

Comprehensive food & beverage analysis: The power of integrated technology

Our analytical techniques and workflows

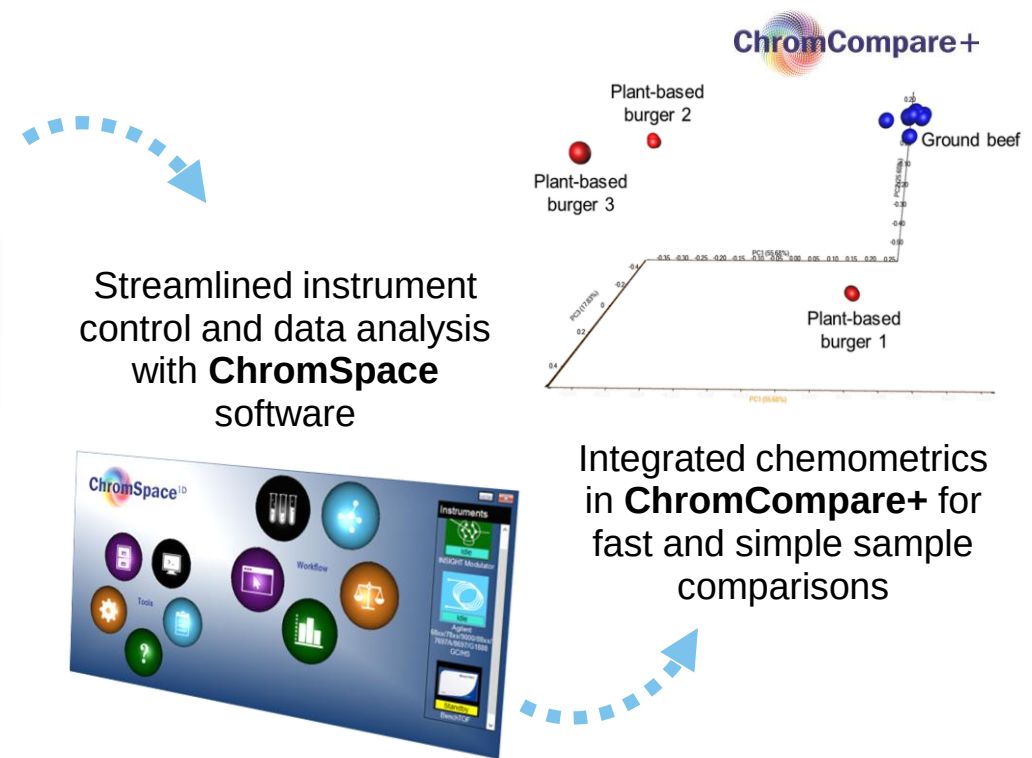
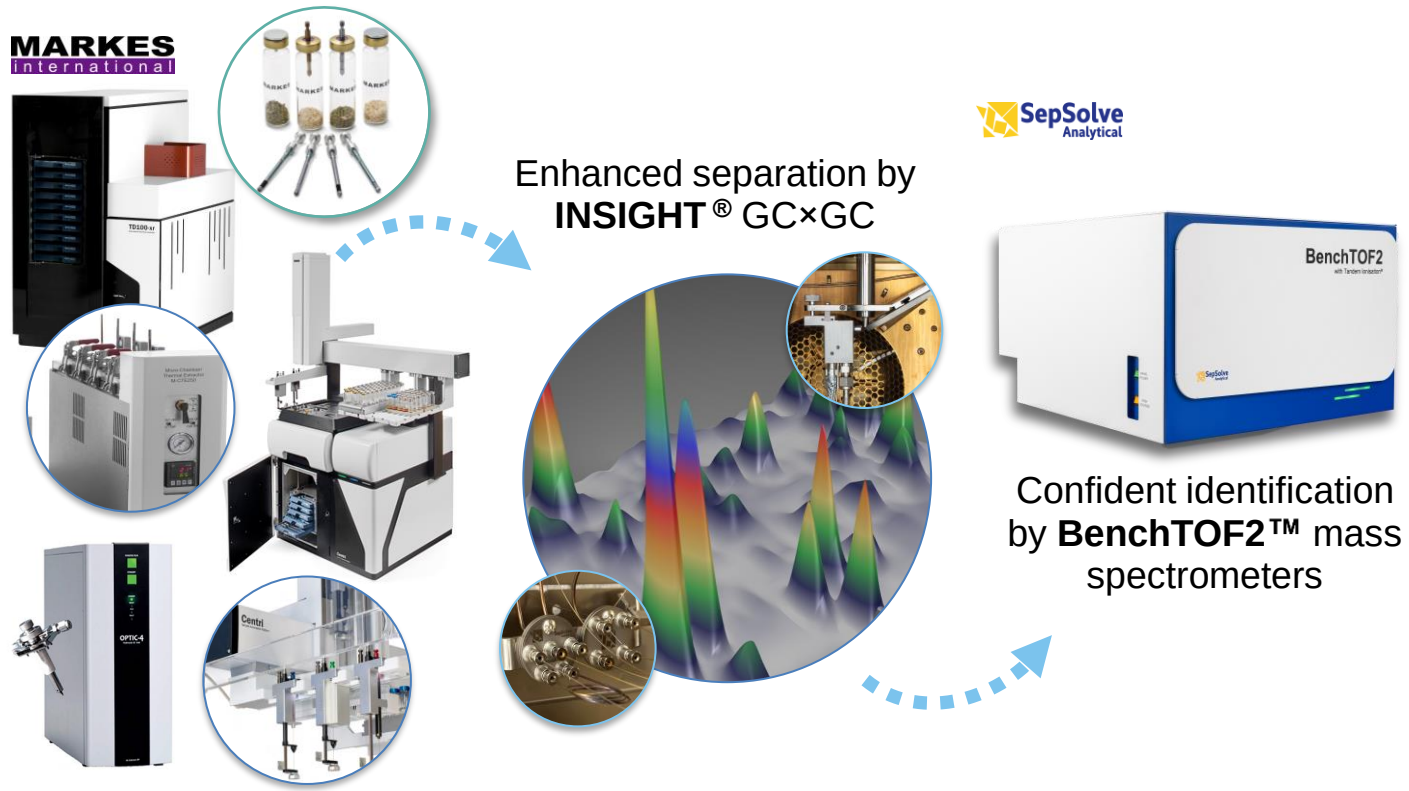
Sample introduction

Separation

Detection

Data analysis

Chemometrics



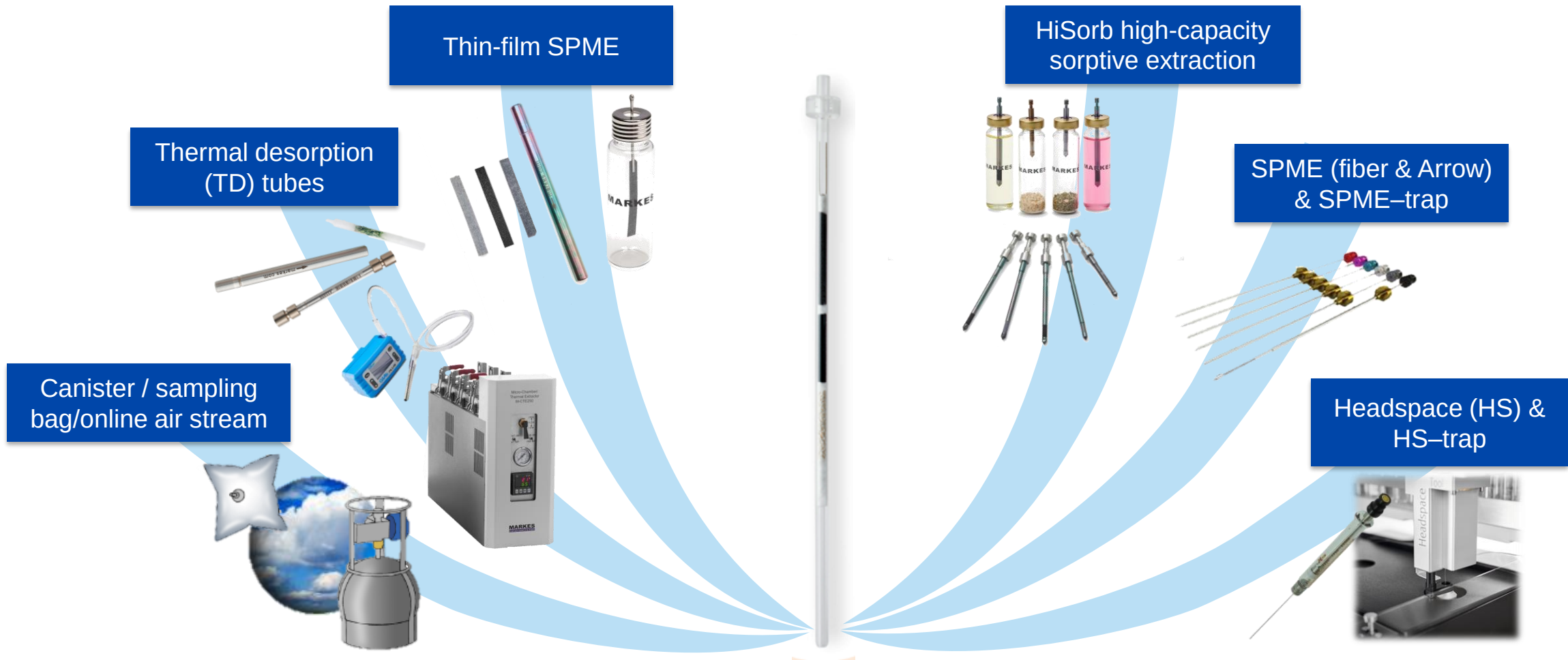
Challenges in food & beverage analysis

Challenges ?	Requirements ✓
Diverse range of matrices	Multi-mode sampling
Wide-ranging odour thresholds mean trace analytes can be equally important	Trace-level screening via sample pre-concentration and/or enrichment
High moisture content	Water management
Perishable samples	Sample re-collection
High sample complexity	Deconvolution or enhanced separation
Non-target screening is often required	Mass spectrometry is essential
It can be difficult to find differences between samples	Chemometrics workflows



How do you get your sample onto the trap?

