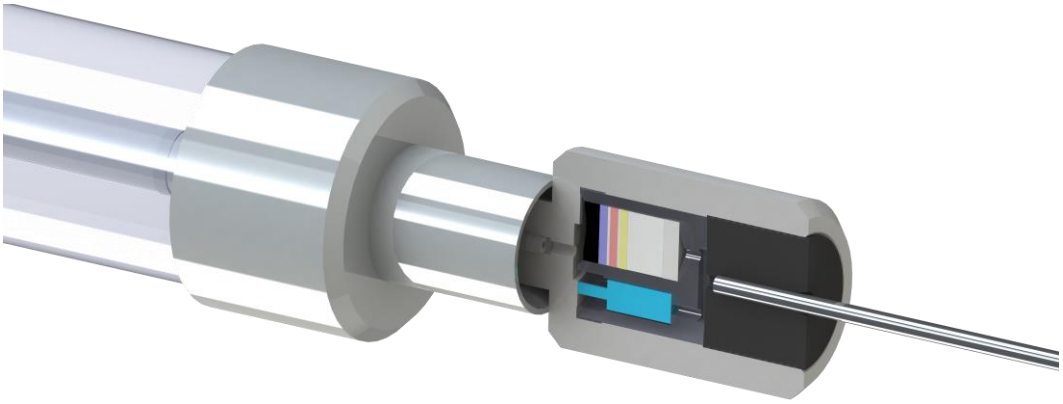
µSPEed® Cartridges



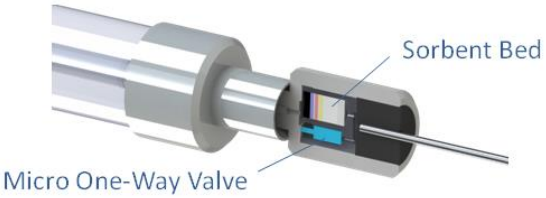
…more than micro-SPE

Disposable micro separation cartridges for ultra clean µSPE, fractionation and HPLC separations

intelligent sample preparation

µSPEed Cartridges (with valve)

µSPEed cartridges offer a unique opportunity to revolutionise micro SPE and micro fractionation. Using a one-way check valve, the sample is aspirated through the cartridge and analytes focused on to the top of a sorbent bed. Using an analytical syringe, relatively high pressures can be generated meaning sorbents of ≤3µm can be used.



The µSPEed cartridges perform like a short HPLC column where separation occurs not just during digital extraction but in the sample clean-up. This results in cleaner sample extractions, compound fractionation, high concentration factors and even LC isocratic and stepped elution for Direct MS Infusion directly from the cartridge. *(Patented)*

FEATURES

- Achieves narrow, low-volume, high concentration elution bands
- Higher concentration factors with narrow, low-volume elution bands enable analyte elution in just µL of solvent. Concentration factors of 1000:1 can be achieved in minutes
- Improved reproducibility with no sample pass through
- Does not have the capacity limitations of SPME
- Reduces or eliminates solvent blowdown – cost efficient
- Small particle media bed for cleaner extracts and better analyte separation capability
- Can be configured for "analytical" separation, allowing direct connection to an analytical detector (eg. Mass Spectrometer)
- Full samples can be transferred to and from the syringe/fitting, reducing the risk of cross-contamination

TYPICAL OPERATION SEQUENCE

STEP 1: [ACTIVATION] Aspirate and Dispense Conditioning Solvent (min 50µL)

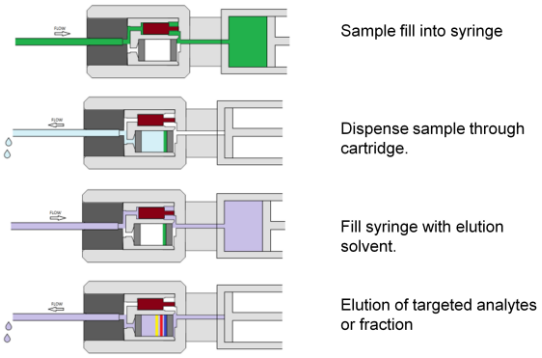
STEP 2: [CONDITIONING] Aspirate and Dispense (100µL) Conditioning Solvent (min 50µL)

