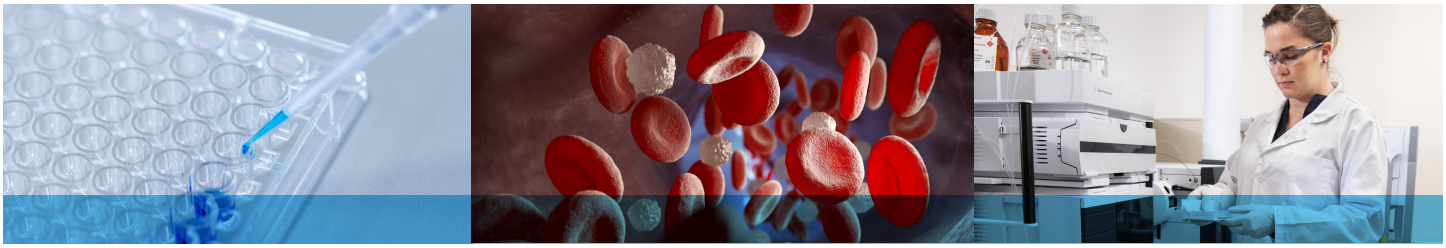
Agilent

Trusted Answers

Guide to Sample Preparation

Agilent Clinical Research



Did You Know That Unexpected Instrument Downtime and Time Spent on Reruns Often Result from the First Part of Your Workflow?

Ensure Confident Clinical Research Results with Confident Sample Preparation

Our suite of sample preparation products can help you to achieve better results from your analyses, while also extending the lifetime of your column and instrument components. These products allow for a strong foundation, in turn building an outstanding analytical performance. Our products provide reliable results for repeated analyses. From filtration products such as Captiva EMR-Lipid, to Supported Liquid Extraction (SLE) products such as Chem Elut S, you can ensure your samples are free of interferences, even with complex biological matrices. Agilent can help you increase your lab productivity with sample preparation solutions, while simplifying your sample preparation methods.

Did You Know That You Can Simplify Liquid-Liquid Extraction and Achieve More Reproducible Results?

Increase reproducibility while decreasing interferences

Agilent Supported Liquid Extraction (SLE) products offer advantages over standard Liquid-Liquid Extraction (LLE) methods including higher throughput, and better recoveries and precision by resolving issues with emulsions that are often formed when performing LLE. Chem Elut S products enable reproducible SLE results with high data quality and sample capacity. The use of a synthetic SLE material, rather than diatomaceous earth, provides consistent pore and particle sizes, allowing for batch-to-batch repeatability and uniform flow. Compared to liquid-liquid extraction, Chem Elut S reduces analyst-to-analyst variability, and requires minimal extraction solvent, which leads to increased analyte concentration and recovery.

Did You Know That You Can Streamline Your Protein Precipitation Workflows and Increase Productivity?

Streamline your workflow while maximizing matrix removal

Captiva EMR-Lipid provides highly selective, efficient lipid/matrix removal, such as phospholipids, without analyte loss. The novel Captiva EMR-Lipid sorbent removes lipids based on size exclusion and hydrophobic interaction. Effective lipid removal ensures minimal ion suppression of target analytes, significantly improving method reliability and ruggedness. Also, compared to traditional protein precipitation, Captiva EMR-Lipid reduces the number of protocol steps, saving you time.

Agilent Chem Elut S, a Synthetic SLE Solution

Achieve consistent results – analyst to analyst and day to day – with synthetic SLE

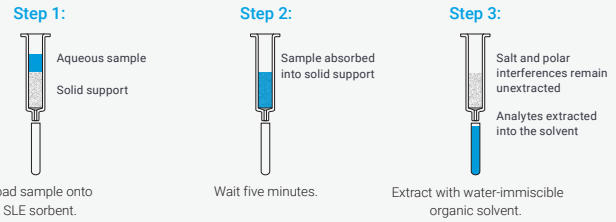
Clinical researchers know that liquid-liquid extraction (LLE) can be labor-intensive and time consuming. Agilent's Chem Elut S, synthetic Supported Liquid Extraction (SLE) products deliver reliable, reproducible results with minimal method development. Chem Elut S synthetic SLE products are optimized to deliver superior reproducibility, sample capacity, and data quality. They have a controlled pore and particle size, creating consistent flow and uniformity in every batch.

