GERSTEL-Twister®

A pioneering development: GC analysis without sample preparation
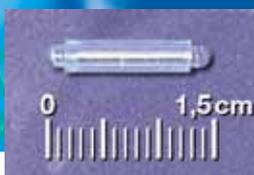
Easy-to-use

Low detection limits

Time-saving

Simple and ingenious

Allows determination of organic compounds in aqueous matrices by gas chromatography without sample preparation. It provides 1000 times lower detection limits than solid phase microextraction (SPME): The GERSTEL Twister - a polydimethylsiloxane (PDMS) coated stir bar for use with common stir plates.

**Stir bar sorptive extraction, or SBSE***
is an equilibrium technique like SPME. Its greatest advantage over SPME is that the quantity of phase used is at least a factor of 100 larger, resulting in detection limits up to 1000 times lower.

* Developed at Research Institute for Chromatography, Kortrijk (Belgium)

Test procedure

The PDMS coated GERSTEL Twister is stirred in the sample for several minutes. Analytes of interest come into contact with the PDMS phase and are extracted.

Without further sample preparation, up to 196 Twisters are placed in a GERSTEL MPS 2 Autosampler fitted with Twister Option and a Twister Desorption Unit (TDU).- The TDU is described in a separate brochure. Alternatively the GERSTEL TDS 2/TDS A Thermal Desorption System can automatically desorb up to 20 Twisters. Analytes are thermally desorbed, focussed in the inlet, and transferred to the GC capillary column.

Chromatogram 1
SBSE-TDS-GC-MS analysis of orange juice
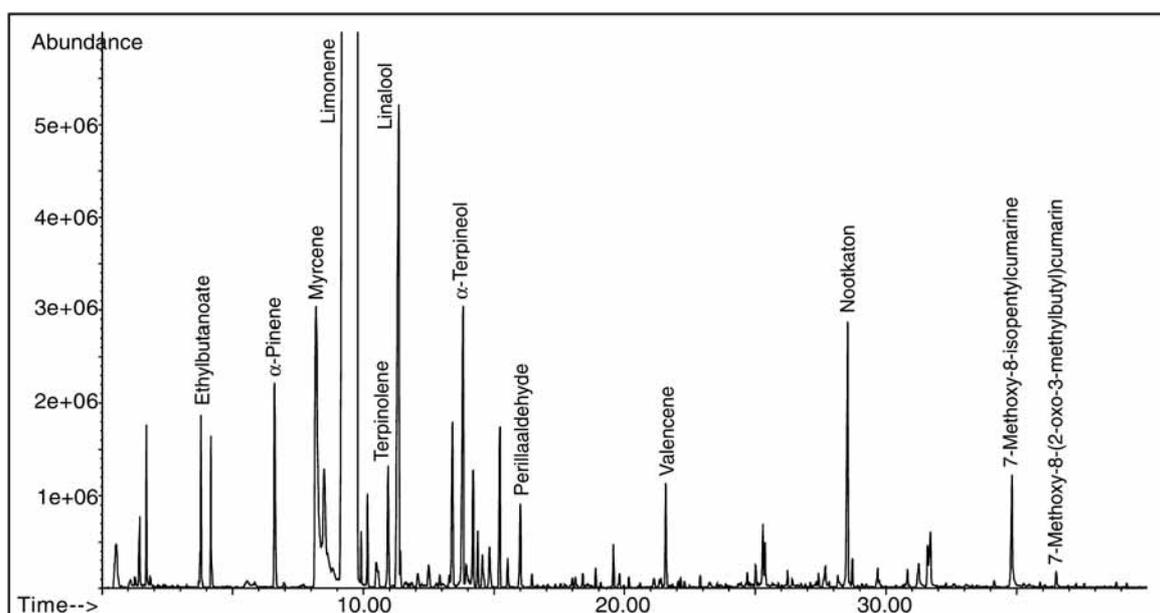
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Applications

Orange juice drinks

A typical example of a Twister quality assurance application. The GERSTEL Twister is used to extract non-polar and semi-polar solutes from the aqueous matrix. Thermal desorption coupled with GC/MS analysis provides a very detailed picture of the flavors contained in the sample. An example chromatogram (1) is shown at bottom left. Peak shapes and resolution are excellent, over the full range from very volatile esters (ethylbutanoate) to semi-volatile coumarins.

