

# ANALYTICAL CHEMISTRY CATALOG



**SILICYCLE** Inc. ®  
UltraPure **SILICA GELS**

# About SiliCycle

*We provide solutions to the global chemical industry.*

Founded in 1995, SiliCycle® Inc. is a worldwide leader in the development, the manufacturing and the commercialization of high value silica-based and specialty products for chromatography, analytical and organic chemistry. Our business extends to more than fifty countries and our customer portfolio includes companies in a wide range of markets.

At SiliCycle, we are at the forefront of the chromatography industry, owing to the extraordinary purity of our silica gels and polymeric sorbents, combined with our capacity to rapidly adapt our products to meet the specific requirements of scientists worldwide.

We lead the way in offering innovative first-rate *UltraPure* products. Our automated manufacturing processes are continuously optimized to ensure high purity and a low percentage of fine particles, thereby guaranteeing optimal performance. With our multi-ton manufacturing capacity, we are your partner of choice for all your analysis, metal removal, catalysis, synthesis, and purification requirements.

SiliCycle is also a leading service provider, offering turnkey solutions based on its expertise in organic chemistry, material science, analytical chemistry to name only a few. With state-of-the-art instrumentation in the areas of chromatography, spectroscopy, and manufacturing combined to an applications support laboratory, we are devoted to extend your R&D and make your project a success.

SiliCycle has several sales offices in many countries such as China, India, European Union (*France & Germany*) just to name a few. All products are available worldwide through SiliCycle or via distributors.

We are committed to providing you with the highest quality products and services in the industry

Information about SiliCycle is available at [www.SiliCycle.com](http://www.SiliCycle.com)



# Analytical Chemistry Fields

## Quality Commitment for SiliCycle Products

SiliCycle has developed products that are used in many fields of the analytical industry to help customers for their analytical needs. The SiliCycle Analytical Chemistry Catalog is designed in the same way that scientists are developing their applications, starting by the sample treatment (*extraction, purification, enrichment, filtration*), to the final analysis (*determination, recovery, yield and selectivity*) including the use of consumables and accessories. In order to facilitate selection of the best product for your requirements, SiliCycle has introduced icons representing each field of the analytical industry.



Bio-Pharma



Pharmaceutical

### Biotechnological & Pharmaceutical

Products and applications for each step of the drug discovery & development, purification, characterization, manufacturing and quality control of small pharmaceutical molecules to large peptides and proteins.



Food

### Food & Beverage

Products and applications available for food & beverage industry including the food safety testing, fragrance & flavor, quality control testing of intermediate and final products, nutraceutical and natural products analysis.



Forensic

### Forensic

Products and applications used for forensic analysis, clinical study and toxicology testing from the preparation of the sample through the analysis.



Environment

### Environment

Products and applications covering environmental testing of broad range of matrices such as water, waste water, soil, sludge and air.



Energy

### Energy

Products and applications covering the petrochemical, biodiesel and alternative fuels development, testing and analysis.

## Word from the President



Dear Colleague,

We are pleased to present you our New SiliCycle Analytical Chemistry Catalog.

The importance of analytical chemistry has never been greater than it is today. Therefore, we have created this new catalog as an essential tool in providing solutions to today's demand for safe food, pure water, safe consumer goods, and safe APIs. Whether you come from the pharmaceutical or biopharmaceutical industry, from agriculture and food, from petrochemicals, environmental industry, quality assurance, quality control or any other analytical lab, this catalog is meant for you.

It is part of our quest to offer you the most appropriate selection of high quality products providing solutions to the most challenging analytical applications. Included within this new catalog, you will find our silica-based best-selling products such as our SiliaChrom® HPLC columns, SiliaPrep™ and SiliaPrepX™ SPE cartridges and well plates, SiliaSphere™ spherical silica gels, SiliaPlate™ TLC plates, and SiliaQuick QuEChERS solutions.

In May 2012, we acquired Chromatography Sciences Company (CSC) Inc. Founded in 1980, CSC was a Canadian pioneer in the manufacturing of HPLC columns and the marketing of other analytical products for the market of research laboratories in North America. With this acquisition, all manufacturing operations, equipments, and know-how of CSC were transferred to SiliCycle state of the art facility, in Quebec City. The key personnel of CSC, including its President, Mr. Denis Boudriau, also joined the SiliCycle team.

We are confident that you will find herein the perfect fit for your day-to-day work. We invite you to visit our Multi-Currency eCommerce website at [www.SiliCycle.com](http://www.SiliCycle.com) for a secure, fast and easy ordering experience, and to get complementary information with regards to our full product lines and services.

You may also contact our highly skilled representatives and knowledgeable technical support people who are available to assist you in application development, and in finding the right solution to any questions you may encounter in your work.

Finally, with over 20 years of market leadership as a worldwide provider of the highest quality products and services, we remain committed to offering you the best and most diversified product lines for analytical and organic chemistry, as well as chromatography, purification and sample clean-up.

To remain at the forefront of the industry, we have increased our presence worldwide in the past few years. Follow us and meet us through our numerous participations in the major trade shows and conferences around the world. It's always a pleasure to meet our fellow colleagues.

*Thank you for your confidence and support.*

Hugo St-Laurent  
President & CEO

# Quality Commitment for SiliCycle Products

## Quality assurance

Having rigorous quality controls (QC) with high standards does not guarantee absolute satisfaction of the customer. This is why SiliCycle created a Quality Assurance department with a clear goal: always ensure that products are consistently produced and controlled to the quality standards appropriate to their intended use. SiliCycle bases its quality management system (QMS) on the ISO standard.

SiliCycle is ISO 9001:2008 certified. This registration shows that we constantly improve the effectiveness of our quality management system; we follow our policies and fulfill our objectives which lead to customer satisfaction.

You can be sure of the outstanding quality of SiliCycle's silica gels because of the tightly controlled manufacturing conditions at our new state of the art facility. Our tight control of every manufacturing process step, affords identical and reproducible properties (*chemical, physical and structural*) and ensures consistent chromatographic selectivities.

Furthermore, our stringent Quality Control and Quality Assurance ensures high performance with no scale-up limitations. Every product meets our quality specifications and is shipped with a Certificate of Analysis (CofA). Individual data sheets are also available directly from our website.

## Audits

For many years, SiliCycle products have been used by major players in the industry (*pharmaceutical, biotechnology, etc.*) who are regulated by strict rules (*GMP for example*). SiliCycle has been audited by several customers and successfully passed each one.

## Bare Silica Gel

The backbone of most of SiliCycle's products is SiliaFlash F60 (40-63  $\mu\text{m}$ , 60  $\text{\AA}$ ) silica gel. It provides superior performance for chromatographic applications due to its narrow particle size distribution and high purity.

Before functionalization, every silica is rigorously characterized and analyzed by the procedures below to ensure lot-to-lot reproducibility.

## Functionalized Silica Gel

The process for functionalizing the silica is highly dependent on the group being attached. However, it is still possible to functionalize 90% of the surface, verified by  $^{29}\text{Si}$  MAS NMR. The remaining 10% of the surface may be endcapped to provide a completely inert support. After being functionalized, the product is submitted to further analysis and quality control as outlined below.

Quality Control Testing	
Type of Analysis	Performed by:
Bare Silica Gel	
Carbon, nitrogen & sulfur content	Elemental analyzer
Total trace metal	ICP-OES
Surface area & porosity	Nitrogen adsorption analyzer
Particle size distribution	Laser light diffraction
Tapped density analysis	Density measurement
Water content	Moisture balance
pH	pH-meter
Functionalized Silica Gel	
Residual solvent content	Moisture balance
Specific reactivity analysis	GC-FID, GC-MS, LC-MS/MS, ICP-OES
Organic function signature	Infrared spectroscopy
Purity analysis	GC-MS





# Analytical Products







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#### SiliaPrep Silica-Based SPE Cartridges and Well Plates

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- SiliaPrep Reversed-Phases : Non-Polar Sorbents
- SiliaPrep Ion Exchange Phases: Ionic Sorbents
- SiliaPrep Mixed-Mode and Specialty Phases

#### SiliaPrepX: Polymeric SPE Cartridges and Well Plates

- SiliaPrepX Polymeric; An Addition to Our Silica-Based SPE Cartridges
- Choose the Optimal SiliaPrepX Polymeric Phase by a Simple & Logical Method
- SiliaPrepX Neutral Phases
- SiliaPrepX Ion-Exchange Phases
- Mechanisms of retention
- Method Development Kits

#### SiliaPrep & SiliaPrepX Applications

# SiliaPrep™ and SiliaPrepX™

## Silica-Based and Polymeric SPE Cartridges and Well Plates



# SPE Cartridges and Well Plates

## Formats available for SiliaPrep and SiliaPrepX:

- SPE Cartridges (50 mg to 100 g)
- Mini-SPE Cartridges – used with a syringe (300 mg to 1 g)
- 48 and 96-Well Plates (10 mg to 100 mg)
- Micro-SPE – Tips (30 µg to 400 µg)



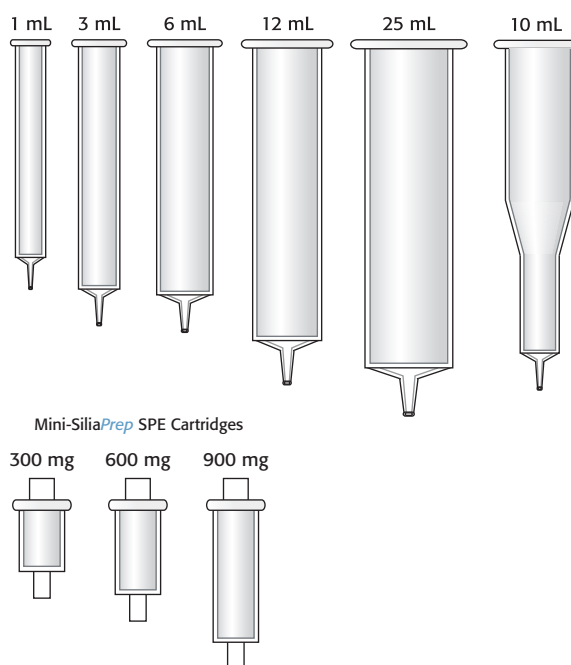
## Why Using SiliaPrep & SiliaPrepX Products

By using our products you will generate higher purity samples and reduce the number of false positives in your screening, resulting in higher quality data. All our SPE cartridges are packed with sorbents made of our fine-free SiliaFlash silica gel which has the highest purity on the market. When you use SiliCycle's SPE we guarantee the following:

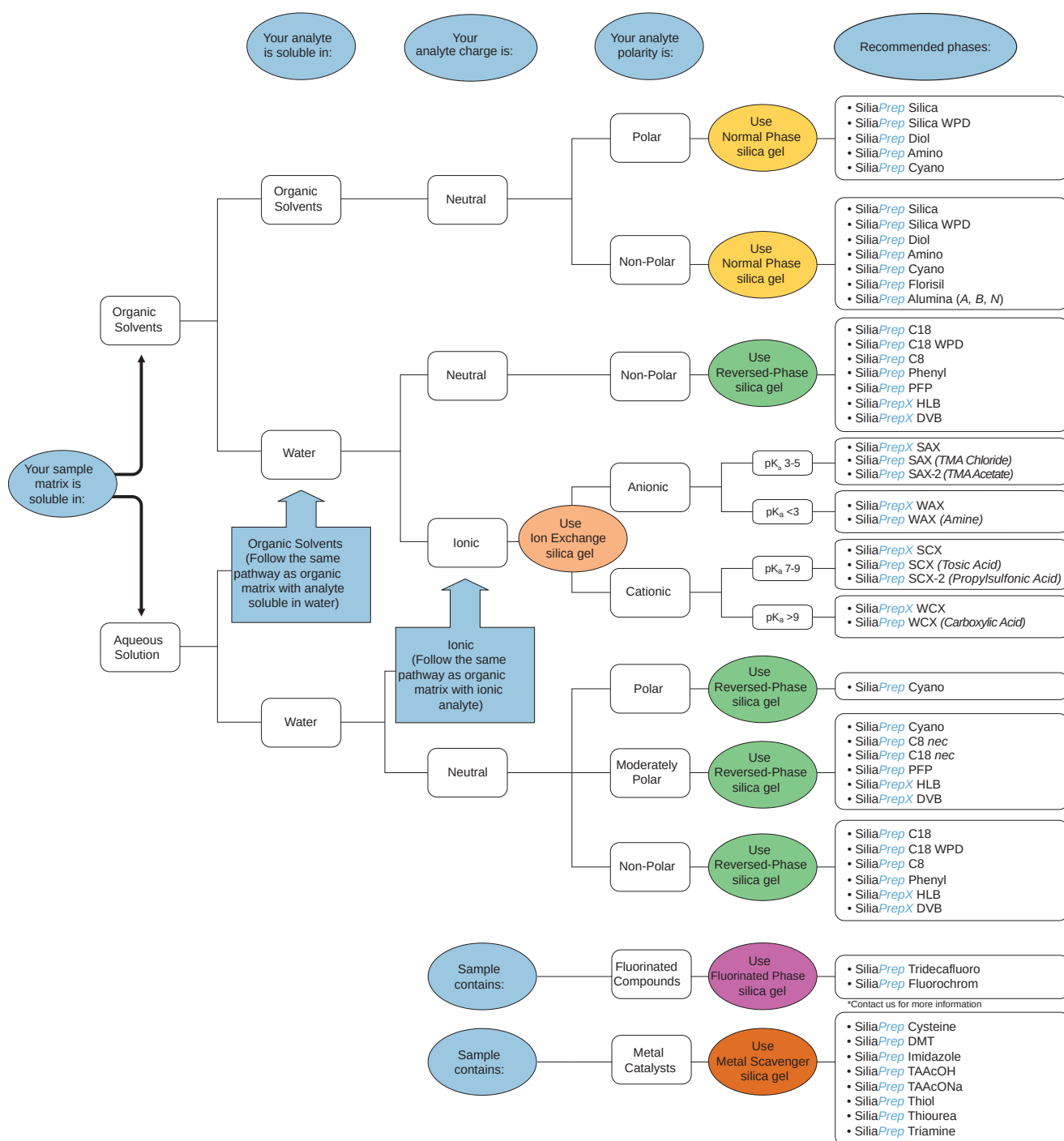
- High quality and wide variety of SiliaBond sorbents available
- Excellent separation (very tight particle size distribution and no fines)
- High recoveries and yields
- No needle clogging
- Less time and solvent spent conditioning the sorbent
- No silica, plastic, or grease contamination of your final product
- Lot-to-lot reproducible results

## SiliCycle SPE Cartridges Sizes

We can provide a complete range of SPE cartridge lengths and diameters. Please note we also offer flanged and flangeless cartridges.



# Product Selection Guide by Sample Properties



« I had a difficult time purifying a compound having a basic center by the conventional chromatography on silica gel. Then, I could purify the compound quickly and cleanly with the SiliaPrep SCX cartridge. »

Sangdon Han, Ph.D. from Arena Pharmaceuticals,  
San Diego, CA, USA

# Product Selection Guide by Manufacturer

Product Selection Guide by Manufacturer	
<b>SiliCycle Silica-Based Non Polar SPE Phases</b>	<b>Alternative to:</b>
SiliaPrep C18 Plus (17%)	Bond Elut® C18 (Agilent); ISOLUTE® C18 (EC) (Biotage); CHROMABOND® C18 ec (Macherey Nagel); Strata® C18-E (Phenomenex); Sep-Pak® tC18 (Waters); Discovery® DSC-18 (Supelco); Supelclean™ ENVI-18 (Supelco); Supelclean™ LC-18; CLEAN-UP® C18 (UCT); BAKERBOND® C18 (J.T. Baker); BAKERBOND® C18 PolarPlus
SiliaPrep C18 nec (17%)	Bond Elut® C18 OH; ISOLUTE® C18; CHROMABOND® C18; Strata® C18-U; HyperSep™ C18 (Thermo Scientific); CLEAN-UP® C18U; BAKERBOND® C18 Light Load
SiliaPrep C18 WPD	Bond Elut® C18 EWP; ISOLUTE® MFC18; CHROMABOND® C18 ec f; Strata® C18-T; Sep-Pak® C18; Discovery® DSC-18Lt
SiliaPrep C8	Bond Elut® C8; ISOLUTE® C8 (EC); Strata® C8; Sep-Pak® C8; Discovery® DSC-8; Supelclean™ ENVI-8; Supelclean™ LC-8; CLEAN-UP® C8; BAKERBOND® C8
SiliaPrep C8 nec	ISOLUTE® C8; CHROMABOND® C8; HyperSep™ C8; CLEAN-UP® C8U
SiliaPrep Phenyl	Bond Elut® Phenyl; ISOLUTE® PH; CHROMABOND® C6H5; Strata® Phenyl; Discovery® DSC-Ph; Supelclean™ LC-Ph; HyperSep™ Phenyl; CLEAN-UP® Phenyl; BAKERBOND® Phenyl (C6H6)
<b>SiliCycle Silica-Based Polar SPE Phases</b>	<b>Alternative to:</b>
SiliaPrep Cyano	Bond Elut® Cyano (CN); ISOLUTE® CN; CHROMABOND® CN; Strata® Cyano (CN); Sep-Pak® Cyano Propyl (CN); Discovery® DSC-CN; Supelclean™ LC-CN; HyperSep™ Cyano; CLEAN-UP® Cyanopropyl; BAKERBOND® Cyano (CN)
SiliaPrep Silica	Bond Elut® Si; ISOLUTE® Si; CHROMABOND® SiOH; Strata® Silica; Discovery® DSC-Si; Supelclean™ LC-Si; HyperSep™ Silica; CLEAN-UP® Silica; BAKERBOND® Silica Gel (SiOH)
SiliaPrep Silica WPD	Sep-Pak® Silica
SiliaPrep Diol nec	Bond Elut® Diol (2OH); ISOLUTE® DIOL; CHROMABOND® OH (Diol); Sep-Pak® Diol; Discovery® DSC-Diol; Supelclean™ LC-Diol; HyperSep™ Diol; CLEAN-UP® Diol; BAKERBOND® Diol (COH-COH)
SiliaPrep Florisil & SiliaPrep Florisil PR	Bond Elut® Florisil; ISOLUTE® FL; CHROMABOND® Florisil®; Strata® Florisil® (FL-PR); Sep-Pak® Florisil®; Supelclean™ ENVI-Florisil®; Supelclean™ LC-Florisil®; HyperSep™ Florisil; CLEAN-UP® Florisil® PR; BAKERBOND® Florisil (Mg <sub>2</sub> SiO <sub>3</sub> )
SiliaPrep Alumina (Acidic, Neutral, Basic)	Bond Elut® Alumina (-A, -N, -B); ISOLUTE® ALUMINA (AL-A, AL-N & AL-B); CHROMABOND® Alox (A, N, B); Strata® Alumina-N (AL-N); Sep-Pak® Alumina (A, N, B); Supelclean™ LC-Alumina (A, N, B); CLEAN-UP® Alumina (ALA, ALN, ALB); BAKERBOND® Alumina, Neutral (Al <sub>2</sub> O <sub>3</sub> )
<b>SiliCycle Silica-Based Ion Exchange SPE Phases</b>	<b>Alternative to:</b>
SiliaPrep SAX nec (TMA Chloride)	Bond Elut® SAX; ISOLUTE® SAX; CHROMABOND® SB; Strata® SAX; Sep-Pak® Accell™ Plus QMA; Discovery® DSC-SAX; Supelclean™ LC-SAX; HyperSep™ SAX; CLEAN-UP® QAX; BAKERBOND® Quaternary Amine
SiliaPrep SAX-2 nec (TMA Acetate)	ISOLUTE® PE-AX; CLEAN-UP® CAQAX
SiliaPrep Carbonate	ISOLUTE® Si-Carbonate (Si-TMA-CO <sub>3</sub> ); Accell Plus QMA Carbonate Plus Light (Waters)
SiliaPrep WAX (Amine)	Bond Elut® NH <sub>2</sub> ; ISOLUTE® NH <sub>2</sub> ; CHROMABOND® NH <sub>2</sub> ; Strata® NH <sub>2</sub> ; Sep-Pak® Amino Propyl (NH <sub>2</sub> ); Discovery® DSC-NH <sub>2</sub> ; Supelclean™ LC-NH <sub>2</sub> ; HyperSep™ Aminopropyl; CLEAN-UP® NAX; BAKERBOND® Amino (NH <sub>2</sub> )
SiliaPrep SCX (Tosic Acid)	Bond Elut® SCX; Bond Elut® PRS; ISOLUTE® SCX; ISOLUTE® SCX-3; CHROMABOND® SA; Strata® SCX; Discovery® DSC-SCX; HyperSep™ SCX; CLEAN-UP® BCX; BAKERBOND® Aromatic Sulfonic Acid

Trademarks: all trademarks and registered trademarks are the property of their respective owners. SiliCycle takes no responsibility for any error or omission relating to this information.

## Product Selection Guide by Manufacturer

SiliaPrep SCX-2 (Propylsulfonic Acid)	ISOLUTE® SCX-2; CHROMABOND® PSA; Supelclean™ LC-SCX
SiliaPrep WCX (Carboxylic Acid)	Bond Elut® WCX; Bond Elut® CBA; ISOLUTE® CBA; CHROMABOND® PCA; Strata® WCX; Sep-Pak® Accell™ Plus CM; Discovery® DSC-WCX; Supelclean™ LC-WCX; CLEAN-UP® CCX1; BAKERBOND® Carboxylic Acid (COOH)
<b>SiliCycle Silica-Based Mixed-Mode and Specialty SPE Phases</b>	<b>Alternative to:</b>
SiliaPrep C8/SAX-2 nec	Bond Elut® Certify II; ISOLUTE® HAX; CHROMABOND® Drug II; Strata® Screen-A; HyperSep™ Verify AX; CLEAN-UP® C8 + QAX; Clean Screen® THC (UCT)
SiliaPrep SCX-2/SAX nec	Bond Elut® AccuCAT
SiliaPrep PCB nec	Bond Elut® PCB; CHROMABOND® SA/SiOH; Supelclean™ Sulfoxide
SiliaPrep CleanDRUG	Bond Elut® Certify; ISOLUTE® HCX; CHROMABOND® Drug; Strata® Screen-C; Discovery® DSC-MCAX; HyperSep™ Verify CX; Clean Screen® DAU; BAKERBOND® Narc™-2
SiliaPrep CleanENVI	EnvirElut® (Agilent); ISOLUTE® PAH; CHROMABOND® C18 PAH; Strata® PAH
<b>SiliCycle Polymeric SPE Phases</b>	<b>Alternative to:</b>
SiliaPrepX HLB	Bond Elut® NEXUS; SampliQ OPT (Agilent); Strata™-X; Strata™-XL; Oasis® HLB (Waters); Supel™-Select HLB (Supelco)
SiliaPrepX DVB	Bond Elut® ENV; Bond Elut® Plexa; ISOLUTE® 101; ISOLUTE® ENV+; EVOLUTE® EXPRESS ABN; CHROMABOND® HR-X; Supelclean™ ENVI-Chrom P; HyperSep™ Retain PEP; STYRE SCREEN® DVB (UCT); BAKERBOND® SDB; BAKERBOND® H2O-Philib DVB
SiliaPrepX SAX	Bond Elut® Plexa PAX; SampliQ SAX; EVOLUTE® EXPRESS AX; CHROMABOND® HR-XA; CHROMABOND® PS-OH-; Strata™-X-A; Strata™-XL-A; Oasis® MAX; Supel™-Select SAX; HyperSep™ Retain AX; STYRE SCREEN® QAX; BAKERBOND® H2O-Philib SA-DVB
SiliaPrepX WAX	EVOLUTE® EXPRESS WAX; CHROMABOND® HR-XAW; CHROMABOND® Easy; CHROMABOND® HR-P; CHROMABOND® PS-RP; Strata™-X-AW; Strata™-XL-AW; Oasis® WAX
SiliaPrepX SCX	Bond Elut® Plexa PCX; SampliQ SCX; EVOLUTE® EXPRESS CX; CHROMABOND® HR-XC; CHROMABOND® PS-H+; Strata™-X-C; Strata™-XL-C; Oasis® MCX; Supel™-Select SCX; HyperSep™ Retain CX; STYRE SCREEN® BCX; BAKERBOND® H2O-Philib SC-DVB
SiliaPrepX WCX	Bond Elut® NEXUS WCX; EVOLUTE® EXPRESS WCX; CHROMABOND® HR-XCW; Strata™-X-CW; Strata™-XL-CW; Oasis® WCX; STYRE SCREEN® CCX

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# Product Selection Guide by Technical Characteristics

Product Selection Guide by Technical Characteristics								
SiliaPrep / SiliaPrepX	Product Number	Particulate Size ( $\mu\text{m}$ )	Pore Size ( $\text{\AA}$ )	Surface Area ( $\text{m}^2/\text{g}$ )	Carbon Load (%)	End Capping	Ionic Capacity ( $\text{meq/g}$ )	pH Stability
Silica-Based Non Polar Phases								
SiliaPrep C18 Plus (17%)	SPE-R00830B-xxx	40 - 63	60	500	17	Proprietary	-	3 - 8
SiliaPrep C18 (17%)	SPE-R31930B-xxx	40 - 63	60	500	17	Yes	-	3 - 8
SiliaPrep C18 nec (17%)	SPE-R35530B-xxx	40 - 63	60	500	17	No	-	3 - 8
SiliaPrep C18 WPD	SPE-R33229G-xxx	37 - 55	125	300	13	Yes	-	3 - 8
SiliaPrep C8	SPE-R31030B-xxx	40 - 63	60	500	12	Yes	-	3 - 8
SiliaPrep C8 nec	SPE-R31130B-xxx	40 - 63	60	500	12	No	-	3 - 8
SiliaPrep Phenyl	SPE-R34030B-xxx	40 - 63	60	500	9	Yes	-	3 - 8
SiliaPrep PFP	SPE-R67530B-xxx	40 - 63	60	500	11	Yes	-	3 - 8
Silica-Based Polar Phases								
SiliaPrep Cyano	SPE-R38030B-xxx	40 - 63	60	500	7	Yes	-	3 - 8
SiliaPrep Silica	SPE-R10030B-xxx	40 - 63	60	500	0	-	-	3 - 8
SiliaPrep Silica WPD	SPE-R10029G-xxx	37 - 55	125	300	0	-	-	3 - 8
SiliaPrep Diol nec	SPE-R35030B-xxx	40 - 63	60	500	8	No	-	3 - 8
SiliaPrep Florisil	SPE-AUT-0014-xxx	75 - 150	100	250	-	-	-	3 - 8
SiliaPrep Florisil PR	SPE-AUT-0015-xxx	150 - 250	100	200	-	-	-	3 - 8
SiliaPrep Alumina Acidic	SPE-AUT-0053-xxx	75 - 150	55 - 90	150 - 320	-	-	-	3 - 8
SiliaPrep Alumina Neutral	SPE-AUT-0054-xxx	75 - 150	55 - 90	150 - 320	-	-	-	3 - 8
SiliaPrep Alumina Basic	SPE-AUT-0055-xxx	75 - 150	55 - 90	150 - 320	-	-	-	3 - 8
Silica-Based Ion Exchange Phases								
SiliaPrep SAX nec	SPE-R66530B-xxx	40 - 63	60	500	10	No	1.1	3 - 8
SiliaPrep SAX-2 nec	SPE-R66430B-xxx	40 - 63	60	500	9	No	1.0	3 - 8
SiliaPrep Carbonate	SPE-R66030B-xxx	40 - 63	60	500	6	Yes	0.6	3 - 8
SiliaPrep WAX	SPE-R52030B-xxx	40 - 63	60	500	7	Yes	1.6	3 - 8
SiliaPrep SCX	SPE-R60530B-xxx	40 - 63	60	500	9	Yes	0.7	3 - 8
SiliaPrep SCX-2	SPE-R51230B-xxx	40 - 63	60	500	5	Yes	0.7	3 - 8
SiliaPrep WCX	SPE-R70030B-xxx	40 - 63	60	500	7	Yes	1.2	3 - 8
Silica-Based Mixed-Mode and Specialty Phases								
SiliaPrep C8/SAX-2 nec	SPM-R026630B-xxx	40 - 63	60	500	11	Proprietary	-	3 - 8
SiliaPrep SCX-2/SAX nec	SPM-R802830B-xxx	40 - 63	60	500	7	Proprietary	-	3 - 8
SiliaPrep PCB nec	SP2-R00650030B-xxx	40 - 63	60	500	3	Proprietary	-	3 - 8
SiliaPrep CleanDRUG	SPEC-R651230B-xxx	40 - 63	60	500	9	Proprietary	-	3 - 8
SiliaPrep CleanENVI	SPEC-R31930B-xxx	40 - 63	60	500	19	Proprietary	-	3 - 8
Polymeric Phases								
SiliaPrepX HLB	SPE-P0002-xxx	40	110	850	88	-	-	1 - 14
SiliaPrepX DVB	SPE-P0001-xxx	85	60	950	90	-	-	1 - 14
SiliaPrepX SAX	SPE-P0010-xxx	85	60	900	85	-	0.30	1 - 14
SiliaPrepX WAX	SPE-P0020-xxx	85	60	800	86	-	0.50	1 - 14
SiliaPrepX SCX	SPE-P0005-xxx	85	60	800	80	-	1.00	1 - 14
SiliaPrepX WCX	SPE-P0015-xxx	85	60	800	85	-	0.70	1 - 14

All SiliaPrepX products also available in 45  $\mu\text{m}$ . Contact us for more information.

## Standard Method Development Procedure

Solid-phase extraction methodology will vary depending on the sorbent (*polar, non-polar or ionic*). Here, we propose generic methods for each mode based on sample and sorbent properties. However, procedures can be slightly different from one sample to another.

Standard Method Development Procedure			
Procedure Step	Reversed-Phases C18, C8, Phenyl, PFP, CN	Ion Exchange Phases SAX, WAX, SCX, WCX	Normal Phases Si, Diol, Cyano, Florisil, Alumina
Analyte properties	Non-polar, uncharged or neutralized, hydrophobic 	Ionized or charged	Slightly to moderately polar, uncharged R—OH      R—NH <sub>2</sub>
Matrix properties	- Organic solvents ( <i>water miscible</i> ): Methanol, Acetonitrile, Acetone - Aqueous: buffer, urine, plasma, tissue	- Aqueous - pH-adjusted solutions	- Organic solvents ( <i>not water miscible</i> ): Dichloromethane, Hexane - Organic solvents ( <i>water miscible</i> ): Methanol, Acetonitrile, Acetone
Conditioning & Equilibration steps	Water-miscible organic solvents & Water	Water-miscible organic solvents & Water or aqueous buffered solution	Methanol or Isopropanol & Low polar solvents
Sample loading step	Dissolve analyte in highly polar solvents BEST = WATER	Dissolve analyte in highly polar solvents BEST = WATER	Dissolve analyte in low polar solvents BEST = HEXANE
Washing step	Aqueous or buffered solution and 5% polar solvents	Aqueous solutions containing salts	Non-polar solvents
Elution step	Polar or non-polar organic solvents	Polar solvents, may contain acids or bases	Mixture of non-polar (5 - 50%) and polar solvents

If you need a more detailed protocol, feel free to contact us.

Suggested Elution Solvents				
Reversed-Phases	Polarity	Ion Exchange Phases	Polarity	Normal Phases
THF Acetone Ethyl Acetate Acetonitrile Methanol	Low ↓ High	For complete ionization, sample should be adjusted 2 pH units above or below the analyte pK <sub>a</sub> . pH can be used to neutralize analyte or sorbent. Use 5% strong acid (HCO <sub>2</sub> H) or strong base (NH <sub>4</sub> OH) in Acetonitrile or Methanol.	Low ↓ High	Hexane Dichloromethane THF Acetone Acetonitrile

Sorbents Loading Capacity		
Sorbent Type	Silica-Based ( <i>SiliaPrep</i> )	Polymeric ( <i>SiliaPrepX</i> )
Sorbent Capacity	Load up to 1% of bed weight 100 mg of silica-based sorbent will retain 1 mg of sample	Load up to 10% of bed weight 100 mg of polymeric sorbent will retain 10 mg of sample

- Not enough sorbent: ANALYTE LOSS => low recovery and reproducibility
- Too much sorbent: MORE EXPENSIVE => more solvent used, taller SPE cartridges
- Concentrated samples: double the bed weight to avoid analyte loss

# SiliaPrep™: Silica-Based SPE Cartridges and Well Plates



## Benefits of using SiliaPrep SPE Cartridges and Well Plates:

- Wide variety of sorbents: all our SiliaBond (high-quality functionalized silica gels) are available in SPE format.
- Tight particle size distribution and very good packing with no fines, allowing excellent separation.
- High recovery and yield.
- Less time and solvent required for conditioning the sorbent.
- Reproducible flow rates lot-to-lot.
- Excellent storage qualities.



