User Guide

Supported Liquid Extraction (SLE) Guide and FAQ's

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HyperSep SLE
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What is SLE?

Supported Liquid Extraction (SLE) is an extraction technique that separates out compounds based on their affinity for one solvent over another immiscible solvent.

Its fundamental principles are the same as Liquid / Liquid extraction where an aqueous sample is mixed with a non-polar organic immiscible solvent such as Hexane, MTBE or ethyl acetate. Upon mixing; the components of the aqueous sample will partition into the non-polar organic solvent to varying degrees, the more non-polar the compound the greater the percentage will partition across.

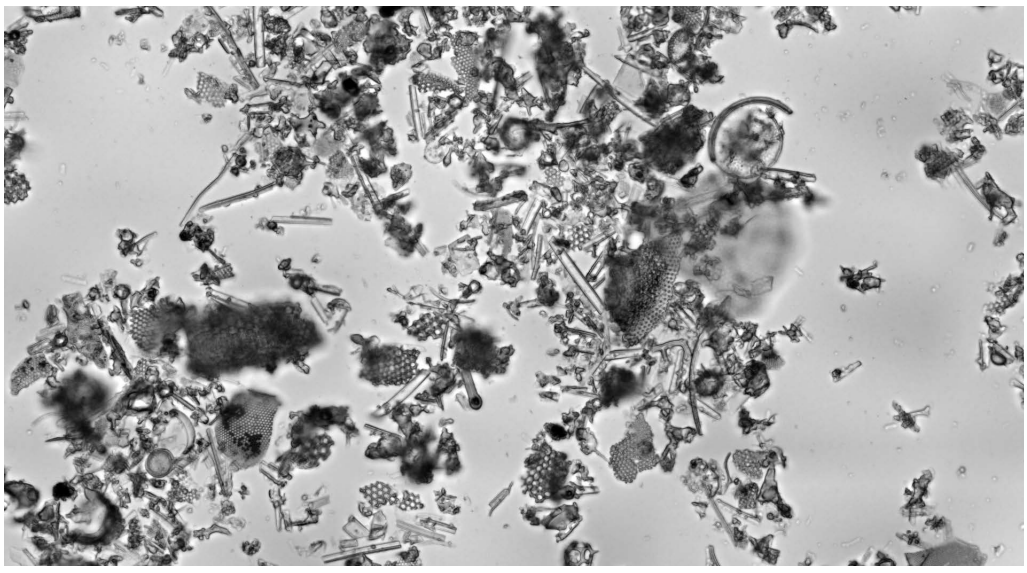
SLE only differs in that the aqueous solvent is supported in place by a highly polar solid media. As the aqueous sample soaks into the support media, the non-polar components concentrate at the surface. The material is then washed with the non-polar organic solvent allowing the non-polar components to partition across and are collected for analysis.

This process speeds up the whole procedure, and simplifies an otherwise time consuming and highly manual task.

What is the support material?

The support material in SLE is Diatomaceous earth, a natural silica based sediment found underneath the sea. It is largely formed from the fossilised remains of Diatoms (tiny hard shelled algae). The ground diatomaceous earth material used in our SLE media is approximately 90% silica. Along with its polarity it has a very high surface area caused by its irregular shape, making it an ideal media to absorb the aqueous sample effectively.

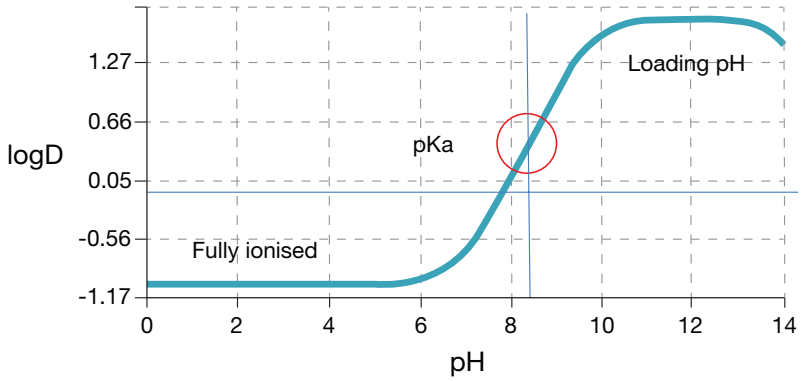
S.E.M. of Diatomaceous earth



How do I prepare my sample for SLE?

Sample should be prepared by diluting in water or an aqueous buffer (typically 1:1 ratio) to assist the sample flow through the media. The compound of interest should be in a non-ionised form. Ionised compounds should be diluted with a pH adjusted aqueous buffer to facilitate this (for acidic compounds dilute with an acidified buffer e.g. 0.1% formic acid). Use the chemical properties of your compound to assess the appropriate pH for loading. It is recommended to buffer the sample to at least 2 pH units above the pKa of the analyte for bases, or below the pKa of your analyte for acids.

logD plot for Pindolol, a weakly basic compound showing the optimum loading pH range



What if my compound of interest is a strong acid / base and can't be neutralised?

