



SOLID PHASE EXTRACTION

SPE (Solid Phase Extraction) is a technique whereby a desired analyte, is concentrated and separated from a complex sample matrix onto a sorbent stationary phase. The interfering matrix, which is not retained, is effectively eliminated. As a result, the analyte can be analyzed at the best possible sensitivity range of the analytical technique, e.g. Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES), without the risk of matrix interference.

In recent years another technique has become very popular, the technique of Matrix Component Retention. In this case, the sorbent is selected to retain unwanted components in the matrix and the analytes of interest are not retained. Again, because the potentially interfering components have been removed, better sensitivity is obtained in sample analysis. This technique is seen most often in the food industry.

KEY FEATURES OF SPE CARTRIDGES:

DigiSEP Blue has an aminodiacetate group that acts as a chelating agent to a variety of metallic cations in solution providing a mean to reversibly immobilize them on the polymeric support.

The functionality has different groups that are sensitive to pH, which will in turn influence the binding capacity. At a pH of 2, the amino and both carboxylate groups are protonated. The overall charge is then positive making the function a weak anion exchanger. At a pH > 5, all functions are deprotonated thus providing the best conditions for the capture of cations. Hence, sample pH should be adjusted around five prior to insertion into the cartridge with ammonium acetate.

Conditioning is necessary in order to ensure the best working conditions. *DigiSEP* Blue is more active in its ammonium form. Ammonium acetate buffer, or alternatively ammonium hydroxide allows changing the sodium Na^+ activated form for the ammonium.

DigiSEP Blue cartridges are used for two main purposes: elimination of interferences or preconcentration of metal ions.

Elimination of interferences

Some matrices, such as in biological samples, contain a high level of dissolved organics that complicate the analysis of heavy metals. It is possible to immobilize the metal onto *DigiSEP* Blue and wash off the other components of the matrix. *DigiSEP* Blue is an alternative sorbent to *DigiSEP* Green when dealing with sea water samples as it is less sensitive to solutions high ionic strength.

Preconcentration

Some instruments are not sensitive enough to provide reliability in trace metal analysis. It is possible to immobilise a metal cation from a large sample and elute it in a smaller volume. Concentration factors of 10 to 100 are easily obtained.

Base Material: poly(methylmethacrylate), PMMA

Functional Group: aminodiacetate, Na^+ form

Exchange Capacity: 0.29-0.34 meq/g of Cu ion

Bed volume = grams of sorbent x 2 mL/g

Sample
Prep

ICP-AES & MS

AA

XRF

Calibration
Standards

Certified
Reference
Materials



PlasmaPURE Acid

- Manufactured with trace metal levels less than 10 ppt (0.01 ppb)

- Complete with a detailed Certificate of Analysis



DigiPREP MS No. 010-500-205

- Digest samples while eliminating sample contamination from digestion system
- Teflon[®] coated graphite block and acid resistant Kydex exterior construction

DigiSEP Blue CATION EXTRACTION CARTRIDGES

Description	Particle (µm)	Surface (m ² /g)	Quantity	Catalog Number
DigiSEP Blue, 100 mg / 3 mL	60 - 75	220 - 270	50 per box	010-700-010
DigiSEP Blue, 250 mg / 6 mL	60 - 75	220 - 270	25 per box	010-700-012
DigiSEP Blue, 500 mg / 6 mL	60 - 75	220 - 270	25 per box	010-700-014

DigiSEP SPE CARTRIDGE PROCEDURE

SAMPLE SIZE

Sample size can be as high as 1,000 mL. The volume depends on the concentration of the product to immobilize. To ensure that the analyte does not break through the SPE, use a sample volume that does not contain more than $\frac{2}{3}$ of the nominal exchange capacity. For sample size of 10 mL or less, use a flow rate of 1 mL/min. For samples of more than 10 mL, use 10 mL/min. Delivery of the solution can be performed automatically with a SPE manifold equipped with a pump and tubing system. Flow rate can be reduced in order to increase contact time and reduce channelling, both improving separation.

SAMPLE PREPARATION

Add 2 M ammonium acetate buffer to the sample in order to have a final concentration of between 5 mM and 100 mM. Adjust pH with PlasmaPURE ammonia solution or acetic acid to pH 5.3.

1. Conditioning

- 2-3 bed volumes of 2 N HNO₃, PlasmaPURE
- 5 bed volumes of deionized water
- 2-3 bed volumes of 100 mM ammonium acetate

Drain the cartridge under vacuum before changing solution.

3. Elution of the analyte

- 2 x 1 bed volumes of 2 N HNO₃ PlasmaPURE (use 3 x 1 bed volumes for sea water). Drain under vacuum at prescribed flow rate between each aliquot.

4. Analysis of the sample

- Adjust to desired volume before analysis on ICP or AA

5. Regeneration of the cartridge

- Same as conditioning

DigiSEP REAGENTS

Description	Conc.	Volume	Catalog Number
Nitric Acid, HNO ₃	2 N	500 mL	250-037-132
Ammonium Acetate	2 M	500 mL	250-037-110

Description	Volume	Catalog Number
Deionized Water, ASTM Type 1	500 mL	140-113-035
(18 Megohm/cm)		

DigiSEP PROMOTIONS*

Description	Quantity	Catalog Number
DigiSEP Blue Starter Kit 250 mg/6ml*	2/pk	010-702-012
DigiSEP Sample Vacuum Kit*	1	010-720-150

* One time offer

DigiSEP ACCESSORIES



SPE Vacuum Manifold Set
No. 010-790-501



Excess Liquid Collection
Vessel with Pump Tubing
No. 010-790-503



Vacuum Pump
No. 010-790-509



DigiSEP Blue Starter
Kit 250 mg/6ml
No. 010-720-012



DigiSEP Sample Vacuum Kit
No. 010-720-150