AFFINIMIP® SPE

Selective Solid Phase Extraction

Molecularly Imprinted Polymers for the Selective Extraction of Trace Analytes from Complex Matrices

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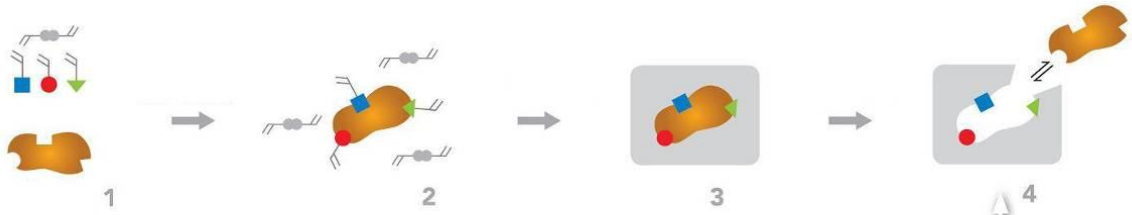
New Extraction Phase Based on Molecularly Imprinted Polymers (MIPs)

MIPs are polymers with shape «memory» and functional groups affine to a template molecule. Using an imprinting process, AFFINISEP designs these materials in order to recognize selectively a target molecule, even in the presence of compounds with structure and functionality similar to the template.



Molecular Recognition materials

AFFINISEP designs these materials for an broad variety of molecules, such as (mycotoxines, antibiotics, …) , pharmaceuticals, etc…

Advantages of SPE based molecularly imprinted polymers

High affinity and selectivity

Stable to
- pH variation
- Temperature variation
- Organic solvents

AFFINIMIP
Synthetic materials

Ensure analysis Reproducibility and reliability via robust and rapid methodology

Analytical and preparative applications in research and production

AFFINIMIP® SPE FOR ANALYTICAL PURPOSE

AFFINIMIP® SPE is a selective solid phase extraction based on Molecularly Imprinted Polymers (MIP). It combines the advantages of immune-affinity columns regarding the selectivity and of a classic Solid Phase Extraction (SPE) in terms of robustness and costs.

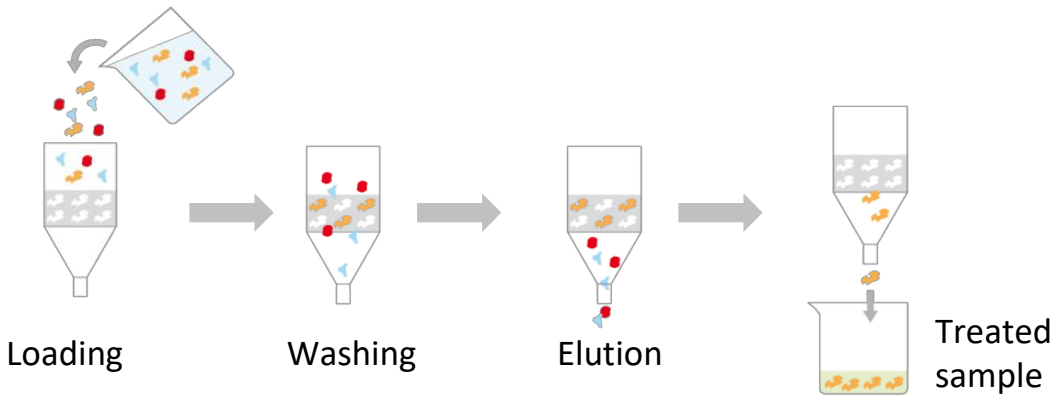
AFFINIMIP® SPE Selective Extraction Cartridges

Perfect clean-up system for trace analysis

Thanks to the selectivity of **AFFINIMIP®SPE**, stringent washing steps can be applied in order to remove all interferences and thus minimize matrix effects. It also **reduces ion-suppression effects.**

Minimal or no method development required

A protocol based on three steps (loading, washing and elution) is supplied with **AFFINIMIP®SPE** kits for tested matrices. No extra-equipment than the usual required for SPE experiments is necessary.

