Productivity & Up-Time in GC analysis

Smart ways in GC-analysis, from injection and detection to automation

*"Imagine to choose your GC-configurations **J**ust-**I**n-**T**ime, using any type of:*

- **injectors** *(hot, cold or T-programmable)*
- **detectors** *(fid, tcd, npd, ecd, pfpd, pdd, ms…)*
- **techniques** *(liquid / headspace / SPME / TD / Pyrolysis)*

without technical service intervention and in most cases 24/7 programmable !"

Innovation is KEY to advanced analysis

Large Volume Injections ('90)
>100ul *vs standard 1ul injections*

Robotic samplers ('00)
multifunctional (liquid / headspace)

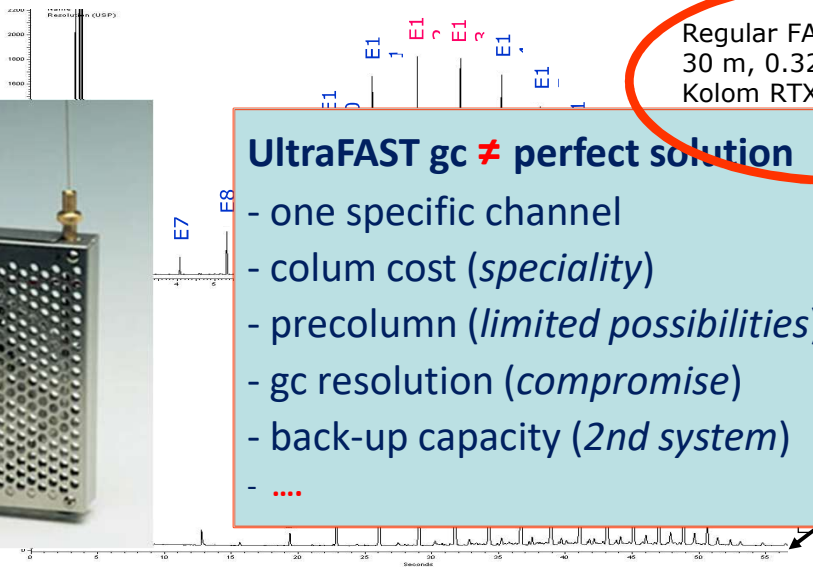
InstantConnect modularity ('12)
flexibility and fit for use always

Relevant developments:
Narrow bore columns
MS and MSMS
Software & data-analysis

“Innovation
is the ability to see change
as an opportunity - not as a threat”

Albert Einstein

Productivity & Up-Time: speed



Regular FAME analysis
30 m, 0.32 mm id, 0.25 um
Kolom RTX5

UltraFAST gc ≠ perfect solution

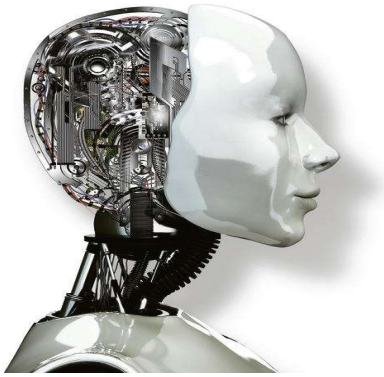
- one specific channel
- colum cost (*speciality*)
- precolumn (*limited possibilities*)
- gc resolution (*compromise*)
- back-up capacity (*2nd system*)
- ....

