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An extra GC dimension at your finger tips

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Food analysis is certainly not a trivial matter. The typical matrix is complex, often requiring several sample preparation steps and extensive sample clean-up. However, even well prepared samples can produce forests of overlapping peaks making it a case of not being able to see the trees for the forest. If a case of unresolved peaks is clearly at hand, or if an odor detected by using an Olfac-Port (ODP) the peaks in gram, the user

doesn't match the chromatogram, the user needs to have a good tool

kit at her or his disposal. In this case, selectable multidimensional GC can be the technique that cuts through the thicket and provides clear, reliable answers whenever one-dimensional GC does not.

Until now, multi-dimensional GC required the use of a dedicated system with two GCs coupled to each other. Due to the extra cost, and to the often limited utilization in the laboratory, such solutions didn't always provide the best return on investment (ROI). GERSTEL now offers a solution that can be used for routine analysis as well as for special challenges. The patented GERSTEL Selectable 1D/2D-GC/MS is a flexible system, based on a single standard GC/MS instrument. It is both a routine analysis system and a complex problem solving system that offers heart-cutting and two-dimensional separation on demand. Because of this dual functionality, when questions arise regarding a section of the standard one-dimensional chromatogram, this section in question can be transferred to a 2nd dimension, i.e. a GC column with different polarity to fur-

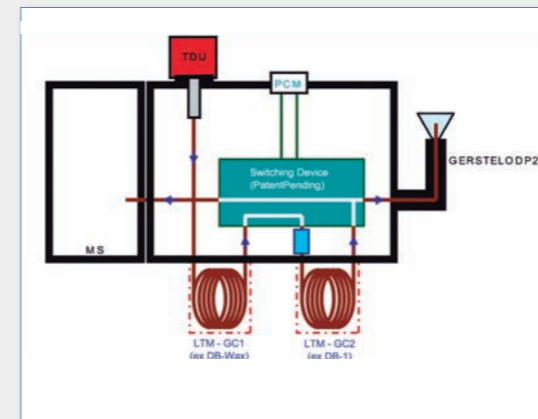
ther increase separation. Both columns are installed in the same GC and are heated independently using Low Ther-



»The main advantages of the selectable 1D/2D-GC-MS system are the simple and fast selection of 1D GC-MS and 2D GC-MS operation with a mouse click (without any instrumental set-up change), and simultaneous mass spectrometric and olfactometry or element-specific detection for both 1D and 2D separation to assure selection of a heart-cut region and correct identification of compounds of interest.«

Nobuo Ochiai, Ph. D.
Technical Director, GERSTEL K.K.

GERSTEL presentation: August 6, 2.00-3.30 pm: "Selectable 1D or 2D GC-MS with Olfactometry and Preparative Fraction Collection for Analysis of Odor Compounds" from Nobuo Ochiai, Ph.D., GERSTEL K.K.



Selectable 1D/2D GC-Olfactometry (O)/MS System

Heart-cutting
User selected peaks eluted from LTM-GC Column 1 are transferred onto LTM-GC Column 2. The transferred peaks are focused at the head of the LTM-GC Column 2 with or without cryo-trapping depending on the compound volatility.



»Also, this system can eliminate preliminary analysis with a "monitor FID" for the selection of the heart-cut region, and can provide a "monitor total ion chromatogram (TIC)" for the 1D column separation in 2D GC-MS analysis.«

Kikuo Sasamoto
Technical Manager, GERSTEL K.K.

mal Mass (LTM) technology. The process of cutting a section of a chromatogram and introducing it to another column is called heart-cutting. The 1D/2D system can be used to determine analytes in either the 1st or the 2nd dimension in a flexible manner. Neither the GC run, nor analyte detection is interrupted during the run. Detection of the analytes that were transferred to the 2nd column follows using the same detector(s) used for the 1st dimension: MSD, Olfactory Detection Port (ODP), PFPD etc. Should lower detection limits be required for the analyte in question, the system enables

heart-cutting from multiple repeat injection, with cryofocusing of the sections that were cut, on a GERSTEL Cryo Trap System (CTS). The accumulated sections are then transferred to the 2nd dimension once there is sufficient mass on column to perform the determination.

