



Dynamic Headspace Analytical Techniques

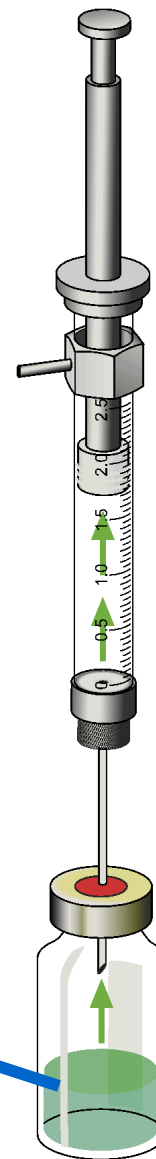


Static Headspace

Heated Syringe

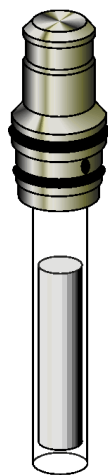
Heated Vial

60 C

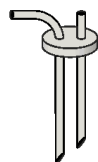




Dynamic Headspace



TDU Adsorbent Tube



Double Needle

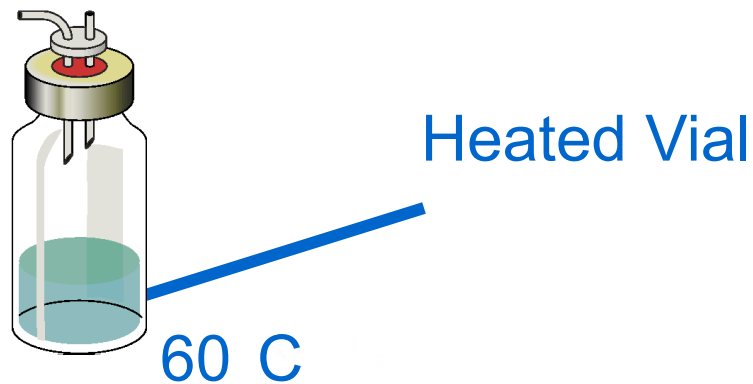
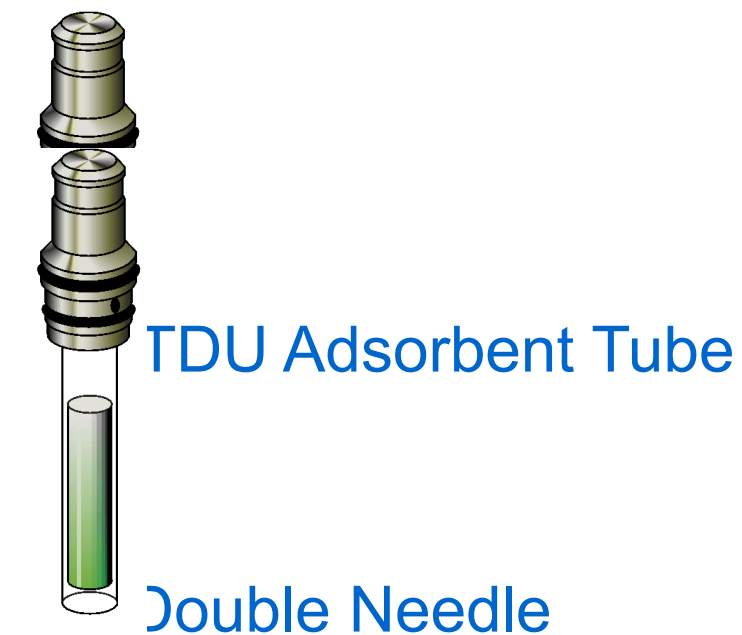