20 min

AME analysis
m id, 0.10 um

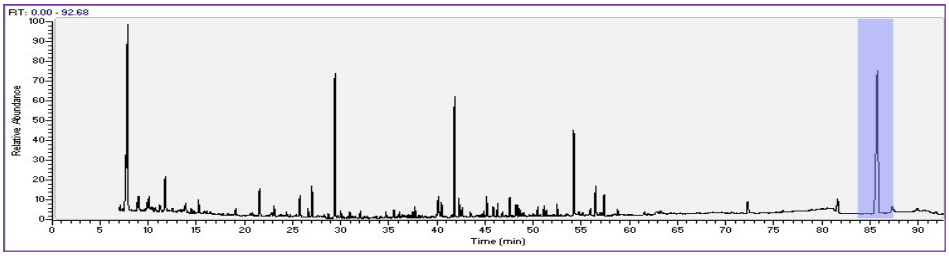
1 min

Productivity in GC-analysis

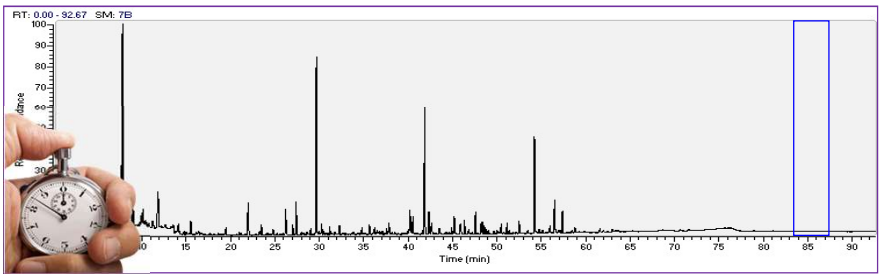


!

Productive in HR-GC: vent high boilers



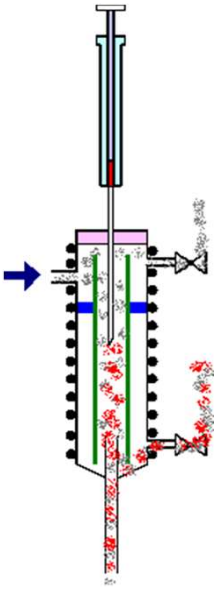
Smart GC
>30 min **faster**
less cooling time
identical resolution



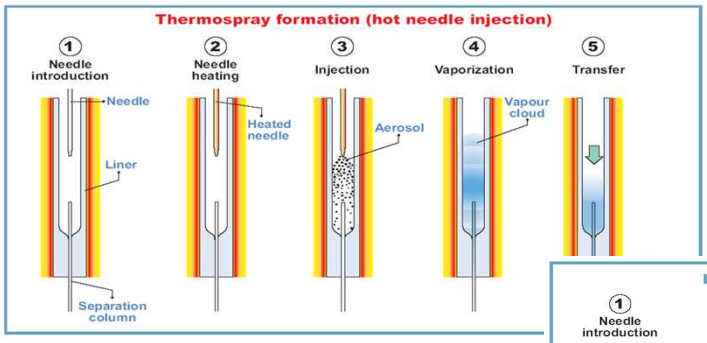
Productivity & Up-Time in GC-injection

Is also about smart choices, such as:

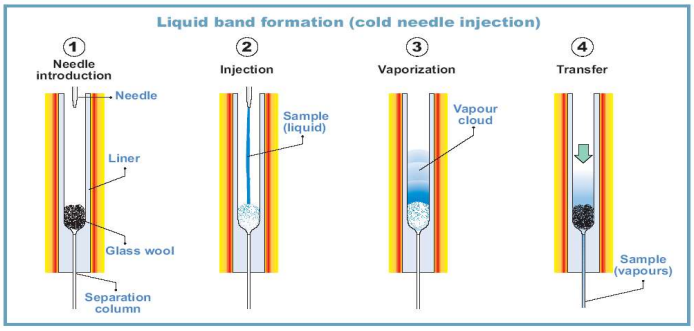
- **Why use *(typical)* a HOT-SSL injector ?**
- **Why inject *(mostly)* 1ul ?**
- **Why use *(just)* the same needle ?**
- **When did you last check septum, liner & splitfow ?**
- **….**



Evaporative injection: 2-types

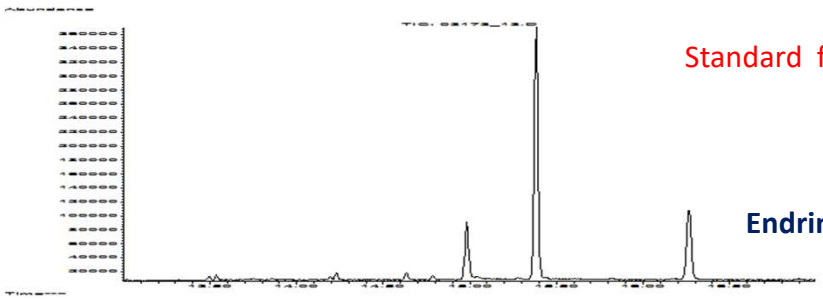


Typical Split-injections
- dirty samples
- higher concentrations
- discrimination of high boilers



