

Monolith SPE Column for Sample Preparation

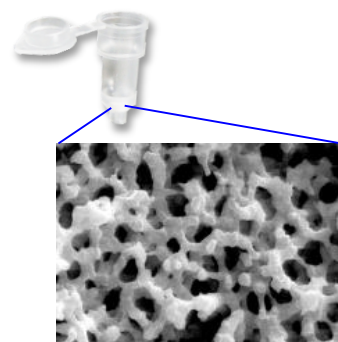
Monolith SPE Column for the Purification and Enrichment of Trace Amount Sample

MonoSpin® Series

GL Sciences' silica monolith, created synthetically using ethyl silicate, has a very uniform three dimensional structure that shows excellent reproducibility from batch-to-batch.

The solid structure of GL Sciences' silica monolith eliminates the need for frits or filters at the ends of the column, thereby reducing dead volume that might otherwise lead to band broadening or sample recovery. For example, when used in the form of a spin column, samples loaded in 10 μL volume, rinsed, and eluted with 10 μL elution buffer show excellent recoveries.

MonoSpin Column



Monolith structure

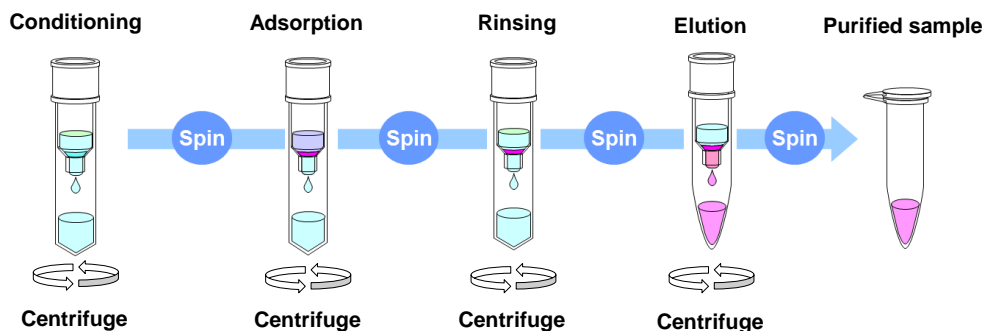
Features

Easy to Operate

Centrifuge elution allows loss-free and efficient processing of many samples simultaneously, with little or no liquid retained by the separation matrix.

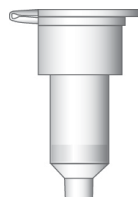
Fast

Excellent mass transfer and rapid sample binding MonoSpin's monolith silica allows extremely rapid sample preparation compared with other methods.



Ideal for Small Sample Volumes

The small type is excellent for the pretreatment for samples of 50-800 μL and the large type for samples of 500-8000 μL (0.5-8 mL).



Small type

- Column Size : Φ 4.2 x 1.5 mm
- Sample Volume : 50 - 800 μL
- Elution Volume : 50 - 800 μL
- Centrifugation speed : 2,000 - 10,000 x g

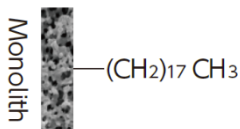


Large type

- Column Size : Φ 9 x 3 mm
- Sample Volume : 500 - 8000 μL
- Elution Solvent : 500 - 8000 μL
- Centrifugation speed : 1,000 x g

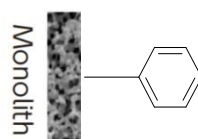
MonoSpin® Series Product Lineup

MonoSpin® C18/C18 FF S L *



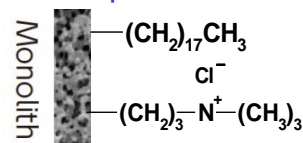
Octadecyl functional group. Optimal for drug extraction in biological samples, and desalting & enrichment of peptide samples. C18 FF employs large through-pore monolith silica for high viscosity samples.

MonoSpin® Ph S



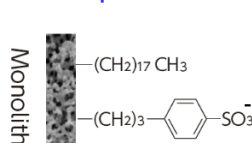
Phenyl functional group. Optimal for the recovery of hydrophobic drugs in biological samples due to its weak retentivity and different selectivity compared to a C18 phase.

MonoSpin® C18-AX S



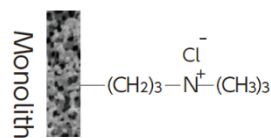
Bonded with octadecyl and trimethylaminopropyl, a mixed mode type. Delivers great retention for high-salt concentrated serum samples. Optimal for the recovery of acidic drugs.

MonoSpin® C18-CX S



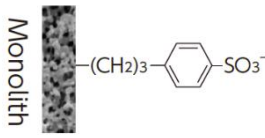
Bonded with octadecyl and benzene sulfonic acid combining both ion exchange & hydrophobic interaction. Optimal for dissociated basic drug in biological samples. Delivers higher cleanup efficiency compared C18 or SCX.

MonoSpin® SAX S L



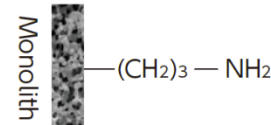
Bonded with trimethylaminopropyl combining both strong anion exchange & weak hydrophobic interaction. Optimal for the extraction of acidic drugs.

MonoSpin® SCX S L



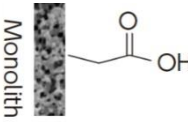
Bonded with benzenesulfonic acid combining both strong cation exchange & hydrophobic interaction. Optimal for the extraction of basic drugs.

MonoSpin® NH2 S L



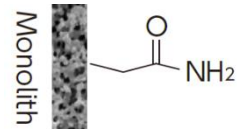
Bonded with aminopropyl. Optimal for the enrichment of sugar chain and/or hydrophilic compounds by HILIC mode.

MonoSpin® CBA S L



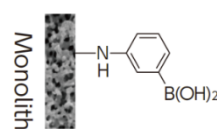
Bonded with carboxyl acid combining both weak cation exchange. Optimal for the extraction of basic drugs.

MonoSpin® Amide S



Bonded with amide. Optimal for the extraction of sugar chains and various hydrophilic acidic and basic compounds by HILIC mode.

MonoSpin® PBA S



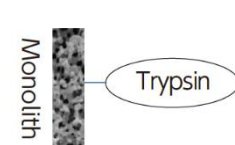
Specific column combined with phenyl boric acid. Excellent for the selective extraction of cis diol compounds, such as catechol amines.

MonoSpin® TiO S



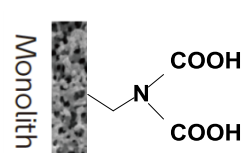
Monolith skeleton coated with titanium dioxide. Excellent for the enrichment of phosphopeptides.

MonoSpin® Trypsin S



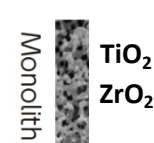
Bonded trypsin is available for performing rapid and efficient tryptic digests of proteins.

MonoSpin® ME S L



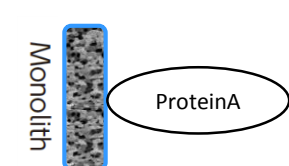
Bonded with iminodiacetic acid. Optimal for the recovery of trace metals.

MonoSpin® Phospholipid S L



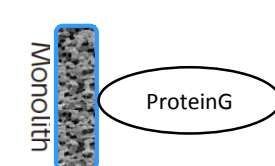
Monolith skeleton coated with TiO₂ and ZrO₂. Excellent for the adsorption and removal of phosphopeptides.

MonoSpin® ProA S 96



Protein A immobilized affinity spin column for the rapid purification of antibodies.

MonoSpin® ProG S 96



Protein G immobilized affinity spin column for the rapid purification of antibodies.

S : Small type

L : Large type

96 : 96-well plate

Specification of MonoSpin® Series

Specifications of MonoSpin® Series

Products	Stationary Phases	Small type		Large type		Surface area (m ² /g)	Maximum loading volume (Small type)	Filter
		Through-pore (µm)	Meso-pore (nm)	Through-pore (µm)	Meso-pore (nm)			
MonoSpin® C18	Octadecyl	5	10	10	10	350	100 µg (Amitriptyline)	NA
MonoSpin® C18 FF	Octadecyl	20	15	-	-	300	50 µg (Amitriptyline)	
MonoSpin® Ph	Phenyl	5	10	-	-	350	100 µg (Amitriptyline)	
MonoSpin® C18-AX	Octadecyl and trimethylaminopropyl	5	10	-	-	350	100 µg (Ibuprofen)	
MonoSpin® C18-CX	Octadecyl and benzenesulfonic acid	5	10	-	-	350	100 µg (Amitriptyline)	
MonoSpin® SAX	Trimethylaminopropyl	5	10	10	10	350	100 µg (Ibuprofen)	
MonoSpin® SCX	Benzenesulfonic acid	5	10	10	10	350	100 µg (Amitriptyline)	
MonoSpin® NH2	Aminopropyl	5	10	10	10	350	100 µg (Maltopentaose)	
MonoSpin® CBA	Carboxyl acid	5	10	10	10	350	100 µg (Amitriptyline)	
MonoSpin® Amide	Amide	5	10	-	-	350	100 µg (Angiotensin II)	
MonoSpin® PBA	Phenyl boric acid	5	10	-	-	350	100 µg (Dopamine)	
MonoSpin® TiO	Titanium dioxide	20	15	-	-	350	40 µg (Adenosine monophosphate)	
MonoSpin® Trypsin	TPCK* treated Trypsin	5	10	-	-	350	-	
MonoSpin® ME	Iminodiacetic acid	5	10	10	10	350	25 µg (Cu ion)	
MonoSpin® Phospholipid	TiO ₂ and ZrO ₂	5	10	10	10	350	10 µL (Human serum)	
MonoSpin® ProA	Protein A	2	60	-	-	-	400 µg (Human IgG)	
MonoSpin® ProG	Protein G	2	60	-	-	-	400 µg (Human IgG)	

* TPCK: L-(tosylamido-2-phenyl) ethyl chloromethyl ketone.