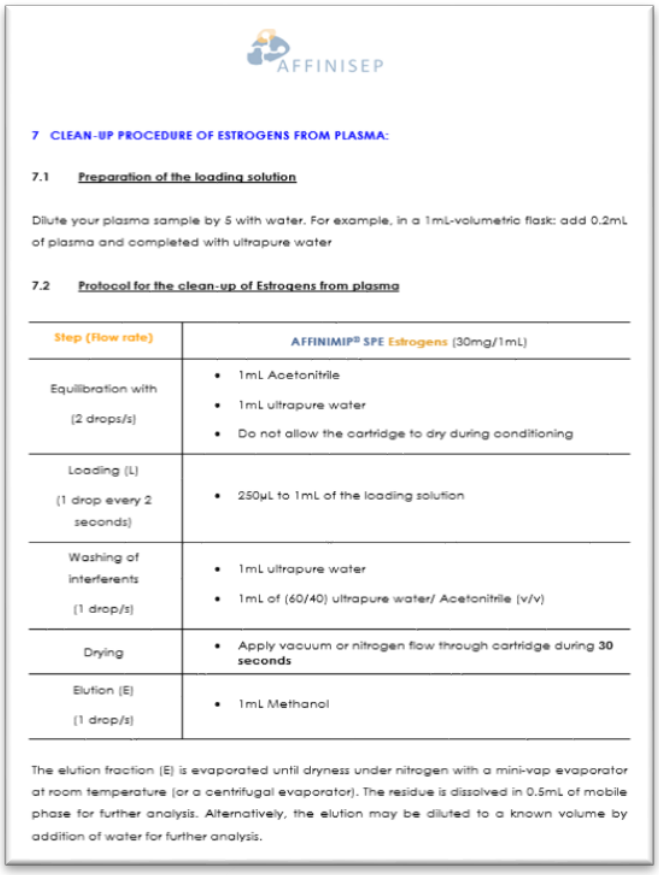


AFFINIMIP® SPE protocols are as well defined by 3 steps of loading, washing and elution. All steps have been already developed in detail by AFFINISEP and an instruction sheet is supplied with the product.

The advantages of **AFFINIMIP® SPE** are essential in trace analysis from a complex matrice in food safety, environment, cosmetics, clinical chemistry. pharmaceutical analysis and others.

The SPE protocol is supplied in an instruction sheet for various complex matrices.

For other matrices, please contact our technical support to help you with your application.



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7 CLEAN-UP PROCEDURE OF ESTROGENS FROM PLASMA:

7.1 Preparation of the loading solution

Dilute your plasma sample by 5 with water. For example, in a 1mL-volumetric flask: add 0.2mL of plasma and completed with ultrapure water

7.2 Protocol for the clean-up of Estrogens from plasma

Step (Flow rate)	AFFINIMIP® SPE Estrogens (30mg/1mL)
Equilibration with (2 drops/s)	• 1mL Acetonitrile • 1mL ultrapure water • Do not allow the cartridge to dry during conditioning
Loading (L) (1 drop every 2 seconds)	• 250µL to 1mL of the loading solution
Washing of interferents (1 drop/s)	• 1mL ultrapure water • 1mL of (60/40) ultrapure water/ Acetonitrile (v/v)
Drying	• Apply vacuum or nitrogen flow through cartridge during **30 seconds**
Elution (E) (1 drop/s)	• 1mL Methanol

The elution fraction (E) is evaporated until dryness under nitrogen with a mini-vap evaporator at room temperature (or a centrifugal evaporator). The residue is dissolved in 0.5mL of mobile phase for further analysis. Alternatively, the elution may be diluted to a known volume by addition of water for further analysis.

