GERSTEL

# Sample Prep Solution
# MOSH/MOAH


**Fully Automated**

**Convenient Operation**

**Modular and Expandable**

## MOSH/MOAH analysis simplified

- Automated Sample Preparation and Introduction
- Complete MOSH/MOAH analysis in just 30 minutes
- Simple and efficient batch processing of data

Efficient determination of Mineral Oil Residues in Food, Feed and Packaging

# GERSTEL Sample Prep Solution MOSH/MOAH

The GERSTEL-MOSH/MOAH Sample Prep Solution performs fully automated sample preparation and sample introduction for efficient determination of mineral oil residues in extracts of food, feed, body care products and packaging. The system is based on an online-coupled HPLC-GC/FID system using the GERSTEL MultiPurpose Sampler (MPS) for automated sample preparation and introduction.

In the initial LC step, mineral oil residue is separated into two fractions: Mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH). These fractions are subsequently transferred to two separate GC columns for individual analysis in a combined dual channel GC system.

The solution meets the requirements of the DIN EN 16995:2017-08 Standard. The dual channel GC separation with FID detection enables **a complete MOSH/MOAH analysis in only 30 minutes**.

**LC- and GC chromatograms are displayed in real time** to facilitate method development or method optimization, for example, adjusting switching times for MOSH and MOAH fraction collection.

The GERSTEL MOSH/MOAH solution is based on HPLC and GC instruments from Agilent® Technologies, adding automation and sample preparation modules developed and manufactured by GERSTEL®. No additional control box is required to set up and control method parameters such as carrier gas pressure or flow.

The GERSTEL MAESTRO software is fully integrated with the Agilent OpenLab™ CDS software. The combined software controls all method parameters for sample preparation, HPLC and GC. The entire workflow is conveniently and efficiently processed under one integrated user interface and sequence table.

The MOSH/MOAH Sample Prep Solution can be extended to perform additional widely used sample preparation steps depending on your requirements:

- Epoxidation to remove interfering naturally occurring olefins
- ALOX Clean-up to retain and remove long chain n-alkanes of plant origin





## 1 GERSTEL online HPLC-GC/FID system

The GERSTEL MOSH/MOAH Sample Prep Solution is based on an HPLC system coupled directly to a dual channel GC/FID system. The configuration shown here includes the optional automated Epoxidation step.

## 2 GERSTEL MultiPurpose Sampler (MPS)

The GERSTEL MPS is used for sample preparation and -introduction and can also perform fraction collection.

## 3 Fractionation by HPLC

The MOSH and MOAH fractions are separated on an HPLC column, which retains triglycerides. During the ensuing GC run, the HPLC column is back-flushed to remove the triglycerides. When the GC is ready, the HPLC column is clean and ready for the next sample.

## The GERSTEL MOSH/MOAH Sample Prep Solution delivers

**Fast answers and reliable results based on efficient automation and intuitively operated software.**

- Determination of MOSH and MOAH in 30 minutes
- Efficient processing and reporting of MOSH/MOAH data, including data generated with other analysis systems, using GERSTEL Enterprise Edition with MOSH/MOAH Data Analysis Software
- Specially developed algorithms for hump- and peak detection ensure fast and efficient data processing and correct results
- Manual method adjustments and reintegration are easily performed at any time

**Simple and efficient operation**

- Method modification by mouse-click
- Unique transverse mounting of GC columns enables easy access and simplified maintenance (see Figure 6)
- Integrated user interface for the complete system

**Flexible adaptation to individual requirements**

- Modular addition of Sample Preparation steps, such as, for example, automated epoxidation or ALOX clean-up
- Easy customization of report formats


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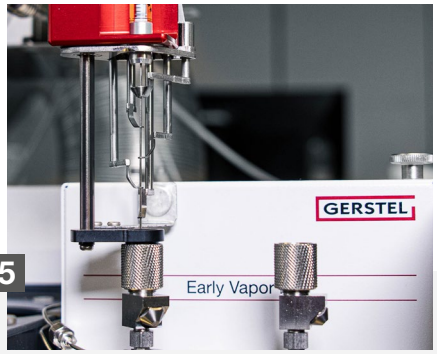