Accessories & consumables for sample collection & introduction



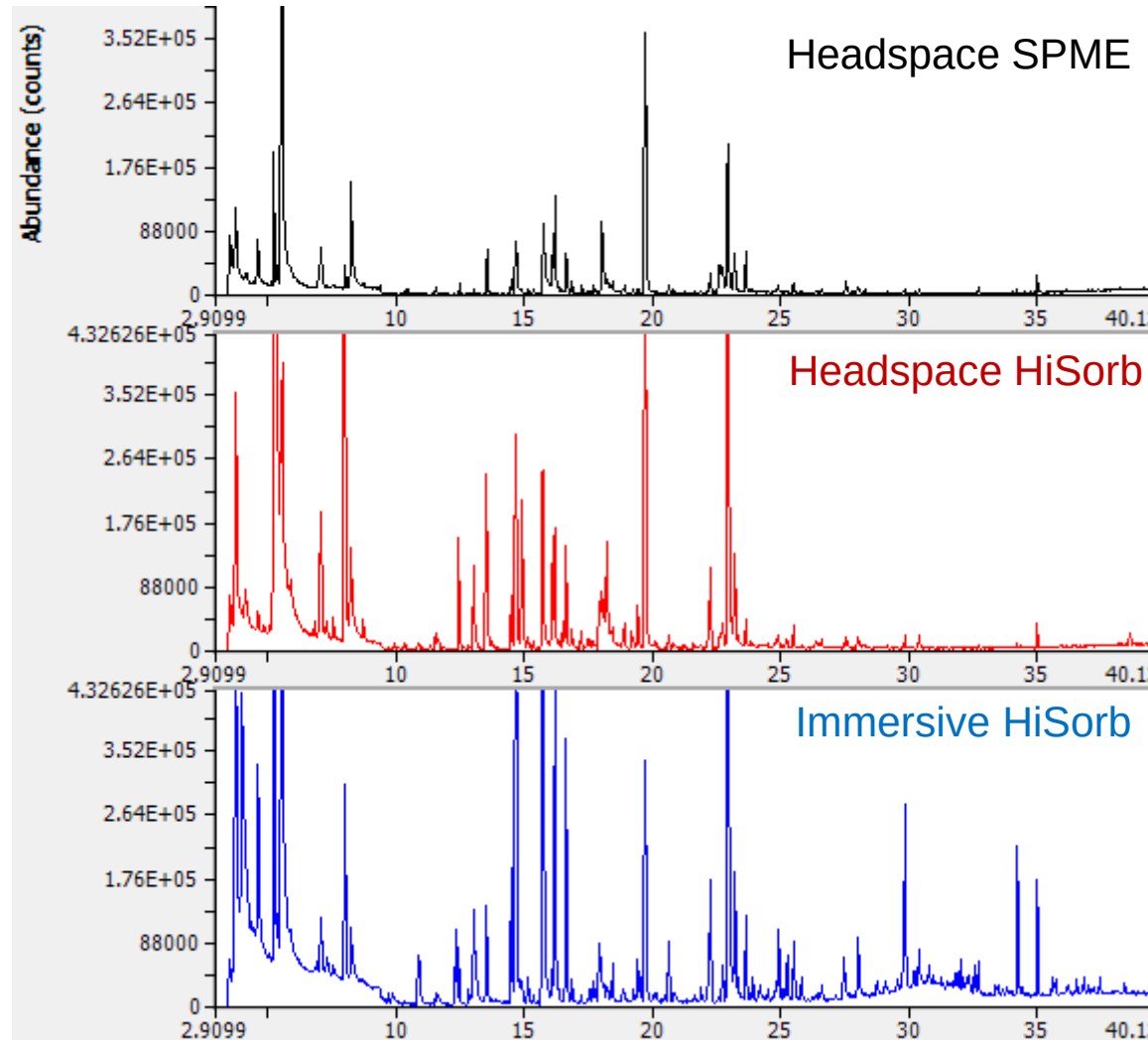
HiSorb: Automated high-capacity sorptive extraction

- Similar principles as solid-phase microextraction (SPME)
- Analytes are extracted via an absorptive or adsorptive process depending on the phase type used
- Can be used for headspace or immersive sampling



HiSorb: Automated high-capacity sorptive extraction

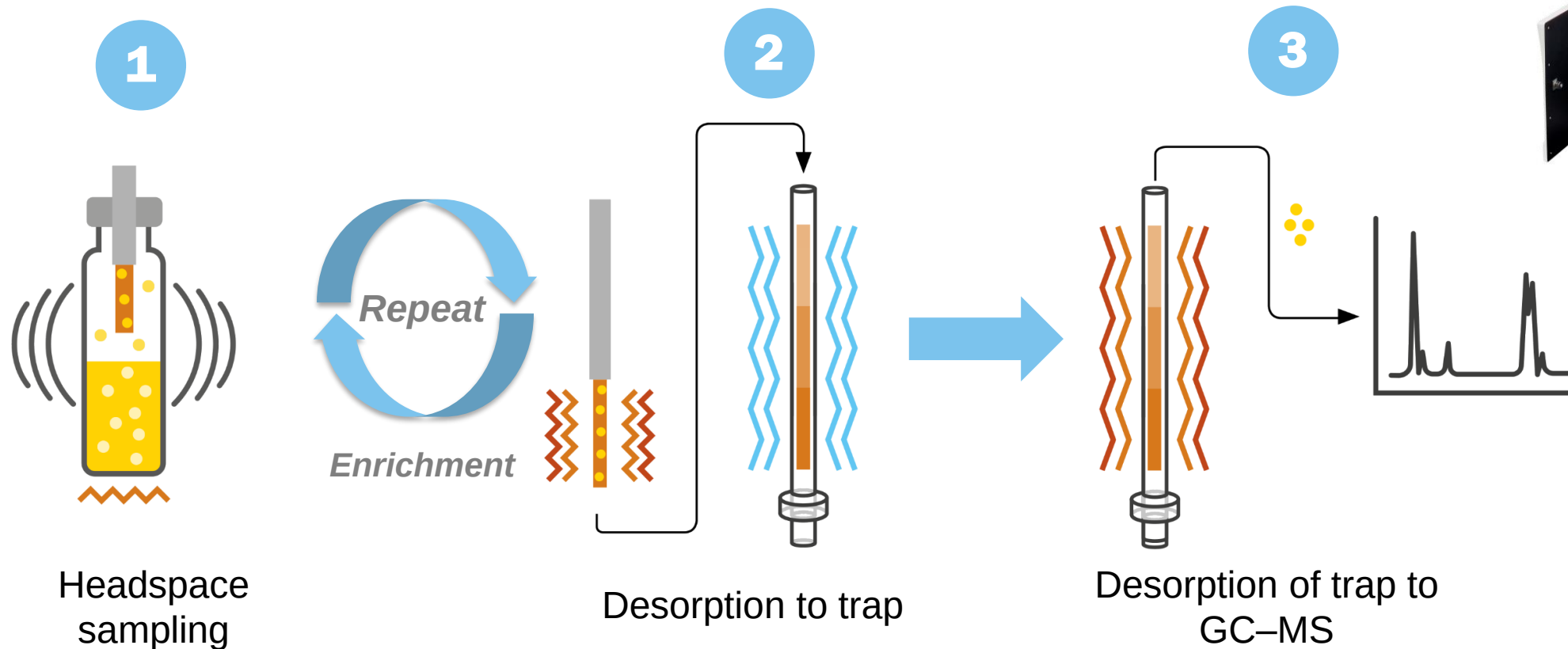
- Intrinsically robust design supports the sorptive phase
- 30-65 μL phase vs. $\sim 0.5 \mu\text{L}$ on SPME fiber for greater sample loading



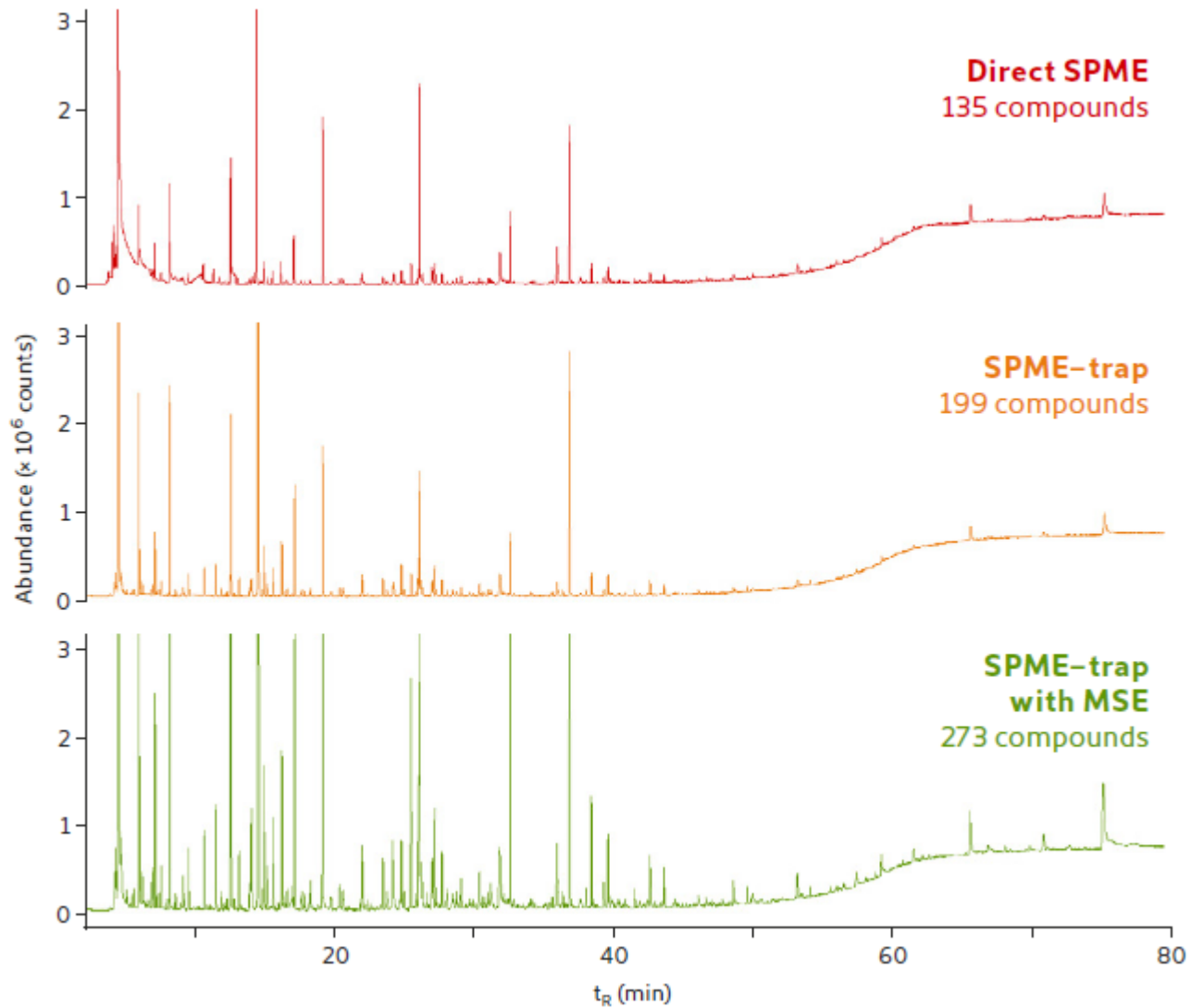
*Greater
sample
detail*

Multi-step-enrichment (MSE®)

Further increasing sensitivity

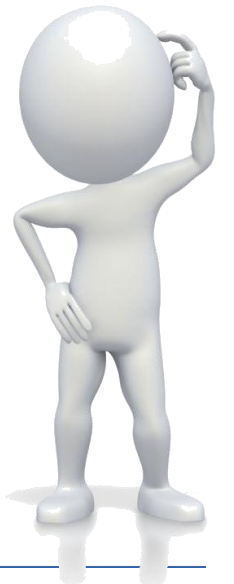


Remaining challenges...



