LCTech GmbH

History and Development

SOLUTIONS BY LCTech

DEXTech 16
Fully automated sample clean-up of 16 samples in one sequence

FREE-STYLE
Automated QuEChERS method for residue analysis in food and feed

D-EVA
Parallel and fast concentration of PCB and dioxin samples

Start biotechnology: Products for analysis of aflatoxins

DEXTech
Automated sample preparation in PCB and dioxin analysis

DEXTech +
4 column set-up for automated sample clean-up in PCB and dioxin analysis

FREE-STYLE XANA
Automated sample clean-up for water analysis

DEXTech Heat
Automated sample clean-up for PCB and dioxin samples hardening at room temperature

First own developed system from LCTech: TACS totally automated clean-up system for pesticide analysis

FREE-STYLE
Robotic system for automated sample preparation

FREE-STYLE
ThermELUTE™ module for fully automated mycotoxin analysis

DEXTech Pure
Clean-up of PCBs and dioxins in one separate ("pure") fraction each

FREE-STYLE XANA PFAS
Automated sample clean-up for PFAS analysis

Foundation LCTech GmbH

| 1998 | 2000 | 2002 | 2011 | 2013 | 2014 | 2016 | 2017 | 2018 | 2019 |

Milestones Dioxin Product Line

SOLUTIONS BY LC Tech

≡DEXTech 16

Fully automated sample clean-up of 16 samples in one sequence

≡D-EVA

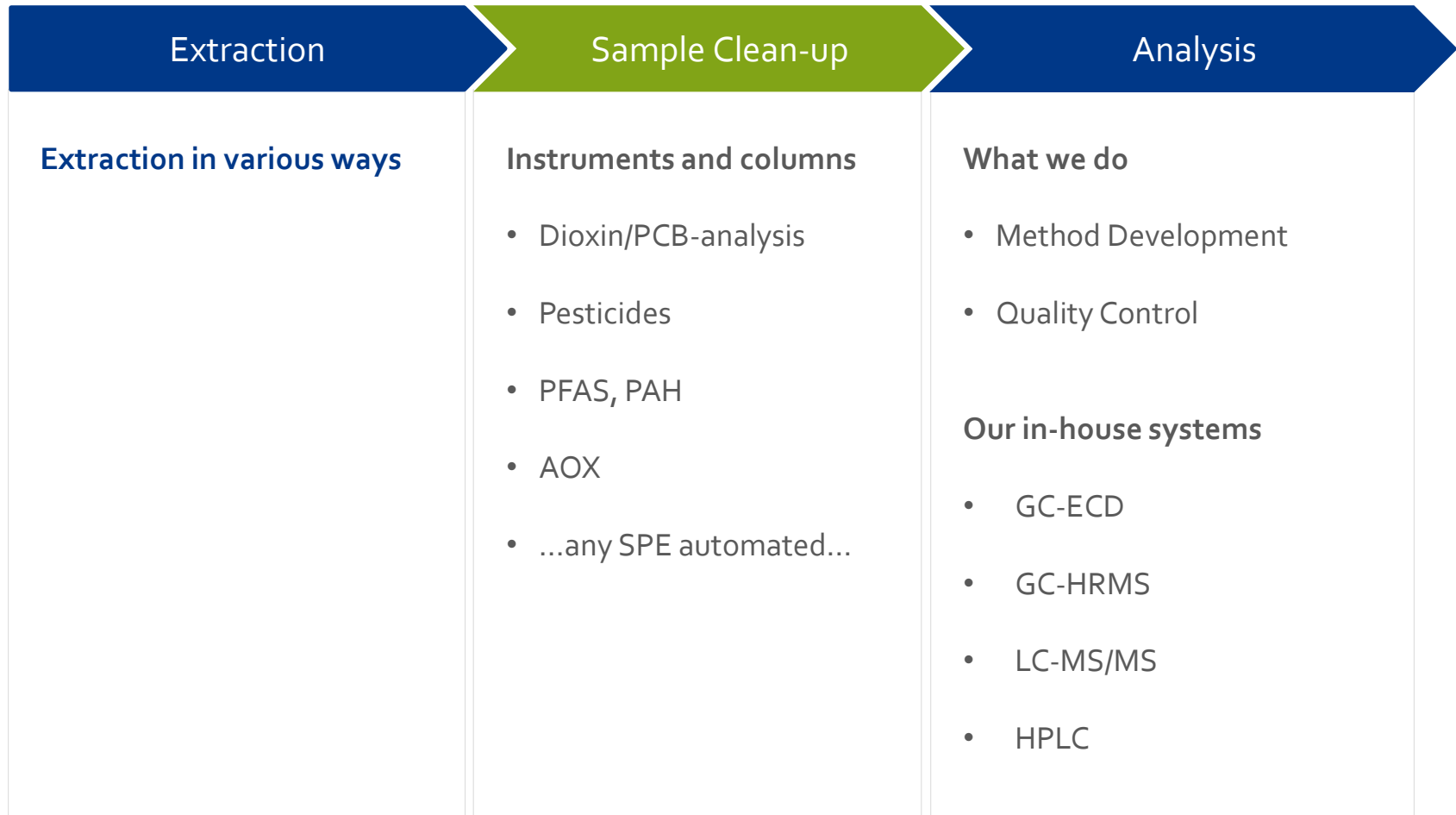Parallel and fast concentration of PCB and dioxin samples