Heated Vial

60 C

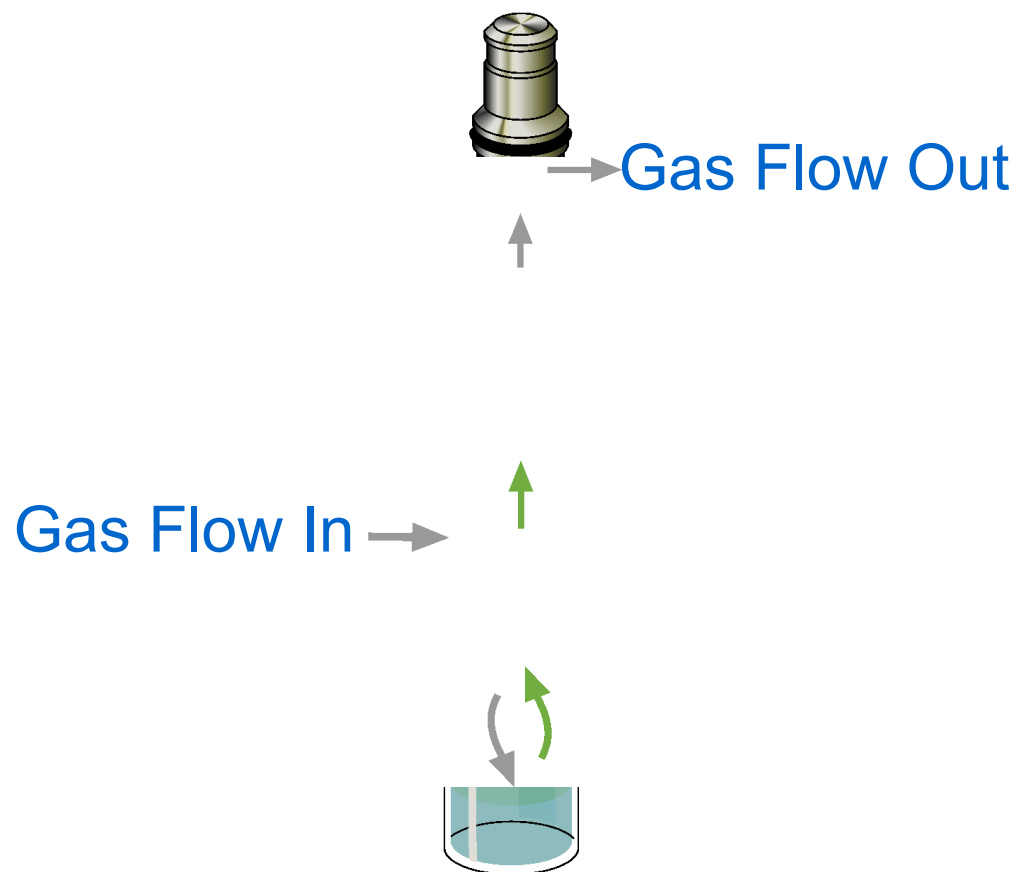


Dynamic Headspace



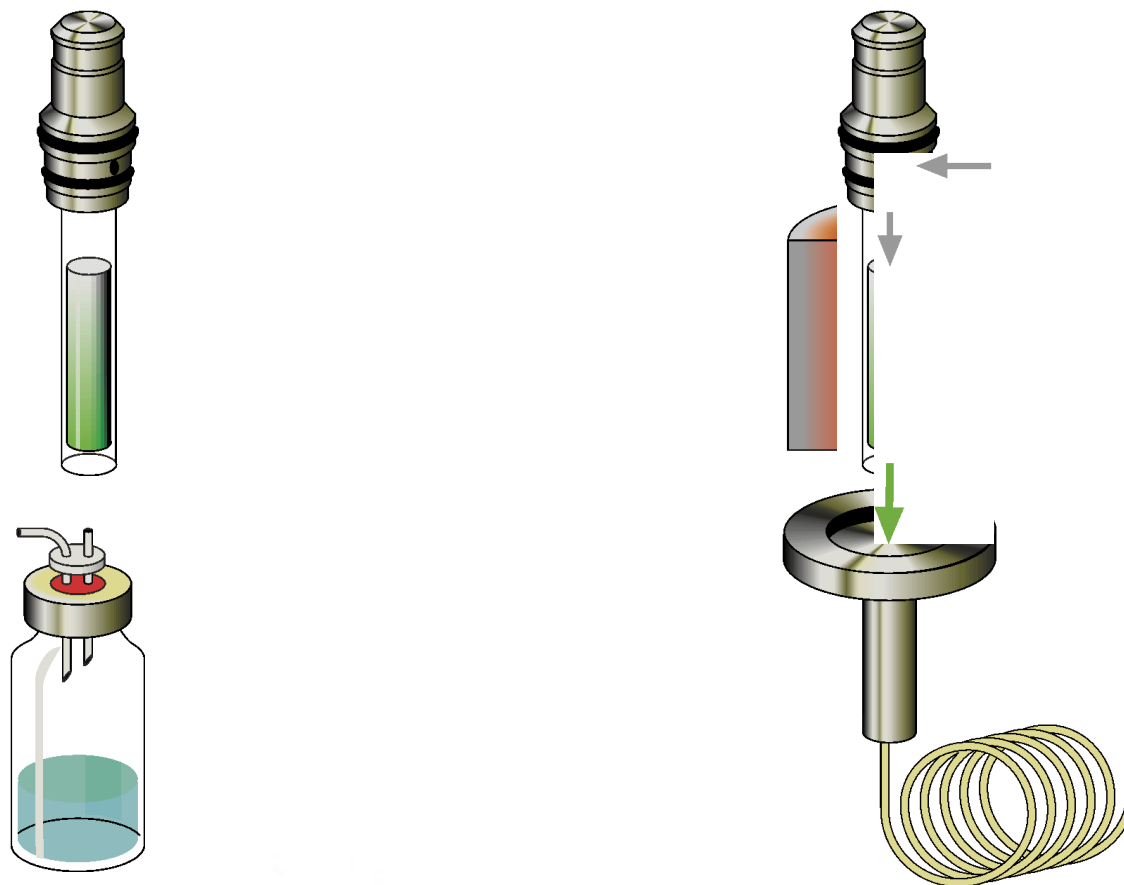


Dynamic Headspace





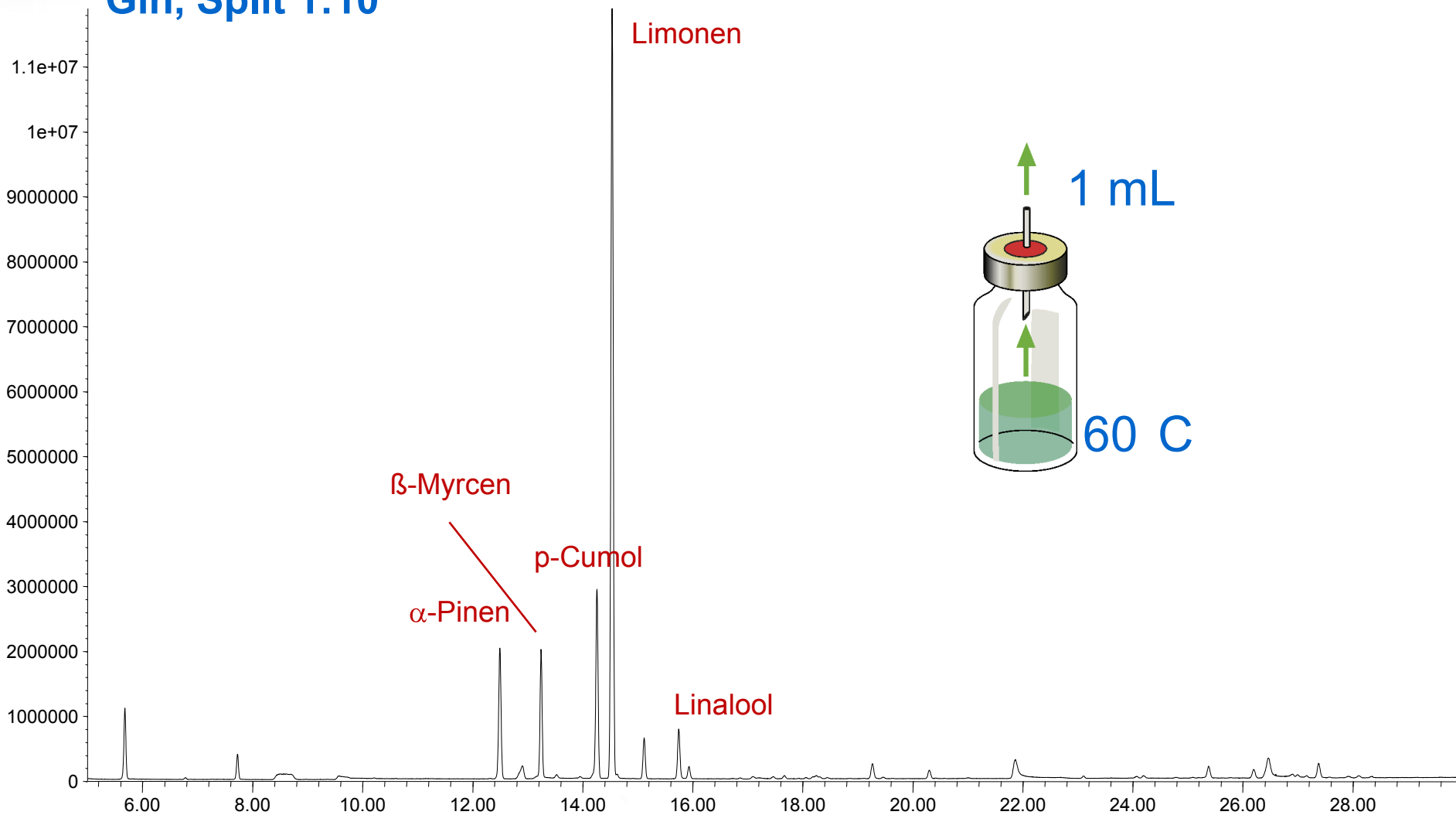
Dynamic Headspace





Static Headspace

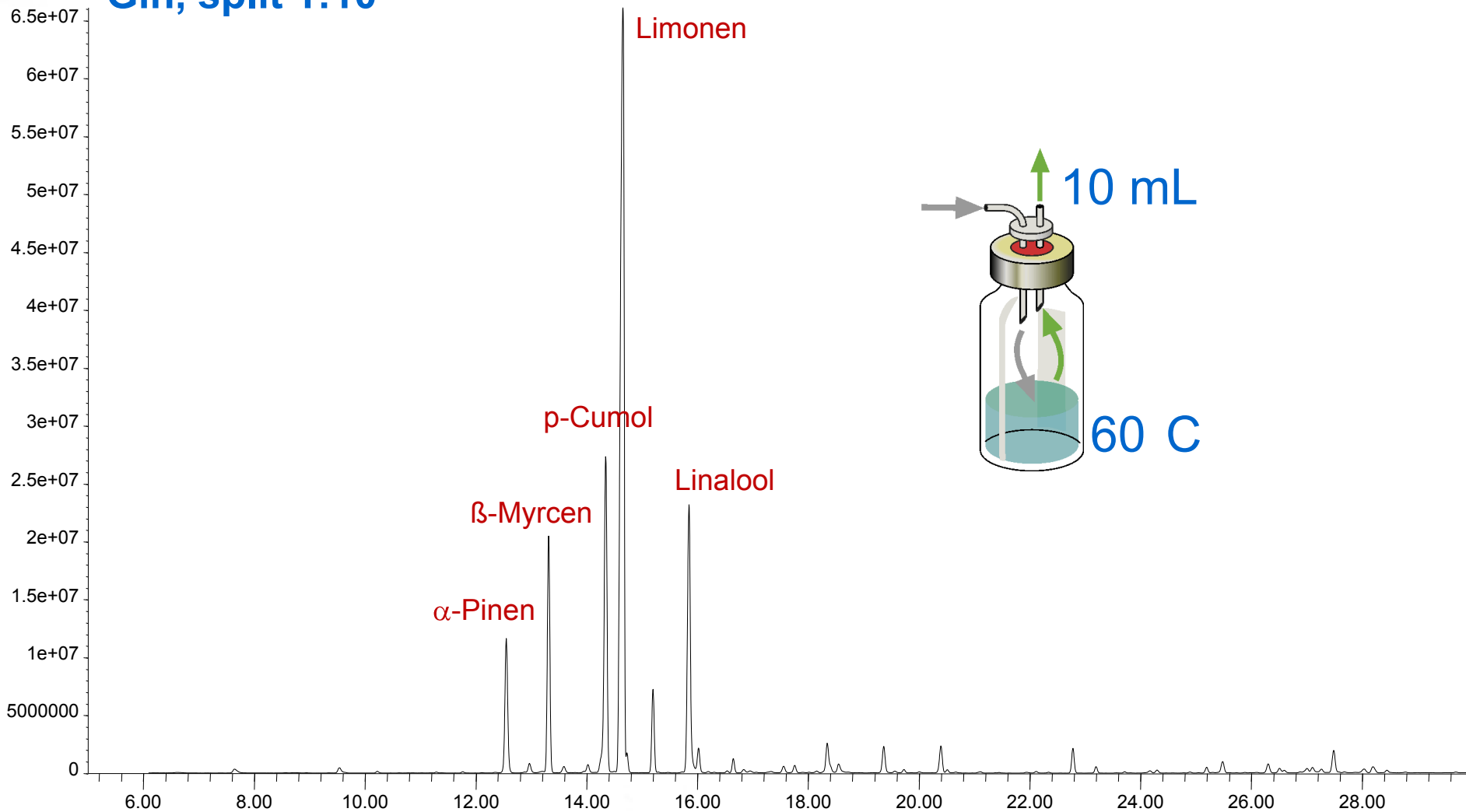
Gin, Split 1:10





Dynamic Headspace

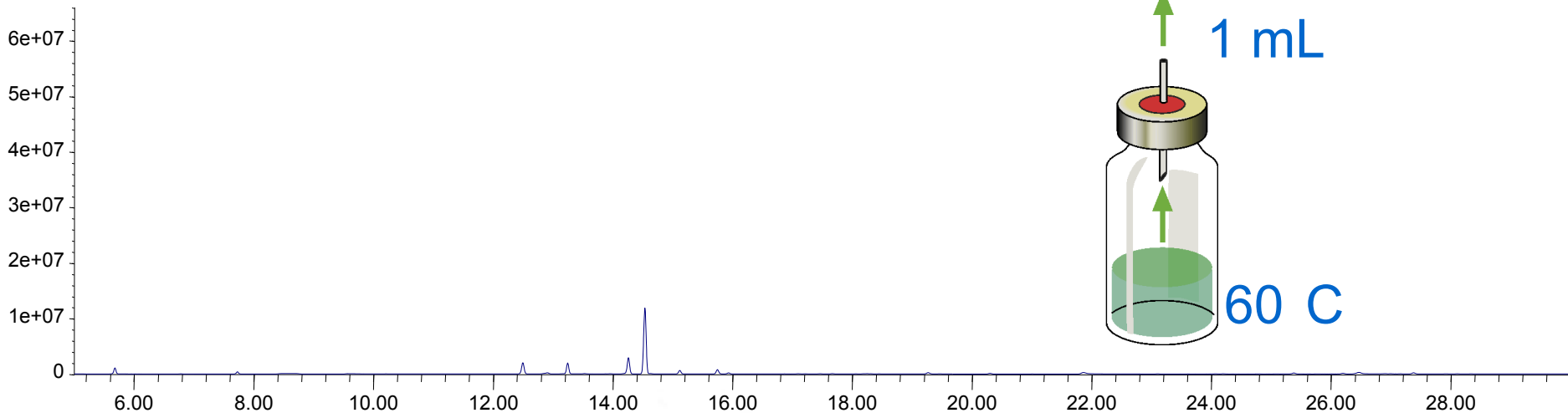
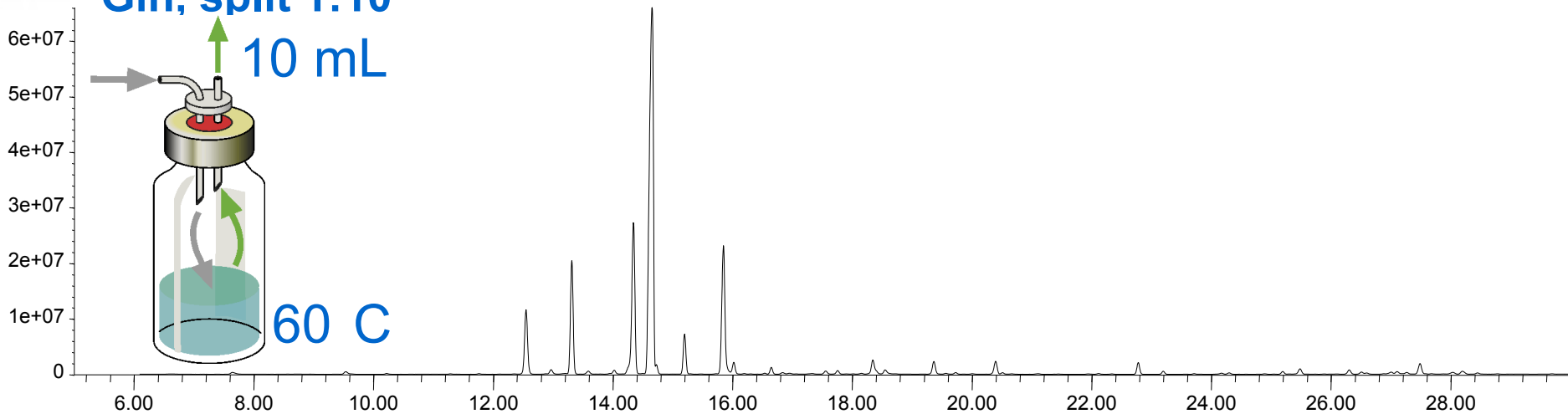
Gin, split 1:10





Compared Dynamic / Static

Gin, split 1:10



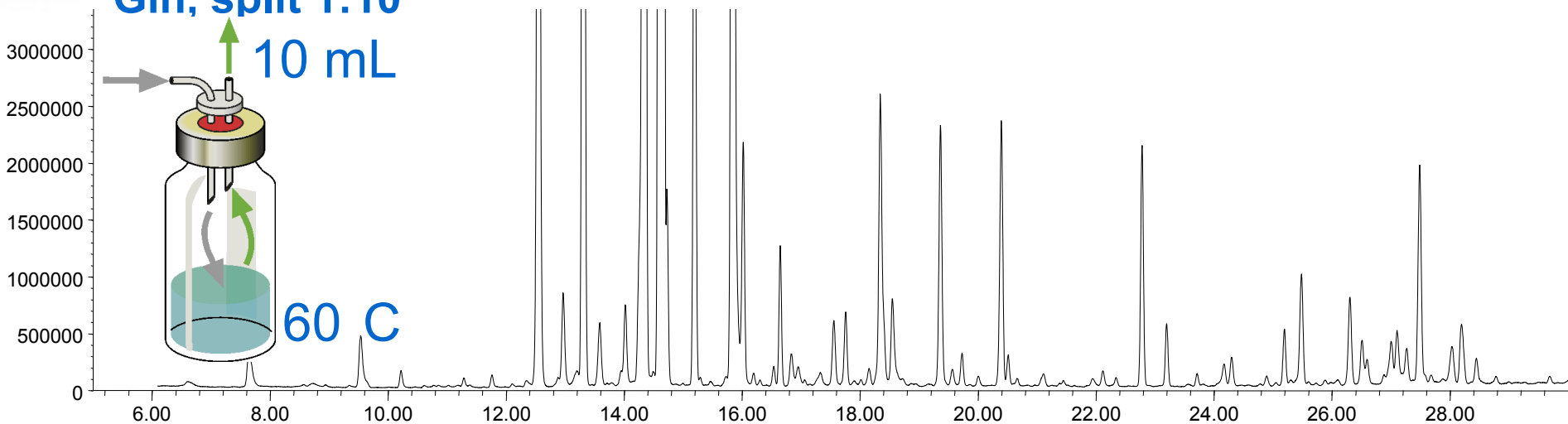


Compared Dynamic / Static

Gin, split 1:10

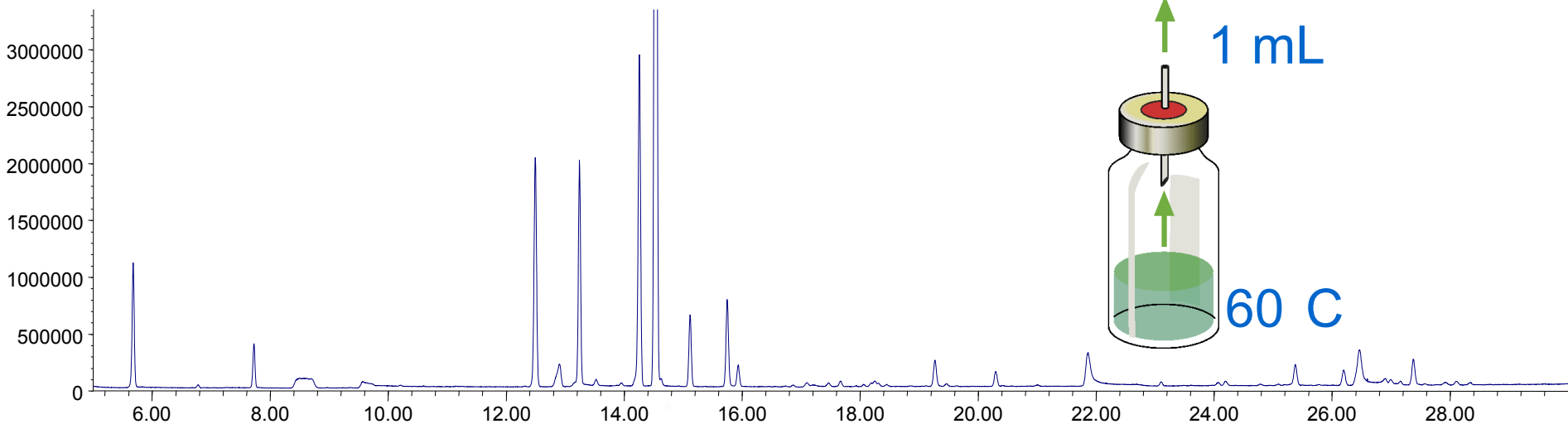
10 mL

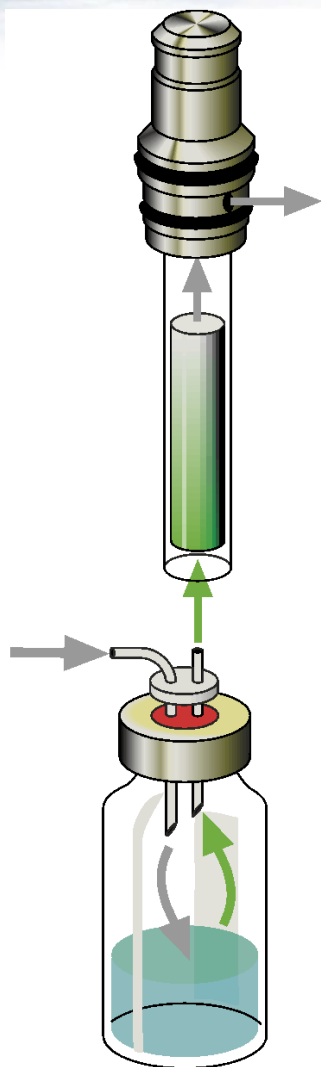
60 C



1 mL

60 C





Gerstel Parameters - Instrument 2

SYSTEM | CIS | MPS

Calculate Injection Speed | Edit Solvents

Liquid | Headspace | SPME | Sample Prep | **LVI Calc**

Solvent: WATER

Current Method Settings:
CIS Initial Temp. -100 °C
Injection Speed 50.00 µL/s

Injection Parameters:
 Stop Flow Column Headpressure 100.0 kPa
Total Flow 100 mL/min
CIS Temp. 60 °C

Factor 1.00 Injection Speed 0.26 µL/s 15.58 µL/min

Update Liquid Method

Help | Apply | OK | Cancel



Gerstel Parameters - Instrument 2

SYSTEM
CIS
MPS

Liquid
Headspace
SPME
Sample Prep
LVI Calc

Calculate Injection Speed | Edit Solvents

Solvent: WATER

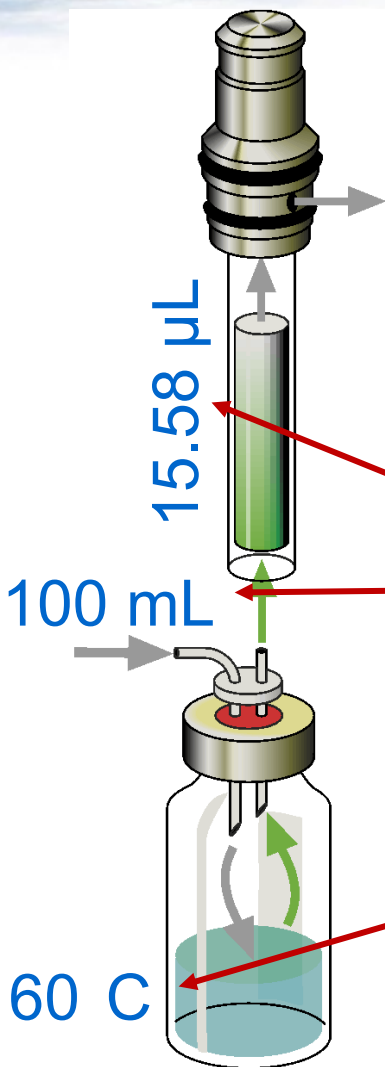
Current Method Settings
CIS Initial Temp. -100 °C
Injection Speed 50.00 µL/s

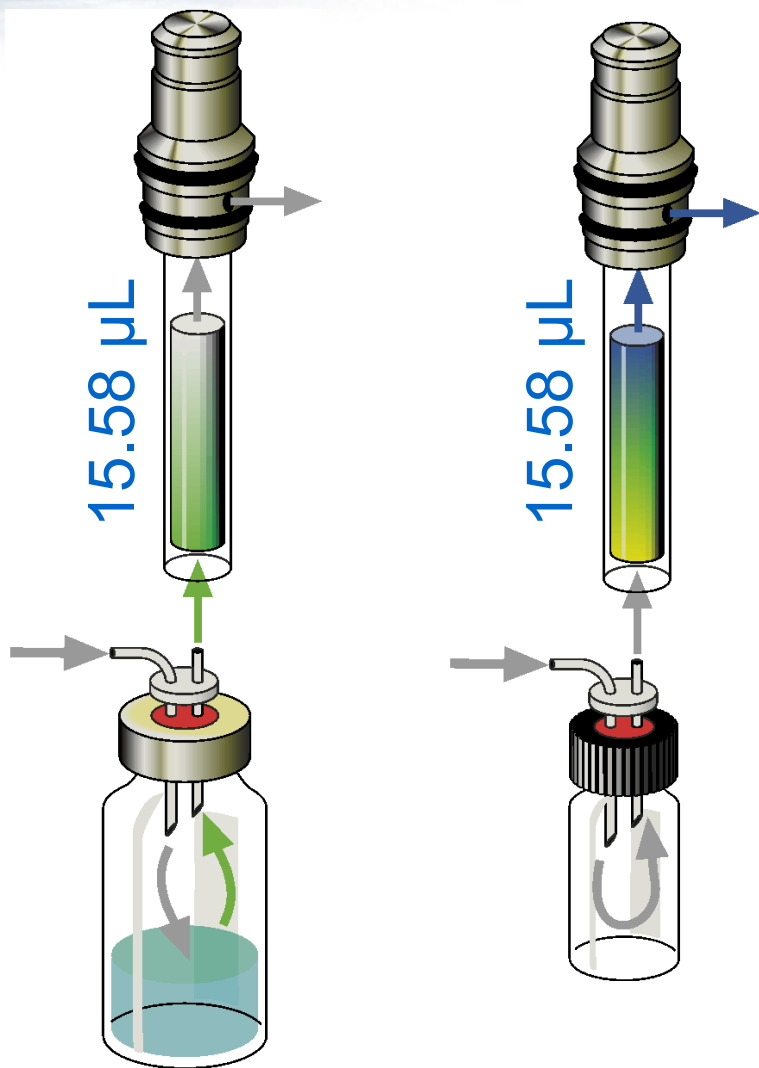
Injection Parameters
 Stop Flow Column Headpressure 100.0 kPa
Total Flow 100 mL/min
CIS Temp. 60 °C