Wine

Another example of an application for the GERSTEL Twister is the analysis of pesticides in wine. Chromatogram (2) shows chlorinated residues found using SBSE-TDS-GC-AED analysis. All pesticides added were easily recovered with good peak shapes. The 1 ppb impurity levels found are lower by an order of magnitude than the levels accepted for wine or grapes, which means that the resulting detection limits are more than satisfactory.

Examples of other applications

Twister summary

The GERSTEL Twister revolutionizes the analysis of organic compounds in aqueous matrices. When compared with traditional methods of sample preparation for GC analysis, the Twister determines organic compounds faster, more cost-effectively and with lower detection limits.

Examples of compounds, which can be determined using the GERSTEL Twister are pollutants, such as pesticides, or flavours, fragrances and off-odors.

The following are a few examples of matrices that are well suited for Twister analysis:

- Vegetables, fruits and baby food
- Water and waste water
- Fruit juices, vegetable juices and lemonade
- Coffee, tea, flavoured teas, and fruit teas
- Beer, wine, vermouth and champagne
- Milk products
- Ketchup
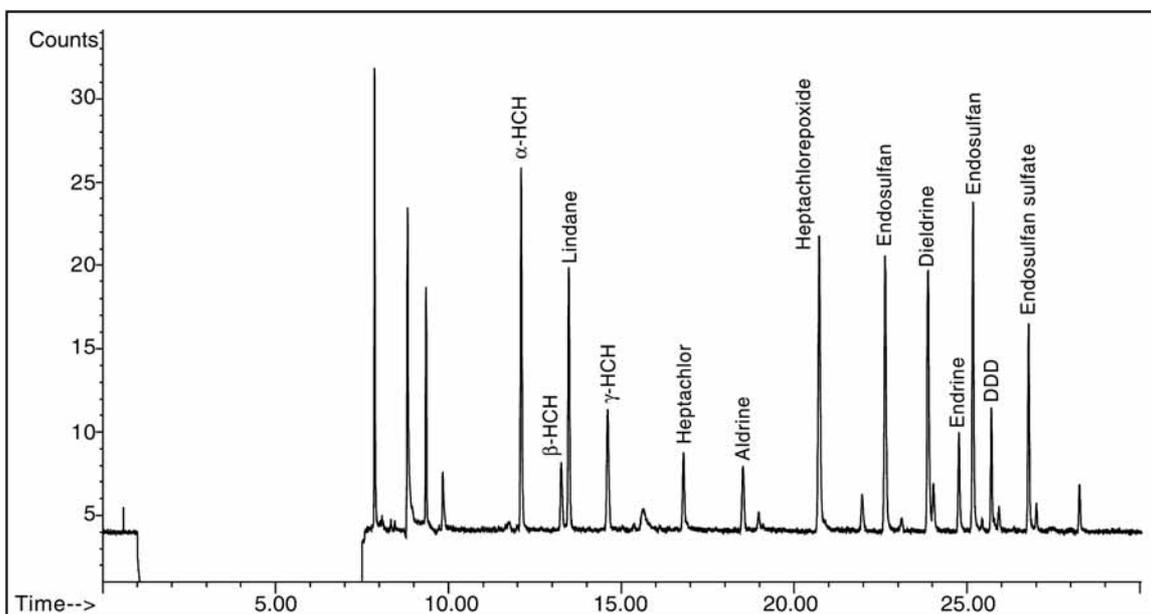
Chromatogram 2
SBSE-TDS-GC-AED analysis of pesticides in wine

Advantages

▶ Up to a 1000 times lower detection limits than SPME

▶ Quantitative, with large linear dynamic range

▶ Several samples may be extracted Simultaneonsly

▶ Requires minimal time and labor outlay

▶ Thermal desorption and GC/MS/AED analysis are carried out automatically
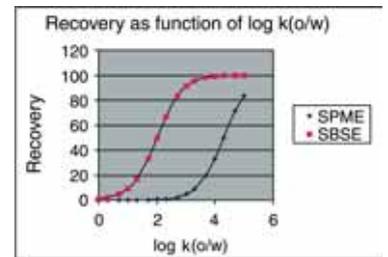
Recovery as function of log k$_{(o/w)}$ using SPME and SBSE

Recovery as function of log k(o/w)

Applications

▶ Food and luxury foods, especially beverages

▶ Flavors and perfumes

▶ Environmental analysis of water or waste water

▶ Biomedicine, including body fluids

▶ Quality control

▶ Residue analysis

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