The complete system is efficiently and conveniently controlled by mouse-click through the GERSTEL MAESTRO software, integrated with the Agilent ChemStation. It couldn't be simpler.

For more information

www.gerstel.com,
e-mail: gerstel@gerstel.com

Literature

Kikuo Sasamoto, Nobuo Ochiai: "Selectable one-dimensional or two-dimensional gas chromatography-mass spectrometry with simultaneous olfactometry or element-specific detection", Journal of Chromatography A, 1217 (2010) 2903-2910.

Next Stop Singapore

GERSTEL on expansion course in South East Asia

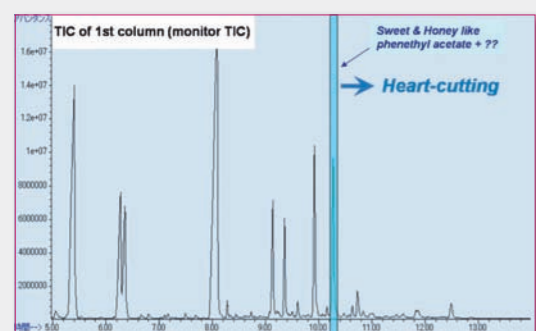


Tan Surakanpinit

In order to support a growing customer base in South East Asia in the fields of automated sample preparation for GC/MS and LC/MS analysis, GERSTEL has founded a wholly-owned subsidiary in Singapore: GERSTEL Limited Liability Partnership (LLP). GERSTEL already has subsidiaries in the U.S.A., Japan and Switzerland. In a further 70 countries world-wide, GERSTEL is represented by carefully selected and fully trained distributors. GERSTEL LLP will be run by Tan Surakanpinit. Ms. Surakanpinit was born in Thailand, where she studied Chemistry and later received her MBA. Ms. Surakanpinit brings extensive international experience in the chromatography laboratory instrumentation business into her new position. Prior to joining GERSTEL, she held a range of positions from Regional Sales & Business Development Manager to World-Wide Marketing Manager taking her to workplaces in Thailand, The Netherlands, The U.S.A. and Singapore. Ms. Surakanpinit's responsibilities will include supporting our distributors and developing new business opportunities in the Asia Pacific Territories, including Singapore, Malaysia, The Philippines, Taiwan, Vietnam, Thailand, Australia and New Zealand.

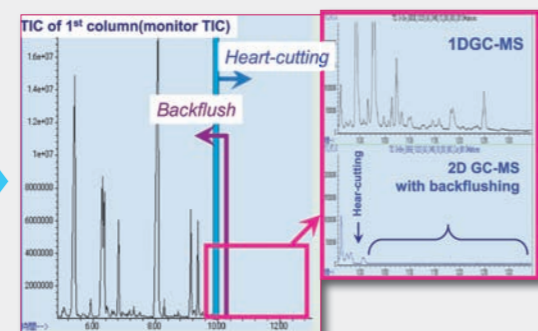
More information: www.gerstel.com

SBSE - 2D GC-O/MS determination of odor-active compounds in beer



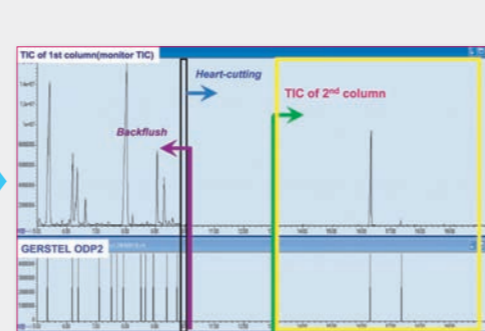
1D GC-O/MS analysis

GC-O/MS can help locate the region of odor-active compounds within a complex Chromatogram, but insufficient resolution may still prevent reliable compound identification. A heart-cut of the region of interest followed by separation on a second column (second dimensional separation) provides the resolution needed to accurately identify individual compounds.