≡DEXTech Pure

Clean-up of PCBs and dioxins one separate ("pure") fraction each

≡DEXTech +

4 column set-up for automated sample clean-up in PCB and dioxin analysis

≡DEXTech
LCTech DIOXIN SYSTEM

Automated sample preparation in PCB and dioxin analysis

≡DEXTech Heat

Automated sample clean-up for PCB and dioxin samples hardening at room temperature

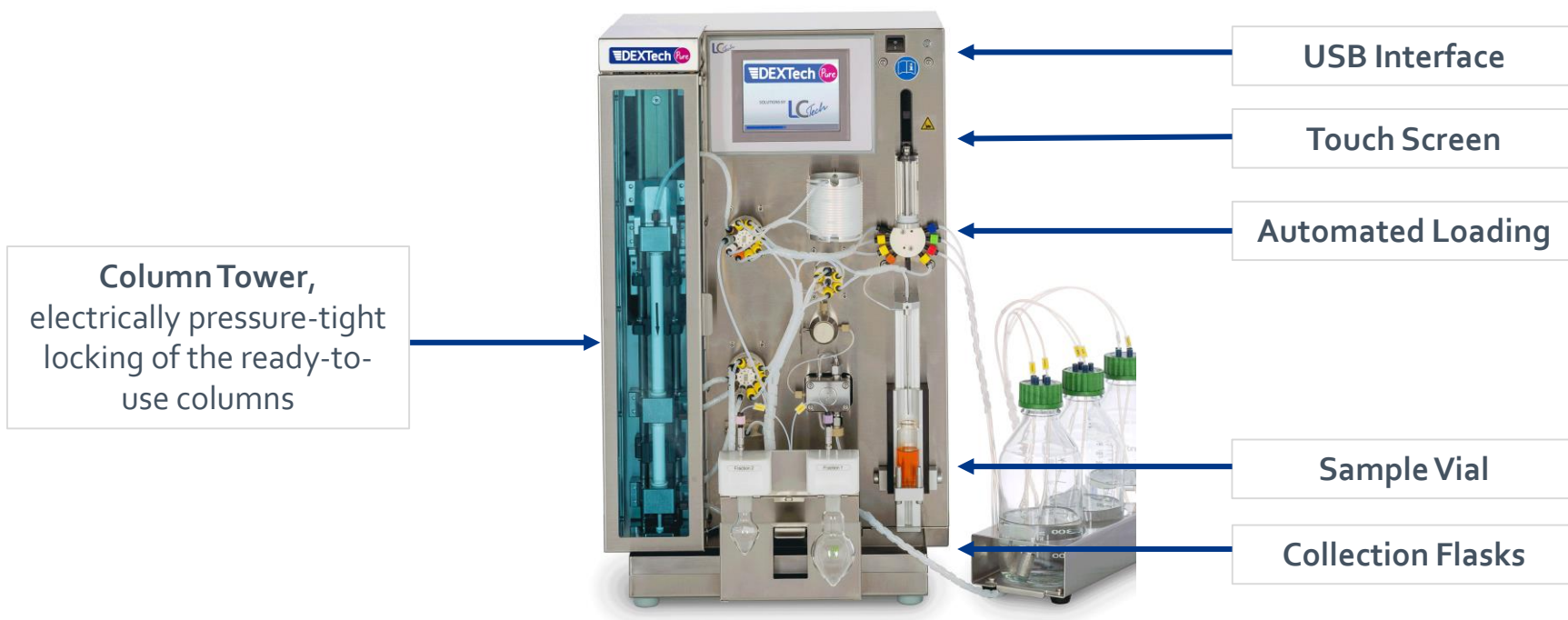**Kick-off dioxin products**

| 2012 | 2013 | 2016 | 2017 | 2018 | 2019 |

SOLUTIONS BY **LC** *Tech*

Expertise in Analysis Chain

Extraction	Sample Clean-up	Analysis

