

University of Stuttgart
Germany



Analytische Qualitätssicherung Baden-Württemberg

Proficiency Test 6/17

- TW S4 – PFC in drinking water -

PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFNA, PFDA, PFBS, PFHxS, PFOS

Final report

provided by

AQS Baden-Württemberg at

Institute for Sanitary Engineering, Water Quality and Solid Waste Management,

University of Stuttgart

Bandtäle 2, 70569 Stuttgart-Büsnau, Germany

and

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AQS Baden-
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Stuttgart, in April 2018

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Version of the report	2.0	

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1. General

This PT was provided by AQS Baden-Württemberg in cooperation with IWW Water Center in Mülheim an der Ruhr and with the network “NORMAN” (Network of reference laboratories for monitoring of emerging environmental pollutants). In this round following parameter were to be determined:

parameter	CAS-number of the parameter
Perfluorobutanoic acid (PFBA)	375-22-4
Perfluoropentanoic acid (PFPeA)	2706-90-3
Perfluorohexanoic acid (PFHxA) (Undecafluorohexanoic acid)	307-24-4
Perfluoroheptanoic acid (PFHpA)	375-85-9
Perfluorooctanoic acid (PFOA)	335-67-1
Perfluorononanoic acid (PFNA)	375-95-1
Perfluorodecanoic acid (PFDA)	335-76-2
1-Perfluorobutanesulfonic acid (PFBS)	375-73-5
Perfluorohexane-1-sulphonic acid (PFHxS)	355-46-4
Perfluorooctane sulfonic acid (PFOS)	1763-23-1

The PT was executed and evaluated according to the requirements of DIN 38402-A45 and ISO/TS 20612.

2. PT design

Each participant received the following samples:

- 3 samples for the determination of the PFC in 1000-ml-ground bottles with ground-in stopper. Stabilisation with sodium azide.

3 different concentration levels/batches were produced. All participants received the same samples.

3. Sample preparation

The samples for the determination of the PFC were based on a real ground water matrix from the northern part of the region Ruhr in North Rhine-Westphalia. The ground water was used without treatment for the sample preparation.

The ground water was spiked with stock solutions and the concentrations covered drinking and ground water relevant ranges.

4. Sample distribution

The samples were dispatched on 24 October 2017 by express service

5. Analytical methods

The participants were free to choose a suitable method, but a limit of quantification of 0,01 µg/l for all parameters was required.

The participants were informed that the samples had to be analysed in the own laboratory, with own personal and own equipment. Subcontracting of the analysis was not allowed.

The samples had to be analysed in duplicate over the complete method (sample preparation and measurement). The participants were asked to report the results as average values in µg/l with three significant digits.

6. Submission of the results

The deadline for the submission of results was on 20 November 2017.

7. Basic principle of evaluation and assessment

The basic principle of the evaluation and assessment of the PTs from AQS Baden-Württemberg are described in the document „Evaluation of the PTs and information for the report“, which can be downloaded from www.aqsbw.de/pdf/ausw_berichte_v1_en.pdf.

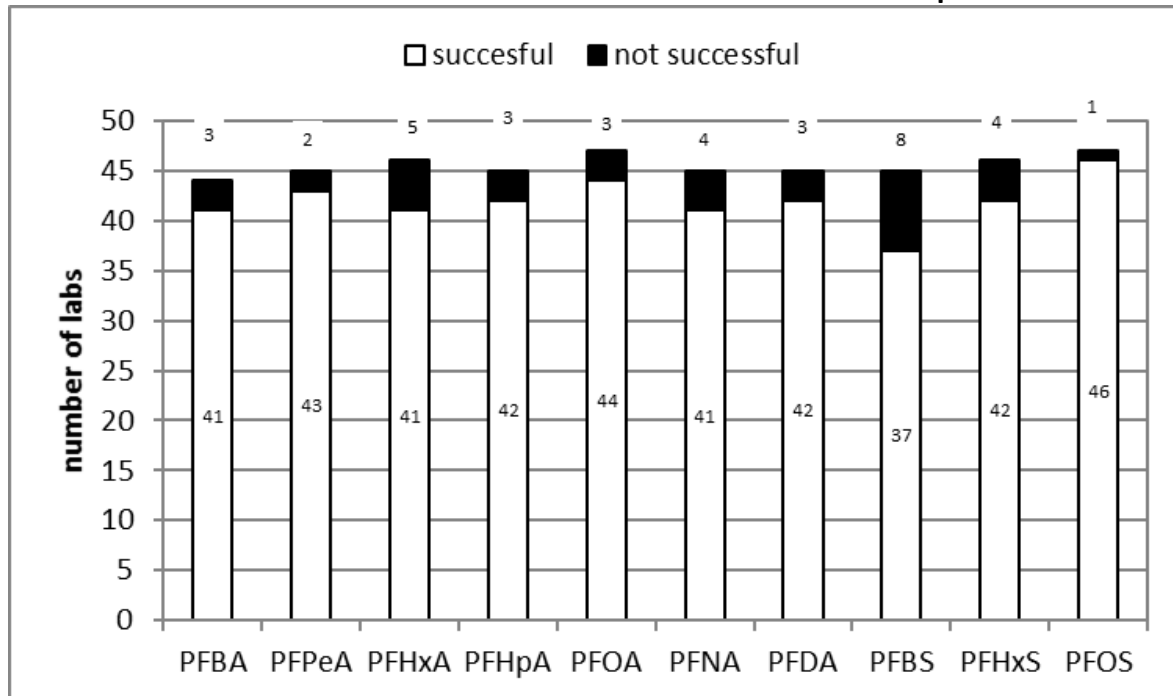
This PT was evaluated as follows:

Assigned value x_{pt}:	Reference value						
Standard deviation for proficiency assessment σ_{pt}:	Q method						
Upper limit of σ_{pt}:	25 %						
Lower limit of σ_{pt}:	5 %						
Assessment:	z_U -Score						
Classification of the single results:	<table style="border: none;"> <tr> <td style="padding-right: 20px;">$z_u \leq 2,0$</td> <td>successful</td> </tr> <tr> <td>$2,0 < z_u < 3,0$</td> <td>questionable</td> </tr> <tr> <td>$z_u \geq 3,0$</td> <td>unsatisfactory</td> </tr> </table>	$ z_u \leq 2,0$	successful	$2,0 < z_u < 3,0$	questionable	$ z_u \geq 3,0$	unsatisfactory
$ z_u \leq 2,0$	successful						
$2,0 < z_u < 3,0$	questionable						
$ z_u \geq 3,0$	unsatisfactory						
Parameter assessment:	A parameter was assessed as successful, if more than half of the values were correctly determined (2 out of 3 values are within the tolerance limits).						

8. Evaluation

Number of participants:	48 1 laboratory reported no results
Number of reported values	1365
Number of accepted values:	1240 (90,84 %)

Illustration of the successful and not successful laboratories for each parameter



9. Explanation for the appendices

The explanations for the appendices can be found in the document „Evaluation of the PTs and information for the report“, which can be downloaded from www.agsbw.de/pdf/ausw_berichte_v1_en.pdf

10. Measurement uncertainty

General:

Number of labs with valid values	47
Number of labs with valid values and reported measurement uncertainties	24 (51,1 %)
Number of valid values	1365
Number of valid values with measurement uncertainties	651 (47,7 %)

Measurement uncertainties against the accreditation status

Accreditation status of the values	Number of values	Number of values with measurement uncertainty
accredited	960	486 (50,6 %)
not accredited	222	105 (47,3 %)
not specified	183	60 (32,8 %)

Interpretation of the reported measurement uncertainties:

If measurement uncertainties are underestimated values assessed as “satisfactory” in the PT ($|z_U| \leq 2$), will have a large ζ -score $|\zeta| > 2$ means that the “own” requirements (defined in terms of estimated uncertainty) are not fulfilled.

Number of values with reported measurement uncertainty having a $z_U \leq 2,0$	587
Number of values with a magnitude of ζ-scores > 2 The own requirements of the laboratory are not fulfilled and the estimation of the measurement uncertainty is too low	159 (27,1 %)

11. Traceable reference values

The explanations about traceable reference values can be found in the document „Evaluation of the PTs and information for the report“, which can be downloaded from www.aqsbw.de/pdf/ausw_berichte_v1_en.pdf

12. Remarks

The reference values were calculated without matrix contents, because the used matrix was ground water not contaminated with PFCs.

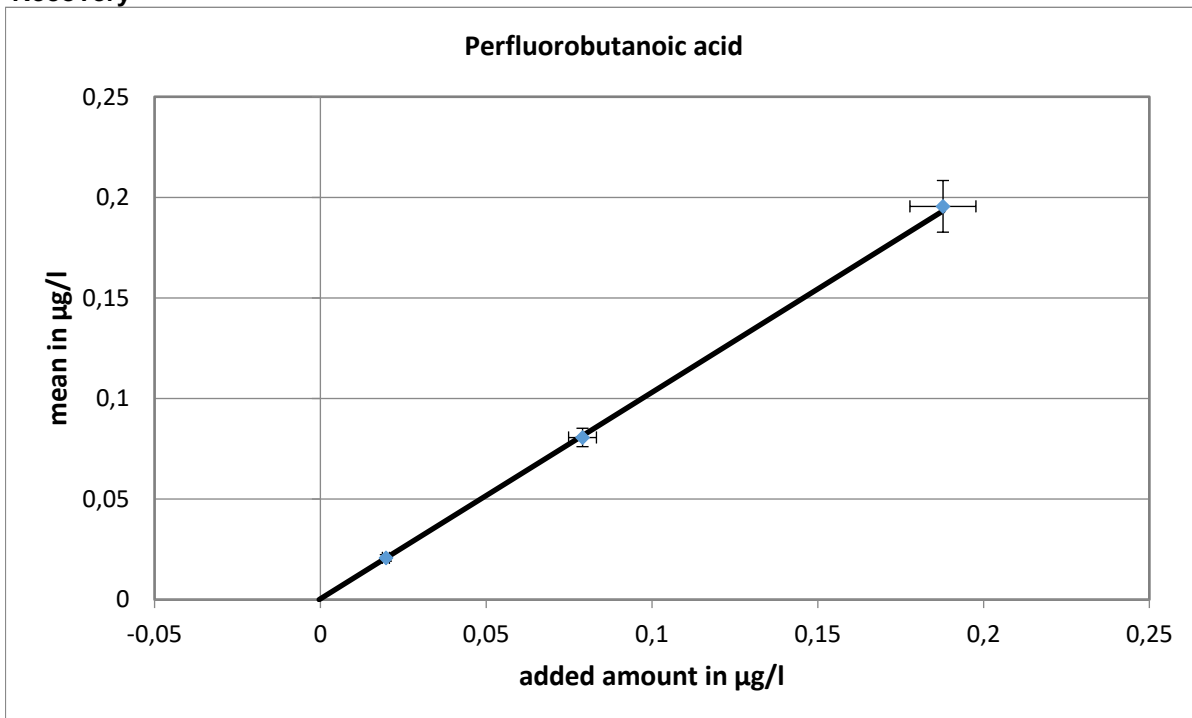
13. Internet

The report is available on the following webpage: http://www.aqsbw/pdf/report617_2.pdf

Perfluorobutanoic acid

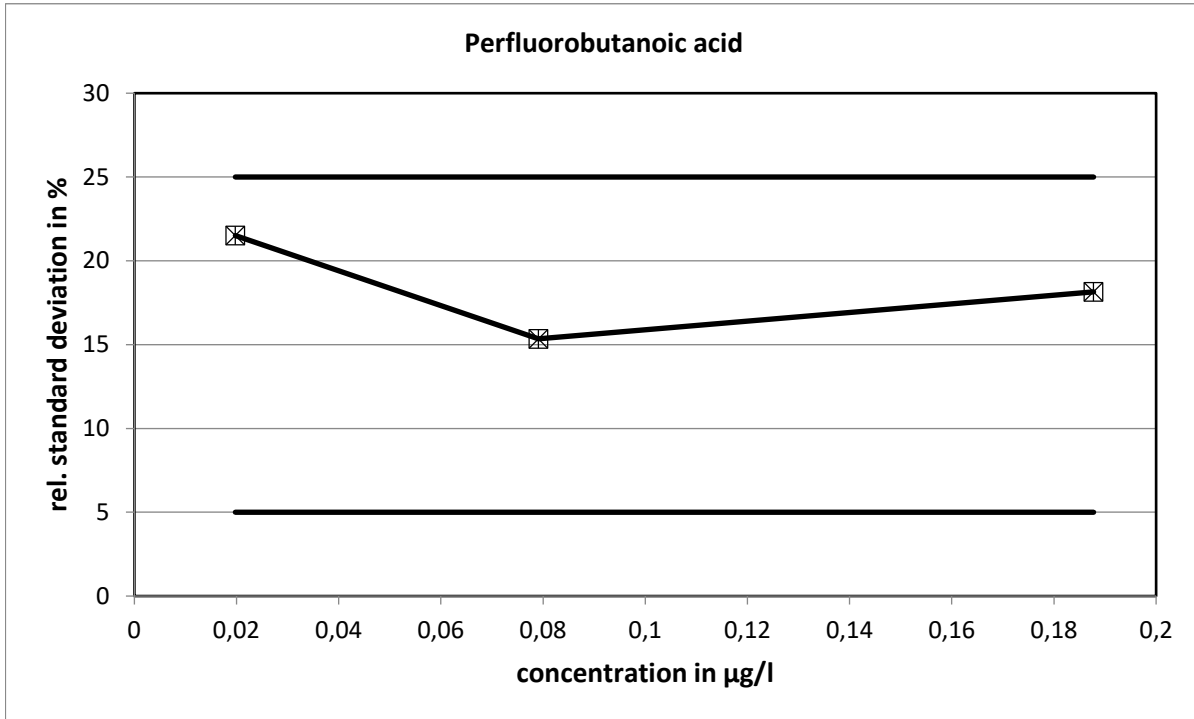
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0198	5,56	0,0043	0,0043	21,51	0,0293	0,0120	48,39	-39,45	44	0	4	9,1
2	0,0791	5,31	0,0121	0,0121	15,35	0,1054	0,0564	33,37	-28,72	44	1	5	13,6
3	0,1878	5,29	0,0341	0,0341	18,14	0,2629	0,1246	40,03	-33,65	44	0	4	9,1
sum										132	1	13	10,6

Recovery

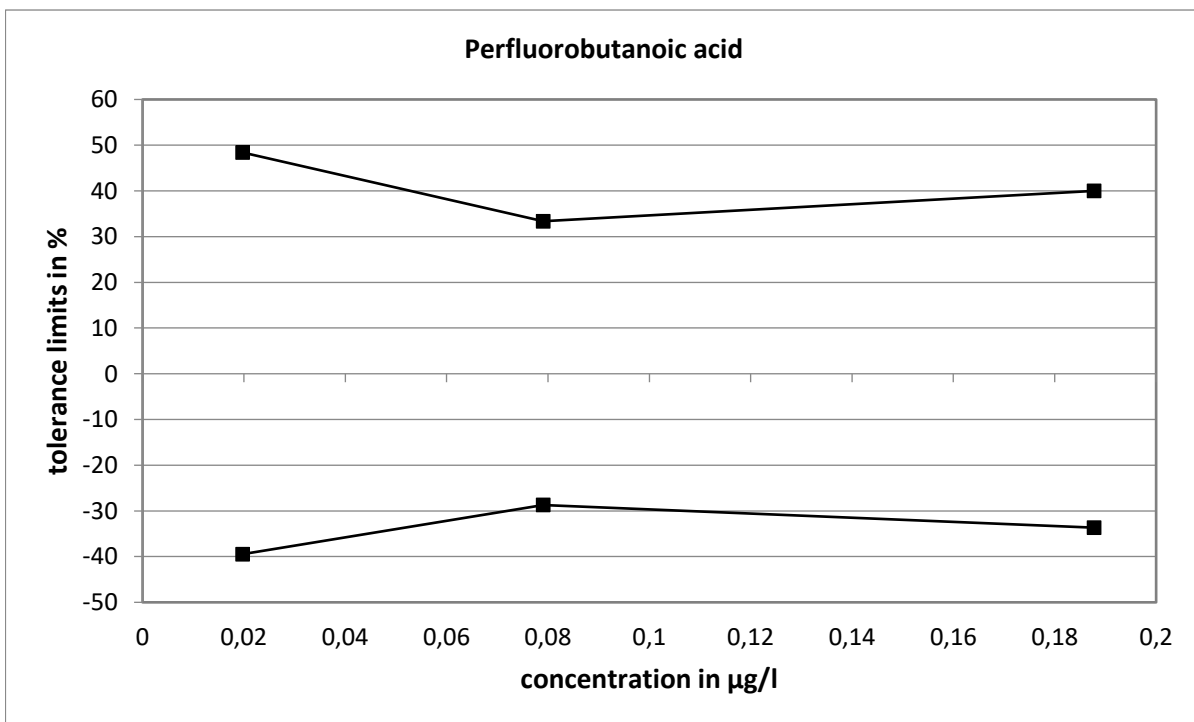


Slope of the regression: 1,027, recovery: 102,7 %

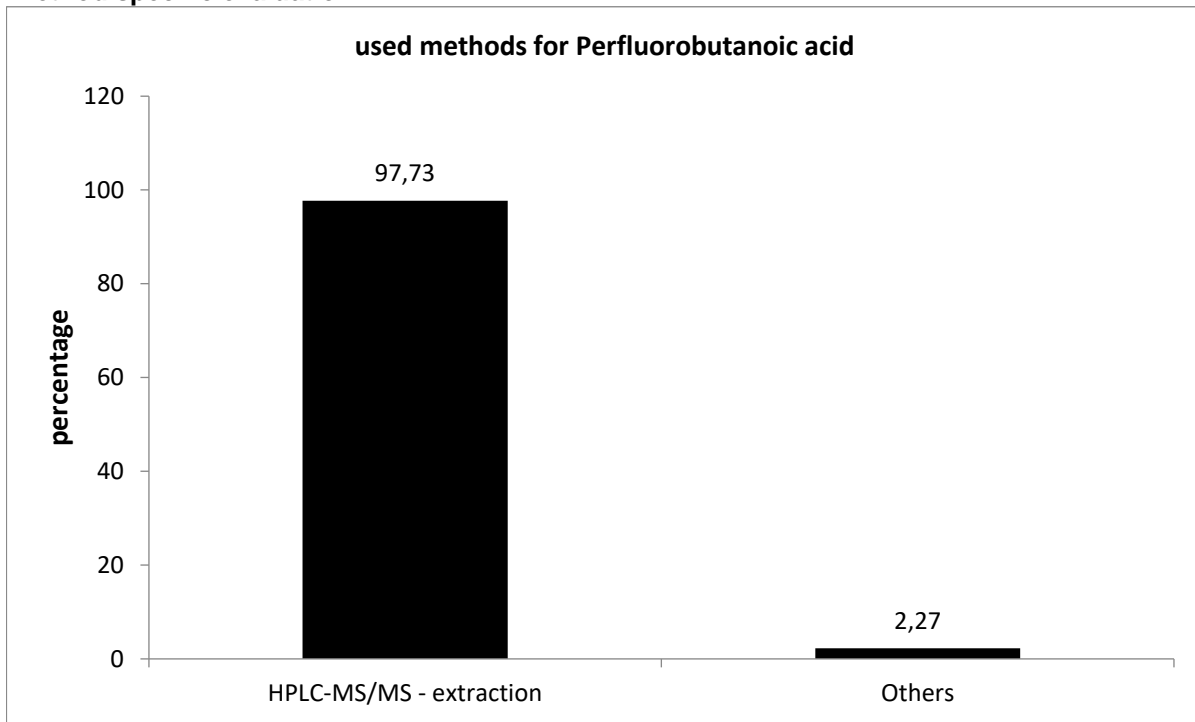
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



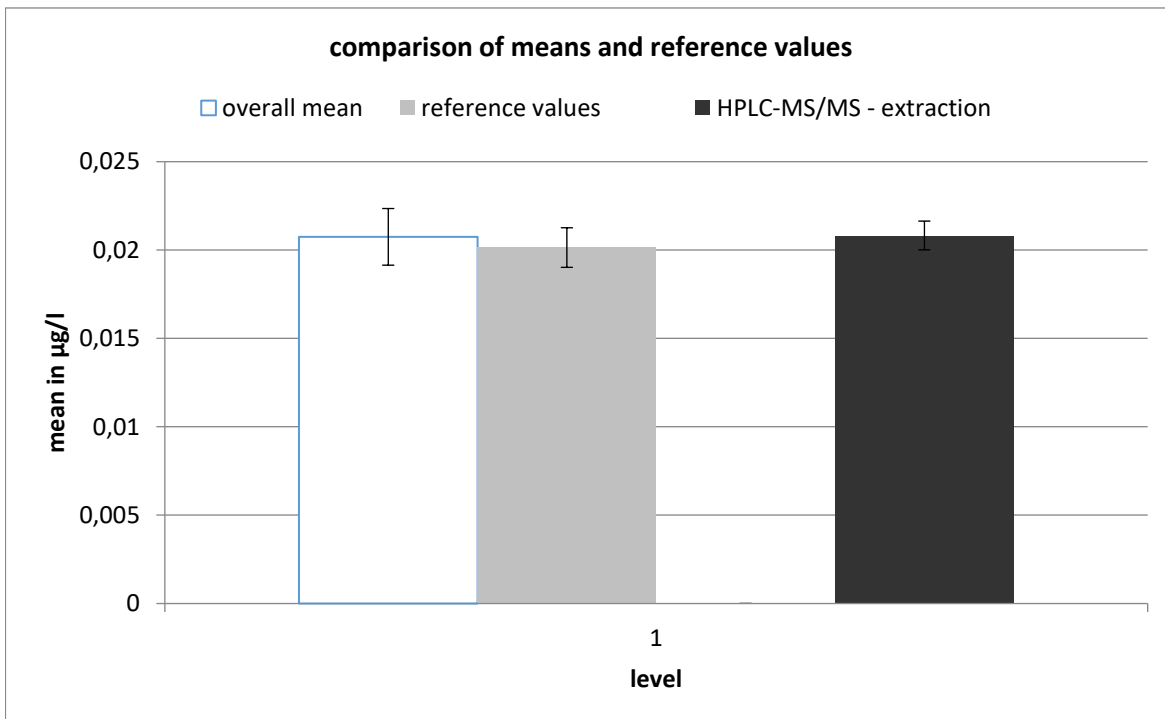
Method specific evaluation

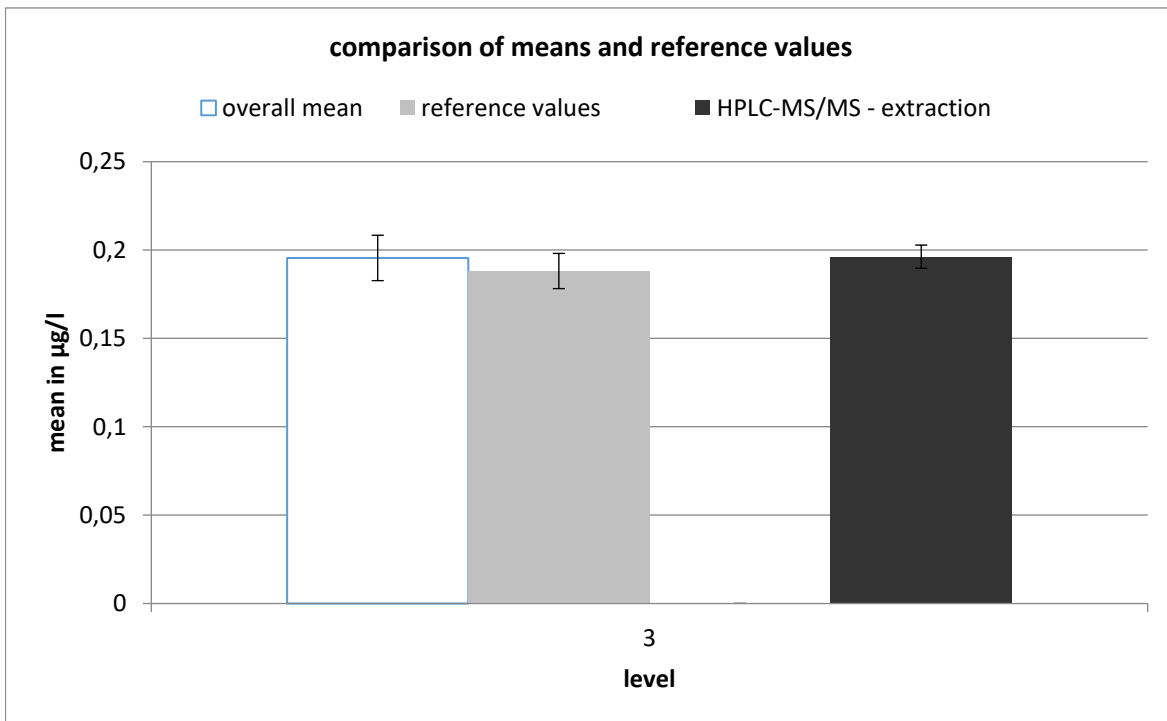
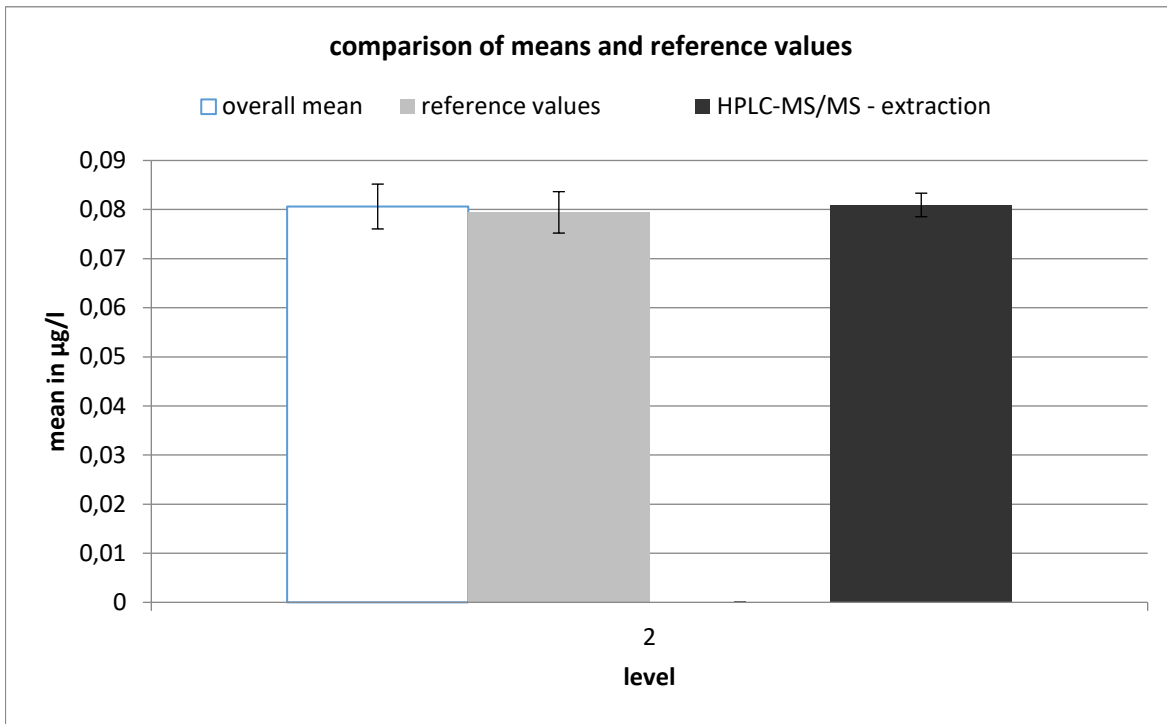


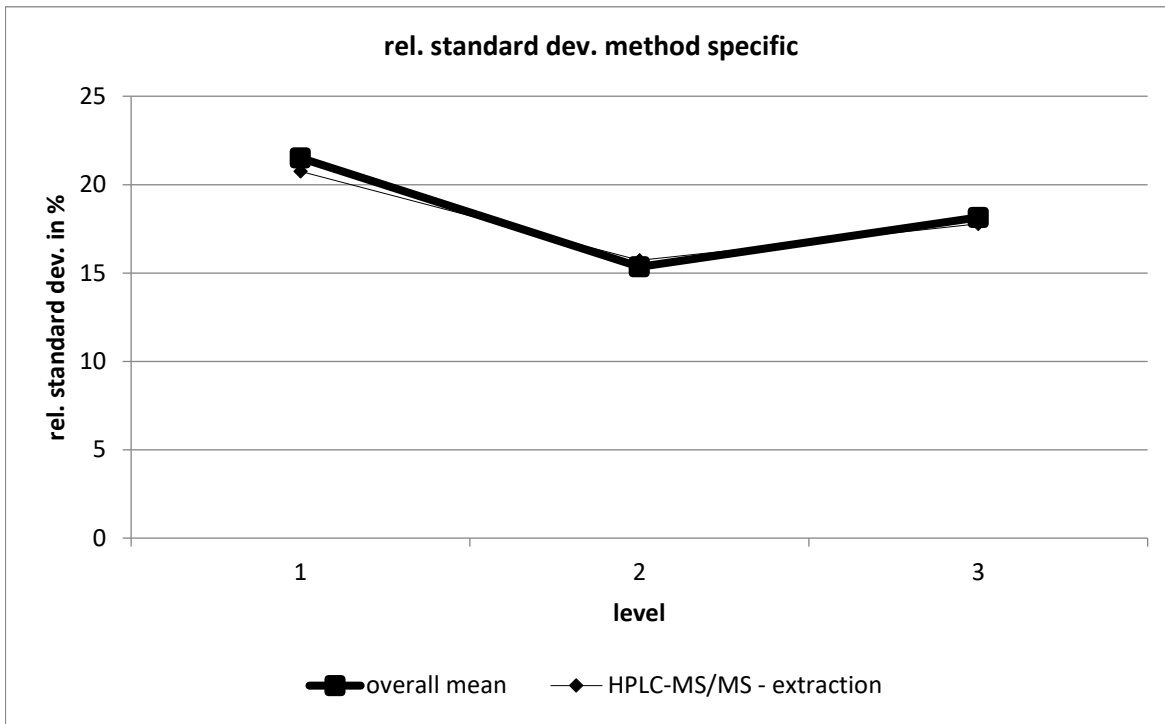
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0207	0,0016	7,7	0,0201	0,0011	5,6
2	0,0806	0,0046	5,7	0,0794	0,0042	5,3
3	0,1955	0,0128	6,6	0,1881	0,0100	5,3





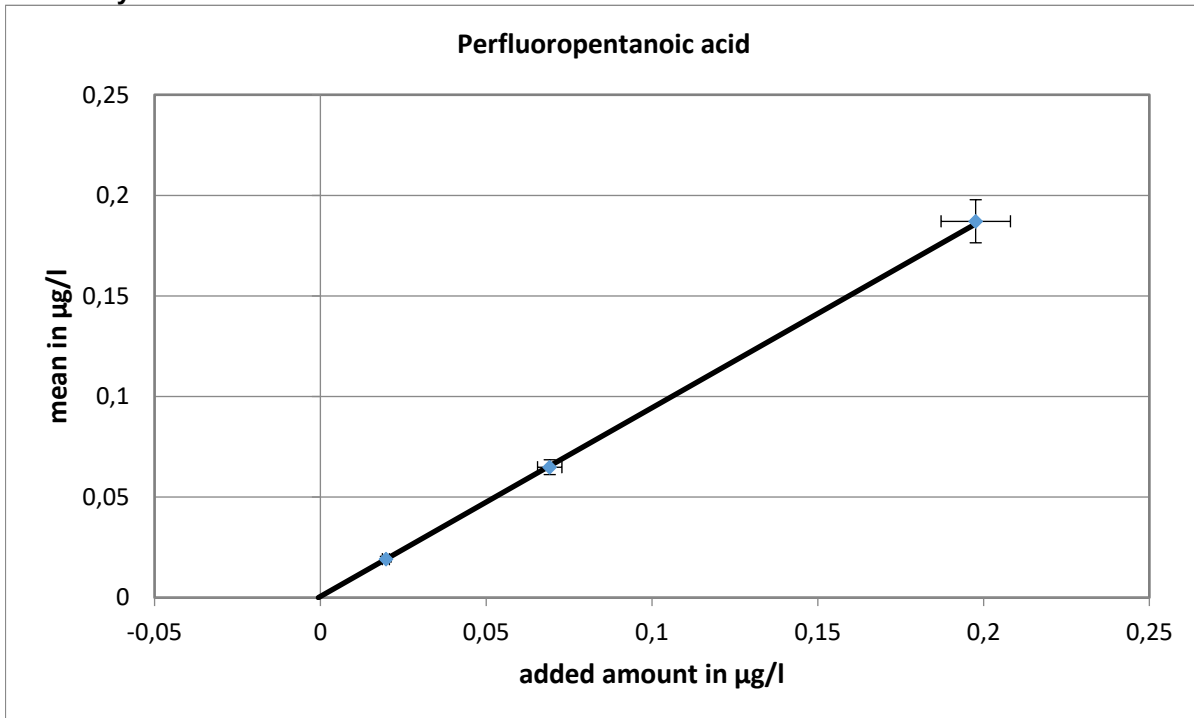


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,021	8E-04	3,91	0,004	20,75	44	2	4	13,64
2	0,081	0,002	2,962	0,013	15,72	44	2	4	13,64
3	0,196	0,007	3,349	0,035	17,77	44	1	2	6,818

Perfluoropentanoic acid

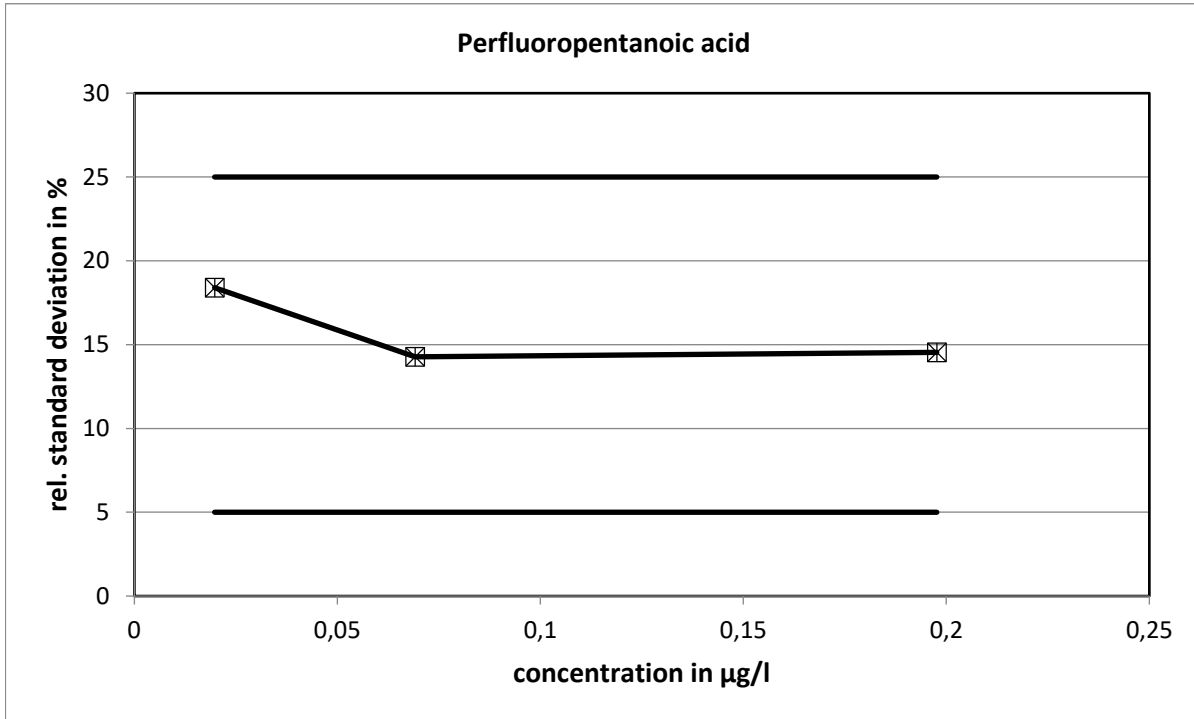
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0198	5,97	0,0036	0,0036	18,40	0,0279	0,0131	41,00	-33,92	44	0	4	8,9
2	0,0692	5,35	0,0099	0,0099	14,27	0,0907	0,0507	31,06	-26,69	45	0	2	4,4
3	0,1976	5,29	0,0287	0,0287	14,54	0,2602	0,1439	31,66	-27,17	45	1	2	6,7
sum										134	1	8	6,7

Recovery and matrix content

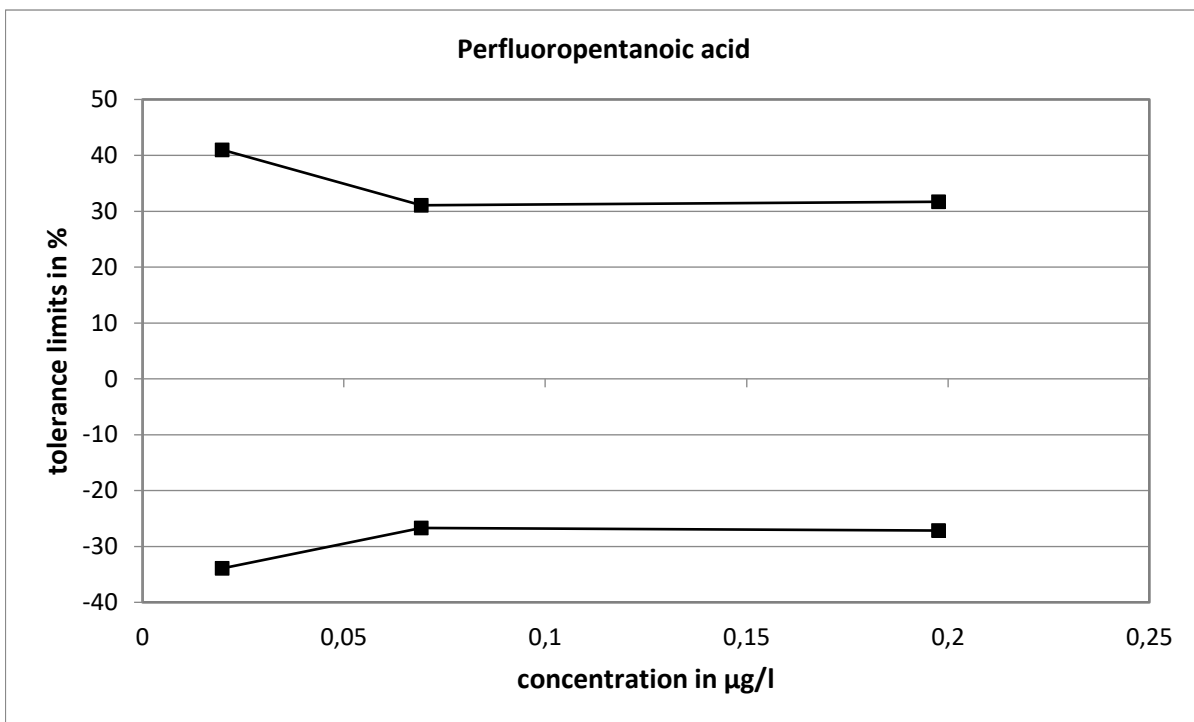


Slope of the regression: 0,937, recovery: 93,7 %

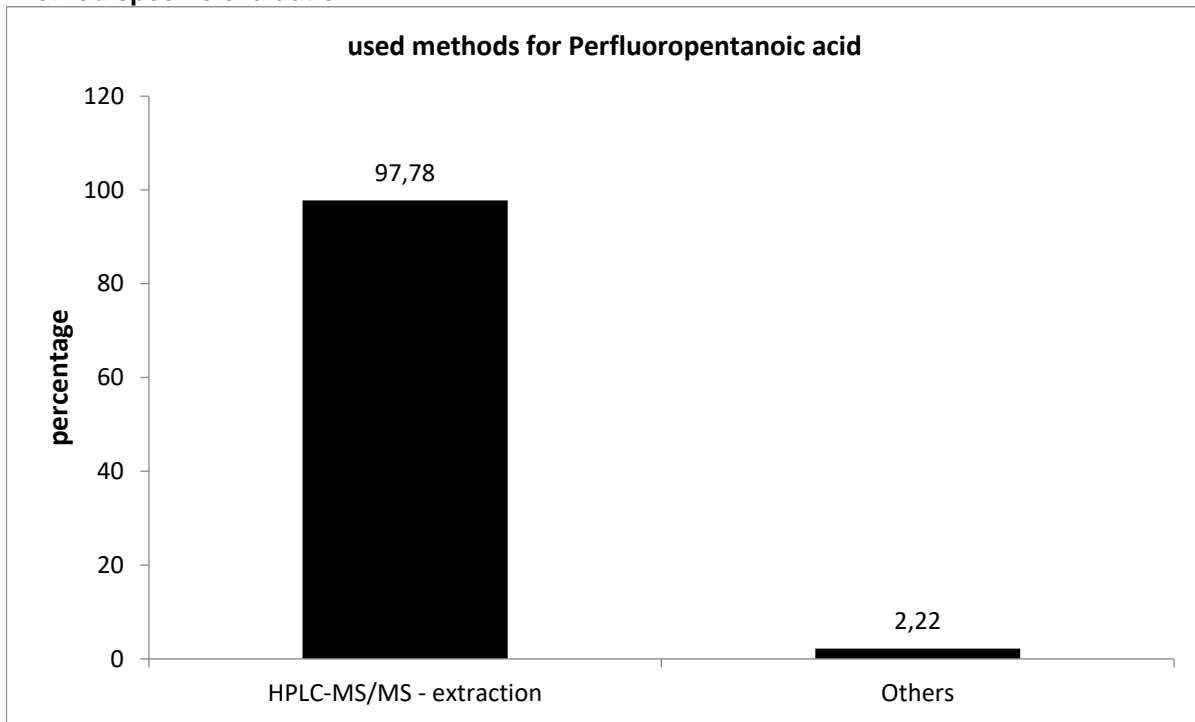
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