STEP 3: [SAMPLE LOAD] Aspirate Sample to Trap Analyte(s)

STEP 4: [SAMPLE DISPENSE] Dispense Sample and needle Wash to Trap Analyte(s)

STEP 5: [WASH] Aspirate and Dispense Wash (typically same as Conditioning) Solvent

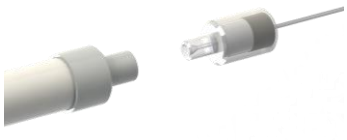
STEP 6: [ELUTION] Aspirate and Dispense Elution Solvent(s)



Multiple Use
µSPEed cartridges can be used multiple times depending on sample matrix and SOP requirements. To reuse, aspirate and dispense 100µL organic conditioning solvent multiple times prior to beginning the next sequence.

AUTOMATED HIGH PRESSURE SYRINGE CONNECTION

The cartridges feature a high pressure, low dead volume connection for fast attachment and disconnection of the cartridge from the syringe and **automated operation**.



High Pressure Connection

- Eprep's automated high-pressure connector allows a seal up to 1500psi. Full sample volume can be delivered from the syringe due to the ultra-low dead volume.

- The connector is ideal for robotic automation applications. The simple push-pull fittings of male and female components connect and disconnect without twisting or turning the parts. **There is no need for complex automation apparatus, processes or programming**. During a sequenced workflow operation, multiple fittings can be easily picked up and dropped off at the required stations.

µSPEed vs Other SPE Methods

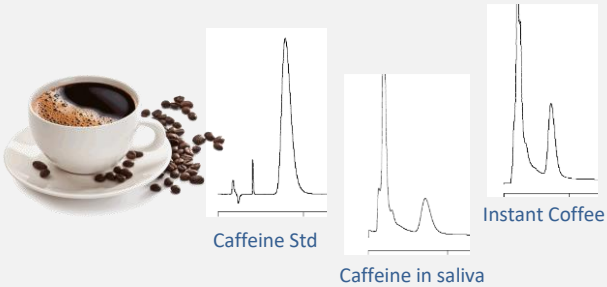
	µSPEed	SPE	MEPS/SPEmx	SPME
Sorbent Size	≤3µm	40-60µm	40-60µm	Coated Fibre
Typical Sample Volume	10µL-10mL	2-3mL	50µL-5mL	2mL
Time/Speed	Very Fast[1.]	Very Slow	Fast	Slow
Extraction Efficiency	Excellent [2.]	Poor	Very Poor	Very Poor
Concentration Factor	Very High(x2-x1000)	Very Low(x1-x10)	High	Low
Price	<$1 (multi use)	$3-$5	<$1 (multi use)	$2
Total Solvent	200µL	10mL	500µL	n/a
Evaporation Step	Never Required	Required	Rarely Required	n/a
Automation	Yes	Difficult	Limited	Yes

[1.] µSPEed is faster than conventional SPE. Because smaller particle size sorbents are used in µSPEed, it performs like a high resolution HPLC column with elution in a narrow precise band. Resolution of targeted compounds in conventional SPE is very limited due to large particle size and inefficient packing of these sorbents.

[2.] Smaller particle size sorbent gives greater efficiency of extraction, with elution conditions becoming far less critical. Also the kinetics of the extraction is less critical with the greater efficiency. Where conventional large particle SPE requires precise conditions, µSPEed is far less method critical leading to greater reproducibility.