Example of an instruction sheet supplied with **AFFINIMIP® SPE**

MYCOTOXINS ANALYSES

Mycotoxins are toxic secondary metabolites produced by different fungi present in agricultural commodities. They are regulated in food and feed due to nephrotoxic, neurotoxic, carcinogenic, estrogenic, and immunosuppressive effects.

AFFINISEP has developed two sets of products for mycotoxins analyses:

Multimycotoxins extraction: Designed for the simultaneous extraction of several mycotoxins which are present in the same matrix prior to LC-MS/MS analyses. These mycotoxins are all present in the same matrix to be analyzed. Their extraction is done all at once by SPE.

AFFINIMIP® SPE Multimyco LCMSMS for the analyses of

Fumonisins
Aflatoxins
Ochratoxin A
T-2 and HT-2
Zearalenone
Deoxynivalenol

AFFINIMIP® SPE FumoZON for the analyses of

Fumonisins
Zearalenone

Single mycotoxin extraction: Designed for the analysis of one specific family of mycotoxin:

AFFINIMIP® SPE Patulin
AFFINIMIP® SPE Ochratoxin A
AFFINIMIP® SPE Zearalenone
AFFINIMIP® SPE Fumonisins
AFFINIMIP® SPE Deoxynivalenol
AFFINIMIP® SPE Aflatoxine

AFFINIMIP® SPE Multimyco LCMSMS

Analytes

- Fumonisins B1/B2
- Aflatoxins B1/B2/G1/G2
- Ochratoxin A
- T-2 and HT-2
- Zearalenone
- Deoxynivalenol

Matrices

- Wheat, Maize, Cereals, sunflower seeds, …

Advantages

- **SIMULTANEOUSLY** clean-up and concentrate the main regulated mycotoxins

Regulation

In Europe, these mycotoxins are all regulated (see set values for each individual mycotoxin)
Aflatoxins - 1881/2006/EC : foodstuffs : 0,1µg/kg Afla B1 for processed cereals for baby food 4,0 µg/kg for total aflas in processed cereals

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Multimyco LCMSMS	6mL	FS118-02B-200	FS118-03B-200

Visit our website to know more about this product and its formats.
Custom designed formats are available on demand.

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AFFINIMIP® SPE FumoZON

Analytes

- Fumonisins B1+B2
- Zearalenone

Matrices

- Wheat, Maize, Cereal-based baby food,

Advantages

- **SIMULTANEOUS** analysis by LC-MS detection
- Very simple protocol

Regulation

Europe - 1126/2007/EC: 20µg/kg and 200µg/kg on maize-based babyfood for respectively Zearalenone and Fumonisins
Codex Alimentarius - (193-1995): 2000µg Fumonisins B1+B2/kg for whole commodity

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE FumoZON	3mL	FS109-02	FS109-03

AFFINIMIP® SPE Patulin

Analytes

- Patulin

Matrices

- Apple juice (clear & cloudy), Apple and Multifruit puree, Baby food, Cider, Alcohol, Pommeau, Manzella, Dried apple, Blueberry, Tomato Ketchup

Advantages

- Applicable to several apple derived matrices
- **Unique** extraction method available on the market
- UV or LC-MS detection

Regulation

Regulations for apple puree:
Europe - 1881/2006/EC : 25µg/kg; 10µg/kg for infants and young children
USA (FDA CPG Sec.510.150) : 50µg/kg
Regulations for apple juice :
Europe - 1881/2006/EC : 50µg/kg; 10µg/kg for infants and young children
Codex alimentarius: (193-1995): 50µg/kg apple juice

Application notes booklet and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Patulin	3mL	FS102-02	FS102-03
	6mL	FS102-02B	FS102-03B
	3mL 50mL Pectinase	FS102-02K	FS102-03K
	6mL & 50mL Pectinase – 1unit	FS102-02KB-200mg	FS102-03KB-200mg
	Pectinase enzymatic Solution 50mL – 1 unit	REA-001-50mL	
	Patulin standard solution 1mL vial 100µg/mL	REA-PAT-1mL	