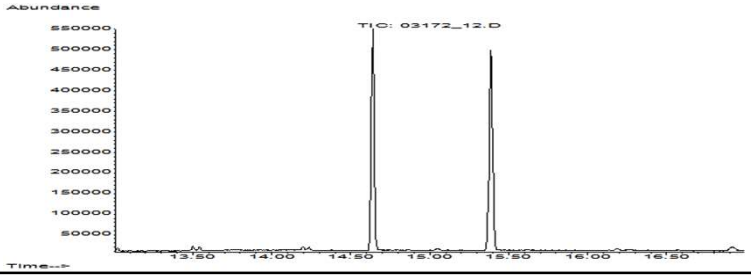
Typical SplitLess-injections
clean samples -
low concentrations -
Thermolabiles -

HOT-SSL: degradation effects



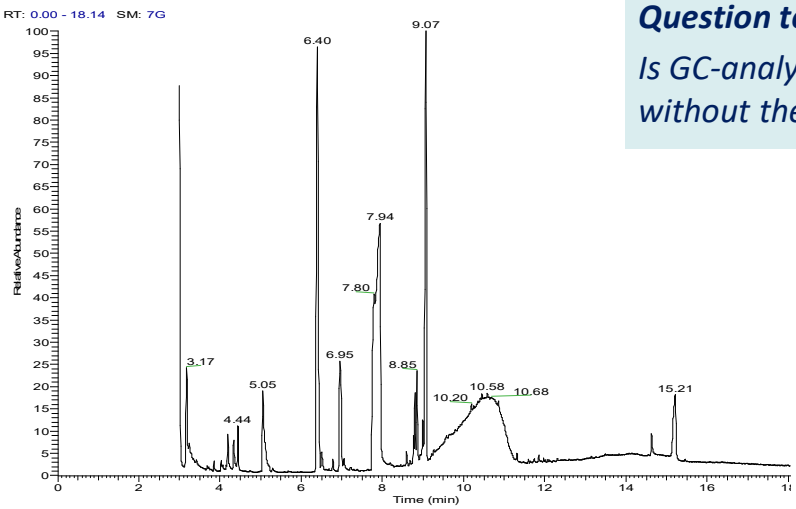
Standard frit-liner

Endrin and o,p-DDT (2 ppm)



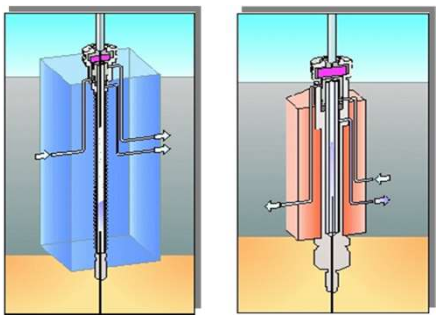
Deactivated tapered liner

IS·X case: thermolable compound

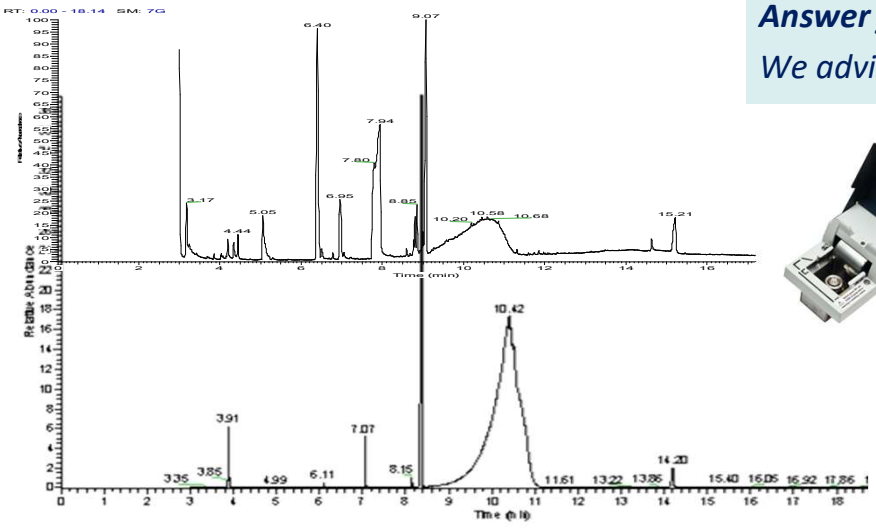


Question to our IS·X team:

Is GC-analysis of this compound possible, without thermal degradation?