With Chem Elut S, you can:

- Improve reproducibility by minimizing analyst-to-analyst variability.
- Eliminate time consuming phase separation and labor intensive organic layer transfer, especially preventing emulsions which can occur with shaking, leading to better recoveries and precision.
- Achieve superior removal of unwanted, interfering matrix, such as salts and phospholipids.
- Meet the recoveries you need—thanks to the minimal amount of extraction solvent required, resulting in a higher concentration of analytes collected.
- Automate high throughput methods

How simple is the Chem Elut S SLE workflow?

See for yourself.



Inert, synthetic SLE sorbent provides a surface for the aqueous sample, such as blood, serum, plasma, urine, or oral fluid to be adsorbed. A water-immiscible organic solvent is used to perform the extraction, resulting in a clean extract, while leaving behind salts and polar interferences.

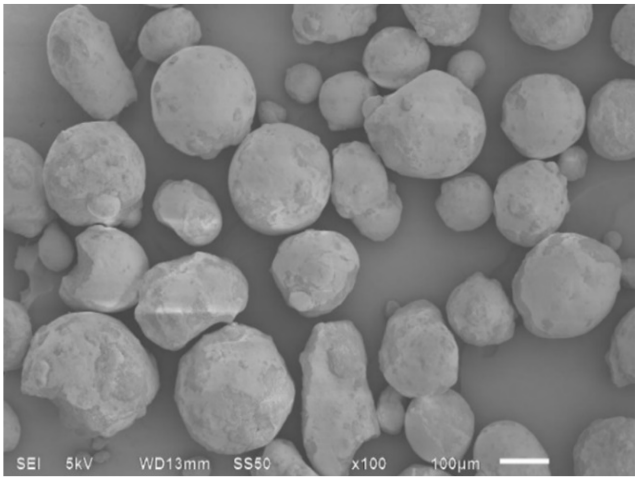
Agilent Chem Elut S

Agilent's Chem Elut S is available in a variety of formats and sizes to fit any clinical research need.

Part Number	Product Description
5610-2003	200 µL sample capacity, 2 mL 96 well plate
5610-2004	400 µL sample capacity, 2 mL 96 well plate
5610-2005	200 µL sample capacity, 1 mL tube, 100/pk
5610-2006	400 µL sample capacity, 3 mL tube, 100/pk
5610-2007	1 mL sample capacity, 6 mL tube, 100/pk

See the difference

Diatomaceous Earth (DE) material used in traditional SLE



Synthetic SLE sorbent used in Chem Elut S

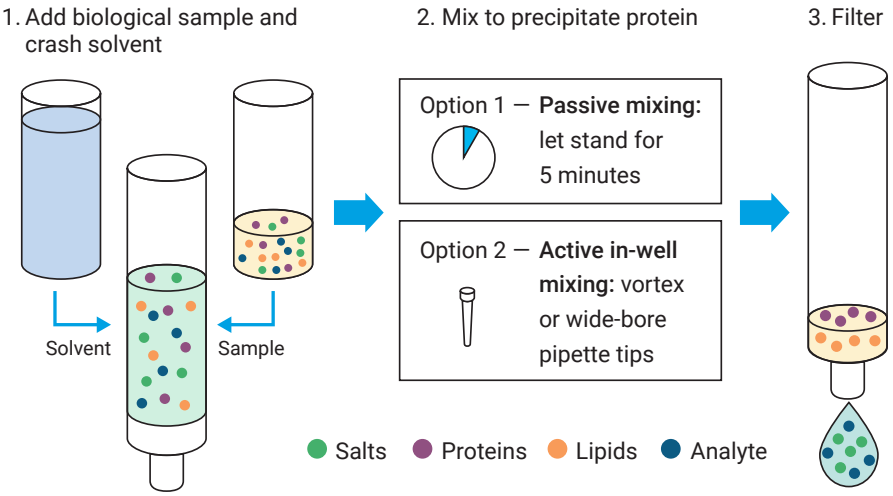
Agilent Captiva EMR-Lipid

Achieve effective lipid removal without analyte loss

In clinical research labs, reducing matrix interference is a must for maintaining analytical sensitivity standards, especially for biological matrices, such as plasma. The innovative sorbent in Captiva EMR-Lipid cartridges and plates capture ion-suppressing lipids—while allowing analytes of interest to pass through. It provides excellent sample cleanup while improving data quality and minimizing system maintenance.