AFFINIMIP® SPE Ochratoxin A

Analytes

- Ochratoxin A

Matrices

- Wheat, Maize, red and white Wine, Several spices (Paprika, Pepper, ginger…), Coco, Human urine…

Advantages

- Storage at RT like all AFFINIMIP®SPE
- Simple protocols
- Fluorescence or LC-MS detection

Regulation

Europe - 1881/2006/EC: foodstuffs : 5µg/kg in raw cereal grains, 30µg/kg in spices, 2µg/kg in wine….

Codex Alimentarius - (193-1995): 5µg/Kg for wheat, barley, rye…

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Ochratoxin A	3mL	FS101-02	FS101-03
	6mL	FS101-02B	FS101-03B
	10mL LRC	FS101-02LRC	FS101-03LRC
	3mL for automate GERSTEL	-	FS101-03-GER
	3mL for automate GILSON	-	FS101-03-GIL
	6mL for automate GERSTEL	-	FS101-03B-GER
	6mL for automate GILSON	-	FS101-03B-GIL

Visit our website to know more about this product and its formats.
Custom designed formats are available on demand.

AFFINIMIP® SPE Deoxynivalenol

Analytes

- Deoxynivalenol (*a.k.a* Vomitoxin)
- 3-AcetylDON
- 15-AcetylDON

Matrices

- Oat, wheat, corn, baby food, meat, animal feed…

Advantages

- UV and LC-MS detection

Regulation

Europe - 1126/2007/EC : 1750µg/kg for unprocessed maize, 200µg/kg for babyfood cereals.

US FDA : 1 ppm in finished wheat products for human consumption

Codex Alimentarius - (193-1995): 1000µg/kg for flour maize, wheat, barley, 200µg/kg for babyfood cereals.

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Deoxynivalenol	6mL -100mg in food and babyfood	FS117-02B	FS117-03B
	6mL – 200mg in feed	FS117-02B-200mg	FS117-03B-200mg

AFFINIMIP® SPE Zearalenone

Analytes

- Zearalenone, Zearalanone, α-zearalenol, α-zearalanol, β-zearalenol, β-zearalanol

Matrices

- Wheat, Maize, Cereal-based baby food, Edible corn oil and Rice

Advantages

- Fluorescence or LC-MS detection

Regulation

Europe - 1881/2006/EC : foodstuffs : 100µg/kg in cereals and 20µg/kg in maize-based babyfood.

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Zearalenone	3mL	FS100-02	FS100-03
	10mL LRC	FS100-02LRC	FS100-03LRC
	3mL for automate GERSTEL	-	FS100-03-GER
	3mL for ASPEC automate GILSON	-	FS100-03-GIL

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AFFINIMIP® SPE Glyphosate

Analytes

- Glyphosate
- AMPA
- Glufosinate

Matrices

- Waters: Geothermal, mineral, river or underground
- Foodstuffs: cereals, honey, tea, juices, cannabis

Advantages

- **NO DERIVATIZATION** required to extract the analytes
- Fluorescence (with derivatization), LC-MS or Capillary Electrophorisis - UV detection
- Fast and simple protocol

Regulation

In Europe, Glyphosate is a debatable active substance, it has been thoroughly assessed by Member States and the European Food Safety Authority (EFSA). In December 2017: the Commission has adopted an act to renew the approval of glyphosate for 5 years

Codex alimentarius : 50µg/kg in meat or milk

Application notes booklet and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Glyphosate	3mL	FS113-02.IP	FS113-03.IP
	6mL	FS113-02B	FS113-03B
	12mL	FS113-02C	FS113-03C