Solid-phase extraction (SPE) is designed for rapid sample preparation and purification prior to chromatographic analysis.

You can meet your specific purification needs by using SiliCycle SiliaPrep silica-based SPE Cartridges and Well Plates: high purity samples, reduced number of false positives in screenings, high quality data.

SiliaPrep products are available in 3 formats:

- SPE cartridges
- 48 & 96-Well Plates

(Well Plates are used in high throughput drug discovery and screening, metabolic pharmacokinetic applications and for automated methods such as multiprobe approaches.)

All our UltraPure silica gels SiliaFlash and functionalized silica gels SiliaBond are available in SPE formats, in bed weights up to 10 grams (>10 g are also available in SiliaSep OT formats).

## Sorbent Specifications & Custom Sorbents

SiliaPrep products are packed with SiliCycle fines-free SiliaFlash UltraPure silica gels, providing superior performance for all types of applications (thanks to the narrow particle size distribution and the high purity).

Standard products included in this catalog are made of SiliaFlash F60 (40-63  $\mu\text{m}$ , 60 Å). But **custom products are available with any type of silica offered by SiliCycle (irregular, spherical and IMPAQ, in various pore and particle sizes) and in any format.** Contact us for more information.

## Cartridge Specifications & Custom Cartridges

Standard SiliaPrep cartridges are made with flanged polypropylene (PP) tubes and 20  $\mu\text{m}$  polyethylene (PE) frits.

Other plastic materials (Teflon®, HDPE, etc.), frit porosity (10  $\mu\text{m}$ ) and cartridge rim's (flangeless) are available on a custom order basis.



# SiliaPrep Reversed-Phases : Non-Polar Sorbents

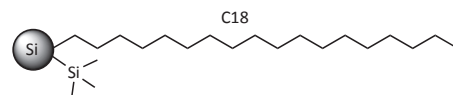
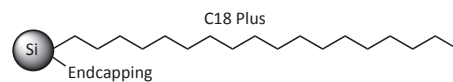
## SiliaPrep C18 Plus and SiliaPrep C18

### Description

Innovative C18 phases, characterized by a homogeneous coverage of the silane on the surface. Strongly hydrophobic and non-polar sorbent. **SiliaPrep C18 Plus is our most efficient C18 phase thanks to its proprietary endcapping.**

### Typical Applications

- Acidic, neutral and basic compounds from aqueous solutions
- Various organic compounds from water
- Drugs and metabolites from physiological fluids



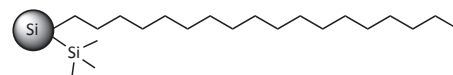
## SiliaPrep C18 WPD (Widepore)

### Description

Moderately hydrophobic, non-polar and highloading capacity sorbent. Homogeneous coverage of the silane on the surface.

### Typical Applications

- Large molecules and untreated matrices
- Acidic, neutral and basic compounds from aqueous solutions
- Various organic compounds from water
- Drugs and metabolites from physiological fluids



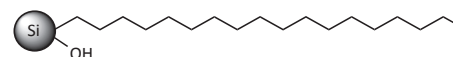
## SiliaPrep C18 nec

### Description

Strongly hydrophobic and non-polar sorbent. Unreacted surface silanols allows higher retention and polar selectivity for basic compounds.

### Typical Applications

- Soft condition catch and release purification of glucuronides
- Basic compounds from aqueous solutions



### SiliaPrep Reversed-Phases C18 SPE Formats

Formats	Qty/Box	SiliaPrep C18 Plus	SiliaPrep C18	SiliaPrep C18 WPD	SiliaPrep C18 nec
<b>SiliaPrep SPE Cartridges</b>					
1 mL/50 mg	100	SPE-R00830B-01B	SPE-R31930B-01B	SPE-R33229G-01B	SPE-R35530B-01B
1 mL/100 mg	100	SPE-R00830B-01C	SPE-R31930B-01C	SPE-R33229G-01C	SPE-R35530B-01C
3 mL/200 mg	50	SPE-R00830B-03G	SPE-R31930B-03G	SPE-R33229G-03G	SPE-R35530B-03G
3 mL/500 mg	50	SPE-R00830B-03P	SPE-R31930B-03P	SPE-R33229G-03P	SPE-R35530B-03P
6 mL/500 mg	50	SPE-R00830B-06P	SPE-R31930B-06P	SPE-R33229G-06P	SPE-R35530B-06P
6 mL/1 g	50	SPE-R00830B-06S	SPE-R31930B-06S	SPE-R33229G-06S	SPE-R35530B-06S
6 mL/2 g	50	SPE-R00830B-06U	SPE-R31930B-06U	SPE-R33229G-06U	SPE-R35530B-06U
12 mL/2 g	20	SPE-R00830B-12U	SPE-R31930B-12U	SPE-R33229G-12U	SPE-R35530B-12U
25 mL/5 g*	20	SPE-R00830B-20X	SPE-R31930B-20X	SPE-R33229G-20X	SPE-R35530B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>					
10 mL/200 mg	50	SPC-R00830B-10G	SPC-R31930B-10G	SPC-R33229G-10G	SPC-R35530B-10G
10 mL/500 mg	50	SPC-R00830B-10P	SPC-R31930B-10P	SPC-R33229G-10P	SPC-R35530B-10P
<b>Mini-SiliaPrep SPE Cartridges</b>					
500 mg	50	SPS-R00830B-P	SPS-R31930B-P	SPS-R33229G-P	SPS-R35530B-P
1,000 mg	50	SPS-R00830B-S	SPS-R31930B-S	SPS-R33229G-S	SPS-R35530B-S
<b>SiliaPrep 96-Well Plates</b>					
2 mL/50 mg	1	96W-R00830B-B	96W-R31930B-B	96W-R33229G-B	96W-R35530B-B
2 mL/100 mg	1	96W-R00830B-C	96W-R31930B-C	96W-R33229G-C	96W-R35530B-C

\*Commercialized under SiliaSep OT branding



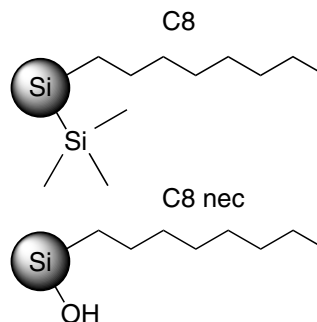
## SiliaPrep C8 and SiliaPrep C8 nec

### Description

Moderately hydrophobic and non-polar sorbent.

### Typical Applications

- Extremely non-polar compounds
- Large compounds such as PAH, vitamin D, oils, greasy compounds



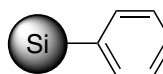
## SiliaPrep Phenyl

### Description

Moderately hydrophobic and non-polar sorbent. Extraction through  $\pi$ - $\pi$  interactions (*on top of hydrophobic interactions*).

### Typical Applications

- Non-polar compounds
- Aromatic compounds



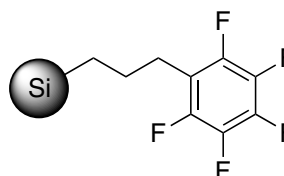
## SiliaPrep Pentafluorophenyl (PFP)

### Description

Moderately hydrophobic and highly polar sorbent. Extraction through  $\pi$ - $\pi$  interactions, hydrogen bondings and dipole-dipole interactions (*on top of hydrophobic interactions*).

### Typical Applications

- Polar & aromatic compounds
- Complex natural products
- Isomers and closely related compounds



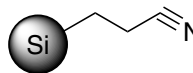
## SiliaPrep Cyano

### Description

Moderately polar sorbent. Used as a reversed-phase (*less hydrophobic than C8 and C18*) or a normal phase (*less polar than silica*).

### Typical Applications

- Acidic, basic and neutral compounds from aqueous solutions



### SiliaPrep Reversed-Phases SPE Formats

Formats	Qty/Box	SiliaPrep C8	SiliaPrep C8 nec	SiliaPrep Phenyl	SiliaPrep PFP	SiliaPrep Cyano
<b>SiliaPrep SPE Cartridges</b>						
1 mL/50 mg	100	SPE-R31030B-01B	SPE-R31130B-01B	SPE-R34030B-01B	SPE-R67530B-01B	SPE-R38030B-01B
1 mL/100 mg	100	SPE-R31030B-01C	SPE-R31130B-01C	SPE-R34030B-01C	SPE-R67530B-01C	SPE-R38030B-01C
3 mL/200 mg	50	SPE-R31030B-03G	SPE-R31130B-03G	SPE-R34030B-03G	SPE-R67530B-03G	SPE-R38030B-03G
3 mL/500 mg	50	SPE-R31030B-03P	SPE-R31130B-03P	SPE-R34030B-03P	SPE-R67530B-03P	SPE-R38030B-03P
6 mL/500 mg	50	SPE-R31030B-06P	SPE-R31130B-06P	SPE-R34030B-06P	SPE-R67530B-06P	SPE-R38030B-06P
6 mL/1 g	50	SPE-R31030B-06S	SPE-R31130B-06S	SPE-R34030B-06S	SPE-R67530B-06S	SPE-R38030B-06S
6 mL/2 g	50	SPE-R31030B-06U	SPE-R31130B-06U	SPE-R34030B-06U	SPE-R67530B-06U	SPE-R38030B-06U
12 mL/2 g	20	SPE-R31030B-12U	SPE-R31130B-12U	SPE-R34030B-12U	SPE-R67530B-12U	SPE-R38030B-12U
25 mL/5 g*	20	SPE-R31030B-20X	SPE-R31130B-20X	SPE-R34030B-20X	SPE-R67530B-20X	SPE-R38030B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>						
10 mL/200 mg	50	SPC-R31030B-10G	SPC-R31130B-10G	SPC-R34030B-10G	SPC-R67530B-10G	SPC-R38030B-10G
10 mL/500 mg	50	SPC-R31030B-10P	SPC-R31130B-10P	SPC-R34030B-10P	SPC-R67530B-10P	SPC-R38030B-10P
<b>Mini-SiliaPrep SPE Cartridges</b>						
500 mg	50	SPS-R31030B-P	SPS-R31130B-P	SPS-R34030B-P	SPS-R67530B-P	SPS-R38030B-P
1,000 mg	50	SPS-R31030B-S	SPS-R31130B-S	SPS-R34030B-S	SPS-R67530B-S	SPS-R38030B-S
<b>SiliaPrep 96-Well Plates</b>						
2 mL/50 mg	1	96W-R31030B-B	96W-R31130B-B	96W-R34030B-B	96W-R67530B-B	96W-R38030B-B
2 mL/100 mg	1	96W-R31030B-C	96W-R31130B-C	96W-R34030B-C	96W-R67530B-C	96W-R38030B-C

\*Commercialized under SiliaSep OT branding

## SiliaPrep Normal Phases: Polar Sorbents

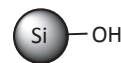
### SiliaPrep Silica

#### Description

The most polar sorbent, with a slightly acidic character. Interactions through hydrogen bonding.

#### Typical Applications

- Various compounds from non-polar solvents
- Structural isomers
- Removing baseline noise



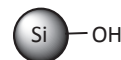
### SiliaPrep Silica WPD (Widepore)

#### Description

The most polar sorbent, with a slightly acidic character. Interactions through hydrogen bonding.

#### Typical Applications

- Large molecules and untreated matrices
- Various compounds from non-polar solvents



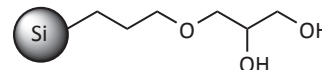
### SiliaPrep Diol nec

#### Description

Moderate polar sorbent presenting neutral character. Alternative to silica when the acidic character is problematic.

#### Typical Applications

- Polar compounds from non-polar solvents
- Structural isomers



SiliaPrep Normal Phases SPE Formats				
Formats	Qty/Box	SiliaPrep Silica	SiliaPrep Silica WPD	SiliaPrep Diol nec
<b>SiliaPrep SPE Cartridges</b>				
1 mL/50 mg	100	SPE-R10030B-01B	SPE-R10029G-01B	SPE-R35030B-01B
1 mL/100 mg	100	SPE-R10030B-01C	SPE-R10029G-01C	SPE-R35030B-01C
3 mL/200 mg	50	SPE-R10030B-03G	SPE-R10029G-03G	SPE-R35030B-03G
3 mL/500 mg	50	SPE-R10030B-03P	SPE-R10029G-03P	SPE-R35030B-03P
6 mL/500 mg	50	SPE-R10030B-06P	SPE-R10029G-06P	SPE-R35030B-06P
6 mL/1 g	50	SPE-R10030B-06S	SPE-R10029G-06S	SPE-R35030B-06S
6 mL/2 g	50	SPE-R10030B-06U	SPE-R10029G-06U	SPE-R35030B-06U
12 mL/2 g	20	FLH-R10030B-15U	FLH-R10029G-15U	SPE-R35030B-12U
25 mL/5 g*	20	FLH-R10030B-25X	FLH-R10029G-25X	SPE-R35030B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>				
10 mL/200 mg	50	SPC-R10030B-10G	SPC-R10029G-10G	SPC-R35030B-10G
10 mL/500 mg	50	SPC-R10030B-10P	SPC-R10029G-10P	SPC-R35030B-10P
<b>Mini-SiliaPrep SPE Cartridges</b>				
500 mg	50	SPS-R10030B-P	SPS-R10029G-P	SPS-R35030B-P
1,000 mg	50	SPS-R10030B-S	SPS-R10029G-S	SPS-R35030B-S
<b>SiliaPrep 96-Well Plates</b>				
2 mL/50 mg	1	96W-R10030B-B	96W-R10029G-B	96W-R35030B-B
2 mL/100 mg	1	96W-R10030B-C	96W-R10029G-C	96W-R35030B-C

\*Commercialized under SiliaSep OT branding

## SiliaPrep Florisil and SiliaPrep Florisil PR

Description	Typical Applications
A polar sorbent ( $SiMgO_3$ ) presenting a basic character.	<ul style="list-style-type: none"> <li>Non-polar to moderately polar compounds from non-polar solvents</li> <li>Chlorinated pesticides, polychlorinated biphenyl (PCB's) and polysaccharides</li> </ul>

## SiliaPrep Alumina-Acidic, Neutral and Basic

Description	Typical Applications
Alumina can present either a cationic, neutral or acidic character. Great stability at high pH.	<ul style="list-style-type: none"> <li>Retention of aromatic compounds and aliphatic amines</li> <li>Retention of compounds containing electronegative functions</li> </ul>

SiliaPrep Normal Phases SPE Formats						
Formats	Qty/Box	SiliaPrep Florisil	SiliaPrep Florisil PR	SiliaPrep Acidic Alumina	SiliaPrep Neutral Alumina	SiliaPrep Basic Alumina
SiliaPrep SPE Cartridges						
1 mL/50 mg	100	SPE-AUT-0014-01B	SPE-AUT-0015-01B	SPE-AUT-0053-01B	SPE-AUT-0054-01B	SPE-AUT-0055-01B
1 mL/100 mg	100	SPE-AUT-0014-01C	SPE-AUT-0015-01C	SPE-AUT-0053-01C	SPE-AUT-0054-01C	SPE-AUT-0055-01C
3 mL/200 mg	50	SPE-AUT-0014-03G	SPE-AUT-0015-03G	SPE-AUT-0053-03G	SPE-AUT-0054-03G	SPE-AUT-0055-03G
3 mL/500 mg	50	SPE-AUT-0014-03P	SPE-AUT-0015-03P	SPE-AUT-0053-03P	SPE-AUT-0054-03P	SPE-AUT-0055-03P
6 mL/500 mg	50	SPE-AUT-0014-06P	SPE-AUT-0015-06P	SPE-AUT-0053-06P	SPE-AUT-0054-06P	SPE-AUT-0055-06P
6 mL/1 g	50	SPE-AUT-0014-06S	SPE-AUT-0015-06S	SPE-AUT-0053-06S	SPE-AUT-0054-06S	SPE-AUT-0055-06S
6 mL/2 g	50	SPE-AUT-0014-06U	SPE-AUT-0015-06U	SPE-AUT-0053-06U	SPE-AUT-0054-06U	SPE-AUT-0055-06U
12 mL/2 g	20	SPE-AUT-0014-12U	SPE-AUT-0015-12U	SPE-AUT-0053-12U	SPE-AUT-0054-12U	SPE-AUT-0055-12U
25 mL/5 g*	20	SPE-AUT-0014-20X	SPE-AUT-0015-20X	SPE-AUT-0053-20X	SPE-AUT-0054-20X	SPE-AUT-0055-20X
SiliaPrep Large Reservoir Volume SPE Cartridges						
10 mL/200 mg	50	SPC-AUT-0014-10G	SPC-AUT-0015-10G	SPC-AUT-0053-10G	SPC-AUT-0054-10G	SPC-AUT-0055-10G
10 mL/500 mg	50	SPC-AUT-0014-10P	SPC-AUT-0015-10P	SPC-AUT-0053-10P	SPC-AUT-0054-10P	SPC-AUT-0055-10P
Mini-SiliaPrep SPE Cartridges						
500 mg	50	SPS-AUT-0014-P	SPS-AUT-0015-P	SPS-AUT-0053-P	SPS-AUT-0054-P	SPS-AUT-0055-P
1,000 mg	50	SPS-AUT-0014-S	SPS-AUT-0015-S	SPS-AUT-0053-S	SPS-AUT-0054-S	SPS-AUT-0055-S
SiliaPrep 96-Well Plates						
2 mL/50 mg	1	96W-AUT-0014-B	96W-AUT-0015-B	-	-	-
2 mL/100 mg	1	96W-AUT-0014-C	96W-AUT-0015-C	-	-	-

\*Commercialized under SiliaSep OT branding

## SiliaPrep Ion Exchange Phases: Ionic Sorbents

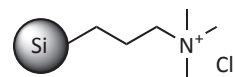
### SiliaPrep SAX nec (TMA Chloride)

#### Description

Strong anion exchanger sorbent, positively charged under all conditions.

#### Typical Applications

- Weak acidic molecules ( $pK_a$  3 - 5)



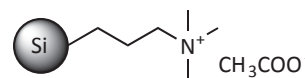
### SiliaPrep SAX-2 nec (TMA Acetate)

#### Description

Strong anion exchanger sorbent, positively charged under all conditions, with a low-selectivity counter-ion (acetate).

#### Typical Applications

- Weak acidic molecules ( $pK_a$  3 - 5)



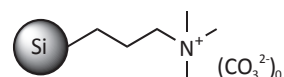
### SiliaPrep Carbonate

#### Description

Specialty phase. Silica-bound equivalent of tetramethyl ammonium carbonate.

#### Typical Applications

- Scavenging of TFA
- Extraction of acids (*boronic acids, acidic phenols including HOBt*)
- Can be used to free amines in their ammonium salt



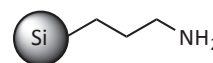
### SiliaPrep WAX (Amine)

#### Description

Weak anion exchanger, used for strong anions thus avoiding irreversible retention.

#### Typical Applications

- Strong acidic molecules  $pK_a < 3$
- Separation of peptides, drugs and metabolites from physiological fluids
- Poly and monosaccharides
- Structural isomers



SiliaPrep Anionic Exchange Phases SPE Formats					
Formats	Qty/Box	SiliaPrep SAX nec	SiliaPrep SAX-2 nec	SiliaPrep Carbonate	SiliaPrep WAX
SiliaPrep SPE Cartridges					
1 mL/50 mg	100	SPE-R66530B-01B	SPE-R66430B-01B	SPM-R66030B-01B	SPE-R52030B-01B
1 mL/100 mg	100	SPE-R66530B-01C	SPE-R66430B-01C	SPM-R66030B-01C	SPE-R52030B-01C
3 mL/200 mg	50	SPE-R66530B-03G	SPE-R66430B-03G	SPM-R66030B-03G	SPE-R52030B-03G
3 mL/500 mg	50	SPE-R66530B-03P	SPE-R66430B-03P	SPM-R66030B-03P	SPE-R52030B-03P
6 mL/500 mg	50	SPE-R66530B-06P	SPE-R66430B-06P	SPM-R66030B-06P	SPE-R52030B-06P
6 mL/1 g	50	SPE-R66530B-06S	SPE-R66430B-06S	SPM-R66030B-06S	SPE-R52030B-06S
6 mL/2 g	50	SPE-R66530B-06U	SPE-R66430B-06U	SPM-R66030B-06U	SPE-R52030B-06U
12 mL/2 g	20	SPE-R66530B-12U	SPE-R66430B-12U	SPM-R66030B-12U	SPE-R52030B-12U
25 mL/5 g*	20	SPE-R66530B-20X	SPE-R66430B-20X	SPM-R66030B-20X	SPE-R52030B-20X
SiliaPrep Large Reservoir Volume SPE Cartridges					
10 mL/200 mg	50	SPC-R66530B-10G	SPC-R66430B-10G	SPC-R66030B-10G	SPC-R52030B-10G
10 mL/500 mg	50	SPC-R66530B-10P	SPC-R66430B-10P	SPC-R66030B-10P	SPC-R52030B-10P
Mini-SiliaPrep SPE Cartridges					
500 mg	50	SPS-R66530B-P	SPS-R66430B-P	SPS-R66030B-P	SPS-R52030B-P
1,000 mg	50	SPS-R66530B-S	SPS-R66430B-S	SPS-R66030B-S	SPS-R52030B-S
SiliaPrep 96-Well Plates					
2 mL/50 mg	1	96W-R66530B-B	96W-R66430B-B	96W-R66030B-B	96W-R52030B-B
2 mL/100 mg	1	96W-R66530B-C	96W-R66430B-C	96W-R66030B-C	96W-R52030B-C

\*Commercialized under SiliaSep OT branding

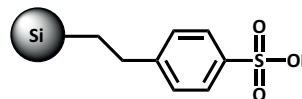
## SiliaPrep SCX (Tosic Acid)

### Description

Strong cation exchanger sorbent, negatively charged under all conditions. Aromatic selectivity.

### Typical Applications

- Basic molecules ( $pK_a$  7 - 9)
- Amine "catch & release" purification



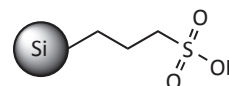
## SiliaPrep SCX-2 (Propylsulfonic Acid)

### Description

Strong cation exchanger sorbent, negatively charged under all conditions. Slightly less acidic than SiliaPrep SCX.

### Typical Applications

- Basic molecules ( $pK_a$  7 - 9)



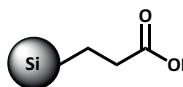
## SiliaPrep WCX (Carboxylic Acid)

### Description

Weak cation exchanger sorbent.

### Typical Applications

- Strong basic compounds ( $pK_a > 9$ )



SiliaPrep Cationic Exchange Phases SPE Formats				
Formats	Qty/Box	SiliaPrep SCX	SiliaPrep SCX-2	SiliaPrep WCX
<b>SiliaPrep SPE Cartridges</b>				
1 mL/50 mg	100	SPE-R60530B-01B	SPE-R51230B-01B	SPE-R70030B-01B
1 mL/100 mg	100	SPE-R60530B-01C	SPE-R51230B-01C	SPE-R70030B-01C
3 mL/200 mg	50	SPE-R60530B-03G	SPE-R51230B-03G	SPE-R70030B-03G
3 mL/500 mg	50	SPE-R60530B-03P	SPE-R51230B-03P	SPE-R70030B-03P
6 mL/500 mg	50	SPE-R60530B-06P	SPE-R51230B-06P	SPE-R70030B-06P
6 mL/1 g	50	SPE-R60530B-06S	SPE-R51230B-06S	SPE-R70030B-06S
6 mL/2 g	50	SPE-R60530B-06U	SPE-R51230B-06U	SPE-R70030B-06U
12 mL/2 g	20	SPE-R60530B-12U	SPE-R51230B-12U	SPE-R70030B-12U
25 mL/5 g*	20	SPE-R60530B-20X	SPE-R51230B-20X	SPE-R70030B-20X
<b>SiliaPrep Large Reservoir Volume SPE Cartridges</b>				
10 mL/200 mg	50	SPC-R60530B-10G	SPC-R51230B-10G	SPC-R70030B-10G
10 mL/500 mg	50	SPC-R60530B-10P	SPC-R51230B-10P	SPC-R70030B-10P
<b>Mini-SiliaPrep SPE Cartridges</b>				
500 mg	50	SPS-R60530B-P	SPS-R51230B-P	SPS-R70030B-P
1,000 mg	50	SPS-R60530B-S	SPS-R51230B-S	SPS-R70030B-S
<b>SiliaPrep 96-Well Plates</b>				
2 mL/50 mg	1	96W-R60530B-B	96W-R51230B-B	96W-R70030B-B
2 mL/100 mg	1	96W-R60530B-C	96W-R51230B-C	96W-R70030B-C

\*Commercialized under SiliaSep OT branding

## SiliaPrep Mixed-Mode and Specialty Phases

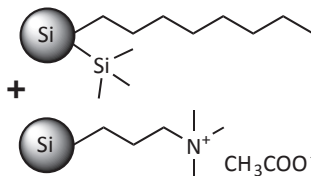
### SiliaPrep C8/SAX-2 nec

#### Description

Mixed-mode sorbent.

#### Typical Applications

- Extract or isolation of acidic and neutral drugs and metabolites from physiological fluids



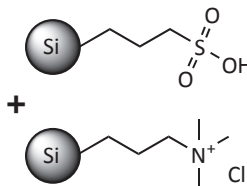
### SiliaPrep SCX-2/SAX nec

#### Description

Mixed-mode sorbent.

#### Typical Applications

- Separation of acidic and basic molecules from non ionizable molecules



### SiliaPrep PCB nec

#### Description

Specialty phase (*proprietary structure*).

#### Typical Applications

- Extraction of PCB's from waste oil (*hexane extract*)

SiliaPrep Mixed-Mode and Specialty Phases SPE Formats				
Formats	Qty/Box	SiliaPrep C8/SAX-2	SiliaPrep SCX-2/SAX	SiliaPrep PCB nec
SiliaPrep SPE Cartridges				
1 mL/50 mg	100	SPM-R026630B-01B	SPM-R802830B-01B	SP2-R00650030B-01B
1 mL/100 mg	100	SPM-R026630B-01C	SPM-R802830B-01C	SP2-R00650030B-01C
3 mL/200 mg	50	SPM-R026630B-03G	SPM-R802830B-03G	SP2-R00650030B-03G
3 mL/500 mg	50	SPM-R026630B-03P	SPM-R802830B-03P	SP2-R00650030B-03P
6 mL/500 mg	50	SPM-R026630B-06P	SPM-R802830B-06P	SP2-R00650030B-06P
6 mL/1 g	50	SPM-R026630B-06S	SPM-R802830B-06S	SP2-R00650030B-06S
6 mL/2 g	50	SPM-R026630B-06U	SPM-R802830B-06U	SP2-R00650030B-06U
12 mL/2 g	20	SPM-R026630B-12U	SPM-R802830B-12U	SP2-R00650030B-12U
25 mL/5 g*	20	SPM-R026630B-20X	SPM-R802830B-20X	SP2-R00650030B-20X
SiliaPrep Large Reservoir Volume SPE Cartridges				
10 mL/200 mg	50	SPC-R026630B-10G	SPC-R802830B-10G	SPC-R00650030B-10G
10 mL/500 mg	50	SPC-R026630B-10P	SPC-R802830B-10P	SPC-R00650030B-10P

\*Commercialized under SiliaSep OT branding

## SiliaPrep CleanDRUG

### Description

Sorbent designed to extract specific analytes with more reproducibility and efficacy when using sensitive detectors (*proprietary structure*).

### Typical Applications

- Developed, tested and quality controlled for drugs of abuse applications

## SiliaPrep CleanENVI

### Description

Sorbent designed for typical environmental samples (*proprietary structure*).

### Typical Applications

- PAH's, PCB's, herbicides and pesticides from water or waste water

SiliaPrep Specialty Phases SPE Formats			
Formats	Qty/Box	SiliaPrep CleanDRUG	SiliaPrep CleanENVI
SiliaPrep SPE Cartridges			
1 mL/50 mg	100	SPEC-R651230B-01B	SPEC-R31930B-01B
1 mL/100 mg	100	SPEC-R651230B-01C	SPEC-R31930B-01C
3 mL/200 mg	50	SPEC-R651230B-03G	SPEC-R31930B-03G
3 mL/500 mg	50	SPEC-R651230B-03P	SPEC-R31930B-03P
6 mL/500 mg	50	SPEC-R651230B-06P	SPEC-R31930B-06P
6 mL/1 g	50	SPEC-R651230B-06S	SPEC-R31930B-06S
6 mL/2 g	50	SPEC-R651230B-06U	SPEC-R31930B-06U
12 mL/2 g	20	SPEC-R651230B-12U	SPEC-R31930B-12U
25 mL/5 g*	20	SPEC-R651230B-20X	SPEC-R31930B-20X

\*Commercialized under SiliaSep OT branding

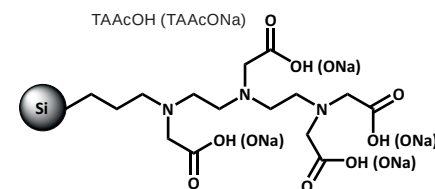
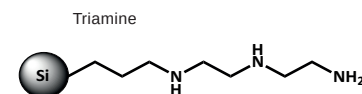
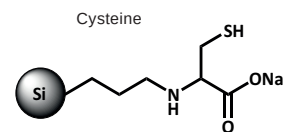
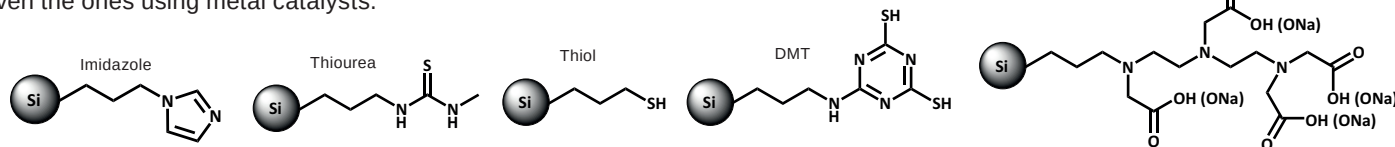
## SiliaPrep Metal Scavengers

### Description

SiliaPrep Metal Scavengers are unique and they have significantly changed how chemists can prepare active pharmaceutical ingredients (APIs). Any synthetic pathway is now possible, even the ones using metal catalysts.

### Typical Applications

- Lower the residual metal concentration of various metal complexes (*Pd*, *Pt*, *Rh*, *Ru*, *Ni*, *Sn*, etc) to single digit ppm



To find out which SiliaPrep Metal Scavenger will better suit your need, we recommend performing some screening using the SiliaPrep Metal Scavenger Kit (PN: SPE-K30730B-03P) to quickly determine which scavenger presents the highest efficiency and optimize the results.

### Typical Experimental Procedure

- SiliaPrep Metal Scavenger sorbent bed weight: use at least 4-8 eq. of the metal scavenger in respect to the residual metal concentration.
- Conditioning step: 1 x Column volume of Methanol (*or appropriate solvent*).
- Loading step: add the metal containing solution to the top of the cartridge and let it pass through under gravity.
- Rinsing step: 1 x Column volume of solution solvent for total recovery of the API.
- Selection of the most efficient SiliaPrep Metal Scavenger by residual metal concentration analysis of each solution (*the one with the lowest residual metal concentration*). You can choose more than one scavenger.
- Experiment optimization using the most efficient SiliaPrep Metal Scavenger (*modify the number of molar equivalents of the metal scavenger, change the reaction time by flow rate adjustment*).