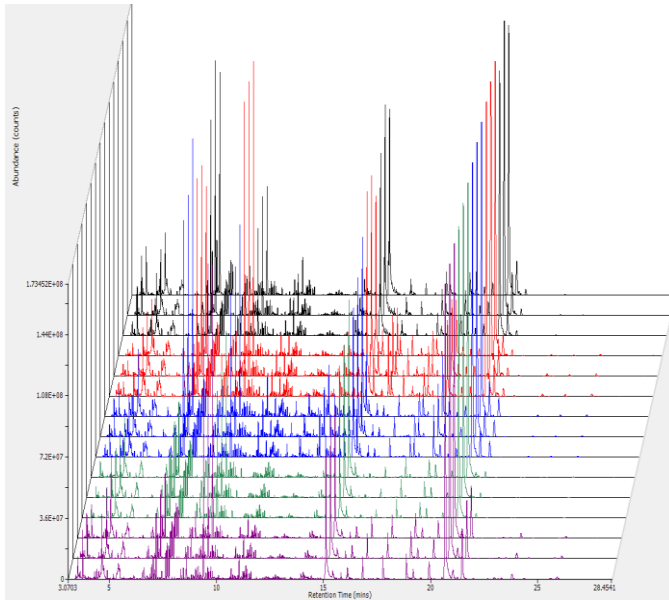
What will I do with all of this data?

My chromatograms are so complex now, surely I will miss something important?

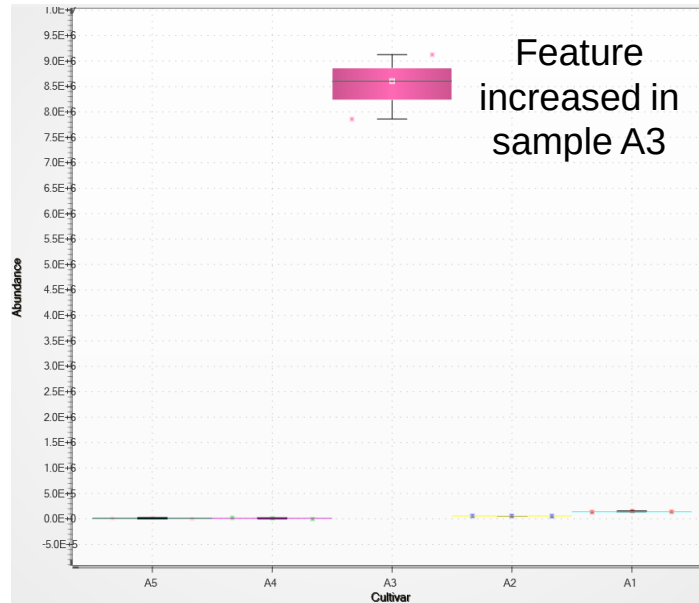


Spot the differences

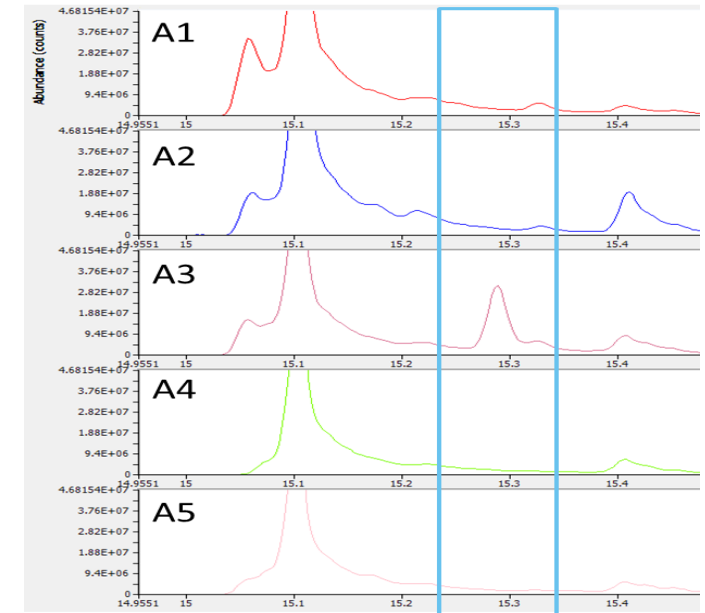
ChromCompare+ chemometrics platform for GC and GC–MS



High quality GC–MS or
GC×GC–MS data



Automated comparisons with
ChromCompare+ software

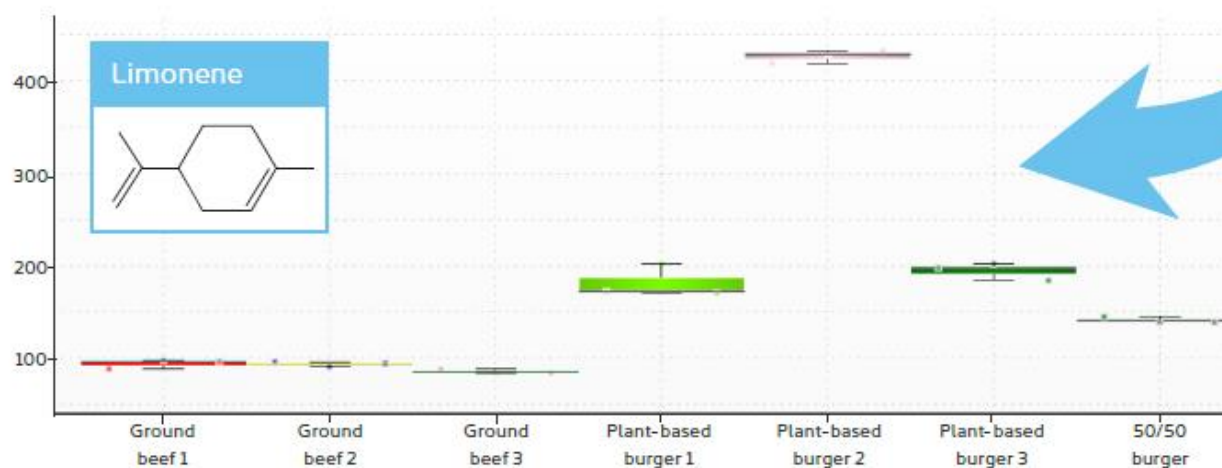
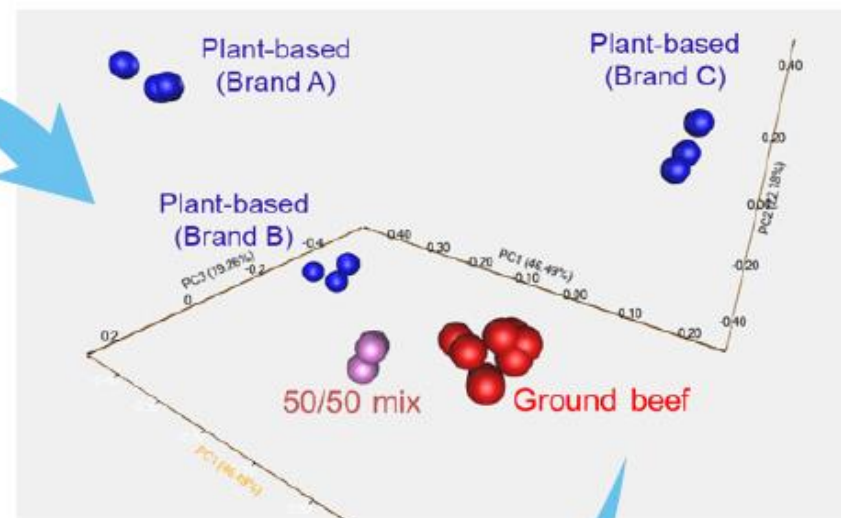
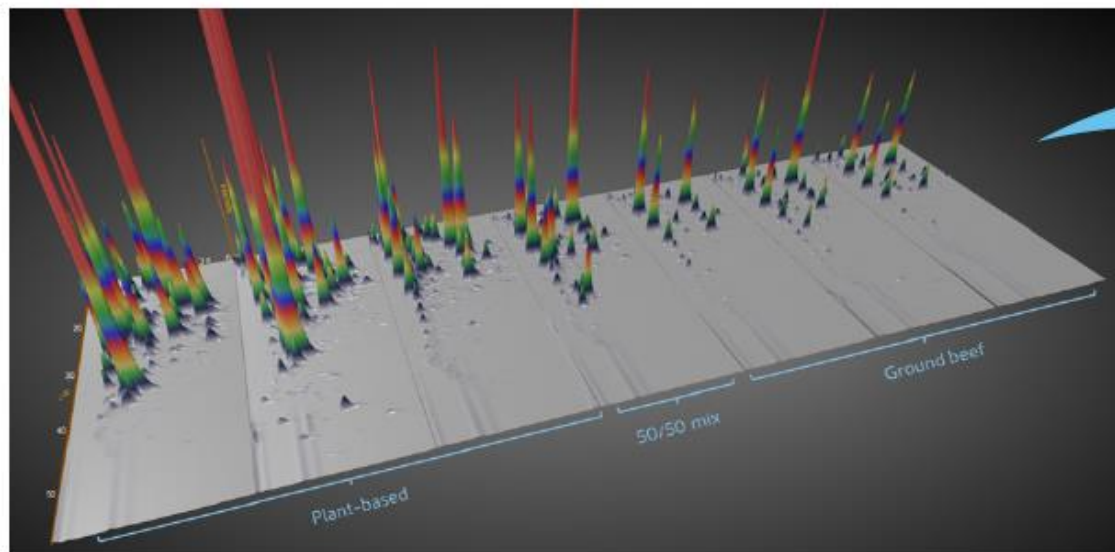


Fast identification of key
differences between samples

- Account for retention time drifts using automated alignment of chromatograms
- Spot the differences between samples
- Use prediction models to automatically classify unknown samples