Specifications of MonoSpin® Column Types

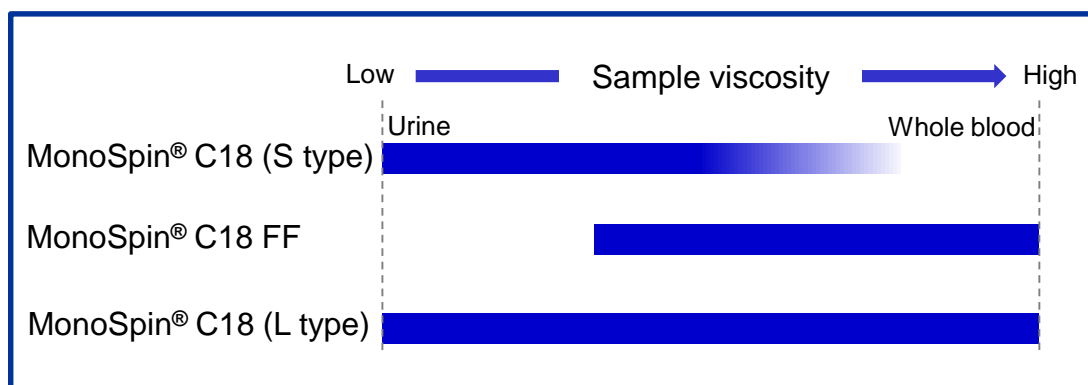
Description	MonoSpin® Small Type* ¹	MonoSpin® Fast Flow (FF)* ²	MonoSpin® Large Type
Column size	Φ 4.2 x 1.5 mm	Φ 4.2 x 1.5 mm	Φ 9 x 3 mm
Sample volume	50 - 800 µL	50 - 800 µL	500 - 8000 µL
Elution volume	50 - 800 µL	50 - 800 µL	500 - 8000 µL
Centrifugation speed	2,000 - 10,000 × g	1,000 × g	1,000 × g
Maximum loading volume	100 µg	50 µg	1 mg

* 1: MonoSpin® ProA and MonoSpin® ProG have different specifications. For more details, please see page xx.

* 2: Fast Flow type (FF) is only available for MonoSpin® C18.

For Various Viscosity Samples

MonoSpin® series are ideal for the sample preparation of biological samples. MonoSpin® C18 Fast Flow (FF) type is appropriate for high viscosity biological samples. Select the appropriate MonoSpin® column type depending on the viscosity of sample and volume.

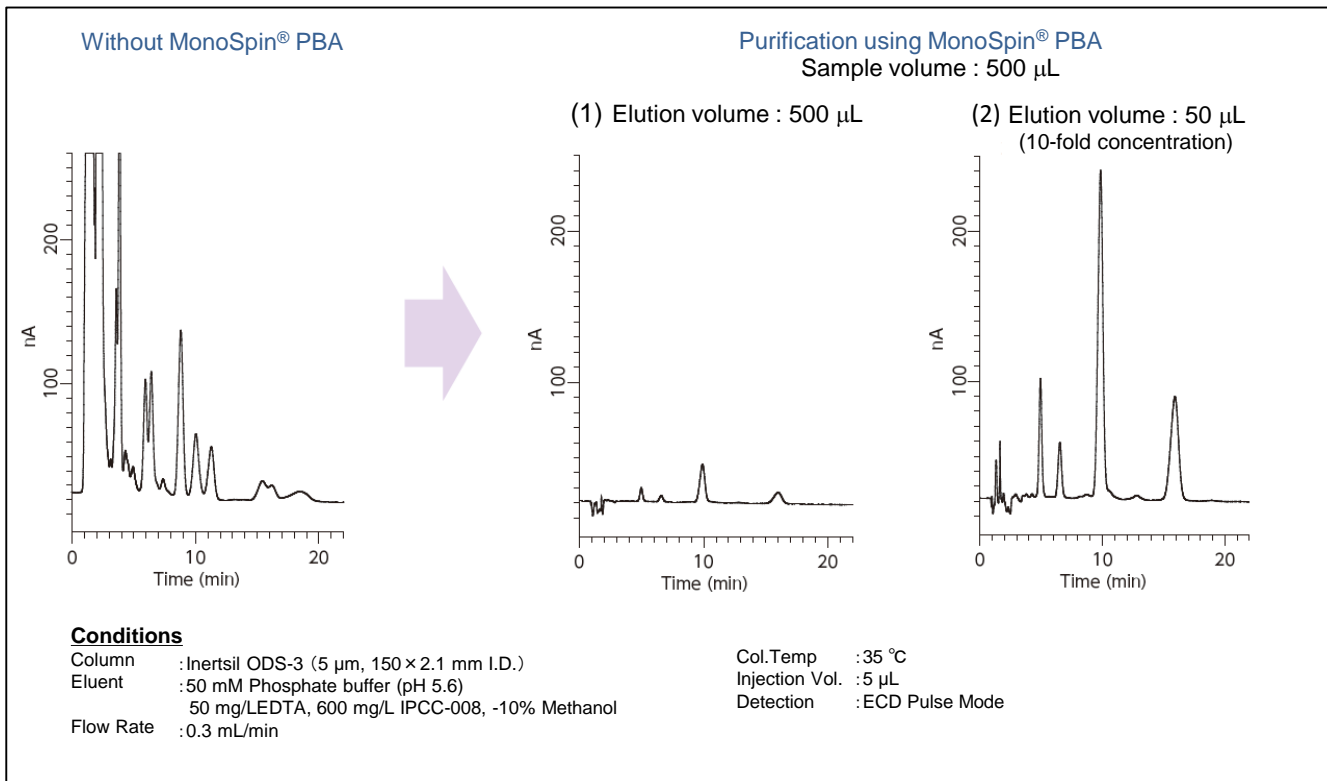


Application with MonoSpin® Series

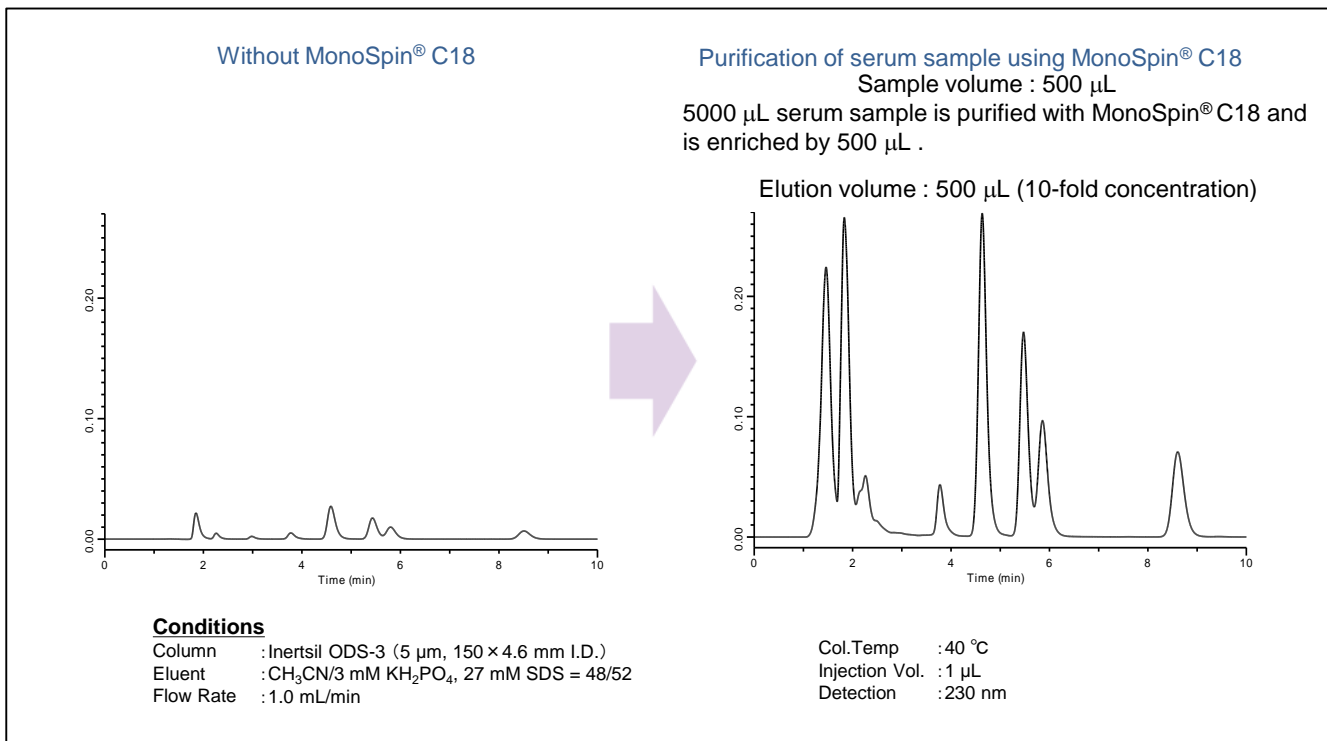
Purification and Enrichment of Trace Amount Sample

The low-pressure, high-flow, and liquid-retention properties of GL Sciences' monolith silica technology make it uniquely suited for handling of small samples. MonoSpin® SPE centrifugal spin columns have been developed to improve concentration and yields in low-volume sample preparation without requiring evaporation or reconstitution.

Small type columns

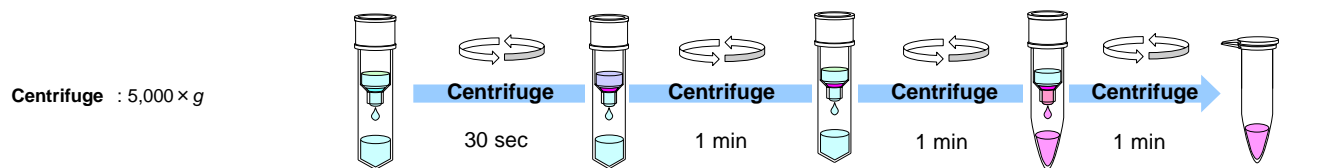


Large type columns



Application with MonoSpin® C18

Purification of Amphetamine in Urine Using MonoSpin® C18



Sample preparation

Prepare 800 μ L sample solution mixed with 400 μ L urine and 400 μ L buffer solution (pH 13.0)

Conditioning

Add 100 μ L methanol
↓ Centrifuge
Add 300 μ L buffer solution (pH 13.0)

Adsorption

Add 800 μ L sample solution

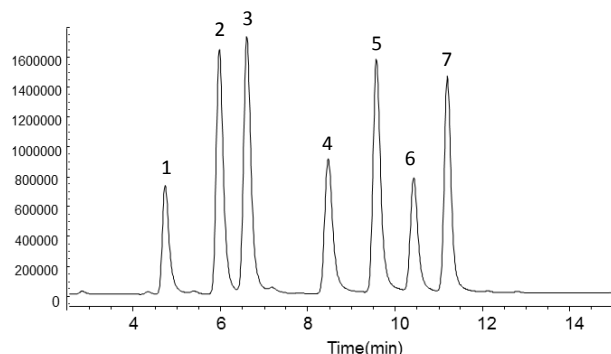
Rinsing

Add 300 μ L buffer solution (pH 13.0)

Elution

Add 100 μ L 0.1 % formic acid – methanol (1 : 1, v/v).

