SHIMADZU
Excellence in Science

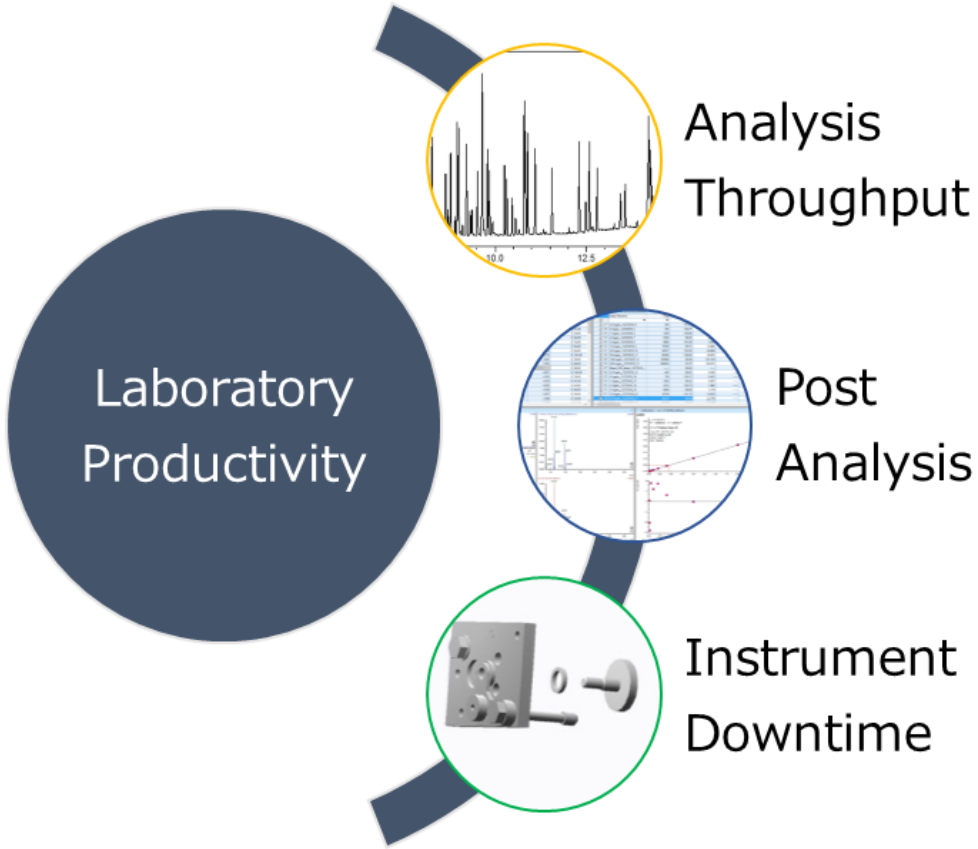
Redefined Analysis Workflow following Environment method

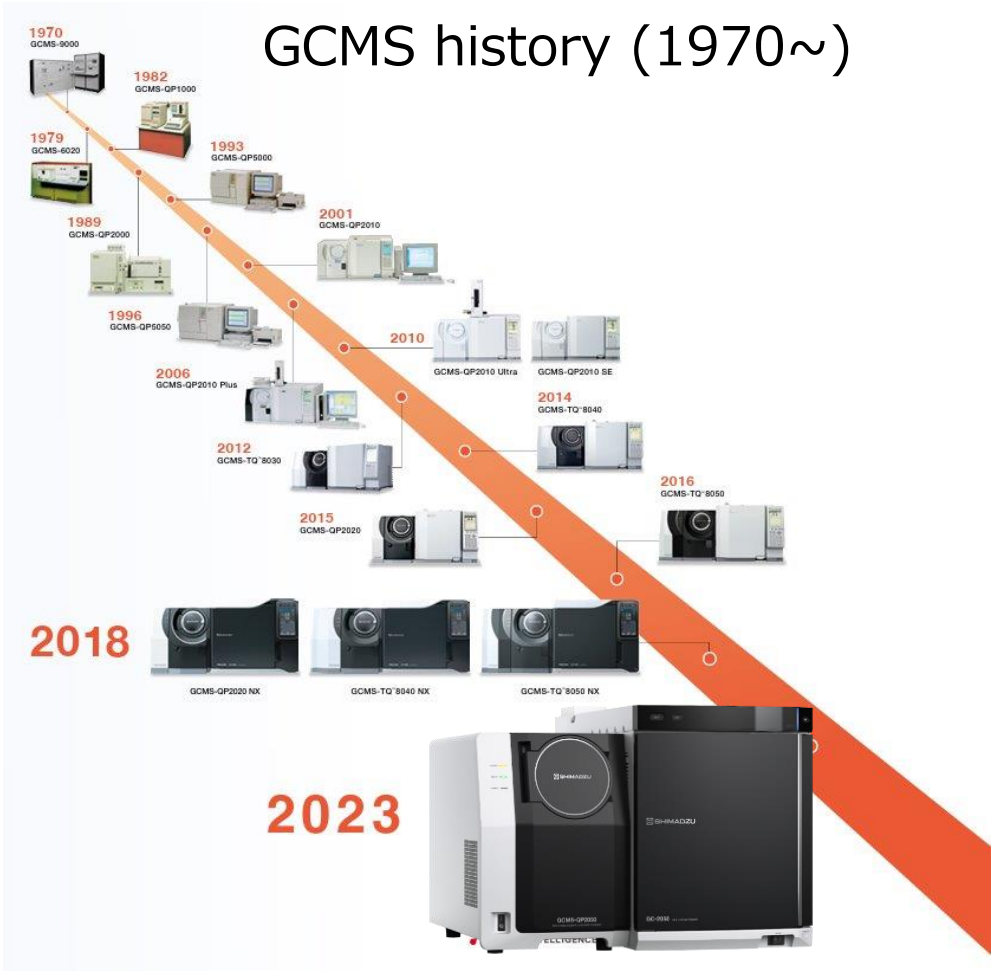
- How to use latest GC-MS technology to enhance your laboratory operation? -

Yoshiro Hiramatsu - GCMS Product Liaison -

Shimadzu Scientific Instrument

What will be big deal to optimize laboratory workflow?



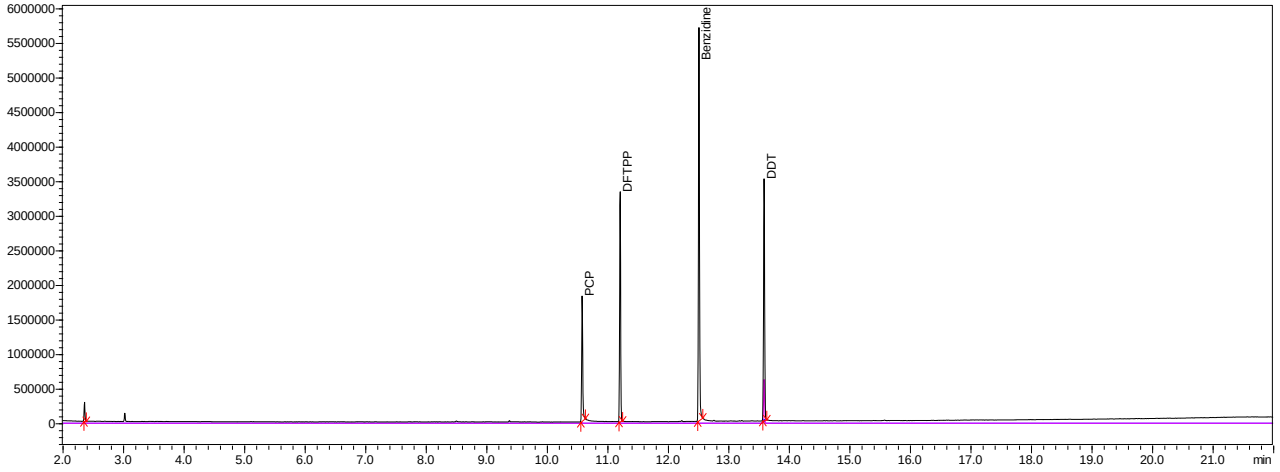


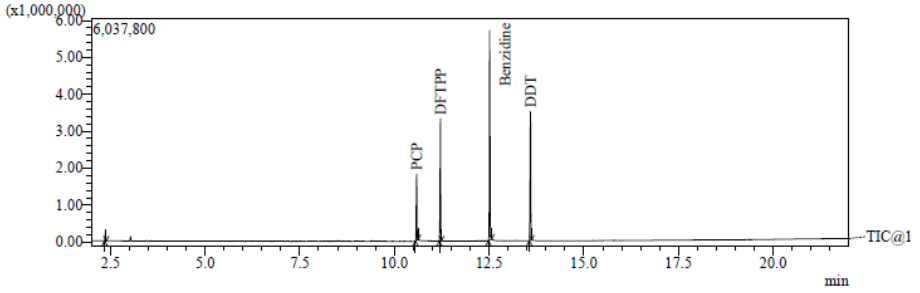
How to use latest GC-MS technology to enhance your laboratory operation?

Enviromental application common workflow

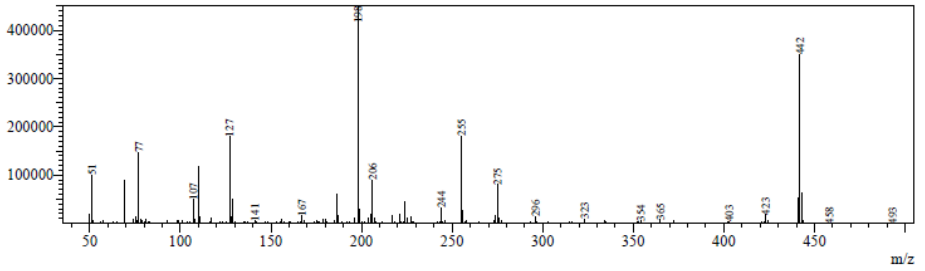
Instrument Checkout and report

Tune mix injection





ID#:1 R.Time:11.210(Scan#:1843)
MassPeaks:451
Spectrum Mode:Averaged 11.210-11.220(1843-1845)
BG Mode:Calculated from Peak Segment 1 - Event 1



Comp. Name : DFTPP Ret. Time : [11.210->11.220]-[11.180<-->11.285]

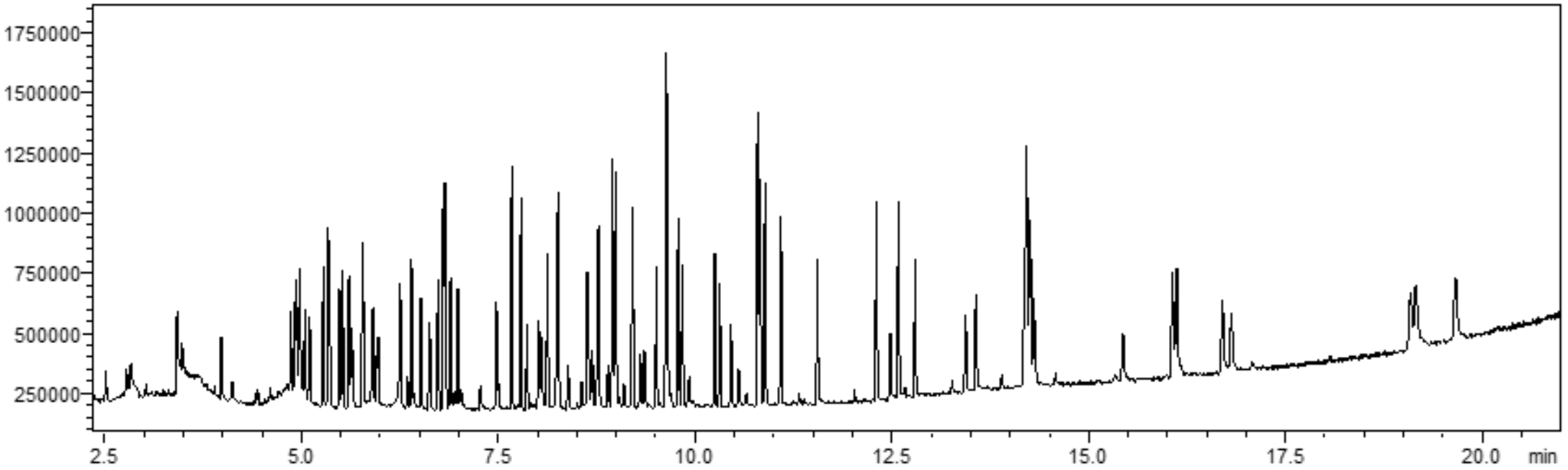
m/z	Criteria	Rel. Int.	Abs. Int.	Status
68	< 2% of mass 69	1.22	1072	Pass
69	Present	19.57	88105	Pass
70	< 2% of mass 69	0.56	489	Pass
197	< 2% of mass 198	0.25	1125	Pass
198	Base peak or present	100.00	450208	Pass
199	5 - 9% of mass 198	6.55	29500	Pass
365	> 1% of the base peak	1.54	6941	Pass
441	< 150% of mass 443	82.00	52358	Pass
442	Base peak or present	77.59	349315	Pass
443	15 - 24% of mass 442	18.28	63853	Pass

Enviromental application common workflow

Run Initial Calibration and ICV(CCV)

TIC (100pg on column) :

8270 Megamix, Benzidine Mix, 1,4-Dioxane, Benzoic Acid, Atrazine, Benzaldehyde, Biphenyl, Caprolactam and ISTD/Surrogate

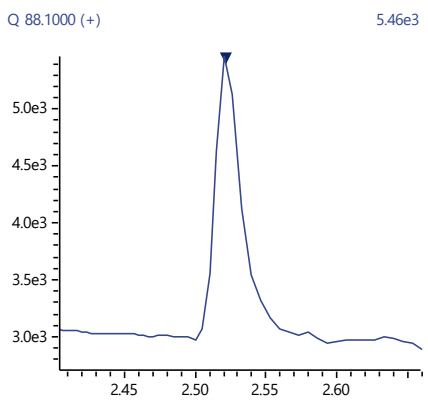


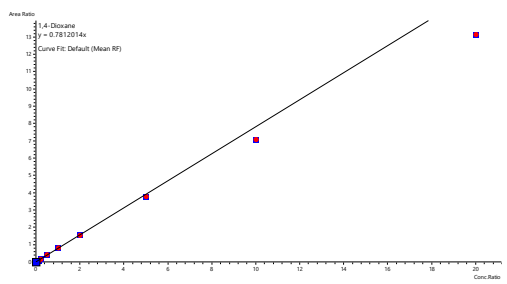
Enviromental application common workflow

Check ICAL and ICV result

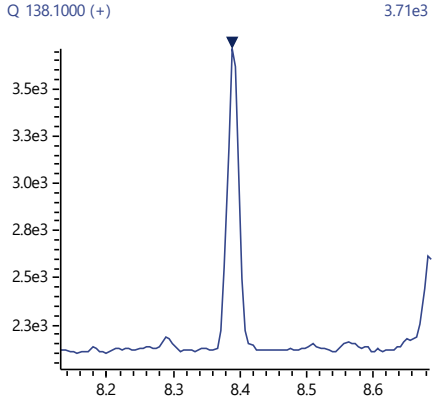
MC result :

