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

Automated
Solid Phase Extraction
SPE

Rugged and reliable system
Highest productivity and throughput
Accurately controlled sample prep for best results

Automated Solid Phase Extraction 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. If SPE can be reliably automated, it becomes a much more efficient and reproducible process. The GERSTEL Multi Purpose Sampler (MPS) with Automated SPE Option for standard cartridges provides several benefits compared with manual SPE:

- Improved recovery, precision and reproducibility
- Maximized sample throughput by performing SPE during GC or LC analysis of the preceding sample
- More than 50 percent time saving for overall analysis, compared to manual process

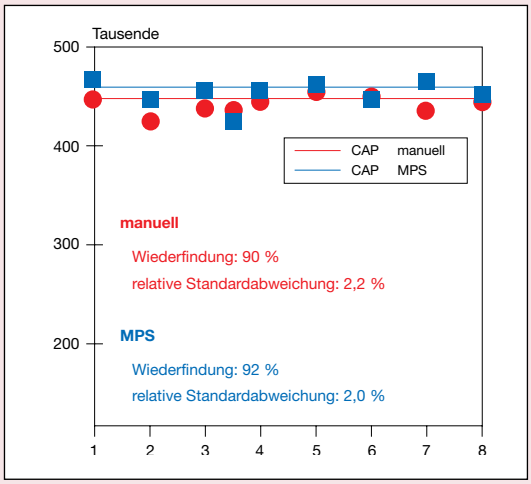
Automated SPE performance

Chloramphenicol (CAP) in food products

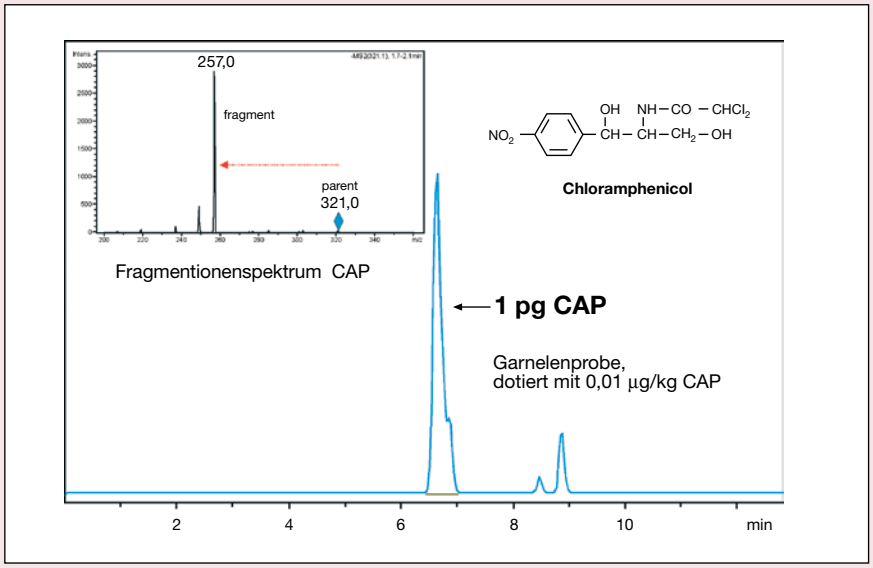
Food products of animal origin are regularly analyzed for the presence of restricted antibiotics such as chloramphenicol (CAP). The CAP concentration is determined using LC/MS, but detection limits achieved depend heavily on the sample preparation used. Even when the highly selective LC-MS/MS technique 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 highly skilled and experienced lab personnel. 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.



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 Automated SPE option.



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).

Automated **SPE** benefits

1 High throughput

Analysis of up to 98 samples including sample preparation using standard 1 mL, 3mL, and 6 mL SPE cartridges premounted with transport adapters for easiest possible automation using the GERSTEL SPE. An added benefit is that the GERSTEL SPE cartridges have practically no dead volume.

2 Efficient

All sample preparation steps are performed during analysis of the preceding sample for highest productivity and system utilization.

3 Optimal timing

All samples receive identical treatment for best reproducibility. Sample introduction to the GC/MS or LC/MS system follows immediately after sample preparation.

4 Highly controlled analysis conditions

Defined volumes and constant flow rates provide highly reproducible conditions and optimal results.

5 Internal Standard Addition

Automated liquid standard addition provide improved Quality Assurance.

6 Contamination free

Transfer of eluent from the SPE cartridge to the sample vial is performed using a disposable syringe needle into a closed vial, eliminating the risk of carry over.

7 Simple concept, highly rugged and efficient

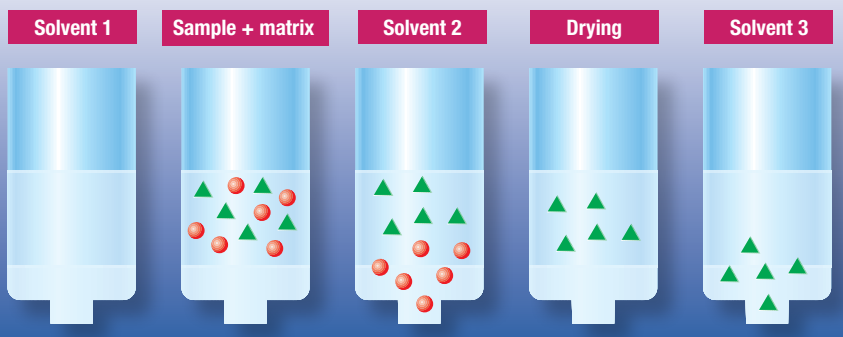
Conditioning, extraction and elution of the cartridge is performed in one dedicated module with minimal movement of the cartridge ensuring highest efficiency and ruggedness.

