



Axel Semrau®

CHRONECT Workstation MCPD



Product Information

MCPD analysis

3-Monochloropropane-1,2-diol (3-MCPD), 2-monochloropropane-1,3-diol (2-MCPD) and glycidol are known as contaminants in foodstuffs due to manufacturing. MCPD fatty acids may occur during the refinement process of oils and fats at high temperature in the presence of chloride containing salts. However, refinement is an essential chemical and physical process. Only through this kind of treatment with high temperature undesired odorants and flavoring substances as well as possible traces of toxic compounds like pesticides, heavy metals or mycotoxins are eliminated.

There is an increasing importance of the analysis of these contaminants due to their carcinogenicity. In March 2016, the European Food Safety Authority (EFSA) declared a reduced value for the tolerable daily uptake of 0.8 µg/kg body weight for 3-MCPD.

There are numerous methods for the determination of MCPD-esters. They can be divided into two groups: the direct determination using LC-MS/MS or the indirect analytics by GC-MS. The direct analysis is more time-consuming because every single ester must be determined by LC/MS.

The indirect method is more frequently used for routine applications. Still, manual determination is linked to a high expenditure of time.

As a solution, Axel Semrau® has chosen the well-established DGF method "DGF C-VI 18(10)" as a basis for an automation approach and optimized it for routine analytics: DGF Fast & Clean.

The application is suitable for determination of 3-MCPD, 2-MCPD and glycidol contents. In the process, the analytes which are bound to fatty acid esters are first converted into their free forms. Release from fatty acid esters is realized by transesterification. MCPD becomes available as a free alcohol. In further steps, free MCPD is extracted and then derivatized. Subsequently, a cleaning step and measurement via GC-MS/MS (Fig. 1) is performed. The application presented here performs the entire sample preparation including analytics fully automated.

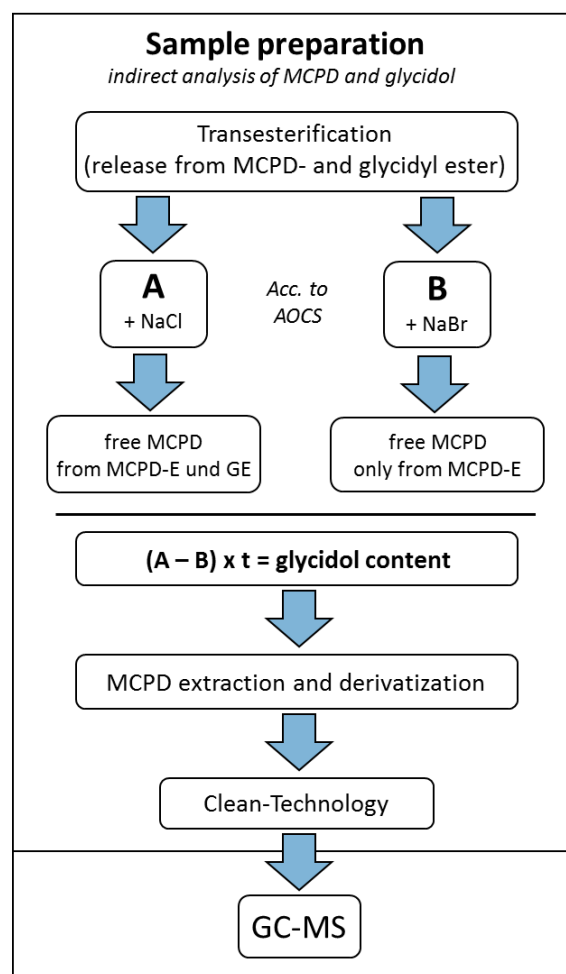


Figure 1: Schematic workflow of the sample preparation for the indirect MCPD analytics according to the DGF Fast & Clean method.

The modular PAL3 system allows for the automation of other methods and therefore is perfectly suited for the everyday lab routine. For example, the 3-in-1 method by SGS (AOCS Cd 29b-13) may partially be automated, a short manual interaction still is required. For the Unilever method (AOCS Cd 29a-13) a centrifuge can be added and integrated making this method as well automatable as the Zwagerman-Overman method. Equally, the earlier Weisshaar method has already been implemented.

Axel Semrau® recommends the AOCS Cd 29c-13 (or DGF C-VI 18(10)) as the most powerful method and therefore has optimized it resulting in the in-house developed Clean-Technology. Applying this method, results are available after 45 minutes only. Traditional methods require up to 18 h reaction time. As a consequence, the new system provides highest precision in combination with a significant time saving. The obtained result always complies with the conventional DGF method.

The entire control of the system is conducted by the user-friendly software CHRONOS, making even complex procedures easy to handle. The CHRONECT solutions by Axel Semrau® are pre-installed in application laboratories and tested (FAT). Then, the systems are delivered ready-to-use to the customer and tested at the customer's lab one more time (SAT). Thus, the quickest possible continuation of the routine measurement is assured.