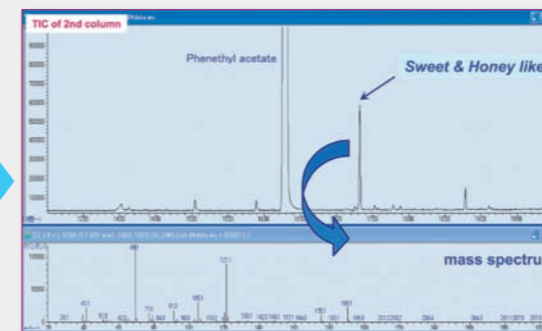


Heart-cutting and Backflushing

The system can be configured to perform 2D GC-O/MS analysis without any hardware or column connection changes. After heart-cutting, the 1st dimensional column can be backflushed. An additional cryo-trap device is available if necessary.

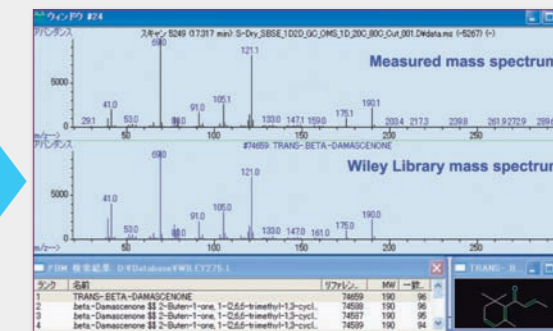


Simultaneous MS and olfactory detection is possible in both 1D and 2D GC analysis modes.



2D GC-O/MS analysis

The peak of interest was well separated, and detected using olfactometry (ODP) on the second dimension. A well defined mass spectrum was obtained for the detected peak.



Library search

A Wiley library search tentatively identified the peak as a β -Damascenone.



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Sample Preparation Solutions

GERSTEL features automated sample preparation solutions for GC/MS and LC/MS based on the GERSTEL MultiPurpose Sampler (MPS). Sample prep is controlled through the GERSTEL MAESTRO software or directly through the Agilent ChemStation or MassHunter software. The MPS is also available as a Workstation performing independent Sample Prep for one or more GC/MS or LC/MS systems. GERSTEL Sample Prep technology includes automated solutions for:

- Solid Phase Extraction (SPE) and dispersive SPE (DPX).
- Liquid Handling including derivatization, dilution and addition of internal standards; agitation and centrifugation.
- Automated Liner Exchange (ALEX) for GC/MS.
- Thermal Desorption and Thermal Extraction of solids and of liquids.
- Dynamic Headspace (DHS) and Headspace.
- Stir Bar Sorptive Extraction (SBSE) based on the GERSTEL Twister, as well as SPME with MultiFiber Exchanger (MFX).

MAESTRO simplifies the task of generating sample prep methods as well as the daily setup of a sequence table. The MAESTRO Scheduler and the PrepAhead function enable the analyst to optimize throughput and timing for both Sample Prep and analysis.



Selectable 1D/2D GC/MS

An extra GC dimension at your finger tips

Gas chromatography (GC) experts rely on sharp peaks and baseline resolution to provide accurate answers. To perform chromatographic analysis of real-world samples, analysts often must deal with either complex sample types such as essential oils and petroleum fractions, or complex matrices like biological fluids, foods, sludge, or polymers. Once the sample has been prepared for analysis, separation of all the individual compounds present by means of a single chromatographic separation can be challenging due to the compounds having different ranges of polarity, boiling point, solubility, MW, and concentration. It is therefore necessary to use innovative yet robust techniques that go beyond using a single chromatographic dimension to achieve compound separation. This sounds simple enough, but until now it hasn't been, since techniques that require a second dimension (column) require a lot of additional hardware.

Not anymore: The patented GERSTEL Selectable 1D/2D-GC/MS System enables the best of both worlds. The system can be used for routine single dimensional GC/MS analysis, and with the click of a mouse, can be switched to perform two-dimensional separation when needed for more complex matrices. This allows interesting sections of the chromatogram to be collected and concentrated from multiple runs to better separate and isolate trace compounds. This can, for example, be used for trouble shooting when off-odors are detected in a product. All this is performed using just one GC/MS system.

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Doing Drugs?

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