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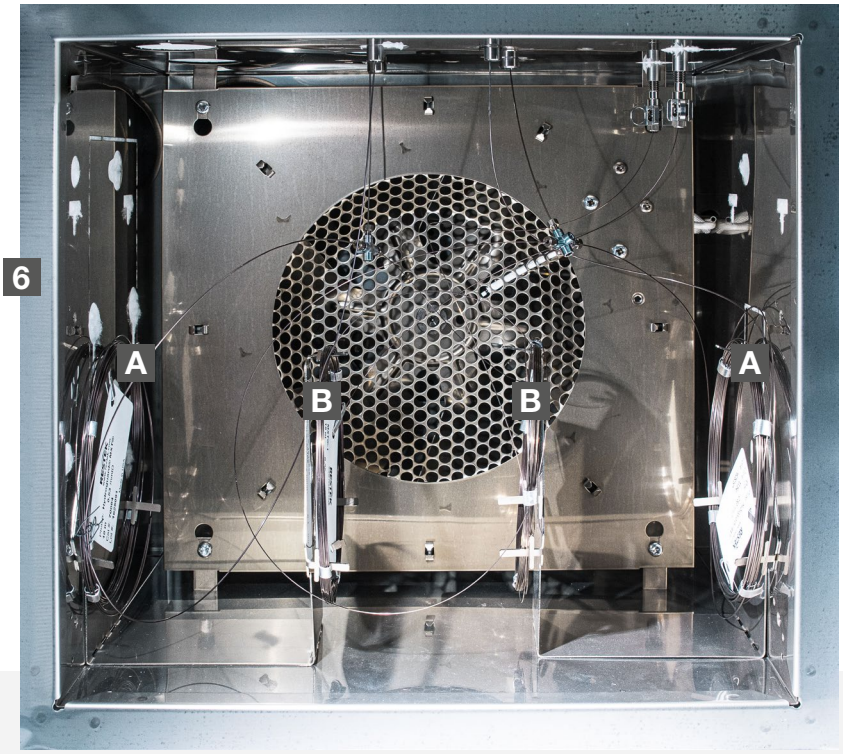


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**4 GERSTEL Early Vapor Exit**

In the Early Vapor Exit, excess HPLC eluent is removed from the MOSH and MOAH fractions before they are transferred to their respective GC separation columns.

**5 Direct On Column Injection of Fractions**

The Septum-Less Head (SLH) included in the system shipment is easily mounted enabling on column injection of fractions collected using the MPS or, for example, of manually prepared samples.

**6 GC oven**

Perfectly organized: In the GC oven, the retention gaps (A) and GC columns (B) are transverse mounted and positioned for easy access.

