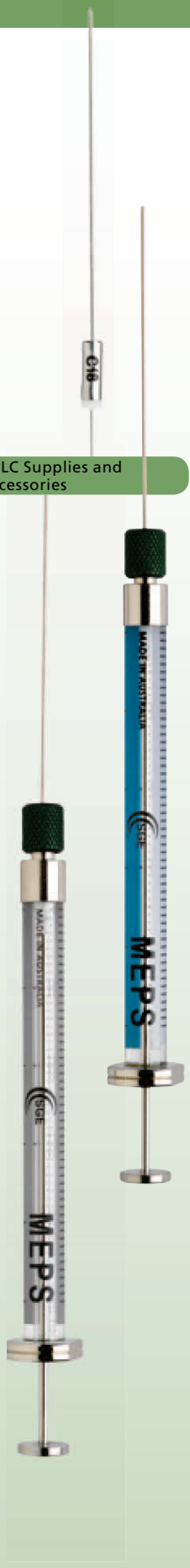


MEPS™ (Micro Extraction by Packed Sorbent) has been created by SGE to overcome the limitations of conventional sample preparation methods. It has been estimated that up to 75% of labor time in a typical analytical laboratory workflow is consumed in preparing and processing samples prior to their analysis. Therefore, any improvement in sample preparation efficiency will increase sample throughput and deliver important time savings for busy laboratories. Below is a comparison of MEPS™ with other common sample preparation techniques.

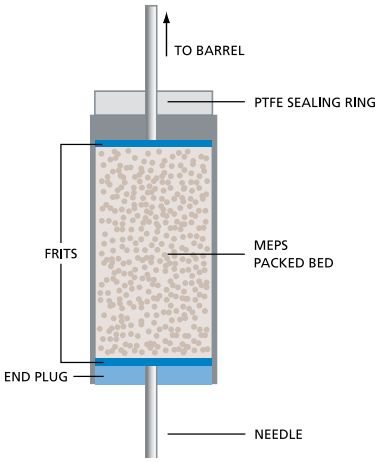
Comparison of Sample Preparation Methods

	LLE (Liquid-Liquid Extraction)	SPE (Solid Phase Extraction)	MEPS™ (Micro Extraction by Packed Sorbent)
Method Description	• Relies on the difference in solubility of analytes in immiscible liquids. • One phase is aqueous (hydrophilic) and the other is an organic (hydrophobic) solvent.	• The organic phase is immobilized on a stationary phase in a cartridge. • A suitable organic solvent mixture is used to selectively elute the compounds of interest. • Stationary phase does not move, sample and solvents must be moved to the cartridge. • Can be used to remove unwanted interfering compounds and to increase sample concentration.	• A miniaturized form of SPE with a reduced stationary phase (3mg) integrated into a high quality SGE analytical syringe. • Stationary phase moves with the syringe which aspirates and dispenses the sample. • Can be used to remove unwanted interfering compounds.
Sample Volume Required	• Generally large e.g. 10-100 mL.	• Small e.g. 3 mL	• Micro e.g. 50 µL.
Evaporation Step	• Solvent evaporation required to increase sample concentration to a level that can be analyzed.	• In the majority of cases, solvent evaporation required to increase sample concentration to a level that can be analyzed.	• Evaporation generally not required.
Solvent Used	• Large solvent volumes required e.g. 10-100 mL.	• Large solvent volumes required e.g. 10 mL.	• Micro e.g. 500 µL.
Time	• Slow and labor intensive.	• Evaporation step can be time consuming.	• Fast e.g. minutes, as one step washes, loads and elutes.
Automation	• Entire process cannot be automated.	• Can be automated.	• Can be fully automated.
Price	• High solvent purchase and discard costs.	• High solvent purchase and discard costs.	• Low solvent purchase and discard costs.

MEPS™ (Micro Extraction by Packed Sorbent) is a micro SPE solution that incorporates the stationary phase in a micro-cartridge integrated in a high quality SGE analytical syringe (Barrel Insert and Needle - BIN configuration). MEPS™ is the miniaturization of conventional SPE packed bed devices from mL to µL bed volumes.

MEPS™ stationary phases available: C2, C8, C18, Silica, C8+SCX, SAX.

eVol® MEPS™ stationary phases available: C2, C8, C18, APS, DVB, SDVB



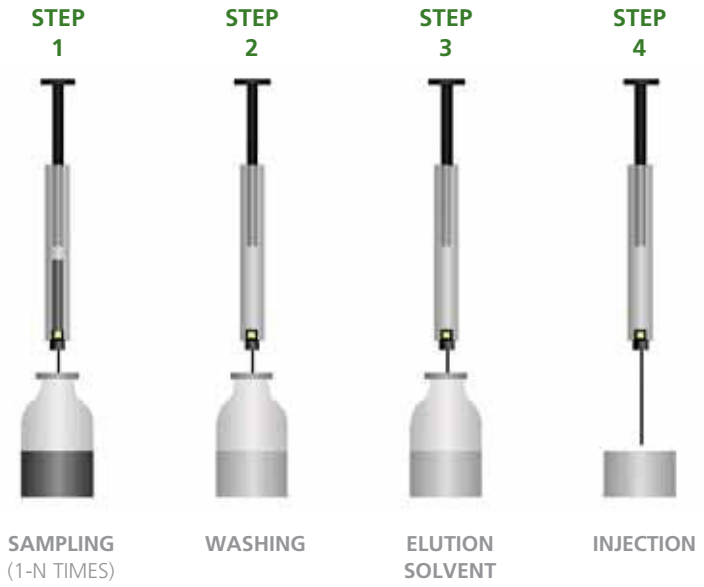
Schematic of the MEPS™ stationary phase within the syringe needle – SGE's patented 'Barrel Insert and Needle' (BIN) configuration.

SGE Analytical Science

To view a demonstration of MEPS™ visit **sge.com/support/videos**

How To Use MEPS™

- Step 1: Pump the sample through the MEPS™ BIN (one or more volumes may be taken).
- Step 2: Wash the MEPS™ BIN once by pumping 20 µL to 50 µL of wash solution through the BIN to remove interferences.
- Step 3: Elute the analyte by drawing solvent through the BIN into the syringe barrel.
- Step 4: Inject the analyte directly into the injector.
- Pump 50 µL solvent followed by 50 µL wash solution to prepare BIN for the next sample.



MEPS™ Is Reusable

Like conventional SPE, the number of times the cartridge can be reused is dependent on the sample matrix and the cleaning regime between elutions. Since only 3mg of stationary phase is used in MEPS™ it can be washed effectively between each extraction without the need for large solvent volumes. For simple applications, MEPS™ devices have been used successfully for up to 50 cycles making it very cost effective.

MEPS™ Can Be Semi or Fully Automated

Semi-automation of MEPS™ can be achieved by coupling MEPS™ syringes to SGE's eVol® automated analytical syringe to speed up repetitive SPE and is ideal for rapid method development. For more information on eVol® see pages 22-24.

MEPS™ can also be fully automated on autosamplers such as the CTC PAL for on-line SPE and injection.

MEPS™ Has Proven Accuracy and Precision Compared to Other Sample Preparation Methods

Method	Ropivacaine LOD (nM)	Accuracy (%)	Precision (RSD%) (Inter-assay)	Handling Time
MEPS™ / GC-MS	2	105	5.0	1 min
LLE / GC-MS	2	101	3.8	20 min
SPE / LC-UV	100	101	3.0	20 min
SPME / GC-MS	5	110	6.3	40 min

Comparison of accuracy and precision between MEPS™ and other methods for ropivacaine (local anesthetics).