Extraction in various ways

Instruments and columns

- Dioxin/PCB-analysis

- Pesticides

- PFAS, PAH

- AOX

- …any SPE automated…

What we do

- Method Development

- Quality Control

Our in-house systems

- GC-ECD

- GC-HRMS

- LC-MS/MS

- HPLC

DEXTech Pure - Basis

USB Interface

Touch Screen

Automated Loading

Column Tower,
electrically pressure-tight
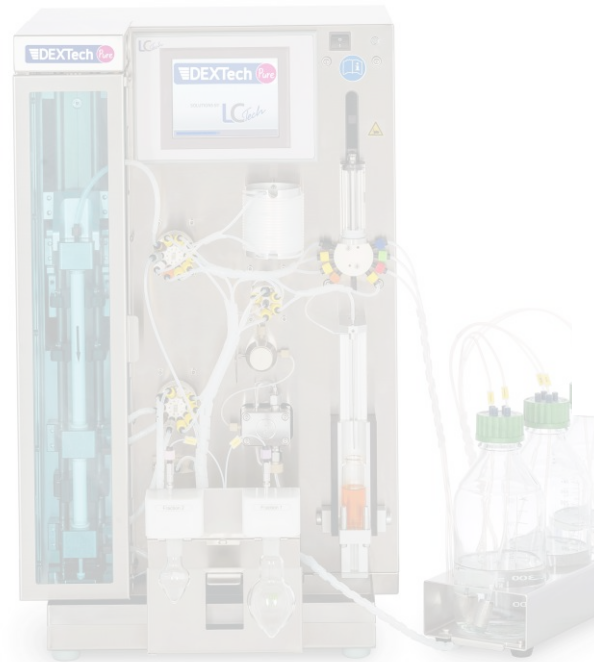locking of the ready-to-
use columns

Sample Vial

Collection Flasks

DEXTech Pure - Basis

Samples **hardening** at room temperature
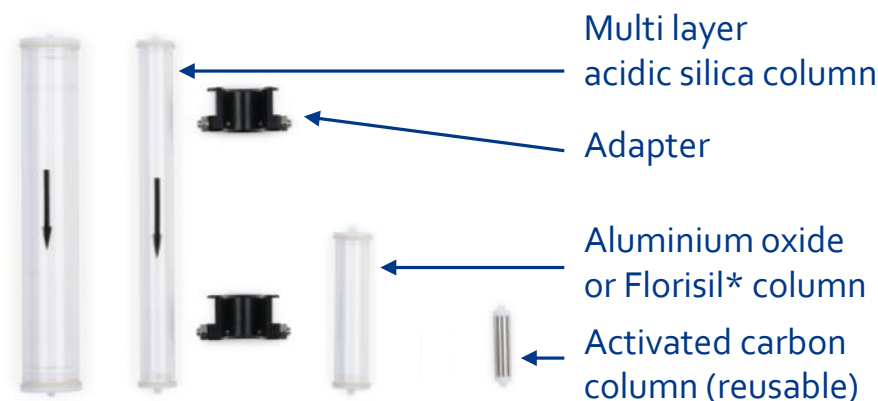