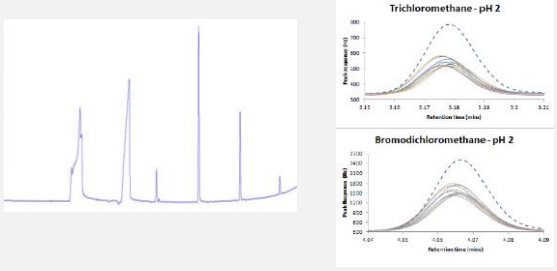
µSPEed Application Examples

µSPEed Analysis of Caffeine in Saliva



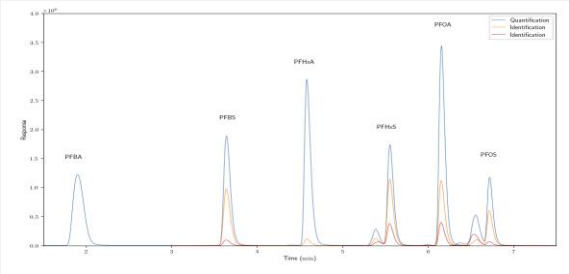
Direct µSPEed Cartridge to UV analysis of caffeine

Trapping Disinfection By-Product (DBP) Clean-up



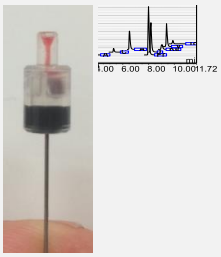
µSPEed DBP concentration from water

PFAS by Automated µSPEed/PFAS



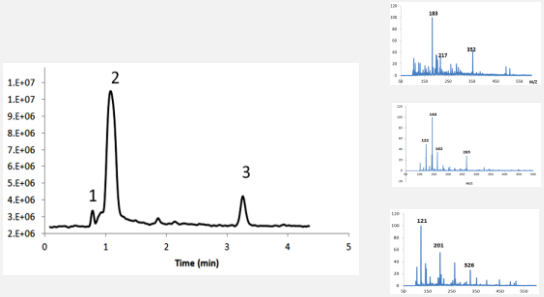
5 µg/L of PFBA, PFBS, PFHxA, PFHxS, PFOA and PFOS that has undergone a ten-times pre-concentration

Recovery of Drug Mix from Serum and Blood



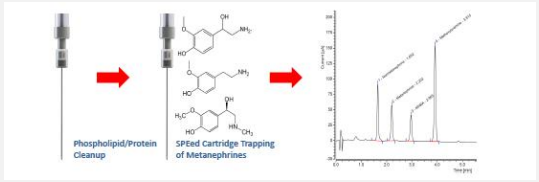
Selective Ion Monitoring at 0.02ppm after µSPEed extraction from serum and blood

µSPEed Plasma Opiate Standard Separation



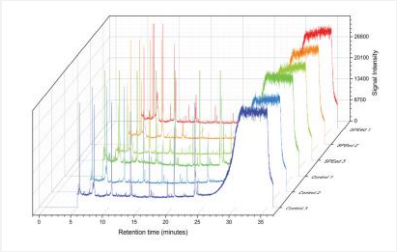
Direct Cartridge to MS of Opiate Standards

µSPEed Clean-up Blood Metanephrines



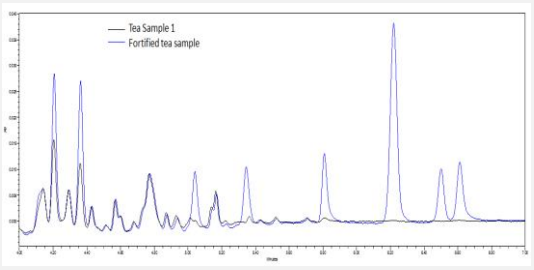
Extraction of Metanephrines in plasma using µSPEed

On-column Derivatisation of Fatty Acids



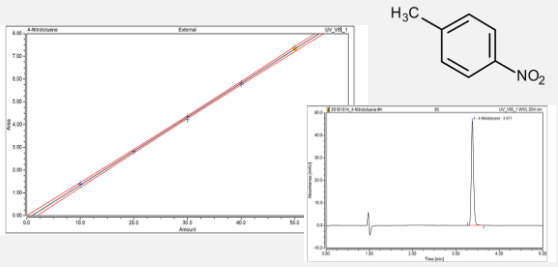
Stacked chromatograms of µSPEed derivatised FAMEs in olive oil