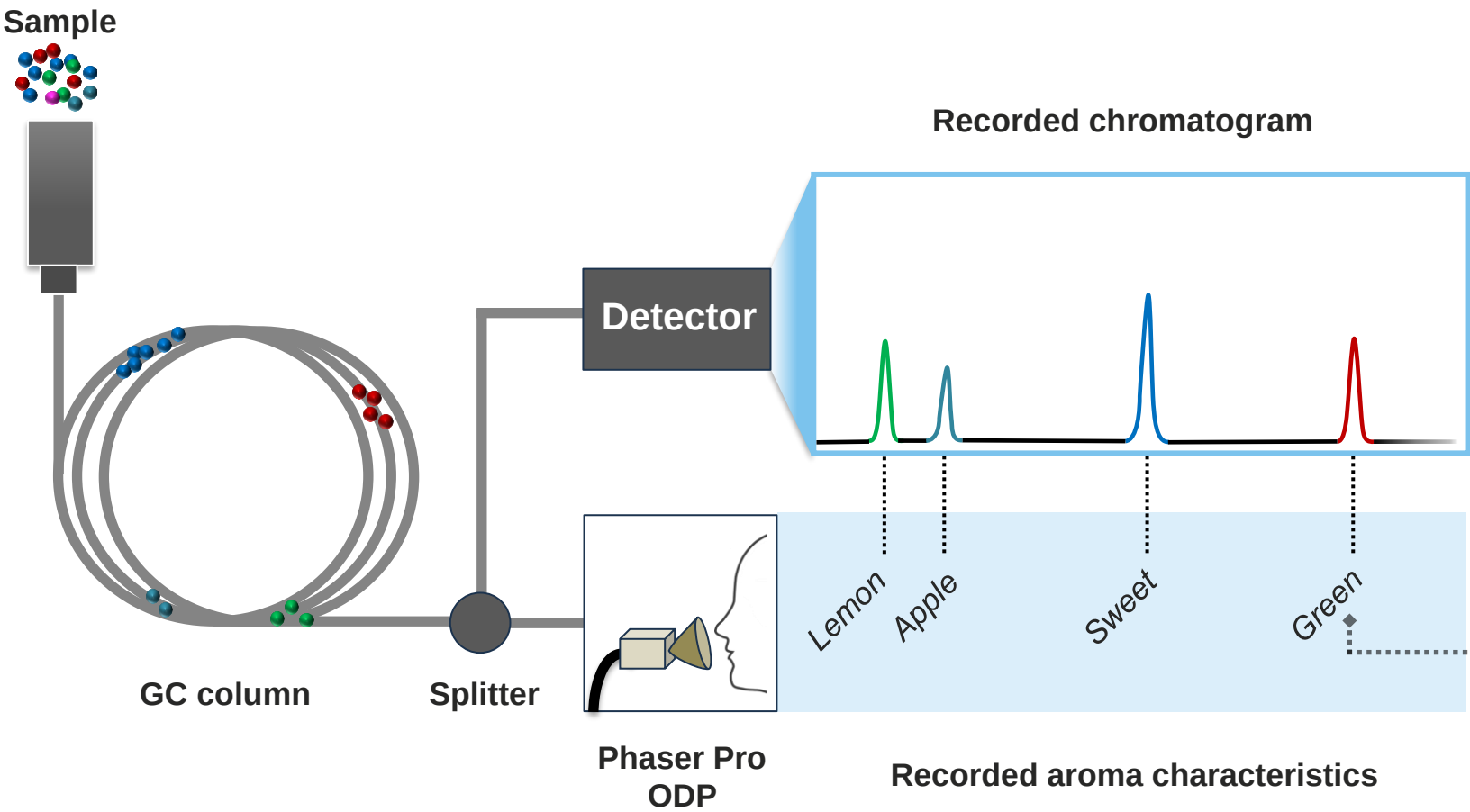


Transforming GC×GC data into meaningful results



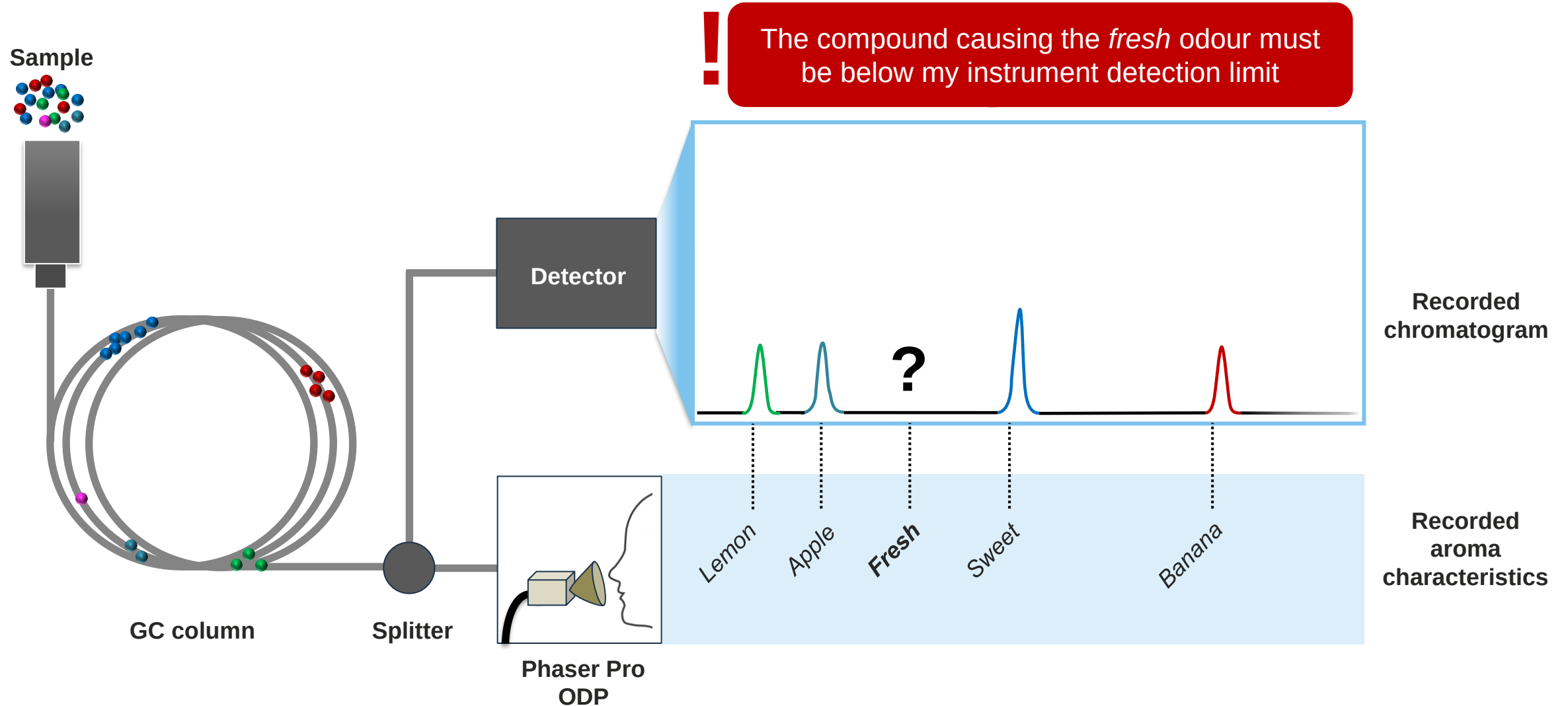
Integrate sensory analysis into workflows

Phaser Pro odour detection port (ODP)

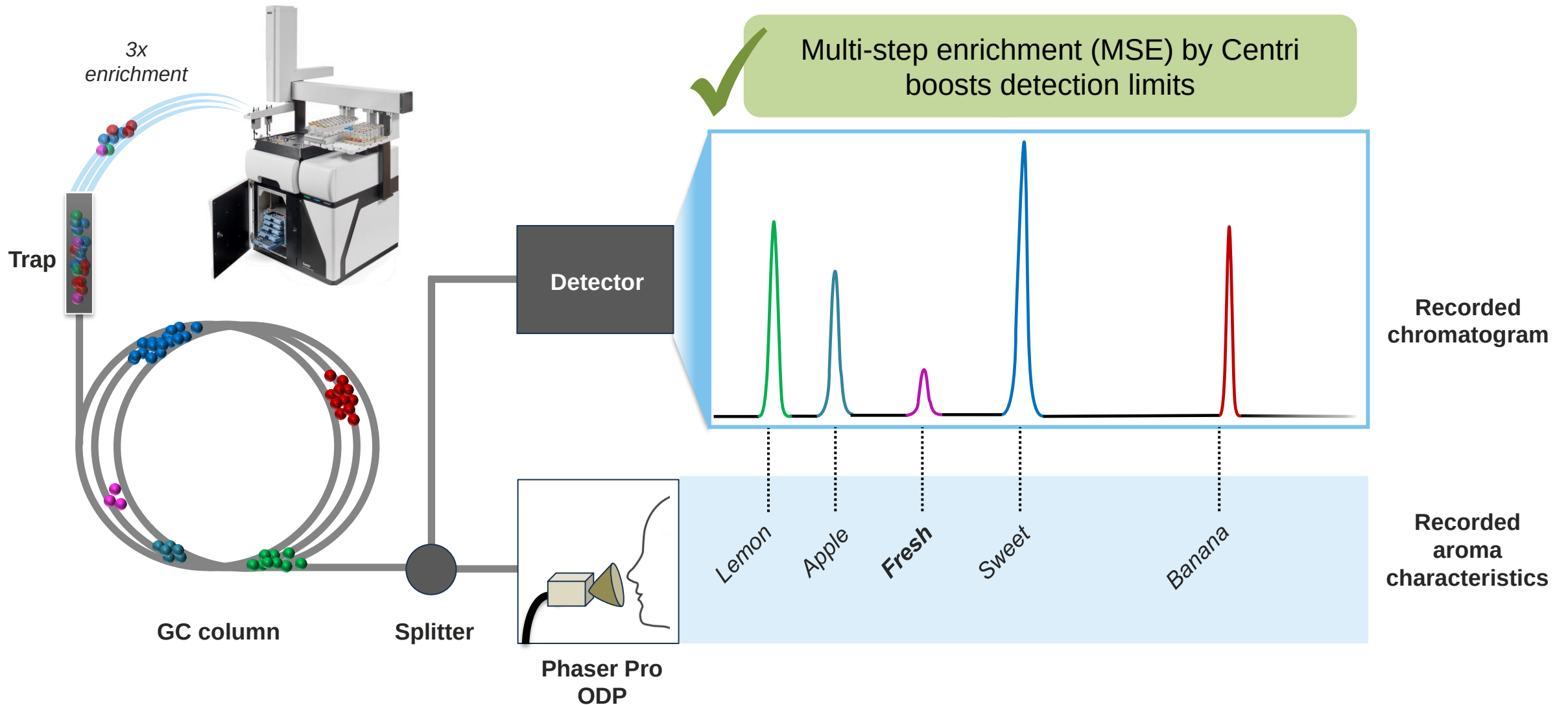


		away	Aroma 0-3	Aroma 0
Sweet	Citrusy		Aroma 1-3	Aroma 1
Fatty	Green		Aroma 2-3	Aroma 2
efruit	Musty	Spicy	Aroma 3-3	Aroma 3
one	Aroma 4-1	Aroma 4-2	Aroma 4-3	Aroma 4

