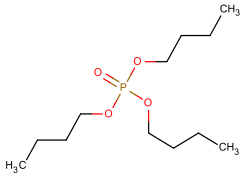
Swedish NTS projects

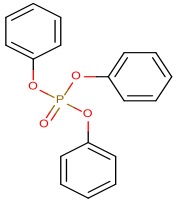
- STP screening
- Leachate from dump sites
- Laundry water
- House dust

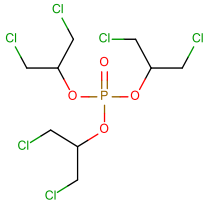
STP Water

Umeå “new” STP

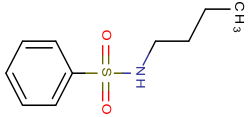
Many STP contaminants…



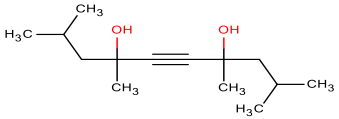




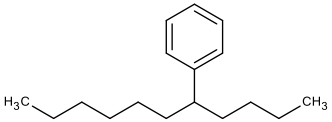
OPs



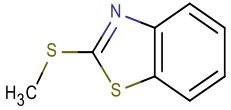
Benzene-sulphonamides, plasticizers



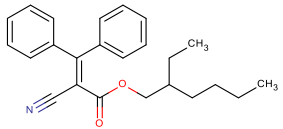
TMDD, surfactant



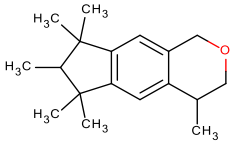
LABs, surfactant imp.



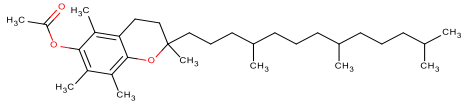
MBT, accelerator rubber



Octocrylene, UV stabilizer

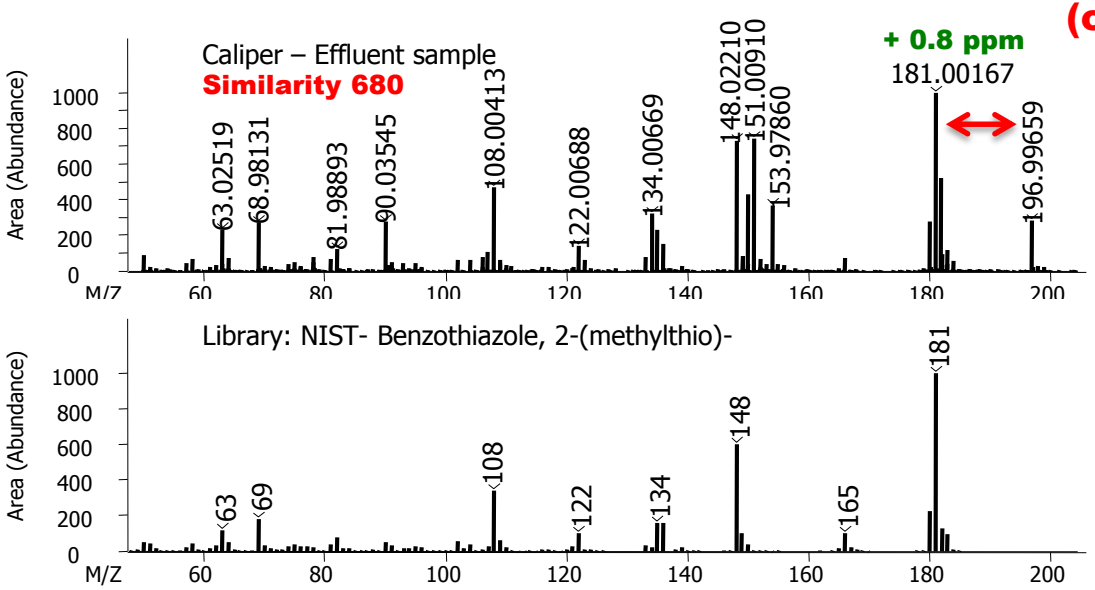


Galaxolide, fragrance

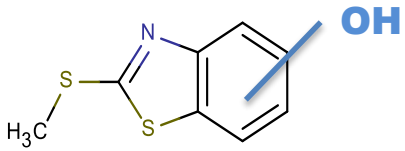


Tocopheryl acetate, antioxidant

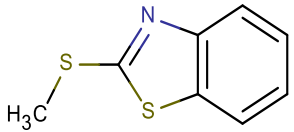
… and also transformation products



+ 15.99492 amu
(oxygen 15.99491 amu)

