-5)
Formetanate HCL (23422-53-9)
Mexacarbate (Zectran) (315-18-4)
Monceron (Pencycuron) (66063-05-6)
Phenmedipham (13684-63-4)
Propamocarb free base (24579-73-5)

Cat.# 31981: LC Multiresidue Pesticide Standard #10 (7 components)

Carbamate/Uron Compounds
100 µg/mL each in methanol
Carbendazim (10605-21-7)



Quantity discounts not available.

* NOTE: When combining a large number of compounds with different chemical functionalities, mix stability can be an issue. In formulating these standards, we extensively studied the 204 compounds involved, and then grouped them into as few mixes as possible while still ensuring maximum long-term stability and reliability. For quantitative analysis, we recommend analyzing each mix separately to ensure accurate results for every compound.

** NOTE: In this standard, fluazinam should only be used for qualitative analysis. A single-component standard (cat.# 31982) is available for quantitative analysis.

PESTICIDE ANALYSIS PRODUCTS (CONT.)



Contains
1 mL each
of these mixtures.
cat.# 32562 (kit)

GC Multiresidue Pesticide Kit

- Accurately identify and quantify pesticide residues by GC-MS/MS in fruits, vegetables, botanicals, and herbals such as tea, ginseng, ginger, echinacea, and dietary supplements.
- Comprehensive 203-compound kit covers food safety lists by the FDA, USDA, and other global governmental agencies; individual ampules also sold separately.
- Formulated and grouped for maximum long-term stability* and well-balanced chromatographic performance, even for early eluting compounds.
- Quantitatively tested to confirm composition; detailed support documentation provided.
- Certified reference material (CRM) manufactured and QC-tested in Restek's ISO-accredited labs satisfies your ISO requirements.

Cat.# 32563: GC Multiresidue Pesticide Standard #1 (16 components)

Organophosphorus Compounds
100 µg/mL each in toluene
Azinphos ethyl (2642-71-9)
Azinphos methyl (86-50-0)
Chlorpyrifos (2921-88-2)
Chlorpyrifos methyl (5598-13-0)
Diazinon (333-41-5)
EPN (2104-64-5)
Fenitrothion (122-14-5)
Isazophos (42509-80-8)
Phosalone (2310-17-0)
Phosmet (732-11-6)
Pirimiphos ethyl (23505-41-1)
Pirimiphos methyl (29232-93-7)
Pyraclofos (77458-01-6)
Pyrazophos (13457-18-6)
Pyridaphenthion (119-12-0)
Quinalphos (13593-03-8)

Cat.# 32564: GC Multiresidue Pesticide Standard #2 (40 components)

Organochlorine Compounds
100 µg/mL each in toluene
Aldrin (309-00-2)
alpha-BHC (319-84-6)
beta-BHC (319-85-7)
delta-BHC (319-86-8)
gamma-BHC (Lindane) (58-89-9)
Chlorbenseide (103-17-3)
cis-Chlordane (5103-71-9)
trans-Chlordane (5103-74-2)
Chlorfensone (Ovex) (80-33-1)
Chloroneb (2675-77-6)
4,4'-DDD (53-19-0)
4,4'-DDD (72-54-8)
2,4'-DDE (3424-82-6)
4,4'-DDE (72-55-9)
2,4'-DDT (789-02-6)
4,4'-DDT (50-29-3)
4,4'-Dichlorobenzophenone (90-98-2)
Dieldrin (60-57-1)
Endosulfan I (959-98-8)
Endosulfan II (33213-65-9)
Endosulfan ether (3369-52-6)
Endosulfan sulfate (1031-07-8)
Endrin (72-20-8)
Endrin aldehyde (7421-93-4)
Endrin ketone (53494-70-5)
Ethylan (Perthane) (72-56-0)
Fenson (80-38-6)
Heptachlor (76-44-8)
Heptachlor epoxide (Isomer B) (1024-57-3)
Hexachlorobenzene (118-74-1)
Isodrin (465-73-6)

2,4'-Methoxychlor (30667-99-3)
4,4'-Methoxychlor olefin (2132-70-9)
Mirex (2385-85-5)
cis-Nonachlor (5103-73-1)
trans-Nonachlor (39765-80-5)
Pentachloroanisole (1825-21-4)
Pentachlorobenzene (608-93-5)
Pentachlorothioanisole (1825-19-0)
Tetradifon (116-29-0)

Cat.# 32565: GC Multiresidue Pesticide Standard #3 (25 components)