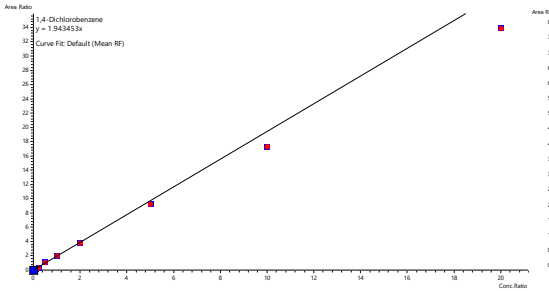
1,4-dioxane
%RSD: 2.53% (5pg on column n=5)
RSE: 8.26% (0.01ppm to 20ppm)



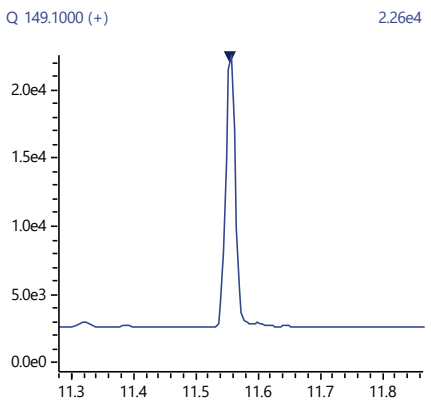


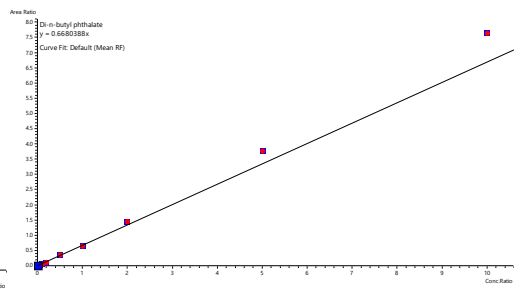
2-Nitroaniline
%RSD: 3.23% (5pg on column n=5)
RSE: 7.96% (0.01ppm to 20ppm)



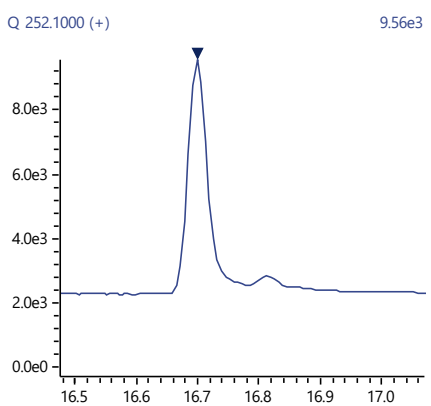


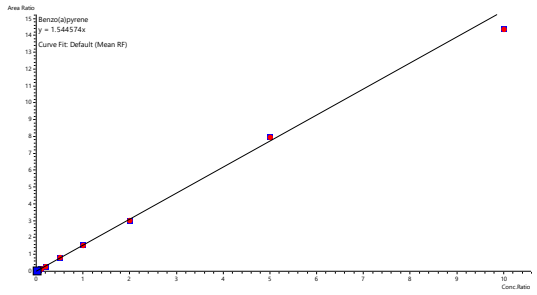
Di-n-butyl phthalate
%RSD: 1.87% (5pg on column n=5)
RSE: 10.43% (0.01ppm to 10ppm)





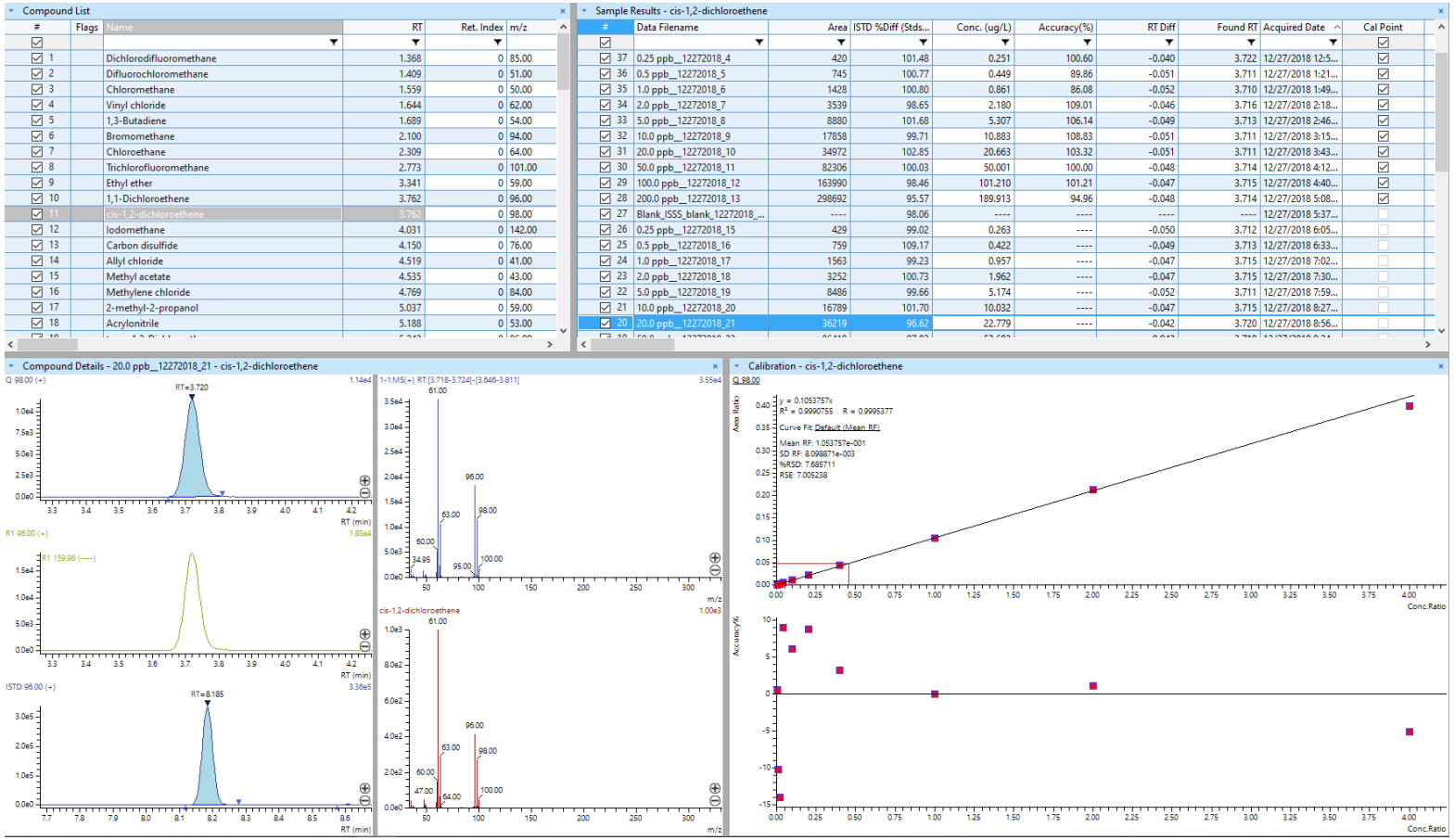
Benzo(a)pyrene
%RSD: 2.58% (5pg on column n=5)
RSE: 8.78% (0.01ppm to 10ppm)

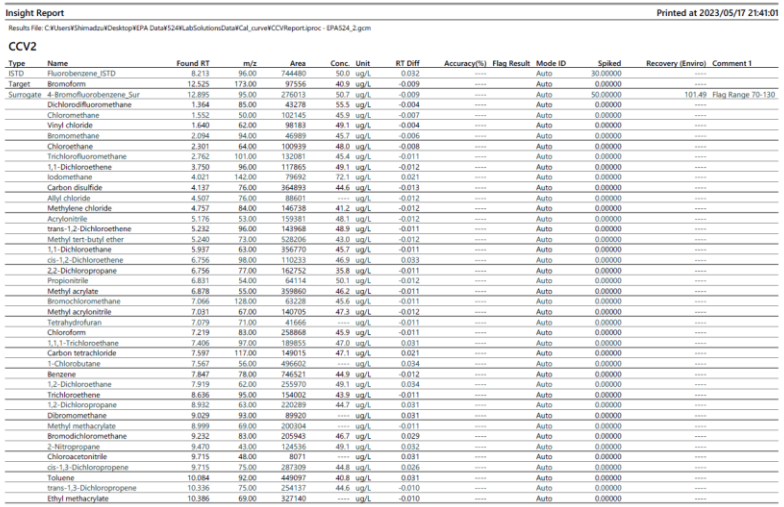




Enviromental application common workflow

Inject Sample and report





Analytical Throughput

Conceptualizing Analytical Throughput

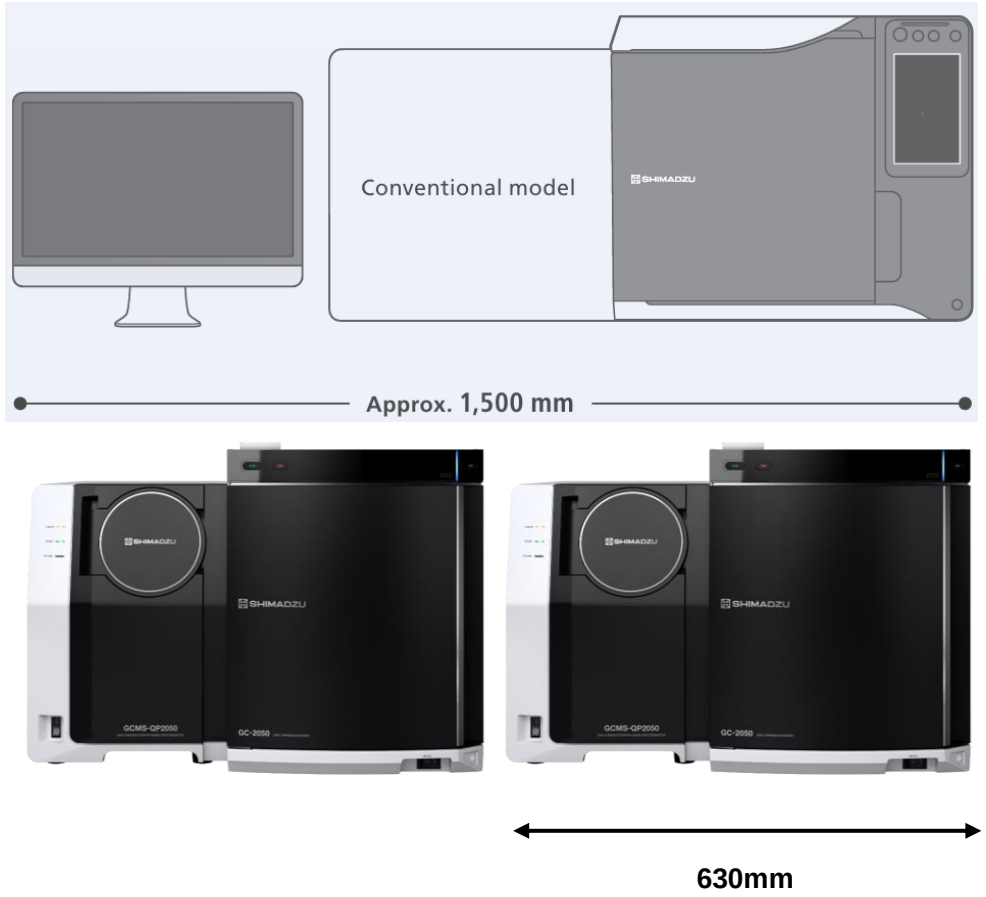
Instruments per laboratory ✖ **Injections per Time**

Instruments per laboratory area

How to increase number of instruments in limited laboratory space?

Instruments per laboratory area

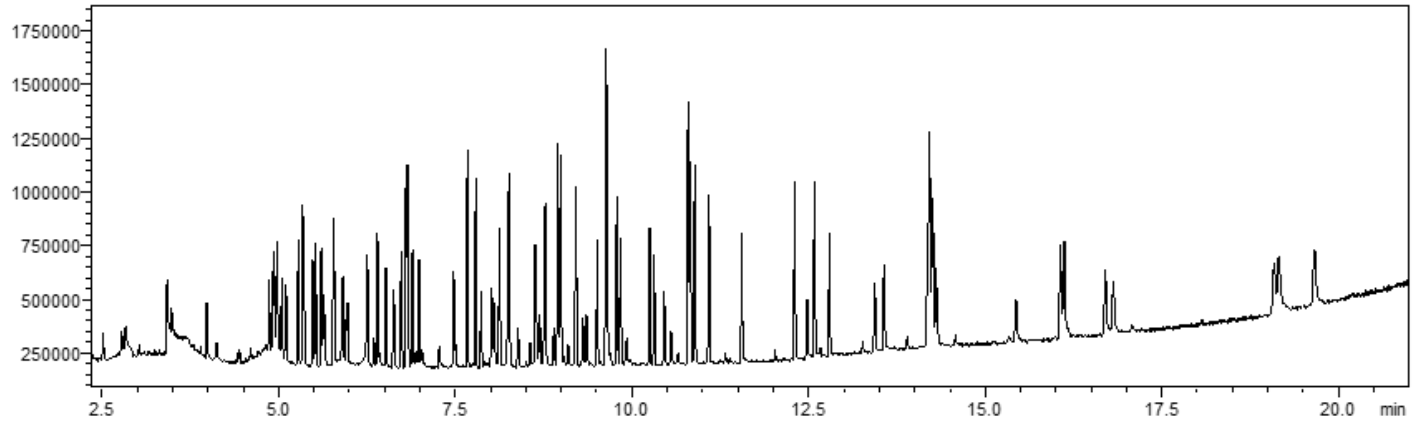
How to increase number of instruments in limited laboratory space?
→Choose Small Foot print GC-MS system



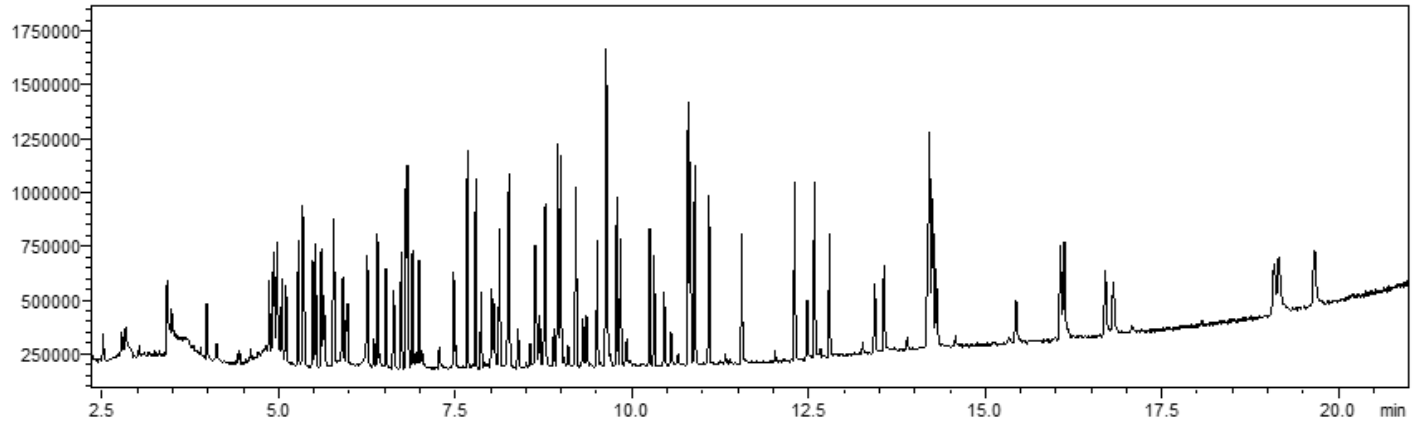
Instruments per laboratory area

You can double your productivity by using two instuments instead of one.

