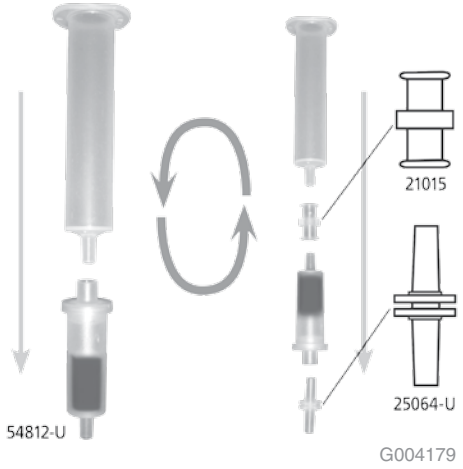
This Data Sheet Contains Important Information About The Product.

Supelclean™ ENVI-Carb™ Plus

Product Description

Traditionally, the sample prep extraction or trace enrichment of highly polar compounds from aqueous sample matrixes has been a great challenge in the field of analytical chemistry. Because of their low solubility in non-polar solvents and lack of affinity to traditional reversed-phase silica-based and polymer-based chromatographic media, traditional liquid-liquid extraction and solid phase extraction have been of limited utility for such applications.

Figure 1. Depicts flow reversal of a reversible SPE tube from sample load and elution during SPE processing.



Unlike traditional graphitized carbon black (e.g., Supelclean ENVI-Carb) which are granular and friable, Supelclean ENVI-Carb Plus consists of strong spherical carbon particles (carbon molecular sieve) that have been developed and engineered for the solid phase extraction of highly polar compounds from aqueous samples such as drinking water and wastewater. Examples of highly polar compounds (Log Po/w <1) that were recovered using Supelclean ENVI-Carb Plus include (but not limited to) acephate (logP = –0.85), phenol (logP = 1.51), acrylamide (logP = –0.67), 1,4-dioxane (logP = –0.27), and oxamyl (logP = -1.2). Using the recommended protocol described in this instruction, ≥ 70% absolute recovery was achieved when extracting a 0.5 L water sample spiked at the levels of 1-100 ng/mL (ppb).

Table 1 lists the specifications of Supelclean ENVI-Carb Plus. When packed in a reversible SPE tube (Figure 1), a simple reversed-phase protocol can be employed during sample load. The tubes are then reversed and eluted in the opposite direction with a small volume of solvent such as methanol or methylene chloride.

Table 1. Specifications of Supelclean ENVI-Carb Plus

Carbon Type	Amorphous Carbon Molecular Sieve (CMS) Polymer Carbon (GPCs) or Graphitized Polymer Carbon (GPCs)
Particle Shape	Spherical
Density	2.27 g/mL
Surf. Area	1149 m^2/g
Pore Vol.	0.782 mL/g
Avg. Pore Diam.	27.2 Å

Recommended Protocol

The procedure below describes SPE procedure of Supelclean ENVI-Carb Plus Reversible Tube using an SPE vacuum manifold. Alternatively, the tube can also be processed using a peristaltic pump with the proper luer couplers and hoses.

1. Place the Supelclean ENVI-Carb Plus Reversible SPE Tube onto the female-luer port of the SPE vacuum manifold.
2. Place an empty syringe barrel SPE tube (with or without PE frit) onto the female luer opening of the reversible SPE tube. The empty SPE tube acts as a headspace reservoir for applying solutions, solvents, and sample to the reversible SPE tube during extraction/processing. Use an empty SPE tube of appropriate size to accommodate the volumes employed during SPE processing.
3. Condition the reversible SPE tube with 10 mL methanol.
4. Equilbrate the reversible SPE tube with 10 mL DI water or buffer of approximate pH, salt type, and concentration to the actual sample.
5. Apply the sample to the reversible SPE tube (up to 1 L) at a flow rate of ~ 9 mL/min. It may be necessary to filter out or centrifuge particulate matter from the sample prior to SPE application. For larger sample volumes (> 60 mL), it may be necessary to use a Large Volume Sampler (Cat. No. 57275 or 57272) in conjunction with the empty SPE tube for easier sample processing.

   Note: Supelclean ENVI-Carb Plus is slightly basic and will exhibit secondary anion-exchange properties. When extracting acidic compounds such as phenol, it is necessary to the decrease the pH of the water sample by adding 1 mL formic acid per 500 mL sample prior to sample load. This will minimize secondary anion-exchange properties during sample load further improving recovery of acidic compounds.
6. It may be necessary to apply 5-10 mL wash step (water or 5-10% methanol) to remove co-retained interferences.

   Note: Addition of a wash step containing an organic modifier may drive analytes further into the packed bed. As a result, larger elution volumes or an extra elution fraction may be necessary to improve analyte recovery during elution.
7. Reverse the reversible SPE tube using the necessary male and female luer couplers (see Figure 1). Elute retained analytes of interest (in the reverse direction) with 4-5 mL methanol (for LC analysis; e.g., acrylamide) or methylene chloride (for GC analysis; e.g., 1,4-dioxane and phenol). Elution should be conducted at a flow rate of ~1 mL/min..

   Note: It may be necessary remove residual moisture from the SPE tube prior to elution or the resulting eluent after elution. To remove moisture from the SPE tube prior to elution, apply vacuum through the cartridge in the direction of sample load prior to reversing the tube for elution. Applying vacuum through the cartridge after reversing the tube will result in loss of analyte due to evaporation.

   To remove residual moisture of the SPE eluent after elution, mix the SPE eluent with ~100 mg of anhydrous sodium sulfate prior to further processing, or transfer the SPE eluent through a small cartridge bed of anhydrous sodium sulfate.
8. Collect the eluent and evaporate/reconstitute as necessary prior to LC or GC analysis.

Featured & Related Products

Description	Pkg. Qty.	Cat. No.
Supelclean ENVI-Carb Plus Reversible Tube, 0.4g/0.5 mL	30	54812-U
Empty SPE Tubes (without frits)		
6 mL volume	30	57242
12 mL volume	20	57179
20 mL volume	12	57021
60 mL volume	12	57022
Male & Female Luer Fittings		
Male luer coupler	20	20564-U
Female luer coupler	20	21015
Visiprep Large Volume Sampler		
For use with 3 or 6 mL SPE tubes (4 adapters)	1	57275
For use with 12, 20, 60 mL SPE tubes (3 adapters)	1	57272

Note: Other configurations of Supelclean ENVI-Carb Plus such as standard SPE tubes, 96-well plates, etc., are available upon request. Please contact Supelco technical service at 800-359-3041/814-359-3044 or techservice@sial.com

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