SPE Columns, Accessories and Equipments

Bonna-Agela Technologies 2011

Cleanert™ SPE Columns

96 Well Plate

Best Value
Guaranteed Product Quality
Innovation to Benefit Customers

HPLC Columns

Venusil™ & Promosil™ HPLC

Venusil™ AA

SPE Columns

Cleanert™ SPE Cartridges

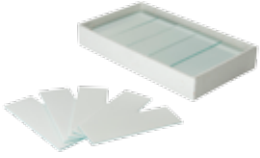
Cleanert™ IC
Pre-treatment Cartridges

Cleanert™ 96 Wellplates

Flash Chromatography Products

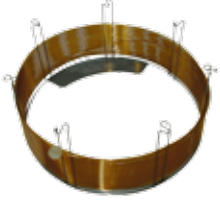
Flash Purification Columns

CHEETAH™ Flash Purification System



TCL Plates

Consumables Products



GC Columns

Clarinert™ Syringe Filters

Vials, Caps, Septa

Bonna-Agela Technologies — A Global Supplier for Chromatography Solutions

2011 Message From Bonna-Agela Technologies

As Bonna-Agela technologies is poised to enter its fifth year with confidence and pride in its innovative separation, purification, and sample preparation products, we would like to thank our many loyal customers for your continuous support and trust. With your support and our effort in delivering the highest quality products to you, our company has grown remarkably. This has allowed us to expand our research and development effort, and thus introduce more innovative products to better service your application needs.

In 2010, we had tremendous accomplishments: We cataloged over one thousand different products. Our manufacturing and R&D operation was certified in compliance with ISO 9001 and passed many quality audits by customers and distributors, including VWR. As a global wide company, we not only have our own international sales force but have also formed a marketing alliance with VWR international. This will allow us to reach higher goals for 2008 and to provide our customers with even better quality products and faster service.

Our 2011 mission statement and commitment:

- Provide products with our INNOVATIVE technologies at the best PERFOR
- MANCE to COST ratio.
- Deliver products with guaranteed quality.
- Provide global support with quick responses

How to Place Orders

Our office is open from 9:00 am to 6:00 pm Eastern Standard Time, Monday through Friday.

To place an order or receive a quote, you may choose from the following contacts:
Mail Address: Bonna-Agela Technologies Inc.
2038A Telegraph Road, Wilmington, DE 19808, USA
Phone: (302) 438-8798
Fax: (302) 636-9339
Email: info@agela.com
On-line: www.agela.com

Please include the following information with your order or request: Account number (if you have one), purchase order number, contact name, organization name, shipping and billing address, telephone number, fax number or email address, product number, brief description and quantity, method of payment, preferred method of delivery. A written confirmation will be sent to you by email or fax. We accept business checks, wire transfers, and major credit cards as methods of payment.

Checks:
Please make checks payable to:
Bonna-Agela Technologies Inc. and send to:
Bonna-Agela Technologies Inc.
2038A Telegraph Road, Wilmington, DE 19808, USA

Wire Transfer:
Please contact us by phone, fax or email for account information.

Credit Cards:
Please include the card type and number, expiration date, and card holder name. Due to security concerns, please do not email the information. Please call or send a fax to provide your credit card information.

Terms and Conditions

PLEASE READ THESE TERMS BEFORE ORDERING. IF YOU HAVE ANY QUESTIONS, PLEASE DO NOT HESITATE TO CONTACT US AND OUR STAFF WILL BE GLAD TO ASSIST YOU.

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All orders placed are subject to the agreement of Bonna-Agela Technologies Inc. The catalogue does not constitute an engagement of the company to sell all listed products. You are guaranteed to be notified at the time of ordering if the ordered
items are in back-order or discontinued.

Price and Payment
The prices are in effect at the time of printing. Bonna-Agela Technologies reserves the right to change the prices without notice, though we do our best to provide our customers with advance notice. The prices quoted at the time of ordering will be guaranteed. The general payment term is net 30 days, F.O.B., Newark, Delaware,USA. However we reserve the right to ask for prepayment if customers' account information is not satisfactory. A 1.5% per month service charge will be added to delinquent accounts. If a purchase order is less than $1000.00, a $50.00 extra charge will be added to the invoice.

Changes
Bonna-Agela Technologies reserves the right to change product specifications, quantities, designs or prices without prior notice and without liability for such changes.

Shipping Policy
The standard shipping method is 2 day FedEx within the United States and Canada. We will try to accommodate requests for other shipping methods if they are available. All shipping and handling charges will be billed separately. Should you receive damaged goods, it is imperative that you notify us immediately and save all packing materials for inspection by the carrier.

Application
All products in this catalog should be used for laboratory or manufacturing use only. They are not intended for direct medicinal or food use. Bonna-Agela Technologies assumes no liability for any misuse of the products.

Returns
Bonna-Agela Technologies tries to accommodate all requests for returns of unused goods. However,return of some items may be restricted by the original manufacturers. Please contact us for return authorization before returning any items. A restocking charge may be applied to certain products.

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All Bonna-Agela Technologies products are warranted to be free of defects in materials and workmanship. They are not warranted for any other particular purpose. Bonna-Agela Technologies shall not under any circumstance be liable for any incidental, consequential or compensatory damage in conjunction with its products. The maximum liability shall not exceed the invoice price of the product.

SPE Columns and Wellplates

Sample Preparation Products

Bonna-Agela Technologies provides a full line of SPE sorbents, columns, wellplates, accessories and supplies.

Cleanert SPE Columns, Wellplates and Media

OMM SPE Products (Optimized Molecular Modification)-PEP, PEP-2, PEP-H, PAX, PCX, PWAX, PWCX and PS are all based on polystyrene/divinylbenzene while each phase has different functionality and unique selectivity. They are highly recommended for the extraction of a wide range of compounds in pharmaceutical, agricultural, food, and environmental industries. PEP series are good replacements of Water Oasis® HLB. Average particle diameter: 40-60μm; Average pore size: 80Å; Specific surface area: 600m^2/g.

MAS (Multi-function Impurity Adsorption SPE)
MAS is a simple sample treatment which applies multi-function impurity adsorption to remove as many as interferences in samples. It achieve a faster and easier approach compare to SPE, can be used in clinical and food residue analysis.

SLE(Solid supported Liquid/liquid Extraction) columns and well-plates
Specially treated diatomite materials are packed in columns and well plates. The liquid/liquid extraction is run on the surface of the materials, which is easily automated in parallel and time-saving.

Bonna-Agela is one of the very few original manufacturers of diatomite for chromatography. Bonna-Agela can provide diatomite at different pH, as well as a variety of surface modification, to meet different application needs. The particle size distribution was narrowed and the surface activity was controlled to avoid unwanted adsorption of analytes.

Bonded silica based SPE column

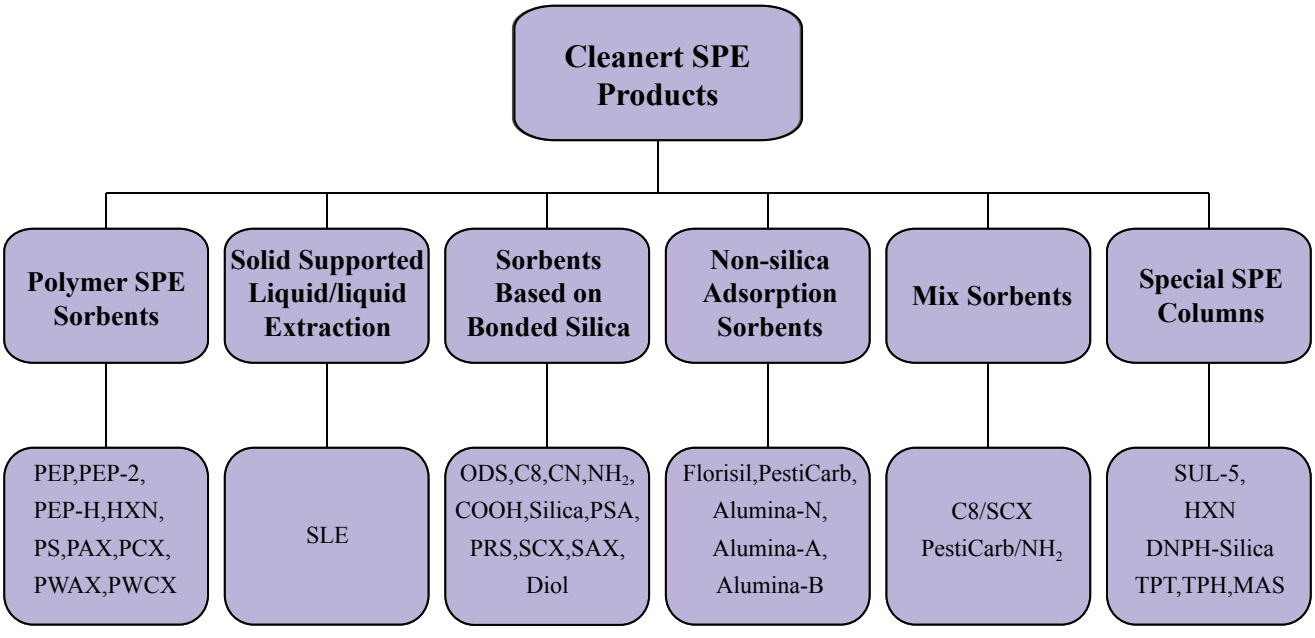
C18, C18-N, C8, NH_2, COOH, Silica, PSA, PRS, SCX, SAX; All of them are made of high quality and low metal silica particles. Using the special surface modification methodology, the activity of silica surface is reduced largely, which in turn will reduce the tailing of compounds and will ensure high recovery and good reproducibility.

Characteristics of silica particles:
Average particle diameter: 50μm
Average pore size: 60Å
Volume of pore: 0.8cm^2/g
Specific surface area: 480m^2/g
Surface of silica: made by special surface modification

Non-silica adsorption phase columns-Florisil, PestiCarb, Alumina(N, A, B). They are commonly used to remove polar interference from non-polar samples. Cleanert adsorption sorbents have high purity, high recovery and good reproducibility. They are widely used in sample preparation for environmental and food analysis.

Mixed and layered phases-C8/SCX, PestiCarb/NH_2, PestiCarb/PSA

Specialized phases- SUL-5 (Determination of Five Sulfonamides in Pork)
TPT---triple-phase for tea (pesticide residues analysis)
TPH---triple-phase for herb (pesticide residues analysis)
DNPH-Silica (aldehyde ketone analysis in air)
HXN (Determination of 10 Sulfonylureas Herbicide Residues in the Soil)
EPH (Extractable petroleum hydrocarbon analysis)
LRC (Large receiver column)
LDC (Large disk column for water analysis)
PPP (Protein Precipitation Plate)



Featured Products

OMM Technology (Optimized Molecular Modification) for SPE

Bonna-Agela SPE products have been developed based on a thorough understanding of the science, e.g., interactive natures of chemical molecules. Our SPE products can thus better meet customer's needs. Our R&D results demonstrated that the adsorption/desorption property of the polymeric SPE materials is regulated by the types of the functional groups and the degree of substitution of the surface modification.

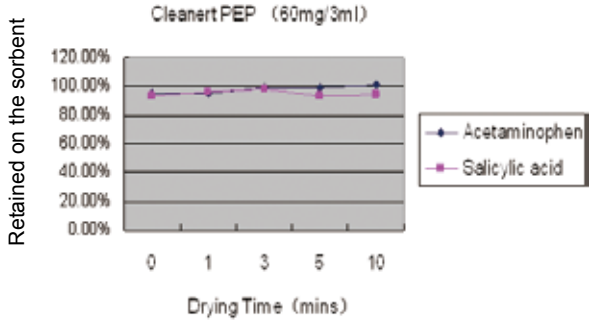
In general, modification with electron donor groups will help to retain the electron-deficient molecules, while modification with electron-withdrawing groups will prefer to retain the electron-rich molecules. Different SPE materials have been developed by incorporating proper types of functional groups and degree of substitutions on the surface, and thus providing optimized and balanced performance for all types of molecules.

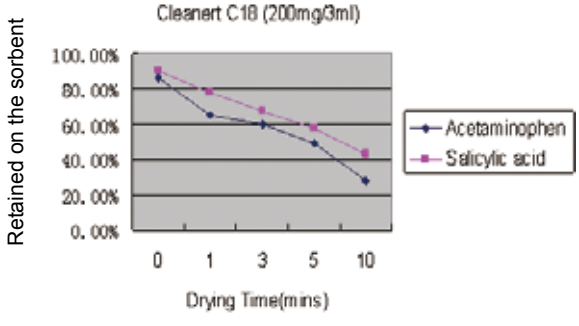
Cleanert PEP series are polymer based SPE sorbents which consists of hydrophilically modified divinyl benzene. PEP polymer series sorbents are water-wettable and they do not suffer from column drying effect. They thus offers consistent performance due to proper wetting capability which is especially important for 96-well plates. It also has high retention for polar compounds and high capacity for a wide spectrum of analytes.

Good Water-Wettability

The Cleanet PEP (polar polymer) sorbent is a unique hydrophilic-lipophilic balance material. It provides excellent wettability since the sorbent hydrophobic surface is highly modified with polar functional groups. The SPE mechanism follows the reverse phase separation principle.

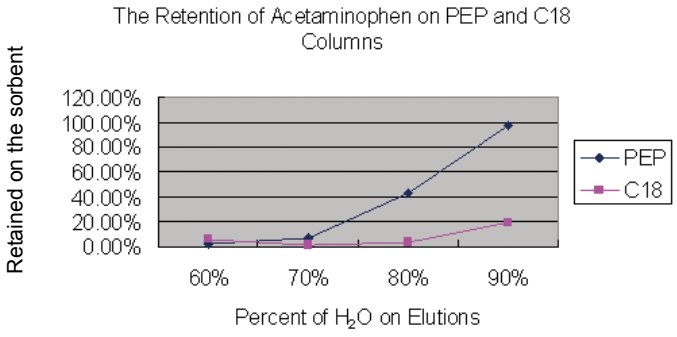
Effect of Drying on Recovery - PEP Versus C18 Sorbents





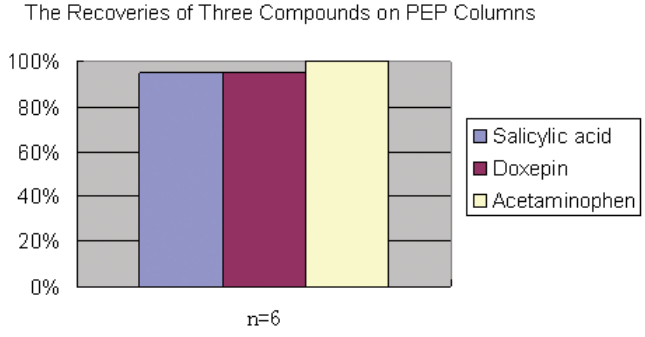
High Retention for Polar Compounds

The electron donating and withdrawing functionalities of the sorbent allows it to have enhanced retention for polar compounds.



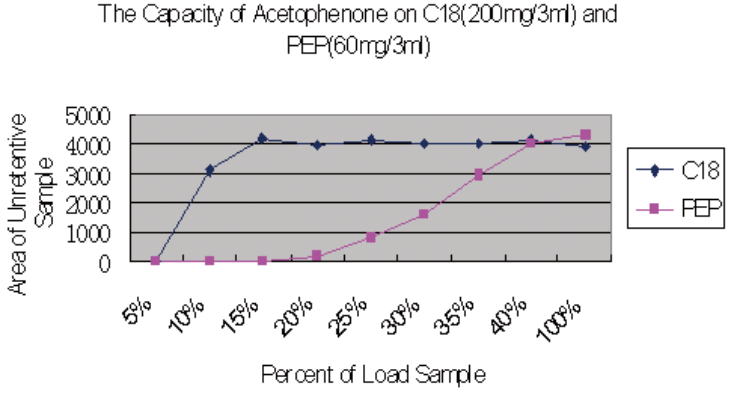
Consistent Performance for Acidic, Neutral and Basic Compounds

PEP sorbents are water-wettable, maintaining high retention and high capacity for a wide spectrum of analytes, even when the SPE column runs dry.



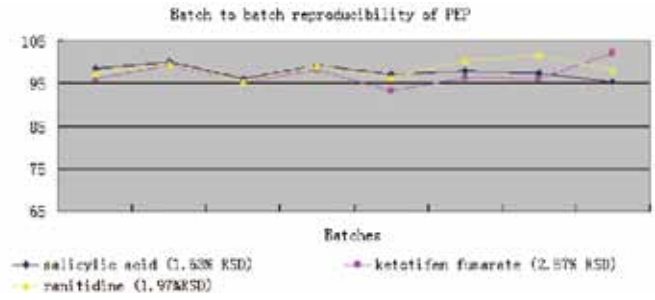
High Capacity

The PEP series sorbents have 2-3x more surface area and shows a dramatic increase of sample capacity compared to silica-based C18. The volume of elution solvents can be reduced, and subsequently the total operation time (including solvent evaporation) will be shortened.



Excellent Batch-to-Batch Reproducibility

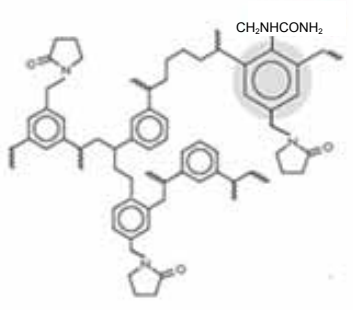
The OMM technology offers consistent surface modifications and thus batch-to-batch reproducibility. Multiple batches of PEP series have been successfully used for various compounds with consistent results.



PEP-2(Polar Polymers)

Description

PEP-2 is made of polydivinylbenzene on which the surface is functionalized with vinyl prolidone and urea. The material has a balanced hydrophilic and hydrophobic property and can be used in the entire pH range of 1.0-14.0. It has a universal absorbent function for many kinds material without adjusting the pH, especially for the strong polar hydrophilic compounds.



Particle Characteristics

Functionalized polymer sorbents; Average particle size: 35μm.
Average pore size: 80Å. Surface area: 600m^2/g.

Application example

Neutral and basic compounds	acidic compounds
• 4mL MeOH	• 4mL MeOH
• 4mL Water	• 2mL Water
• 1mL sample (50μg/mL in Water)	• 2mL 20mmol phosphate buffer pH 7
• 2mL Water	• 1mL sample (50μg in phosphate buffer pH 7)
• 4min drying time	• 2mL phosphate buffer
• elution with 4mL MeOH 100%	• 2mL Water
• gently evaporate at 50	• 4min drying time
• reconstitute in 1mL 50% MeOH	• elution with 4mL MeOH 100%
• Neutral = Caffeine	• Acidic compound=Salicylic acid
• Basisc = Metoprolol	

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PEP-2	30mg	1mL	100	PE0301-2
	60mg	3mL	50	PE0603-2
	100mg	3mL	50	PE1003-2
	200mg	6mL	30	PE2006-2
	500mg	6mL	30	PE5006-2
	30mg/well	2mL	96-wellplate	PE0302-2W
	50mg/well	2mL	96-wellplate	PE0502-2W
	10g	-	-	PE0010-2
	100g	-	-	PE0100-2

PEP-H

Description:

- PEP-H is one of the series of PEP.
- It is base on the polydivinylbenzene and derived from PEP by increase the surface polarity to improve the adsorption for polar analytes

The material can be used in the entire pH range of 1-14, also can be used to extract a variety of polar and non-polar compounds. Some highly hydrophilic compounds which have little retention on C18 columns,

Particle Characteristics

Functionalized polymer sorbents; Average particle size: 70μm.
Average pore size: 80Å; Surface area: 600m^2/g.

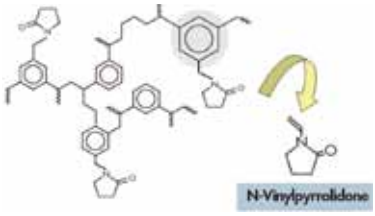
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PEP-H	30mg	1mL	100	PE0301-H
	60mg	3mL	50	PE0603-H
	100mg	3mL	50	PE1003-H
	200mg	6mL	30	PE2006-H
	500mg	6mL	30	PE5006-H
	30mg/well	2mL	96-wellplate	PE0302-HW
	50mg/well	2mL	96-wellplate	PE0502-HW
	10g	-	-	PE0010-H
	100g	-	-	PE0100-H

PEP(Polar Polymers)

Description:PEP (polar polymers, alternative to Oasis HLB)

PEP is made of polydivinylbenzene on which the surface is functionalized with vinyl prolidone. The material has a balanced hydrophilic and hydrophobic property and can be used in the entire pH range of 1-14.



Particle Characteristics

Functionalized polymer sorbents; Average particle size: 35μm or 70μm.
Average pore size: 80Å; Surface area: 600m^2/g.

Ordering Information

Material	Sorbent	Vol	Particle size	Tubes/box	Cat. Number
Cleanert PEP	30mg	1mL	35um	100	PE0301-S
	60mg	3mL	35um	50	PE0603-S
	30mg	1mL	70um	100	PE0301
	60mg	3mL	70um	50	PE0603
	100mg	3mL	70um	50	PE1003
	200mg	6mL	70um	30	PE2006
	500mg	6mL	70um	30	PE5006
	30mg/well	2mL	70um	96-wellplate	PE0302-W
	50mg/well	2mL	70um	96-wellplate	PE0502-W
	10g	-	70um	-	PE0010
	100g	-	70um	-	PE0100
	30mg/well	2mL	35um	96-wellplate	PE0302-SW
	50mg/well	2mL	35um	96-wellplate	PE0502-SW
	10g	-	35um	-	PE0010-S
	100g	-	35um	-	PE0100-S

MAS (Multi-function Impurity Adsorption SPE)

Description

Cleanert MAS is a simple sample treatment for bioanalysis which applies multi-function impurity adsorption to remove as many as interferences. It combines protein precipitation with SPE method, and achieve a faster and easier approach.

Particles Characteristics

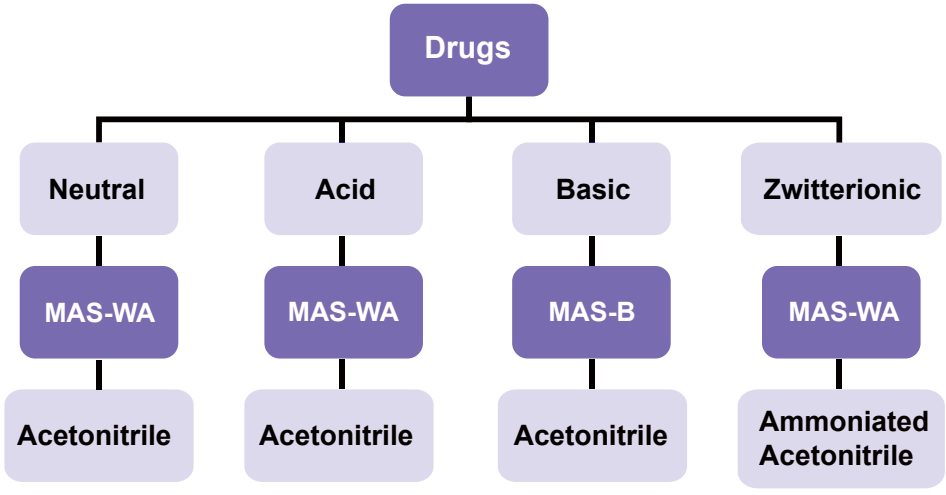
Treated diatomiteous earth materials, Average particle diameter: 40-60um;
Average pore size: 70A; Special surface area: 600m^2/g;

Benefit

Compared to traditional methods including liquid-liquid extraction (LLE), solid-phase extraction (SPE) and protein precipitation (PPT), Cleanert MAS has a better performance on interference removal and more convenient operation. It's a better replacement of protein precipitation, also an evolution of SPE.

	LLE	SPE	PPT	MAS
Interferences Removal	-	+	-	+
Operation	-	-	+	+

The General Method Includes



Ordering Information

Material	Application	Vol.	Package	Cat. Number
MAS SPE cartridge	SPE cartridges,used for basic and netrual substances extaction in Plasma and biological samples.	1mL	100	MSC-B-0301
		1mL	100	MSC-B-0601
	SPE cartridges,used for acid substances extaction in Plasma and biological samples.	1mL	100	MSC-A-0301
		1mL	100	MSC-A-0601
	SPE cartridges,used for week acid substances extaction in Plasma and biological samples.	1mL	100	MSC-WA-0301
		1mL	100	MSC-WA-0601
MAS 96 well plate	96 well plate,used for basic and netrual substances extaction in plasma and biological samples.	30mg/2ml/well	2	MS-B-0302-W
	96 well plate,used for basic and netrual substances extaction in plasma and biological samples, design with a filter membrane (can bu used in centrifugation).	30mg/2ml/well	2	MS-B-0302-FW
	96 well plate,used for acid substances extaction in plasma and biological samples.	30mg/2ml/well	2	MS-A-0302-W
	96 well plate,used for acid substances extaction in plasma and biological samples, design with a filter membrane (can be used in centrifugation).	30mg/2ml/well	2	MS-A-0302-FW
	96 well plate,used for week acid substances extaction in plasma and biological samples.	30mg/2ml/well	2	MS-WA-0302-W
	96 well plate,used for week acid substances extaction in plasma and biological samples, design with a filter membrane (can be used in centrifugation).	30mg/2ml/well	2	MS-WA-0302-FW

Relevant Accessories

Cat. Number	Vol	Tubes/box	Description
96SP2036	8×12well	24	Collection plate, square well, round bottom
96SP2036-Y	8×12well	24	Collection plate, round well,round bottom
96GP2036	8×12well	24	96 well cap mat

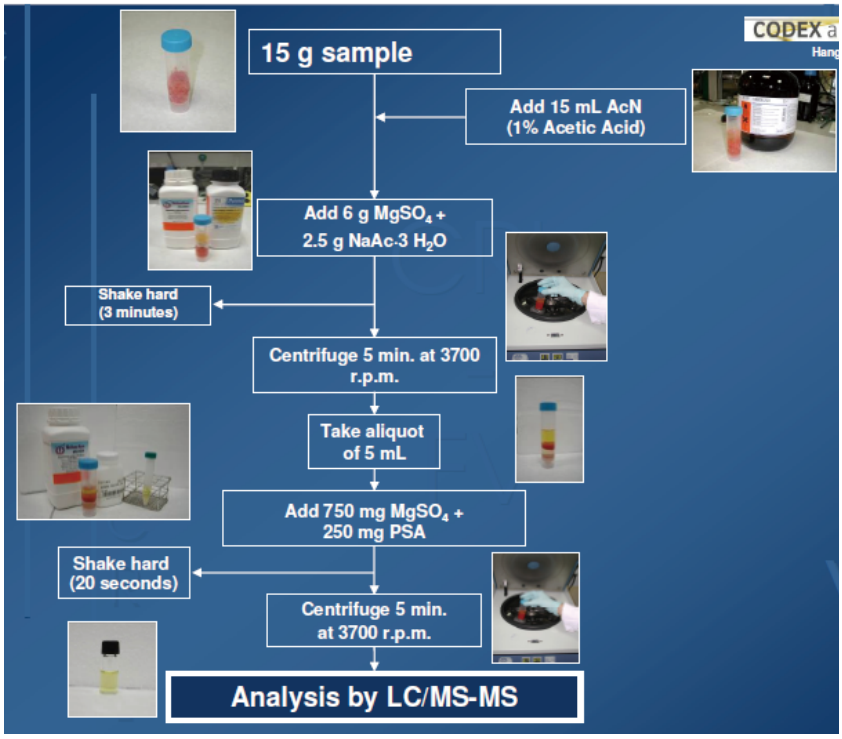
MAS-QuEChERS

Description

Adsorption of multiple mechanisms for impurity extraction purification method.
Through multi-functionalized compound Absorption materials, biological samples will be absorbed as the main interfere matrix, and strong water-soluble material be remained in the tested samples solution. so as to achieve the purification and enrichment purposes.

The General Method Includes

- Put the samples and reagent in the centrifugal tube at the same time, vibration extraction and ultrasonic extraction.
- Put SPE material in the centrifugal tube to purify the sample matrix and after centrifuging the analytes was remained in the solution.
- Take supernatant for other treatment or direct detection.



http://www.quechers.com

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
MAS-Q	PAX 500mg,C18 500mg	50mL	50	MS-SPC5001
	PAX 200mg,C18 200mg	50mL	50	MS-SPM5001
	6g $MgSO_4$(anhydrous), 1.5g NaAc.$3H_2O$	50mL	50	MS-MG5050
	100mg PSA,100mg C18, 0.3g $MgSO_4$(anhydrous)	15mL	50	MS-PA1010
	6g $MgSO_4$(anhydrous) 250mg PestiCarb,500mg NH_2	50mL	50	MS-PN5050
	magnesium sulfate 4g,sodium chloride 1g,sodium citrate dibasic sesquihydrate 0.5g,sodium citrate tribasic dihydrate		50	MS-NMS5050
	$MgSO_4$ 750mg, PSA 125mg	50mL	50	MS-PAMG1550
	500mg C18	1.5mL	50	MS-185050
	50mg C18, 150mg $MgSO_4$ (anhydrous)	1.5mL	100	MS-180205
	200mg PAX	10mL	100	MS-AX1030
	50mg PAX	1.5mL	100	MS-AX0230
	200mg PCX	10mL	100	MS-CX1030
	50mg PCX	1.5mL	100	MS-CX0230
	200mg PEP	10mL	100	MS-PE1020
	50mg PEP	2mL	100	MS-PE0205

SLE (Solid Supported Liquid/liquid Extraction) Technology and Sorbents

Description

Solid supported liquid/liquid Extraction columns and plates use specially treated diatomiteous earth materials as a solid support for liquid/liquid extractions. Agela can provide different pH sorbents as customer requirement to make extraction of different properties substance. This kind of material were often used in clinical analysis, it also can be used to replace most of the analysis using Liquid/Liquid extraction (LLE).

Particles Characteristics

Treated diatomiteous earth materials, Average particle diameter: 10-1000um;
pH=7 (acidification material) or 9-10 (alkalization material);
Capability of water absorption: 0.8-1mL/g;

The General Method Includes

1. Load an aqueous sample into the column by gravity or a soft vacuum.
2. Apply one or a multiple organic solvents by gravity or well-controlled vacuum.
3. Vacuum the organic solution which contains the analyte out from bottom of the columns or plates, collect the solution.
4. Concentrate the collected solution.

Benefit

The SPE procedures can be easily automated. It also can be used to replace most of the analysis using Liquid/Liquid extraction to reduce the solvent usage, even emulsification phenomenon of LLE.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Special treated diatomite SLE(pH=7)	200mg	3ml	50	HC2003-7
	500mg	3ml	50	HC5003-7
	500mg	6ml	30	HC5006-7
	1g	6ml	30	HC0006-7
	2g	12ml	20	HC200012-7
	4g	25ml	15	HC400025-7
	200mg	2ml/well	96-wellplate	HC2002-7W
	400mg	2ml/well	96-wellplate	HC4002-7W
	500mg	2ml/well	96-wellplate	HC5002-7W
Special treated diatomite SLE(pH=7)	200mg	3ml	50	HC2003-9
	500mg	3ml	50	HC5003-9
	500mg	6ml	30	HC5006-9
	1g	6ml	30	HC0006-9
	2g	12ml	20	HC200012-9
	4g	25ml	15	HC400025-9
	200mg	2ml/well	96-wellplate	HC2002-9W
	400mg	2ml/well	96-wellplate	HC4002-9W
	500mg	2ml/well	96-wellplate	HC5002-9W

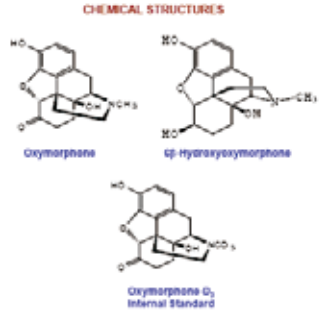
Bulk sorbent

Material	Description	Particle Size(μm)	Package	Cat. Number
Special treated diatomite SLE	pH=10	10-1000um	1kg	HC1001000-10
	pH=7	10-1000um	1kg	HC1001000-68
	pH=9	10-1000um	1kg	HC1001000-9

Application

SLE can be used in the drug analysis in plasma, urine, etc; it also be used to replace most of the analysis using Liquid/Liquid extraction.

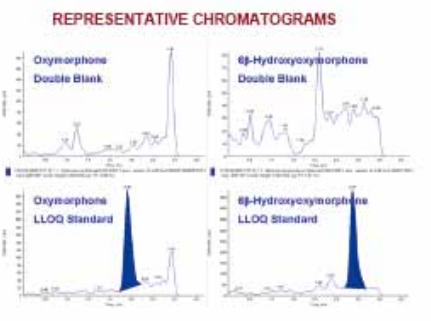
Determination of Low Concentration of Oxymorphone and 6β-hydroxyoxymorphonein Human Plasma by LC-MS/MS (Cleanert SLE,P/N:HC2002-W)



Experimental

400μL of human plasma samples were spiked with internal standard and immediately processed by solid-support liquid-liquid extraction on Tomtec and extracted with 1.4mL of ethyl acetate. The supernatant was transferred and evaporated to dryness in a 40°C bath under a nitrogen stream. All samples then were reconstituted with 200μL of a Type 1 water for LC-MS/MS analysis.

Mass Spectrometry:
Sciex API 4000, TIS positive
The precursor → product ion transitions under multiple reaction monitoring (MRM) were:
m/z 302.2 (M+H)+ → 227.20 (oxymorphone)
m/z 304.30 (M+H)+ → 268.2 (6β-hydroxyoxymorphone)
HPLC: Shimadzu Pump with Leap Injector.
Mobile Phase: A: Water : Ammonium Hydroxide / 100 : 0.05 (v:v)
B: Methanol : Ammonium Hydroxide / 100 : 0.05 (v:v)
Program: Gradient, Starting at 25% B and ramping to 100% B
Flow rate: 300μL/min
HPLC column: Phenomenex Gemini-NX, 5μm, 2.0 x 50mm



RESULTS

The validated method shows adequate selectivity, sensitivity, specificity, accuracy, and reproducibility for analysis of oxymorphone and 6β-hydroxyoxymorphone in the human plasma. Oxymorphone and 6β-hydroxyoxymorphone have been shown to be stable in human plasma and processed samples under all conditions tested.

- Benchtop stability in plasma: 19hours
- Freeze/Thaw stability: 6 cycles at -20°C
- Reinjection reproducibility: 200 hours at 4°C
- Long-term frozen stability: 139 days at -20°C and -70°C

Special column 2011 new product!

Cleanert SLE

Description

Solid supported liquid/liquid Extraction columns and plates use specially treated diatomiteous materials as a solid support for liquid/liquid extractions. The Cleanert SLE were used in Chinese globle method of GB/T 17952-2006; It was specialized for pretreatment of azo dyes analysis in textile.

Application

Determination of forbidden azo dyes in textiles (Cleanert SLE, P/N:HC2000060)

1. Foundamental

Reduce the textiles in citrate buffer solution by sodiumdithionate to obtain forbidden aromatic amines that possibly exist. Extract the aromatic amines by proper liquild-liquid partition cartridge. After concentration, dilute to volume with proper organic solvent for determination by GC-MS. If necessary, choose one or more other methods to confirm the existence of isomers. HPLC/DAD or GC/MS is employed for quantification.

2. Materials

2.1 Cleanert Celite extraction cartridge: 20cm×2.5cm (i.d.) polypropylene cartridge, packed with 20g of diatomite.

2.2 Citrate buffer (0.06mol/L, pH=6.0): Dissolve 12.526g of citric acid and 6.320g of sodium hydroxide in water and dilute to 1000mL.

2.3 Sodiumdithionate solution: 200mg/mL sodiumdithionate in water, fresh prepared with solid sodiumdithionate ($Na_2S_2O_4$≥85%) before use.

3. Sample preparation

Cut representative sample into small pieces of 5mm × 5mm and mix. Transfer 1.0 (accurate to 0.01g) of sample into reactor and add 16mL of citrate buffer at 70±2°C. Seal the reactor and shake up until all samples are soaked in liquid. Put the reactor in water bath at 70±2°C for 30min to soak the textiles thoroughly. Add 3.0mL of sodiumdithionate solution, seal and shake up. After another 30min in water bath, cool the reactor to room temperature in 2min.