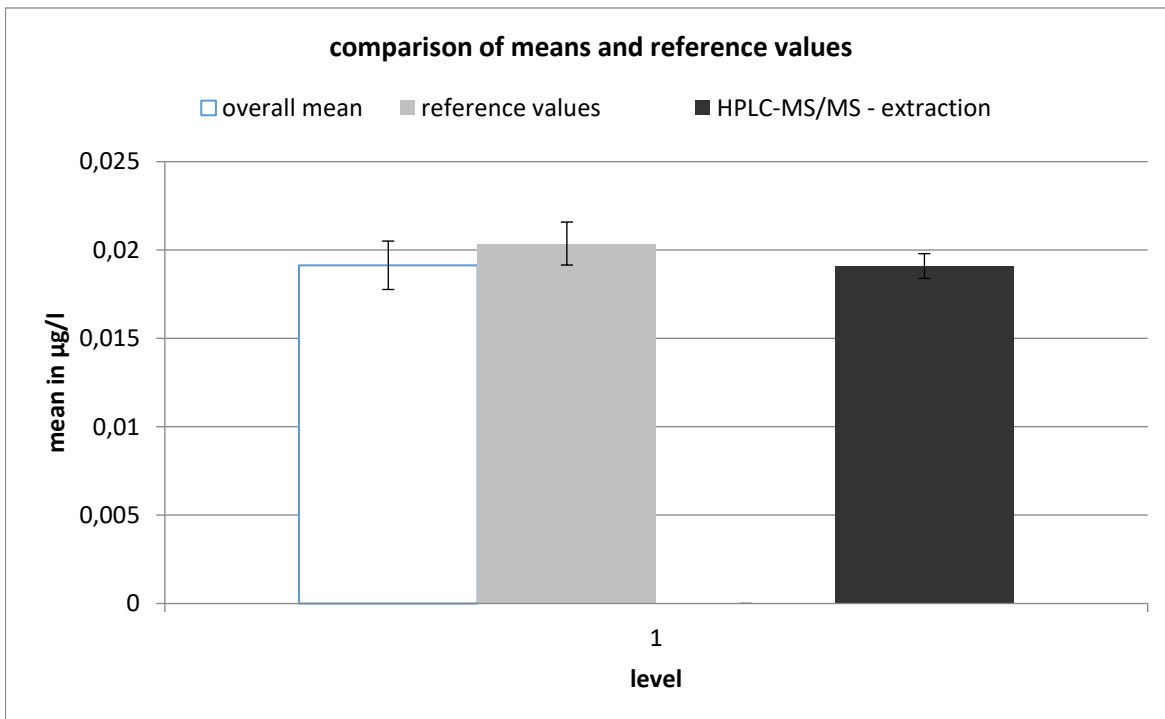
Method specific evaluation

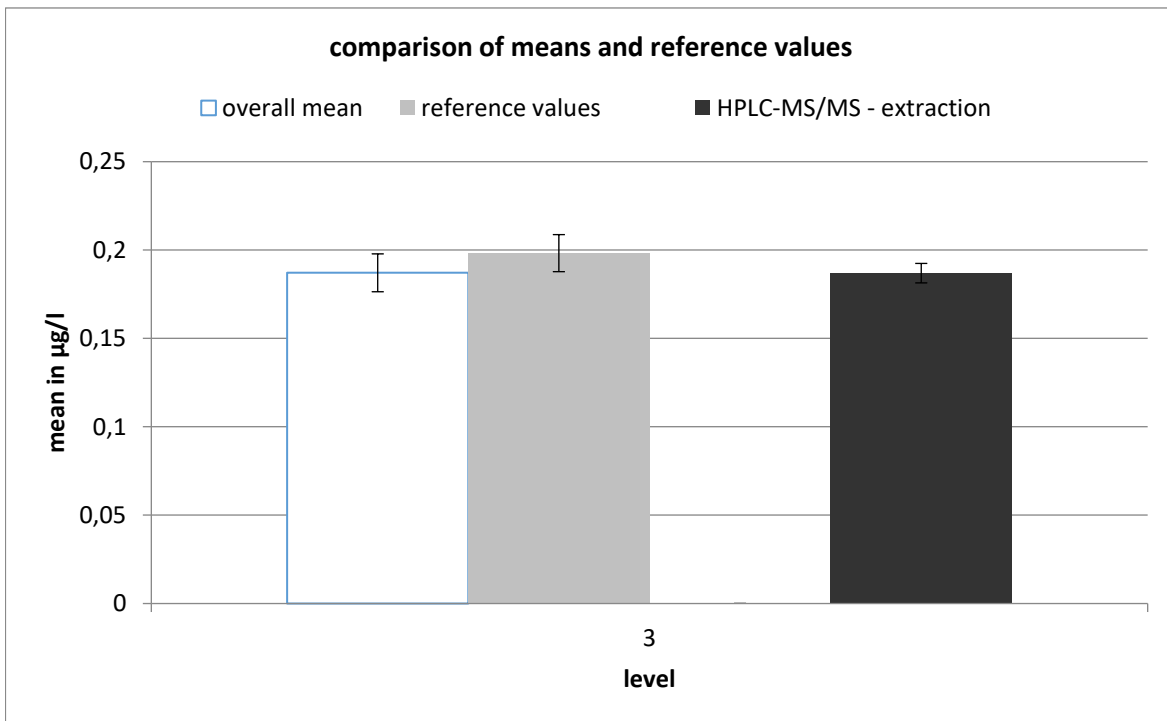
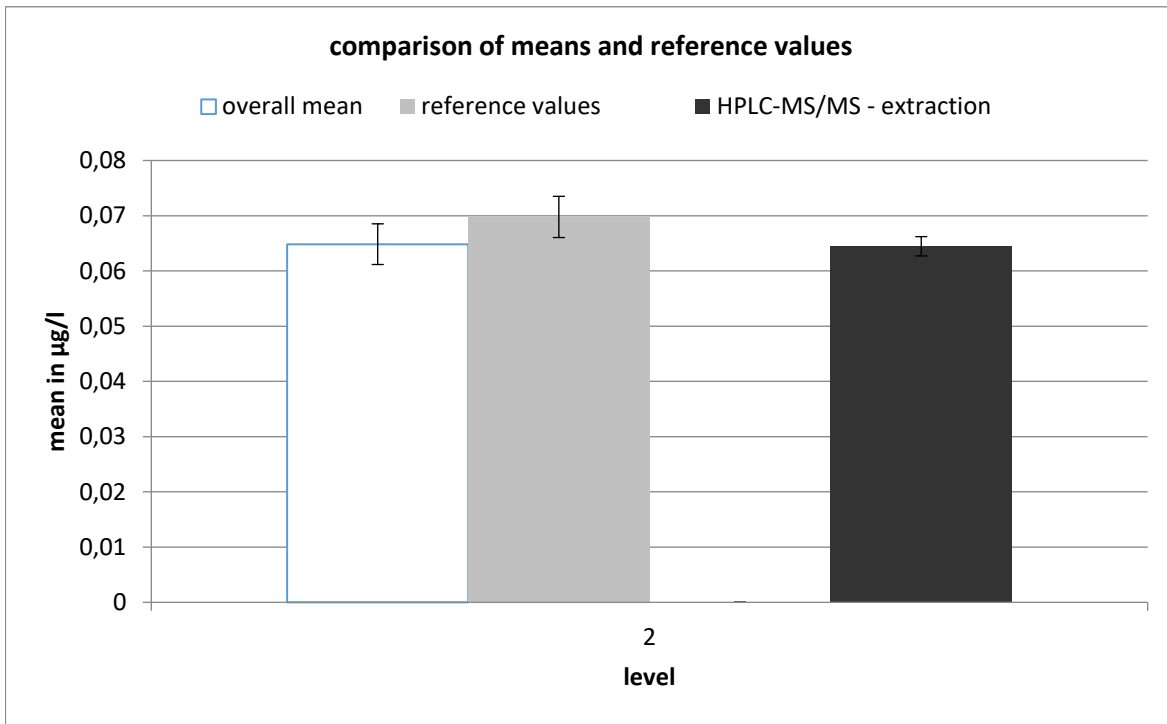


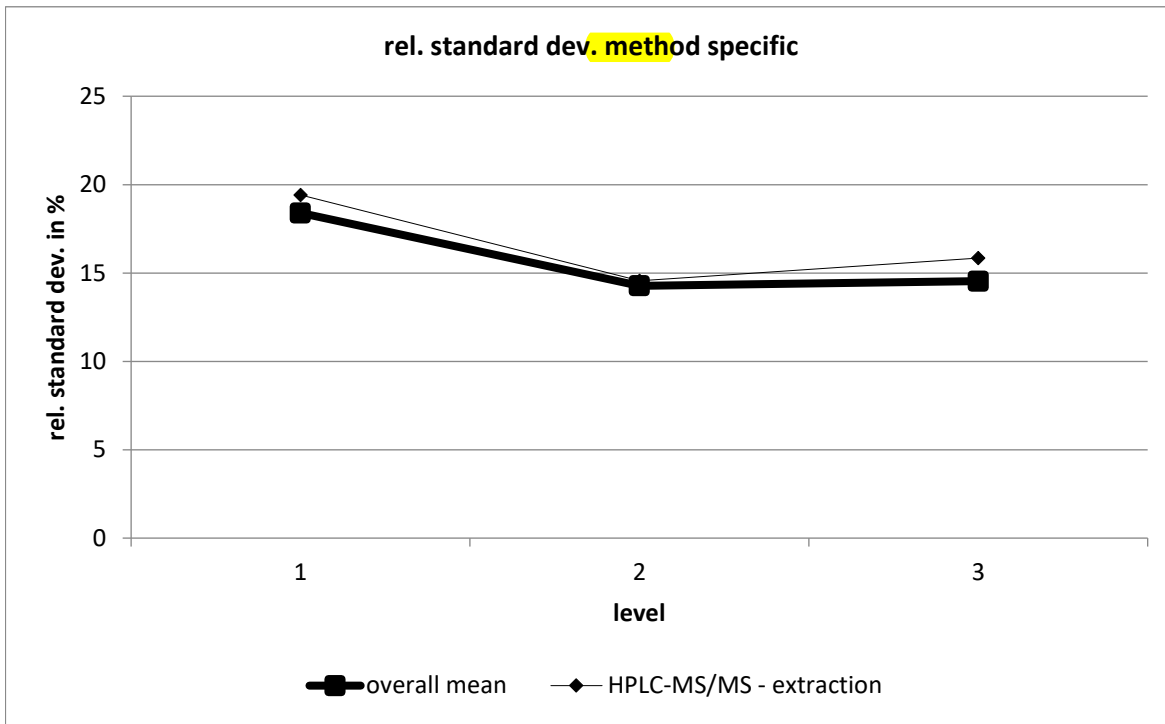
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]			reference value [µg/l]		
	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0191	0,0014	7,2	0,0204	0,0012	6,0
2	0,0648	0,0037	5,7	0,0698	0,0037	5,3
3	0,1871	0,0107	5,7	0,1982	0,0105	5,3





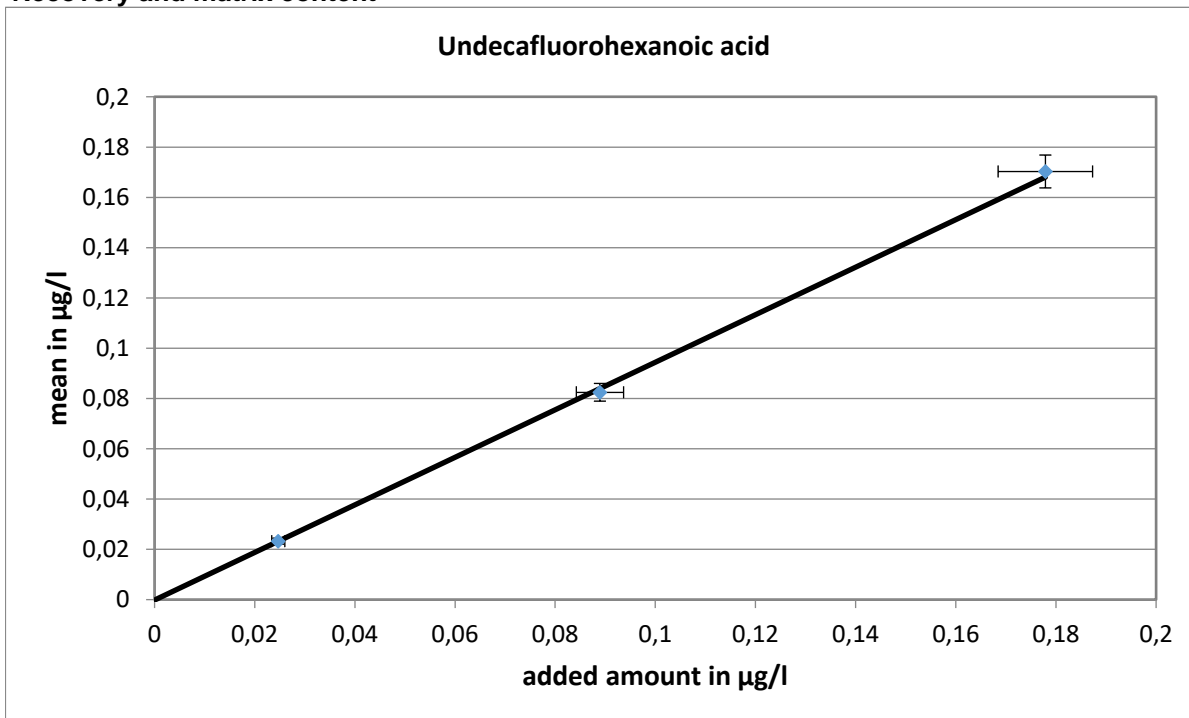


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,019	7E-04	3,659	0,004	19,41	44	1	3	9,091
2	0,064	0,002	2,713	0,009	14,56	45	1	2	6,667
3	0,187	0,006	2,951	0,03	15,84	45	2	2	8,889

Undecafluorohexanoic acid

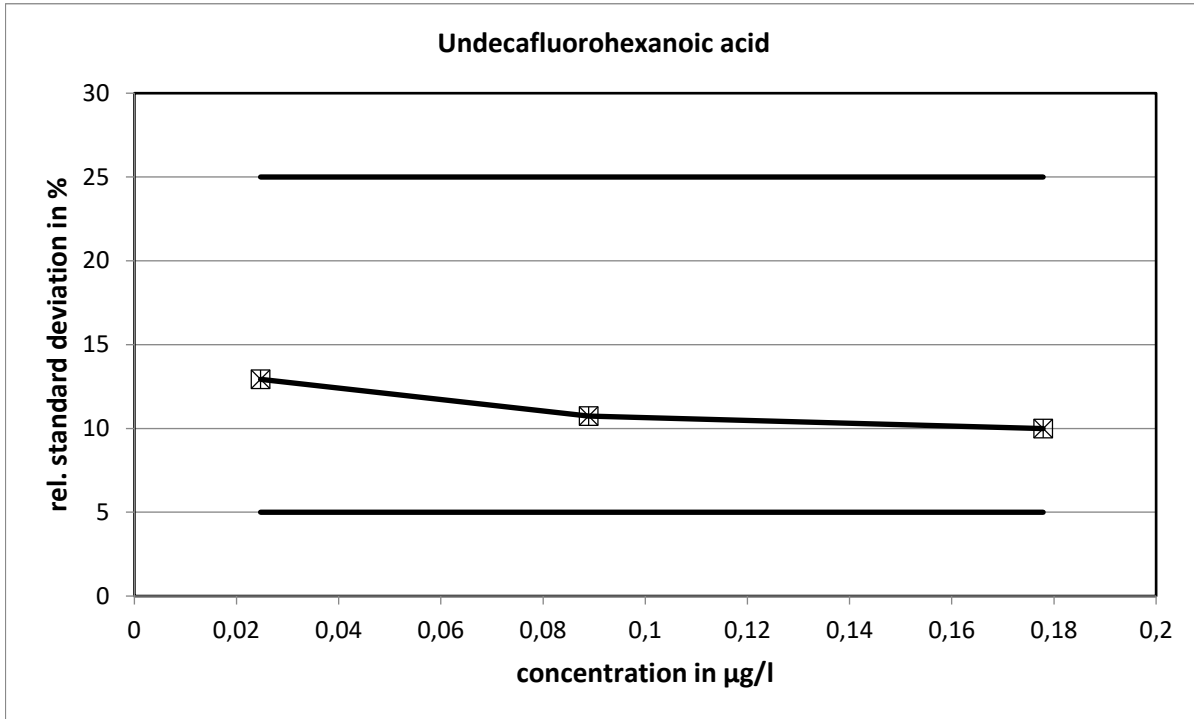
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0247	5,36	0,0032	0,0032	12,93	0,0316	0,0187	27,89	-24,32	45	3	2	10,9
2	0,0889	5,31	0,0095	0,0095	10,74	0,1093	0,0708	22,87	-20,37	46	3	2	10,9
3	0,1779	5,31	0,0178	0,0178	9,99	0,2155	0,1440	21,14	-19,05	46	1	2	6,5
sum										137	7	6	9,5

Recovery and matrix content

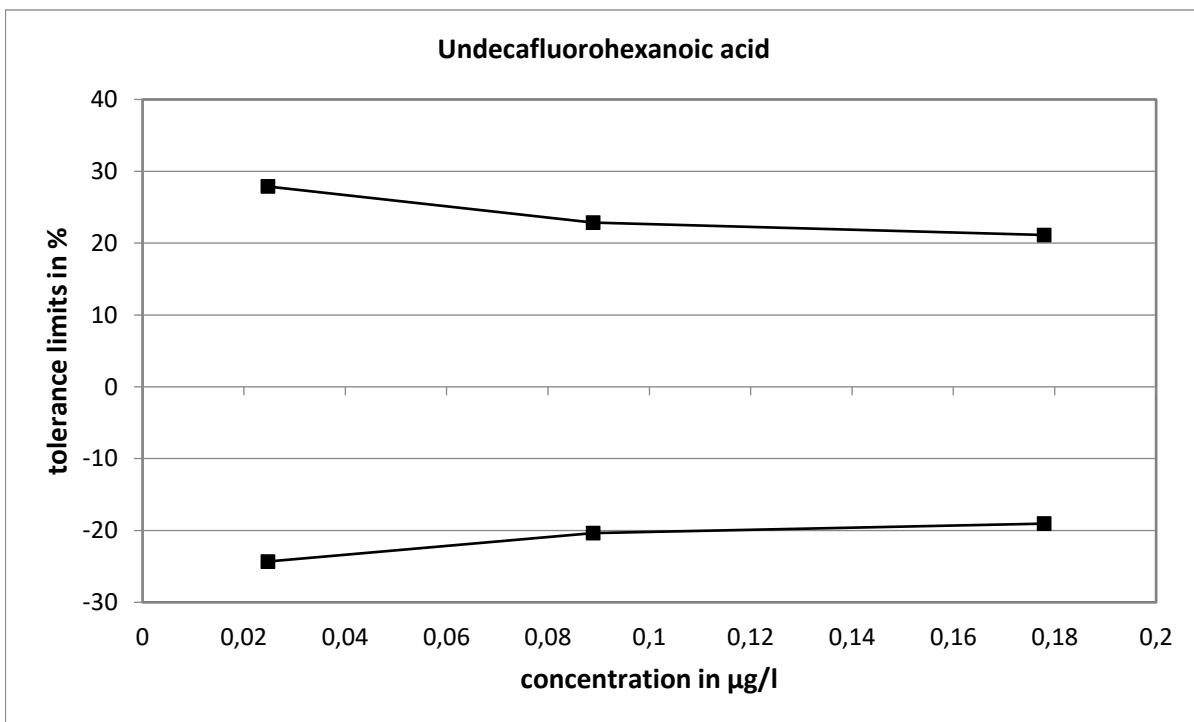


Slope of the regression: 0,946, recovery: 94,6 %

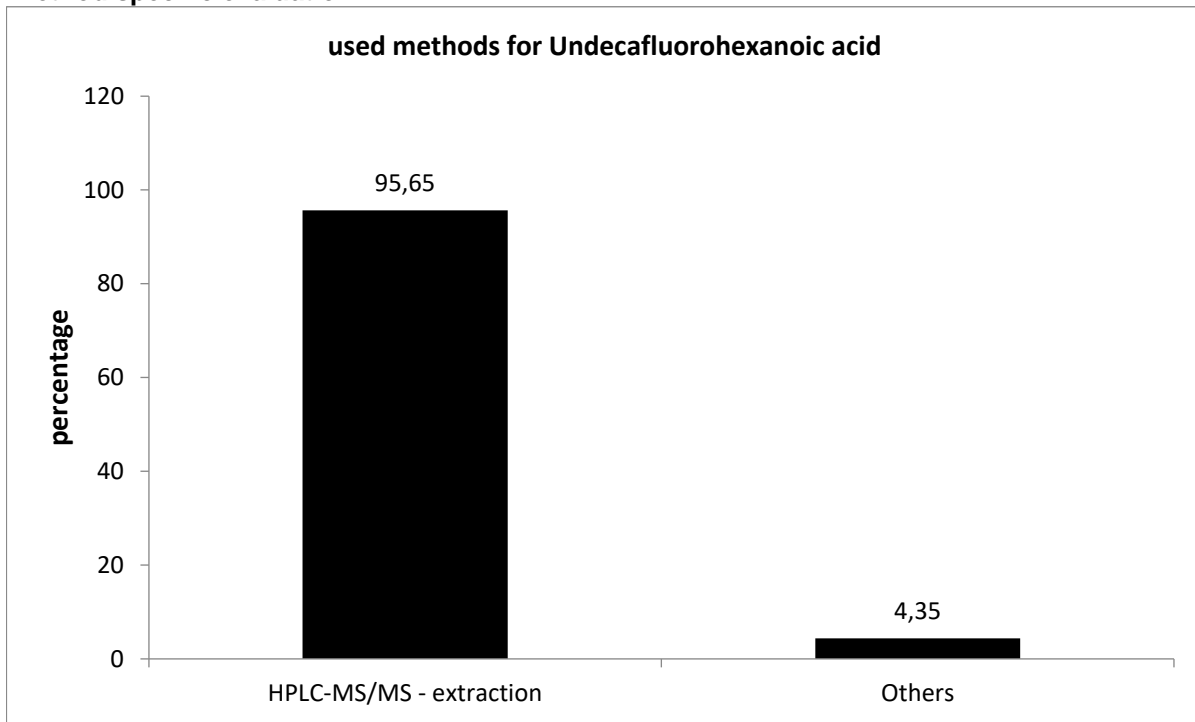
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



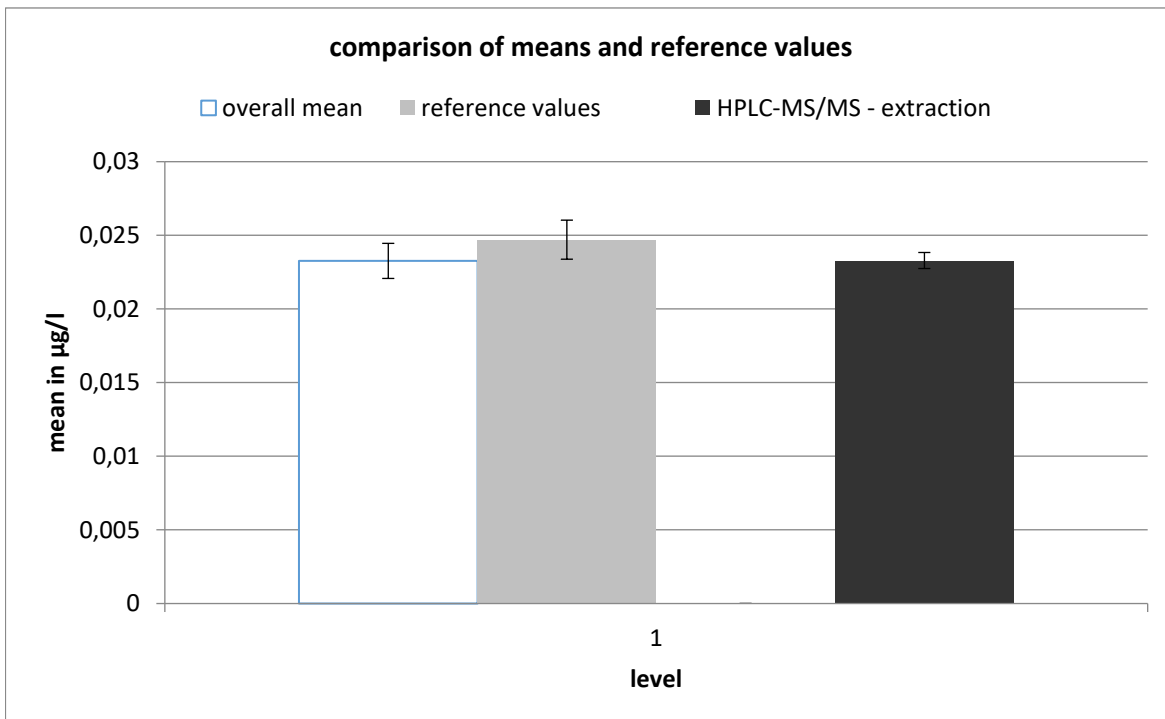
Method specific evaluation

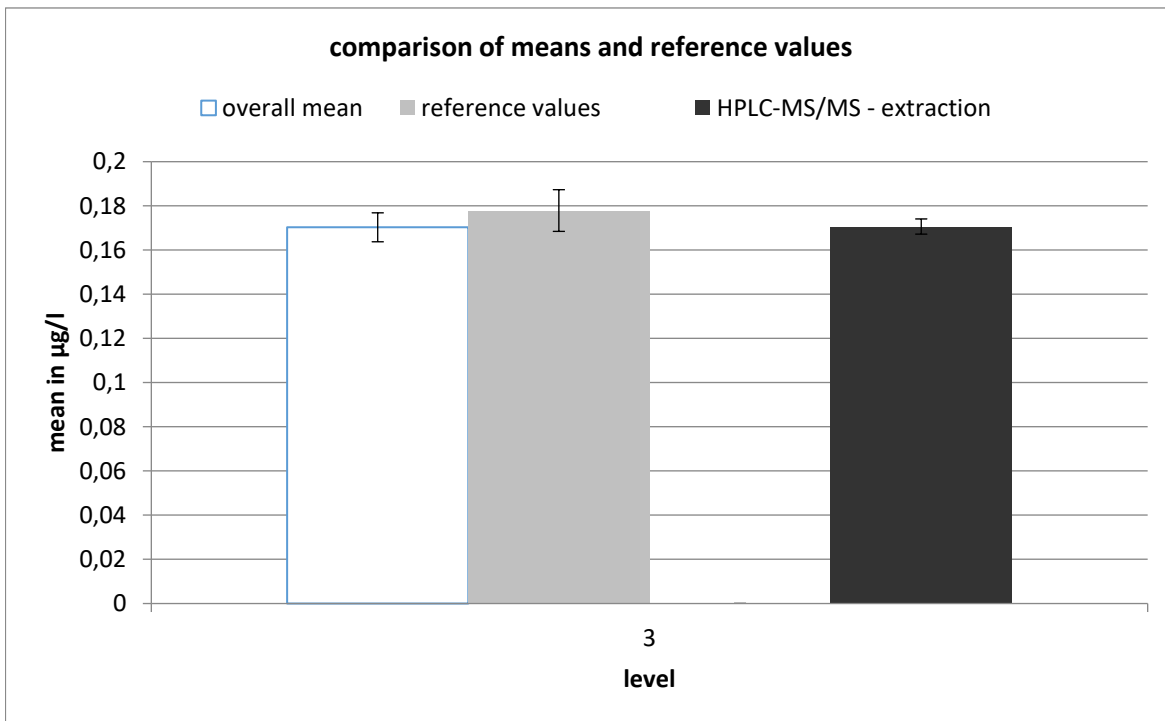
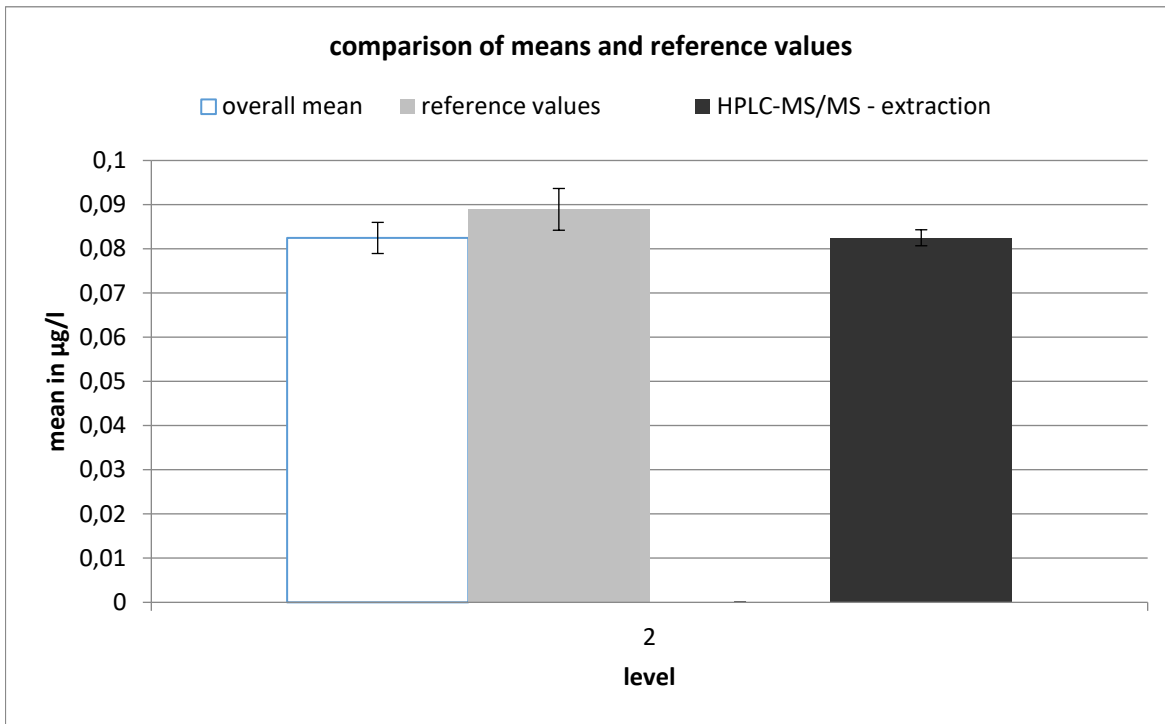


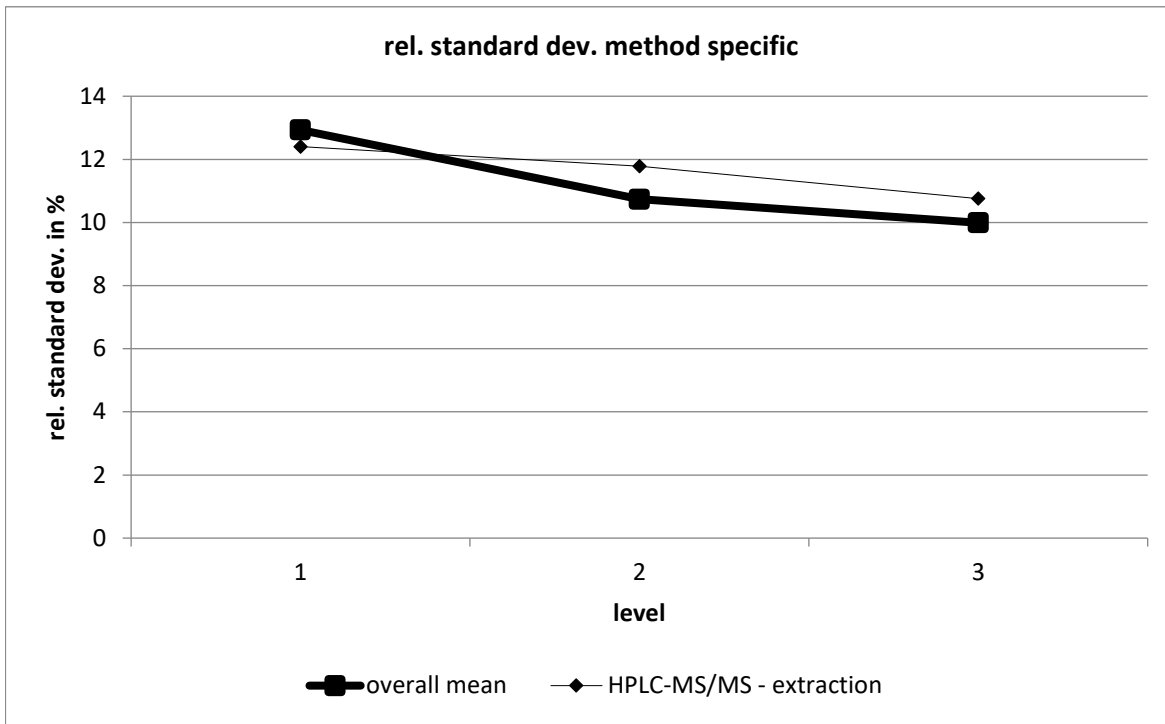
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	Experimental Data			Reference Data		
	mean [$\mu\text{g/l}$]	exp. uncertainty [$\mu\text{g/l}$]	exp. uncertainty [%]	reference value [$\mu\text{g/l}$]	exp. uncertainty [$\mu\text{g/l}$]	exp. uncertainty [%]
1	0,0233	0,0012	5,1	0,0247	0,0013	5,4
2	0,0825	0,0035	4,3	0,0889	0,0047	5,3
3	0,1703	0,0066	3,8	0,1779	0,0094	5,3





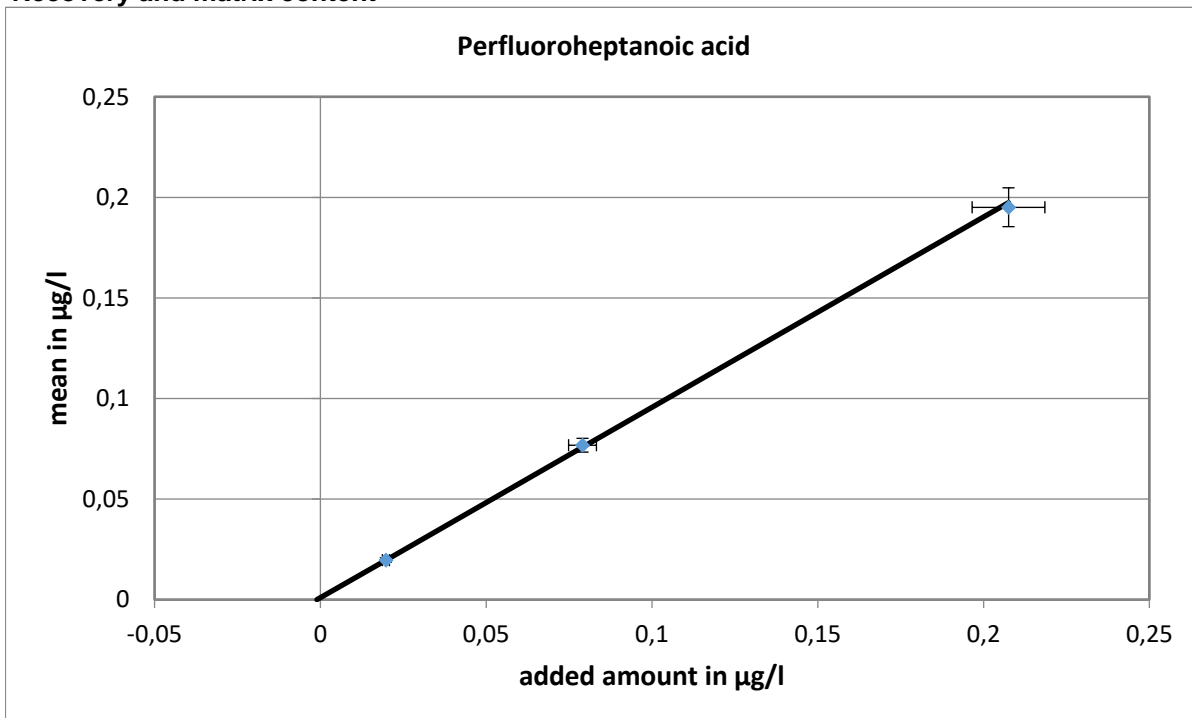


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,023	5E-04	2,338	0,003	12,4	44	1	3	9,091
2	0,083	0,002	2,195	0,01	11,78	45	1	3	8,889
3	0,171	0,003	2,004	0,018	10,75	45	1	2	6,667

