



AttractSPE™ Disks



AttractSPE™ Disks are **thin** and **uniform** membranes based chromatography for Extraction/separation, purification and concentration of analyte molecules from liquid or air samples.

AttractSPE™ Disks are soft membranes which can not only collect analytes but also release them for analysis with an elution step, if necessary.

*SPE Particle-loaded membranes
with more than 90% Sorbent by
weight*

AttractSPE™ Disks

- ✓ Broad diversity of chemistry: C18, HLB, SDB-XC, SDB-RPS, Anion and cation exchanges...
- ✓ For all needs of automatization 96 well plates, tips, disks
- ✓ Diversity of capacity giving high kinetics for all applications

AttractSPE™ Disks Advantages



- ❑ It is a thin, soft and mechanically stable membrane
- ❑ It has a high exposed surface area of active particles
- ❑ This very interesting feature makes the membrane specially designed for many applications of extraction or purification
- ❑ Its format makes possible to pass through large volume samples used in environmental analysis or very small volumes used in life science
- ❑ The membrane material exists under various formats like disks, cartridges, tips or 96-well plates.

Sorbent particles are tightly enmeshed



No needs to frits

Dense particle packing with no void space & uniform particle



High separation efficiency
Reduced elution volume

Thin membrane, small bed volume



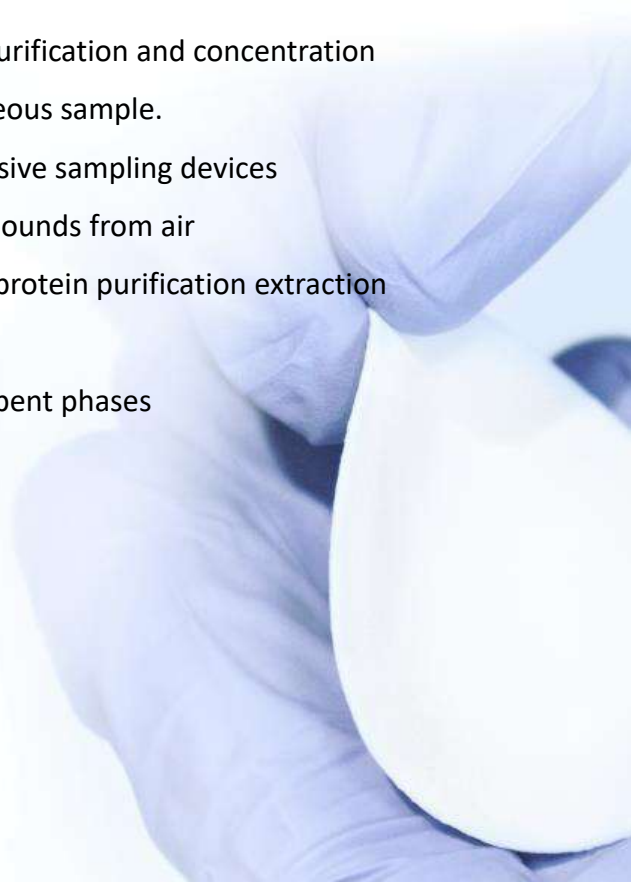
Can extract large volumes

AttractSPE™ Disks Applications

All characteristic properties make AttractSPE™ Disks extremely useful for many applications.

Examples: AttractSPE™ membrane formats are used to prepare samples of large volumes used in environmental analysis to very small volumes used in drug discovery.