Purified sample

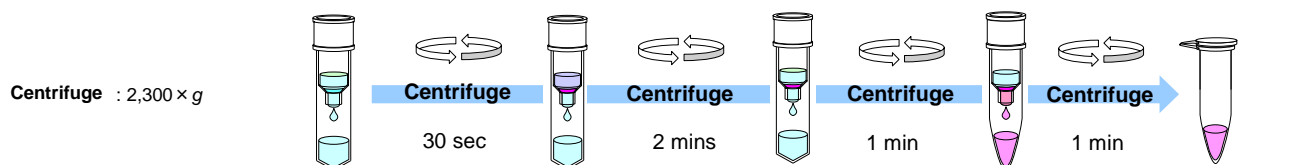


Data provided by Dr. Namera of Hiroshima University.

Conditions

Column : InertSustainSwift C18 (3 μ m, 150 \times 2.1 mm I.D.)
Eluent : A) 10 mM Ammonium acetate – Formic acid (pH 3.3)
 B) CH₃OH
 A/B = 90/10 - 2 min - 90/10 - 13 min - 70/30, v/v
Flow Rate : 0.3 mL/min
Col. Temp. : 40 °C
Detection : LC/MS
Sample : 1. Norephedrine
 2. Ephedrine
 3. Methylephedrine
 4. Amphetamine
 5. Methamphetamine
 6. 3,4-methylenedioxyamphetamine
 7. 3,4-methylenedioxymethamphetamine

Recovery of Drugs in Serum using MonoSpin® C18



Sample preparation

Prepare 600 μ L sample solution mixed with 200 μ L serum and 400 μ L 10 mM potassium phosphate buffer solution (pH 7.0)

Conditioning

Add 300 μ L methanol
↓ Centrifuge
Add 300 μ L 10 mM potassium phosphate (pH 7.0)

Adsorption

Add 600 μ L sample solution

Rinsing

Add 300 μ L water

Elution

Add 200 μ L acetonitrile

Purified sample

Reproducibility study for drugs in serum sample for three days using MonoSpin® C18 (n=10).

MonoSpin® C18 demonstrated high reproducibility and recovery, but also superb purification efficiency for drugs in serum sample.

Con. : Concentration

Sample	Con. (ng/mL)	Recovery (%)	RSD (%)
Desipramine	5	91.2	4.8
	10	86.1	3.3
	50	85.2	5.9
	250	88.4	6.5
Imipramine	5	96.3	9.5
	10	95.8	1.5
	50	94.5	0.9
	250	95.9	0.9
Fluvoxamine	5	96.8	11.6
	10	87.1	5.0
	50	86.8	8.1
	250	87.5	9.7

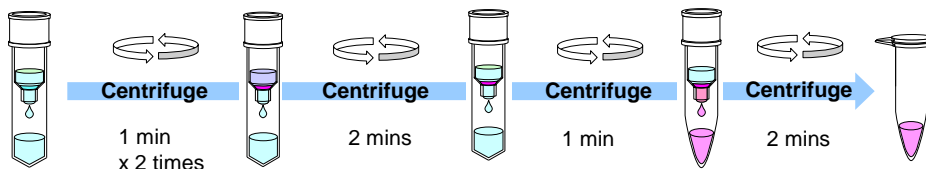
Sample	Con. (ng/mL)	Recovery (%)	RSD (%)
Paroxetine	5	83.7	3.9
	10	84.1	7.8
	50	83.9	8.2
	250	86.7	7.5
Maprotiline	5	85.7	8.1
	10	84.7	3.2
	50	88.6	5.4
	250	87.5	7.7
Duloxetine	5	106.3	9.9
	10	104.8	6.7
	50	99.8	8.7
	250	99.8	6.0

Sample	Con. (ng/mL)	Recovery (%)	RSD (%)
Amitriptyline	5	83.7	7.0
	10	81.8	2.8
	50	83.8	3.0
	250	88.4	2.7
Sulpiride	5	97.9	9.0
	10	95.5	8.5
	50	90.8	2.6
	250	92.6	3.0

Application with MonoSpin® C18

Protein digests Using MonoSpin® C18

Centrifuge : 2,300 × g



Sample preparation

Prepare 800 µL sample solution. Add TFA to tryptic digest sample and adjust the TFA final concentration to 0.1 %.

Conditioning

Add 200 µL acetonitrile
↓ Centrifuge
Add 200 µL 0.1 %TFA

Adsorption

Add 800 µL sample solution

Rinsing

Add 200 µL 0.1 %TFA

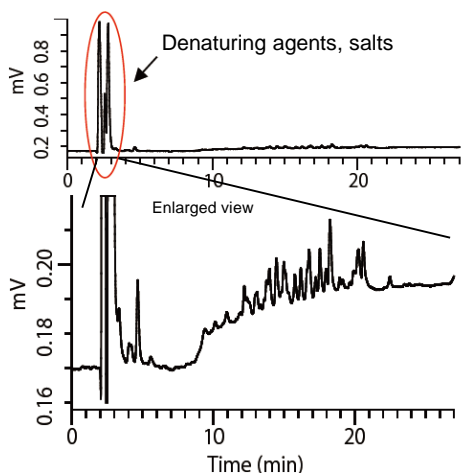
Elution

Add 200 µL 60 % acetonitrile

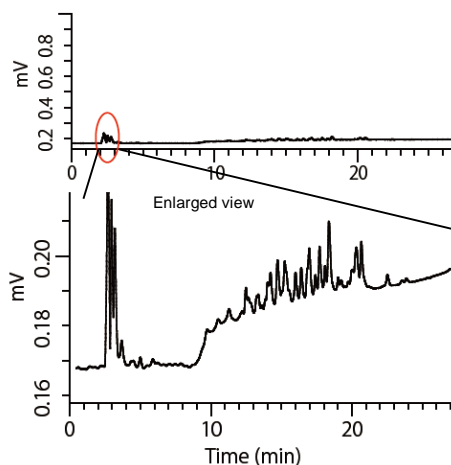
Purified Sample

MonoSpin® C18 provide highly effective removal of concentrated denaturing agents and salts in tryptic digest samples

Without MonoSpin® C18



With MonoSpin® C18

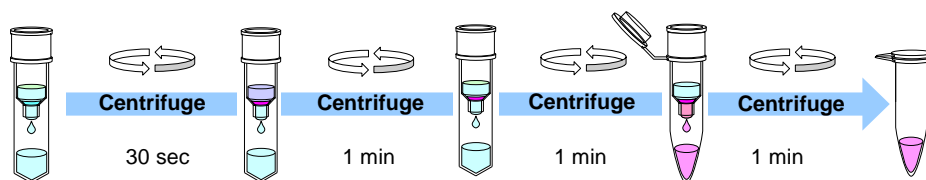


Conditions

Column : Inertsil ODS-3
(3 µm, 150 × 2.1 mm I.D.)
Eluent : A) H₂O (0.1 % TFA)
B) Acetonitrile (0.1 % TFA)
A/B = 90/10 - 20 min - 50/50
Flow Rate : UV 210 nm
Col. Temp. : 0.2 mL/min
Detection : 40 °C
Sample : Digested BSA 2 µL

Recovery of Hormone in Serum Using MonoSpin® C18

Centrifuge : 2,300 × g



Sample preparation

Add 20 µL of 1 mg/mL of adrenomedullin to 190 µL serum. Add 0.1 %TFA to the serum solution and centrifuged at 10,000 × g for 1 min. Take the supernatant.

Conditioning

Add 200 µL acetonitrile
↓ Centrifuge
Add 200 µL 0.1 %TFA

Adsorption

Add 400 µL sample solution

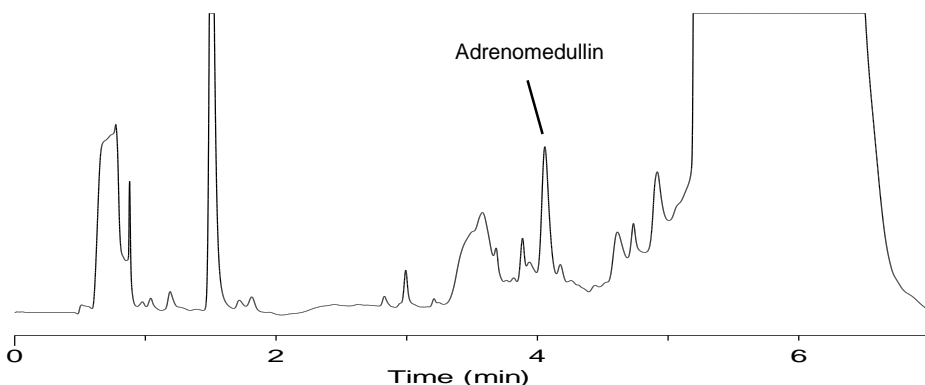
Rinsing

Add 200 µL 0.1 % TFA

Elution

Add 200 µL 0.1 %TFA in 60 % acetonitrile

Purified Sample



Conditions

Column : InertSustain C18
(2 µm, 50 × 2.1 mm I.D.)
Eluent : A) 0.1 % TFA in H₂O
B) 0.1 % TFA in Acetonitrile
A/B = 85/15 - 5 min - 50/50
- 2 min - 50/50
Flow Rate : 200 µL/min
Col. Temp. : 40 °C
Detection : UV 210 nm
Injection Vol. : 10 µL

Application with MonoSpin® C18 FF

MonoSpin® C18 FF is ideal for high viscosity samples, such as whole blood and complex matrix samples.