Perfluoroheptanoic acid

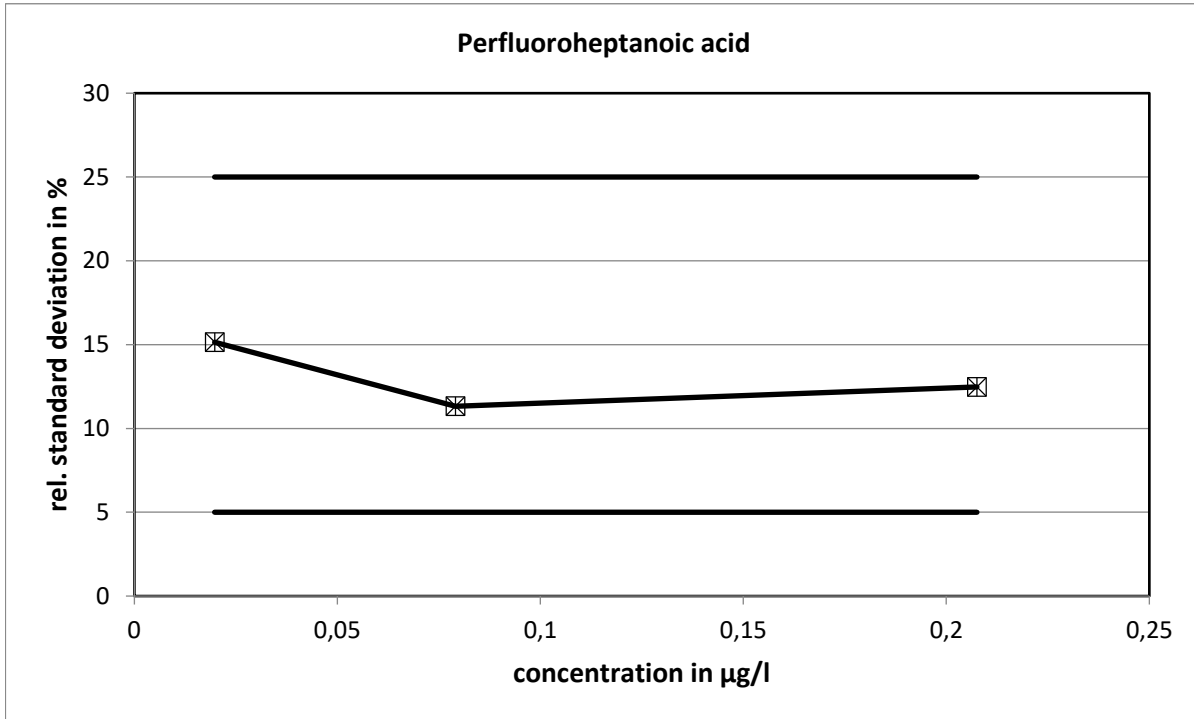
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0198	5,56	0,0030	0,0030	15,14	0,0263	0,0142	32,96	-28,32	47	1	5	12,8
2	0,0791	5,40	0,0090	0,0090	11,32	0,0981	0,0621	24,12	-21,47	43	2	1	7,0
3	0,2075	5,29	0,0259	0,0259	12,47	0,2632	0,1588	26,82	-23,50	45	1	1	4,4
sum										135	4	7	8,1

Recovery and matrix content

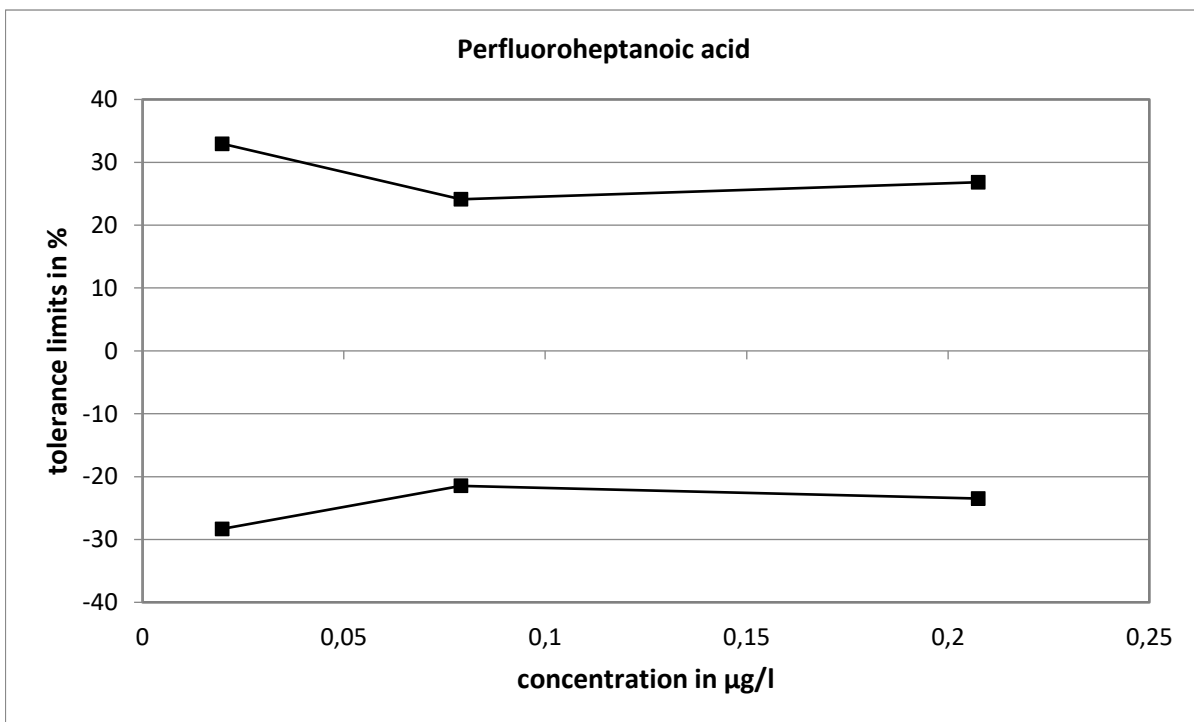


Slope of the regression: 0,946, recovery: 94,6 %

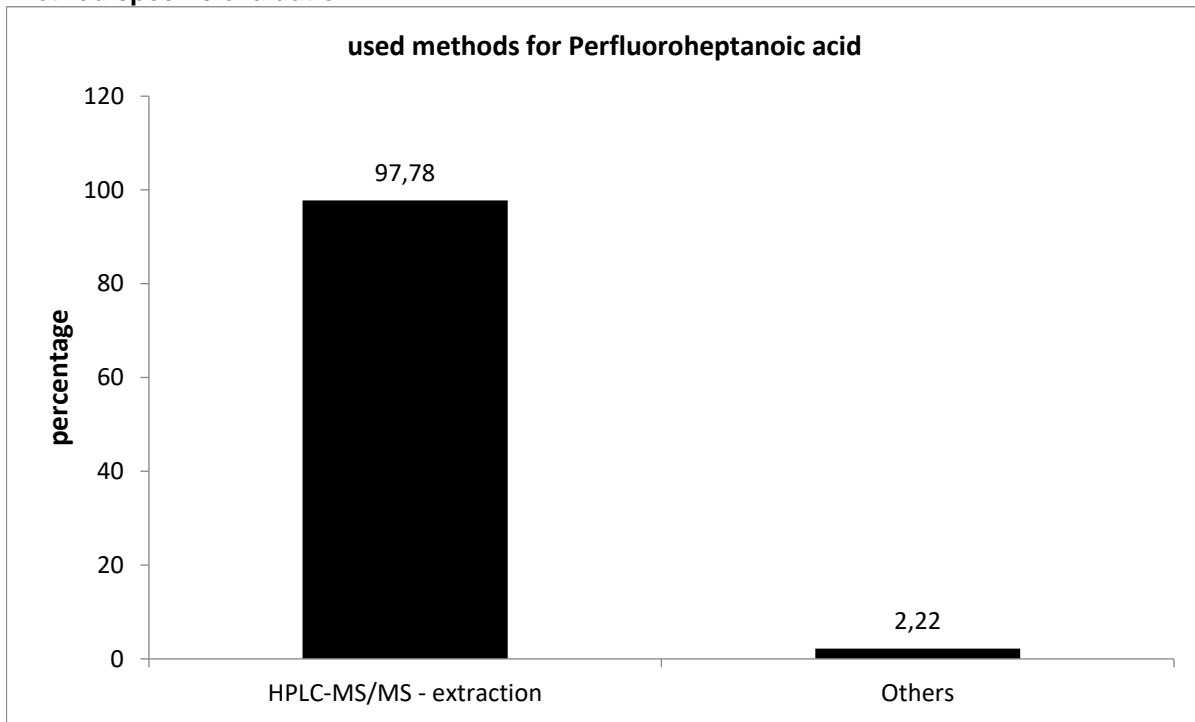
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



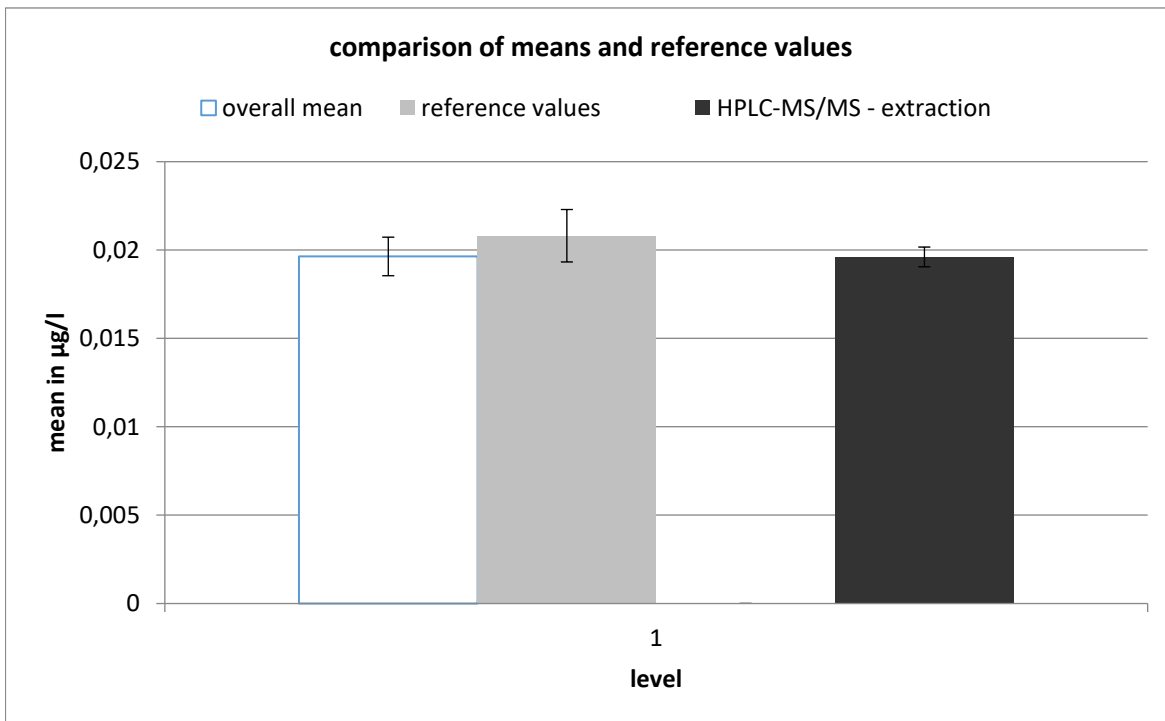
Method specific evaluation

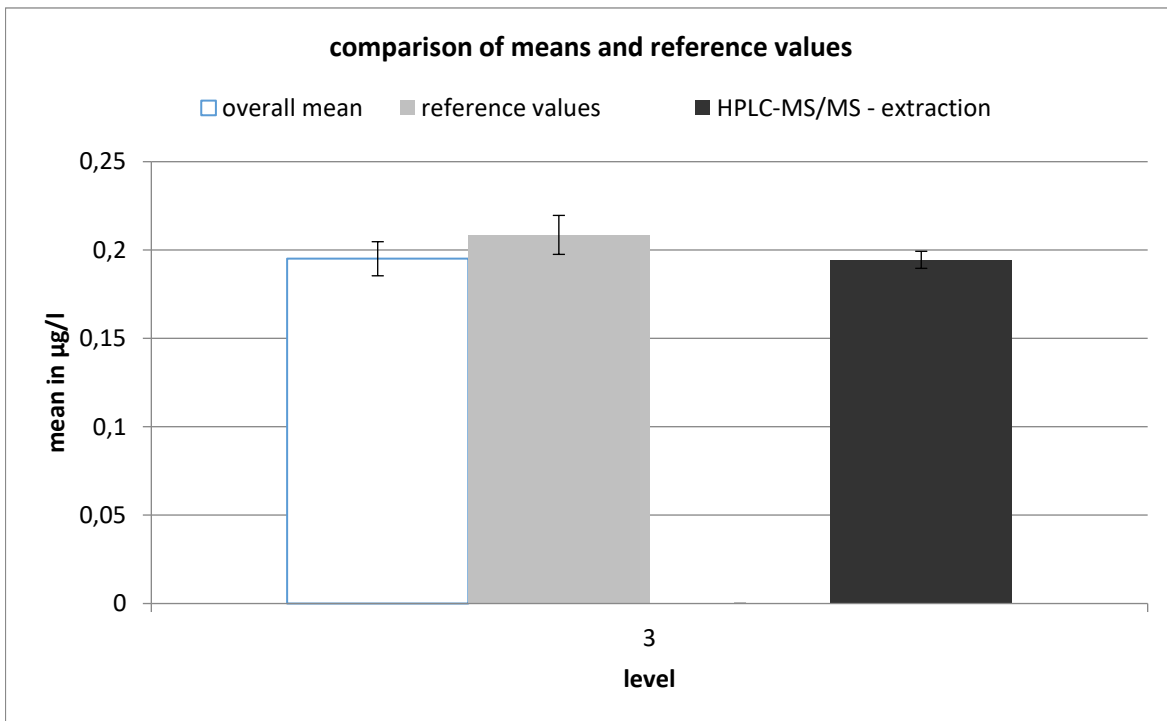
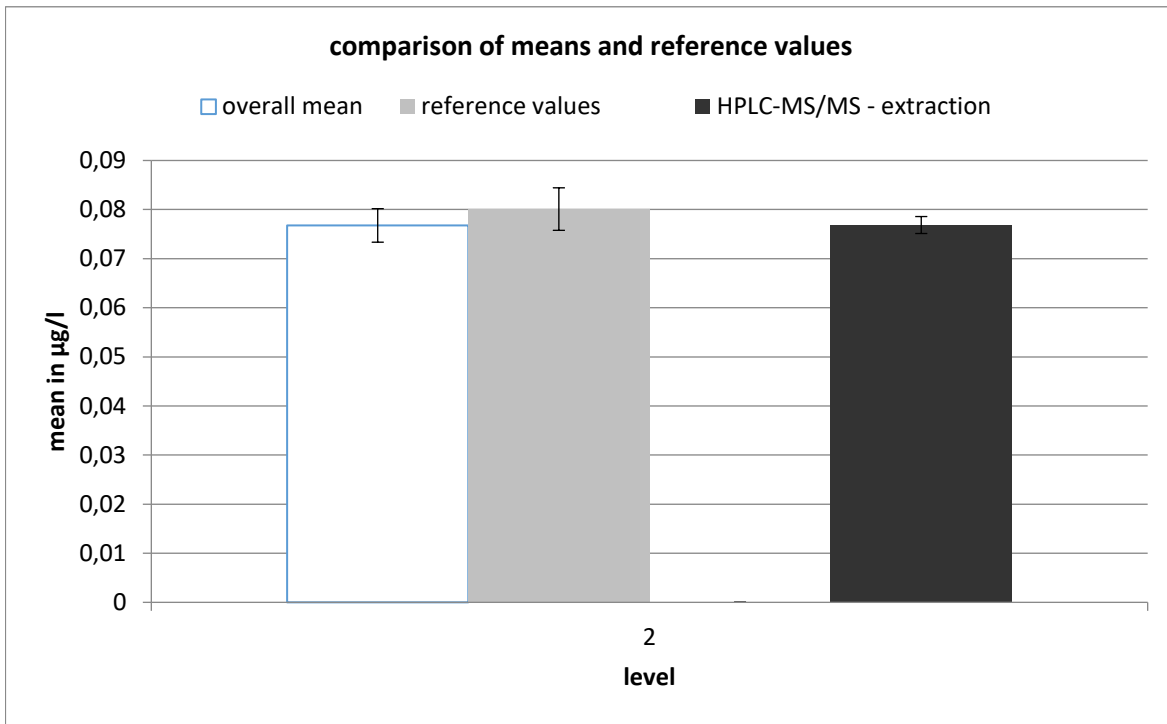


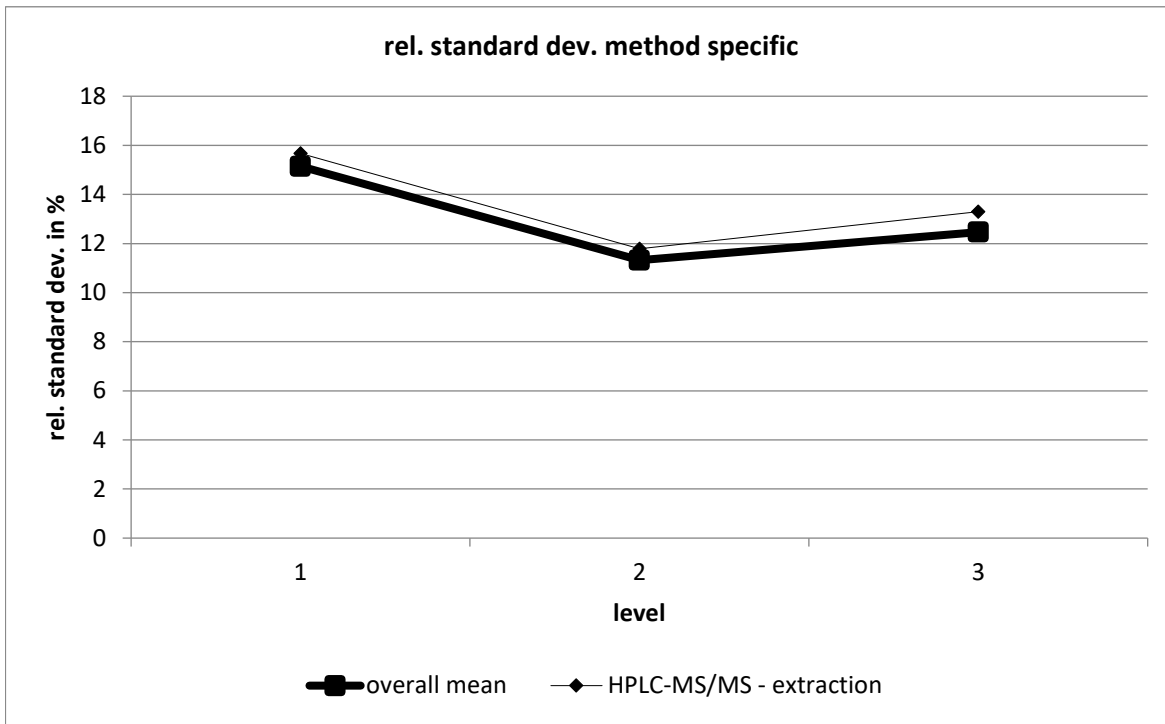
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0196	0,0011	5,6	0,0208	0,0015	7,1
2	0,0768	0,0034	4,4	0,0801	0,0043	5,4
3	0,1951	0,0096	4,9	0,2086	0,0110	5,3





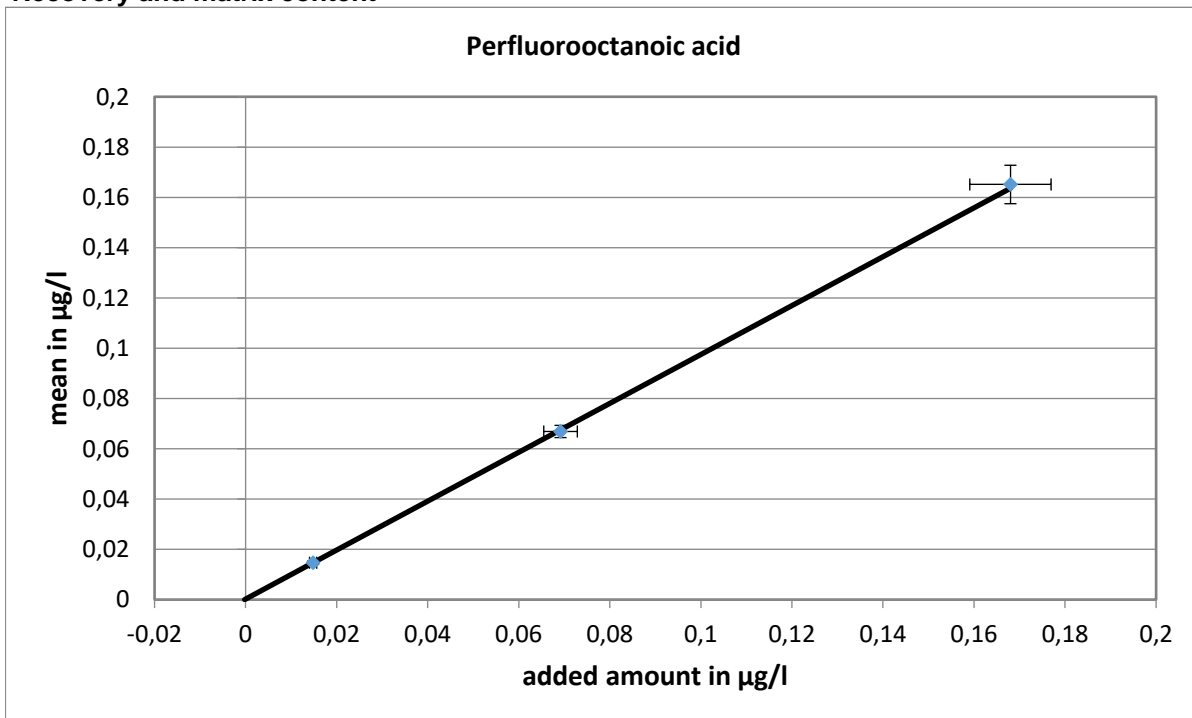


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,02	6E-04	2,857	0,003	15,67	47	2	4	12,77
2	0,077	0,002	2,247	0,009	11,79	43	2	1	6,977
3	0,194	0,005	2,479	0,026	13,3	45	1	1	4,444

Perfluorooctanoic acid

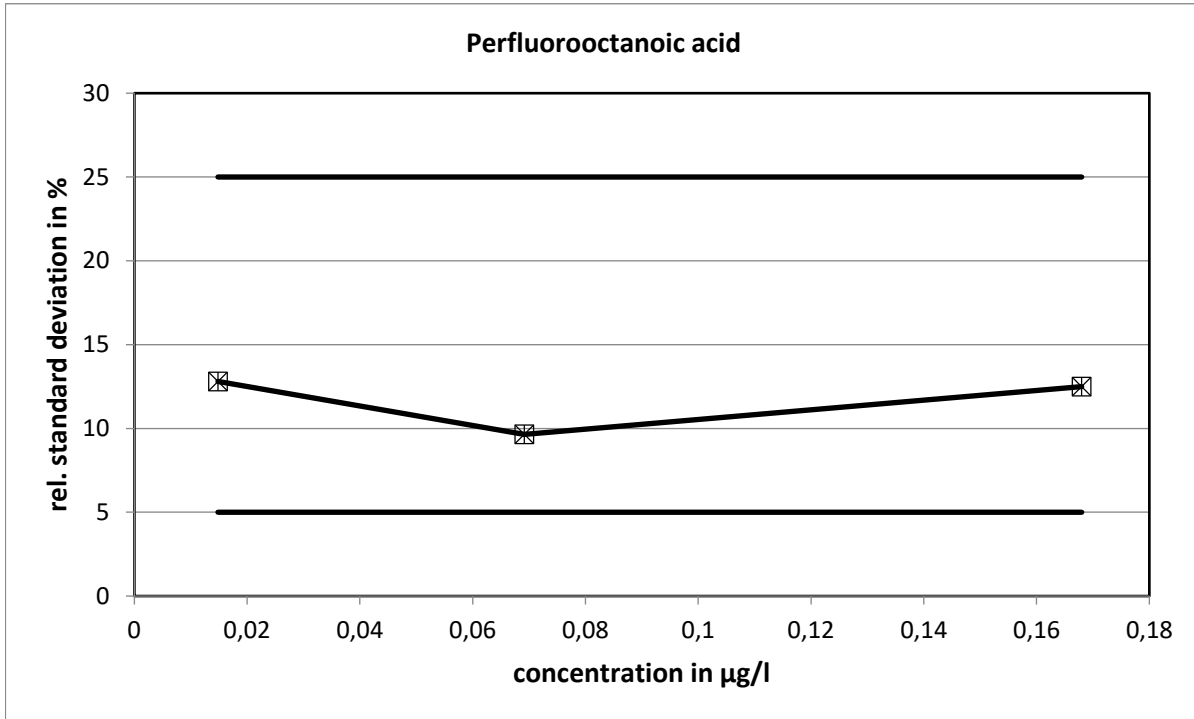
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0148	4,72	0,0019	0,0019	12,80	0,0189	0,0112	27,49	-24,16	47	0	7	14,9
2	0,0692	5,32	0,0067	0,0067	9,64	0,0833	0,0564	20,35	-18,42	47	3	2	10,6
3	0,1680	5,30	0,0210	0,0210	12,49	0,2130	0,1284	26,77	-23,58	47	2	2	8,5
sum										141	5	11	11,3

Recovery and matrix content

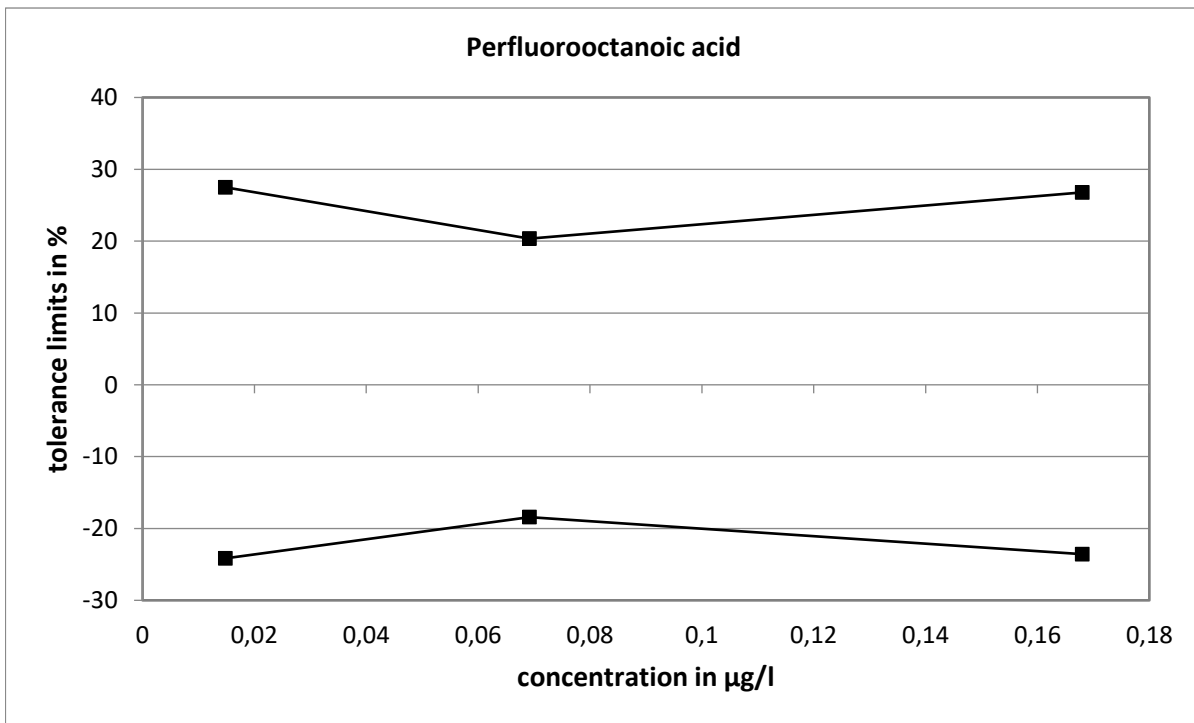


Slope of the regression: 0,973, recovery: 97,3 %

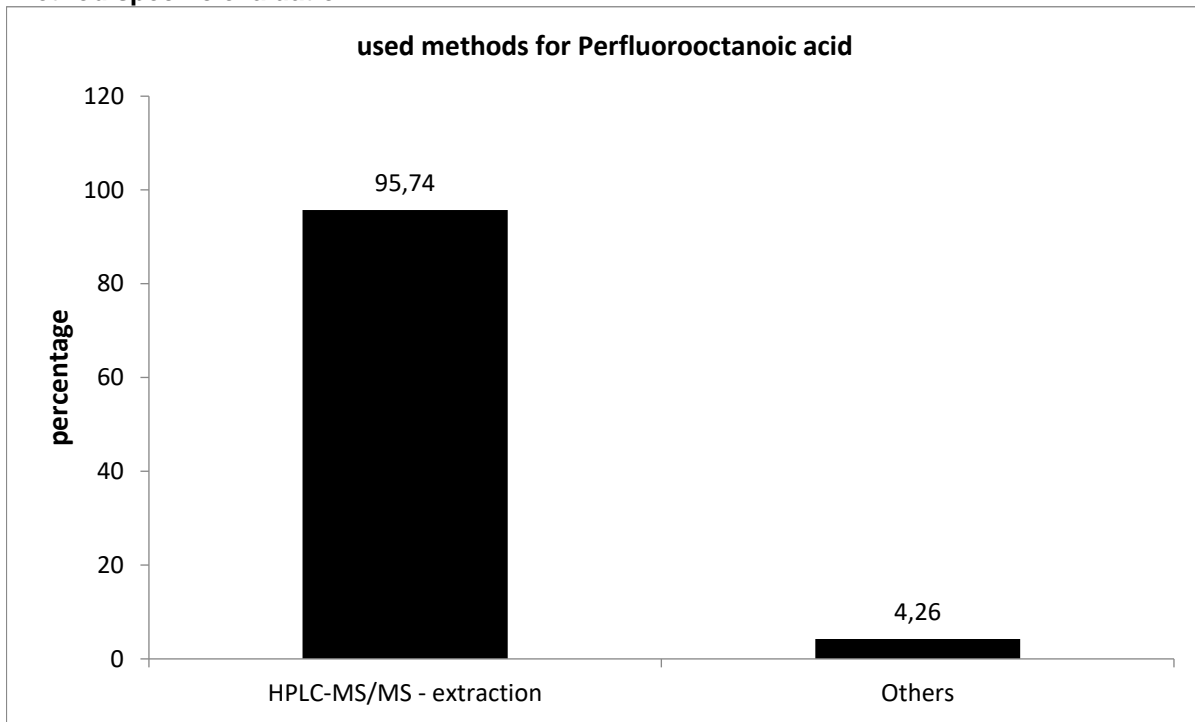
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



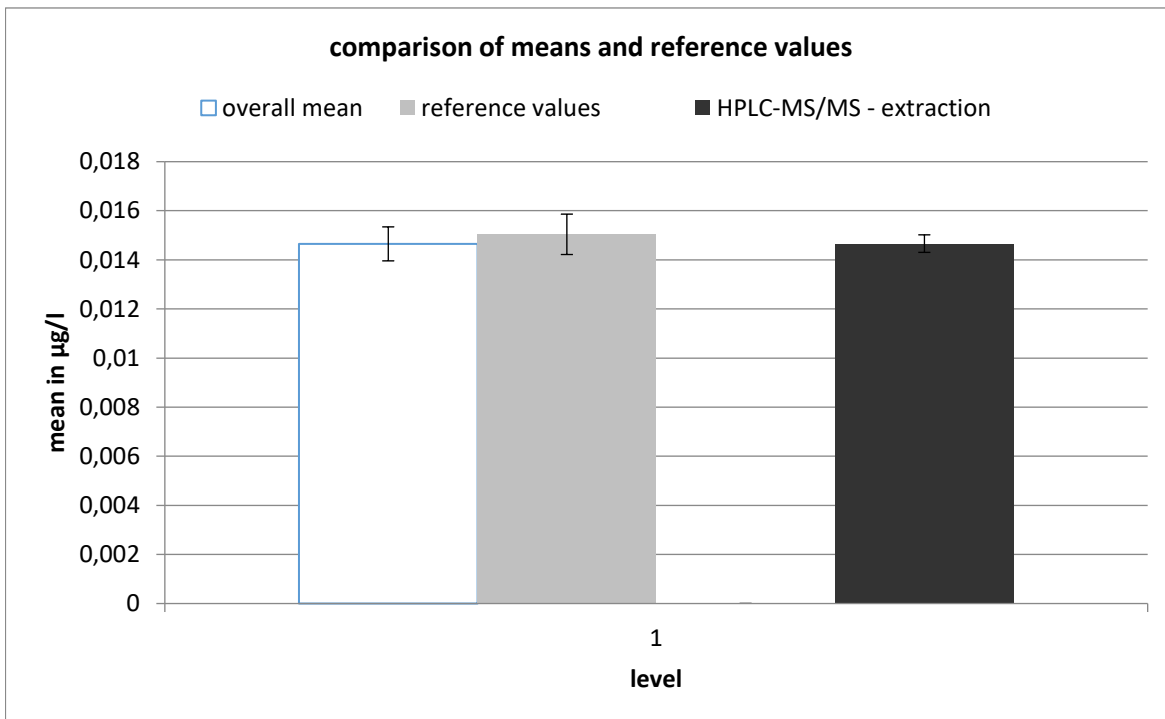
Method specific evaluation

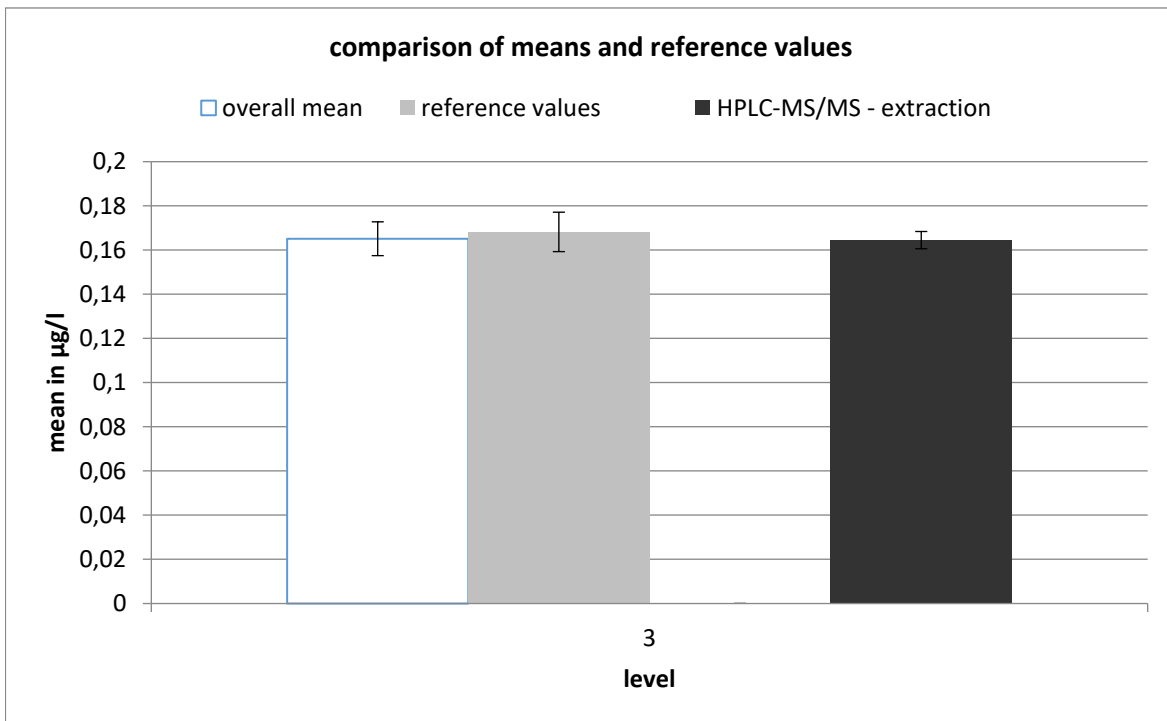
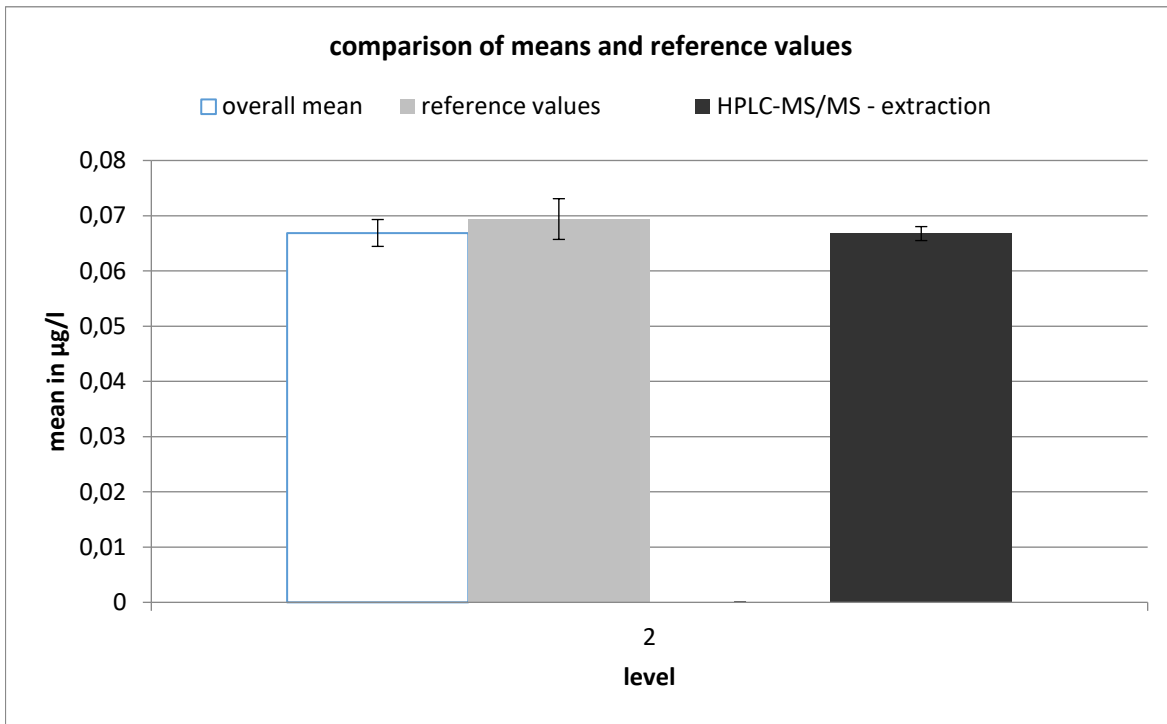


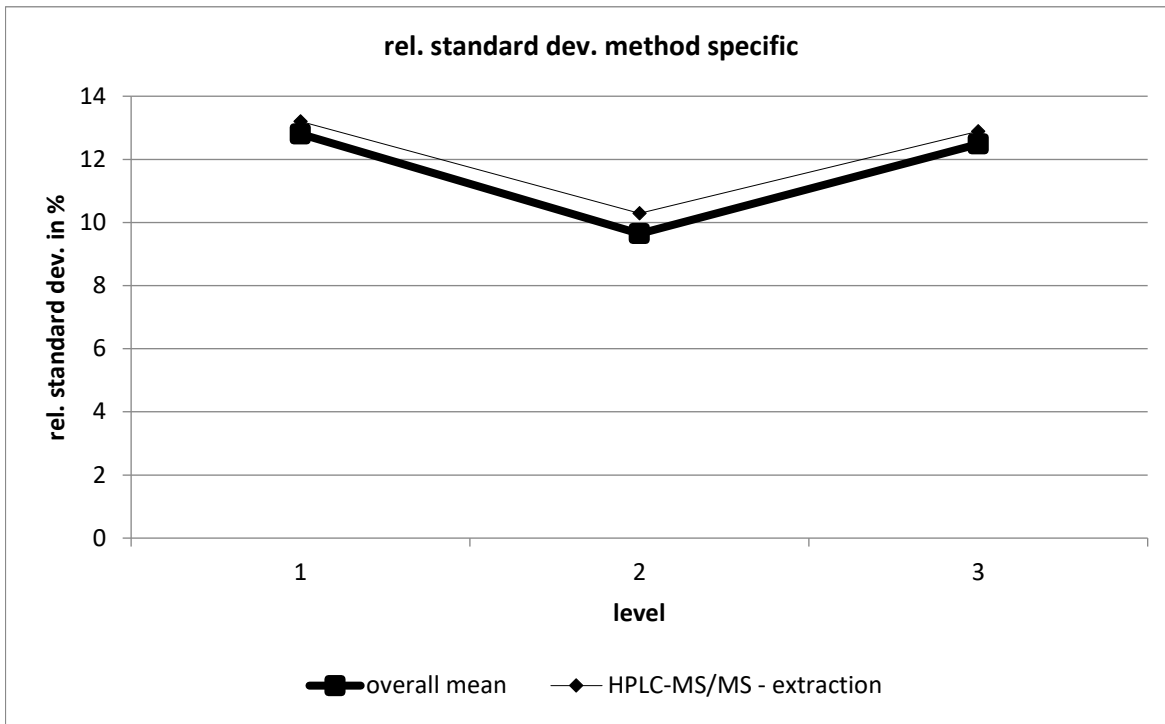
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0147	0,0007	4,7	0,0150	0,0008	5,5
2	0,0669	0,0024	3,6	0,0694	0,0037	5,3
3	0,1651	0,0076	4,6	0,1682	0,0089	5,3