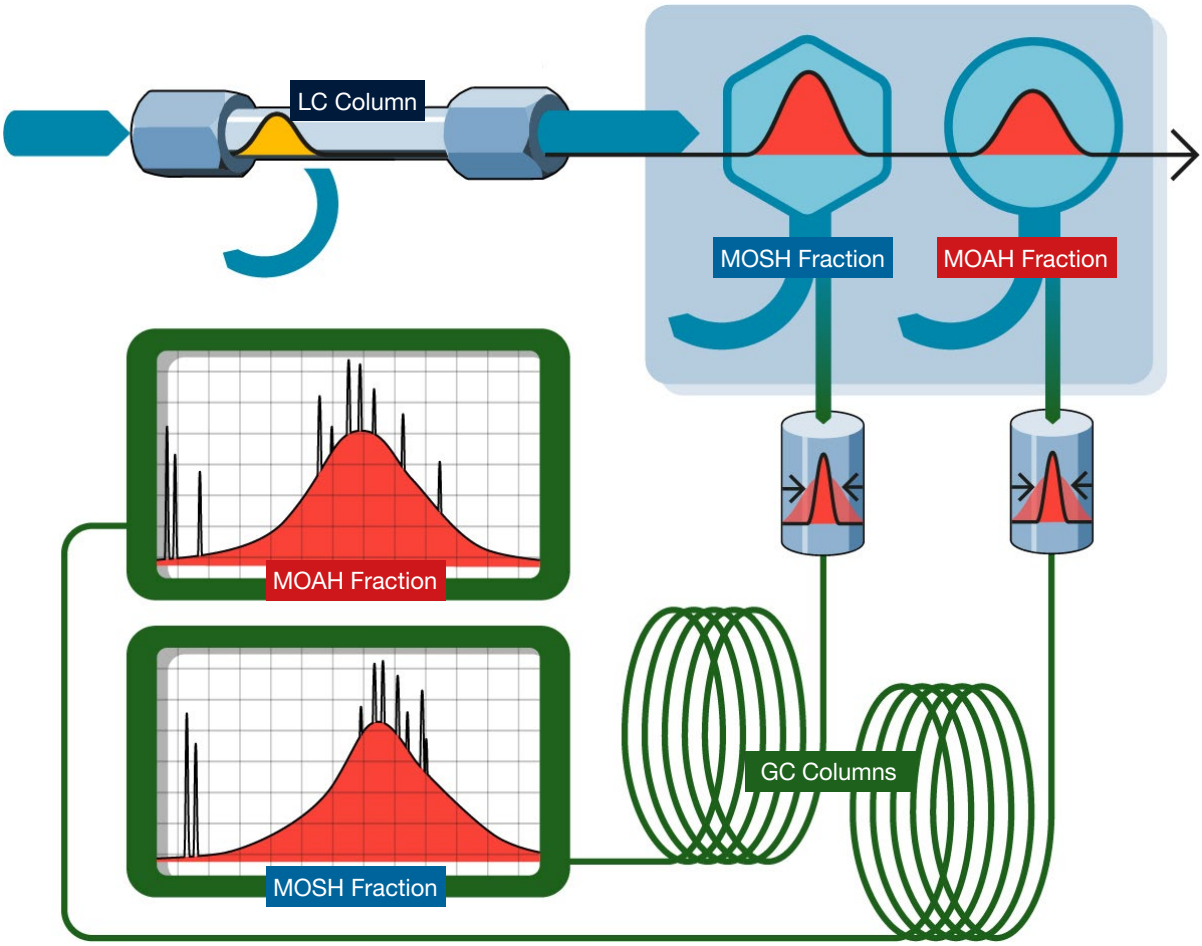
# Analysis details

The MOSH and MOAH fractions are separated by HPLC and individually transferred to their designated GC channel. The HPLC separation is performed using a normal phase silica gel column and n-hexane/dichloromethane mobile phase.

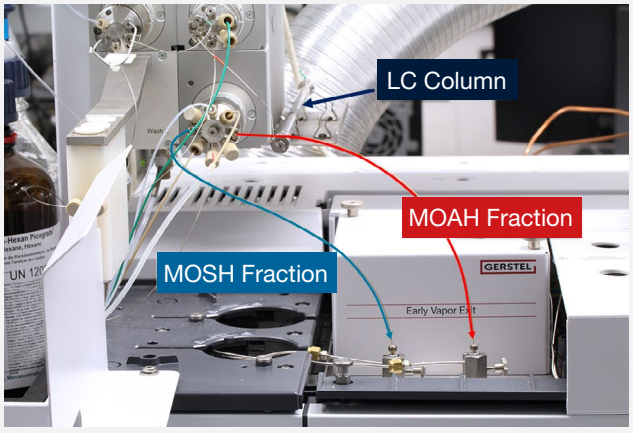
The individual 450 µL fractions are transferred to their respective GC channels while triglycerides are retained on the HPLC column.

During the GC run, the HPLC column is back-flushed and cleaned. This ensures that correct results can be obtained for the following sample while safeguarding reliable system operation.

In the Early Vapor Exit, excess HPLC eluent is removed before the MOSH and MOAH fractions are transferred to their respective GC separation columns.




As described in the DIN EN 16995:2017-08 standard, volatile compounds are retained by solvent trapping applying partially concurrent eluent evaporation. High boiling compounds spread over the entire length of the flooded zone and are refocused using the retention gap technique. The dual channel GC/FID system enables simultaneous determination of the MOSH and MOAH fractions in 30 minutes.

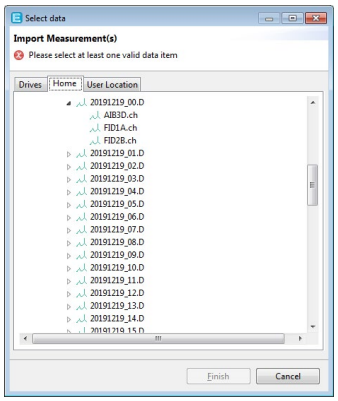


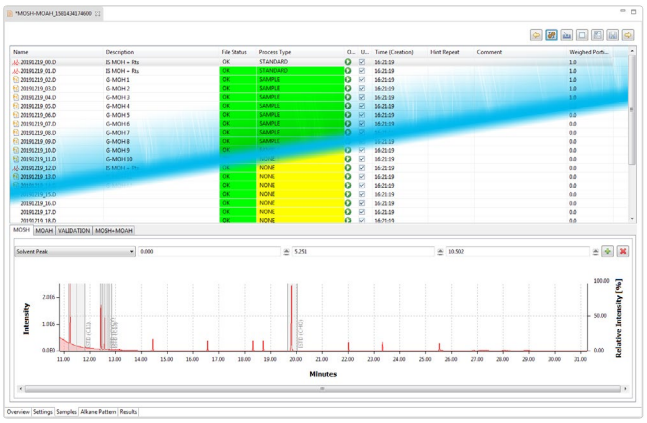
# Generating MOSH/MOAH analysis reports in 4 steps

The GERSTEL MOSH/MOAH Data Processing Software uses dedicated algorithms developed specifically for hump- and peak detection to ensure efficient data processing as well as accurate results and reporting. Manual adjustments and reintegration are easily performed at any time.