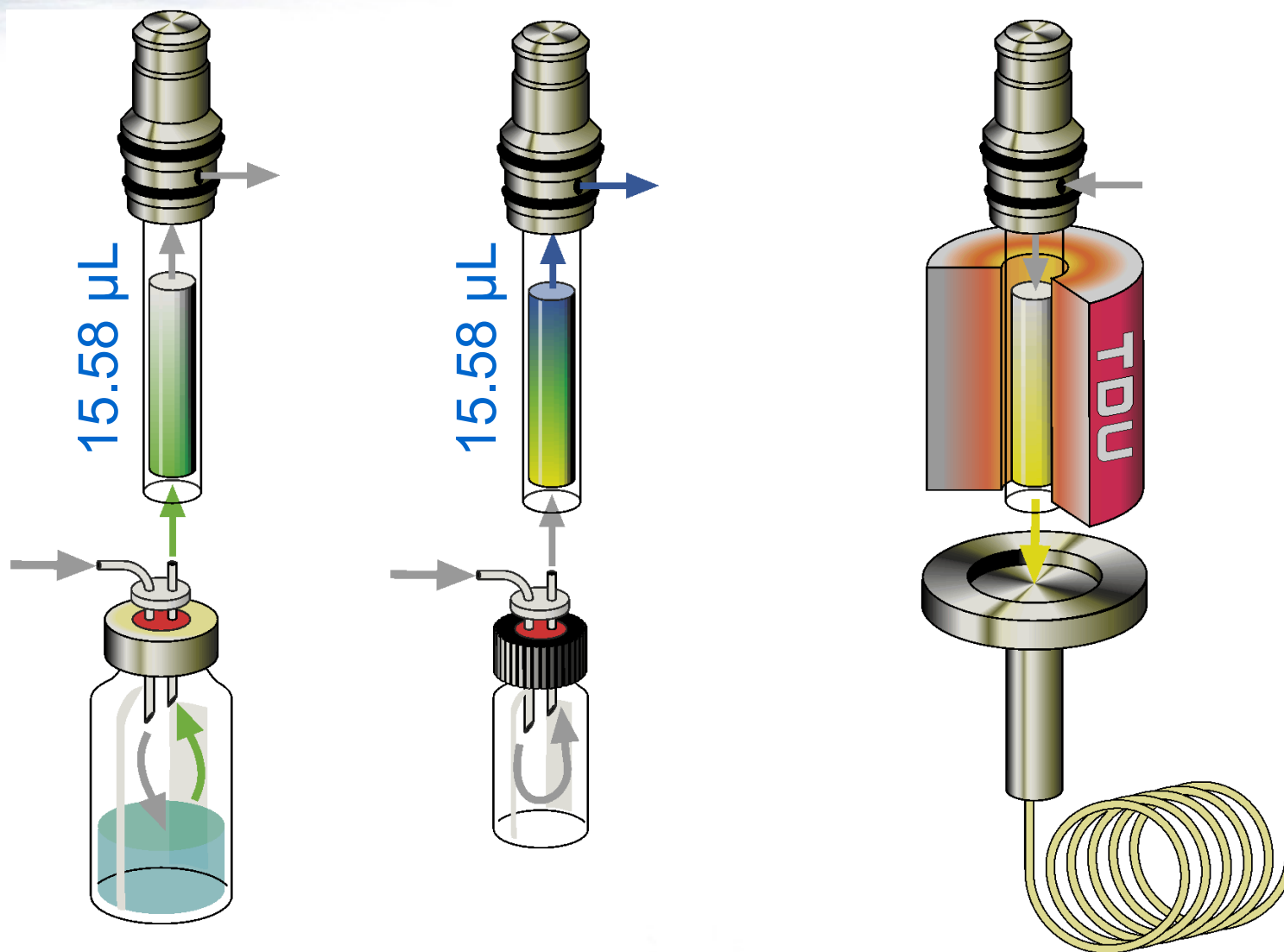
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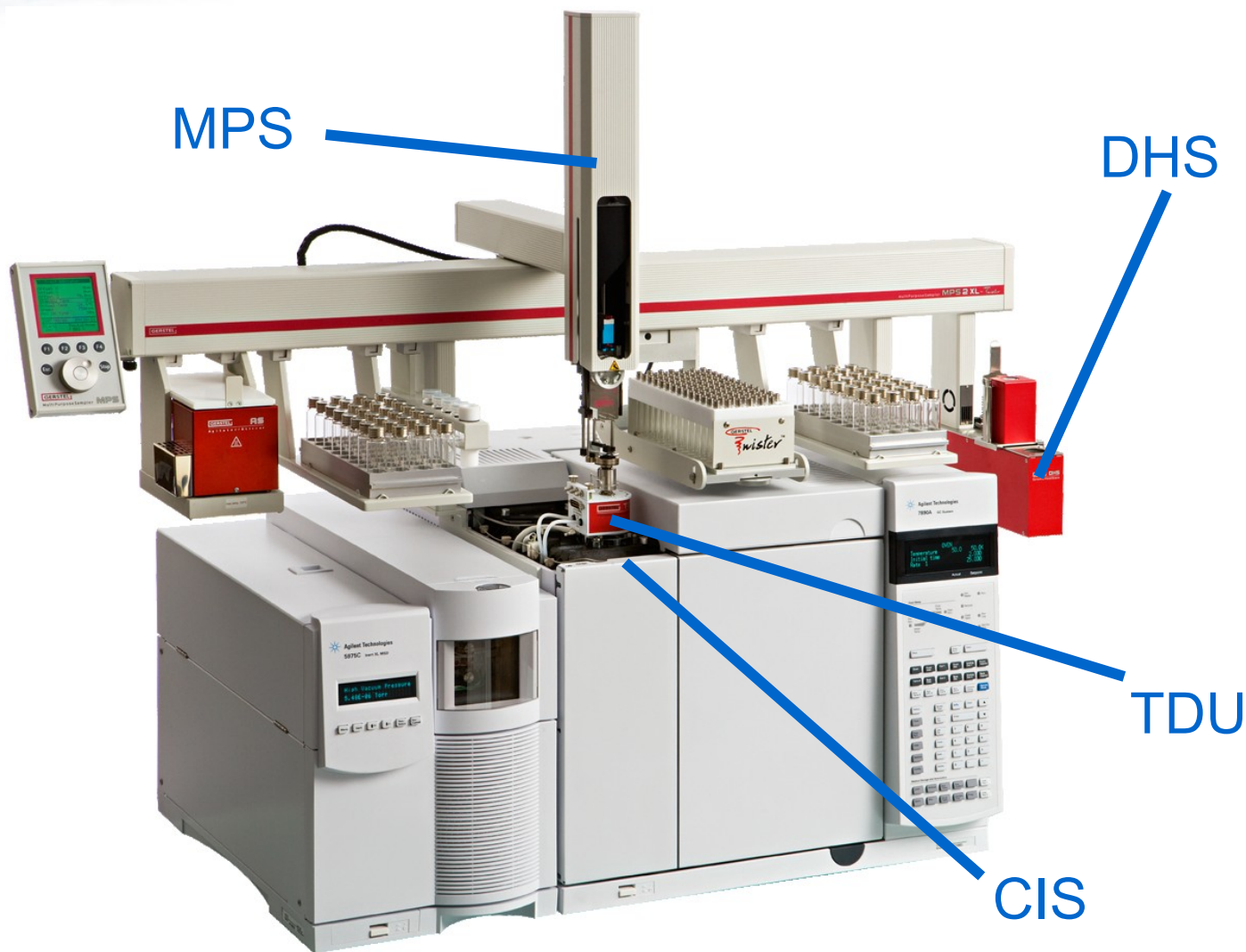
Update Liquid Method

Help
Apply
OK
Cancel





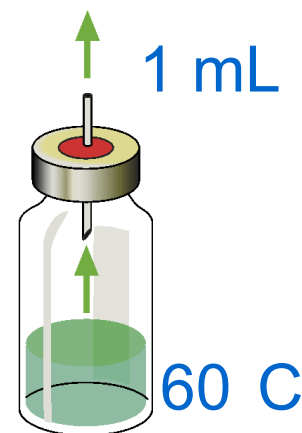
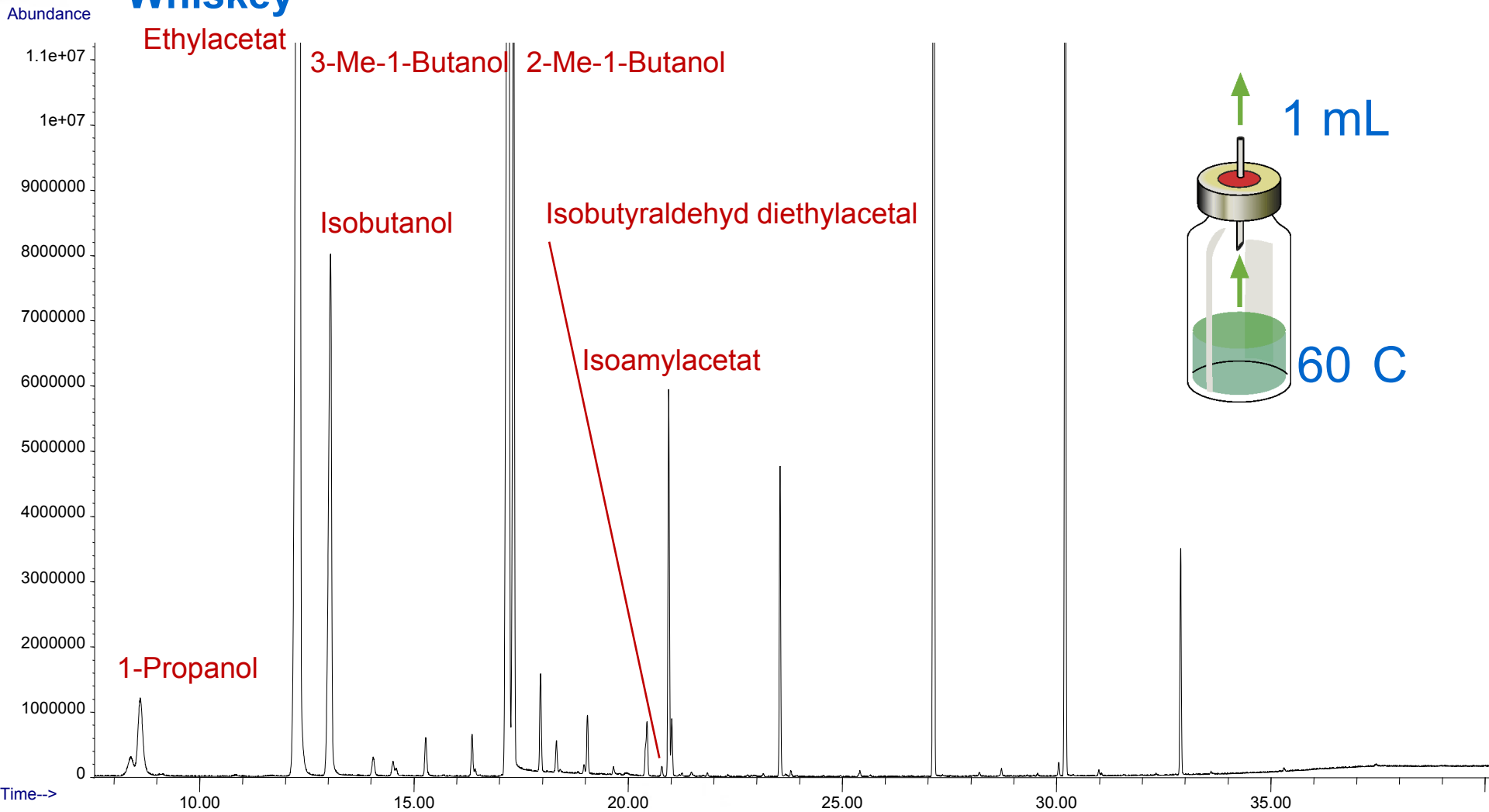