MonoSpin® C18 FF Specification

Through-pore	20 µm
Meso-pore	15 nm
Column size	Φ4.2 x 1.5 mm
Sample volume	50 - 800 µL
Elution volume	50 - 800 µL
Centrifugation speed	1,000 x g
Maximum loading volume	50 µg (Amitriptyline)

Relationship between centrifugation speed and flow of samples.

MonoSpin® C18 offer fast flow of viscosity samples at a low centrifugation speed (1,000 x g).

Comparison of each solution passing through MonoSpin® C18 and MonoSpin® C18 FF.

Solvents	Volume	MonoSpin® C18*	MonoSpin® C18 FF
Methanol	500 µL	○	○
Water	500 µL	400 µL	○
Serum**	500 µL	300 µL	○

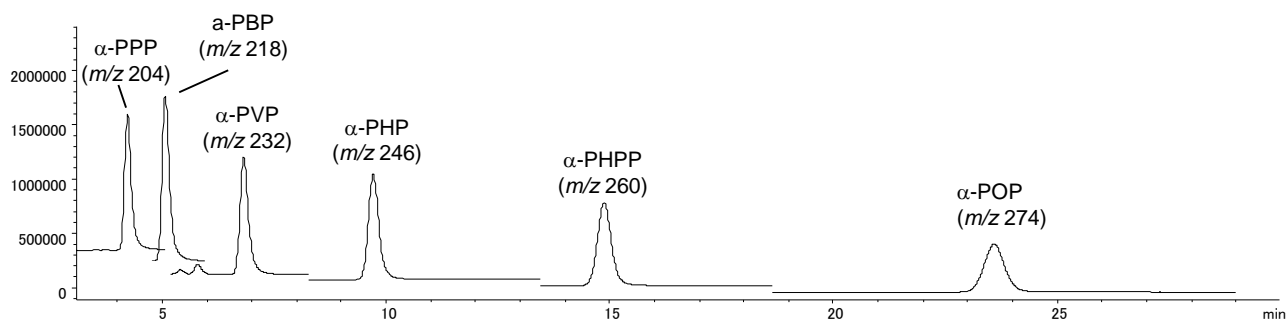
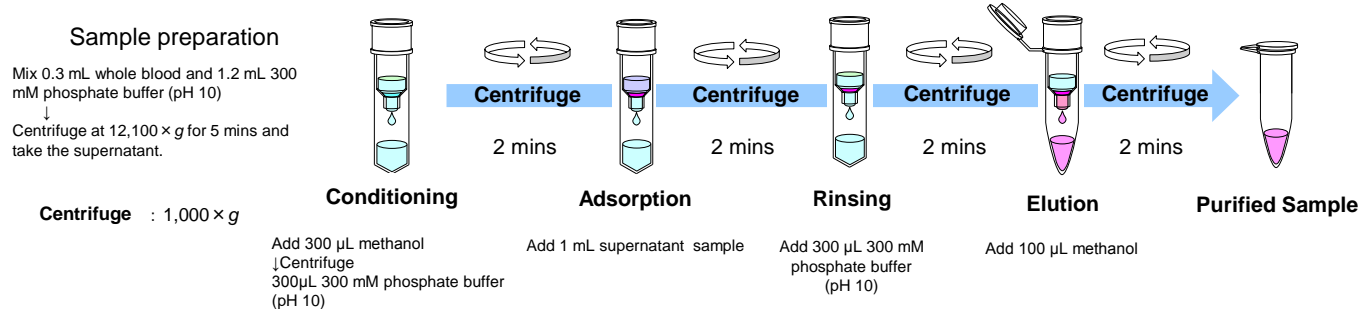
Conditions

Centrifuge at 1,000 x g for 30 sec

* Generally, MonoSpin® C18 should be used with a centrifugation speed at 2,300 x g or higher for at least 30 sec.

** A supernatant from serum sample was used, which was centrifuged at 10,000 x g for 1 min.

Purification of Whole Blood Using MonoSpin® C18 FF



Conditions

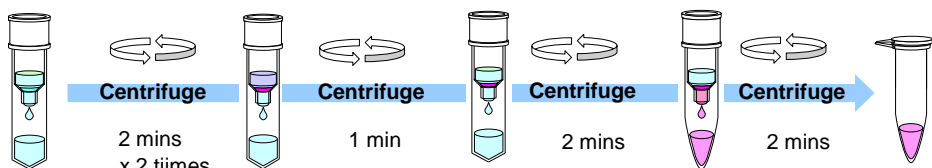
Column : InertSustain Phenyl (3 µm, 150 × 2.1 mm I.D.)
 Eluent : Acetonitrile-HCOONH₄ (10 mM, 0.1 % HCOOH) = 25:75 (v/v)
 Flow Rate : 0.2 mL/min
 Col. Temp. : 40 °C
 Detection : MS(ESI)

Application with MonoSpin® NH2

Purification of Pyridylaminated(PA) Sugar Chain Using MonoSpin® NH2

Sample preparation

Prepare 800 μ L sample solution. Add acetonitrile to PA sugar chain sample and adjust the acetonitrile final concentration from 90 to 95 %.



Centrifuge : 2,300 $\times g$

Conditioning

Add 500 μ L solution mixed with 250 μ L 0.1% formic acid* in water and 250 μ L 0.1% formic acid in acetonitrile.
 ↓ Centrifuge
 Add 500 μ L solution mixed with 50 μ L 0.1% formic acid in water and 450 μ L 0.1% formic acid in acetonitrile.

Adsorption

Add 800 μ L sample solution.

Rinsing

Add 500 μ L solution mixed with 50 μ L 0.1% formic acid in water and 450 μ L 0.1% formic acid in acetonitrile.

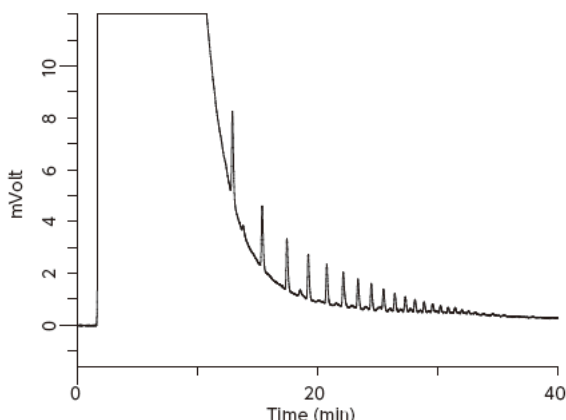
Elution

Add 50 - 800 μ L mixed with 25 - 400 μ L 0.1% formic acid in acetonitrile and 25 - 400 μ L water.

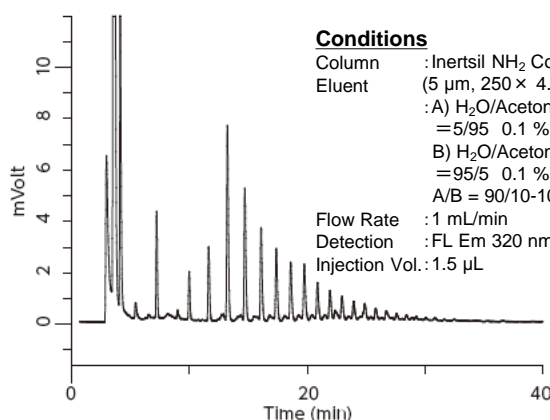
Purified Sample

*Acetic acid or TFA can also be used as an alternative to formic acid.

Without MonoSpin® NH2



With MonoSpin® NH2



Conditions

Column : Inertsil NH₂ Column
 Eluent (5 μ m, 250 \times 4.6 mm I.D.)
 A) H₂O/Acetonitrile = 5/95 0.1% Formic acid
 B) H₂O/Acetonitrile = 95/5 0.1% Formic acid
 A/B = 90/10-10 min-90/10-40 min-60/40
 Flow Rate : 1 mL/min
 Detection : FL Em 320 nm, Ex 400 nm
 Injection Vol. : 1.5 μ L

Purified PA sugar chain by HILIC mode.

MonoSpin® NH2 also can remove residual fluorescent labeling reagents.

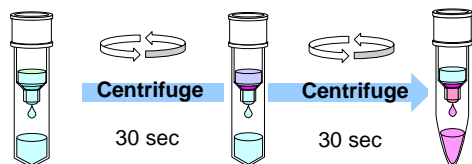
Application with MonoSpin® SCX

Fractionation Protein Digests Using MonoSpin® SCX

MonoSpin® SCX provide a fast and easy fractionation of peptides by stepwise Elution using buffers with different salt concentration.

Sample preparation

Prepare 500 μ L peptide solution. First, desalt the peptide solution using MonoSpin C18. Then dissolve it with 0.1 formic acid.



Centrifuge : 10,000 $\times g$

Conditioning

Add 300 μ L 0.1% formic acid. Add 500 μ L peptide solution.

Adsorption

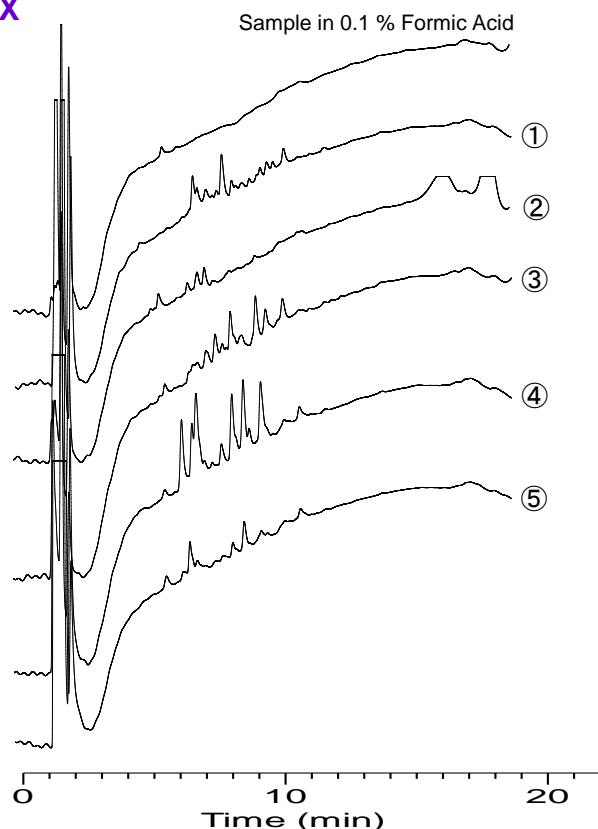
Elution

Always replace and attach a new recovery tube whenever adding a new elution buffer.