## 1 Data import

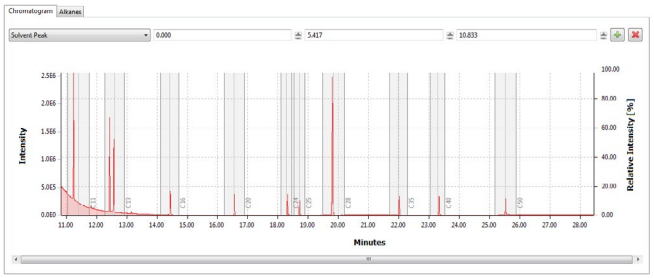
Batch processing of a large number of chromatograms using standardized conditions ensures high throughput



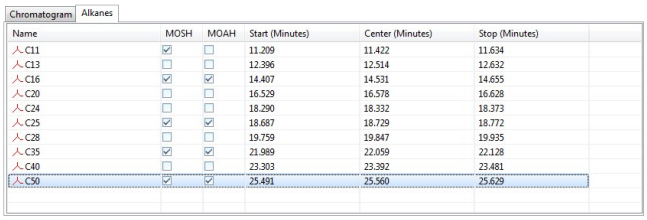

## 2 Automated sample type recognition

Chromatogram file information helps determine whether files represent samples or standards and is used for sample description




## 3 Visual inspection of integration intervals

Predefined integration intervals for standard alkanes are clearly displayed and can be adjusted as required, enabling fast visual inspection and reliable identification of standard peaks


Chromatogram | Alkanes

| Name | MOSH | MOAH | Start (Minutes) | Center (Minutes) | Stop (Minutes) |
|---|---|---|---|---|---|
| C11 | ☑ | ☐ | 11.209 | 11.422 | 11.634 |
| C13 | ☐ | ☐ | 12.396 | 12.514 | 12.632 |
| C16 | ☑ | ☑ | 14.407 | 14.531 | 14.655 |
| C20 | ☐ | ☐ | 16.529 | 16.578 | 16.628 |
| C24 | ☐ | ☐ | 18.290 | 18.332 | 18.373 |
| C25 | ☑ | ☑ | 18.687 | 18.729 | 18.772 |
| C28 | ☐ | ☐ | 19.759 | 19.847 | 19.935 |
| C35 | ☑ | ☑ | 21.989 | 22.059 | 22.128 |
| C40 | ☐ | ☐ | 23.303 | 23.392 | 23.481 |
| C50 | ☑ | ☑ | 25.491 | 25.560 | 25.629 |

## 4 Integration interval selection

Integration windows for MOSH and MOAH and for standards are selected by mouse-click

## Report Generation

Results are presented in one of several standard report formats that are easily customized to meet your needs. Data can be exported in a variety of formats for further processing.

**See for yourself in our user video!**

# Looking for more?

GERSTEL delivers integrated sample preparation solutions for GC (GC/MS) and HPLC (LC-MS/MS) adapted to your needs. For the GERSTEL MOSH/MOAH Sample Prep Solution, additional support options are available:

- MOSH/MOAH application training
- Sample preparation method development for MOSH/MOAH analysis

Our proven solutions are based on intelligent combination of market leading Agilent Technologies instruments with GERSTEL sample preparation technology under integrated software control.

To ensure your success, GERSTEL provides comprehensive technical and application support by a team of highly experienced and motivated colleagues.

## Service from day one

### Installation and familiarization by fully trained technical staff

Following installation, your system is tested and the service engineer provides the user with a system and software familiarization to ensure that he or she can operate the system and reliably generate results.

### Training courses

Comprehensive training courses given by experienced application chemists are available as options. Courses include classroom presentations as well as hands-on instrument operation and maintenance.

GERSTEL systems and solutions are developed, produced and distributed under a quality system certified to meet the demanding ISO 9001:2015 quality standard. Before an instrument or Sample Prep Solution is brought into operation it is tested for technical and application functionality to ensure that it reliably operates to specification.

### Service and Support

Support to us includes all aspects of our customers' needs: We provide comprehensive professional advice, reliable delivery and thorough training. Whenever technical issues arise, we respond promptly and bring to bear the latest support and communication technology to ensure the fastest possible resolution no matter where in the world our customer is located.

GERSTEL is represented in more than 70 countries worldwide. In territories, where we do not have a GERSTEL Service Organization, our network of trained and certified distributors provide timely, high quality support. All GERSTEL distributors have gone through training and certification in the training center at our headquarters in Germany. Leading laboratories world-wide rely on GERSTEL solutions.

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