By default, the system is equipped with a Bruker EVOQ™ GC-TQ including a 456-GC. Alternatively, installation is possible with instruments of other manufacturers or based on pre-existent GC-MS devices.

System components

The application system consists of the following components:

- CHRONECT Robotic including:
 - CTC PAL3 DHR autosampler (160 cm model)
 - software platform CHRONOS
- Bruker EVOQ™ GC-TQ with a 456-GC incl. Blackflush element
- **Factory Acceptance Test and Site Acceptance Test** to assure analytical performance
- instruction and commissioning, training, support

Benefits of the CHRONECT Workstation MCPD

- measurement results of a sample in 45 minutes only using DGF Fast & Clean by Axel Semrau®
- up to 36 samples in 24 h
- automation of various methods: DGF classical, Zwagerman-Overman method, SGS 3-in-1 method, etc.
- excellent reproducibility
- minimum maintenance because of Clean-Technology
- no risk of contamination
- best possible sensitivity
- automated analysis of blanks
- QC samples to check LOD/LOQ and recovery are generated automatically
- automated control of transformation factor for DGF methods
- expandable to other applications
- online and offline mode
- investment safety
- optimal for utilization in routine analytics

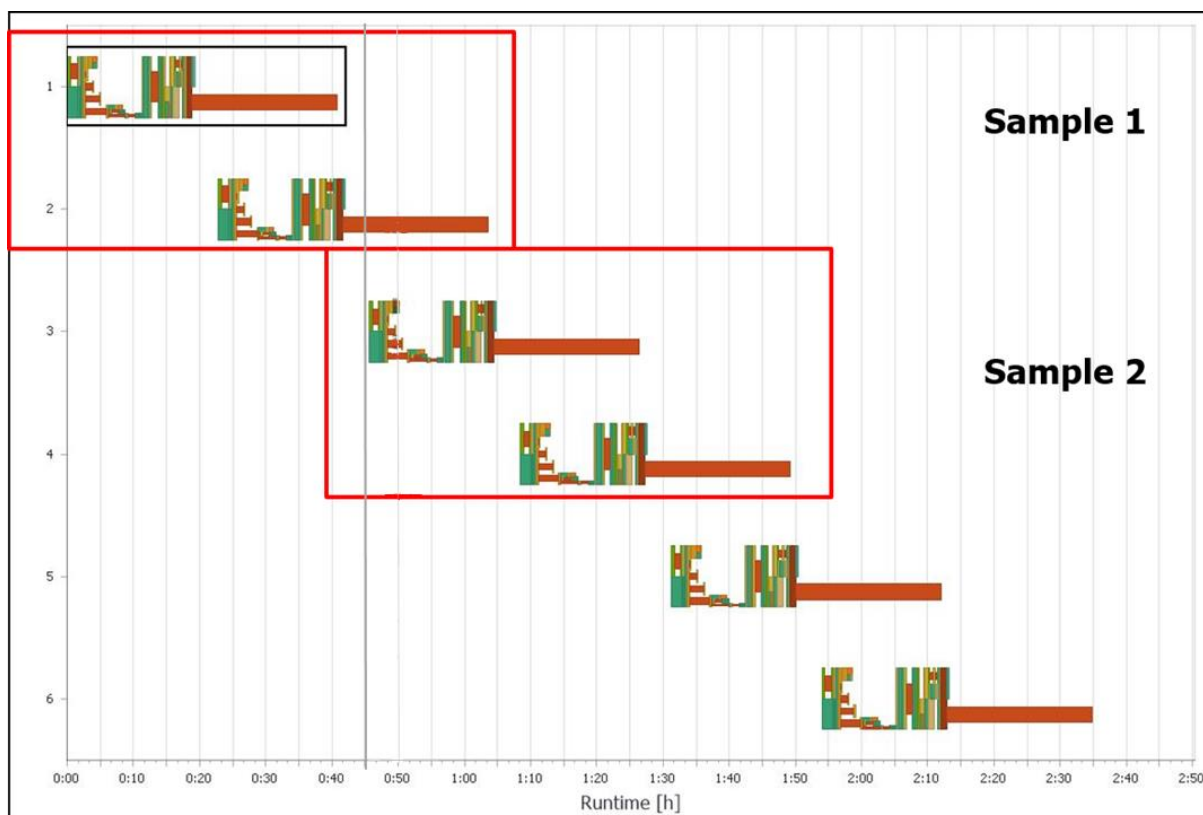


Figure 2: Schedule from the software CHRONOS: Interlaced measurement of Part A and Part B of a sample in 45 minutes.

Subject to technical changes

**The CHRONECT Workstation MCPD
is a development by Axel Semrau®**

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