- ① 25 mM HCOONH₄ in 10% acetonitrile: 200 μ L
- ② 50 mM HCOONH₄ in 10% acetonitrile: 200 μ L
- ③ 100 mM HCOONH₄ in 10% acetonitrile: 200 μ L
- ④ 500 mM HCOONH₄ in 10% acetonitrile: 200 μ L
- ⑤ 1 M HCOONH₄ in 10% acetonitrile: 200 μ L

Conditions

Column : Inertsil ODS-3 (3 μ m, 2.1 \times 150 mm)
 Eluent A) H₂O (0.1% HCOOH)
 B) Acetonitrile (0.1% HCOOH)
 A/B = 90/10 - 20 min - 50/50
 Detection : UV 210 nm
 Flow Rate : 0.2 mL/min
 Col. Temp. : 40 $^{\circ}$ C
 Injection Vol. : 2 μ L



Sample in 0.1% Formic Acid

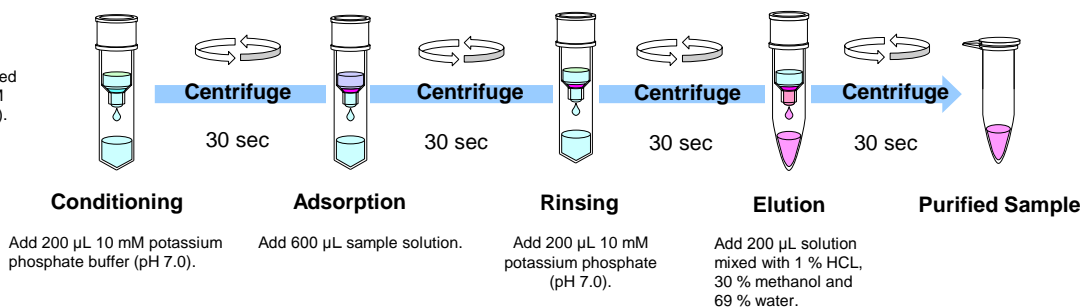
Application with MonoSpin® CBA

Purification of Paraquat and Diquat Using MonoSpin® CBA

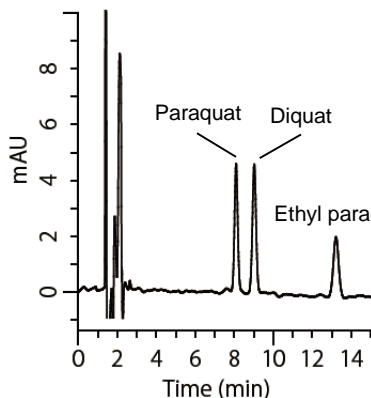
Sample preparation

Prepare 600 µL sample solution mixed with 200 µL urine and 400 µL 10 mM potassium phosphate buffer (pH 7.0).

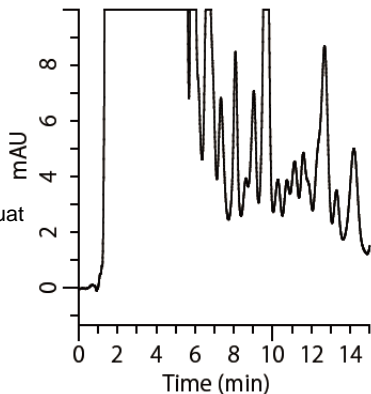
Centrifuge : 10,000 × g



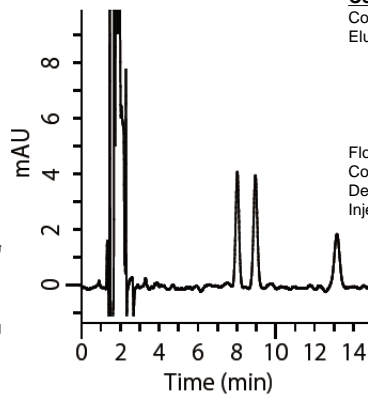
Standard Solution (1 µg/mL)



Urine + Pesticide (each 1 µg/mL)



With MonoSpin® CBA



Conditions

Column : Inertsil ODS-3 (5 µm, 150 mm × 4.6 mm I.D.)
 Eluent : 0.2 M phosphoric acid, 0.1 M diethyl amine, 7.5 mM IPCC08(IPCC-0.8, Sodium 1-Octanesulfonate) /Acetonitrile=89/11
 Flow Rate : 1 mL/min
 Col.Temp. : 40 °C
 Detection : PDA 290 nm
 Injection Vol. : 50 µL

MonoSpin® CBA deliver highly efficient purification of strong basic pesticides such as paraquat and diquat.

Application with MonoSpin® Trypsin

Rapid Digestion of BSA using MonoSpin® Trypsin

Protein Digestion Time: 10 min

Protein Digestion Temperature: Room Temperature

Example of Reduction and Alkylation Protocol

1 mg Bovine serum albumin

- Add 175 µL 500 mM Tris-HCL(pH 8.0) and 8 M urea (Solution 1).
- Add 25 µL 40 mg/mL dithiothreitol in solution 1.
- Incubation* at 37 °C for 90 mins.
- Add 50 µL 40 mg/mL iodoacetoamide in solution 1.
- Incubation* at 37 °C for 30 mins without exposure to light.

250 µL Reduced and alkylated protein

- Add 50 mM ammonium bicarbonate to make the urea final concentration to 2 M and dilute it to 750 µL

* With gentle mixing

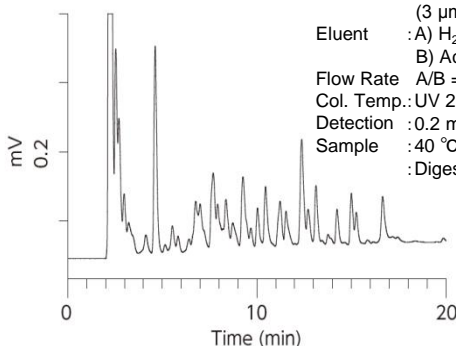
MonoSpin® Trypsin

The protocol above is just an example. Optimize the protocol of preparation of reduced and alkylated sample depending on the types of proteins.

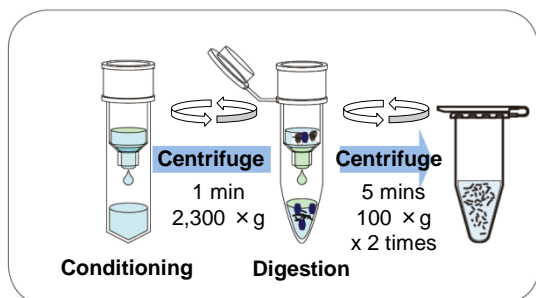
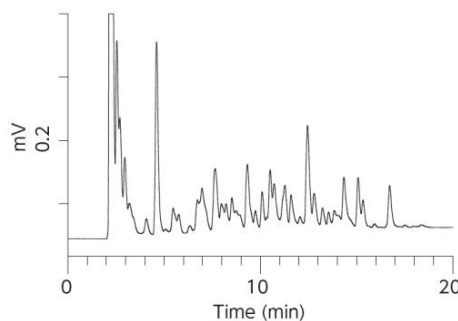
● In-solution protein digestion at 37 °C, 10 hours

Conditions

Column : Inertsil ODS-3 (3 µm, 150 × 2.1 mm I.D.)
 Eluent : A) H₂O (0.1 % HCOOH)
 B) Acetonitrile (0.1 % HCOOH)
 Flow Rate : A/B = 90/10 - 20 min - 50/50
 Col. Temp.: UV 210 nm
 Detection : 0.2 mL/min
 Sample : 40 °C
 : Digested BSA 2 µL



● With MonoSpin Trypsin, Protein digestion at 25 °C for 10 mins



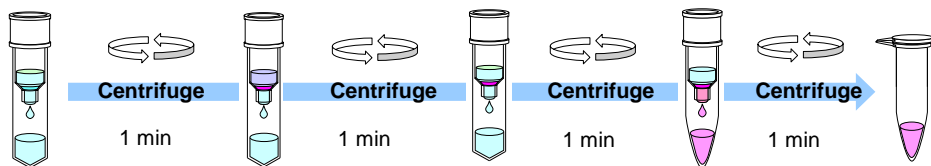
Application with MonoSpin® PBA

Purification of Catecholamine Using MonoSpin® PBA

Sample preparation

Prepare 250 μ L sample solution mixed with 200 μ L urea or serum and 50 μ L 1 M KH_2PO_4 adjusted the pH 8.0 using phosphoric acid

Centrifuge : 10,000 \times g



Conditioning

Add 200 μ L 1 % acetic acid
↓ Centrifuge
Add 200 μ L 100 mM KH_2PO_4 adjusted the pH 8.0 using phosphoric acid

Adsorption

Add 250 μ L sample solution

Rinsing

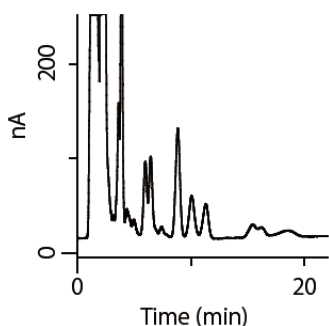
Add 200 μ L 100 mM KH_2PO_4 adjusted the pH 8.0 using phosphoric acid

Elution

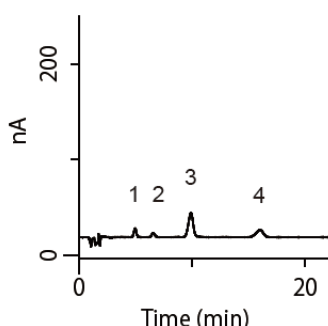
Add 200 μ L 1 % acetic acid

Purified Sample

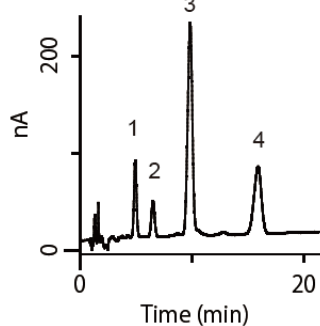
Without MonoSpin® PBA



500 μ L elution using MonoSpin® PBA



50 μ L elution using MonoSpin® PBA



Conditions

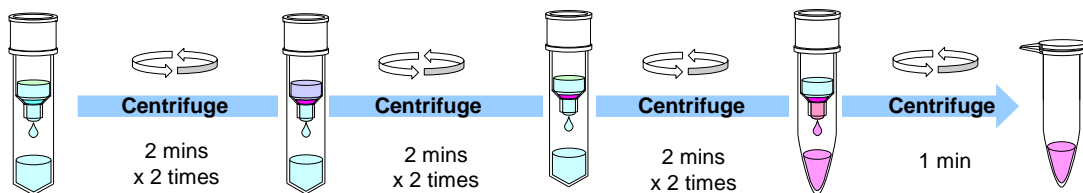
Column : Inertsil ODS-3
(5 μ m, 150 mm \times 2.1 mm I.D.)
Eluent : 50 mM Phosphate buffer (pH 5.6)
50 mg/L EDTA
600 mg/L IPCC-008
-10 % Methanol
Flow Rate : 0.3 mL/min
Col.Temp. : 35 $^{\circ}$ C
Injection : 5 μ L
Detection : ECD Pulse Mode
Sample : 1. Noradrenaline
2. Adrenaline
3. DHBA
4. Dopamine

MonoSpin® PBA can offer selective enrichment of catecholamines including compounds containing cis-diol.