Organonitrogen Compounds
100 µg/mL each in toluene:acetone (99:1)
Benfluralin (1861-40-1)
Biphenyl (92-52-4)
Chlorothalonil (1897-45-6)
Dichlofluanid (1085-98-9)
Dichloran (99-30-9)
3,4-Dichloroaniline (95-76-1)
2,6-Dichlorobenzonitrile (Dichlobenil) (1194-65-6)
Diphenylamine (122-39-4)
Ethalfuralin (55283-68-6)
Fluchloralin (33245-39-5)
Isopropalin (33820-53-0)
Nitralin (4726-14-1)
Nitrofen (1836-75-5)
Oxyfluorfen (42874-03-3)
Pendimethalin (40487-42-1)
Pentachloroaniline (527-20-8)
Pentachlorobenzonitrile (20925-85-3)
Pentachloronitrobenzene (Quintozene) (82-68-8)
Prodiamine (29091-21-2)
Profluralin (26399-36-0)
2,3,5,6-Tetrachloroaniline (3481-20-7)
Tetrachloronitrobenzene (Tecnazene) (117-18-0)
THPI (Tetrahydrophthalimide) (1469-48-3)
Tolyfluanid (731-27-1)
Trifluralin (1582-09-8)

Cat.# 32566: GC Multiresidue Pesticide Standard #4 (28 components)

Organonitrogen Compounds
100 µg/mL each in toluene
Acetochlor (34256-82-1)
Alachlor (15972-60-8)
Allidochlor (93-71-0)
Clomazone (Command) (81777-89-1)
Cycloate (1134-23-2)

Diallate (*cis & trans*) (2303-16-4)
Dimethachlor (50563-36-5)
Diphenamid (957-51-7)
Fenpropathrin (39515-41-8)
Fluquinconazole (136426-54-5)
Flutolanil (66332-96-5)
Linuron (330-55-2)
Metazachlor (67129-08-2)
Methoxychlor (72-43-5)
Metolachlor (51218-45-2)
N-(2,4-Dimethylphenyl)formamide (60397-77-5)
Norflurazon (27314-13-2)
Oxadiazon (19666-30-9)
Pebulate (1114-71-2)
Pretilachlor (51218-49-6)
Prochloraz (67747-09-5)
Propachlor (1918-16-7)
Propanil (709-98-8)
Propisochlor (86763-47-5)
Propyzamide (23950-58-5)
Pyridaben (96489-71-3)
Tebuflufenpyrad (119168-77-3)
Triallate (2303-17-5)

Cat.# 32567: GC Multiresidue Pesticide Standard #5 (34 components)

Organonitrogen Compounds
100 µg/mL each in toluene
Atrazine (1912-24-9)
Bupirimate (41483-43-6)
Captafol (2425-06-1)
Captan (133-06-2)
Chlorfenapyr (122453-73-0)
Cyprodinil (121552-61-2)
Etofenprox (80844-07-1)
Etriazolone (2593-15-9)
Fenarimol (60168-88-9)
Fipronil (120068-37-3)
Fludioxonil (131341-86-1)
Fluridone (Sonar) (59756-60-4)
Flusilazole (85509-19-9)
Flutriafol (76674-21-0)
Folpet (133-07-3)
Hexazinone (Velpar) (51235-04-2)
Iprodione (36734-19-7)
Lenacil (2164-08-1)
MGK-264 (113-48-4)
Myclobutanil (88671-89-0)
Paclobutrazol (76738-62-0)
Penconazole (66246-88-6)
Procymidone (32809-16-8)
Propargite (2312-35-8)
Pyrimethanil (53112-28-0)
Pyriproxyfen (95737-68-1)
Tebuconazole (107534-96-3)
Terbacil (5902-51-2)
Terbutylazine (5915-41-3)
Triadimefon (43121-43-3)

Triadimenol (55219-65-3)
Tricyclazole (Beam) (41814-78-2)
Triflumizole (68694-11-1)
Vinclozolin (50471-44-8)

Cat.# 32568: GC Multiresidue Pesticide Standard #6 (18 components)

Synthetic Pyrethroid Compounds
100 µg/mL each in toluene
Acrinathrin (101007-06-1)
Anthraquinone (84-65-1)
Bifenthrin (82657-04-3)
Bioallethrin (584-79-2)
Cyfluthrin (68359-37-5)
lambda-Cyhalothrin (91465-08-6)
Cypermethrin (52315-07-8)
Deltamethrin (52918-63-5)
Fenvalerate (51630-58-1)
Flucythrinate (70124-77-5)
tau-Fluvalinate (102851-06-9)
cis-Permethrin (61949-76-6)
trans-Permethrin (61949-77-7)
Phenothrin (*cis & trans*) (26002-80-2)
Resmethrin (10453-86-8)
Tefluthrin (79538-32-2)
Tetramethrin (7696-12-0)
Transfluthrin (118712-89-3)

Cat.# 32569: GC Multiresidue Pesticide Standard #7 (10 components)