- Extraction/separation, purification and concentration of analytes from an aqueous sample.
- Sorbent material for passive sampling devices
- Capture of volatile compounds from air
- Design of small-volume protein purification extraction columns (StageTips)
- Layering of different sorbent phases



AttractSPE™ Disks Environment

- ❑ Waters analysis
- ❑ Compatible to many EPA methods
- ❑ Passive samplers
- ❑ Contaminants enrichment

AttractSPE™ Disks BioMol

- ❑ Automated process to desalt or “clean-up” proteins/peptides
- ❑ Liquid handling robotics,
- ❑ StageTips, 96 well plates and disks

AttractSPE™ Disks for Passive Sampling

- ❑ Chemcatcher™, POCIS
- ❑ Air sampling to identify and quantify health hazards

AttractSPE™ Disks advantages

- Small particles give high sample capacity
- Active sorbent particles retain absorbed compounds during sample
- Collection and store easily
- High extraction recoveries
- Higher stability of compounds stored on disks

Broad range of sorbents to collect required contaminants

AttractSPE™ Disks for Bio Application

Disks extraction methods

- “ Urine analysis (Isolate large quantities of metabolites for future studies)
- “ Plate for clean up of human serum samples for drug and metabolite quantification

Micro elution methods under tips and 96-well plate

- “ Small elution volumes reduce the need for small elution

AttractSPE™ Disks Environment



AttractSPE™ Disks Environment have been designed for environmental applications such as high volume loading (including in compliance with EPA methods) or chemcatcher use.

Product	Compatible with analytical methods
AttractSPE™ Disks HLB	<p>EPA methods :</p> <p>532 (Phenylurea compounds), 548 (Endothall), 625 (Acids and Base/Neutrals including PCBs), 8081 (Organochlorine Pesticides), 8082 (PCBs), 8270 (Semivolatile Organic Compounds), 8315 (Carbonyl Compounds), 8318 (N-Methylcarbamates), 8330 (Nitroaromatics & Nitramines)</p> <p>and also Hormons, sex steroids, PAHs, PPCPs, Pharmaceutical compounds, Endocrine disruptors</p>
AttractSPE™ Disks C18	<p>EPA methods :</p> <p>506 (Phthalate & Adipate Esters), 507 (Nitrogen- & Phosphorus-Containing Pesticides), 508.1 (Chlorinated Pesticides), 525 (Organic Compounds), 532 (Phenylurea compounds), 548 (Endothall), 550.1 (PAHs), 553.1 (Benzidine & Nitrogen-containing Pesticides), 554 (Carbonyl Compounds & Formaldehyde), 608 (Organochlorine Pesticides), 1613 (Dioxins & Furans), 1614, 1657 (Organophosphorus Pesticides), 1668 (PCBs), 8061 (Phthalate Esters), 8081 (Organochlorine Pesticides), 8082 (PCBs), 8315 (Carbonyl Compounds)</p> <p>and also Bisphenols & Alkyl phenols, PBDEs, Dioxins & Furans, Phthalates, Herbicides, PAHs, Carbaryl, Microcystins</p>
AttractSPE™ Disks SDB-XC	EPA method 515.2 chlorinated acids
AttractSPE™ Disks SDB-RPS	Explosives Residues (HDX, RDX)
AttractSPE™ Disks Anion Exchange - SR	<p>EPA methods:</p> <p>548.1 Rev. 1 (Endothall), EPA Method 552.1 Rev. 1 (Haloacetic Acids and Dalapon)</p> <p>And also Pesticides, Pharmaceutical compounds and analytes containing carboxylic acid groups</p>
AttractSPE™ Disks Cation Exchange - SR	Metals, Amines
AttractSPE™ Disks Oil & Grease	Oil & grease



AttractSPE™ Disks Environment



AttractSPE™ Disks Environment are available with three diameters of membranes: 25mm, 47mm and 90mm.