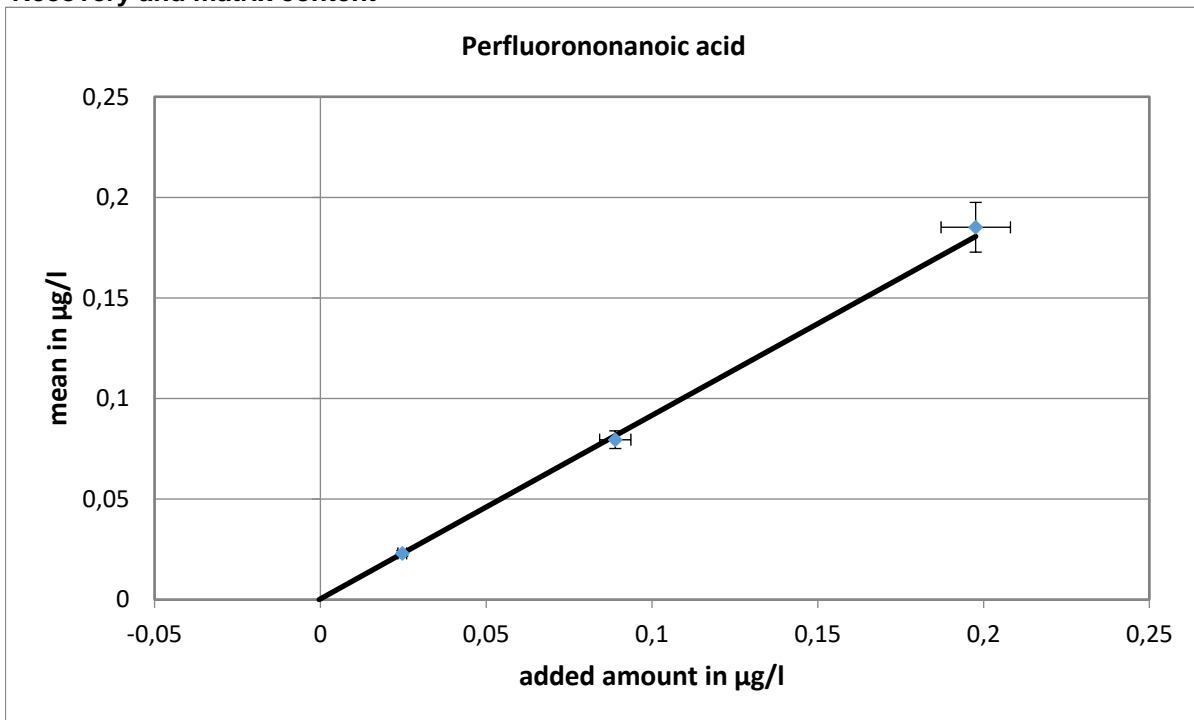


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,015	4E-04	2,433	0,002	13,2	46	0	7	15,22
2	0,067	0,001	1,896	0,007	10,29	46	2	2	8,696
3	0,164	0,004	2,376	0,021	12,89	46	2	2	8,696

Perfluorononanoic acid

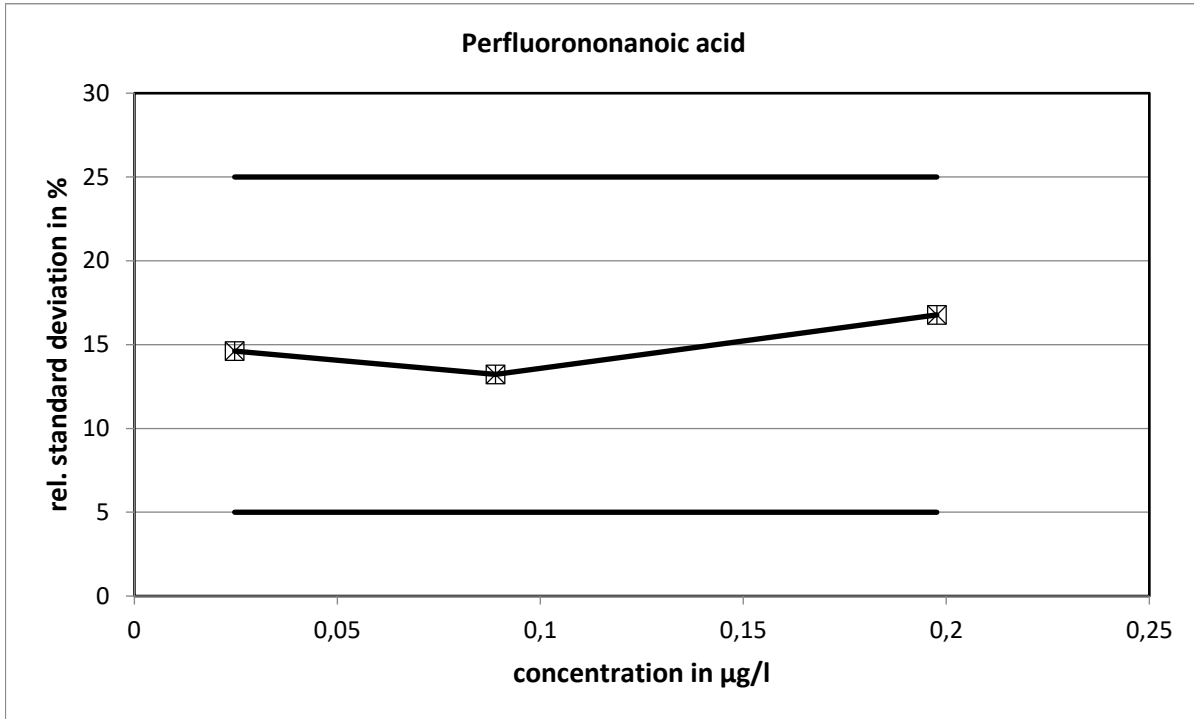
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0247	5,45	0,0036	0,0036	14,62	0,0326	0,0180	31,91	-27,28	45	2	2	8,9
2	0,0889	5,30	0,0118	0,0118	13,22	0,1145	0,0669	28,71	-24,77	45	3	1	8,9
3	0,1976	5,29	0,0332	0,0332	16,77	0,2710	0,1363	37,12	-31,06	45	1	1	4,4
sum										135	6	4	7,4

Recovery and matrix content

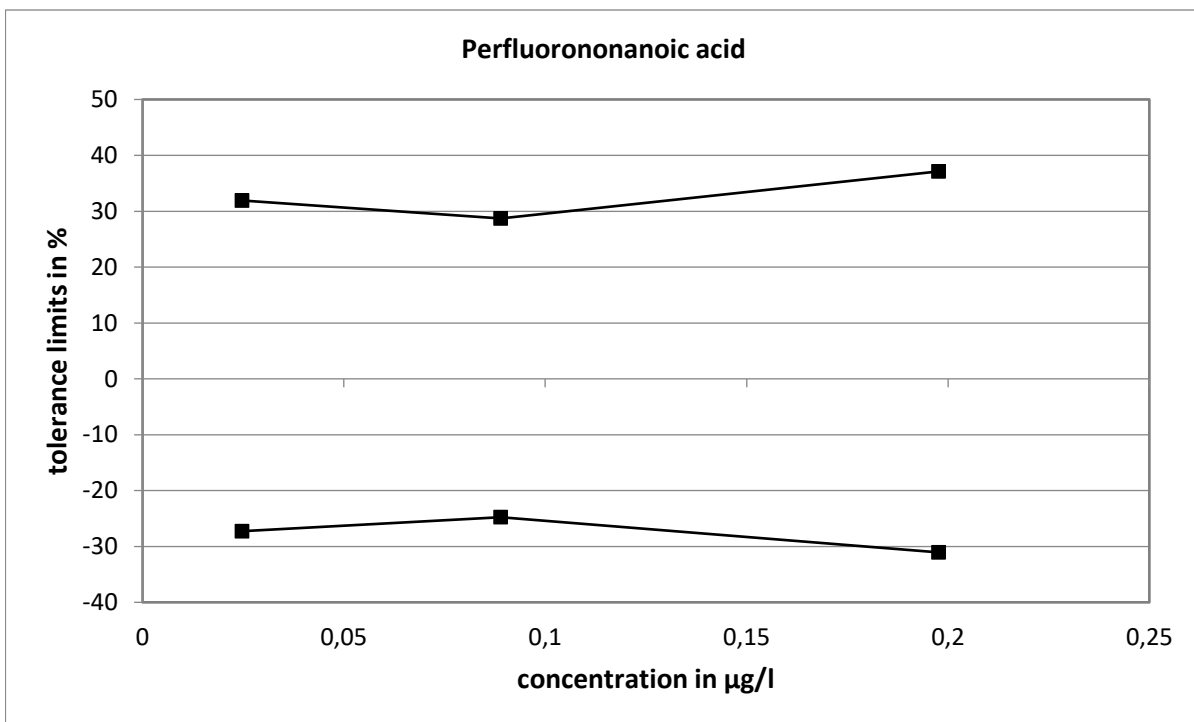


Slope of the regression: 0,912, recovery: 91,2 %

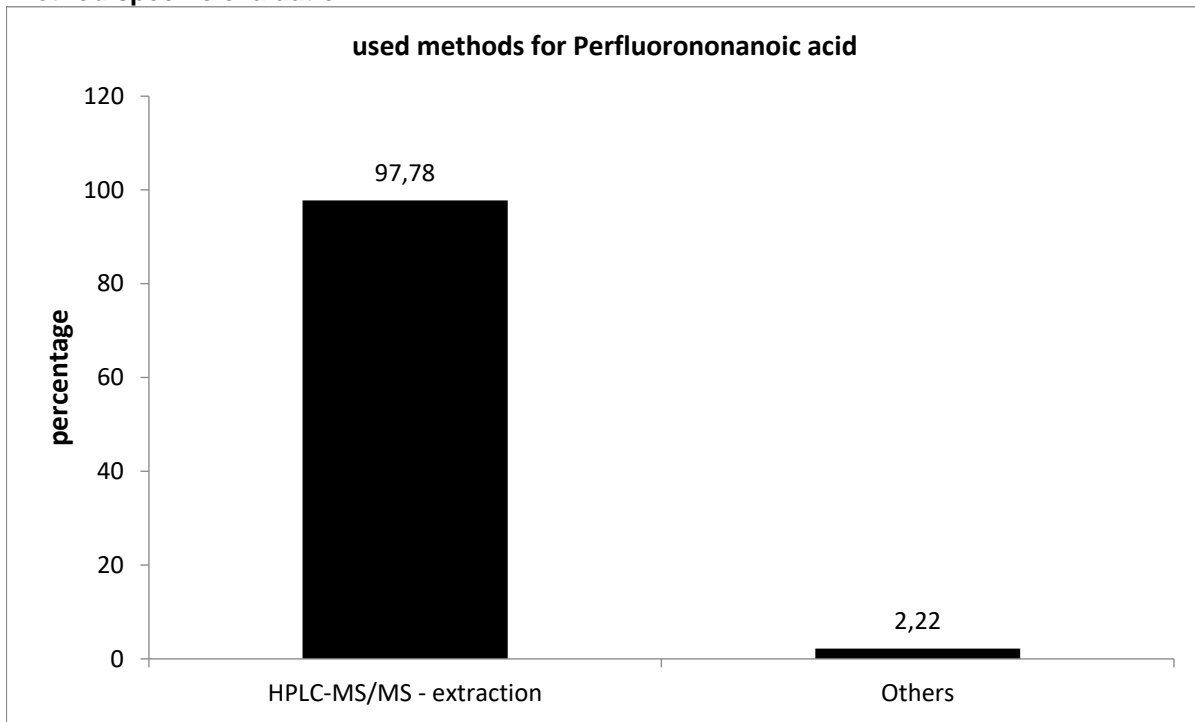
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



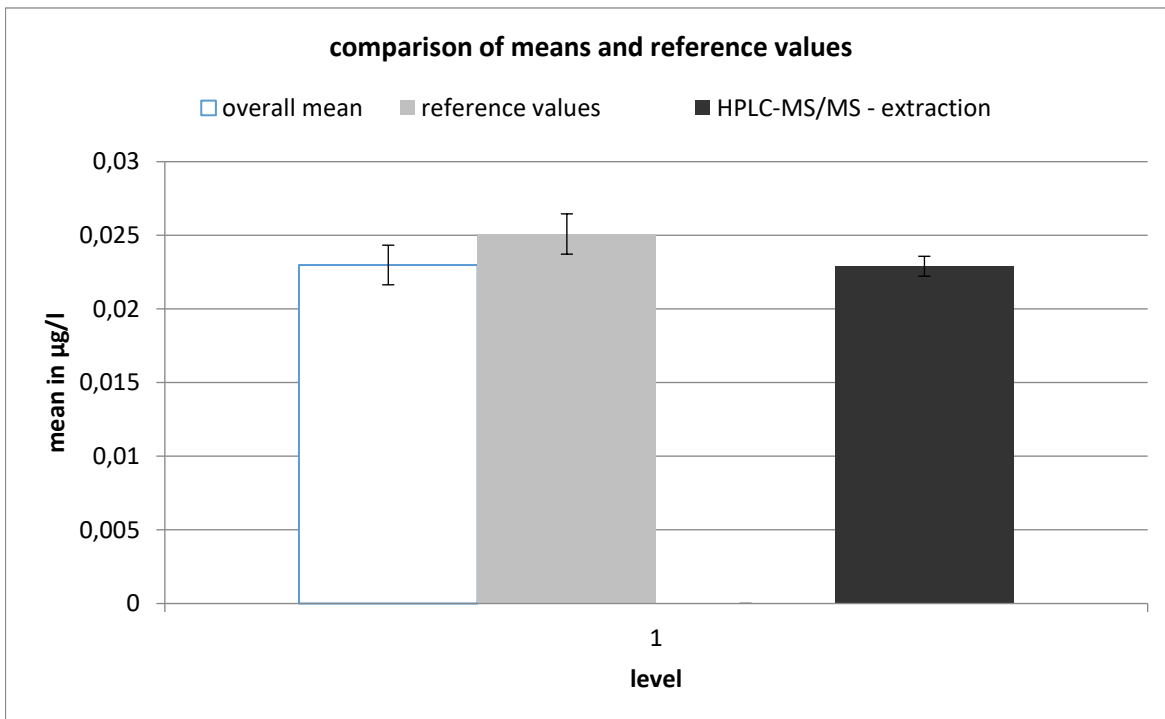
Method specific evaluation

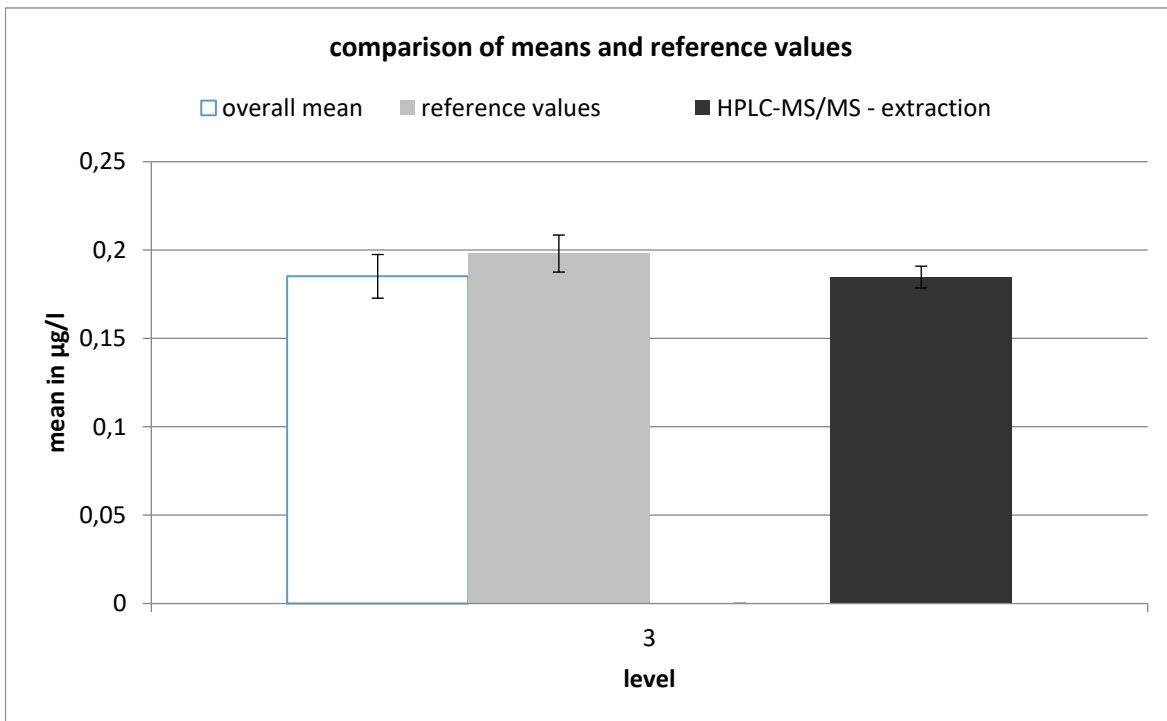
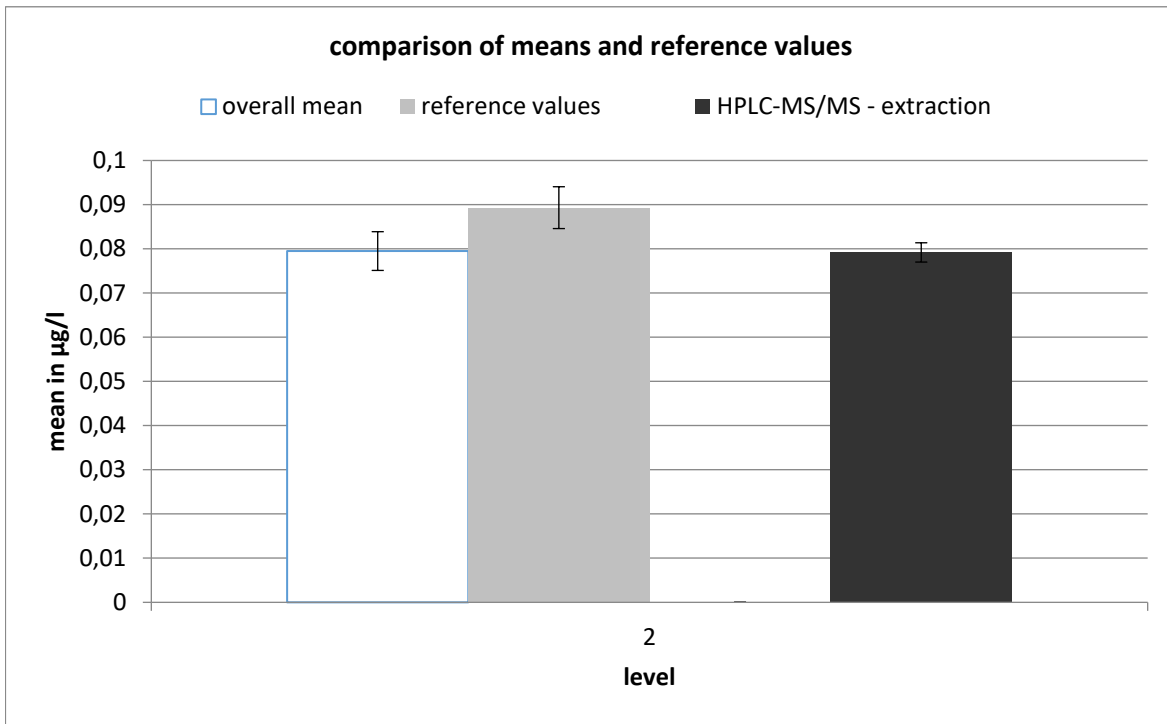


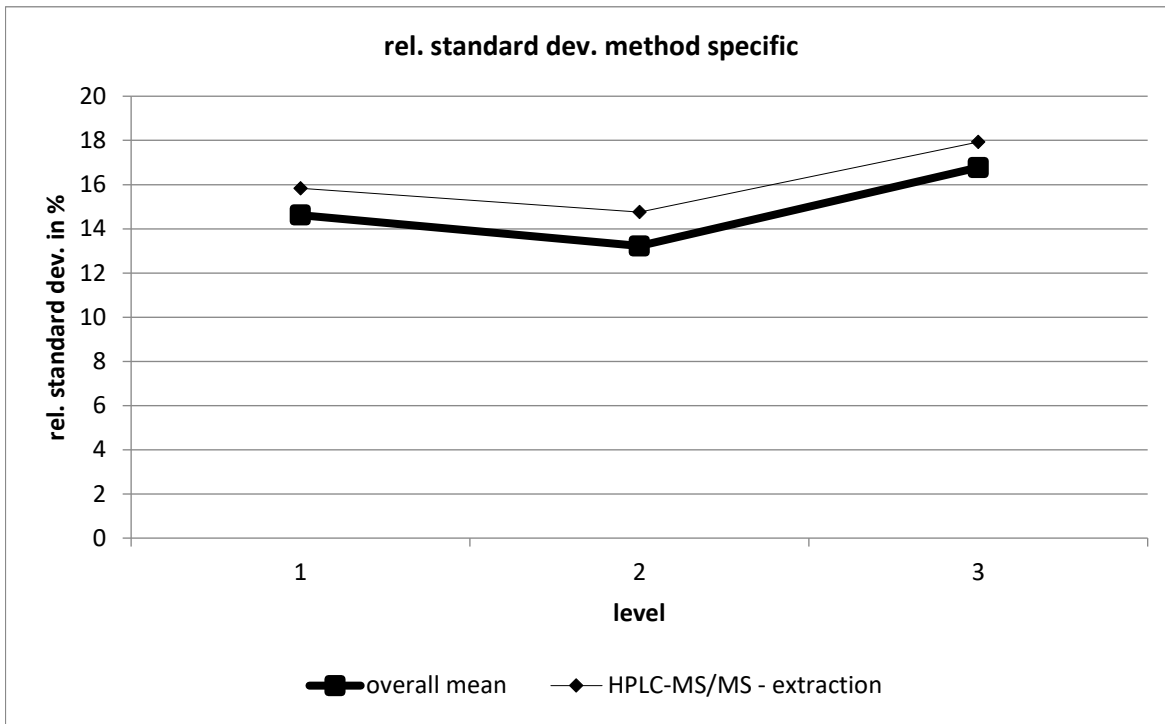
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0230	0,0013	5,9	0,0251	0,0014	5,4
2	0,0795	0,0044	5,5	0,0893	0,0047	5,3
3	0,1851	0,0124	6,7	0,1980	0,0105	5,3





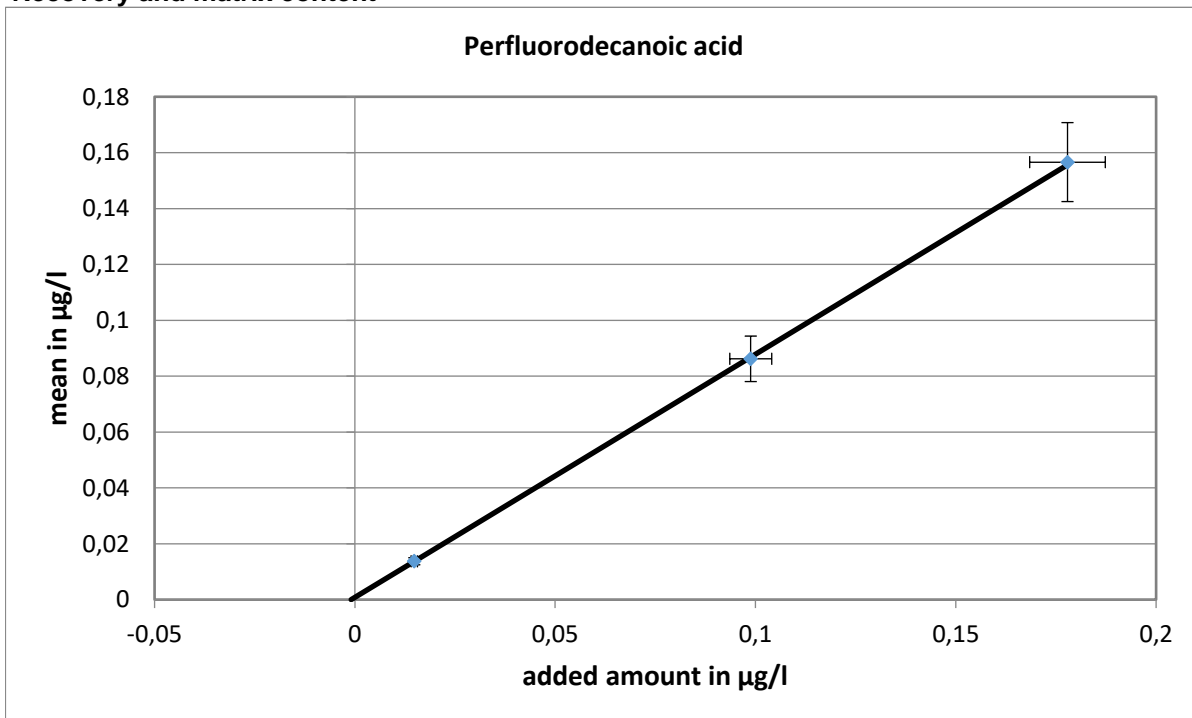


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,023	7E-04	2,95	0,004	15,83	45	1	3	8,889
2	0,079	0,002	2,749	0,012	14,76	45	1	2	6,667
3	0,185	0,006	3,341	0,033	17,93	45	1	1	4,444

Perfluorodecanoic acid

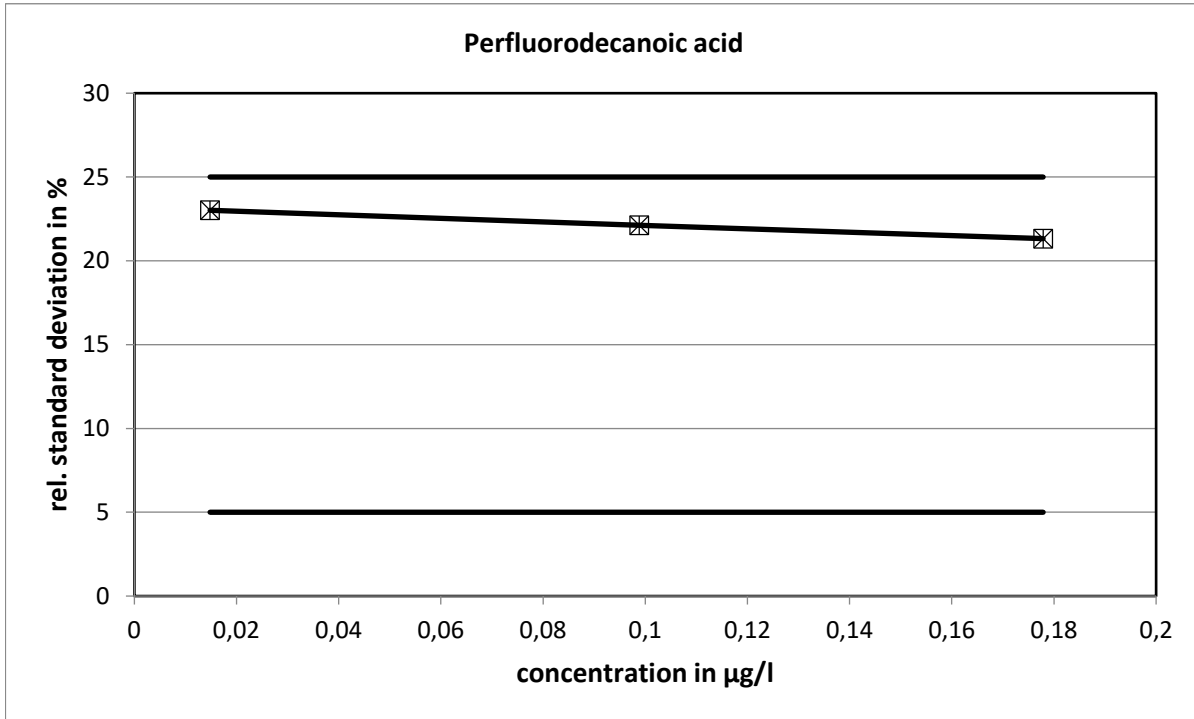
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0148	7,79	0,0034	0,0034	23,01	0,0227	0,0087	53,33	-41,62	45	1	2	6,7
2	0,0988	5,33	0,0219	0,0219	22,11	0,1495	0,0593	51,29	-39,97	45	0	1	2,2
3	0,1779	5,30	0,0379	0,0379	21,32	0,2654	0,1091	49,20	-38,64	45	1	2	6,7
sum										135	2	5	5,2

Recovery and matrix content

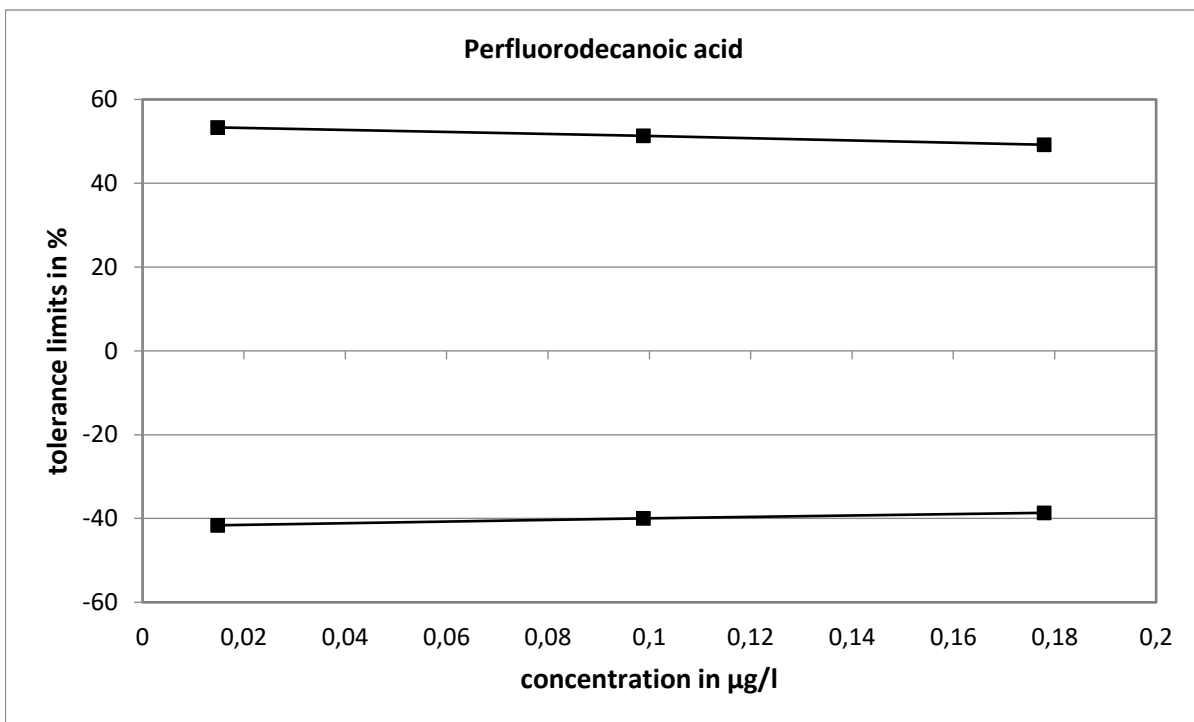


Slope of the regression: 0,87, recovery: 87 %

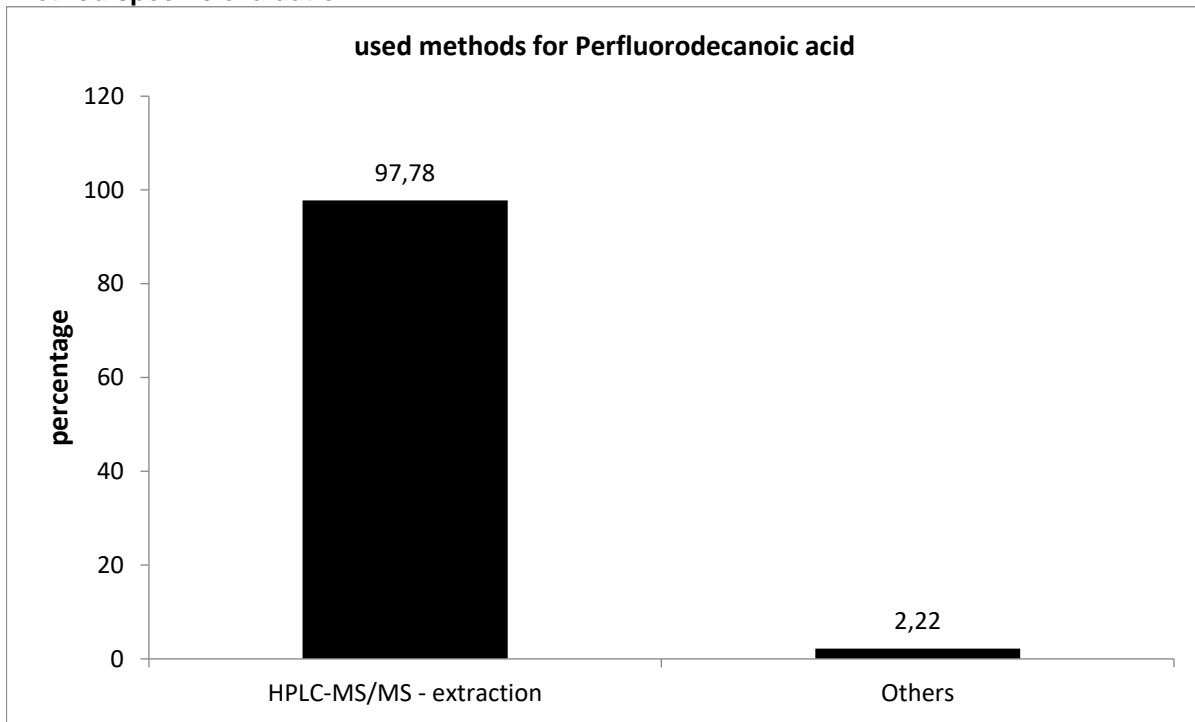
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



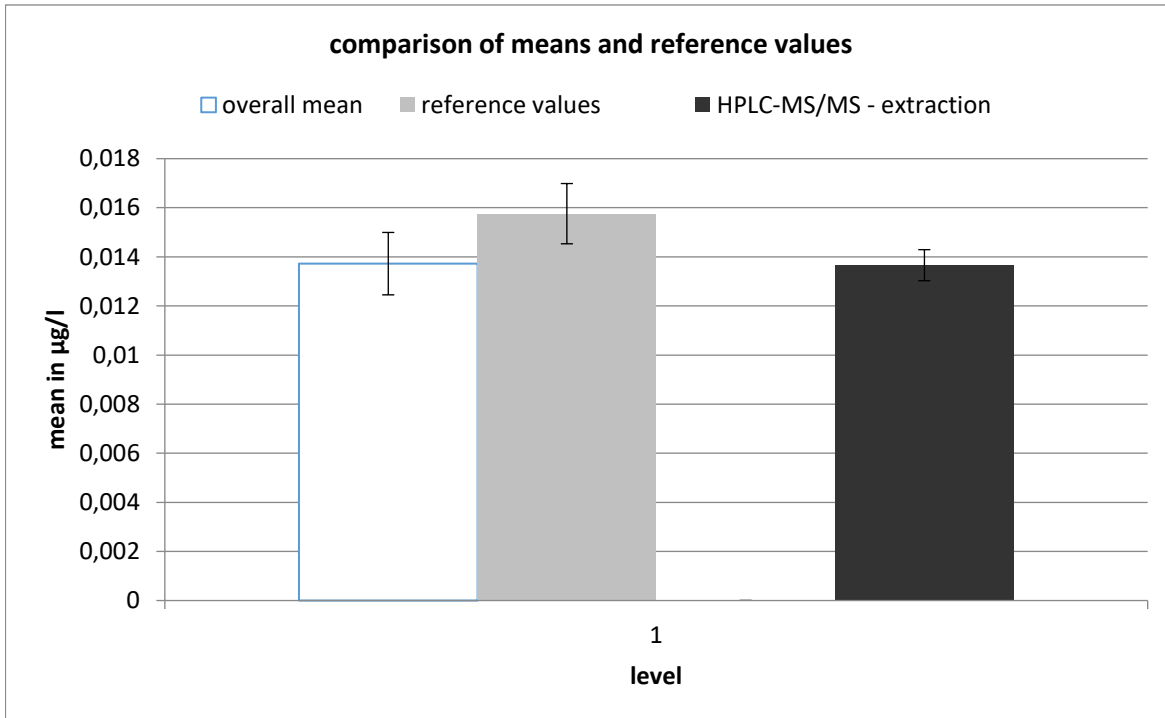
Method specific evaluation

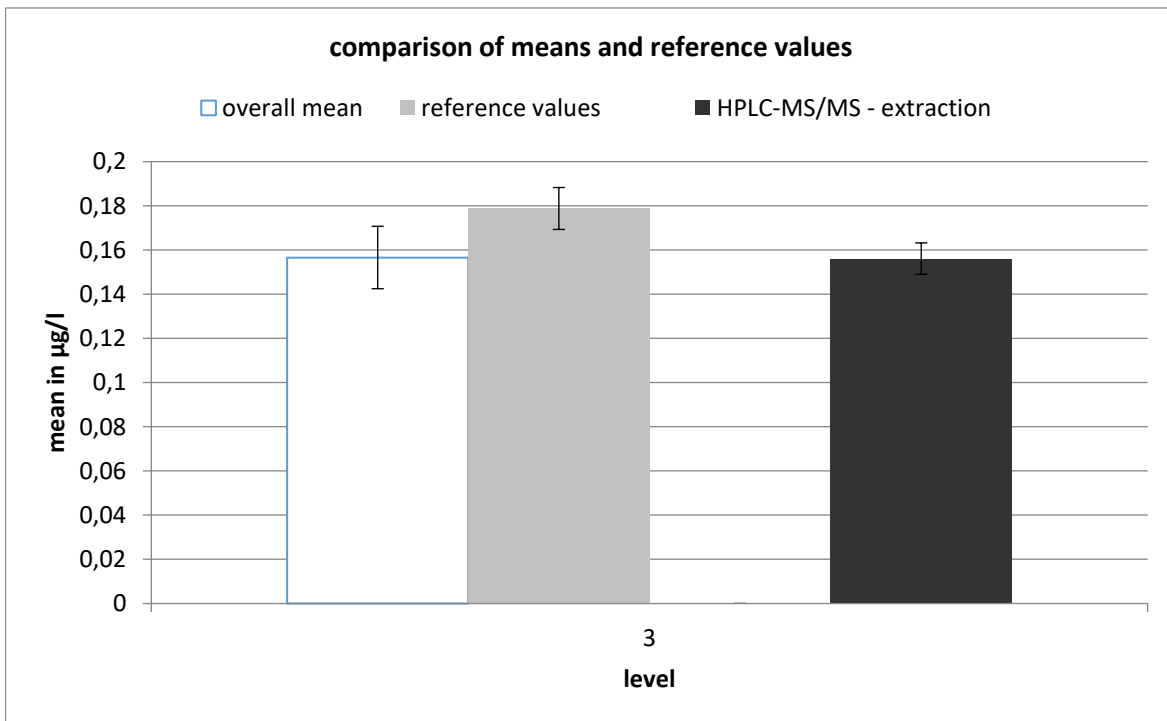
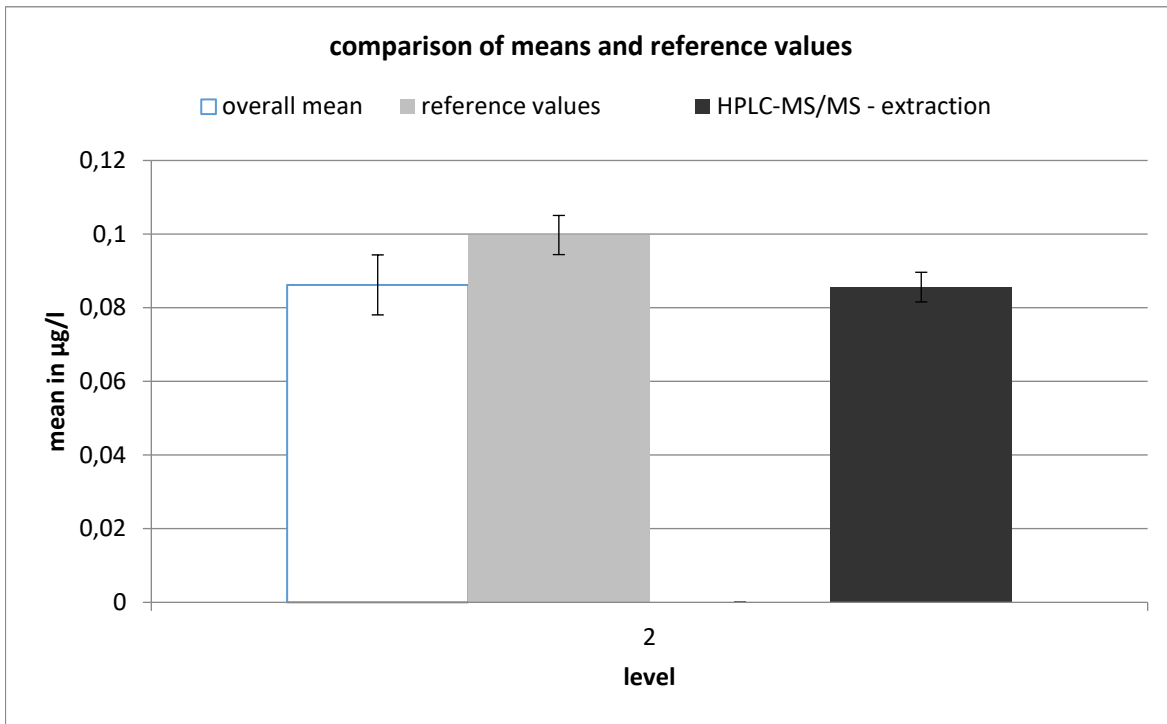


