

GERSTEL

Automated
Solid Phase Extraction

SPE²



Easy automation of manual SPE methods

Fast, intuitive setup

Standard dimension SPE cartridges

Accurate and reproducible results

Rugged and reliable system

21792-001

Automated Solid Phase Extraction SPE with GERSTEL MPS



Performing Solid Phase Extraction (SPE) manually can be time consuming and nerve-racking, especially when recovery and reproducibility are lacking due to sample variability. If SPE can be reliably automated, it becomes a much more efficient and reproducible process.

GERSTEL offers automated integrated SPE solutions for GC/MS and LC/MS as well as stand-alone WorkStations. Automated SPE from GERSTEL is based on standard dimension 1 mL, 3 mL, and 6 mL cartridges. SPE can be combined with other sample preparation steps, such as adding a standard, derivatizing, or evaporating solvent from the eluate for improved limits of detection and system stability.

Automating your manual SPE method is easy. Your SPE method steps can be transferred directly to the GERSTEL SPE method; setup in the MAESTRO software is intuitive, simple and fast.

Key benefits of GERSTEL SPE automation:

- Improved recovery, precision and reproducibility with reliable positive displacement liquid delivery
- Maximized sample throughput: SPE is performed during analysis of the preceding sample
- Accurate results: All samples are prepared using the exact same timing. Integrated systems even prepare each sample just in time for the GC/MS or LC/MS analysis using the PrepAhead function.



Automated SPE performance

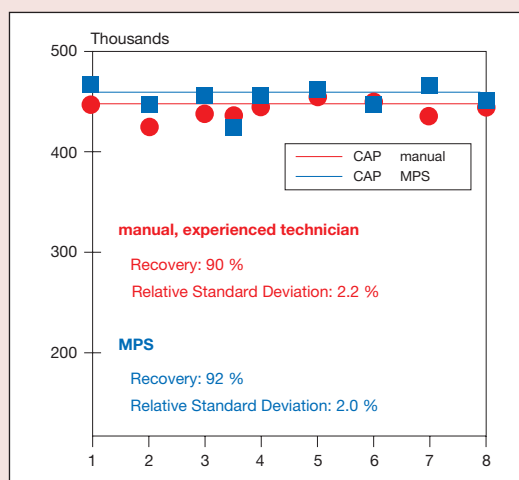
Chloramphenicol (CAP) in food products

Food products of animal origin are regularly analyzed for the presence of restricted antibiotics such as chloramphenicol (CAP). The CAP concentration is determined using LC/MS, but detection limits achieved depend heavily on the sample preparation used. Even when the highly selective LC-MS/MS technique is used, an extreme matrix load could result in inaccurate quantitation.

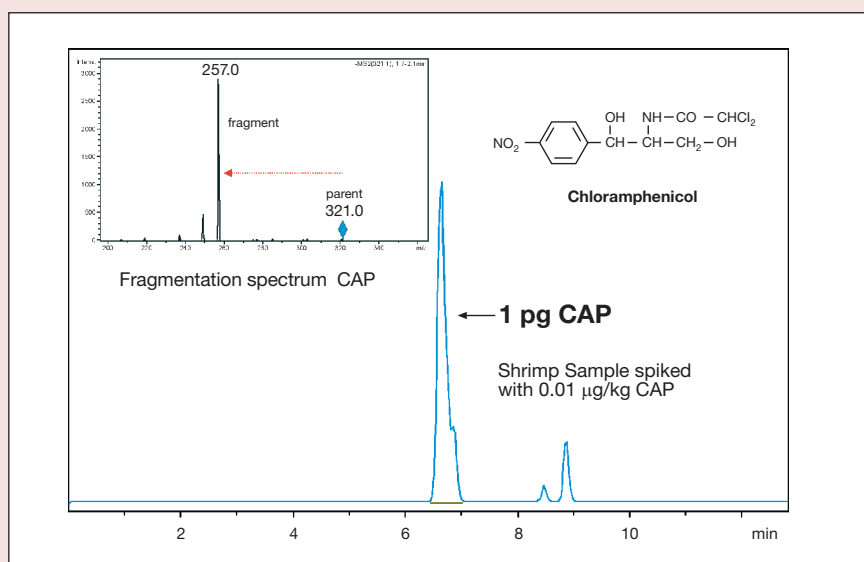
When analyzing food products for CAP, solid phase extraction (SPE) is the sample preparation technique of choice. Recovery and reproducibility for manual and automated SPE were compared. The best results obtained for manual processing were a 90 % recovery rate with a relative standard deviation of 2.2 %. These outstanding results were achieved by a highly skilled and experienced lab technician. The MPS fitted with Automated SPE Option performed even better, delivering a 92 % recovery rate with a relative standard deviation of 2.0 %.