Product name	Ref – Diam 25mm - 40/pk	Ref – Diam 47mm - 20/pk	Ref – Diam 90mm - 10/pk
AttractSPE™ Disks HLB	SPE-Disks-HLB-25.T1.40	SPE-Disks-HLB-47.T1.20	SPE-Disks-HLB-90.T1.10
AttractSPE™ Disks C18	SPE-Disks-C18-25.T1.40	SPE-Disks-C18-47.T1.20	SPE-Disks-C18-90.T1.10
AttractSPE™ Disks C8	SPE-Disks-C8-25.T1.40	SPE-Disks-C8-47.T1.20	SPE-Disks-C8-90.T1.10
AttractSPE™ Disks SDB-XC with PS-DVB sorbent	SPE-Disks-DVB-25.T1.40	SPE-Disks-DVB-47.T1.20	SPE-Disks-DVB-90.T1.10
AttractSPE™ Disks SDB-RPS with modified PS-DVB sorbent	SPE-Disks-RPS-25.T1.40	SPE-Disks-RPS-47.T1.20	SPE-Disks-RPS-90.T1.10
AttractSPE™ Disks Anion exchange – SR with SAX sorbent	SPE-Disks-AN-25.T1.40	SPE-Disks-AN-47.T1.20	SPE-Disks-AN-90.T1.10
AttractSPE™ Disks Cation exchange – SR with SCX sorbent	SPE-Disks-CAT-25.T1.40	SPE-Disks-CAT-47.T1.20	SPE-Disks-CAT-90.T1.10
AttractSPE™ Disks Oil & Grease		SPE-Disks-OIL-47.T1.20	SPE-Disks-OIL-90.T1.10



AttractSPE™ Disks BioMol applications

Designed for microextraction used in Stagetips, 96 well columns and minisPE.

Product	Use for
AttractSPE™ Disks Bio - HLB	Fractionation of peptides
AttractSPE™ Disks Bio - C18	Desalting of peptides; fractionation of peptides at acidic and neutral pH
AttractSPE™ Disks Bio - C8	Desalting of large peptides and proteins; usage as frit to retain beads in a tip
AttractSPE™ Disks Bio – C4	Desalting of large peptides and proteins
AttractSPE™ Disks Bio – SDB - RPS	Desalting and fractionation of peptides
AttractSPE™ Disks Bio - SAX	Fractionation of peptides by salt or pH steps
AttractSPE™ Disks Bio - SCX	Fractionation of peptides by salt or pH steps
AttractSPE™ Disks Bio - SDB	Fractionation of peptides at basic pH



AttractSPE™ Disks BioMol



AttractSPE™ Disks BioMol are available with two diameters: 25 and 47mm.



Product name	Ref – Diam 25mm -40/pk	Ref – Diam 47mm -20/pk
AttractSPE™ Disks Bio HLB	SPE-Disks-Bio-HLB-25.40	SPE-Disks-Bio-HLB-47.20
AttractSPE™ Disks Bio C18	SPE-Disks-Bio-C18-100.25.40	SPE-Disks-Bio-C18-100.47.20
AttractSPE™ Disks Bio - C8	SPE-Disks-Bio-C8-100.25.40	SPE-Disks-Bio-C8-100.47.20
AttractSPE™ Disks Bio – C4	SPE-Disks-Bio-C4-300.25.40	SPE-Disks-Bio-C4-300.47.20
AttractSPE™ Disks Bio SDB - RPS	SPE-Disks-Bio-RPS-25.40	SPE-Disks-Bio-RPS-47.20
AttractSPE™ Disks Bio SAX	SPE-Disks-Bio-SAX-25.40	SPE-Disks-Bio-SAX-47.20
AttractSPE™ Disks Bio SCX	SPE-Disks-Bio-SCX-25.40	SPE-Disks-Bio-SCX-47.20
AttractSPE™ Disks Bio SDB	SPE-Disks-Bio-DVB-25.40	SPE-Disks-Bio-DVB-47.20



Custom-made Disks

As manufacturer, **on demand**, we can design and supply under your specifications:

- Multi mode disks
- Various thicknesses
- Different diameters



Any question, please contact us by email : contact@affinisep.com

Visit our website for AttractSPE™StageTips BioMol

“Spinnable and automatable StageTip (stop-and-go-extraction tips) in shotgun proteomics to clean/desalt peptide samples prior to LC-MS/MS analysis

“Load your sample on **AttractSPE™Tips** for desalting or purify peptides and proteines

“Several sorbents based Stage-tips and stacking



Determination of Pharmaceuticals in water with AttractSPE™ Disks HLB

PAHs with AttractSPE™ Disks HLB

PAHs with AttractSPE™ Disks C18 – EPA method 550.1 :