SVOC



SVOC



Instruments per laboratory area

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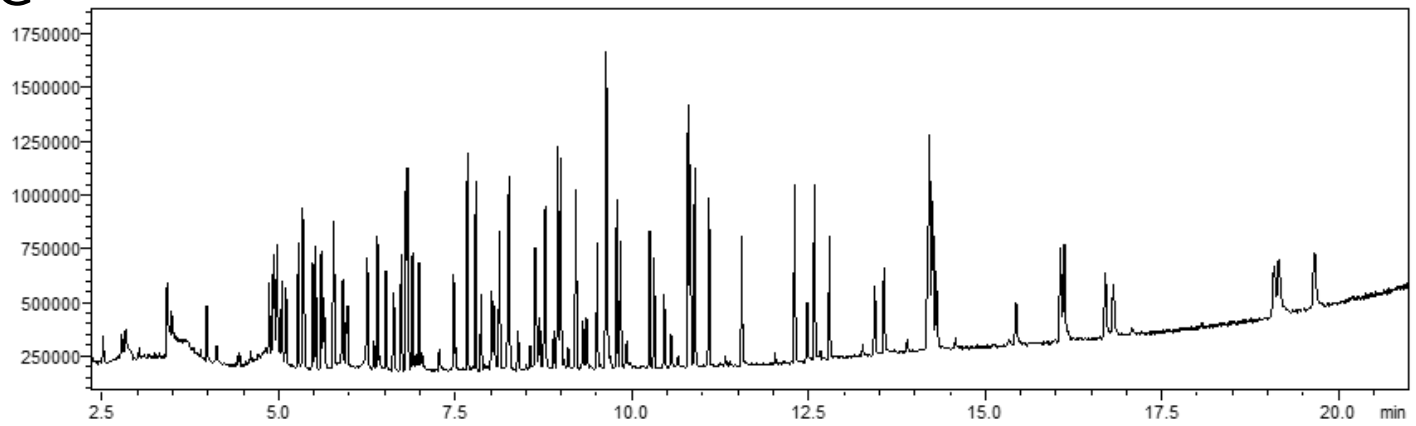
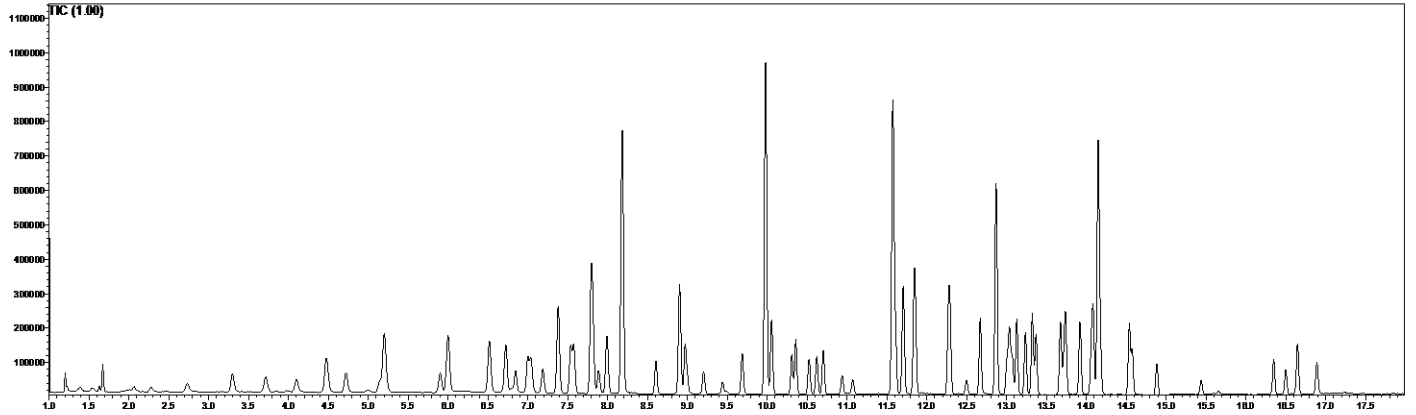
SVOC



Other application

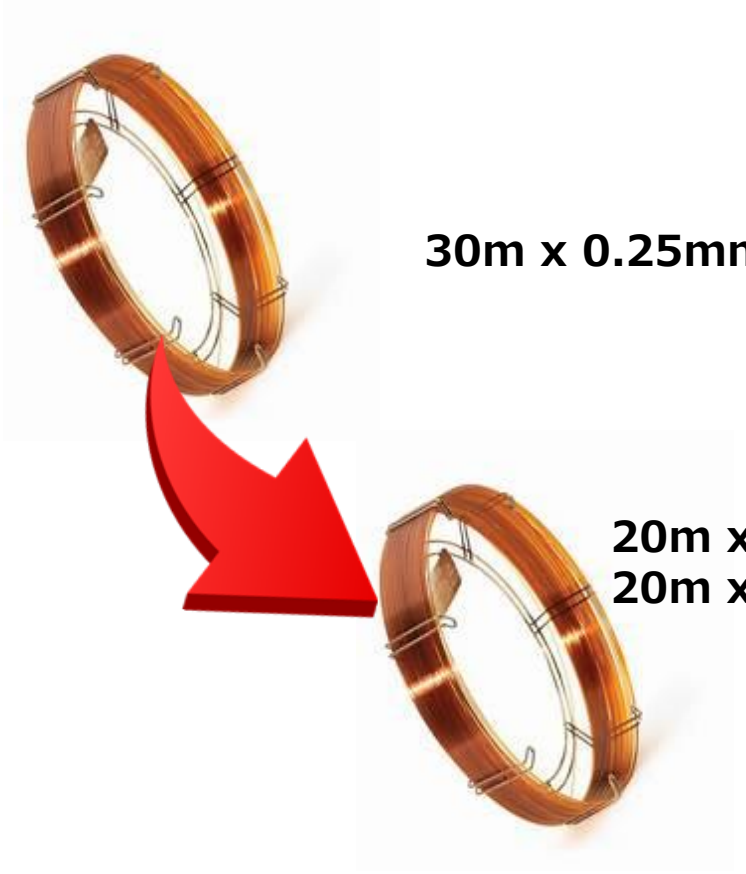


Sample per time

How can we increase the number of injections given in a specific time slot?

Sample per time

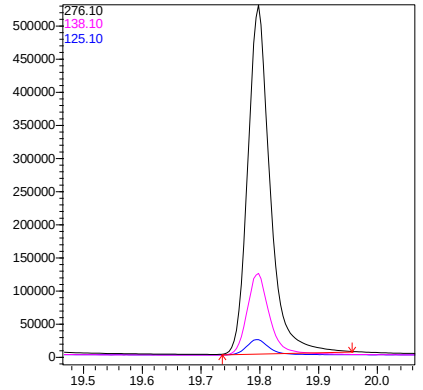
How can we increase the number of injections given in a specific time slot?
→Choose narrow bore column to run sample



30m x 0.25mm (I.D)

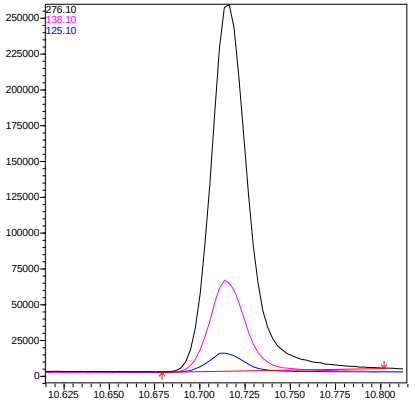
R.T: 19.8 min

Benzo (g,h,i)pyrelene



20m x 0.18mm (I.D)
20m x 0.15mm (I.D)

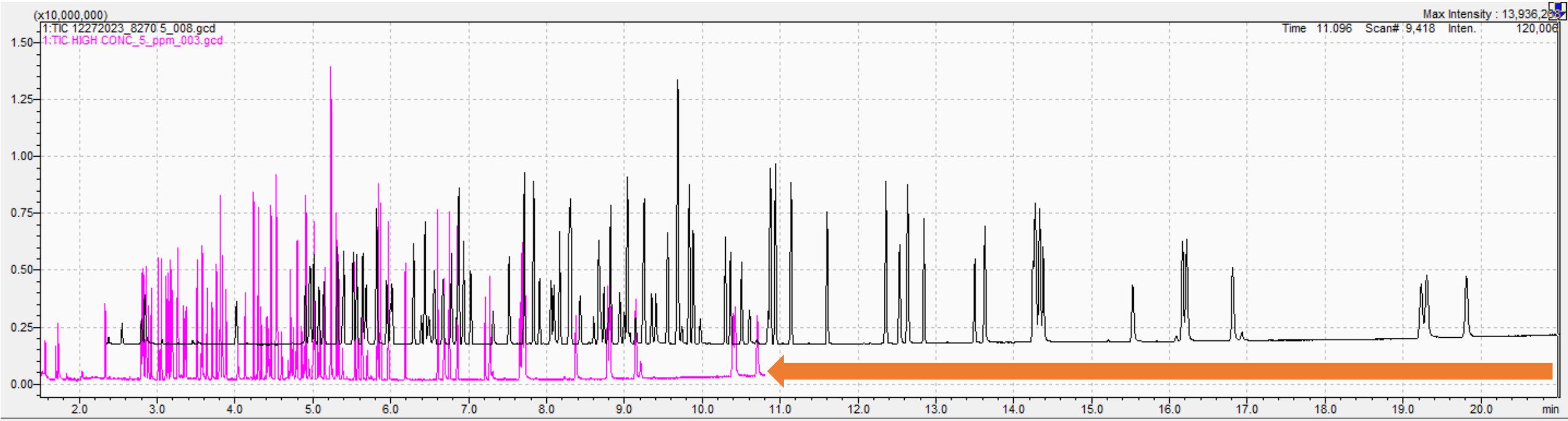
R.T: 10.7 min



Sample per time

When use Narrow bore column, run time is 50% and injection to injection is 65% compare with conventional column.

TIC (500pg on column) :
8270 Megamix, Benzidine Mix, 1,4-Dioxane, Benzoic Acid, Atrazine, Benzaldehyde, Biphenyl, Caprolactam



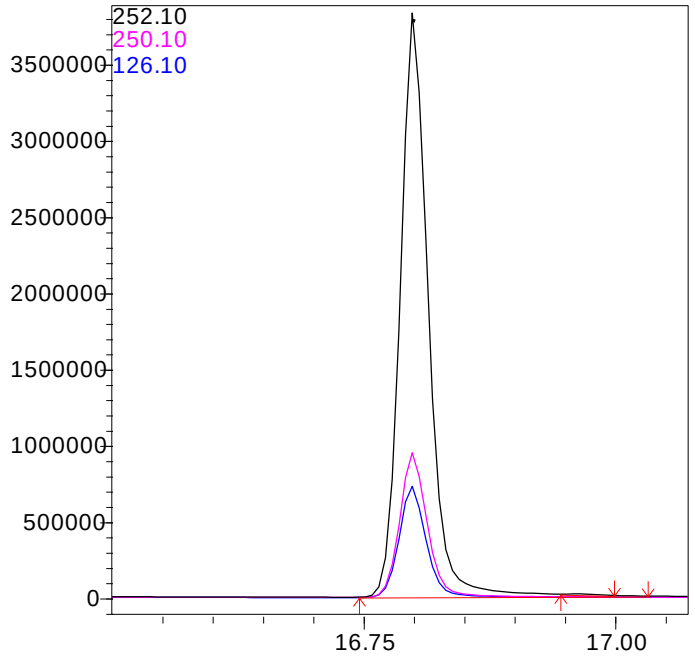
Sample per time

What should we keep in mind when using a narrow bore column?
→**Column Capacity** and Scan rate

30m x 0.25mm (I.D)

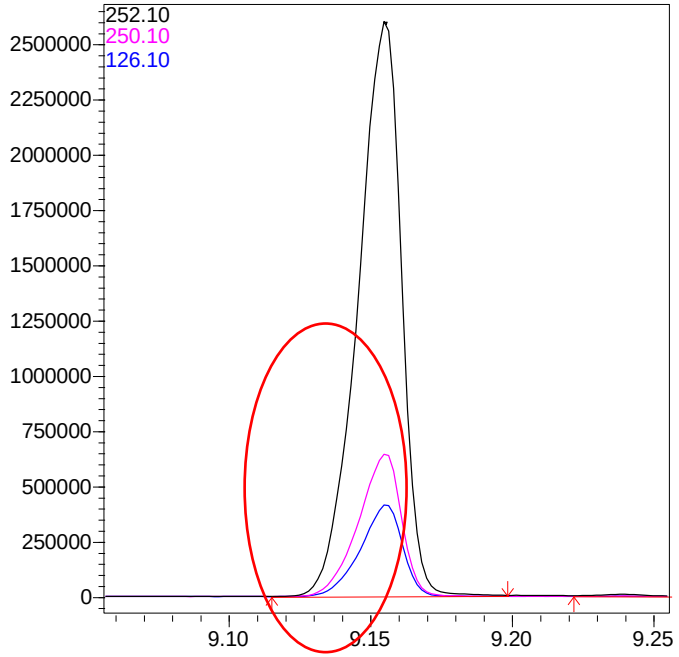
Split 10:1

Benzo(a)pyrene (10ppm on vial)



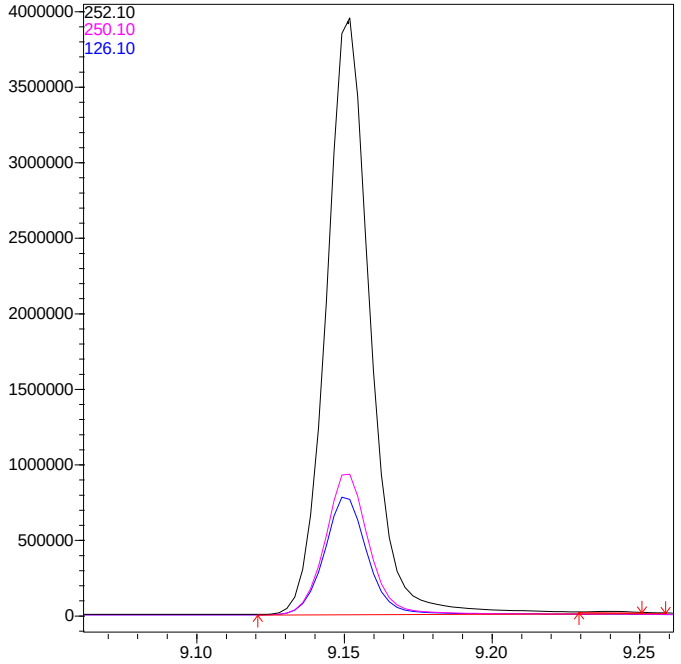
20m x 0.15mm (I.D)

Split 10:1



20m x 0.15mm (I.D)

Split **30:1**



Sample per time

What should we keep in mind when using a narrow bore column?
→Column Capacity and **Scan rate(Scan Speed)**