4. Extraction and concentration

4.1 Extraction:

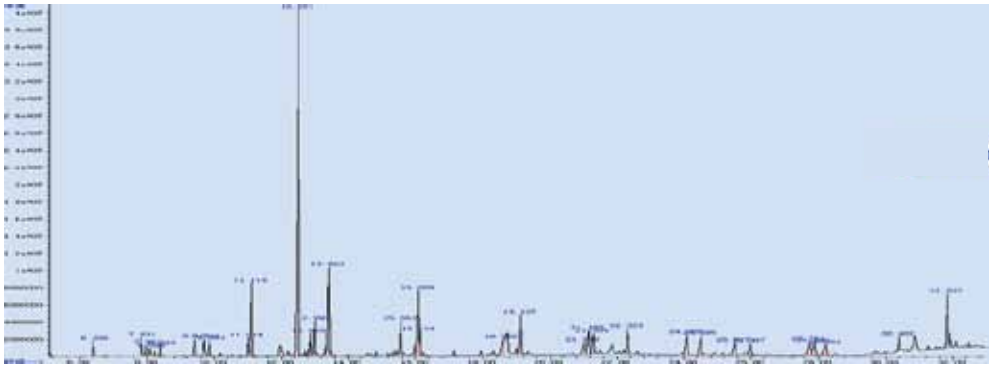
Press the sample in the reactor with glass rod, and transfer the liquid into diatomite extraction cartridge(2.1). Allow to adsorb for 15min. Elute the cartridge with ether four times (20mL × 4). For each time, combine the ether and eluate, and load onto the cartridge. Control the flow rate. Collect the eluate in a round-bottom flask.

4.2 Concentration:

Evaporate the eluate to 1 mL by rotary evaporator at 35°C and dry under a slow stream of nitrogen.

5. GC-MS analysis

Capillary column: DA-5MS,30m×0.25mm×0.25μm(P/N:1525-3002), or a corresponsive one.
Injection temperature: 250°C
Column temperature: 50°C (0.5min) 20°C/min 150°C(8min) 20°C/min 230°C (20min) 20°C/ min 260°C(5min)
MS interface temperature: 270°C; MS scan range: 35~350amu; Injection mode: splitless; Carrier gas: He(≥99.999%);
Flow rate: 1.0mL/min; Injection volume: 1μL; Ionization source: EI; Ionization voltage: 70eV



Cleanert TPT—— Triple Phase SPE for Tea

Description

TPT was constituted by three kinds of materials. These three kinds of materials using different mechanism of action, focus on the colorants, organic acid and tea polyphenols, also cosidering different polarity of the interferent, such as nonpolarity substance, substance with hydroxyl and carboxyl group, also the basic group. By mixing different materials together, we achieve a better result of clean up, expecially complicated matrix. TPT is majorly used for extraction and detection of pesticides from tea,It can absorb reduce up to 80% interferent and without adsorb any pesticide residues.

The General Method Includes

Determination of 519 pesticides and related chemicals residues in teas—GC-MS method

1) Extraction
Weigh 5g of tea in a centrifuge tube, and then add 15mL of acetonitrile. The solution is homogenized and then centrifugated at 4200r/min for 5min. Transfer the supernatant , and extract the residue with 15mL of acetonitrile again and centrifugate. Combine the two supernatants and evaporate to 1 for further purification.
2) Purification
GC-MC purification method:
Load 2cm high of anhydrous sodium sulfate onto Cleanert TPT cartridge. Wash the cartridge with 10mL of acetonitrile/toluene (3:1, v/v). Load the concentrated sample onto the Cleanert TPT cartridge. Wash the sample bottle with 2mL of acetonitrile/toluene (3:1, v/v) 3 times and combine the solutions onto the cartridge.

Determination of 448 pesticides and related chemicals residues in tea—LC-MS-MS method.(Clenert TPT, P/N:TPT200010)

Except that the sample amount is 2g, the sample extraction and purification method is the same as above. Evaporate the collected eluate to 0.5 mL by rotary evaporator in water bath at 40℃ . Dry under a stream of nitrogen at 35℃ . Redissolve the residue in 1mL of acetonitrile/water (3:2, v/v). Filter the solution through 0.2μm membrane for LC-MS/MS analysis.

Ordering information

Packing Material	Specification, Package	Cat. No.
Cleanert TPT	1g/6mL,30	TPT0006
	2g/12mL,20	TPT200010

Cleanert TPH—— Triple Phase SPE for Herb

Description

TPH means triple phase SPE for Herb, and it was constituted by three kinds of materials. These three kinds of materials using different mechanism of action, focus on the colorants, organic acid and organic substance, also cosidering different polarity of the interferent, such as nonpolarity substance, substance with hydroxyl and carboxyl group, also the basic group. By mixing different materials together, we achieve a better result of clean up, expecially complicated matrix. TPH is majorly used for extraction and detection of pesticides from ChineseHerb such as Ramulus Mori, Honeysuckle and the Fruit of Chinese Wolfberry, It can absorb reduce up to 80% interferent and without adsorb any pesticide residues.

Cleanert TPH has been used in China national standard methods, Determination of 488 Pesticide Residues and Related Chemicals Residues and 413 Pesticide Residues and Related Chemicals Residues in the Ramulus Mori, Honeysuckle and the Fruit of Chinese Wolfberry with GS-MS and LC-MS/MS Respectively, Determination of 448 pesticides and related chemicals residues in tea—LC-MS-MS method.

The process mainly containing ACN extraction, Load the sample on the pre-actived column, and then eluted by ACN- toluene (3+1).

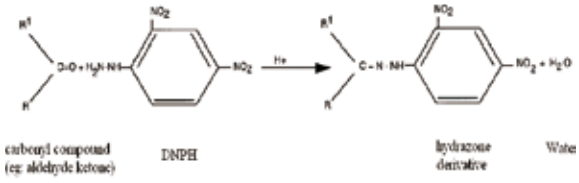
Ordering information

Packing Material	Specification, Package	Cat. No.
Cleanert TPH	1g/6mL,30	TPH0006
	2g/12mL,20	TPH200010

Cleanert DNPH-Silica

Description

DNPH-Silica employs the derivant generated from the specific reaction of DNPH and carbonyl compounds to separate. It's mainly used in the collection of aldehyde ketone from automobiles and atmosphere in the room.



Mechanism

The General Method Includes

Loading sample:

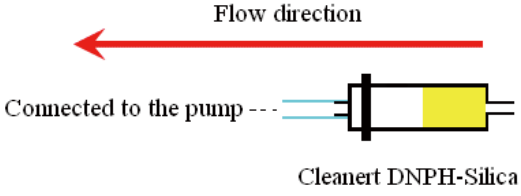
Elute the aldehyde ketone, put the cartridge on the SPE vacuum manifold, add 5mL acetonitrile to elute the cartridge.

HPLC codition:

Column: Agela Venusil XBP-C18, 4.6×250mm, 5μm (P/N: VX952505-0);

Mobile phase: water:acetonitrile=40:60;

Flow rate: 1ml/min; Tempreture: room temperature; Detector: UV 360nm;



Ordering information

Packing Material	Specification, Package	Cat. No.
Cleanert DNPH-Silica	200mg/3mL, 1piece/package	DN 2003
	200mg/1mL, 1 piece/package	ICDN2001

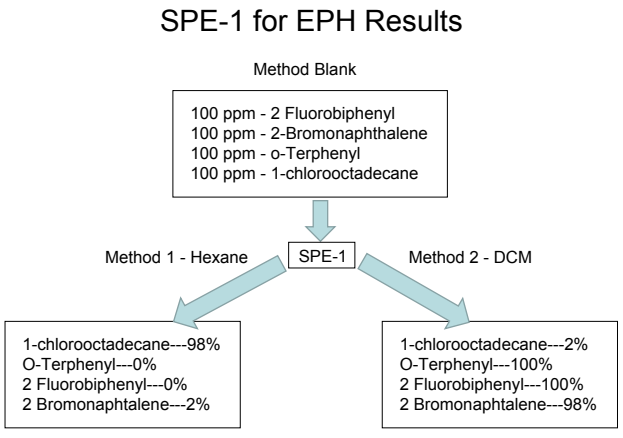
Cleanert TPT—Triple Phase SPE for Tea

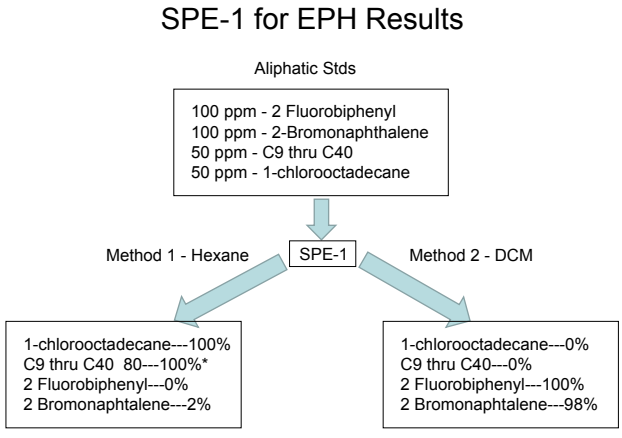
Description

Cleanert EPH use specially silica as material to separate aliphatic fraction to atomatic fraction in soil. The column was used in New Jersey Department of Environmental Protection Site Remediation Program, extractable petroleum hydrocarbons methodology (Version 1.1). The method also can be move onto the SPE working station of full-automatic (SPE-10 P/N: SPE-10).

Application

Extractable petroleum hydrocarbons methodology
Homogenize the soil sample with a solvent-rinsed stainless steel spatula. Weigh about five grams !à.01g of the sample into a tared aluminum pan. Dry at 105 degrees Celsius for 12 hours and calculate the percent solids content. Blend 10-30g of the solid sample with 10-30g of anhydrous sodium sulfate and place in an extraction thimble. Add 100µg of the surrogate standard spiking solution onto the sample. Add 1mL of the concentrated fractionation surrogate spiking solution to the 1mL hexane extract.
Rinse the column with 30mL of hexane (60mL if pre-rinsed with methylene chloride). Let the hexane flow through the column until the head of the column is just above the frit. Close the stopcock to stop flow. Discard the hexane.
Load 1mL of the combined sample extract/fractionation surrogate solution onto the column. Open the stopcock and start collecting the elutant immediately in a 25mL flask labeled "aliphatics."
Just prior to the exposure of the column frit to air, elute the column with an additional 19mL of hexane so a total of 20mL of hexane has passed through the column. (It is essential that "plug flow" of the extract be achieved through the silica gel column/cartridge.)
Hexane should be added in 1 to 2mL increments with additions occurring when the level of solvent drops to a point just prior to exposing the column frit to air. The use of a stopcock is required.
Following the recovery of the aliphatic fraction, elute the column with 20mL methylene chloride. Collect the elutant in a 25mL volumetric flask. Label this fraction aromatics.
Transfer the contents of the aliphatic and aromatic volumetric flasks into separate, labeled graduated concentrator tubes. Concentrate each of the extracts to a final volume of 1mL under a gentle stream of nitrogen. Analyze each of the extracts separately.





Ordering information

Packing Material	Specification, Package	Cat. No.
Cleanert EPH	5g/25mL,15	SI500025-30

Cleanert PPP—Protein Precipitation Plate

Description

Cleanert Protein Precipitation Plate product for DMPK research is manufactured with the reagents of the highest purity. Every lot is subjected to a wide range of rigorous quality control tests and must confirm to our strict specification.The graded frit design is optimized to efficiently remove most of the interference of plasma samples without plugging or breakthrough.
The 96-well plate design can be accomplished with most of auto-station, also minimizing sample handling. The plates are compatible with Agela 96 well vacuum manifold, also can be used in centrifugal machine.

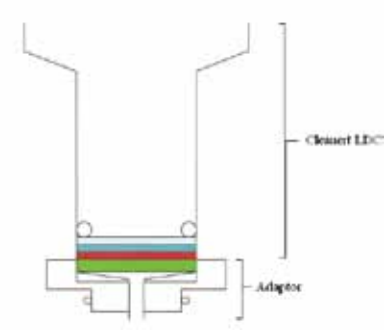
Operation

- Loading about 50μl plasma sample
- Add 3 times solvents as elute solution and shake the plate to help precipitation
- Apply vacuum or centrifuge to get the solution through the plate

Cleanert LDC—Large Disk for water analysis Cartridge

Description

Cleanert LDC use SPE sorbent to concentrated trace chemical substances in environmental samples. The special cartridge design was suitable for water concentration, and it can replace SPE disk in most of the analysis.



Ordering information

Packing Material	Specification, Package	Cat. No.
Cleanert LDC C18	100mL, 1	LDC18100
Cleanert LDC PEP	100mL, 1	LDCPE100
Cleanert LDC SCX	100mL, 1	LDCSC100

Cleanert LRC—Large Receiver Column

Description

Cleanert LRC was design to load more solvents when SPE process, specially can by used in little sorbent bed but Large elute solvents.

Ordering information

Packing Material	Specification, Package	Cat. No.
Cleanert LRC C18	200mL/10mL, 20	L1820010
Cleanert LRC PEP	60mL/10mL, 20	LPE0610

Cleanert Glass Column

Description

Cleanert Glass column series can reduce the dissolution of the tube material, and so can be used in environmental analysis, especially the plasticizer and environmental interferent.

Ordering information

Packing Material	Specification, Package	Cat. No.
Cleanert C18 glass	200mL/3mL, 50	182003-G
Cleanert PEP glass	60mL/3mL, 50	PE0603-G

Polymer sorbents

PAX(RP/Strong Anion Exchange)

Description

It is designed to overcome the limitations of traditional silica based mixed-mode SPE sorbents such as C18/SAX. It is a RP/strong anionexchange mixed mode polystyrene/divinylbenzene sorbent, stable from pH 0-14.0 .

Particle Characteristics

Based on functioalized polystyrene/divinylbenzene;
Average particle diameter: 40μm; Average pore size: 70Å; Volume of pore: 1.2cm^2/g; Specific surface area: 600m^2/g.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PAX	30mg	1mL	100	AX0301
	60mg	3mL	50	AX0603
	100mg	3mL	50	AX1003
	200mg	6mL	30	AX2006
	500mg	6mL	30	AX5006
	30mg/well	2mL	96-wellplate	AX0302-W
	50mg/well	2mL	96-wellplate	AX0502-W
	10g	-	-	AX0010
	100g	-	-	AX0100

PCX(RP/Strong Cation Exchange)

Description

PCX is a mixed-mode, strong cation exchange sorbent. It has a reverse-phase and cation-exchange dual functionality. It high surface area and a wide usable pH range of 0-14.0 .

Particle Characteristics

Based on Functionalized polystyrene/divinylbenzene;
Average particle diameter: 40μm; Average pore size: 70Å; Volume of pore: 1.2cm^2/g; Specific surface area: 600m^2/g.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PCX	30mg	1mL	100	CX0301
	60mg	3mL	50	CX0603
	100mg	3mL	50	CX1003
	200mg	6mL	30	CX2006
	500mg	6mL	30	CX5006
	30mg/well	2mL	96-wellplate	CX0302-W
	50mg/well	2mL	96-wellplate	CX0502-W
	10g	-	-	CX0010
	100g	-	-	CX0100

PWAX(RP/Weak Anion Exchange)

Description

Cleanert PWAX provides the dual modes of retention, weak anion exchange and reverse phase on a stable polymer sorbent, which improves the retention for acidic analytes.

Particle Characteristics

Based on partially functionalized aminopolystyrene/divinylbenzene;
Average particle diameter: 40μm; Average pore size: 70Å; Volume of pore: 1.2cm^2/g; Specific surface area: 600m^2/g.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PWAX	30mg	1mL	100	WA0301
	60mg	3mL	50	WA0603
	100mg	3mL	50	WA1003
	200mg	6mL	30	WA2006
	500mg	6mL	30	WA5006
	30mg/well	2mL	96-wellplate	WA0302-W
	50mg/well	2mL	96-wellplate	WA0502-W
	10g	-	-	WA0010
	100g	-	-	WA0100

PWCX(RP/Weak Cation Exchange)

Description

Cleanert PWCX provides the dual modes of retention, weak cation exchange and reverse phase on a stable polymer sorbent, which improves the retention for basic analytes.

Particle Characteristics

Based on partially functionalized polystyrene/divinylbenzene;
Average particle diameter: 40μm; Average pore size: 70Å; Volume of pore: 1.2cm^2/g; Specific surface area: 600m^2/g.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PWCX	30mg	1mL	100	WC0301
	60mg	3mL	50	WC0603
	100mg	3mL	50	WC1003
	200mg	6mL	30	WC2006
	500mg	6mL	30	WC5006
	30mg/well	2mL	96-wellplate	WC0302-W
	50mg/well	2mL	96-wellplate	WC0502-W
	10g	-	-	WC0010
	100g	-	-	WC0100

PS

Description

PS is made of non-substituted polydivinylbenzene. It has larger surface areas (>600m^2/g.) and thus greater capacity than reverse phase bonded silica.PS can be used for the extraction of non-polar and polar compounds.

Particle Characteristics

Based on polystyrene/divinylbenzene; Average particle diameter: 40μm;
Average pore size: 70Å; Volume of pore: 1.2cm^2/g; Specific surface area: 600m^2/g.

Ordering Information

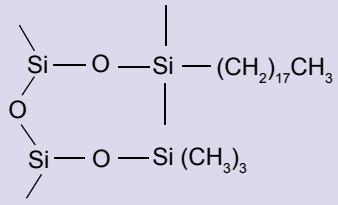
Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PS	30mg	1mL	100	PS0301
	60mg	3mL	50	PS0603
	100mg	3mL	50	PS1003
	200mg	6mL	30	PS2006
	500mg	6mL	30	PS5006
	30mg/well	2mL	96-wellplate	PS0302-W
	50mg/well	2mL	96-wellplate	PS0502-W
	10g	-	-	PS0010
	100g	-	-	PS0100

Bonded Silica SPE

ODS C18(End-capped)

Description

ODS C18 products columns and plates are packed with reverse phase, octadecylsilane bonded silica sorbents. The sorbent is double endcapped and has a high bonding density (%C>17). These columns can be used as a replacement for BondElute C18 and Super clean ENVI C18. These products can be used for desalting biomolecules, such as proteins and DNAs.



Particle Characteristics

Based on silica; C%: 18-19%; Average particle diameter: 50μm; Average pore size: 60Å; Volume of pore: 0.8cm^2/g; Specific surface area: 480m^2/g.

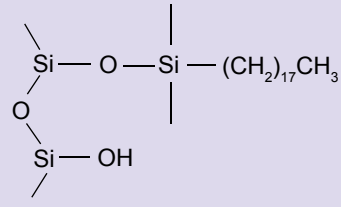
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert ODS (C18,end-capped)	100mg	1mL	100	181001
	200mg	3mL	50	182003
	500mg	3mL	50	185003
	500mg	6mL	30	185006
	1g	6mL	30	180006
	50mg/well	2mL	96-wellplate	180502-W
	100mg/well	2mL	96-wellplate	181002-W
	10g			180010
	100g			180100

ODS C18-N(Non-end-capped)

Description

ODS C18-N products have silica based reverse phase sorbents bonded with octadecylsilane without endcapping. The extra silanol residue of the sorbent provides additional polar interactions associated with surface silanol groups which enhance the retention of basic compounds. These columns are similar to Agilent AccuBond C18 and BondElute C18 OH.



Particle Characteristics

Based on silica; C%: 17-18%; Average particle diameter: 50μm; Average pore size: 60Å; Volume of pore: 0.8cm^2/g;Specific surface area: 480m^2/g

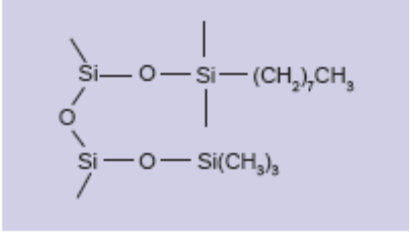
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert ODS-N (C18,Non-end-capped)	100mg	1mL	100	181001-N
	200mg	3mL	50	182003-N
	500mg	3mL	50	185003-N
	500mg	6mL	30	185006-N
	1g	6mL	30	180006-N
	50mg/well	2mL	96-wellplate	180502-N-W
	100mg/well	2mL	96-wellplate	181002-N-W
	10g	-	-	180010-N
	100g	-	-	180100-N

C8 (Octyl)

Description

The property of C8 products is similar to ODS C18 products. However, this sorbent is slightly less retentive than C18, which facilitates the elution of more hydrophobic substance. C8 is successfully used for the extraction of both water-soluble and fat-soluble vitamins from serum, as well as the desalting of biological macromolecules.



Particle Characteristics

Based on silica; C%: 9-10%; Average particle diameter: 50μm;
Average pore size: 60Å; Volume of pore: 0.8cm^2/g; Specific surface area: 480m^2/g

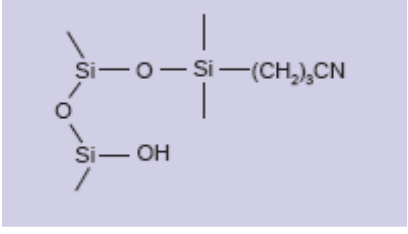
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert C8	100mg	1mL	100	81001
	200mg	3mL	50	82003
	500mg	3mL	50	85003
	500mg	6mL	30	85006
	1g	6mL	30	80006
	50mg/well	2mL	96-wellplate	080502-W
	100mg/well	2mL	96-wellplate	081002-W
	10g	-	-	80010
	100g	-	-	80100

CN (Cyanopropyl)

Description

Cyano(CN) SPE have silica based sorbents bonded with cyanopropyl functional group. This polar sorbent exhibits both polar and non-polar interactions. It can be used for extraction of both polar and non-polar molecules in either normal phase or reverse phase mode.



Particle Characteristics

Based on silica; C%: 5-6%; Average particle diameter: 50μm;
Average pore size: 60Å; Volume of pore: 0.8cm^2/g; Specific surface area: 480m^2/g

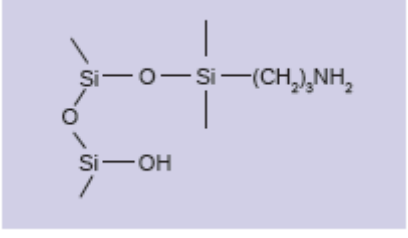
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert CN	100mg	1mL	100	CN1001
	200mg	3mL	50	CN2003
	500mg	3mL	50	CN5003
	500mg	6mL	30	CN5006
	1g	6mL	30	CN0006
	50mg/well	2mL	96-wellplate	CN0502-W
	100mg/well	2mL	96-wellplate	CN1002-W
	10g	-	-	CN0010
	100g	-	-	CN0100

NH_2 (Aminopropyl)

Description

NH_2 SPE products have silica based sorbents bonded with aminopropyl funtional group. This sorbent can be used in either normal phase or reverse phase mode. It retains the analytes either by a polar adsorption (from non-polar solution) or by weak anion exchange (from aqueous solution). pKa=9.8 .



Particle Characteristics

Based on silica; Average particle diameter: 50μm;
Average pore size: 60Å; Volume of pore: 0.8cm^2/g; Specific surface area: 480m^2/g

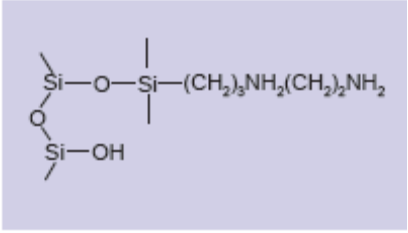
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert NH_2	100mg	1mL	100	NH1001
	200mg	3mL	50	NH2003
	500mg	3mL	50	NH5003
	500mg	6mL	30	NH5006
	1g	6mL	30	NH0006
	50mg/well	2mL	96-wellplate	NH0502-W
	100mg/well	2mL	96-wellplate	NH1002-W
	10g	-	-	NH0010
	100g	-	-	NH0100

PSA {(N-aminoethyl) Aminopropyl}

Description

PSA SPE is similar to Cleanert-NH2. PSA has two amino groups with pKa=10.1 and 10.9 respectively. This sorbent is an anion exchanger slightly stronger than NH2. It can be used for the extraction of metal ions by chelating interactions. It is also commonly used to remove organic acids, pigments and metal ions from organic samples such as vegetables and fruits.



Particle Characteristics

Based on silica; Average particle diameter: 50μm;
Average pore size: 60Å; Volume of pore: 0.8cm^2/g; Specific surface area: 480m^2/g

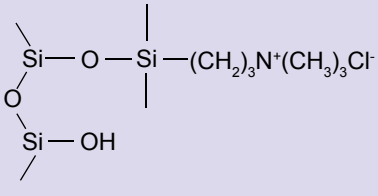
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PSA	100mg	1mL	100	PA1001
	200mg	3mL	50	PA2003
	500mg	3mL	50	PA5003
	500mg	6mL	30	PA5006
	1g	6mL	30	PA0006
	50mg/well	2mL	96-wellplate	PA0502-W
	100mg/well	2mL	96-wellplate	PA1002-W
	10g	-	-	PA0010
	100g	-	-	PA0100

SAX (Strong Anion Exchanger)

Description

SAX SPE products have silica based sorbents bonded with a quaternary amine. This strong anion exchanger is used to extract compounds capable of carrying a negative charge from both aqueous and non-aqueous solutions. They are ideally suit to extraction of weak acids and desalting of biological macromolecules, like BondElute-SAX.



Particle Characteristics

Based on silica; C%: 9-10%; Average particle diameter: 50μm; Average pore size: 60Å; Volume of pore: 0.8cm^2/g;Specific surface area: 480m^2/g The ion exchange degree: 0.5meq/g.

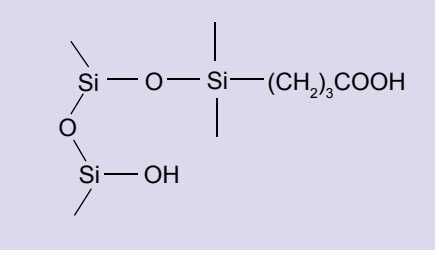
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert SAX	100mg	1mL	100	SA1001
	200mg	3mL	50	SA2003
	500mg	3mL	50	SA5003
	500mg	6mL	30	SA5006
	1g	6mL	30	SA0006
	50mg/well	2mL	96-wellplate	SA0502-W
	100mg/well	2mL	96-wellplate	SA1002-W
	10g	-	-	SA0010
	100g	-	-	SA0100

COOH (Weak Cation Exchanger)

Description

COOH SPE products consist of a propane carboxylic acid on the inner silica surface. The pKa of the carboxylic acid group is approximately 3.8. It is a useful sorbent for quaternary ammonium salt and other strong cations.



Particle Characteristics

Based on silica; C%: 5-6%; Average particle diameter: 50μm; Average pore size: 60Å; Volume of pore: 0.8cm^2/g;Specific surface area: 480m^2/g

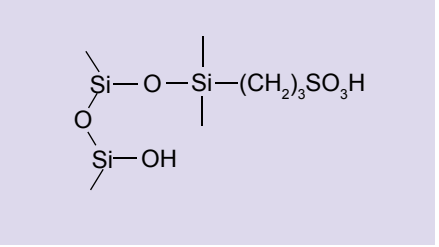
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert COOH	100mg	1mL	100	CH1001
	200mg	3mL	50	CH2003
	500mg	3mL	50	CH5003
	500mg	6mL	30	CH5006
	1g	6mL	30	CH0006
	50mg/well	2mL	96-wellplate	CH0502-W
	100mg/well	2mL	96-wellplate	CH1002-W
	10g	-	-	CH0010
	100g	-	-	CH0100

PRS (Propane Sulfonic Acid)

Description

PRS SPE sorbent is a silica gel based strong cation exchanger. This sorbent, consisting of a propane sulfonic acid, has slightly less exchange capability than SCX. It can be applied to the extraction of weak cations, such as pyridine, with high recovery.



Particle Characteristics

Based on silica; Average particle diameter: 50μm; Average pore size: 60Å;
Volume of pore: 0.8cm^2/g;Specific surface area: 480m^2/g The ion exchange degree: 0.3meq/g.

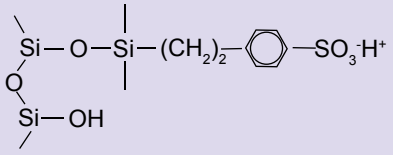
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PRS	100mg	1mL	100	PR1001
	200mg	3mL	50	PR2003
	500mg	3mL	50	PR5003
	500mg	6mL	30	PR5006
	1g	6mL	30	PR0006
	50mg/well	2mL	96-wellplate	PR0502-W
	100mg/well	2mL	96-wellplate	PR1002-W
	10g	-	-	PR0010
	100g	-	-	PR0100

SCX (Strong Cation Exchanger)

Description

SCX products are strong cation exchangers based on silica gel, with benzene sulfonic acid. The sorbent is used to extract positively charged basic compounds or remove the salt from biological samples. It can also be mixed with C18 sorbent to extract the organic bases.



Particle Characteristics

Based on silica; Average particle diameter: 50μm; Average pore size: 60Å;
Volume of pore: 0.8cm^2/g;Specific surface area: 480m^2/g The ion exchange degree: 0.5meq/g.

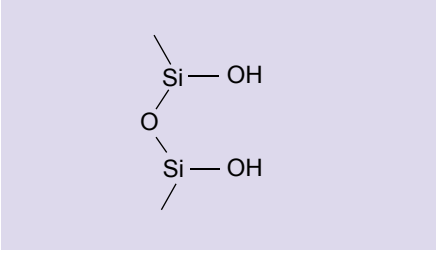
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert SCX	100mg	1mL	100	SC1001
	200mg	3mL	50	SC2003
	500mg	3mL	50	SC5003
	500mg	6mL	30	SC5006
	1g	6mL	30	SC0006
	50mg/well	2mL	96-wellplate	SC0502-W
	100mg/well	2mL	96-wellplate	SC1002-W
	10g	-	-	SC0010
	100g	-	-	SC0100

Silica

Description

Silica SPE product has unbonded, activated irregular silica as the sorbent. This sorbent exhibits high polar interaction and is used for the extraction of weak-polar or non-polar compound, such as oil. In addition, the silanol groups are ionzable at intermediate pH, so it can be used as a weak cation exchanger.



Particle Characteristics

Based on silica; Average particle diameter: 50μm; Average pore size: 60Å;
Volume of pore: 0.8cm^2/g;Specific surface area: 480m^2/g

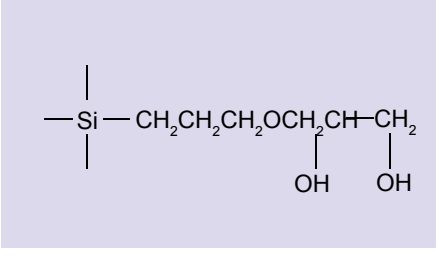
Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert Silica	100mg	1mL	100	SI1001
	200mg	3mL	50	SI2003
	500mg	3mL	50	SI5003
	500mg	6mL	30	SI5006
	1g	6mL	30	SI0006
	50mg/well	2mL	96-wellplate	SI0502-W
	100mg/well	2mL	96-wellplate	SI1002-W
	10g	-	-	SI0010
	100g	-	-	SI0100

Diol

Description

Silica based dihydroxy SPE. It is used to extract polar analytes from non-polar solutions. It is a neutral sorbent and extracts compounds by forming hydrogen bonding or polar-polar interaction. As an example, it can be used to extract THC.



Particle Characteristics

Based on silica; C%: 5-6%; Average particle diameter: 50μm; Average pore size: 60Å;
Volume of pore: 0.8cm^2/g;Specific surface area: 480m^2/g

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert Diol	100mg	1mL	100	DI1001
	200mg	3mL	50	DI2003
	500mg	3mL	50	DI5003
	500mg	6mL	30	DI5006
	1g	6mL	30	DI0006
	50mg/well	2mL	96-wellplate	DI0502-W
	100mg/well	2mL	96-wellplate	DI1002-W
	10g	-	-	DI0010
	100g	-	-	DI0100

Non-silica Adsorption Sorbent

Florisil (Magnesia Silica)

Description

Florisil is a highly selective adsorbent, which cotains silica (84%), magnesium oxide (15.5%), and sodium sulfate (0.5%), It was used for AOAC, EPA and other methods designed for the pesticide residues, separation, internal secretion and the separation of oil, PCBs, PAHs, and the the separation of nitrogen compounds and antibiotic substances in hydrocarbons. Commonly used in pesticide analysis, removal of pigment, for analysis method NY761, the functions of which are similar to Supelco LC Florisil and Bond Elut FL.

Particle Characteristics

Adsorption sorbents; Average particle diameter: 80-100μm (40-60μm optional);
Average pore size: 80Å; Specific surface area: 291m^2/g

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert Florisil	100mg	1mL	100	FS1001
	200mg	3mL	50	FS2003
	500mg	3mL	50	FS5003
	500mg	6mL	30	FS5006
	1g	6mL	30	FS0006
	50mg/well	2mL	96-wellplate	FS0502-W
	100mg/well	2mL	96-wellplate	FS1002-W
	10g	-	-	FS0010
	100g	-	-	FS0100

PestiCarb (Graphitized Carbon)

Description

PestiCarb is made of graphitized carbon by a distinct surface modification process, and has been used for sample cleanup in pesticide residues in plants or animal tissues. This sorbent can effectively reduce the background noise and increase the sensitivity, the functions of which are similar to Supelco Envicarb.

Particle Characteristics

Adsorption sorbents; Average particle size: 120-400 mesh.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PestiCarb	100mg	1mL	100	PC1001
	200mg	3mL	50	PC2003
	500mg	3mL	50	PC5003
	500mg	6mL	30	PC5006
	1g	6mL	30	PC0006
	50mg/well	2mL	96-wellplate	PC0502-W
	100mg/well	2mL	96-wellplate	PC1002-W
	10g	-	-	PC0010
	100g	-	-	PC0100

Alumina N (Aluminium Oxide;Neutral)

Description

Alumina N sorbents(pH=7.5) can adsorb molecules by interaction with the aluminum metal center. The neutralized surface allows interaction with compounds whose heteroatoms are electronegative(e.g.N,S,P) or with an electron-rich ,highly aromatic structure.

Particle Characteristics

Adsorption sorbents;
Average particle size: 150 mesh; Average pore size: 58Å;

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert Alumina N	100mg	1mL	100	AL1001-N
	200mg	3mL	50	AL2003-N
	500mg	3mL	50	AL5003-N
	500mg	6mL	30	AL5006-N
	1g	6mL	30	AL0006-N
	50mg/well	2mL	96-wellplate	AL0502-N-W
	100mg/well	2mL	96-wellplate	AL1002-N-W
	10g	-	-	AL0010-N
	100g	-	-	AL0100-N

Alumina A (Aluminium Oxide;Acidic)

Description

Alumina A sorbents(pH=4.5) can be used as strong polar absorbents or mild cation exchangers. This sorbent is processed with a special deactivation procedure which ensures high analytes recovery.

Particle Characteristics

Adsorption sorbents;
Average particle size: 150 mesh; Average pore size: 58Å;

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert Alumina A	100mg	1mL	100	AL1001-A
	200mg	3mL	50	AL2003-A
	500mg	3mL	50	AL5003-A
	500mg	6mL	30	AL5006-A
	1g	6mL	30	AL0006-A
	50mg/well	2mL	96-wellplate	AL0502-A-W
	100mg/well	2mL	96-wellplate	AL1002-A-W
	10g	-	-	AL0010-A
	100g	-	-	AL0100-A

Alumina B (Aluminium Oxide; Basic)

Description

Alumina B products(pH=10) can be used to remove organic acids and phenols in the sample matrix. They have been pre-treated by special deactivation to ensure high analytes recovery.

Particle Characteristics

Adsorption sorbents;
Average particle size: 150 mesh; Average pore size: 58Å.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert Alumina B	100mg	1mL	100	AL1001-B
	200mg	3mL	50	AL2003-B
	500mg	3mL	50	AL5003-B
	500mg	6mL	30	AL5006-B
	1g	6mL	30	AL0006-B
	50mg/well	2mL	96-wellplate	AL0502-B-W
	100mg/well	2mL	96-wellplate	AL1002-B-W
	10g	-	-	AL0010-B
	100g	-	-	AL0100-B

Mixed and Layered Phases

PestiCarb/NH_2

Description

PestiCarb/NH_2 SPE column is packed of 500mg PestiCarb and 500mg NH_2.It has been used wildly in analysis of pesticides residue, esp. for the Japanese Positive List System. It can be used in pesticide residue analysis, coloring matter, fatty acid and hydroxybenzene.

Particle Characteristics

See Pesticarb and Cleanert NH_2

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert PestiCarb/NH_2	500mg/500mg	6ml	30	PN0006

C8/SCX

Description

Mixed mode SPE based on silica of C8 and strong cation-exchange. It is usually used for the extraction of basic drugs from urine or blood.