Comparison with 3M Empore SPE Disks C18

Multiresidues analysis with AttractSPE™ Disks HLB :

Comparison with competitor SPE Disks HLB

Acid Herbicides with AttractSPE™ Disks HLB

Ionic herbicides with AttractSPE™ Disks Anion exchange SR

Analysis of Seven tetracyclines in water using AttractSPE™ Disks HLB

Determination of Pharmaceuticals in water with AttractSPE™ Disks HLB



AttractSPE™ Disks HLB is successfully tested in similar conditions of EPA 1694 and showed recovery yields >80% for most the analytes.

Analyte	Blank	Spiked recovery %	Concentration (ng/L)
Penicilin V	0	105	160
Flucloxacillin	0	105	80
Sulfathiazole	0	92	16
Sulfadimethoxine	0	84	16
Sulfamethazine	0	88	80
Sulfadiazine	0	95	32
Caffeine	0	106	80
Carbamazepine	0	98	16
4-epitetracycline	0	107	820
4-epioxytetracycline	0	104	440
Oxytetracycline	0	78	1160
Tetracycline	0	102	860
4-epichlorotetracycline	0	113	720
Chlorotetracycline	0	87	800
Doxycycline	0	49	800

INSTALLATION AND CONDITIONING

Put the SPE disk on the holder

Loading solution: One liter of reagent water put to pH 2-2,5 with HCl 37%. Add 80mg of sodium thiosulfate, and 500 mg of EDTA-Na₄2H₂O. Solution is then spiked with analytes of interest.

Important: For each conditioning and elution step, apply a fast vacuum to soak the disk and wait 1 minute before starting elution.

LOADING

- 1 L of loading solution in 15 minutes

WASHING

- 20 mL ultrapure water

Apply vacuum for 30 s to dry the disk

ELUTION

- 20 mL Methanol
- (for tetracyclines only)4*20 mL Methanol +3% Formic Acid

ANALYSIS

- Evaporation under N₂ and dissolved in mobile phase.
- Tetracyclines: Elutions mixed and diluted by 4 with water 5mM Oxalic Acid, prior to analysis. (Can also be evaporated

Catalog number:

AttractSPE™ Disks HLB - 47mm diameter,
20/pk : SPE-Disks-HLB-47.T1.20

PROTOCOL OF PURIFICATION

Sample preparation

1L of water was put to pH<2 with HCl 37% (optional) and spiked at 20ng/L with each analyte (Benzo[a]anthracene, Chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, Dibenz[a,h]anthracene, Benzo[a]pyrene, Benzo[g,h,i]perylene).

Purification with a AttractSPE™ Disks HLB

Equilibration

- Put the SPE disk on the holder
- 10 mL Acetone
- 10 mL Isopropanol
- 10 mL Methanol
- 50 mL of ultrapure water

Loading

- 1 L of loading solution

Elution (E)

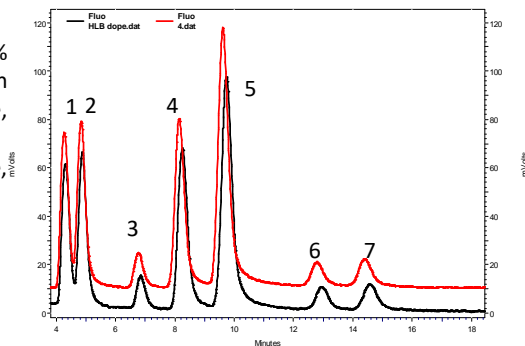
- 10 mL Methanol
- 4x10 mL Ethyl Acetate

Evaporate the elution solution and reconstitute with 5mL Acetonitrile prior to analysis

Recovery yields obtained for the loading of 1L of water spiked with 7 PAHs at 20 ng/L each and concentrated using **AttractSPE™ Disks HLB**