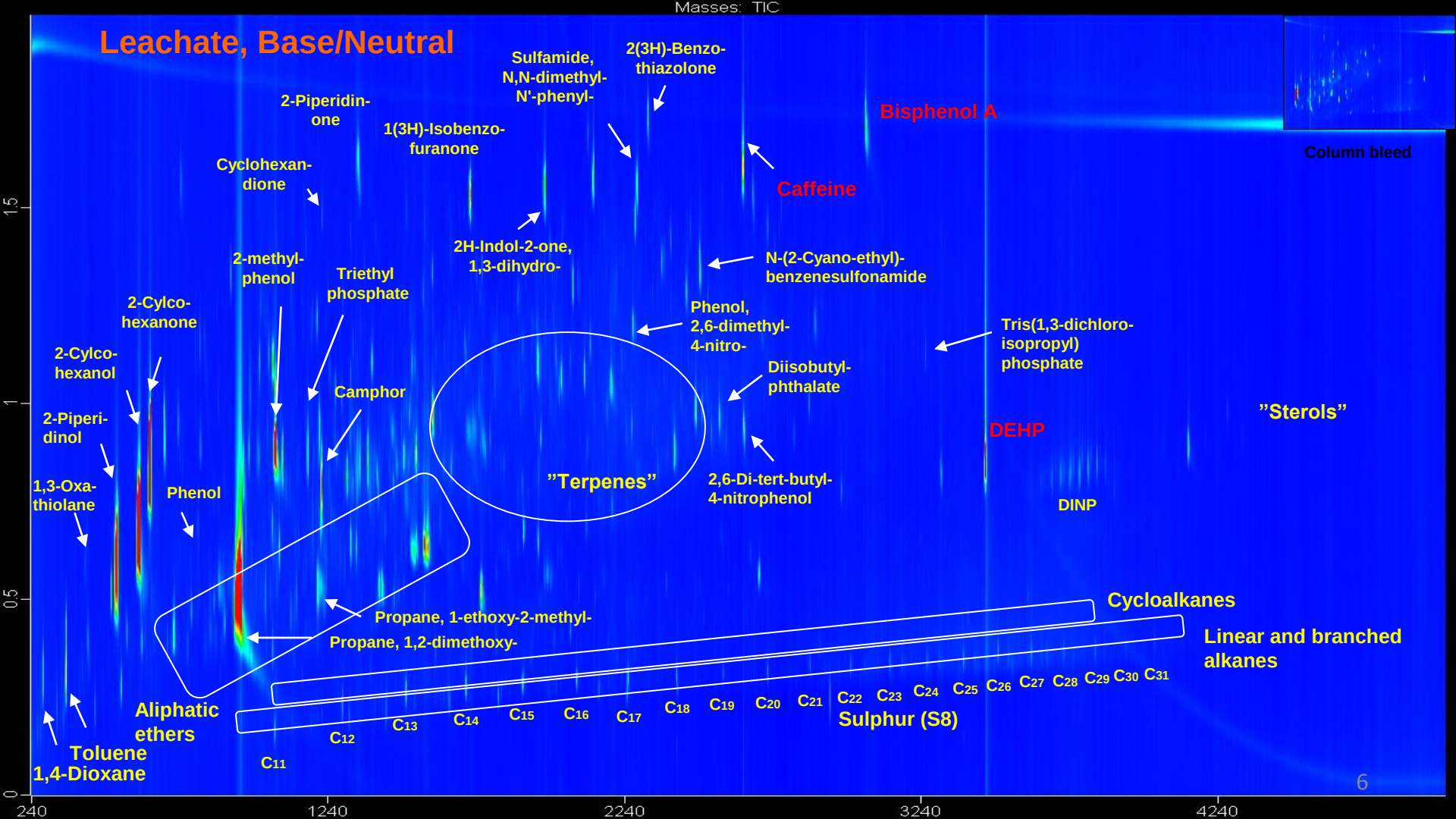


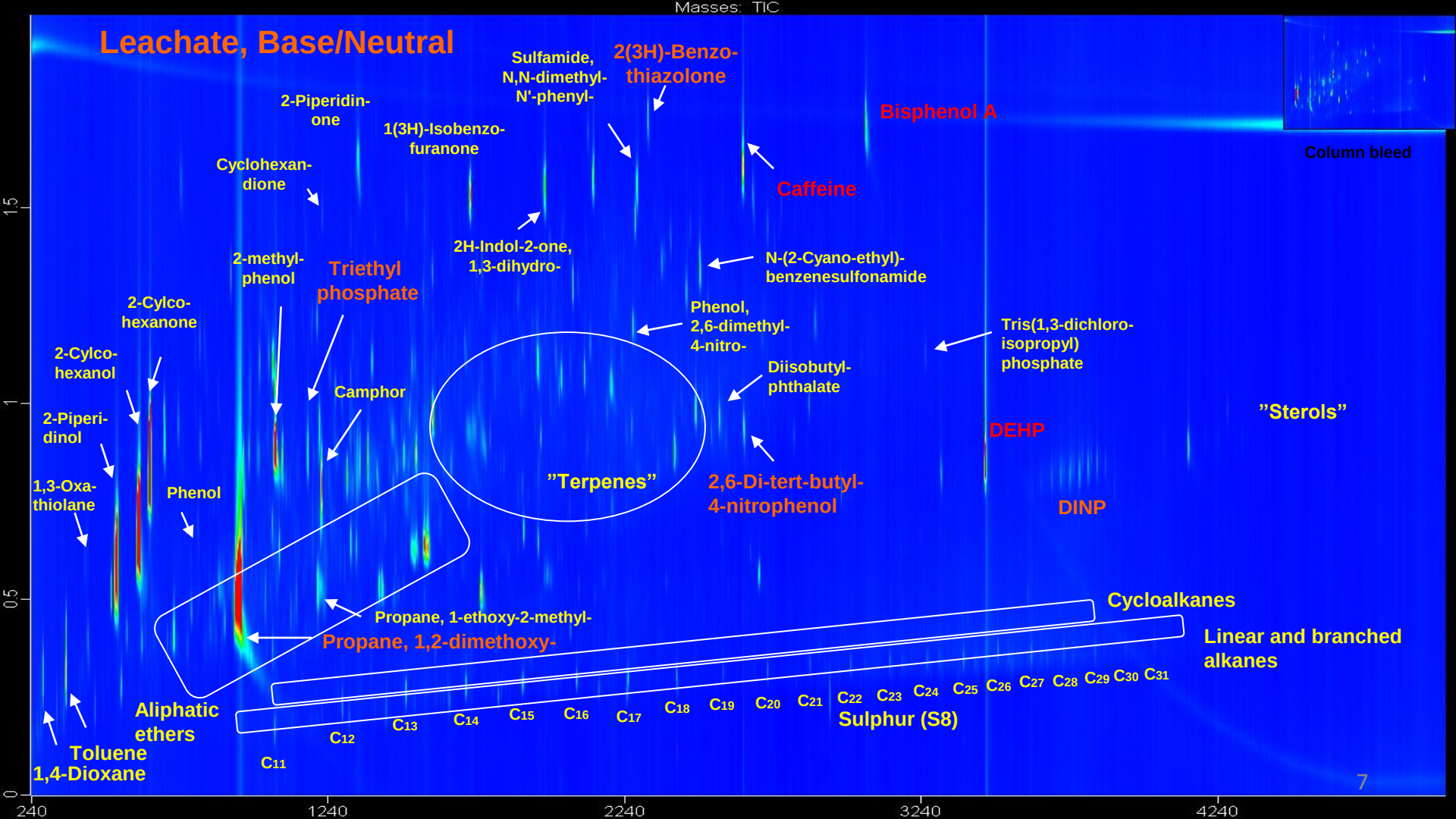
6-OH-MBT ?

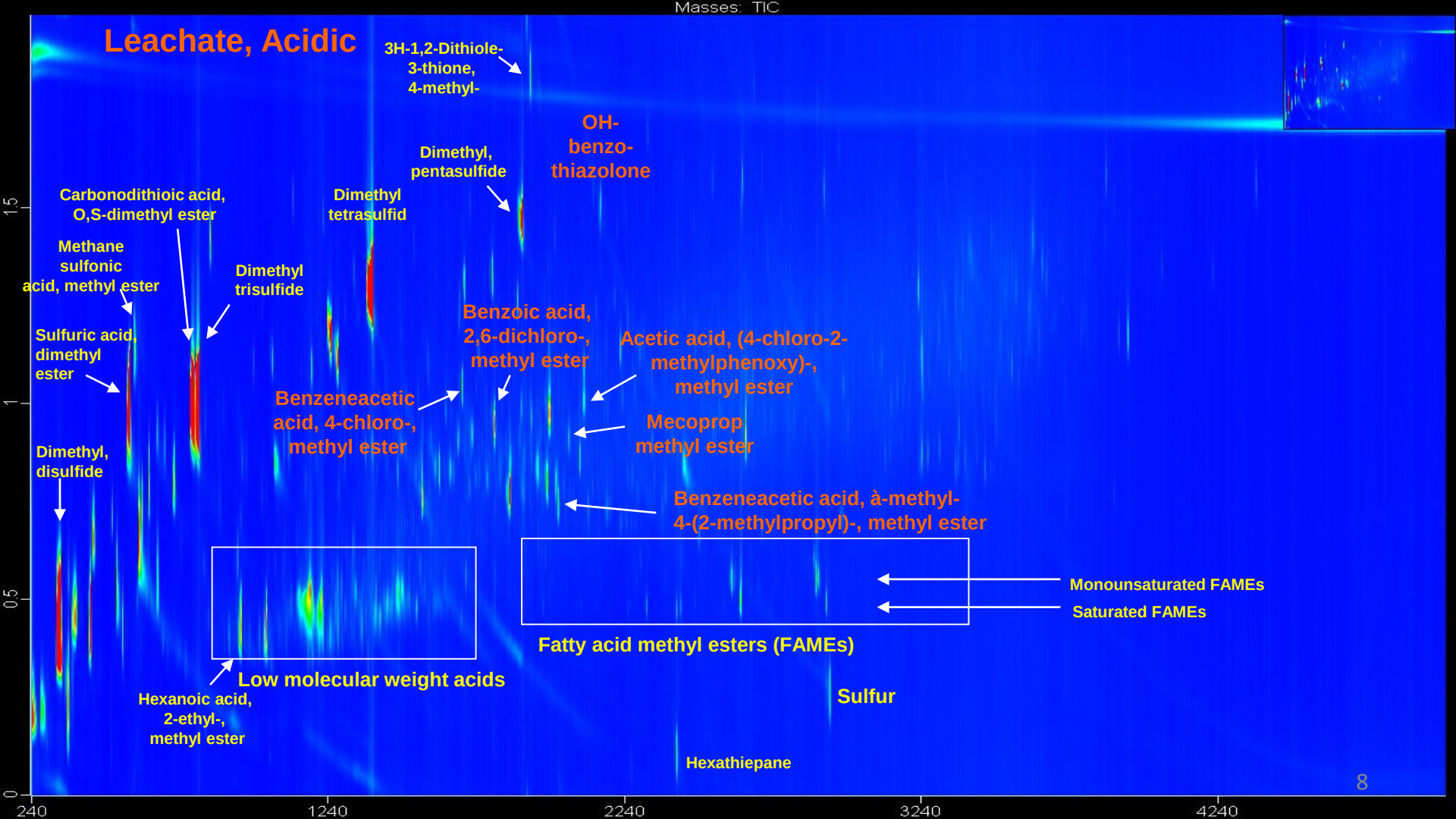


MBT
(2-methylthio-benzothiazole)