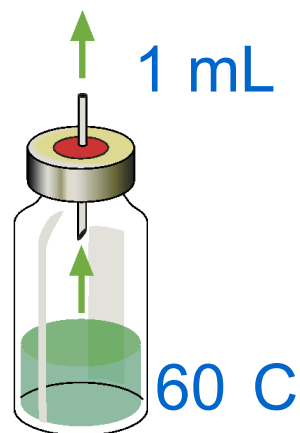
Static Headspace

Whiskey





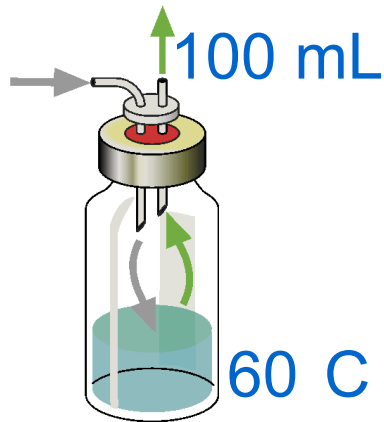
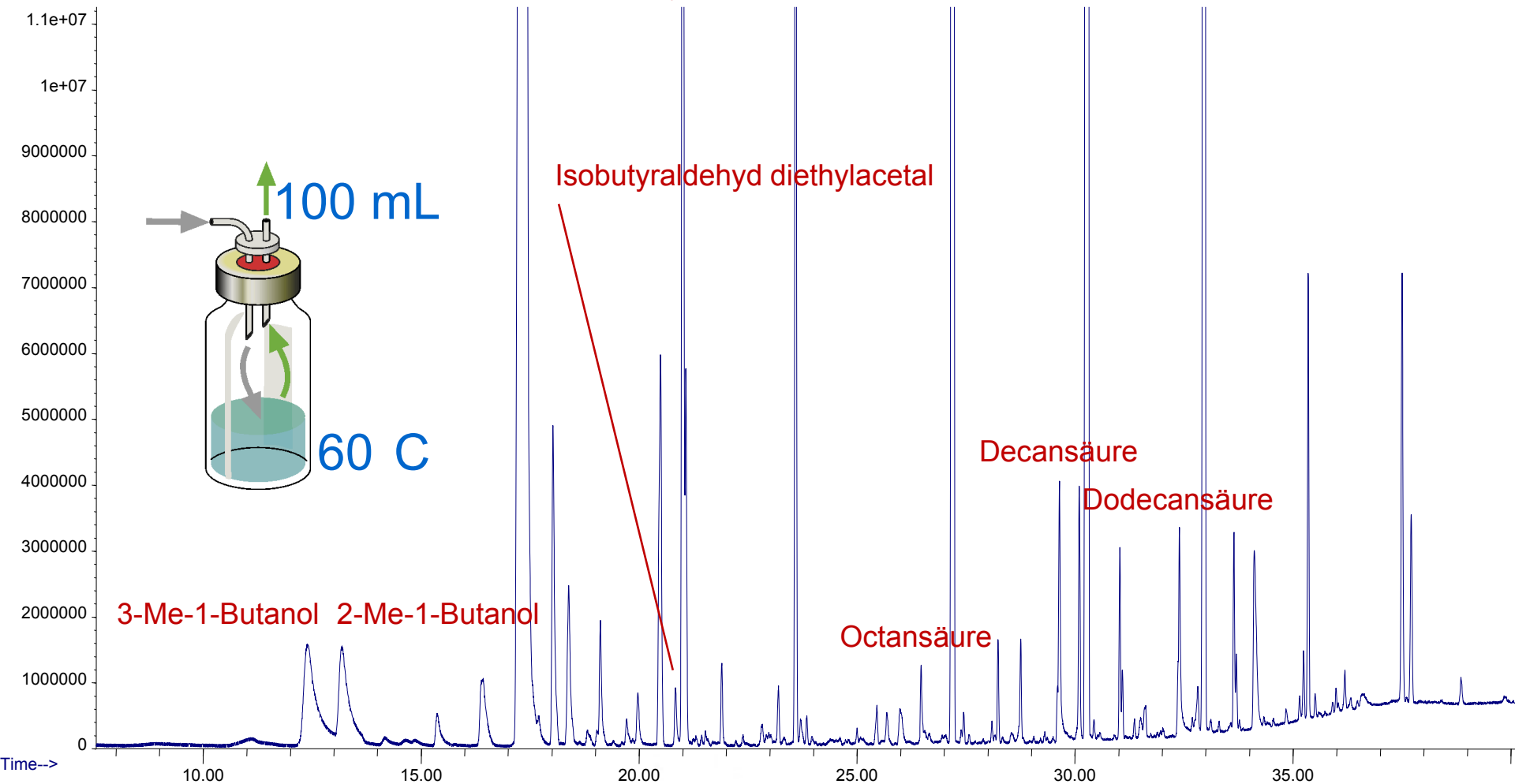
- 1 **propanol**
- 2 **ethyl acetate**
- 3 **isobutanol**
- 4 3-me butanal
- 5 2-me butanal
- 6 1-butanol
- 7 1,1 diethoxy methane
- 8 propionic acid ethyl ester
- 9 n-propyl acetate
- 10 **3-me-1-butanol**
- 11 **2-me-1-butanol**
- 12 isobutyric acid ethyl ester
- 13 isobutyl acetate
- 14 butyric acid ethyl ester
- 15 butyric acid 2&3 methyl-ethyl ester
- 16 **isobutyraldehyde diethyl acetal**
- 17 **isoamyl acetate**
- 18 2-me-1-butyl acetate
- 19 butyraldehyde diethyl acetal
- 20 acetaldehyde ethyl amyl acetal
- 21 hexanoic acid ethyl ester
- 22 hexyl acetate
- 23 heptanoic acid ethyl ester
- 24 nonanal
- 25 β phenyl ethyl alcohol
- 26 octanoic acid
- 27 octanoic acid ethyl ester
- 28 decanal
- 29 β phenyl ethyl acetate
- 30 nonanoic acid ethyl ester
- 31 decanoic acid
- 32 ethyl trans-4 decenoate
- 33 decanoic acid ethyl ester
- 34 octanoic acid 3-me- butyl ester
- 35 1,ethyl propyl octanoate
- 36 capric acid isobutyl ester
- 37 dodecanoic acid
- 38 decanoic acid ethyl ester
- 39 pentadecanoic acid 3-me-butyl ester
- 40 pentadecanoic acid 2-me-butyl ester
- 41 tetradecanoic acid ethyl ester
- 42 ethyl-9-hexadecenoate
- 43 hexadecanoic acid ethyl ester



Dynamic Headspace

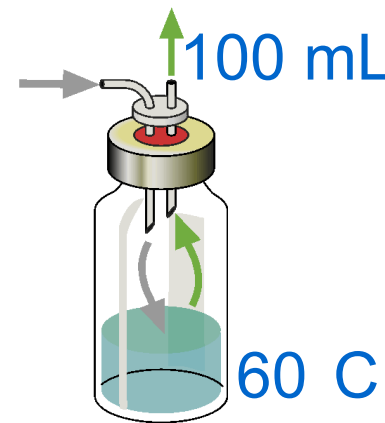
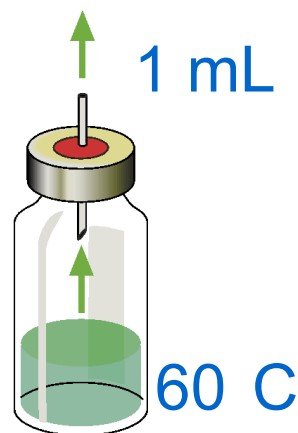
Whiskey

Abundance

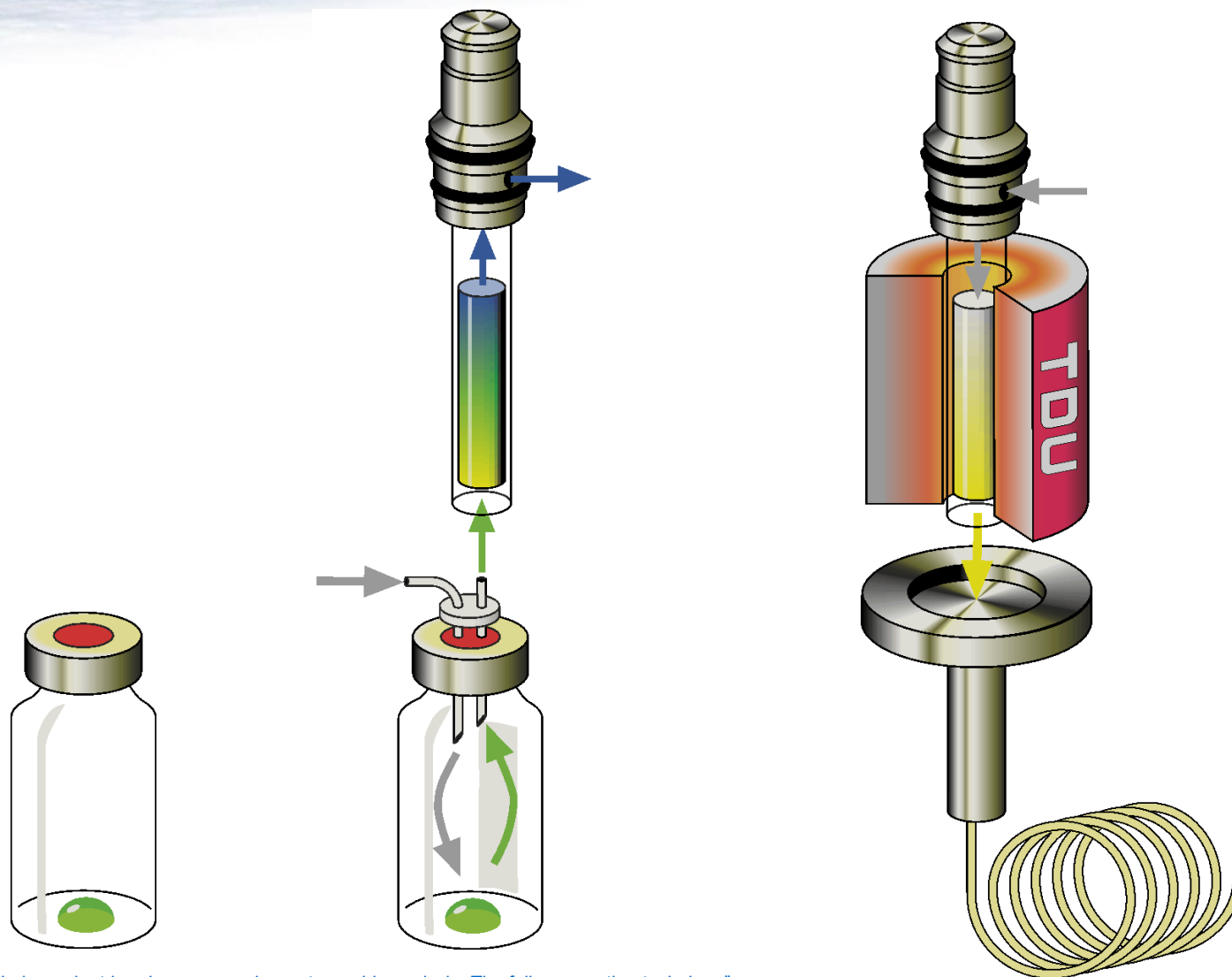




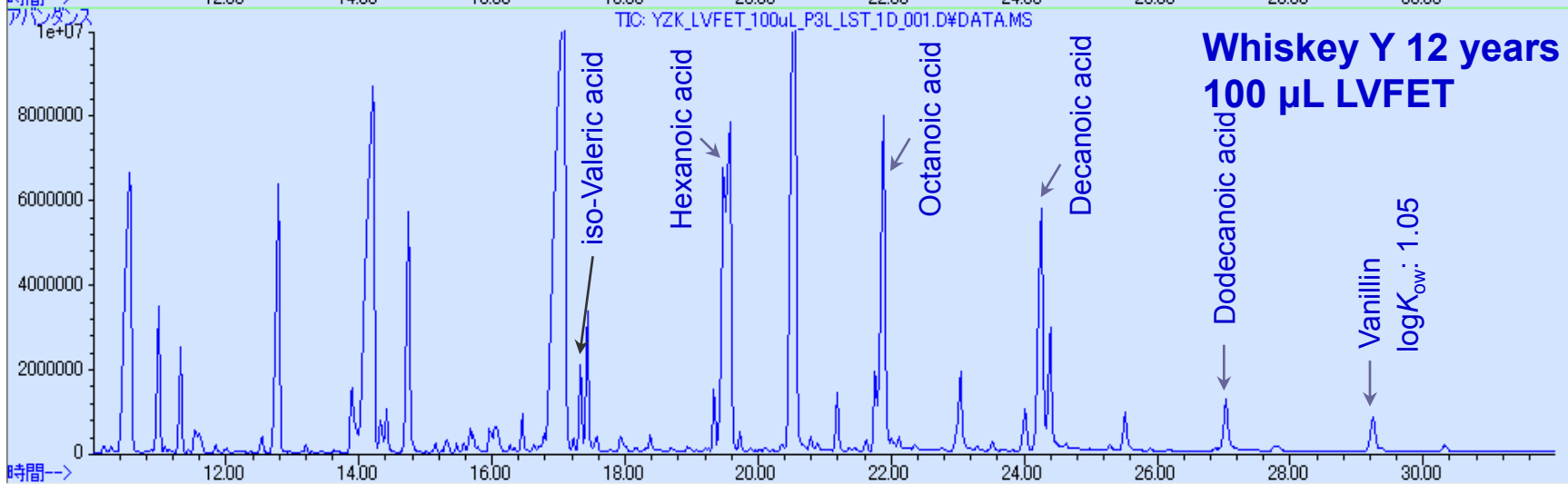
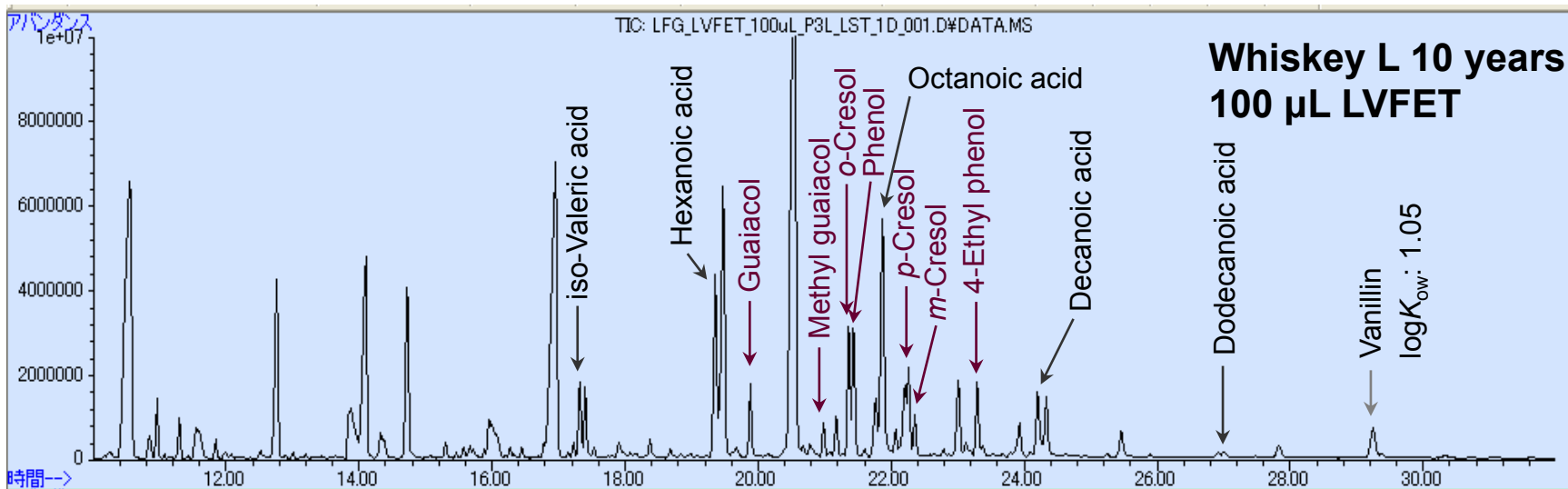
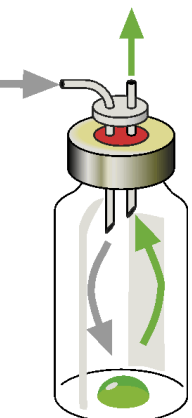
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- 33 decanoic acid ethyl ester
- 34 **octanoic acid 3-me- butyl ester**
- 35 **1,ethyl propyl octanoate**
- 36 **capric acid isobutyl ester**
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- 39 **pentadecanoic acid 3-me-butyl ester**
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"Matrix independent headspace gas chromatographic analysis. The full evaporation technique"