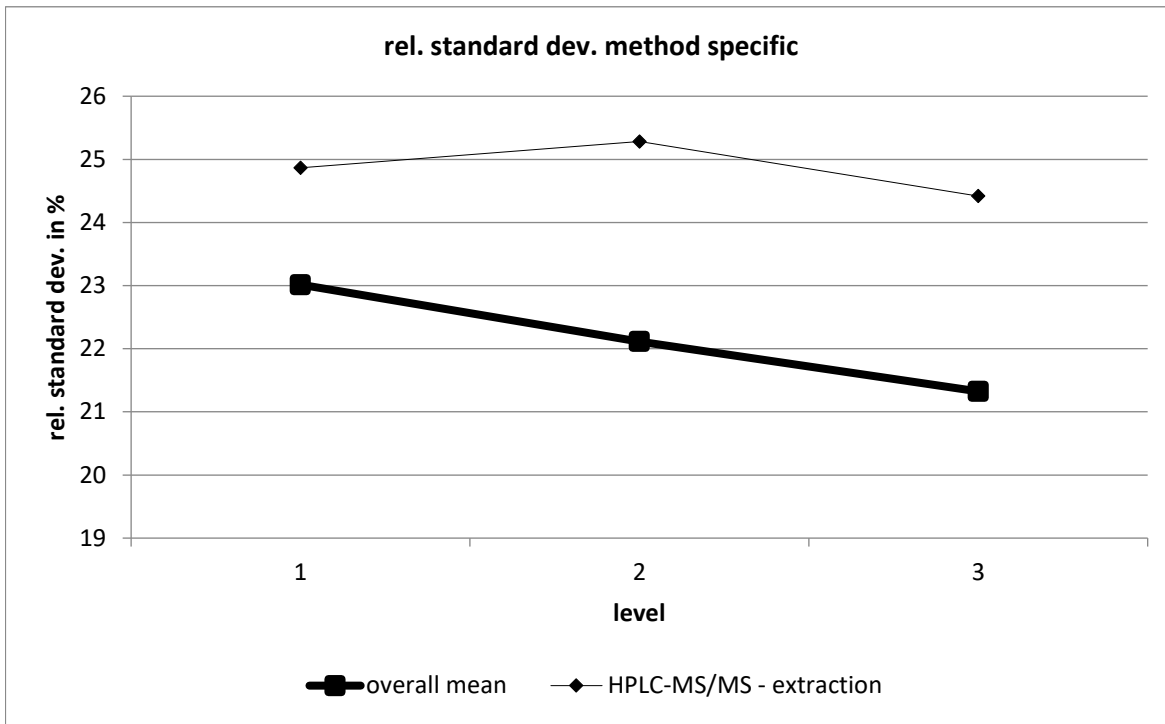
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0137	0,0013	9,3	0,0158	0,0012	7,8
2	0,0862	0,0081	9,4	0,0998	0,0053	5,3
3	0,1566	0,0141	9,0	0,1788	0,0095	5,3





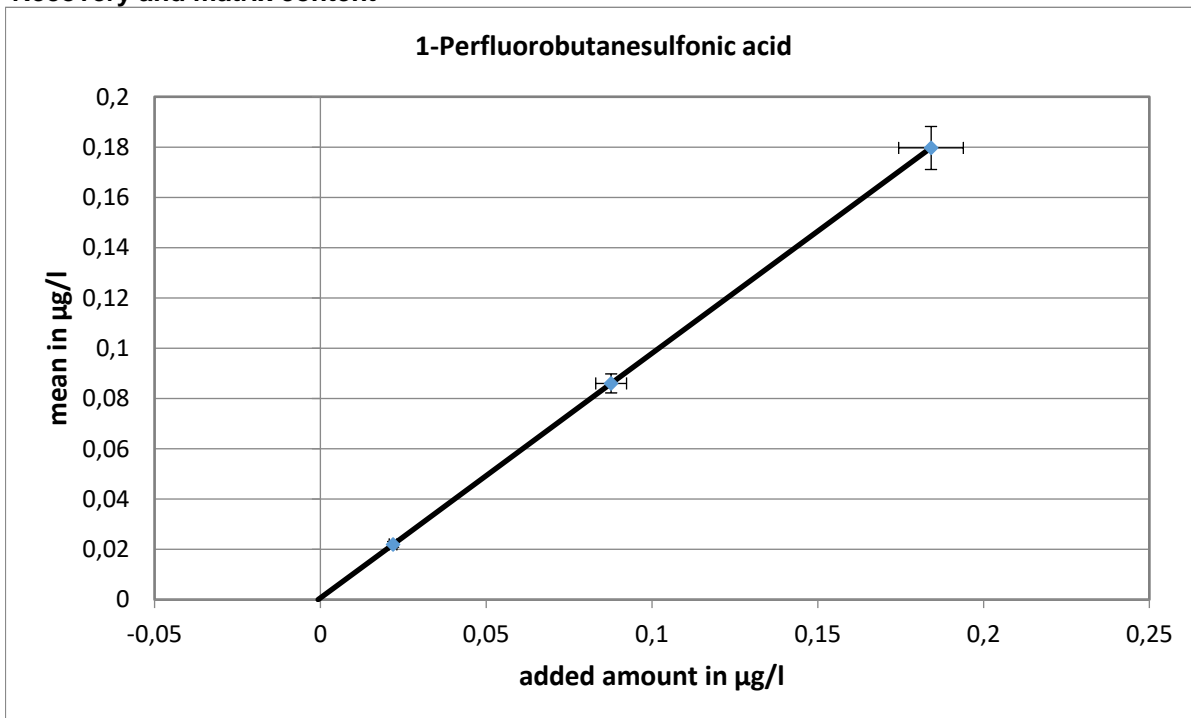


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,014	6E-04	4,633	0,003	24,86	45	1	3	8,889
2	0,086	0,004	4,711	0,022	25,28	45	0	3	6,667
3	0,156	0,007	4,55	0,038	24,42	45	0	2	4,444

1-Perfluorobutanesulfonic acid

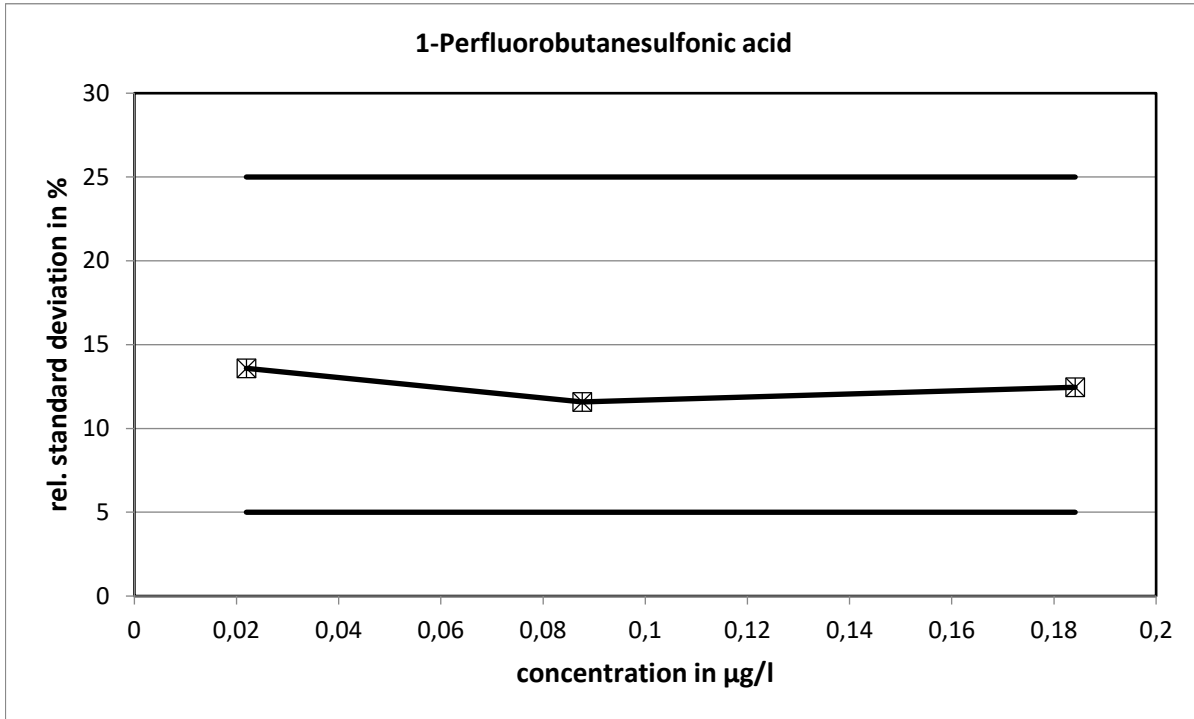
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0219	5,05	0,0030	0,0030	13,59	0,0283	0,0163	29,27	-25,57	45	0	4	8,9
2	0,0877	5,31	0,0102	0,0102	11,58	0,1093	0,0684	24,70	-21,95	45	2	6	17,8
3	0,1842	5,29	0,0230	0,0230	12,46	0,2334	0,1408	26,73	-23,53	45	1	5	13,3
sum										135	3	15	13,3

Recovery and matrix content

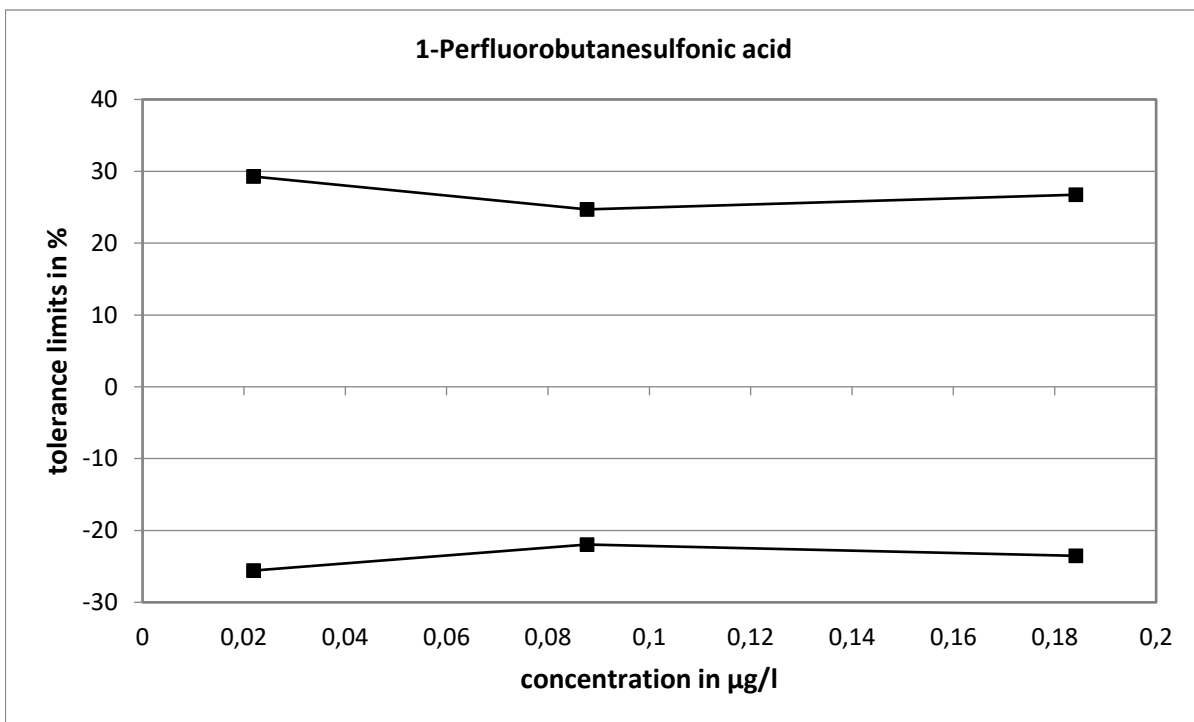


Slope of the regression: 0,972, recovery: 97,2 %

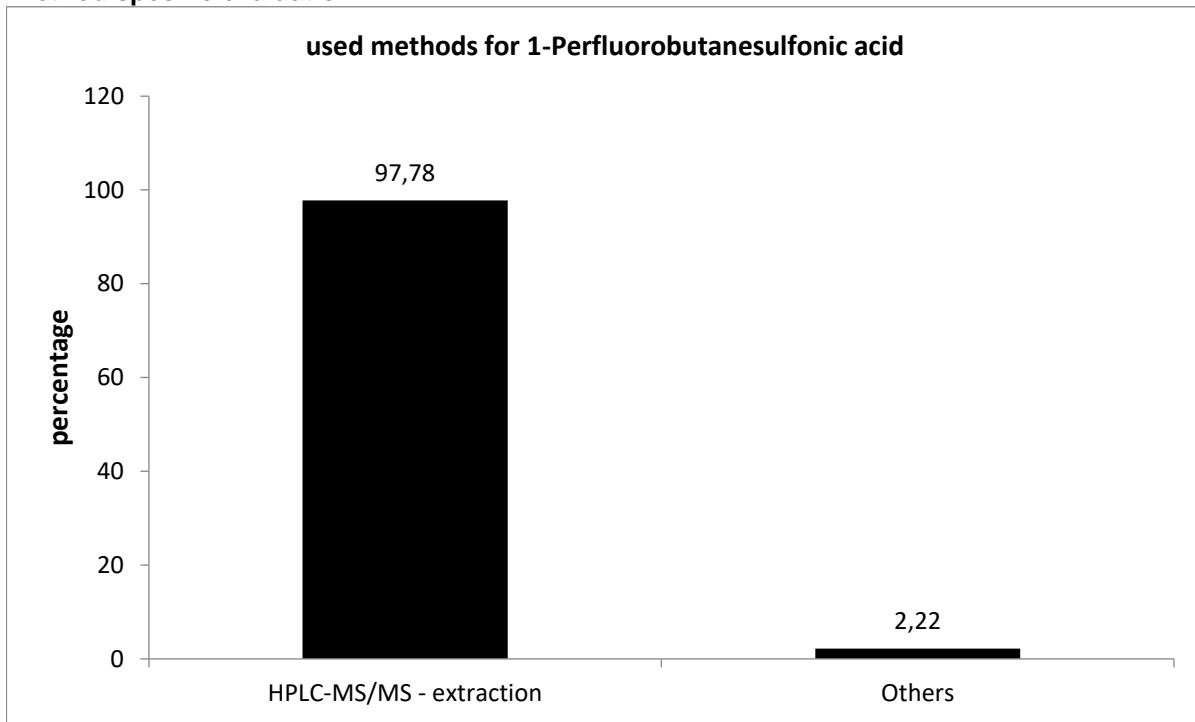
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



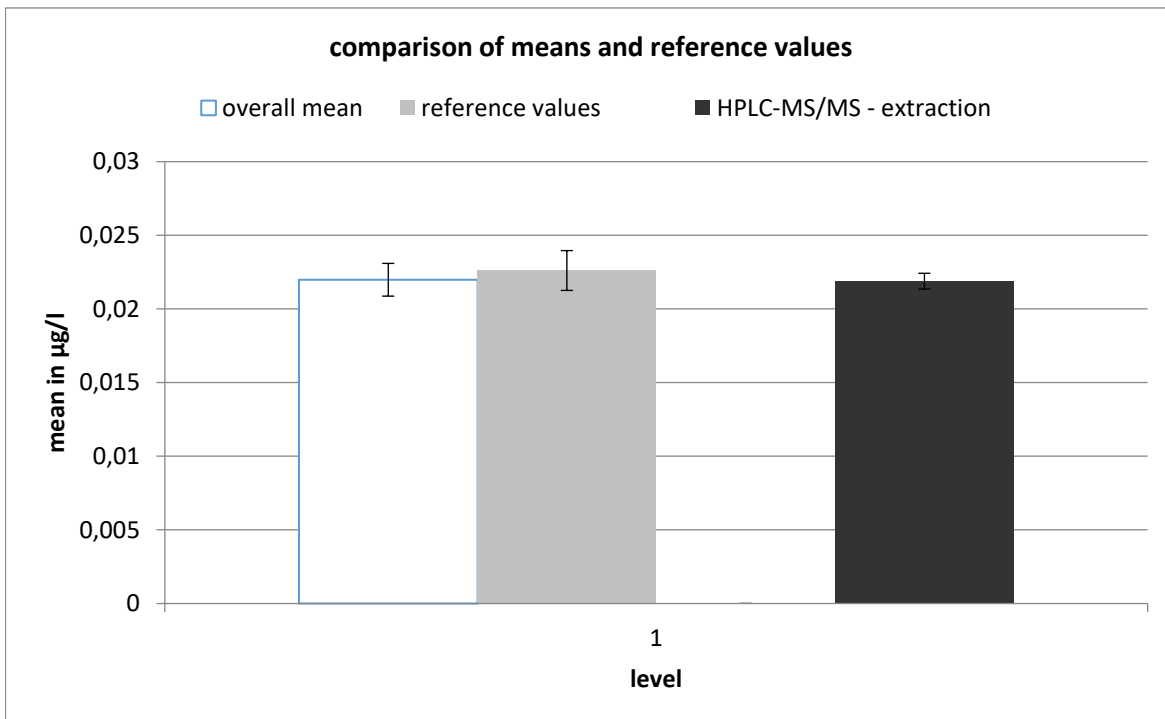
Method specific evaluation

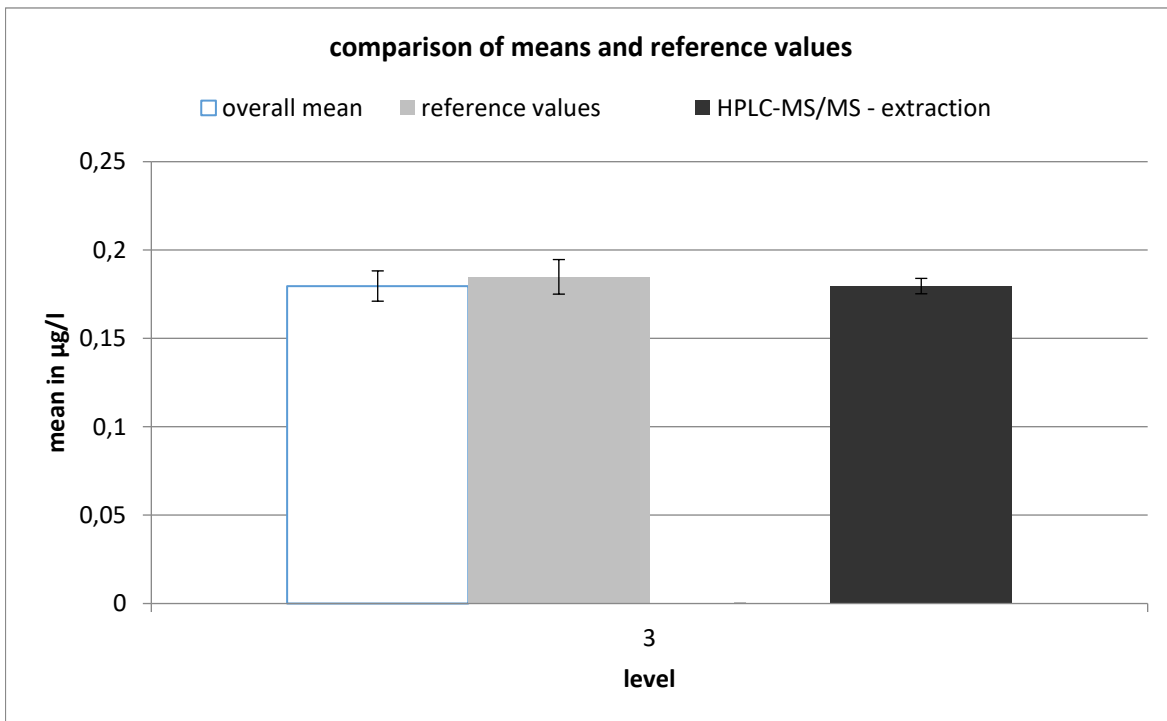
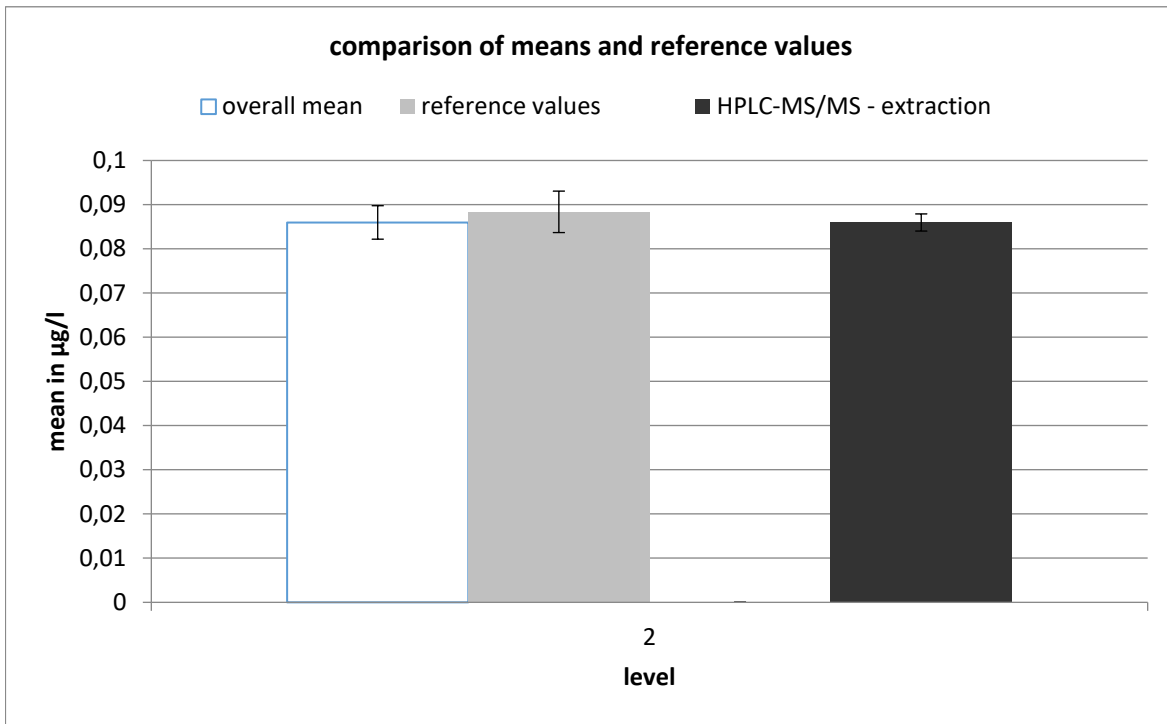


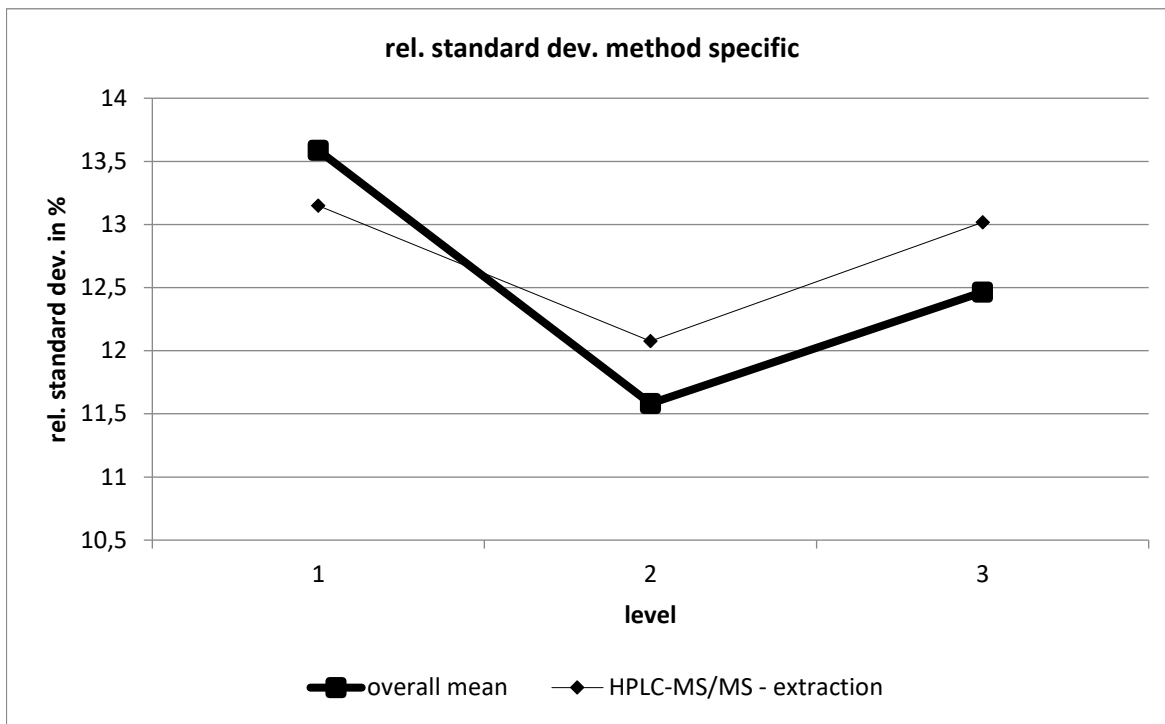
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]			reference value [µg/l]		
	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0220	0,0011	5,0	0,0226	0,0014	6,0
2	0,0860	0,0038	4,4	0,0884	0,0047	5,3
3	0,1796	0,0086	4,8	0,1848	0,0098	5,3





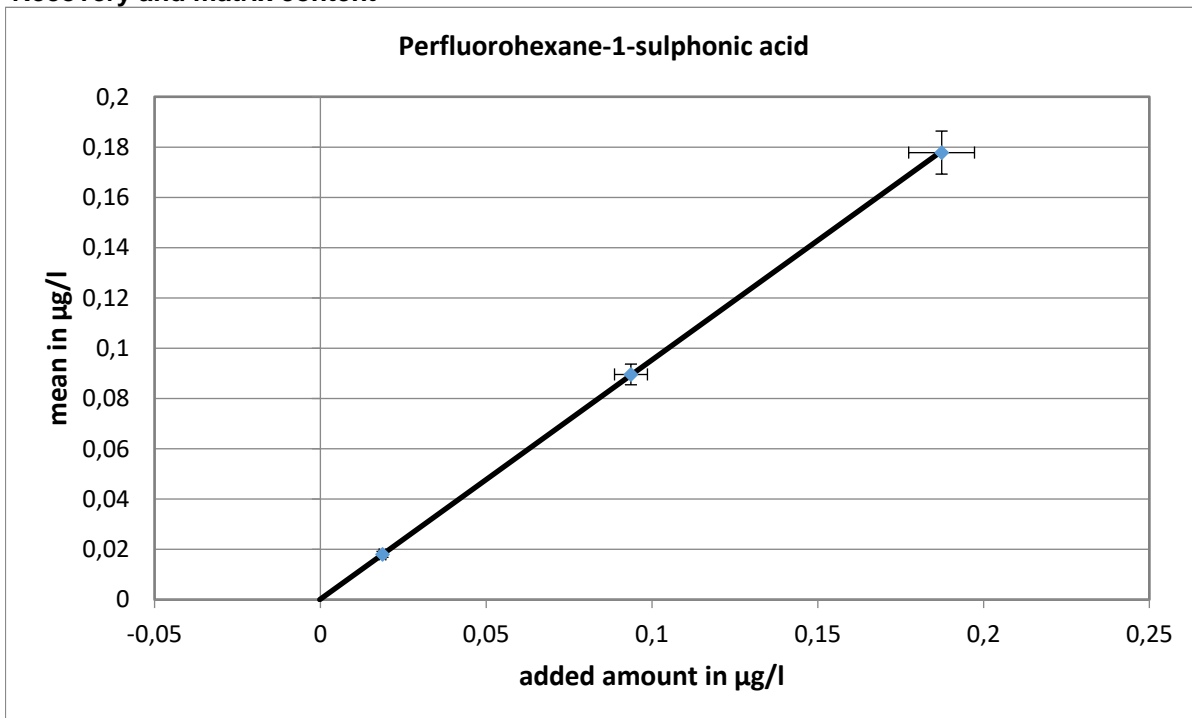


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,022	5E-04	2,45	0,003	13,15	45	1	5	13,33
2	0,086	0,002	2,25	0,01	12,08	45	2	7	20
3	0,18	0,004	2,426	0,023	13,02	45	1	5	13,33

Perfluorohexane-1-sulphonic acid

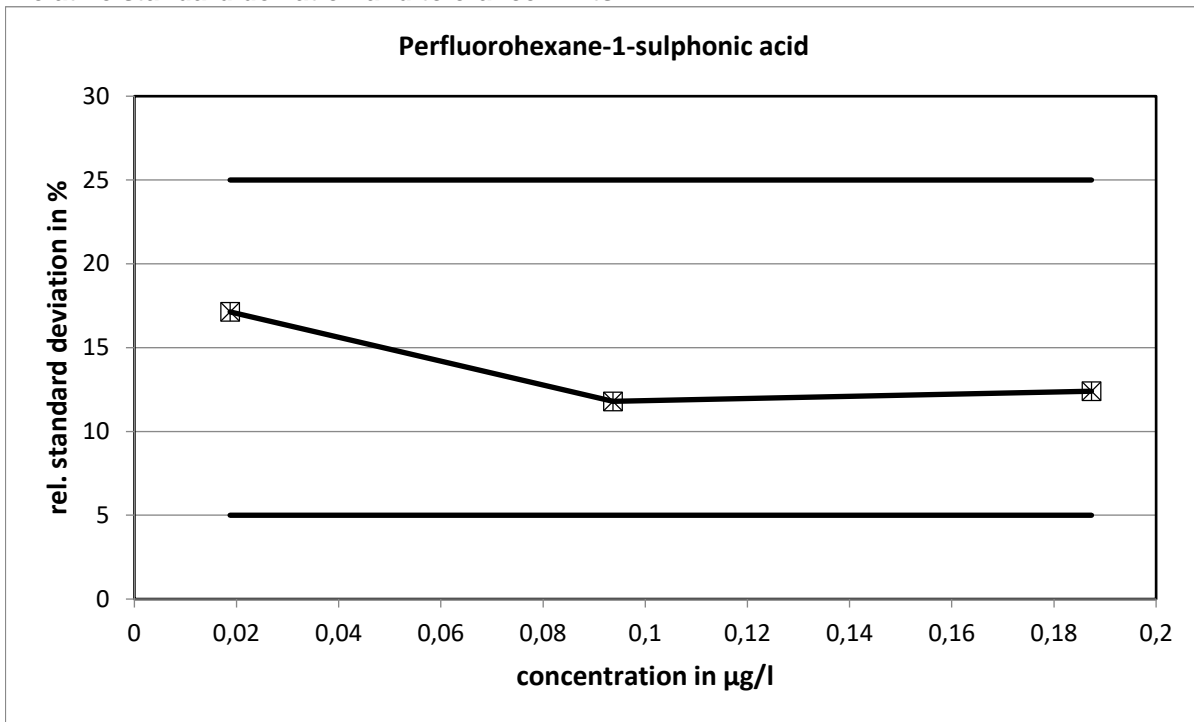
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0187	5,38	0,0032	0,0032	17,13	0,0258	0,0128	37,90	-31,73	46	1	4	10,9
2	0,0937	5,29	0,0110	0,0110	11,80	0,1173	0,0728	25,23	-22,31	45	1	5	13,0
3	0,1873	5,29	0,0232	0,0232	12,39	0,2372	0,1436	26,62	-23,37	46	2	1	6,5
sum										137	4	10	10,2

Recovery and matrix content

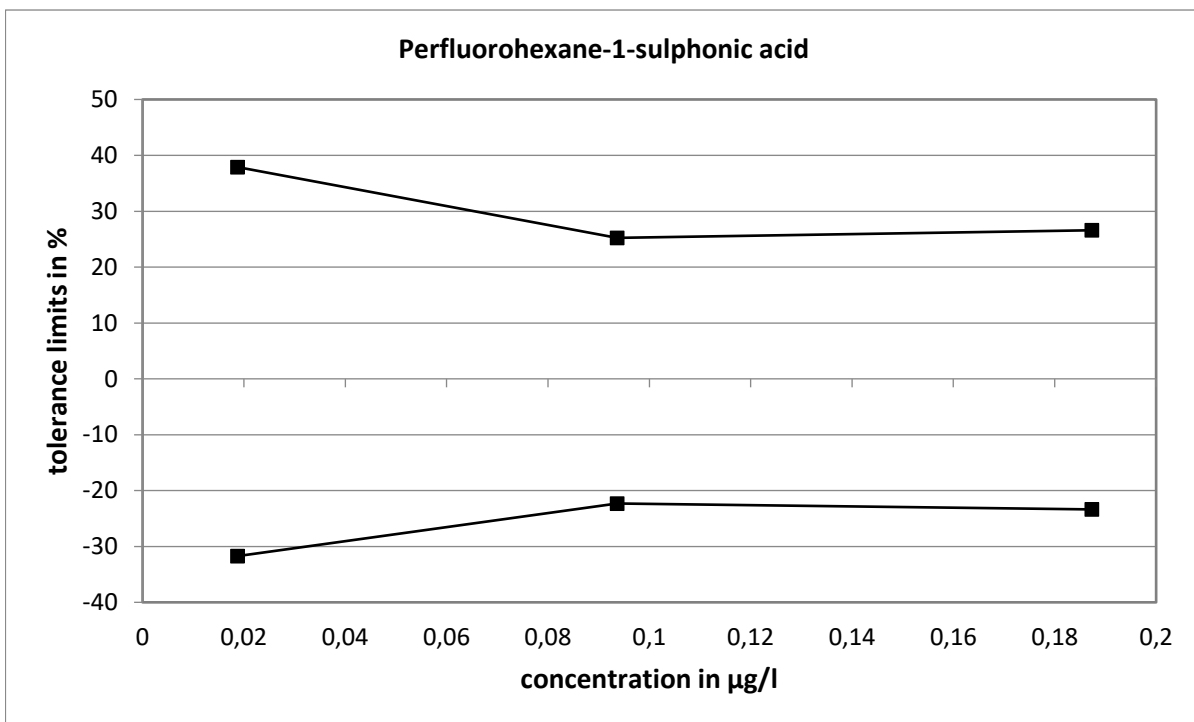


Slope of the regression: 0,951, recovery: 95,1 %

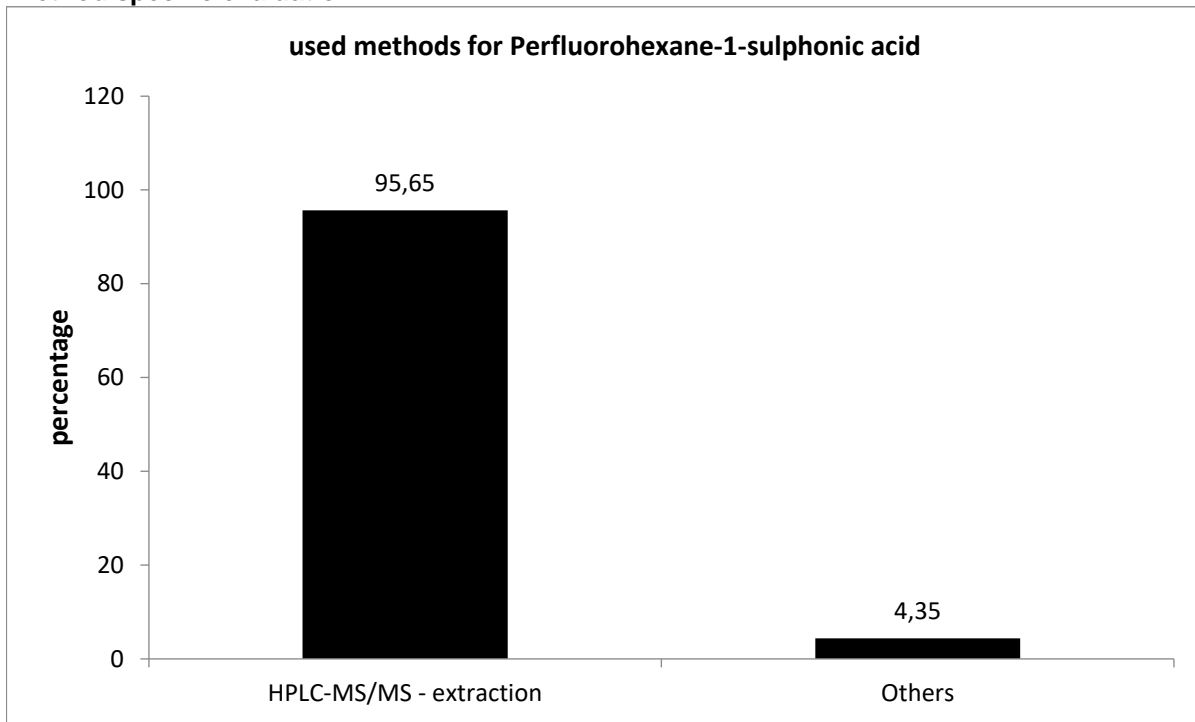
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