Leachate Water


Masses: TIC
Leachate, Base/Neutral
Sulfamide, N,N-dimethyl-N'-phenyl-
2(3H)-Benzo-thiazolone
2-Piperidin-one
1(3H)-Isobenzo-furanone
Bisphenol A
Column bleed
Cyclohexan-dione
Caffeine
2H-Indol-2-one, 1,3-dihydro-
N-(2-Cyano-ethyl)-benzenesulfonamide
2-methyl-phenol
Triethyl phosphate
2-Cylco-hexanone
Phenol, 2,6-dimethyl-4-nitro-
Tris(1,3-dichloro-isopropyl) phosphate
2-Cylco-hexanol
Diisobutyl-phthalate
Camphor
2-Piperi-dinol
"Sterols"
DEHP
"Terpenes"
1,3-Oxa-thiolane
Phenol
2,6-Di-tert-butyl-4-nitrophenol
DINP
Cycloalkanes
Propane, 1-ethoxy-2-methyl-
Propane, 1,2-dimethoxy-
Linear and branched alkanes
Aliphatic ethers
C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31
Sulphur (S8)
Toluene
1,4-Dioxane
0 0.5 1 1.5
240 1240 2240 3240 4240


Masses: TIC
Leachate, Base/Neutral
Sulfamide, N,N-dimethyl-N'-phenyl-
2(3H)-Benzo-thiazolone
2-Piperidin-one
1(3H)-Isobenzo-furanone
Bisphenol A
Column bleed
Cyclohexan-dione
Caffeine
2H-Indol-2-one, 1,3-dihydro-
N-(2-Cyano-ethyl)-benzenesulfonamide
2-methyl-phenol
Triethyl phosphate
2-Cylco-hexanone
Phenol, 2,6-dimethyl-4-nitro-
Tris(1,3-dichloro-isopropyl) phosphate
2-Cylco-hexanol
Diisobutyl-phthalate
Camphor
2-Piperi-dinol
"Sterols"
DEHP
"Terpenes"
1,3-Oxa-thiolane
Phenol
2,6-Di-tert-butyl-4-nitrophenol
DINP
Cycloalkanes
Propane, 1-ethoxy-2-methyl-
Propane, 1,2-dimethoxy-
Linear and branched alkanes
C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31
Sulphur (S8)
Aliphatic ethers
Toluene
1,4-Dioxane
0 0.5 1 1.5
240 1240 2240 3240 4240


Masses: TIC
Leachate, Acidic
3H-1,2-Dithiole-3-thione, 4-methyl-
OH-benzo-thiazolone
Dimethyl, pentasulfide
Dimethyl tetrasulfid
Carbonodithioic acid, O,S-dimethyl ester
Methane sulfonic acid, methyl ester
Dimethyl trisulfide
Sulfuric acid, dimethyl ester
Benzoic acid, 2,6-dichloro-, methyl ester
Acetic acid, (4-chloro-2-methylphenoxy)-, methyl ester
Benzeneacetic acid, 4-chloro-, methyl ester
Mecoprop methyl ester
Dimethyl, disulfide
Benzeneacetic acid, à-methyl-4-(2-methylpropyl)-, methyl ester
Monounsaturated FAMEs
Saturated FAMEs
Fatty acid methyl esters (FAMEs)
Low molecular weight acids
Hexanoic acid, 2-ethyl-, methyl ester
Sulfur
Hexathiepane
1.5
1
0.5
0
240
1240
2240
3240
4240

Hazard Assessment (PBT)

	Substances
Identified	600
1/3 of samples; >100 ng/L	140

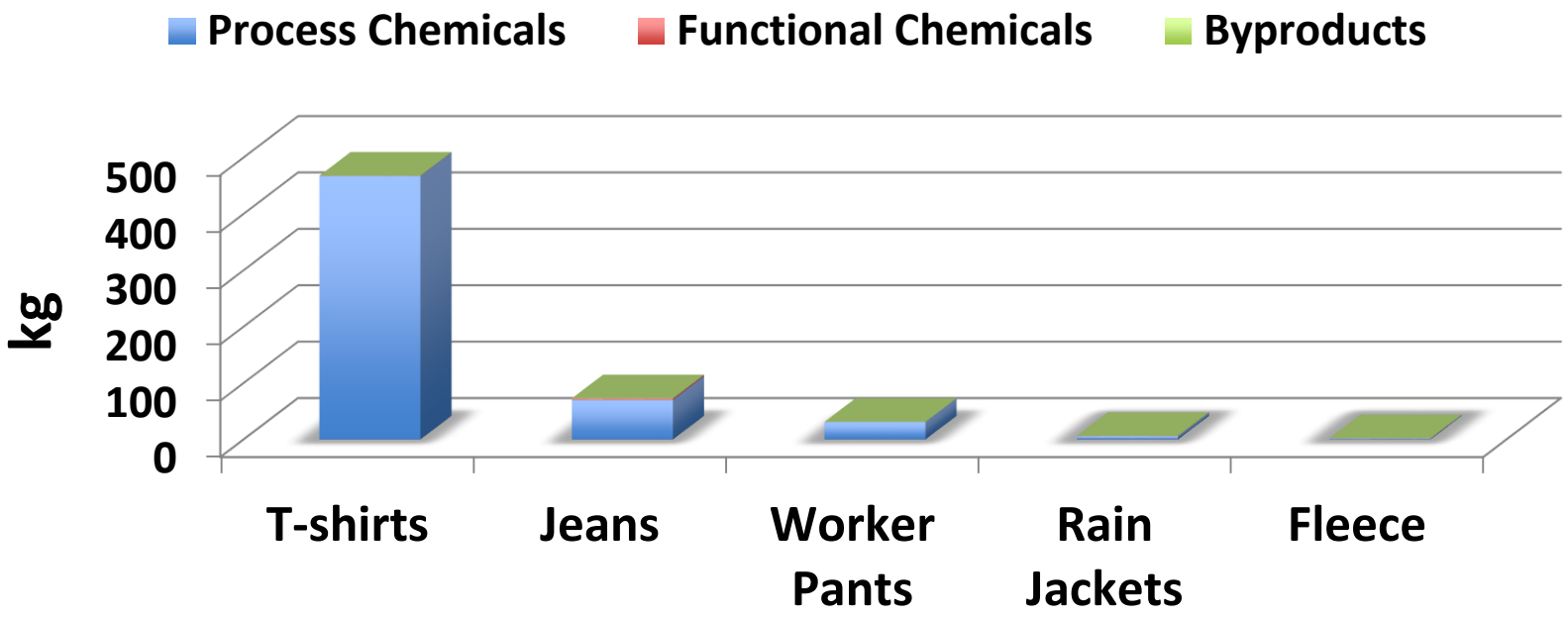
Properties	
Highly persistent	**3**
Persistent	47
Highly bioaccumulating	**1**
Bioaccumulating	3
Highly toxic	**26**
Toxic	50

Laundry Water

Laundry – Target – NTS (workers pants)

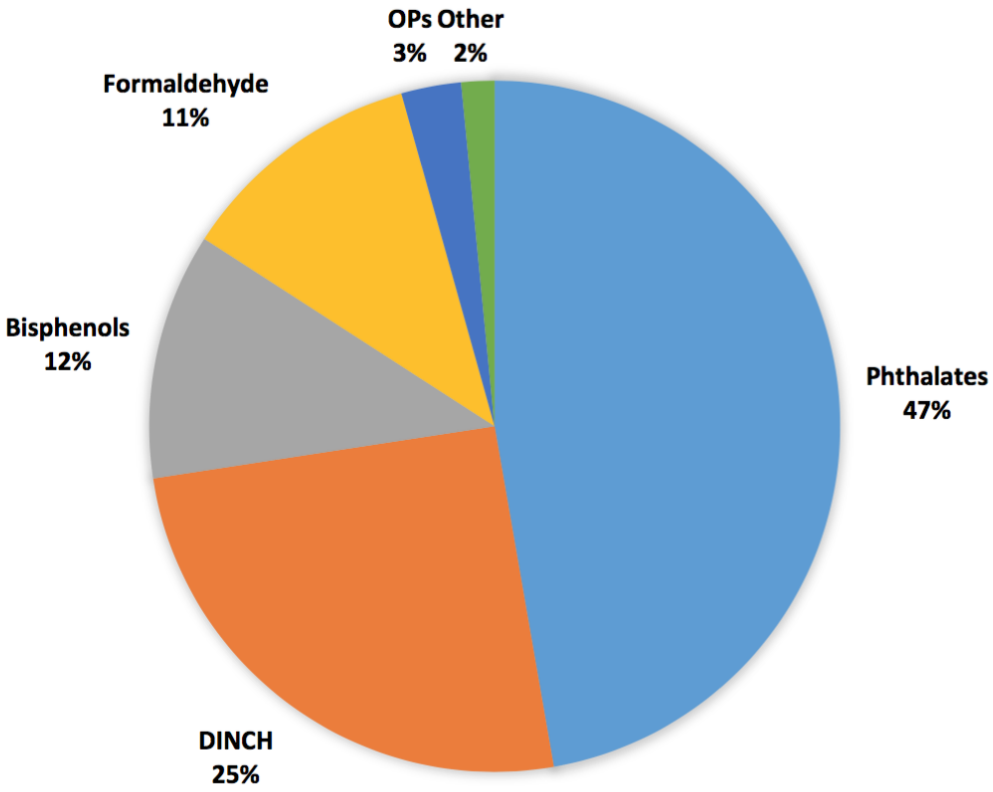
Blank Shell jackets Fleece Worker pants T-shirts Jeans