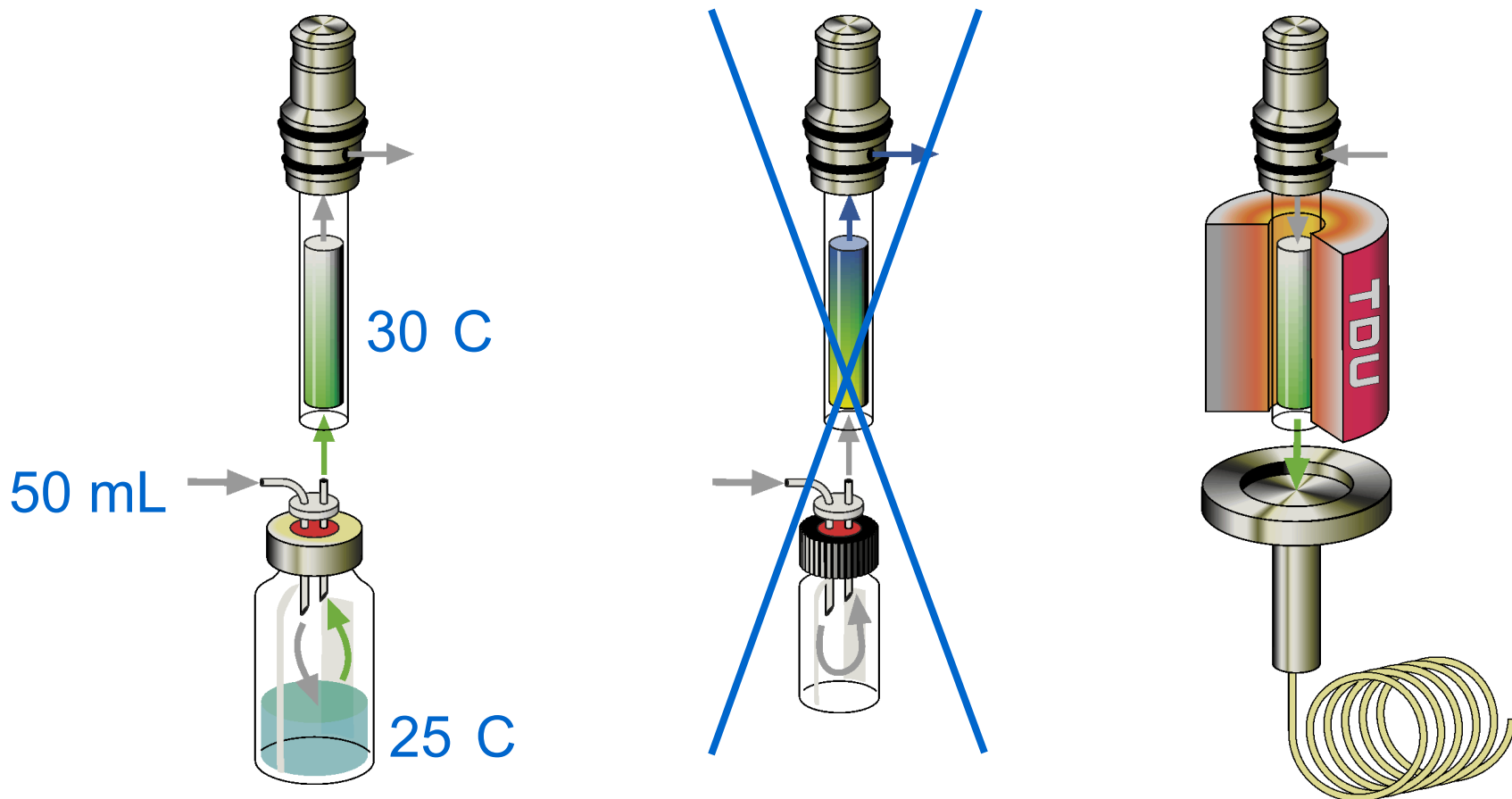






Dynamic Headspace

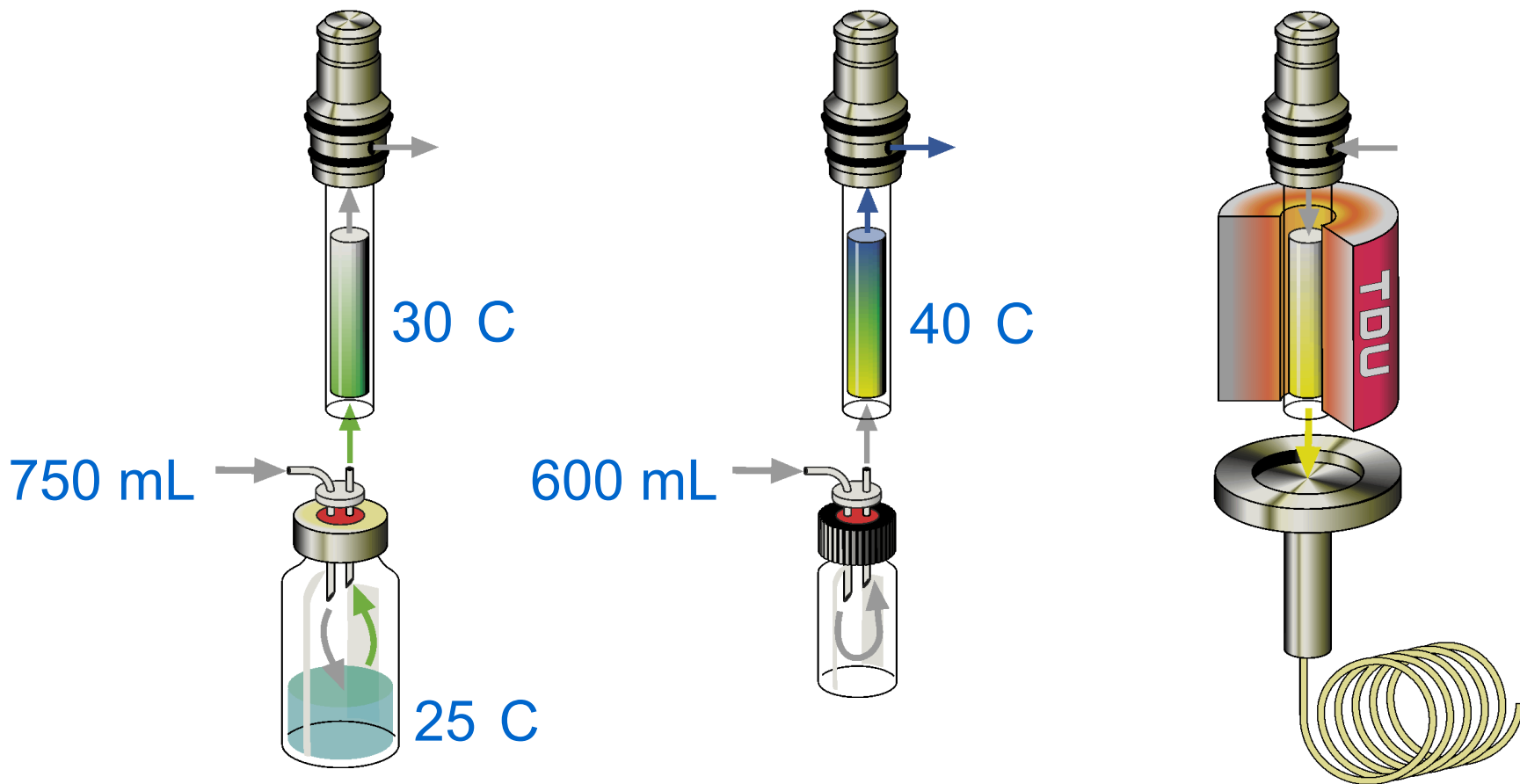
Method 1: Very Volatile Analytes





Dynamic Headspace

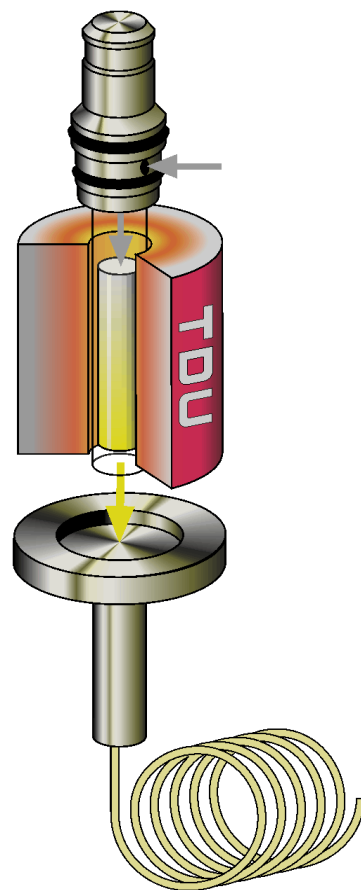
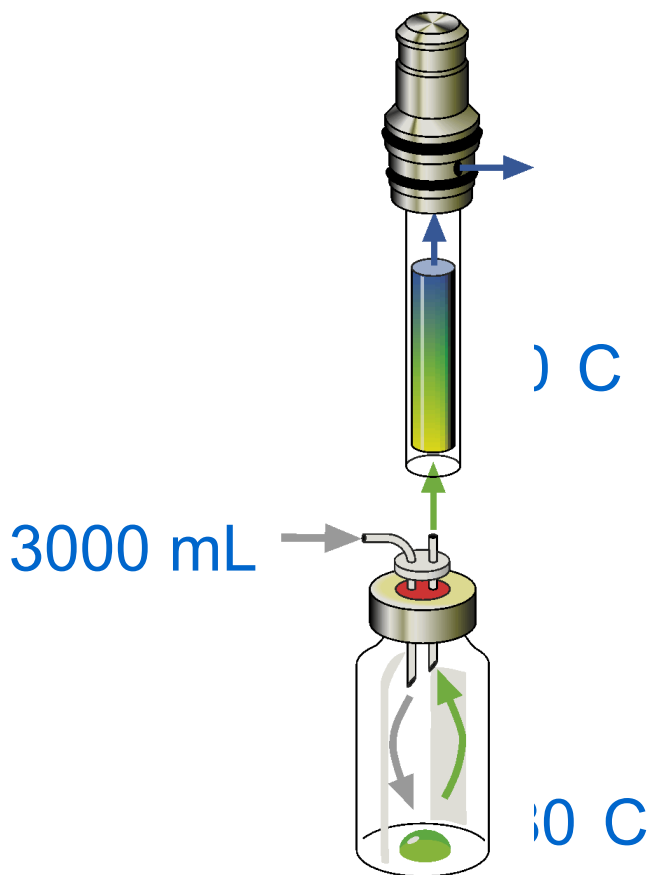
Method 2: Volatile or Semi Volatile Analytes





Dynamic Headspace

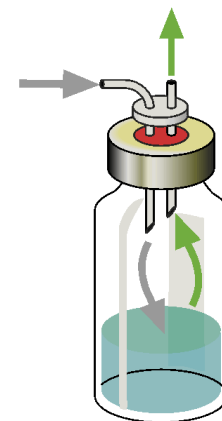
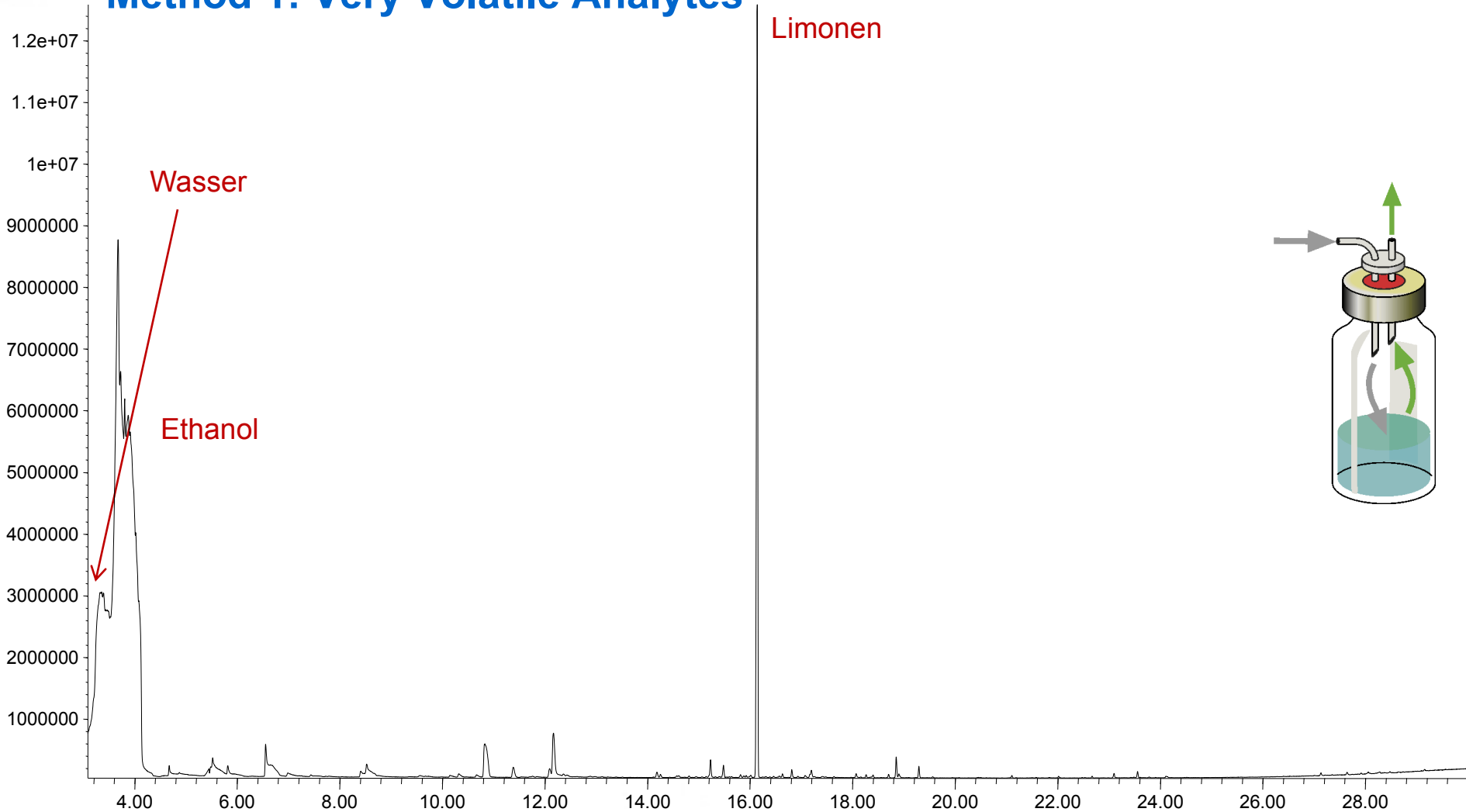
Method 3: Volatile, non volatile and hydrophilic analytes