AFFINIMIP® SPE Picolinic Herbicides

Analytes

- Picloram
- Aminopyralid
- Clopyralid

Matrices

- Water, Compost, Cereal, Soil…

Advantages

- Fast, short and easy protocol

Regulation

Europe - 322/2012/EC: 0.1 to 5 mg Clopyralid/kg in cereals
2017/171/EC: 10µg Aminopyralid/kg in nuts, vegetable, oilseeds…

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP®SPE Picolinic Herbicides	3mL	FS115-02	FS115-03
	6mL	FS115-02B	FS115-03B
	10mL LRC	FS115-02LRC	FS115-03LRC
	12mL	FS115-02C	-

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AFFINIMIP® SPE PAHs

Analytes

- Benzo[a]anthracen B[a]A; Benzo[a]pyren B[a]P; Benzo[a] fluoranthen B[a]F; Chrysen (CHR), etc.

Matrices

- Edible oils (colza, oliva…), fatty food

Advantages

- LC-MS, HPLC/UV, Fluorescence
- Fast and simple protocol

Regulation

Europe (EC 835/2011) 2 ng/g benzo[a]pyrene individually, and 10 ng/g benzo[a]pyrene, benzo[b]fluoranthene, chrysene and benzo[a]anthracene combined for edible oils

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE PAHs	3mL	FS119-02	FS119-03
	6mL	FS119-02B	FS119-03B
	10mL LRC	FS119-02LRC	FS119-03LRC
	12mL	FS119-02C	-
	96 well plate – 1 unit	FS119-1.96W	

AFFINIMIP® SPE Tetracyclines

Analytes

- Tetracycline
- Chlortetracycline
- Oxytetracycline, their epimers
- Doxycycline.

Matrices

- Meat, Tissues, Animal source foods, milk

Advantages

- UV detection

Regulation

Europe : 37/2010/EU 100µg/kg in muscle or milk
Codex alimentarius : 100 µg/kg of milk; 200µg/kg of muscle

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Tetracyclines	1mL	FS112-02A	FS112-03A
	3mL	FS112-02	FS112-03
	LRC 10mL	FS112-02LRC	FS112-03LRC
	96 well plate – 1 unit	FS112-1.96W	
	Multipurpose sampler automate (GERSTEL)-1mL	-	FS112-03A-GER
	ASPEC automate (GILSON)-1mL	-	FS112-03A-GIL
	ASPEC automate (GILSON)-3mL	-	FS112-03-GIL

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AFFINIMIP® SPE Chloramphenicol

Analytes

- Chloramphenicol

Matrices

- Honey, Milk, Shrimp, Bovine Urine

Advantages

- Very low limit of detection
- LC-MS

Regulation

Europe - 2003/181/EC: minimum required performance 0.3µg/kg in residue of animal origin
US FDA : prohibited

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Chloramphenicol	1mL	FS110-02A	FS110-03A
	3mL	FS110-02	FS110-03
	LRC 10mL	FS110-02LRC	FS110-03LRC
	96 well plate – 1 unit	FS110-1.96W	

AFFINIMIP® SPE Aminoglycosides

Analytes

- Spectinomycin, Hygromycin B, Streptomycin, Dihydrostreptomycin, Amikacin, Kanamycin A, Apramycin, Paromomycin, Tobramycin, Sisomicin, Gentamicin C1a, Gentamicin C2, Neomycin B

Matrices

- Tissus muscles, milk, fish, egg

Advantages

- **SIMULTANEOUS** analysis by LC-MS detection

Regulation

Europe – 37/2010/EC: 50µg total Gentamycins/kg 100µg Kanamycin A/kg, 300µg Spectinomycin/kg, 500µg Dihydrostreptomycin in muscle
Codex Alimentarius - 100µg total Gentamycins/kg, 500µg Spectinomycin/kg, 600µg Dihydrostreptomycin + Streptomycin in muscle

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Aminoglycosides	3 mL	FS124-02	FS124-03
	6mL	FS124-02B	FS124-02B

Visit our website to know more about this product and its formats.
Custom designed formats are available on demand.