Target Analysis

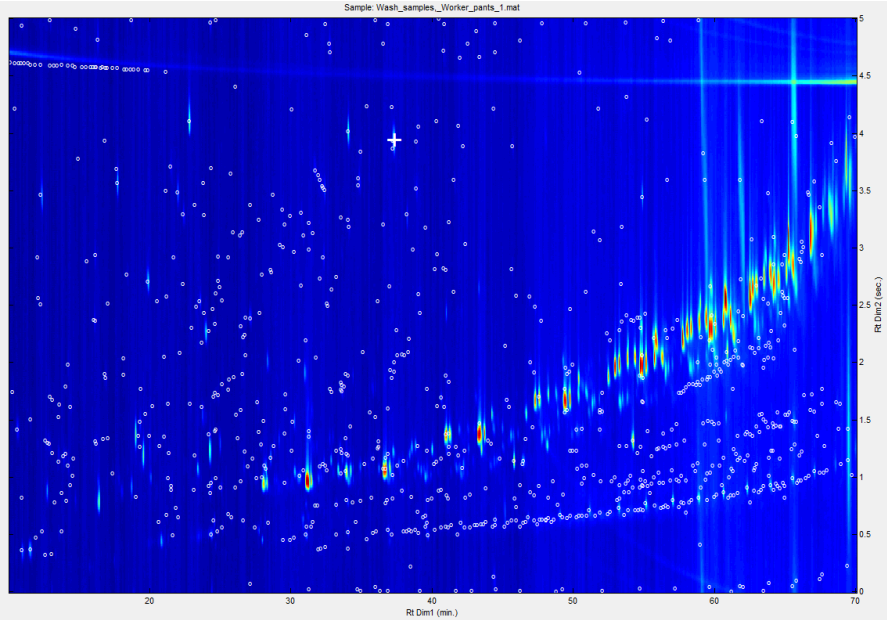


Net supply (ton)	10,000	6,000	3,200	3,600	1,000

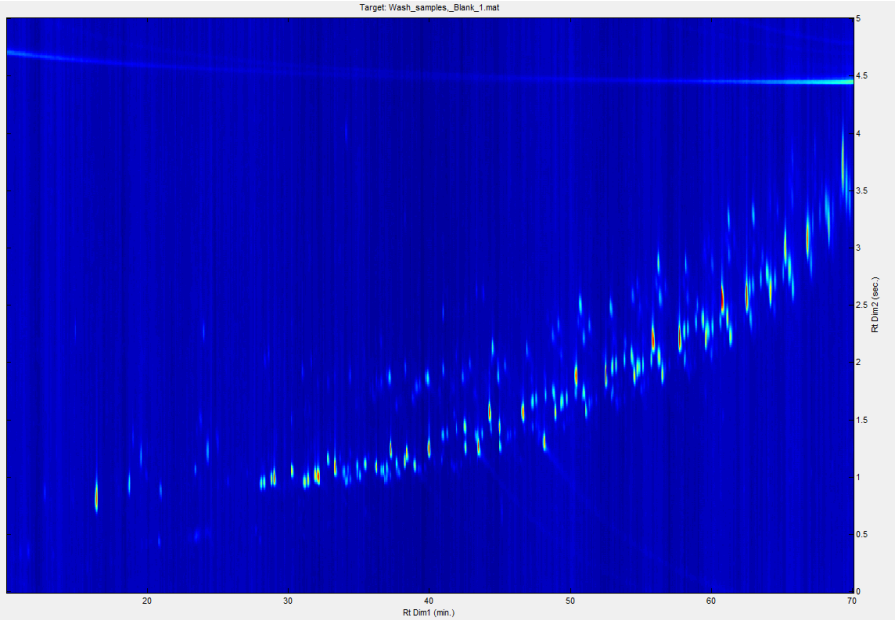
Compound classes



NTS of Working Pants

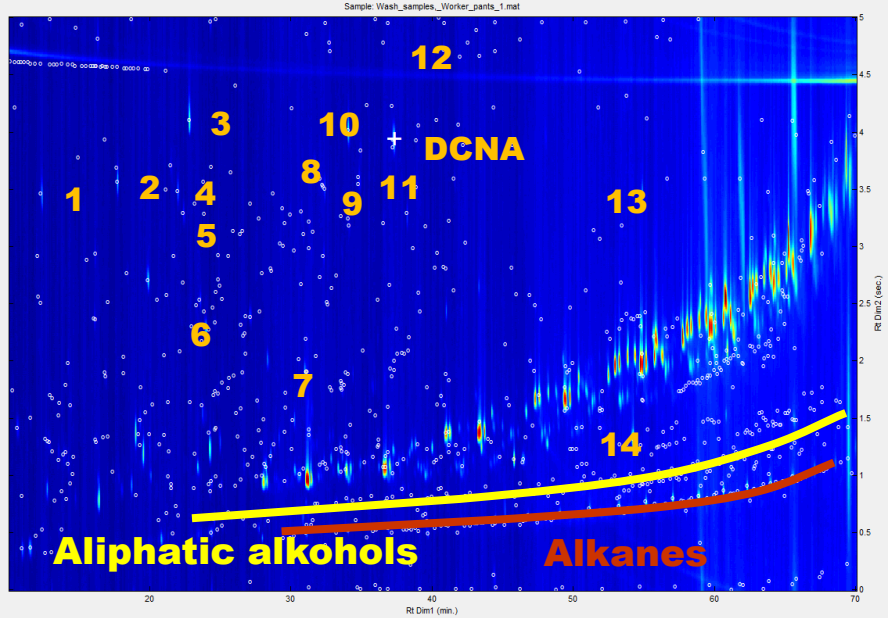


Working Pants

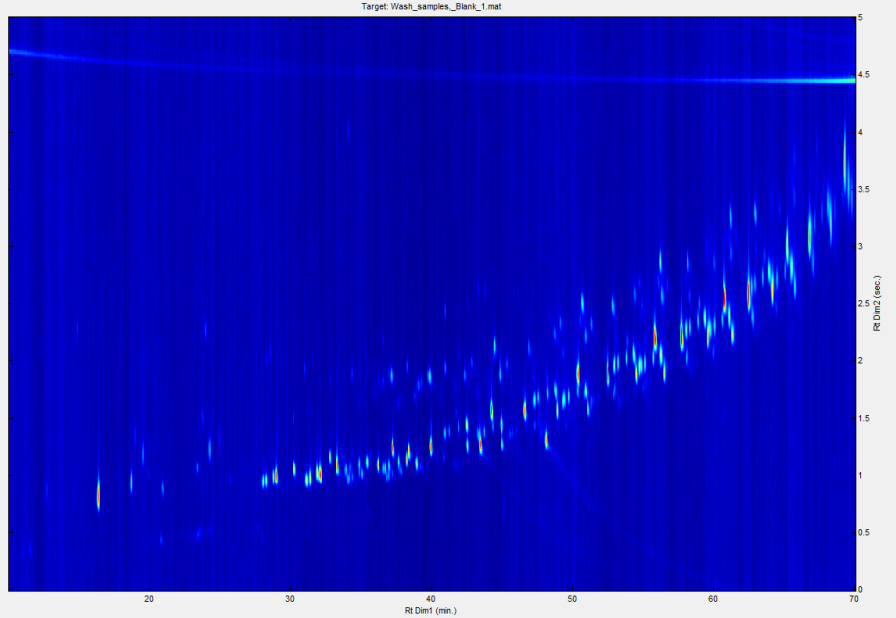


Detergent only

Working Pant Contaminants

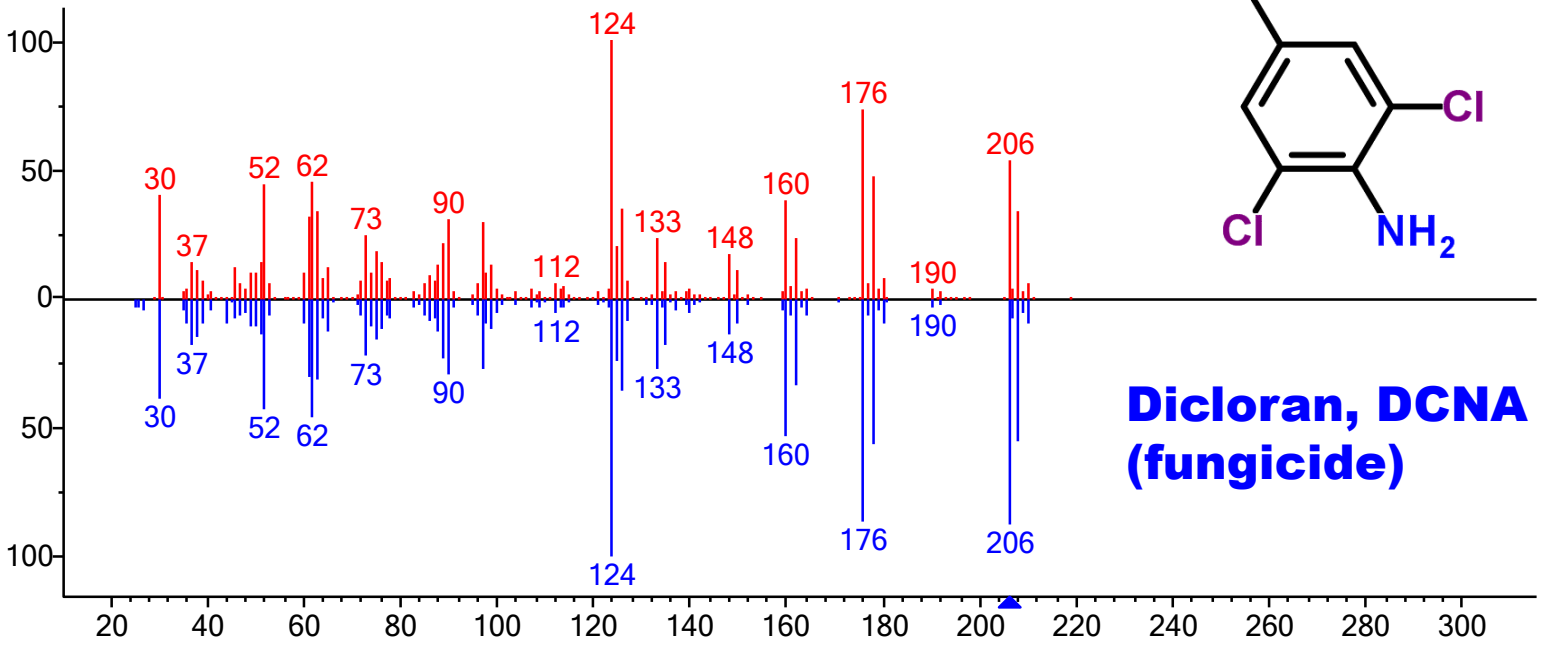


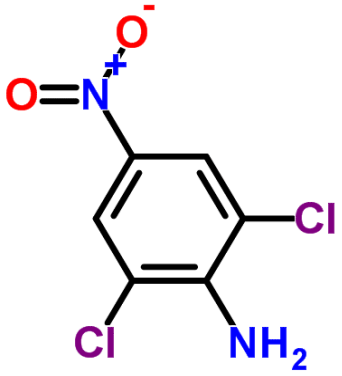
Working Pants



Detergent only

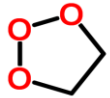
Working Pant: DCNA fungicide



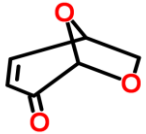


Dicloran, DCNA (fungicide)

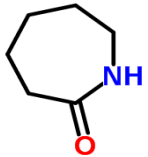