8 Evaporative concentration

The eluate can be concentrated inside the collection vial while in the SPE station. A keeper solvent can be added automatically before, during or after evaporation in order to minimize loss of analytes or in order to change over to an LC- or GC-compatible solvent for the ensuing analysis. This enables complete automation of sample preparation and sample introduction even if the SPE eluent is not compatible with the LC- or GC column or analysis conditions.

9 Easy transfer of your established manual methods

The MPS with automated SPE option is based on standard SPE cartridges. Manual SPE methods can be directly transferred to the automated SPE. The complete system is easily and conveniently controlled from the GERSTEL MAESTRO Software in Stand-Alone mode or integrated in the Agilent ChemStation or MassHunter Software. All sample preparation steps, including dilution, mixing, adding standards or evaporation are easily selected from a drop down menu and added to the overall method. One sequence table controls the complete system including sample prep and GC/MS or LC/MS analysis.



GERSTEL MAESTRO Software

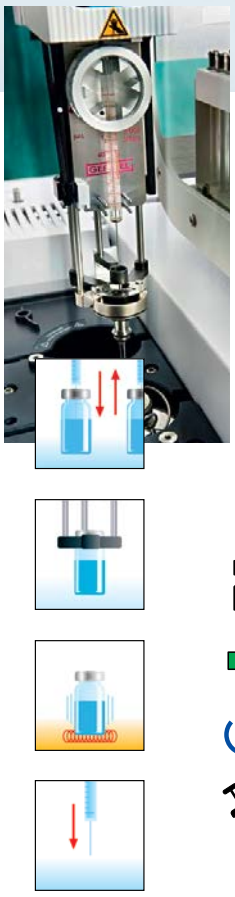
Next generation software for automated sample preparation and sample introduction. MAESTRO optimizes performance and throughput of GERSTEL modules and systems.

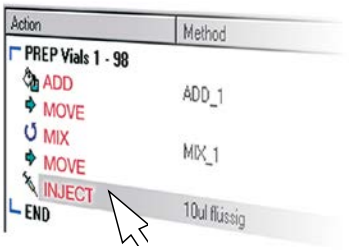
- Stand-Alone operation or fully integrated in the Agilent ChemStation Software
- One sequence table operates the entire system including LC/MS or GC/MS
- Sample Prep by Mouse-Click using the PrepBuilder functions
- Scheduler for easy planning
- PrepAhead: Automated overlapping of sample prep and analysis for optimum productivity and 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
- Control of up to 4 systems from one PC
- Real-time monitoring of all modules and parameters
- Remote support tool included

Sample Prep by Mouse-Click

The MPS is an autosampler and sample preparation robot for GC and LC. 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 and highly accurate and reproducible manner for best possible 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. Available sample preparation techniques are:

- Disposable Pipette Extraction (DPX)
- Solid Phase Extraction (SPE)
- Addition of internal standard
- Derivatization
- Extraction and dilution
- Weighing, sonication, centrifugation
- Heating, conditioning and mixing
- Twister Back Extraction (TBE)
- Automated Liner EXchange (ALEX)
- Automated TDU-Liner EXchange (ATEX) and thermal extraction in micro-vials
- Automated Twister desorption and analysis (SBSE)
- Thermal Desorption and Thermal Extraction (TDS/TDU)
- Dynamic Headspace (DHS)
- SPME and SPME MultiFiber Exchange (MFX)
- Multidimensional GC (MCS)





MAESTRO Software enables Sample Prep by Mouse-Click. All sample preparation steps are conveniently and easily selected from a drop down menu and added to the method. Example:

ADD
Add solvent, internal standard or reagent

MOVE
Move the vial or cartridge

MIX
Agitate or stir and incubate the sample at a set temperature

INJECT
Introduce an aliquot of the sample to the GC or LC system

GERSTEL

GLOBAL ANALYTICAL SOLUTIONS

GERSTEL GmbH & Co. KG
Eberhard-Gerstel-Platz 1
45473 Mülheim an der Ruhr
Deutschland
☎ +49 208 - 7 65 03-0
🖷 +49 208 - 7 65 03 33
@ gerstel@gerstel.de
🌐 www.gerstel.de

GERSTEL, Inc.
701 Digital Drive
Suite J
Linthicum, MD 21090
USA
☎ +1 410 - 247 5885
🖷 +1 410 - 247 5887
@ info@gerstelus.com
🌐 www.gerstelus.com

GERSTEL AG
Enterprise
Surentalstrasse 10
6210 Sursee
Schweiz
☎ +41 41 - 9 21 97 23
🖷 +41 41 - 9 21 97 25
@ swiss@ch.gerstel.com
🌐 www.gerstel.de

GERSTEL K.K.
2-13-18 Nakane
Meguro-ku
152-0031 Tokio
Japan
☎ +81 3 57 31 53 21
🖷 +81 3 57 31 53 22
@ info@gerstel.co.jp
🌐 www.gerstel.co.jp

CERTIFIED QM-SYSTEM ISO 9001 ISO 9001:2008 CERTIFICATE NO. 12686.01

Agilent Technologies
Premier Solution Partner

S00135-022-02