

AFFINIMIP® SPE and dedicated applications

Selective Solid Phase Extraction

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



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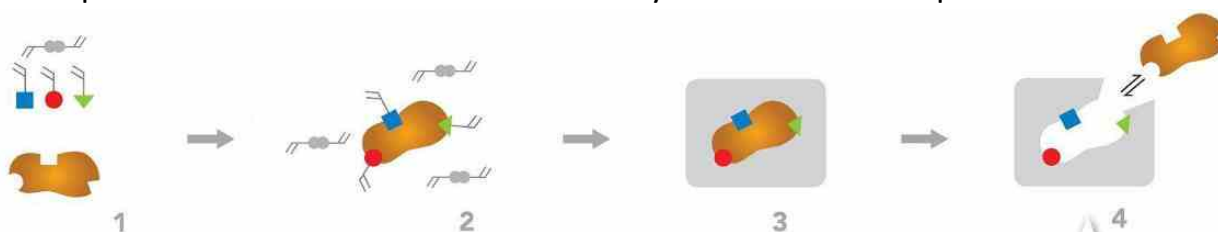


Selective Solid Phase Extraction

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

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.

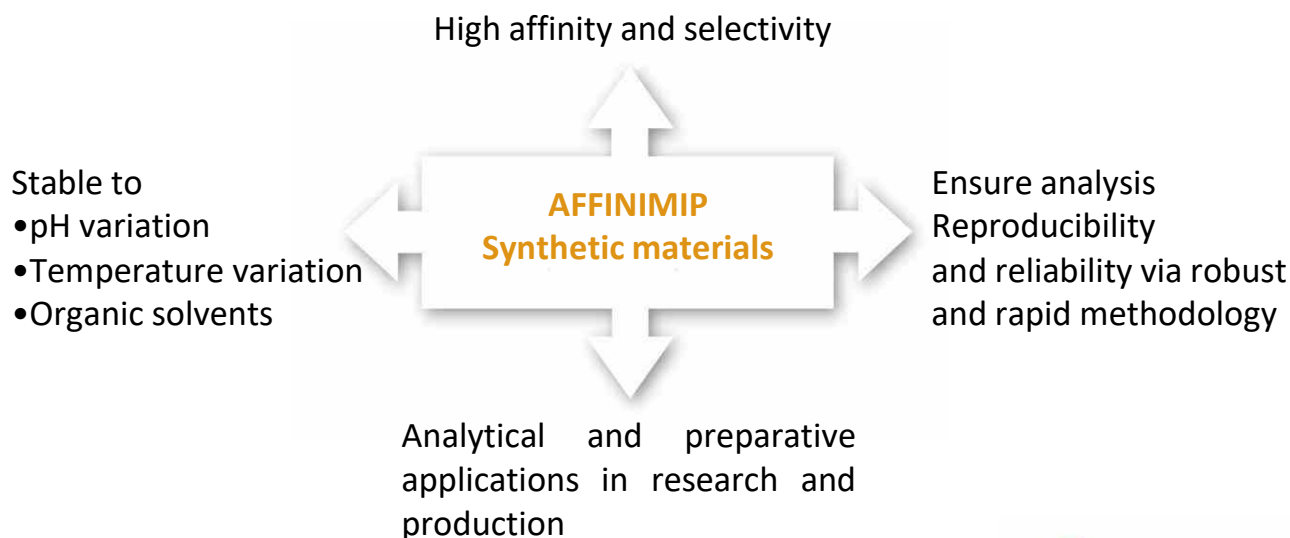


Molecular Recognition materials

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



Advantages of SPE based molecularly imprinted polymers



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.