Non-Target Analysis of Worker Pants



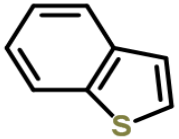
1. Trioxolan



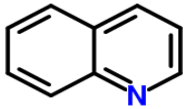
2. Levoglucosenone



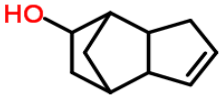
3. Caprolactam



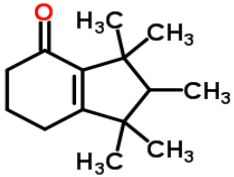
4. Benzothiophene



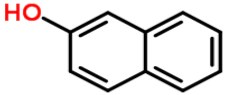
5. Quinoline



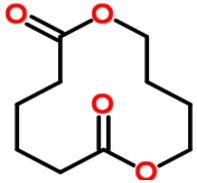
6. Tcd-alcohol



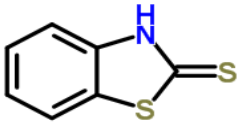
7. Cashmeran



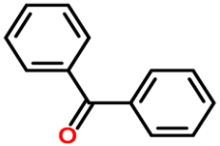
8. 2-Naphthol



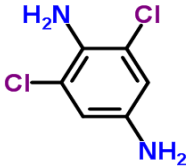
9. 1,6-Dioxacyclodo-decane-7,12-dione



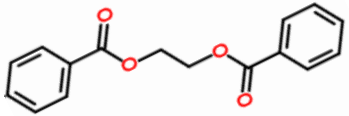
10. 2-Mercapto-benzothiazole (MBT)