With Captiva EMR-Lipid, you can:

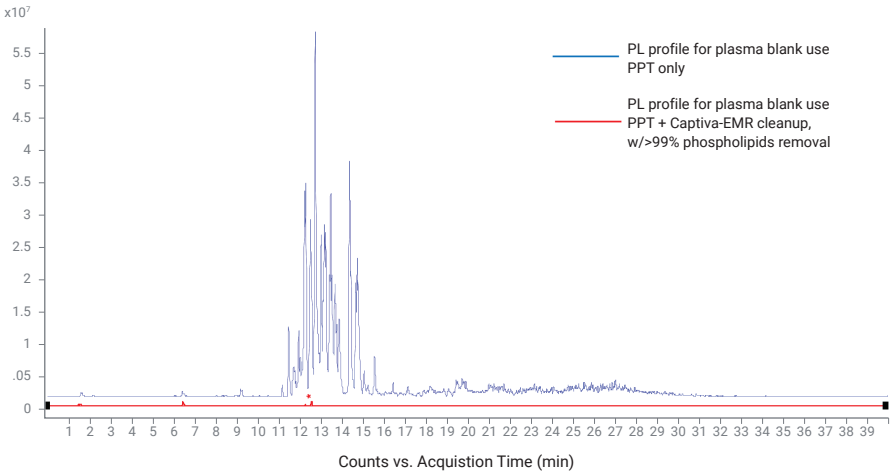
- Improve efficiency and selectivity with the unique Captiva EMR-Lipid mechanism: combining size exclusion and hydrophobic interactions between the sorbent and the long aliphatic chain of the lipids.
- Achieve better speed and precision with solvent retention frits that streamline and automate your in-well protein precipitation workflow.
- Realize an easier flow with an advanced filter design and construction technology that ensures clog-free operation.



These 3 steps are achieved using the 96 well plate and 1 mL cartridge formats, which incorporate a solvent retention frit for in-well protein precipitation.
*Alternatively, protein precipitation (Steps 1 and 2) can be performed offline (Option 3), at which point the sample can be transferred to Step 3.

Agilent Captiva EMR-Lipid

Effective phospholipid removal



The chromatogram above is a LC/MS analysis of a plasma sample. More than 99% of phospholipids were removed using protein precipitation (PPT) and Captiva EMR-Lipid (red trace), compared to PPT alone (blue trace).

Part Number	Product Description
5190-1000	1 mL 96 well plate, 40mg sorbent mass*, 1/pk
5190-1001	1 mL 96 well plate, 40mg sorbent mass*, 5/pk
5190-1002	1 mL cartridge, 40mg sorbent mass*, 100/pk

Agilent Bravo Metabolomics Sample Prep Platform

Automate and standardize your metabolomics sample preparation protocol

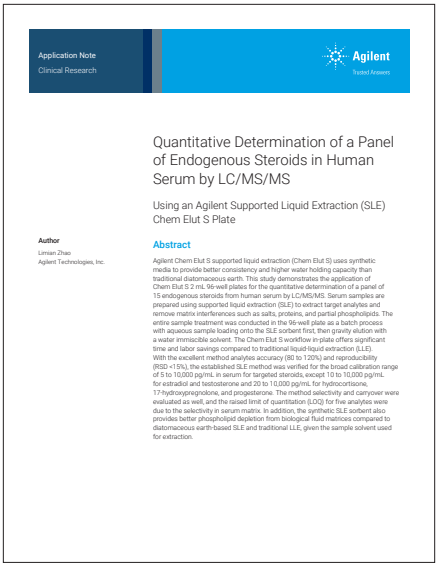
Agilent Captiva EMR-Lipid is the featured product in the automated Agilent Bravo Metabolomics platform. This platform is designed to extract metabolites from plasma samples, providing an alternative to manual sample preparation with all the benefits of Captiva EMR-Lipid.