The MPS with Automated SPE option makes it possible to prepare and analyze even complex samples in a simple and safe manner combining accurate results with high throughput.

Detection of 0.01 µg/kg chloramphenicol in shrimp meat by LC/MS/MS following automated SPE combined with automated sample concentration on a MultiPurpose Sampler (MPS).



Comparison of recovery and relative standard deviation for chloramphenicol determination in shrimp meat using manual (red line) and automated (blue line) solid phase extraction based on a GERSTEL MPS with SPE option.



Automated SPE benefits



- 1** Direct transfer of existing manual SPE methods

 - Simple Method transfer
 - Saves time
 - Improved occupational hygiene, less contact with solvents
 - Safe and contamination free analysis through single use cartridges
- 2** Automated conditioning, extraction and elution

 - Accurate and reliable results over extended time period
 - Best possible reproducibility and recovery
- 3** Optimal conditioning and elution

 - Change of elution solvent with cartridge drying step
 - Availability of up to 4 solvents per Solvent Filling Station (SFS) in 1 Liter containers. Multiple SFS units can be used in parallel.
- 4** Defined and reproducible sample preparation duration and controlled flow rates

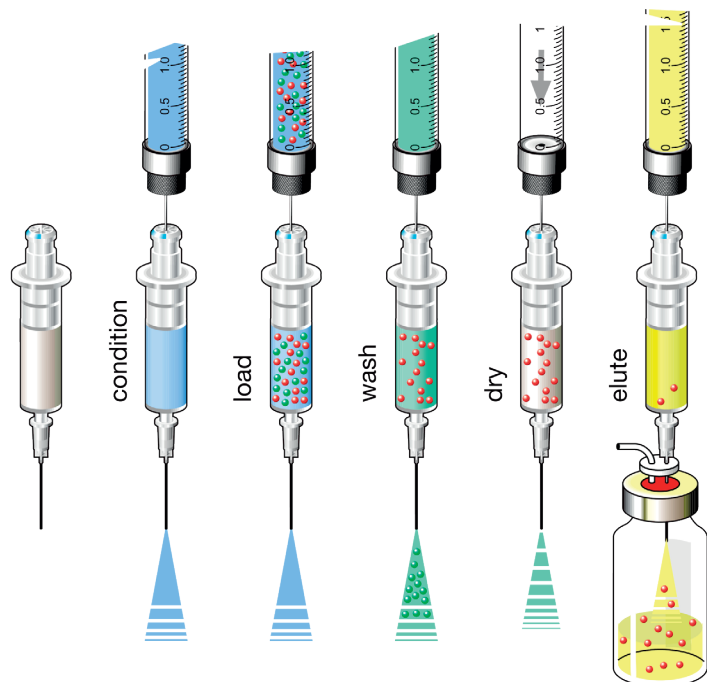
 - Reliable and reproducible analysis results
 - Optimized utilization of laboratory time and resources through predictable duration
- 5** Eluate concentration with ^mVAP and change of solvent

 - Best possible analyte recovery through addition of keeper solvent
 - Improved limits of determination
 - Change to best possible solvent for chromatography and/or MS ionization
- 6** Integrated with GC/MS- or LC/MS sample introduction

 - Just-in-time sample preparation directly prior to introduction to GC/MS or LC/MS: Accurate and reliable results through identical treatment of all samples
 - Higher productivity and less manual steps through combination of SPE and sample introduction in one system
- 7** Independent WorkStation operation

 - Optimized use of laboratory time and resources through highly flexible stand-alone operation
- 8** Can be combined with all automated sample preparation techniques on the MPS

 - Higher sample throughput
 - Great flexibility
 - Reliable and reproducible analysis results



Solvent Filling Station (SFS³)



Comprehensive sample preparation procedures can require significant volumes of solvent – especially when large numbers of samples have to be processed overnight or on weekends. The GERSTEL Solvent Filling Station (SFS) for the MPS easily covers all your needs. The solvent dispensing station is mounted next to the sample trays and is small enough to avoid limiting the number of samples in most cases.

Every one of the four dispensing positions is connected to a 1 liter reservoir. Up to three SFS can be attached and accessed by the MPS providing sufficient capacity to process a large number of samples without running out of solvent.