Unattended automated clean-up of up to **16 samples in sequence**

Easy Handling

- Ready-to-use click-in columns

  - Glass column bodies (inert)

    - Acidic Silica column (Universal or SMART)

    - Aluminium oxide (accepting toluene of up to 1 mL) or Florisil column*

    - Activated carbon column (stainless steel, reusable)

- Just click it – no screwing or tools needed for inserting the columns

Multi layer acidic silica column

Adapter

Aluminium oxide or Florisil* column

Activated carbon column (reusable)

Just click it

Use of the Florisil column is only possible with DEXTech Plus

Easy Insertion and Change of Columns

Just click it! – Universal column

Just click it! – Adapter

Just click it! – SMART column

- Just click it!

- Reliable electronic column lock mechanism

- Easy change between Universal column and SMART column only by using an adapter

Proven Electric Locking System

- Connected by motor (press fitted) - patented

- No screwing of columns – easy one hand operation

- No cross-contamination
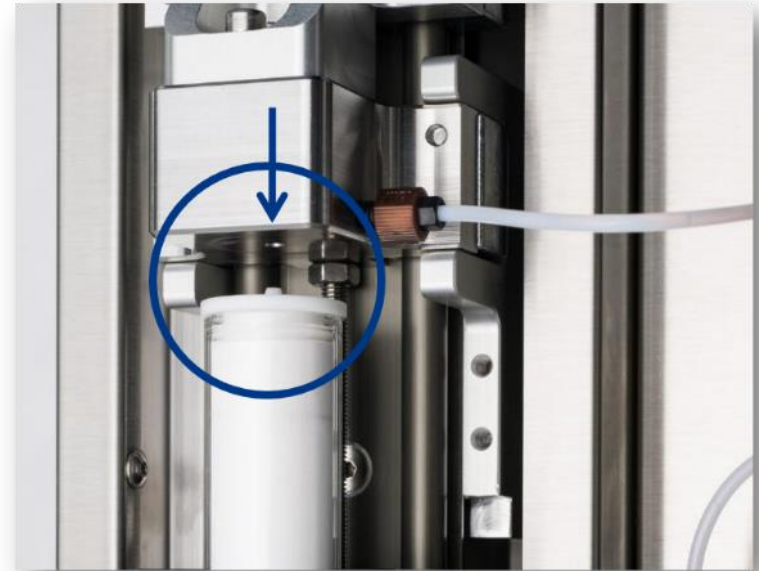
Easy Sample Application

- Put the sample vial into the system and you are ready to go:

  - Automated sample transfer into the sample loop

  - Automated rinsing of the sample vial for quantitative transfer and unifying the sample

- Fully automated processing

- No cross-contamination

Sample Loading Procedure

Sample Transfer from the Glass with Rinsing and Loading to the Sample Loop

Sample is sucked and vial rinsed by the syringe pump

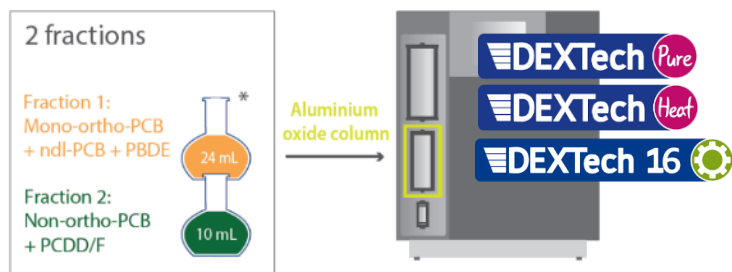**No contact** of sample and pump because of additional volume and air/solvent gap

Safety Features

- Leakage detection

- Overpressure control

- Front door with safety shut-off
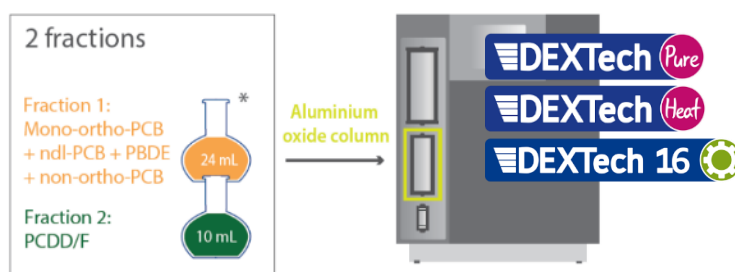
- Level sensor for waste (optional)

