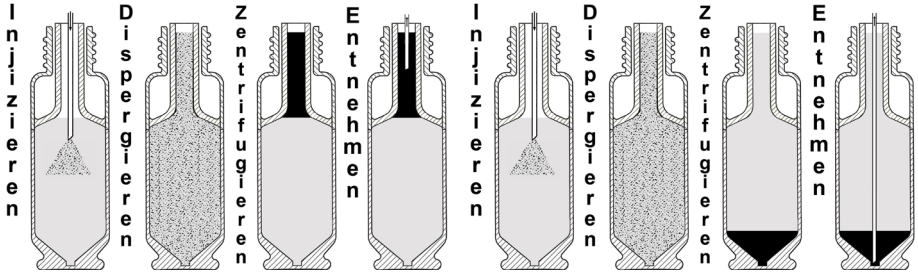
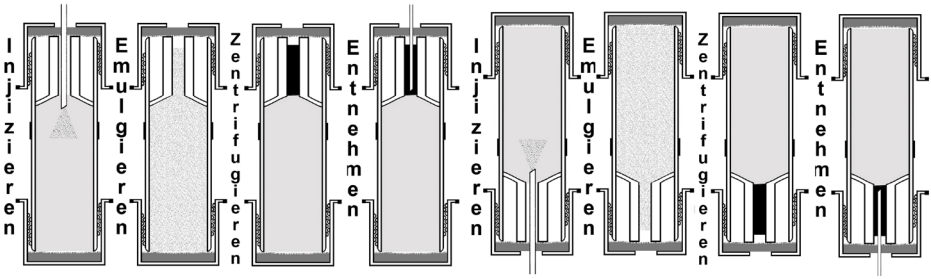
LABC
LABORTECHNIK

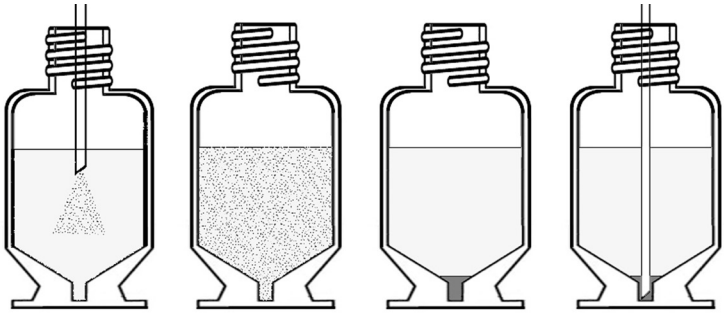
The Dispersive Liquid-Liquid-Microextraction (DLLME) with the bilimex®-assortment



bilimex®-LD/HD-AS



bilimex®-LD/HD-MAN



bilimex®-HD

The alternative Dispersive Liquid-Liquid Microextraction sample preparation method (DLLME) involves the extraction and simultaneous concentration of the desired analyte from aqueous solutions using a small amount of organic solvent.

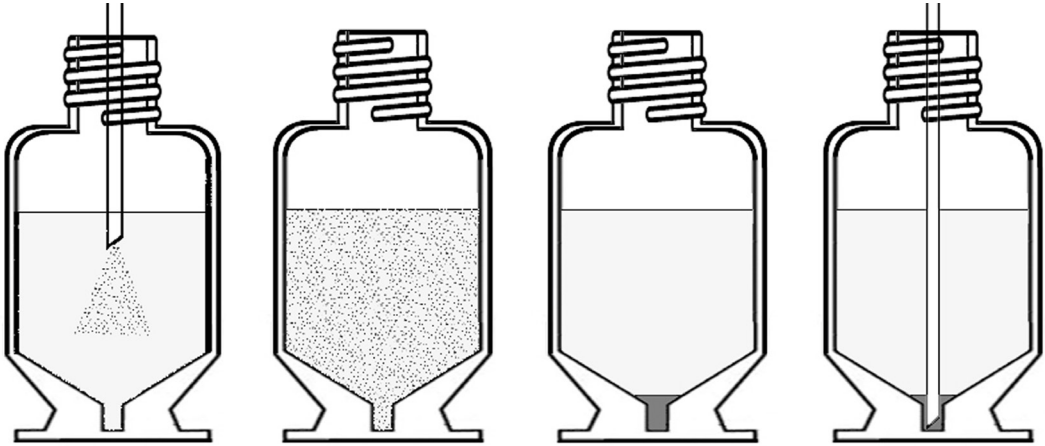
Dispersive Liquid-Liquid Microextraction (DLLME) is usually fast, automated, and is carried out with a minimum of material required and a high efficiency. In this method, the analyte is separated through extraction of aqueous samples using 10 µl to approx. 150 µl of an organic solvent that is immiscible in water (an extractant), the solvent having a higher or lower density than water, and using a solvent that is miscible in water (a dispersant). Useful organic solvents (with high density) include halogenated hydrocarbons or ionic liquids. The miscible solvents include acetone or methanol, for example. Useful organic solvents (with low density) include hydrocarbons, and miscible solvents for this purpose include acetone or ethanol, for example.