µSPEed extraction of polyphenols in teas



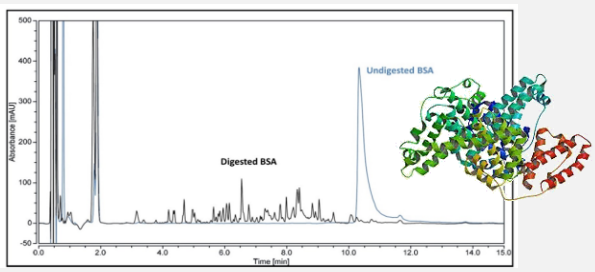
µSPEed traction of 8 selected phenolics compounds from tea at 0.1-1µg/mL

µSPEed Recovery of 4-nitrotoluene



µSPEed extraction of 4-nitrotoluene at 101-110% recoveries and five point calibration with a linear regression of 0.9994

2min Trypsin Digest of Bovine Serum Albumin (BSA)



Overlaid chromatograms at 215 nm of undigested BSA (blue), and the resulting 2 minute BSA digestion on trypsin µSPEed-Cxyl

µSPEed Cartridges (valve)

Ordering Information

Part No	Code	Description	
µSPEed Cartridges			
Silica Based			
01-10110	µSPEed, C18RPS-3µm/120Å (Pkt 10)	3µm/ 120Å ODS spherical silica packing with high acidic resistance suitable for general organic compound applications.	
01-10115	µSPEed, Silica-3µm/120Å (Pkt 10)	3µm/120Å spherical bare silica packing. High purity silica for normal and hilic applications	
Speciality Silica Based			
01-10118	µSPEed, PFAS-3µm/120Å (Pkt 10)	3µm/120Å PFAS spherical silica packing. PFAS specific applications	
01-10185	µSPEed, Cxyl-3µm (Pkt 10)	3µm Carboxyl spherical inert silica packing. Customisable chemistry applications	
Polymer Based			
01-10150	µSPEed, PS/DVB -3µm/ 300Å (Pkt 10)	3µm/ 300Å spherical, crosslinked polystyrene divinyl benzene	
01-10151	µSPEed, PS/DVB RP-3µm/ 300Å (Pkt 10)	3µm/ 300Å Phenyl (RP) spherical, crosslinked polystyrene divinyl benzene	
01-10155	µSPEed, PS/DVB SAX-3µm/ NP (Pkt 10)	3µm/Non-Porous SAX spherical, crosslinked polystyrene divinyl benzene	
01-10156	µSPEed, PS/DVB SCX-3µm/ NP (Pkt 10)	3µm/Non Porous SCX spherical, crosslinked polystyrene divinyl benzene	

SPEmx Cartridges (without valve)

SPEmx cartridges are packed with 40-60 micron sorbents and do not include the one-way check valve. Sample is loaded from the bottom of the sorbent bed making them ideal for “dirty” matrices such as blood, plasma and saliva. Loading mechanism makes the separation process digital as per conventional MEPS/SPE.

Ordering Information

Part No	Code	Description	
SPEmx Cartridges			
01-10205	SPEmx, C4-Silica/SPE (Pkt 10)	40-60µm C4 spherical silica	
01-10209	SPEmx, C18-Silica/SPE (Pkt 10)	40-60µm C18 spherical silica	

Detachable Needles for µSPEed Syringes

Needles fitted with a high-pressure connection hub can be used with µSPEed syringe for automated operation on ePrep. Needles are used in a Workflow for syringe filling, priming and washing prior to cartridge or filter connection.

Ordering Information

Part No	Code	Description	
Filters			
01-10990	Ndle-Hub (Pkt 25)	Needle µSPEed Hub 50|26g|Domed (Pkt 25)	

intelligent sample preparation

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Publication No.94-12002-02 Mar 2018