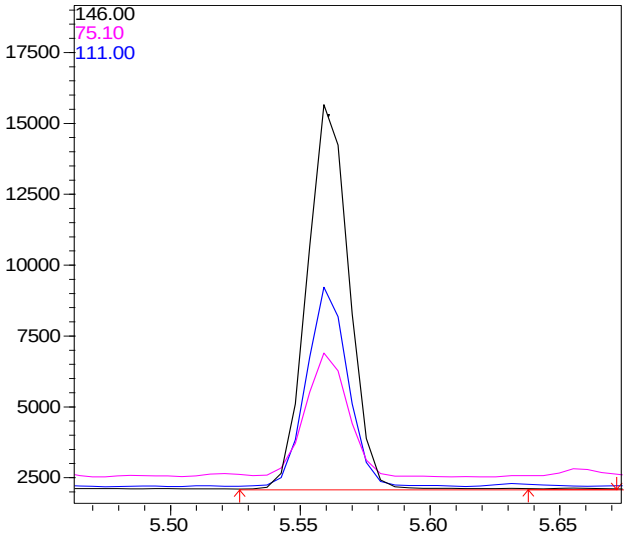
30m x 0.25mm (I.D)

20m x 0.15mm (I.D)

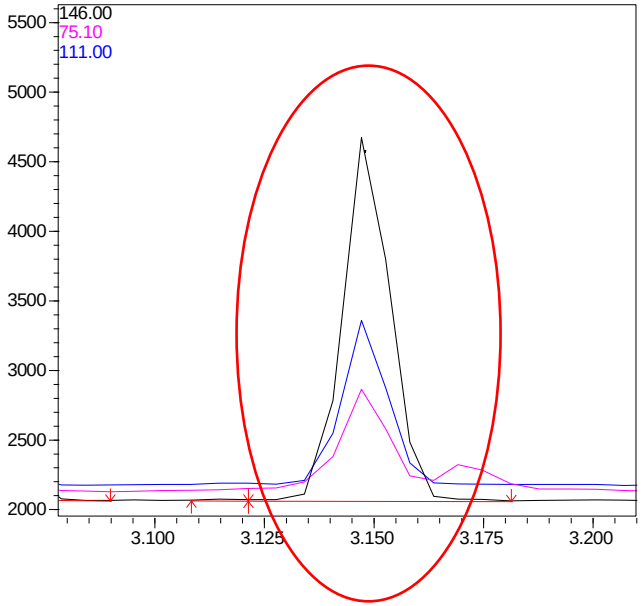
20m x 0.15mm (I.D)

1,2-Dichlorobenzene

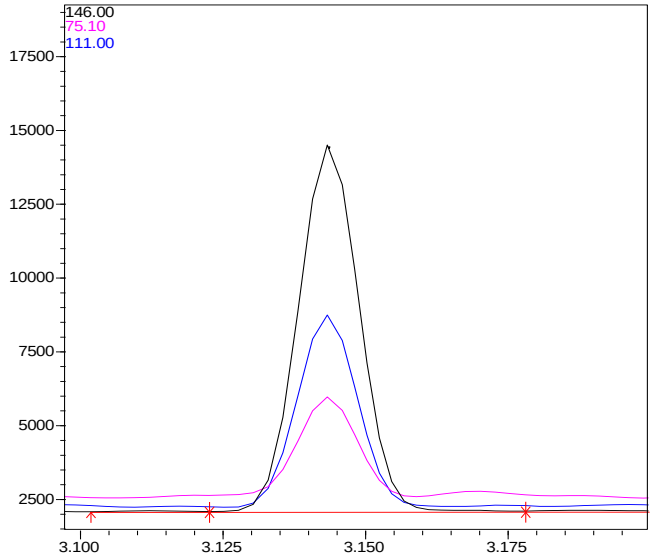
Scan/SIM: 5,000u/sec
10 points



Scan/SIM: 5,000u/sec
6 points



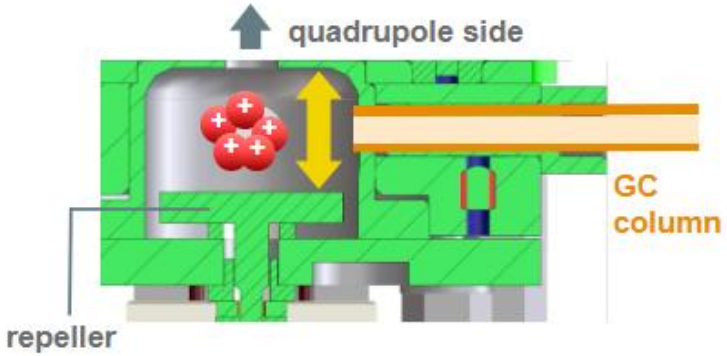
Scan/SIM: **10,000u/sec**
10 points



Sample per time

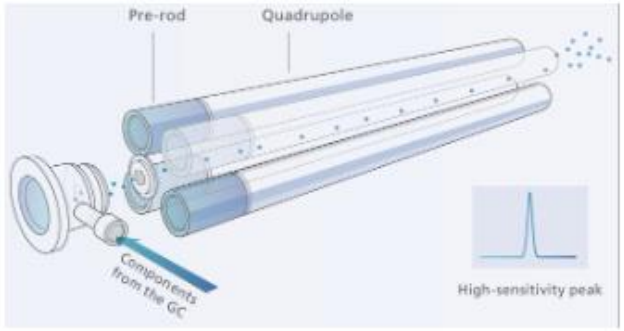
How does the latest GC-MS technology support the use of narrow bore columns?
→**High sensitivity and Fast Scan/SIM analysis**

DuraEase ion source (section)



High performance Ion source

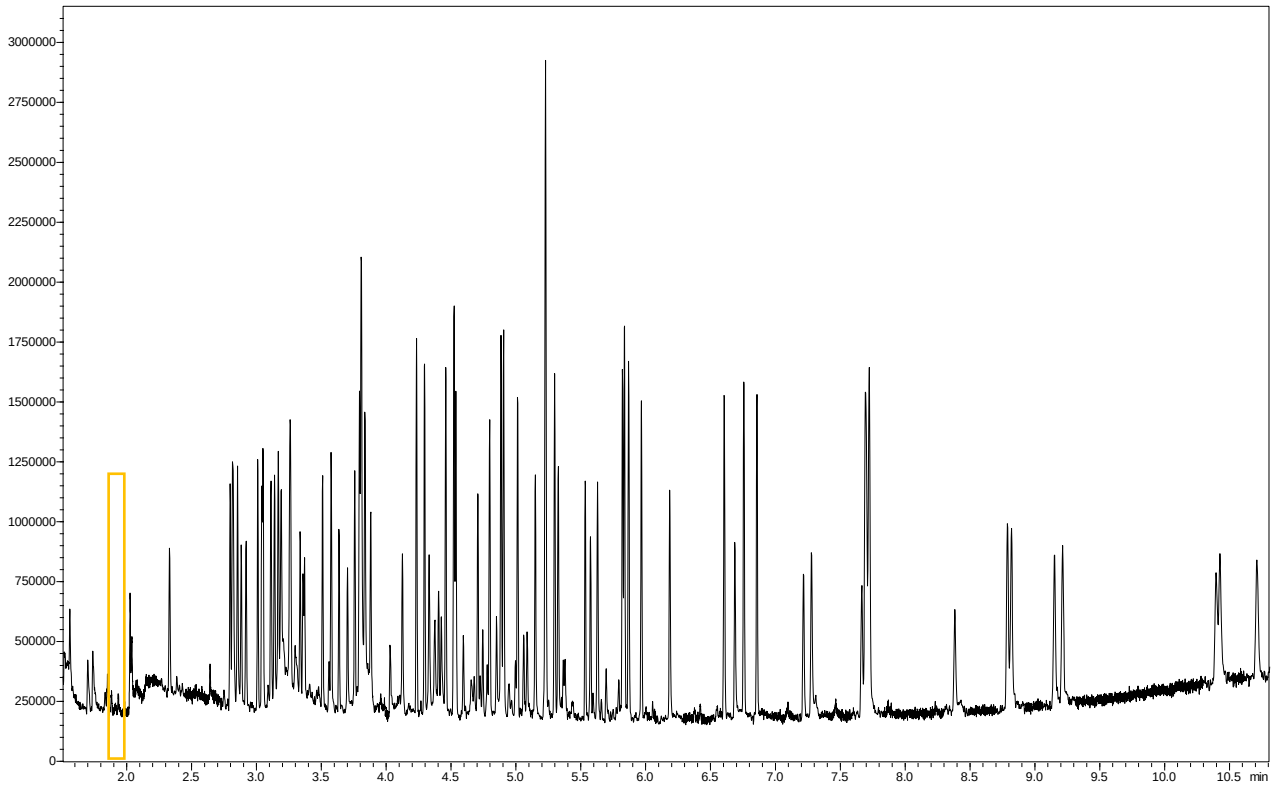
Quadrupole rods with Prerod



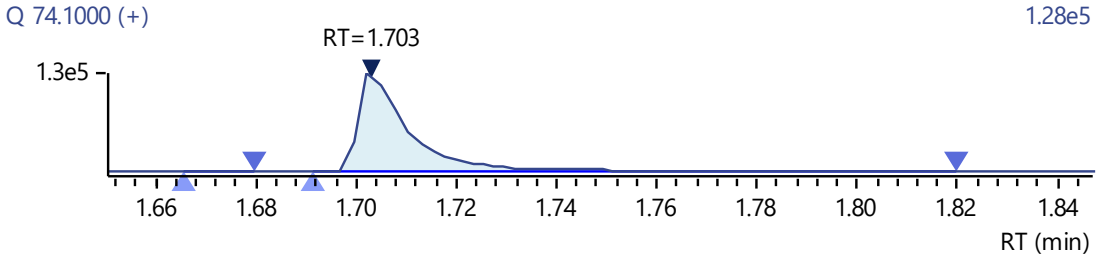
Ultra-fast scan performance without sacrificing accuracy.

Sample per time

Using narrow bore column method, we can meet 8270E criteria for all compounds

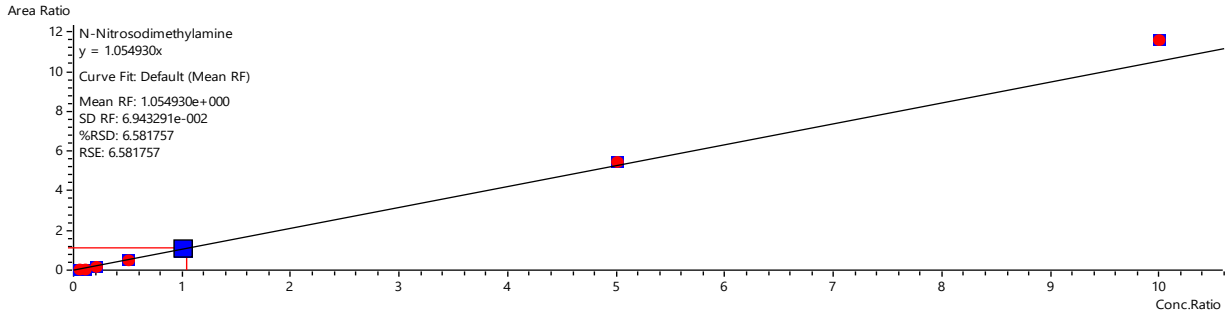


N-Nitrosodimethylamine (1ppm with Split 30)



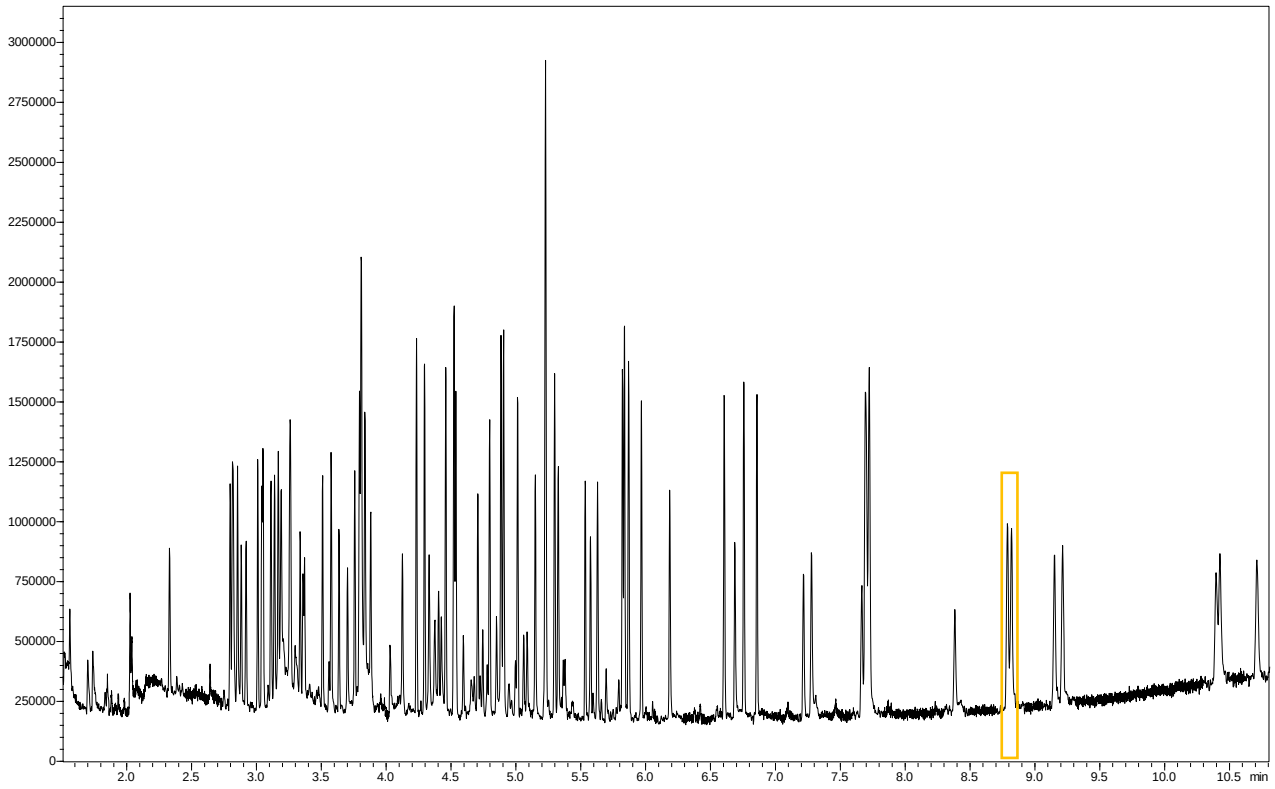
Calibration (0.05ppm to 10ppm)

RSE: 6.581% (0.05ppm to 10ppm)