The DLLME method achieves high recovery rates and enrichment ratios.

After adding the extractant and dispersant, a dispersion forms, either spontaneously or after a bit of shaking - possibly including ultrasound application, and the non-polar analytes promptly dissolve into the finely distributed organic extractant droplets. The formation of the emulsion enlarges the surface area of the non-polar phase, and equilibrium sets up instantaneously. In the final centrifugation step, the dispersed droplets containing the analytes are centrifuged away; the analytes thus separated from the dispersing matrix are removed using a microlitre syringe and then analysed.

DLLME methods and application examples are described in Maria Johansson's masters thesis (11.Mar.2013, Laboratory of Analytical Chemistry, University of Helsinki).

For manual DLLME (including the centrifugation step) using organic solvents of low density (LD, low density), there have been no suitable vessels available up to this point.
Moreover, there have been no suitable vials with magnetic caps for automated DLLME (including the centrifugation step) with CTC autosamplers, not for DLLME (LD, low density) nor for DLLME (HD, high density). In DLLME with an extractant that has a lower density than water, there is no Liquid-Liquid microextractor available so far for this kind of DLLME sample preparation.



- bilimex®-HD that can be used in swing-out rotor centrifuges up to 3500 rpm, with a high-quality PTFE-coated silicone septum and a magnetic hole-screw cap for automatic operation in an autosampler.

LABC-Labortechnik has developed four products in the bilimex® assortment that meet the requirements of LD- and HD-DLLME.

In LD-DLLME, the organic phase (the extractant), which is lighter than water (LD, low density), separates on top in the capillary.

In HD-DLLME, by rotating the bilimex® by 180°, the organic phase (the extractant), which is heavier than water (HD, high density), separates on bottom in the capillary. By puncturing the septum with the cannula of a microlitre syringe, the respective separated organic phase (the extractant) can be removed and analysed.

The bilimex®-HD-MAN and the bilimex®-LD/HD-MAN were developed for manual DLLME.

The bilimex®-HD-MAN is made from classical borosilicate 3.3 centrifuge glass with a 60° conical base, GL threads with a screw cap and Teflon-coated seal insert, and use intended for the HD-DLLME.

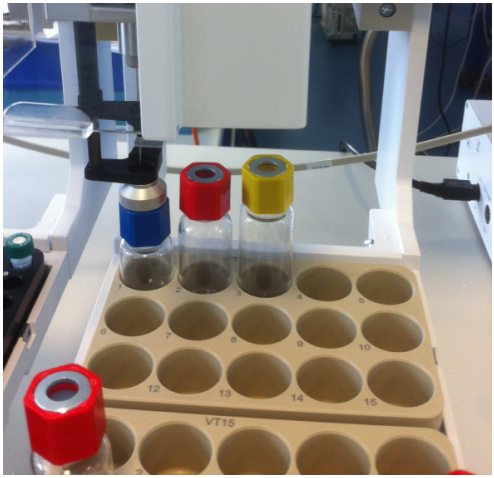
The bilimex®-LD/HD-MAN is suitable for the LD-DLLME or HD-DLLME by rotating it 180°. A cylindrical instead of a conical design of the separator space makes the bilimex®-LD/HD-MAN the ideal centrifuge - separatory funnel for DLLME. The GL-25 cap as a base makes easy handling possible during manual sample preparation. The bilimex®-LD/HD-MAN

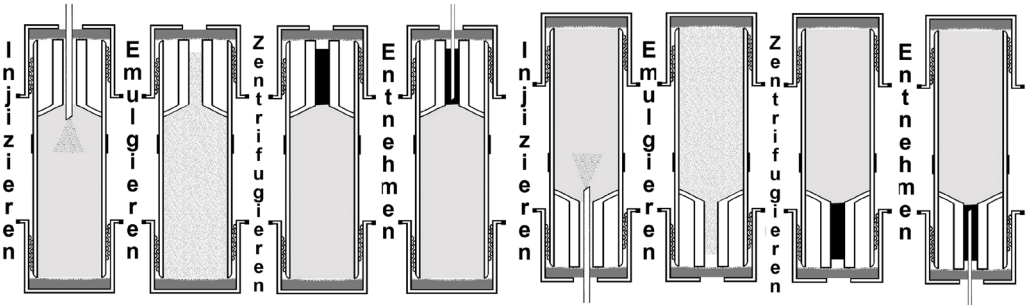
is made of borosilicate 3.3 and can be cleaned and used multiple times.

The bilimex®-HD-AS and the bilimex®-LD/HD-AS were developed for DLLME in the autosampler.

The bilimex®-HD-AS is an extractor made of glass in vial form, with a magnetic cap for facilitating automatic injection and removal via a microlitre syringe, and a CTC autosampler. It is used as a one-time use item.

The bilimex®-LD-AS is an extractor made of glass in vial form, with a magnetic cap for facilitating automatic injection and removal via a microlitre syringe, and a CTC autosampler. It can be used multiple times and cleaned.