Multi-Position Evaporation Station mVAP



The GERSTEL Multi-Position Evaporation Station (mVAP) performs solvent evaporation enabling automated analyte concentration for lower detection limits as well as solvent exchange for improved chromatography and LC/MS ionization.

mVAP can evaporate solvents after SPE or liquid/liquid extraction in batches of up to six samples. The resulting solution can be injected into the GC/MS or LC/MS system by the MPS. Vacuum level, temperature and agitation are freely selectable by the user, enabling smooth evaporation with minimal analyte loss. Parameters are set by mouse-click in the MAESTRO Software when the method is generated. The mVAP has been updated with self-aligning vacuum caps held on a magnetic baseplate for best possible reliability.



Sample Prep by Mouse-Click MAESTRO



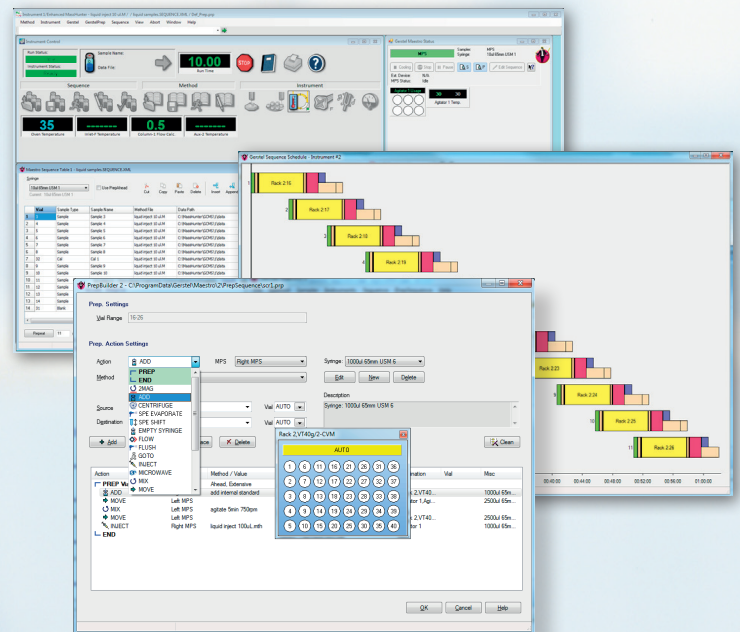
The MultiPurpose Sampler (MPS) is an autosampler and sample preparation robot for GC/MS and LC/MS. Sample preparation steps are performed during the analysis of the preceding sample for best possible system utilization and highest sample throughput. Sample preparation steps are performed in a controlled, highly accurate and reproducible manner delivering outstanding results. Every step is selected by mouse-click from a pull-down menu in the MAESTRO software and added to the overall GC/MS or LC/MS method. The following sample preparation techniques are available:

- Solid Phase Extraction (SPE)
- Derivatization and addition of standards
- Extraction, dilution and filtration
- Weighing, sonication, centrifugation and evaporation (mVAP)
- Heating, conditioning and mixing
- Automated DNPH cartridge elution and LC determination
- Automated Liner EXchange (ALEX)
- SPME and SPME Fiber changer
- SBSE using the GERSTEL Twister
- Thermal Desorption and PYRO
- Dynamic Headspace (DHS) and DHS^{large}

GERSTEL MAESTRO Software

Next generation software for automated sample preparation and sample introduction. MAESTRO optimizes performance and throughput of GERSTEL modules and systems.

- Stand-Alone operation, fully integrated in the Agilent ChemStation or MassHunter Software, or integrated with the Thermo Scientific® Xcalibur™ sequence table
- Sample Prep by Mouse-Click using PrepBuilder functions
- Scheduler for easy planning of sequences and of laboratory work-flow
- Sequence Setup by Barcode, just load the samples
- PrepAhead / Multiple Sample Overlap: Automated overlapping of sample preparation and analysis for maximum throughput
- Priority samples can be added to the system at any point in the analysis sequence
- LOG file and Service LOG file functions ensure traceability
- Automated E-mail notification if the sequence is stopped
- Real-time monitoring of all modules and parameters
- Interactive on-line help function



www.gerstel.com

GERSTEL

G L O B A L A N A L Y T I C A L S O L U T I O N S

GERSTEL, Inc., USA
+1 410 - 247 5885
sales@gerstel.us.com

GERSTEL GmbH & Co. KG,
Germany
+49 208 - 7 65 03-0
gerstel@gerstel.com

GERSTEL K.K., Japan
+81 3 57 31 53 21
info@gerstel.co.jp

GERSTEL BRASIL
+55 11 5665 8931
gerstel_brasil@gerstel.com

GERSTEL AG, Switzerland
+41 41 - 9 21 97 23
gerstelag@ch.gerstel.com

GERSTEL LLP, Singapore
+65 6779 0933
sea@gerstel.com



Agilent Technologies
Premier Solution Partner