SiliaPrep Metal Scavenger Phases SPE Formats									
Formats	Qty/Box	Cysteine	DMT	TAAcOH	TAAcONa	Thiol	Thiourea	Imidazole	Triamine
SiliaPrep SPE Cartridges									
1mL/50mg	100	SPE-R80530B-01B	SPE-R79030B-01B	SPE-R69030B-01B	SPE-R69230B-01B	SPE-R51030B-01B	SPE-R69530B-01B	SPE-R79230B-01B	SPE-R48030B-01B
1mL/100mg	100	SPE-R80530B-01C	SPE-R79030B-01C	SPE-R69030B-01C	SPE-R69230B-01C	SPE-R51030B-01C	SPE-R69530B-01C	SPE-R79230B-01C	SPE-R48030B-01C
3mL/200mg	50	SPE-R80530B-03G	SPE-R79030B-03G	SPE-R69030B-03G	SPE-R69230B-03G	SPE-R51030B-03G	SPE-R69530B-03G	SPE-R79230B-03G	SPE-R48030B-03G
3mL/500mg	50	SPE-R80530B-03P	SPE-R79030B-03P	SPE-R69030B-03P	SPE-R69230B-03P	SPE-R51030B-03P	SPE-R69530B-03P	SPE-R79230B-03P	SPE-R48030B-03P
6mL/500mg	50	SPE-R80530B-06P	SPE-R79030B-06P	SPE-R69030B-06P	SPE-R69230B-06P	SPE-R51030B-06P	SPE-R69530B-06P	SPE-R79230B-06P	SPE-R48030B-06P
6mL/1g	50	SPE-R80530B-06S	SPE-R79030B-06S	SPE-R69030B-06S	SPE-R69230B-06S	SPE-R51030B-06S	SPE-R69530B-06S	SPE-R79230B-06S	SPE-R48030B-06S
6mL/2g	50	SPE-R80530B-06U	SPE-R79030B-06U	SPE-R69030B-06U	SPE-R69230B-06U	SPE-R51030B-06U	SPE-R69530B-06U	SPE-R79230B-06U	SPE-R48030B-06U
12mL/2g	20	SPE-R80530B-12U	SPE-R79030B-12U	SPE-R69030B-12U	SPE-R69230B-12U	SPE-R51030B-12U	SPE-R69530B-12U	SPE-R79230B-12U	SPE-R48030B-12U
25mL/5g*	20	SPE-R80530B-20X	SPE-R79030B-20X	SPE-R69030B-20X	SPE-R69230B-20X	SPE-R51030B-20X	SPE-R69530B-20X	SPE-R79230B-20X	SPE-R48030B-20X
SiliaPrep Large Reservoir Volume SPE Cartridges									
10mL/200mg	50	SPC-R80530B-10G	SPC-R79030B-10G	SPC-R69030B-10G	SPC-R69230B-10G	SPC-R51030B-10G	SPC-R69530B-10G	SPC-R79230B-10G	SPC-R48030B-10G
10mL/500mg	50	SPC-R80530B-10P	SPC-R79030B-10P	SPC-R69030B-10P	SPC-R69230B-10P	SPC-R51030B-10P	SPC-R69530B-10P	SPC-R79230B-10P	SPC-R48030B-10P

\* Commercialized under SiliaSep OT branding



# SiliaPrepX™ : Polymeric SPE Cartridges and Well Plates

## Benefits of using SiliaPrepX Polymeric SPE Cartridges and Well Plates:

- **Higher loadability** than silica-based materials, allowing decreased solvent consumption.
- More concentrated samples thanks to **smaller elution volumes** (compared to silica-based materials).
- **Larger pH stability** than silica-based materials: 1 - 14.
- Exceptional lot-to-lot reproducibility.
- High recovery and yield.
- No contamination from the matrix in MS applications (reduced ion suppression and increased selectivity).



## SiliaPrepX Polymeric, A Complement to Our Silica-Based SPE Cartridges

At SiliCycle, we are committed to offer the best and most diversified portfolio for analytical, chromatographic and organic chemistry. That is why we developed the SiliaPrepX family of polymeric SPE cartridges and well plates, to cover the whole spectrum of your solid-phase extraction needs. All polymeric phases used in the field of sample purification are available in our SiliaPrepX family. This complete range of sorbents allows treatment of most common matrices:

- human and animal biological fluids
- waste waters
- petrochemical residues
- toxicological residues
- food and beverage

SiliaPrepX polymeric products are made using state of the art technology, providing highest quality and lot-to-lot reproducibility. In addition, we conduct strict quality controls and analysis during the manufacturing process to remove any impurity or defect that could alter our products.

## Cartridge Specifications & Custom Cartridges

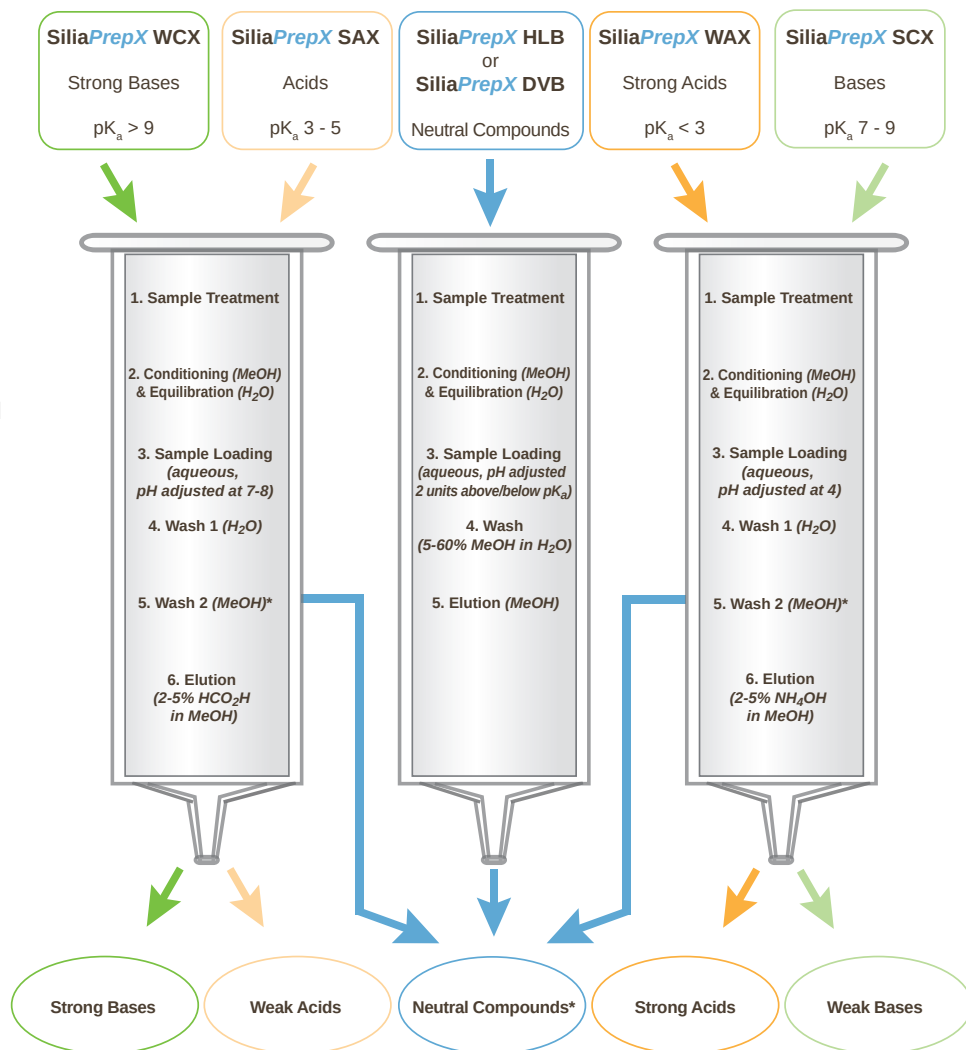
Standard SiliaPrepX cartridges are made with flanged polypropylene (PP) tubes and 20 µm polyethylene (PE) frits.

Other plastic materials (Teflon®, HDPE, etc.), frit porosity (10 µm) and cartridge rim's (flangeless) are available on a custom order basis.

## Choose the Optimal SiliaPrepX Polymeric Phase by a Simple & Logical Method

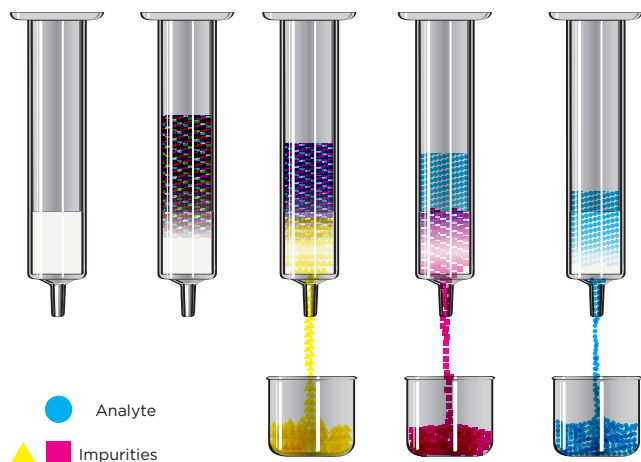
Follow the simple and logical steps below to determine the optimal SiliaPrepX polymeric phase to use for a clean extract and to achieve high recovery:

- 1) Determine your analyte's classification (*neutral, acidic or basic compound*)
- 2) Determine your analyte's  $pK_a$
- 3) Select the appropriate SiliaPrepX phase
- 4) Follow the corresponding protocol
- 5) Verify recovery by LC analysis



\*Polar compounds such as organic acids and bases can also be eluted after the Wash 2.

Conditioning    Loading    Washing Step 1    Washing Step 2    Elution



## SiliaPrepX Neutral Phases

### SiliaPrepX HLB

#### Description

Wettable copolymer presenting a Hydrophilic-Lipophilic Balance (*HLB*) allowing a strong retention for neutral, acidic and basic compounds, and a higher stability in organic solvents.

#### Typical Applications (*HLB* & *DVB*)

- Drugs and metabolites in biological fluids
- API from tablets and creams, in waste water & drinking water
- Environmental analysis: trace of PAHs, pesticides, herbicides, phenols and PCBs in water
- Antibiotics and pesticides in food & beverage

### SiliaPrepX DVB

#### Description

Polystyrene-divinylbenzene copolymer presenting a high hydrophobicity. Used as a reversed-phase for the extraction of neutral, acidic and basic compounds in viscous matrices or for post synthesis clean-up.

#### SiliaPrepX HLB & DVB General Extraction Proc.

Conditioning step	1 x Column volume of Methanol
Equilibration step	1 x Column volume of water
Loading step	Aqueous sample, pH adjusted 2 units above $pK_a$ ( <i>bases</i> ) or below $pK_a$ ( <i>acids</i> )
Washing step	1 x Column volume of 5 - 60% Methanol in water
Elution step	1 x Column volume of Methanol

Note: This procedure is a convenient starting point for method development. In general, SPE protocols tend to be very specific to each molecule. Further optimization may be required to tailor the method to your application needs.

SiliaPrepX Neutral Phases SPE Formats			
Formats	Qty/Box	SiliaPrepX HLB	SiliaPrepX DVB
SiliaPrepX Polymeric SPE Cartridges			
1 mL/30 mg	100	SPE-P0002-01AA	SPE-P0001-01AA
3 mL/30 mg	50	SPE-P0002-03AA	SPE-P0001-03AA
3 mL/30 mg	200	SPE-P0002-03AA-J	SPE-P0001-03AA-J
3 mL/60 mg	50	SPE-P0002-03BB	SPE-P0001-03BB
3 mL/60 mg	200	SPE-P0002-03BB-J	SPE-P0001-03BB-J
6 mL/100 mg	30	SPE-P0002-06C	SPE-P0001-06C
6 mL/200 mg	30	SPE-P0002-06G	SPE-P0001-06G
6 mL/500 mg	30	SPE-P0002-06P	SPE-P0001-06P
Custom formats available on request			
SiliaPrepX Polymeric 96-Well Plates			
2 mL/10 mg	1	96W-P0002-1A	96W-P0001-1A
2 mL/30 mg	1	96W-P0002-AA	96W-P0001-AA

## SiliaPrepX Ion Exchange Phases

### SiliaPrepX SAX

#### Description

Polystyrene-divinylbenzene copolymer functionalized by a strong anion exchanger (*Quaternary amine*,  $pK_a$  18), presenting a high selectivity for weak / medium acids ( $pK_a$  3 - 5). Highly stable in organic solvents.

#### Typical Applications

- Acidic compounds & metabolites from biological fluids & tissues
- Food additives & contaminants
- Phenolic acids
- Acidic herbicides

SiliaPrepX SAX General Extraction Procedure	
Conditioning step	1 x Column volume of methanol
Equilibration step	1 x Column volume of water
Loading step	Aqueous sample, pH adjusted at 7 - 8
Washing step 1	1 x Column volume of water
Washing step 2	1 x Column volume of methanol (elution of acidic and neutral compounds)
Elution step	1 x Column volume of 2 - 5% HCO <sub>2</sub> H in methanol (elution of weak acidic compounds)

Note: These procedures are a convenient starting point for method development. In general, SPE protocols tend to be very specific to each molecule. Further optimization may be required to tailor the method to your application needs.

### SiliaPrepX WAX

#### Description

Polystyrene-divinylbenzene copolymer functionalized by a weak anion exchanger (*Tertiary Amine*,  $pK_a$  6), used to catch and release strong acidic compounds ( $pK_a < 3$ ). Highly stable in organic solvents.

#### Typical Applications

- Strong acidic compounds & metabolites from biological fluids & tissues
- Sulfonates & perfluorinated surfactants

SiliaPrepX WAX General Extraction Procedure	
Conditioning step	1 x Column volume of methanol
Equilibration step	1 x Column volume of water
Loading step	Aqueous sample, pH adjusted at 4 - 5
Washing step 1	1 x Column volume of water
Washing step 2	1 x Column volume of methanol (elution of acidic and neutral compounds)
Elution step	1 x Column volume of 2 - 5% NH <sub>4</sub> OH in methanol (elution of strong acidic compounds)

### SiliaPrepX Anionic Exchange Phases SPE Formats

Formats	Qty/Box	SiliaPrepX SAX	SiliaPrepX WAX
SiliaPrepX Polymeric SPE Cartridges			
1 mL/30 mg	100	SPE-P0010-01AA	SPE-P0020-01AA
3 mL/30 mg	50	SPE-P0010-03AA	SPE-P0020-03AA
3 mL/30 mg	200	SPE-P0010-03AA-J	SPE-P0020-03AA-J
3 mL/60 mg	50	SPE-P0010-03BB	SPE-P0020-03BB
3 mL/60 mg	200	SPE-P0010-03BB-J	SPE-P0020-03BB-J
6 mL/100 mg	30	SPE-P0010-06C	SPE-P0020-06C
6 mL/200 mg	30	SPE-P0010-06G	SPE-P0020-06G
6 mL/500 mg	30	SPE-P0010-06P	SPE-P0020-06P
Custom formats available on request			
SiliaPrepX Polymeric 96-Well Plates			
2 mL/10 mg	1	96W-P0010-1A	96W-P0020-1A
2 mL/30 mg	1	96W-P0010-AA	96W-P0020-AA

## SiliaPrepX SCX

### Description

Polystyrene-divinylbenzene copolymer functionalized by a strong cation exchanger (*Benzenesulphonic Acid*,  $pK_a < 1$ ), presenting a high selectivity for weak / medium bases ( $pK_a$  7 - 9). Highly stable in organic solvents.

### Typical Applications

- Basic drugs from biological fluids & tissues
- Pesticides, herbicides, fungicides and melamine from food & beverage

SiliaPrepX SCX General Extraction Procedure	
Conditioning step	1 x Column volume of methanol
Equilibration step	1 x Column volume of water
Loading step	Aqueous sample, pH adjusted at 3-4
Washing step 1	1 x Column volume of water
Washing step 2	1 x Column volume of methanol ( <i>elution of acidic and neutral compounds</i> )
Elution step	1 x Column volume of 2 - 5% $NH_4OH$ in methanol ( <i>elution of weak basic compounds</i> )

Note: These procedures are a convenient starting point for method development. In general, SPE protocols tend to be very specific to each molecule. Further optimization may be required to tailor the method to your application needs.

## SiliaPrepX WCX

### Description

Polystyrene-divinylbenzene copolymer functionalized by a weak cation exchanger (*Carboxylic Acid*,  $pK_a$  5), used to catch and release strong basic compounds ( $pK_a > 9$ ). Highly stable in organic solvents.

### Typical Applications

- Strong basic compounds from biological fluids & tissues
- Streptomycin from food

SiliaPrepX WCX General Extraction Procedure	
Conditioning step	1 x Column volume of methanol
Equilibration step	1 x Column volume of water
Loading step	Aqueous sample, pH adjusted at 8
Washing step 1	1 x Column volume of water
Washing step 2	1 x Column volume of methanol ( <i>elution of acidic and neutral compounds</i> )
Elution step	1 x Column volume of 2 - 5% $HCO_2H$ in methanol ( <i>elution of strong basic compounds</i> )

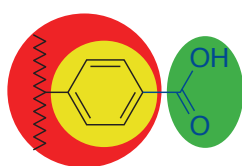
SiliaPrepX Cationic Exchange Phases SPE Formats			
Formats	Qty/Box	SiliaPrepX SCX	SiliaPrepX WCX
SiliaPrepX Polymeric SPE Cartridges			
1 mL/30 mg	100	SPE-P0005-01AA	SPE-P0015-01AA
3 mL/30 mg	50	SPE-P0005-03AA	SPE-P0015-03AA
3 mL/30 mg	200	SPE-P0005-03AA-J	SPE-P0015-03AA-J
3 mL/60 mg	50	SPE-P0005-03BB	SPE-P0015-03BB
3 mL/60 mg	200	SPE-P0005-03BB-J	SPE-P0015-03BB-J
6 mL/100 mg	30	SPE-P0005-06C	SPE-P0015-06C
6 mL/200 mg	30	SPE-P0005-06G	SPE-P0015-06G
6 mL/500 mg	30	SPE-P0005-06P	SPE-P0015-06P
Custom formats available on request			
SiliaPrepX Polymeric 96-Well Plates			
2 mL/10 mg	1	96W-P0005-1A	96W-P0015-1A
2 mL/30 mg	1	96W-P0005-AA	96W-P0015-AA

## Mechanisms of retention

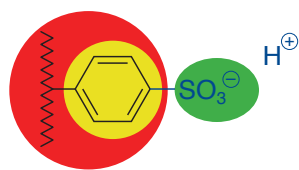
### SiliaPrepX SCX and SiliaPrepX WCX

#### Mechanisms of retention

- Cationic Exchange
- $\pi$ - $\pi$  Bonding
- Hydrophobic Interactions



SiliaPrepX  
WCX

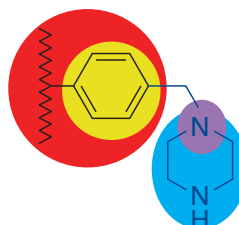


SiliaPrepX  
SCX

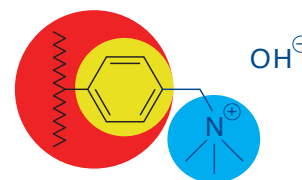
### SiliaPrepX SAX and SiliaPrepX WAX

#### Mechanisms of retention

- Anionic Exchange
- $\pi$ - $\pi$  Bonding
- Hydrophobic Interactions
- Hydrogen Bonding Dipole-Dipole Interaction



SiliaPrepX  
WAX

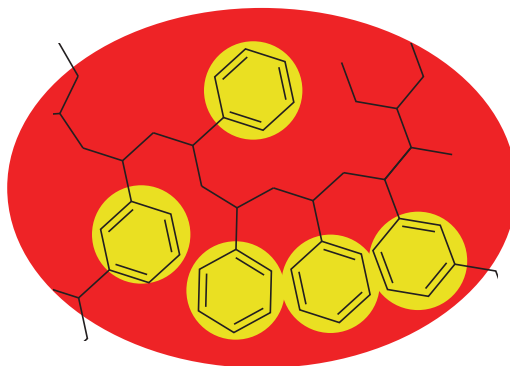


SiliaPrepX  
SAX


### SiliaPrepX HLB and SiliaPrepX DVB

#### Mechanisms of retention

- $\pi$ - $\pi$  Bonding
- Hydrophobic Interactions



## Method Development Kits

 <b>SiliaPrep and SiliaPrepX Development Kits</b>				
PN	Kits	Formats	Qty/Box	Phases
<b>SiliaPrep Silica-Based SPE Cartridges Kits</b>				
SPE-K32730B-03P	SiliaPrep Reversed Phase Development Kit	3 mL/500 mg	10 cartridges of each phase	C8, C18 Plus (17%), C18 <i>nec</i> (23%), Cyano, Phenyl, PFP
SPE-K31430B-03P	SiliaPrep Ion Exchange Development Kit	3 mL/500 mg	10 cartridges of each phase	SAX, SAX-2, WAX, SCX, SCX-2, WCX
SPE-K30730B-03P	SiliaPrep Metal Scavenger Development Kit	3 mL/500 mg	10 cartridges of each phase	Cysteine, DMT, Imidazole, TAAcOH, TAAcONa, Thiol, Thiourea, Triamine
<b>SiliaPrep Silica-Based 96-Well Plates Kits</b>				
96W-K32730B-C	SiliaPrep Reversed Phase Development Kit	2 mL/100 mg	3 plates of each phase	C8, C18 Plus (17%), C18 <i>nec</i> (23%), Cyano, Phenyl, PFP
96W-K31430B-C	SiliaPrep Ion Exchange Development Kit	2 mL/100 mg	3 plates of each phase	SAX, SAX-2, WAX, SCX, SCX-2, WCX
<b>SiliaPrepX Polymeric SPE Cartridges Kits</b>				
SPE-K0050-03BB	SiliaPrepX Polymeric Development Kit	3 mL/60 mg	10 cartridges of each phase	HLB, DVB, SAX, WAX, SCX, WCX
<b>SiliaPrepX Polymeric 96-Well Plates Kits</b>				
96W-K0050-AA	SiliaPrepX Polymeric Development Kit	2 mL/30 mg	3 plates of each phase	HLB, DVB, SAX, WAX, SCX, WCX
<b>SiliaPrep &amp; SiliaPrepX SPE Cartridges Kits</b>				
SPE-KMIXA-03GBB	SiliaPrep & SiliaPrepX Anionic Exchange Development Kit	SiliaPrep: 3 mL/200 mg SiliaPrepX: 3 mL/60 mg	10 cartridges of each phase	SiliaPrep: SAX, SAX-2, WAX SiliaPrepX: SAX, WAX
SPE-KMIXC-03GBB	SiliaPrep & SiliaPrepX Cationic Exchange Development Kit	SiliaPrep: 3 mL/200 mg SiliaPrepX: 3 mL/60 mg	10 cartridges of each phase	SiliaPrep: SCX, SCX-2, WCX SiliaPrepX: SCX, WCX
<b>SiliaPrep &amp; SiliaPrepX 96-Well Plates Kits</b>				
96W-KMIXA-CAA	SiliaPrep & SiliaPrepX Anionic Exchange Development Kit	SiliaPrep: 2 mL/100 mg SiliaPrepX: 2 mL/30 mg	3 plates of each phase	SiliaPrep: SAX, SAX-2, WAX SiliaPrepX: SAX, WAX
96W-KMIXC-CAA	SiliaPrep & SiliaPrepX Cationic Exchange Development Kit	SiliaPrep: 2 mL/100 mg SiliaPrepX: 2 mL/30 mg	3 plates of each phase	SiliaPrep: SCX, SCX-2, WCX SiliaPrepX: SCX, WCX

# SiliaPrep™ and SiliaPrepX™ Applications



Forensic



## Extraction of Methadone from Human Urine and Serum

CARTRIDGE	SiliaPrepX SCX 6 mL/200 mg Part Number: SPE-P0005-06G						
SAMPLE PRETREATMENT	200 µL of Phosphoric Acid 2% was added to 1 mL of urine / serum sample						
CONDITIONNING STEP	6 mL of Methanol						
EQUILIBRATION STEP	6 mL of water						
LOADING STEP	Treated sample was slowly aspirated through the cartridge						
WASHING STEP	6 mL of Hydrochloric Acid 0.1N then 6 mL of Methanol, dry the cartridge						
ELUTION STEP	2 x 3 mL of 10% Ammonia in Methanol						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Methadone in urine</td> <td>90%</td> </tr> <tr> <td>Methadone in serum</td> <td>95%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)		Methadone in urine	90%	Methadone in serum	95%
Recovery (at 1 µg/mL)							
Methadone in urine	90%						
Methadone in serum	95%						

## Extraction of Methadone from Human Urine and Serum

CARTRIDGE	SiliaPrepX WAX 3 mL/60 mg Part Number: SPE-P0020-03BB
SAMPLE PRETREATMENT	5 mL of serum was mixed with 5 µL of a solution of Camphor Sulfonic Acid (0.5 mg/mL) and 5 mL of Phosphoric Acid 4%
CONDITIONNING STEP	2 mL of Methanol
EQUILIBRATION STEP	2 mL of water
LOADING STEP	2 mL of sample solution was slowly aspirated through the cartridge
WASHING STEP	2 mL of 2% Formic Acid in water then 2 mL of Methanol, dry the cartridge
ELUTION STEP	2 mL of 5% Ammonia in Methanol
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS
RECOVERY	Recovery (at 0.25 µg/mL): 99%

## Extraction of Methadone and EDDP from Human Urine

CARTRIDGE	SiliaPrepX HLB 1 mL/30 mg Part Number: SPE-P0002-01AA						
SAMPLE PRETREATMENT	40 µL of internal standard (Methadone-d9 at 200 ng/mL in Methanol) was added to 200 µL of urine sample and 200 µL of Ammonium Hydroxide 4%						
CONDITIONNING STEP	1 mL of Methanol						
EQUILIBRATION STEP	1 mL of Ammonium Hydroxide 2%						
LOADING STEP	Urine sample was slowly aspirated through the cartridge						
WASHING STEP	1 mL of Methanol / Ammonium Hydroxide 2% (50:50) then 1 mL of Methanol / Ammonium Hydroxide 2% (80:20)						
ELUTION STEP	1 mL of Methanol / water (80:20)						
FURTHER TREATMENT	Quantification by LDTD-MS/MS*						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1,000 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>Methadone</td> <td>91%</td> </tr> <tr> <td>EDDP</td> <td>85%</td> </tr> </tbody> </table>	Recovery (at 1,000 ng/mL)		Methadone	91%	EDDP	85%
Recovery (at 1,000 ng/mL)							
Methadone	91%						
EDDP	85%						

\* Collaboration with Phytroxin

## Extraction of Fentanyl and Norfentanyl from Urine

CARTRIDGE	SiliaPrep CleanDRUG 1 mL/100 mg Part Number: SPEC-R651230B-01C						
SAMPLE PRETREATMENT	200 µL of urine was added to 600 µL of Sodium Acetate in water and 40 µL of internal standard (200 ng/mL in Methanol)						
CONDITIONNING STEP	1 mL of Methanol						
EQUILIBRATION STEP	1 mL of water and 1 mL of Sodium Acetate in water (100mM, pH 6.0)						
LOADING STEP	Urine sample was slowly aspirated through the cartridge						
WASHING STEP	1 mL of water then 1 mL of Methanol						
ELUTION STEP	1 mL of Ethyl Acetate / Isopropanol / Ammonium Hydroxide (78:20:2)						
FURTHER TREATMENT	Evaporation, reconstitution and quantification by LDTD-MS/MS*						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 500 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>Fentanyl</td> <td>96%</td> </tr> <tr> <td>Norfentanyl</td> <td>98%</td> </tr> </tbody> </table>	Recovery (at 500 ng/mL)		Fentanyl	96%	Norfentanyl	98%
Recovery (at 500 ng/mL)							
Fentanyl	96%						
Norfentanyl	98%						

\* Collaboration with Phytroxin





### Extraction of Codeine from Human Urine and Serum

CARTRIDGE	SiliaPrepX SCX 6 mL/200 mg Part Number: SPE-P0005-06G						
SAMPLE PRETREATMENT	200 µL of Phosphoric Acid 2% was added to 1 mL of urine / serum sample						
CONDITIONNING STEP	6 mL of Methanol						
EQUILIBRATION STEP	6 mL of water						
LOADING STEP	Treated sample was slowly aspirated through the cartridge						
WASHING STEP	6 mL of Hydrochloric Acid 0.1N then 6 mL of Methanol, dry the cartridge						
ELUTION STEP	2 x 3 mL of 5% Ammonia in Methanol						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Codeine in urine</td> <td>70%</td> </tr> <tr> <td>Codeine in serum</td> <td>92%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)		Codeine in urine	70%	Codeine in serum	92%
Recovery (at 1 µg/mL)							
Codeine in urine	70%						
Codeine in serum	92%						

### Extraction of Phencyclidine (PCP) from Human Urine

CARTRIDGE	SiliaPrepX HLB 1 mL/30 mg Part Number: SPE-P0002-01AA
SAMPLE PRETREATMENT	40 µL of internal standard (PCP-d5 at 200 ng/mL in Methanol) was added to 200 µL of urine sample and 200 µL of Ammonium Hydroxide 4%
CONDITIONNING STEP	1 mL of Methanol
EQUILIBRATION STEP	1 mL of Ammonium Hydroxide 2%
LOADING STEP	Urine sample was slowly aspirated through the cartridge
WASHING STEP	1 mL of Methanol / Ammonium Hydroxide 2% (50:50) then 1 mL of Methanol / Ammonium Hydroxide 2% (80:20)
ELUTION STEP	1 mL of Methanol / Hydrochloric Acid 0.02N (80:20)
FURTHER TREATMENT	Quantification by LDTD-MS/MS*
RECOVERY	Recovery (at 25 ng/mL): 99%

\* Collaboration with Phytronix

### Isolation of Synthetic Cannabinoid Metabolites from Urine

CARTRIDGE	SiliaPrep CleanDRUG 1 mL/30 mg Part Number: SPEC-R651230B-03G																				
SAMPLE PRETREATMENT	1 mL of synthetic urine was spiked with the metabolites and deuterated internal standard, then diluted with 2 mL of a Phosphate buffer solution (pH 6)																				
CONDITIONNING STEP	3 mL of Methanol																				
EQUILIBRATION STEP	3 mL of water and 1 mL of Phosphate buffer																				
LOADING STEP	Urine sample was slowly aspirated through the cartridge																				
WASHING STEP	3 mL of water then 3 mL of Phosphate buffer / Acetonitrile (80:20)																				
ELUTION STEP	6 mL of Ethyl Acetate / Methanol (90:10)																				
FURTHER TREATMENT	Evaporation under Nitrogen, derivatization using BSTFA and TMCS, and quantification by GC-MS																				
RECOVERY	<table border="1"> <thead> <tr> <th>Recovery (at 1,000 ng/mL)</th> <th>SiliaPrepX HLB</th> <th>Bond Elut® Certify II</th> <th>Hyper-Sep™ Verify AX</th> <th>Clean Screen® CSTHC</th> </tr> </thead> <tbody> <tr> <td>JWH-018</td> <td>102%</td> <td>109%</td> <td>112%</td> <td>97%</td> </tr> <tr> <td>JWH-122</td> <td>96%</td> <td>72%</td> <td>111%</td> <td>80%</td> </tr> <tr> <td>JWH-250</td> <td>101%</td> <td>71%</td> <td>118%</td> <td>89%</td> </tr> </tbody> </table>	Recovery (at 1,000 ng/mL)	SiliaPrepX HLB	Bond Elut® Certify II	Hyper-Sep™ Verify AX	Clean Screen® CSTHC	JWH-018	102%	109%	112%	97%	JWH-122	96%	72%	111%	80%	JWH-250	101%	71%	118%	89%
Recovery (at 1,000 ng/mL)	SiliaPrepX HLB	Bond Elut® Certify II	Hyper-Sep™ Verify AX	Clean Screen® CSTHC																	
JWH-018	102%	109%	112%	97%																	
JWH-122	96%	72%	111%	80%																	
JWH-250	101%	71%	118%	89%																	

### Detection of Δ<sup>9</sup>-Tetrahydrocannabinol in Human Plasma

CARTRIDGE	SiliaPrep C18 3 mL/500 mg Part Number: SPE-R31930B-03P								
SAMPLE PRETREATMENT	250 µL of plasma was added to 1 mL Phosphate buffer (0.1M, pH 6.0)								
CONDITIONNING STEP	3 mL of Methanol, then 3 mL of Hydrochloric Acid 1M and 3 mL of water								
EQUILIBRATION STEP	5 mL of water								
LOADING STEP	Plasma sample was slowly aspirated through the cartridge								
WASHING STEP	2 mL of water, then 1 mL of Acetic Acid 1M and 2 mL of 20% Methanol in water								
ELUTION STEP	5 mL of Methanol								
FURTHER TREATMENT	Evaporation under Nitrogen, derivatization using Dansyl Chloride, liquid-liquid extraction, centrifugation, evaporation under Nitrogen, reconstitution with Formic Acid / Acetone and quantification by LC-MS								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 2 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>THC</td> <td>80%</td> </tr> <tr> <td>THC-COOH</td> <td>99%</td> </tr> <tr> <td>THC-OH</td> <td>92%</td> </tr> </tbody> </table>	Recovery (at 2 ng/mL)		THC	80%	THC-COOH	99%	THC-OH	92%
Recovery (at 2 ng/mL)									
THC	80%								
THC-COOH	99%								
THC-OH	92%								