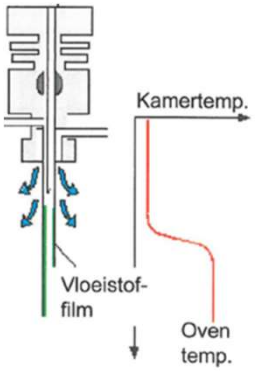


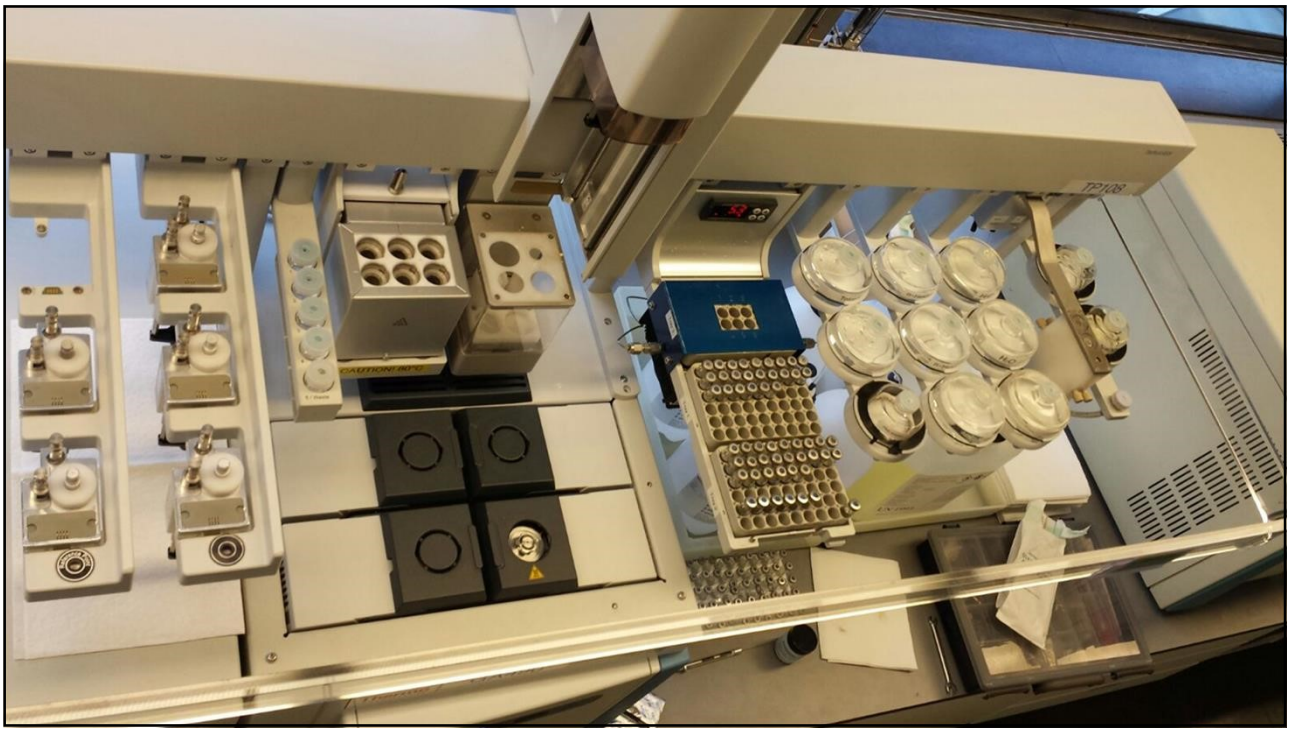
IS·X case: thermolable compound



Answer from our IS·X team:

We advise to use cold injection





Productive & Up-Time: platform solutions

One GC platform for One or Two Applications

- 2 columns *(regular, any brand, type and dimensions)*
- 2 injectors and 2 detectors *(any combination and/or MS)*
- 1 or 2 techniques *(any type, micro or macro)*
- 1 or 2 sequences and 1 or 2 set of samples
- highly productive at same time, 24/7 and/or backup capacity for Up-Time guarantee
- cost effective solution on just 50 cm bench

Productive & Up-Time: platform solutions

Two GC platform and Two to Four independent

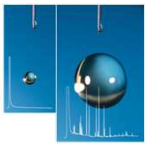
- *2 to 4 columns (regular, any brand, type and dimensic*
- *2 to 4 injectors and 2 to 4 detectors (any combination*
- *1 robot and 1 to 5 techniques (Liq/HS/SPME/TD/Pyro)*
- *2 to 4 sequences and upto 4 sets of samples*
- *highly productive, flexible and back-up capacity*
- *cost effective automation and 24/7 operational*