AFFINIMIP® SPE Estrogens

Analytes

- Broad family of natural and synthetic estrogens

Matrices

- Waters, river water and sediment, Plasma, treated sewage, animal body fluid

Advantages

- LC-MS, GC/MS

Regulation

Europe : COM(2011)876 proposed Ethinylestradiol and 17 α-Ethinylestradiol as priority substances in water
USA: 17 α-Etinylestradiol, Estriol, Estrone and Ethinylestradiol in Contaminant candidate list CCL3

Application notes booklet and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Estrogens	1mL	FS104-02A	FS104-03A
	3mL	FS104-02	FS104-03
	6mL	FS104-02B	FS104-03B
	10mL LRC	FS104-02LRC	FS104-03LRC
	12mL	FS104-02C	FS104-03C
	96 well plate – 1 unit	FS104-1.96W	
	Reversible cart. – 0.7mL	FS104-02Rev1	FS104-03Rev1
	Reversible cart. – 2 mL	FS104-02Rev2	FS104-03Rev2

AFFINIMIP® SPE Bisphenols

Analytes

- Bisphenols such as Bisphenol A and closely 18 related structures

Matrices

- Water, milk (infant formula), powdered infant formula, canned food, vegetable puree for infant, Beer, urine, …

Advantages

- SIMULTANEOUS analyis of bisphenols analogs
- Broad range of solid and liquid foods tested
- LC-MS, GC/MS, fluorescence

Regulation

Europe 2011/8/EU : forbiden in infant feeding bottle
Specific migration limit of 0.6mg/kg in food from packaging
Forbiden in food materials in France

Application notes booklet and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Bisphenols	3mL (PP)	FS106-02	FS106-03
	6mL (PP)	FS106-02B	FS106-03B
	6mL (Glass)	FS106-02G	FS106-03G
	10mL LRC (PP)	FS106-02LRC	FS106-03LRC
	12mL (PP)	FS106-02C	FS106-03C
	96 well plate – 1 unit	FS106-1.96W	
	Multipurpose sampler automate (GERSTEL) -3mL	-	FS104-03-GER
	ASPEC automate (GILSON) - 3mL	-	FS104-03-GIL

AFFINIMIP® SPE Zeranol Residues

Analytes

- Zeranol
- Zearalenone
- β-Zearalanol (Taleranol)
- α and β-Zearalenol
- Zearalanone
- Resorcylic acid lactones

Matrices

- Meat, Urine, Tissues, Plasma

Advantages

- LC-MS, HPLC-Fluorescence

Regulation

Its use is banned in several countries (e.g. European directive 96/22/EC and in China).
Codex alimentarius: 2µg/kg in muscle

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Zeranol Residues	3mL	FS105-02	FS105-03
	LRC 10mL	FS105-02LRC	FS105-03LRC

AFFINIMIP® SPE Phenolics

Analytes

- Parabens, carnosic acid, hydroxylated PAHs
- Tocopherols
- Nitrophenols
- Chlorophenols
- Catechins…

Matrices

- Food, cosmetic, wine, meat

Advantages

- Extraction of broad range of phenolics compounds
- LC-MS, HPLC/UV

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Phenolics	3mL	FS103-02	FS103-03
	6mL	FS103-02B	FS103-03B
	10mL LRC	FS103-02LRC	FS103-03LRC
	12mL	FS103-02C	-
	96 well plate – 1 unit	FS103-1.96W	
	Reversible cart. – 0.7mL	FS103-02Rev1	FS103-03Rev1
	Reversible cart. – 2 mL	FS103-02Rev2	FS103-03Rev2

Visit our website to know more about this product and its formats.
Custom designed formats are available on demand.