Source: Thesis "An Evaluation of Commercially Available Solid Phase Extraction Cartridges for the Isolation of Synthetic Cannabinoid Metabolites from urine", by Amanda Marie Forni, B.S., Ohio University, 2011



### Extraction of Tricyclic Antidepressants from Serum

CARTRIDGE	SiliaPrepX WCX 3 mL/60 mg Part Number: SPE-P0015-03BB										
SAMPLE PRETREATMENT	250 µL of serum were diluted with 1 mL of 10% Formic Acid in water										
CONDITIONNING STEP	3 mL of Methanol										
EQUILIBRATION STEP	3 mL of water										
LOADING STEP	Treated sample was slowly aspirated through the cartridge										
WASHING STEP	1 mL of 5% Formic Acid in water then 1 mL Methanol, dry the cartridge										
ELUTION STEP	3 mL of 5% Formic Acid in Methanol										
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS										
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Doxepine</td> <td>79%</td> </tr> <tr> <td>Imipramine</td> <td>79%</td> </tr> <tr> <td>Amitriptyline</td> <td>91%</td> </tr> <tr> <td>Trimipramine</td> <td>98%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)		Doxepine	79%	Imipramine	79%	Amitriptyline	91%	Trimipramine	98%
Recovery (at 1 µg/mL)											
Doxepine	79%										
Imipramine	79%										
Amitriptyline	91%										
Trimipramine	98%										

### Extraction of Pharmaceutical Drugs from Serum

CARTRIDGE	SiliaPrepX SAX 6 mL/200 mg Part Number: SPE-P0010-06G																								
SAMPLE PRETREATMENT	pH of serum sample was adjusted to basic value with Sodium Hydroxide 1N																								
CONDITIONNING STEP	6 mL of Methanol																								
EQUILIBRATION STEP	6 mL of water																								
LOADING STEP	Treated sample was slowly aspirated through the cartridge																								
WASHING STEP	6 mL of water, dry the cartridge																								
ELUTION STEP	2 x 3 mL of Methanol ( <i>basic analytes</i> ) and 2 x 3 mL of Formic Acid 10% in Methanol ( <i>acidic analytes</i> )																								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS																								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Nortriptyline</td> <td>69%</td> <td>Imipramine</td> <td>80%</td> </tr> <tr> <td>Doxepine</td> <td>72%</td> <td>Tolmetin</td> <td>85%</td> </tr> <tr> <td>Trimipramine</td> <td>73%</td> <td>Naproxen</td> <td>86%</td> </tr> <tr> <td>Protriptyline</td> <td>75%</td> <td>Suprofen</td> <td>96%</td> </tr> <tr> <td>Amitriptyline</td> <td>78%</td> <td></td> <td></td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)				Nortriptyline	69%	Imipramine	80%	Doxepine	72%	Tolmetin	85%	Trimipramine	73%	Naproxen	86%	Protriptyline	75%	Suprofen	96%	Amitriptyline	78%		
Recovery (at 1 µg/mL)																									
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Protriptyline	75%	Suprofen	96%																						
Amitriptyline	78%																								

### Ropinirole & Amitriptyline Detection in Human Plasma

CARTRIDGE	SiliaPrep CleanDRUG 3 mL/500 mg Part Number: SPEC-R651230B-03P						
SAMPLE PRETREATMENT	Mix 0.1 mL of plasma with 0.1 mL of Methanol and water (50/50) and 2 mL of 1% Acetic Acid						
CONDITIONNING STEP	3 mL of Methanol						
EQUILIBRATION STEP	3 mL of water						
LOADING STEP	Plasma sample was slowly aspirated through the cartridge						
WASHING STEP	3 mL of water then 3 mL of Methanol						
ELUTION STEP	3 mL of 5% Ammonium Hydroxide in Methanol						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 10 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>Ropinirole</td> <td>94%</td> </tr> <tr> <td>Amitriptyline</td> <td>90%</td> </tr> </tbody> </table>	Recovery (at 10 ng/mL)		Ropinirole	94%	Amitriptyline	90%
Recovery (at 10 ng/mL)							
Ropinirole	94%						
Amitriptyline	90%						

### Extraction of Pharmaceutical Drugs from Serum

CARTRIDGE	SiliaPrepX SCX 6 mL/200 mg Part Number: SPE-P0005-06G																								
SAMPLE PRETREATMENT	200 µL of Phosphoric Acid 2% was added to 1 mL of serum sample																								
CONDITIONNING STEP	6 mL of Methanol																								
EQUILIBRATION STEP	6 mL of water																								
LOADING STEP	Treated sample was slowly aspirated through the cartridge																								
WASHING STEP	6 mL of Chlorhydric Acid 0.1N, dry the cartridge																								
ELUTION STEP	2 x 3 mL of Methanol ( <i>acidic and neutrals analytes</i> ) and 2 x 3 mL of 10% Ammonia in Methanol ( <i>basic analytes</i> )																								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS																								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Indomethacin</td> <td>33%</td> <td>Phenobarbital</td> <td>108%</td> </tr> <tr> <td>Tolmetin</td> <td>73%</td> <td>Trimipramine</td> <td>92%</td> </tr> <tr> <td>Hexobarbital</td> <td>80%</td> <td>Amitriptyline</td> <td>94%</td> </tr> <tr> <td>Naproxen</td> <td>85%</td> <td>Imipramine</td> <td>95%</td> </tr> <tr> <td>Suprofen</td> <td>108%</td> <td>Doxepin</td> <td>101%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)				Indomethacin	33%	Phenobarbital	108%	Tolmetin	73%	Trimipramine	92%	Hexobarbital	80%	Amitriptyline	94%	Naproxen	85%	Imipramine	95%	Suprofen	108%	Doxepin	101%
Recovery (at 1 µg/mL)																									
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Hexobarbital	80%	Amitriptyline	94%																						
Naproxen	85%	Imipramine	95%																						
Suprofen	108%	Doxepin	101%																						



### Amphetamine Quantification in Human Urine

CARTRIDGE	SiliaPrepX HLB 3 mL/60 mg Part Number: SPE-P0002-03BB																																						
SAMPLE PRETREATMENT	100 µL of TFA was added to 10 mL of urine																																						
CONDITIONNING STEP	3 mL of Methanol																																						
EQUILIBRATION STEP	3 mL of water																																						
LOADING STEP	1 mL of urine sample was slowly aspirated through the cartridge																																						
WASHING STEP	3 mL of (5:95) Methanol / water with 2% Ammonium Hydroxide; then 3 mL of (20:80) Methanol / water with 2% Ammonium Hydroxide and 1 mL of (80:20) Methanol / water																																						
ELUTION STEP	3 mL of Methanol then 3 mL of 2% Formic Acid in Methanol																																						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water (70:30) and quantification by LC-MS																																						
RECOVERY	<table border="1"> <thead> <tr> <th>Recovery (at 100 ng/mL)</th> <th>Silia-PrepX HLB</th> <th>Bond Elut® Plexa</th> <th>Oasis® HLB</th> <th>Strata™-X</th> </tr> </thead> <tbody> <tr> <td>Amphetamine</td> <td>91%</td> <td>88%</td> <td>75%</td> <td>87%</td> </tr> <tr> <td>MDA</td> <td>86%</td> <td>86%</td> <td>91%</td> <td>98%</td> </tr> <tr> <td>MDEA</td> <td>95%</td> <td>97%</td> <td>90%</td> <td>101%</td> </tr> <tr> <td>MDMA</td> <td>92%</td> <td>94%</td> <td>91%</td> <td>101%</td> </tr> <tr> <td>Methamphetamine</td> <td>92%</td> <td>95%</td> <td>86%</td> <td>101%</td> </tr> <tr> <td>Phentermine</td> <td>99%</td> <td>93%</td> <td>90%</td> <td>97%</td> </tr> </tbody> </table>				Recovery (at 100 ng/mL)	Silia-PrepX HLB	Bond Elut® Plexa	Oasis® HLB	Strata™-X	Amphetamine	91%	88%	75%	87%	MDA	86%	86%	91%	98%	MDEA	95%	97%	90%	101%	MDMA	92%	94%	91%	101%	Methamphetamine	92%	95%	86%	101%	Phentermine	99%	93%	90%	97%
Recovery (at 100 ng/mL)	Silia-PrepX HLB	Bond Elut® Plexa	Oasis® HLB	Strata™-X																																			
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MDEA	95%	97%	90%	101%																																			
MDMA	92%	94%	91%	101%																																			
Methamphetamine	92%	95%	86%	101%																																			
Phentermine	99%	93%	90%	97%																																			

### Drugs of Abuse Determination in Human Urine

CARTRIDGE	SiliaPrep CleanDRUG 3 mL/200 mg Part Number: SPEC-R651230B-03G									
SAMPLE PRETREATMENT	0.5 mL of urine sample was mixed with 2.5 mL Sulfuric Acid 0.1M									
CONDITIONNING STEP	3 mL of Methanol									
EQUILIBRATION STEP	3 mL of Sulfuric Acid 0.1M									
LOADING STEP	2 mL of urine sample was slowly aspirated through the cartridge									
WASHING STEP	3 mL of Phosphate buffer (pH 7), then 3 mL of Sulfuric Acid 0.1M and 3 mL of Methanol									
ELUTION STEP	2 x 3 mL of Ammonium Hydroxide (5% in Methanol)									
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Methanol and quantification by LC-MS									
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 25 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>MDMA</td> <td>92%</td> </tr> <tr> <td>MDEA</td> <td>89%</td> </tr> <tr> <td>Amphetamine</td> <td>82%</td> </tr> </tbody> </table>		Recovery (at 25 ng/mL)		MDMA	92%	MDEA	89%	Amphetamine	82%
Recovery (at 25 ng/mL)										
MDMA	92%									
MDEA	89%									
Amphetamine	82%									

### Extraction of Acidic Pharmaceuticals from Serum

CARTRIDGE	SiliaPrepX SAX 6 mL/200 mg Part Number: SPE-P0010-06G																						
SAMPLE PRETREATMENT	pH of serum sample was adjusted to basic value with Sodium Hydroxide 1N																						
CONDITIONNING STEP	6 mL of Methanol																						
EQUILIBRATION STEP	6 mL of water																						
LOADING STEP	Treated sample was slowly aspirated through the cartridge																						
WASHING STEP	6 mL of water, then 6 mL of Sodium Hydroxide 0.1N and 6 mL of Methanol, dry the cartridge																						
ELUTION STEP	6 mL of 1% Formic Acid in Methanol																						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS																						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Carprofen</td> <td>69%</td> <td>Diclofenac</td> <td>95%</td> </tr> <tr> <td>Ibuprofen</td> <td>88%</td> <td>Fenoprofen</td> <td>98%</td> </tr> <tr> <td>Ketoprofen</td> <td>90%</td> <td>Fenoprop</td> <td>104%</td> </tr> <tr> <td>Meclufenamic Acid</td> <td>92%</td> <td>Flurbiprofen</td> <td>106%</td> </tr> </tbody> </table>			Recovery (at 1 µg/mL)				Carprofen	69%	Diclofenac	95%	Ibuprofen	88%	Fenoprofen	98%	Ketoprofen	90%	Fenoprop	104%	Meclufenamic Acid	92%	Flurbiprofen	106%
Recovery (at 1 µg/mL)																							
Carprofen	69%	Diclofenac	95%																				
Ibuprofen	88%	Fenoprofen	98%																				
Ketoprofen	90%	Fenoprop	104%																				
Meclufenamic Acid	92%	Flurbiprofen	106%																				

### Sibutramine Detection in Human Plasma

CARTRIDGE	SiliaPrep CleanDRUG 3 mL/500 mg Part Number: SPEC-R651230B-03P	
SAMPLE PRETREATMENT	Mix 0.1 mL of plasma with 2 mL of 1 % Acetic Acid	
CONDITIONNING STEP	3 mL of Methanol	
EQUILIBRATION STEP	3 mL of water	
LOADING STEP	Plasma sample was slowly aspirated through the cartridge	
WASHING STEP	3 mL of water then 3 mL of Methanol	
ELUTION STEP	3 mL of 5% Ammonium Hydroxide in Methanol	
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS	
RECOVERY	Recovery (at 5 ng/mL): 82%	



### Determination of Testosterone in Human Urine

CARTRIDGE	Mini-SiliaPrep C18 WPD 500 mg Part Number: SPS-R33229G-P
CONDITIONNING STEP	5 mL of Methanol
EQUILIBRATION STEP	5 mL of water
LOADING STEP	2mL of urine sample was slowly aspirated through the cartridge
WASHING STEP	5 mL of water then 5 mL of Hexane
ELUTION STEP	5 mL of Methanol
FURTHER TREATMENT	Evaporation under Nitrogen, derivatization using Girard-P and quantification by LC-MS/MS
RECOVERY	Recovery (at 250 ng/mL): 95%

### Determination of Clenbuterol in Human Plasma

CARTRIDGE	SiliaPrep CleanDRUG 1 mL/100 mg Part Number: SPEC-R651230B-01C
SAMPLE PRETREATMENT	50 µL of internal standard ( <i>Clenbuterol-d9</i> at 20 ng/mL in Methanol) was added to 500 µL of plasma and 500 µL of Sodium Acetate (100 mM, pH 6)
CONDITIONNING STEP	1 mL of Methanol
EQUILIBRATION STEP	1 mL of water and 1 mL of Sodium Acetate (100 mM, pH 6)
LOADING STEP	Plasma sample was slowly aspirated through the cartridge
WASHING STEP	1 mL of water, then 1 mL of Acetic Acid 1M and 2 x 1 mL of Methanol
ELUTION STEP	1 mL of Ethyl Acetate/Isopropanol/Ammonium Hydroxide (78:20:2)
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LDTD-MS/MS*
RECOVERY	Recovery (at 100 pg/mL): 94%

\* Collaboration with Phytionix

### Extraction of Atenolol from Human Urine

CARTRIDGE	SiliaPrepX WCX 3 mL/60 mg Part Number: SPE-P0015-03BB
SAMPLE PRETREATMENT	9 mL of urine was mixed with 1 mL of a solution of Atenolol in Methanol / Water (10:90)
CONDITIONNING STEP	2 mL of Methanol
EQUILIBRATION STEP	2 mL of water
LOADING STEP	1 mL of sample solution was slowly aspirated through the cartridge
WASHING STEP	2 mL of Monopotassium Phosphate 25 mM (pH 5) then 2 mL of Methanol, dry the cartridge
ELUTION STEP	2 mL of 2% Formic Acid in Methanol
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS
RECOVERY	Recovery (at 10 µg/mL): 90%

### Extraction of Caffeine, Cotinine & Nicotine from Human Urine

CARTRIDGE	SiliaPrepX HLB 3 mL/60 mg Part Number: SPE-P0002-03BB																				
SAMPLE PRETREATMENT	500 µL of urine was mixed with 1.5 mL of Sodium Hydroxide 0.1M																				
CONDITIONNING STEP	3 mL of Methanol																				
EQUILIBRATION STEP	3 mL of water																				
LOADING STEP	1 mL of urine sample was slowly aspirated through the cartridge																				
WASHING STEP	3 mL of water and dry the cartridge																				
ELUTION STEP	3 mL of Methanol																				
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS																				
RECOVERY																					
	<table border="1"> <thead> <tr> <th>Recovery (at 100 ng/mL)</th> <th>SiliaPrepX HLB</th> <th>Bond Elut® Plexa</th> <th>Oasis® HLB</th> <th>Strata™-X</th> </tr> </thead> <tbody> <tr> <td>Caffeine</td> <td>97%</td> <td>99%</td> <td>96%</td> <td>97%</td> </tr> <tr> <td>Cotinine</td> <td>99%</td> <td>100%</td> <td>98%</td> <td>99%</td> </tr> <tr> <td>Nicotine</td> <td>89%</td> <td>86%</td> <td>90%</td> <td>89%</td> </tr> </tbody> </table>	Recovery (at 100 ng/mL)	SiliaPrepX HLB	Bond Elut® Plexa	Oasis® HLB	Strata™-X	Caffeine	97%	99%	96%	97%	Cotinine	99%	100%	98%	99%	Nicotine	89%	86%	90%	89%
Recovery (at 100 ng/mL)	SiliaPrepX HLB	Bond Elut® Plexa	Oasis® HLB	Strata™-X																	
Caffeine	97%	99%	96%	97%																	
Cotinine	99%	100%	98%	99%																	
Nicotine	89%	86%	90%	89%																	



### Extraction of Alkaloids from Serum

CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G												
CONDITIONNING STEP	6 mL of Methanol												
EQUILIBRATION STEP	6 mL of water												
LOADING STEP	1 mL of serum sample was slowly aspirated through the cartridge												
WASHING STEP	6 mL of Methanol, dry the cartridge												
ELUTION STEP	2 x 3 mL of Acetone												
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS												
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 2 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Atropine</td> <td>99%</td> </tr> <tr> <td>Papaverine</td> <td>97%</td> </tr> <tr> <td>Noscapine</td> <td>95%</td> </tr> <tr> <td>Strychnine</td> <td>94%</td> </tr> <tr> <td>Quinine</td> <td>60%</td> </tr> </tbody> </table>	Recovery (at 2 µg/mL)		Atropine	99%	Papaverine	97%	Noscapine	95%	Strychnine	94%	Quinine	60%
Recovery (at 2 µg/mL)													
Atropine	99%												
Papaverine	97%												
Noscapine	95%												
Strychnine	94%												
Quinine	60%												

### Extraction of Anti-inflammatory Drugs From Serum

CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G																				
CONDITIONNING STEP	6 mL of Methanol																				
EQUILIBRATION STEP	6 mL of water																				
LOADING STEP	1 mL of serum sample (pH value adjusted with 25 µL of Phosphoric Acid) was slowly aspirated through the cartridge																				
WASHING STEP	6 mL of 5% Methanol in water, dry the cartridge																				
ELUTION STEP	2 x 3 mL of Methanol																				
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS																				
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery</th> </tr> </thead> <tbody> <tr> <td>Suprofen</td> <td>89%</td> <td>Naproxen</td> <td>87%</td> </tr> <tr> <td>Tolmetin</td> <td>89%</td> <td>Flurbiprofen</td> <td>87%</td> </tr> <tr> <td>Sulindac</td> <td>84%</td> <td>Indomethazin</td> <td>85%</td> </tr> <tr> <td>Piroxicam</td> <td>86%</td> <td>Acetyl Salicylic Acid</td> <td>72%</td> </tr> </tbody> </table>	Recovery				Suprofen	89%	Naproxen	87%	Tolmetin	89%	Flurbiprofen	87%	Sulindac	84%	Indomethazin	85%	Piroxicam	86%	Acetyl Salicylic Acid	72%
Recovery																					
Suprofen	89%	Naproxen	87%																		
Tolmetin	89%	Flurbiprofen	87%																		
Sulindac	84%	Indomethazin	85%																		
Piroxicam	86%	Acetyl Salicylic Acid	72%																		

### Extraction of Barbiturates from Serum

CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G								
CONDITIONNING STEP	6 mL of Methanol								
EQUILIBRATION STEP	6 mL of water								
LOADING STEP	1 mL of serum sample was slowly aspirated through the cartridge								
WASHING STEP	6 mL of water, dry the cartridge								
ELUTION STEP	6 x 1 mL of Methanol								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 100 ng/ml)</th> </tr> </thead> <tbody> <tr> <td>Phenobarbital</td> <td>99%</td> </tr> <tr> <td>Pentobarbital</td> <td>69%</td> </tr> <tr> <td>Hexobarbital</td> <td>86%</td> </tr> </tbody> </table>	Recovery (at 100 ng/ml)		Phenobarbital	99%	Pentobarbital	69%	Hexobarbital	86%
Recovery (at 100 ng/ml)									
Phenobarbital	99%								
Pentobarbital	69%								
Hexobarbital	86%								

### Extraction of Antibacterial Drugs from Serum

CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G										
SAMPLE PRETREATMENT	Mix 0.1 mL of plasma with 2 mL of 1 % Acetic Acid										
CONDITIONNING STEP	6 mL of Methanol										
EQUILIBRATION STEP	6 mL of water										
LOADING STEP	1 mL of serum sample was slowly aspirated through the cartridge										
WASHING STEP	6 mL of water, dry the cartridge										
ELUTION STEP	2 x 3 mL of Methanol										
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / Water and quantification by LC-MS										
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery</th> </tr> </thead> <tbody> <tr> <td>Cinoxacin</td> <td>100%</td> </tr> <tr> <td>Penicillin G</td> <td>94%</td> </tr> <tr> <td>Penicillin V</td> <td>90%</td> </tr> <tr> <td>Cloxacillin</td> <td>88%</td> </tr> </tbody> </table>	Recovery		Cinoxacin	100%	Penicillin G	94%	Penicillin V	90%	Cloxacillin	88%
Recovery											
Cinoxacin	100%										
Penicillin G	94%										
Penicillin V	90%										
Cloxacillin	88%										



### Extraction of Steroids from Serum

CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G										
CONDITIONING STEP	5 mL of Methanol										
EQUILIBRATION STEP	5 mL of water										
LOADING STEP	1 mL of serum sample was slowly aspirated through the cartridge										
WASHING STEP	5 mL of 5% Methanol in water, dry the cartridge										
ELUTION STEP	2 x 3 mL of Methanol										
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS										
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery</th> </tr> </thead> <tbody> <tr> <td>Methyl-6a-hydroxy-11<math>\beta</math>-progesterone</td> <td>89%</td> </tr> <tr> <td>Methyl-6a-hydroxy-17a-progesterone</td> <td>86%</td> </tr> <tr> <td>Methyl-6a-hydroxy-17a-progesterone acetate</td> <td>84%</td> </tr> <tr> <td>Hydrocortisone-21-acetate</td> <td>31%</td> </tr> </tbody> </table>	Recovery		Methyl-6a-hydroxy-11 $\beta$ -progesterone	89%	Methyl-6a-hydroxy-17a-progesterone	86%	Methyl-6a-hydroxy-17a-progesterone acetate	84%	Hydrocortisone-21-acetate	31%
Recovery											
Methyl-6a-hydroxy-11 $\beta$ -progesterone	89%										
Methyl-6a-hydroxy-17a-progesterone	86%										
Methyl-6a-hydroxy-17a-progesterone acetate	84%										
Hydrocortisone-21-acetate	31%										

### Extraction of Tricyclic Antidepressants from Serum

CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G														
CONDITIONING STEP	5 mL of Methanol														
EQUILIBRATION STEP	5 mL of water														
LOADING STEP	1 mL of serum sample (pH value adjusted with 25 $\mu$ L of Phosphoric Acid) was slowly aspirated through the cartridge														
WASHING STEP	5 mL of water, dry the cartridge														
ELUTION STEP	2 x 3 mL of Methanol														
FURTHER TREATMENT	Quantification by LC-MS														
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery</th> </tr> </thead> <tbody> <tr> <td>Protriptyline</td> <td>80%</td> </tr> <tr> <td>Nortriptyline</td> <td>75%</td> </tr> <tr> <td>Doxepine</td> <td>91%</td> </tr> <tr> <td>Imipramine</td> <td>88%</td> </tr> <tr> <td>Amitriptyline</td> <td>88%</td> </tr> <tr> <td>Trimipramine</td> <td>88%</td> </tr> </tbody> </table>	Recovery		Protriptyline	80%	Nortriptyline	75%	Doxepine	91%	Imipramine	88%	Amitriptyline	88%	Trimipramine	88%
Recovery															
Protriptyline	80%														
Nortriptyline	75%														
Doxepine	91%														
Imipramine	88%														
Amitriptyline	88%														
Trimipramine	88%														



### Extraction of Marbofloxacin & Sarafloxacin from Salmon

CARTRIDGE	SiliaPrepX SCX 3 mL/60 mg Part Number: SPE-P0005-03BB						
SAMPLE PRETREATMENT	Add 2 g of salmon and 15 mL of 3% H <sub>3</sub> PO <sub>4</sub> aqueous solution in a 50 mL tube. Shake the tube in a horizontal position for 15 min. Add 5 mL of hexane and vortex for 2 min. Centrifugate at 3,000 rpm for 5 min. Recuperate the aqueous phase from the gelled organic phase by filtration.						
CONDITIONING STEP	3 mL of Methanol						
EQUILIBRATION STEP	3 mL of Hydrochloric Acid 1M and 3 mL of water						
LOADING STEP	3 mL of the filtered sample was slowly aspirated through the cartridge						
WASHING STEP	2 mL of Hydrochloric Acid 2M then 1 mL of Methanol						
ELUTION STEP	3 mL of 10% Ammonium Hydroxide in Methanol						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Methanol and quantification by LC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 50 ppb)</th> </tr> </thead> <tbody> <tr> <td>Marbofloxacin</td> <td>97%</td> </tr> <tr> <td>Sarafloxacin</td> <td>87%</td> </tr> </tbody> </table>	Recovery (at 50 ppb)		Marbofloxacin	97%	Sarafloxacin	87%
Recovery (at 50 ppb)							
Marbofloxacin	97%						
Sarafloxacin	87%						

### Extraction of Clenbuterol and Ractopamine from Beef

CARTRIDGE	SiliaPrepX WCX 3 mL/60 mg Part Number: SPE-P0015-03BB						
SAMPLE PRETREATMENT	100 $\mu$ L of internal standard (250 $\mu$ g/mL of Ractopamine d-6 and 250 $\mu$ g/mL of Clenbuterol-d9 in Methanol) were added to 1g of chopped beef. Add 5 mL of 0.2N Sodium Acetate (pH 5.2) and 50 $\mu$ L of Beta-Glucuronidase/Arylsulfatase. Add 2.5 mL of 0.1M Perchloric Acid, 2 mL of Phosphoric Acid 4% in Acetonitrile and 5 mL of 0.5M Glycine (pH 10.5). Adjust to pH 10.50. Add 10 mL of Acetonitrile, 4g of MgSO <sub>4</sub> and 1g of NaCl. Evaporation and reconstitution with 0.1M Perchloric Acid.						
CONDITIONING STEP	3 mL of Methanol						
EQUILIBRATION STEP	3 mL of water						
LOADING STEP	2 mL of treated sample was slowly aspirated through the cartridge						
WASHING STEP	1.5 mL of Phosphate buffer 25 mM (pH 7), then 3 mL of water and 1 mL of Methanol						
ELUTION STEP	3 mL of Formic Acid 2% in Methanol						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 70 ppb)</th> </tr> </thead> <tbody> <tr> <td>Clenbuterol</td> <td>92%</td> </tr> <tr> <td>Ractopamine</td> <td>91%</td> </tr> </tbody> </table>	Recovery (at 70 ppb)		Clenbuterol	92%	Ractopamine	91%
Recovery (at 70 ppb)							
Clenbuterol	92%						
Ractopamine	91%						



Food



### Determination of Carbendazim in Orange Juice

CARTRIDGE	SiliaPrepX SCX 3 mL/60 mg Part Number: SPE-P0005-03BB										
SAMPLE PRETREATMENT	Centrifugate 5 mL of orange juice 5 min at 3000 rpm. Sample 1 mL of the supernatant. Add 2 mL of Acetic Acid 10% and vortex 1 min										
CONDITIONNING STEP	3 mL of Methanol										
EQUILIBRATION STEP	3 mL of Acetic Acid 10%										
LOADING STEP	3 mL of the treated sample was slowly aspirated through the cartridge										
WASHING STEP	2 mL of Acetic Acid 10% then 2 mL of Methanol										
ELUTION STEP	3 mL of 5% Ammonium Hydroxide in Methanol										
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Methanol and quantification by LC-MS										
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 100 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>SiliaPrepX SCX</td> <td>93%</td> </tr> <tr> <td>Bond Elut® Plexa PCX</td> <td>92%</td> </tr> <tr> <td>Oasis® MCX</td> <td>92%</td> </tr> <tr> <td>Strata™-X-C</td> <td>91%</td> </tr> </tbody> </table>	Recovery (at 100 ng/mL)		SiliaPrepX SCX	93%	Bond Elut® Plexa PCX	92%	Oasis® MCX	92%	Strata™-X-C	91%
Recovery (at 100 ng/mL)											
SiliaPrepX SCX	93%										
Bond Elut® Plexa PCX	92%										
Oasis® MCX	92%										
Strata™-X-C	91%										

### Extraction of Fungicides in Apple Juice

CARTRIDGE	SiliaPrepX SCX 6 mL/200 mg Part Number: SPE-P0005-06G						
SAMPLE PRETREATMENT	0.5 mL of Sodium Hydroxide 0.1N was added to 5 mL of apple juice						
CONDITIONNING STEP	6 mL of Methanol						
EQUILIBRATION STEP	6 mL of Ammonia 2%						
LOADING STEP	Treated sample was slowly aspirated through the cartridge						
WASHING STEP	3 mL of Ammonia 2%, 3 mL of 30% Methanol in Ammonia 5%, 3 mL of Hydrochloric Acid 0.1N and 3 mL of Methanol, dry the cartridge						
ELUTION STEP	6 mL of 30% Methanol in Ammonia 5%						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Methanol and quantification by LC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Carbendazime</td> <td>89%</td> </tr> <tr> <td>Thiabendazole</td> <td>92%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)		Carbendazime	89%	Thiabendazole	92%
Recovery (at 1 µg/mL)							
Carbendazime	89%						
Thiabendazole	92%						

### Extraction of Patulin from Apple Juice

CARTRIDGE	SiliaPrepX HLB 3 mL/60 mg Part Number: SPE-P0002-03BB
SAMPLE PRETREATMENT	100 µL of internal standard (250 µg/mL of Patulin-13C (3) in water) and 75 µL of Pectinase Aspergillus Aculeatus were added to 9 mL of apple juice, centrifugate at 3000 rpm
CONDITIONNING STEP	3 mL of Methanol
EQUILIBRATION STEP	3 mL of water
LOADING STEP	2 mL of sample supernatant was slowly aspirated through the cartridge
WASHING STEP	3 mL of 1% Sodium Bicarbonate and 1 mL of 0.1% Acetic Acid, dry the cartridge
ELUTION STEP	2 x 1.5 mL of Ethyl Acetate
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS
RECOVERY	Recovery (at 150 ng/kg): 85%

### Enrichment of Streptomycin in Honey

CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G
SAMPLE PRETREATMENT	Add 2 g of honey to 8 mL of phosphate buffer (pH 2), filter, dilute to 16 mL (with the same phosphate buffer) and adjust pH value to 7.5
CONDITIONNING STEP	5 mL of Methanol
EQUILIBRATION STEP	3 mL of water
LOADING STEP	Treated sample was slowly aspirated through the cartridge
WASHING STEP	5 mL of water, dry the cartridge
ELUTION STEP	5 mL of 3 % Formic Acid in Methanol
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Acetonitrile and identification by LC-UV
RECOVERY	Recovery (at 10 µg/kg): 30%



## Food



Acrylamide Determination in Fried Potato Chips	
CARTRIDGES	Step 1: SiliaPrepX HLB 6 mL/200 mg Part Number: SPE-P0002-06G Step 2: SiliaPrepX SCX 3 mL/60 mg Part Number: SPE-P0005-03BB
SAMPLE PRETREATMENT	Extraction 1: vortex for 1 min 1g of potato chips and 8 mL of Sodium Chloride aqueous 4M. Incubate 30 min at 60°C (vortex 10 sec every 10 min). Centrifuge for 10 min at 4500 rpm and collect the supernatant. Extraction 2: repeat previous 3 steps with same potato chips. Add 1 mL of solution Cirraz 1 (15 g of $K_4Fe(CN)_6$ in 100 mL water) and 1 mL of solution Cirraz 2 (30 g of $Zn(O_2CCH_3)_2$ in 100 mL water).
CONDITIONNING STEP (1) (SiliaPrepX HLB)	3 mL of Methanol
EQUILIBRATION STEP (1)	3 mL of water
LOADING STEP (1)	1.5 mL of the treated sample was slowly aspirated through the cartridge
WASHING STEP (1)	1.5 mL of water
ELUTION STEP (1)	3 mL of Methanol
CONDITIONNING STEP (2) (SiliaPrepX SCX)	3 mL of Methanol
LOADING STEP (2)	The treated sample eluted from SiliaPrepX HLB was slowly aspirated through the cartridge (collect this fraction)
WASHING STEP (2)	1 mL of Methanol (mix this fraction with the one previously collected)
FURTHER TREATMENT	Evaporation to dryness, reconstitution with water / Methanol and quantification by LC-MS
RECOVERY	Recovery (at 100 µg/kg): 88%