Particle Characteristics

See C8 and SCX

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert C8/SCX	50mg	3mL	50	CS0503
	130mg	3mL	50	CS1303
	300mg	3mL	50	CS3003
	500mg	6mL	30	CS5006
	1g	6mL	30	CS0006
	50mg/well	2mL	96-wellplate	CS0502-W
	100mg/well	2mL	96-wellplate	CS1002-W
	10g	-	-	CS0010
	100g	-	-	CS0100

Specialized Phases

HXN(Mid Polar Polymers Specially for Sulfonyl Urea Samples)

Description

HXN is also made of polydivinylbenzene having surface modified with vinylpyrrolidone. This sorbent is specially designed to extract sulfonyl ureas from water and soil at ppb level. It is less polar than PEP and can also be used to extract, enrich and clean up samples from mid polar to high polar compounds.

Particle Characteristics

Based on polystyrene/divinylbenzene;Average particle diameter: 40μm;
Average pore size: 70Å; Volume of pore: 1.2cm^2/g; Specific surface area: 600m^2/g

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert HXN	30mg	1mL	100	HX0301
	60mg	3mL	50	HX0603
	100mg	3mL	50	HX1003
	200mg	6mL	30	HX2006
	500mg	6mL	30	HX5006
	30mg/well	2mL	96-wellplate	HX0302-W
	50mg/well	2mL	96-wellplate	HX0502-W
	10g	-	-	HX0010
	100g	-	-	HX0100

SUL-5(Specific Columns for Sulfonamides)

Description

SUL-5 (specific columns for sulfonamides) is specially designed for the extraction of five sulfonamides(SM2,SMM,SMZ,SDM.SQ) in pork.

Particle Characteristics

Adsorption sorbents.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert SUL-5	2g	10ml	100	SUL-5

DNPH-Silica

Description

DNPH-Silica aldehyde ketone gas sample collecting tube uses DNPH (2,4-dinitrophenylhydrazine) to exclusively derivative the carbonyl group. Then the derivatives can be separated by chromatography. This cartridge is widely used to collect aldehyde ketone pollutants in car or indoor air.

Ordering Information

Material	Sorbent	Vol	Tubes/box	Cat. Number
Cleanert DNPH-Silica	200mg	3ml	50/package	DN2003

Cleanert IC:
Sample Clean-up Cartridges for the Ion Chromatography

Description

The sample preparation is necessary not only for HPLC but also for IC.
The demands for sample preparation of IC led to a development of a new SPE product family, which we named "Cleanert Pre-IC", and they can perform excellently for sample preparation of IC thanks to their sorbent of high capacity and a good flow property.

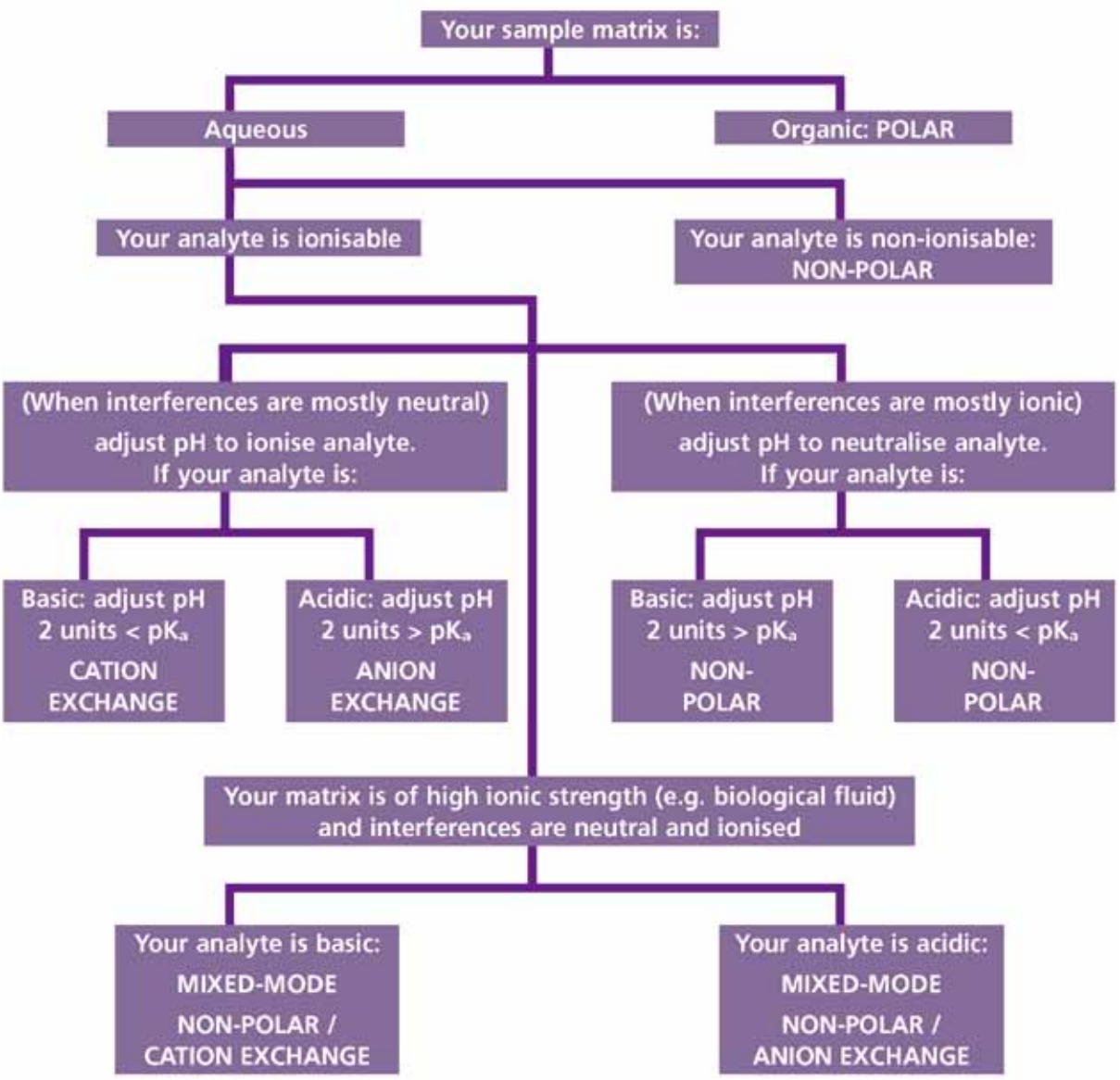
Part No.	The type of resin	Average particle size	Capacity	Application	Sepcification
IC-RP10	divinylbenzene resin	40μm	300mg/1cc cartridge	To remove substances such as aromatic dyes, some aromatic carboxylic acids, hydrocarbons, and surfactants from sample matrices.	10 pk
IC-P10	polyvinylpyrrolidone (PVP) polymer resin	40μm	350mg/1cc cartridge	To remove the phenolic fraction of humic acids, tannic acids, lignins, anthocyanins, and azodyes from samples.	10 pk
IC-A10	16% cross-linked, styrene-based, anion-exchange resin in the bicarbonate form.	40μm	0.7meq/1cc cartridge	To remove anion contaminant and neutralize the strongly acidic sample solution.	10 pk
IC-H10	16% cross-linked, styrene-based, sulfonic acid , cation-exchange resin in the hydrogen form.	40μm	2.0-2.2meq /1cc cartridge	To remove high levels of alkaline earths and transition metals from sample matrices and in the neutralization of highly alkaline samples such as sodium hydroxide or sodium carbonate.	10 pk
IC-Na10	16% cross-linked, styrene-based, sulfonic acid , cation-exchange resin in the sodium form.	40μm	2.0-2.2meq /1cc cartridge	To remove high levels of alkaline earths and transition metals from sample matrices without acidifying the sample. This ensures good recovery of acid labile analytes such as nitrite.	10 pk
IC-Ag10	16% cross-linked, styrene-based, sulfonic acid, cation-exchange resin in the silver form.	40μm	2.0-2.2meq /1cc cartridge	To remove chloride, bromide, and iodide from sample matrices. An IC- H cartridge should be used after the IC- Ag cartridge to remove dissolved Ag.	10 pk
IC-Ba10	styrene-based, sulfonic acid , cation-exchange resin in the barium form.	40μm	2.0-2.2meq /1cc cartridge	To remove SO_4^{2-}.For reproducible, quantitative determinations in low-ionic-strength samples, these cartridges should be activated with a chloride-based activating solution. Then the added chloride need to be removed.	10 pk
IC-M10	iminodiacetate resin in the ammonium form.	40μm	0.4meq/1cc cartridge	To remove transition metals and matrix elimination of alkali and alkaline earth metals.	10 pk
IC-Ag/H10	It is a layered cartridge that contains IC- Ag resin and IC- H resin.				10 pk
IC-Ba/Ag/H10	It is a layered cartridge that contains IC-Ba resin, IC- Ag resin and IC- H resin.				10 pk

The Development of SPE Method

There are many factors influenced the establishment of SPE, and the following are the four main ones which must be considered:

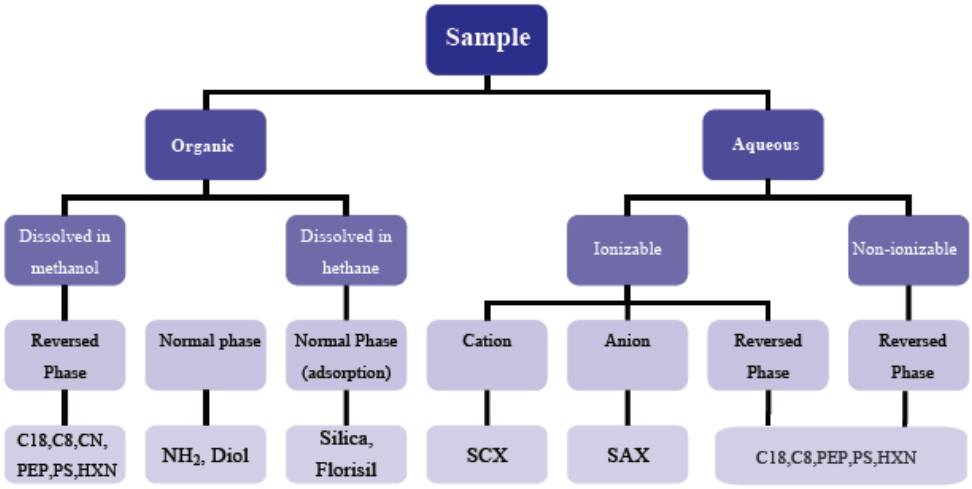
1) The Selection of Sorbent Retention Mechanism

The guide on this page briefly outlines the decision making process required to choose a suitable extraction mechanism.



2) The Selection of SPE Columns

The guide on this page briefly outlines the decision making process required to choose a suitable sorbent.

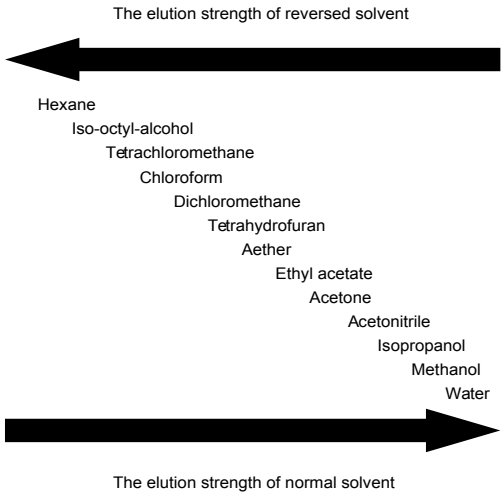


The selection of column packaging and the parameter of sample loading and elution

For the normal phase and reversed phase SPE cartridges, the weight of sample can not exceed the 5% of sorbent weight. For the ion-exchange mode, the capacity of the ion-exchange must be considered.
The table below is the capability and eluted parameter of SPE:

Specification	Quality of Loading Sample	The Minimum Volume of Elution
50mg/1mL	2.5mg	125μL
100mg/1mL	5mg	250μL
200mg/3mL	10mg	500μL
500mg/6mL	25mg	1.2mL
1g/6mL	50mg	2.4mL

3) The Selection of Ideal Elution Solvent



Applications

1. Application of veterinary drug residues

Determination of Four β- Agonist Drugs Residue (Clenbuterol Hydrochloride, Salbutamol, Cimaterol, Ractopamine etc) in Animal Tissues (Cleanert PCX, P/N: CX1506)

1. Experimental materials

(1) SPE Cartridge: PCX(150mg/6mL);
(2) Four β- agonist drugs: Clenbuterol hydrochloride, Salbutamol, Cimaterol, Ractopamine;

2. Sample preparation

Blank samples are pretreated by liquid-liquid extraction and then spiked with standard solutions at proper concentrations. (For details please refer to: NY/T 468-2001).

3. Cleanup Procedures

Condition the SPE cartridges with 5mL of methanol, 5mL of water and 5mL of 30mmol/L HCl sequently. Load the prepared sample in the cartridge. Activate and condition the cartridge with 5mL of water and 5mL of methanol. Then the cartridge was dried by using N2 gas. Elute the PCX cartridge with 5mL of methanol containing 4% ammonia. Collect the eluate to a glass test tube with cap and dry at 50℃ under nitrogen stream. Control the flow rate of sample and eluant at ca. 1mL/min.

4. Derivatization and detection

Heat the glass tube with stopper in oven at 50℃ for a moment to remove water. Add 100μL of toluene and 100μL of N,O-Bis(trimethylsilyl) trifluoroacetamide(BSTFA) to the test tube. Vortex mix for 20s. Seal the test tube and place it in oven at 80℃ for 1 h. Cool and add 300μL of toluene to the test tube. The solution is ready for GC-MS analysis (GC column: DA-5MS, 30m×0.25mm×0.25μm, P/N:1525-3002).

5. Results

(1) Recovery (precision and accuracy);
After pretreating the blank samples of pig liver by liquid-liquid extraction, spike with standard solutions to obtain sample solutions at five concentrations: 1μg/L, 2μg/L, 5μg/L, 10μg/L and 100μg/L. Four batches of samples are tested. For each batch, samples are tested 5 times for each concentration. (For the typical chromatogram of sample recovery study please see attached figure.)

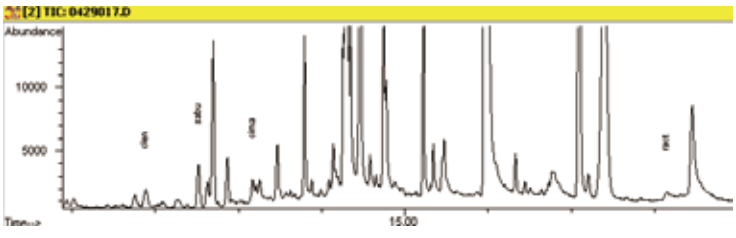
Results of analysis of pig liver samples:

Spiked concentration (μg/L)	Measured concentration (μg/L)	Mean measured concentration (μg/L)	Mean percent recovery (%)	RSD(%)
1	0.75	0.72	72.40	5.93
	0.67			
	0.72			
	0.70			
	0.78			
2	1.62	1.63	81.30	1.23
	1.66			
	1.60			
	1.61			
	1.64			
5	4.02	4.24	84.80	4.16
	4.10			
	4.27			
	4.38			
	4.43			
10	8.24	8.45	84.45	2.81
	8.35			
	8.77			
	8.62			
	8.25			
100	90.24	9.12	91.15	2.86
	87.15			
	91.77			
	92.62			
	93.95			

(2) Repeatability Experiment (error experiment in batch-to-batch)
Results of analysis of pig liver samples:

Batch	Spiked concentration (μg/L)									
	1		2		5		10		100	
	Mean recovery %	RSD%	Mean recovery %	RSD%	Mean recovery %	RSD%	Mean recovery %	RSD%	Mean recovery %	RSD%
1	72.40	5.93	81.30	3.49	84.80	6.16	84.45	3.59	91.15	2.86
2	75.37	6.12	80.47	5.37	84.74	7.55	87.46	4.68	90.05	3.86
3	70.09	7.85	80.80	6.57	83.10	8.17	83.21	5.39	89.53	4.16
4	76.73	4.90	78.50	8.35	82.90	5.11	85.95	5.72	88.27	5.93
Average	73.65	6.20	80.25	5.95	83.88	6.75	85.27	4.84	89.75	4.20
RSD%	12.95		10.79		9.43		7.00		5.75	

Figure: Typical total ion chromatography (TIC) of spiked pig liver samples at six concentrations: 0.5μg/L, 1μg/L, 2μg/L, 5μg/L, 10μg/L and 100μg/L: liver+1ppb(pcx)



Determination of Five Sulfonamides in Pork (Cleanert SUL-5, P/N: SUL-5)

1. Experimental materials

(1) SPE cartridge: Cleanert SUL-5(2g/10mL)
(2) Five sulfonamides: sulphadimidine(SM2), Sulfamonomethoxine(SMM), Sulfamethoxazolum (SMZ), Sulfadimoxine(SDM), Sulfaquinoxaline (SQ)
(3) Working Standard Solutions
Working Standard Solutions are prepared according to Appendix E of NY 5029-2001 at the concentration of 10 mg/kg.

2. Procedure

(1) Cartridge retention recovery (according to Appendix E of NY 5029-2001)
Dilute 50 or 100μL of working standard solutions in 2.95 or 2.90 mL of 95% acetonitrile. Then pass through the PUL-5 cartridge conditioned with 5 mL of 95% acetonitrile.
The details are as follows:
1) Conditioning: 95% acetonitrile 5mL
2) Sample loading: sample solution containing 95% acetonitrile 3mL
3) Washing: 95% acetonitrile 5mL
4) Elution: 70% acetonitrile 10mL
Collecting the elution for HPLC analysis. The injection volume is 20μL

Cartridge batch	Drugs	Recovery(%)			Mean recovery (%)	RSD(%)
Batch 1	SM_2	94.37	96.10	95.19	95.22	0.91
	SMM	96.97	95.38	96.10	96.15	0.83
	SMZ	89.95	90.96	98.50	93.14	5.01
	SDM	94.66	98.15	95.08	95.96	1.99
	SQ	93.48	91.85	90.55	91.96	1.59
Batch 2	SM_2	94.18	95.49	101.13	96.93	3.81
	SMM	97.55	88.94	96.90	94.46	5.07
	SMZ	91.73	87.87	94.46	91.35	3.62
	SDM	87.22	99.60	97.87	94.90	7.06
	SQ	92.18	94.80	93.17	93.38	1.43
Batch 3	SM_2	95.08	94.76	94.52	94.79	0.30
	SMM	99.63	95.11	95.96	96.90	2.48
	SMZ	96.40	98.16	87.26	93.94	6.23
	SDM	96.79	96.66	94.55	96.00	1.31
	SQ	96.32	91.38	92.49	91.93	0.85

(2) Sample spiked recovery(according to Appendix E of NY 5029-2001)
Add 5g (accurate to 0.01g) of tissue sample to a centrifuge tube containing 10g of anhydrous sodium sulfate. Add 25mL of acetonitrile. Homogenize at more than 10000 r/min for 1 min and centrifugate at 3000 r/min for 5 min. Dissolve the residue in 25mL of acetonitrile and centrifugate at 3000r/min for 5 min. Combine the supernatants of two centrifugations. Add 30mL of hexane and vortex mix for 10 min. Centrifugate at 3000r/min for 5 min and discard the supernatant layer. Add 10mL of n-propanol and evaporate to dryness under reduced pressure at the temperature below 50℃ . Dissolve the residue in 3mL of 95% acetonitrile and load onto basic alumina cartridge. Wash the cartridge with 5mL of 95% acetonitrile and then elute with 10mL of 70% acetonitrile. Collect the eluate for HPLC analysis.

(3) Results and discussion

1) Cartridge retention test

Cartridge retention test of Cleanert SUL-5 cartridge is operated at two concentration levels, corresponding to 100 and 200μg/kg sulfonamides in real samples. The results are summarized in table 1 and 2. The mean recovery ranges of SM2, SMM, SMZ, SDM, and SQ are 92.47~99.37%, 93.69~99.44%, 88.61~96.27%, 90.87~96.06%, and 91.83~95.92%, respectively. The intra-batch RSD of Cleanert cartridge is 0.30~9.38%, showing good stability.

2) Sample recovery

Sample recovery test of Cleanert SUL-5 SPE cartridge is carried out at two concentrations. For each concentration, the tests are repeated six times. The results are listed in table 3. The mean recovery and intra-batch RSD for spiked pork samples (100 and 200μg/kg) are 80.62~94.49% and 3.98~7.79%, respectively, indicating that the Cleanert Series SPE cartridge has high recovery and good stability.

Table 1 Cartridge retention recovery of Cleanert SUL-5 cartridge (corresponding to 100 μg/kg sulfonamides in tissues)

Cartridge batch	Drugs	Recovery(%)			Mean recovery (%)	RSD(%)
Batch 1	SM_2	94.37	96.10	95.19	95.22	0.91
	SMM	96.97	95.38	96.10	96.15	0.83
	SMZ	89.95	90.96	98.50	93.14	5.01
	SDM	94.66	98.15	95.08	95.96	1.99
	SQ	93.48	91.85	90.55	91.96	1.59
Batch 2	SM_2	94.18	95.49	101.13	96.93	3.81
	SMM	97.55	88.94	96.90	94.46	5.07
	SMZ	91.73	87.87	94.46	91.35	3.62
	SDM	87.22	99.60	97.87	94.90	7.06
	SQ	92.18	94.80	93.17	93.38	1.43
Batch 3	SM_2	95.08	94.76	94.52	94.79	0.30
	SMM	99.63	95.11	95.96	96.90	2.48
	SMZ	96.40	98.16	87.26	93.94	6.23
	SDM	96.79	96.66	94.55	96.00	1.31
	SQ	96.32	91.38	92.49	91.93	0.85

Table 2 Cartridge retention test recovery of Cleanert SUL-5 cartridge (corresponding to 200 μg/kg sulfonamides in tissues)

Cartridge batch	Drugs	Recovery(%)			Mean recovery (%)	RSD(%)
Batch 3	SM_2	99.66	99.26	98.75	99.22	0.46
	SMM	97.46	100.25	96.37	98.03	2.04
	SMZ	96.35	94.42	97.06	95.94	1.42
	SDM	94.97	94.86	98.34	96.06	2.06
	SQ	98.22	91.96	97.59	95.92	3.59
Batch 4	SM_2	100.45	85.90	91.06	92.47	7.97
	SMM	94.67	88.58	97.83	93.69	5.02
	SMZ	95.96	81.25	88.63	88.61	8.30
	SDM	99.83	82.87	89.90	90.87	9.38
	SQ	96.21	87.89	91.40	91.83	4.54
Batch 5	SM_2	98.69	100.31	99.11	99.37	0.85
	SMM	101.51	100.78	96.04	99.44	2.99
	SMZ	91.35	98.78	98.68	96.27	4.43
	SDM	92.75	97.29	97.88	95.97	2.92
	SQ	84.27	98.61	98.20	93.69	8.71

Spiked concentration(μg/kg)	Drugs	Recovery (%)					Mean Recovery (%)	RSD(%)
100	SM2	93.39	97.95	98.87	90.33	98.27	94.49	4.83
	SMM	97.46	90.66	94.33	81.83	93.64	92.40	6.17
	SMZ	83.78	88.45	94.40	80.24	82.04	84.87	6.56
	SDM	91.26	96.75	91.79	87.57	85.88	90.28	4.30
	SQ	88.44	85.14	92.61	81.03	79.57	85.06	5.69
200	SM2	80.85	77.37	88.39	90.53	73.80	82.02	7.79
	SMM	91.79	88.87	96.23	92.96	87.01	90.70	3.98
	SMZ	79.60	77.27	87.34	86.98	75.44	81.52	6.09
	SDM	84.31	72.35	84.52	81.92	82.53	80.62	5.79
	SQ	91.93	81.86	91.83	87.89	86.17	87.76	4.33

Determination of Terramycin, Tetracycline and Aureomycin in the Aquatic Products and Imported Meat(Cleanert PS, P/N:PS2003)

1. SPE Cartridge:Cleanert PS(200mg/3mL)

2. Sample Treatment

Put 5g sample of homogenate in 100mL centrifuge tube.
Add the buffer solution of citric acid containing EDTA2Na 30mL and 20mL respectively and merge the supernatant after mixing and vibration.
Add 20mL Hexane and supernate in the separating funnel and vibrate them 5min completely, and then merge the substratum.
Preperation of the buffer solution of citric acid EDTA2Na: add 1.86g EDTA2Na into the mixture of 307mL of 0.1mol/L citric acid buffer solution and 193mL of 0.5mol/L disodium hydrogen phosphate buffer solution, dissolve.

3. Cleanup procedure

Activate the PS cartridge with 10mL of methanol, 10mL of water and 5mL of EDTA2Na;
Add supernatant and elute the cartridge with 10mL of water,dry the cartridge;
Elute the sample with 10mL of methanol and collect the eluate.

4. Concentration and Constant Volume

Concentration: decompresssion and concentration on the rotary evaporators at the temperature less than 40℃
Constant volume: analyze the solution added with 1.0mL of 1.36% monopotassium by HPLC

5. Condition of HPLC

Column: Venusil MP C18, 5μm, 4.6*250mm
Mobile phase: A:B=77:23
A:Iminazole buffer solution—dissolve 68.08g iminazole, 10.72g magnesium acetate and 0.37g EDTA2Na in the water of 800mL; modify pH to 7.2 with glacial acetic acid; bring the solution to the volume with the water of 1000mL.
B:Acetonitrile

6.Result:

Compound	Recovery-1	Recovery-2
Terramycin	128%	137%
Tetracycline	91.8%	97.4%
Aureomycin	88.5%	87.1%
Doxycycline	97.3%	95.3%

Determination of Tetracycline in Honey (Cleanert PEP,Cleanert COOH,P/N:PE5006,CH5003)

1. Sample preparation:

Add 6g of honey sample to 30mL of extract solution (pH=4.0) and vortex mix.

Extractive solution preparation:

Dissolve citric acid (10.5g), nonaqueous disodium hydrogen phosphate (8.88g), EDTA2Na (30.3g) in 820mL of water. Adjust pH to 4.0 with 2 M hydrochloric acid.

2. SPE procedures

(1) PEP(500mg/6mL)
Activation: methanol, water
Sample loading: load sample extract onto cartridge
Washing: 5% methanol in water (5mL), dry the cartridge

(2) COOH(500mg/3mL)
Activation: ethyl acetate (double cartridge volume)

(3) PEP (top)–COOH (down) in series
Washing: ethyl acetate (15mL), remove PEP cartridge, dry COOH cartridge (5min)
Elution: mobile phase (0.01 M oxalic acid: acetonitrile: methanol= 350:100:50) 4.5mL
Dilute the eluate with 0.01 M oxalic acid in volumetric flask to 5mL. Shake the volumetric flask to obtain homogeneous solution. Filter and assay by UPLC.

Determination of Chloramphenicol Residue in the Aquatic Products by Gas Chromatography(Cleanert C18,P/N:180006)

1. Sample preparation

Remove squamae and skins of fish and take back muscles. Remove the head, shell, and limbs of shrimp and take the muscles. Take the muscles of crab, turtle, etc. Cut the muscle samples into small pieces (no bigger than 0.5cm×0.5cm×0.5cm) and mix. Freeze in fridge for later use.

2. Extraction

Defreeze the sample and transfer 5g (accurate to 0.001g) of sample to a 50mL glass centrifuge tube. Add 20mL of ethyl acetate and homogenize by homogenizer for 1 min to extract chloramphenicol. Centrifugate at 4000r/min for 3 min and transfer the ethyl acetate layer to a 100mL pear-shaped bottle. Add 10 mL of ethyl acetate to the centrifuge tube and homogenize by the same homogenizer for 1 min. Centrifugate at 4000 r/min for 3 min and combine the ethyl acetate layer to the pear-shaped bottle. Evaporate to dryness by rotary evaporator in water bath at 40℃ .

3. Degreasing

Add 1mL of methanol to the pear-shaped bottle , vortex and dissolve the residue. Add 15mL of n-hexane and 25mL of 4% sodium chloride solution. Cap the bottle and vibrate for 1min to mix thoroughly to extract lipids. Transfer the solution to a 50mL centrifuge tube and centrifugate at 4000r/min for 2min. Discard the supernatant n-hexane layer. Add 10mL of n-hexane again to the aqueous layer to repeat the extraction process and discard the n-hexane layer.
Add 15mL of ethyl acetate to the aqueous layer , vortex and mix for 2min. Centrifugate at 3000 r/min for 3 min. Dehydrate the ethyl acetate layer by nonaqueous sodium sulfate cartridge to a 50mL pear-shaped bottle. Add 15mL of ethyl acetate to the aqueous layer again and repeat the above operation. Wash the nonaqueous sodium sulfate cartridge with a small amount of ethyl acetate and combine the eluate to the 50mL pear-shaped bottle. Evaporate to dryness by rotary evaporator in water bath at 40. For most samples, the goal of cleanup can be achieved after above operations. Samples, that are not thoroughly purified, can be further purified by C18 SPE cartridge.
Dissolve the residue in 2mL of ethyl acetate and transfer to a 5mL centrifuge tube with cap. Wash the pear-shaped bottle with 1mL of ethyl acetate and combine the ethyl acetate. Evaporate under nitrogen stream in sand bath at 50~55℃ almost to dryness. Wash the centrifuge tube wall with 1mL of ethyl acetate and evaporate to dryness. Dissolve the residue in 5mL of water containing 5% (v/v) acetonitrile for further cleanup.

4. Cleanup by Cleanert C18 cartridge(1g/6mL)

(1) Cartridge activation: activate the cartridge sequentially with 5mL of methanol, 5mL of chloroform, 5mL of methanol, and 5mL of water. (avoid the cartridge to be dry).
(2) Sample loading: load the pretreated sample solution onto the cartridge (control the flow rate below 1mL/min).
(3) Washing: wash the cartridge with 6mL of water and dry the cartridge.
(4) Elution: elute with 5mL of acetonitrile and collect the eluate.
(5) Concentration: evaporate the eluate under nitrogen stream in sand bath at 50~55℃ almost to dryness. Wash the centrifuge tube wall with 1mL of ethyl acetate and evaporate to dryness under nitrogen stream.

5. Derivatization

Add 100μL of derivatization reagent (N,O-bis(trimethylsilyl)trifluoroacetamide(BSTFA)/trimethylchloro-silane (TMCS), 99/1, v/v) to the dried residue. Cap the tube and vortex and mix for 10s. Allow to react in oven at 70 for 30 min. Remove the excess reagent under nitrogen stream in sand bath at 50~55℃ until the tube is just dried. (Note: Too long time of evaporation may result in loss of analytes.) Add 0.5mL of n-hexane, vortex and mix for 10s for the analysis of GC DA-5, 30m×0.53mm×1.5μm, P/N:0153-3015.

Determination of Nitrofuran Residues with LC-MS (Cleanert PEP,P/N:PE0603)

1. Material: SPE Cartridge PEP(60mg/3mL)

2. Sample preparation

(1) Treatment on milk powder and milk
1) Sample treatment: add 15mL of solution mixed by trichloroacetic acid and water 2 and 1 5mol in milk powder of 1g (milk of 5g); append the interior label and mixed label; water bath and hydrolyzation at 37.5 for 5h; centifuge at 4000 rpm for 5min and then get the supernatant for usage.
2) Initial cleanup and derivation of the sample activate the PEP cartridge with 5mL of methanol and 5mL of water; pass the treated supernatant in SPE cartridge and wash the cartridge with 5mL of trichloroacetic acid; collect the solution into another test tube; derive the derivating agent of 100μl (dissolve 20mg 2-nitrobenzaldehyde in dimethylsulfoxide of 1mL) at 37.5 for 16h in the water bath (overnight).

(2) Treatment on the samples of pork, beef, chicken,pork liver, aquatic product and honey

1) Bulk processing of samples: add 15mL mixed solution of methanol and water in 2g of pork, beef, chicken,pork liver and aquatic product respectively (honey of 5g) and vortex; centrifuge at 4000 rpm for 5min and add the interior label and mixed label into the supernate.

2) Deriving add derivating agent (dissolve 20mg 2-nitrobenzaldehyde in dimethylsulfoxide of 1mL)of 100μL into the supernate; derivate the solution in the water bath of 37.5 for 16h (overnight); add dipotassium phosphate of 5mL (pH=7.4) and centrifuge at 4000rpm for 10min. (If the sample contain much fat, the supernate should be added n-haxane of 5mL; absorb and remove n-haxane by vibration for 2min and centrifuging at 4000rpm for 10min).

3. Cleanup of PEP cartridge

(1) Activation: activate the cartridge with the methanol of 5mL and water of 5mL.
(2) Sample loading: add the buffer solution of dipotassium phosphate 5mL in the derivative solution from 2.2B or 2.2B; adjust the pH to 7.4 with 1mol/l of sodium hydroxide solution; centrifuge at 4000r/min for 10min; keep the supernate(If the sample contain much fat, the supernatant should be added n-haxane of 5mL; absorb and remove n-haxane by vibration for 2min and centrifuging at 4000rpm for 10min) going through the PEP cartridge with the flow rate less than 2mL/min.
(3) Washing: elute SPE cartridge with 10mL of water and remove all outflow; dry SPE cartridge of PEP for 15min under the negative pressure of 65kPa with the vaccum pump.
(4) Elution: elute the tested sample with ethylacetate of 5mL into 25mL-brown centrifuge tube.
(5) Concentration: dry the eluate with nitrogen at 40; dissolve the solution and fix the volume to 1.0mL with the sample of constant volume solution; filter through the filter membrane of 0.2μm by LC-MS after mixing.

Determination of 19 Quinolone Residues in Honey by LC-MS/MS (Cleanert PAX,P/N:AX0603)

1. Materials

(1) Quinolone standards: Enrofloxacin (ENR), Ciprofloxacin (CIP), Norfloxacin (NOR), Ofloxacin(OFL), Flumequine(FLU), Oxolinic acid(OXO), Difloxacin HCl (DIF), Sarafloxacin HCl(SAR), Sparfloxacin (SPA), Danofloxacin (DAN), Fleroxcain (FLE), Marbofloxacin (MAR), Enoxacin (ENO), Orbifloxacin (ORB), Pipemidic acid (PIP), Pefloxacin (PEF), Lomefloxacin (LOM), Cinoxacin (CIN), Nalidixic acid (NAL). The purities of all above standards are all ≥ 99%.
(2) SPE cartridge: Cleanert PAX(60mg/3mL).
(3) Internal standard stock solution of deuterated Norfloxacin (NOR-D5): dissolve proper amount of NOR-D5 standard in methanol to obtain internal standard stock solution of 100 μg/mL. Dilute proper amount of the internal standard stock solution with methanol to obtain working solution at the concentration of 1μg/mL and store at 4℃ .

2. Extraction

Weigh 5g (accurate to 0.01g) of sample and add to a 50mL centrifuge tube with stopper. Add 50μL of 1μg/mL internal standard solution and 5mL of 0.1mol/L sodium hydroxide solution. Vortex mix to dissolve the honey thoroughly. Activate Cleanert PAX SPE mini-cartridge with 5mL of methanol followed by 3mL of water. Load the sample solution onto the mini-colunn. Wash the cartridge sequentially with water and methanol. Elute with 3mL of methanol containing 5% formic acid. Collect the eluate and evaporate to dryness by rotary evaporator in water bath at 40. Dilute to 1.0mL with 20% methanol in water. Filter through 0.45μm membrane to sample vial for LC-MS analysis.

3. Determination

(1) LC conditions:

a) Column: Venusil MP C18, 3μm, 150mm×2.0mm i.d or equivalent;

b) Mobile phase: methanol + water containing 0.1% formic acid;

c) Flow rate: 0.20 mL/min;
d) Gradient elution procedure: (omitted);
e) Temperature: room temperature;
f) Injection volume: 25μL;

(2) MS methods: (omitted)

Please download the details at the website of Bonna-Agela: http://www.agela.com.cn/

Determination of Nitroimidazole Drugs and Metabolites Residues in Royal Jelly with LC-MS/MS (Cleanert PAX,P/N:AX0603)

1. Materials

(1) Standards: Metronidazole (MNZ), Dimetridazole (DMZ) and related metabolite-2 - hydroxymethyl--1 - methyl-5–nitroimidazole (HMMNI), Ipronidazole (IPZ) and related metabolite-2-(2-hydroxy isopropyl)-1-methyl-5 –nitroimidazole (IPZOH), Ronidazole (RNZ). The purities of all above standards are all ≥ 99%.