Multivitamin Juice

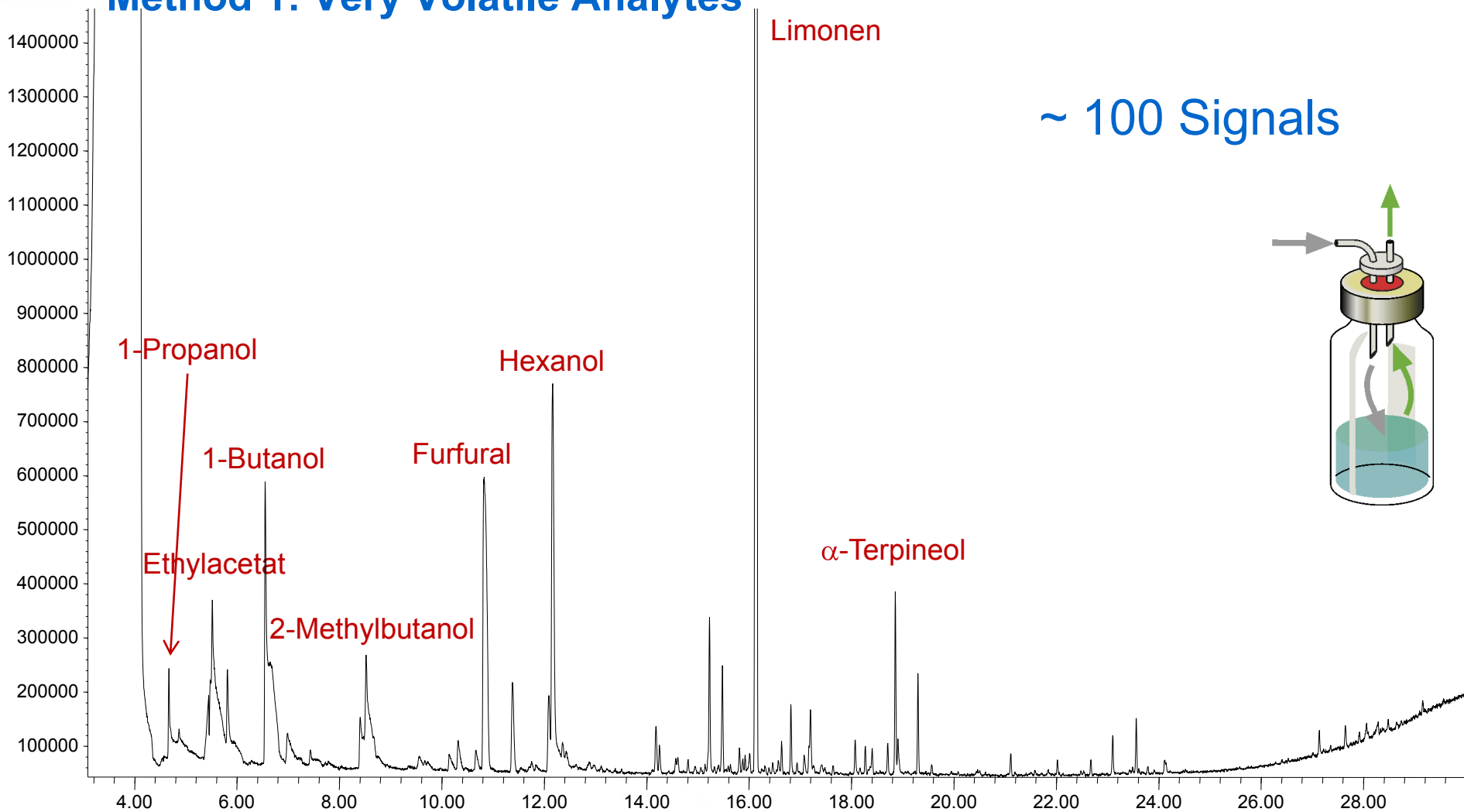
Method 1: Very Volatile Analytes





Multivitamin Juice

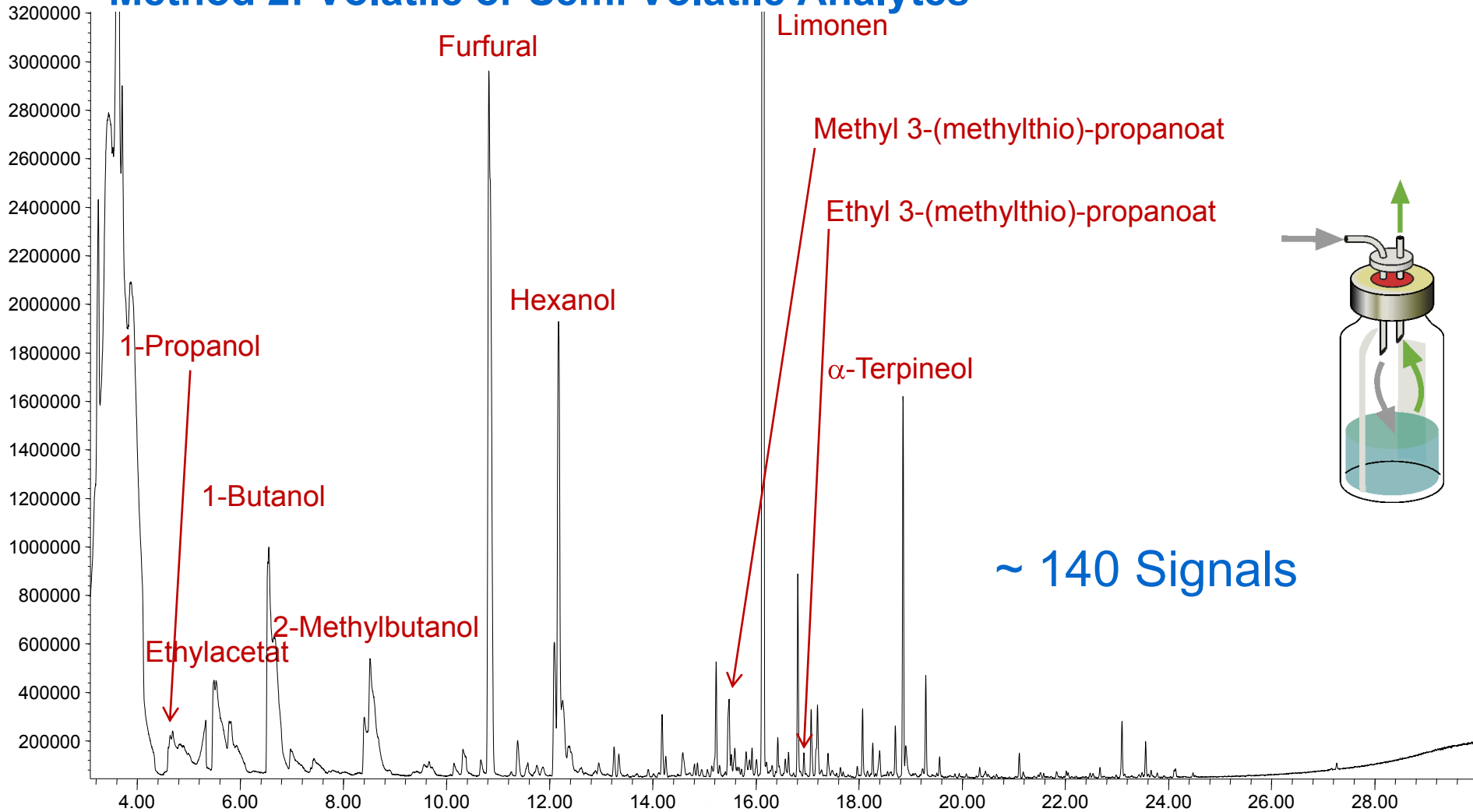
Method 1: Very Volatile Analytes





Multivitamin Juice

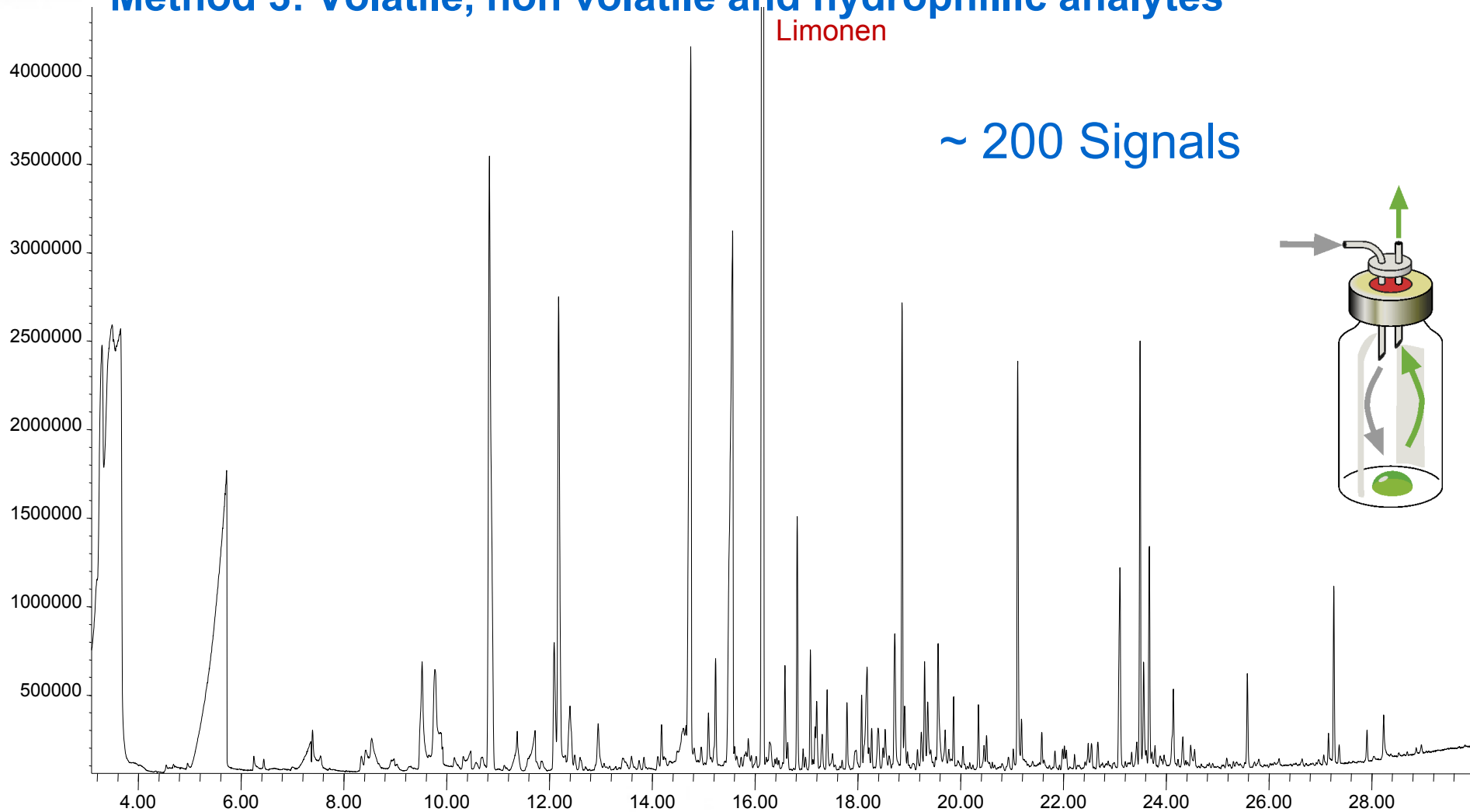
Method 2: Volatile or Semi Volatile Analytes





Multivitamin Juice

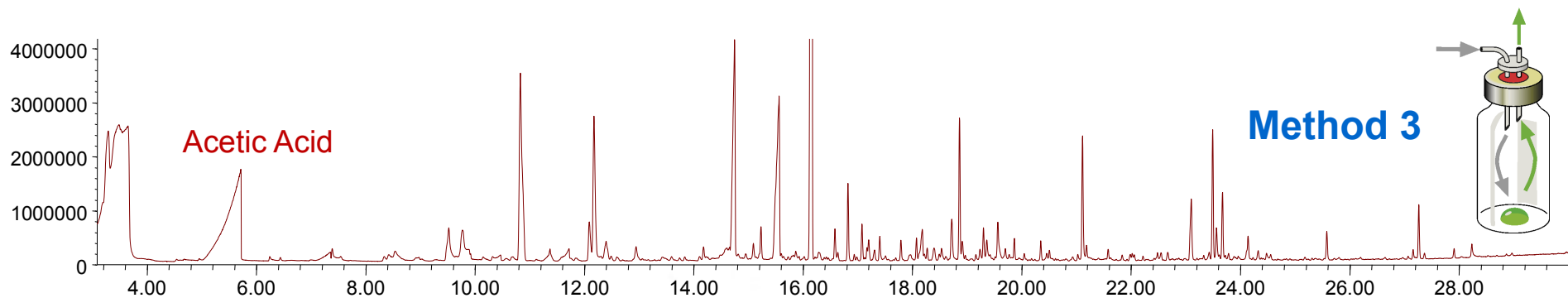
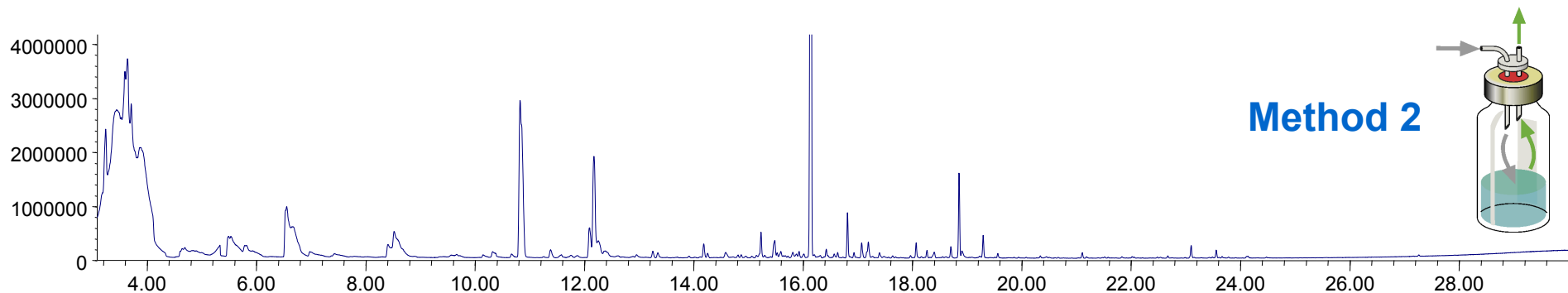
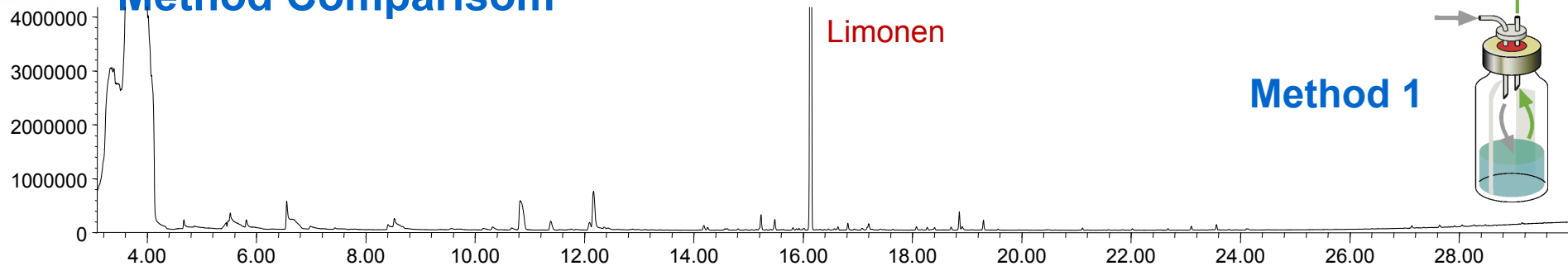
Method 3: Volatile, non volatile and hydrophilic analytes