Flexible in Fractionation

Default Method - „Alox Plus Method"

2 fractions

Fraction 1:
Mono-ortho-PCB
+ ndl-PCB + PBDE

Fraction 2:
Non-ortho-PCB
+ PCDD/F

24 mL

10 mL

Aluminium
oxide column

In Addition two coast effective methods:

• 2 Column „Dioxin Only Method"

• 2 Column „PCB Only Method"

Default Method - „Alox Pure Method"

2 fractions

Fraction 1:
Mono-ortho-PCB
+ ndl-PCB + PBDE
+ non-ortho-PCB

Fraction 2:
PCDD/F

24 mL

10 mL

Aluminium
oxide column

Individual fraction required?
Just ask us and we will find your solution.

* Dichlormethan / n-Hexan   Toluol

Experimental Procedure

Comparison of the different DEXTech methods for different oils (fish oil, corn oil, olive oil etc.)

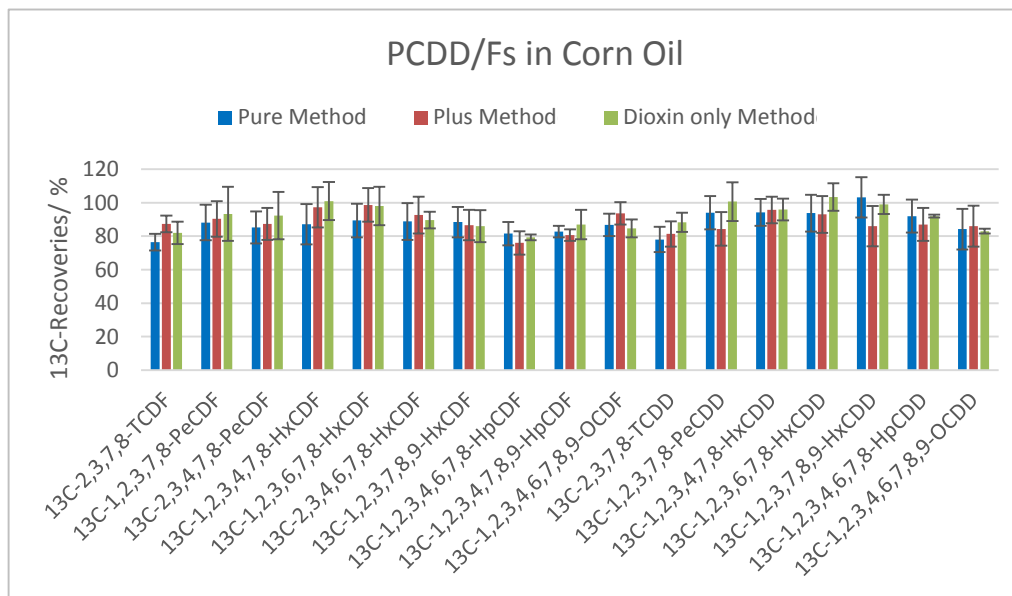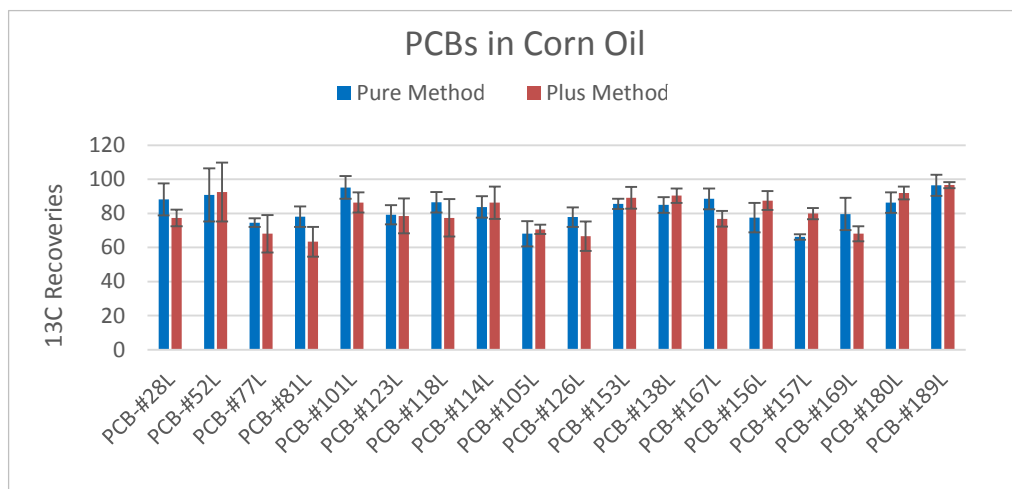| Clean-up	EVAporation	Analysis