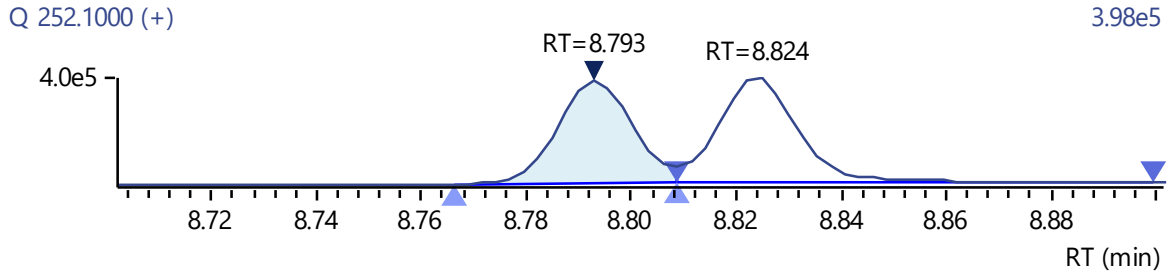


Sample per time

Using narrow bore column method, we can meet 8270E criteria for all compounds

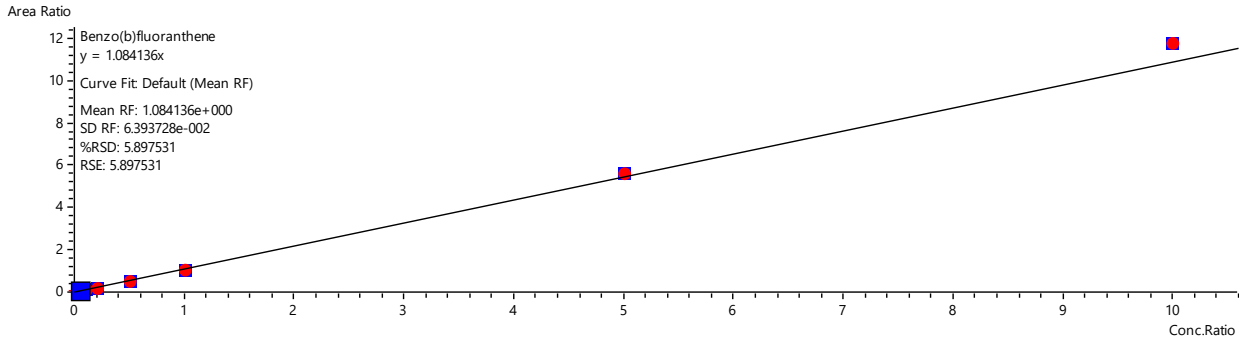


Benzo(b)fluoranthene (1ppm with Split 30)



Calibration (0.05ppm to 10ppm)

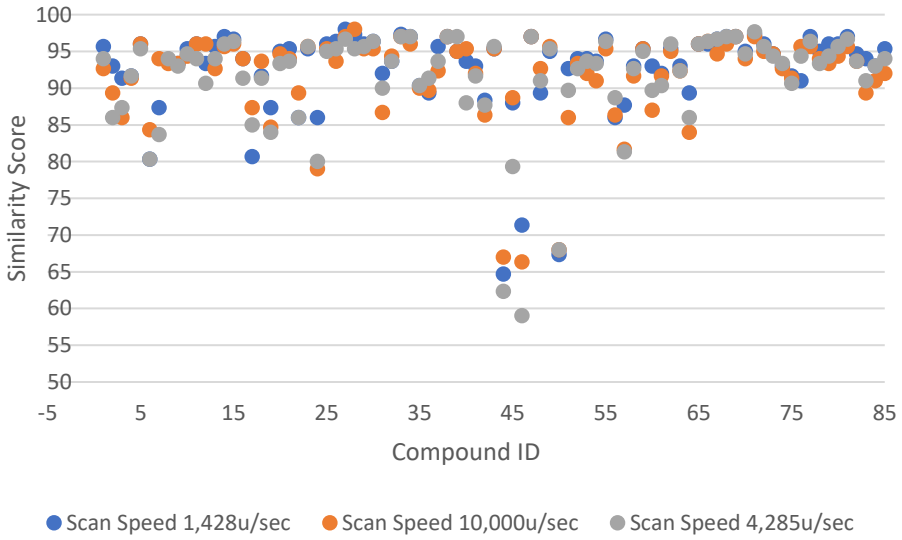
RSE: 5.897% (0.05ppm to 10ppm)



Sample per time

Using a faster scan speed, the library search scores for all compounds are similar across all methods.

Method	Scan only n=3		Scan/SIM n=3
Loop Time (Sampling rate)	0.3sec	0.1sec	0.25 sec or less (Scan: 0.1 sec, SIM 0.15 sec or less)
Scan range(m/z)	40-450	40-600	40-450
Scan Speed(u/sec)	1,428	10,000	4,285
Average Similarity Score (85 compounds)	92.62	91.79	91.49



※Some compounds are co-eluting and show lower similarity score

Post Analysis

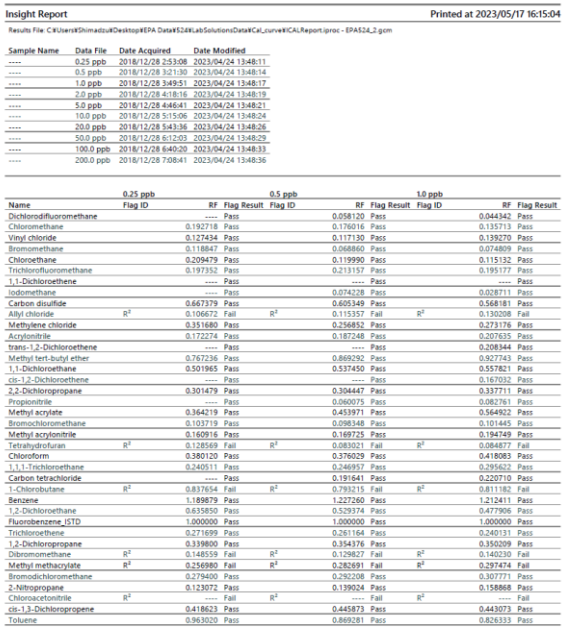
Conceptualizing post processing in laboratory

Data processing + Report

Pre-set report template

Pre-set report template makes easier ICAL/CCV/sample report

ICAL report

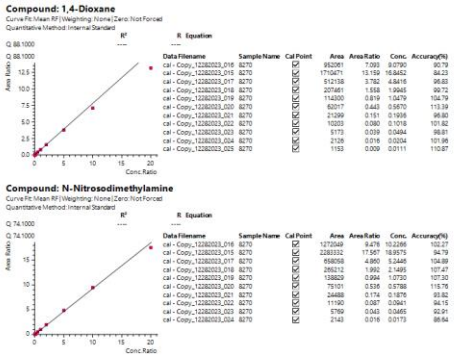


Insight Report — Printed at 2023/05/17 16:15:04

Results File: C:¥Users¥Shimadzu¥Desktop¥EPA Data¥524¥LabSolutionsData¥Cal_curve¥ICALReport.lcproc - EPA524_2.gcm

Sample Name	Data File	Date Acquired	Date Modified
----	0.25 ppb	2018/12/28 2:53:08	2023/04/24 13:48:11
----	0.5 ppb	2018/12/28 3:21:30	2023/04/24 13:48:14
----	1.0 ppb	2018/12/28 3:49:51	2023/04/24 13:48:17
----	2.0 ppb	2018/12/28 4:18:16	2023/04/24 13:48:19
----	5.0 ppb	2018/12/28 4:46:41	2023/04/24 13:48:21
----	10.0 ppb	2018/12/28 5:15:06	2023/04/24 13:48:24
----	20.0 ppb	2018/12/28 5:43:36	2023/04/24 13:48:26
----	50.0 ppb	2018/12/28 6:12:03	2023/04/24 13:48:29
----	100.0 ppb	2018/12/28 6:40:20	2023/04/24 13:48:33
----	200.0 ppb	2018/12/28 7:08:41	2023/04/24 13:48:36

	0.25 ppb			0.5 ppb			1.0 ppb		
Name	Flag ID	RF	Flag Result	Flag ID	RF	Flag Result	Flag ID	RF	Flag Result
Dichlorodifluoromethane		----	Pass		0.058120	Pass		0.044342	Pass
Chloromethane		0.192718	Pass		0.176016	Pass		0.135713	Pass
Vinyl chloride		0.127434	Pass		0.117130	Pass		0.139270	Pass
Bromomethane		0.118847	Pass		0.068860	Pass		0.074809	Pass
Chloroethane		0.209479	Pass		0.119990	Pass		0.115132	Pass
Trichlorofluoromethane		0.197352	Pass		0.213157	Pass		0.195177	Pass
1,1-Dichloroethene		----	Pass		----	Pass		----	Pass
Iodomethane		----	Pass		0.074228	Pass		0.028711	Pass
Carbon disulfide		0.667379	Pass		0.605349	Pass		0.568181	Pass
Allyl chloride	R^2	0.106672	Fail	R^2	0.115357	Fail	R^2	0.130208	Fail
Methylene chloride		0.351680	Pass		0.256852	Pass		0.273176	Pass
Acrylonitrile		0.172274	Pass		0.187248	Pass		0.207635	Pass
trans-1,2-Dichloroethene		----	Pass		----	Pass		0.208344	Pass
Methyl tert-butyl ether		0.767236	Pass		0.869292	Pass		0.927743	Pass
1,1-Dichloroethane		0.501965	Pass		0.537450	Pass		0.557821	Pass
cis-1,2-Dichloroethene		----	Pass		----	Pass		0.167032	Pass
2,2-Dichloropropane		0.301479	Pass		0.304447	Pass		0.337711	Pass
Propionitrile		----	Pass		0.060075	Pass		0.082761	Pass
Methyl acrylate		0.364219	Pass		0.453971	Pass		0.564922	Pass
Bromochloromethane		0.103719	Pass		0.098348	Pass		0.101445	Pass
Methyl acrylonitrile		0.160916	Pass		0.169725	Pass		0.194749	Pass
Tetrahydrofuran	R^2	0.128569	Fail	R^2	0.083021	Fail	R^2	0.084877	Fail
Chloroform		0.380120	Pass		0.376029	Pass		0.418083	Pass
1,1,1-Trichloroethane		0.240511	Pass		0.246957	Pass		0.295622	Pass
Carbon tetrachloride		----	Pass		0.191641	Pass		0.220710	Pass
1-Chlorobutane	R^2	0.837654	Fail	R^2	0.793215	Fail	R^2	0.811182	Fail
Benzene		1.189879	Pass		1.227260	Pass		1.212411	Pass
1,2-Dichloroethane		0.635850	Pass		0.529374	Pass		0.477906	Pass
Fluorobenzene_ISTD		1.000000	Pass		1.000000	Pass		1.000000	Pass
Trichloroethene		0.271699	Pass		0.261164	Pass		0.240131	Pass
1,2-Dichloropropane		0.339800	Pass		0.354376	Pass		0.350209	Pass
Dibromomethane	R^2	0.148559	Fail	R^2	0.129827	Fail	R^2	0.140230	Fail
Methyl methacrylate	R^2	0.256980	Fail	R^2	0.282691	Fail	R^2	0.297474	Fail
Bromodichloromethane		0.279400	Pass		0.292208	Pass		0.307771	Pass
2-Nitropropane		0.123072	Pass		0.139024	Pass		0.158868	Pass
Chloroacetonitrile	R^2	----	Fail	R^2	----	Fail	R^2	----	Fail
cis-1,3-Dichloropropene		0.418623	Pass		0.445873	Pass		0.443073	Pass
Toluene		0.963020	Pass		0.869281	Pass		0.826333	Pass



Compound: 1,4-Dioxane

Curve Fit: Mean RF | Weighting: None | Zero: Not Forced

Quantitative Method: Internal Standard

R² = ----

R Equation = ----

Data Filename	Sample Name	Cal Point	Area	Area Ratio	Conc.	Accuracy(%)
cal - Copy_122802023_016	8270		952081	7.093	0.0790	80.79
cal - Copy_122802023_015	8270		1710471	13.159	16.8452	84.23
cal - Copy_122802023_017	8270		512138	3.782	4.8416	96.83
cal - Copy_122802023_018	8270		207481	1.558	1.9845	99.72
cal - Copy_122802023_019	8270		114300	0.819	1.0479	104.79
cal - Copy_122802023_020	8270		62017	0.443	0.5870	113.39
cal - Copy_122802023_021	8270		21299	0.151	0.1936	96.80
cal - Copy_122802023_022	8270		10203	0.080	0.1018	101.62
cal - Copy_122802023_023	8270		5173	0.039	0.0494	98.81
cal - Copy_122802023_024	8270		2126	0.016	0.0204	101.96
cal - Copy_122802023_025	8270		1153	0.009	0.0111	110.87

Compound: N-Nitrosodimethylamine

Curve Fit: Mean RF | Weighting: None | Zero: Not Forced

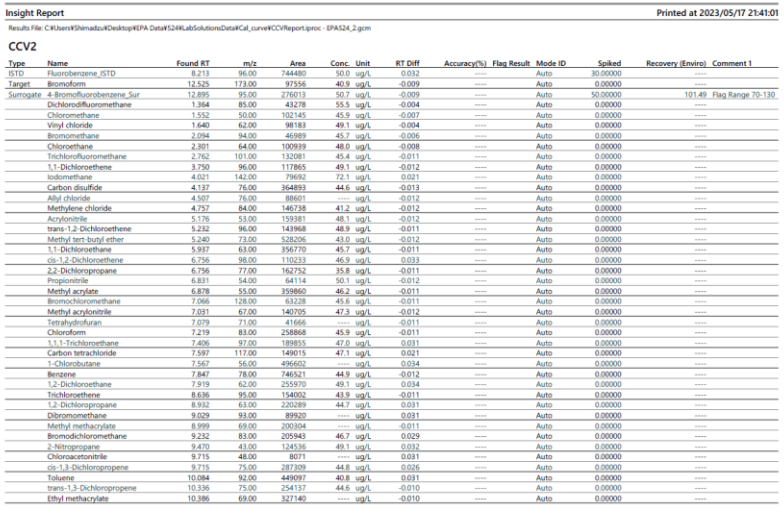
Quantitative Method: Internal Standard

R² = ----

R Equation = ----

Data Filename	Sample Name	Cal Point	Area	Area Ratio	Conc.	Accuracy(%)
cal - Copy_122802023_016	8270		1270049	9.476	10.2286	102.27
cal - Copy_122802023_015	8270		2283332	17.567	18.9575	94.79
cal - Copy_122802023_017	8270		558068	4.890	5.2449	104.89
cal - Copy_122802023_018	8270		285212	1.992	2.1495	107.47
cal - Copy_122802023_019	8270		138829	0.994	1.0730	107.30
cal - Copy_122802023_020	8270		73101	0.516	0.5788	115.76
cal - Copy_122802023_021	8270		24488	0.174	0.1876	93.82
cal - Copy_122802023_022	8270		11190	0.087	0.0941	94.15
cal - Copy_122802023_023	8270		5769	0.043	0.0465	92.91
cal - Copy_122802023_024	8270		2143	0.016	0.0173	86.64

Quant Report
(CCV, Sample, Duplicate)

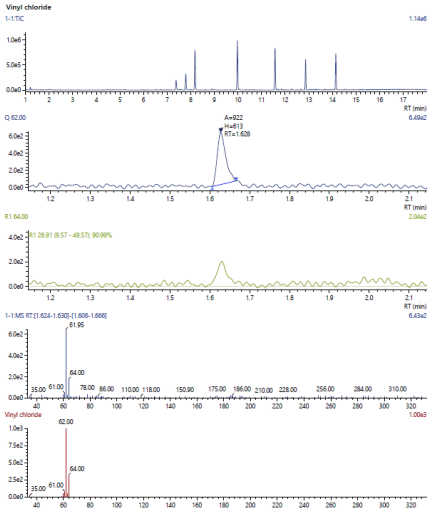


Insight Report — Printed at 2023/05/17 21:41:01

Results File: C:¥Users¥Shimadzu¥Desktop¥EPA Data¥524¥LabSolutionsData¥Cal_curve¥CCVReport.lcproc - EPA524_2.gcm