Multivitamin Juice

Method Comparisom

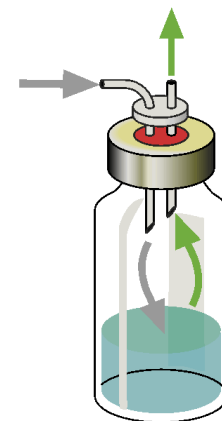
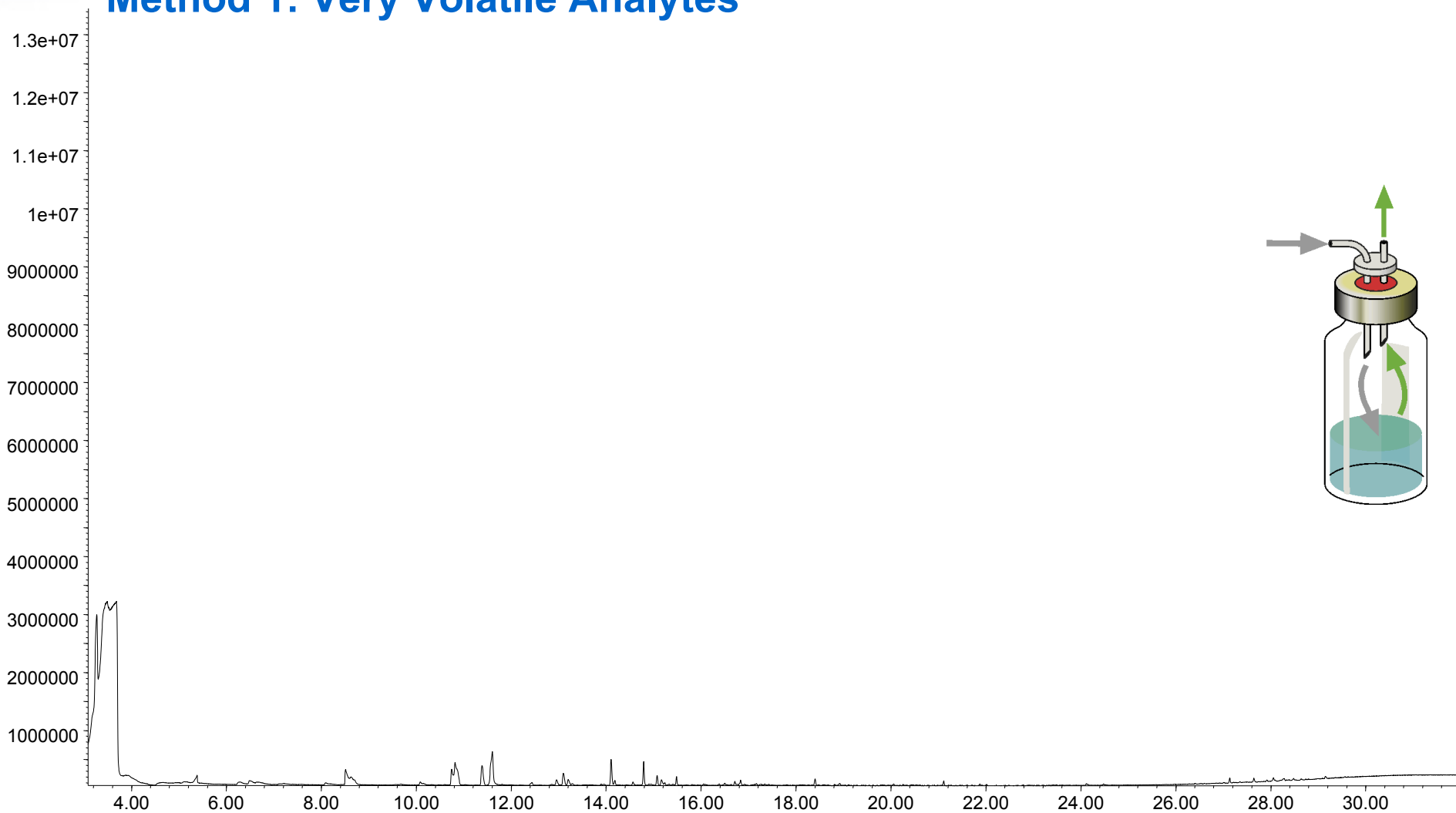






Coffee

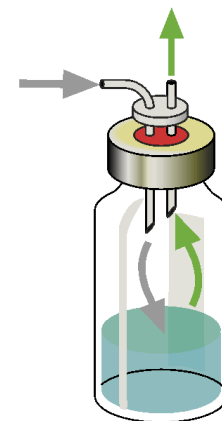
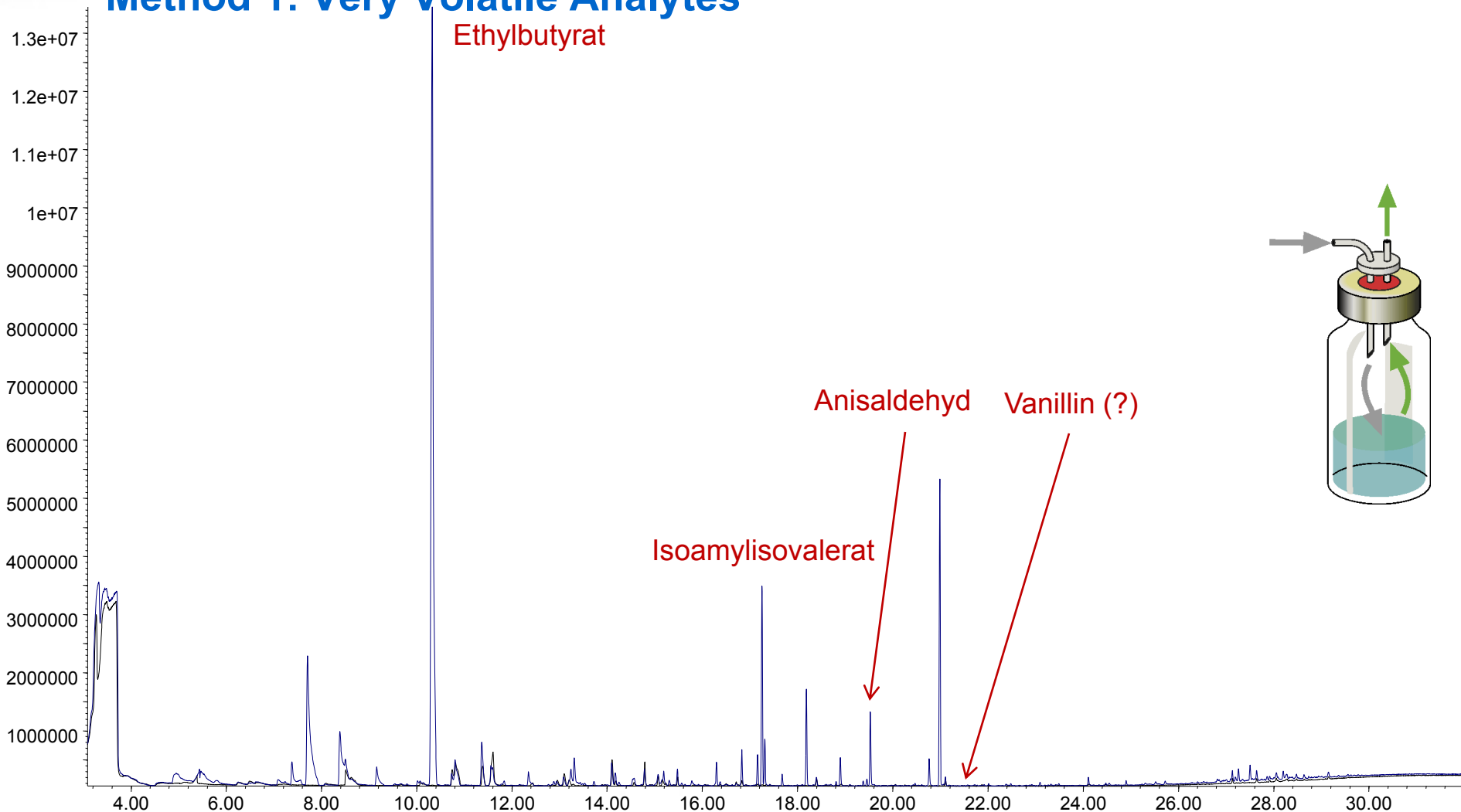
Method 1: Very Volatile Analytes





Coffee

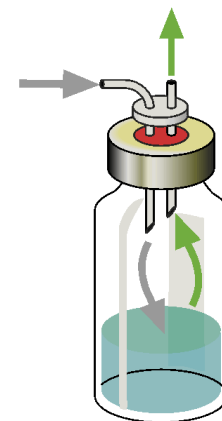
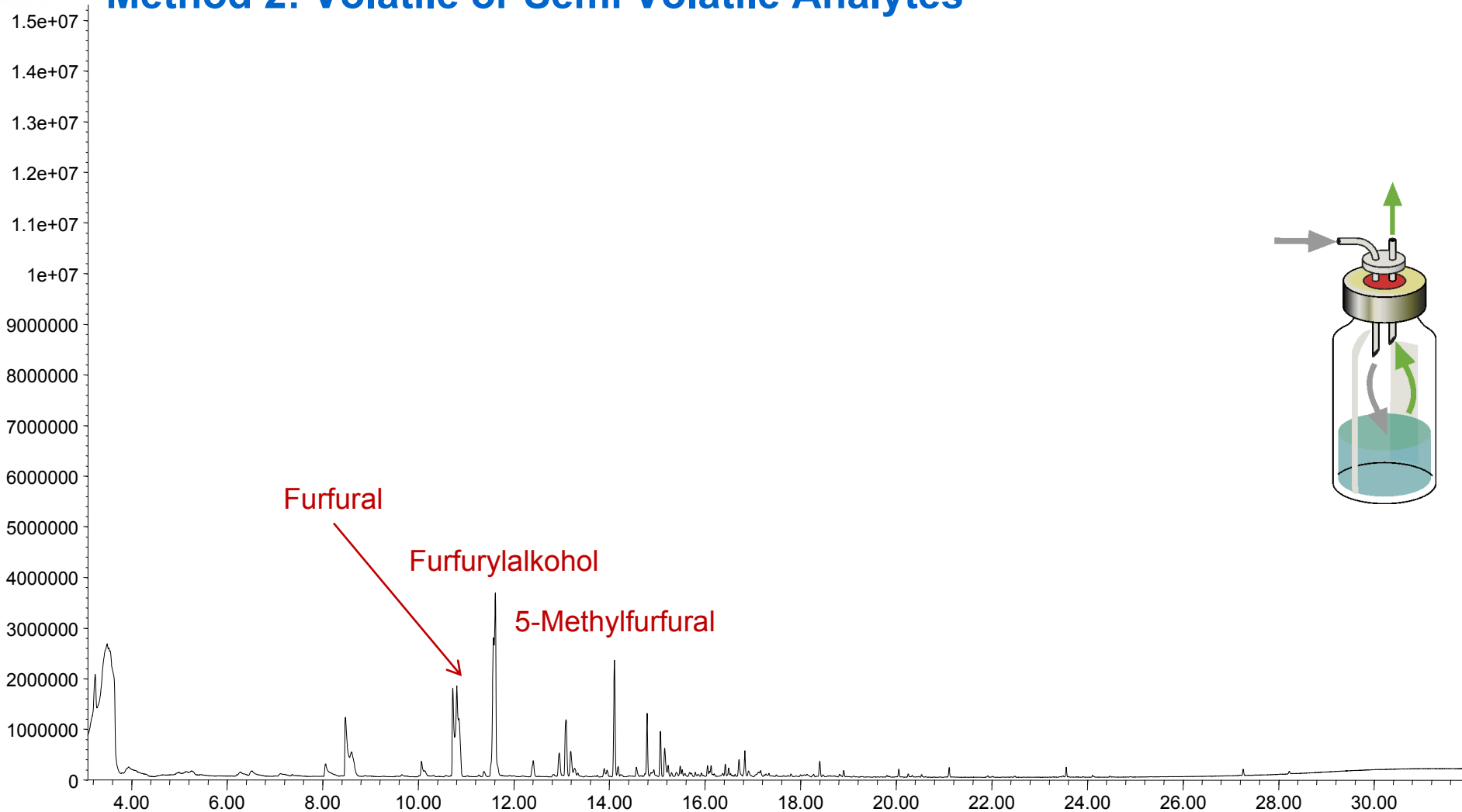
Method 1: Very Volatile Analytes





Coffee

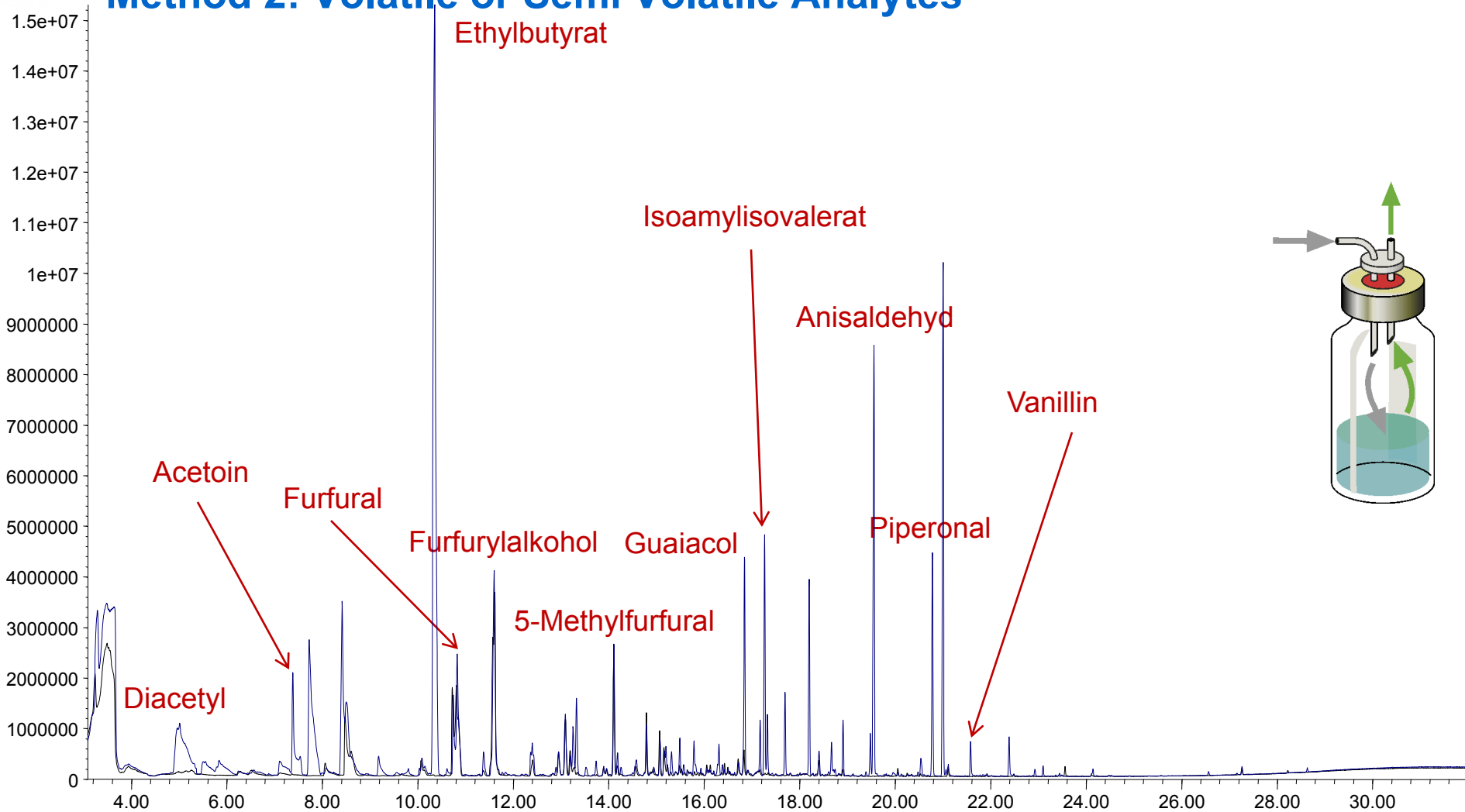
Method 2: Volatile or Semi Volatile Analytes