Application with MonoSpin® TiO

Purification of Organic Phosphorous Pesticides in Serum Using MonoSpin® TiO

Centrifuge : 5,200 \times g



Conditioning

Add 20 μ L solution mixed with 16 μ L 0.1 % formic acid in acetonitrile and 4 μ L 0.1 % formic acid in water.
↓ Centrifuge
Add 20 μ L solution mixed 10 μ L 0.1 % formic acid in acetonitrile and 10 μ L 0.1 % formic acid in water.

Adsorption

Add 50 μ L sample solution mixed with 10 μ L sample and 40 μ L water.
↓ Centrifuge
Collect the eluate from the recovery tube and attach a new one. Then apply the eluate to MonoSpin® TiO again.

Rinsing

Add 20 μ L solution mixed with 10 μ L 0.1 % formic acid in acetonitrile and 10 μ L 0.1 % formic acid in water.
↓ Centrifuge
Repeat the above protocol.

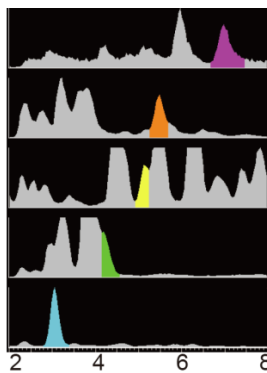
Elution

Add 50 μ L 2 % NH_3 .

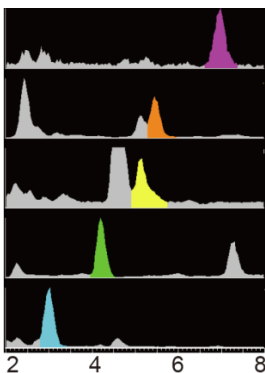
Purified Sample

Derivatize the purified sample with N-Acetyl-O-methylate and then inject to LC/MS/MS.

Without MonoSpin® TiO

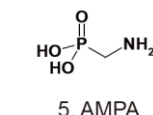
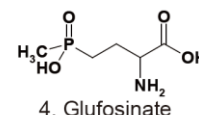
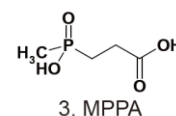
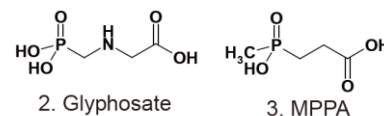
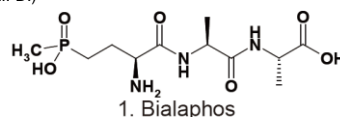


With MonoSpin® TiO



Conditions

Column : ODS Column (150 \times 2.1 mm. D.)
Eluent : CH_3OH
20 mM HCOONH_4 (pH 3.0)
A/B = 15/85, w/w
Flow Rate : 200 μ L/min
Detection : SIM
Injection Vol. : 5 μ L
Sample : 1. Bialaphos
2. Glyphosate
3. MPPA
4. Glufosinate
5. AMPA



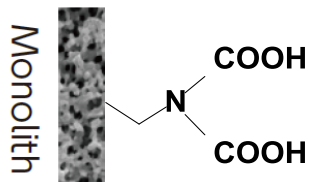
References of Application

Product	Target compounds	Sample matrix	Concentration	Recovery rate	Detector	Reference No.
MonoSpin® C18	amitraz, metabolites	serum	5 ng/mL	95.5, 92.2 %	LC-MS	1
	dibudcaine, naphazoline	serum	5 - 10 ng/mL	70.2 - 78.6 %	LC-MS	2
	MA, AP, MDA, MDMA	urine	100 ng/mL	96 - 111 %	LC-UV	3
	9 cold medicines	serum	5 - 50 ng/mL	2.5 - 73.8 %	GC-MS	4
	amphetamines (AP, MA, MDA, MDMA)	urine	5 - 10 ng/mL	84 - 94 %	GC-MS	5
	eperison	serum	0.5 ng/mL	92.8 - 96.0 %	GC-MS	6
	paraquat, diquat, fenitrothion	serum, urine	25 - 100 ng/mL	51.3 - 106.1 %	GC-MS	7
	arsenics	urine	1 ng/mL	91.9 - 106.5 %	GC-MS	8
	MAM-2201	blood	1 ng/mL	-	LC-MS/MS	9
	a-PVP, a-PBP	urine	1 ng/mL	82 - 100 %	GC-MS	10
	a-PVP, a-PBP	hair	0.2 ng/mL	75.5 - 101.5 %	LC-MS	11
	Phthalic acid esters	physiological saline	0.2 - 50 µg/L	71.2 - 107.3 %	-	12
	<desalting>	digested peptides	-	-	-	13
	<desalting>	iTRAQ labeled samples	-	-	-	14
	MAM-2201	blood	2.5 - 100 ng/mL	1 ng/mL	-	15
	Naringin	grapefruit juice	10 - 500 µM	10 µM	-	16
MonoSpin® SCX	opiates benzodiazepines, metabolites	urine serum	10 ng/mL 1 - 10 ng/mL	69.2 - 98.9 % 83.3 - 112.3 %	LC-MS	17
	<Pre-column fluorescence derivatization>	-	-	-	-	18
	<desalting of amino acid>	-	-	-	-	19
MonoSpin® C18-CX	acidic and basic drugs	urine	1 - 25 ng/mL	65 - 123 %	GC-MS	20
	<halogenated compounds>	cells	-	-	-	21
MonoSpin® C18-AX	amphetamines (AP, MA), opiates, THC	urine	2 - 10 ng/mL	93.1 - 108.1 %	GC-MS	22
MonoSpin® PBA	Adenosine	urine	6 µM	80 - 113 %	-	23

References

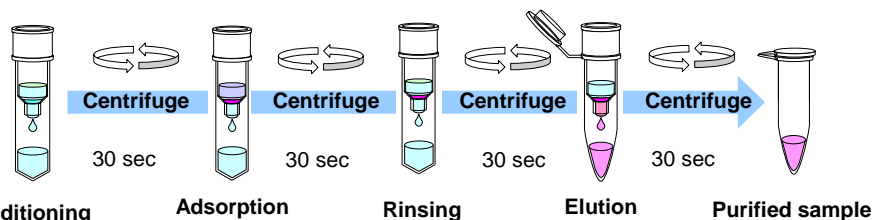
- [1] J. Chromatogr., B 867 (2008) 99-104.
- [2] J. Chromatogr., B 872 (2008) 186-190.
- [3] J. Chromatogr., A 1208 (2008) 71-75.
- [4] Chromatographia., 70 (2009) 519-526.
- [5] Anal. Chim. Acta., 661 (2010) 42-46.
- [6] J. Health Sci., 56 (2010) 598-605.
- [7] Anal. Bioanal. Chem., 400 (2011) 25-31.
- [8] J. Sep. Sci., 35 (2012) 2506-2513.
- [9] Forensic Toxicol., 31 (2013) 333-337.
- [10] Forensic Toxicol., 32 (2014) 68-74
- [11] J. Chromatogr., B 942-943 (2013) 15-20.
- [12] J Pharm Anal., 1 (2011) 92-99
- [13] Proteomics., 13 (2013) 751-755
- [14] Journal of proteomics., 84 (2013) 40-51
- [15] Forensic Toxicol., 31 (2013) 333-337
- [16] The Journal of Clinical Pharmacology., 54 (2013)
- [17] J. AOAC Int., 94 (2011) 765-774.
- [18] Biomed. Chromatogr., 26 (2012) 147-151.
- [19] Orig Life Evol Biosph., 43 (2013) 99-108
- [20] J. Sep. Sci., 34 (2011) 2232-2239.
- [21] Toxicology., 314 (2013) 22-29
- [22] Forensic Toxicol., 31 (2013) 312-321.
- [23] Biosensors and Bioelectronics., 41 (2013) 379-385

Application with MonoSpin® ME



- Bonded with iminodiacetic acid.
- Optical for the recovery and purification of metal ions.
- Specifically, appropriate for the extraction and purification of trace Pb in blood or urine.
- Excellent for removing inorganic divalent cations from sample to prevent ion suppression for LC/MS/MS applications.