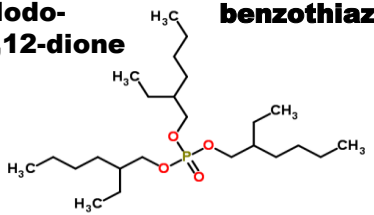
11. Benzophenone



12. Benzenediamine, 2,6-dichloro-



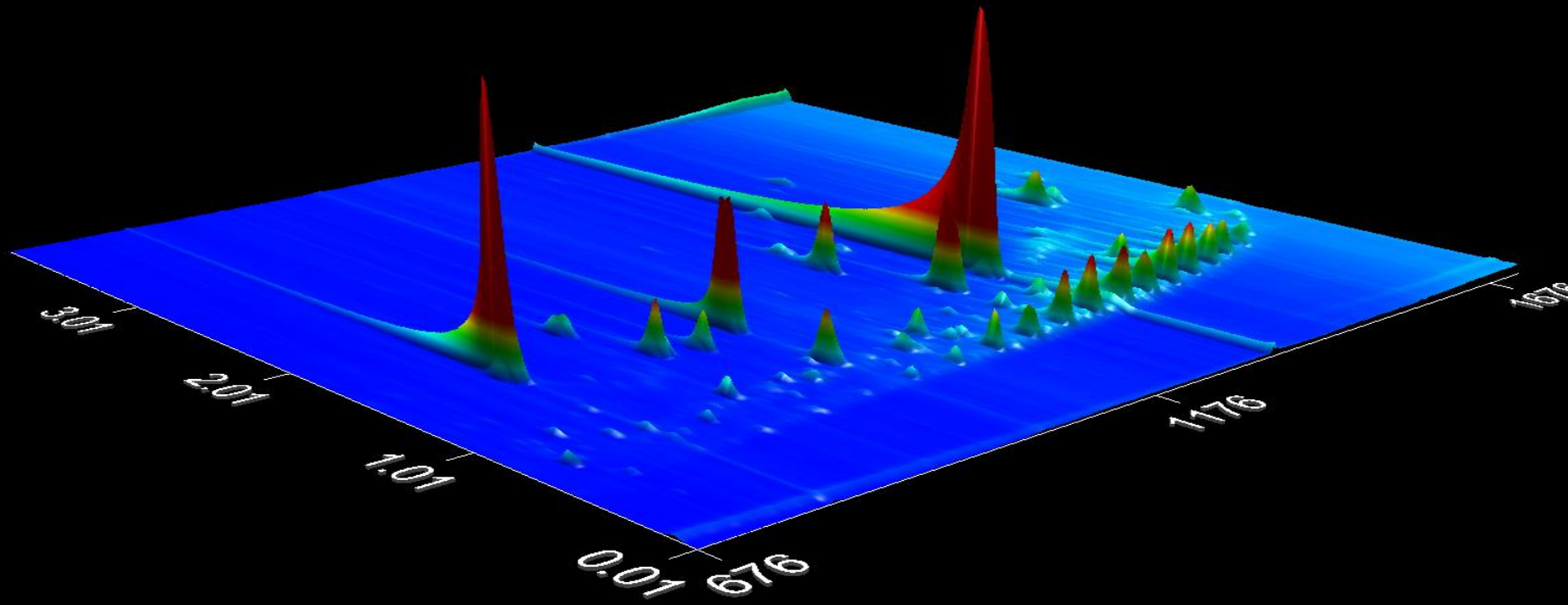
13. Ethylene dibenzoate

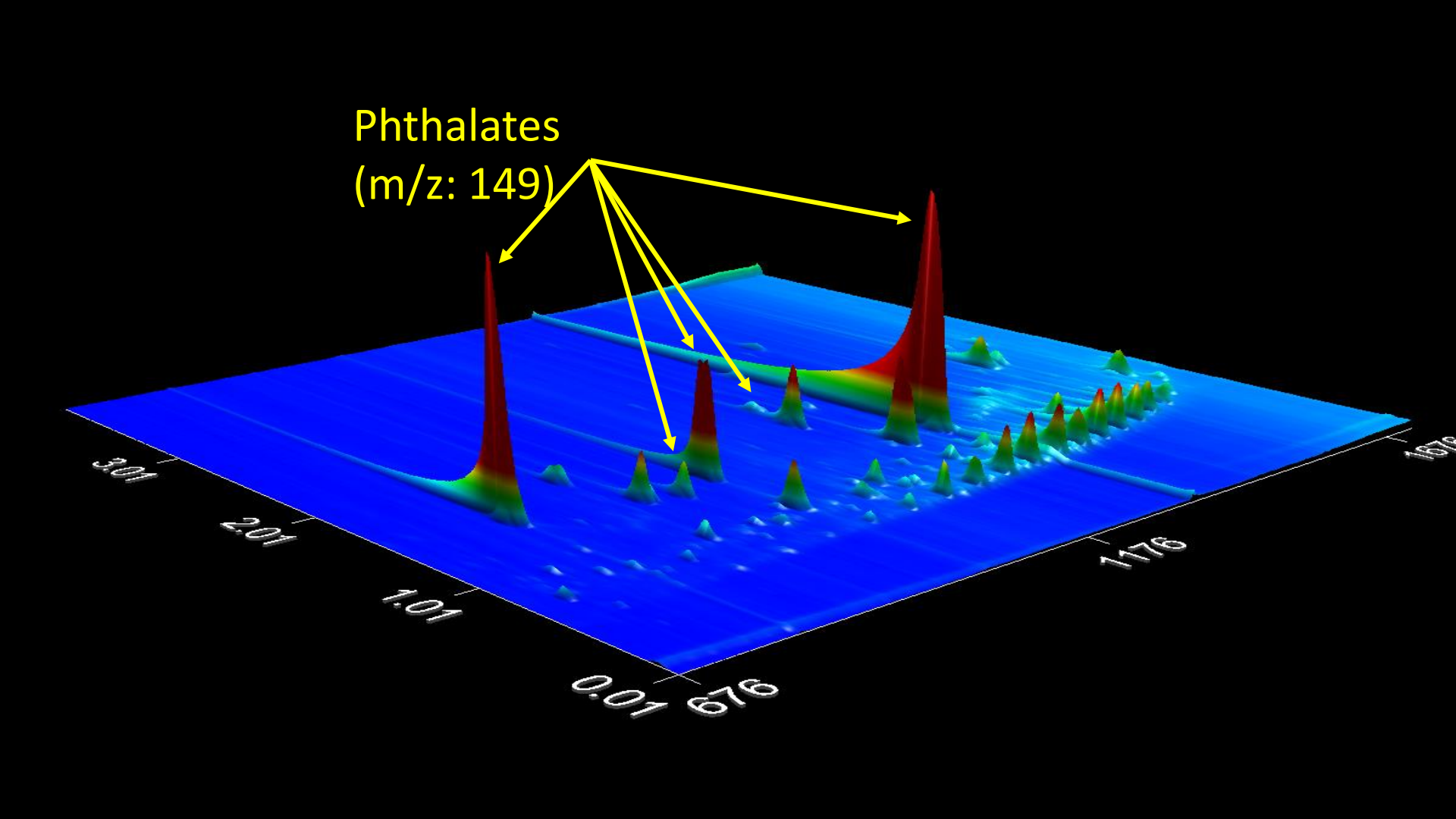


14. Tris(ethylhexyl)-phosphate

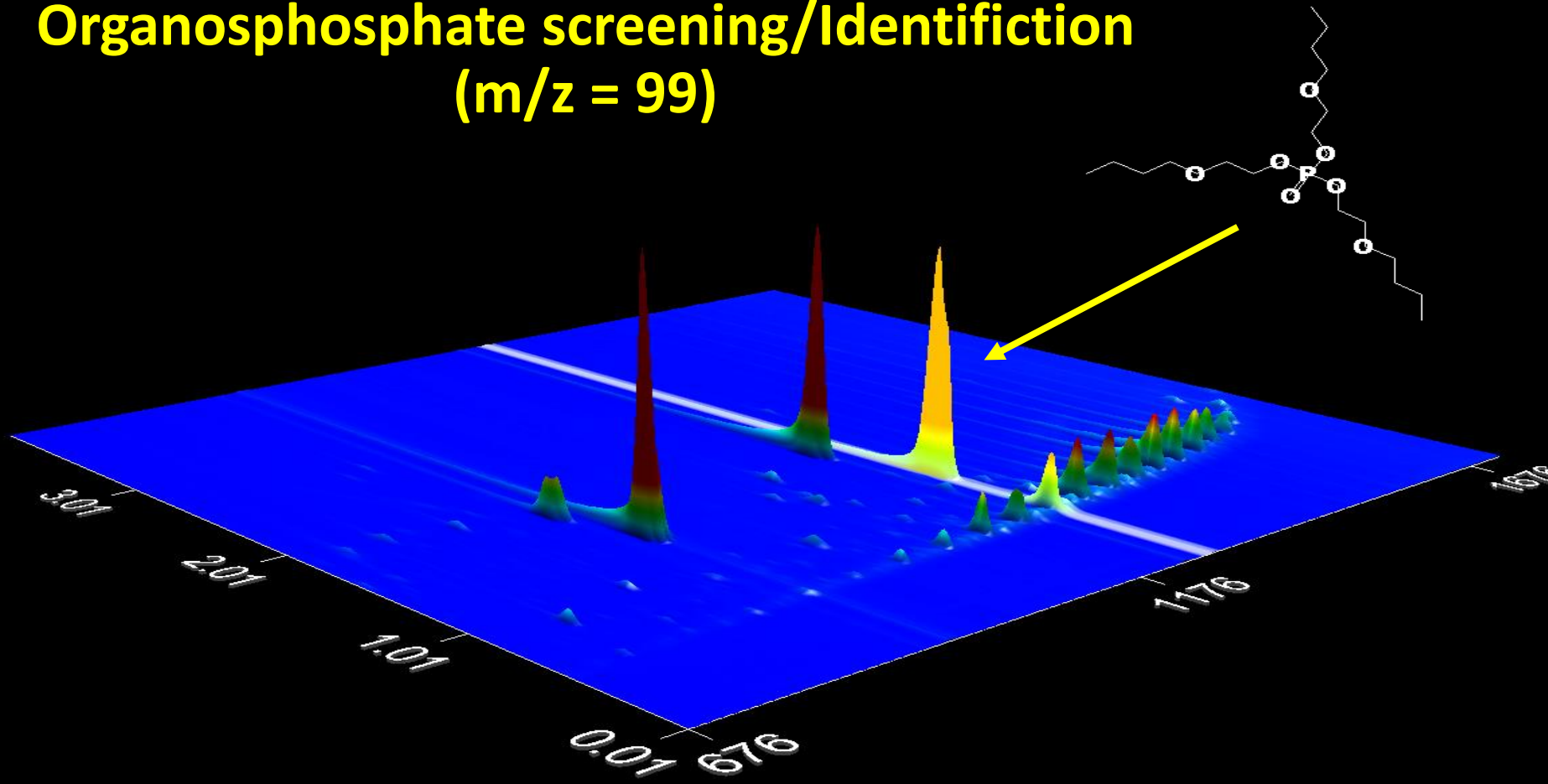
House Dust

Single Indoor Dust Sample

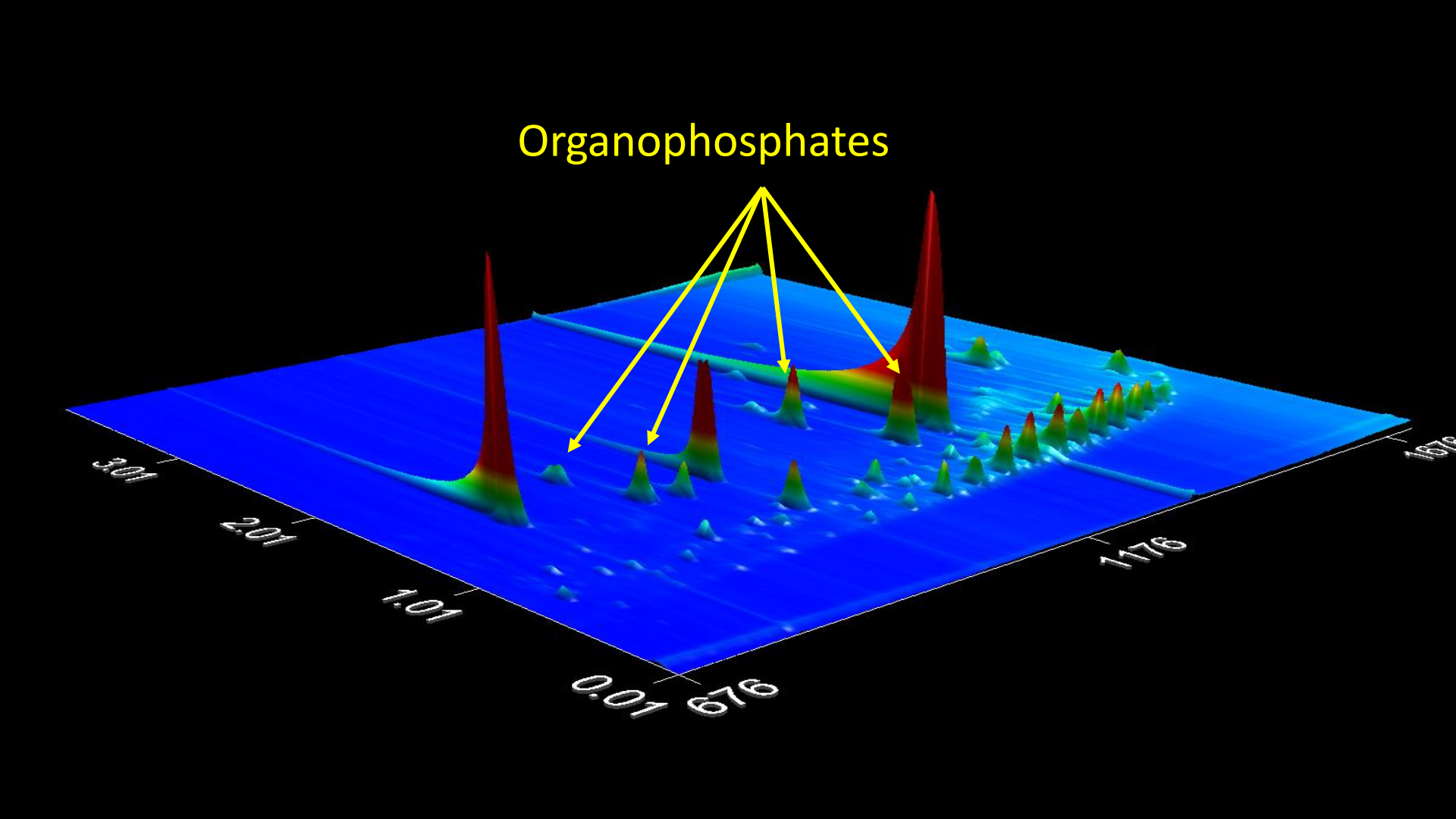


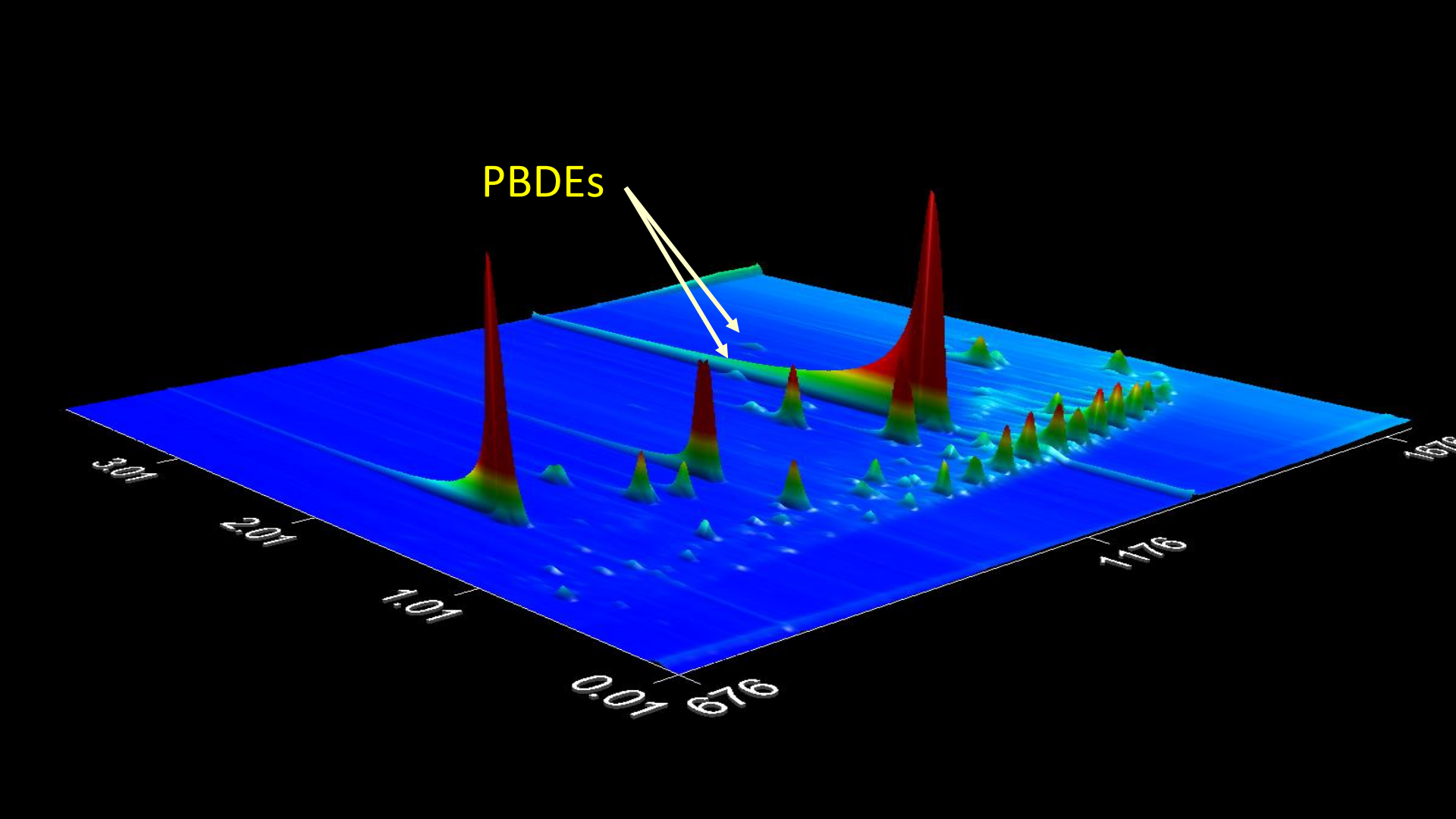

Phthalates
(m/z: 149)
3.01
2.01
1.01
0.01
676
1176
1676

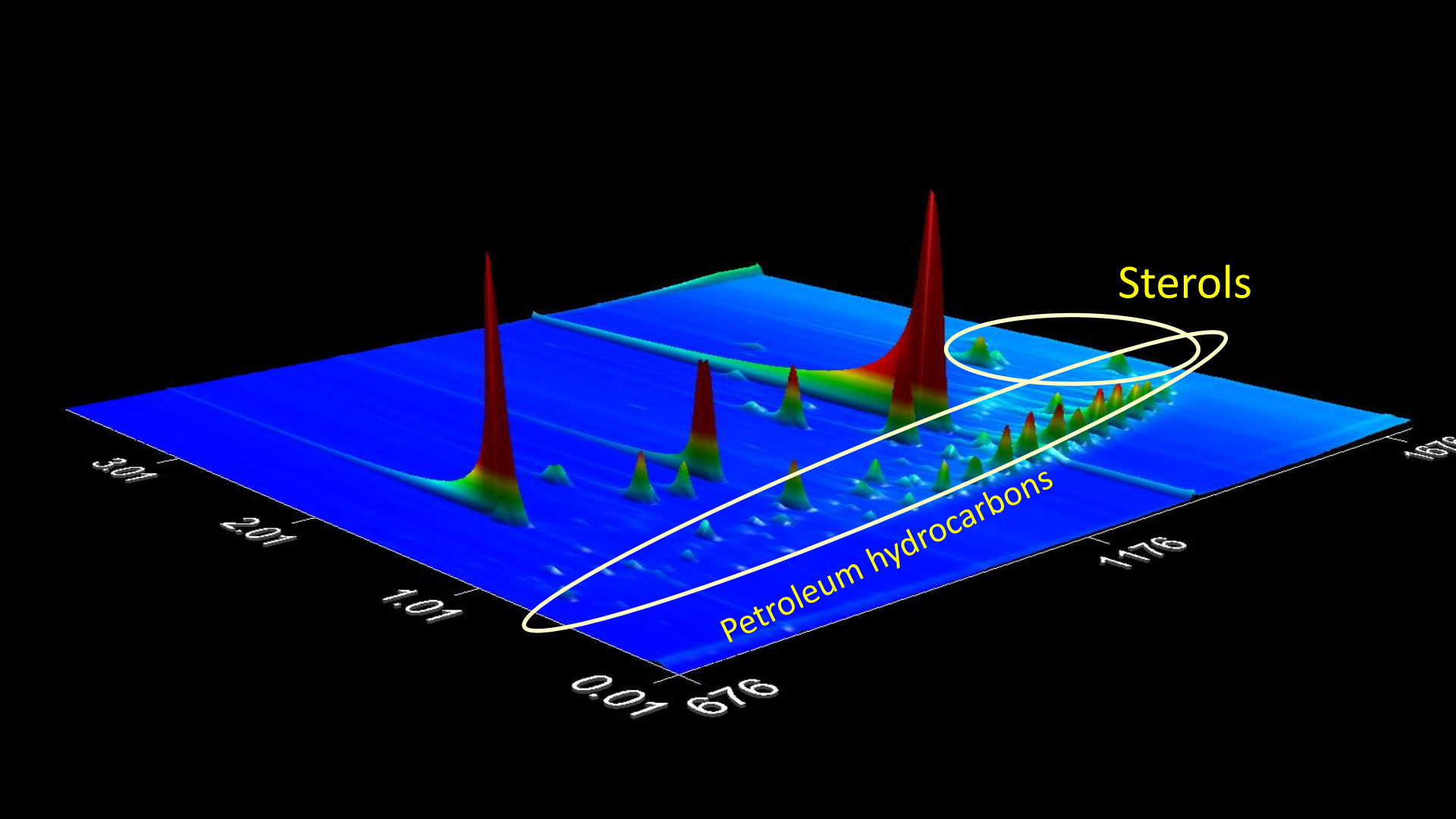
Organosphosphate screening/Identifiction (m/z = 99)



Name	Similarity	Reverse	Probability	CAS
Ethanol, 2-butoxy-, phosphate (3:1)	857	860	8680	78-51-3