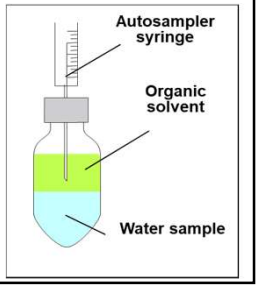
Productive: cross-border GCMSMS innovation

"Automatic sampleprep using robotics leads to lower rsd's and LOD's."

3 = 6

'WE HALEN DE NORMEN OP ONZE SLOFFEN'

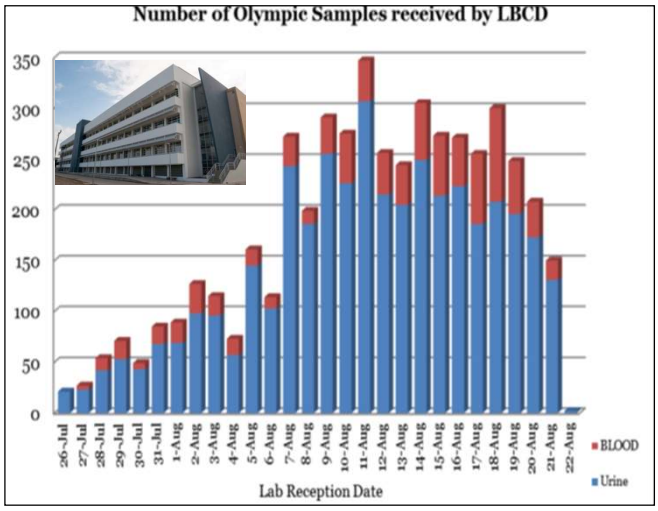




Dutch Water Lab, Haarlem

Efficient analysis in multi methods

Productivity & Up-Time in Doping ctrl



Challenges for LBCD lab:

- > 5000 samples in 4 wk
- > 250 samples/day during 2 wk
- Ultralow levels of quantitation
- No false neg/pos conclusions
- Fast reporting

Rio2016: impact in Sport Anti-Doping ctrl

Advanced instrumentation and automation:
>10x lcms (triple / qOrbi) and >10x gcms (triple / IRms)

providers technical people.
Summing up this experience, the instruments showed better performance in terms of sensitivity, friendliness of operation, reliability and productivity than anticipated, by far meeting the needs of LBCD to cope with the Games challenges. This certainly reflected in the positive appraisal of LBCD's role during the Games, by the World Antidoping Agency (WADA) independent observers, as attested by their report.

Rio de Janeiro, 23rd January 2017.

Prof. Dr. Francisco Radler de Aquino Neto
Director
LBCD – LADETEC / IQ - UFRJ

Fipronil: Don't check, don't find

Food-analysis, are we safe?

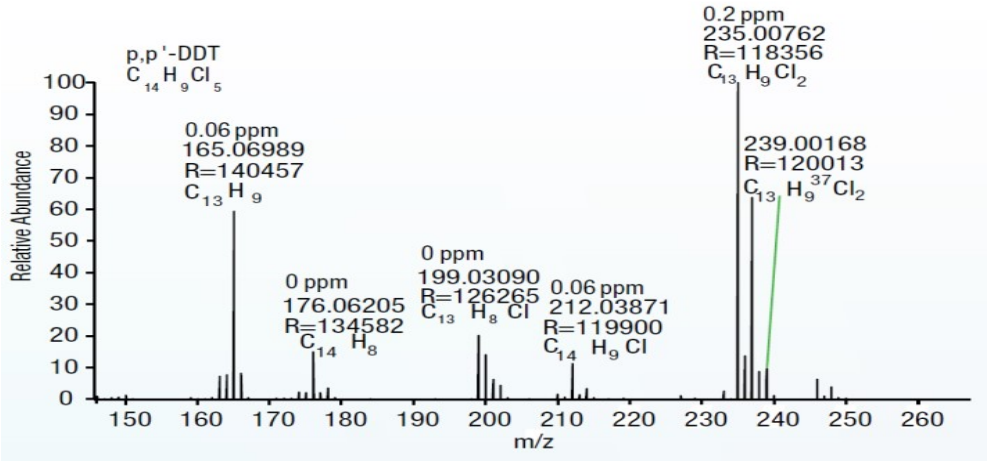
Markets and labs are very competitive
production, distributors and controllers