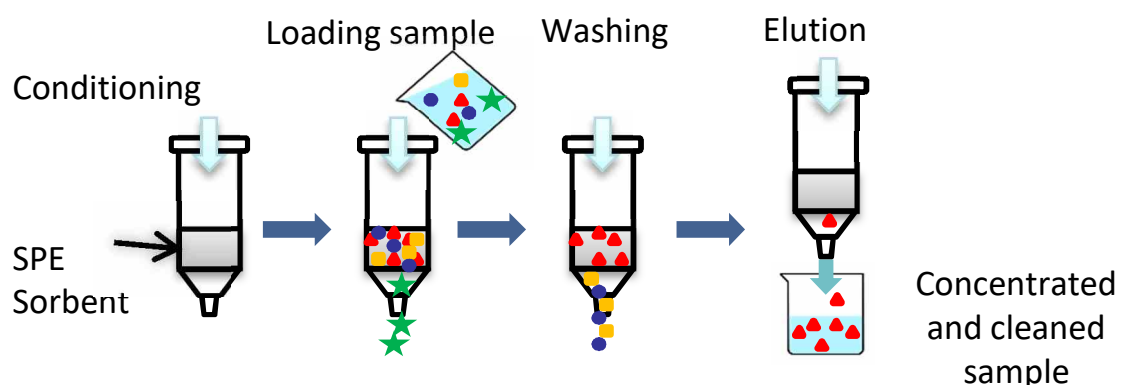
AFFINIMIP® SPE Selective Extraction Cartridges

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.

AFFINIMIP® SPE FOR ANALYTICAL PURPOSE



Benefits

- High affinity and selectivity
- Lowered quantification limits
- High reproducibility and repeatability
- Robust materials

The advantages of **AFFINIMIP® SPE** are essential in trace analysis from a complex matrix 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.

AFFINISEP

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 1 mL-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)	<ul style="list-style-type: none">• 1mL Acetonitrile• 1mL ultrapure water• Do not allow the cartridge to dry during conditioning
Loading (L) (1 drop every 2 seconds)	<ul style="list-style-type: none">• 250µL to 1mL of the loading solution
Washing of interferents (1 drop/s)	<ul style="list-style-type: none">• 1mL ultrapure water• 1mL of (60/40) ultrapure water/ Acetonitrile (v/v)
Drying	<ul style="list-style-type: none">• Apply vacuum or nitrogen flow through cartridge during 30 seconds
Elution (E) (1 drop/s)	<ul style="list-style-type: none">• 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 **Multimycoco LCMSMS** for the analyses of

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

AFFINIMIP® SPE **FumoZON** for the analyses of

- Fumonisin
- 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 **Fumonisin**

AFFINIMIP® SPE **Deoxynivalenol**

AFFINIMIP® SPE **Aflatoxine**



Analytes

- "Fumonisin 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 et 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.*



Analytes

~Fumonisin 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 Fumonisin
Codex Alimentarius - (193-1995): 2000µg Fumonisin B1+B2/kg for whole commodity

Application notes et publications are available on our website.

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

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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 et 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



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 et 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

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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 et 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

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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 et 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 Electrophoresis - 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 et 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

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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 et 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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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 et 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	

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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 et 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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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 et 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	

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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	

Application notes et publications are available on our website.

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

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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 -Ethinylestradiol, Estriol, Estrone and Ethinylestradiol in Contaminant candidate list CCL3

Application notes et 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

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

Regulation

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

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

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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 et 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

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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

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Analytes

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

Matrices

“Urine

Advantages

“LC-MS & LC-MS/MS

Application notes et publications are available on our website.

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	

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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)].

Application notes et publications are available on our website.

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	

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Analytes

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

Matrices

~ Plasma , Serum

Advantages

~ LC-MS, HPLC/UV

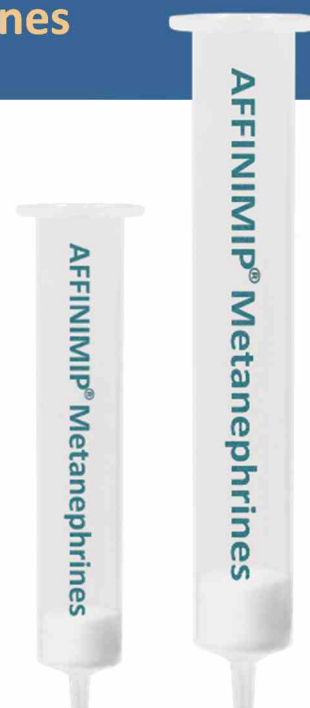
Application notes et publications are available on our website.

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	

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AFFINIMIP® SPE Metanephrines

Analytes
<ul style="list-style-type: none"> ~ Metanephrine ~ Normetanephrine ~ 3-methoxytyramine
Matrices
<ul style="list-style-type: none"> ~ Plasma , Serum
Advantages
<ul style="list-style-type: none"> ~ LC-MS, HPLC/UV



Application notes et 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	

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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 et publications are available on our website.

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

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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.
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