If your compound is permanently ionised then consider the use of ion-pairing agents such as Dibutyl ammonium acetate for acids or Trifluoroacetic acid (TFA) for bases to aid solubility into the non-polar solvent. This approach can also be useful when analysing for multiple compounds in one extraction. For example; for the analysis of a basic parent compound and an acidic metabolite the sample can be diluted with 25 mM Dibutyl ammonium acetate (1:1). This neutralises the parent base and pairs with the acid group on the metabolite to aid partitioning of both compounds into the extraction solvent.

Which SLE bed weight should I select?

As a guide select a bed weight of 1g per 1mL of sample, including the volume of the diluent. This ensures there is enough support material for the entire sample to fully adsorb onto. If any of the sample leaks through the SLE material upon loading then the bed weight is not sufficient and should be increased. For example a 200 uL plasma sample, diluted with 200 uL of water will require at least a bed weight of 400mg.

Are there different types of SLE sorbent?

We provide two different types of SLE sorbent. HyperSep SLE pH 7 and HyperSep SLE pH9. The HyperSep SLE pH7 can be used for all SLE applications. The HyperSep SLE pH9 is specially treated at high pH and is optimised for basic compounds only.

Which non-polar organic solvent should I use?

The choice of which non-polar organic solvent you use is completely dependent on the analyte of interest. The most important factor is the solubility of the analyte in the chosen solvent. Typical solvents include, but not restricted to;

- Methyl tert-butyl ether (MTBE)
- Dichloromethane (DCM)
- Ethyl Acetate (EtAc)
- Hexane
- Chloroform
- Doping the above with 5% iospropanol may be appropriate for more polar compounds

Is there an Generic Procedure I can follow?

Described below is an generic SLE procedure. Volumes, SLE bed weight and pH of buffers should adjusted accordingly to sample size and compound type;

Sample Pre-treatment	Dilute sample 1:1 with water or pH adjusted buffer to neutralise compound of interest.
Load sample	Aliquot sample onto the SLE cartridge. Apply a low vacuum for 2-5 seconds to initiate flow. Allow sample to pass onto cartridge under gravity.
WAIT	Leave for 5 minutes. This will allow the aqueous sample to adsorb onto the support media allowing the neutral analytes to concentrate on the surface.
Elute	Apply extraction solvent at approximately 5 times the volume of the sample. Leave to flow under gravity. Once flow has stopped apply a low vacuum to complete elution.
Concentrate	Evaporate sample to dryness and reconstitute in a compatible solvent for analysis.

For more information, related products, supporting material and advice please visit
www.thermoscientific.com/chromexpert

Ordering information

HyperSep SLE Cartidges

Special treated diatomite SLE (ph=7)

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
200	3	**60109-200-3-7**	50 Pack
500	3	**60109-500-3-7**	50 Pack
500	6	**60109-500-6-7**	30 Pack
1,000	6	**60109-1000-6-7**	30 Pack
2,000	12	**60109-2000-12-7**	20 Pack
4,000	25	**60109-4000-25-7**	15 Pack
20,000	60	**60109-20000-60-7**	10 Pack

HyperSep SLE 96 Well Plates

Special treated diatomite SLE (ph=7)

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
200	2	**60109-200-2-7W**	1 Each
300	2	**60109-300-2-7W**	1 Each
400	2	**60109-400-2-7W**	1 Each
500	2	**60109-500-2-7W**	1 Each

HyperSep SLE Cartidges

Special treated diatomite SLE (ph=9)

Bed Weight (mg)	Column Volume (mL)	Cat. No.	Quantity
200	3	**60109-200-3-9**	50 Pack
500	3	**60109-500-3-9**	50 Pack
500	6	**60109-500-6-9**	30 Pack
1,000	6	**60109-1000-6-9**	30 Pack
2,000	12	**60109-2000-12-9**	20 Pack
4,000	25	**60109-4000-25-9**	15 Pack
20,000	60	**60109-20000-60-9**	10 Pack

HyperSep SLE 96 Well Plates

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300	2	**60109-300-2-9W**	1 Each
400	2	**60109-400-2-9W**	1 Each
500	2	**60109-500-2-9W**	1 Each

Resources
for Chromatographers

Thermo Scientific Chromatography Columns and Consumables Catalog

This extensive catalog includes over 650 pages of proven chromatography tools and product selection guides. Available online, with a robust search tool and optimized for your iPad®.
Visit **www.thermoscientific.com/catalog**

Chromatography Resource Center

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