(2) SPE cartridge: Cleanert PAX(60mg/3mL)

(3) Preparation of Internal standard solution of deuterated Norfloxacin (NOR-D5): dissolve proper amount of NOR-D5 standard in MeOH to obtain internal standard solution at 100μg/mL. Dilute proper amount of the internal standard solution with MeOH to a concentration of 1μg/mL and store at 4℃ .

2. Extraction

Add 5g (accurate to 0.01g) of sample to a 50mL centrifuge tube with cap. Add 50μL of mixture of three internal standards (1.3) and 10mL of 0.5mol/L sodium hydroxide solution. Mix for 15s to dissolve the sample. Add 10mL of ethyl acetate and mix for 30s. Centrifugate at 2500r/min for 3min. Transfer the supernatant ethyl acetate layer to a 50mL glass test tube. Add 10mL of ethyl acetate again and repeat the extraction procedures. Combine the ethyl acetates and evaporate to dryness by rotary evaporator in water bath at 40. Dissolve the residue with 5mL of acetonitrile containing 10% formic acid. Activate the SPE cartridge with 3mL of methanol and 3mL of water. Load the sample onto the catridge. Wash the cartridge with 3mL of water and draw almost to dryness. Elute with 3mL of methanol containing 5% ammonia. Collect the eluate and evaporate to dryness by rotary evaporator in water bath at 45. Dilute with 1.0 mL of water containing 20% methanol. Filter through membrane to sample vial for LC-MS/MS analysis.

3. Determination

(1) Reference conditions for LC analysis;
a) Column: C18 (end capped), 3μm, 150mm×2.0mm i.d or equivalent;
b) Mobile phase: methanol (A)+5mmol/L ammonium acetate(B);
c) Flow rate: 0.20mL/min;
d) Gradient elution procedure: (omitted);
e) Temperature: room temperature;
f) Injection volume: 25μL;
Please download the details from the website of Agela: http://www.agela.com.cn/

Determination of Glucocorticoids Drugs Residues in Animal-derived Foods with LC-MS (Cleanert Silica, P/N:SI5006)

1. SPE cartridge: Cleanert Silica.00mg/6mL

2. Extraction

(1) Muscle tissue sample
Weigh 5g (±0.05g) of tissue sample in a 50mL centrifuge tube. Add 30mL of ethyl acetate and 10g of anhydrous sodium sulfate. Homogenize for 1min and vibrate on shaker at 200r/min for 20min. Centrifugate at 4200r/min for 10min and take the ethyl acetate layer. Add 25mL of ethyl acetate to the residue. Homogenize for 1min and vibrate on shaker at 200r/min for 20min. Centrifugate at 4200r/min for 10min and take the ethyl acetate layer. Combine the ethyl acetate layers and evaporate by rotary evaporator in water bath at 40℃ almost to dryness. Dissolve the residue in 1mL of ethyl acetate and 5mL of n-hexane for cleanup.
(2) Bovine milk, egg sample
Weigh 5g (±0.05g) of bovine milk or egg sample in a 50mL centrifuge tube. Add 30mL of ethyl acetate. Homogenize for 1min and vibrate on shaker at 200r/min for 20min. Centrifugate at 4200r/min for 10min and take the ethyl acetate layer. Add 25mL of ethyl acetate to the residue. Homogenize for 1min and vibrate on shaker at 200r/min for 20min. Centrifugate at 4200r/min for 10min and take the ethyl acetate layer. Combine the ethyl acetate layers and evaporate by rotary evaporator in water bath at 40℃ almost to dryness.
Dissolve the residue in 1mL of ethyl acetate and 5mL of n-hexane for cleanup.

3. Cleanup Procedure

Load the extract onto silica cartridge activated with 6mL of n-hexane. Wash the cartridge with 6mL of n-hexane and dry it. Elute with 6mL of n-hexane-acetone (6/4 v/v). Evaporate the eluate under a stream of nitrogen at 50℃ to dryness. Dissolve the residue in 0.5mL of water containing 20% acetonitrile and transfer to a 1.5mL centrifuge tube. Centrifugate at 4200r/min for 20min. Filter supernatant layer through 0.22μm membrane for HPLC-MS/MS analysis.

Determination of Zearanol Drugs Residues in Animal-derived Foods with LC-MS (Cleanert NH_2,PAX,P/N:NH5006, AX1506)

1. SPE Cartridge: Cleanert NH_2: 500mg/6mL, PAX: 150mg/6mL

2. Sample preparation

(1) Muscle tissue sample
1) Extraction: Weigh 5g (±0.05g) of tissue sample in a 50mL centrifuge tube. Add 15mL of methanol and vortex mix for 1min. Centrifugate at 4000r/min for 10min and transfer the supernatant layer to another centrifuge tube. Extract again and combine the extracts. Add 20mL of n-hexane and shake 20 times by hand. Centrifugate at 3000r/min for 5min and discard the n-hexane layer. Add 20mL of n-hexane again to repeat the degreasing process. Transfer the underlayer to a 100mL pear-shaped bottle and evaporate by rotary evaporator in water bath at 50℃ almost to dryness. Add 5mL of ethyl acetate and vortex mix for 1min. Stand for 10s and transfer the supernatant to the same centrifuge tube. Wash the pear shape tube once again with 10mL of n-hexane. Combine the solutions for later use.
2) Cleanup: load 2g of anhydrous sodium sulfate on the NH_2 cartridge and knock to uniformity with a glass stick. Activate the cartridge with 5mL of ethyl acetate followed by 5mL of n-hexane. Load the prepared sample onto the cartridge. Wash sequentially with 5mL of n-hexane and 5mL of n-hexane-ethyl acetate (60/40 v/v). Elute sequentially with 4mL of n-hexane-ethyl acetate (20/80 v/v) and 4mL of ethyl acetate. Combine the eluates and dry under a stream of nitrogen at 50℃ .
add 0.5mL of acetonitrile to the residue and vortex mix for 1min. Add 0.5mL of water and mix. Filter the solution through 0.2μm organic membrane for LC-MS/MS analysis.

(2) Liver tissue sample

1) Weigh 5g (±0.05g) of sample in a 50mL centrifuge tube. Add 15mL of methanol and vortex mix for 1min. Centrifugate at 4000r/min for 5min and transfer the supernatant layer to another centrifuge tube. Extract again and combine the two extracts. Add 10mL of n-hexane and shake 20 times by hand. Centrifugate at 3000r/min for 5min and discard the supernatant n-hexane layer. Dry the underlayer under a stream of nitrogen at 50℃. Add 5mL of n-hexane and vortex mix for 1min. Add 20mL of n-hexane and vortex mix for 30s. Centrifugate at 4000r/min for 5min and take the supernatant for later use.

2) Cleanup: load 2g of anhydrous sodium sulfate on the NH_2 cartridge and knock to uniformity with glass stick. Load the prepared sample onto the cartridge activated with 5mL of ethyl acetate followed by 5mL of n-hexane. Wash sequentially with 5mL of n-hexane and 5mL of n-hexane-ethyl acetate (45/55 v/v). Elute sequentially with 5mL of n-hexane-ethyl acetate (20/80 v/v) and 5mL of ethyl acetate containing 2% methanol. Combine the eluates and dry under a stream of nitrogen at 50℃.
add 0.5mL of acetonitrile to the residue and vortex mix for 1min. Add 0.5mL of water and mix. Add 2mL of n-hexane and vortex mix for 30s. Centrifugate at 9000r/min for 5min. Filter the underlayer through 0.2μm organic membrane for LC-MS/MS analysis.

(3) Bovine milk sample

1) Extraction: add 5.0mL of sample to a 50mL centrifuge tube. Add 0.1mL of 18% H_2SO_4 solution and vortex mix to uniformity. Stand for 10min. Add 10mL of n-hexane and 20mL of acetonitrile and vortex mix at 300r/min for 10min. Centrifugate at 4000r/min for 10min and discard the n-hexane layer. Transfer 12.5mL of the extract to a centrifuge tube. Evaporate under a stream of nitrogen at 50℃ to less than 0.1mL. Add 10mL of water and adjust with 5mol/L sodium hydroxide to pH=11. Centrifugate at 9000r/min for 5min for later use.

2) Cleanup: activate and equilibrate Cleanert PAX SPE cartridge sequentially with 2mL of methanol and 2mL of water. Load the sample onto the cartridge. Wash sequentially with 1mL of methanol-ammonia-water (5/5/90 v/v/v) and 0.5mL of methanol. Elute with 4mL of 2% ethyl acetate. Collect the eluate and dry under a stream of nitrogen at 50℃.
add 0.5mL of acetonitrile to the residue and vortex mix for 1min. Add 0.5mL of water and mix. Filter the solution through 0.2μm organic membrane for LC-MS/MS analysis.

(4) Egg sample

1) Extraction: add 5g (±0.05 g) of sample to a 50mL centrifuge tube. Add 10mL of acetonitrile and vortex mix for 1min. Centrifugate at 9000 r/min for 5min. Transfer the supernatant to another centrifuge tube. Extract again and combine the two extracts. Transfer 12.5mL of the extract to a centrifuge tube. Evaporate under a stream of nitrogen at 50℃ to less than 0.1mL. Add 10mL of water and adjust with 5mol/L sodium hydroxide to pH=11.0. Centrifugate at 9000r/min for 5min for later use.

2) Cleanup: activate and equilibrate Cleanert PAX SPE cartridge sequentially with 2mL of methanol and 2mL of water. Load the sample onto the cartridge. Wash sequentially with 1mL of methanol-ammonia-water (5/5/90 v/v/v) and 0.5mL of methanol. Elute with 4mL of 2% ethyl acetate. Collect the eluate and dry under a stream of nitrogen at 50℃.
add 0.5mL of acetonitrile to the residue and vortex mix for 1min. Add 0.5mL of water and mix. Filter the solution through 0.2μm organic membrane for LC-MS/MS analysis.

Determination of β-estradiol Residues in Muscles of Fish and Shell with Deuterium Isotope by GC-MS(Cleanert C18, P/N:185003)

1. SPE cartridge: Cleanert C18. 500mg/3mL

2. Sample preparation

(1) Extraction

Muscle tissues of fish or shellfish are minced by domestic blender and stored in refrigerator at -18 ℃ for later usage. Transfer 5.00g of sample, accurately weighed, into a 50mL centrifuge tube. Add 100μL of internal standard working solution and 5mL of sodium acetate buffer. Homogenize the mixture at 18000r/min twice, by homogenizer, each time for 30s. Add 10mL of acetonitrile and vortex mix for 1min. Ultrasonic extract at room temperature for 15min. Centrifugate the mixture at 10000r/min, 4 ℃ , for 10min. Transfer the supernatant to another centrifuge tube. Add 10mL of acetonitrile to the residue and repeat the extraction steps. Combine the supernatants.

(2) Cleanup

Add 10mL of n-hexane to the supernatant. Cap the tube and shake tempestuously for 1~2min. Centrifugate at 1000r/min at 4℃ for 5min. Discard the n-hexane layer and wash the underlayer with n-hexane again. Transfer the remaining solution to a pear-shaped bottle. Add 0.5mL of n-propanol and evaporate to dryness by rotary evaporator in water bath at 45 ℃ . Add 1mL of acetonitrile to the residue and ultrasonic wash the bottle for 1min. Transfer the solution to a 5mL syringe. Repeat the extraction with 1mL of acetonitrile and combine the solution to the syringe. Filter the solution through organic membrane. Dilute the filtered solution with water to 10mL. Load the sample solution onto the C18 SPE cartridge (activated sequentially with 6mL of methanol, 3mL of 0.1% acetic acid and 3mL of water) at the flow rate of 1~2mL/min. Wash the C18 cartridge with 3mL of water then elute the cartridge with 9mL of acetonitrile. Collect the eluate and dry under nitrogen stream.

(3) Derivatization

Accurately add 100μL of MSTFA2DTE2TM IS derivatization reagent to the residue. Cap the tube and vortex mix for 1min. Allow to react in oven at 60℃ for 30min and then cool to room temperature. Analyze the sample by GC-MS within 48h. For standard solution derivatization, β-estradiol and internal standard working solution should be added to deactivation sample reaction tube (Agilent, U.S.) Vortex mix and dry under nitrogen stream, and then be derivatizated.

3. GC/ MS conditions

DA-5MS capillary column (25m×0.32mm×0.52μm); column temperature: 120℃ (2min)---- 250℃ (15℃ /min), 300℃ (5min, 5℃ /min); Carrier gas: He (≥ 99. 999%); Flow rate: 1. 0mL /min; Injector port temperature: 250℃ . Splitless injection volume: 1μL; EI source temperature: 230℃ ; Quadrupole temperature: 150℃ ; Interface temperature: 280℃ ; Ionization voltage: 70 Ev. Solvent detention time: 3min; Electron motiplier voltage: 1106V; Mass scan range: 40~500 amu.

2. Pesticide Residues

Determination of 519 Pesticide Residues and Related Chemicals Residues in Tea by GC-MS and 448 Pesticide Residues and Related Chemicals Residues in Tea by LC-MS/MS(Clenert TPT,P/N:TPT200010)

1. SPE Catridge: Cleanert TPT cartridge 2g/10mL

2. Extraction

Weigh 5g (accurate to 0.01g) of sample in a 80mL centrifuge tube, and then add 15mL of acetonitrile. The solution is homogenized at 15000r/min for 1min, and then centrifugated at 4200r/min for 5min. Transfer the supernatant into a 100mL pear-shaped bottle. Extract the residue with 15mL of acetonitrile again and centrifugate. Combine the two supernatants and evaporate to 1mL by rotary evaporator in water bath at 40℃ for further cleanup.

3. Cleanup

Method for GC/MS: load ca. 2cm high of anhydrous sodium sulfate onto Cleanert TPT cartridge. Wash the cartridge with 10mL of acetonitrile/toluene (3:1, v/v), and place it on a fixed mount with a pear-shaped bottle under it. Load the concentrated sample onto the Cleanert TPT cartridge. Wash the sample bottle with 2mL of acetonitrile/toluene (3:1, v/v) 3 times and combine the solutions onto the cartridge. Add a 50mL liquid reservoir on the cartridge and wash the cartridge with 25mL of acetonitrile/toluene (3:1, v/v). Collect all the eluate in a pear-shaped bottle and evaporate to 0.5mL by rotary evaporator in water bath at 40 ℃ . Exchange the solvent with 5mL of n-hexane twice and obtain ca. 1mL of solution. Add 40μL of internal standard solution and mix for GC-MS analysis.

Method for LC-MS/MS: Except that the sample amount is 2g, the sample extraction and cleanup method is the same as above. Evaporate the collected eluate to ca. 0.5mL by rotary evaporator in water bath at 40 ℃ . Dry under a stream of nitrogen at 35 ℃ . Redissolve the residue in 1mL of acetonitrile/water (3:2, v/v). Filter the solution through 0.2μm membrane for LC-MS/MS analysis.
For details please refer to GB/T 23204-2008 and GB/T 23205-2008.

Determination of 488 Pesticide Residues and Related Chemicals Residues and 413 Pesticide Residues and Related Chemicals Residues in the Ramulus Mori, Honeysuckle and the Fruit of Chinese Wolfberry with GS-MS and LC-MS/MS Respectively(Cleanert TPH,P/N:TPH200010)

1. SPE Catridge: Cleanert TPH, 2g/10mL

2. GC-MS

(1) Extraction
Weigh 5g (accurate to 0.01g) of honeysuckle, medlar samples, 2.5g (accurate to 0.01g) of lotus leaf, ramuli mori samples in 50mL centrifuge tubes, respectively. Add 15mL of acetonitrile. (For medlar sample, add another 5mL of water). Homogenize at 15000r/min for 1min. Add 2g of sodium chloride and homogenize again for 1min. Centrifugate at 4200r/min for 5min and transfer the supernatant into a 150mL pear-shaped bottle. Add 15mL of acetonitrile to the centrifuge tube again and homogenize for 1min. Centrifugate at 4200r/min for 5min and combine the supernatant to the pear-shaped bottle. Evaporate to 1~2mL by rotary evaporator in water bath at 40℃ for further cleanup.

(2) Cleanup
Load ca. 2cm high of anhydrous sodium sulfate onto Cleanert TPH cartridge. Place it on a fixed mount. Wash the cartridge with 10mL of hexane/acetone (4:6,v/v). When the washing solution reaches the upper surface of the sodium sulfate, load the concentrated sample (2.1) onto the cartridge. Collect the eluate in a pear-shaped bottle. Wash the pear-shaped bottle (2.1) with 2mL of hexane/acetone(4:6, v/v) 3 times. Combine the washing solutions onto the cartridge. Add a 25mL liquid reservoir onto the cartridge. Wash the cartridge with 25mL of hexane/acetone to elute the pesticides and related compounds. Collect the eluate and evaporate by rotary evaporator in water bath at 40℃ almost to dryness. Redissolve the residue in 1mL of hexane. Add 40μL of internal standard solution and mix. Filter the solution through 0.2μm membrane for GC-MS analysis.

3. LC-MS/MS

(1) Extraction
Weigh 2g (accurate to 0.01g) of honeysuckle, medlar, (lotus leaf) and ramuli mori samples in 50mL centrifuge tubes, respectively. Add 15mL of acetonitrile. (For medlar sample, add another 5mL of water). Homogenize at 15000r/min for 1min. Add 2g of sodium chloride and homogenize again for 1min. Centrifugate at 4200r/min for 5min and transfer the supernatant into a 150mL pear-shaped bottle. Add 15mL of acetonitrile to the centrifuge tube again and homogenize for 1min. Centrifugate at 4200r/min for 5min and combine the supernatant to the pear-shaped bottle. Evaporate to 1~2mL by rotary evaporator in water bath at 40℃ for further cleanup.
(2) Cleanup
Load ca. 2cm high of anhydrous sodium sulfate onto Cleanert TPH cartridge. Place it on a fixed mount. Wash the cartridge with 10mL of acetonitrile/toluene (3:1,v/v). When the washing solution reaches the upper surface of the sodium sulfate, load the concentrated sample (3.1) onto the cartridge. Collect the eluate in a pear-shaped bottle. Wash the pear-shaped bottle (3.1) with 2mL of acetonitrile/toluene (3:1,v/v) 3 times. Combine the washing solutions onto the cartridge. Add a 25mL liquid reservoir on the cartridge. Wash the cartridge with 25 mL of acetonitrile/toluene (3:1,v/v) to elute the pesticides and related compounds. Collect the eluate and evaporate to 1~2mL by rotary evaporator in water bath at 40℃ . Dry under a stream of nitrogen. Redissolve the residue in 1mL of acetonitrile/toluene (3:1, v/v). Filter the solution through 0.2μm membrane for LC-MS/MS analysis.

Determination of Cyromazine Residues in Vegetables with HPLC(Cleanert SCX,P/N:SC5006)

1.SPE cartridge: Cleanert SCX (500mg/6mL)

2.Sample preparation

Take the edible part of the vegetables and wipe off the adhesion on the surface with a clean gauze. Cut into small pieces and mix thoroughly. Sampling by quartation method. Or homogenize the vegetables and store in PE bottle under -16° C~ -20° C. Before weighing samples, mix thoroughly first for samples stored in room temperature; for frozen samples, defreeze first and mix thoroughly.

3. Sample extraction

Weigh 20g (accurate to 0.01g) of homogenized sample to a 150mL beaker. Add 50mL of 0.05mol/L ammonium acetate/acetonitrile (1/4, v/v). Homogenize at 14000r/min for 2 min. Filter the solution through Buchner funnel into a 100mL colorimetric tube with cap. Wash the beaker and blade of homogenizer with 35mL of 0.05mol/L ammonium acetate/acetonitrile (1/4, v/v). Homogenize at 14000r/min for 30s and combine the solution to the colorimetric tube. Dilute to volume with 0.05mol/L ammonium acetate/acetonitrile (1/4, v/v). Cap the tube and mix the solution thoroughly. Transfer 10mL of the mixed solution with pipette to a 150mL round-bottom flask and evaporate by rotary evaporator in water bath at 40° C to remove organic solvent thoroughly. Adjust pH to 2 with 0.1mol/L hydrogen chloride solution for further cleanup.

4. Cleanup

Activate SCX cartridge with 5mL of methanol and water sequentially. When the solvent reaches the surface of the adsorption layer, load the sample(3) onto the cartridge. Discard the eluate. Wash the round-bottom flask with 3mL of chlorhydric acid solution twice and combine the solutions onto the cartridge. Wash the cartridge with 5mL of methanol followed by 5mL of water. Discard the eluates and dry the cartridge. Elute the SCX cartridge three times with 5mL of 5% ammonia/methanol (v/v). Collect the eluates in a 150mL round-bottom flask. Evaporate by rotary evaporator in water bath at 40° C almost to dryness and dry under nitrogen stream. Dissolve the residue in 1mL of acetonitrile/water (93:7, v/v). Filter through 0.45μm membrane for further analysis.

5. HPLC conditions

Column: Venusil NH_2 column, 4.6*250mm, 5μm
Mobile phase: acetonitrile/water=97:3(v/v)
UV: 215nm
Flow rate: 1.0mL/min
Injection volume: 10μL
Column temperature: 35° C
For details please refer to the detection of cyromazine residues in the vegetables in NY/T 1725-2009
Please download the details at the website of Agela www.agela.com.cn

Determination of Organophosphorus, Organic Chloride and Carbamates Residues in the Vegetables(Cleanert Florisil,P/N: FS0006)

1. SPE cartridge: Cleanert Florisil (1g/6mL)

2. Sample preparation

Select tomato and spinach samples according to GB/T 8855. Take the edible part of the vegetables. Cut into small pieces and mix thoroughly. Smash by food machining machine. Store the samples in subpackages at -16° C~ -20° C.

3. Extraction

Weigh 25g of sample accurately and place in homogenizer. Add 50mL of acetonitrile and homogenize for 2min. Filter the solution through filter paper into a 100mL graduated cylinder with cap containing 5~7g sodium chloride in it. Collect 40~50mL of filtrate. Cap the graduated cylinder and shake for 1min. Stand at room temperature for 30 min to allow acetonitrile and water phases separated.

4. Cleanup

Transfer 10mL of acetonitrile solution into a 150mL beaker. Heat the beaker in water bath at 80° C and evaporate the solution under nitrogen or air stream almost to dryness. Add 2mL of n-hexane and cover the beaker with aluminium foil for further cleanup. Wash and condition Florisil cartridge sequentially with 5mL of acetone/hexane (10:90, v/v) and 5mL of hexane. When the solvent reaches the adsorption layer of the cartridge, load the sample in beaker onto the cartridge. Collect the eluate in a 15mL centrifuge tube. Wash the beaker with 5mL of acetone/hexane(10:90, v/v) twice. Combine the solutions onto the cartridge and collect the eluates into the centrifuge tube. Evaporate under nitrogen stream in water bath at 50° C to less than 5mL. Dilute to 5mL with hexane again. Vortex mix and transfer the solution to two 2mL sample vials for GC analysis. (column: DA-50+, 30m×0.53mm×1.0μm P/N:5053-3010 DA-1, 30m×0.53mm×1.5μm P/N:0153-3015).

5. Results

Recoveries of tomato and cole samples, with low and high levels of pigments respectively, are studied (spiked concentrations: 0.1mg/kg and 0.2mg/kg). For each concentration level, tests are repeated three times. The results are summarized in Table 1.

Table 1 Recoveries of tomato and cole samples

Pesticides	Spiked concentration 0.1mg/kg		Spiked concentration 0.2mg/kg		Average
	Tomato	Cole	Tomato	Cole	
Chlorothalonil	72.6	68.8	70.0	70.9	70.6
Ketotriazole	88.6	84.7	87.8	82.7	88.4
Cyfluthrin	91.0	97.6	97.1	98.0	93.4
Cypermethrin	81.8	77.7	82.0	83.0	81.1
Fenvalerate	77.0	72.0	78.0	79.8	76.7
Fenpropathrin	77.7	77.1	81.2	79.0	78.5

Determination of 466 Pesticide Residues in the Vegetables and Fruits(Cleanert PestiCarb/NH2,Cleanert C18,P/N: PN0006,18200010)

1. SPE Cartridge: Cleanert C18 2g/10mL; Cleanert PestiCarb/NH_2 , 500mg/500mg/6mL

2. Extraction

Weigh 20g (accurate to 0.01g) of sample in a 80mL centrifuge tube. Add 40mL of acetonitrile and homogenize at 15000r/min for 1min. Add 5g of sodium chloride and homogenize for 1min again. Centrifugate at 3000r/min for 5min and take 20mL (corresponding to 10g of sample) of the supernatant for further cleanup.

3. Cleanup

(1) Activate Cleanert C18 cartridge with 10mL of acetonitrile. Load the sample (2) onto the cartridge and elute with 15mL of acetonitrile. Collect the solutions in a pear-shaped bottle and evaporate to 1 mL by rotary evaporator in water bath at 40° C for later cleanup.

(2) Load ca. 2cm high of anhydrous sodium sulfate onto Cleanert PestiCarb/NH_2 cartridge with a pear-shaped bottle under it. Wash the cartridge with 4mL of acetonitrile/toluene (3:1, v/v). When the washing solution reaches the upper surface of the sodium sulfate, load the concentrated sample (3.1) onto the cartridge. Wash the pear-shaped bottle (3.1) with 2mL of acetonitrile/toluene (3:1, v/v) 3 times. Combine the washing solutions onto the cartridge. Wash the cartridge with 25mL (divided into several times) of acetonitrile/toluene (3:1, v/v). Collect the eluate in pear-shaped bottle and evaporate to 0.5mL by rotary evaporator in water bath at 40° C. Add 5mL of n-hexane to exchange the solvent and evaporate by rotary evaporator in water bath at 40° C. Repeat the solvent exchange process and obtain 1mL of sample. Add 40μL of internal standard solution and mix for GC-MS analysis. (Column: DA1701, 30m×0.25mm×0.25μm P/N:6125-3002)

For details please refer to: GB/T 19648-2005 multiresidues of 446 pesticides in vegetables.
Please download at: www.agela.com.cn

3. Detection of food additives

Determination of Melamine in the Eggs(Cleanert PCX, P/N: CX0603)

1. Materials and method

(1) Instruments and reagents
Chromatographic column Venusil ASB C8 4.6×250mm,5μm SPE(mixed cation exchange) Cleanert PCX 60mg/3mL , SPE manifolds of 12 port configuration HPLC, high speed centrifuge, ultrasonic oscillators, vortex mixer, analytical balance(one out of ten thousand) ,solvent filtrator with organic and auqueous filtering membrane of 0.45μm and vaccum pump, acetonitrile (HPLC level ,standard substance of melamine ≥ 99.0% ,citric acid(analytical reagent), heptane sulfonic acid sodium salt (HPLC grade), water over second distilled water .
(2) HPLC condition
Column: Venusil ASB C8 4.6×250mm,5μm
Mobile phase acetonitrile: 10mM/L citric acid +10mM/L heptane sulfonic acid sodium salt buffer solution=7:93(pH=3.0)
Detection: 240nm flow rate 1mL/min Injection 20μL.

2. Experiment

(1) Standard solution preparation of the melamine
Weigh the master standard of melamine of 10mg , add mobile phase to dissolve the sample to the volume of 100mL, and get the melamine solution with the density of 100mL. Dilute the melamine solution to the standard solutions of 1mg/L,5mg/L,10mg/L,15mg/L,20mg/L respectively with water and filter the diluted solutions with the filtering membrane of 0.45μm for detection.
(2) Preparation of trichloroacetic acid solution of 1%
Weigh trichloroacetic acid of 1g dissolve it to the volume of 1000mL with water
(3) Preparation of amonium methanol of 5%
Measure ammonia water of 5mL and methanol of 95mL, mix them for usage
(4) Preparation of lead acetate solution of 5%
Weigh lead acetate of 5g and dissolve to the volume of 100mL with water
(5) Activation of mixed cation exchange SPE Cleanert PCX 60mg/3mL
Activate Cleanert PCX cartridge with methanol of 3mL and water of 3mL and discard the outflow for reserve
(6) Treatment on the spiked sample
Whip up the eggs and weigh 1g as the sample in 10mL-centrifuge tube with cap; add 10μl,20μl,100μl of 100mg/L melamine standard solution respectively in the tube and get the sample with density of 1mg/kg,2mg/kg,10mg/kg respectively. Spike 10mL of 1% trichloroacetic acid and 2mL of 5% lead acetate in the mentioned centifuge tube and shake it; ultrasound for 20 min and centrifugate at 8000rpm for 10 min; transfer all supernate into the activated mixed cation exchange SPE Cleanert PCX 60mg/3mL and wash it with water of 3mL and methanol of 3mL, dry and discard the leacheate; elute the solution with 5mL of 5% amonium methanol V/V and dry the elution with a stream of nitrogen at 50° C; constant volume with mobile phase of 1mL and filtration with the filtering membrane of 0.45μm for detection by HPLC.
Get another egg of 1g as blank sample without the addition of melamine and process as the mentioned steps to get the blank control sample.

3. Experimental result

(1) Peak shape and seperation
Inject the blank sample of egg and the sample of egg spiked with 10ppm, the result as figure1.
Figure1 shows that the peak shape is symmetrical and pointed and the seperation from the impurity is well with the method.
(2) Accuracy
Remove and get the standard solution of melamine of 1mg/L and 5mg/L respectively, load the sample for 6 times sequentially respectively, the result as the table 1.
Table1 shows that the accuracy and reproducibility result from the method.

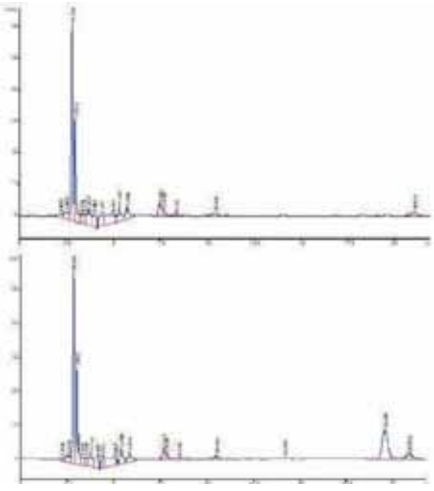


Figure 1 blank sample of egg and sample of egg spiked with 10ppm

Table1 stable data of retention time and peak area ratio

Density (mg/mL)	Indicator	1#	2#	3#	4#	5#	6#	Mean value	RSD%
1.0	Retention time (min)	18.830	18.829	18.829	18.838	18.840	18.834	18.833	0.026
	Peak area ratio	89	81	84	88	84	80	84	4.286
5.0	Retention time (min)	18.949	18.952	18.947	18.949	18.950	18.946	18.949	0.011
	Peak area ratio	423	440	438	439	437	438	436	1.461

(3) Standard adjusted curve
Linear equation is y=87.43x-13.67 and R^2=0.999 according to table 2; involving curve seen in figure 2.
The result shows that linear relation is well in the range from 1mg/kg to 20mg/kg with the method.

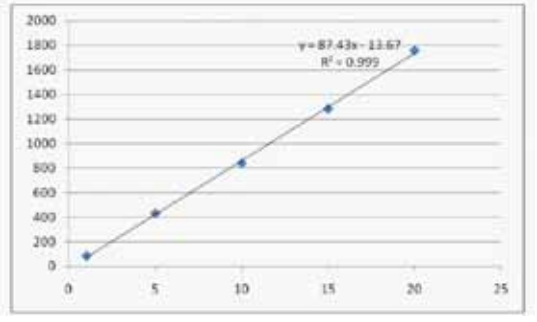


Figure 2 Regression curve of density and peak area ratio

Table 2 Experimental data of standard adjusted curve

Density(mg/kg)	First sample injection	Second sample injection	Average value of peak area ratio
1.0	89	79	84
5.0	423	440	431
10.0	832	844	838
15.0	1265	1299	1282
20.0	1689	1823	1756

(4) Addition recovery ratio

Table 3 shows that the recovery ratio of melamine in the eggs is relatively good with the method

Concertration (mg/kg)	Peak area	Content	Recovery (%)
1.0	19.9	1.158892	115.89
1.0	21.0	1.214532	121.45
2.0	41.7	2.261587	113.08
2.0	40.8	2.216062	110.80
10.0	188.8	9.702247	97.02
10.0	219.6	11.26018	112.60

4. Conclusion

Melamine detection in the eggs with the method has the following advantages:
Excellent matrix purity performance;
Less impurity interference;
Good peak symmetry;
Easy operation and high accuracy.

Determination of Sudan Red in Foods with HPLC(Cleanert Alumina-N,P/N:AL5006-N)

1. SPE Cartridge: Cleanert Alumina-N (500mg/6mL)

2. Sample extraction and cleanup

(1) Red chili and other powder samples
Ultrasonic extract 1g~5g (accurate to 0.001g) of sample in 10mL~30mL of n-hexane in a triangular flask for 5 minutes and filtrate. Wash the residue with 10mL (divided into several times) of n-hexane until the supernatant is colorless. Combine the supernatants and concentrate by rotary evaporator to less than 5mL and then load onto Cleanert Alumina-N cartridge slowly. To guarantee the effect of cleanup, load the sample when liquid level is at 2mm and avoid the cartridge to be dry. Wash the triangular flask with n-hexane several times and combine all the solutions onto the cartridge. Keep the pigment zone shorter than 0.5cm. After all the sample flows out, wash the cartridge with 10 mL~30mL (depend on the amount of lipid impurities) of n-hexane until the eluate is colorless. Discard the n-hexane solution. Elute the cartridge with 60mL of n-hexane (contain 5% acetone). Collect and concentrate the eluate; transfer and dilute with acetone to 5mL. Filter the solution through 0.45μm organic membrane for later use.
(2) Red chili oil, hot pot ingredients, cream and other oil samples
Dissolve 0.5g~2g (accurate to 0.001g) of sample in n-hexane (approximately 1mL~10mL) in a small beaker. Heat it if the sample is hard to dissolve. Follow the operations in 2.1 “load onto Cleanert Alumina-N cartridge slowly--- Filter the solution through 0.45μm organic membrane for later use.”
(3) Chili sauce, tomato sauce and other sample with high content of water
Weigh 10g~20g (accurate to 0.01g) of sample in a centrifuge tube and add 10mL~20mL of water to form a paste (more water if the sample contains thickening agent). Add 30mL of n-hexane/acetone(3:1); homogenize for 5 minutes and centrifuge at 3000rpm for 10 minutes. Transfer the n-hexane layer and then add 20mL of n-hexane to the underlayer to repeat the extraction twice. Combine the n-hexanes of 3 times and dehydrate by 5g of anhydrous sodium sulfate and filtrate. Evaporate to dryness by rotary evaporator and stand for 5 minutes. Dissolve the residue in 5mL of hexane and then follow the operations in 2.1 “load onto Cleanert Alumina-N cartridge slowly--- Filter the solution through 0.45μm organic membrane for later use.”

(4) Sausage and other meat products
Weigh 10~20g (accurate to 0.01g) of smashed sample in a triangular flask. Add 60mL of n-hexane and homogenize for 5 minutes. Filter and obtain clear filtrate. Add 20mL of n-hexane to repeat the extraction twice. Combine the n-hexane solutions of 3 times and dehydrate by 5g of anhydrous sodium sulfate. Filter the solution and evaporate to less than 5mL by rotary evaporator. Follow the operation in 2.1 “load onto Cleanert Alumina-N cartridge slowly--- Filter the solution through 0.45μm organic membrane for later use.”