- 5 g of oil were dissolved in n-hexane.
- 13C extraction standard was added
- Sample was cleaned on a DEXTech Pure
- The fractions were evaporated down to near dryness using our vacuum centrifuge the D-EVA system
- Sample was re-dissolved in injections standard and transferred into a GC-vial
- Sample was measured on a HRMS – GC system DFS from Thermo Fisher Scientific
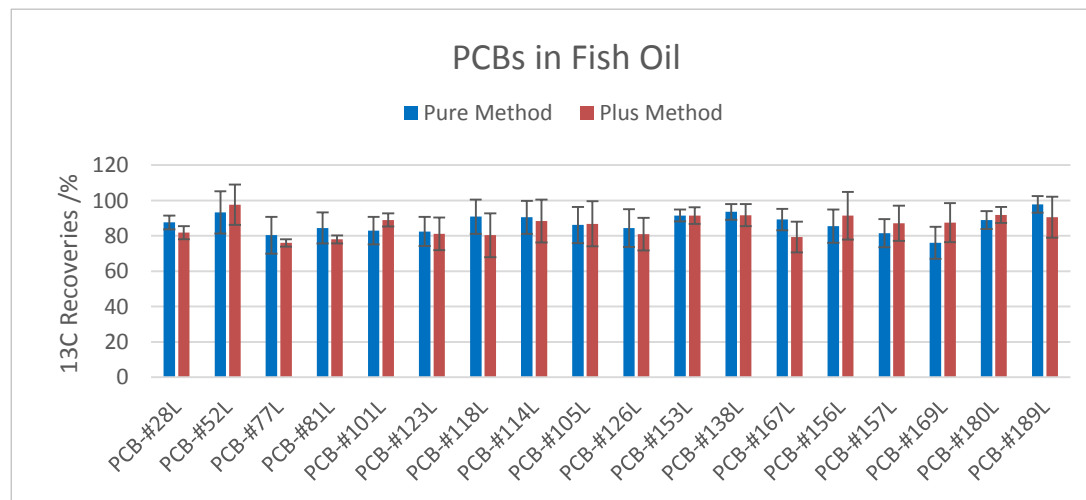
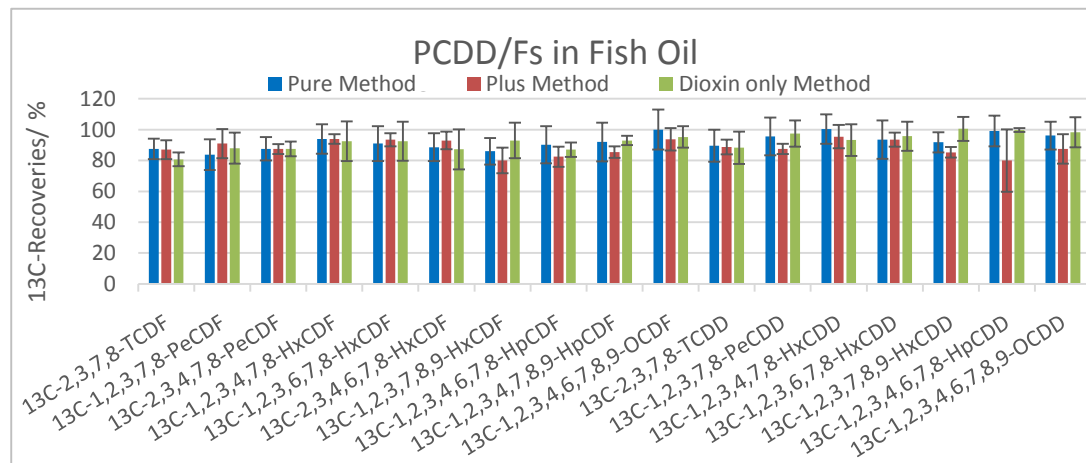# D-EVA Vacuum Centrifuge