Extraction of Glycoalkaloids from Potatoes	
CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G
SAMPLE PRETREATMENT	Extract 3 g of potato powder with 20 mL of water / Acetic Acid / Sodium Metabisulfite (95:5:0.5). Centrifuge for 10 min and filtrate.
CONDITIONNING STEP	5 mL of Acetonitrile
EQUILIBRATION STEP	5 ml of water / Acetic Acid / Sodium Metabisulfite (95:5:0.5)
LOADING STEP	10 mL of treated sample was slowly aspirated through the cartridge
WASHING STEP	4 mL of 0.5% Ammonium Hydroxide, then 4 mL of water and 4 mL of Acetonitrile / water (15:85). Dry the cartridge.
ELUTION STEP	5 mL of Acetonitrile / Potassium Dihydrogen Phosphate 10mM (60:40), pH 7.6
FURTHER TREATMENT	Qualitative analysis by TLC

Sulfonamides, Tetracyclines & Pyrimethaminetermination in Milk																																																							
CARTRIDGES	SiliaPrepX HLB 3 mL/60 mg Part Number: SPE-P0002-03BB OR SiliaPrepX DVB 3 mL/60 mg Part Number: SPE-P0001-03BB																																																						
SAMPLE PRETREATMENT	Vortex 2 min 600 µL of bovine milk with 250 µL of 20% Trichloroacetic Acid in water. Add 2.5 mL of McIlvain buffer (vortex 3 min). Adjust pH of the solution at 5.5 with 1M Sodium Hydroxide. Centrifuge at 3000 rpm for 5 min.																																																						
CONDITIONNING STEP	3 mL of Methanol																																																						
EQUILIBRATION STEP	3 mL of water																																																						
LOADING STEP	1 mL of the treated sample was slowly aspirated through the cartridge																																																						
WASHING STEP	2 x 3 mL of 10% Methanol in Ammonium Acetate buffer (pH 5.5), dry the cartridge																																																						
ELUTION STEP	3 mL of Methanol																																																						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS																																																						
RECOVERY																																																							
	<table border="1"> <thead> <tr> <th>Recovery (at 1,000 µg/mL)</th> <th>Silia-PrepX HLB</th> <th>Silia-PrepX DVB</th> <th>Bond Elut® Plexa</th> <th>Oasis® HLB</th> <th>Strata™-X</th> </tr> </thead> <tbody> <tr> <td>Sulfathiazol</td> <td>84%</td> <td>83%</td> <td>85%</td> <td>83%</td> <td>86%</td> </tr> <tr> <td>Sulfadiazine</td> <td>90%</td> <td>89%</td> <td>88%</td> <td>87%</td> <td>85%</td> </tr> <tr> <td>Sulfamethoxy-pyridazine</td> <td>87%</td> <td>89%</td> <td>85%</td> <td>83%</td> <td>87%</td> </tr> <tr> <td>Sulfamethazole</td> <td>88%</td> <td>84%</td> <td>87%</td> <td>89%</td> <td>82%</td> </tr> <tr> <td>Sulfamethazine</td> <td>83%</td> <td>84%</td> <td>86%</td> <td>86%</td> <td>84%</td> </tr> <tr> <td>Pyrimethamine</td> <td>90%</td> <td>90%</td> <td>91%</td> <td>89%</td> <td>86%</td> </tr> <tr> <td>Tetracycline</td> <td>96%</td> <td>96%</td> <td>95%</td> <td>84%</td> <td>88%</td> </tr> <tr> <td>Oxytetracycline</td> <td>96%</td> <td>96%</td> <td>93%</td> <td>80%</td> <td>87%</td> </tr> </tbody> </table>	Recovery (at 1,000 µg/mL)	Silia-PrepX HLB	Silia-PrepX DVB	Bond Elut® Plexa	Oasis® HLB	Strata™-X	Sulfathiazol	84%	83%	85%	83%	86%	Sulfadiazine	90%	89%	88%	87%	85%	Sulfamethoxy-pyridazine	87%	89%	85%	83%	87%	Sulfamethazole	88%	84%	87%	89%	82%	Sulfamethazine	83%	84%	86%	86%	84%	Pyrimethamine	90%	90%	91%	89%	86%	Tetracycline	96%	96%	95%	84%	88%	Oxytetracycline	96%	96%	93%	80%	87%
Recovery (at 1,000 µg/mL)	Silia-PrepX HLB	Silia-PrepX DVB	Bond Elut® Plexa	Oasis® HLB	Strata™-X																																																		
Sulfathiazol	84%	83%	85%	83%	86%																																																		
Sulfadiazine	90%	89%	88%	87%	85%																																																		
Sulfamethoxy-pyridazine	87%	89%	85%	83%	87%																																																		
Sulfamethazole	88%	84%	87%	89%	82%																																																		
Sulfamethazine	83%	84%	86%	86%	84%																																																		
Pyrimethamine	90%	90%	91%	89%	86%																																																		
Tetracycline	96%	96%	95%	84%	88%																																																		
Oxytetracycline	96%	96%	93%	80%	87%																																																		

Extraction of Melamine from Milk	
CARTRIDGE	SiliaPrepX SCX 6 mL/200 mg Part Number: SPE-P0005-06G
SAMPLE PRETREATMENT	1 mL of Hydrochloric Acid 1N was added to 10 mL of milk sample, then mixed with 10 mL of Methylene Chloride. After 15 min centrifugation, remove aqueous layer and extract again organic layer 2 times with 5 mL of Hydrochloric Acid 0.1N. Combine the 3 aqueous fractions.
CONDITIONNING STEP	6 mL of Methanol
EQUILIBRATION STEP	6 mL of water
LOADING STEP	Combined aqueous fractions were slowly aspirated through the cartridge
WASHING STEP	6 mL of Hydrochloric Acid 0.1N then 6 mL of Methanol, dry the cartridge
ELUTION STEP	2 x 6 mL of 30% Methanol in Ammonia 5%
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Methanol and quantification by LC-MS
RECOVERY	Recovery (at 1 µg/mL): 99%





Analysis of Bisphenol A in Bottled Water	
CARTRIDGE	SiliaPrep C18 Plus 6 mL/200 mg (glass) Part Number: SPE-R00830B-06G
SAMPLE PRETREATMENT	100 µL of internal standard (Bisphenol A-d16 in methanol, 1 µg/mL) was added to 50 mL of bottled water
CONDITIONNING STEP	3 mL of Methanol
EQUILIBRATION STEP	3 mL of water (HPLC grade) and 1 mL of Acetic Acid 100 mM
LOADING STEP	The whole sample was aspirated through the cartridge using SilaMiniBlock equipment (2 drops/second)
WASHING STEP	5 mL of water (HPLC grade), dry the cartridge
ELUTION STEP	3 mL of Methanol
FURTHER TREATMENT	Evaporation to dryness, derivatization using Dansyl Chloride, liquid-liquid extraction, evaporation, reconstitution with Methanol and quantification by LC-MS/MS
RECOVERY	Recovery (at 3,000 pg/mL): 97%

Extraction of Bisphenol A, Triclosan & Ethynyl Estradiol from Water									
CARTRIDGE	SiliaPrepX HLB 3 mL/60 mg Part Number: SPE-P0002-03BB								
SAMPLE PRETREATMENT	To 25 mL of sample water was added 250 µL of internal standard (1 ppb of 17α-Ethynyl Estradiol d-6, 1 ppb of Bisphenol A d-16 and 0.4 ppb of Triclosan d-3 in Methanol)								
CONDITIONNING STEP	3 mL of Methanol								
EQUILIBRATION STEP	3 mL of water and 1 mL of Acetic Acid 100mM								
LOADING STEP	Treated sample was slowly aspirated through the cartridge								
WASHING STEP	3 mL of water, 1 mL of Acetic Acid 100 mM and 2 mL of 20% Methanol in water, dry the cartridge								
ELUTION STEP	2 x 3 mL of Dichloromethane / Acetone (50:50)								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Sodium Carbonate in water, derivatization with Dansyl Chloride and quantification by LC-MS/MS								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery</th> </tr> </thead> <tbody> <tr> <td>17α-Ethynyl Estradiol</td> <td>93%</td> </tr> <tr> <td>Bisphenol A</td> <td>115%</td> </tr> <tr> <td>Triclosan</td> <td>98%</td> </tr> </tbody> </table>	Recovery		17α-Ethynyl Estradiol	93%	Bisphenol A	115%	Triclosan	98%
Recovery									
17α-Ethynyl Estradiol	93%								
Bisphenol A	115%								
Triclosan	98%								

Analysis of Pesticides after a Fatty Acids Cleanup							
CARTRIDGE	SiliaPrep Diamine 6 mL/500 mg Part Number: SPE-R49030B-06P						
SAMPLE PRETREATMENT	10 g of oat was added to 100 mL of water and 200 mL of Acetone. 35 g of NaCl and 100 mL of 50% Ethylacetate in Cyclohexane were added for liquid-liquid extraction. The organic layer (200 mL) was dried with NaSO <sub>4</sub> , filtered, evaporated and reconstituted with 10 mL of 50% Ethylacetate in Cyclohexane.						
CONDITIONNING STEP	3 mL of Methanol						
EQUILIBRATION STEP	3 mL of Acetone and 3 mL of 50% Ethyl Acetate in Cyclohexane						
LOADING STEP	1 mL of treated sample was slowly aspirated through the cartridge (collect the eluted solvent)						
WASHING STEP	6 mL of Hydrochloric Acid 0.1N then 6 mL of Methanol, dry the cartridge						
ELUTION STEP	15 mL of 50% Ethyl Acetate in Cyclohexane (mix with the fraction previously collected)						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile, derivatization using HMDS and TFA, and quantification by GC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery</th> </tr> </thead> <tbody> <tr> <td>&gt; 80% for 84 pesticides</td> <td></td> </tr> <tr> <td>&lt; 1% for Fatty Acids</td> <td></td> </tr> </tbody> </table>	Recovery		> 80% for 84 pesticides		< 1% for Fatty Acids	
Recovery							
> 80% for 84 pesticides							
< 1% for Fatty Acids							

Pharmaceutical Drugs Determination in Water																									
CARTRIDGE	SiliaPrepX HLB (200 mg) + SAX (60 mg) / 10 mL Part Number: custom cartridge																								
SAMPLE PRETREATMENT	100 mL of sample water was mixed with 5 mL of Sodium Acetate 10%. pH was adjusted to 9.5 with a buffer solution (NH <sub>4</sub> Cl 0.5M and NH <sub>4</sub> OH 0.5M in water).																								
CONDITIONNING STEP	6 mL of Methanol																								
EQUILIBRATION STEP	6 mL of water and 6 mL of buffer pH 9.5																								
LOADING STEP	Treated sample was slowly aspirated through the cartridge																								
WASHING STEP	3 mL of buffer pH 9.5 and 3 mL of water, dry the cartridge																								
ELUTION STEP	2 mL of Methanol and 2 mL of Formic Acid 2% in Methanol																								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Acetonitrile and quantification by LC-MS/MS																								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery (at 100 ppt)</th> </tr> </thead> <tbody> <tr> <td>Trimethoprim</td> <td>105%</td> <td>Caffeine C13</td> <td>96%</td> </tr> <tr> <td>Sulphamethoxazole</td> <td>100%</td> <td>Acetaminophen</td> <td>93%</td> </tr> <tr> <td>Naproxen</td> <td>100%</td> <td>Norfloxacin</td> <td>70%</td> </tr> <tr> <td>Ibuprofen</td> <td>85%</td> <td>Maprotiline</td> <td>79%</td> </tr> <tr> <td>Carbamazepine</td> <td>102%</td> <td></td> <td></td> </tr> </tbody> </table>	Recovery (at 100 ppt)				Trimethoprim	105%	Caffeine C13	96%	Sulphamethoxazole	100%	Acetaminophen	93%	Naproxen	100%	Norfloxacin	70%	Ibuprofen	85%	Maprotiline	79%	Carbamazepine	102%		
Recovery (at 100 ppt)																									
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Carbamazepine	102%																								

Source: P. Steinbach, W. Schwack / J. Chromatogr. A 1323 (2014) 28–38.  
"Comparison of different solid-phase-extraction cartridges for a fatty acid cleanup of the ethyl acetate/cyclohexane based multi-pesticide residue method EN 12393"



Environment



### Pesticides Determination in Water

CARTRIDGE	SiliaPrepX LRV SAX 10 mL/60 mg Part Number: SPC-P0010-10BB
CONDITIONNING STEP	3 mL of Methanol
EQUILIBRATION STEP	3 mL of water (HPLC grade)
LOADING STEP	100 mL of sample water was slowly aspirated through the cartridge
WASHING STEP	3 mL of water (HPLC grade)
ELUTION STEP	3 mL of Methanol then 3 mL of Methanol with Formic Acid 2%
FURTHER TREATMENT	Quantification by LC-MS/MS
RECOVERY	Recovery (at 1,000 pg/mL): > 80% for 23 pesticides

### Glyphosate & AMPA Determination in Water

CARTRIDGE	SiliaPrepX HLB 3 mL/60 mg Part Number: SPE-P0002-03BB						
SAMPLE PRETREATMENT	Derivatization with FMOC-Cl: to 5 mL of sample water was added 325 µL of Sodium Borate 50mM, 200 µL of EDTA 0.1M, 4.5 mL of Acetonitrile and 0.6 mL of FMOC-Cl 50 mg/mL. Evaporate. Aqueous supernatant was mixed with 2 mL Ethyl Acetate. Adjust pH of the aqueous layer to 5 by adding 100 µL of Formic Acid 5%.						
CONDITIONNING STEP	3 mL of Methanol						
EQUILIBRATION STEP	3 mL of water and 3 mL of Formic Acid 0.1%						
LOADING STEP	Derivatized sample was slowly aspirated through the cartridge						
WASHING STEP	1 mL of Formic Acid 0.1% then 2 x 500 µL of water, dry the cartridge						
ELUTION STEP	3 mL of Methanol						
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Acetonitrile and quantification by LC-MS/MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 5 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>Glyphosate</td> <td>120%</td> </tr> <tr> <td>AMPA</td> <td>106%</td> </tr> </tbody> </table>	Recovery (at 5 ng/mL)		Glyphosate	120%	AMPA	106%
Recovery (at 5 ng/mL)							
Glyphosate	120%						
AMPA	106%						

### Determination of Pesticides in Water (by GC-ECD)

CARTRIDGE	SiliaPrepX HLB 3 mL/60 mg Part Number: SPE-P0002-03BB																								
CONDITIONNING STEP	3 mL of 30% Acetone in Toluene then 3 mL of Methanol																								
EQUILIBRATION STEP	3 mL of distilled water																								
LOADING STEP	100 mL of sample water was slowly aspirated through the cartridge																								
WASHING STEP	3 mL of distilled water, dry the cartridge																								
ELUTION STEP	500 µL of Acetone, then 2 mL of 30% Acetone in Toluene and 2.5mL of 30% Acetone in Toluene																								
FURTHER TREATMENT	Quantification by GC-ECD																								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery</th> </tr> </thead> <tbody> <tr> <td>Trifluralin</td> <td>90%</td> <td>Endrin</td> <td>95%</td> </tr> <tr> <td>Lindane</td> <td>88%</td> <td>4,4'-DDT</td> <td>75%</td> </tr> <tr> <td>Aldrin</td> <td>78%</td> <td>Diclofop-methyl</td> <td>90%</td> </tr> <tr> <td>Heptachlor Epoxide</td> <td>88%</td> <td>Methoxychlor</td> <td>86%</td> </tr> <tr> <td>Dieldrin</td> <td>90%</td> <td>Chlordane</td> <td>79%</td> </tr> </tbody> </table>	Recovery				Trifluralin	90%	Endrin	95%	Lindane	88%	4,4'-DDT	75%	Aldrin	78%	Diclofop-methyl	90%	Heptachlor Epoxide	88%	Methoxychlor	86%	Dieldrin	90%	Chlordane	79%
Recovery																									
Trifluralin	90%	Endrin	95%																						
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Aldrin	78%	Diclofop-methyl	90%																						
Heptachlor Epoxide	88%	Methoxychlor	86%																						
Dieldrin	90%	Chlordane	79%																						

### Determination of Pesticides in Drinking Water

CARTRIDGE	SiliaPrepX HLB 6 mL/200 mg Part Number: SPE-P0002-06G																																													
CONDITIONNING STEP	6 mL of Methanol																																													
EQUILIBRATION STEP	6 mL of water (HPLC grade)																																													
LOADING STEP	100 mL of drinking water was slowly aspirated through the cartridge																																													
WASHING STEP	6 mL of water (HPLC grade)																																													
ELUTION STEP	2 x 6 mL of Methanol																																													
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol and quantification by LC-MS																																													
RECOVERY	<table border="1"> <thead> <tr> <th>Recovery (at 1,000 pg/mL)</th> <th>Atrazine</th> <th>Benalaxyl</th> <th>Carbendazim</th> <th>Chloroxuron</th> </tr> </thead> <tbody> <tr> <td>SiliaPrepX HLB</td> <td>75%</td> <td>76%</td> <td>103%</td> <td>91%</td> </tr> <tr> <td>Oasis® HLB</td> <td>66%</td> <td>48%</td> <td>103%</td> <td>99%</td> </tr> <tr> <td></td> <th>Imazail</th> <th>Methalaxyl</th> <th>Myclobutanil</th> <th>Propoxur</th> </tr> <tr> <td>SiliaPrepX HLB</td> <td>78%</td> <td>87%</td> <td>91%</td> <td>70%</td> </tr> <tr> <td>Oasis® HLB</td> <td>78%</td> <td>61%</td> <td>101%</td> <td>42%</td> </tr> <tr> <td></td> <th>Simazine</th> <th>Thiambazole</th> <td></td> <td></td> </tr> <tr> <td>SiliaPrepX HLB</td> <td>98%</td> <td>91%</td> <td></td> <td></td> </tr> <tr> <td>Oasis® HLB</td> <td>79%</td> <td>80%</td> <td></td> <td></td> </tr> </tbody> </table>	Recovery (at 1,000 pg/mL)	Atrazine	Benalaxyl	Carbendazim	Chloroxuron	SiliaPrepX HLB	75%	76%	103%	91%	Oasis® HLB	66%	48%	103%	99%		Imazail	Methalaxyl	Myclobutanil	Propoxur	SiliaPrepX HLB	78%	87%	91%	70%	Oasis® HLB	78%	61%	101%	42%		Simazine	Thiambazole			SiliaPrepX HLB	98%	91%			Oasis® HLB	79%	80%		
Recovery (at 1,000 pg/mL)	Atrazine	Benalaxyl	Carbendazim	Chloroxuron																																										
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SiliaPrepX HLB	98%	91%																																												
Oasis® HLB	79%	80%																																												



Environment



Pesticides Determination in Drinking Water									
CARTRIDGE	SiliaPrep CleanENVI 6 mL/1 g Part Number: SPEC-R31930B-06S								
CONDITIONNING STEP	10 mL of Methanol								
EQUILIBRATION STEP	10 mL of water (HPLC grade)								
LOADING STEP	10 mL of drinking water was slowly aspirated through the cartridge								
WASHING STEP	2 x 5 mL of water (HPLC grade)								
ELUTION STEP	2 x 3 mL of Acetone								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with water / Methanol and quantification by LC-MS								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 50 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>Atrazine</td> <td>84%</td> </tr> <tr> <td>Simazine</td> <td>95%</td> </tr> <tr> <td>Alachlor</td> <td>68%</td> </tr> </tbody> </table>	Recovery (at 50 ng/mL)		Atrazine	84%	Simazine	95%	Alachlor	68%
Recovery (at 50 ng/mL)									
Atrazine	84%								
Simazine	95%								
Alachlor	68%								

Diquat & Paraquat Determination in Water							
CARTRIDGE	SiliaPrepX WCX 3 mL/60 mg Part Number: SPE-P0015-03BB						
CONDITIONNING STEP	3 mL of Methanol						
EQUILIBRATION STEP	3 mL of water						
LOADING STEP	100 mL of sample water was slowly aspirated through the cartridge						
WASHING STEP	3 mL of water then 3 mL of Methanol						
ELUTION STEP	2 x 3 mL of Acetonitrile / Isopropanol / Formic Acid (40:40:20)						
FURTHER TREATMENT	Quantification by LC-MS/MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 10 ppb)</th> </tr> </thead> <tbody> <tr> <td>Diquat</td> <td>90%</td> </tr> <tr> <td>Paraquat</td> <td>90%</td> </tr> </tbody> </table>	Recovery (at 10 ppb)		Diquat	90%	Paraquat	90%
Recovery (at 10 ppb)							
Diquat	90%						
Paraquat	90%						

Extraction of Desphenyl Chloridazon from Water	
CARTRIDGE	SiliaPrepX SAX 3 mL/60 mg Part Number: SPE-P0010-03BB
SAMPLE PRETREATMENT	100 $\mu$ L of Ammonium Hydroxide 26% was added to 1 mL of water sample
CONDITIONNING STEP	1 mL of Methanol
EQUILIBRATION STEP	1 mL of Ammonium Hydroxide 5%
LOADING STEP	Treated sample was slowly aspirated through the cartridge
WASHING STEP	1 mL of Ammonium Hydroxide 5% then 1 mL of Methanol
ELUTION STEP	2 x 1 mL of 5% Formic Acid in Ethyl Acetate
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Acetonitrile / water and quantification by LC-MS
RECOVERY	Recovery (at 10 $\mu$ g/mL): 83%

Determination of Surfactants in Water															
CARTRIDGE	SiliaPrepX WAX 3 mL/60 mg Part Number: SPE-P0020-03BB														
CONDITIONNING STEP	2 mL of 5% Ammonia in Methanol then 2 mL of Methanol														
EQUILIBRATION STEP	2 mL of water														
LOADING STEP	500 mL of water sample was slowly aspirated through the cartridge														
WASHING STEP	2 mL of water, then 2 mL of Acetone / Acetonitrile / Formic Acid (50:50:1) and 2 mL of Methanol														
ELUTION STEP	2 mL of 5% Ammonia in Methanol														
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS														
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 20 <math>\mu</math>g/L)</th> </tr> </thead> <tbody> <tr> <td>Perfluorooctane Sulfonate Potassium Salt</td> <td>81%</td> </tr> <tr> <td>Perfluoropentanoic Acid</td> <td>94%</td> </tr> <tr> <td>Perfluorohexanoic Acid</td> <td>94%</td> </tr> <tr> <td>Perfluorooctanoic Acid</td> <td>95%</td> </tr> <tr> <td>Perfluoropropionic Acid</td> <td>103%</td> </tr> <tr> <td>Perfluorododecanoic Acid</td> <td>82%</td> </tr> </tbody> </table>	Recovery (at 20 $\mu$ g/L)		Perfluorooctane Sulfonate Potassium Salt	81%	Perfluoropentanoic Acid	94%	Perfluorohexanoic Acid	94%	Perfluorooctanoic Acid	95%	Perfluoropropionic Acid	103%	Perfluorododecanoic Acid	82%
Recovery (at 20 $\mu$ g/L)															
Perfluorooctane Sulfonate Potassium Salt	81%														
Perfluoropentanoic Acid	94%														
Perfluorohexanoic Acid	94%														
Perfluorooctanoic Acid	95%														
Perfluoropropionic Acid	103%														
Perfluorododecanoic Acid	82%														



Quantification of Acidic Herbicides											
CARTRIDGE	SiliaPrepX SAX 6 mL/200 mg Part Number: SPE-P0010-06G										
SAMPLE PRETREATMENT	pH of sample was adjusted to basic value with Sodium Hydroxide 1N										
CONDITIONNING STEP	6 mL of Methanol										
EQUILIBRATION STEP	6 mL of water										
LOADING STEP	Treated sample was slowly aspirated through the cartridge										
WASHING STEP	3 mL of Sodium Acetate then 3 mL of Methanol, dry the cartridge										
ELUTION STEP	2 x 3 mL of Formic Acid 10% in Methanol										
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS										
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Bentazon</td> <td>79%</td> </tr> <tr> <td>Dicamba</td> <td>87%</td> </tr> <tr> <td>2,4-Dichlorophenoxy Acetic Acid</td> <td>82%</td> </tr> <tr> <td>4-Chloro-2-methylphenoxy Acetic Acid</td> <td>76%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)		Bentazon	79%	Dicamba	87%	2,4-Dichlorophenoxy Acetic Acid	82%	4-Chloro-2-methylphenoxy Acetic Acid	76%
Recovery (at 1 µg/mL)											
Bentazon	79%										
Dicamba	87%										
2,4-Dichlorophenoxy Acetic Acid	82%										
4-Chloro-2-methylphenoxy Acetic Acid	76%										

Quantification of Phenolic Acids									
CARTRIDGE	SiliaPrepX SAX 6 mL/200 mg Part Number: SPE-P0010-06G								
SAMPLE PRETREATMENT	pH of sample was adjusted to basic value with Sodium Hydroxide 1N								
CONDITIONNING STEP	6 mL of Methanol								
EQUILIBRATION STEP	6 mL of water								
LOADING STEP	Treated sample was slowly aspirated through the cartridge								
WASHING STEP	3 mL of water, then 3 mL of Sodium Hydroxide 0.1N and 3 mL of Methanol, dry the cartridge								
ELUTION STEP	2 x 3 mL of Formic Acid 5% in Methanol								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Syringic Acid</td> <td>70%</td> </tr> <tr> <td>Vanillic Acid</td> <td>86%</td> </tr> <tr> <td>p-Hydroxybenzoic Acid</td> <td>97%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)		Syringic Acid	70%	Vanillic Acid	86%	p-Hydroxybenzoic Acid	97%
Recovery (at 1 µg/mL)									
Syringic Acid	70%								
Vanillic Acid	86%								
p-Hydroxybenzoic Acid	97%								

Triacylglycerols Profiling of Marine Microalgae	
CARTRIDGE	SiliaPrep Silica 3 mL/500 mg Part Number: SPE-R10030B-03P
SAMPLE PRETREATMENT	Algal extracts were extracted with Hexane, washed with water and evaporated
CONDITIONNING STEP	3 mL of Hexane
EQUILIBRATION STEP	3 mL of distilled water
LOADING STEP	50 mg of lipid sample in 300 µL of Hexane was slowly aspirated through the cartridge
ELUTION STEP	Elution 1 (for triacylglycerols): Hexane / Diethyl Ether / Acetic Acid (80:20:1) Elution 2 (for polar lipids and chlorophyll): Acetone
FURTHER TREATMENT	Evaporation, reconstitution with Hexane and quantification by LC-MS/MS
Source: M. Danielewicz, L. Anderson, A. Franz / Journal of Lipid Research Volume 52, 2011. Triacylglycerol profiling of marine microalgae by mass spectrometry.	

Determination of Tricyclic Antidepressants in Water							
CARTRIDGE	SiliaPrepX DVB 3 mL/60 mg Part Number: SPE-P0001-03BB						
CONDITIONNING STEP	1 mL of Methanol						
EQUILIBRATION STEP	1 mL of water						
LOADING STEP	1 mL of sample was slowly aspirated through the cartridge						
WASHING STEP	1 mL of water						
ELUTION STEP	1 mL of Acetonitrile						
FURTHER TREATMENT	Quantification by LC-MS						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 1 µg/mL)</th> </tr> </thead> <tbody> <tr> <td>Protriptyline</td> <td>93%</td> </tr> <tr> <td>Nortriptyline</td> <td>90%</td> </tr> </tbody> </table>	Recovery (at 1 µg/mL)		Protriptyline	93%	Nortriptyline	90%
Recovery (at 1 µg/mL)							
Protriptyline	93%						
Nortriptyline	90%						



Determination of Explosives in Well Water																																									
CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G																																								
CONDITIONING STEP	6 mL of Methanol, 6 mL of Acetonitrile																																								
EQUILIBRATION STEP	10 mL of water																																								
LOADING STEP	1 L of well water (with 5 g of Sodium Chloride) was slowly aspirated through the cartridge																																								
WASHING STEP	10 mL of water, DO NOT dry the cartridge																																								
ELUTION STEP	6 of mL Methanol / Acetonitrile (50:50)																																								
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS																																								
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery (at 1 µg/L)</th> </tr> </thead> <tbody> <tr> <td>Hexanitrodiphenylamine</td> <td>96%</td> <td>4-Amino-2,6-dinitrotoluene</td> <td>95%</td> </tr> <tr> <td>Diphenylamine</td> <td>100%</td> <td>2-Amino-4,6-dinitrotoluene</td> <td>94%</td> </tr> <tr> <td>Pentaerythritol Tetranitrate</td> <td>108%</td> <td>2,4,6-Trinitrotoluene</td> <td>92%</td> </tr> <tr> <td>3-Nitrotoluene</td> <td>78%</td> <td>Nitroglycerine</td> <td>88%</td> </tr> <tr> <td>4-Nitrotoluene</td> <td>81%</td> <td>1,3-Dinitrobenzene</td> <td>86%</td> </tr> <tr> <td>2-Nitrotoluene</td> <td>67%</td> <td>1,3,5-Trinitrobenzene</td> <td>96%</td> </tr> <tr> <td>2,6-Dinitrotoluene</td> <td>94%</td> <td>Ethylene Glycol Dinitrate</td> <td>95%</td> </tr> <tr> <td>2,4-dinitrotoluene</td> <td>85%</td> <td>Picric Acid</td> <td>92%</td> </tr> <tr> <td>Octogen</td> <td>94%</td> <td>Diethylene Glycol Dinitrate</td> <td>74%</td> </tr> </tbody> </table>	Recovery (at 1 µg/L)				Hexanitrodiphenylamine	96%	4-Amino-2,6-dinitrotoluene	95%	Diphenylamine	100%	2-Amino-4,6-dinitrotoluene	94%	Pentaerythritol Tetranitrate	108%	2,4,6-Trinitrotoluene	92%	3-Nitrotoluene	78%	Nitroglycerine	88%	4-Nitrotoluene	81%	1,3-Dinitrobenzene	86%	2-Nitrotoluene	67%	1,3,5-Trinitrobenzene	96%	2,6-Dinitrotoluene	94%	Ethylene Glycol Dinitrate	95%	2,4-dinitrotoluene	85%	Picric Acid	92%	Octogen	94%	Diethylene Glycol Dinitrate	74%
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Isothiazolinone Biocides in an Aqueous Sample															
CARTRIDGE	SiliaPrepX DVB 6 mL/200 mg Part Number: SPE-P0001-06G														
SAMPLE PRETREATMENT	5 mL of isothiazolinones standard solution (1 µg/mL) are diluted in 50 mL water and 500 µL Formic Acid. The solution is filled up to 100 mL.														
CONDITIONING STEP	6 mL of Methanol														
EQUILIBRATION STEP	6 mL of 0.1 % Formic Acid in water														
LOADING STEP	5 mL of sample was slowly aspirated through the cartridge														
WASHING STEP	6 mL 0.1 % Formic Acid in water, dry the cartridge														
ELUTION STEP	3 mL of Methanol then 6 mL of Acetonitrile														
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS														
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 50 ng/L)</th> </tr> </thead> <tbody> <tr> <td>Methylisothiazolinone</td> <td>93%</td> </tr> <tr> <td>Chloromethylisothiazolinone</td> <td>96%</td> </tr> <tr> <td>Benzisothiazolinone</td> <td>85%</td> </tr> <tr> <td>Butylbenzisothiazolinone</td> <td>88%</td> </tr> <tr> <td>Octylisothiazolinone</td> <td>90%</td> </tr> <tr> <td>Dichlorooctylisothiazolinone</td> <td>83%</td> </tr> </tbody> </table>	Recovery (at 50 ng/L)		Methylisothiazolinone	93%	Chloromethylisothiazolinone	96%	Benzisothiazolinone	85%	Butylbenzisothiazolinone	88%	Octylisothiazolinone	90%	Dichlorooctylisothiazolinone	83%
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Extraction of Allantoin from a Cosmetic Product	
CARTRIDGE	SiliaPrepX SAX 3 mL/60 mg Part Number: SPE-P0010-03BB
SAMPLE PRETREATMENT	1g of cosmetic was diluted in 100 mL of water, pH was adjusted to 10 with Ammonium Hydroxide 5%
CONDITIONING STEP	3 mL of Methanol
EQUILIBRATION STEP	3 mL of Ammonium Hydroxide 5%
LOADING STEP	1 mL of treated sample was slowly aspirated through the cartridge
WASHING STEP	3 mL of Ammonium Hydroxide 5% then 3 mL of Methanol
ELUTION STEP	2 x 1 mL of Hydrochloric Acid 0.6%
FURTHER TREATMENT	Add Acetonitrile / Ammonium Chloride 30mM, and qualification by HP LC

Extraction of Amines from an Aqueous Sample																													
CARTRIDGE	SiliaPrepX SCX 6 mL/200 mg Part Number: SPE-P0005-06G																												
SAMPLE PRETREATMENT	200 µL of Phosphoric Acid 2% was added to 1 mL of aqueous sample																												
CONDITIONING STEP	6 mL of Methanol																												
EQUILIBRATION STEP	6 mL of water																												
LOADING STEP	Treated sample was slowly aspirated through the cartridge																												
WASHING STEP	6 mL of Hydrochloric Acid 0.1N then 6 mL of Methanol, dry the cartridge																												
ELUTION STEP	2 x 3 mL of 10% Ammonia in Methanol																												
FURTHER TREATMENT	Evaporation under Nitrogen, reconstitution with Methanol / water and quantification by LC-MS																												
RECOVERY	<table border="1"> <thead> <tr> <th colspan="4">Recovery (at 100 ppm)</th> </tr> </thead> <tbody> <tr> <td>2-Naphthylamine</td> <td>65%</td> <td>4,4'-Methylene-bis-(2-chloro-aniline)</td> <td>75%</td> </tr> <tr> <td>Benzidine</td> <td>104%</td> <td>4,4'-Oxydianiline</td> <td>104%</td> </tr> <tr> <td>5-Nitro-o-toluidine</td> <td>80%</td> <td>4,4'-Methylenedianiline</td> <td>109%</td> </tr> <tr> <td>Xenylamine</td> <td>89%</td> <td>4,4'-Thiodianiline</td> <td>100%</td> </tr> <tr> <td>o-Aminoazotoluene</td> <td>89%</td> <td>4,4'-Methylen-di-o-toluidine</td> <td>110%</td> </tr> <tr> <td>4-Aminoazobenzene</td> <td>99%</td> <td>3,3-Dichlorobenzidine</td> <td>110%</td> </tr> </tbody> </table>	Recovery (at 100 ppm)				2-Naphthylamine	65%	4,4'-Methylene-bis-(2-chloro-aniline)	75%	Benzidine	104%	4,4'-Oxydianiline	104%	5-Nitro-o-toluidine	80%	4,4'-Methylenedianiline	109%	Xenylamine	89%	4,4'-Thiodianiline	100%	o-Aminoazotoluene	89%	4,4'-Methylen-di-o-toluidine	110%	4-Aminoazobenzene	99%	3,3-Dichlorobenzidine	110%
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INSIDE THIS SECTION

SiliCycle MiniBlock

SiliCycle MiniBlock Reactors

Shaking and Washing Stations

Parallel Synthesis & Purification

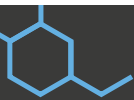
SiliaPrep and SiliaPrepX Development Kits

SiliCycle MiniBlock: Multifunctional Synthesis Platform

# SiliaPrepMB™

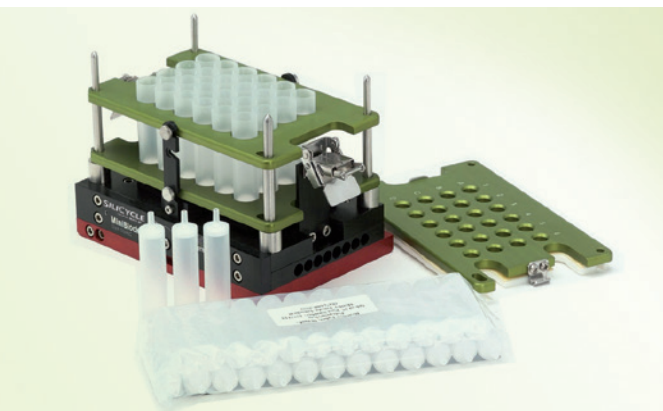
SPE cartridges for SiliCycle MiniBlock®





## Functionalized Silica and SiliCycle MiniBlock - An Ideal Combo

- The productivity enhancement of SiliCycle MiniBlock combined with the cutting-edge technology of our functionalized silica enable chemists to design reactions that eliminate tedious work-up and purification issues.
- SiliCycle MiniBlock is compatible with the full range of SiliCycle products from synthesis through purification.