For details please refer to GB/T 19681-2005 Sudan Red in food by HPLC.
Please download at www.agela.com.cn

Determination of Malachite Green and Crystal Violet Residues in Aquatic Products with HPLC-MS(Cleanert Alumina-N,Cleanert PCX,P/N:AL0006-N,CX0603)

1. SPE cartridge

Alumina Neutral cartridge: Cleanert Alumina-N, 1g/6mL, activate with 5mL of acetonitrile Cation exchange cartridge: Cleanert PCX 60mg/3mL activate sequentially with 3mL of acetonitrile and 3mL of formic acid solution

2. Sample preparation

(1) Fresh aquatic product
1) Extraction
Weigh 5.00g of smashed sample in a 50mL centrifuge tube. Add 200μL of mixed internal standard solution and 11mL of acetonitrile. Sonicate for 2min; homogenate at 8000r/min for 30s; centrifugate at 4000r/min for 5min. Transfer the supernatant into a 25mL colorimetric tube. Wash the blade of homogenizer with 11mL of acetonitrile in another 50mL centrifuge tube for 10s and transfer the solution to the former centrifuge tube. Mash the sediments in the centrifuge tube with a glass rod and vortex mix for 30s. Sonicate for 5min and centrifugate at 4000r/min for 5min. Combine the supernatant into the 25mL colorimetric tube, dilute with acetonitrile to 25mL. Shake up for later use.
2) Cleanup
Load 5mL of sample onto the activated Alumina Neutral cartridge, and wash the cartridge with 4mL of acetonitrile. Collect the eluate in a KD–concentrator. Evaporate the solution to approximately 1mL by rotary evaporator in water bath at 45° C, dilute with acetonitrile to 1mL. Ultrasonicate the solution for 5min and then add 1mL of 5mmol/L ammonium acetate, ultrasonicate for 1min. Filter the sample solution through 0.2μm membrane for HPLC-MS analysis.
(2) Processed aquatic products
1) Extraction
Weigh 5g of mashed sample in a 100mL centrifuge tube. Add 200μL of mixed internal standard solution, 1mL of 0.25g/mL hydroxylamine hydrochloride, 2mL of 1mol/L p-toluenesulfonic acid, 2mL of 0.1mol/L ammonium acetate and 40mL of acetonitrile, sequentially. Homogenize at 10000r/min for 2min and centrifugate at 3000r/min for 3min. Transfer the supernatant into a 250mL separatory funnel. Extract the residue with 20mL of acetonitrile again and combine the supernatant. Add 30mL of dichloromethane and 35mL of water to the separatory funnel and shake for 2min. Stand to let two layers separated. Transfer the underlayer to a 150mL pear-shaped flask. Extract with 20mL of dichloromethane again and combine dichloromethane layers. Evaporate by rotary evaporator in water bath at 45 almost to dryness.
2) Cleanup
Connect Cleanert Alumina-N cartridge (top) with Cleanert PCX (down). Vortex mix to dissolve the residue (c) in 6mL of acetonitrile (divided into three times) and load the solutions sequentially onto the connected cartridges. Keep the flow rate in Cleanert PCX cartridge below 0.6mL/min. Wash Cleanert Alumina-N cartridge with 2mL of acetonitrile and discard the eluate. Wash the Cleanert PCX cartridge with 3mL of 2% (V/V) formic acid, 3mL of acetonitrile sequentially and discard the effluent. Elute with 4mL of 5% ammonium acetate in methanol at the flow rate of 1mL/min. Collect the eluate in a 10mL scaled test tube and dilute with water to 10mL. Filter the sample solution through 0.2μm filter membrane for HPLC-MS analysis.

4. Determination of Environmental residues

Determination of Phenols in the Water(Cleanert PEP, P/N: PE0603)

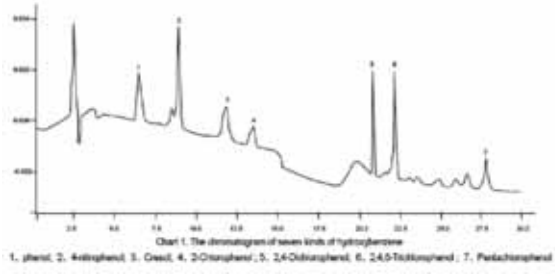
1. Experimental materials

SPE Cartridge: Cleanert PEP 60mg/3mL
7types of phenols: phenol 4-nitrophenol metacresol, 2-chlorophenol, 2,4-bitin, 2,4,6- trichlorophenol, pentachlorophenol

2. Experimental process

(1) Pretreatment on the sample
1) Activation activate the Cleanert PEP cartridge sequentially with methyl tertiary butyl ether of 3mL 10:90 V/V , methanol of 3mL and deionized water of 3mL at 5mL/min
2) Wash wash the cartridge with deionized water of 10mL at 5mL/min and dry it for 20min by vaccum
3) Elution: elute the methanol of 2mL and methy tertiary butyl ether (10:90 V/V by two steps and collect the elution to the fine tip flask
4) Concentration concentrate the collected elution of 2mL with a stream of nitrogen to 1mL

(2) HPLC conditions
Column: Venusil MP C18(4.6×150,5μm)
Mobile phase: A: 1% acetic acid
B: 1% acetic methyl alcohol
Detector UV



Time	Mobile phase ratio	Flow rate(mL/min)	Detection wavelength(nm)
0-15min	A:B=50:50	1	275
15-30min	A:B=15:85	1.8	295

3. Experimental result

Recovery of the 7 types of phenol seen in Table 1

Table 1 Result of recovery of the phenols

	Mark			Average value	Standard deviation	Average recovery(%)
	1	2	3			
phenol	1.367	1.541	1.524	1.477	0.096	100.3
4-nitrophenol	1.229	1.308	1.430	1.322	0.101	90.0
metacresol	1.294	1.540	1.548	1.461	0.144	106.3
2-chlorophenol	0.527	0.684	0.641	0.617	0.081	100.6
2,4- bitin	1.305	1.613	1.621	1.513	0.180	92.8
2,4,6- trichlorophenol	1.365	1.609	1.511	1.495	0.123	90.3
pentachlorophenol	1.259	1.487	1.472	1.406	0.128	95.6

SPE Methods of Polycyclic Aromatic Hydrocarbons(PAHs) in the Water (Cleanert PEP, P/N: PE0603)

1. SPE Cartridge: Cleanert PEP 60g/3mL

2. Target components

Naphthalene, acenaphthene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, chrysene, benzo(a)anthracene, benzo(k)fluoranthene, benzo(a,h)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)pyrene, indeno(1,2,3-cd)pyrene

3. Sample preparation

Add 20mL of 10% nitric acid into 1L of water

4. Cleanup(SPE method)

Activation: isopropanol 5mL, water 5mL, sequentially
Sample Loading: Load the prepared sample on PEP cartridge
Washing: eluant (water 300mL+methanol 700mL+Na_2HPO_4 2.1 g+KH_2PO_4 2.04 g) 5mL
Drying: dry the cartridge by vacuum pump for 30 min.
Elution: eluant (isopropanol 90mL+acetic acid 10mL+toluene 200mL+petroleum ether 1L) 4mL
Concentration, dilution

5. HPLC conditions

Column: Venusil PAH,4.6×250mm,5μm,200Å
Sample: soluble in methanol dichloromethane(1:1) 16PAHs sample, dilute 10times with methanol and dichloromethane(1:1)
Flow Rate: 1.2mL/min
Injection:10μL
Temperature:30℃
Wavelength: 254nm
Gradient table:

Time (min)	Methanol (%)	Water (%)
0	85	15
2	85	15
7	95	5
40	95	5

SPE Methods of Nitrobenzene in the Water(Cleanert PEP, P/N: PE5006)

1. SPE cartridge:
Cleanert PEP 500mg/6mL

2. Sample preparation

Adjust pH of water sample to neutral. Add methanol to each sample to obtain solution containing 0.5% methanol.

3. SPE method

- PEP cartridge activation: Set PEP cartridge on SPE system. Wash the cartridge with 3mL of n-hexane; add 5mL of methanol; load 10mL of water onto the cartridge before it is dry. Keep the cartridge wet and activated.
- Sample enrichment: Transfer definite amount of water sample to a separatory funnel connected with PEP cartridge. Turn on the SPE vacuum system; let the water sample flow through the activated cartridge at the flow rate of below 5mL/min. Keep the liquid level at least 1cm above the adsorption bed during the extraction process. After all the sample passes the cartridge, wash the internal wall of separating funnel with 10mL of ultra pure water and keep vacuum for 20 min.
- Elution of SPE cartridge: Put test tube rack and receiving tubes in the extraction cylinder of vacuum multiple tube system. Elute the cartridge with n-hexane of 10mL/acetone (90:10 V/V) and collect the outflow into the receiving tubes, concentrate to 1.0mL by pressure blowing concentrator at 40 for analysis.
- Drying cartridge pretreatment: Add 5g of anhydrous sodium sulfate to a drying cartridge with sieve plate. Wash the cartridge with 10mL of acetone, n-hexane, and acetone sequentially to purify the drying cartridge before use.
- Elution: Put test tube rack and receiving tubes in the extraction cylinder of vacuum multiple tube system. Connect the drying cartridge between cartridge holding part of SPE system and extraction cartridge. Load 1mL of acetone on the cartridge (do not let the cartridge dry in this procedure and let the acetone and packing material balance for 2 minutes). Elute the extraction cartridge with 10mL of hexane/acetone (90/10, V/V) and let the flow pass the drying cartridge (connected to PEP cartridge). Collect the eluate in receiving tubes. Concentrate the eluate under nitrogen stream at 40 to 1.0mL for further analysis. (separated layers caused by residual water can affect the efficiency of evaporation under nitrogen stream).

SPE Methods of Bentazone in the Water(Cleanert PEP, P/N: PE5006)

1. SPE cartridge:
Cleanert PEP 500mg/6mL

2. Sample preparation

Adjust the pH of sample with 0.5mL of H_2SO_4 to below 3

3. SPE method

- Activation: Wash the PEP cartridge with 5mL of furanidine, 5mL of methanol and 5mL of water sequentially
- Sample Loading: Load 500mL of water sample onto the cartridge at a flow rate of below 5mL/min.
- Washing: Wash the cartridge with 5mL of pure water and dry the cartridge under nitrogen stream for 20 min. Then wash the cartridge with 0.9mL of methanol and discard the eluate.
- Elution: Elute the cartridge with 3mL of furanidine at the flow rate of below 1mL/min. Collect the eluate and concentrate to 3 mL for HPLC determination. Or dehydrate by anhydrous sodium sulfate cartridge and evaporate under a stream of nitrogen to 1mL for HPLC determination.

4. Results

Recovery of spiked tap water sample is beyond 85%.

SPE Methods of 2, 4-D in the Water(Cleanert PEP, P/N: PE5006)

1. SPE cartridge: Cleanert PEP 500mg/6mL

2. Sample preparation

Adjust the pH of water sample with 0.5mL H_2SO_4 to 1.5~2.0

3. SPE method

- Activation: activate the PEP cartridge with 5mL of methanol and 5mL of water sequentially
- Sample loading: Load 500mL of water sample on the cartridge at a flow rate of below 5mL/min
- Washing: Wash the cartridge with 5mL of pure water and dry the cartridge under nitrogen stream for 20 min. Wash the cartridge with 0.8mL of methanol (stand for 2 min to ensure methanol to roak packing material thoroughly) and discard the eluate.
- Elution: Elute the cartridge with 3mL of furanidine at a flow rate of below 1mL/min. Collect the eluate and concentrate to 3mL for HPLC determination. Or dehydrate with anhydrous sodium sulfate cartridge and evaporate under a stream of nitrogen to 1mL for HPLC determination.

4. Results

Recovery of spiked tap water sample is beyond 80%.

SPE Methods of Chlorophenol in the Water(Cleanert PEP, P/N: PE5006)

1. SPE cartridge: Cleanert PEP 500mg/6mL

2. Sample preparation

Adjust the pH of 500mL of water sample with 0.5mol/L H_2SO_4 to 1.5~2.0

3. SPE method

- Activation: activate the PEP cartridge with 5mL of methanol and 5mL of water sequentially
- Sample loading: load water sample onto the cartridge at a flow rate of below 5mL/min
- Washing: Wash the cartridge with 5mL of pure water and dry the cartridge under nitrogen stream for 20 min. Wash the cartridge with 0.8mL of methanol (stand for 2 min to ensure methanol to soak packing material thoroughly) and discard the eluate.
- Elution: Elute the cartridge with 5mL of furanidine. Collect the eluate and concentrate under nitrogen stream at 30℃ to 1mL for HPLC determination.

4. Results

Recovery of chlorophenol is between 75-90%.

Determination of 10 Sulfonylureas Herbicide Residues in the Soil with HPLC-MS(Cleanert HXN, P/N: HX1003)

1. Materials

(1) SPE cartridge: Cleanert HXN 100mg/3mL.
(2) 10 Sulfonylurea herbicides:nicosulfuron,ethidimuron, metsulfuron-methyl, sulfometuron methyl, chlorsulfuron, ethametsulfuron-methyl, tribenuron-methyl, bensulfuron methyl, pyrazosulfuron-ethyl, chlorimuron-ethyl.
(3) Standard solution: dissolve the sulfonylurea herbicides in acetonitrile as standard solution. Dilute the standard solution with acetonitrile to obtain standard working solution for later use.

2. Experimental

(1) Extraction
Weigh 10.0g of air-dried soil (filtered with 20 mesh sieve) in a centrifuge tube with cap. Add 10mL of extractive solution (pH=7.8, 0.2M phosphate buffer:methanol (8:2,V/V)). Vortex mix for 3 min, ultrasonicate for 5 min, and centrifugate at 4000r/min for 10 min. Repeat the extraction procedures twice. Combine the supernatants of three times and adjust pH with 85% phosphoric acid to 2.5.
(2) Cleanup and concentration
Purify the sample solution with Cleanert C18 cartridge (100mg/3mL): Activate the SPE cartridge with 5mL of methanol (soak the cartridge for 30 min and then wash). Wash the cartridge with 5mL of extractive solution (pH adjusted to 2.5 with 85% phosphoric acid). Load the sample onto the cartridge at the flow rate of 1mL/min. Dry the cartridge under vacuum for 10 min after all the sample flows out. Elute with 3mL of acetonitrile/phosphate buffer (pH=7.8) (9/1, V/V). Collect the eluate and evaporate under nitrogen stream to 1mL.
(3) HPLC conditions
Column: Venusil ASB C18 (250mm×4.6mm, 5μm)
Mobile phase: acetonitrile-methanol-water (0.2% acetic acid); flow rate: 1mL/min; gradient elution procedure is listed in Table 1.
UV: 254nm; column temperature: 30; injection volume: 10uL.

Table 1. Gradient elution procedure

Time(min)	Water containing 0.2% acetonitrile (%)	Acetonitrile (%)	Methanol(%)
0.00	80	10	10
14.00	10	45	45
16.00	4	48	48
18.00	80	10	10

3. Results

Figure 1 and 2 show total ion chromatogram and extractive ion chromatogram of 10 sulfonylurea herbicides by HPLC-MS, respectively; the spiked recoveries of 10 sulfonylurea herbicides in soil samples at three concentration levels (0.01, 0.1, 1μg/mL) are summarized in Table 1.

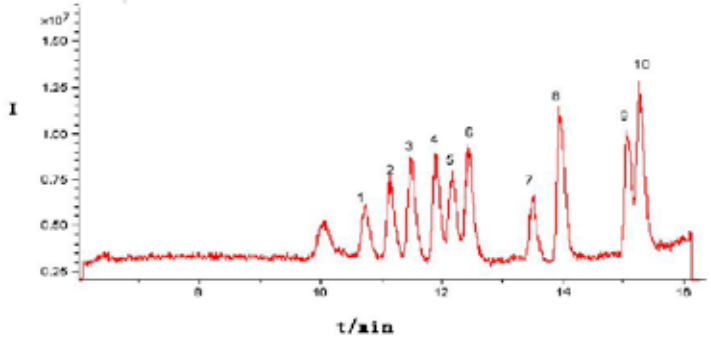


Figure 1. Total ion chromatogram of 10 sulfonylurea herbicides

1. nicosulfuron; 2. ethidimuron; 3. metsulfuron-methyl;
4. sulfometuron methyl; 5. chlorsulfuron;
6. ethametsulfuron-methyl 7. tribenuron-methyl;
8. bensulfuron methyl; 9. pyrazosulfuron-ethyl;
10. chlorimuron-ethyl

Table 1 Recovery of 10 sulfonylurea herbicides in spiked soil samples at three concentration levels

Sulfonylurea herbicides	Spiked concentration (μg/mL)	Recovery (%)	R.S.D (%)
Nicosulfuron	0.01	94.52	7.22
	0.1	97.31	4.07
	1	84.83	0.02
Ethidimuron	0.01	88.20	0.11
	0.1	87.43	9.95
	1	82.69	0.02
Metsulfuron-methyl	0.01	104.52	2.81
	0.1	87.57	0.25
	1	83.14	0.05
Sulfometuron methyl	0.01	95.52	8.43
	0.1	94.128	4.49
	1	80.16	0.14
Chlorsulfuron	0.01	91.41	5.37
	0.1	85.53	1.65
	1	89.26	0.03
Ethametsulfuron-methyl	0.01	102.67	12.85
	0.1	92.58	14.90
	1	87.72	0.01
Tribenuron-methyl	0.01	34.79	2.20
	0.1	16.57	12.10
	1	11.00	0.03
Bensulfuron methyl	0.01	90.09	8.58
	0.1	83.34	2.15
	1	84.01	0.03
Pyrazosulfuron-ethyl	0.01	101.28	12.24
	0.1	85.98	1.65
	1	86.04	0.03
Chlorimuron-ethyl	0.01	86.70	7.71
	0.1	85.54	8.10
	1	100.53	0.03

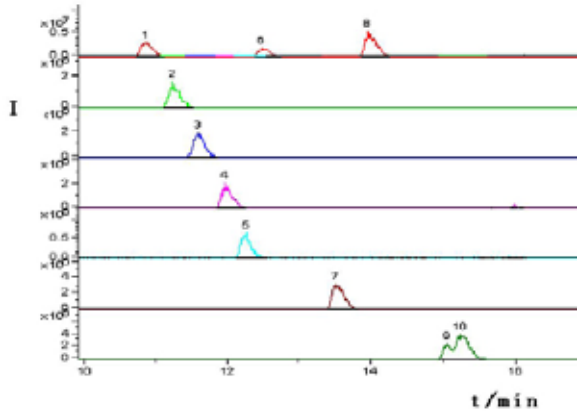


Figure 2 Extractive ion chromatogram of 10 sulfonylurea herbicides

5. Detection of Drug Metabolism

Application of Oleic Acid in the Blood Plasma and its Metabolites in LC-MS Analyse(Cleanert PAX, P/N: AX0301)

1. Oleic acid structure(Figure1)

2. Extraction and Cleanup(Figure2)

3. Detection conditions

Instrument: API Qtrap 3200(from Applied Biosystem in USA LC-20A HPLC(from Shimadzu Corporation in Japan).
Mass spectra conditions: electric ion spray sources detection of anion model multiple reaction monitoring.
Ionic reaction for quantitative analysis are m/z 281.2 → m/z 281.2 (oleic acid), m/z 315.2 → m/z 315.2(oleic acid metabolite) and m/z 269.2 → m/z 269.2 (internal label C17)
Mobile phase: ACN:3mmol/L ammonium acetate=85:15

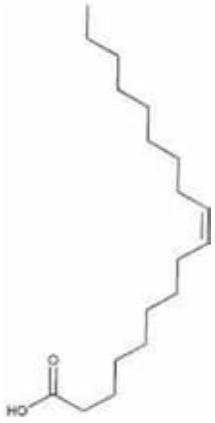


Figure 1 Oleic acid structure

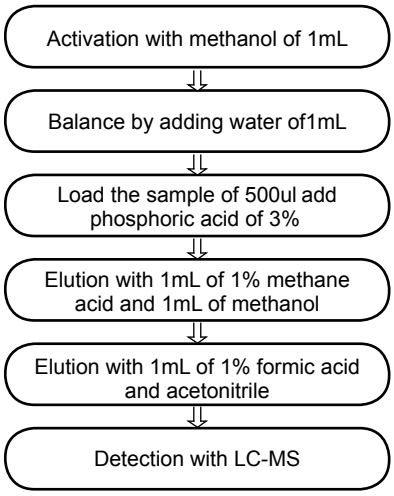


Figure 2 extraction and cleanup

4. Experimental result

Density	10ng/mL(n=3)	100ng/mL(n=3)	2500ng/mL(n=3)
Recovery of oleic acid(%)	77	87	91
RSD	2.9	0.9	0.2

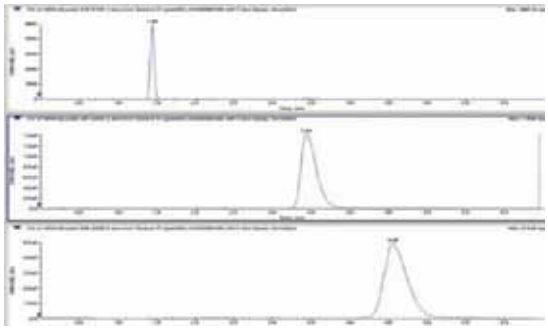


Figure 3 Chromatogram map of oleic acid

Rapid Analysis on the Pseudoephedrine in the Human Plasma with LC-MS(Cleanert PCX, P/N: CX0301)

1. Pseudoephedrine formula(Figure 1)

2. Cleanup(Cleanert PCX 30mg/1mL)

Activation activate PCX cartridge with methanol of 2mL and water of 2mL.
Sample loading load the serum diluted with formic acid of 2%.
Washing wash the PCX minicartridge with water of 1mL and methanol of 1mL .
Elution elute targeted sample with 1mL of 5% ammonia water and methanol and collect.

3. Detection conditions

Instrument API Qtrap 3200 from Applied Biosystem in USA LC-20A HPLC(from Shimadzu Corporation in Japan)
Mass spectrum conditions electric ion spray sources detection of anion model multiple reaction monitoring.
Ionic reaction for quantitative analysis are m/z 166.0 → m/z 148.1(Pseudoephedrine) and m/z 235.3 → m/z 86.1 (internal label, lidocaine)

4. Result

Concertration	10ng/mL(n=3)	100ng/mL(n=3)	2500ng/mL(n=3)
Recovery of Pseudoephedrine(%)	77	79	85
RSD	3.5	1.9	0.5
Recovery of Lidocaine(%)	88	92	87
RSD	4.9	2.1	0.3

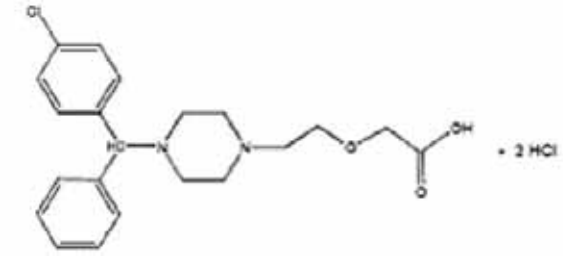


Figure 1 Pseudoephedrine formula

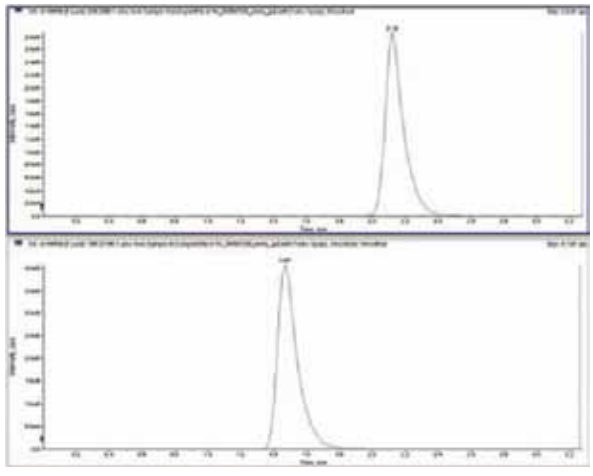
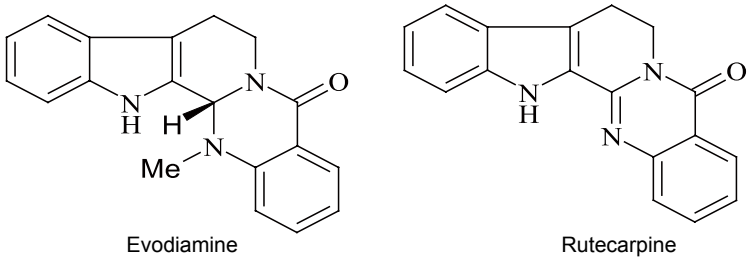


Figure 2 Chromatogram map of pseudoephedrine and internal label of lidocaine

Evodianmine and Rutaecarpine in Human Serum (Cleanert C18, P/N: 182003)

1. SPE cartridge: Cleanert C18; 200mg/3mL, P/N: 182003

2. Sample: human serum, sample concentration: 50ng/mL (diluted 2-fold with water)



Evodiamine Rutecarpine

Figure 1. Structural formula of two extracts from Tetradium ruticarpum (evodiamine and rutecarpine)

3. Sample Cleanup

- Cartridge activation: activate the SPE cartridge with 2mL of methanol followed by 2mL of water
- Sample loading: load 2mL of sample at the flow rate of 0.5mL/min
- Washing: wash the SPE cartridge with 1mL of water twice, then dry the cartridge under nitrogen
- Elution: elute with 1mL of acetic ether twice, and collect the eluate

Evaporate the eluate to dryness under nitrogen at 40℃ . Dilute with 1mL of methanol-water (85/15).
Filter the solution through 0.45 μm filter membrane for LC-MS analysis.

4. LC-MS conditions

Instrument Agilent 1100
Column: Venusil XBP-C18, 4.6 x150mm, 5μm,
P/N: VX951505-0;
Mobile phase: methanol:water=85:15;
Flow rate: 0.5mL/min; Column temperature: 25℃ ;
Injection volume: 10μl; MS: ESI;

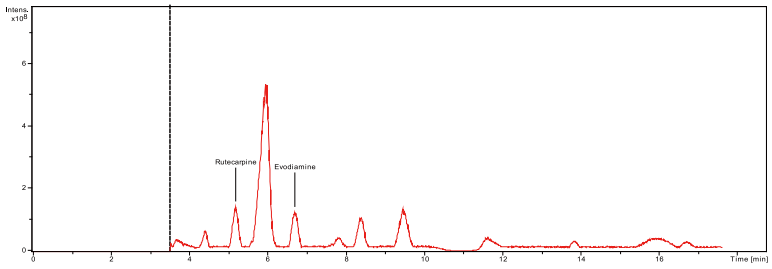


Figure 2. Total ion chromatogram of Evodiamine and Rutecarpine in human serum

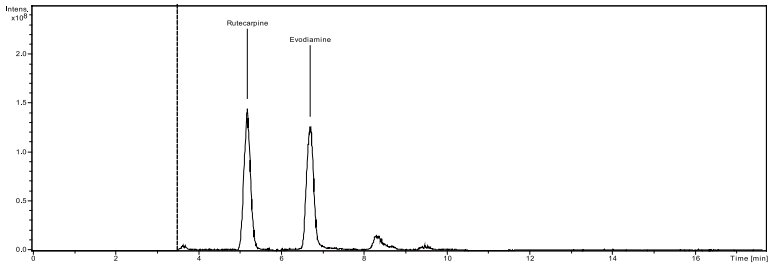


Figure 3. Total ion chromatogram of Evodiamine and Rutecarpine in human serum

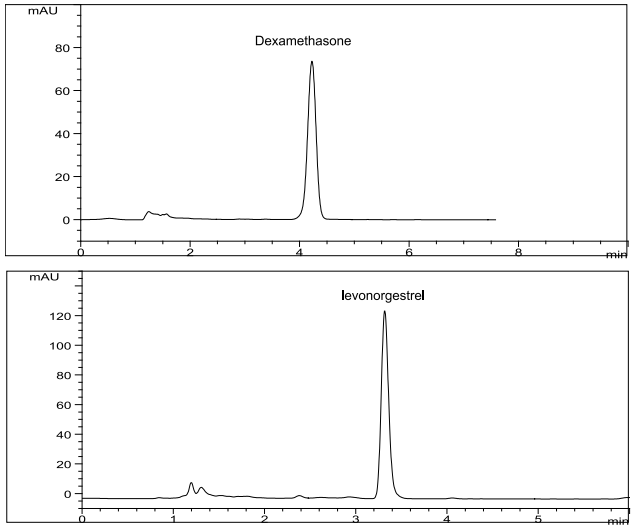
Drug Ingredients in the Serum by SPE (Cleanert PEP, P/N:PE0603)

1. Sample Cleanup

Cartridge activation: methanol 3mL, water 3mL
Sample loading: load spiked serum sample onto SPE cartridge
Washing: water 3mL or 5% methanol 3mL
Elution: methanol 3mL

2. Results

Analytes	Recovery (%)
Dexamethasone	97.9
Ethinylestradiol	96.3
Hydrocortisonμm	74.0
Triamcinolone	71.9
Levonorgestrel	93.9
Ganciclovir	54.1
Prednisone Acetate	98.6
Cefalexin	58.6
Cefradine	45.6



Determination of Sulpiride in Human Plasma by SPE and HPLC (CleanertC18, P/N: 181001)

1. SPE cartridge: Cleanert C18 100mg/1mL

2. Sample preparation

Transfer 0.75 mL of blood plasma accurately to a 2-mL centrifuge tube. Add 10 μL of internal standard solution of metoclopramide and vortex mix.

3. Sample Cleanup

- Activation: activate with 2mL of methanol, equilibrate with 2mL of water
- Sample loading: load the prepared blood plasma sample onto the cartridge
- Washing: wash the cartridge with 1mL of water after all sample solution flows out
- Elution: methanol 2mL, collect the eluate and dry under nitrogen in water bath at 55℃ . Dissolve the residue in 100 μL of methanol. Centrifugate at 3000r/min for 5 min and take 20μL of the supernatant for analysis.

Determination of IFO in the Serum by SPE and HPLC (Cleanert C18, P/N: 181001)

1. Materials

(1) SPE cartridge: Cleanert C18, 100mg/1mL
(2) Cyclophosphamide solution as internal standard: add 0.2g of cyclophosphamide to a 100mL volumetric flask. Dissolve and dilute to volume with mobile phase solution. Store this internal standard solution (2 mg·mL-1) in refrigerator at 4℃ .

2. Pretreatment of blood sample

Add 12.5μL of internal standard solution to 0.5mL of serum sample for later use.

3. Sample Cleanup

● Activation: Activate SPE cartridge with 2mL of acetonitrile, followed by 2mL of physiological saline.
● Sample loading: Load the prepared sample onto SPE cartridge.
● Washing: Wash the cartridge with 1mL of physiological saline followed by 1mL of 5% acetonitrile solution. Dry the cartridge after all eluant flows out.
● Elution: Elute with 0.5mL of acetonitrile. Collect the eluate and take 20μL of eluate for further determination.
Figure 1 shows the chromatogram of ifosfamide (retention time: 11.6 min) and cyclophosphamide (retention time: 12.8 min). Both peaks are in good shape without interference of impurities.

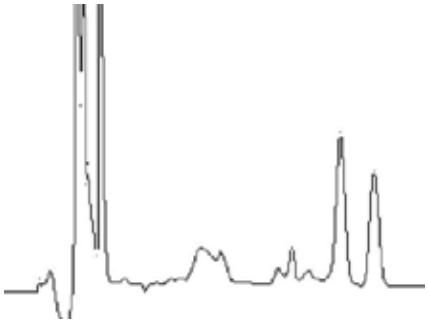


Figure 1. Chromatogram of ifosfamide and cyclophosphamide spiked in blank serum

4. HPLC conditions

Column: Venusil ASB C18 (4.6mm×250mm,5μm)
Mobile phase: acetonitrile : water (25:75); Flow rate: 1 mL·min-1;
UV: 200 nm; Injection volume: 20μL; Column temperature: room temperature

5. Results

Table 1. Recovery and precision of ifosfamide (n=5)

Spiked concentration	Recovery of extraction	Recovery of method	RSD(%)	
(μg·mL-1)	(%)	(%)	Inter-day	Intra-day
100	92.0±1.8	101.2±3.5	1.1	2.1
50	93.6±5.6	107.2±1.5	2.9	4.1
5	89.3±1.3	95.3±4.3	2.2	2.4

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8 Uretic Residues in the Animal Urine by HPLC-MS/MS (Cleanert PAX, P/N: AX0603)

1. Materials

(1) SPE cartridge Cleanert PAX,60mg/3mL

2. Sample pretreatment

Transfer 2mL of sample accurately to a 50mL centrifuge tube. Adjust pH with 5mol/L hydrogen chloride solution to 3.5±0.5. Add 1mL of 5% lead acetate solution and 5mL of water-saturated acetic ether. Vortex mix and vibrate on shaker for 10 min. Centrifugate at 5000rpm for 5 min and transfer the supernatant to another 50mL centrifuge tube. Add 5mL of water-saturated acetic ether to the aqueous underlayer. Vortex mix and vibrate on shaker for 10 min. Centrifugate at 5000rpm for 5 min and combine the supernatants. Dry the solution under nitrogen at 50℃. Dissolve the residue in 3mL of acetonitrile-2% ammonia (10:90 V/V) for later use.

3. Sample Cleanup

Load the sample onto Cleanert PAX cartridge activated with 3mL of methanol followed by 3mL of 2% ammonia. Wash the SPE cartridge with 3mL of 2% ammonia, methanol and 5% formic acid, sequentially. Dry the cartridge. Elute the cartridge with 3mL of methanol containing 5% formic acid. Dry the eluate under nitrogen. Dissolve the residue in 1.00mL of acetonitrile-0.3% ammonia(10:90 V/V). Vortex mix and filter the solution through 0.22μm membrane for LC-MS/MS analysis.

4. Results

Table 1 Recovery of eight diuretics spiked in bovine urine (n=5)

Spiked concentration (μg/L)	Measured parameter	Drugs							
		Chlorath-iazide	Dihydro-chlorot-hiazide	Hydrofl-umethia-zide	Chlort-alido-ne	Trichlor-methiaz-ide	Methy-clothi-azide	Furose-mide	Etacrynic Acid
20	Mean recovery (%)	88.9	80.0	91.2	71.1	86.6	89.9	95.3	99.8
	Intra-batch RSD(%)	6.7	7.9	5.3	6.9	10.1	7.6	8.8	7.1
	Inter-batch RSD(%)	9.3	10.3	13.5	7.7	15.6	9.9	12.7	13.3
50	Mean recovery (%)	87.2	86.7	86.0	78.6	93.3	91.5	97.7	90.8
	Intra-batch RSD(%)	9.5	6.7	9.8	4.6	7.2	6.5	10.0	8.3
	Inter-batch RSD(%)	11.3	8.5	13.8	7.7	9.8	7.4	13.9	9.8
100	Mean recovery (%)	86.3	93.6	95.6	81.2	101.1	82.6	106.5	109.0
	Intra-batch RSD(%)	6.6	7.9	4.7	8.6	5.2	3.9	5.8	9.3
	Inter-batch RSD(%)	8.9	10.7	6.4	11.8	9.6	7.7	13.0	12.8

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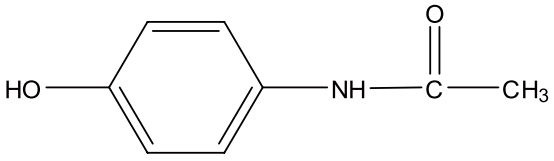
Extraction and Cleanup of Acetaminophen in Hyclone (Cleanert PEP,PCX, P/N: PE1203,PC0603)

1. SPE cartridge

Cleanert PEP (120mg/3mL) 0.6mmol/g
Cleanert PEP (60mg/3mL) 1.0mmol/g
Cleanert PCX (60mg/3mL)

2. Structural formula of Ethylamino-phenol



3. Sample pretreatment

Dissolve 10mg of Ethylamino-phenol in 100mL of water. (100ppm)
Dilute 25mL of Ethylamino-phenol solution to 50mL with water in a flask.
Dilute 25mL of Ethylamino-phenol solution to 50mL with serum in a flask.

4. Sample Cleanup

- Activation: methanol 2mL for activation, water 2mL for equilibration
- Sample loading: prepared sample 2mL
- Washing: 5% methanol 2mL
- Elution: methanol 2mL

5. Results:

SPE cartridge	Recovery (%)	
	Pretreatment 1	Pretreatment 2
PEP(0.6/120mg/3mL)+50% serum	86.9	81.6
PEP(1.0/60mg/3mL)+50% serum	58.5	40.3
PCX+50% serum	94.6	94.6

Note: PEP(0.6/120mg/3mL), PEP(1.0/60mg/3mL), 0.6, 1 represent degree of bond.

6. MAS-C Protein Precipitate Columns and SLE on the Drug Metabolism Analysis in the Sample of Serum

MAS is Multi-function Impurity Adsorption SPE. Composite adsorption materials which are multiply functionalized are used in this method. Thus most interfering matrices in biological samples are adsorbed and strong water soluble components of interest are kept in sample solution. By this method, the sample can be purified and the components of interest can be enriched. The most important thing of this method is to choose appropriate separation material which has good selectivity to the interfering biological matrices, such as proteins, peptides, amino acids, phospholipids and so on. After optimizing experimental conditions (solvents, pH), MAS is able to remove most interfering biological matrices in samples and keep the strong water soluble analytes with a recovery higher than 70%. It offers the probability for highly sensitive detection in LC-MS.