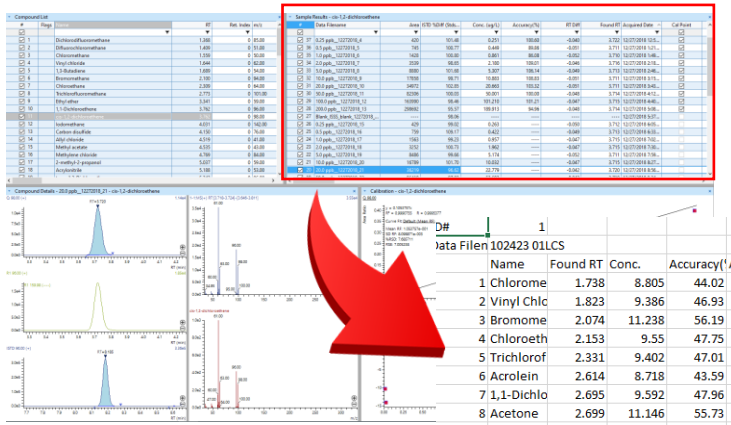
CCV2

Type	Name	Found RT	m/z	Area	Conc.	Unit	RT Diff	Accuracy(%)	Flag Result	Mode ID	Spiked	Recovery (Enviro)	Comment 1
ISTD	Fluorobenzene_ISTD	8.213	96.00	744480	50.0	ug/L	0.032	----		Auto	50.00000	----	
Target	Bromoform	12.525	173.00	97556	40.9	ug/L	-0.009	----		Auto	0.00000	----	
Surrogate	4-Bromofluorobenzene_Sur	12.895	95.00	276013	50.7	ug/L	-0.009	----		Auto	50.00000	101.49	Flag Range 70-130
	Dichlorodifluoromethane	1.364	85.00	43278	55.5	ug/L	-0.004	----		Auto	0.00000	----	
	Chloromethane	1.552	50.00	102145	45.9	ug/L	-0.007	----		Auto	0.00000	----	
	Vinyl chloride	1.640	62.00	98183	49.1	ug/L	-0.004	----		Auto	0.00000	----	
	Bromomethane	2.094	94.00	46989	45.7	ug/L	-0.006	----		Auto	0.00000	----	
	Chloroethane	2.301	64.00	100939	48.0	ug/L	-0.008	----		Auto	0.00000	----	
	Trichlorofluoromethane	2.762	101.00	132081	45.4	ug/L	-0.011	----		Auto	0.00000	----	
	1,1-Dichloroethene	3.750	96.00	117865	49.1	ug/L	-0.012	----		Auto	0.00000	----	
	Iodomethane	4.021	142.00	79692	72.1	ug/L	0.021	----		Auto	0.00000	----	
	Carbon disulfide	4.137	76.00	364893	44.6	ug/L	-0.013	----		Auto	0.00000	----	
	Allyl chloride	4.507	76.00	88601	----	ug/L	-0.012	----		Auto	0.00000	----	
	Methylene chloride	4.757	84.00	146738	41.2	ug/L	-0.012	----		Auto	0.00000	----	
	Acrylonitrile	5.176	53.00	159381	48.1	ug/L	-0.012	----		Auto	0.00000	----	
	trans-1,2-Dichloroethene	5.232	96.00	143968	48.9	ug/L	-0.011	----		Auto	0.00000	----	
	Methyl tert-butyl ether	5.240	73.00	528206	43.0	ug/L	-0.012	----		Auto	0.00000	----	
	1,1-Dichloroethane	5.937	63.00	356770	45.7	ug/L	-0.011	----		Auto	0.00000	----	
	cis-1,2-Dichloroethene	6.756	98.00	110233	46.9	ug/L	0.033	----		Auto	0.00000	----	
	2,2-Dichloropropane	6.756	77.00	162752	35.8	ug/L	-0.011	----		Auto	0.00000	----	
	Propionitrile	6.831	54.00	64114	50.1	ug/L	-0.012	----		Auto	0.00000	----	
	Methyl acrylate	6.878	55.00	359860	46.2	ug/L	-0.011	----		Auto	0.00000	----	
	Bromochloromethane	7.066	128.00	63228	45.6	ug/L	-0.011	----		Auto	0.00000	----	
	Methyl acrylonitrile	7.051	67.00	140705	47.3	ug/L	-0.012	----		Auto	0.00000	----	
	Tetrahydrofuran	7.079	71.00	41666	----	ug/L	-0.011	----		Auto	0.00000	----	
	Chloroform	7.219	83.00	258868	45.9	ug/L	-0.011	----		Auto	0.00000	----	
	1,1,1-Trichloroethane	7.406	97.00	189855	47.0	ug/L	0.031	----		Auto	0.00000	----	
	Carbon tetrachloride	7.597	117.00	149015	47.1	ug/L	0.021	----		Auto	0.00000	----	
	1-Chlorobutane	7.567	56.00	496602	----	ug/L	0.034	----		Auto	0.00000	----	
	Benzene	7.847	78.00	746521	44.9	ug/L	-0.012	----		Auto	0.00000	----	
	1,2-Dichloroethane	7.919	62.00	255970	49.1	ug/L	0.034	----		Auto	0.00000	----	
	Trichloroethene	8.636	95.00	154002	43.9	ug/L	-0.011	----		Auto	0.00000	----	
	1,2-Dichloropropane	8.932	63.00	220289	44.7	ug/L	0.031	----		Auto	0.00000	----	
	Dibromomethane	9.029	93.00	89920	----	ug/L	0.031	----		Auto	0.00000	----	
	Methyl methacrylate	8.999	69.00	200304	----	ug/L	-0.011	----		Auto	0.00000	----	
	Bromodichloromethane	9.232	83.00	205943	46.7	ug/L	0.029	----		Auto	0.00000	----	
	2-Nitropropane	9.470	43.00	124536	49.1	ug/L	0.032	----		Auto	0.00000	----	
	Chloroacetonitrile	9.715	48.00	8071	----	ug/L	0.031	----		Auto	0.00000	----	
	cis-1,3-Dichloropropene	9.715	75.00	287309	44.8	ug/L	0.026	----		Auto	0.00000	----	
	Toluene	10.084	92.00	449097	40.8	ug/L	0.031	----		Auto	0.00000	----	
	trans-1,3-Dichloropropene	10.336	75.00	254137	44.6	ug/L	-0.010	----		Auto	0.00000	----	
	Ethyl methacrylate	10.386	69.00	327140	----	ug/L	-0.010	----		Auto	0.00000	----	



Report export

Directly exporting table from the processing software helps integrate the LIMS system.



D# 1

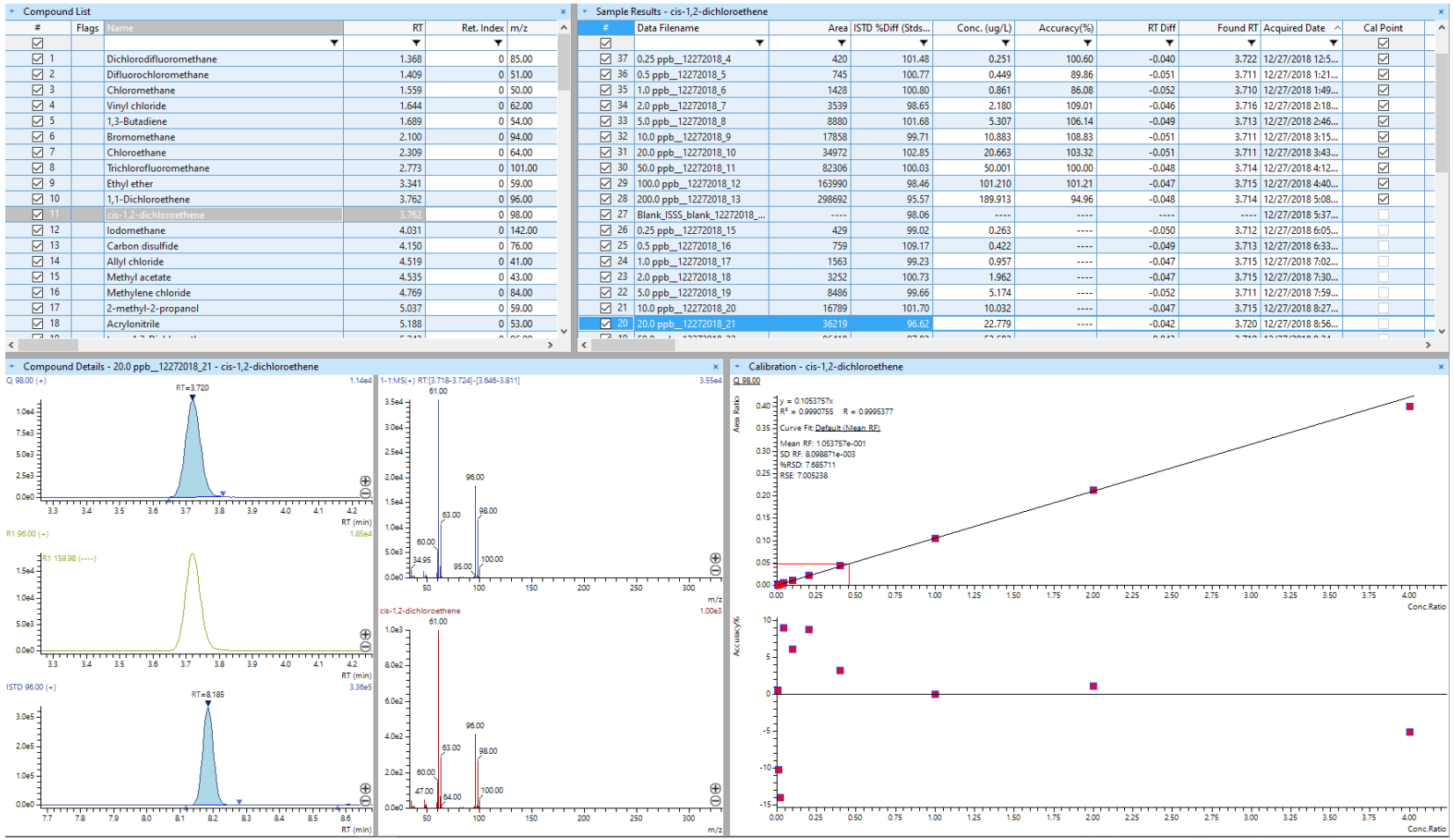
Data File\102423 01LCS

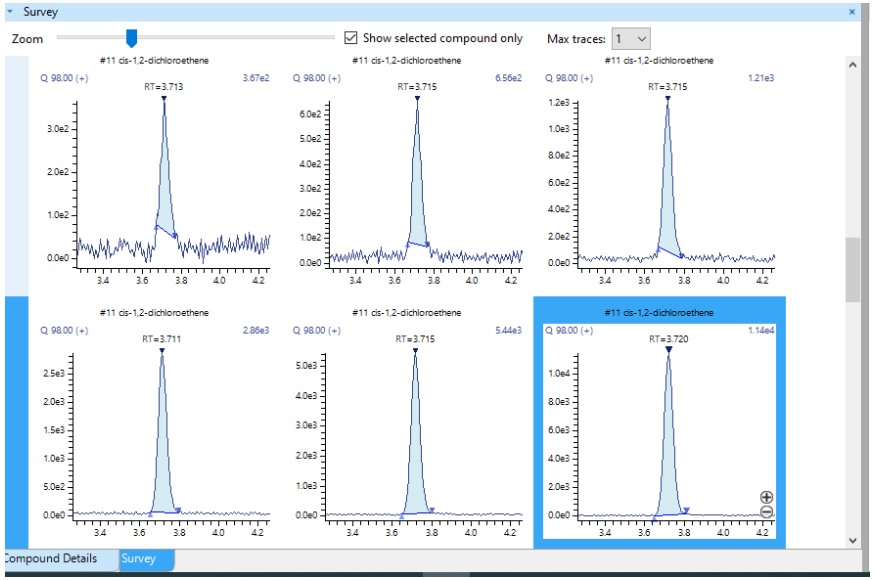
	Name	Found RT	Conc.	Accuracy(%	Area	Recovery	Spiked	RF %RSD (	ISTD %Dif	ISTD %Dif	Status	Actual Ret	Unit	m/z	ISTD Area	Area Ratio	Type	%RSD (Co	ISTD Grou	Tailing F.	Asymmetr	S/I
1	Chlorome	1.738	8.805	44.02	853217	44.02	20	152.988	100.58	100	Pending	0	ppb	50	3374229	0.253	Target		1	0		
2	Vinyl Chlc	1.823	9.386	46.93	679438	46.93	20	150.7404	100.58	100	Pending	0	ppb	62	3374229	0.201	Target		1	0		
3	Bromome	2.074	11.238	56.19	242271	56.19	20	146.087	100.58	100	Pending	0	ppb	94	3374229	0.072	Target		1	0		
4	Chloroeth	2.153	9.55	47.75	373766	47.75	20	152.1311	100.58	100	Pending	0	ppb	64	3374229	0.111	Target		1	0		
5	Trichlorof	2.331	9.402	47.01	435694	47.01	20	148.4978	100.58	100	Pending	0	ppb	101	3374229	0.129	Target		1	0		
6	Acrolein	2.614	8.718	43.59	158415	43.59	20	157.5276	100.58	100	Pending	0	ppb	56	3374229	0.047	Target		1	0		
7	1,1-Dichlo	2.695	9.592	47.96	867141	47.96	20	155.1256	100.58	100	Pending	0	ppb	61	3374229	0.257	Target		1	0		
8	Acetone	2.699	11.146	55.73	326257	55.73	20	160.2486	100.58	100	Pending	0	ppb	43	3374229	0.097	Target		1	0		
9	Methylen	3.023	9.217	46.09	877011	46.09	20	152.1939	100.58	100	Pending	0	ppb	49	3374229	0.26	Target		1	0		
10	Acrylonitr	3.166	8.771	43.86	344527	43.86	20	158.691	100.58	100	Pending	0	ppb	53	3374229	0.102	Target		1	0		
11	trans-1,2-I	3.208	9.33	46.65	929175	46.65	20	154.6388	100.58	100	Pending	0	ppb	61	3374229	0.275	Target		1	0		
12	1,1-Dichlo	3.503	9.252	46.26	1073240	46.26	20	153.1664	100.58	100	Pending	0	ppb	63	3374229	0.318	Target		1	0		
13	Ethyl Acet	3.867	7.321	36.61	1085266	36.61	20	154.1255	100.58	100	Pending	0	ppb	43	3374229	0.322	Target		1	0		
14	Chlorofori	4.109	8.26	41.3	641997	41.3	20	151.2245	100.58	100	Pending	0	ppb	83	3374229	0.19	Target		1	0		
15	1,1,1-Trich	4.254	9.32	46.6	463597	46.6	20	150.7924	100.58	100	Pending	0	ppb	97	3374229	0.137	Target		1	0		
16	Carbon Te	4.367	9.757	48.78	374614	48.78	20	151.5158	100.58	100	Pending	0	ppb	117	3374229	0.111	Target		1	0		
17	Isopropyl	4.475	2.487	12.43	1401670	12.43	20	149.2	100.58	100	Pending	0	ppb	43	3374229	0.415	Target		1	0		
18	1,2-Dichlo	4.479	29.567	98.56	957214	98.56	30	0.518219	100.58	100	Pending	0	ppb	65	3374229	0.284	Target		1	0		
19	Benzene	4.51	5.461	27.31	2095380	27.31	20	196.674	100.58	100	Pending	0	ppb	78	3374229	0.621	Target		1	0		
20	1,2-Dichlo	4.535	9.268	46.34	688200	46.34	20	152.6257	100.58	100	Pending	0	ppb	62	3374229	0.204	Target		1	0		
21	Fluorober	4.712	30	100	3374229		0		100.58	100		0	ppb	96	3374229		ISTD		1	0		
22	Trichloroe	4.981	9.172	45.86	509510	45.86	20	150.1063	101.45	100	Pending	0	ppb	130	1744723	0.292	Target		2	0		
23	1,2-Dichlo	5.183	1.011	5.05	658430	5.05	20	0	101.45	100	Pending	0	ppb	63	1744723	0.377	Target		2	0		
24	Bromodicl	5.371	9.666	48.33	460888	48.33	20	152.5379	101.45	100	Pending	0	ppb	83	1744723	0.264	Target		2	0		
25	2-Chloroe	5.567	8.18	40.9	397757	40.9	20	138.6593	101.45	100	Pending	0	ppb	43	1744723	0.228	Target		2	0		
26	cis-1,3-Dic	5.715	9.447	47.23	668830	47.23	20	148.4615	101.45	100	Pending	0	ppb	75	1744723	0.383	Target		2	0		
27	Toluene-D	5.944	29.521	98.4	3374795	98.4	30	1.444597	101.45	100	Pending	0	ppb	98	1744723	1.934	Target		2	0		
28	Toluene	6.002	9.337	46.68	2187715	46.68	20	157.3203	101.45	100	Pending	0	ppb	91	1744723	1.254	Target		2	0		
29	trans-1,3-I	6.174	9.566	47.83	543315	47.83	20	149.0686	101.45	100	Pending	0	ppb	75	1744723	0.311	Target		2	0		
30	2-Bromo-1	6.303	30	100	1744723		0		101.45	100		0	ppb	41	1744723		ISTD		2	0		
31	1,1,2-Trich	6.348	6.111	30.55	413880	30.55	20	201.7038	94.55	100	Pending	0	ppb	97	2204193	0.188	Target		3	0		
32	Tetrachlor	6.443	9.565	47.82	602621	47.82	20	153.0763	94.55	100	Pending	0	ppb	166	2204193	0.273	Target		3	0		
33	Dibromoc	6.689	10.144	50.72	352658	50.72	20	156.1117	94.55	100	Pending	0	ppb	129	2204193	0.16	Target		3	0		

