GERSTEL

MAKING LABS WORK

Automated Solid Phase Extraction SPE²

Easy automation of manual SPE methods
Standard dimension SPE cartridges
Accurate and reproducible results
Rugged and reliable system
Fast, intuitive setup

robotic^{pro}
smart series

MultiPurpose Sampler

Efficient and reliably automated SPE

Performing Solid Phase Extraction (SPE) manually can be time consuming and nerve-racking, especially when recovery and reproducibility are lacking due to sample variability. Reliably automated, SPE 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. GERSTEL SPE 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 straightforward. Your SPE method steps are 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. The cartridge never runs dry

- Maximized sample throughput: SPE is performed during analysis of the previous 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.
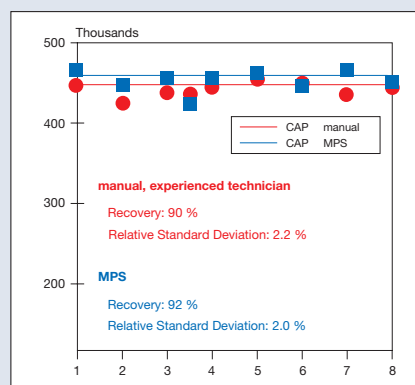
Automated SPE performance
Chloramphenicol (CAP) in food products

Food products of animal origin are 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, a high matrix load could result in inaccurate quantitation.
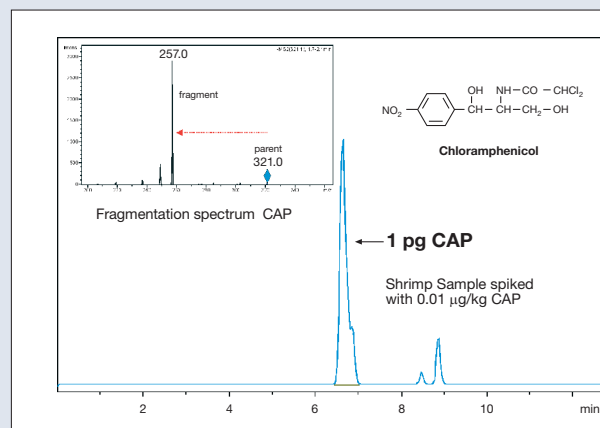
When analyzing food products for CAP, solid phase extraction (SPE) is the sample preparation technique of choice. Recovery and reproducibility for manual and automated SPE were compared. The best results obtained for manual processing were a 90 % recovery rate with a relative standard deviation of 2.2 %, achieved by a highly 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 SPE option enables sample preparation and analysis even of complex samples in a simple and safe manner combining accurate results with high throughput.

Thousands

| | CAP manual |
| | CAP MPS |

manual, experienced technician
Recovery: 90 %
Relative Standard Deviation: 2.2 %

MPS
Recovery: 92 %
Relative Standard Deviation: 2.0 %

Comparison of recovery and relative standard deviation for chloramphenicol determination in shrimp meat using manual (red line) and automated (blue line) solid phase extraction.

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).

257.0
fragment
parent
321.0
Fragmentation spectrum CAP

Chloramphenicol

← 1 pg CAP

Shrimp Sample spiked with 0.01 µg/kg CAP

Automated SPE benefits

Transfer of existing manual SPE methods

- Simple Method transfer
- Saves time
- Improved occupational hygiene, less contact with solvents
- Carry-over eliminated through single use cartridges

Automated conditioning, extraction and elution

- Accurate and reliable results over extended time period
- Best possible reproducibility and recovery

Optimal conditioning and elution

- Change of elution solvent can be combined 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.

Defined, reproducible sample preparation timing and controlled flow rates

- Reliable and reproducible analysis results
- Optimized utilization of laboratory time and resources, predictable analysis workflow

Independent WorkStation operation

- Optimized use of laboratory time and resources through flexible stand-alone operation

## Can be combined with other automated MPS sample preparation techniques

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

Eluate concentration and change of solvent in the ^{m}VAP

- Best possible analyte recovery through addition of keeper solvent
- Improved limits of determination
- Change to best possible solvent for chromatography and/or MS ionization

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 by combining SPE and sample introduction in one system

condition · load · wash · dry · elute
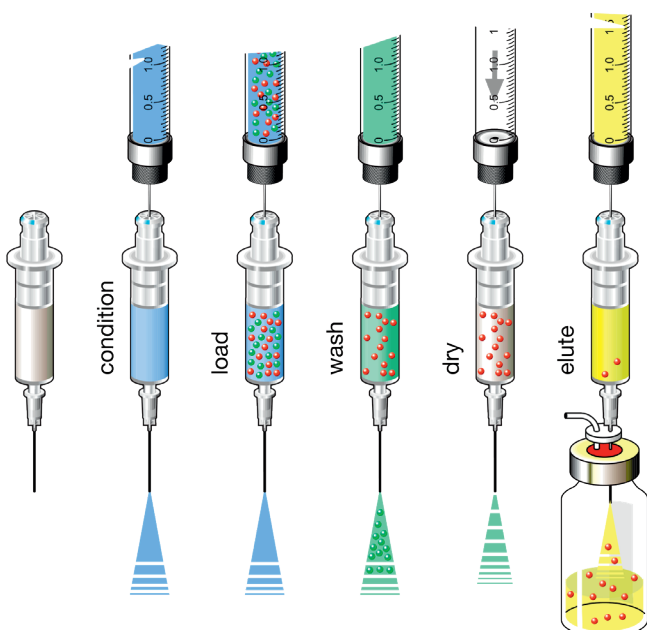
Solvent Filling Station (SFS³)

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. Each 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.

Evaporation Station ᵐVAP

The GERSTEL Multi-Position Evaporation Station (ᵐVAP) performs solvent evaporation and analyte concentration for lower detection limits as well as solvent exchange for improved chromatography and LC/MS ionization.
ᵐVAP can evaporate solvents from SPE eluates or liquid extracts 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 user defined enabling smooth evaporation with minimal analyte loss. Parameters are set by mouse-click in MAESTRO Software when the method is generated.

Sample Prep by Mouse-Click

The GERSTEL 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 MAESTRO software and added to the overall GC/MS or LC/MS method. The following sample preparation techniques are available:

- Solid Phase Extraction (SPE)/µSPE
- Derivatization, 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)

GERSTEL MAESTRO Software

Software for automated sample preparation and sample introduction. MAESTRO optimizes performance and throughput.

- Stand-Alone operation, fully integrated in Agilent 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 at any point in the sequence
- LOG file and Service LOG file functions ensure traceability
- Automated E-mail notification if the sequence is stopped
- Interactive help function

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GERSTEL GmbH & Co. KG
Eberhard-Gerstel-Platz 1
45473 Mülheim an der Ruhr
Germany

www.gerstel.com

GERSTEL GmbH & Co. KG, Germany
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