The key point of this method is to use dispersed solid phase extraction. First, put pretreated sample into a centrifuge tube and add extractive solvent, like acetonitrile. Then add SPE adsorbents, such as C18, PestiCarb, PSA, Alumina-N and so on, and some water removal materials like anhydrous sodium sulfate or magnesium sulfate. Shake up and centrifugate. The supernatant is collected and analyzed. This method, which can replace the cleanup method with SPE mini-cartridge, has following merits:
① it is fast and simple, with which extraction and cleanup are completed in one step;
② the analyte lost in sample emulsification and concentration procedures is avoided;
③ it is economical and has a low cost. However, the weakness is that the detection limit is not satisfactory. Besides, water cannot be removed completely, resulting in the loss of extraction efficiency.

MAS method is simple, fast and low cost. Agela technologies now can provide a series of centrifuge tubes containing accurately weighed SPE packing materials to support the MAS products and method kits which are most widely used.

Series of MAS-C mainly employ the MAS-products of 96 wellplates to wipe off the protein and phospholipid in drug analysis, and the packings with the specifical adsorption to the endogenous impurities to realize the precipitation of protein and extraction of drugs in one step with special membrance.

The series is divided into MAS-A and MAS-B with the suitable scope as below:
Series of MAS-A is suitable for pretreatment on the acidic drugs in serum and removal of protein and phosphorus;
Series of MAS-B is suitable for pretreatment on the alkaline and neutral drugs in the serum and removal of protein and phosphorus.

Comparasion of the Cleanup capibility of MAS-SPE, PPT and SPE by the study of AmLodipine in the Serum(Cleanert MAS-B, P/N: MSC-B)

1. Materials

(1) MAS-B (60mg/1mL)
(2) SPE Cartridge (60mg/1mL) Brand W

2. Experimental

(1) MAS-SPE
- Activation: 2mL of 2% formic acid and acetonitrile methanol (80:20)
- Sample loading plasma of 200μL+50μL of 200ng/mL standard amLodipine
- Elution 1mL of 1% formic acid and acetonitrile 2mL of 2% formic and acetonitrile: methanol (80:20) N2, constant volume of 0.5mL

(2) PPT

Add the sample of 200μL into 5mL-centrifuge tube spike 1mL of 1% formic and acetonitrile and 2mL of 2% formic and acetonitrile: methanol(80:20), vibrate for 3min at 10000rad/min and centrifuge for 15min, dry the supernate with N2 to 0.5mL.

(3) SPE

- Activation: methanol of 2mL water of 2mL
- Sample: loading plasma of 200μL+50μL of 200ng/mL amLodipine
- Washing: 2mL of 5% solution of methanol and water
- Elution: 2mL of methanol

(4) HPLC conditions

Column: Venusil ASB C18 (2.1×150, 3μm)

Mobile phase: 10mmol of ammonium acetate buffer acetonitrile=40:60

Flow rate: 0.2mL/min

Column temperature: 25℃

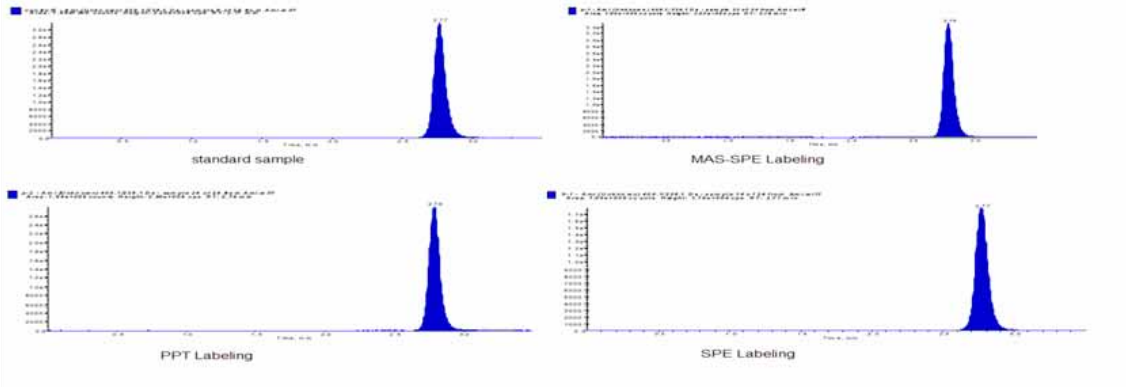
Sample loading: 5μL

Detector: ABI4000 QT amLodipine MRM 409.1/238.1m/z

3. Experimental results

(1) Original experiment Chromatogram

(2) Recovery



	Recovery(%)	Mean recovery
MAS-SPE	83.2	82.9
MAS-SPE	82.6	
PPT	81.2	82.4
PPT	83.6	
SPE	59.2	64.5
SPE	70.1	

Propranolol in the Serum with MAS-LC-MS(Cleanert MAS-B, P/N: MSC-B)

1. Materials: MAS-B (60mg/1mL)

2. Experiment

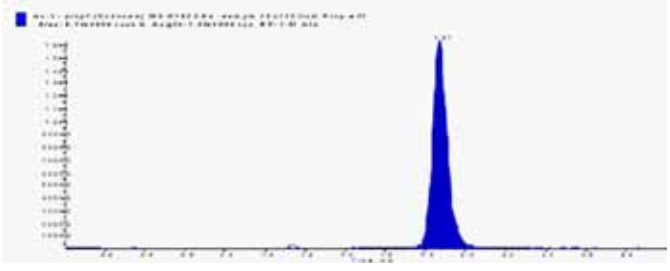
(1) MAS-SPE
● Activation: 2mL of 2% formic and acetonitrile methanol (80:20)
● Sample: loading 200μL of plasma+50μl of 200ng/mL propranolol
● Elution: 1mL of 1% formic and acetonitrile 2mL of 2% formic and acetonitrile:methanol (80:20) dry with N2 to 0.5mL
(2) PPT
Add 200μL of sample into 5mL-centrifuge test spike 1mL of 1% formic and acetonitrile and 2mL of 2% formic and acetonitrile: methanol (80:20) vibrate for 3min at10000rad/min centrifuge for15min. Dry the supernate with N2 to 0.5mL.
(3) HPLC conditions
Column: Venusil ASB C18 (2.1×150, 3μm)
Mobile phase: 10mmol of ammonium acetate buffer acetonitrile=40:60
Flow rate: 0.2mL/min Temperature 25℃
Sample loading: 5μL
Detector: ABI4000 QT propranolol MRM 260.1/183.0m/z

3. Results

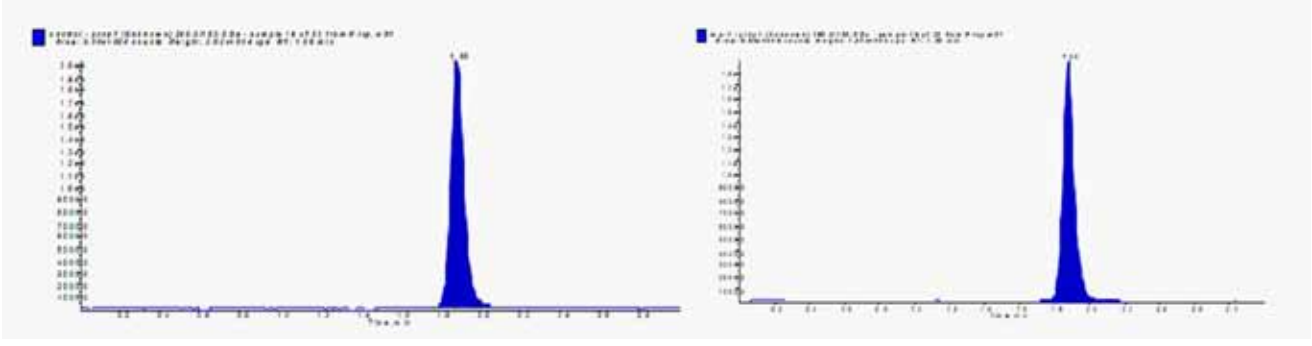
(1) Original Chromatogram
(2) Recovery Figure1

Figure 1 Spiked Recovery result

	Recovery (%)	Mean recovery
MAS-SPE	91.2	90.0
MAS-SPE	88.8	
PPT	78.3	82.9
PPT	87.5	



PPT Spiked



Standard sample

MAS-SPE Spiked

Simultaneous Detection of Glipizide and Glibenclamide with MAS (Cleanert MAS-B, P/N: MSC-B)

1. Materials: MAS-B (60mg/1mL)

2. Experimental

(1) MAS-SPE

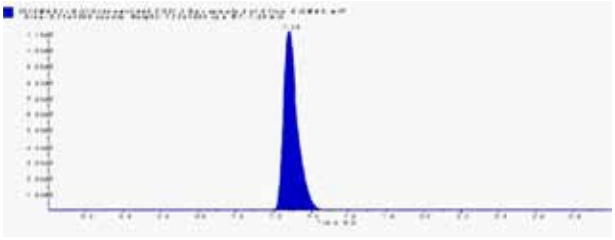
- Activation:2mL of 2% formic and acetonitrile: methanol (80:20)
- Sample loading:200μL of plasma+50μl of 200ng/mL propranolol
- Elution:1mL of 1% formic and acetonitrile 2mL of 2% formic and acetonitrile:methanol (80:20),dry with N2 to 0.5mL

(2) HPLC conditions

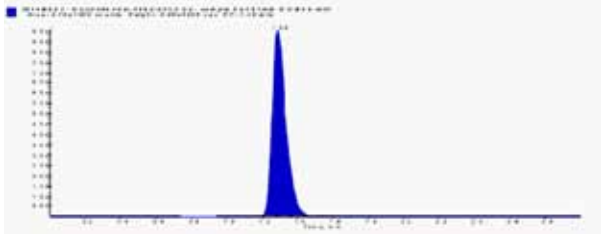
Column: Venusil ASB C18 (2.1×150, 3μm)
Mobile phase: 10mmol ammonium acetate buffer acetonitrile=20:80
Flow rate:0.2mL/min
Temperature:25℃
Sample loading:5uL
Detector:ABI4000 QT glipizide MRM 446.3/321.1m/z glucovance MRM 464.2/369.0m/z

3. Result

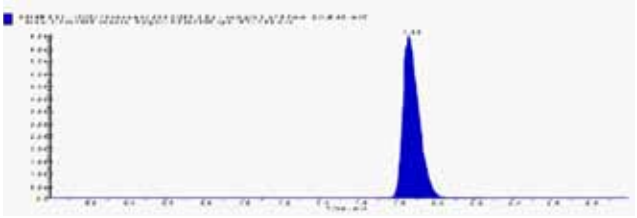
(1) Original Chromatogram



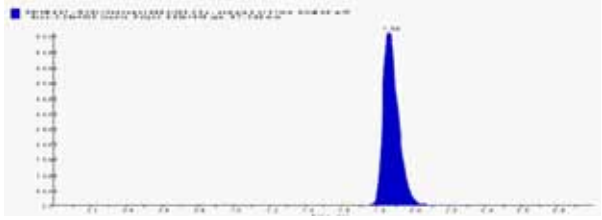
Sample of glipizide



Spiked Glipizide



Sample of glucovance



Spiked Glucovance

(2) Recovery

	Recovery (%)	Mean recovery
Spiked Glipizide	83.8	80.6
Spiked Glipizide	77.4	
Spiked Glucovance	88.9	78.6
Spiked Glucovance	68.3	

Hydrochlorothiazide in the Bovine Plasma(Cleanert MAS-A, P/N: MSC-A)

1. Materials: MAS-A (60mg/1mL)

2. Experimental

(1) MAS-SPE

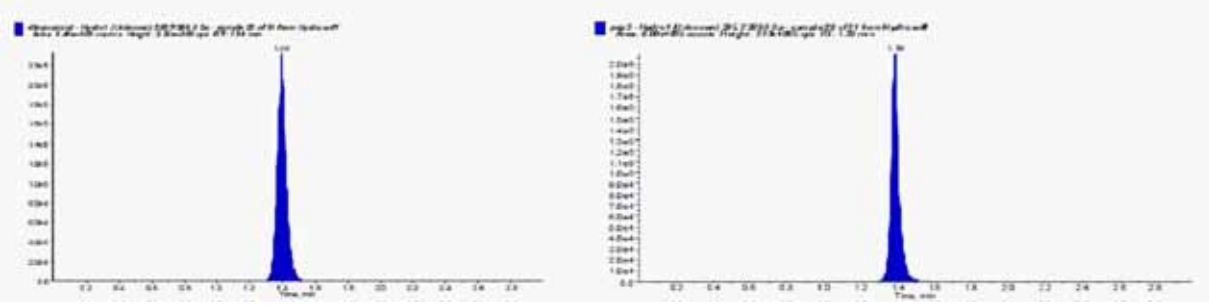
- Activation 2mL of 5% ammoniation and acetonitrile
- Sample loading 200μL of plasma+50μL of 200ng/mL hydrochlorothiazide
- Elution 2mL of 5% ammoniation and acetonitrile dry with N2 constant volume of 0.5mL

(2) HPLC conditions

Column: Venusil ASB C18 (2.1×150, 3um)
Mobile phase: 10mmol of ammonium acetate buffer acetonitrile=10:90
Flow rate: 0.2mL/min
Temperature: room temperature
Sample loading: 2μL
Detector: ABI4000 QT Target MRM 295.7/269.0m/z

3. Results

(1) Chromatogram



Standard Chromatogram　　Spiked Sample Chromatogram

(2) Recovery

	Recovery (%)	Mean recovery (%)
Spiked Hydrochlorothiazide	76.5	75.5
Spiked Hydrochlorothiazide	74.9	
Spiked Hydrochlorothiazide	75.1	

Nadifloxacin in the Bovine Serum

1. Material: MAS-A 60mg/1mL S/N MSC-A

2. Experimental

(1) MAS-SPE
- Activation: 3mL of acetronitrile
- Sample loading: 0.5mL
- Elution: 5mL of 2% formic and acetonitrile dry with N2 to1mL

(2) HPLC conditions
Column: Venusil ASB C18 (4.6×150, 5μm)
Mobile phase: 1% of acetic acid:methanol=45:55
Wavelength: 280nm
Flow rate: 1mL/min
Temperature: room temperature
Sample loading: 20μL

3. Results

(1) Original experimental Chromatogram
(2) Spiked Recovery Table1

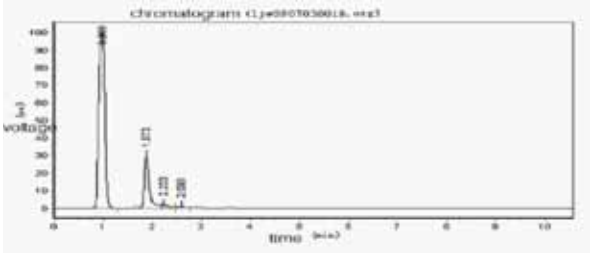


Figure 1 Chromatogram of Bovine Serum Blank

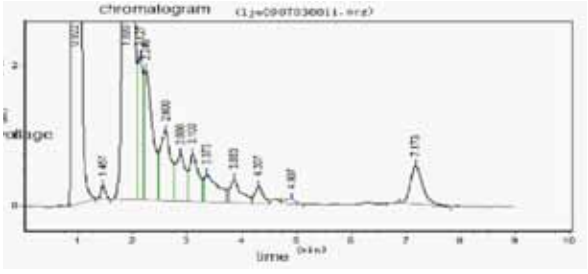


Figure 3 Sample Spiked with 0.5ppm Standard

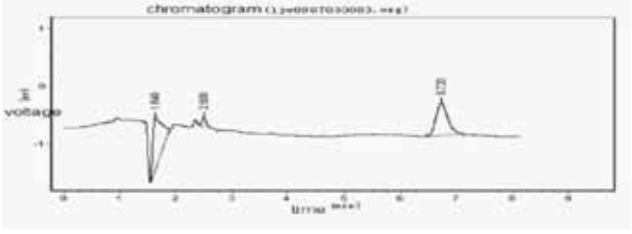
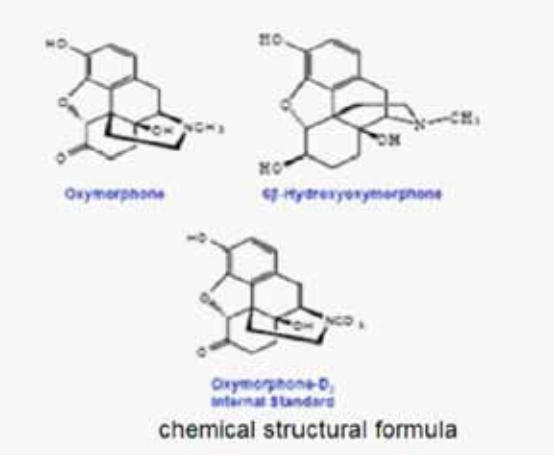


Figure 2 Chromatogram of 0.5ppm Standard

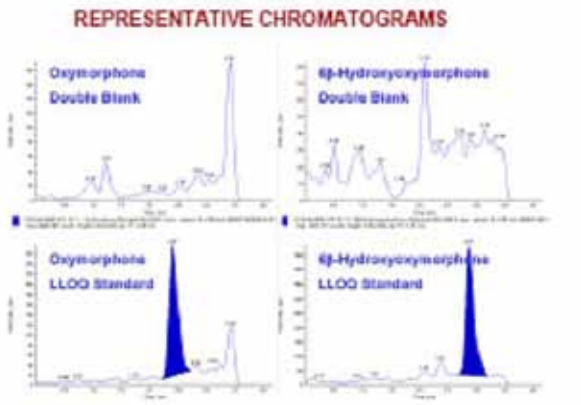
Spiked concertration	Recovery (%)	Mean recovery(%)
0.5ppm of sample passing cartridge	85.2	82.6
1ppm of sample passing cartridge	92.7	95.0
2ppm of sample passing cartridge	96.6	99.1

Extraction of Oxymorphone and its Isomeride in the Human Plasma by Cleanert SLE(200mg/well/2mL,P/N:HC2002-W)

Oxymorphone belongs to the drugs of semisynthetic opium agonist and the second forbidden drugs; 6β-hydroxy oxymorphone is an important metabolite of oxymorphone. These two drugs need extreme low limit of detection, moreover, these two drugs are isomeride which is difficult to be separated.



chemical structural formula

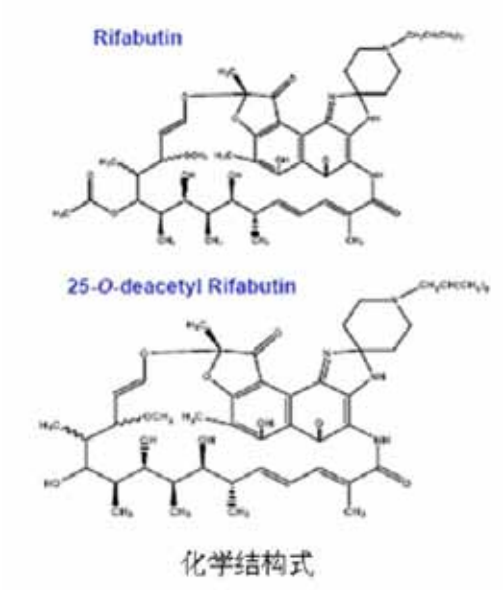


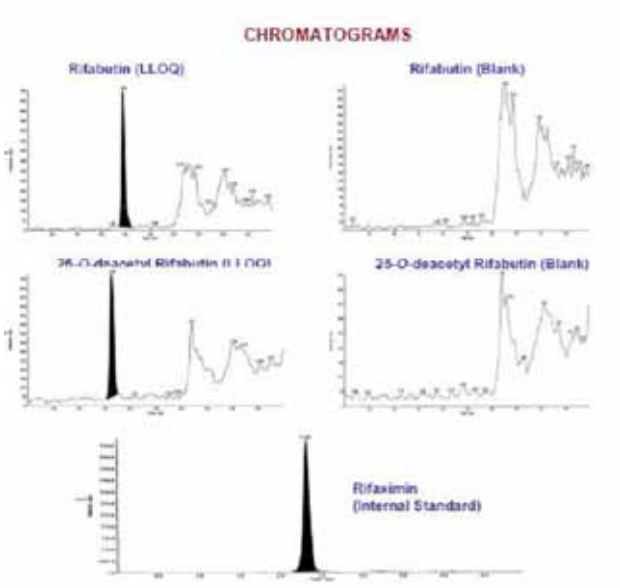
Experimental

Quickly add 400μL of plasma spiked with internal standard substance into the pretreated products of Cleanert SLE 200mg/well/2mL P/N:HC2002-W , and process the sample with Tomtec processing station and elute with 1.4mL of acetic acid and ethyl ester, dry the supernate with N_2 at 40° C and dissolve the treated sample with 200μL of first class water for LC-MS/MS analysis.
Mass spectrum scanning: first grade of API scanning for 4000 times, TIS positive pole MRM detection:
m/z 302.2 (M+H)+ → 227.20 (oxymorphone)
m/z 304.30 (M+H)+ → 268.2 (6β-hydroxyoxymorphone)
Mobile phase: A: water :ammonia water / 100 : 0.05 (v:v)
B:methanol: ammonia water / 100 : 0.05 (v:v)
Gradient elution rised from 25% of B to 100% of B
Flow rate: 300μL/min
LC Column: Durashell C18, 3μm, 3.0x50mm

	oxymorphone	hydroxy oxymorphone
Day to day precision(% CV)	1.4—10.8	2.2—10.1
Day to day accuracy(% RE)	-6.9—1.2	-9.2—0.7
Day to day precision(% CV)	2.2—8.1	3.6—8.4
Day to day accuracy(% RE)	-4.4—-0.2	-6.7—-1.7
Mean recovery	82.7%	76.2%

Analysis of Rifamycin Derivant in Serum by SLE (Solid supported Liquid/ liquid Extraction)
(Cleanert SLE wellplate, 200mg/well/2mL, P/N:HC2002-W)





Experimental:

SLE is easier and faster than SPE in developping method, and can be transplanted from LPE. The method inherited the advantage of high throughput of SPE and realize high throughput with 96-plate. Moreover, it has been adopted firstly as cleanup in the pharmacokinetic lab recently.

- Cartridge: Cleanert SLE wellplate (200mg/well/2mL, P/N:HC2002-W) SLE;
- Sample Loading: 50μL of plasma;
- Elution of targeted sample: 1.4mL of methyl tert-butyl ether/acetic acid and ethyl ester (1:1,v/v);
- Concentration of collected liquid: dry with N_2 ; 400μL of methanol :water:acetic acid/45:55:0.1 (v:v:v);

LC-MS analysis Venusil XBP-C4 analytical cartridge, LC-MS-MS, sample loading of 5μL.

Mean recovery (%)	Rifabutin: 62.7%; 25-O-deacetyl
	Rifabutin: 66.6%
Mean recovery of internal standard solution(%)	60.7%
QC Day to day precision(%CV)	Rifabutin: 2.0-11.8; 25-O-deacetyl
	Rifabutin: 2.1-9.9
QC Day to day accuracy(%RE)	Rifabutin: -7.6-6.8; 25-O-deacetyl
	Rifabutin: -11.0-6.4
QC Day to day precision(%CV)	Rifabutin: 4.2-9.4; 25-O-deacetyl
	Rifabutin: 3.8-9.3
QC Day to day accuracy(%RE)	Rifabutin: -4.3-3.9; 25-O-deacetyl
	Rifabutin: -6.7-5.0

7. MAS-Q Applied in Pesticide and Veterinary Drug Residues

MAS-Q series have developed based on the dispersion of matrix, applying for the fast detection of pesticide residue, veterinary residue and food additives. The operation is very easy as below: add liquid sample or extracted liquid into the centifuge tube, vibrate and mix the sample, take the supernate after centrifuging for concentration or direct detection.

Melamine in Fish, Milk and Eggs by MAS-HPLC (MAS Purified Tube for Melamine,P/N:MS-SPM5001)

Experimental

1. Instruments and reagents

Instruments: L6-1 series HPLC (Beijing purkinje general instrument Co., Ltd.); sample preparation method for melamine determination, including HCl 0.1mol/L, 6% sulfosalicylic acid, mixed anion exchange packing material Cleanert PAX (the achievement of the country '11th Five-Year Plan' supported science and technology project); Venusil SCX-M, 5μm, 4.6×250mm strong cation exchange cartridge (the achievement of the country '11th Five-Year Plan' supported science and technology project, Tianjin Agela technologies Inc.) and its guard cartridge; needle type filters (Agela Clarify, 0.22/0.45μm, nylon); melamine standard (>99%); homogenizer (T25 Basic, IKA).
Reagents: acetonitrile (chromatographic grade), potassium dihydrogen phosphate (analytical grade), ultrapure water.

2. HPLC conditions

Column: Venusil SCX-M, 4.6×250mm, 5μm, 300Å (the achievement of the country '11th Five-Year Plan' supported science and technology project); mobile phase: potassium dihydrogen phosphate (0.050 mol/L):acetonitrile=70:30; flow rate: 1.5mL/min; column temperature: ambient temperature; UV wavelength: 240nm; all injection volume is 20μL if not noted otherwise.

3. Preparation of melamine working standard solutions

(1) Stock standard solution of melamine: 1.00×103mg/L.
Weigh 100mg (accurate to 0.1mg) of melamine standard and dissolve completely in water. Dilute with water to 100mL and mix.
(2) Working standard solutions
1) **Standard solution A:** 2.00×102mg/L.
Take 20.0mL of standard stock solution of melamine (1.3.1) accurately into a 100mL volumetric flask. Dilute with water to volume and mix for use.
2) **Standard solution B:** 0.50mg/L.
Take 0.25mL of standard solution A (1.3.2.1) into a 100mL volumetric flask. Dilute with water to volume and mix for use.
3) **Working standard solutions**
Take different volumes of standard solution A (1.3.2.1) into volumetric flasks according to Table 1. Dilute with water to volume and mix. Filter the solutions through 0.45μm membrane for determination. Take different volumes of standard solution B (1.3.2.2) into volumetric flasks according to Table 2. Dilute with water to volume and mix. Filter the solutions through 0.45μm membrane for determination.

Table 1 Preparation of working standard solutions (high concentration)

Volume of standard solution A (mL)	0.1	0.25	1.00	1.25	5.00	12.5
Volumetric flask volume (mL)	100	100	100	50	50	50
Final concentration (mg/L)	0.20	50	2.00	5.00	20.0	50.0

Table 2 Preparation of working standard solutions (low concentration)

Volume of standard solution B (mL)	1.00	2.00	4.00	20.0	40.0
Volumetric flask volume (mL)	100	100	100	100	100
Final concentration (mg/L)	0.005	0.01	0.02	0.10	0.20

4. Sample Preparation

(1) Milk sample

Take 15.0g of milk into a 25mL volumetric flask. Add 7mL of 0.1mol/L HCl, 3.0mL of 60g/L sulfosalicylic acid . After vortex mixing for 2 min and centrifugation at 1000r/min, collect the supernatant and filter it through 0.45μm membrane for LC analysis.

(2) Egg sample

Take 0.5g of well mixed egg sample and add 10mL of 0.1mol/L HCl for 10 min-ultrasound. Add 3mL of 60g/L sulfosalicylic acid and 2mL of 0.1mol/L HCl . Add the sample into the melamine cleanup tube of MAS (S/N:MS-SPM5001). After vortex mixing and centrifugation at 1000r/min for 10 min, collect the supernatant and filter it through 2μm membrane for LC analysis.

(3) Fish sample

Take 1.0g of chopped meat of fish back and 10mL of 0.1mol/L HCl. After ultrasound for 10min , add 3.0mL of 60g/L sulfosalicylic acid and 2mL of 0.1mol/L HCl. Pour the sample into the melamine cleanup tube of MAS (S/N:MS-SPM5001). After vortex mixing and centrifugation at 1000r/min for 10 min, collect the supernatant and filter it through 2μm membrane for LC analysis.

5. Results and discussion

(1) Linear range

The curve of low concentration is made by 5 standard samples of different concentrations - 0.005mg/L, 0.01mg/L, 0.02mg/L, 0.1mg/L, 0.2mg/L. The standard working curve is shown as below.

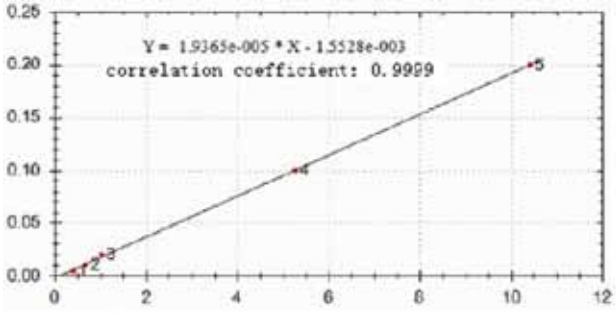


Figure 1 Linearity of low concentration samples

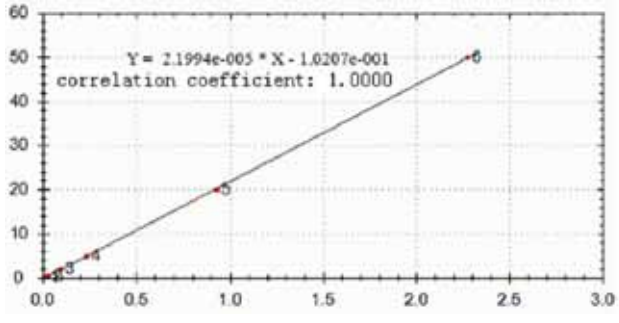


Figure 2 Linearity of high concentration samples

The curve of high concentration is made by 6 standard samples of different concentrations - 0.2mg/L, 0.5mg/L, 2mg/L, 5mg/L, 20mg/L, 50mg/L. The standard working curve is shown as below.

Results show good linearity of melamine at concentrations between 0.005mg/L~ 50.0mg/L.

(2) Reproducibility

Analyze 20μL of 5mg/L standard solution 6 times. Calculate the RSD of retention time and peak area. The results are listed in the table 3. Table 3 and figure 3 show good reproducibility of this method.

Table 3 Repeatability (precision) of retention time and peak area

Item \ Number	1#	2#	3#	4#	5#	6#	Average	RSD%
Rentention time/min	6.817	6.833	6.817	6.817	6.858	6.808	6.825	0.26
Peak area/μAu·s	571360	574492	569813	572187	574525	575593	572995	0.39

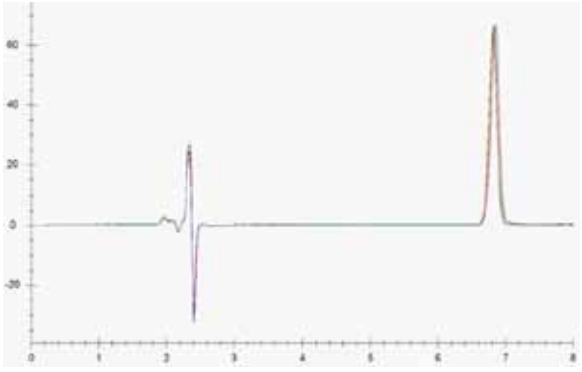


Figure 3 Chromatogram showing repeatability

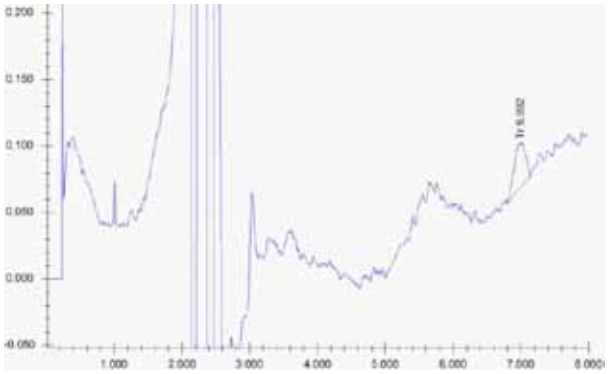


Figure 4 Chromatogram of 0.005 mg/L sample (indicating limit of detection)

(3) Limit of detection

Limit of detection (LOD) is estimated to be 0.0032mg/L from the peak height of noise in chromatogram of 0.005mg/L sample (figure 4). (S/N=3)

(4) Real samples

1) Milk sample

A) Figure 5 shows the chromatogram of blank milk sample.

B) Recovery of spiked milk sample

Figure 6 shows the chromatograms of spiked milk samples at concentrations of 1.0mg/kg, 5.0mg/kg and 10.0mg/kg.

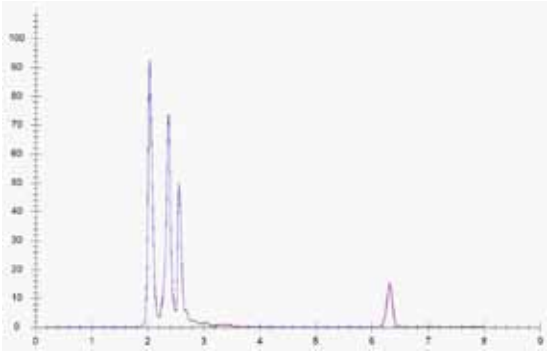


Figure 5 Chromatogram of blank milk sample

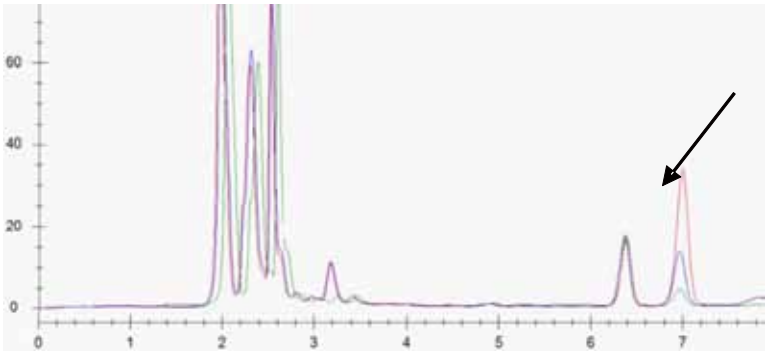


Figure 6 Chromatograms of spiked milk samples at different concentration levels

The recoveries of melamine obtained from above chromatograms are listed in table 4.

Table 4 Results of recovery of melamine spiked in milk

Sample	Amount of spiked melamine (mg/kg)	Amount of measured melamine (mg/kg)	Recovery(%)
Blank milk	0.00	-	-
1#	1.00	1.05	105.0%
2#	5.00	5.18	103.6%
3#	10.00	9.04	90.4%

The results show that the MAS cleanup method of melamine in milk has a good recovery and impurities are effectively removed. The melamine can be well separated from impurities.

2) Fish sample

A) Figure 7 shows the chromatogram of blank fish sample.

B) Recovery of spiked fish sample

Figure 8 and 9 show the chromatograms of spiked fish samples at concentrations of 1.0mg/kg, 5.0mg/kg and 10.0mg/kg.

From the chromatograms, the recoveries of melamine spiked in fish samples are listed in table 5.

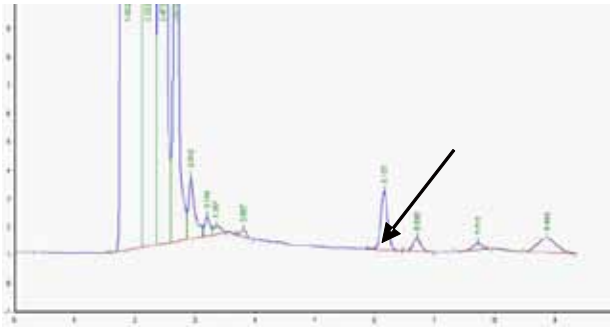


Figure 7 Chromatogram of blank fish sample

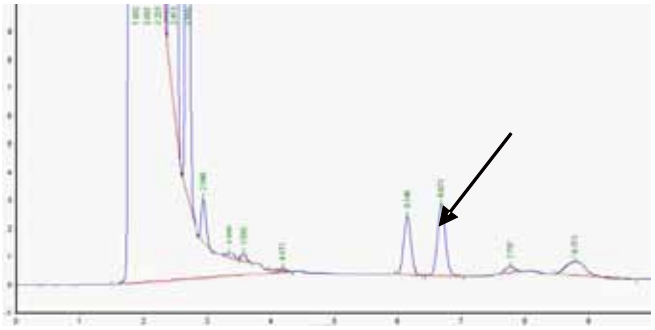


Figure 8 Chromatogram of spiked fish sample (1.0 mg/kg)

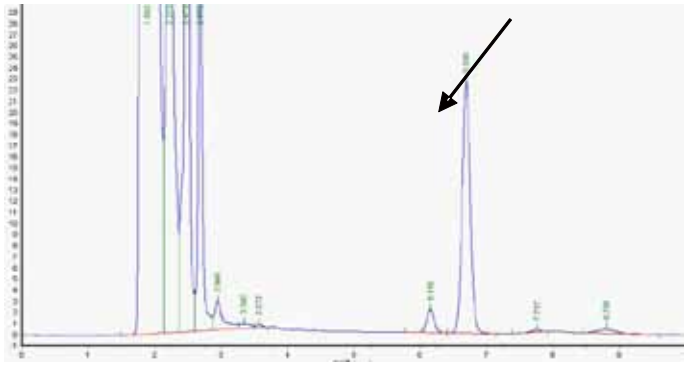


Figure 9 Chromatogram of spiked fish sample (10.0 mg/kg)

Table 5 Results of recovery of melamine spiked in fish

Sample	Amount of spiked melamine (mg/kg)	Amount of measured melamine (mg/ Kg)	Recovery(%)
Blank	0.00	-	-
1#	1	0.98	98.0%
3#	5	5.81	116.2%
5#	10	9.67	96.7%

The results show that the MAS pretreatment method of melamine in fish has a good recovery and impurities are effectively removed. The melamine can be well separated from impurities.