	AttractSPE™ Disks HLB	
	Blank	Spiked
Benzo[a]anthracene BaA	0	90%
Chrysene CHR	0	90%
benzo[b]fluoranthene BbFA	0	90%
benzo[k]fluoranthene BkFA	0	96%
Benzo[a]pyrene BaP	0	91%
Dibenz[a,h]anthracene DBahA	0	92%
Benzo[g,h,i]perylene BghiP	0	99%

RESULTS



Fluorescence chromatograms ($\lambda_{exc/em}$ 252nm / 400nm) for 7 PAHs (1 - BaA, 2 - CHR, 3 - BbFA, 4 - BkFA, 5 - BaP, 6 - DbahA, 7 - BghiP)

The black profile uses the **AttractSPE™ Disks HLB** to concentrate the 20ng/L PAHs contained in 1L of water while the red one is the solution with PAHs standards.

Conditions of analysis:

LC-Fluorescence. Column: Zorbax eclipse PAH 4,6*50mm (1,8 μ m), at 30°C. Injection volume: 50 μ L. Isocratic: Water / Acetonitrile 15 / 85. Flow rate: 0.5 mL/min, run of 25min.

Fluorescence detection: $\lambda_{exc/em}$ 252nm / 400nm

Catalog number:

AttractSPE™ Disks HLB - 47mm diameter,
20/pk : SPE-Disks-HLB-47.T1.20

PAHs with AttractSPE™ Disks C18 - EPA method 550.1 Comparison with 3M Empore SPE Disks C18



PROTOCOL OF PURIFICATION

Sample preparation

1L of water was put to pH<2 with HCl 37% (optional) and spiked at 20ng/L with each analyte (Benzo[a]anthracene, Chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, Benzo[a]pyrene, Dibenz[a,h]anthracene, Benzo[g,h,i]perylene).

Purification with a AttractSPE™ Disks C18

Equilibration

- Put the SPE disk on the holder
- 10 mL Ethyl Acetate
- 10 mL Methanol
- 50 mL of ultrapure water

Loading

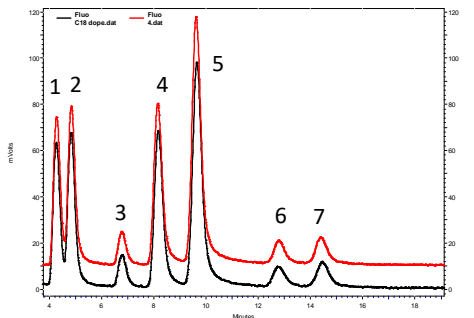
- 1 L of loading solution

Elution (E)

- 10 mL Methanol
- 4x10 mL Ethyl Acetate

Evaporate the elution solution and reconstitute with 5mL Acetonitrile prior to analysis

RESULTS



Fluorescence chromatograms ($\lambda_{exc/em}$ 252nm / 400nm) for 7 PAHs (1 - BaA, 2 - CHR, 3 - BbFA, 4 - BkFA, 5- BaP, 6- DbahA, 7 - BghiP)

The black profile uses the **AttractSPE™ Disks C18** to concentrate the 20ng/L PAHs contained in 1L of water while the red one is the solution with PAHs standards.

Conditions of analysis:

LC-Fluorescence. Column: Zorbax eclipse PAH 4,6*50mm (1,8µm), at 30°C. Injection volume: 50 µL. Isocratic: Water / Acetonitrile 15 / 85. Flow rate: 0.5 mL/min, run of 25min.

Fluorescence detection: $\lambda_{exc/em}$ 252nm / 400nm

Recovery yields obtained for the loading of 1L of water spiked with 7 PAHs at 20 ng/L each and using either **AttractSPE™ Disks C18** or 3M Empore SPE disks C18

	AttractSPE™ Disks C18		3M Empore SPE disks C18	
	Blank	Spiked	Blank	Spiked
Benzo[a]anthracene BaA	0	96%	0	96%
Chrysene CHR	0	98%	0	96%
benzo[b]fluoranthene BbFA	0	94%	0	93%
benzo[k]fluoranthene BjFA	0	98%	0	100%
Benzo[a]pyrene BaP	0	91%	0	94%
Dibenz[a,h]anthracene DBahA	0	88%	0	96%
Benzo[g,h,i]perylene BghiP	0	97%	0	97%