Recovery of Metal Ions Using MonoSpin® ME



Conditioning
 Add 200 μ L water
 ↓ Centrifuge
 Add 200 μ L 2N-HNO₃
 ↓ Centrifuge
 Add 400 μ L 100 mM CH₃COONH₄ (pH 5.5)

Adsorption
 Add 500 μ L 25 μ g/mL Cu²⁺

Rinsing
 Add 10 mM CH₃COONH₄ (pH 5.5)

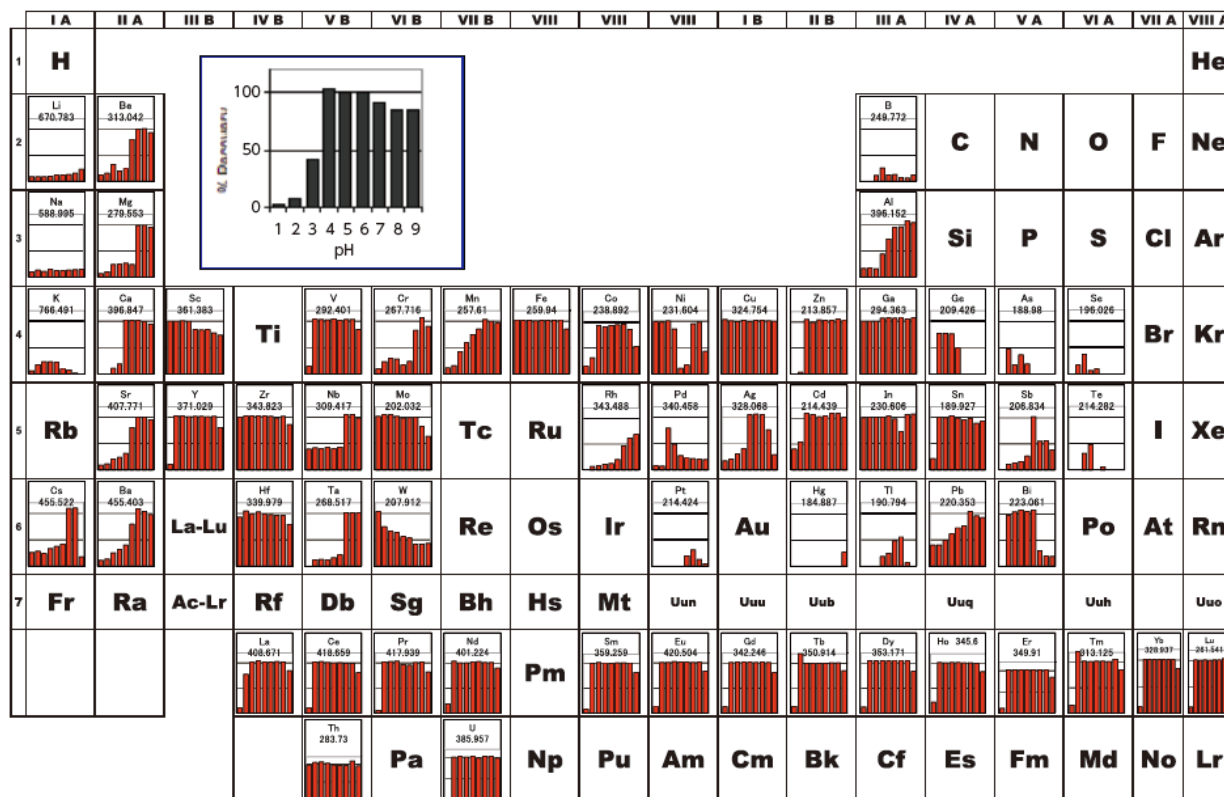
Elution
 Add 500 μ L 2N-HNO₃

Centrifuge : 3,000 × g

Recovery rate of Cu²⁺ using Zeeman GF-A-AF system

Number of Injections	Volume of solvent introduced (mL)	Recovery rate (%)
1	0.8	98 ± 4
2	1.6	97 ± 5
3	2.4	95 ± 5
4	3.2	95 ± 5
5	4	94 ± 3

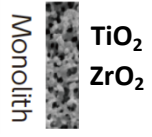
Retention characteristics of Metal Element Using Iminodiacetic Acid Functional Groups with Various pH.



* Do not ensure the quality of MonoSpin® ME on the above table.

Application with MonoSpin® Phospholipid

Features

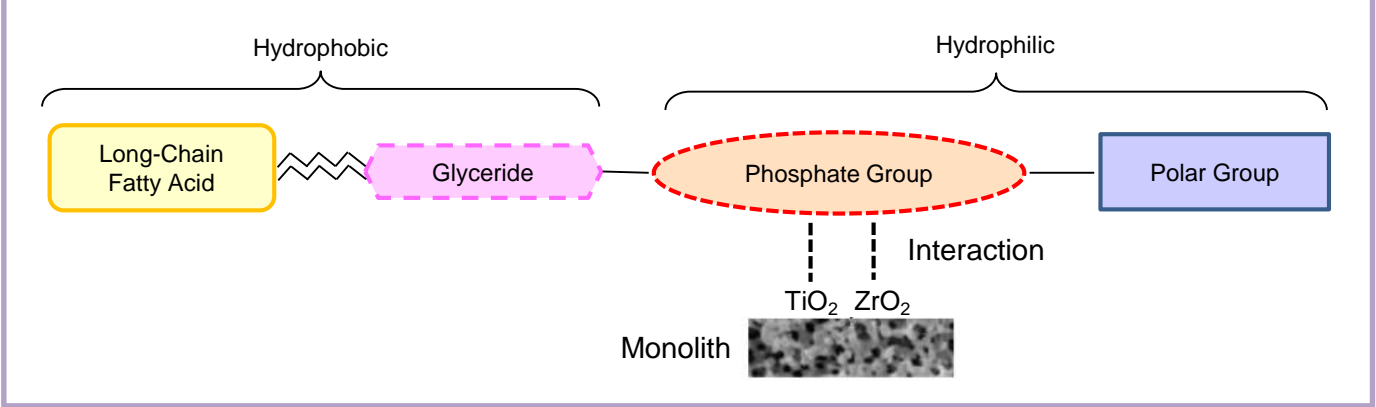


- Simple & easy protocol to remove phospholipids from biological samples.
- Removes more than 90% of phospholipids resulting in eliminating ion suppression.
- Also removes phospholipids from a serum sample volume of 50 µL.

Retention Mechanism of Phospholipids

- Monolith skeletal structure coated with TiO₂ and ZrO₂.
- Selectively interacts with metal oxides and phosphorylated compounds, resulting in removing more than 90 % of phospholipids.

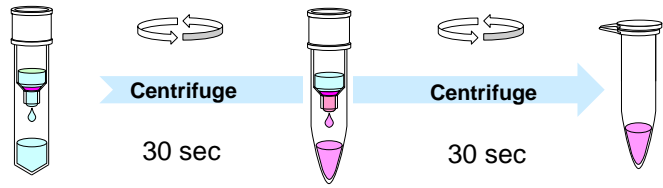
Structure of Phospholipids



Protocol of removal of phospholipids

Sample preparation

Mix 0.1% formic acid in acetonitrile with serum (4:1) in 2 mL tube .
 ↓ Centrifuge at 10,000 × g for 30 sec.
 Take the supernatant.



Centrifuge : 3,000 × g

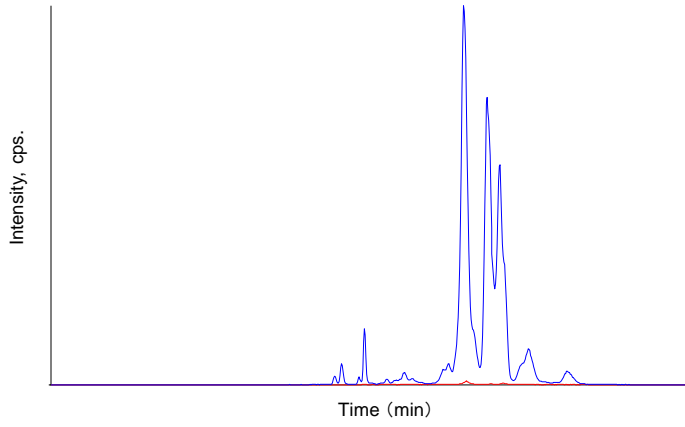
Conditioning

Add 200 µL 0.1 % formic acid in acetonitrile.

Adsorption

Add 50 µL sample solution

Phospholipid-free sample



Phospholipid Removal Efficiency of MonoSpin® Phospholipid

- Deproteinized and centrifuged supernatant
- Sample clean up by MonoSpin® Phospholipid (Removes more than 90% of phospholipids)



Related Product : **FastRemover® for Phospholipid**

The FastRemover® for Phospholipid 96-well plate deliver a rapid and effective removal of proteins and phospholipids in plasma and serum samples without sacrificing the recovery of your target analytes.

Rapid Purification of Antibodies

MonoSpin® ProA, MonoSpin® ProG

MonoSpin® ProA and MonoSpin® ProG are available already immobilized onto a silica monolith offering rapid purification of antibodies. A 96-well plate format is available to purify a number of analyte.

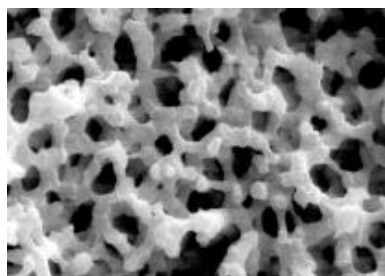
96 well plate



Spin columns

Features

The silica is modified with a hydrophilic polymer and then immobilized with either Protein A or Protein G to prevent the adsorption of proteins, resulting in higher purification and recovery of antibodies.