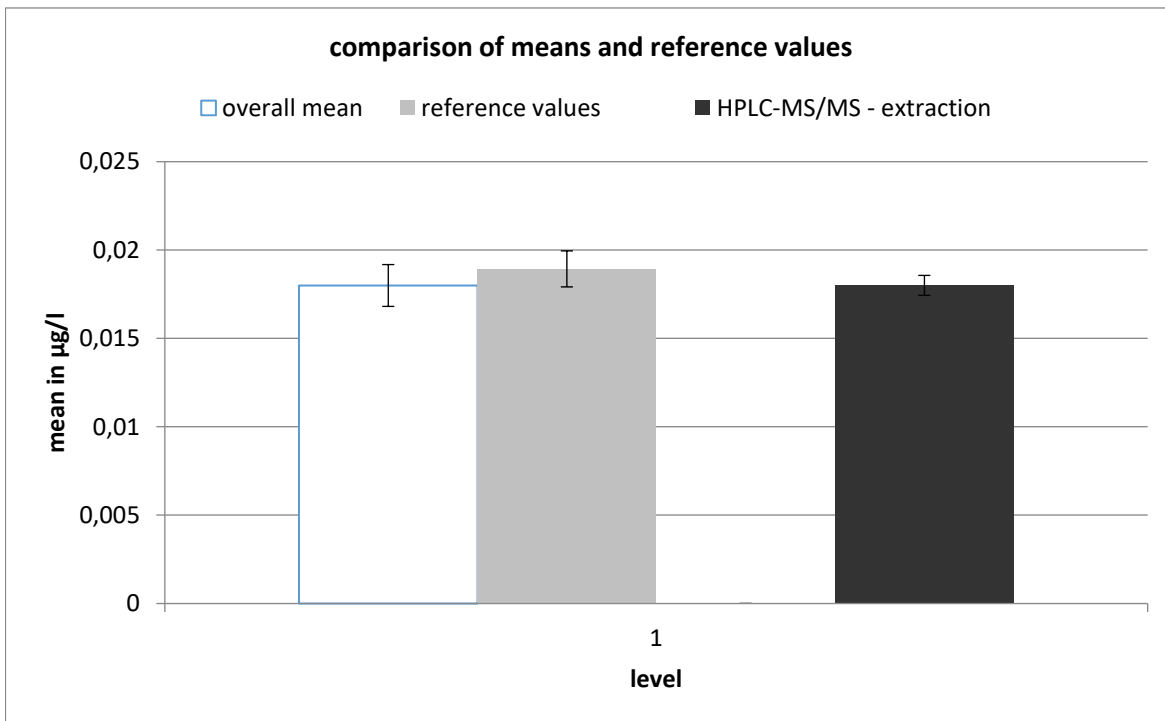
Method specific evaluation

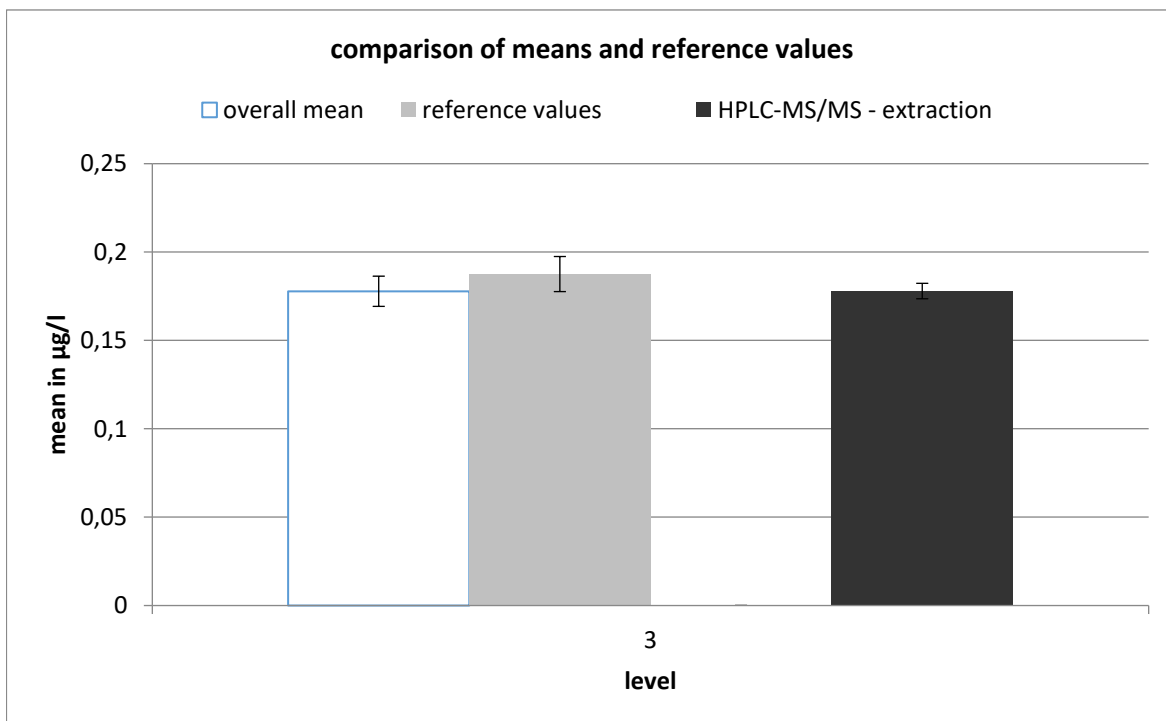
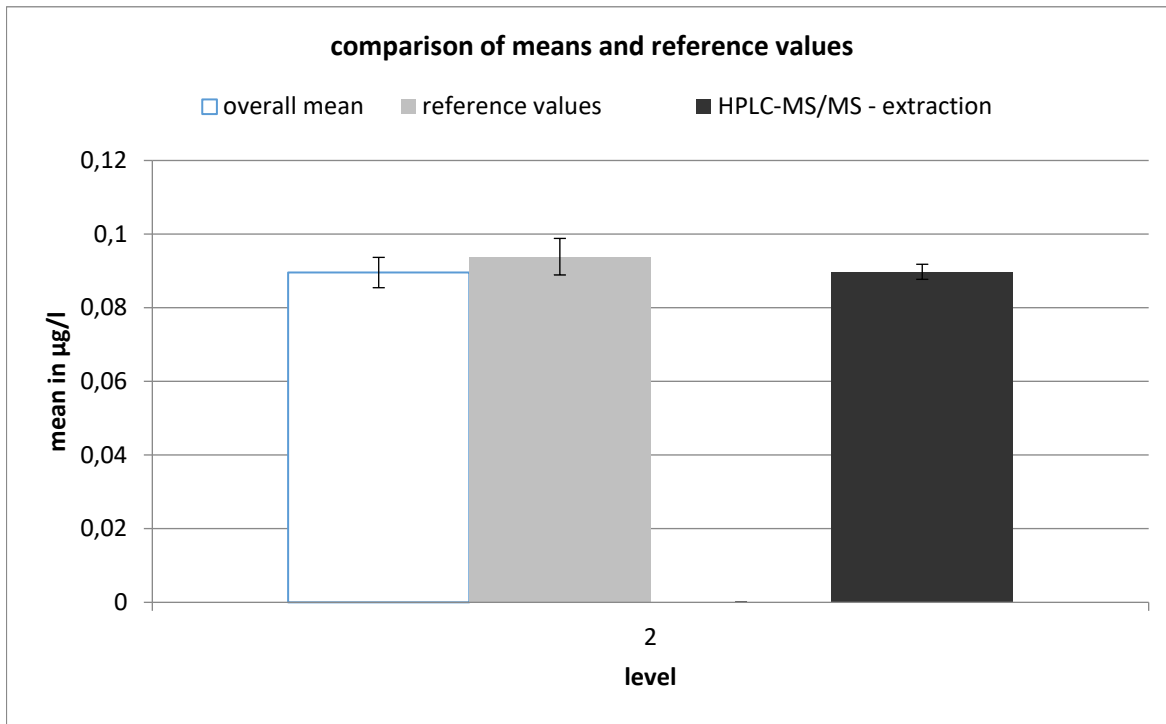


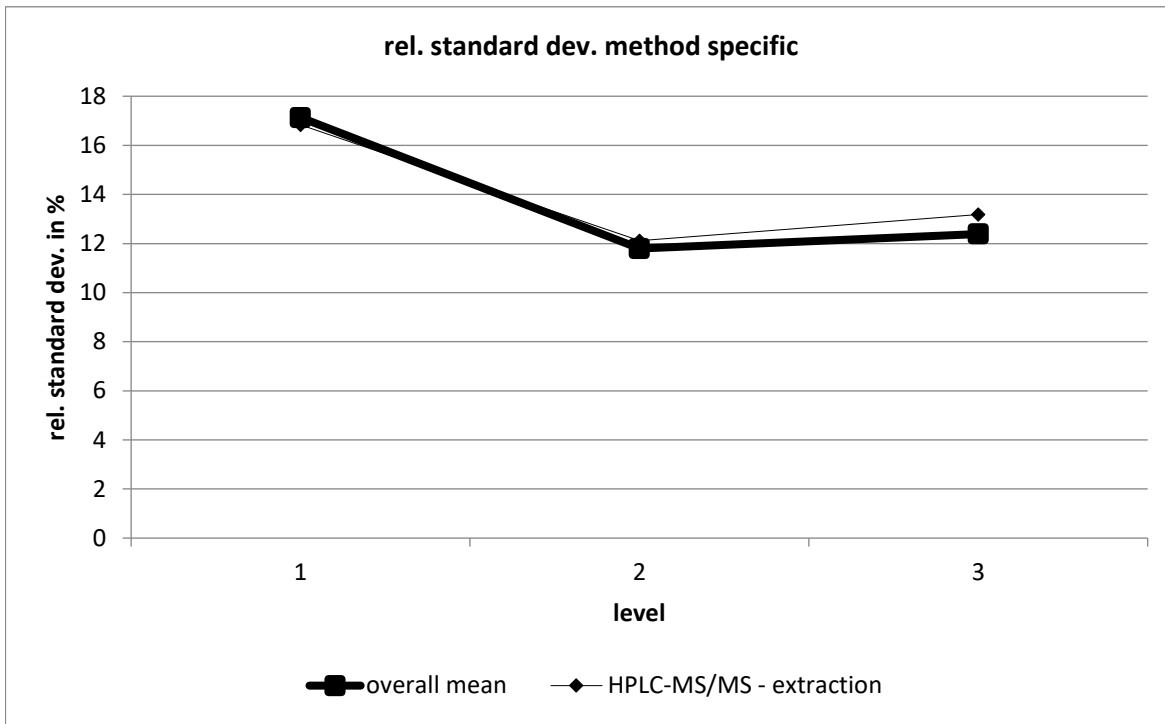
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

level	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0180	0,0012	6,6	0,0189	0,0010	5,4
2	0,0896	0,0041	4,6	0,0939	0,0050	5,3
3	0,1778	0,0086	4,8	0,1875	0,0099	5,3





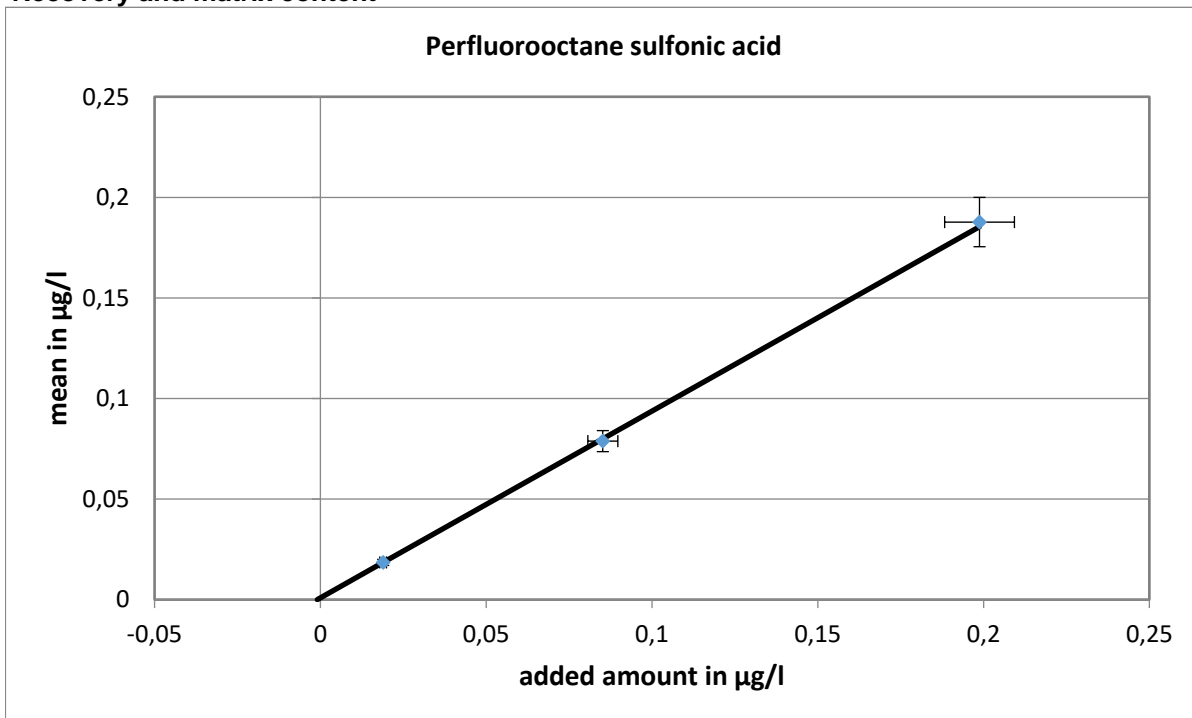


HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,018	6E-04	3,137	0,003	16,83	45	1	5	13,33
2	0,09	0,002	2,283	0,011	12,12	44	2	4	13,64
3	0,178	0,004	2,456	0,023	13,18	45	0	2	4,444

Perfluorooctane sulfonic acid

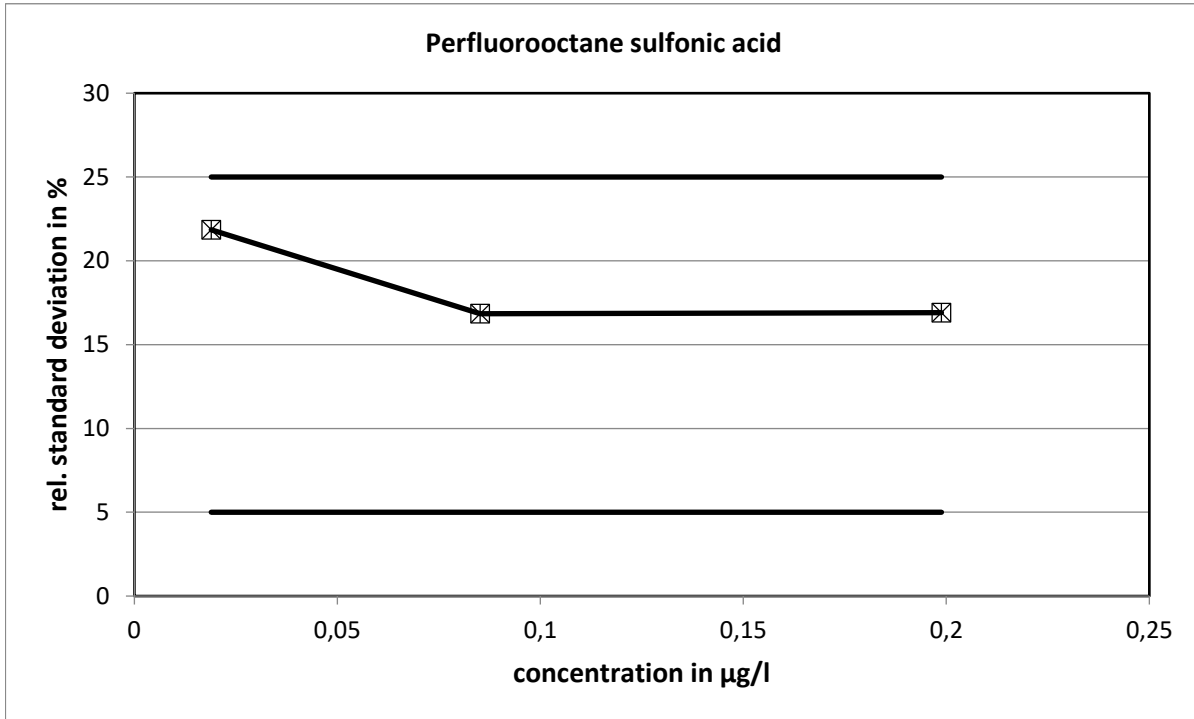
level	assigned value [µg/l]	expanded uncertainty of the assigned value [%]	standard deviation, calculated using robust statistics [µg/l]	standard deviation for proficiency assessment [µg/l]	standard deviation for proficiency assessment [%]	upper tolerance limit [µg/l]	lower tolerance limit [µg/l]	upper tolerance limit [%]	lower tolerance limit [%]	number of results	out below	out above	out [%]
1	0,0189	8,16	0,0041	0,0041	21,85	0,0284	0,0114	49,78	-39,83	47	0	1	2,1
2	0,0852	5,36	0,0143	0,0143	16,84	0,1170	0,0587	37,35	-31,15	47	1	0	2,1
3	0,1988	5,29	0,0336	0,0336	16,91	0,2732	0,1366	37,43	-31,31	47	1	2	6,4
sum										141	2	3	3,5

Recovery and matrix content

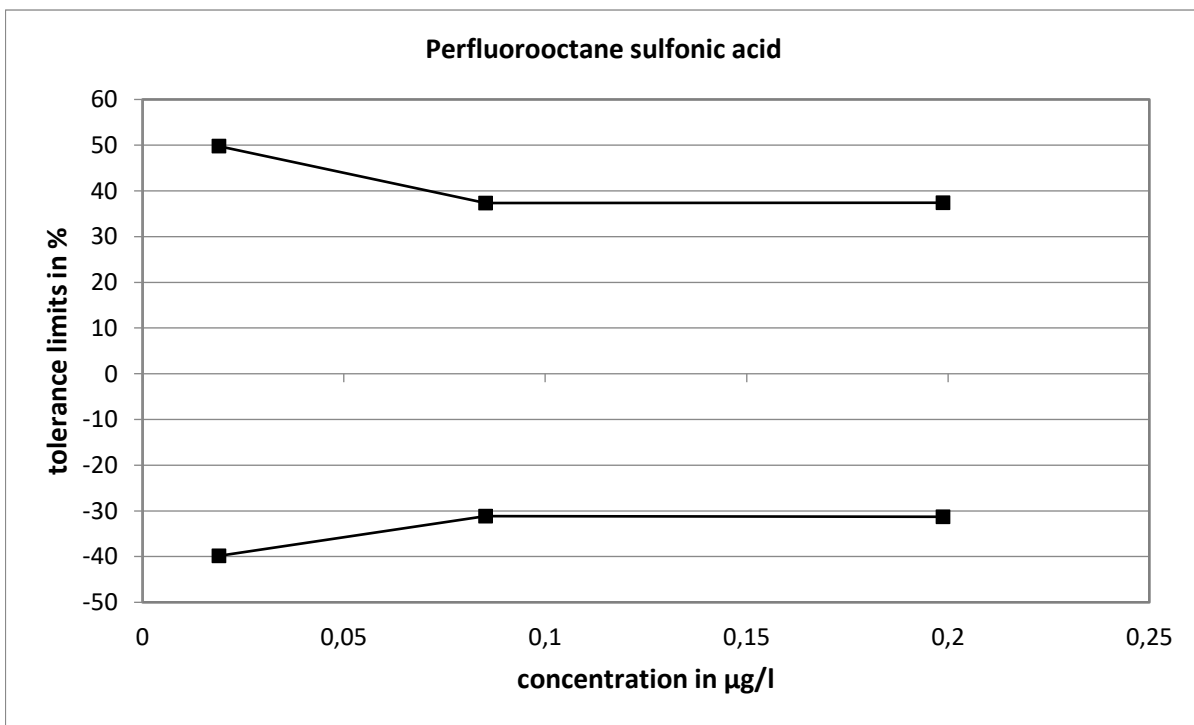


Slope of the regression: 0,928, recovery: 92,8 %

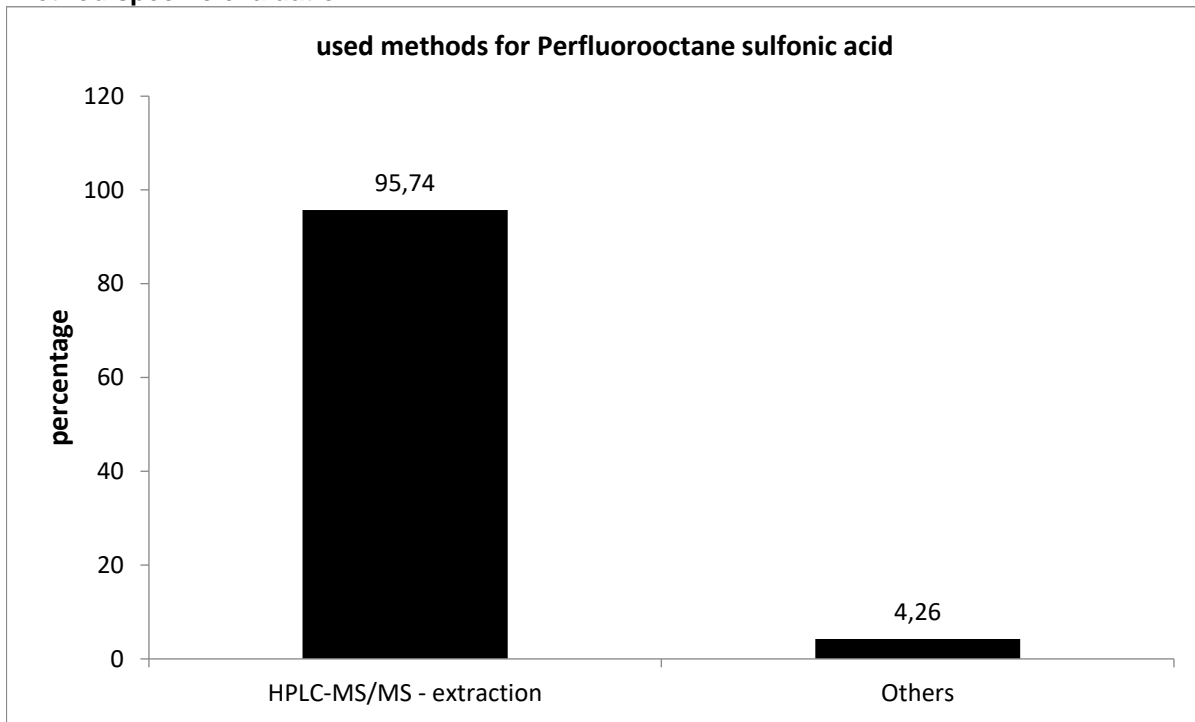
Relative standard deviation and tolerance limits



The relative standard deviations calculated with the Q-method did not reach the limits.



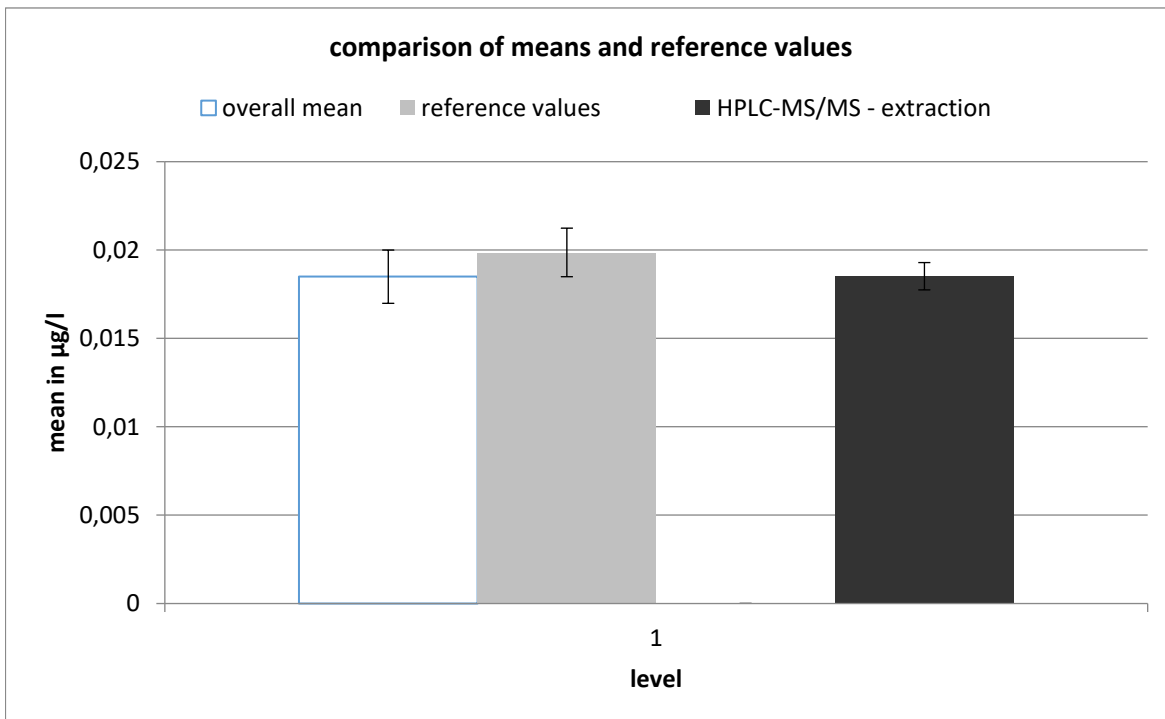
Method specific evaluation

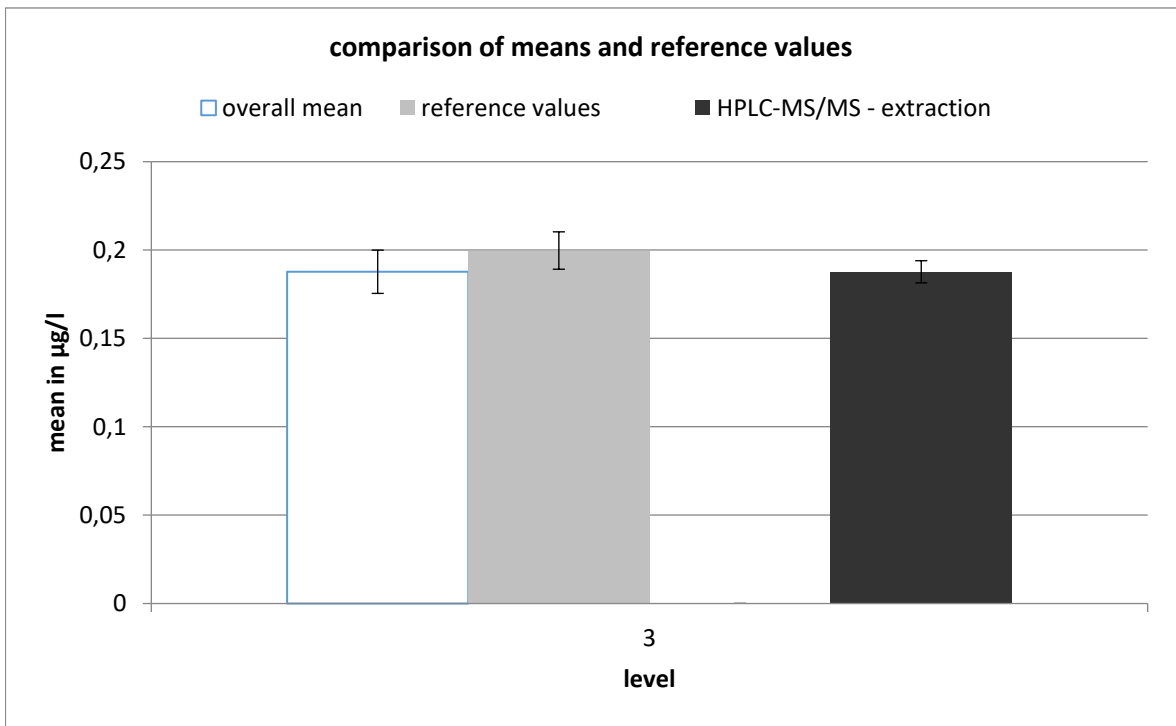
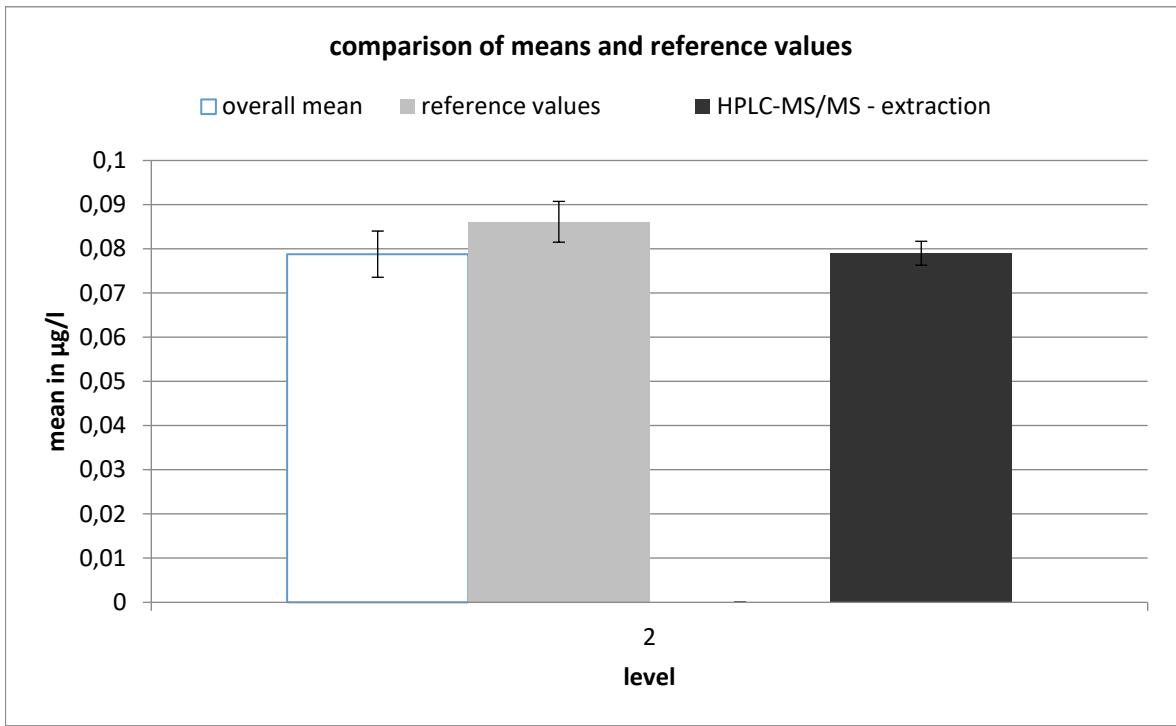


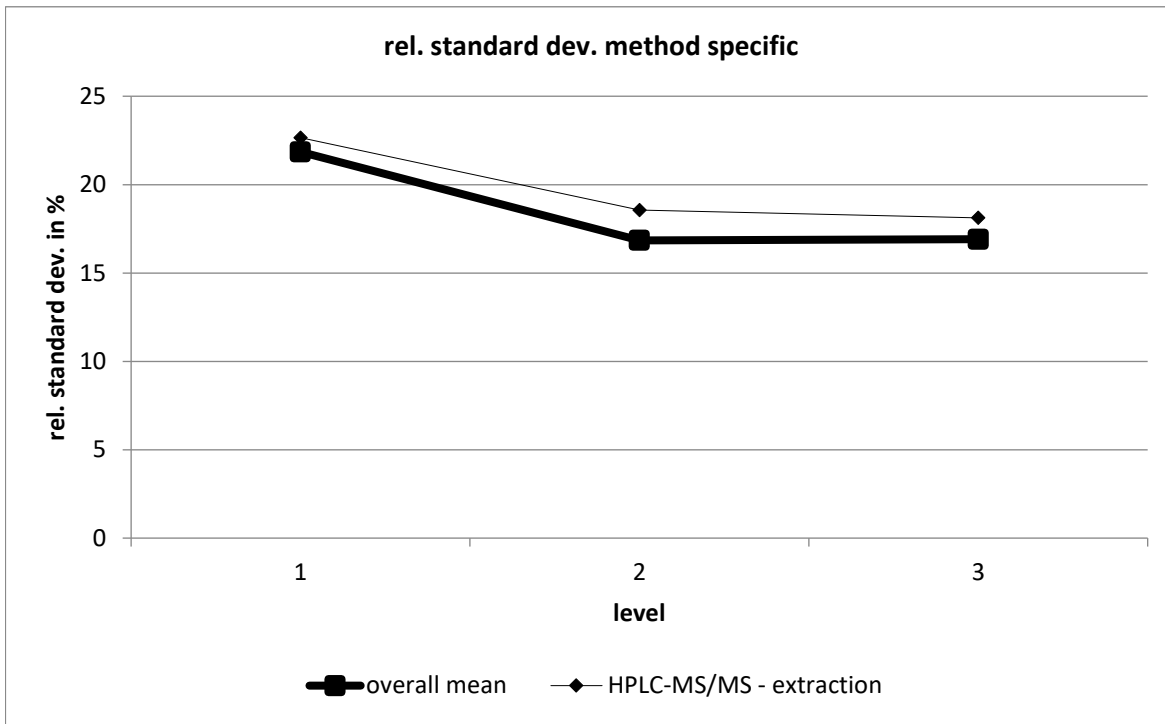
There is no method comparison, because almost all laboratories used HPLC-MS/MS after extraction.

Comparison of means and reference values

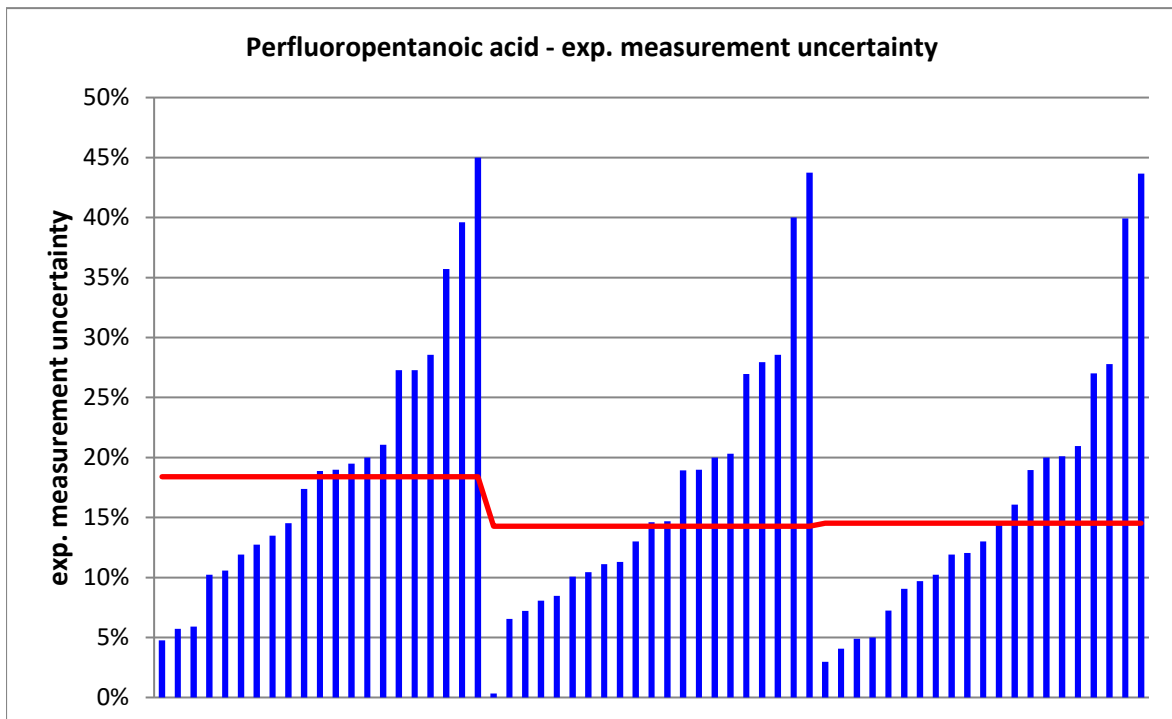
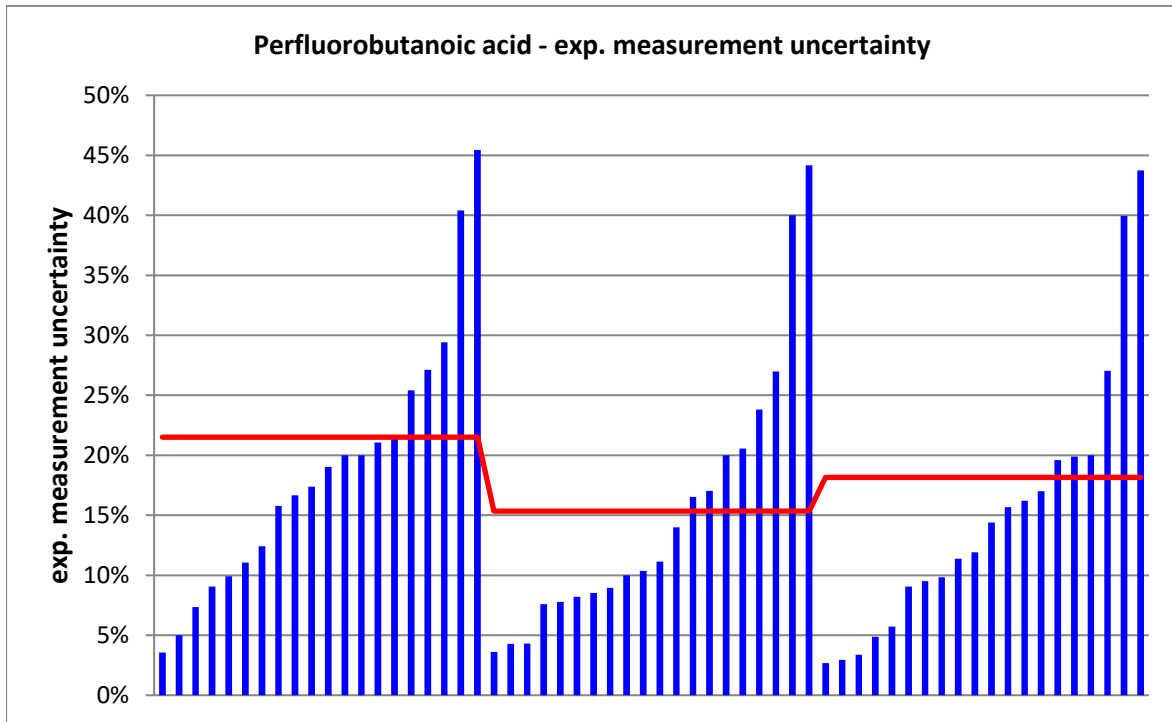
level	mean [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]	reference value [µg/l]	exp. uncertainty [µg/l]	exp. uncertainty [%]
1	0,0185	0,0015	8,2	0,0199	0,0014	6,9
2	0,0788	0,0052	6,6	0,0861	0,0046	5,4
3	0,1877	0,0123	6,5	0,1997	0,0106	5,3