These experiments show that **AttractSPE™ Disks C18** behave similarly to **3M Empore SPE Disks C18**

Order on
www.affinisep.com

Catalog number:

AttractSPE™ Disks C18 - 47mm diameter, 20/pk : **SPE-Disks-C18-47.T1.20**

Multiresidues analysis with AttractSPE™ Disks HLB comparison with competitor SPE Disks HLB



PROTOCOL OF PURIFICATION

Sample preparation

2L of water were spiked at 200ng/L with each molecule (Caffeine, Diclofenac and Metolachlor ESA).

Purification with a AttractSPE™ Disks HLB using SPE-DEX 4790 Automated Extractor System **

Equilibration

- Put the SPE disk on the holder
- 50 mL Methanol
- 50 mL of ultrapure water

Loading

- 2 L of loading solution

Elution (E)

- 50 mL Methanol

Dilute by 10 with ultrapure water prior to analysis

RESULTS

Conditions of analysis for Caffeine and Diclofenac:

LC-MS/MS HPLC U3000 - QTRAP 4000. Column: Hypersil Gold 150x2.1cm 3µm, pre-column (hypersil gold 1cm) at 30°C. Injection volume: 20 µL. Gradient: Water with 0.1% Formic acid and Acetonitrile with 0.1% Formic acid. Flow rate: 0.3 mL/min.

Conditions of analysis for Metolachlor ESA:

LC-MS/MS HPLC U3000 - QTRAP 4000. Column: Hypersil Gold 150x2.1cm 3µm, pre-column (hypersil gold 1cm) at 30°C. Injection volume: 20 µL. Gradient: Water with 0.01% Formic acid and Acetonitrile. Flow rate: 0.3 mL/min.

Recovery yields obtained for the loading of 2L of water spiked with several analytes at 200 ng/L each and using either **AttractSPE™ Disks HLB** or competitor SPE disks HLB

	AttractSPE™ Disks HLB		Competitor SPE disks HLB	
	Blank	Spiked	Blank	Spiked
Caffeine	0	98%	0	54%
Diclofenac	0	102%	0	33%
Metolachlor ESA	0	88%	0	13%

Catalog number:

AttractSPE™ Disks HLB - 47mm diameter,
20/pk : **SPE-Disks-HLB-47.T1.20**

** The testings were carried out with SPE-DEX 4790 Automated Extractor System by Toxem (Le Havre, France)

Acid herbicides with AttractSPE™ Disks Anion exchange SR



PROTOCOL OF PURIFICATION

Sample preparation

One liter of water was spiked at 1 µg/L of aminopyralid, clopyralid and picloram.

Purification with a AttractSPE™ Disks Anion exchange SR

Equilibration

- Put the SPE disk on the holder
- 50 mL of methanol
- 50 mL of ultrapure water

Loading

- 1 L of loading solution

Washing (E)

- 50 mL Ultrapure water

Elution (E)

- 50 mL Methanol with 3% formic acid

Dilute by 10 with mobile phase prior to analysis

Conditions of analysis:

LC-MS/MS HPLC U3000 - QTRAP 4000.
Column: Hypersil Gold 150x2.1cm 3µm, pre-column (hypersil gold 1cm) at 30°C.
Injection volume: 20 µL. Gradient: Water with 0.1% Formic acid and Acetonitrile with 0.1% Formic acid. Flow rate: 0.3 mL/min.

Catalog number:

AttractSPE™ Disks Anion Exchange SR - 47mm diameter, 20/pk : SPE-Disks-SAX-47.T1.20

RESULTS

Recovery yields obtained for the loading of 1L of water spiked with 1µg/L each using **AttractSPE™ Disks Anion exchange SR** to concentrate

	Recovery yield %		
	Amino pyralid	Clo pyralid	Picloram
Ultrapure water	102	102	108
Tap water	80	90	87

PROTOCOL OF PURIFICATION

Sample preparation

One liter of water was spiked at 1 µg/L of metolachlor OA and metolachlor ESA.