Herbicide Methyl Esters
100 µg/mL each in toluene
Acequinocyl (57960-19-7)
Bromopropylate (18181-80-1)
Carfentrazone ethyl (128639-02-1)
Chlorobenzilate (510-15-6)
Chlorpropham (101-21-3)
Chlzolinate (84332-86-5)
DCPA methyl ester (Chlorthal-dimethyl) (1861-32-1)
Fluazifop-p-butyl (79241-46-6)
Metalaxyl (57837-19-1)
2-Phenylphenol (90-43-7)

Cat.# 32570: GC Multiresidue Pesticide Standard #8 (24 components)

Organophosphorus Compounds
100 µg/mL each in toluene
Bromfeninfos-methyl (13104-21-7)
Bromfeninfos (33399-00-7)
Bromophos ethyl (4824-78-6)
Bromophos methyl (2104-96-3)
Carbophenothion (786-19-6)
Chlorfeninfos (470-90-6)
Chlorthiophos (60238-56-4)

Coumaphos (56-72-4)
Edifenphos (17109-49-8)
Ethion (563-12-2)
Fenamiphos (22224-92-6)
Fenclorophos (Ronnell) (299-84-3)
Fenthion (55-38-9)
Iodofenphos (18181-70-9)
Leptophos (21609-90-5)
Malathion (121-75-5)
Methacrifos (62610-77-9)
Profenofos (41198-08-7)
Prothiofos (34643-46-4)
Sulfotepp (3689-24-5)
Sulprofos (35400-43-2)
Terbufos (13071-79-9)
Tetrachlorinfos (22248-79-9)
Tolclofos-methyl (57018-04-9)

Cat.# 32571: GC Multiresidue Pesticide Standard #9 (8 components)

Organophosphorus Compounds
100 µg/mL each in toluene
Disulfoton (298-04-4)
Fonofos (944-22-9)
Methyl parathion (298-00-0)
Mevinphos (7786-34-7)
Parathion (Ethyl parathion) (56-38-2)
Phorate (298-02-2)
Piperonyl butoxide (51-03-6)
Triazophos (24017-47-8)



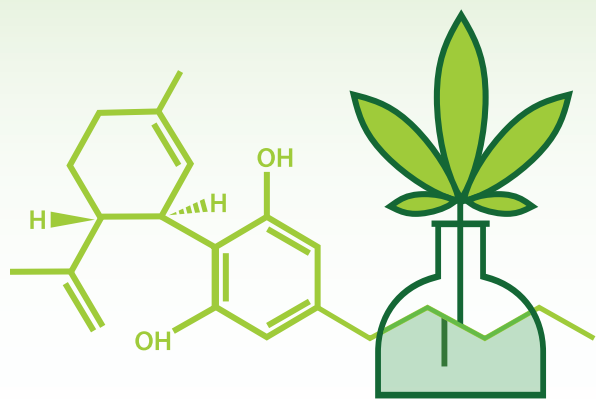
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* NOTE: When combining a large number of compounds with different chemical functionalities, mix stability can be an issue. In formulating these standards, we extensively studied the 203 compounds involved, then grouped them into as few mixes as possible while still ensuring maximum long-term stability and reliability. For quantitative analysis, we recommend analyzing each mix separately to ensure accurate results for every compound.

Notes:

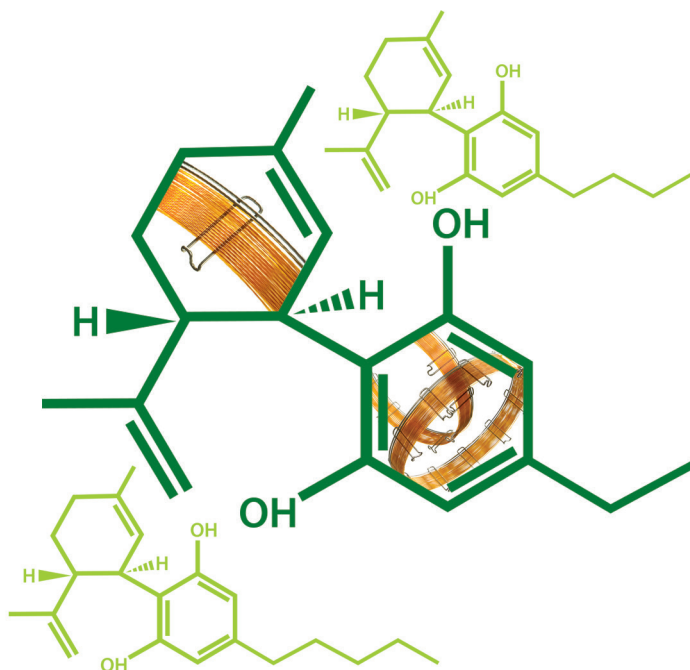


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