## SiliCycle MiniBlock

The SiliCycle MiniBlock is an easy-to-use reaction block designed to run multiple synthesis in parallel and screen for optimal conditions. It is the only compact parallel synthesizer that allows synthesis via solid or solution-phase as well as filtration/purification to be carried out on the same platform.

### SiliCycle MiniBlock Reactors

Patented reactor with built-in valve design. Available in 48, 24, 12, and 6-Position arrays for reaction vessel volumes of respectively 4 mL, 10 mL, 20 mL and 40 mL.

### Shaking and Washing Stations

High performance orbital shaker with integrated basins for wash and rinse capability. Customized and configured to provide vigorous vortex mixing for 1 (*Micro Shaker*) or 2 (*Compact Shaker*) SiliCycle MiniBlocks.



### Parallel Synthesis & Purification

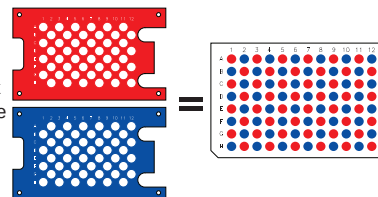
SiliCycle MiniBlock is ideal for parallel synthesis and post-reaction cleanup using SiliaPrep MB prepacked SPE cartridges with either our chromatographic phases, our silica-supported reagents and catalysts, or our metal or organic scavengers. You just have to stack one SiliCycle MiniBlock onto a second SiliCycle MiniBlock to filter / purify your extracts.



# SiliCycle MiniBlock: Multifunctional Synthesis & Purification Platform

## One Platform, 6 Configurations

Red and Blue SiliCycle MiniBlock combine to produce 96 compounds.



## Inert Conditions

Continuous inert gas flow enables air/moisture sensitive reactions. Easily add reagents through the septum layer.



## Agitation and Resin Washing

Customized shaker allows precision vortex mixing of reactions. Built-in washing capability allows rapid preparation of resins or washing of products while reaction blocks remain on the shaker.



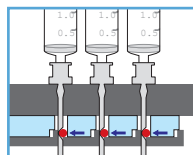
## With Just the Turn of a Key

Collect products from SiliCycle MiniBlock cleanly and efficiently.

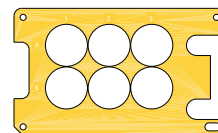


## Unique Built-In Valve

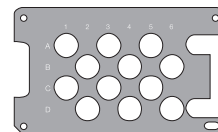
Provides rapid bottom filtration – no need to invert or disassemble the reactor. Saves time and prevents cross-contamination.



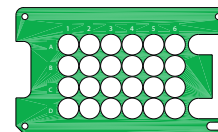
40 mL - 6 vessels



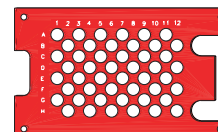
20 mL - 12 vessels



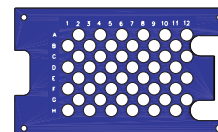
10 mL - 24 vessels



4 mL - 48 vessels



4 mL - 48 vessels




## Configure Your SiliCycle MiniBlock to Suit Your Needs

SiliCycle MiniBlock can synthesize compounds in individual vessels ranging in size from as small as 4 mL up to as large as 40 mL, all delivered into racks with microplate footprints. This flexibility provides a smooth, seamless work-flow from synthesis to screening.



## Development Kits

 <b>SiliaPrep MB Development Kits</b>				
PN	Kits	Formats	Qty/Box	Phases
SiliaPrep™ MB SPE Cartridges				
KSPMB-K2000-045P	SiliaPrep MB Silica-Based Chromatography Development Kit	4 mL/500 mg	8 cartridges of each phase	Silica, C18, Cyano, Diol, Diatomaceous Earth
KSPMB-K2000-100S	SiliaPrep MB, Silica-Based Chromatography Development Kit	10 mL/1 g	4 cartridges of each phase	Silica, C18, Cyano, Diol, Diatomaceous Earth
KSPMB-K2001-045P	SiliaPrep MB, Silica-Based Ion Exchange Development Kit	4 mL/500 mg	8 cartridges of each phase	SAX, SAX-2, WAX, SCX, SCX-2, WCX
KSPMB-K2001-100S	SiliaPrep MB, Silica-Based Ion Exchange Development Kit	10 mL/1 g	4 cartridges of each phase	SAX, SAX-2, WAX, SCX, SCX-2, WCX
KSPMB-K2002-045P	SiliaPrep MB, Silica-Based Metal Scavenger Development Kit	4 mL/500 mg	6 cartridges of each phase	Thiol, DMT, Thiourea, Triamine, TAAcOH, TAAcONa, Imidazole, DEAM
KSPMB-K2002-100S	SiliaPrep MB, Silica-Based Metal Scavenger Development Kit	10 mL/1 g	3 cartridges of each phase	Thiol, DMT, Thiourea, Triamine, TAAcOH, TAAcONa, Imidazole, DEAM
KSPMB-K2003-045G	SiliaPrepX MB, Polymeric Development Kit	4 mL/200 mg	6 cartridges of each phase	HLB, DVB, SAX, WAX, SCX, WCX
KSPMB-K2003-100P	SiliaPrepX MB, Polymeric Development Kit	10 mL/500 mg	3 cartridges of each phase	HLB, DVB, SAX, WAX, SCX, WCX



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[SiliaPrep Vacuum Adapters](#)

[SiliaPrep Empty Tubes](#)

[SiliaPrep SPE Vacuum Manifolds](#)

[SiliaPrep 96-Well Collection Plates](#)  
[SiliaPrep 96-Well Plate Cap Mats](#)

[SiliaPrep Phase Separator Cartridges](#)



# SiliaPrep™

## Accessories



**SiliaPrep Accessories; the #1 solution to simplify your solid-phase extractions.**

- Great complement to our SiliaPrep & SiliaPrepX SPE Cartridges and Well Plates products.
- Wide variety of accessories available to increase your productivity thereby save time and money.



## Maximize your Productivity with SiliaPrep Accessories

SiliCycle offers various accessories for SPE Cartridges and Well Plates to simplify method development and expedite high throughput analysis.

### SiliaPrep Adapters

Enable cartridge stacking or easy SPE cartridge connection with syringe or gas lines (for positive pressure).

AUT-0172 SiliaPrep Adapter for 1, 3, 6 & 12 mL SPE (10/box)

AUT-0173 SiliaPrep Adapter for 25 & 60 mL SPE (10/box)



AUT-0172

### SiliaPrep Vacuum Adapters

Fast, user friendly, and economical adapters for SPE cartridges. Only a vacuum source is needed.



AUT-0173

SiliaPrep Vacuum Adapter - Flasks		
Joint	PN	Description
20/40	AUT-0043	20/40 - SiliaPrep Vacuum Adapter
19/22	AUT-0044	19/22 - SiliaPrep Vacuum Adapter
14/22	AUT-0045	14/22 - SiliaPrep Vacuum Adapter

Note: One unit per box.

SiliaPrep Vacuum Adapter - Screw Thread Vials		
Thread	PN	Description
22/400	AUT-0046	22/400 Vial - SiliaPrep Vacuum Adapter Without Vial Connector
22/400	AUT-0047	22/400 Vial - SiliaPrep Vacuum Adapter With Vial Connector

Note: One unit per box.



AUT-0043

AUT-0044

AUT-0045



AUT-0046

AUT-0047

## SiliaPrep Empty Tubes

Looking to pack your own SPE cartridges using our bulk sorbent, use our SiliaPrep Empty Tubes with frits for this purpose.

SiliaPrep Empty Tubes	
Formats	Description
SIM-0007-001	Empty 1 mL SPE tube with 2 frits (100/box)
SIM-0008-003	Empty 3 mL SPE tube with 2 frits (100/box)
SIM-0002-006	Empty 6 mL SPE tube with 2 frits (100/box)
SIM-0003-012	Empty 12 mL SPE tube with 2 frits (100/box)
SIM-0004-020	Empty 25 mL SPE tube with 2 frits (100/box)
SIM-0006-060	Empty 60 mL SPE tube with 2 frits (100/box)
SIM-0009-150	Empty 150 mL SPE tube with 2 frits (20/box)

## SiliaPrep SPE Vacuum Manifolds

Run multiple samples simultaneously with a controlled flow rate for higher reproducibility with SiliaPrep SPE Vacuum Manifolds. These manifolds are available in 12, 16 and 24 position configurations and allow consistent extraction and no possibility of cross-contamination from one sample to another.

The design consists in a clear glass chamber equipped with replaceable individual stopcocks (also known as control valves) and solvent guide needles. The adjustable racks allow the use of a wide variety of collection vessels including 13 and 16 mm test tubes, autosampler & scintillations vials, volumetric and Erlenmeyer flasks.

Simply apply a vacuum source to elute sample through a cartridge or a disk directly to the collection vessel of choice.

### Complete Set Includes

- Glass chamber, vacuum gauge & bleed valve
- Cover, gasket, male and female luer fittings
- Individual stopcocks and needles
- Collection racks with supporting legs, retaining clips, shelves and posts

SiliaPrep SPE Vacuum Manifolds (complete set)	
Product Number	Description
AUT-0128-12	12-Position SiliaPrep SPE Vacuum Manifold
AUT-0129-24	24-Position SiliaPrep SPE Vacuum Manifold

16-Position and 10-Position manifolds also available, contact us for more information.



## SiliaPrep Vacuum Manifold Accessories

Various replacement parts are available for each SiliaPrep Vacuum Manifold offered by SiliCycle.

SiliaPrep Vacuum Manifold Accessories				
Description	10-Position Vacuum Manifold	12-Position Vacuum Manifold	16-Position Vacuum Manifold	24-Position Vacuum Manifold
SiliaPrep Vacuum Manifold Complete Set	AUT-0130-10 (1/box)	AUT-0128-12 (1/box)	AUT-0128-16 (1/box)	AUT-0129-24 (1/box)
Glass Chamber [ Dimensions: Length x Width x Height ]	AUT 0182-1 (1/box) [ 12" x 5.25" x 12" ]	AUT-0182-2 (1/box) [ 7" x 5.25" x 7" ]	AUT-0184 (1/box) [ 12" x 5.25" x 7" ]	AUT-0185 (1/box) [ 12" x 5.25" x 7" ]
Vacuum Gauge, Valve & Glass Chamber Kit	AUT-0186 (1/box)	AUT-0187 (1/box)	AUT-0188 (1/box)	AUT-0189 (1/box)
Top Cover Gasket	AUT-0190-10 (2/box)	AUT-0174 (2/box)	AUT-0175 (2/box)	AUT-0193 (2/box)
Polypropylene Stopcocks	AUT-0194 (10/box)	AUT-0146 (12/box)	AUT-0195 (16/box)	AUT-0147 (24/box)
Teflon® Stopcocks	AUT-0149-25 (25/box) or AUT-0149-50 (50/box)			
Polypropylene Needles	AUT- 0196 (10/box)	AUT-0154 (12/box)	AUT-0197 (16/box)	AUT-0155 (24/box)
Stainless Steel Needles	AUT-0198 (10/box)	AUT-0178 (12/box)	AUT-0199 (16/box)	AUT-0179 (24/box)
Teflon® Needles	AUT-0200 (100/box)			
Collection Racks Kit ( <i>supporting legs, retaining clips, shelves and posts included</i> )	AUT-0201 (1/box)	AUT-0202 (1/box)	AUT-0203 (1/box)	AUT-0204 (1/box)
Plate for 13 mm Test Tubes	-	AUT-0205 (1/box)	AUT-0206 (1/box)	AUT-0207 (1/box)
Plate for 16 mm Test Tubes	-	AUT-0208 (1/box)	AUT-0209 (1/box)	AUT-0210 (1/box)
Plate for 19 mm Test Tubes	AUT-0211 (1/box)	-	-	-
Plate for 25 mm Test Tubes	AUT-0212 (1/box)	-	-	-
Plate for Autosampler Vials	-	AUT-0213 (1/box)	-	-
Plate for Volumetric Flasks	-	AUT-0214 (1/box)	-	-

## SiliaPrep Waste Containers

Disposable solvent resistant polypropylene containers are available for the 12 port manifolds. These waste containers greatly simplify sample preparation, solvent disposal and clean-up. Depending on the nature of the solvent used, the waste container can be reused many times prior to discarding.



AUT-0176 (10/box)

## SiliaPrep Drying Manifold Covers

SiliaPrep Drying Manifold Covers can be used to concentrate samples with a flow of air or gas (*nitrogen*). These covers are available for the 12, 16 and 24 port vacuum manifolds.

SiliaPrep Drying Manifold Covers (1/box)	
Product Number	Description
AUT-0215-12	12-Position SiliaPrep Drying Manifold Cover
AUT-0215-16	16-Position SiliaPrep Drying Manifold Cover
AUT-0215-24	24-Position SiliaPrep Drying Manifold Cover



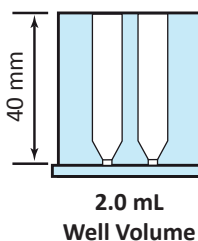
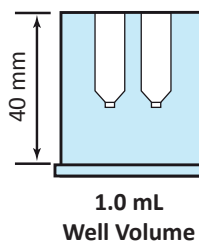
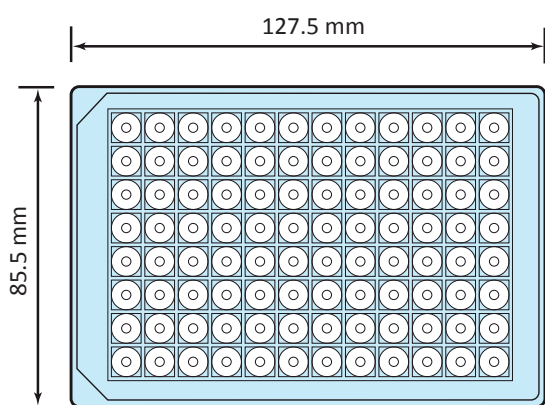
AUT-0215-12

## SiliaPrep 96-Well Collection Plates

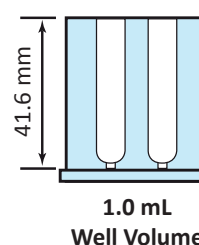
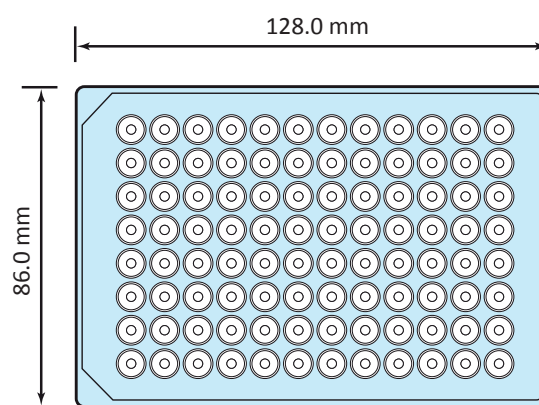
SiliCycle offers SiliaPrep 96-Well Collection Plates made from polypropylene with extremely low extractable levels. These collection plates are available with square deep shape in both 1.0 mL and 2.0 mL well volume and with round bottom in 1 mL only. Cap mats are available for all these collection plates.

SiliaPrep 96-Well Collection Plates	
Product Number	Description
96W-0009	SiliaPrep 96 Well Collection Plate Square Bottom, 2 mL (50/box)
96W-0010	SiliaPrep 96 Well Collection Plate Square Bottom, 1 mL (50/box)
96W-0011	SiliaPrep 96 Well Collection Plate Round Bottom, 1 mL (50/box)

### 96-Well Collection Plates Square Shape



### 96-Well Collection Plates Round Shape



## SiliaPrep Disposable Reservoir Trays for 96-Well Plates

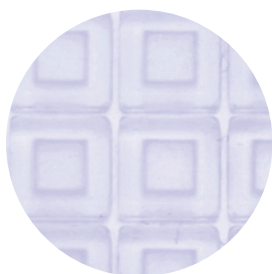
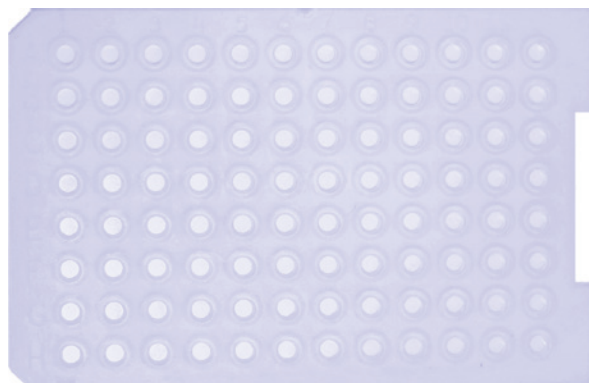
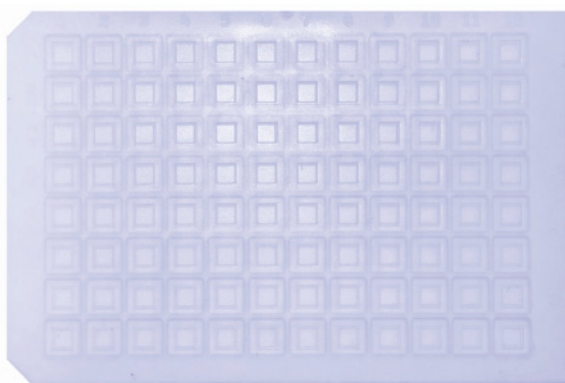
SiliCycle offers SiliaPrep Disposable Reservoir Trays to collect waste solvents used during activation, loading and washing steps. These disposable trays are made in PVC and are compatible with all manifolds used with well plates.

SiliaPrep Disposable Reservoir Trays	
Product Number	Description
96M-0012	SiliaPrep Disposable Reservoir Trays (25/box)

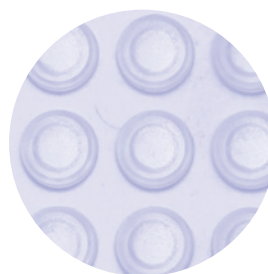


## SiliaPrep 96-Well Plate Cap Mats

SiliCycle offers SiliaPrep 96-Well Plate Cap Mats compatible with most 96-Well Plate available on the market. These cap mats are made from a premium silicone quality with a PTFE coating for ultra low bleed. Slit and 384 well plate cap mats are available under request.



SiliaPrep 96 Well Plate Square  
Silicone/PTFE Cap Mats



SiliaPrep 96 Well Plate Round  
Silicone/PTFE Cap Mats

## SiliaPrep 96-Well Plate Cap Mats Ordering Information

Ordering Information			
Well Shape	Quantity per box	Product Number	Description
Square	5 / box	96M-0001S	SiliaPrep 96-Well Plate Square Silicone/PTFE Cap Mats (use with 96W-0009 & 96W-0010 collection plate)
	25 / box	96M-0001S-25	
	50 / box	96M-0001S-50	
	100 / box	96M-0001S-100	
Round	5 / box	96M-0001R	SiliaPrep 96-Well Plate Round Silicone/PTFE Cap Mats (use with 96W-0011 collection plate)
	25 / box	96M-0001R-25	
	50 / box	96M-0001R-50	
	100 / box	96M-0001R-100	

\* Contact us if you are looking for a cap mat not listed inside this table.

## SiliaPrep Phase Separator Cartridges

SiliCycle offers SiliaPrep Phase Separator Cartridges to separate the aqueous phase from chlorinated solvents under gravity. These ready-to-use cartridges are fitted with a proprietary hydrophobic frit and are a great alternative to liquid-liquid extraction, the most popular technique to do this separation. However, this last method is time consuming, requires the use of a glass funnel which needs to be washed between each separate extraction and is not suitable for multiple extractions. SiliaPrep Phase Separator Cartridges solve these drawbacks and offer many advantages.

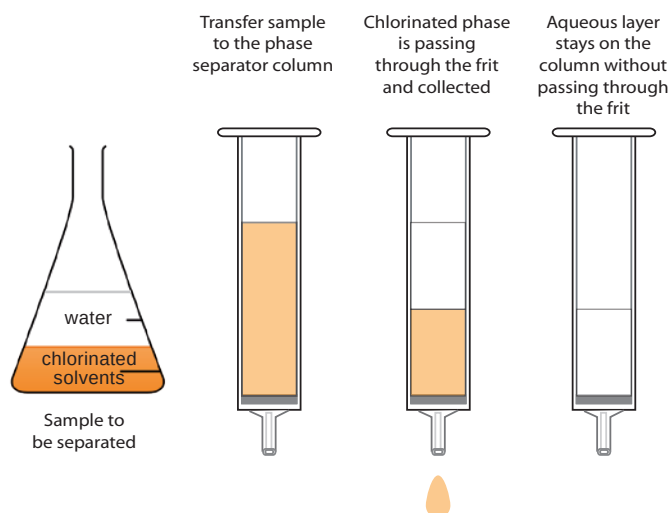
Why choose SiliaPrep Phase Separator Cartridges

- Ease of use
- Efficient and cost saving
- Comply with green chemistry philosophy
- Compatible with automated systems

SiliaPrep Phase Separator Cartridges	
Product Number	Description
PS-012	SiliaPrep Phase Separator Cartridge 12 mL (100/box)
PS-060	SiliaPrep Phase Separator Cartridge 60 mL (50/box)
PS-150	SiliaPrep Phase Separator Cartridge 150 mL (25/box)

### Typical Experimental Procedure

1. Select the appropriate size of SiliaPrep Phase Separator Cartridge to hold the entire sample volume (*both aqueous and chlorinated phases*).
2. Connect the SiliaPrep Phase Separator Cartridge on a vacuum manifold. Ensure the collection vessel volume is large enough to entirely recover the organic layer.  
(Note: Do not connect the manifold to a vacuum source.)
3. Transfer the sample mixture to be separated on top of the SiliaPrep Phase Separator Cartridge.
4. After a few seconds (*under gravity*), the water immiscible chlorinated solvent will start to pass through the frit and can be collected in the suitable vial already placed inside the manifold.
5. The proprietary frit used in the SiliaPrep Phase Separator Cartridge allows the aqueous layer to be left on the column for at least 48 hours without passing through the frit.



SiliaPrep Phase Separator Typical Experimental Procedure

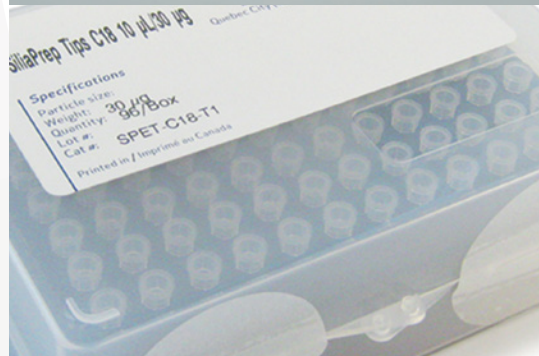
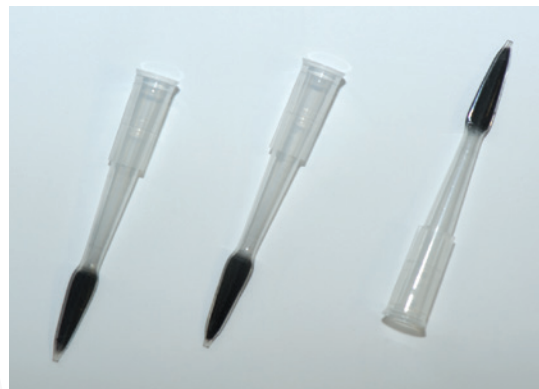
### Important Advices

- **Process under gravity only - Do not apply vacuum or positive pressure**  
The SiliaPrep Phase Separator Cartridges are designed to be used under gravity only. The use of vacuum or positive pressure source can yield to a loss in the separation efficiency.
- **Biphasic or two phase system required**  
The sample to be separated needs to contain water and a water immiscible solvent with greater density than water to form the lower layer. Most common solvents are dichloromethane, chloroform and other chlorinated solvents. Furthermore, try to minimize the presence of water miscible solvent (*i.e. methanol, ethanol or acetone*) which can cause problem in obtaining a real biphasic system and consequently, the phase separator may not work effectively.

\*To obtain a more efficient compound partition between aqueous and organic layers, a liquid-liquid extraction can be done prior to use the phase separator column.







INSIDE THIS SECTION

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[SiliaPrep Tips Micro-SPE Application](#)

# SiliaPrep™ Tips

## Micro-SPE Cartridges

# SiliaPrep™ Tips Micro-SPE Cartridges

Using SiliaPrep Tips Micro-SPE Cartridges guarantees the following benefits:

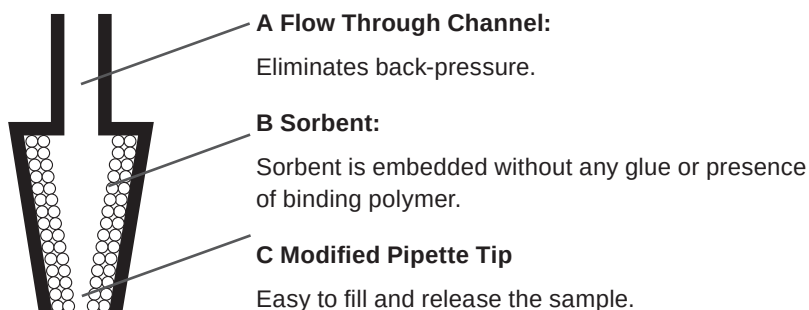
- Simple, fast analyte retention & elution with minimal loss.
- Sorbents are directly embedded into inner cartridge wall for reduced risk of contamination.
- Exceptional binding capacity.
- No back-pressure.



## SiliaPrep Tips for Micro Sample Preparation

SiliaPrep Tips Micro-SPE Cartridges are designed for micro-purification and micro-extraction of femtomole (*fmol*) to picomole (*pmol*) quantities of analytes prior to the analysis by chromatographic techniques and/or mass spectrometry. The constant improvement of these techniques of analysis has allowed scientists to decrease the limit of quantification of several applications. This lower limit has pushed SPE manufacturers to design new SPE cartridges accepting small volumes of analytes.

These Tips are specially designed to achieve extraction and purification of small molecules, peptides, phosphopeptides and proteins. SiliaPrep Tips Micro-SPE Cartridges are available in 3 different cartridge formats based on the binding capacity of each embedded sorbent. They are packed with our SiliaBond functionalized silica gels and specialty phases to cover the broadest spectrum of applications requiring small volume of analytes. The SiliaBond phases are embedded directly in the inner surface of the tip to provide consistent flow rates. Finally, no glue is used during packing procedures in order to prevent any contamination of the analyte.



## SiliaPrep Tips General Experimental Procedure

The following lines present the general experimental procedure for the purification and enrichment of small molecules, peptides and proteins using SiliaPrep Tips Micro-SPE Cartridges.

### Conditioning Step:

Attach the SiliaPrep Tips to a micropipette and aspirate/expel the elution solution 5 times and the binding solution 3 times.

#### A) Loading Step:

Aspirate/expel the sample 20 to 50 times to allow the compounds to adsorb onto the sorbent.

#### B) Washing Step:

Aspirate/expel the binding 10 times solution and discard the expelled solution each time.

#### C) Elution Step:

Aspirate/expel 10 times the elution solution and collect the expelled solution in a suitable clean tube. Repeat with a fresh portion of elution solution if you want to be sure to collect all of the adsorbed compounds.

(Note : repeat 3-5 times for the carbon black sorbent.)

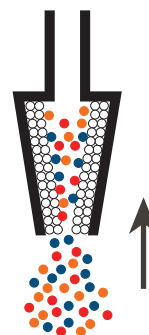
#### Binding Solution:

0.1% formic acid or 0.05% trifluoroacetic acid (TFA).

