SHIMADZU
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C146-E374

EU Regulation Compliant GC-MS/MS Method Package for Dioxins in Foods

Supports the Analysis of Dioxins in Foods Using GC-MS/MS

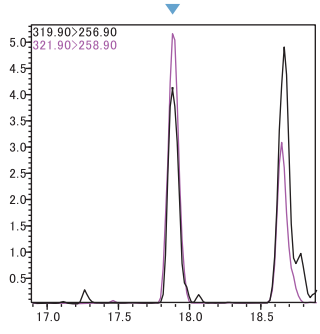
Until recently, the analysis of dioxins in foods was mainly performed using magnetic sector (double-focusing) GC-MS instruments. However, GC-MS/MS (TQ) instruments are low cost and easy to handle, and offer a significant improvement in quantitative accuracy. Accordingly, in June 2014, the TQ method was officially recognized in the EU as being equivalent to the magnetic sector GC-MS method (EU 589/2014).
This product consists of method files for the analysis of dioxins in foods, and a report creation tool, supporting the analysis of dioxins via TQ.

1 Method Files Registered with the Optimal Conditions for the Analysis of Dioxins

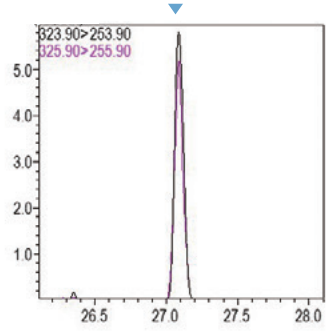
Optimized analysis conditions (including transition and collision energy) are pre-registered in this product's method files. Additionally, the files are registered with retention times and retention indices, and the retention times can be adjusted automatically using the retention time adjustment function (AART: Automatic Adjustment of Retention Time), allowing analysis to start immediately.

Method Files Are Registered with the Optimal Analysis Conditions for DXNs, PCBs, and BFRs

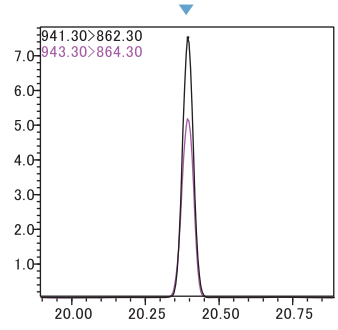
This product contains three method files with dioxins (DXNs), polychlorinated biphenyls (PCBs), and brominated flame retardants (BFRs) set up as target compounds, so typical compounds for which toxicity is a concern have been preselected. Additionally, since DXNs and PCBs are highly toxic, they must be accurately quantified at low concentrations. These method files are registered with the optimal analysis conditions for the compounds, so they can be analyzed with high quantitative accuracy without adjusting the conditions.



2,3,7,8-Tetrachlorodibenzo-p-dioxin
0.05 pg/uL concentration



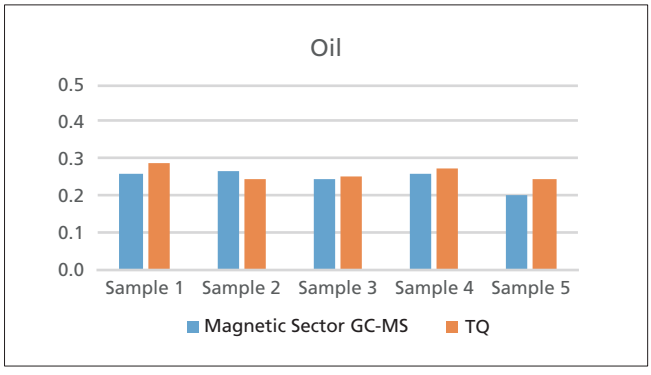
3,3',4,4',5-Pentachlorobiphenyl (#126)
0.3 pg/uL concentration

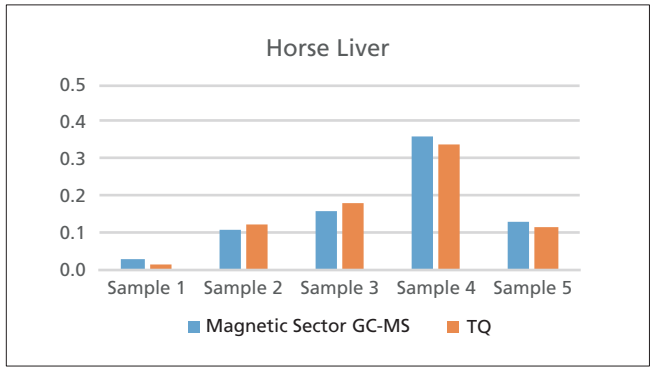


Decabromodiphenylether (#209)
10 pg/uL concentration

Method File Performance Confirmed by the Analysis of More than 44 Types/201 Samples of Foods and Feeds

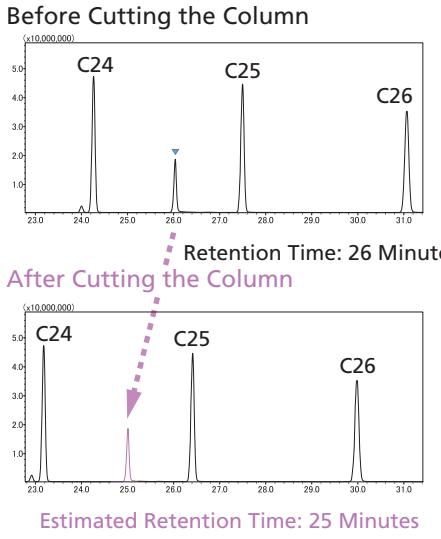
More than 44 types/201 samples of foods and feeds have been analyzed using the method files in this product and a Shimadzu TQ. Additionally, the same samples were analyzed using a magnetic sector GC-MS, and the results were compared. The results of the comparison of the total values for TEQ (pg/uL) are shown below.
The samples are shown on the horizontal axis, and the total values for TEQ for each sample are shown on the vertical axis. Regardless of the sample, the values for TEQ are similar for the magnetic sector GC-MS and TQ, confirming that favorable performance was obtained.