Purification with a AttractSPE™ Disks HLB

Equilibration

- Put the SPE disk on the holder
- 50 mL of methanol
- 50 mL of ultrapure water

Loading

- 1 L of loading solution

Washing (E)

- 50 mL Ultrapure water

Elution (E)

- 50 mL Methanol with 3% formic acid

Dilute by 10 with mobile phase prior to analysis

Conditions of analysis:

LC-MS/MS HPLC U3000 - QTRAP 4000.
 Column: Hypersil Gold 150x2.1cm 3µm, pre-column (hypersil gold 1cm) at 30°C.
 Injection volume: 20 µL. Gradient: Water with 0.1% Formic acid and Acetonitrile with 0.1% Formic acid. Flow rate: 0.3 mL/min.

Catalog number:

AttractSPE™ Disks HLB - 47mm diameter, 20/pk : SPE-Disks-HLB-47.T1.20

RESULTS

Recovery yields obtained for the loading of 1L of water spiked with 1µg/L each using **AttractSPE™ Disks HLB** to concentrate

	Recovery yield %	
	Metolachlor OA	Metolachlor ESA
Ultrapure water	100	102
Tap water	98	90

Analysis of Seven tetracyclines in water using AttractSPE™ Disks HLB



AttractSPE™ Disks HLB was successfully tested for the seven tetracyclines above and showed high recovery yields.



Analyte	Blank	Spiked recovery %	Concentration (ng/L)
4-epitetracycline	ND	70	68,6
4-epioxytetracycline	ND	97	36,6
Oxytetracycline	ND	87	96,6
Tetracycline	ND	75	71,3
4-epichlorotetracycline	ND	105	59,9
Chlorotetracycline	ND	75	66,6
Doxycycline	ND	93	66,6

Loading solution: To one liter of water, 22,195g of Disodium Hydrogen Phosphate heptahydrate, 11,257g of Citric Acid, and 500mg of ETDA- $\text{Na}_4 \cdot 2\text{H}_2\text{O}$ are added. The solution is mixed until total dissolution (pH measured = 4,2) and spiked with tetracyclines.

Important: For each conditioning and elution step, apply a fast vacuum to soak the disk and wait 1 minute before starting elution.

Condition of analysis: LC/MS-MS ESI+, Please find complete method available at our website

CONDITIONING Step

Put the SPE disk on the holder

- 20 mL Acetone
- 50 mL Methanol
- 20 mL of ultrapure water

LOADING

- 1 L of loading solution in 15 minutes

WASHING

- 20 mL ultrapure water

Apply vacuum for 30 s to dry the disk

ELUTION

- 20 mL Methanol
- 20 mL Methanol +3% Formic Acid

ANALYSIS

- Evaporation under N_2 and dissolved with water 5mM Oxalic Acid, prior to analysis.

Table: Recovery yields obtained for the loading of 1L of spiked solution.

Catalog number:

AttractSPE™ Disks HLB - 47mm diameter,
20/pk : SPE-Disks-HLB-47.T1.20




About AFFINISEP


AFFINISEP is a **worldwide expert in sample preparation applications as well as for the design and the development of intelligent polymers with Molecularly Imprinted Polymers (MIP).**

AFFINISEP is dedicated to the development of analytical applications in various fields such as water, biological fluids, food and feed analysis with a complete set of products and services for sample preparation.

Our mission is to develop innovative products of high value and to **offer you the most comprehensive range of solid phase extraction products.**

 Brands
AFFINIMIPSPE™
AttractSPE™
SilactSPE™ ...

 Applications
Sample Preparation
Passive Sampling
Filtration

 Matrices
Food, Feed, Soil,
Oil, Water,
Biological fluids...

The analytical chemists can find any solution for sample preparation, selective extraction and sample clean-up needs in various sectors: food and feed safety and quality, pharmaceutical R&D and quality control, clinical diagnosis, environment and doping.