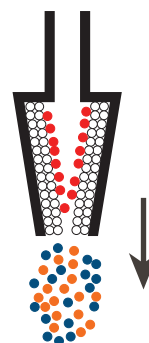
#### Elution Solution:

0.1% formic acid or 0.05% trifluoroacetic acid (TFA) plus  $\pm 60\%$  of acetonitrile, propanol or methanol depending on the compound polarity.

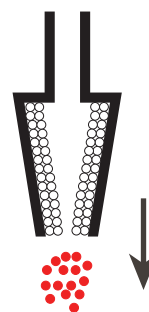
A) Loading Step



B) Washing Step



C) Elution Step



SiliaPrep Tips Micro-SPE Cartridges Specifications				
Tip Volume ( $\mu\text{L}$ )	Sample Volume ( $\mu\text{L}$ )	Binding Capacity ( $\mu\text{g}$ )	Sorbent Weight ( $\mu\text{g}$ )	Product Number
1 - 10	0.5 - 10	1	30	SPET-xxx-T1
10 - 200	2 - 25	2.5	75	SPET-xxx-T2
10 - 200	5 - 50	15	400	SPET-xxx-T3

SiliaPrep Tips Micro-SPE Cartridges are sold in box of 96.

## SiliaPrep Tips Sorbent Selection Guide

SiliaPrep Tips Sorbent Selection Guide				
Molecule	Application	Analyte	Sorbent	
Small Molecules	Desalting	All	C18; Carbon Black	
	Protein removal	All	C18; Hilic	
	Metal Scavenging	All	Cysteine; DMT; Imidazole; PSA; TAAcOH; TAAcONa; Thiol; Thiourea; Triamine	
	Enrichment	Hydrophobic		C18; HLB; DVB; Carbon Black; Hilic
		Hydrophilic		Silica; Cyano; Carbon Black; Hilic
		Neutral		C18; HLB; DVB; Carbon Black; Hilic; Cyano
		Cationic		SCX; WCX; XSCX; XWCX
Anionic		SAX; NH <sub>2</sub> ; XSAX; XWAX		
Fluorinated Compounds		Fluoro		
Peptides	Desalting	All	C4; C8; C18; Carbon Black; Hilic	
	SDS removal	All	SDS Removal	
	Enrichment	Glycopeptide		Carbon Black; Hilic; TiO <sub>2</sub>
		Phosphopeptide		TiO <sub>2</sub> ; ZrO <sub>2</sub> ; TiO <sub>2</sub> /ZrO <sub>2</sub> ; SAX; NH <sub>2</sub> ; XSAX; XWAX
Other peptide		SAX; NH <sub>2</sub> ; XSAX; XWAX; SCX; WCX; XSCX; XWCX		
Proteins	SDS removal	All	SDS Removal	
	Tryptic digestion	All	Trypsin	
	Enrichment	Phosphoprotein		TiO <sub>2</sub> ; ZrO <sub>2</sub> ; TiO <sub>2</sub> /ZrO <sub>2</sub> ; SAX; NH <sub>2</sub> ; XSAX; XWAX
		Other protein		SAX; NH <sub>2</sub> ; XSAX; XWAX; SCX; WCX; XSCX; XWCX
Oligo-saccharides	Desalting	All	Carbon Black	
	Enrichment	Sulfated glycan		SAX; XSAX
		Sialo-glycan		SAX; XSAX
Other oligosaccharide		Carbon Black; Hilic; TiO <sub>2</sub>		

For bigger volumes, we also offer SiliaPrep XL Tips Micro-SPE Cartridges.

SiliaPrep XL Tips Micro-SPE Cartridges Specifications				
Tip Volume (μL)	Sample Volume (μL)	Binding Capacity (μg)	Sorbent Weight (mg)	Product Number
1 - 10	1 - 10	400	4	SPETXL-xxx-T1
10 - 200	2 - 25	1000	10	SPETXL-xxx-T2
100 - 1000	20 - 1000	5000	50	SPETXL-xxx-T3

SiliaPrep XL Tips Micro-SPE Cartridges T1 and T2 are sold by box of 96, T3 by box of 20.

# SiliaPrep Tips Sorbent Descriptions

SiliaPrep Tips Sorbent Descriptions and Ordering Information				
SiliaPrep Tips Sorbent	Description	Product Number		
		10 µL/30 µg	200 µL/75 µg	200 µL/400 µg
C18	Highest hydrophobic character sorbent. Mainly used for small peptides and small molecules purification, enrichment or desalting analysis.	SPET-C18-T1	SPET-C18-T2	SPET-C18-T3
C8	Mid-level hydrophobic sorbent. Mainly used for sample treatment of proteins and peptides requiring a lower hydrophobic capacity.	SPET-C8-T1	SPET-C8-T2	SPET-C8-T3
C4	Lowest hydrophobic character sorbent. Mainly used for protein purification, enrichment or desalting analysis.	SPET-C4-T1	SPET-C4-T2	SPET-C4-T3
HLB	Polymeric sorbent with an hydrophilic-lipophilic balance. Mainly used for hydrophobic and neutral molecules enrichment.	SPET-HLB-T1	SPET-HLB-T2	SPET-HLB-T3
DVB	Highly hydrophobic polymeric sorbent. Mainly used for hydrophobic and neutral molecules enrichment.	SPET-DVB-T1	SPET-DVB-T2	SPET-DVB-T3
Carbon Black	Hydrophilic and hydrophobic character. Mainly used for purification of oligosaccharides and other macromolecules containing sugar functions.	SPET-CB-T1	SPET-CB-T2	SPET-CB-T3
Hilic	Moderately polar sorbent. Mainly used for proteins removal, peptides desalting and small molecules enrichment.	SPET-HI-T1	SPET-HI-T2	SPET-HI-T3
Cyano	Both polar and hydrophobic character. Mainly used for hydrophilic and neutral molecules enrichment.	SPET-CN-T1	SPET-CN-T2	SPET-CN-T3
Silica	Most polar sorbent. Mainly used for hydrophilic molecules enrichment.	SPET-SI-T1	SPET-SI-T2	SPET-SI-T3
SAX	Strong anion exchanger sorbent. Mainly used for weak acids enrichment.	SPET-SAX-T1	SPET-SAX-T2	SPET-SAX-T3
NH <sub>2</sub> (WAX)	Weak anion exchanger sorbent. Mainly used for strong acids enrichment ( <i>phosphopeptides and phosphoproteins</i> ).	SPET-NH2-T1	SPET-NH2-T2	SPET-NH2-T3
SCX	Strong cation exchanger sorbent. Mainly used for weak bases enrichment.	SPET-SCX-T1	SPET-SCX-T2	SPET-SCX-T3
WCX	Weak cation exchanger sorbent. Mainly used for strong bases enrichment.	SPET-WCX-T1	SPET-WCX-T2	SPET-WCX-T3
SAX Polymeric	Polymeric sorbent functionalized by a strong anion exchanger. Mainly used for weak acids enrichment.	SPET-XSAX-T1	SPET-XSAX-T2	SPET-XSAX-T3
WAX Polymeric	Polymeric sorbent functionalized by a weak anion exchanger. Mainly used for strong acids enrichment ( <i>phosphopeptides and phosphoproteins</i> ).	SPET-XWAX-T1	SPET-XWAX-T2	SPET-XWAX-T3
SCX Polymeric	Polymeric sorbent functionalized by a strong cation exchanger. Mainly used for weak bases enrichment.	SPET-XSCX-T1	SPET-XSCX-T2	SPET-XSCX-T3
WCX Polymeric	Polymeric sorbent functionalized by a weak cation exchanger. Mainly used for strong bases enrichment.	SPET-XWCX-T1	SPET-XWCX-T2	SPET-XWCX-T3
TiO <sub>2</sub>	High selectivity for multiple phosphorylated peptides. Mainly used for phosphopeptide enrichment.	SPET-TI-T1	SPET-TI-T2	SPET-TI-T3
ZrO <sub>2</sub>	High selectivity for mono-phosphorylated peptides. Mainly used for phosphopeptide enrichment.	SPET-ZR-T1	SPET-ZR-T2	SPET-ZR-T3
TiO <sub>2</sub> /ZrO <sub>2</sub>	Excellent alternative for the enrichment of a broad spectrum of phosphopeptides ( <i>literature suggests only 30% overlap in phosphopeptides isolated by TiO<sub>2</sub> versus ZrO<sub>2</sub></i> ).	SPET-TIZR-T1	SPET-TIZR-T2	SPET-TIZR-T3
SDS Removal	Used to remove SDS from peptides and proteins.	SPET-SDS-T1	SPET-SDS-T2	SPET-SDS-T3
Trypsin	Used to cleave proteins and peptides at the C-terminal side, with minimal protease contaminants.	SPET-TRYP-T1	SPET-TRYP-T2	SPET-TRYP-T3
Fluoro	Fluorinated sorbent. Mainly used for fluorine containing molecules enrichment.	SPET-FL-T1	SPET-FL-T2	SPET-FL-T3
Metal Scavengers	Mainly used to lower the residual metal concentration of various metal complexes ( <i>Pd, Pt, Rh, Ru, Ni, Sn, etc</i> ). Choice of 9 metal scavenging sorbents: Cysteine, DMT, Imidazole, PSA, TAAcOH, TAAcONa, Thiol, Thiourea and Triamine.	SPET-CYS-T1 SPET-DMT-T1 SPET-IMIDAZ-T1 SPET-PSA-T1 SPET-TAACOH-T1 SPET-TAACONA-T1 SPET-THIOL-T1 SPET-THIOUREA-T1 SPET-TRINH2-T1	SPET-CYS-T2 SPET-DMT-T2 SPET-IMIDAZ-T2 SPET-PSA-T2 SPET-TAACOH-T2 SPET-TAACONA-T2 SPET-THIOL-T2 SPET-THIOUREA-T2 SPET-TRINH2-T2	SPET-CYS-T3 SPET-DMT-T3 SPET-IMIDAZ-T3 SPET-PSA-T3 SPET-TAACOH-T3 SPET-TAACONA-T3 SPET-THIOL-T3 SPET-THIOUREA-T3 SPET-TRINH2-T3

# SiliaPrep™ Tips Micro-SPE Application



Forensic



## Micro-Extraction of Dextromethorphan from Plasma

CARTRIDGE	SiliaPrepX Tips C18 10 $\mu$ L/30 $\mu$ g Part Number: SPET-C18-T1						
SAMPLE PRETREATMENT	8 $\mu$ L of plasma sample was mixed with 2 $\mu$ L of internal standard (Dextromethorphan-d3 at 10 ng/mL in Methanol)						
CONDITIONING STEP	8 $\mu$ L of Methanol (10 aspirate/expel)						
EQUILIBRATION STEP	8 $\mu$ L of water (10 aspirate/expel)						
LOADING STEP	Plasma sample (30 aspirate/expel)						
WASHING STEP	8 $\mu$ L of water (10 aspirate/expel) then 8 $\mu$ L of 25% Methanol in water (10 aspirate/expel)						
ELUTION STEP	8 $\mu$ L of Acetonitrile (30 aspirate/expel)						
FURTHER TREATMENT	Quantification by LDTD-MS/MS*						
RECOVERY	<table border="1"> <thead> <tr> <th colspan="2">Recovery (at 10 ng/mL)</th> </tr> </thead> <tbody> <tr> <td>Dextromethorphan</td> <td>86%</td> </tr> <tr> <td>Dextromethorphan d-3</td> <td>80%</td> </tr> </tbody> </table>	Recovery (at 10 ng/mL)		Dextromethorphan	86%	Dextromethorphan d-3	80%
Recovery (at 10 ng/mL)							
Dextromethorphan	86%						
Dextromethorphan d-3	80%						

(\* Collaboration with Phytronix)



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[SiliaQuick QuEChERS Tips & Troubleshooting](#)

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[Choose your SiliaQuick QuEChERS Dispersive SPE Clean-Up Kits by Food Types](#)

[Case Study: Detection of Multiple Pesticides Residues in Canadian Apples](#)

[Case Study: Detection of Common Neonicotinoids Residues in Honey](#)

**SiliaQuick**<sup>TM</sup>  
QuEChERS



# SiliaQuick™ QuEChERS



Food



Environment

Using SiliaQuick QuEChERS ensures the following benefits:

- Clean extracts from pure products.
- High recovery and lot-to-lot reproducibility.
- Great variety of QuEChERS to cover 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: **Quick, Easy, Cheap, Effective, Rugged and Safe.**

The QuEChERS method has gained in popularity to become the most valuable alternative for 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, antibiotics, drugs, and any other compounds present in all food, beverage, animal and human 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**:

- 1) First step is to carry out the extraction of compounds of interest from your food or beverage matrix through a solvent (mainly *acetonitrile*).
- 2) 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 solution.
- 3) Final analysis step consists in a simple injection into a LC or GC coupled with MS or MS/MS instrument to quantify the analyte concentration.

### Step 1

#### Liquid Extraction

Extract pesticides or analytes of interest into an organic layer relying on the perfect combination of salts and acetonitrile.



### Step 2

#### dispersive SPE Clean-Up

Subject organic layer from 1<sup>st</sup> step to further clean-up and selectively remove unwanted interferences such as lipids and pigments.



### Step 3

#### LC or GC Analysis

Analyze your clean from last step and ready for GC or HPLC with MS/MS, or your selective detector.



## SiliaQuick QuEChERS for Food Sample Treatments

SiliaQuick QuEChERS are designed to ensure 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.
- Easy:** Preweighed & ready-to-use tubes or packets for only 3 straightforward steps.
- 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.

Traditional Liquid & Solid Extractions for Sample Preparation involve a number of issues that QuEChERS can sort out:

### Liquid-Phase Extractions are:

- Labor intensive
- Necessitate large volumes of organic solvents, including halogenated solvents
- Difficult to automate
- Emulsion prone
- Not specific to a given analyte

### Solid-Phase Extractions are:

- Complex and difficult to master
- Necessitate large volumes of organic solvents, including halogenated solvents
- Lengthy to develop: necessitate time & efforts in method development
- Offer too many possibilities to choose from
- Ineffective toward many analytes

## Advantages of QuEChERS over Traditional Sample Preparation

Advantages of QuEChERS Over Traditional Sample Preparation			
	Traditional SPE	QuEChERS	QuEChERS Benefits
Estimated time to process 6 samples	120 minutes	20 minutes	About 6 times faster
Solvent used per sample	90 mL	10 - 15 mL	About 6 - 9 times less solvent needed
Chlorinated waste	30 mL	None	Safer, greener, less costly
Glassware and specialized equipment	Clean separatory funnels, waterbath, round bottom flasks, rotary evaporator...	Centrifuge	No additional supplies needed

**Remember, QuEChERS is the only sample preparation technique in line with green chemistry principles and it is highly effective.**

## 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
Anhydrous Magnesium Sulfate ( $MgSO_4$ )	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
SiliaQuick Diamine (Primary Secondary Amine)	Removes sugars, fatty acids, organic acids, lipids, and some pigments. Sterols and additional lipids can also be removed in combination with SiliaQuick C18.
SiliaQuick Amine	Removes sugars and fatty acids as well as the SiliaQuick Diamine but is less likely to catalyze degradation of base sensitive analytes.
SiliaQuick C18	Removes long chain, non-polar compounds, and sterols.
Graphitized Carbon Black	Removes pigments, polyphenols, and other polar compounds.
Anhydrous Magnesium Sulfate ( $MgSO_4$ )	Removes residual water from the organic phase.

# Schematic Flow Chart of the Most Used QuEChERS Technique



Note: Please note that these procedures are a convenient starting point for method development but are only meant to orient. Further optimization depending on the analyte of interest may be required to tailor the method to your application needs and maximize your LC-MS or GC-MS analysis.

$MgSO_4$ : Anhydrous Magnesium Sulfate

NaCl: Sodium Chloride

$Na_3Citrate \cdot 2H_2O$ : Trisodium Citrate Dihydrate

$Na_2HCitr \cdot 1.5H_2O$ : Disodium Hydrogenecitrate Sesquihydrate

PSA: Primary Secondary Amine - SiliaQuick Diamine

GCB: Graphitized Carbon Black

C18: C18 Fonctionalized Silica - SiliaQuick C18

# How to Choose the Proper SiliaQuick QuEChERS Kit

## Step 1: For Liquid Extraction

Extract the pesticides or analytes of interest into an organic layer by relying on the perfect combination of salts and organic solvents (*usually acetonitrile*).

The table below presents the SiliaQuick QuEChERS Liquid Extraction kits specially pre-packed with anhydrous salts and/or sorbents to suit the QuEChERS technique of your choice.

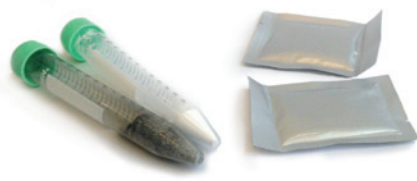
**Selection Criteria:**

- For base or heat-sensitive analytes, use buffered method.
- With doubt, use buffered method.



Original Method	Buffered Methods	
	AOAC 2007.01 Method	EN 15662 Method
10 g Sample	15 g Sample	10 g Sample
4 g MgSO <sub>4</sub> ; 1.5 g NaCl	6 g MgSO <sub>4</sub> ; 1.5 g NaOAc	4 g MgSO <sub>4</sub> ; 1 g NaCl; 1 g SCTD; 0.5 g SCDS
PN: QE-0001-100P ( <i>packets only</i> ) PN: QE-0001-100K ( <i>packets &amp; tubes</i> )	PN: QE-0002-100P ( <i>packets only</i> ) PN: QE-0002-100K ( <i>packets &amp; tubes</i> )	PN: QE-0003-100P ( <i>packets only</i> ) PN: QE-0003-100K ( <i>packets &amp; tubes</i> )

**MgSO<sub>4</sub>** = Anhydrous Magnesium Sulfate , **NaCl** = Sodium Chloride, **NaOAc** = Sodium Acetate, **GCB** =Graphitized Carbon Black, **SCTD**=Sodium Citrate Dibasic Sesquihydrate, **SCDS**=Sodium Citrate Tribasic Dihydrate



## Step 2: For dispersive Solid-Phase Extraction Clean-Up

An aliquot of the organic layer from the 1<sup>st</sup> step is subjected to further clean-up. This step helps selectively remove unwanted interferences such as lipids and pigments but NOT your analytes of interest!

The following table presents the 4 types of SiliaQuick QuEChERS dispersive Solid-Phase Extraction clean-up kits to match your food matrices.

dSPE kits contain pre-weighed sorbents/salts inside 2 mL or 15 mL centrifuge tubes. We recommend using 2 mL dispersive tubes for an extract volume of 1 mL and 15 mL dispersive tubes for extract volumes higher than 3 mL.

### Selection Criteria:

- Aliquot size is specified by the method.
- Kits are created for these specific amounts.
- 4 easy-to-choose typed of food matrices.
- Colour-coded caps that match matrix category for reduced error.
- Two methods depending on molecules to be removed.



Check pH and adjust to pH 5 - 5.5  
Add internal standards aliquot  
**SHAKE AND CENTRIFUGE**

Cap Color for 2 mL tubes	Matrix	2 mL tubes for small extract volumes		15 mL tubes for large extract volumes	
		AOAC 2007.01	EN 15662	AOAC 2007.01	EN 15662
Clear	<b>General matrices</b> <ul style="list-style-type: none"> <li>• Apples</li> <li>• Bananas</li> <li>• Broccoli</li> <li>• ...</li> </ul>	150 mg MgSO <sub>4</sub> 50 mg PSA PN: QD-1000-2T	150 mg MgSO <sub>4</sub> 25 mg PSA PN: QD-1001-2T	1200 mg MgSO <sub>4</sub> 400 mg PSA PN: QD-2000-15T	900 mg MgSO <sub>4</sub> 150 mg PSA PN: QD-2001-15T
Pink	<b>Pigmented matrices</b> <ul style="list-style-type: none"> <li>• Lettuces</li> <li>• Peppers</li> <li>• Strawberries</li> <li>• ...</li> </ul>	150 mg MgSO <sub>4</sub> 50 mg PSA 50 mg GCB PN: QD-1002-2T	150 mg MgSO <sub>4</sub> 25 mg PSA 2.5 mg GCB PN: QD-1003-2T	1200 mg MgSO <sub>4</sub> 400 mg PSA 400 mg GCB PN: QD-2002-15T	900 mg MgSO <sub>4</sub> 150 mg PSA 15 mg GCB PN: QD-2003-15T
Green	<b>Highly pigmented matrices</b> <ul style="list-style-type: none"> <li>• Urine</li> <li>• Avocados</li> <li>• Coffee</li> <li>• ...</li> </ul>	150 mg MgSO <sub>4</sub> 50 mg PSA 50 mg GCB 50 C18 PN: QD-1004-2T	150 mg MgSO <sub>4</sub> 25 mg PSA 7.5 mg GCB PN: QD-1005-2T	1200 mg MgSO <sub>4</sub> 400 mg PSA 400 mg GCB 400 mg C18 PN: QD-2004-15T	900 mg MgSO <sub>4</sub> 150 mg PSA 45 mg GCB PN: QD-2005-15T
Blue	<b>Fatty and waxed matrices</b> <ul style="list-style-type: none"> <li>• Milk</li> <li>• Shrimps</li> <li>• Blood</li> <li>• Liver</li> <li>• ...</li> </ul>	150 mg MgSO <sub>4</sub> 50 mg PSA 50 mg C18 PN: QD-1006-2T	150 mg MgSO <sub>4</sub> 25 mg PSA 25 mg C18 PN: QD-1007-2T	1200 mg MgSO <sub>4</sub> 400 mg PSA 400 mg C18 PN: QD-2006-15T	900 mg MgSO <sub>4</sub> 150 mg PSA 150 mg C18 PN: QD-2007-15T

MgSO<sub>4</sub> = anhydrous Magnesium Sulfate, PSA = SiliaQuick Primary Secondary Diamine, GCB = Graphitized Carbon Black, C18 = SiliaQuick C18

### Step 3: For dispersive Solid-Phase Extraction Clean-Up

The extract, containing the analyte(s) is ready to be analysed by GC or HPLC with MS, MS/MS or your selective detector.

#### Selection Criteria:

- Consider your application (*analyte MW, solubility*).
- Consider the stationary phase (*column chemistry, separation mode, particle size, retention capacity*).
- Column dimensions (*internal diameter, length*).

SHAKE AND CENTRIFUGE

#### SiliaChrom dt C18

Universal C18 for most popular applications  
(*highest purity silica gel*)

#### SiliaChrom XDB C18

Ideal for barbiturates, fat-soluble  
vitamins, fatty acids, steroids


#### SiliaChrom SCX

Ideal for charged analytes

Check pages 112 - 165 of our Analytical Catalog, visit our website or contact us for more information




## Bulk Sorbents Available for Your Own Recipe Creation

 <b>SiliCycle Bulk Sorbents for QuEChERS</b>		
Description	Available Quantities	Product Number
SiliaQuick™ C18	1 g	AUT-1313
SiliaQuick™ Anhydrous Magnesium Sulfate ( <i>MgSO<sub>4</sub></i> )	5 g	AUT-0310
	10 g	
SiliaQuick™ Primary Secondary Amine (PSA)	25 g	AUT-0312
	50 g	
	100 g	
SiliaQuick™ Amine	250 g	AUT-0412
	500 g	
	1 kg	
SiliaQuick™ Graphitized Carbon Black (GCB)	5 kg	AUT-0311
	10 kg	
	25 kg ... up to multi-ton Contact us for details	



New to QuEChERS Technology? We Have Starter Kits to Introduce This New Technique:

 <b>SiliaQuick QuEChERS Starter Kits</b>			
PN	Product Name	Tube Volume (mL)	Qty/box
QD-2001-15K	SiliaQuick™ Extraction + dSPE Clean-up Kit for EN 15662 (QE-0003-100K + QD-2001-15T)	50 + 15	50 + 50
QD-1004-2K	SiliaQuick™ Extraction + dSPE Clean-up Kit for AOAC 2007.01 (QE-0002-100K + QD-1004-2T)	50 + 2	100 + 100
QD-2004-15K	SiliaQuick™ Extraction + dSPE Clean-up Kit for AOAC 2007.01 (QE-0002-100K + QD-2004-15T)	50 + 15	50 + 50
QD-1007-2K	SiliaQuick™ Extraction + dSPE Clean-up Kit for EN 15662 (QE-0003-100K + QD-1007-2T)	50 + 2	100 + 100
QD-2007-15K	SiliaQuick™ Extraction + dSPE Clean-up Kit for EN 15662 (QE-0003-100K + QD-2007-15T)	50 + 15	50 + 50



## SiliaQuick QuEChERS Tips & Troubleshooting

When facing poor recovery of pesticide compounds:

### Step 1:

- Each sample has to be at the minimum 80% hydrated to perform optimal liquid extraction.
- Homogenization is a key step and can significantly impact your results.
- Freezing sample at -20 °C can significantly improve the breaking behavior of the sample in order to obtain a higher fineness and homogeneity.
- Great care must be taken in keeping the sample cool, as many pesticides are volatile and some analytes are heat-sensitive. Some mills will continuously cool the sample with liquid nitrogen while grinding.
- Homogenize with dry ice until a fine powder is obtained.
- For base sensitive compounds use buffered method. If you don't know, use buffered method.
- If analyte is sensible, always mix the sample with the solvent first to reduce the exothermic reaction produced by the addition of Magnesium Sulfate (*hence, choose packets instead of pre-filled tubes*).

### Step 2:

- Choose minimal possible tube size. Aliquot size is specified by the method, and kits are created for these specific amounts.
- You can build your own recipe in function of your unwanted interferences using bulk sorbents.

### Step 3:

- 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.



## Select the Right SiliaQuick QuEChERS dSPE Clean-Up Kit According to your Matrix Type

The SiliaQuick QuEChERS dispersive Solid-Phase Extraction clean-up kits are assembled to match different types of matrices. Here is below a table with multiple examples of typical matrices, to help you choose the right kit and combination of sorbents.









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
<b>Root and Tuber Vegetables</b>				
Beets				
Carrot				
Radish				
Potato				
<b>Fruiting Vegetables</b>				
Eggplant				
Cucumber				
Pepper (green or red)				
Pumpkin				
Tomato				
<b>Cabbage</b>				
Broccoli				
Brussels sprouts				
Cauliflower				
<b>Stem Vegetables</b>				
Aparagus				
Celery				
Leek				
Rhubarb				
<b>Leafy Vegetables</b>				
Lettuce				
Basil				
Parsley				
Spinach				
<b>Leek Plants</b>				
Garlic				
Onion				
Shallot				



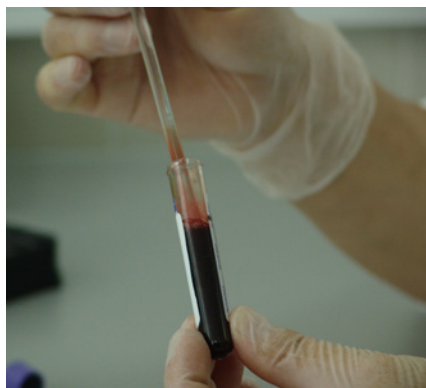
Choose your SiliaQuick QuEChERS Dispersive SPE Clean-Up Kits by Food Types (con't)

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

## Choose your SiliaQuick 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
Animal Proteins				
Organs ( <i>liver, intestine...</i> )				
Milk				
Shrimps & seafood				
Biological Fluids				
Blood				
Urine				

SiliaQuick™ QuEChERS

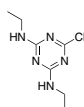


## Case study: Detection of Multiple Pesticides Residues in Canadian Apples

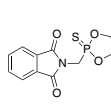


The QuEChERS approach was used by SiliCycle scientists for the extraction and clean-up of nine of the most used pesticides for apple-growing sector in Canada. The application outlines the AOAC 2007.01 methodology, and extracts from this procedure were then diverted to HPLC/MS/MS for analysis.

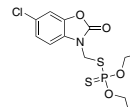
### Pesticides Analyzed



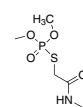
Simazine



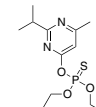
Phosmet



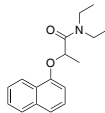
Phosalone



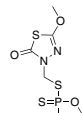
Dimethoate



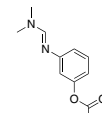
Diazinon



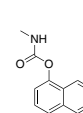
Napropamide



Methidation



Formetanate



Carbaryl

### SiliaQuick Kits Used

#### - STEP 1: PN: QE-0002-100P (6 g MgSO<sub>4</sub> & 1.5 g NaOAc)

- 10 g of apple matrix was weighed in a 50 mL centrifuge tube.
- 10 mL of H<sub>2</sub>O was added.
- Mixture was homogenized.
- Salt packet was added.
- Tube was vortexed for 30 sec and then centrifuged at 3,000 rpm for 5 min.

#### - STEP 2: PN: QD-2000-15T («AOAC method for General Fruits & Veggies» : 1,200 mg MgSO<sub>4</sub>, 400 mg PSA)

- Supernatant was transferred into a 15 mL dSPE.
- Tube was vortexed for 30 sec and then centrifuged at 3,000 RPM for 5 min.

#### - STEP 3: SiliaChrom dt C18 PN: H141802E-G050 (3.0 x 50 mm, 2.5 μm, 100 Å)

- Extract, containing the pesticides, was transferred to a 2 mL, 9 mm wide opening vial PN: 2SW-C9-C and then injected for subsequent analysis.

## Instruments Conditions

### HPLC Conditions

<b>MOBILE PHASE</b>	MPA: 1 mM Ammonium Formate in 95/5 H <sub>2</sub> O/MeCN, 0.1 % Formic Acid (v/v) MPB: 1 mM Ammonium Formate in 5/95 H <sub>2</sub> O/MeCN, 0.1 % Formic Acid (v/v)
<b>COLUMN</b>	SiliaChrom® dt C18, 2.5 µm
<b>COLUMN SIZE</b>	3.0 x 50 mm
<b>SILICYCLE PN</b>	H141802E-G050
<b>FLOW RATE</b>	0.600 mL/min
<b>TEMPERATURE</b>	23°C
<b>INJECTION VOL</b>	2 µL

### MS/MS Detection

<b>DETECTOR</b>	Sciex API 3000
<b>IONISATION MODE</b>	ESI+
<b>GAS FLOW</b>	8,000 cc/min
<b>TEMPERATURE</b>	375°C

## Experimental Results

Quality Control					
Pesticide	*LLQC	*QC1 (3 X LLOQ)	*QC2 (30% ULQC)	*QC3 (70% ULQC)	*ULQC
Carbaryl	92 ± 3	103 ± 9	96 ± 5	95 ± 3	95 ± 2
Diazinon	102 ± 7	104 ± 2	96 ± 1	97 ± 2	98 ± 2
Dimethoate	106 ± 3	105 ± 5	98 ± 3	93 ± 1	95 ± 1
Formetanate	101 ± 6	99 ± 3	93 ± 2	97 ± 2	97 ± 2
Methidation	95 ± 7	103 ± 4	101 ± 2	96 ± 4	96 ± 3
Napropamid	92 ± 10	102 ± 6	95 ± 3	95 ± 2	95 ± 1
Phosalone	83 ± 4	103 ± 6	94 ± 5	98 ± 1	94 ± 5
Phosmet	85 ± 5	96 ± 6	102 ± 5	100 ± 6	98 ± 6
Simazine	106 ± 8	103 ± 4	97 ± 1	94 ± 2	95 ± 2

Concentration Levels						
Pesticide	LLOQ (%)	3 X LLOQ	30% ULOQ	70% ULOQ	ULOQ	LOQ (ppt)
Carbaryl	100 ± 3	113 ± 2	104 ± 3	103 ± 3	103 ± 3	0.05
Diazinon	94 ± 4	101 ± 2	99 ± 2	102 ± 1	103 ± 1	0.03
Dimethoate	109 ± 8	96 ± 7	110 ± 3	104 ± 2	105 ± 2	0.10
Formetanate	88 ± 6	87 ± 1	81 ± 1	86 ± 1	89 ± 1	0.50
Methidation	109 ± 2	110 ± 3	109 ± 2	106 ± 1	108 ± 2	0.06
Napropamid	91 ± 9	103 ± 5	107 ± 2	106 ± 1	107 ± 1	0.05
Phosalone	97 ± 8	106 ± 4	110 ± 2	115 ± 3	111 ± 4	0.20
Phosmet	112 ± 2	94 ± 7	100 ± 1	101 ± 1	106 ± 4	0.25
Simazine	107 ± 10	107 ± 7	106 ± 3	106 ± 2	106 ± 2	0.25

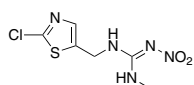
- The **accuracy** of the method, expressed as **recovery**, was between 81 and 113 %
- The **precision**, expressed as RSD, was between 0.3 and 11.6 %
- The established limit of quantification (LOQ) was 25 ng/g, which is significantly lower than the respective Maximum Residue Limit for such pesticides in food by the FDA and Santé Canada

## Case Study: Detection of Common Neonicotinoids Residues in Honey

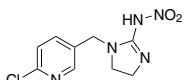


Clothianidin, Imidacloprid and Thiamethoxan are three of the most common neonicotinoids, which is a type of neuroactive insecticide. In January 2013, the European Food Safety Authority declared that these three neonicotinoids pose a high risk for bees and set up maximum residue limits in honey. The QuEChERS approach was used by SiliCycle scientists for the extraction and clean-up of nine of the most used pesticides in apple-growing sector in Canada. The QuEChERS AOAC technique coupled with LDTDMS/ MS was used to obtain a clean extract of honey and a high extraction recovery for these insecticides.