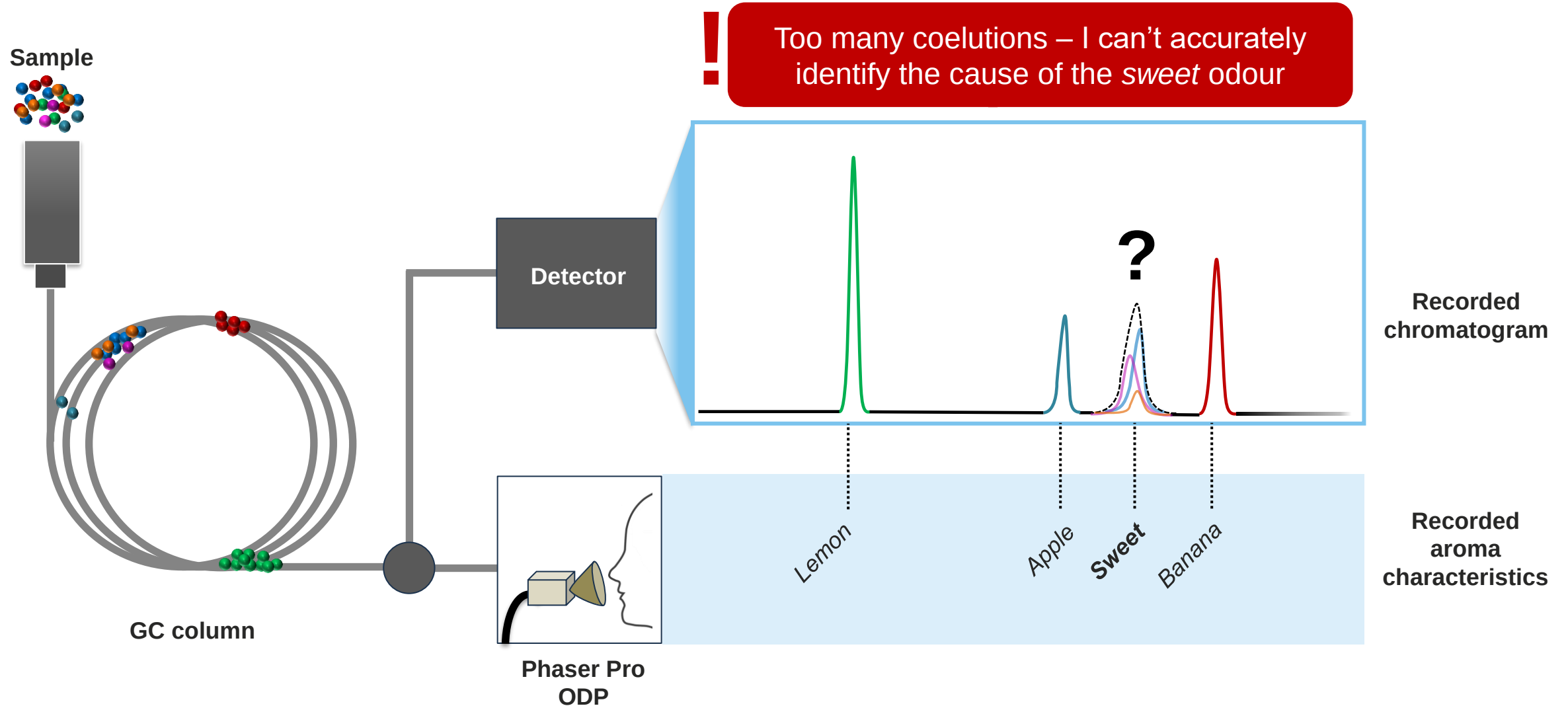
Challenges with sensory evaluation #1: Detection limits



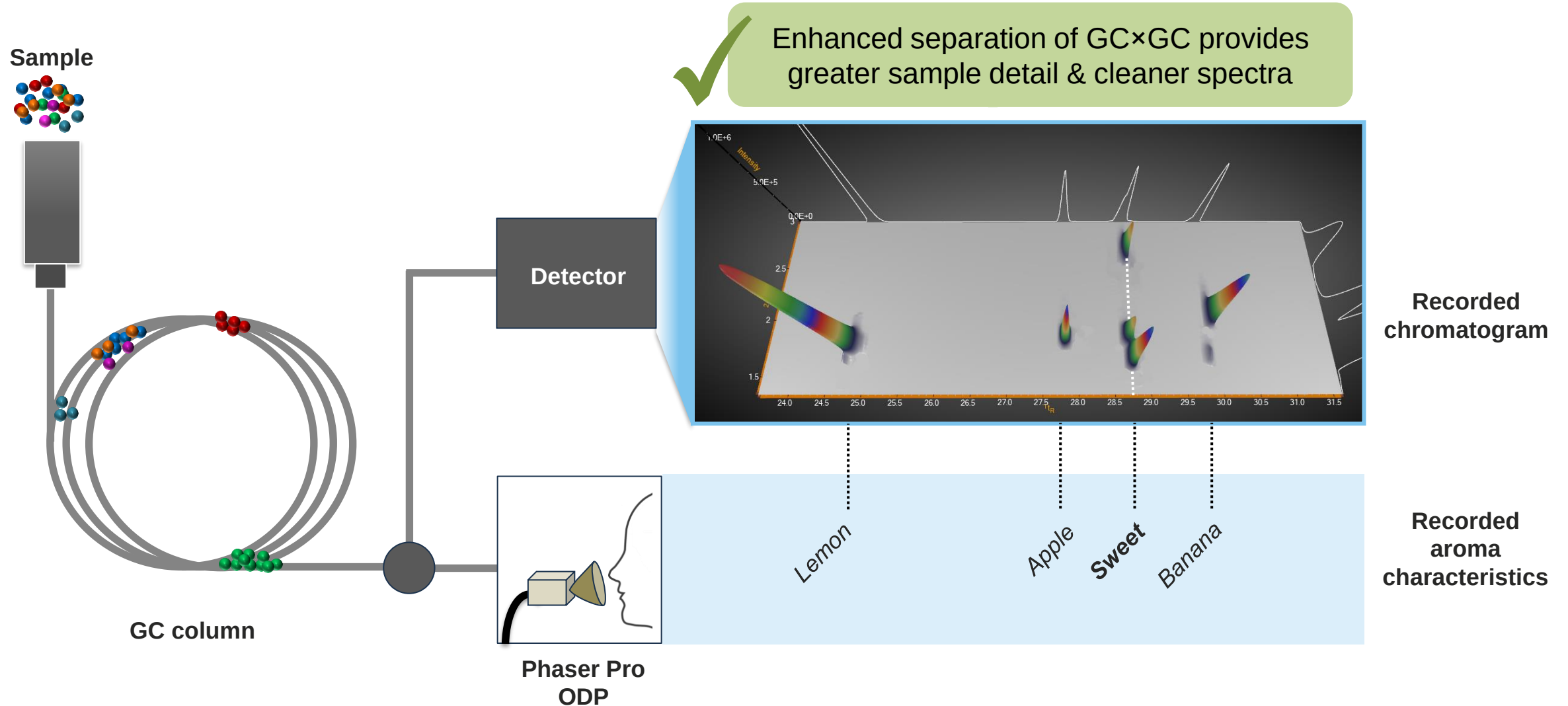
Enhanced sensory evaluation with enrichment



Challenges with sensory evaluation #2: Coelutions



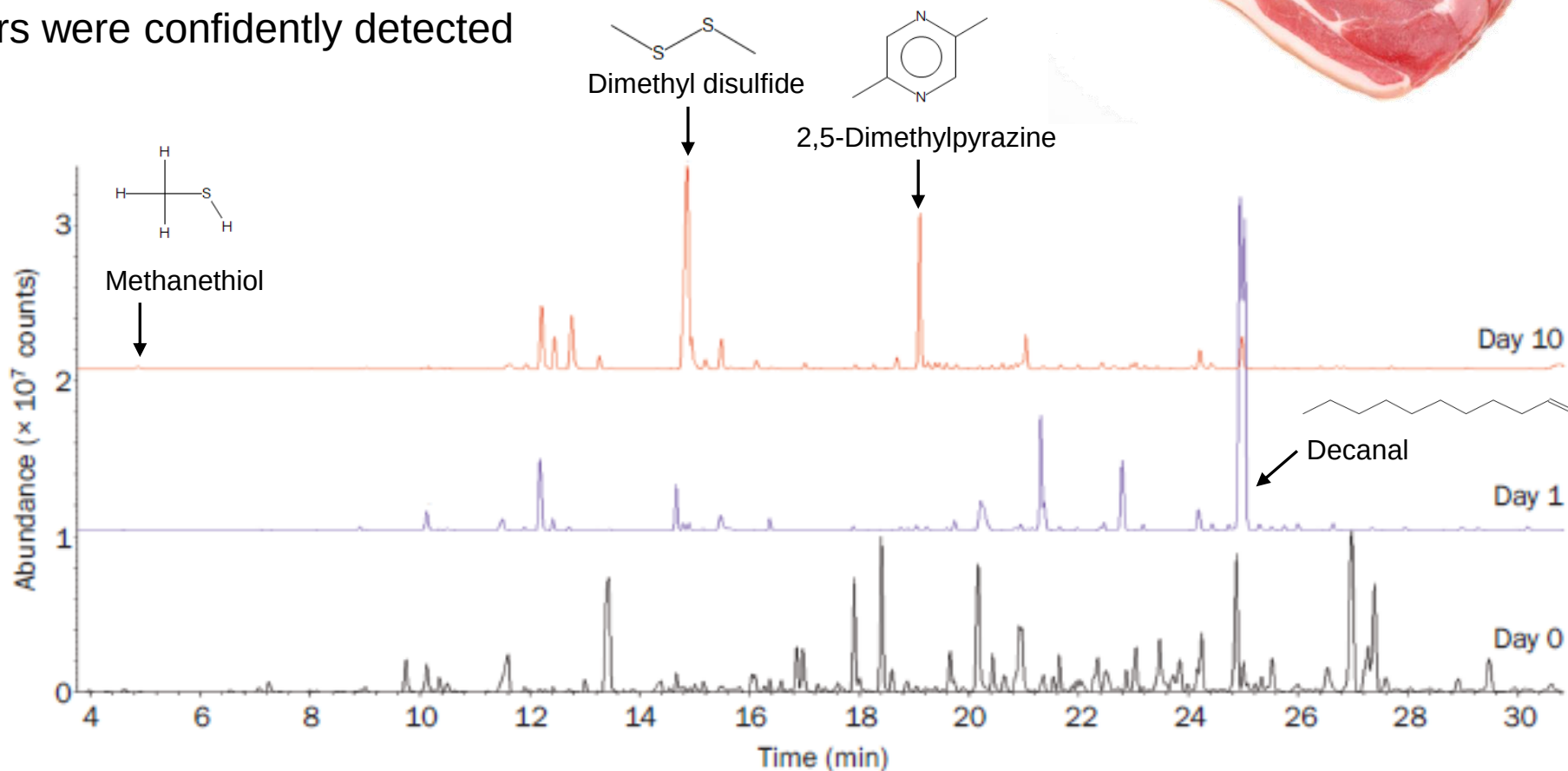
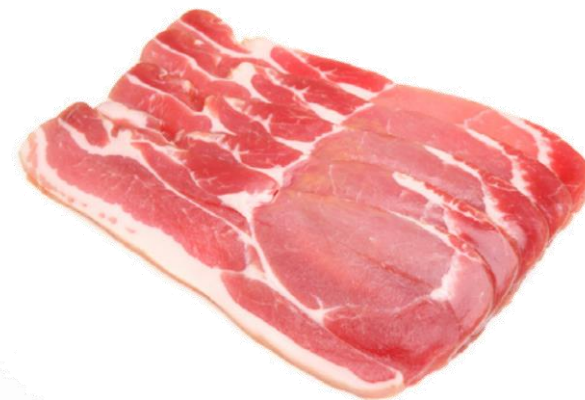
Enhanced sensory evaluation with GC×GC