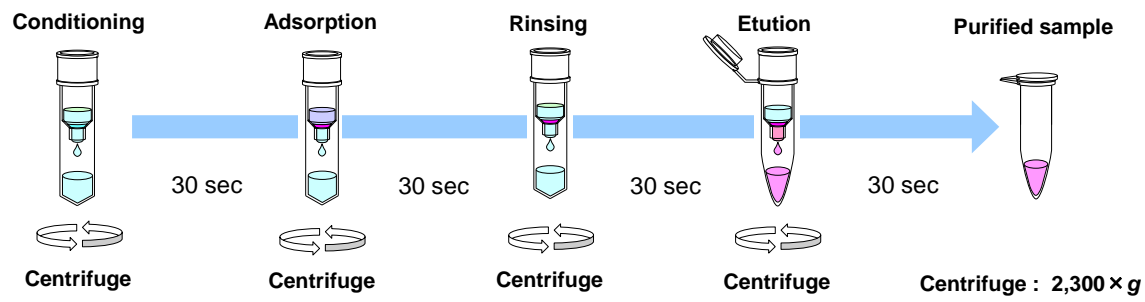
Specification	
Bonded phase	Protein A or Protein G
Through-pore size	2 µm
Meso-pore size	60 nm
Column size	Φ4.6 x 1.5 mm
Sample volume	50 - 500 µL
Recovery rate	MonoSpin ProA: IgG 90 % (With 400 µg IgG) MonoSpin ProG: IgG 90 % (With 300 µg IgG)
Elution volume	50 µL
Centrifugation speed	2,300 × g

Antibody compatibility table

Species	Antibody class	Protein A	Protein G
Human	IgG	⊙	⊙
	IgG1	⊙	⊙
	IgG2	⊙	⊙
	IgG3	—	⊙
	IgG4	⊙	⊙
	IgM	—	—
	IgA	—	—
	IgE	—	—
	IgD	—	—
	Fab	○	○
	ScFv	○	—

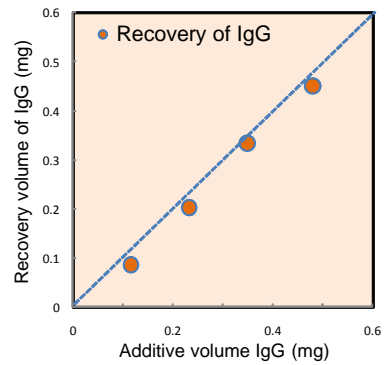
Rapid Purification of Antibodies

Purification of IgG Using MonoSpin® ProA and MonoSpin® ProG in Only 5 min.

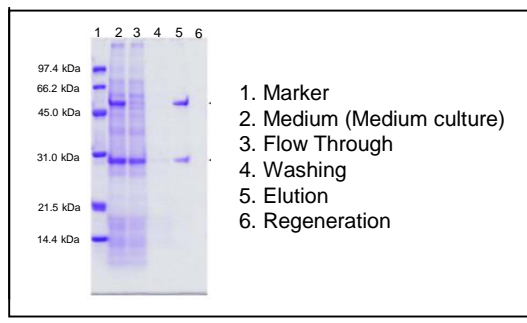


As shown below, the antibody concentrations were determined quantitatively from medium of CHO cells. The purified antibodies show very less impurities by the results from electrophoresis.

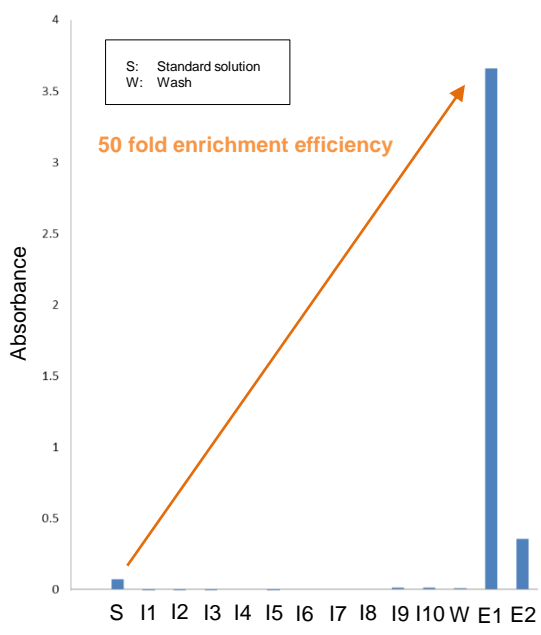
Calibration curve of IgG concentration



Results of recovery electrophoresis



Enrichment of Antibody Solution Using MonoSpin® ProA



500 μ L volume of 0.025 mg / mL of human IgG solution is applied to MonoSpin® ProG spin column (In = I1 – I10). And then the elution of IgG concentration is measured with 100 μ L elution buffer twice (En = E1 and E2). The first IgG elution (E1) is 50 fold concentration of standard solution and indicates 90 % recovery of IgG without the loss of IgG.

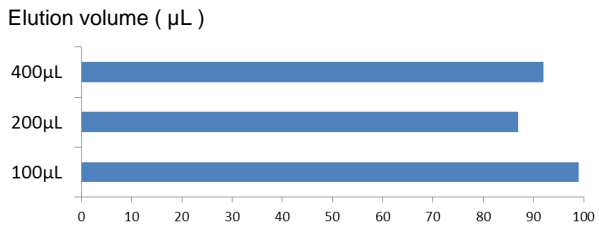
Number of injections (In) or Elution (En) (Times:n=1,2,...,10).

Rapid Purification of Antibodies

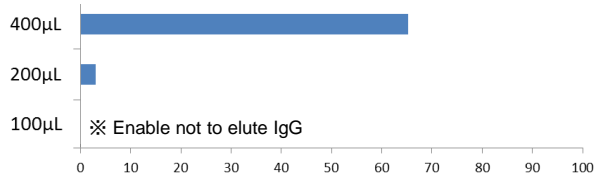
Relationship Between Elution Volume and Recovery Rate With Other Brands Products.

MonoSpin® ProA only requires 100 µL elution buffer, providing a recovery rate of at least 90% IgG. On the other hand, other brands products requires 400 µL of elution buffer with a recovery rate of 70% IgG.

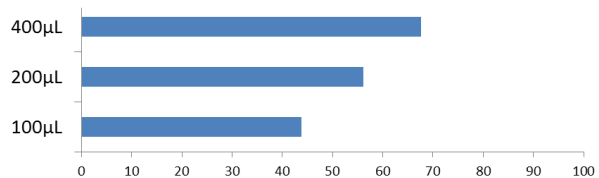
MonoSpin® ProA
90 % recovery rate of IgG with 100 µL elution.



Brand T's Product
60-65 % recovery rate of IgG with 400 µL elution.

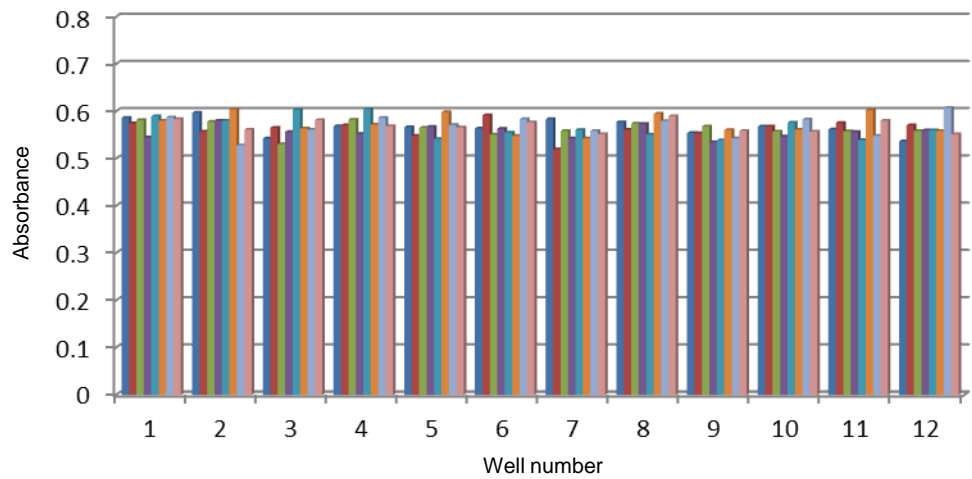


Brand G's Product
65-70 % recovery rate of IgG with 400 µL elution.



Recovery rate (%)

Recovery Rate and Reproducibility of IgG from medium cultured CHO cells with MonoSpin® ProA 96 Well Plate



Sample volume: 150 µL
 Elution volume: 150 µL
 Recovery rate: 90 % (CV 3.1 %)
 IgG concentration: 1.3 mg/mL

MonoSpin® Series Ordering Information

MonoSpin® Column Small Type*

Products	Quantity	Cat.No.
MonoSpin® C18	50 pcs	5010-21700
	100 pcs	5010-21701
MonoSpin® C18 FF	50 pcs	5010-21670
	100 pcs	5010-21671
MonoSpin® Ph	50 pcs	5010-21733
	100 pcs	5010-21734
MonoSpin® C18-AX	50 pcs	5010-21735
	100 pcs	5010-21736
MonoSpin® C18-CX	50 pcs	5010-21731
	100 pcs	5010-21732
MonoSpin® SAX	50 pcs	5010-21720
	100 pcs	5010-21721
MonoSpin® SCX	50 pcs	5010-21725
	100 pcs	5010-21726
MonoSpin® NH2	50 pcs	5010-21710
	100 pcs	5010-21711
MonoSpin® CBA	50 pcs	5010-21729
	100 pcs	5010-21730
MonoSpin® Amide	50 pcs	5010-21727
	100 pcs	5010-21728
MonoSpin® PBA	50 pcs	5010-21715
	100 pcs	5010-21716
MonoSpin® TiO	50 pcs	5010-21705
	100 pcs	5010-21706
MonoSpin® Trypsin	50 pcs	7820-11300
	100 pcs	7820-11301
MonoSpin® ME	50 pcs	5010-21737
	100 pcs	5010-21738
MonoSpin® Phospholipid	50 pcs	5010-21698
	100 pcs	5010-21699

* Each MonoSpin® products are attached with 1.7 mL recovery and 2.0 mL waste tubes.

MonoSpin® Column Small type



1.7 mL Recovery Tube



2.0 mL Tube for Waste Solution



MonoSpin® Column Large Type**

Products	Quantity	Cat.No.
MonoSpin® L C18	30 pcs	7510-11320
MonoSpin® L SAX	30 pcs	7510-11321
MonoSpin® L SCX	30 pcs	7510-11322
MonoSpin® L NH2	30 pcs	7510-11323
MonoSpin® L CBA	30 pcs	7510-11324
MonoSpin® L ME	30 pcs	7510-11325
MonoSpin® L Phospholipid	30 pcs	7510-11326

MonoSpin® Column Large type



** MonoSpin® Large type columns dose not come with any recovery and waste tubes. Please prepare 50 mL centrifuge tubes separately.

MonoSpin® Series Ordering Information

MonoSpin® ProA, MonoSpin® ProG

Products	Quantity	Cat.No.
MonoSpin® ProA Small type	10 pcs	7510-11310
MonoSpin® ProG Small type	10 pcs	7510-11311
MonoSpin® ProA 96-well plate	1 pcs	7510-11312
MonoSpin® ProG 96-well plate	1 pcs	7510-11313

MonoSpin® Column Small type



96-well plate