3) Egg sample

A) Figure 10 shows the chromatogram of blank egg sample.

B) Recovery of spiked egg sample

Figure 11 shows the chromatograms of spiked egg samples at concentrations of 1.0mg/kg, 5.0mg/kg and 10.0mg/kg.

The recoveries of melamine spiked in egg samples are listed in table 6.

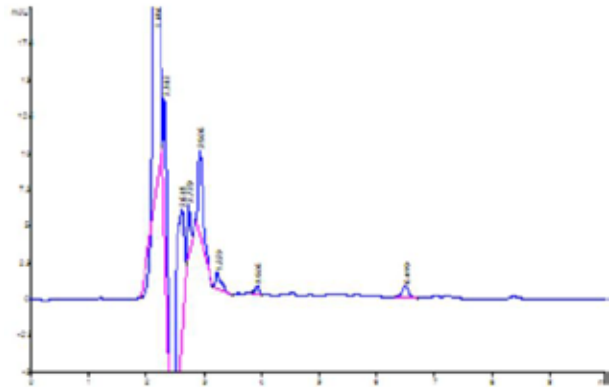


Figure 10 Chromatogram of blank egg sample

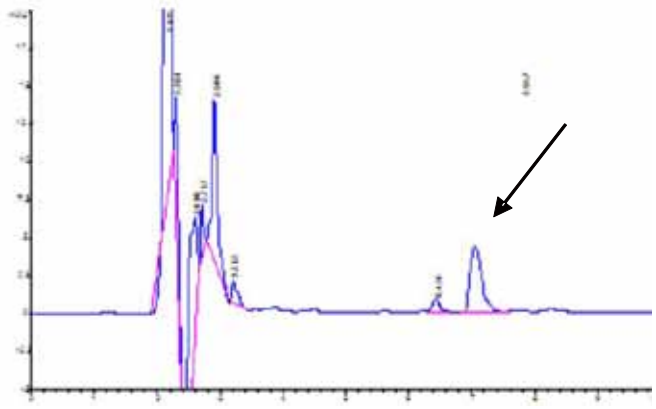


Figure 11 Chromatogram of spiked egg sample (5.0 mg/Kg)

Table 6 Recovery of melamine spiked in egg samples

Sample	spiked melamine (mg/kg)	measured melamine (mg/ Kg)	Recovery(%)
Blank	0.00	-	-
1#	1	0.89	89.0%
3#	5	5.55	111.0%
5#	10	10.48	104.8%

The results show that the MAS cleanup method of melamine in egg sample has a good recovery and impurities are effectively removed. The melamine can be well separated from impurities.

6. Conclusions

The above experiment results show that the MAS sample pretreatment method, which utilizes mixed anion exchange packing Cleanert PAX as extraction material, provides a fast and accurate approach for treatment of milk, fish and egg samples. Cation exchange column is used for HPLC analysis. The whole analysis method can be used for melamine in different samples, with low limit of detection, high repeatability, wide linear range and good recovery, which totally meets the demands of fast melamine.

Application of QuEChERS Fast Analysis Method for Pesticide Multi-residues(Cleanert PSA, C18, PestiCarb, NH2,P/N: PA0010, 180010, PC0010, NH0010)

1. Materials

PSA absorbent: Cleanert PSA
C18 absorbent : Cleanert ODS C18
Graphite carbon black absorbent: Cleanert PestiCarb
NH2 absorbent : Cleanert NH_2

2. Sample preparation

Take edible parts of samples, mince and mix. Weigh 15g (accurate to 0.01g) of sample and place it into a 100mL plastic centrifuge tube. Add 15mL of 0.1% acetic acid / acetonitrile solution, 6.0g of anhydrous magnesium sulfate, 1.5g of sodium acetate and homogenize.

Centrifugate at 5000r/min for 5 min. Take 10mL of organic phase accurately into a 15mL plastic centrifuge tube. Dry the solution under nitrogen stream. Vortex mix to dissolve the residue in 2.0mL of 0.1% acetic acid / acetonitrile solution. According to the interference of sample matrix, select and weigh proper amount of absorbents like C18, PSA, graphite carbon black or NH_2, and place into another 15mL plastic centrifuge tube. Transfer 2mL of the above dissolved solution to the centrifuge tube. Vortex mix for 2 min and centrifuge at 5000r/min for 3 min. Take the supernatant with a disposable syringe and filter through 0.45μm membrane for analysis.

3. GC analysis

The treated sample can be analyzed with GC-FPD for organophosphorus pesticide determination, GC-ECD for organochlorine pesticides determination or GC-MS for multi-residue organophosphorus, organochlorine, carbamate et al. Here GC-MS is applied for simultaneous multiple residues. The conditions of instrument are as follows:
Column: Agela DA-35MS capillary column, (30m×0.25mm×0.25μm,P/N:3525-3002);
Temperature programming in column box: 50℃ (for 2min), 10℃ /min to 180℃ (hold on for 1 min), 3℃ /min to 250℃ (hold on for 1 min), 2℃ /min to 270℃ (hold on for 15min);
Inlet temperature: 250℃ ;
Carrier gas: He (>99.999%), constant flow, flow rate 1.0mL/min;
Injection volume: 1μL;
Injection type: Splitless injection. After 0.8 min switch the splitting valve on.
Electron impact ionization source: 70eV;
Temperature of ionization soure: 250℃
Temperature of GC/MS interface: 250℃
Selected ion monitoring: For each compound, select one ion for quantitative analysis and 2~3 ions for qualitative analysis. All the ions to be determined in each group are monitored respectively at different time, according to their retention times.

4. Results

Recovery and precision experiments are carried out with spiked spinach, cabbage and yellow peach samples at three concentration levels. For each level, experiments are repeated six times. At the concentrations between 0.05mg/kg~1.0mg/kg, the recovery and RSD are 65%~120% and 1%~13.5%, respectively.

5. Discussion

(1) Improvement of sample extraction
The original QuEChERS analysis method in fast multiple pesticide residues uses shaking as the way of extraction and directly takes 2mL of the extract for next cleanup. The improved method uses homogenization for sample extraction and has better extraction efficiency, especially for those samples with long fiber and hard to mix. Dry 10mL of the extract under nitrogen stream. Then redissolve the residue in 2mL of extractive solvent for next cleanup. The reason for redissolving is that 10mL of the extract contains more analytes than 2mL. Therefore the detection sensitivity could be improved by 5 times theoretically. Besides, vegetables and fruits contain a large amount of water. Although anhydrous magnesium sulfate with better dehydration effect is used instead of anhydrous sodium sulfate, little water inevitably remains in the organic phase because of the intersolubility of water and acetonitrile, which is harmful to ECD detector and mass spectrometer. During the drying process under nitorgen, the solvent is hard to dry if there is too much water in organic phase. In this situation, some anhydrous magnesium sulfate could be added to remove the water completely. Then dissolve the residue in 2mL of extractive solvent for next cleanup.
(2) Improvement of sample cleanup
PSA has a good effect on fatty acid removal while for pigment, sterol and vitamin, the effect is ordinary. C18 and graphite carbon black have better ability of removing vitamin, pigment and sterol. The adsorption capability of NH_2 absorbent is even stronger than PSA. Thus during the cleanup, C18, NH_2 and graphite carbon black absorbents are also taken into consideration besides the original PSA. Moreover, the amount of absorbents used is not definite but adjustable for different sample matrix, which always goes between 100 and 350mg. For example, treat spinach sample both with original QuEChERS method and improved method. The prepared spinach sample by improved method is colorless and transparent while the old method treated sample looks green. It's obvious that the interference from matrix with improved method is smaller. As for recovery, C18 has no influence on pesticide recovery. But PSA, NH_2 and graphite carbon black could absorb some pesticides strongly, leading to a decreased recovery. In practice, it is best to choose appropriate absorbent and its amount according to the properties of matrix and the target compounds.

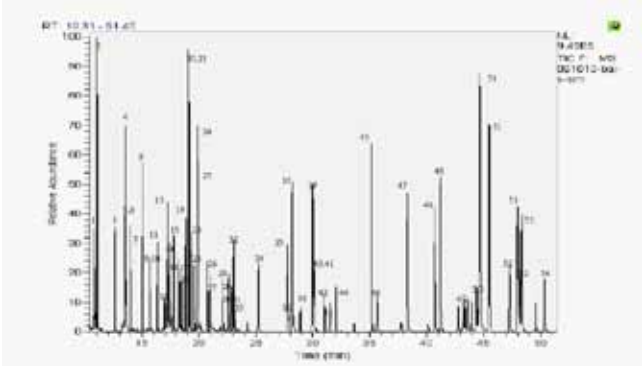


Figure 1 GC-EI-MS SIM spectrum of spiked cabbage sample

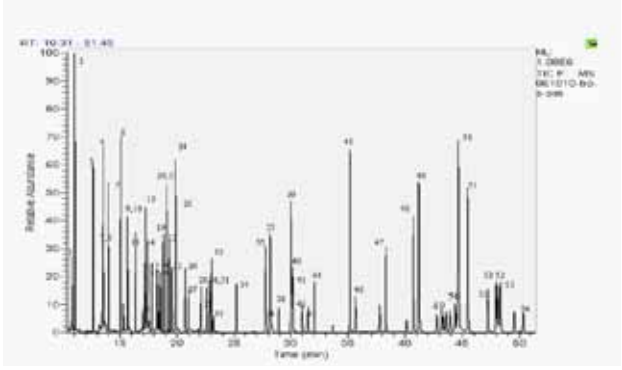


Figure 2 GC-EI-MS SIM spectrum of spiked spinach sample

The spiked concentration is the level 3 in table 4.

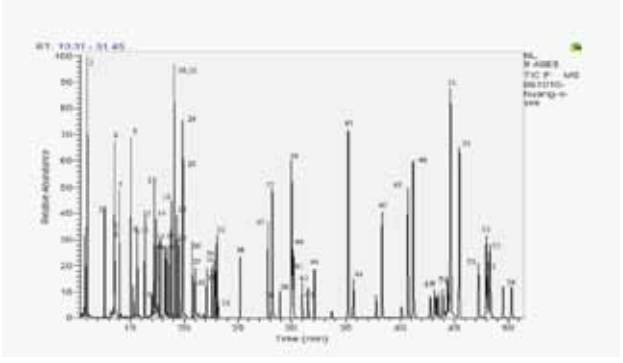


Figure 3 GC-EI-MS SIM spectrum of spiked yellow peach sample

For more details please download the article at Agela's website: http://www.agela.com.cn/
imidacloprid, tebufenozide, avennectins and hexythiazox in vegetables by QuEChERS-HPLC

Clopidol, Diclazuril and Sulfonamides in Animal Tissues by QuEChERS-HPLC Simultaneously(Cleanert PSA, C18, Alumina-N, P/N: PA0010,180010,AL0010-N)

1. Materials

PSA absorbent: Cleanert PSA
C18 absorbent: Cleanert C18
Neutral alumina absorbent: for chromatography (roast at 600℃ in muffle furnace before use)

2. Sample preparation

Weigh 5g (accurate to 0.01g) of minced and mixed sample in a 50mL centrifuge tube. Add 14mL of acetonitrile/chloroform (10/1) solution, 1.0mL of 10% sodium sulfate solution and homogenize. Centrifugate at 5000r/min for 5 min. Take 10mL of the extract precisely and concentrate or evaporate almost to dryness under nitrogen stream. Dilute with acetonitrile/chloroform (10/1) to 2mL. Choose and add proper amount of C18, PSA or alumina absorbents. Vortex mix for 2 min to purify sample by dispersed solid phase extraction. Centrifugate at 5000r/min for 3 min. Transfer 1.0mL of the supernatant precisely into another 15mL centrifuge tube. Dry under nitrogen stream and vortex dissolve the residue in 1.0mL of acetonitrile/water (12/88). Filter through 0.45μm membrane for analysis.

3. HPLC conditions

Column: Venusil ASB C18 (5μm, 3.9×150mm)
Mobile phase: A: acetonitrile; B: acetic acid/water (3/1000)
Gradient elution: see table 1
Flow rate: 1.0 mL/min; injection volume: 20μL;
Column temperature: 40℃ ; UV: 270nm.

Table 1 Program of gradient elution

Time/min	A %	B %	Gradient Curve
0.00	12	88	linear
8.50	12	88	linear
8.51	35	65	linear
15.00	35	65	linear
15.01	60	40	linear
20.00	60	40	linear
20.01	12	88	linear
25.00	12	88	linear

4. Results

(1) Linear range and limit of detection (LOD)

The limits of detection of different samples could not be exactly the same due to the difference of recovery even at the same spiked concentration. LOD of 7 compounds could reach: 0.05mg/kg for clopidol, 0.05mg/kg for sulfonamides, 0.10mg/kg for diclazuril.

(2) Recovery and precision

Recovery and precision experiments are carried out with spiked chicken meat and liver samples at three concentration levels, respectively. For each level, experiments are repeated six times. At the concentrations between 0.10mg/kg~1.0mg/kg, the recovery and RSD are 65%~100% and 1%~10%, respectively. Chromatograms of spiked chicken meat and liver samples are shown as figure 1 and 2, respectively.

5. Discussion

The original QuEChERS method for pesticide residues in vegetables needs 15g of sample and uses shaking for extraction. The extract is taken directly for next cleanup. The improved method for veterinary drug residues in animal tissues uses 5g of sample and extraction by homogenization has better extraction efficiency. Take 10mL of the extract and evaporate almost to dryness by rotary evaporator. Dissolve the residue and dilute with extractive solvent to 2mL for next cleanup. The improved method enriches more analytes than the original one. Therefore the sensitivity could be improved by 5 times theoretically.

PSA is used in the original QuEChERS method to remove fatty acids and pigments. As animal tissues have large amounts of proteins and fats, C18 and neutral alumina absorbent also need to be considered during the cleanup process. Sample cleanup is carried out by mixed dispersed solid phase extraction. The amount of different adsorbents, which usually is between 100 and 250mg, is adjustable with different sample matrices. As for recovery, C18 and neutral alumina have strong adsorption towards diclazuril, thus reducing its recovery. But these adsorbents can hardly adsorb other 6 veterinary drugs. PSA could absorb 7 compounds to different extents. In practice, it is best to choose appropriate absorbent and its amount according to the properties of matrix and the target compounds.

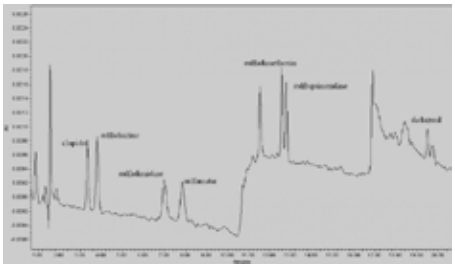


Figure 1 Chromatogram of spiked chicken meat sample

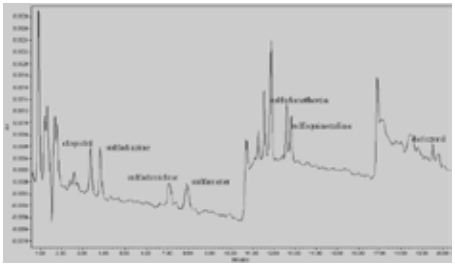


Figure 2 Chromatogram of spiked chicken liver sample

For more details please download the paper at Agela's website: http://www.agela.com.cn/
clopidol, diclazuril and sulfonamides in animal tissues by QuEChERS – HPLC

8. Determination of the banned azo colourants in Textiles

Banned azo colourants in textiles(Cleanert SLE Azo dyes Extraction Column, P/N:GB/T17592-2006)

Reduce the textiles in citrate buffer solution by sodiumdithionate to obtain forbidden aromatic amines that possibly exist. Extract the aromatic amines by proper liquild-liquid partition cartridge. After concentration, dilute to volume with proper organic solvent for determination by GC-MS. If necessary, choose one or more other methods to confirm the existence of isomers. HPLC/DAD or GC/MS is employed for quantification.

1. Materials

(1) Cleanert SLE extraction cartridge
20cm×2.5 cm (i.d.) polypropylene cartridge packed with 20 g of diatomite.
(2) Citrate buffer (0.06mol/L, pH=6.0)
Dissolve 12.526 g of citric acid and 6.320 g of sodium hydroxide in water and dilute to 1000 mL.
(3) Sodiumdithionate solution
200 mg/mL sodiumdithionate in water, fresh prepared with solid sodiumdithionate ($Na_2S_2O_4$ ≥ 85%) before use.

3. Sample preparation

Cut representative sample into small pieces of 5mm×5 mm and mix. Transfer 1.0 (accurate to 0.01g) of sample into reactor and add 16 mL of citrate buffer at 70±2° C. Seal the reactor and shake up until all samples are soaked in liquid. Put the reactor in water bath at 70±2° C for 30 min to soak the textiles thoroughly. Add 3.0 mL of sodiumdithionate solution, seal and shake up. After another 30 min in water bath, cool the reactor to room temperature in 2 min.

4. Extraction and concentration

(1) Extraction:
Press the sample in the reactor with glass rod, and transfer the liquid into diatomite extraction cartridge(2.1). Allow to adsorb for 15 min. Elute the cartridge with ether four times (20 mL×4). For each time, combine the ether and eluate, and load onto the cartridge. Control the flow rate. Collect the eluate in a round-bottom flask.
(2) Concentration:
Evaporate the eluate to 1 mL by rotary evaporator at 35° C and dry under a slow stream of nitrogen.

5. GC-MS analysis

Capillary column: DA-5MS,30m×0.25mm×0.25μm(P/N:1525-3002), or a corresponsive one.
Injection temperature: 250° C
Column temperature: 50° C (0.5min) 20° C/min 150° C(8min) 20° C/min 230° C (20min) 20° C/ min 260° C(5min)
MS interface temperature: 270° C MS scan range: 35~350amu; Injection mode: splitless; Carrier gas: He(≥ 99.999%); Flow rate: 1.0mL/min; Injection volume: 1μL; Ionization source: EI; Ionization voltage: 70eV

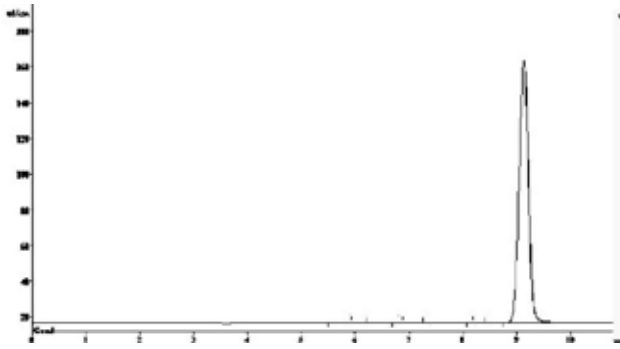
9. Removal of impurity ions and organic compounds

Nitrites in Food (Cleanert IC-Ag and Na, P/N: IC-Ag,IC-Na)

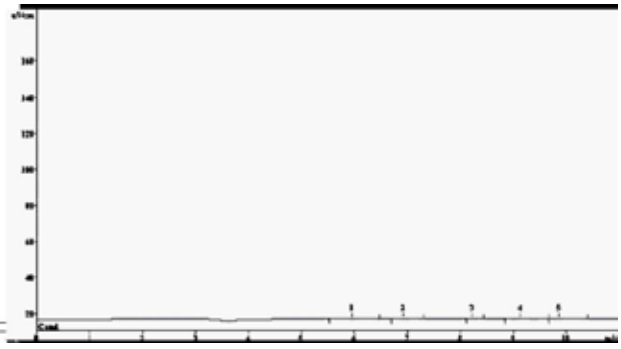
For nitrites in food, ion chromatography is gradually replacing diazonium-coupled spectrophotometric analysis for its convenience and accuracy. During sample preparation process, impurities in extracted water solution such as particles, organic compounds and Cl^- must be removed.

First particles are eliminated by MCM syringe filters. And then, Cleanert IC-RP cartridge is employed to remove organic compounds in samples to avoid contamination of ion chromatography cartridge; Cleanert IC-Ag and Na cartridges are combined to remove Cl^-, which can affect the peak shape of NO^{3-}.

The comparison of chromatograms before and after sample pretreatment is shown in the following figures to demonstrate the elimination effect of Cl– by Cleanert IC-Ag and Na cartridge.



Chromatogram of untreated sample



Chromatogram of sample treated by Cleanert IC-Ag and Na cartridge

Preparation Method for Oil Field Water(Cleanert IC-RP, P/N: IC-RP)

During oil exploration process, ion content in oil field water of different drilling depth must be monitored. Collect the supernatant of oil field water sample after centrifugation and eliminate particles by MCM syringe filter. Then remove organic compounds by Cleanert IC-RP cartridge.

Different preparation methods should be chosen according to the sample amount. Manual manipulation is more suitable for small amount of samples; SPE system, on the contrary, is capable of dealing with multiple samples at one time therefore more suitable for large scale of samples.

SPE Products

1. Categories of SPE Products

Classification according to the type of packings

(1) Bonded silica gel C18 end capping C18 Non-end capping C8 CN, NH_2, PSA, SAX, COOH, PRS, SCX, Silica, Diol.
The most commonly used packing materials in SPE are silica gel or bonded silica gels (Different functional groups are bonded to the silanol groups on the surface of silica gel). The applicable pH scope is 2.0-8.0. Various bonded-silica gel-based packing materials provide plenty of choices for use.

(2) Polymers PEP, PAX, PCX, PS, HXN.
In order to expand the applicable scale and improve the absorption balance as well as the reproducibility of reversed phase SPE packing materials, new types of reversed phase SPE packing materials based on polar functional polymeric resins appeared in the late 90s of late century. The packing material is copolymerized by ketopyrrolidine and divinyl-benzene. With the introduction of polar functional groups by ketopyrrolidine, this type of SPE cartridge has even absorption to polar and non-polar compounds. It overcomes the following disadvantages of conventional C18 cartridges:

- Cartridge drying — no soakage or adsorption
  — requiring careful manipulation during activation
- Inadequate or no retention of polar compounds;
- Low recovery of basic compounds – strong interaction with silanol groups;

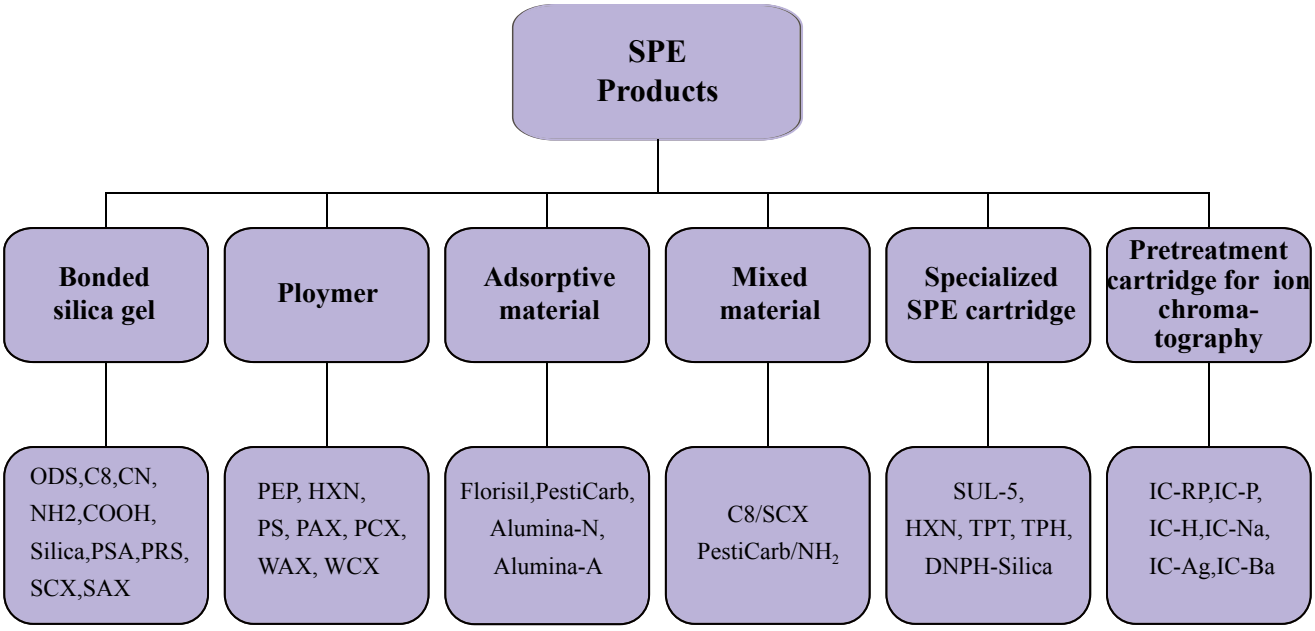
Poor recovery and reproducibility.

(3) Absorptive packing material Florisil magnesium silicate, PestiCarb graphitized carbon blac, alumina Alumina-N, neutral Alumina-A, acidic Alumina-B basic PestiCarb/NH_2

(4) Mixed and specialized series SUL-5(specialized for sulfanilamides) HXN(specialized for sulfonylurea herbicides) DNPH-Silica (collecting tube of aldehyde ketone compounds in air), TPT specialized for tea TPH specialized for Chinese medicinal herb

(5) MAS
MAS-Q series adopt the principle of media dispersion to realize the fast detection of pesticide residue and veterinary residue;
MAS-C series adopt 96-plate to remove protein and phospholipid in the analysis of drug;
The series is divided into MAS-A and MAS-B which use the packings with special adsorption to the endogenous impurity,such as phospholipid and realize the extraction of protein and drug at one step with the special designed membrane.

(6) Pretreatment cartridge of IC IC-RP IC-P IC-H IC-Na IC-Ag IC-Ba IC-A IC-M IC-Ag/H IC-Ba/H
Pretreatment minicartridges of Cleanert IC have been developed on the basis of the principle of SPE and remove organics and foreign ions effectively with high clean materials and the principle of reverse adsorption and ion-exchange, which avoid the pollution on the IC and the influence on seperation.



Classification according to the type of product

1. SPE minicartridge(Figure1)

About SPE minicartridge

- The common SPE cartridge can be divided into three parts: medical polypropylene tube, porous polypropylene sieve plate (20μm) and packings (40-60μm,80-100μm).
- Common specification:100mg/1mL,200mg/3mL,500mg/3mL,1g/6mL etc. Take 100mg/1mL of cartridge as an example, 100mg is the quality of packings and 1mL is the volume of void column(bulk volume of cartridge-the volume of packings) .
- Disposable usage:SPE is disposable for avoiding the crossing pollution and reliability of detection.

Figure 1 SPE cartridge

(2) 96-plate(Figure 2)

96-plate is the product with high throughput. Every hole contains little adsorbent (10-100mg)with sample loading of 2mL/hole. With the main application in the cleanup of multi-sample in the area of biology and medicine, it mostly connects with the automated sample-dealing equipment (liquid dealing working station of Tomtec) for operation. The basic principle and method are similar with that of SPE.

Figure 2 96-well plate

(3) Modularization 96-plate (Figure 3)

The innovative modularization 96-plate created by Agela is different with the common one on the following points:every minicartridge can be dismantled and combined freely; the minicartridges can be used independently; at the same time, the minicartridges can be combined with the same

Figure 3 96-wellplate of Modularization

materials or different materials according to the requirement of the customers. Details refer to “ Products Manual of Drug Metabolism Analysis”

(4) Pretreated cartridge of IC (Figure 4)

Specialize in the detection of IC with easy operation; liquid sample and extracted liquid can be pushed by the minicartridge in order to achieve cleanup.

Figure 4 Pretreated cartridge of IC

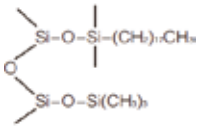
(5) Bulk packings(Figure 5)

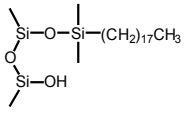
Be suitable for diversified requirements from customers and the demand of matrix dispersion and Quenchers-users.

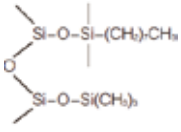
Figure 5 Bulk media

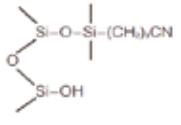
2. Ordering information

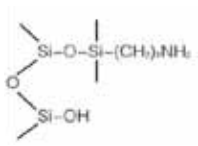
Silica matrix

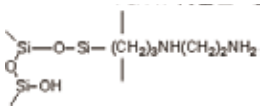
PaPcking Material	DeDscription	Specification, Package	Cat. No.
ODS C18 (end capping) 	Cleanert C18 (end capping) is a silica based reversed phase C18 SPE cartridge. Three major advantages of this cartridge are high ligand density, low bleeding and high recovery. This cartridge is equivalent to BondElute C18 or Super clean ENVI C18. It is mainly used for analysis of drugs and their metabolites in blood, plasma or urine, desalting of macromolecules such as proteins and DNAs, and enrichment of organic components in environmental water samples and so on.	100mg/1mL,100	181001
		200mg/3mL,50	182003
		500mg/3mL,50	185003
		500mg/6mL,30	185006
		1000mg/6mL,30	180006
		10g/bottle	180010
		100g/bottle	180100
		50mg/2mL/well,96w	180502-W
		100mg/2mL/well,96w	181002-W

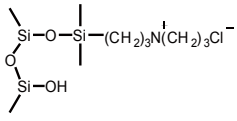
Packing Material	DeDscription	Specification, Package	Cat. No.
ODS C18-N (Non-end capping) 	Cleanert ODS C18-N (without end capping) is a silica based reversed phase C18 SPE cartridge without end capping. The silanol functional groups of the surface provide extra polar interaction. Compared with the end capping adsorbent, this cartridge enhances the retention of basic compounds. This cartridge is a universal stationary phase for both polar and non-polar compounds. It is equivalent to Aglient AccuBond C18 or BondElute C18 OH.	100mg/1mL,100	181001-N
		200mg/3mL,50	182003-N
		500mg/3mL,50	185003-N
		500mg/6mL,30	185006-N
		1000mg/6mL,30	180006-N
		10g/bottle	180010
		100g/bottle	180100
		50mg/2mL/well,96w	180502-N-W
		100mg/2mL/well,96w	181002-N-W

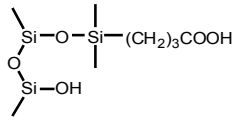
Packing Material	Description	Specification, Package	Cat. No.
C8 	The absorbability of Cleanert C8 is similar with C18 cartridge, which depends on non-polar C-C interaction. Because the carbon number of C8 is smaller than C18, the retention of non-polar compounds is weaker than C18, which is helpful for the elution of non-polar sample strongly adsorbed. The C8 SPE cartridge can extract fat-soluble and water-soluble vitamins from plasma simultaneously. This cartridge can also be used for desalting of biological macromolecules.	100mg/1mL,100	081001
		200mg/3mL,50	082003
		500mg/3mL,50	085003
		500mg/6mL,30	085006
		1000mg/6mL,30	080006
		10g/bottle	180010
		100g/bottle	180100
		50mg/2mL/well,96w	080502-W
		100mg/2mL/well,96w	081002-W

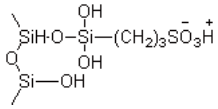
Packing Material	Description	Specification, Package	Cat. No.
CN 	Cleanert CN(cyano-)SPE cartridge is cyanopropyl-boned-silica based extraction cartridge. This cartridge has medium polarity, and can be used for reversed phase or normal phase extraction.	100mg/1mL,100	CN1001
		200mg/3mL,50	CN2003
		500mg/3mL,50	CN5003
		500mg/6mL,30	CN5006
		1000mg/6mL,30	CN0006
		10g/bottle	CN0010
		100g/bottle	CN0100
		50mg/2mL/well,96w	CN0502-W
		100mg/2mL/well,96w	CN1002-W

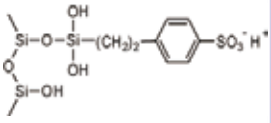
Packing Material	Description	Specification, Package	Cat. No.
NH_2 	Cleanert NH_2 (amino-) is aminopropyl-bonded-silica based extraction cartridge. It contains polar stationary phase and weak anion exchanger, so it has double retention behaviors based on weak anion exchange (aqueous solution) and polar adsorption (non-polar organic solution). When using it in non-polar solution (like hexane), this cartridge can form hydrogen bond with molecules containing –OH, -NH or –SH functional groups. The pKa of amino group is 9.8, so the interaction between amino group and anion is weaker than that of SAX. When using it in aqueous solution, pH < 7.8, this cartridge can be used as weak anion exchanger to remove strong anions like sulfonate ion in samples.	100mg/1mL,100	NH1001
		200mg/3mL,50	NH2003
		500mg/3mL,50	NH5003
		500mg/6mL,30	NH5006
		1000mg/6mL,30	NH0006
		10g/bottle	NH0010
		100g/bottle	NH0100
		50mg/2mL/well,96w	NH0502-W
		100mg/2mL/well,96w	NH1002-W

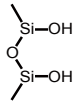
Packing Material	Description	Specification, Package	Cat. No.
PSA N-propyl ethylenediamine 	Cleanert PSA is similar with NH2. PSA has two amino groups with the pKa of 10.1 and 10.9 respectively. This cartridge has stronger ion exchange capacity than NH2 cartridge. Besides, PSA cartridge can form chelation with metal ions, so it can be used to extract metal ions. The major application of this cartridge is sample pretreatment of pesticide analysis to remove the organic acids, pigments, metal ions and phenols.	100mg/1mL,100	PA1001
		200mg/3mL,50	PA2003
		500mg/3mL,50	PA5003
		500mg/6mL,30	PA5006
		1000mg/6mL,30	PA0006
		10g/bottle	PA0010
		100g/bottle	PA0100
		50mg/2mL/well,96w	PA0502-W
		100mg/2mL/well,96w	PA1002-W

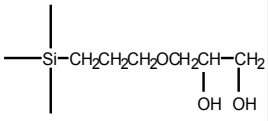
Packing Material	Description	Specification, Package	Cat. No.
SAX Strong Anion Exchange 	Cleanert SAX is silica based strong anion exchange SPE cartridge, in which quaternary ammonium salt functional groups are boned to silica support. This kind of strong anion exchanger can extract negatively charged compounds from aqueous or non-aqueous solution, especially suitable for extraction of weak acids. The major application of this cartridge is extraction of weak anionic compounds, such as carboxylic acids and so on. It is equivalent to BondElute SAX. This packing material is often used to remove strong anions (organic acids, nucleic acids, nucleotides, sulfonate ion, inorganic ions, etc) from samples, and applied for desalting of biological macromolecules.	100mg/1mL,100	SA1001
		200mg/3mL,50	SA2003
		500mg/3mL,50	SA5003
		500mg/6mL,30	SA5006
		1000mg/6mL,30	SA0006
		10g/bottle	SA0010
		100g/bottle	SA0100
		50mg/2mL/well,96w	SA0502-W
		100mg/2mL/well,96w	SA1002-W

Packing Material	Description	Specification, Package	Cat. No.
COOH 	Cleanert COOH is silica based weak cation exchange SPE cartridge. Carboxyl groups with pKa of 3.8 are bonded to silica support. It is equivalent to BondElute CBA. It is used to extract quaternary ammonium salts or other strong cations.	100mg/1mL,100	CH1001
		200mg/3mL,50	CH2003
		500mg/3mL,50	CH5003
		500mg/6mL,30	CH5006
		1000mg/6mL,30	CH0006
		10g/bottle	CH0010
		100g/bottle	CH0100
		50mg/2mL/well,96w	CH0502-W
		100mg/2mL/well,96w	CH1002-W