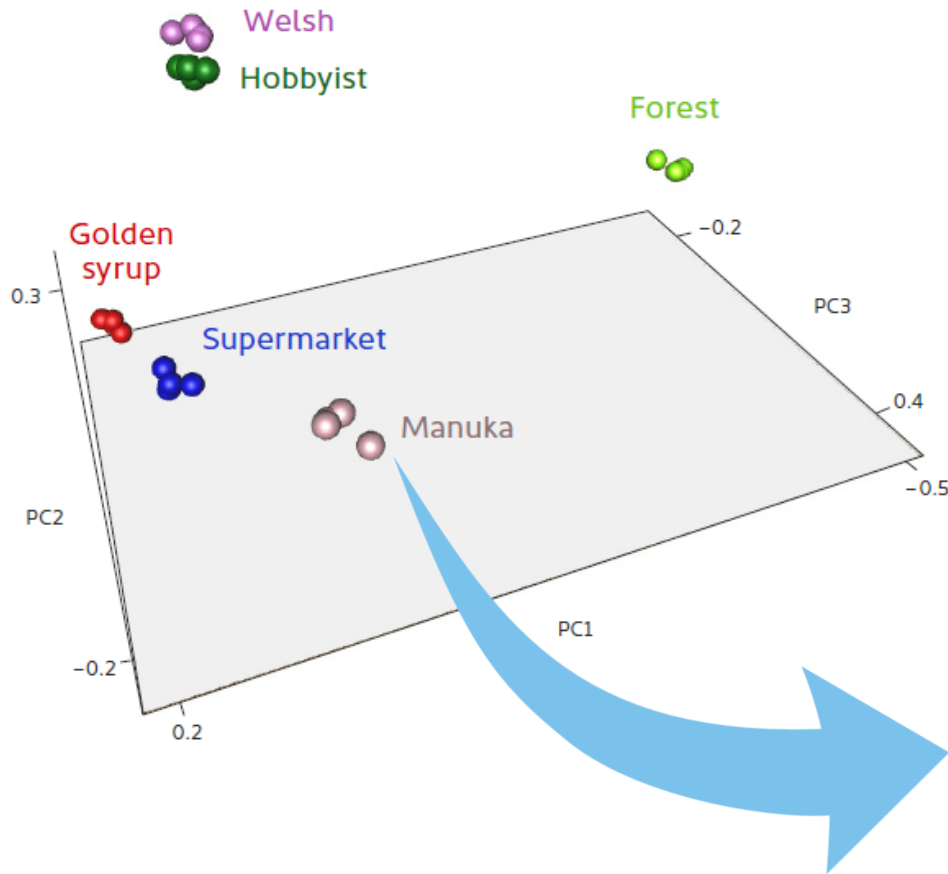
Example case studies

Shelf-life studies using TD-GC-MS

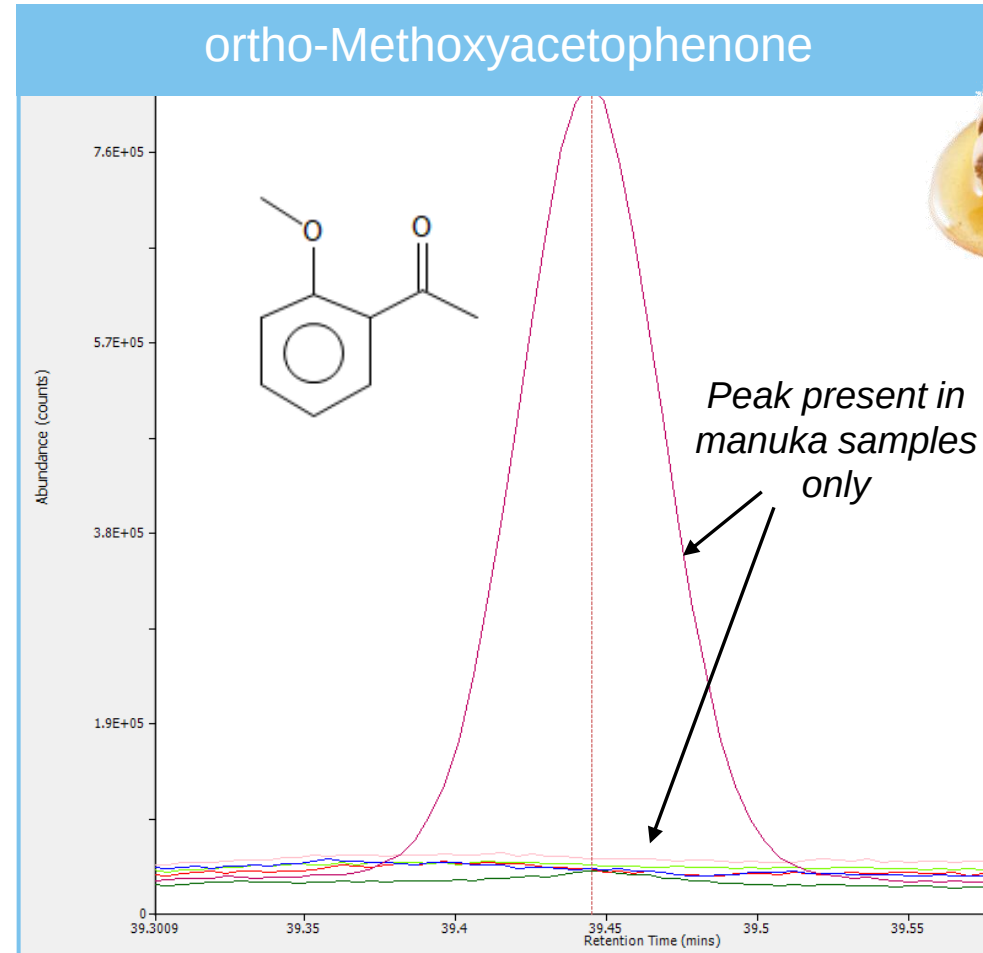
- Emission profiles were monitored at day 0, 1 and 10
- Thermally-labile sulfurs were confidently detected