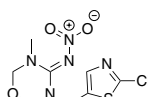
### Pesticides Analyzed



Clothianidin



Imidacloprid



Thiamethoxam

### SiliaQuick Kits Used

#### - STEP 1: PN: QE-0002-100K (tube with 6 g MgSO<sub>4</sub> & 1.5 g NaOAc)

- 1 g of honey was weighed in a 50 mL centrifuge tube containing the salts
- Sample was diluted and homogenized in 10 mL of saturated H<sub>2</sub>O with NaCl and spiked with the desired concentration
- 3 mL of ACN was added and tube was vortex

#### - STEP 2: PN: QD-1006-2T («AOAC method for Fatty and Waxed Fruits & Veggies» : 150 mg MgSO<sub>4</sub>, 50 mg PSA, 50 mg 18)

- Supernatant was transferred into a 2 mL dSPE tube
- Tube was vortexed for 30 sec and then centrifuged at 14,000 RPM for 2 min

#### - STEP 3: SiliaChrom dt C18 PN: H141802E-G050 (3.0 x 50 mm, 2.5 μm, 100 Å)

- A 4 μL extract, containing the pesticides, was transferred to a 2 mL, 9 mm wide opening vial PN: 2SW-C9-C and then injected for subsequent analysis

## Instruments Conditions

### LTDT Conditions

<b>FLOW RATE</b>	3 mL/min														
<b>TEMPERATURE</b>	22°C														
<b>INJECTION VOL</b>	4 µL														
<b>LASER PATTERN</b>															
	<table border="1"> <thead> <tr> <th>Time (s)</th> <th>Power (%)</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0</td> </tr> <tr> <td>2.0</td> <td>0</td> </tr> <tr> <td>5.0</td> <td>65</td> </tr> <tr> <td>6.0</td> <td>65</td> </tr> <tr> <td>6.1</td> <td>0</td> </tr> <tr> <td>8.0</td> <td>0</td> </tr> </tbody> </table>	Time (s)	Power (%)	0.0	0	2.0	0	5.0	65	6.0	65	6.1	0	8.0	0
Time (s)	Power (%)														
0.0	0														
2.0	0														
5.0	65														
6.0	65														
6.1	0														
8.0	0														

### MS/MS Detection

Insecticide	Transition	CE	DP
Clothianidin	250.1 -> 169.1	17	80
Imidacloprid	292.1 -> 211.1	17	80
Thiamethoxan	256.1 -> 209.1	20	80

- MODE : Positive

## Experimental Results

### Linearity Results

Excellent linearity ( $r^2 > 0.99$ ) with no sign of carryover effect was achieved within the quantification range (10 to 500 ng/g of honey for Clothianidin and Thiamethoxan and 25 to 1,250 ng/g of honey for Imidacloprid) without the use of an internal standard.

Clothianidin					
	LLOQ	Low-QC	Mid-QC	High-QC	ULOQ
<b>Conc. (ng/g honey)</b>	10	25	100	250	500
<b>N</b>	3	3	3	3	3
<b>Mean (ng/g honey)</b>	9.18	28.42	89.13	277.41	497.44
<b>% RSD</b>	7.3	4.5	11.1	3.4	10.1
<b>% Nom</b>	91.83	113.67	89.13	110.96	99.49

Thiamethoxan					
	LLOQ	Low-QC	Mid-QC	High-QC	ULOQ
<b>Conc. (ng/g honey)</b>	10	25	100	250	500
<b>N</b>	3	3	3	3	3
<b>Mean (ng/g honey)</b>	9.50	27.11	110.37	276.45	497.98
<b>% RSD</b>	14.3	9.9	4.5	2.7	10.7
<b>% Nom</b>	94.85	108.44	110.37	110.58	99.60

Imidacloprid					
	LLOQ	Low-QC	Mid-QC	High-QC	ULOQ
<b>Conc. (ng/g honey)</b>	25	63	250	625	1250
<b>N</b>	3	3	3	3	3
<b>Mean (ng/g honey)</b>	23.70	73.48	224.95	690.64	1213.12
<b>% RSD</b>	9.3	4.1	8.1	5.2	12.3
<b>% Nom</b>	94.81	117.56	89.98	110.50	97.05

- The accuracy of the method, expressed as recovery, was between 89 and 117 %.
- The precision, expressed as RSD, was between 2.7 and 14.3 %.
- The established limit of quantification (LOQ) for Clothianidin, imidacloprid and thiamethoxan respectively was found to be 9, 24 and 9 ng/g, hence falling within the respective maximum residue limit for such insecticide in honey set by the FDA, Santé Canada and the European Food Safety Authorities.



## Matrix Effect

Matrix effect was also evaluated by adding a known concentration of neonicotinoids (50 ng/g of honey for Clothianidin and Thiamethoxan, and 125 ng/g of honey for Imidacloprid) in different honey brands. All non-spiked compounds were negative for neonicotinoids. As shown in tables below, no matrix effect was observed between four different honey brands.

Clothianidin					Imidacloprid					Thiamethoxan				
	A	B	C	D		A	B	C	D		A	B	C	D
Conc. (ng/g honey)	50	50	50	50	Conc. (ng/g honey)	125	125	125	125	Conc. (ng/g honey)	50	50	50	50
N	3	3	3	3	N	3	3	3	3	N	3	3	3	3
Mean (ng/g honey)	45.44	57.74	48.28	57.28	Mean (ng/g honey)	116.79	132.30	122.20	138.16	Mean (ng/g honey)	42.62	57.60	51.22	48.83
% RSD	9.1	2.1	14.4	10.6	% RSD	12.7	14.5	14.1	3.4	% RSD	13.4	10.7	13.2	9.2
% Nom	90.88	115.47	96.57	114.57	% Nom	93.43	105.84	97.76	110.52	% Nom	85.25	115.20	102.44	97.66

Hence, no matrix effect was observed. LDTD-MS/MS provides the high-throughput analysis of clothianidin, imidacloprid and thiamethoxan in honey in **9 seconds sample-to-sample** without carryover.

Please contact us for more applications and case studies, such as:

- Detection and analysis of Oxytetracyclines and Sulfadiazines in Shrimps.
- Detection and analysis of Plant Protection Products (PPPs) in different Tobacco Grades.
- Detection and analysis of Pesticides Residues in Green Tea.
- Detection and analysis of Nicotine and Nicotine Metabolites in Biological Fluids.
- Detection and analysis of Pesticides Residues in Rice.
- Detection and analysis of over 20 Veterinary Drugs in Animal Food.



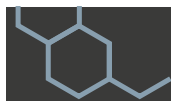


# Contact Us

Pharmaceutical Catalog & Order now



## Check Out SiliCycle's Pharmaceutical Catalog for Further Insights into our Vast Array of Innovative Products



### Drug Purification: Immobilised Scavengers for Metal and Organic Removal Technology (SiliaMetS® & SiliaBond®)

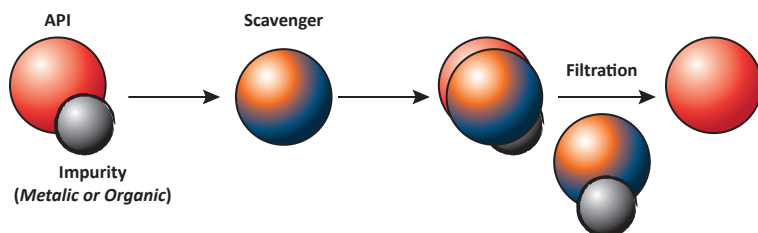
This technology has proven to be extremely effective for a variety of fields such as pharmaceuticals, organic chemistry labs, agrochemicals, mining, fine chemicals, water and waste treatments.

SiliCycle has pioneered the field of functionalized silicas, so you can benefit from our scavenging expertise.



Our functionalized silicas are an elegant and practical approach for the removal of metals or organic impurities in your final compound or solution. Challenging purifications in chemistry can now be overcome creatively and elegantly!

A functional group is bound to a silica backbone, that will specifically react with a product either excess reagents (*unreacted*) or impurities. Your molecule of interest is then recovered by simple filtration:



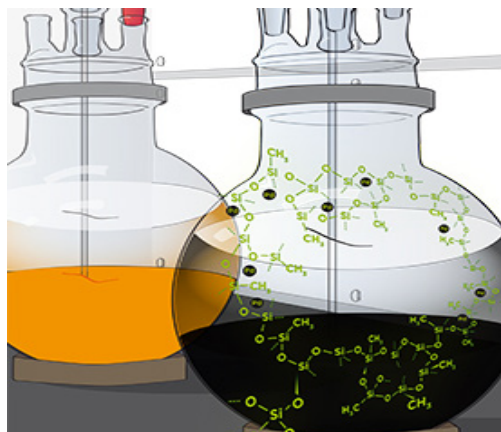
This is a clean, easy, fast, cheap and strongly effective strategy for drug purification, with great compatibility for a myriad of experimental conditions, solvents, pH and temperature.

We have over 20 years of know-how in silica-grafting and scavenging technology and the broadest portfolio on the market of scavengers with associated applications.

This also means the widest range of formats (*bulk, SPE...*), addressing all purification scales (*from laboratory to plant scale*), and the largest range of metals and organics that can be scavenged.

Functionalized Silicas for Metal & Organic Scavenging		
SiliaMetS Metal Scavengers	Both Metal & Organic Scavengers	SiliaBond Organic Scavengers
AMPA ( <b>R85130B</b> )	Amine ( <b>R52030B</b> )	Maleimide ( <b>R71030B</b> )
Cysteine ( <b>R80530B</b> )	Diamine ( <b>R49030B</b> )	Propylsulfonic Acid ( <b>R51230B</b> )
DMT ( <b>R79030B</b> )	Triamine ( <b>R48030B</b> )	Tosic Acid ( <b>R60530B</b> )
DOTA ( <b>R91030B</b> )	DEAM ( <b>R54430B</b> )	Isocyanate ( <b>R50030B</b> )
Imidazole ( <b>R79230B</b> )		Tosyl Chloride ( <b>R44030B</b> )
TAAcOH ( <b>R69030B</b> )		Carboxylic ( <b>R70030B</b> )
TAAcONa ( <b>R69230B</b> )		TMA Acetate ( <b>R66430B</b> )
Thiol ( <b>R51030B</b> )		DMAP ( <b>R75530B</b> )
Thiourea ( <b>R69530B</b> )		Piperazine ( <b>R60030B</b> )
		Guanidine ( <b>R68230B</b> )
		Carbonate ( <b>R66030B</b> )
		Diol ( <b>R35030B</b> )

## Check Out SiliCycle's Pharmaceutical Catalog for Further Insights into our Vast Array of Innovative Products



Immobilisation of different organic functionalities is an elegant, clean and practical strategy to overcome these concerns. These unique and strongly effective materials offer a whole new range of possibilities to medicinal, process, R&D and screening chemists, researchers and manufacturers.

Functionalized Silicas for Heterogeneous Catalysis			
SiliaCat Catalyst	SiliaBond Oxidants	SiliaBond Reagents	
Si-DPP-Pd ( <b>R390-100</b> )	Si-KMnO <sub>4</sub> ( <b>R23030B</b> )	Aluminium Chloride ( <i>Si-<b>AlCl<sub>3</sub></b></i> ) ( <b>R74030B</b> )	DMAP ( <i>Si-<b>DMAP</b></i> ) ( <b>R75530B</b> )
Si-Pd0 ( <b>R815-100</b> )	Si-PCC ( <b>R24030B</b> )	Carbodiimide ( <i>Si-<b>DCC</b></i> ) ( <b>R70530B</b> )	HOBT ( <i>Si-<b>HOBT</b></i> ) ( <b>R70730B</b> )
Si-Pt0 ( <b>R820-100</b> )	Si-PDC ( <b>R24530B</b> )	Dichlorotriazine ( <i>Si-<b>DCT</b></i> ) ( <b>R52230B</b> )	Morpholine ( <i>Si-<b>MOR</b></i> ) ( <b>R68030B</b> )
		EDC ( <i>Si-<b>EDC</b></i> ) ( <b>R70630B</b> )	Piperidine ( <i>Si-<b>PIP</b></i> ) ( <b>R71530B</b> )
		Diphenylphosphine ( <i>Si-<b>DPP</b></i> ) ( <b>R39030B</b> )	



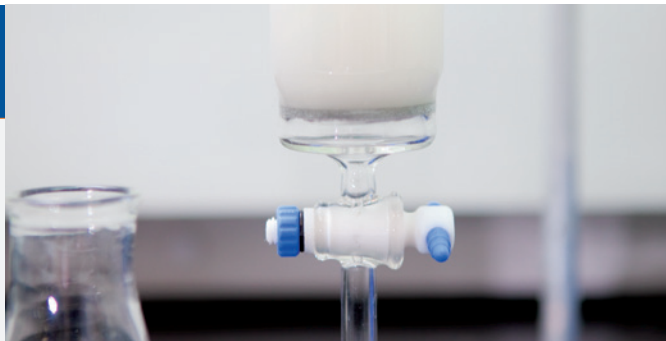
Our silica gels are ideal for both analytical and preparative chromatography, from laboratory to pilot-plant processes and production scale.

## Check Out SiliCycle's Pharmaceutical Catalog for Further Insights into our Vast Array of Innovative Products

### Drug Purification: Functionalized Silicas as Chromatographic & Ion Exchange Phases (SiliaBond® & SiliaSphere® PC)

Silica is the most widely used matrix in chromatography. These bare and grafted supports possess great properties for use as stationary phases and are particularly appreciated for their high mechanical resistance.

We offer the largest range of functionalized silicas, all available with capped or uncapped residual silanol groups.



**In a mixture**, the interactions between the two phases will generate the separation. Hence, depending on the analyte's polarity, the appropriate stationary phase has to be chosen, and the mobile phase's polarity has to be tuned.

**In an ion exchange process**, the silica support is modified by a function carrying a charge with its counter ion. This counter ion is exchangeable with other ions in solution. If the immobilized phase is carrying an anion, the exchangeable species is a cation. Inversely, if the immobilized phase carries a cation, the ion exchangeable species will be an anion.

Functionalized Silicas for Chromatography		
SiliaBond Reversed-Phases	SiliaBond Normal Phases	SiliaBond Ion-Exchange Phases
Si-C18, C8, C6, C4, C1	Amine (R52130B)	Amine (R52130B)
Si-Cyano (R38030B)	Bare Silica (R10030B)	Diethylamine (Si-WAX2) (R76630B)
Si-PHE (R33830B, R34030B, R34130B)	Si-Cyano nec (R38130B)	TMA Chloride (Si-SAX) (R66230B)
Si-PFP (R67530B)	Si-Diol (R35030B)	TMA Acetate (Si-SAX2) (R66430B)
	AgNO <sub>3</sub> (R23530B)	Tosic Acid (Si-SCX) (R60430B)
		Propylsulfonic Acid (SCX-2) (R51430B)
		Carboxylic Acid (WCX) (R70130B)

### SiliCycle Prepacked Flash Cartridges (SiliaSep™)

The use of flash cartridges improves purification efficiency by offering superior reproducibility and productivity compared to conventional manual flash chromatography.

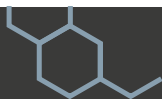
More tight & more homogeneous packing equals better separation.



Our silica-based flash cartridges offer superior performances over competitive cartridges. They are available in various silica gel grades (40-63 & 15-40  $\mu\text{m}$ ) and in the most vast array of functionalities (reversed, normal, ion-exchange phases, functionalized with metal & organic scavengers etc.)

Small scale purification	Production scale purification
up to 1.6 kg	up to 40 kg cartridge

# Check Out SiliCycle's Pharmaceutical Catalog for Further Insights into our Vast Array of Innovative Products



## SiliCycle MiniBlock XT: Multifunctional Synthesis Platform

SiliCycle MiniBlock XT is a compact easy-to-use reaction block designed for synthesis and screening reactions.

SiliCycle MiniBlock XT is widely used by chemists working in biopharma, chemical, petrochemical and polymers.



Applications include synthesis of small organic molecules, optimization of critical process parameters and screening for optimal reaction conditions.

It enables reactions to be run under stringent conditions, allowing complete freedom when choosing a synthetic route.

- Parallel Synthesis
- Reaction Screening
- Catalyst Screening
- Reflux and Inerting

#### Inert Conditions

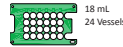
Continuous inert gas flow enables air/moisture sensitive reactions. Easily add reagents through the septum layer.



110 mL  
6 Vessels



55 mL  
12 Vessels



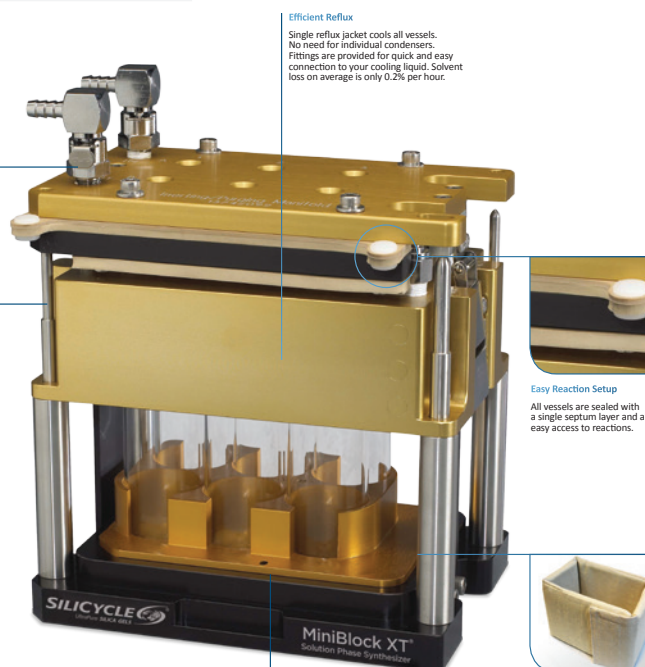
18 mL  
24 Vessels



11.5 mL  
48 Vessels

#### Configure Your SiliCycle MiniBlock XT to Suit Your Needs

Easily configure the SiliCycle MiniBlock XT to choose the scale and number of experiments based on your project requirements.



#### Efficient Reflux

Single reflux jacket cools all vessels. No need for individual condensers. Fittings are provided for quick and easy connection to your cooling liquid. Solvent loss on average is only 0.2% per hour.



#### Easy Reaction Setup

All vessels are sealed with a single septum layer and allow easy access to reactions.



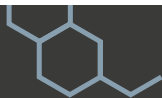
#### Heating and Cooling

Precision heating to 120°C and cooling down to -20°C are achieved using modular heat transfer jackets. Temperature uniformity and reproducibility is within 1°C at 80°C.



#### Modular Racks

Readily interchangeable reaction vessel racks enable simple conversion between 6, 12, 24, and 48-Positions arrays. The 24 and 48-Positions vessel racks are compatible with parallel centrifugal evaporators.



## SiliCycle R&D Services

We aim at establishing long-term partnership with our customers by offering all-inclusive service.

SiliCycle is devoted to serving the global chemical industry and constantly focuses on quality. Our flexible approach for each project brings added value to our services to match each client's requirement.

Our mandate is to offer on-time tailored package of work with communication report format, cost and timeframe in lined with your projects.

Portfolio of some available services:

- Scavenging
- Screening
- Catalysis services
- Organic services
- Chromatography, purification & analytical services
- Material science services
- Custom HPLC packing services

## Terms and Conditions

### General

Unless otherwise stated, all transactions are expressly subject to these Terms and Conditions. Modifications or additions will be recognized only if accepted in writing by an officer of SiliCycle Inc. (*hereinafter named SiliCycle*), or an officially designated representative. Provisions of buyer's Purchase Order or other documents that add to or differ from these Terms and Conditions are expressly rejected. No waiver of these Terms and Conditions or acceptance of others shall be construed as failure of the Company to raise objections.

### Privacy Policy

Because your clientele is our most vital asset, we take privacy very seriously and won't share your personal information with anyone. Your information is used only to personalize your profile and to facilitate the transaction. You can change or update your information at any time.

### Quotation and Published Prices

Quotations automatically expire 30 calendar days from the date issued unless otherwise stated. Quotes are subject to withdrawal with notice within that period. Prices shown on the published price lists and other published literature issued by SiliCycle are not unconditional offers to sell, and are subject to change without notice.

### Warranty

SiliCycle guarantees to the original buyer that the products sold conform to the composition and purity described therein at the time of their shipment. The buyer's sole remedy in the event that SiliCycle fails to meet said warranty shall be the replacement of the unused portion of the product(s), or if approved by SiliCycle, a refund (*at the purchase price*) provided that the buyer returns the alleged non-conforming product(s) within 30 days after reception of product(s). SiliCycle makes no other guarantee of suitability for a particular purpose or of the merchantability in the use or handling of the product, and does not accept any liability for consequential, special, indirect or incidental damages resulting therefrom.

### Changes

The buyer may, with the express written consent of SiliCycle, make changes in the specifications for products or work covered by the contract. In such an event, the contract price and delivery dates shall be equitably adjusted. SiliCycle shall be entitled to payment for reasonable profit plus costs and expenses incurred by work and materials rendered unnecessary as a result of such changes and for work and materials required to effect said changes.

If the buyer has made a mistake on his/her purchase order, and the material has already been shipped and received, SiliCycle may approve the exchange of said material (*if price is identical*); however the buyer will be responsible for all shipping costs. See return authorization policy section on the next page to obtain a return merchandise authorization form prior to returning goods.

### Cancellation

Undelivered parts of any order may be cancelled by the buyer only with the written approval of SiliCycle. If the buyer makes an assignment for the benefit of creditors, or in the event that SiliCycle, for any reason feels insecure about buyer's willingness or ability to perform, SiliCycle shall have the unconditional right to cancel the sales transaction or demand full or partial payment.

In the event of any cancellation of this order by either party, the buyer shall pay SiliCycle for reasonable costs and expenses incurred by the SiliCycle prior to receipt of the cancellation notice, plus SiliCycle's usual rate of profit for similar work.

### Taxes

The Company's prices do not include any applicable sales, goods and services, use, excise or similar taxes and the amount of any such tax SiliCycle may be required to pay or collect will be added to each invoice and paid by the buyer.

### Terms of Payment

All merchandise purchased remains the property of SiliCycle until such time as all invoices for the merchandise have been paid in full. Except for purchases paid online, or unless explicitly stated elsewhere in writing, terms are cash net 30 days from date of invoice. Additional fees of 2% per month (*26.8% per year*) will accrue on all accounts past due. If any payment is in default, and it becomes necessary to hire a recovery agency or lawyer, the client accepts to pay, in addition to the outstanding balance, recovery fees equal to 20% of the balance in capital and interests. By reason of the financial condition of buyer or otherwise, SiliCycle may require full or partial payment in advance.

Certain orders may require a deposit or progressive payments as referenced in the quote. Such deposits may be increased upon receipt of purchase order based upon the buyer's most current credit rating. Subject to the warranties stated in this policy, all sales are final without right of return.

## Return Policy

Our Customer Service Department is available to assist you at any time should a problem arise with your order. Please make sure to inspect your packages immediately upon receipt and notify us within the next two (2) business days of any damage and/or discrepancies. Should a product be sent to you incorrectly, as the result of an error on our part, we will take quick and appropriate action to correct the problem at no charge to you. In order to maintain the quality of our products and continue to provide competitive prices, some products may not be returned for credit. SiliCycle will not grant credit for:

- (i) Shelf-worn, used or defaced products;
- (ii) Scavengers, reagents, catalysts, or any other bounded silica whose containers have been opened;
- (iii) Products that are personalized or customized;
- (iv) Refrigerated or temperature-controlled products;
- (v) Products that have been discontinued;
- (vi) Products not directly purchased from SiliCycle

Products sold in distribution by SiliCycle will be subject to the Terms and Conditions Policy of the respective manufacturer.

Prior to any return, an authorization and a return material authorization (RMA) number must be obtained from our Customer Service Department. Shipping instructions will also be provided at this point. The RMA will ensure the safe and proper handling of material; it should therefore be referenced on all shipping labels.

The buyer has 30 days from the issuance of the RMA to return the goods. Returns made without an authorization number will not be accepted and will be returned to the buyer.

**Returns are subject to a 50% restocking and/or disposal fee.**

## Shipping Policy

SiliCycle uses a two-day or five-day delivery (*or equivalent*) depending on weight and availability of product. Standard overnight delivery can also be arranged. Freight charges are prepaid and added to the invoice unless special instructions are requested by the customer. These conditions apply to all North American shipments. International delivery delays will vary according to orders and destination countries.

## Delivery

Delivery dates indicated in the contract documents are approximate and based on prompt receipt of all necessary information regarding the product covered by the contract. SiliCycle will use reasonable efforts to meet the indicated delivery dates, but cannot be held responsible for its failure to do so.

In the event of any delivery delay caused by the buyer, SiliCycle will store and handle all items ordered at buyer's risk and will invoice buyer for the unpaid portion of the contract price, plus storage, insurance, and handling charges on or after the date on which the product is ready for delivery. The invoice will be payable in full within 30 days from the invoice date, unless otherwise expressly agreed to in writing by SiliCycle.

SiliCycle will not hold orders unless specifically approved. SiliCycle has the right to make partial shipments and bill for those shipments; the buyer will make payment in accordance with the terms mentioned in this policy.

## Shipping and Handling Charges

Shipping charges plus the applicable company handling charges will be prepaid and billed as a separate item on the product invoice. Title to the product and risk of loss shall pass to buyer upon delivery to a carrier.

## Application

All products are sold for laboratory or manufacturing uses. Only professional laboratory staff should handle the chemicals.



# Ordering Information

## How to order

You can order any SiliCycle product on-line through the new SiliCycle e-commerce website at [www.SiliCycle.com](http://www.SiliCycle.com).

Orders can also be placed by phone, fax, mail or e-mail. If you prefer, you can reach us by e-mail ([info@silicycle.com](mailto:info@silicycle.com)) or by phone (1 418.874.0054 or Toll free for North America only 1 877.745.4292). Please have the following information on hand:

- Your name
- Company name, billing and shipping address
- Purchase order number
- Credit card information
- Product number and description
- Size, quantity and unit of measure
- E.I.N. or F.I.N. (*for United States clients only*)

## Technical Support

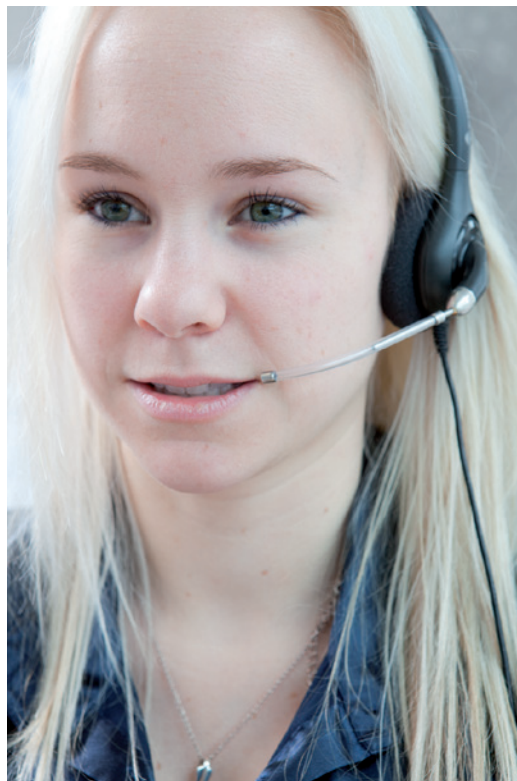
At SiliCycle, we are committed to providing the best technical support possible. Our worldwide Technical Support Group is comprised of a team of highly qualified M.Sc., Engineers and PhD Chemists, Technical Support Professionals and Service Coordinators who are prepared to troubleshoot, answer questions, and provide solutions for your service and applications needs.

In order to better respond to your technical inquiries, feel free to contact us in three different ways:

- E-mail: [support@silicycle.com](mailto:support@silicycle.com)
- Phone: International 1 418.874.0054  
North America 1 877.745.4292 (*Toll-Free*)

SiliCycle headquarters address:

2500, Parc-Technologique Blvd  
Quebec City, Quebec  
G1P 4S6, CANADA





As a recognized industry leader in the development, manufacturing and commercialization of innovative silica gel products, and with multi-ton manufacturing capability, SiliCycle® is your partner of choice for all your METAL REMOVAL, CATALYSIS, SYNTHESIS, and PURIFICATION requirements.

### METAL & ORGANIC SCAVENGING



Removal of:

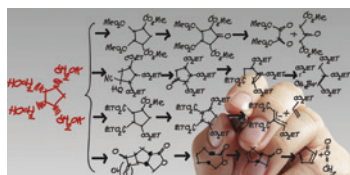
- Metals
- Electrophiles & Nucleophiles
- Potential Genotoxic Impurities (PGI)

### CATALYSIS & SYNTHESIS



- Couplings (Suzuki, Stille, Heck, ...)
- Debenzylation & Hydrogenation
- Oxidation
- And Many More Reactions

### ACIDS, BASES & REAGENTS



- Acids & Bases
- Amide Couplings
- Reductive Aminations
- Other Reactions

### LOW PRESSURE CHROMATOGRAPHY



- Bulk Silica Gels (*Irregular & Spherical*)
- Bonded Phases
- TLC Plates
- Prepacked Flash Cartridges

### SAMPLE PREPARATION



- SPE & Well Plates
- Micro-SPE Tips
- QuEChERS
- SPE Hardware & Manifold

### HIGH PRESSURE CHROMATOGRAPHY



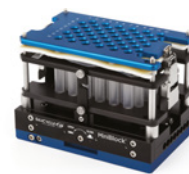
- Bulk Sorbents
- HPLC & UHPLC Columns
- SEC & SFC Columns
- Guard Cartridges & Accessories

### CONSUMABLES



- Vials & Caps
- Syringe Filters
- Membrane Filters

### EQUIPMENTS



- Parallel Synthesis Station - SiliCycle MiniBlock® Family
- TLC Scanner
- Vacuum Manifold

### DESICCANTS & OTHER BULK ABSORBENTS



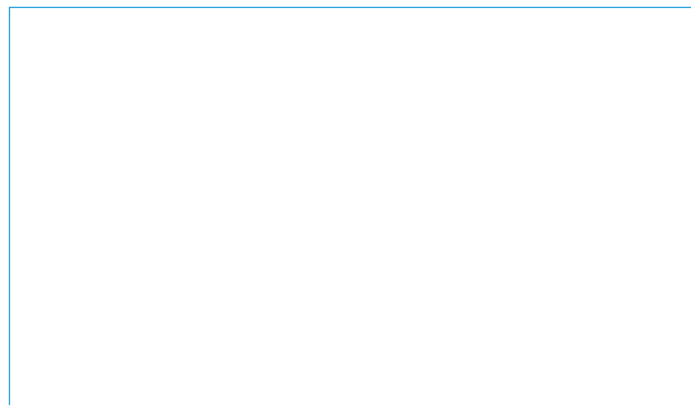
- Desiccant
- Activated Alumina
- Molecular Sieve

### R&D SERVICES



- Scavenging Screening
- Method Development & Optimization
- Impurities Determination
- Custom Column Packing

### CONTACT INFORMATION:



T: 1 418.874.0054 F: 1 418.874.0355  
 Toll Free : 1 877.SILICYCLE (North America only)  
 info@SiliCycle.com  
 SiliCycle.com

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