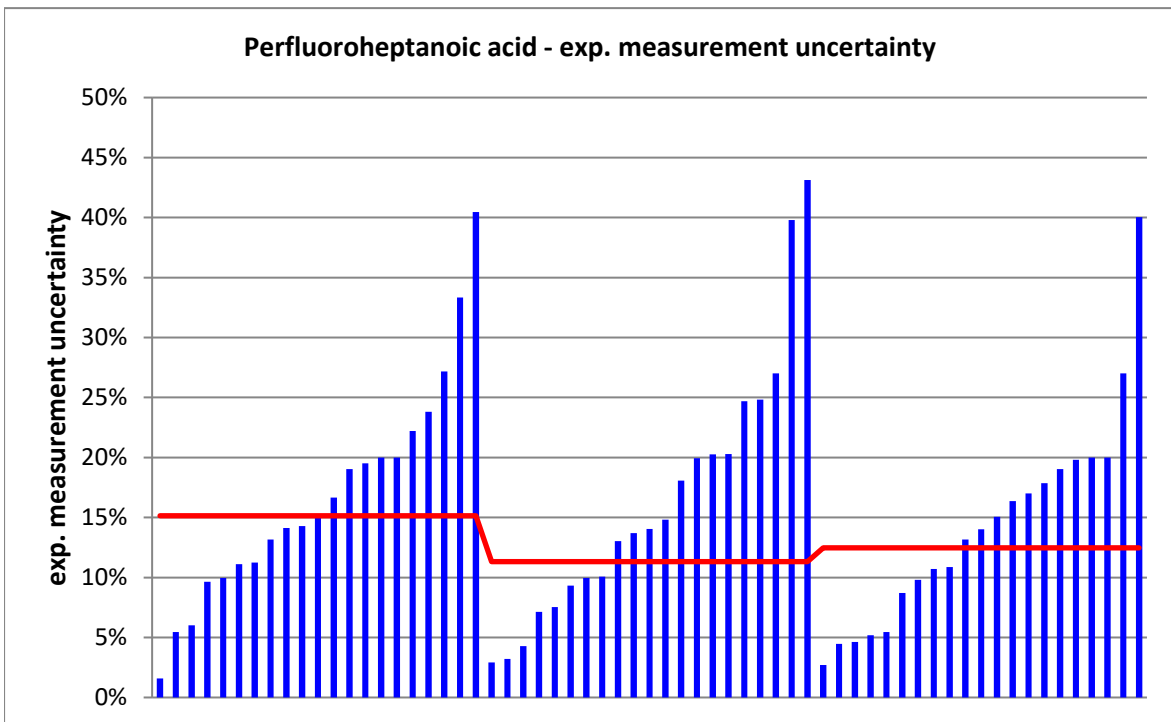
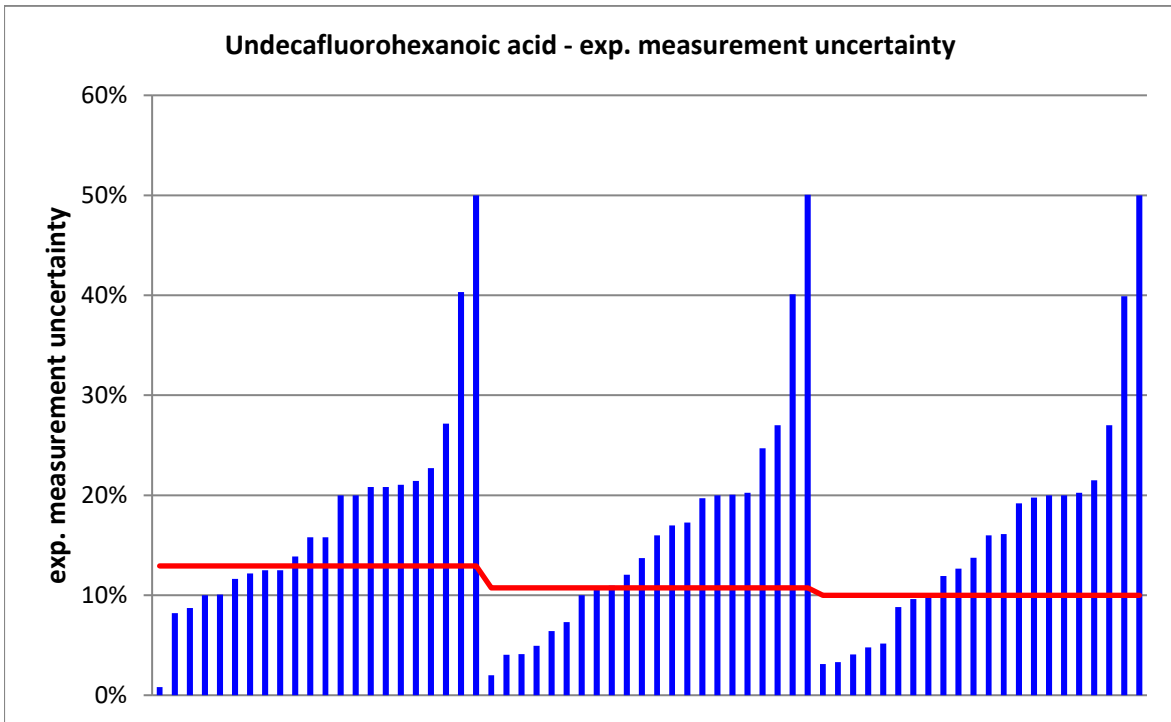


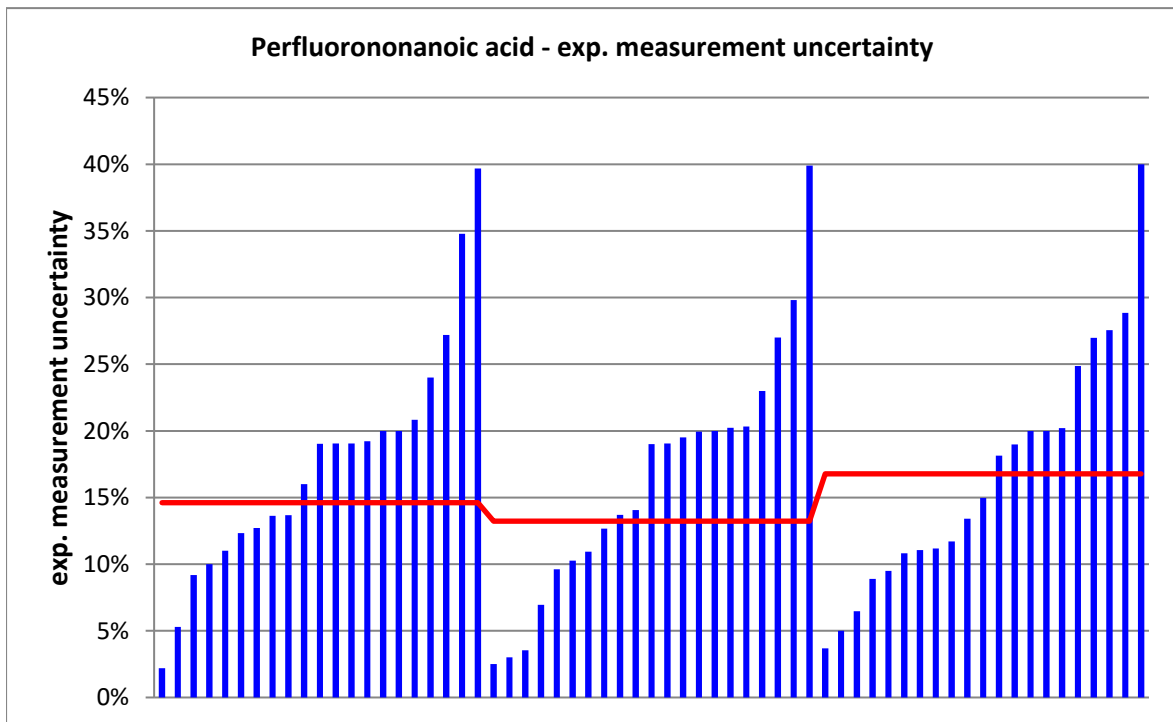
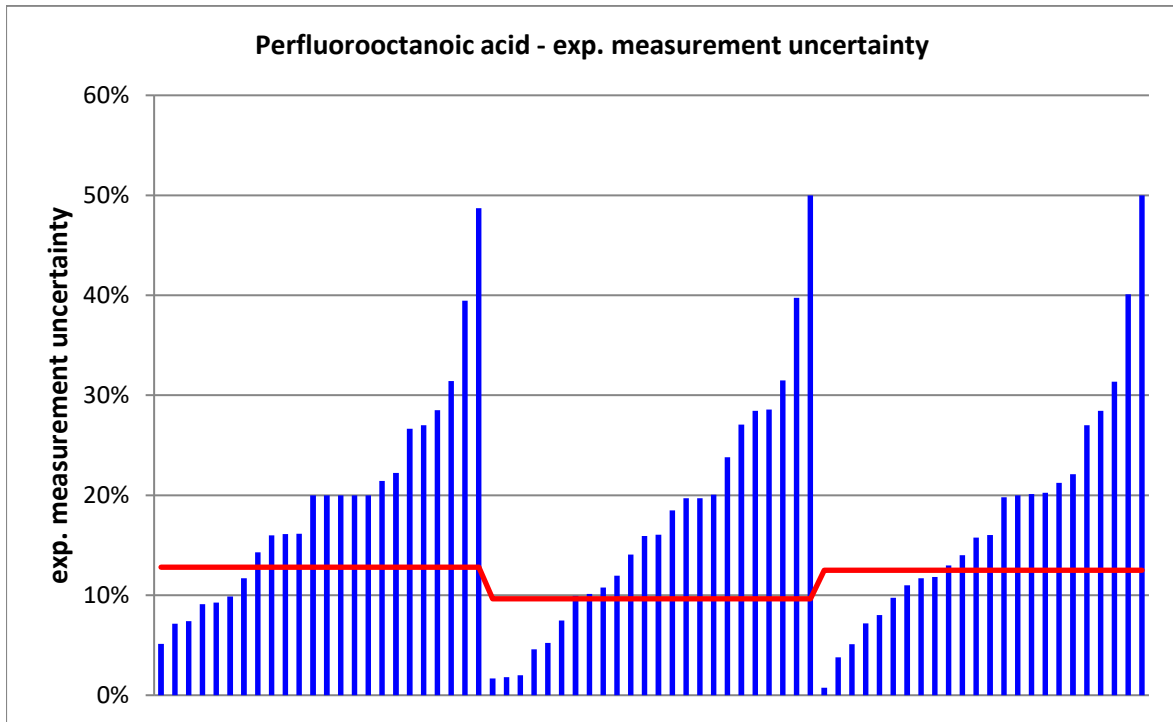


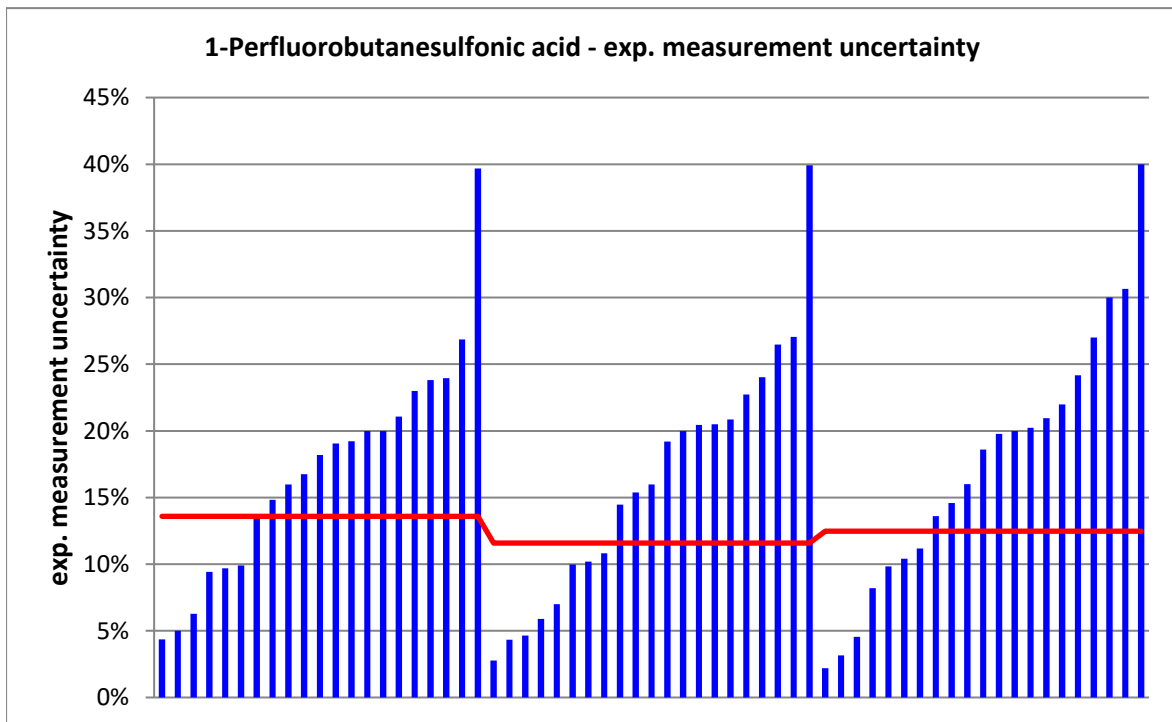
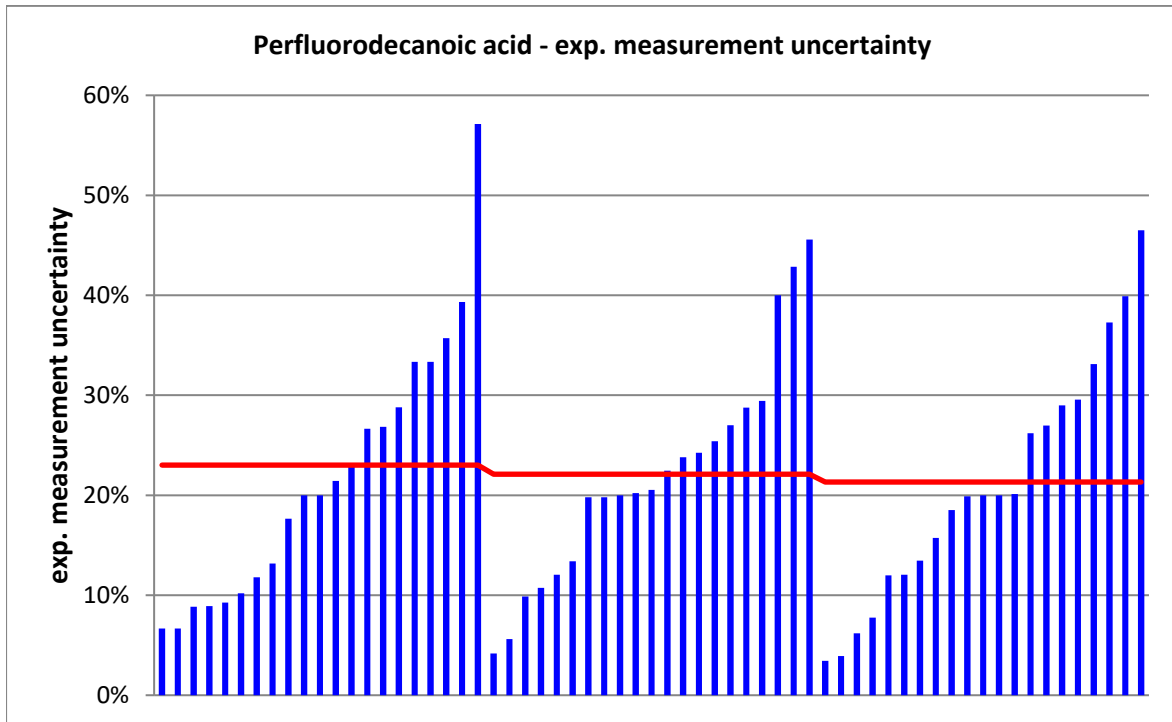


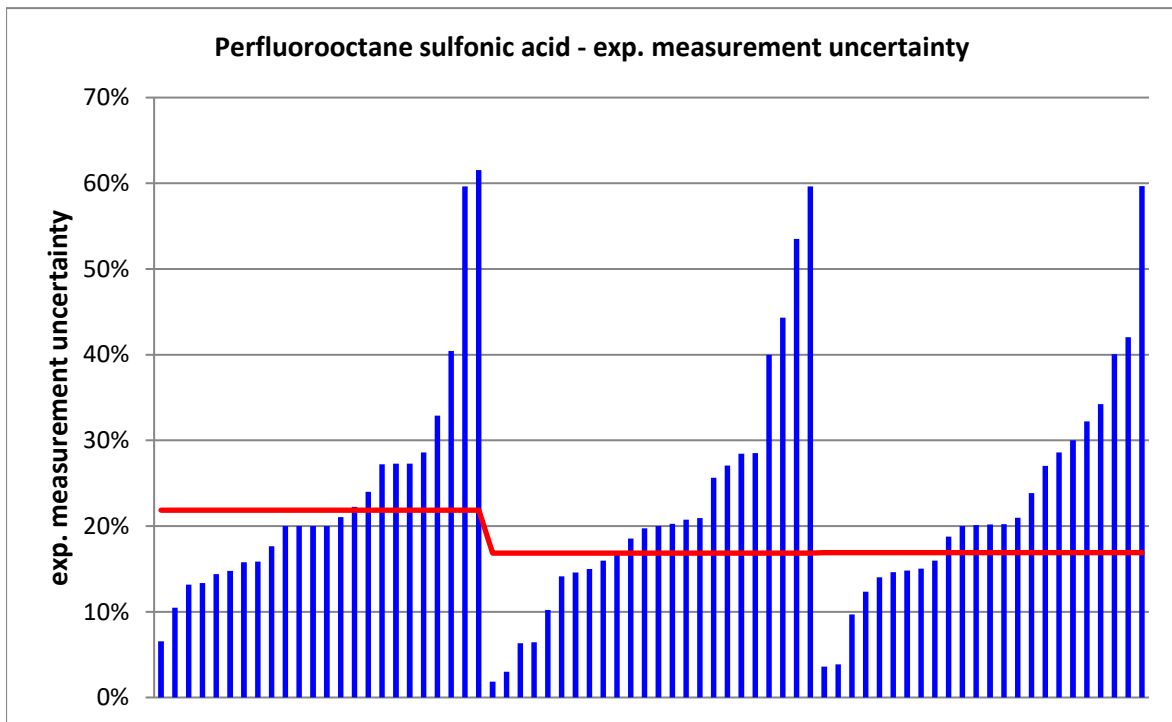
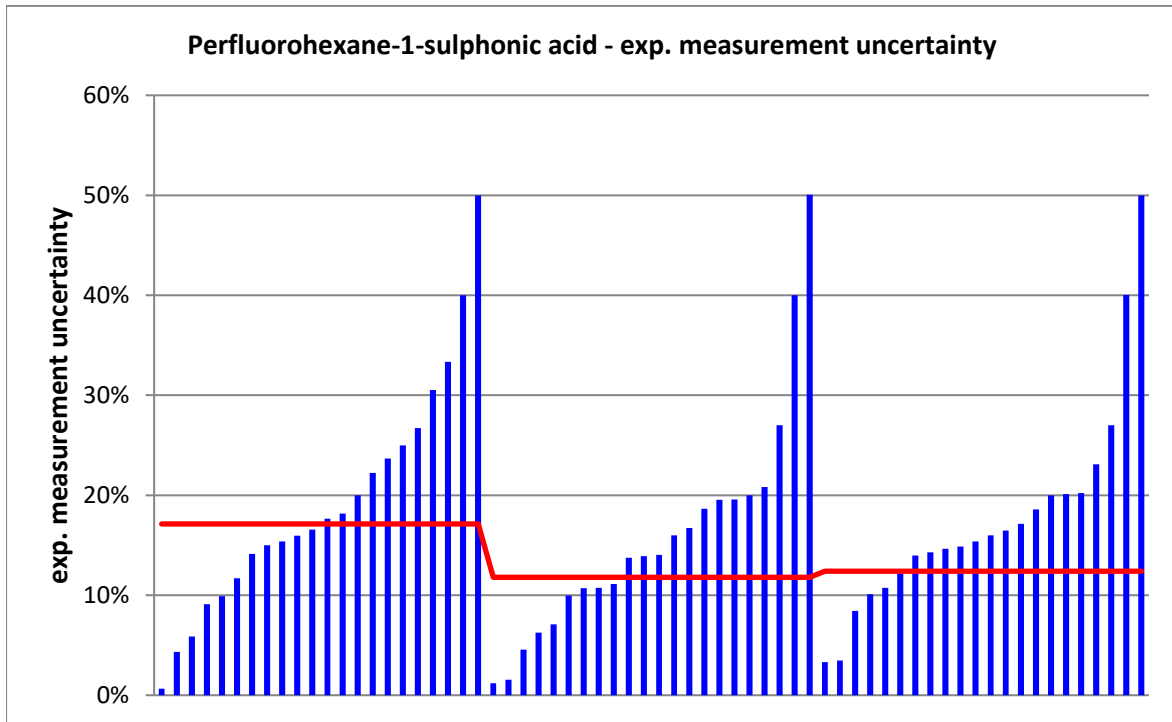
HPLC-MS/MS - extraction									
level	robust mean [µg/l]	exp. unc. of the mean [µg/l]	exp. unc. of the mean [%]	robust standard deviation [µg/l]	robust standard deviation [%]	number of results	out below	out above	out [%]
1	0,019	8E-04	4,175	0,004	22,66	46	0	1	2,174
2	0,079	0,003	3,421	0,015	18,56	46	1	0	2,174
3	0,188	0,006	3,339	0,034	18,12	46	1	2	6,522







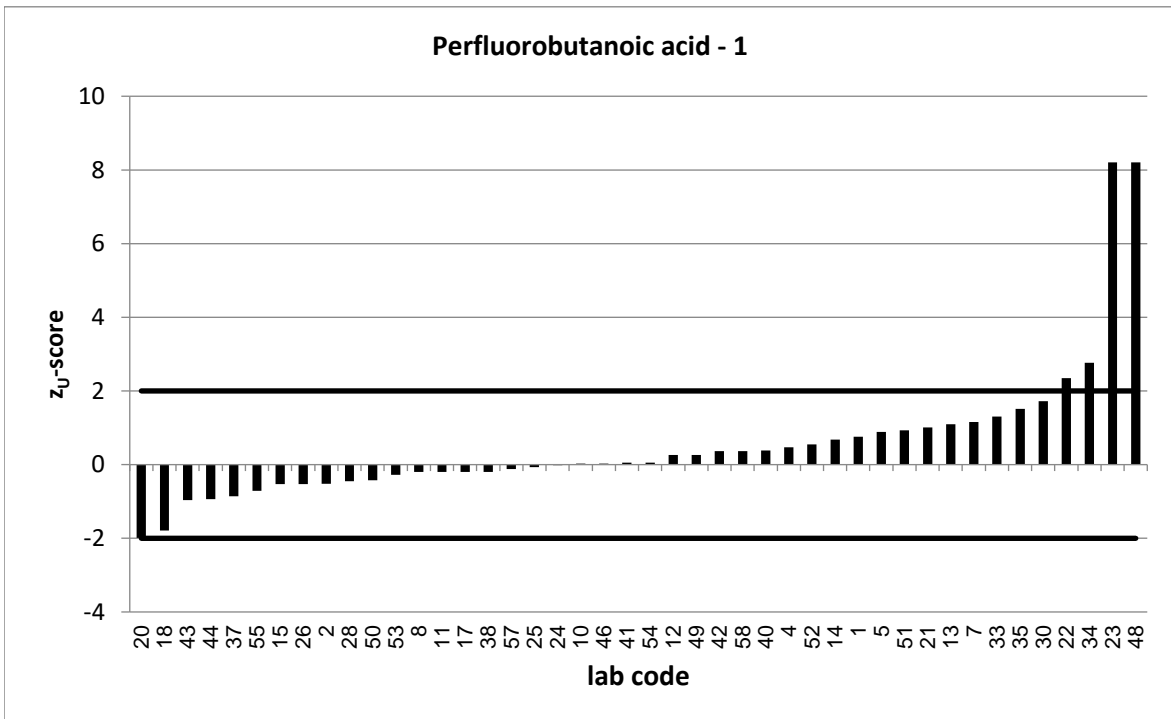
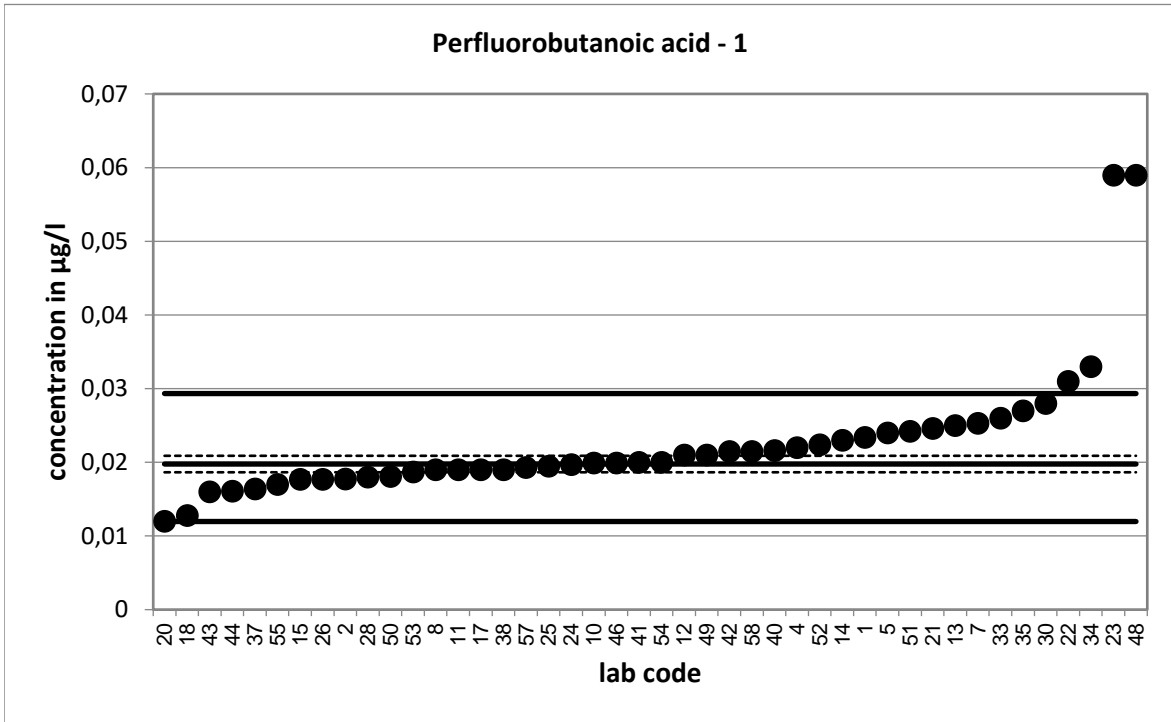


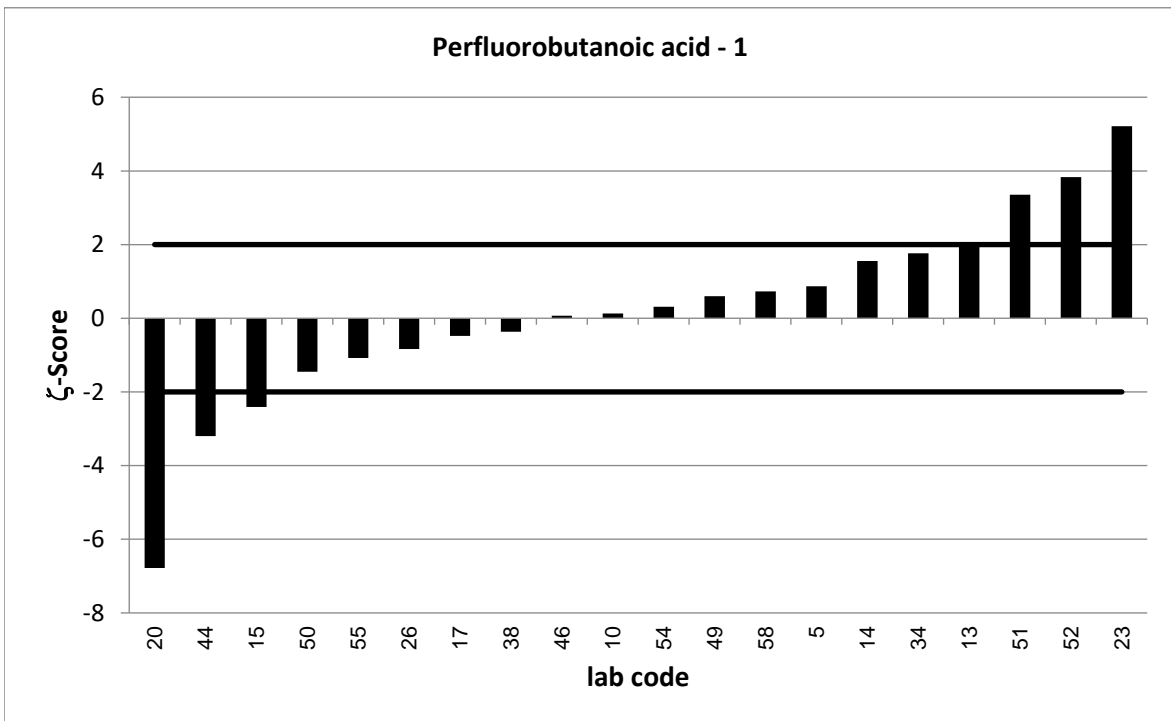
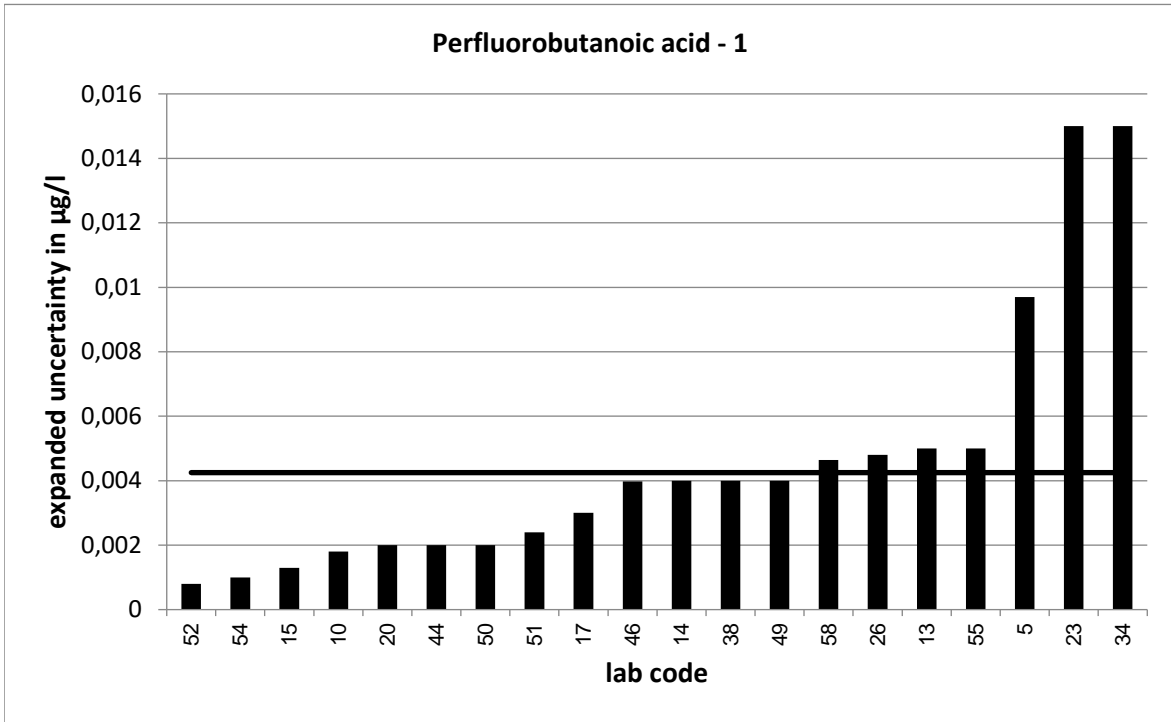


PT 6/17 - TW S4		Perfluorobutanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01976 \pm 0,00112			
upper tolerance limit [$\mu\text{g/l}$]		0,02933			
lower tolerance limit [$\mu\text{g/l}$]		0,01197			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0234			0,8	s
2	0,01774			-0,5	s
4	0,022			0,5	s
5	0,024	0,01	0,9	0,9	s
7	0,0253			1,2	s
8	0,019			-0,2	s
10	0,0199	0,002	0,1	0,0	s
11	0,019			-0,2	s
12	0,021			0,3	s
13	0,025	0,005	2,0	1,1	s
14	0,023	0,004	1,6	0,7	s
15	0,0177	0,001	-2,4	-0,5	s
17	0,019	0,003	-0,5	-0,2	s
18	0,0128			-1,8	s
20	0,012	0,002	-6,8	-2,0	s
21	0,0246			1,0	s
22	0,031			2,3	q
23	0,059	0,015	5,2	8,2	u
24	0,0197			0,0	s
25	0,0195			-0,1	s
26	0,0177	0,005	-0,8	-0,5	s
28	0,018			-0,5	s
30	0,028			1,7	s
33	0,026			1,3	s
34	0,033	0,015	1,8	2,8	q
35	0,027			1,5	s
37	0,0164			-0,9	s
38	0,019	0,004	-0,4	-0,2	s
40	0,0216			0,4	s
41	0,02			0,0	s
42	0,0215			0,4	s
43	0,016			-1,0	s
44	0,0161	0,002	-3,2	-0,9	s
46	0,0199	0,004	0,1	0,0	s
48	0,059			8,2	u
49	0,021	0,004	0,6	0,3	s
50	0,0181	0,002	-1,5	-0,4	s
51	0,0242	0,002	3,4	0,9	s
52	0,0224	8E-04	3,8	0,6	s
53	0,0187			-0,3	s
54	0,02	0,001	0,3	0,0	s
55	0,017	0,005	-1,1	-0,7	s
57	0,0193			-0,1	s
58	0,0215	0,005	0,7	0,4	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

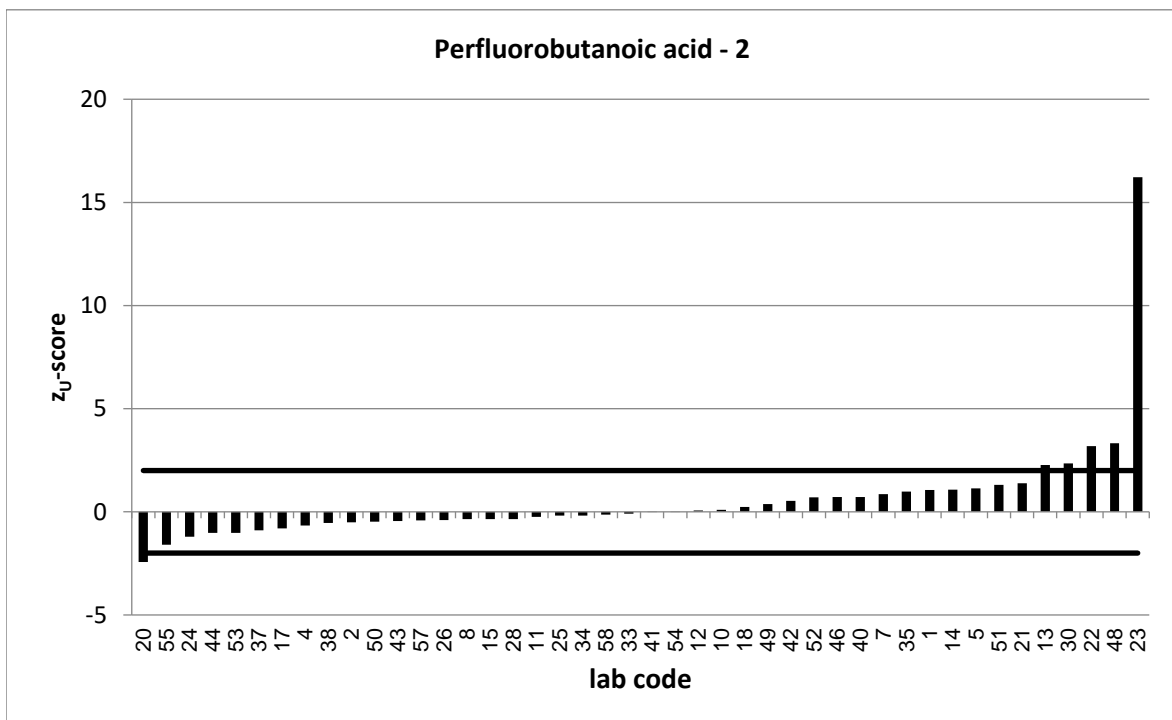
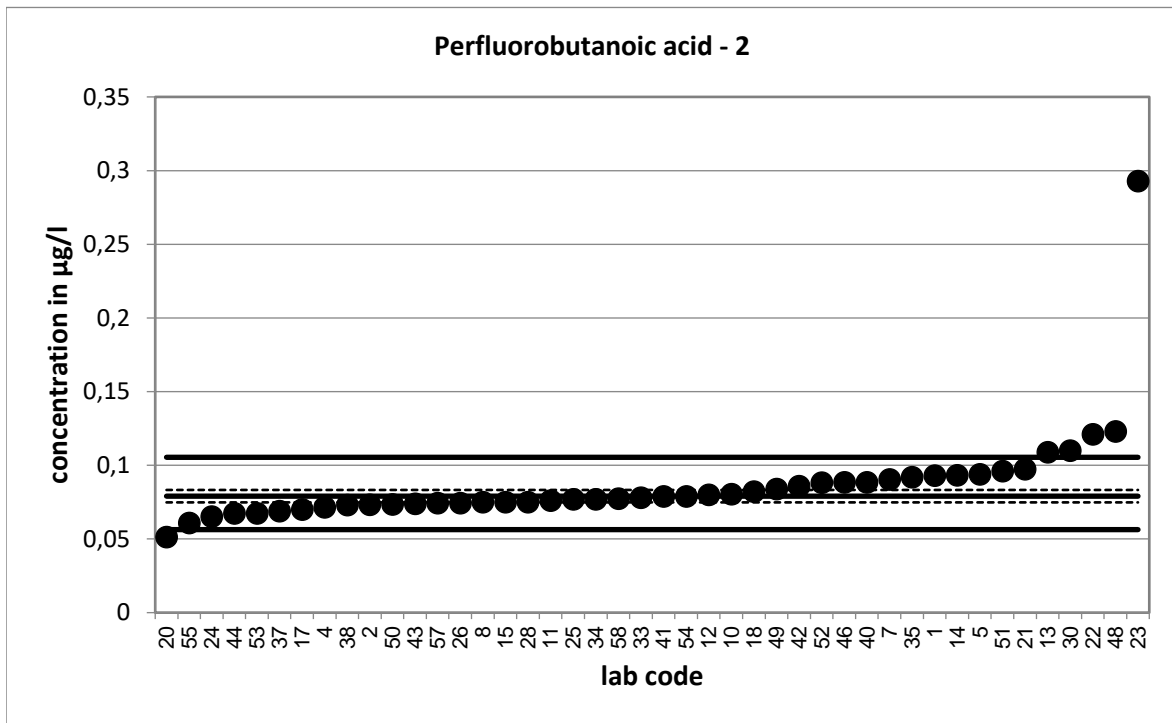