- D-EVA (Dioxin-EVAporation) consists of:
  - Centrifuge
  - Cold trap
  - Rotor
  - Special LCTech sensor
- From 1 - 26 samples
- Sensor controlled evaporation down to
  - 30 to 100 µL for the PCDD/F-Fraction
  - 300 to 500 µL for the PCB-Fraction

Comparison Recovery Corn Oil

Comparison Recovery Fish Oil

PCDD/Fs in Fish Oil

Pure Method · Plus Method · Dioxin only Method

13C-Recoveries/ %

Categories: 13C-2,3,7,8-TCDF, 13C-1,2,3,7,8-PeCDF, 13C-2,3,4,7,8-PeCDF, 13C-1,2,3,4,7,8-HxCDF, 13C-1,2,3,6,7,8-HxCDF, 13C-2,3,4,6,7,8-HxCDF, 13C-1,2,3,7,8,9-HxCDF, 13C-1,2,3,4,6,7,8-HpCDF, 13C-1,2,3,4,7,8,9-HpCDF, 13C-1,2,3,4,6,7,8,9-OCDF, 13C-2,3,7,8-TCDD, 13C-1,2,3,7,8-PeCDD, 13C-1,2,3,4,7,8-HxCDD, 13C-1,2,3,6,7,8-HxCDD, 13C-1,2,3,7,8,9-HxCDD, 13C-1,2,3,4,6,7,8-HpCDD, 13C-1,2,3,4,6,7,8,9-OCDD

PCBs in Fish Oil

Pure Method · Plus Method

13C Recoveries /%

Categories: PCB-#28L, PCB-#52L, PCB-#77L, PCB-#81L, PCB-#101L, PCB-#123L, PCB-#118L, PCB-#114L, PCB-#105L, PCB-#126L, PCB-#153L, PCB-#138L, PCB-#167L, PCB-#156L, PCB-#157L, PCB-#169L, PCB-#180L, PCB-#189L

Conclusion

One system – capable for **many methods**

Solution for every lab on the same **quality** level with **excellent results**!

… and Benefits

- Reduced Costs per Sample
  - Fast Runtime
  - Best prices for consumables

- Highest Automation (e.g. Electric Locking, Automated Loading)
  - High reproducibility
  - Short learning curve
  - No manual interaction

- According Official Methods
  - EU Regulation
  - EPA

- Highest Flexibility in Fractionation
  - PCB Only
  - Dioxin Only
  - PCBs – Dioxins
  - PCBs – Non-ortho PCBs + Dioxins

Outlook

- PCB 209
  - Separation of 209 PCBs and Dioxins
  - 209 PCB-only

- PCNs

- HBCDD

- Preparation for upcoming reduced tolerated weekly intake (higher sample intake - maybe)
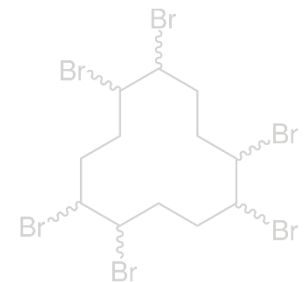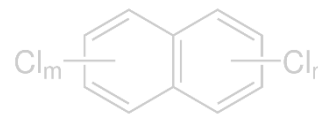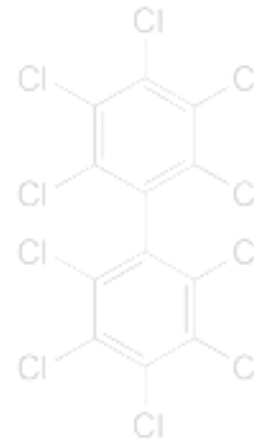
Thanks for Your Time!

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