Ethanol, 2-butoxy-, phosphate (3:1)	839	862	8520	78-51-3


Organophosphates
3.01
2.01
1.01
0.01
676
1176
1676


PBDEs
3.01
2.01
1.01
0.01
676
1176
1676


Sterols
Petroleum hydrocarbons
3.01
2.01
1.01
0.01
676
1176
1676

Summary of Major Components

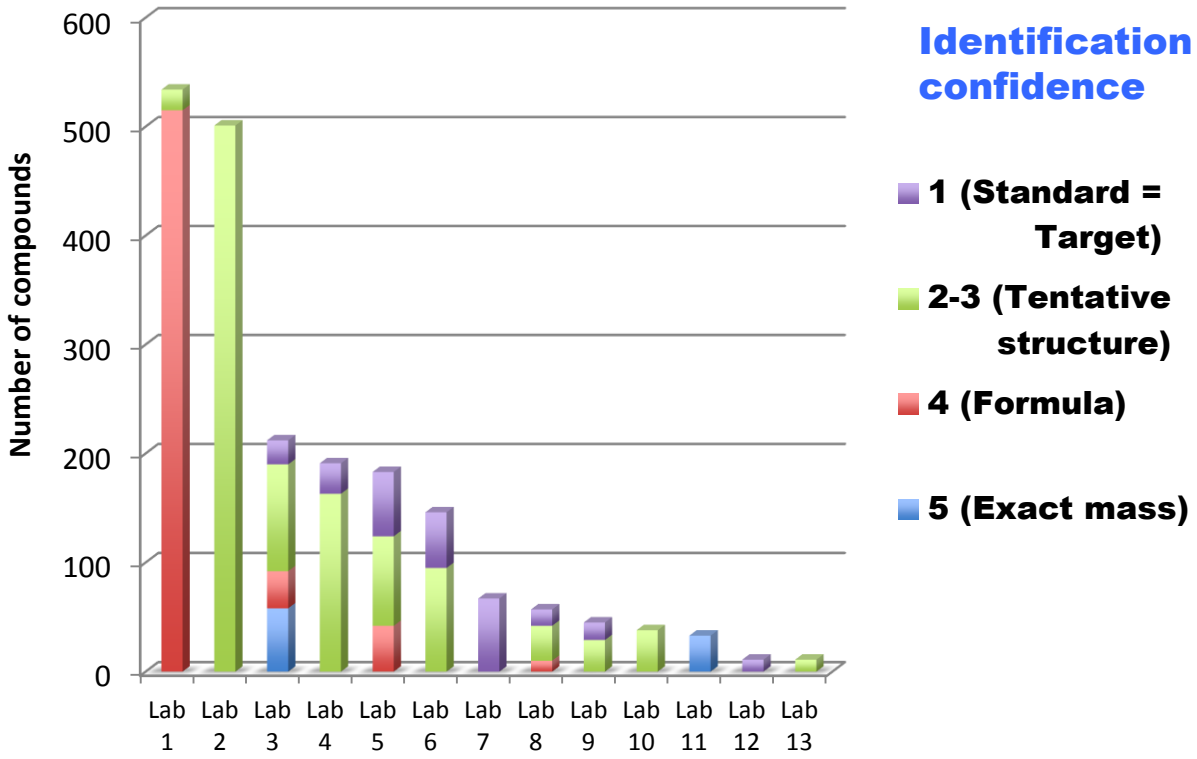
- Phthalate plasticizers
- Organophosphate plasticizers/flame retardants
- Brominated flame retardants
- Petroleum hydrocarbons
- Bacteria sterols

Norman NTS Indoor Dust

	Organization	Instrumentation
1	NILU	both
2	Stockholm University	LC-MS
3	University of Antwerp	both
4	Umeå University	both
5	National Institute for Environmental Studies, Japan	both
6	Stockholm University	GC-MS
7	Research Centre for Toxic Compounds in the Environment	LC-MS
8	RIKILT Wageningen UR	both
9	Helmholtz Centre for Environmental Research - UFZ	both
10	University of Bordeaux	LC-MS
11	INERIS	both
12	EHESP-LERES	GC-MS
13	Environmental Institute	both
14	IVL Swedish Environmental Research Institute	LC-MS
15	UC Davis	both
16	Ontario Ministry of Environment and Climate Change	both
17	NIVA	both
18	Vrije Universiteit Amsterdam	LC-MS
19	The University of Queensland, Australia	both
20	Environment Canada	both
21	Environment Canada	both
22	National and Kapodistrian University of Athens	both
23	Duke University	both
24	University jaume I	both
25	ENEA C.R. Casaccia	GC-MS

Delivered:

13 GC-MS

15 LC-MS

Norman NTS dust: GC Data