- bilimex®-LD/HD-MAN for manual DLLME and DLLME method development using an extractant that is lighter or heavier than water.
  bilimex®-LD/HD-MAN made of DURAN® laboratory glass

Deliverable variations of **bilimex®-HD:**

Magnetic headspace hole-screw cap in green, silicone/white PTFE septum insert for CTC autosampler, conical bottom with base, closure able to handle up to 150 °C, VPE = 100 ea.

Item No.:	Volume:	Size:	Details:
280-0397322	8 ml	23 x 42 mm	Clear glass
280-0400930	8 ml	23 x 42 mm	Silanised (INNO-Sil®), clear glass
280-0397414	8 ml	23 x 42 mm	Brown glass
280-0400602	8 ml	23 x 42 mm	Silanised (INNO-Sil®), brown glass
280-0401968	17 ml	23 x 72 mm	Clear glass
280-0404877	17 ml	23 x 72 mm	Silanised (INNO-Sil®), clear glass
280-0404907	17 ml	23 x 72 mm	Brown glass
280-0404921	17 ml	23 x 72 mm	Silanised (INNO-Sil®), brown glass

INNO-Sil® is a new deactivation process. It provides maximum inerting of glass surfaces and prevents adsorption even of sensitive substances, such as pesticides, amines, steroids and phenols.

LABC
LABORTECHNIK

Deliverable variations of **bilimex®-LD/HD-MAN:**

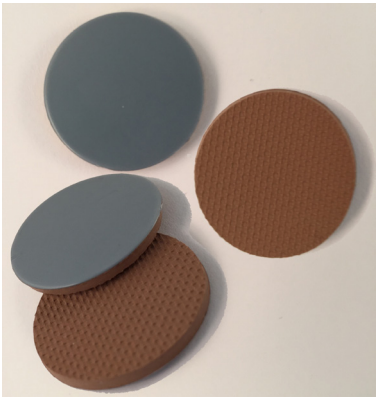
Made of DURAN®laboratory glass with an fused capillary tube, double threads 2 x GL25, including two PTB red GL25 hole-screw caps and PTFE-coated 3 mm silicone gaskets

Item No.:	Volumen	Capillary volume:	Lenght:
280-0400695	7 ml	35 µl	60 mm
280-0400718	7 ml	100 µl	60 mm
280-0400701	12 ml	35 µl	80 mm
280-0400725	12 ml	100 µl	80 mm
280-0396615	17 ml	35 µl	100 mm
280-0396592	17 ml	100 µl	100 mm

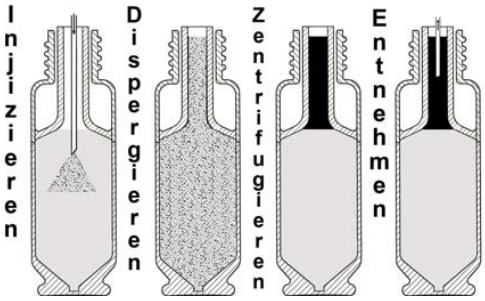
Optional accessories for the bilimex®-LD/HD-MAN:

Item No.: 120-0400626

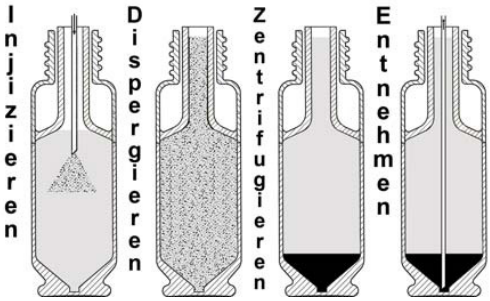
Sealing discs (round blanks) for the GL25, butyl rubber red/PTFE grey, diam. = 23.5 mm, 2.4 mm thick, 55 shore A,
VPE = 10 ea.



When a silicone seal does not make sense in an analysis, a BK/PTFE sealing disc is an alternative, such as when determining the aromatic fraction in mineral oil via LC/GC-FID after a DLLME.



DLLME LD = low density



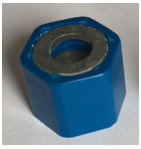
DLLME (HD = high density)

bilimex®-LD/HD-AS no Caps:

Item No.: 120-0750035

For DLLME-LD or -HD, 12 ml, 23 x 72 mm screwed vial, brown glass, conically narrowed on top and bottom,
VPE = 10 ea.

Caps and septa fitting the **bilimex®-LD/HD-AS**:



Item No.: 120-0750059

Screw closure with magnetic hole-screw cap, blue, with GHS threads, 3 mm silicone/white PTFE septum insert for CTC autosampler, closure can handle up to 150 °C,
VPE = 100 ea.

Contact:

To order and for further information, please contact:

LABC-Labortechnik GmbH

Josef-Dietzgen-Str. 1
D-53773 Hennef

Phone.: +49 2242 96946-0
Fax: +49 2242 96946-20
E-Mail: info.gmbh@labc.de

Represented by:
Managing partner:
Florian Zillger
Managing director:
Franziska Zillger

Many other **products** and **information** can also be found under:

www.LABC.de