Automatic Adjustment of Retention Times Using the AART Function

The retention times and retention indices for the target compounds are registered in the method files. The AART function adjusts the retention times for the target compounds using the retention indices for the target compounds and the results of the analysis of an n-alkane standard sample. The retention times and time programs are automatically adjusted even if the retention times for the target compounds change due to maintenance of the column tip for example.



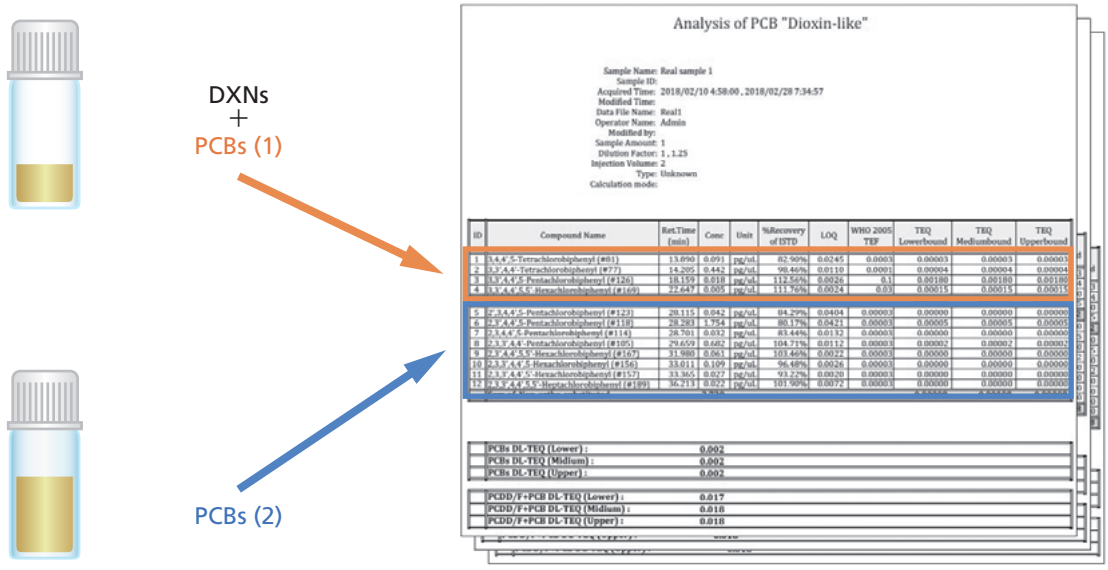
Alkanes with different carbon numbers are investigated at a wide range of retention times, so the retention times of target compounds with a variety of boiling points can be adjusted with high accuracy.

2 Report Creation Tool, Capable of Outputting Items Required by EU Regulations

Reports of the analysis of dioxins in foods must contain the results of complicated calculations. Included in this product is a report creation tool that can automatically create reports showing items required by EU regulations. Additionally, it is capable of combining reports on DXNs and PCBs, changing the calculation method, and the items displayed of the Limit of Quantification (LOQ) to accommodate varied customer requirements.

Report Creation Tool Enabling Support for A Variety of Samples And Pretreatment Methods

In the analysis of dioxins in foods, DXN analysis samples and PCB analysis samples are prepared from a single sample. However, depending on the pretreatment method, some of the PCBs can become mixed into the DXN sample, so the analysis results for PCBs are sometimes divided into two parts. With this product's report creation tool, even if the analysis results for PCBs are divided into two parts, they can be combined, enabling support for a variety of samples and pretreatment methods.



Reports Can Be Created Combining the Two Analysis Results

■ Product Contents

Method Files (method file for analysis of DXNs, PCBs, or BFRs)
Method File for Adjusting the Retention Times
Report Creation Tool

■ Supported Instruments

GC/MS: GCMS-TQ8050

■ Operating Environment

Excel: Microsoft® Excel® 2016
Workstation: GCMSsolution™ Ver. 4.45 SP1 or later
LabSolutions Insight™ Ver. 3.2 SP1 or later

■ Recommended Consumables

Insert Liner: Topaz® 3.5 mm ID Single Taper Inlet Liner w/ Wool, P/N 23336 (Restek Corporation)
n-alkanes: C8-C40 Alkane calibration standard (SIGMA-ALDRICH, Cat#:40147-U)
Quantitative Retention Index Standard (C7-C33) (Restek Corporation, 31080)
Column: DXNs Analysis: SH-Rxi™-5Sil MS (60 m, 0.25 mm I.D., 0.25 µm), P/N: 227-36036-02 (SHIMADZU)
PCBs Analysis: HT8-PCB (60 m, 0.25 mm I.D.), P/N: 054237 (Trajan Scientific)
BFRs Analysis: SH-Rtx®-1614 (15 m, 0.25 mm I.D., 0.1 µm), P/N: 227-36265-01 (SHIMADZU)

Precautions
1. Please note that no guarantee is offered regarding the accuracy of the information contained in this product, or the usefulness of the information obtained from the results of its use.
2. To reliably identify the registered substances using this product, perform the measurements with the instrument conditions in the method files included in the product.
3. The n-alkanes mixed sample is used in analysis in order to adjust the measurement parameters and retention times in the method files using the AART function. BFR compounds with carbon Nos. C33 and higher are included.
P/N 31080: for customers who only analyze DXNs and PCBs.
P/N 40147-U: for customers who analyze BFRs.

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First Edition: July 2018, Printed in Japan 3655-06811-15AIT