LIMS

Speedup data processing

Manual peak identification/integration sometimes need to finish processing.

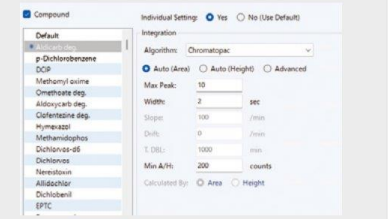




AI-Assisted peak integration

AI assisted peak integlation accelerate data processing

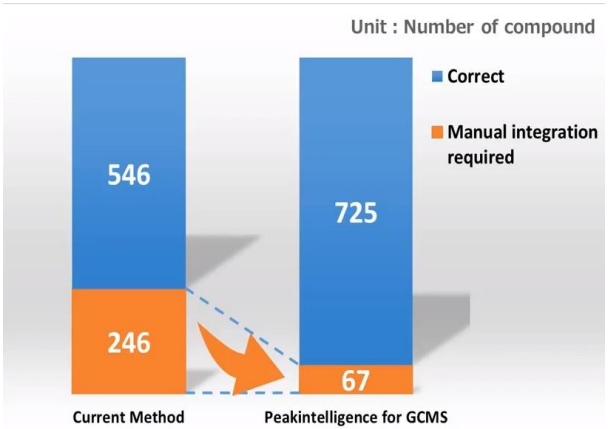
Conventional Shimadzu Algorithm

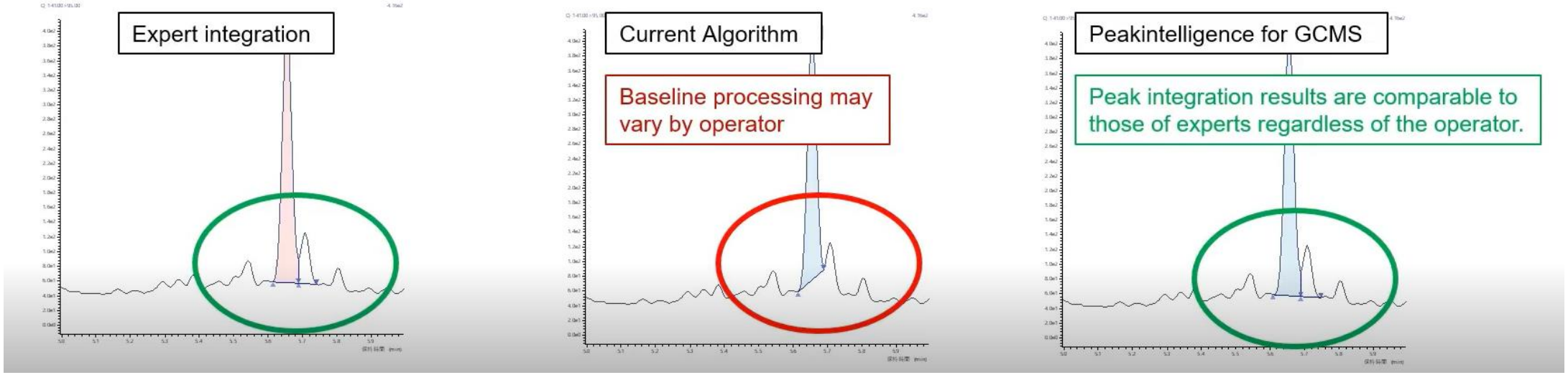


The simultaneous analysis of hundreds of regulated compounds.
Adjusting the peak integration parameters
for each compound is a tremendous task.

Peakintelligence for GCMS

Accurate peak integration is achieved without
configuring the parameter settings.





Focusing data

By flagging the data, the focus data becomes clearer, which improves processing efficiency.

Compound Results - MatrixSpike

#	Fla...	Flag ID	Type	Name	Conc.	ISTD %Diff (Selected) Area	ISTD %Diff (CC) Area	Recovery (Enviro)	RPD	Flag Result
48			Target	1,1,1,2-Tetrachloroethane	44.822076...	93.77	96.75	89.64	3.45	Pass
49			Target	Xylene Total	127.18399...	93.77	96.75	84.79	2.32	Pass
50	⚑	RPD	Target	m/p-Xylene	120.05264...	93.77	96.75	120.05	36.68	Fail
51			Target	o-Xylene	42.925714...	93.77	96.75	85.85	3.75	Pass
52	⚑	rEnv, RPD	Target	Styrene	14.893732...	93.77	96.75	29.79	95.73	Fail
53			Target	Bromoform	40.945274...	93.77	96.75	81.56	8.53	Pass
54			Target	Isopropylbenzene	41.973292...	93.77	96.75	83.95	2.88	Pass
55	⚑	rEnv	Surrogate	4-Bromofluorobenzene_Su...	50.743044...	93.77	96.75	169.14	0.16	Fail
56			Target	1,1,2,2-Tetrachloroethane	44.296847...	93.77	96.75	88.59	7.62	Pass
57			Target	Bromobenzene	43.310274...	93.77	96.75	86.62	4.91	Pass
58			Target	trans-1,4-Dichloro-2-butene	40.251729...	93.77	96.75	80.50	13.03	Pass
59			Target	1,2,3-Trichloropropane	44.596189...	93.77	96.75	89.19	9.61	Pass
60			Target	n-Propylbenzene	41.823714...	93.77	96.75	83.65	3.77	Pass
61			Target	2-Chlorotoluene	42.453903...	93.77	96.75	84.91	4.66	Pass
62			Target	4-Chlorotoluene	44.608940...	93.77	96.75	89.22	4.14	Pass
63			Target	1,2,4-Trimethylbenzene	42.331516...	93.77	96.75	84.66	5.20	Pass
64	⚑	RPD	Target	tert-Butylbenzene	41.404369...	93.77	96.75	82.81	120.69	Fail
65			Target	1,3,5-Trimethylbenzene	42.672844...	93.77	96.75	85.35	4.97	Pass
66			Target	Pentachloroethane	46.455152...	93.77	96.75	92.91	4.85	Pass
67			Target	sec-Butylbenzene	41.726976...	93.77	96.75	83.45	5.58	Pass

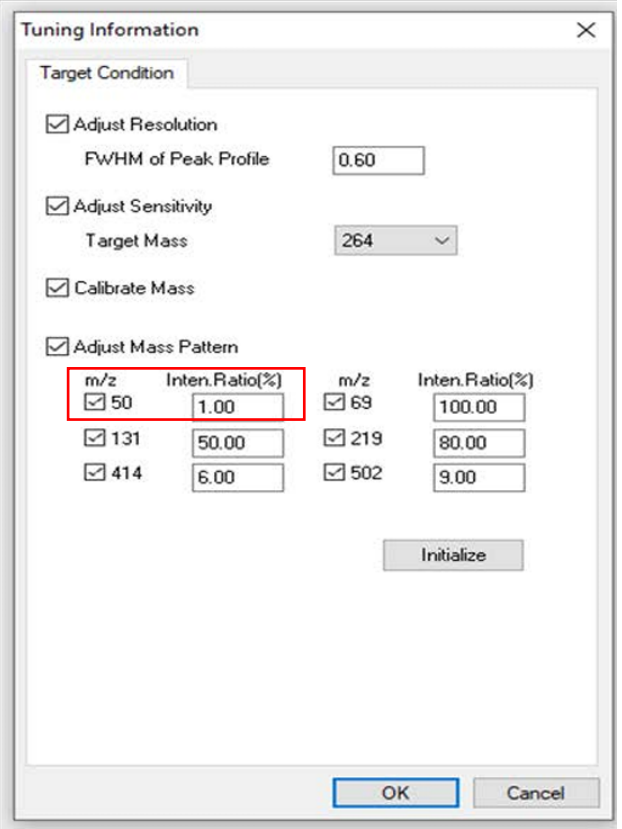
Instrument downtime

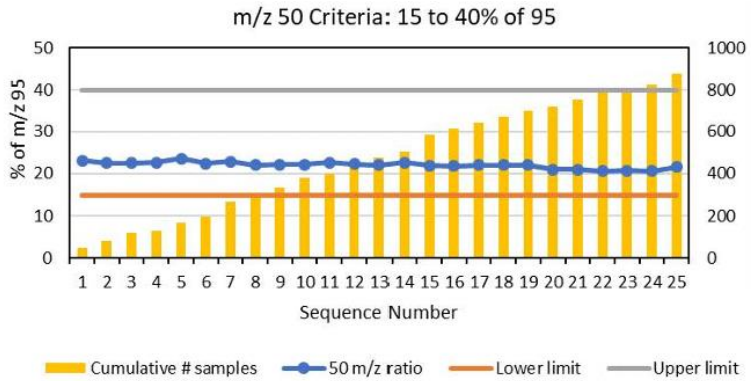
Conceptualizing downtime in laboratory

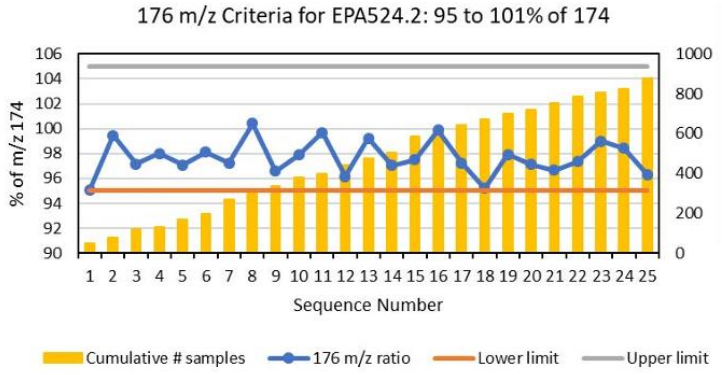
Maintenance Frequency ✖ Time for Maintenance ✚ Human Error

Keep running instrument

How can we keep the instrument running without interruption?
→**<u>Use BFB/DFTPP tuning algorithm with proven robustness</u>**





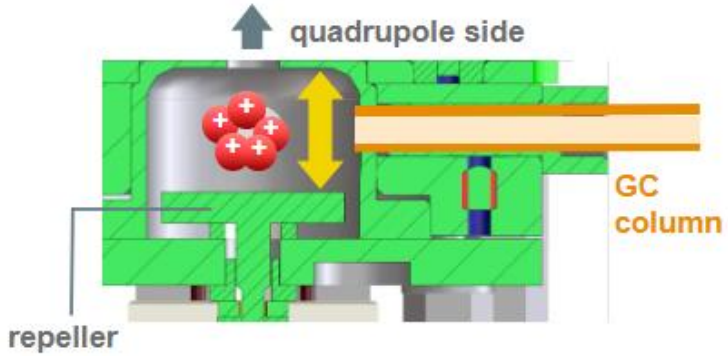


Even using 524.2 BFB criteria which know well as strict criteria,
BFB tuning algorithm works over 800 injections (Standards and samples)

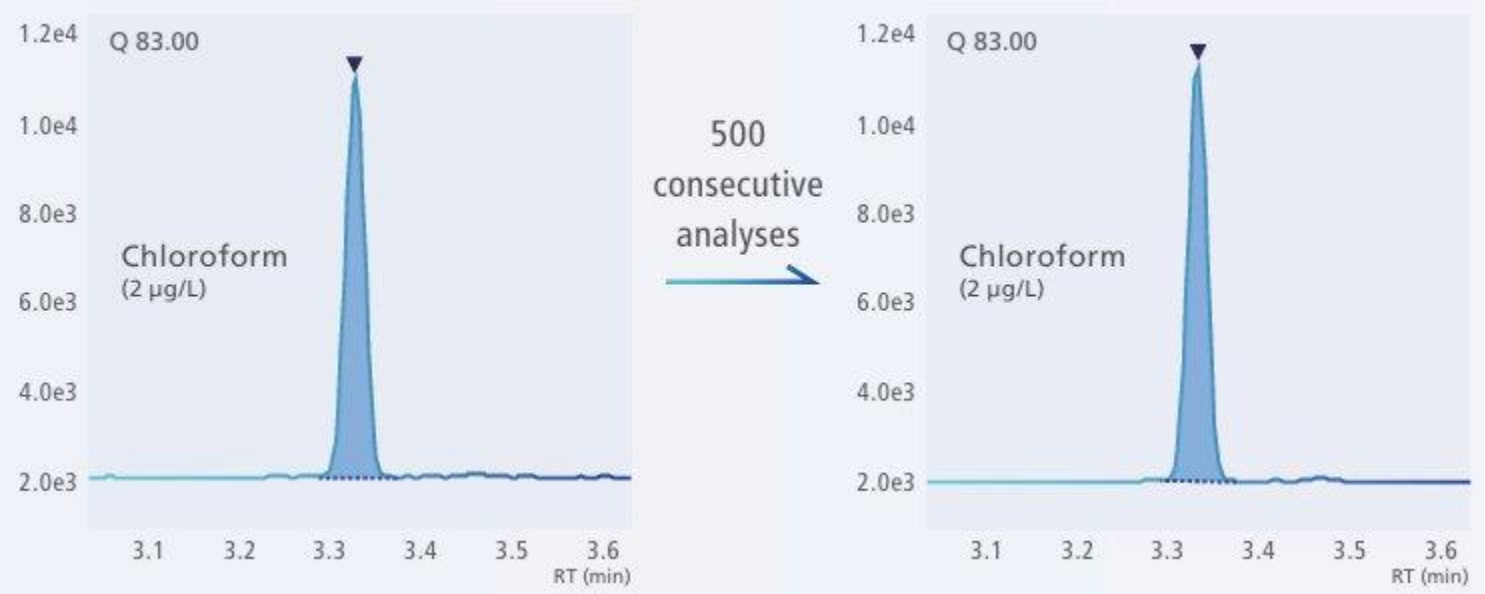
Reduce maintenance frequency

How to reduce maintenance frequency?
→**<u>Use robust MS instrument without compromising effectiveness</u>**