Discovering authenticity markers in honey

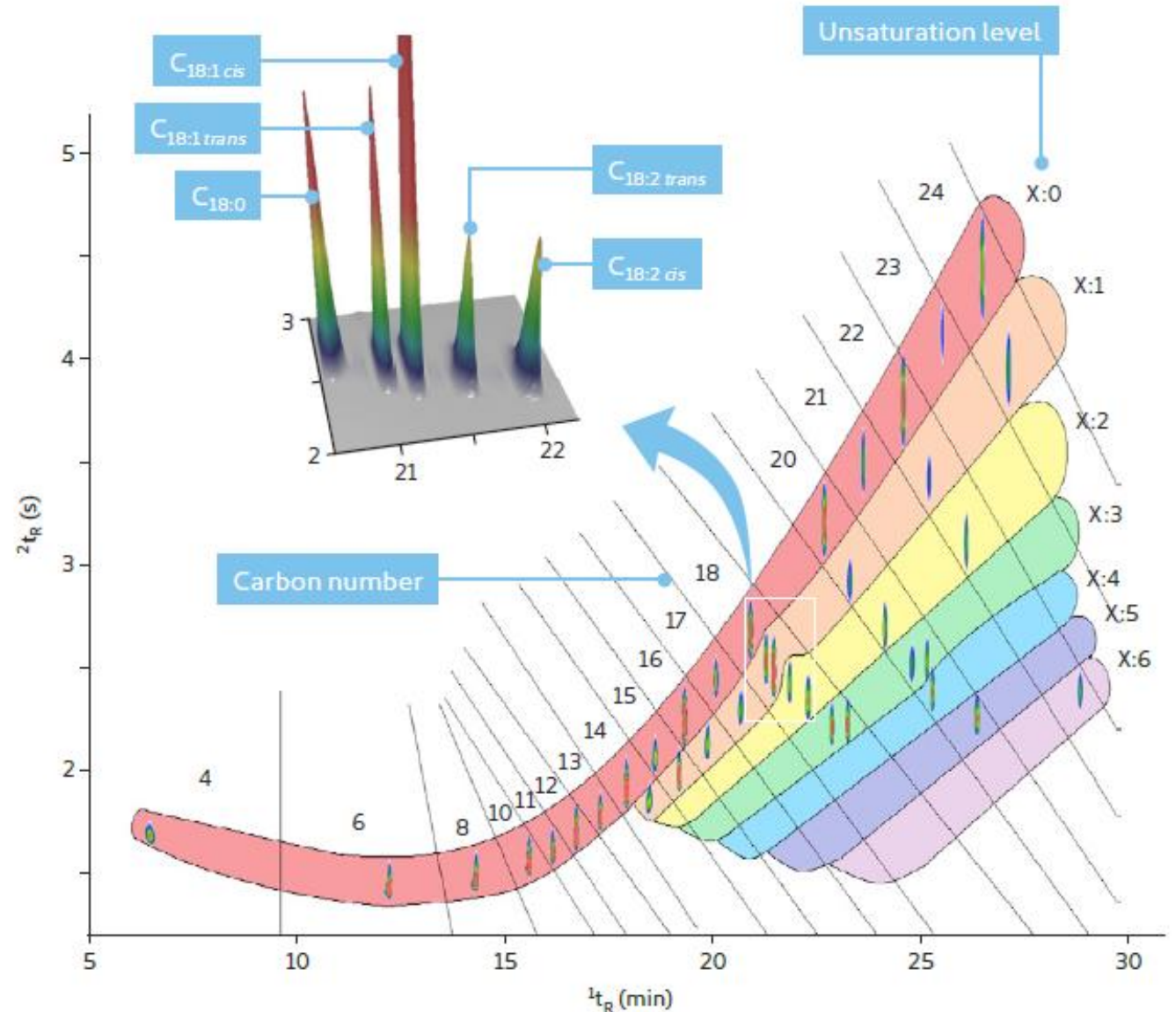


- Aroma profiling of honey from different sources using HiSorb-GC-MS



Full separation of FAMES

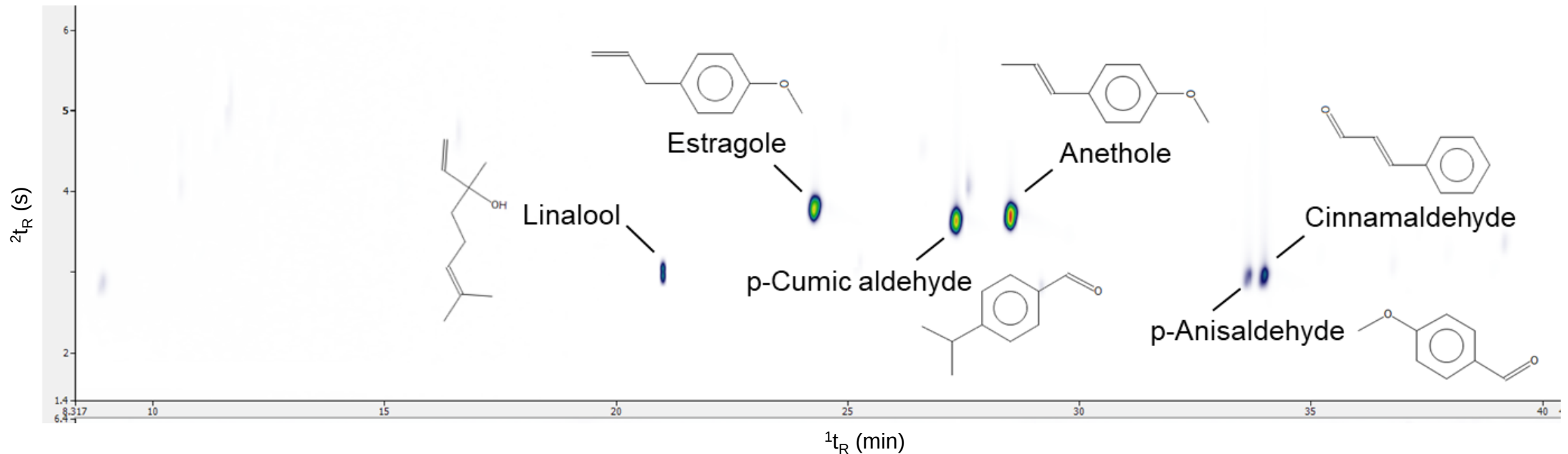
- Analysis of fatty acid methyl esters (FAMES) in food is important for assessing nutritional content
- GC×GC separates FAMES by carbon number as well as their degree of unsaturation



Simple pairwise comparison

Identifying markers of quality in curry powder

Expensive *minus* Inexpensive

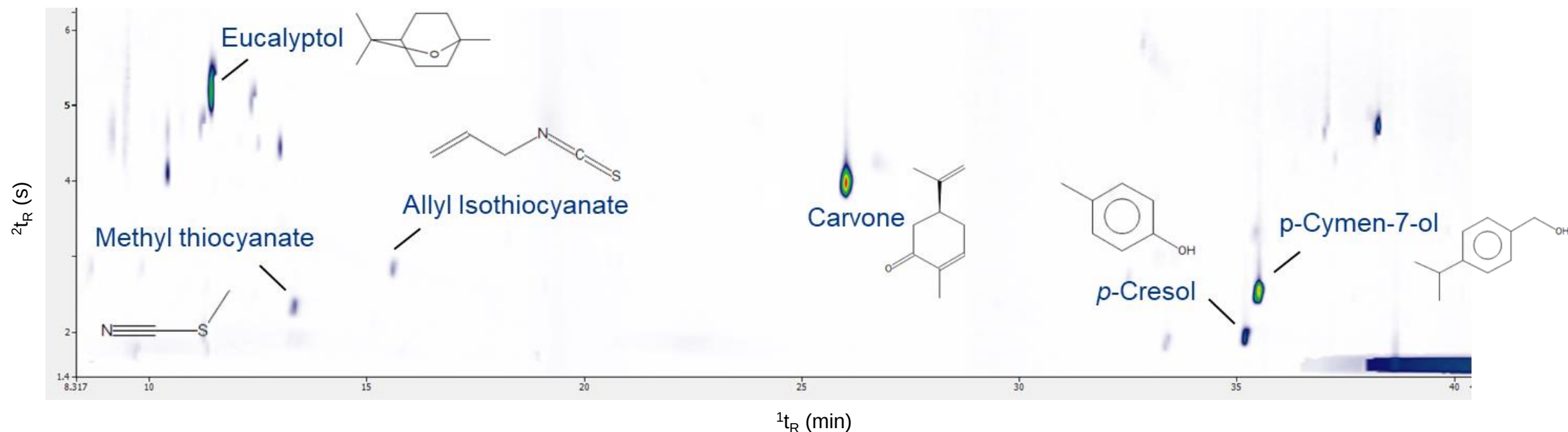


- Aroma-active compounds from ingredients such as star anise, cardamom and cinnamon – indicative of **high quality**.