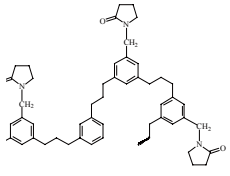
Packing Material	Description	Specification, Package	Cat. No.
PRS Propyl Sulfonic Acid 	Cleanert PRS is silica based strong cation exchange SPE cartridge. Silica support is bonded with propylsulfonic acid functional groups, the acidity of which is a little less than SCX. It has high recovery for extraction of weak cations, such as pyridine and so on. This cartridge is widely used for sample pretreatment of malachite green.	100mg/1mL,100	PR1001
		200mg/3mL,50	PR2003
		500mg/3mL,50	PR5003
		500mg/6mL,30	PR5006
		1000mg/6mL,30	PR0006
		10g/bottle	PR0010
		100g/bottle	PR0100
		50mg/2mL/well,96w	PR0502-W
		100mg/2mL/well,96w	PR1002-W

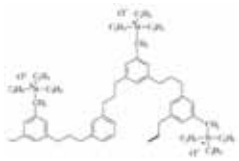
Packing Material	Description	Specification, Package	Cat. No.
SCX Strong Cation Exchange 	Cleanert SCX is silica based strong cation exchange SPE cartridge, in which silica is bonded with benzene sulfonic acid functional groups. It is used for extraction of organic basic compounds and desalting of biological macromolecules. Besides, it can be mixed with C18 for extraction of organic basic compounds, such as antibiotics, drugs, organic bases, amino acids, catecholamine, herbicides, nucleic acid bases, nucleosides, surfactants and so on.	100mg/1mL,100	SC1001
		200mg/3mL,50	SC2003
		500mg/3mL,50	SC5003
		500mg/6mL,30	SC5006
		1000mg/6mL,30	SC0006
		10g/bottle	SC0010
		100g/bottle	SC0100
		50mg/2mL/well,96w	SC0502-W
		100mg/2mL/well,96w	SC1002-W

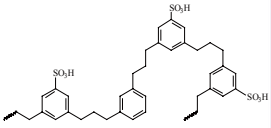
Packing Material	Description	Specification, Package	Cat. No.
Silica 	Cleanert Silica is non-bonded silica based polar SPE cartridge with weak acidity and strong polarity. It is used for separation of non-polar or weak polar compounds, such as lipids, especially these compounds with similar structures.	100mg/1mL,100	SI1001
		200mg/3mL,50	SI2003
		500mg/3mL,50	SI5003
		500mg/6mL,30	SI5006
		1000mg/6mL,30	SI0006
		10g/bottle	SI0010
		100g/bottle	SI0100
		50mg/2mL/well,96w	SI0502-W
		100mg/2mL/well,96w	SI1002-W

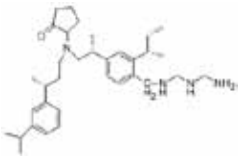
Packing Material	Description	Specification, Package	Cat. No.
Diol 	Cleanert Diol is diol group-bonded- silica based SPE cartridge. Relying on polar interaction, it can extract polar compounds from non-polar solutions. Similar with non-bonded silica cartridge, this cartridge can form hydrogen bond with samples, and can also separate samples with similar structures. Besides, it can also be used for extraction of non-polar compounds, as its bonded carbon chain can provide enough non-polar interaction to retain hydrophobic samples.	50mg/1mL,100	DI0501
		100mg/1mL,100	DI1001
		500mg/3mL,50	DI5003
		500mg/6mL,30	DI5006
		1000mg/6mL,30	DI0006
		10g/bottle	DI0010
		100g/bottle	DI0100
		50mg/2mL/well,96w	DI0502-W
		100mg/2mL/well,96w	DI1002-W

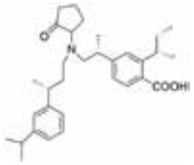
Macromoleclar polymer matrix

Packing Material	Description	Specification, Package	Cat. No.
PEP 	Cleanert PEP(Polar Enhanced Polymer) is functional polystyrene/ divinylbenzene SPE cartridge. The surface is bonded with hydrophilic and hydrophobic functional groups simultaneously. So this cartridge has equivalent adsorption interaction with polar or non-polar compounds. The applicable pH range is 1-14. The adsorption capacity and sample capacity of this cartridge is much higher than silica based C18 cartridge (3-10 times). It is widely used for extraction, enrichment, purification of varieties of compounds. Many strong hydrophilic compounds, which can hardly be retained by C18, have good recovery on PEP cartridge. It is equivalent to Waters Oasis HLB.	30mg/1mL,100	PE0301
		60mg/1mL,100	PE0601
		60mg/3mL,50	PE0603
		150mg/6mL,30	PE1506
		500mg/6mL,30	PE5006
		10g/bottle	PE0010
		100g/bottle	PE0100
		30mg/2mL/well,96w	PE0302-W
		50mg/2mL/well,96w	PE0502-W

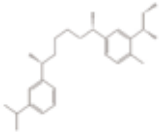
Packing Material	Description	Specification, Package	Cat. No.
PAX 	Cleanert PAX is water infiltrated polymer based SPE cartridge, which depends on cation exchange mixed principle. It is stable during the pH range of 0-14. This cartridge is used for extraction of acidic compounds and their metabolites from biological matrices. It is equivalent to Waters Oasis MAX.	30mg/1mL,100	AX0301
		60mg/1mL,100	AX0601
		60mg/3mL,50	AX0603
		150mg/6mL,30	AX1506
		500mg/6mL,30	AX5006
		10g/bottle	AX0010
		100g/bottle	AX0100
		30mg/2mL/well,96w	AX0302-W
		50mg/2mL/well,96w	AX0502-W

Packing Material	Description	Specification, Package	Cat. No.
PCX 	Cleanert PCX is water infiltrated polymer based SPE cartridge, which depends on cation exchange mixed principle. It provides dual retention modes: ion exchange and reversed phase retention. It is stable in the pH range of 0-14. In addition, this cartridge has high binding capacity. It is widely used for extraction and purification of basic compounds from biological matrices, which need high adsorption capacity, such as plasma, urine, bile, tissue homogenate. It is equivalent to Waters Oasis MCX.	30mg/1mL,100	CX0301
		60mg/1mL,100	CX0601
		60mg/3mL,50	CX0603
		150mg/6mL,30	CX1506
		500mg/6mL,30	CX5006
		10g/bottle	CX0010
		100g/bottle	CX0100
		30mg/2mL/well,96w	CX0302-W
		50mg/2mL/well,96w	CX0502-W

Packing Material	Description	Specification, Package	Cat. No.
PWAX 	Cleanert PWAX is water infiltrated polymer based SPE cartridge, which depends on weak negative ion exchange and reverse mixture principle. It is stable in the range of pH 0-14. It 's used for extracting the acidic compounds and metabolite from biological matrix. It is equivalent to Waters Oasis WAX.	30mg/1mL,100	WA0301
		60mg/1mL,100	WA 0601
		60mg/3mL,50	WA 0603
		150mg/6mL,30	WA 1506
		500mg/6mL,30	WA 5006
		10g/bottle	WA 0010
		100g/bottle	WA 0100
		30mg/2mL/well,96w	WA 0302-W
		50mg/2mL/well,96w	WA 0502-W

Packing Material	Description	Specification, Package	Cat. No.
PWCX 	Cleanert PWCX is water infiltrated polymer based SPE cartridge, which depends on cation exchange principle. It provides dual-retention mode i.e. ion exchange and reverse retention. Packing is stable in the range of pH 0-14 and large in the capacity of combination. It 's usually used for extracting alkaline compounds from the biological matrix wich needs high adsorption such as plasma, urine, bile and tissue homogenate. It is equivalent to Waters Oasis WCX.	30mg/1mL,100	WC0301
		60mg/1mL,100	WC 0601
		60mg/3mL,50	WC 0603
		150mg/6mL,30	WC 1506
		500mg/6mL,30	WC 5006
		10g/bottle	WC 0010
		100g/bottle	WC 0100
		30mg/2mL/well,96w	WC 0302-W
		50mg/2mL/well,96w	WC 0502-W

Packing Material	Description	Specification, Package	Cat. No.
HXN	Cleanert HXN is medium polar polymer, specialized for sulfonylurea compounds, functional polystyrene/ divinylbenzene SPE cartridge. The polarity of HXN is a little less than PEP. This cartridge is specialized for sample preparation of ppb order of magnitude sulfonylurea herbicides in soil or water. It is widely used for extraction, enrichment and purification of varieties of medium and strong polar compounds.	30mg/1mL,100	HX0301
		60mg/1mL,100	HX0601
		60mg/3mL,50	HX0603
		150mg/6mL,30	HX1506
		500mg/6mL,30	HX5006
		10g/bottle	HX0010
		100g/bottle	HX0100
		30mg/2mL/well,96w	HX0302-W
		50mg/2mL/well,96w	HX0502-W

Packing Material	Description	Specification, Package	Cat. No.
PS 	Cleanert PS is un-substituted polystyrene/ divinylbenzene SPE cartridge. The polarity of this adsorbent is a little more than silica based C18. Because of high specific surface (>600m^2/g), this cartridge has high adsorbability and sample capacity for both non-polar and polar compounds.	30mg/1mL,100	PS0301
		60mg/1mL,100	PS0601
		60mg/3mL,50	PS0603
		150mg/6mL,30	PS1506
		500mg/6mL,30	PS5006
		10g/bottle	PS0010
		100g/bottle	PS0100
		30mg/2mL/well,96w	PS0302-W
		50mg/2mL/well,96w	PS0502-W

Adsorption

Packing Material	Description	Specification, Package	Cat. No.
Florisil Magnesium Silicate	Cleanert Florisil has high selectivity. This adsorbent is composed of three components: silicon dioxide (84%), magnesium oxide (15.5%) and sodium sulfate (0.5%). It is widely used SPE packing with good effect and economical cost. It is designed for AOAC, EPA, and other methods, which are used for purification and/or separation of pesticide residues, endocrines, lipids, PCBs, PAHs, nitrogen-containing hydrocarbons, antibiotics, etc. It is widely used to remove pigments in pesticide residue analysis, as the absolutely necessary sample pretreatment SPE cartridge for NY871 analysis method.	100mg/1mL,100	FS1001
		200mg/3mL,50	FS2003
		500mg/3mL,50	FS5003
		500mg/6mL,30	FS5006
		1000mg/6mL,30	FSi0006
		10g/bottle	FS0010
		100g/bottle	FS0100
		50mg/2mL/well,96w	FS0502-W
		100mg/2mL/well,96w	FS1002-W

Packing Materia	Description	Specification, Package	Cat. No.
PestiCarb Graphitized Carbon	Cleanert PestiCarb uses new carbon black material (spherical) as cartridge packing, which has high purification effect, high recovery and high reproducibility. It is widely used in pesticide residue analysis, especially pretreatment of samples containing large amount of pigments, such as vegetables or fruits. It is equivalent to Envi carb packing. It is widely used to remove pigments in pesticide residue analysis.	100mg/1mL,100	PC1001
		250mg/3mL,50	PC1001
		200mg/3mL,50	PC2003
		250mg/6mL,30	PC2003
		500mg/3mL,50	PC5003
		500mg/6mL,30	PC5006
		1g/6mL,30	PC0006
		1g/10mL,20	PC00010
		2g/10mL,20	PC00020
		10g/bottle	PC0010
		100g/bottle	PC0100
		50mg/2mL/well	PC0502-W
		100mg/2mL/well	PC1002-W

Packing Material	Description	Specification, Package	Cat. No.
Alumina N	Cleanert Alμmina N is neutral aluminum oxide SPE cartridge, the pH of which is 7.5. It is a strong polar adsorbent. The neutral surface can easily retain electron rich compounds, such as heterocyclic compounds (containing N, P, and S.), aromatic compounds, organic amines and so on. After special deactivation to ensure sample pretreatment, this cartridge packing can be used for pretreatment of samples like vitamins, antibiotics, aromatic oils, enzymes, glycosides and so on. It is widely used for pretreatment of samples containing sudan red or malachite green.	100mg/1mL,100	AL1001-N
		200mg/3mL,50	AL2003-N
		500mg/3mL,50	AL5003-N
		500mg/6mL,30	AL5006-N
		1000mg/6mL,30	AL0006-N
		10g/bottle	AL0010-N
		100g/bottle	AL0100-N
		50mg/2mL/well,96w	AL0502-N-W
		100mg/2mL/well,96w	AL1002-N-W

Packing Material	Description	Specification, Package	Cat. No.
Alumina A	Cleanert Alumina A is acidic alumina SPE cartridge, the pH of which is 4.5. It can be used as strong polar adsorbent and medium cation exchanger. The special deactivation of this cartridge makes sure the reproducibility of samples.	100mg/1mL,100	AL1001-A
		200mg/3mL,50	AL2003-A
		500mg/3mL,50	AL5003-A
		500mg/6mL,30	AL5006-A
		1000mg/6mL,30	AL0006-A
		10g/bottle	AL0010-A
		100g/botle	AL0100-A
		50mg/2mL/well,96w	AL0502-A-W
		100mg/2mL/well,96w	AL1002-A-W

Packing Material	Description	Specification, Package	Cat. No.
Alumina B	Cleanert Alumina B is basic alumina SPE cartridge, the pH of which is 10. After special deactivation to ensure the reproducibility of samples, it can be used to remove organic acids, phenols and so on.	100mg/1mL,100	AL1001-B
		200mg/3mL,50	AL2003- B
		500mg/3mL,50	AL5003- B
		500mg/6mL,30	AL5006- B
		1000mg/6mL,30	AL0006- B
		10g/bottle	AL0010- B
		100g/bottle	AL0100- B
		50mg/2mL/well,96w	AL0502-B-W
		100mg/2mL/well,96w	AL1002-B-W

Mixed and specialized cartridge

Packing Material	Description	Specification, Package	Cat. No.
Cleanert PestiCarb/NH_2	Cleanert PestiCarb/NH_2 is filled with equal PestiCarb and NH_2, extensively used in produce analysis,especially in the detection of various pesticide residue listed in 'Positive List System' of Japan. It is mainly applied in the removal of pigment, delspray and phenols,especially the extraction of organophosphorus in the tea.		
		500mg/500mg/6mL,30	PN0006
		300mg/500mg/6mL,30	PN8006

Packing Material	Description	Specification, Package	Cat. No.
Cleanert TPT	Cleanert TPT is layeredly filled with three materials according to a certain proportion. The main function is to get rid of the pigment , volatile organic acid and tea polyphenol in the tea without adsorbing targeted pesticide in order to keep the purification and recovery of the sample. It has been applied in 'GB/T 23204-2008 Detection of 519 pesticides and related chemical residues in the tea with LC/MS'		
		1g/6mL,30	TPT0006
		2g/10mL,20	TPT200010

Packing Material	Description	Specification, Package	Cat. No.
Cleanert TPH	Cleanert TPH is layeredly filled with three materials according to a certain proportion. The main function is to get rid of pigment, acidic interfered impurity, sugar and ester – soluble impurity without adsorbing the targeted pesticide in Chinese medicinal herb. It has been applied in 'GB/T 23200-2008 Detection of 488 pesticide residues and related chemicals residues in the ramulus mori, honeysuckle and the fruit of Chinese wolfberry with GS-MS' and 'GB/T 23201-2008 Detection of 413 pesticide residues and related chemicals residues in the ramulus mori, honeysuckle and the fruit of Chinese wolfberry with LC-MS/MS'		
		1g/6mL,30	TPH0006
		2g/10mL,20	TPH200010

Packing Material	Description	Specification, Package	Cat. No.
Cleanert SUL-5	SUL-5(specialized for sulfanilamide)is filled with polar materials. It can be used for the pretreatment of 5 sulfanilamides (SM2, SMM, SMZ, S D M, SQ) with special craftsmanship. The method is refer to appendix E of NY 5029-2001	2g/10mL , 20	SUL-5

Packing Material	Description	Specification, Package	Cat. No.
Cleanert DNPH-Silica	DNPH-Silica employs the derivant generated from the specific reaction of DNPH and carbonyl compounds to separate. It's mainly used in the collection of aldehyde ketone from automobiles and atmosphere in the room.	200mg/3mL , 1piece/package	DN 2003
		1mL , 1 piece/package	ICDN2001

Packing Material	Description	Specification, Package	Cat. No.
Cleanert SLE (specialized in pretreatment of azo dyes)	Cleanert SLE is designed according to the cartridge in 'Detection of Textiles/Forbidden Azo Dyes' with the feature of ease and quickness. The processed celatom is characterized by high purity, high specific surface , high water absorbing capacity and inert surface. Obvious advantages are outstanding in the line of the same products after comparison.	14.5g/60mL ,20	GB/T 17952-2006

Packing Material	Description	Specification, Package	Cat. No.
Cleanert SLE	The processed elatom with the highest specific surface and lowest surface activity can provide ideal supported surface for liquid-liquid distribution. It is suitable for drug analysis in the blood and tissue; ①Replace traditional separating funnel to achieve liquid-liquid extraction for surface support of solid phase. ② Complete extraction through loading sample and elution. ③ Easy, efficient and convenient on operation; save solvent, time and raw material.	100mg/1mL,100	HC1001
		200mg/3mL,50	HC2003
		500mg/3mL,50	HC5003
		500mg/6mL,30	HC5006
		1000mg/6mL,30	HC0006
		100g/bottle	HC0100
		1000g/bottle	HC1000
		200mg/2mL/well,96w	HC2002-W
		400mg/2mL/well,96w	HC4002-W
		500mg/2mL/well,96w	HC5002-W

Packing Material	Description	Specification, Package	Cat. No.
C8/SCX	It is silica based mixed C8 and strong cation exchange SPE cartridge. It is widely used for extraction of basic drugs from urine and blood.	50mg/1mL,50	CS0503
		130mg/1mL,50	CS1303
		300mg/3mL,50	CS3003
		500mg/6mL,30	CS5006
		1000g/6mL,30	CS0006
		10g/bottle	CS0010
		100g/bottle	CS0100
		30mg/2mL/well,96w	CS0502-W
		50mg/2mL/well,96w	CS1002-W

Packing Material	Description	Specification, Package	Cat. No.
NY1380-2007 method ----pretreatment of 51 pesticides in vegetables and fruits	NY1380-2007method kit	1	NY1380-2007
	Cleanert PSA adsorbent	100g	PA0010
	Cleanert C18 adsorbent	100g	180100
	Anhydrous magnesium sulfate	500g	7487-88-9
	50-mL polystyrene centifuge tube with cap	30pieces	PSP50
	3-ethyoxyl-1,2-propylene glycol(98%)	1g	1874-62-0
	Sorbitol(98%)	0.5g	NY1380-2007

MAS

MAS-Q

Item No.	Vessel	Packing Material	Application	Package (piece/package)	Description
MS-SPC5001	50-mL centrifuge tube	Polystyrene materials of hyamine fictionalized	Application for complex matrix (such as feed, chocolate, flour, fish and meat etc.	50	The series is developed on the principle of matrix dispersion and SPE, and used for the detection of pesticide residue and veterinary residue. The operation is easy as below: Add liquid sample or extracted liquid into the centrifuge tube, virate and mix, take the supernate after centrifuge for concentration or detection.
MS-SPM5001	50-mL centrifuge tube	Polystyrene materials of hyamine fictionalized	Application for pretreatment on melamine and pretreatment on melamine in dairy	50	
MS-MG5050	50-mL centrifuge tube	6g $MgSO_4$(anhydrous) 1.5g NaAc.$3H_2O$ 100mg PSA	Application for melon and fruit etc. (NYT-1380-2007)	50	
MS-PA1510	15-mL centrifuge tube	100mg C18 0.3g $MgSO_4$(anhydrous)	Application for removing acidic impurity and water (NYT-1380-2007)	50	
MS-PN5050	50-mL centrifuge tube	6g $MgSO_4$(anhydrous) 250mg PestiCarb 500mg NH_2	Application for melon and fruit etc.,equal to the efficiency of PC/NH_2	50	
MS-PC0205	1.5-mL centrifuge tube	50mg PestiCarb	Application for little matrix with more chlorophyll	100	
MS-PC5050	50-mL centrifuge tube	500mg PestiCarb	Application for lots of sample matrixes with more chlorophyll	50	
MS-PA0250	1.5-mL centrifuge tube	50mg PSA 150mg	Application for removing acidic impurity and water	100	
MS-PA5050	50-mL centrifuge tube	$MgSO_4$(anhydrous) 500mg PSA 1.5g $MgSO_4$(anhydrous)	Application for removing acidic impurity and water	50	
MS-185050	50-mL centrifuge tube	500mg C18	Application for lots of sample matrixes with fat	50	
MS-180205	1.5-mL centrifuge tube	50mg C18, 150mg $MgSO_4$(anhydrous)	Application for removing the lipoprotein in the hand samples	100	
MS-NMS5050	50-mL centrifuge tube	4g magnesium, 1g sodium chloride, 1.5g sodium citrate, 0.5g hydrates, 1g ternary dihydrate of sodium citrate	Application for the detection of residues in the melon and fruit	50	
MS-PAMG1550	15-mL centrifuge tube	magnesium, 750mg PSA 125mg	Application for the detection of residues in the melon and fruit	100	

MAS-C

Term of Product	Item No.	Specification	Application	Package	Description
MAS-B	MSC-B	1 mL	Application for the pretreatment on the alkaline and neutral drugs in plasma and removal of protein and phospholipid	100(pieces/ package)	MAS is Multi-function Impurity Adsorption SPE. Through wipping off the protein and phospholipid in drug analysis, and the packings with the specifical adsorption to the endogenous impurities to realize the precipitation of protein and extraction of drugs in one step with special membrance.
	MS-B-w	Well/2 mL		96w	
MAS-A	MSC-A	1 mL	Application for the pretreatment on the acidic drugs in plasma and removal of protein and phospholipid	100(pieces/ package)	
	MS-A-w	Well/2 mL		96w	

Cleanert IC sample pretreatment cartridge for ion chromatography

Cartridge packing		Average particle size	Exchange capacity	Application	Specification, Package	Cat. No.
IC-ODS	Reversed phase C18	40μm			1cc,50/pk 2.5cc,50/pk	IC-1810 IC-1825
IC-RP	Polystyrene divinylbenzene polymer	40μm	300mg/1cc	Remove hydrophobic compounds, especially unsaturated compounds and aromatic compounds. Applicable pH range: 0-14.0	1cc,50/pk 2.5cc,50/pk	IC-RP10 IC-RP25
IC-P	Pyrrolidone substituted Polystyrene divinylbenzene polymer	40μm	350mg/1cc	Similar function as reversed-phase cartridge, and good selectivity to polar compounds	1cc,50/pk 2.5cc,50/pk	IC-P10 IC-P25
IC-A	Carbonate hydrogen type strong basic anion exchange resin	80μm	0.7meq/1cc	Remove anion pollutants; neutralize the strong acidity of sample solution.	1cc,50/pk 2.5cc,50/pk	IC-A10 IC-A25
IC-H	H type strong acidic cation exchange resin	40μm	2.0-2.2meq /1cc	Remove alkali earth metal ions, transition metal ions, and carbonate ions; neutralize the strong basicity of sample solution.	1cc,50/pk 2.5cc,50/pk	IC-H10 IC-H25
IC-Na	Na type strong acidic cation exchange resin	40μm	2.0-2.2meq /1cc	Remove alkali earth metal ions, transition metal ions	1cc,50/pk 2.5cc,50/pk	IC-Na10 IC-NaP25
IC-Ag	Ag type strong acidic cation exchange resin	40μm	2.0-2.2meq /1cc	Remove Cl^-, Br^-, I^-, AsO_4^{3-}, CrO_4^{2-}, CN^-, MoO_4^{2-}, PO_4^{3-}, SeO_3^{2-}, SO_3^{2-},$SeCN^-$, S_2^-, SCN^-, WO_4^{2-} and so on	1cc,50/pk 2.5cc,50/pk	IC-Ag10 IC-Ag25
IC-Ba	Ba type strong acidic cation exchange resin	40μm	2.0-2.2meq /1cc	Remove SO_4^{2-}; activate with Cl^- solution if the anion concentration is low	1cc,50/pk 2.5cc,50/pk	IC-Ba10 IC-Ba25
IC-M	Amino type chelating resin	40μm	0.4meq/1cc	Remove transition metal alkali metal and alkali earth metal	1cc,50/pk 2.5cc,50/pk	IC-M10 IC-M25
IC-A	Ag H type strong acidic cation exchange resin complex	equivalent function as combined Ag and H type cartridges			1cc,50/pk 2.5cc,50/pk	IC-AgH10 IC-AgH25
IC-Ag/Na	Ag Na type strong acidic cation exchange resin complex	equivalent function as combined Ag and Na type cartridges			1cc,50/pk 2.5cc,50/pk	IC-AgNa10 IC- AgNa 25
IC-Ba/Ag/H	Ba Ag H type strong acidic cation exchange resin complex	equivalent function as combined Ba, Ag and H type cartridges			1cc,50/pk 2.5cc,50/pk	IC-Ba/Ag/H10 IC- Ba/Ag/H 25

Cross-reference Table

	Agela	Waters	Supelco	Aglient	Varian
C18 (end capping)	Cleanert C18	Sep-pak C18	ENVI-18	—	Bond Elut C18
C18 (without end capping)	Cleanert C18-N	—	—	AccuBOND C18	Bond Elut C18-OH
C8	Cleanert C8	Sep-pak C8	ENVI-8	AccuBOND C8	Bond Elut C8
Cyano group	Cleanert CN	Sep-pak CN	LC-CN	AccuBOND CN	Bond Elut CN
Amino group	Cleanert NH_2	Sep-pak NH_2	LC- NH_2	AccuBOND NH_2	Bond Elut NH_2
Propyl ethylene diamine	Cleanert PSA	—	—	—	Bond Elut PSA
Quaternary ammonium salt (Strong anion-exchange cartridge)	Cleanert SAX	—	LC- SAX	AccuBOND SAX	Bond Elut SAX
Carboxyl group (Weak cation-exchange cartridge)	Cleanert COOH	—	LC- WCX	—	Bond Elut CBA
Propylsulfonic acid	Cleanert PRS	—	—	—	Bond Elut PRS
Benzene sulfonic acid (Strong cation-exchange cartridge)	Cleanert SCX	—	LC- SCX	AccuBOND SCX	Bond Elut SCX
Silica gel	Cleanert Silica	Sep-pak Silica	LC- Silica	AccuBOND Silica	Bond Elut Silica
Diol	Cleanert Diol	Sep-pak Diol	LC-Diol	AccuBOND Diol	Bond Elut Diol
Polystyrene/divinyl-benzene	Cleanert PS	—	ENVI-Chrom P	AccuBOND ENV PS-DVB	—
Polar polymer cartridge	Cleanert PEP	Oasis HLB	—	—	Bond Elut® Plexa
Mixed anion-exchange cartridge	Cleanert PAX	Oasis MAX	—	—	—
Mixed cation-exchange cartridge	Cleanert PCX	Oasis MCX	—	—	—
Cartridge specialized for sulfonylureas	Cleanert HXN	—	—	—	—
Magnesium silicate (Florisil)	Cleanert Florisil	Sep-pak Florisil	LC Florisil	—	Bond Elut FL
Graphitized carbon	Cleanert PestiCarb	—	ENVI Carb	—	—
Neutral alumina	Cleanert Alumina N	Sep-pak Alumina N	LC- Alumina N	AccuBOND Alumina N	Bond Elut Alumina N
Acidic alumina	Cleanert Alumina A	Sep-pak Alumina A	LC- Alumina A	AccuBOND Alumina A	Bond Elut Alumina A
Basic alumina	Cleanert Alumina B	Sep-pak Alumina B	LC- Alumina B	AccuBOND Alumina B	Bond Elut Alumina B
Mixed graphitized carbon and amino group cartridge	Cleanert PestiCarb/NH_2	Sep-pak Carb/ NH_2	ENVI Carb/ NH_2	—	—
Cartridge specialized for sulfanilamides	Cleanert SUL-5	—	—	—	—
DNPH-Silica cartridge (specialized for pretreatment of aldehydes and ketones in air)	Cleanert DNPH-Silica	Sep-pak DNPH-Silica	—	—	—
Solid supported liquid/liquid Extraction columns	Cleanert SLE(P/N:GB/T17592-2006)	—	—	—	Chem Elut SLE

SPE Accessories and Supplies

SPE Vacuum Manifolds

Description

SPE Vaccum Manifold for SPE sample preparation, filtration and elution are available in 12 and 24 port configurations. These manifolds permit consistent extraction and filtration results. Multiple sample processing with these manifolds consist of a clear glass chamber and lid, to which a vacuum is applied to draw solvents and sample through an SPE column, cartridge, or disk. The lid is CNC machined, solvent resistant, low extractable virgin polypropylene. The lid is autoclavable, and will not wrap. The female Lure inlets and male Lure outlets are molded of pure polypropylene. Adjustable racks placed in the glass chamber will accommodate a variety of sample collection vessels, including test tubes, autosampler vials, volumetric flasks, and Erlenmeyer flasks. Eluants are deposited directly into the collection vessel of choice via polypropylene, or optional stailness steel or Teflon needles.

Cat No.:VM12/24

Ordering Information

Product Name	Specification, Package	Cat. No.
Vaccum manifold	12 positions	VM12
	24 positions	VM24
Stopcocks	12 pieces/ package	A81213
Teflon Needles	12 pieces/ package	A80100
Vacuum pump	1	A01003

SPE-10 Automated Processing Station

- Designed for sample preparation in analysis of food and environmental samples;
- Process up to 6 samples per batch without attendance;
- Up to 5 solvents can be used for column conditioning and multi step elution;
- Two fractions can be collected for each sample;
- Accommodate 1-25mL SPE cartridges;
- Flow rate can be 1-20mL/min;
- Maximum100mL sample can be loaded;
- Exhaustive sample injection by positive pressure;
- Easy operation with panel or by computer;
- 20 programs can be stored in the machine;

Cat No.:SPE-10

Large receiver SPE Vacuum manifold

Description

Application for detecting pesticide residue with the following features:
1.deal with 6 pieces of sample
2.connect a vaccum pump off board for providing negative pressure
3.Connect with pear-shaped bottle which is suitable for bulk mass elution
low price and easy operation

Cat No.:VM06

96 well plate vacuum manifold

Cat No.:VM96

Description

1. Flow rate controlled by gas valve
2. Display operational pressure
3. Anticrrosion design
4. Selective heightening modules

Be suitable for various hydraulic plates and different eluants

Positive Pressure SPE Work-station

192-position positive pressure SPE work-station

Cat No.:EZY-P192

Description

The 192 uses positive pressure for two 96-well SPE plates processing simultaneously. The same flow rate in each well of the 96-well plates in the 8x12 micro-plate pattern. Flow rate control is continuous, and response to flow rate adjustment is immediate.

Features & Benefits

96 Positive Pressure Processor provides uniform flow for all extraction steps.
Provides even pressure to each 96 well plate. Even flow can be maintained whether you are using one, or two 96-well plates.
Dual flow regulators. Allows users to set 2 different pressures for extraction and drying the plates.
Uniform drying of extraction plate bed is achieved by flowing nitrogen or moisture-free air at 25psi.

48-position positive pressure SPE work-station

Description

The work-station can process SPE Columns of 1ml, 3ml, and 6ml capacity in batches of 1 to 48 samples. It provides a positive pressure for solid phase extraction using dry inert pressurized air, nitrogen or other inert gases. The standard hardware provided with the unit is designed for 1ml columns, with elution using 12x75mm test-tubes.
The 48 Positive Pressure Processor is the ideal accessory for solid phase extraction applications with the ability to provide set pressure levels for conditioning, sample transfer, wash steps, along with the line pressure for drying prior to the elution step.

Features & Benefits

Modular rack design, allowing quick interchangeability between 1ml, 3ml and 6ml columns, eluting into 12x75mm, 13x100mm and 16x100mm test-tube racks respectively.
Uniform gas distribution through the manifold ensures uniform pressure and uniform liquid flow at each SPE tubes. The uniform flow, ensures uniform flow, with some SPE columns open along with reproducible SPE runs from column to column. It also ensures uniform flow rate when less than 48 columns are used.
Liquid flow rate in the columns changes quickly and proportionately when gas pressure is changed. The pressurized air source can be replaced with other inert, dry gases like Nitrogen and Helium.

Ordering Information

Cat.No.	Description	Qty/Pk
APSP-48	Positive Pressure Processor-48 Position	1
APSP-22	Rack for 1 ml SPE Columns	1
APSP-23	Rack for 3 ml SPE Columns	1
APSP-24	Rack for 6 ml SPE Columns	1
APSP-19	Collection Tube Rack, 12 x 75 mm Tubes	1
APSP-20	Collection Tube Rack, 13 x 100 mm Tubes	1
APSP-21	Collection Tube Rack, 16 x 100 mm Tubes	1
APSP-25	Collection Vial Rack, 12 x 32 mm Auto-Sampler	1
APSP-26	Waste Bin	1
APSP-27	48-Column Sealing Gasket	1
APSP-28	Gas Supply Adapter	1

Solvent Evaporator

Product Features

- Combination of heating and vacuum for speedy evaporation of a variety of solvents at relative lower temperature (safe, faster and better for unstable compounds)
- Simple operation, no programming set-up needed
- Adjustable gas pressure and flow
- Multi-size block interchangeable, accepts tubes OD from 11 to 29mm
- Optional automatic shutoff, for safe and fast parallel enrichment of various samples
- Small footprint, only 18(W)x16(D)inch bench area
- Broad customization configurations
- Economic and reliable

1.Height post; 2.Vacuum vent;
3.Needle piercing gas manifold;
4.Sample tubes;
5.Temperature controller;
6.System flow controller;

Technical Specifications

Dimension	31(W)x22(H)x42(D) mm
Weight	7kg
Power	220V, 50-60Hz, 560W
Working environment	0 to 50°C, Humidity <85% RH
Well dimension	16mm
Number of Well Plate	30
Temperature	RT-150°C
Temperature accuracy	+-1°C
Gas flow	0-8 liter/min
Needle	Stainless steel, 1.6(OD)x150(L)mm
Gas/vacuum connection fitting	Hose barb 1/8 flow port

Multi-Needle manifold with individually controlled flow

Ordering Information

Cat.No.	Description
NV30-G	30-position Solvent evaporator, including a multi-needle manifold, inert gas flow module, heater & controller, 1year limited warranty.
NV15-G	15-position Solvent evaporator, including a multi-needle manifold, inert gas flow module, heater & controller, 1year limited warranty.
	Order multi-well blocks and manifold plates separately!

Empty Columns and Accessories

Ordering Information

Product name	Specification, Package	Cat. No.
Cartridge	1mL,100pieces/package	AZ001
	3mL,100pieces/package	AZ003
	6mL,100pieces/package	AZ006
	12mL,100pieces/package	AZ012
	25mL,100pieces/package	AZ030
	60mL,100pieces/package	AZ060
	150mL,100pieces/package	AZ150
96w	1 piece/package	96CK0036
Sieve plate	Application for 1-mL cartridge, 100 pieces/package	AS001-A
	Application for 3-mL cartridge, 100 pieces/package	AS003-A
	Application for 6-mL cartridge, 100 pieces/package	AS006-A
	Application for 12-mL cartridge, 100 pieces/package	AS012-A
	Application for 25-mL cartridge, 100 pieces/package	HS-30-S
	Application for 60-mL cartridge, 100 pieces/package	HS-60-S
	Application for 150-mL cartridge, 100 pieces/package	HS-150-S
General adapter	Application for 3-mL, 6-mL, and10mL cartridge,	A80115
	12 pieces/package	
IC cartridge	1-mL IC cartridge	AZ-IC-1
	1-mL IC cartridge(with sieve)	AZ-IC-1T
	2.5-mL IC cartridge	AZ-IC-2.5
	2.5-mL IC cartridge(with sieve)	AZ-IC-2.5T

Large Loading column

Ordering Information

Product name	Specification	Cat. No.
Large Loading column (30mL)	1 piece/package	A82030
Large Loading column (60mL)	1 piece/package	A82060
Water Loading tube	1 piece/package	A80116

96 Well Filtration Plates and Collection Plates

Ordering Information

Product name	Specification	Quality	Quantity	Cat. No.
2-mL 96w collection plate	8×12 pores	square pore and circular bottom	1	96SP2036
2-mL 96w collection plate	8×12 pores	circular pore and bottom	1	96SP2036-Y
96well silica pad	8×12 pores	square pore	1	96GP2036