AFFINIMIP® SPE NNAL

Analytes

- **Total and free NNAL** (4-(methyl nitrosamino) -1-(3-pyridyl) -1-butanol)

Matrices

- Urine

Advantages

- LC-MS & LC-MS/MS

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE NNAL	3mL	DG103-02	DG103-03
	10mL LRC	DG103-02LRC	DG103-03LRC
	96 well plate – 1 unit	DG103-1.96W	

AFFINIMIP® SPE Amphetamines

Analytes

- Amphetamine
- Methamphetamine derivatives

Matrices

- Urine, Serum

Advantages

- LC-MS

Regulation

Several US and European states have set up a cut-off value in urine or blood [e.g. France and Virginia (respectively 50ng/mL and 100ng/mL of blood)].

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Amphetamines	3mL	DG102-02	DG102-03
	10mL LRC	DG102-02LRC	DG102-03LRC
	96 well plate – 1 unit	DG102-1.96W	

Visit our website to know more about this product and its formats.
Custom designed formats are available on demand.

AFFINIMIP® SPE Catecholamines

Analytes

- Dopamine (DA)
- Norepinephrine or Noradrenaline(NA)
- Epinephrine or Adrenaline (A)

Matrices

- Plasma , Serum

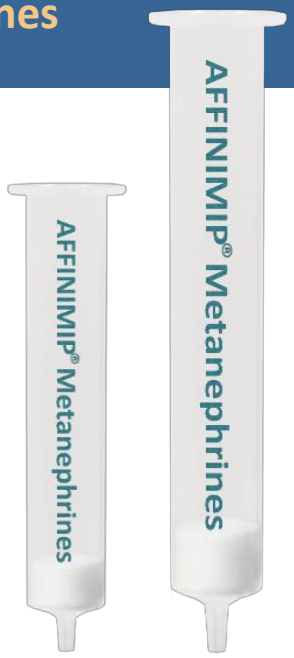
Advantages

- LC-MS, HPLC/UV

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Catecholamines	1mL	DG100-02A	DG100-03A
	3mL	DG100-02	DG100-03
	10mL LRC	DG100-02LRC	DG100-03LRC
	12mL	DG100-02C	-
	96 well plate – 1 unit	DG100-1.96W	

AFFINIMIP® SPE Metanephrines



Analytes

- Metanephrine
- Normetanephrine
- 3-methoxytyramine

Matrices

- Plasma , Serum

Advantages

- LC-MS, HPLC/UV

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Metanephrines	1mL	DG101-02A	DG101-03A
	3mL	DG101-02	DG101-03
	10mL LRC	DG101-02LRC	DG101-03LRC
	96 well plate – 1 unit	DG101-1.96W	

Visit our website to know more about this product and its formats.
Custom designed formats are available on demand.

AFFINIMIP® SPE Tamoxifen

Analytes

- Tamoxifen
- its metabolite: 4-HydroxyTamoxifen

Matrices

- Biofluids such as urine

Advantages

- LC-MS, HPLC/UV

Regulation

Since January 2000, Tamoxifen has been included in the list of prohibited substances by the International Olympic Committee.

Application notes and publications are available on our website.

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Tamoxifen	3mL	PH101-02	PH101-03

AFFINIMIP® SPE Cannabis

Analytes

- Tetrahydrocannabinol (THC) and its metabolites
- THC-OH
- THC-COOH

Matrices

- Biofluids such as urine, saliva, blood

Advantages

- LC-MS

Regulation

This drug is forbidden in most countries in the world. However, some countries or US states make possible the use of this product for medical use (*e.g.* Arizona, Florida, Louisiana…) and for even less countries/states for recreational use (e.g. Canada, California, Alaska, Massachusetts…).

Designation	Description	25c/box	50 c/box
AFFINIMIP® SPE Cannabis	3mL	PH123-02	PH123-03
	6mL	PH123-02B	PH123-03B
	10mL LRC	PH123-02LRC	PH123-03LRC

Visit our website to know more about this product and its formats.
Custom designed formats are available on demand.