DuraEase ion source (section)



In the continuous analysis of VOCs in water, **the effect of elution of the column liquid phase was eliminated to the extreme, and very stable measurement was realized.**



Reduce maintenance time

Intuitive/less step operation reduce Instrument downtime

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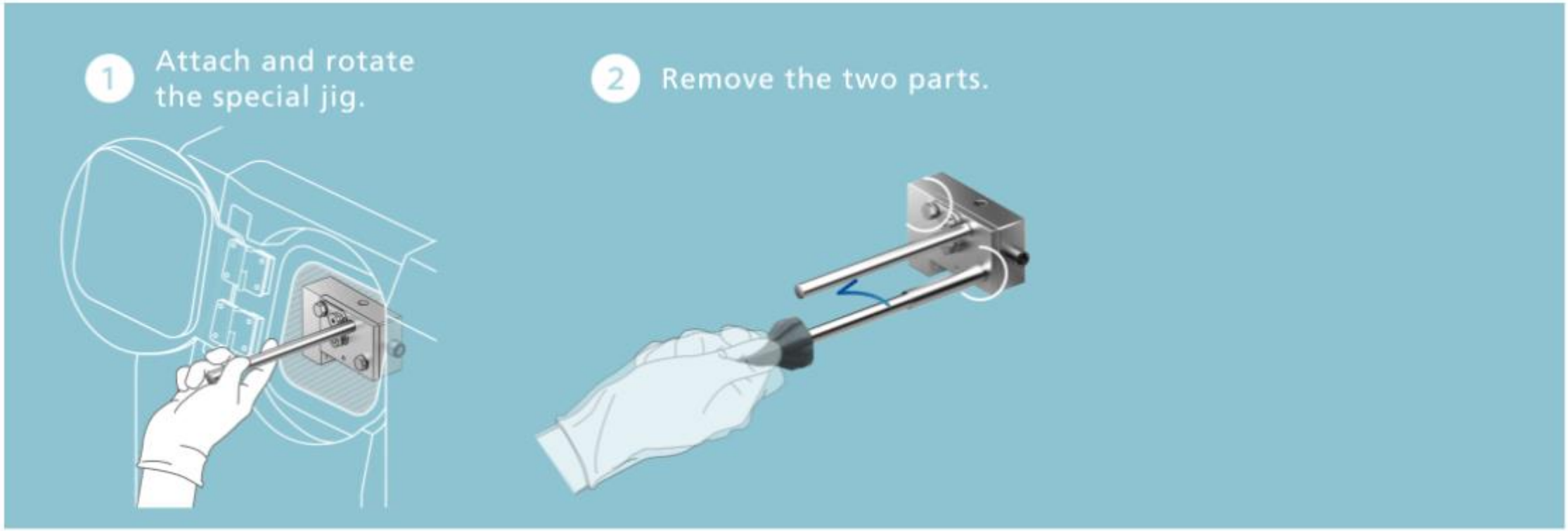
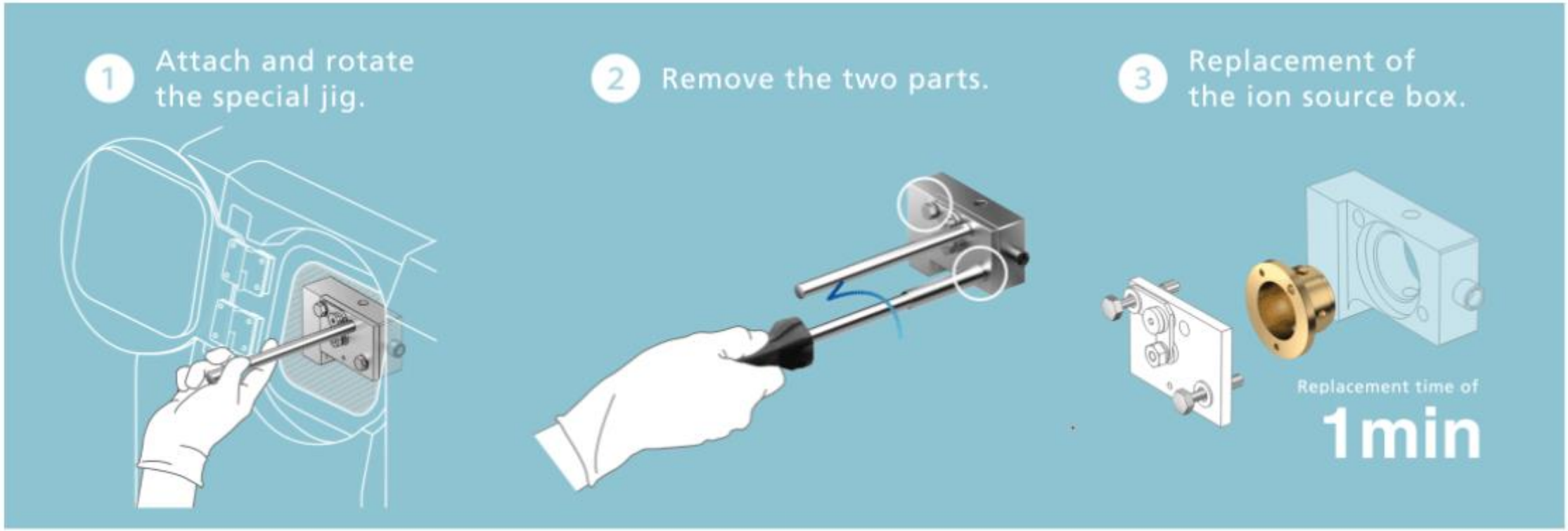
Intuitive/less step operation reduce Instrument downtime



Reduce maintenance time

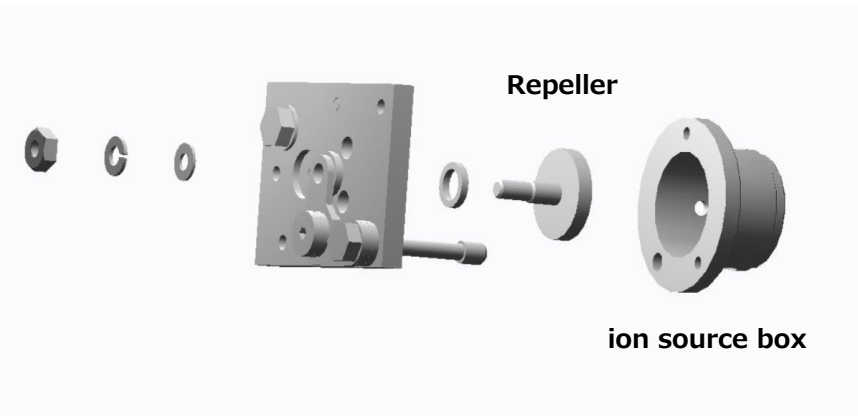
Intuitive/less step operation reduce Instrument downtime



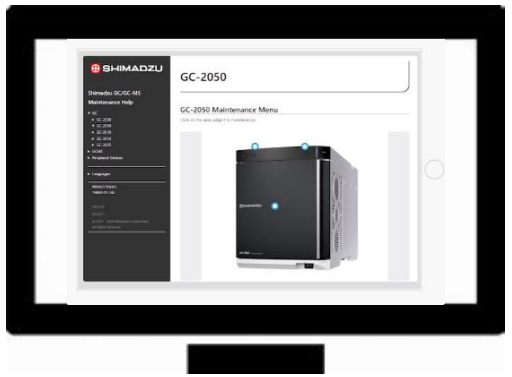
Reduce Human Error

A simplified design makes maintenance easier for operators, and accessible instructions from anywhere help reduce human error.

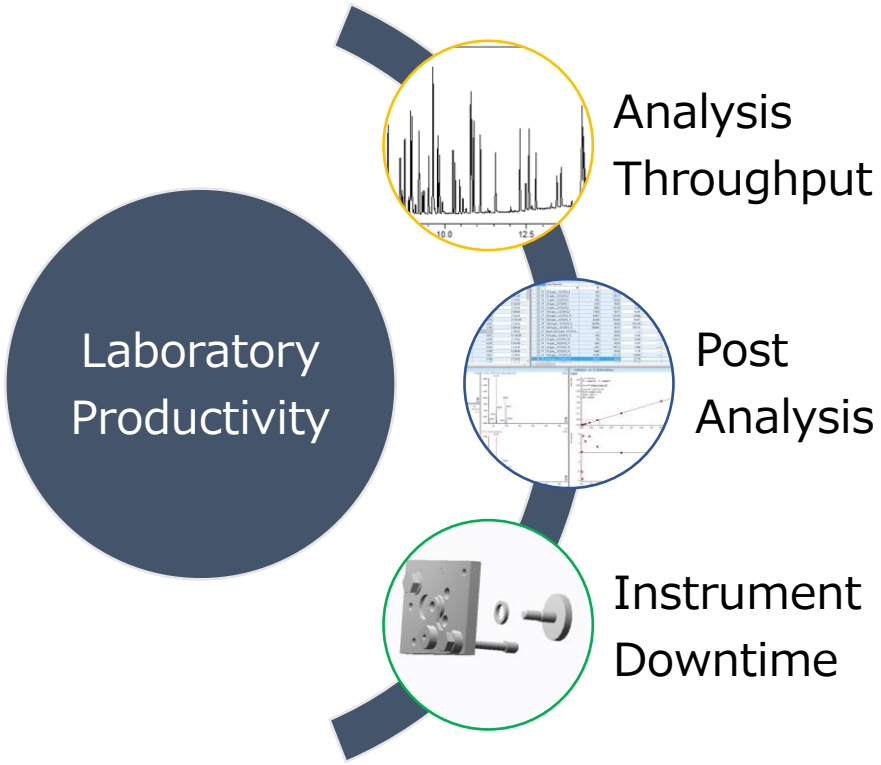
	Latest GC-MS	Conventional GC-MS
Parts (PC)	7	10
Tools (PC)	3	5
Assemble (Min)	1	10
Cleaning (Min)	0 (Disposable)	15



Easy access to maintenance help



Take home message

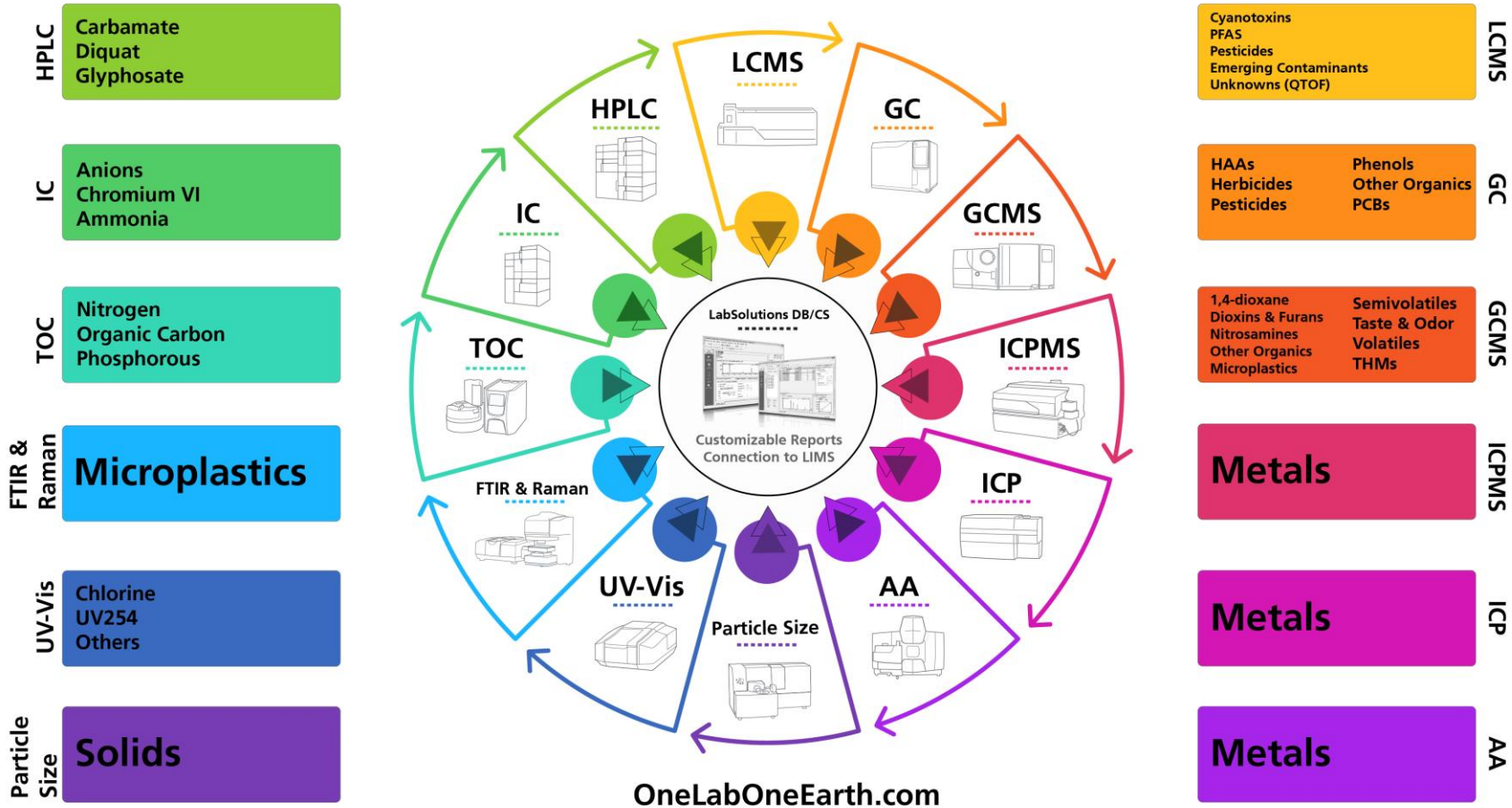


Integrating a compact design with rapid Scan/SIM analysis improves injection efficiency in terms of area and time.

AI-assisted peak integration and visualization software streamline data processing, reducing manual tasks and enhancing processing efficiency

Highly durable instruments minimize maintenance needs, while intuitive maintenance procedures prevent human error-related issues

Q&A



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