Simple pairwise comparison

Identifying markers of quality in curry powder

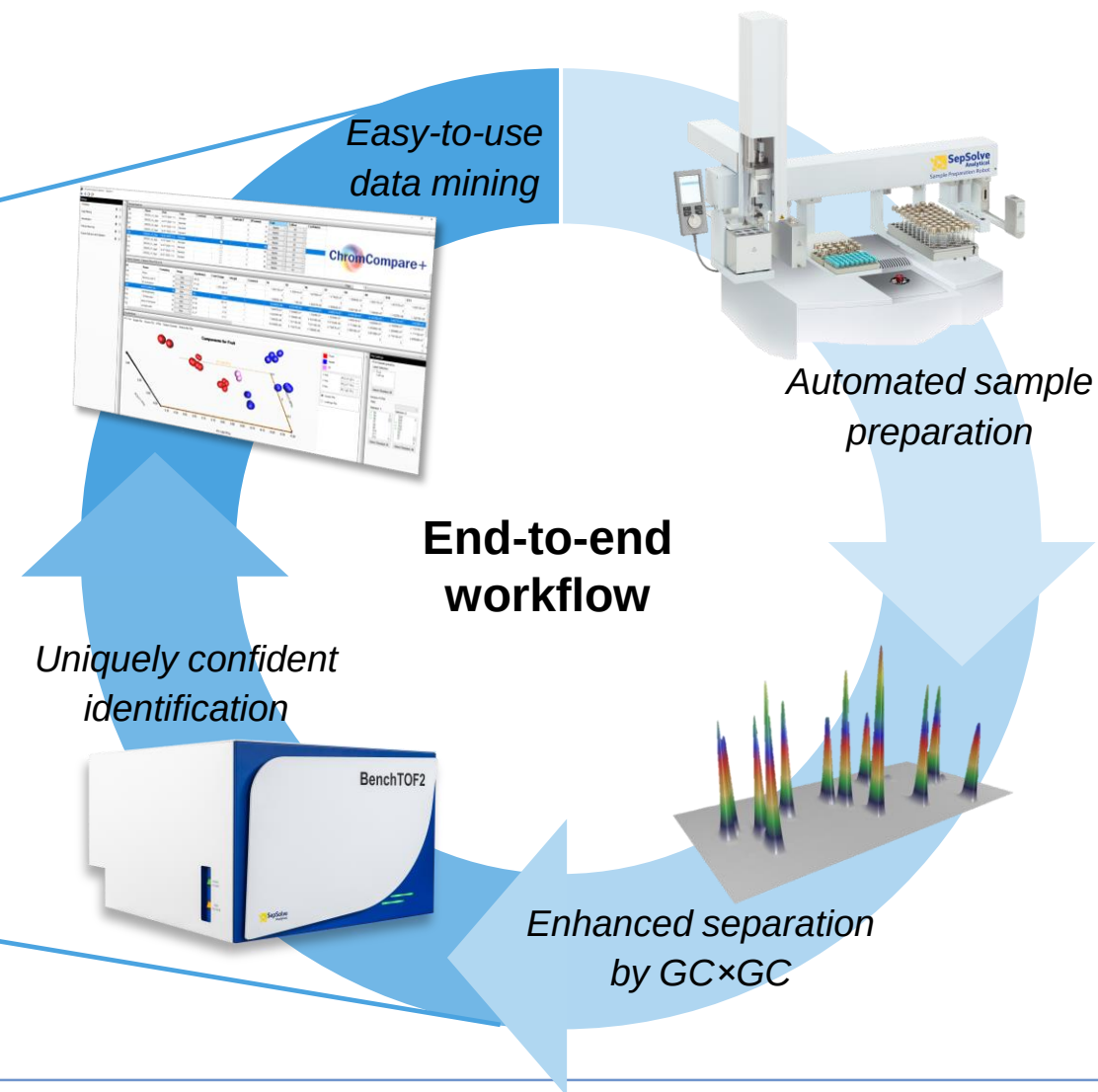
Inexpensive *minus* Expensive



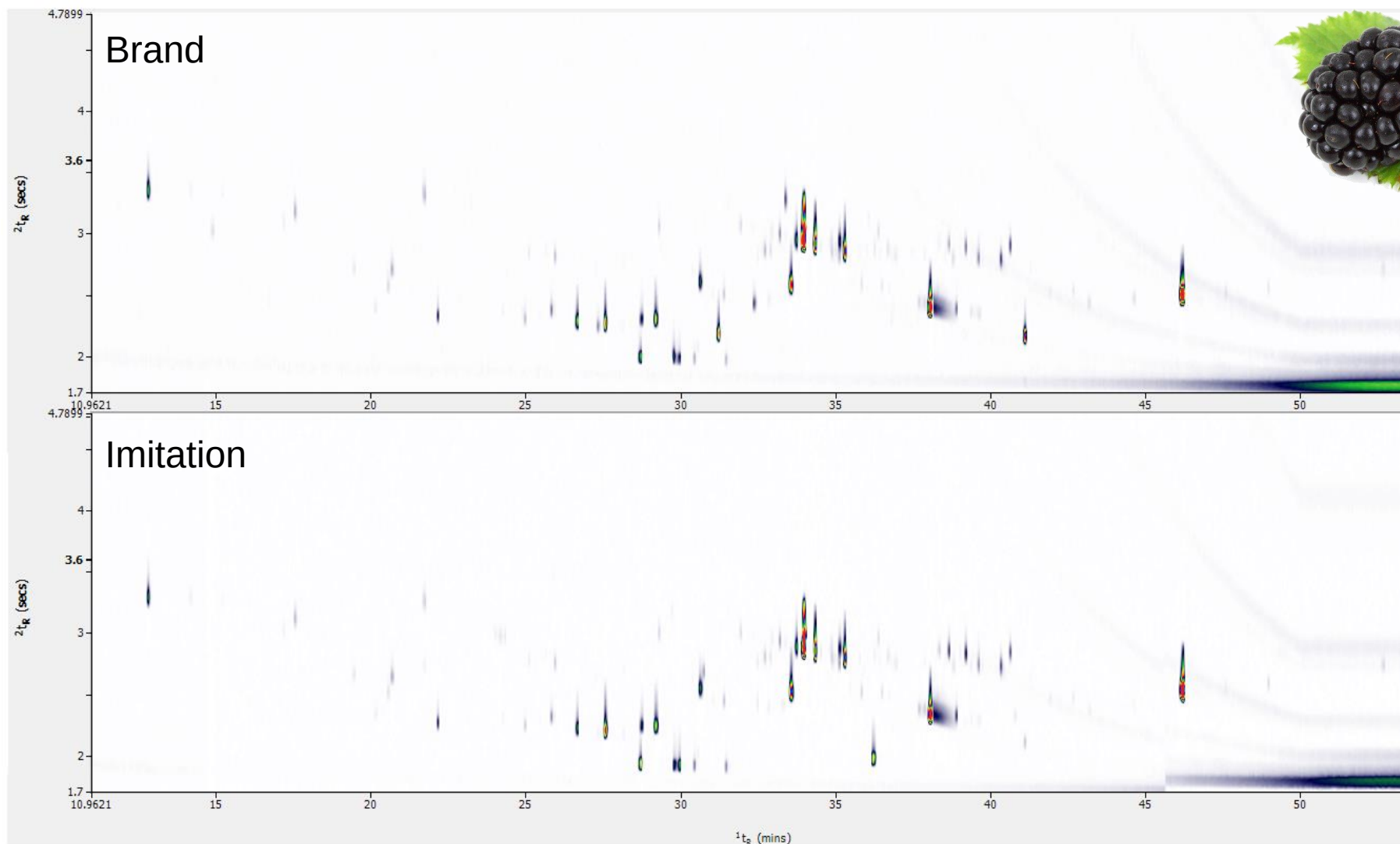
- Aroma-active compounds from ingredients such as mustard – indicative of **lower quality**.

Fragrance profiling by GC×GC–TOF MS

- A powerful combination of techniques for unparalleled sample characterisation

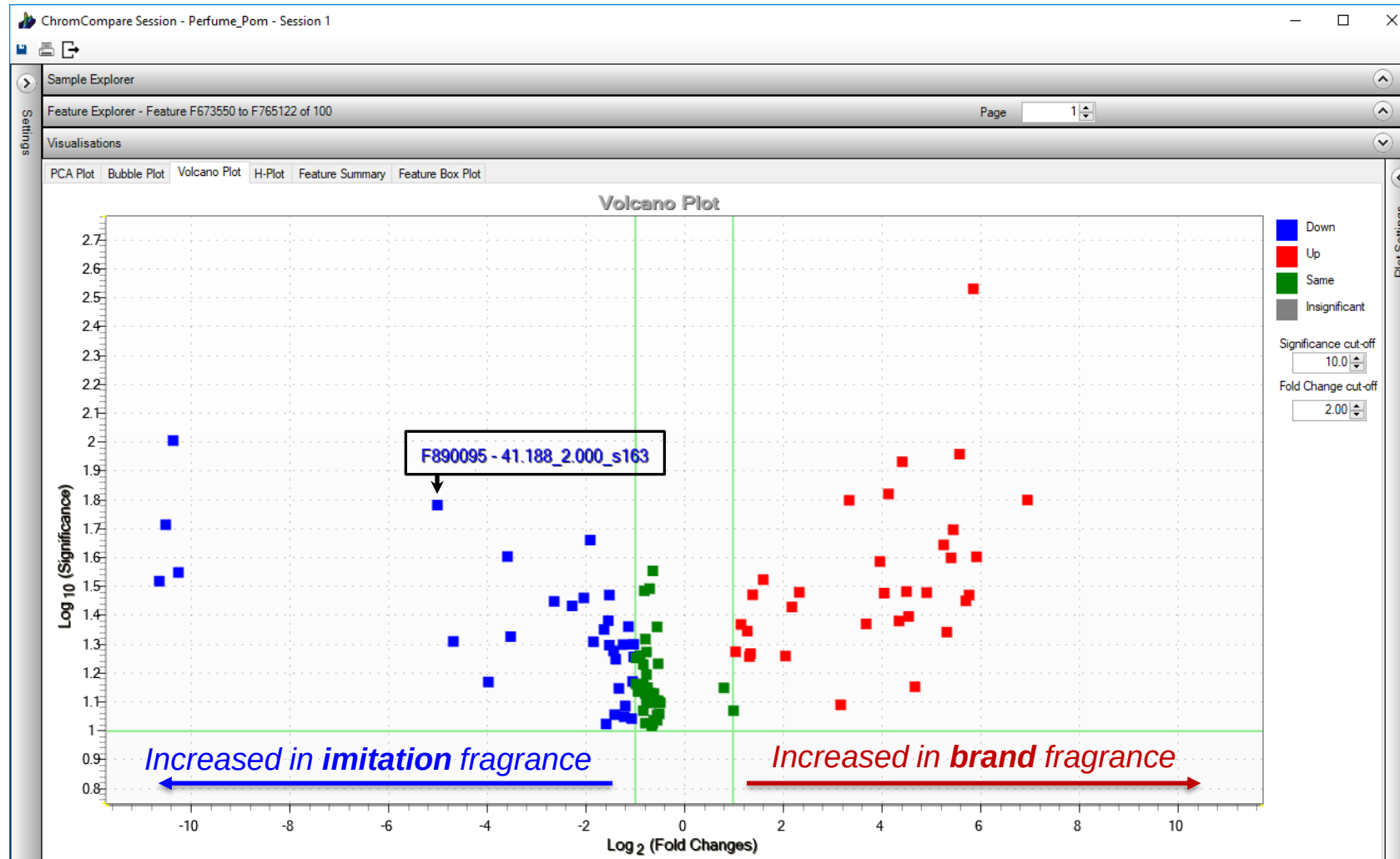


Comparison of brand and imitation fragrances



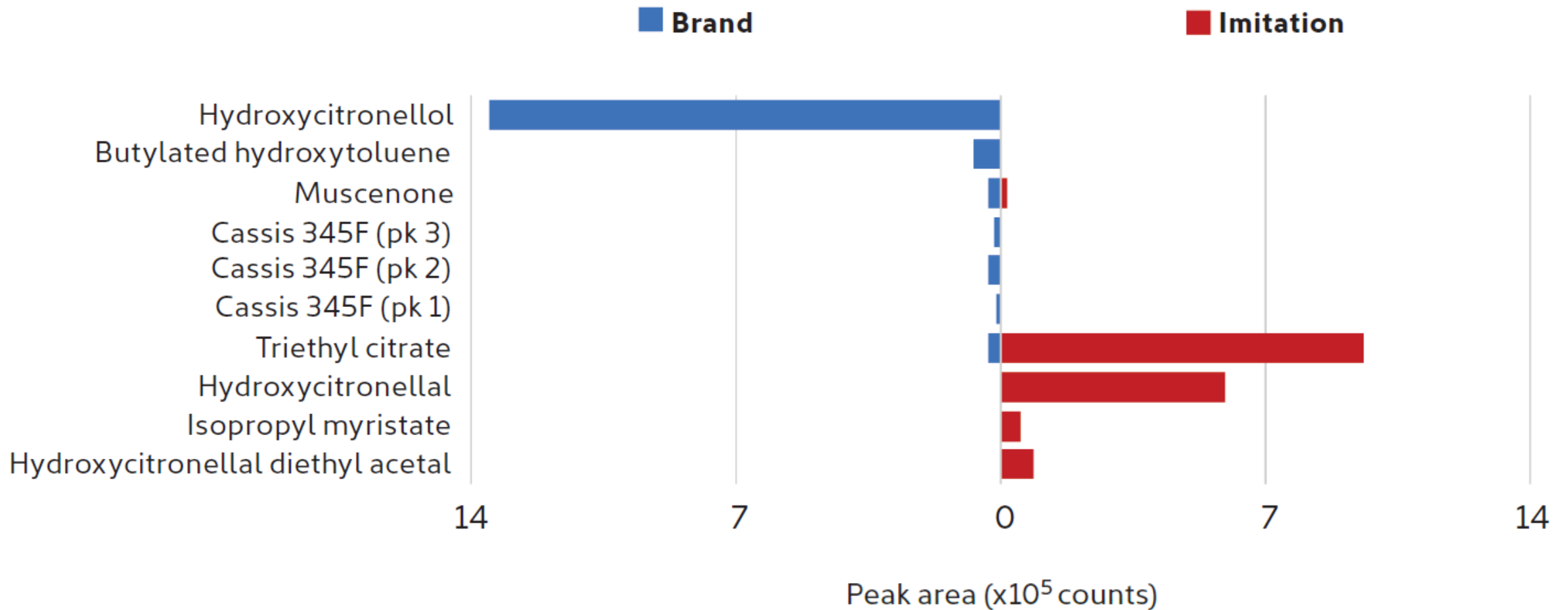
Comparison of fragrances in ChromCompare+

Pomegranate scent



Fast and simple discovery of key differences

Blackberry scent



Want to find out more?



Scan the QR code to
download our e-book



The background of the slide is a 2x5 grid of 10 chromatograms. Each chromatogram shows a noisy baseline with several distinct peaks. The peaks are color-coded differently in each plot, such as red, green, blue, and yellow. The text 'Thanks for listening!' is overlaid in large white font across the top half of the grid.

Thanks for listening!

Any questions?