Application Notes

Chem Elut S

Quantitative determination of a panel of endogenous steroids in human serum by LC/MS/MS
5994-0949EN

Drug Analysis in Human Urine Using Agilent Chem Elut S Supported Liquid Extraction by LC/MS/MS
5994-0950EN


Application Note
Clinical Research
Agilent
Trusted Answers
Quantitative Determination of a Panel of Endogenous Steroids in Human Serum by LC/MS/MS
Using an Agilent Supported Liquid Extraction (SLE) Chem Elut S Plate
Author
Limian Zhao
Agilent Technologies, Inc.
Abstract
Agilent Chem Elut S supported liquid extraction (Chem Elut S) uses synthetic media to provide better consistency and higher water holding capacity than traditional diatomaceous earth. This study demonstrates the application of Chem Elut S 2 mL 96-well plates for the quantitative determination of a panel of 15 endogenous steroids from human serum by LC/MS/MS. Serum samples are prepared using supported liquid extraction (SLE) to extract target analytes and remove matrix interferences such as salts, proteins, and partial phospholipids. The entire sample treatment was conducted in the 96-well plate as a batch process with aqueous sample loading onto the SLE sorbent first, then gravity elution with a water immiscible solvent. The Chem Elut S workflow in-plate offers significant time and labor savings compared to traditional liquid-liquid extraction (LLE). With the excellent method analytes accuracy (80 to 120%) and reproducibility (RSD <15%), the established SLE method was verified for the broad calibration range of 5 to 10,000 pg/mL in serum for targeted steroids, except 10 to 10,000 pg/mL for estradiol and testosterone and 20 to 10,000 pg/mL for hydrocortisone, 17-hydroxyprognolone, and progesterone. The method selectivity and carryover were evaluated as well, and the raised limit of quantitation (LOQ) for five analytes were due to the selectivity in serum matrix. In addition, the synthetic SLE sorbent also provides better phospholipid depletion from biological fluid matrices compared to diatomaceous earth-based SLE and traditional LLE, given the sample solvent used for extraction.

5994-0949EN

Captiva EMR-Lipid

Protein Precipitation for Biological Fluid Samples Using Agilent Captiva EMR-Lipid 96-Well Plates
5991-9222EN

Quantitative LC/MS/MS Analysis of Drugs in Human Serum With Agilent Captiva EMR-Lipid Cleanup
5991-8007EN

Vitamin D Metabolite Analysis in Biological Samples Using Agilent Captiva EMR-Lipid
5991-7956EN

Analysis of Hydroxychloroquine and Metabolites in Human Serum and Plasma Using the Agilent Captiva EMR-Lipid by LC-QQQ
5994-2949EN

Analysis of Hydroxychloroquine and Metabolites in Human Whole Blood Using the Agilent Captiva EMR-Lipid by LC/TQ
5994-2420EN

Efficiency of Biological Fluid Matrix Removal Using Agilent Captiva EMR-Lipid Cleanup
5991-8006EN


Application Note
Clinical Research
Agilent
Trusted Answers
Protein Precipitation for Biological Fluid Samples Using Agilent Captiva EMR—Lipid 96-Well Plates
Authors
Limian Zhao and Megan Juck
Agilent Technologies, Inc.
Abstract
Protein precipitation (PPT) is one of the most popular techniques used to prepare biological fluid (bio-fluid) samples for LC/MS/MS research analysis. By applying protein precipitation to bio-fluid samples, proteins can efficiently be removed from the matrix. This Application Note discusses the important steps, considerations, and cautions on PPT for bio-fluid samples. It focuses on in-well PPT using Captiva EMR—Lipid 96-well plates, including the appropriate crashing solvent, ratio, additives, bio-fluid matrix, bio-fluid sample aliquot and crashing solvent addition order on plate, internal standard (IS) addition, and sample mixing in plate. Lastly, a comparison between traditional PPT using centrifugation and PPT followed by Captiva EMR—Lipid cleanup is discussed in detail, including the time, method performance, and impact on instrument.

5991-9222EN

The Agilent Difference: Support at Each Step in Your Workflow

Agilent sample preparation products support the first part of your workflow. The true value of Agilent comes from the complete workflow solution.

Consistent sample preparation

From SLE to filtration, Agilent sample preparation products let you quickly produce extracts that are representative, reproducible, and homogenous.

High-performing Agilent columns

For the most efficient LC separations and reproducible results, choose InfinityLab Poroshell 120 LC columns.

Innovative instrumentation from LC to MS

Agilent instrumentation innovations help you to drive better business outcomes by enhancing usability, productivity, and your return on investment.

MassHunter Workstation

Produce high-quality MS data—and use that data to identify and quantify targets and unknowns.

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From Insight to Outcome

Agilent CrossLab services

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