Laboratories are certified (QS/ISO/…)
Targeted analysis is cost-effective

Worldwide logistics
urgency to check for unexpexted compounds

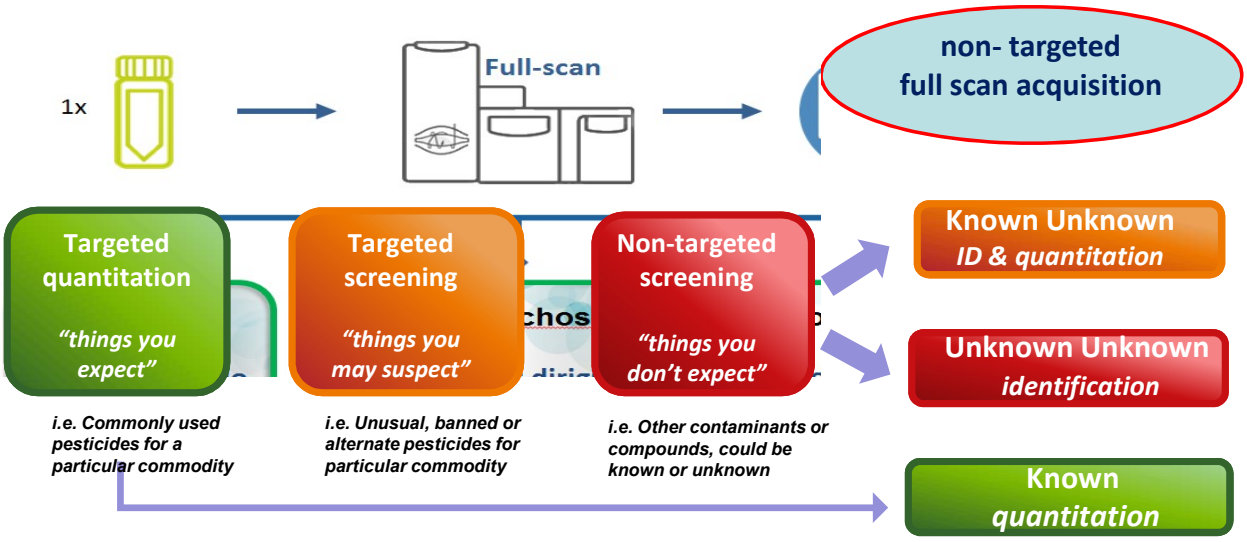
Practical need for
- **Effective**
- **NON targeted**
- **Residual analysis**

High Resolution Accurate Mass Spectrometry



Resolution => Selectivity => Certainty

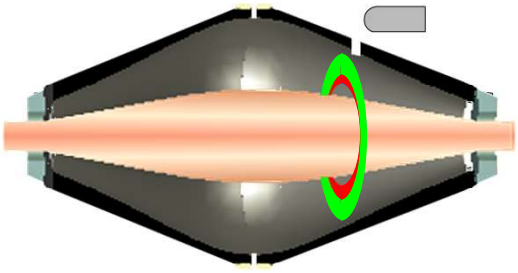
qOrbi GC-HRAM : Straightforward workflow



GC-qOrbi: Performance to be certain

Unique GC-HRMS technology:

- **FT-MS** principle, counts all ions
- **accurate** mass (± 0.0001 Da)
- **linear** response (> 8 decades)
- **SCAN** acqusition for msms performance in terms of sensitivity and selectivity (fg)



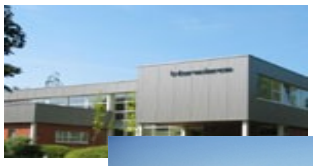
ONE injection for **THREE** answers:
Quantitative results
Qualitative identification
Retrospective analysis in future

Biotech: testimonial Corbion

Source: Lab Insights, Mei 2017

'We meten nu 700x gevoeliger'

Interscience profile



Benelux company
Founded in 1974, private owned
Full service organization
70 employees, >30 M€ turnover

GC / GCMS / GCMSMS / GC HRAM
SamplePREP **&** *Robotics*
Data Acquisition **&** *Analysis*
Consumables **&** *Accessories*