Coffee

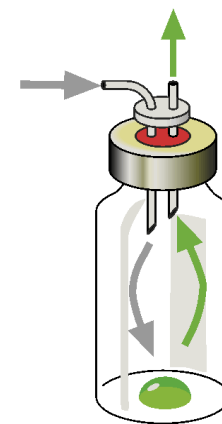
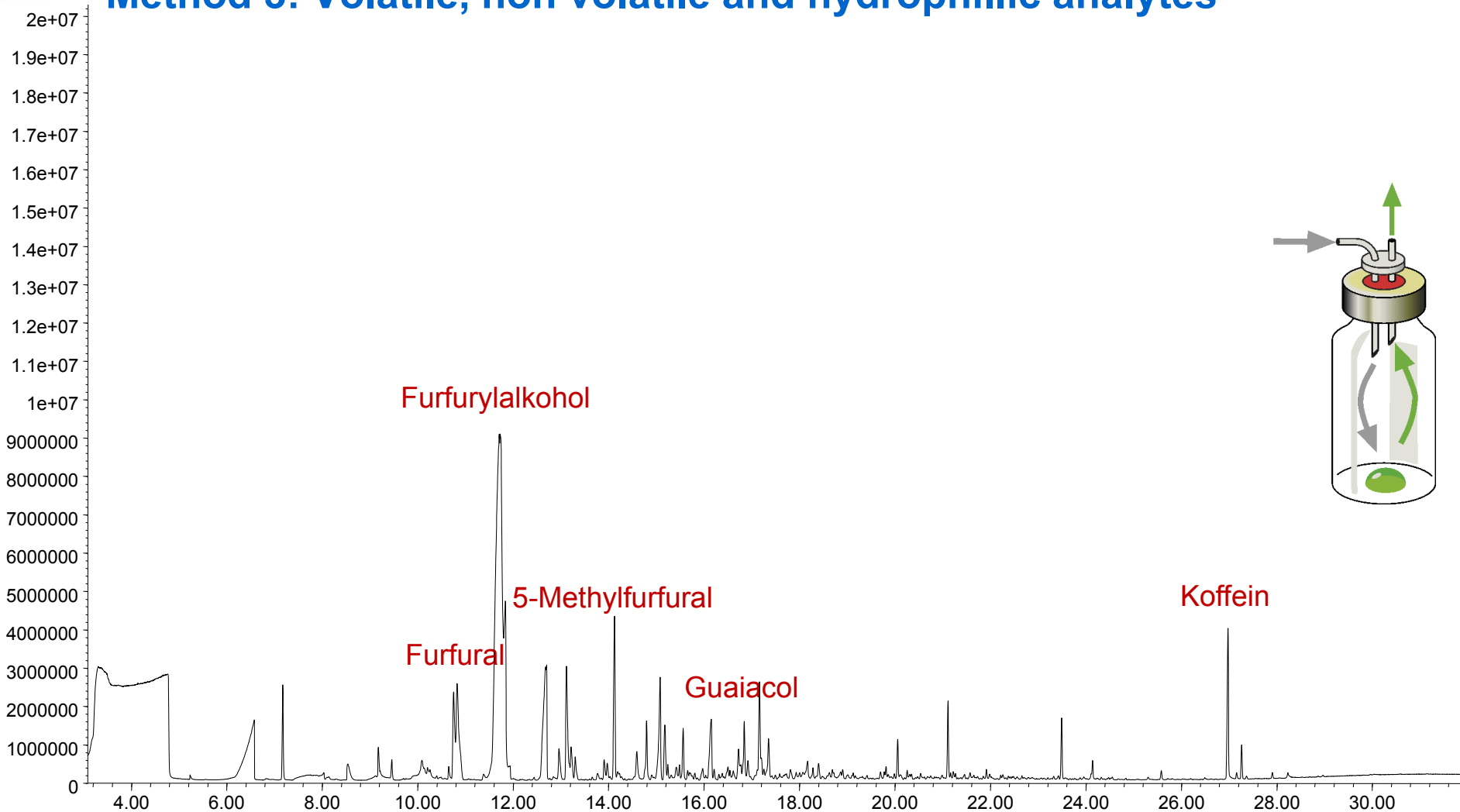
Method 2: Volatile or Semi Volatile Analytes





Coffee

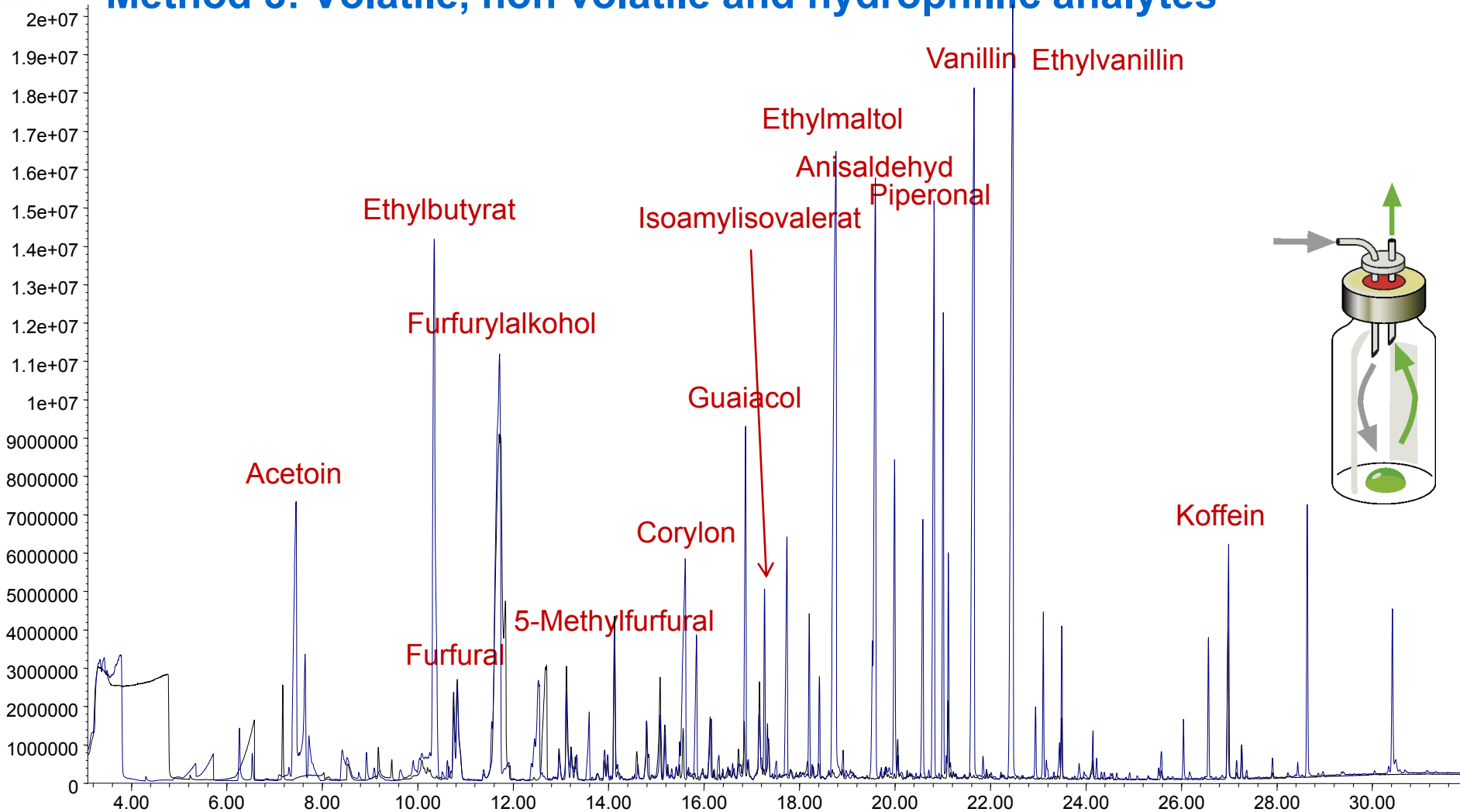
Method 3: Volatile, non volatile and hydrophilic analytes





Coffee

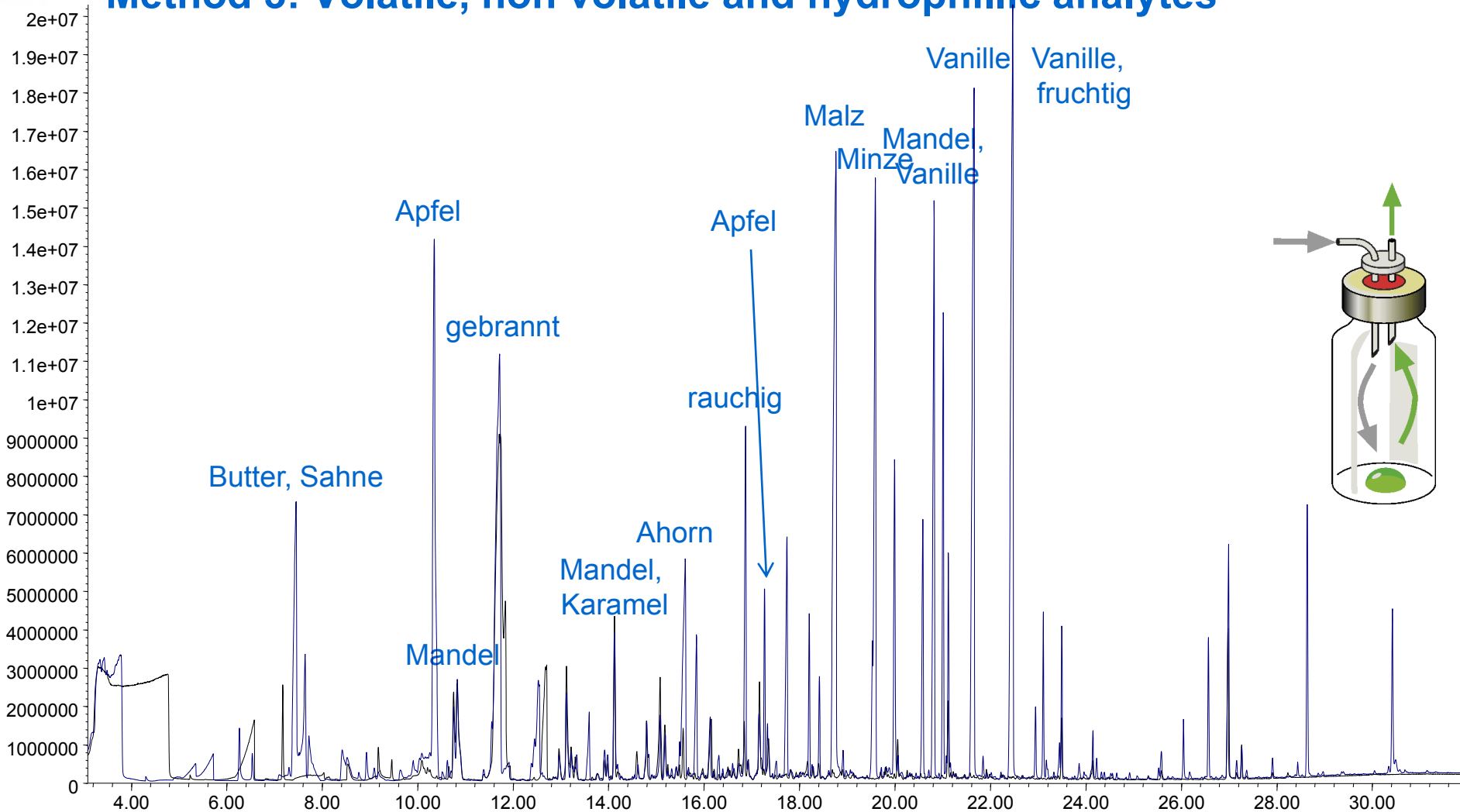
Method 3: Volatile, non volatile and hydrophilic analytes





Coffee

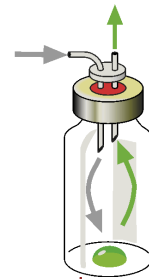
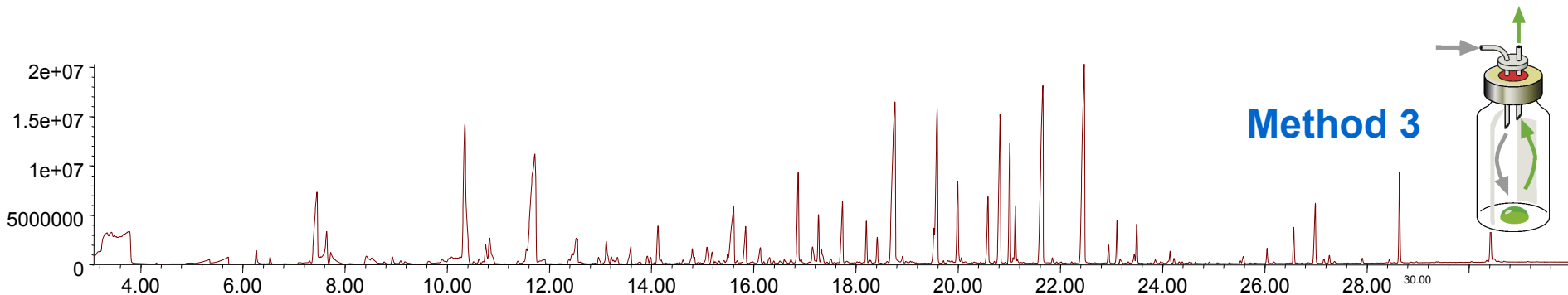
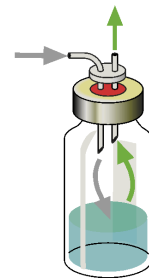
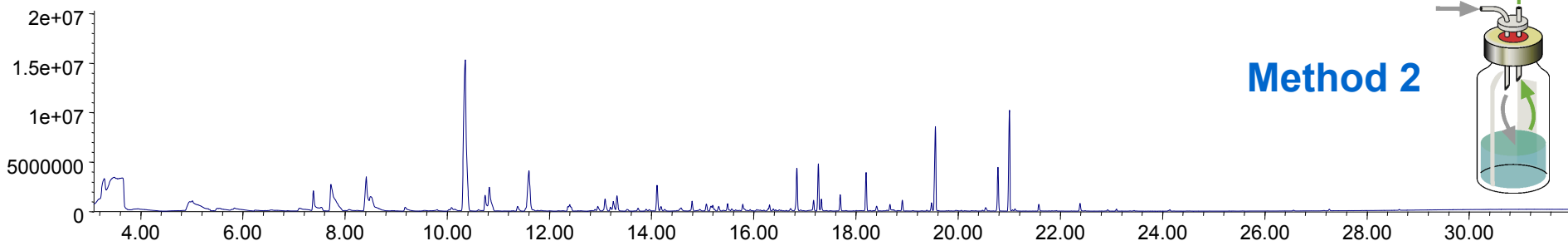
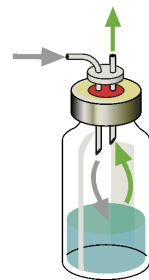
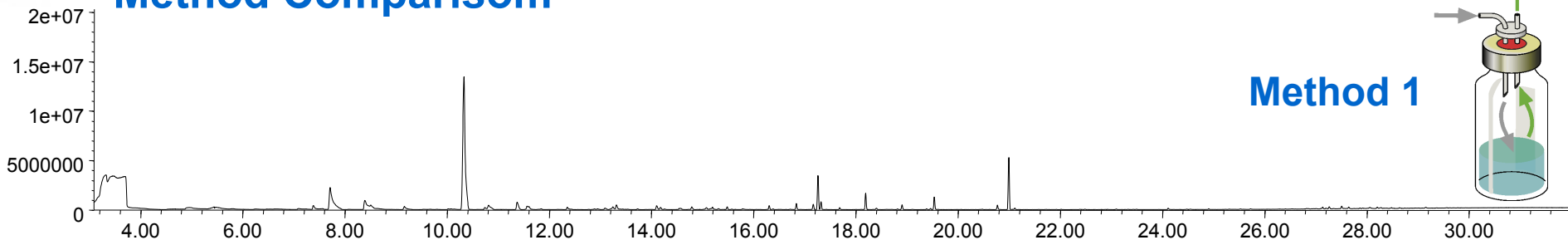
Method 3: Volatile, non volatile and hydrophilic analytes





Coffee - French Vanilla

Method Comparisom





Summary

- Very Volatile Compounds:
 - Method 1: „Static Headspace“
- Volatile and Semi-Volatile Compounds
 - Method 2: Classical Dynamic Headspace
- Volatile, Non-Volatile and Hydrophilic Compounds
 - Method 3: FEDHS