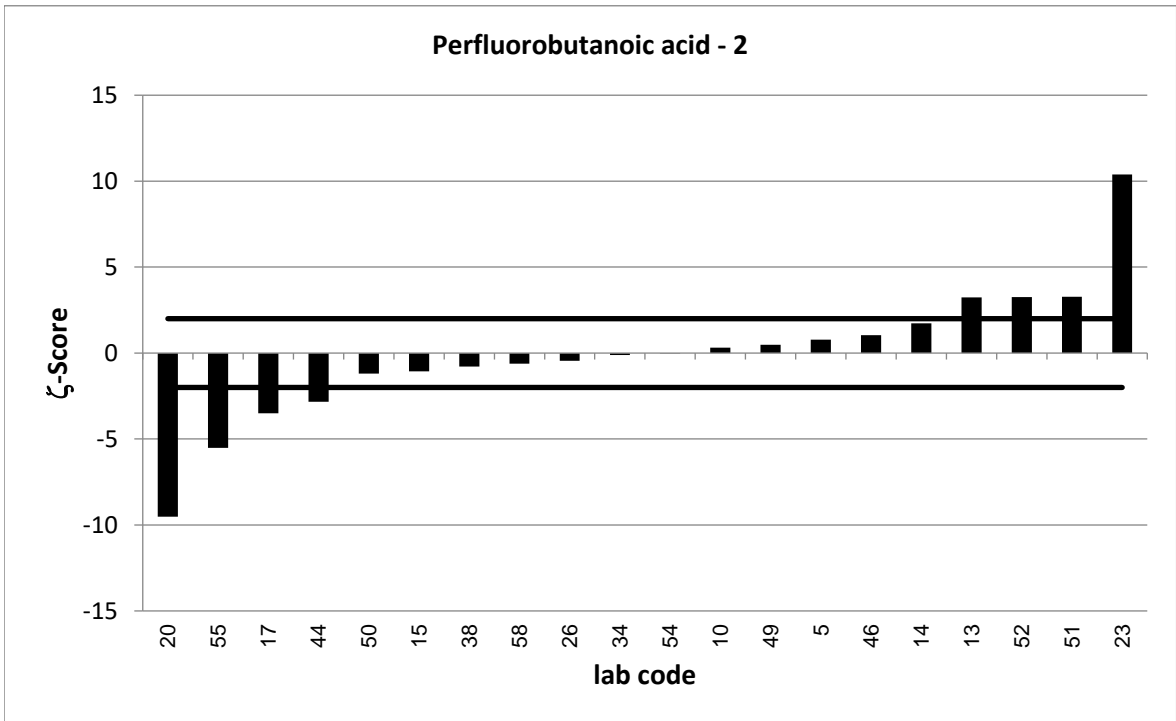
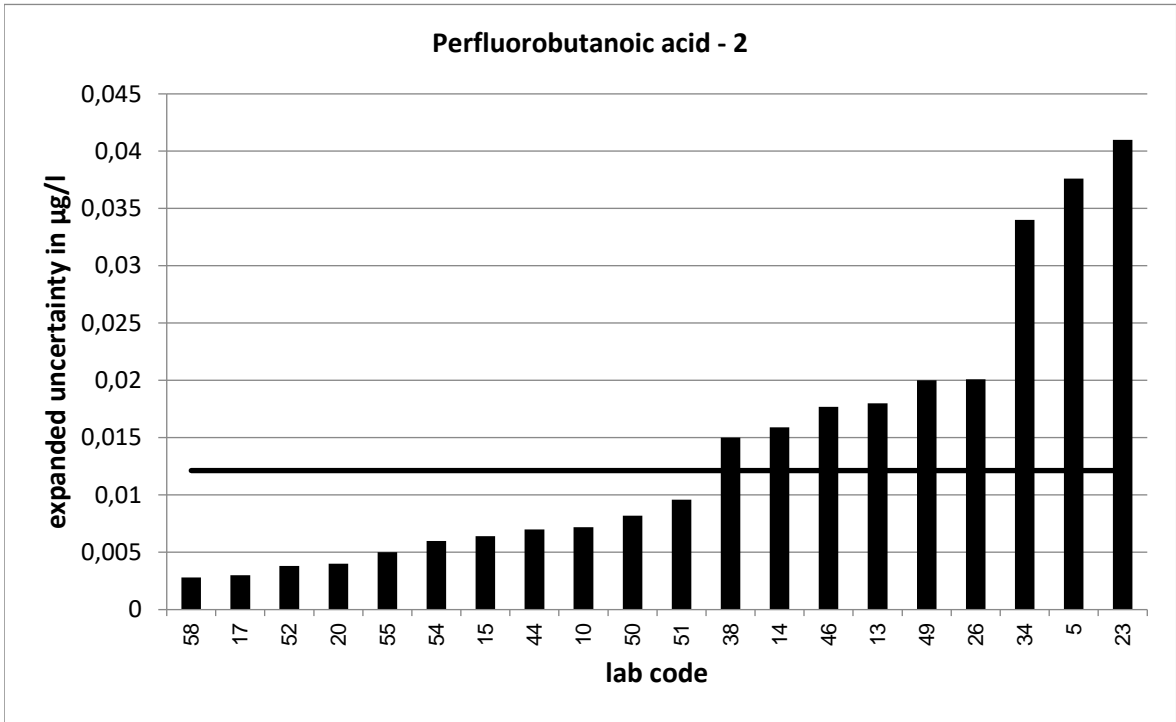


PT 6/17 - TW S4		Perfluorobutanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,07906 \pm 0,00422			
upper tolerance limit [$\mu\text{g/l}$]		0,1054			
lower tolerance limit [$\mu\text{g/l}$]		0,05635			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0931			1,1	s
2	0,07337			-0,5	s
4	0,0715			-0,7	s
5	0,094	0,038	0,8	1,1	s
7	0,0904			0,9	s
8	0,075			-0,4	s
10	0,0804	0,007	0,3	0,1	s
11	0,0762			-0,3	s
12	0,08			0,1	s
13	0,109	0,018	3,2	2,3	q
14	0,0933	0,016	1,7	1,1	s
15	0,075	0,006	-1,1	-0,4	s
17	0,07	0,003	-3,5	-0,8	s
18	0,0822			0,2	s
20	0,0514	0,004	-9,5	-2,4	q
21	0,0974			1,4	s
22	0,121			3,2	u
23	0,293	0,041	10,4	16,2	u
24	0,0653			-1,2	s
25	0,077			-0,2	s
26	0,0745	0,02	-0,4	-0,4	s
28	0,075			-0,4	s
30	0,11			2,3	q
33	0,078			-0,1	s
34	0,077	0,034	-0,1	-0,2	s
35	0,092			1,0	s
37	0,0689			-0,9	s
38	0,073	0,015	-0,8	-0,5	s
40	0,0886			0,7	s
41	0,079			0,0	s
42	0,086			0,5	s
43	0,074			-0,4	s
44	0,0675	0,007	-2,8	-1,0	s
46	0,0885	0,018	1,0	0,7	s
48	0,123			3,3	u
49	0,084	0,02	0,5	0,4	s
50	0,0736	0,008	-1,2	-0,5	s
51	0,0962	0,01	3,3	1,3	s
52	0,0883	0,004	3,3	0,7	s
53	0,0675			-1,0	s
54	0,079	0,006	0,0	0,0	s
55	0,061	0,005	-5,5	-1,6	s
57	0,0743			-0,4	s
58	0,0775	0,003	-0,6	-0,1	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

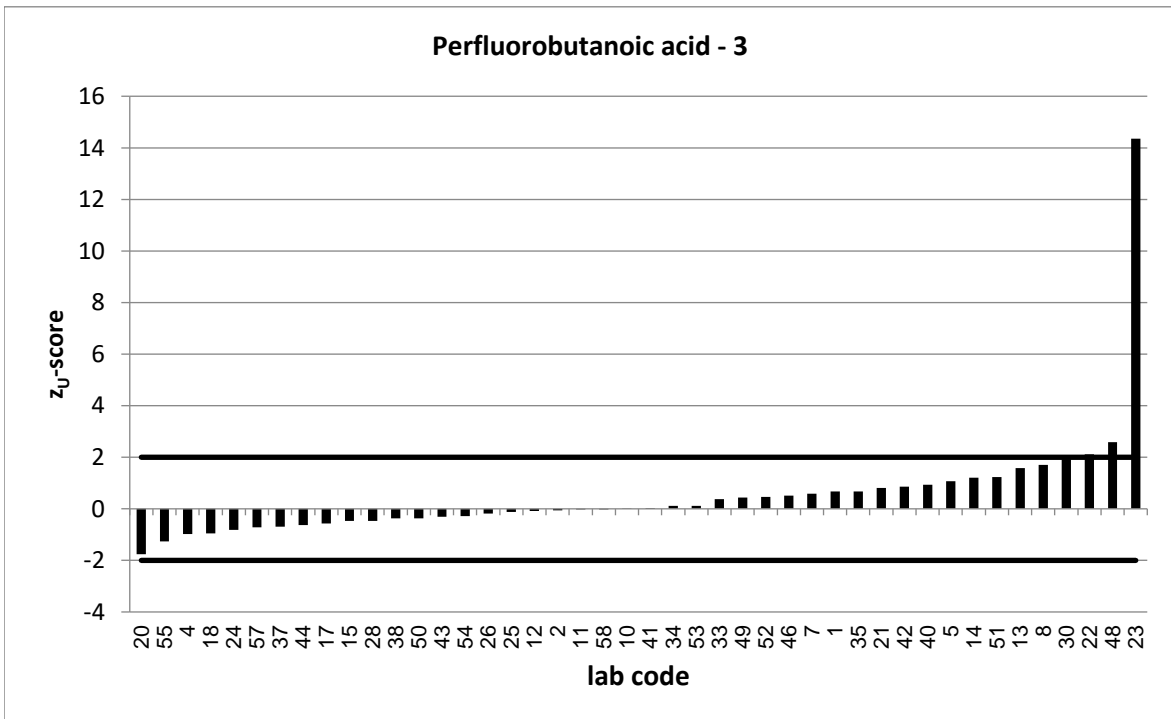
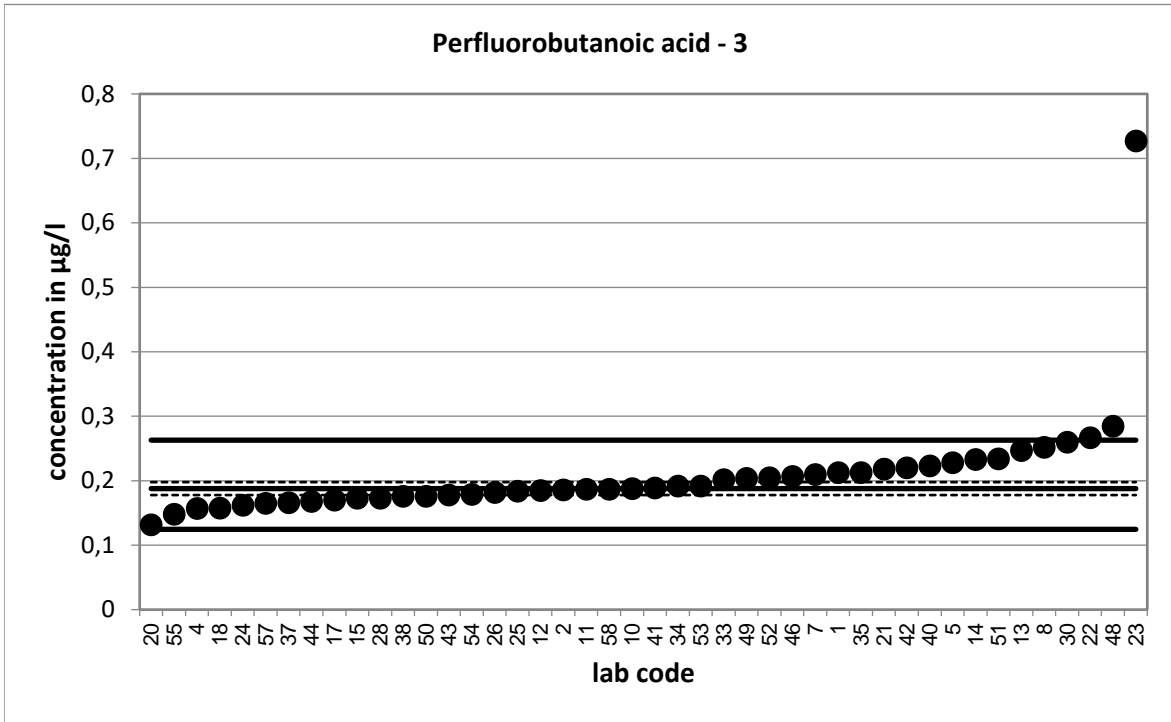


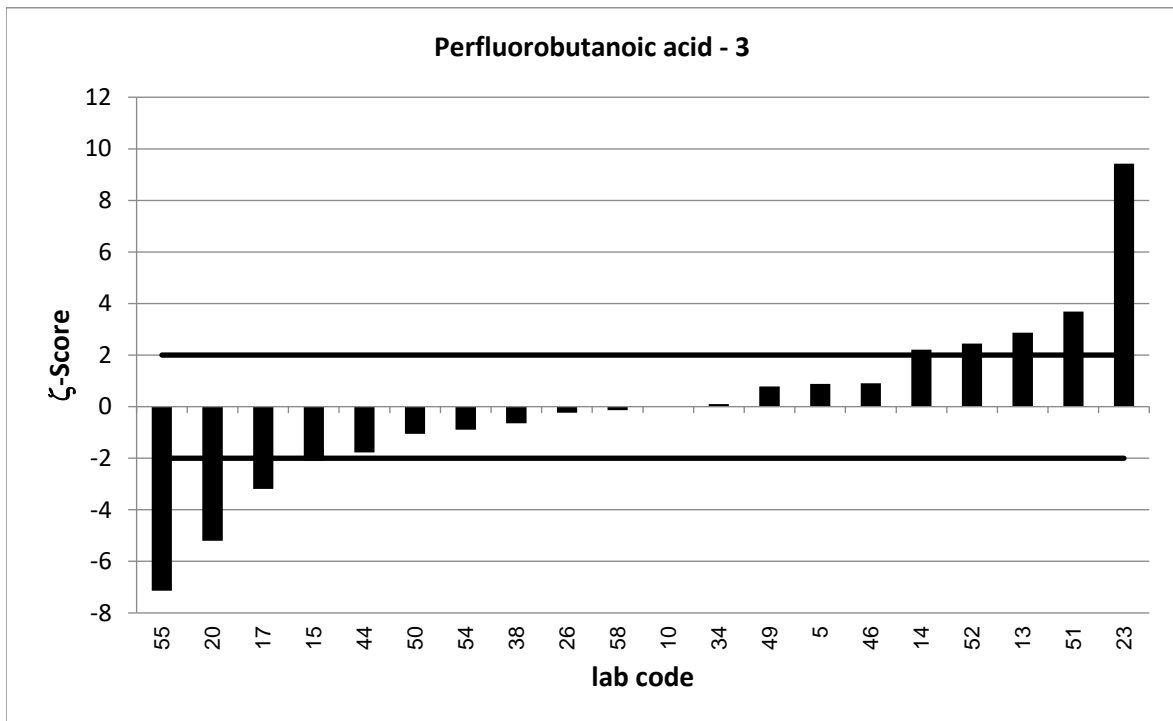
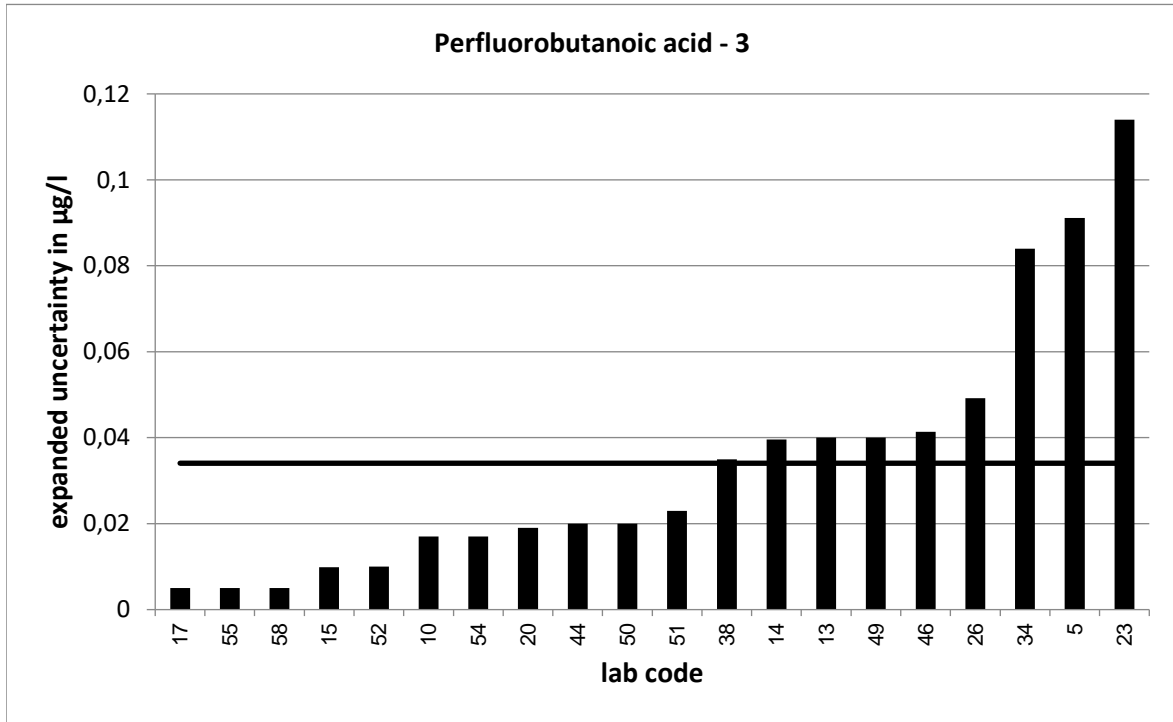


PT 6/17 - TW S4		Perfluorobutanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1878 \pm 0,01			
upper tolerance limit [$\mu\text{g/l}$]		0,2629			
lower tolerance limit [$\mu\text{g/l}$]		0,1246			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,213			0,7	s
2	0,186			-0,1	s
4	0,157			-1,0	s
5	0,228	0,091	0,9	1,1	s
7	0,21			0,6	s
8	0,252			1,7	s
10	0,188	0,017	0,0	0,0	s
11	0,187			0,0	s
12	0,185			-0,1	s
13	0,247	0,04	2,9	1,6	s
14	0,233	0,04	2,2	1,2	s
15	0,173	0,01	-2,1	-0,5	s
17	0,17	0,005	-3,2	-0,6	s
18	0,1575			-1,0	s
20	0,132	0,019	-5,2	-1,8	s
21	0,218			0,8	s
22	0,267			2,1	q
23	0,727	0,114	9,4	14,3	u
24	0,162			-0,8	s
25	0,184			-0,1	s
26	0,182	0,049	-0,2	-0,2	s
28	0,173			-0,5	s
30	0,26			1,9	s
33	0,202			0,4	s
34	0,192	0,084	0,1	0,1	s
35	0,213			0,7	s
37	0,166			-0,7	s
38	0,176	0,035	-0,6	-0,4	s
40	0,223			0,9	s
41	0,189			0,0	s
42	0,22			0,9	s
43	0,178			-0,3	s
44	0,168	0,02	-1,8	-0,6	s
46	0,207	0,041	0,9	0,5	s
48	0,285			2,6	q
49	0,204	0,04	0,8	0,4	s
50	0,176	0,02	-1,1	-0,4	s
51	0,234	0,023	3,7	1,2	s
52	0,205	0,01	2,4	0,5	s
53	0,192			0,1	s
54	0,179	0,017	-0,9	-0,3	s
55	0,148	0,005	-7,1	-1,3	s
57	0,165			-0,7	s
58	0,187	0,005	-0,1	0,0	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

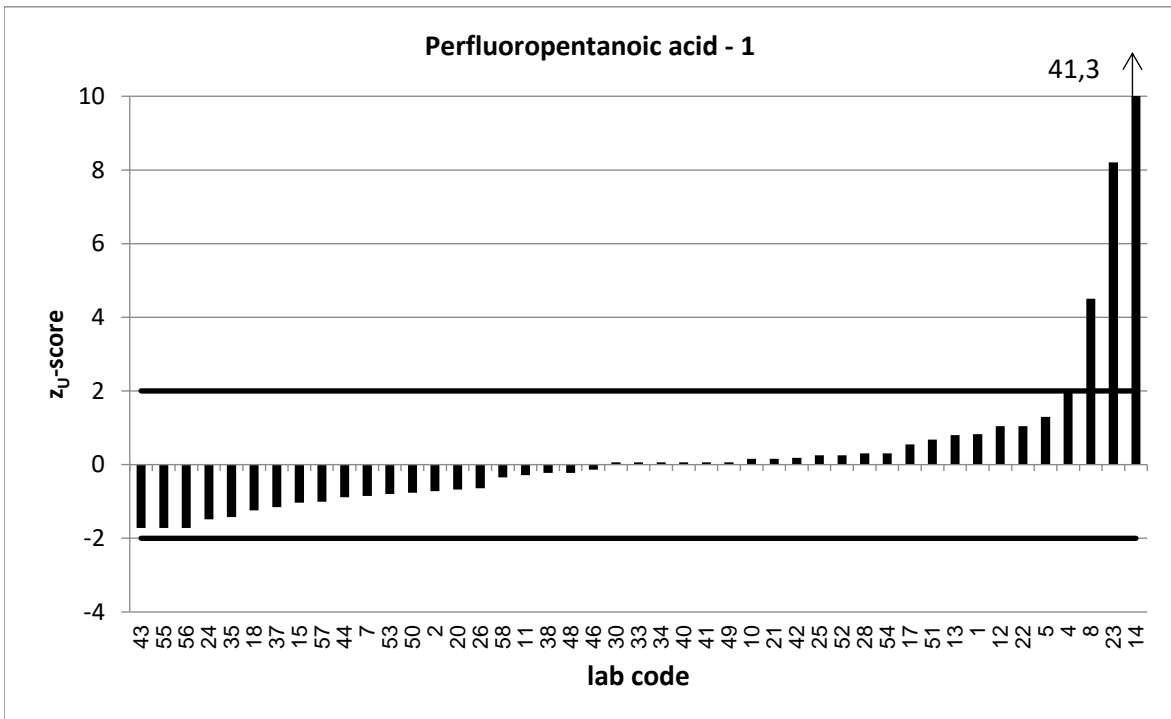
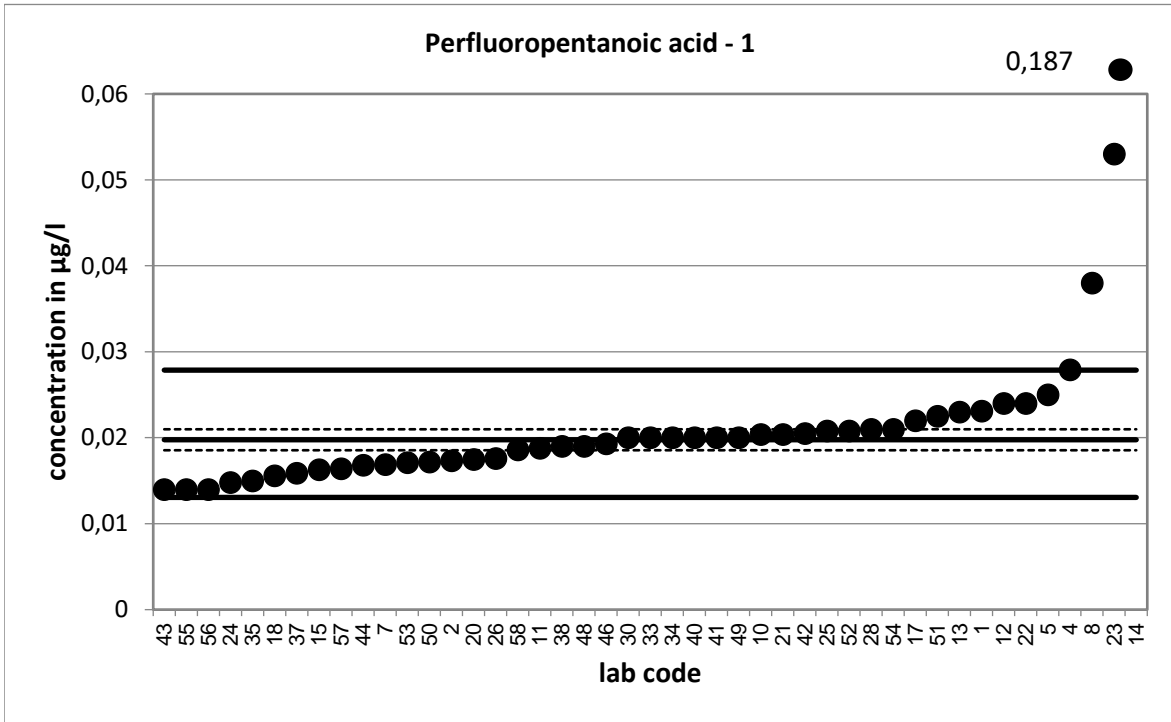


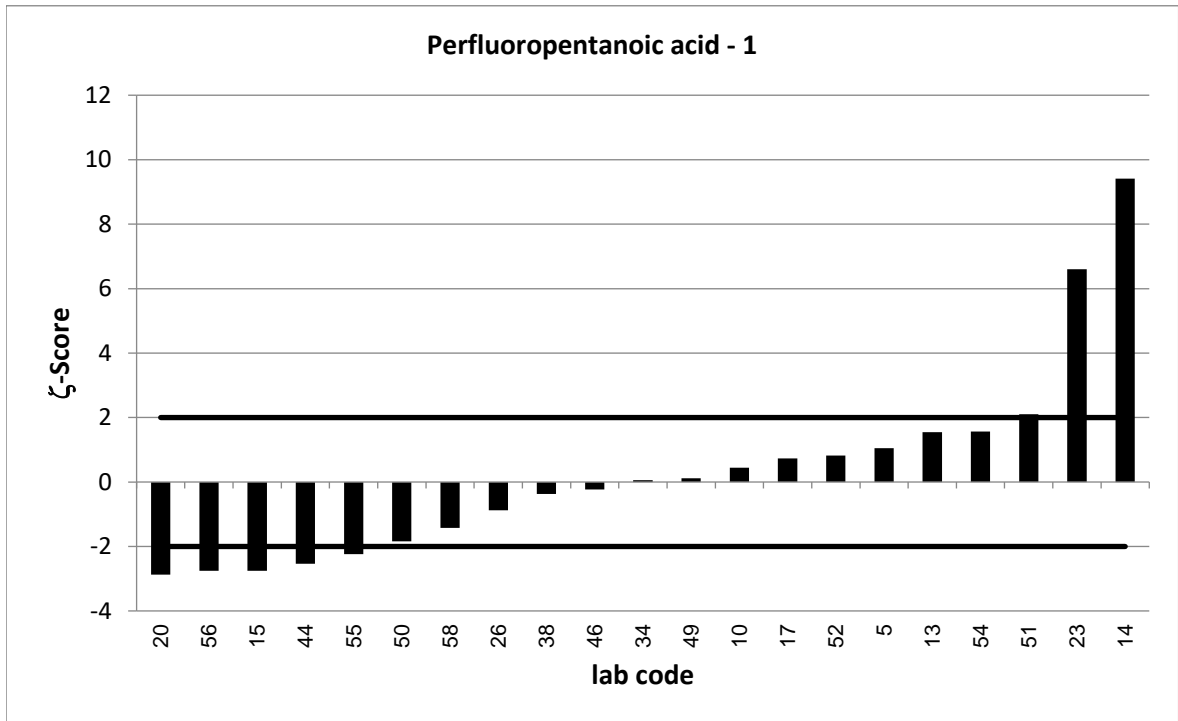
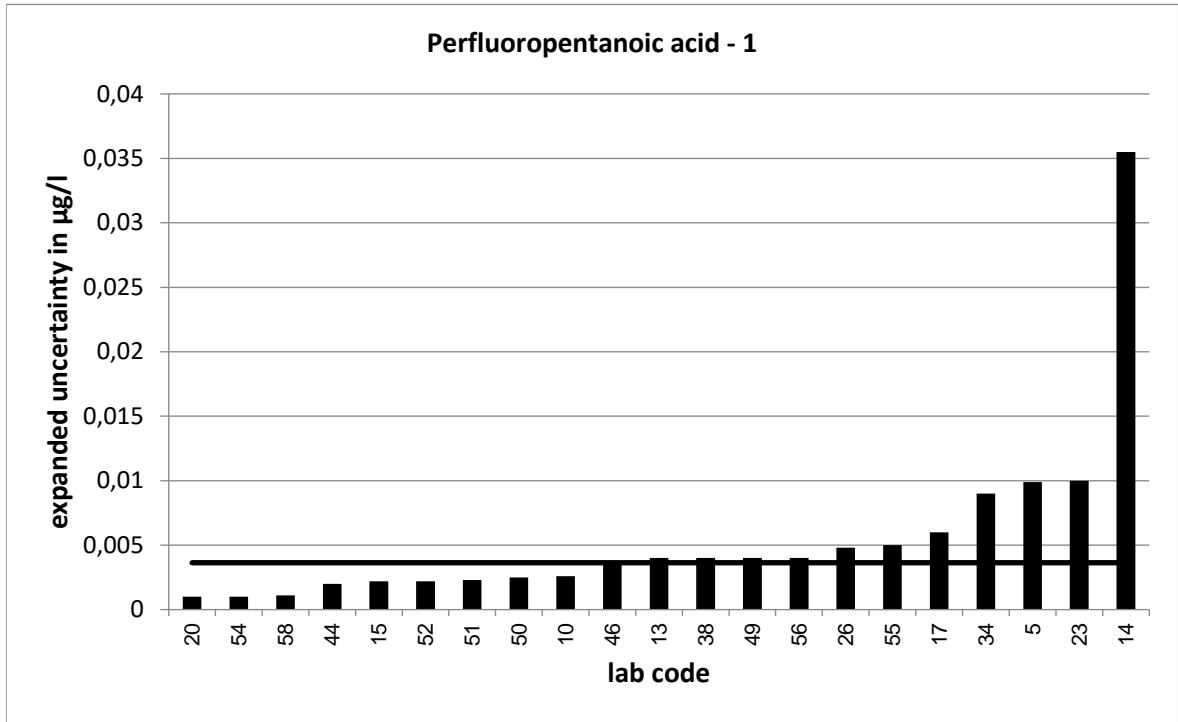


PT 6/17 - TW S4		Perfluoropentanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01976 \pm 0,00122			
upper tolerance limit [$\mu\text{g/l}$]		0,02787			
lower tolerance limit [$\mu\text{g/l}$]		0,01306			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0231			0,8	s
2	0,01734			-0,7	s
4	0,0279			2,0	s
5	0,025	0,01	1,0	1,3	s
7	0,0169			-0,9	s
8	0,038			4,5	u
10	0,0204	0,003	0,4	0,2	s
11	0,0188			-0,3	s
12	0,024			1,0	s
13	0,023	0,004	1,5	0,8	s
14	0,187	0,036	9,4	41,3	u
15	0,0163	0,002	-2,8	-1,0	s
17	0,022	0,006	0,7	0,6	s
18	0,0156			-1,2	s
20	0,0175	0,001	-2,9	-0,7	s
21	0,0204			0,2	s
22	0,024			1,0	s
23	0,053	0,01	6,6	8,2	u
24	0,0148			-1,5	s
25	0,0208			0,3	s
26	0,0176	0,005	-0,9	-0,6	s
28	0,021			0,3	s
30	0,02			0,1	s
33	0,02			0,1	s
34	0,02	0,009	0,1	0,1	s
35	0,015			-1,4	s
37	0,0159			-1,2	s
38	0,019	0,004	-0,4	-0,2	s
40	0,02			0,1	s
41	0,02			0,1	s
42	0,0205			0,2	s
43	0,014			-1,7	s
44	0,0168	0,002	-2,5	-0,9	s
46	0,0193	0,004	-0,2	-0,1	s
48	0,019			-0,2	s
49	0,02	0,004	0,1	0,1	s
50	0,0172	0,003	-1,8	-0,8	s
51	0,0225	0,002	2,1	0,7	s
52	0,0208	0,002	0,8	0,3	s
53	0,0171			-0,8	s
54	0,021	0,001	1,6	0,3	s
55	0,014	0,005	-2,2	-1,7	s
56	0,014	0,004	-2,8	-1,7	s
57	0,0164			-1,0	s
58	0,0186	0,001	-1,4	-0,3	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

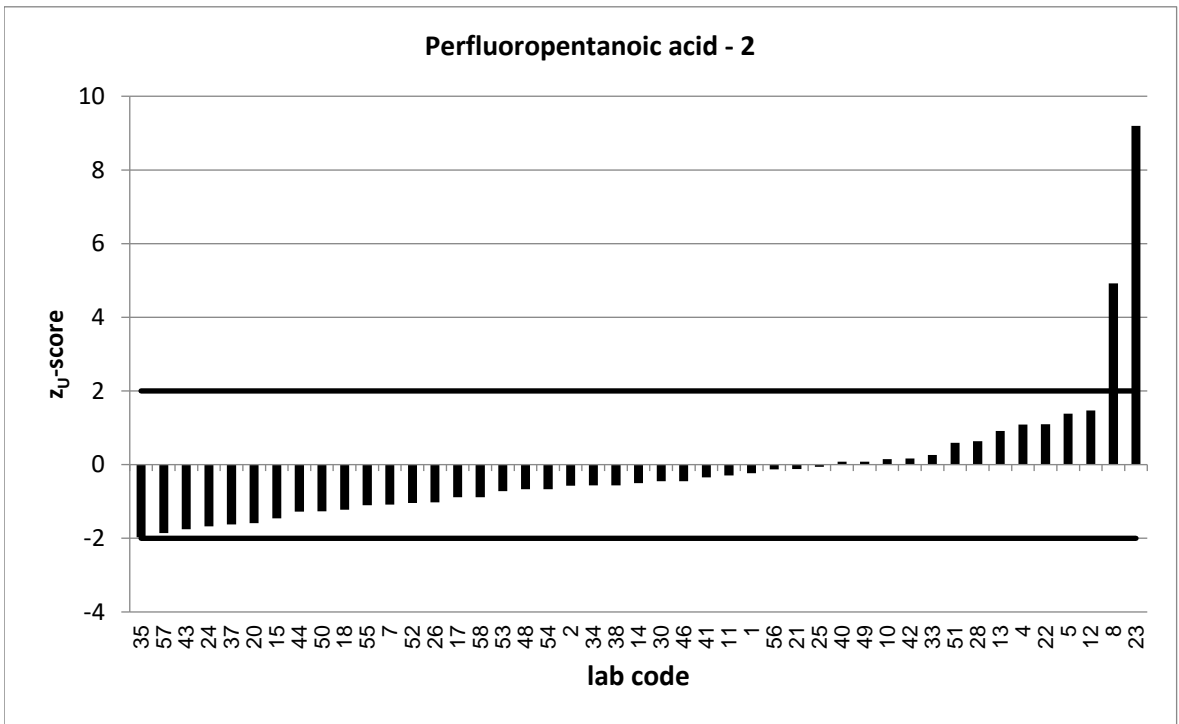
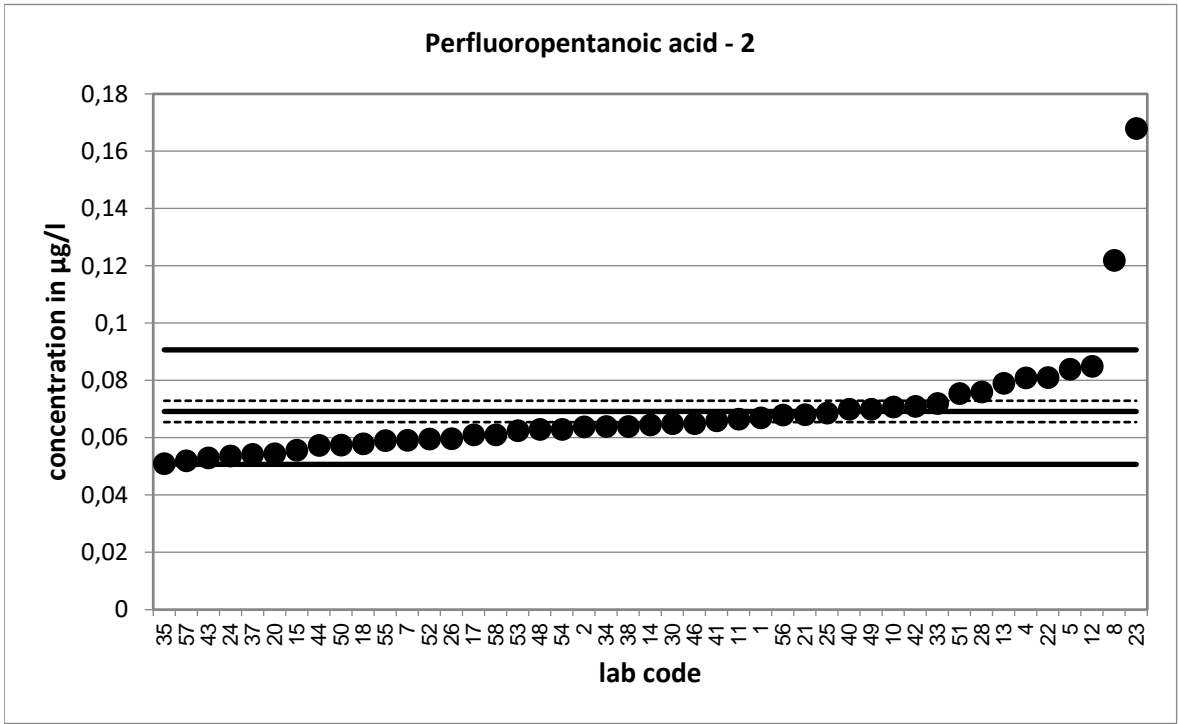


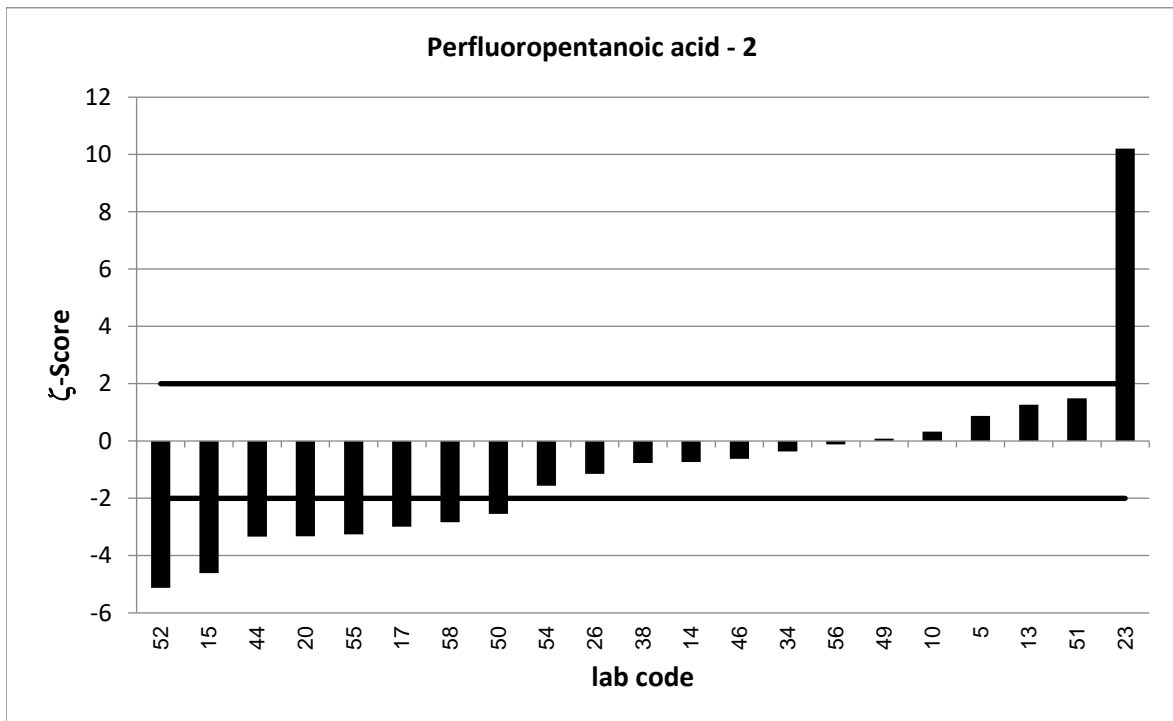
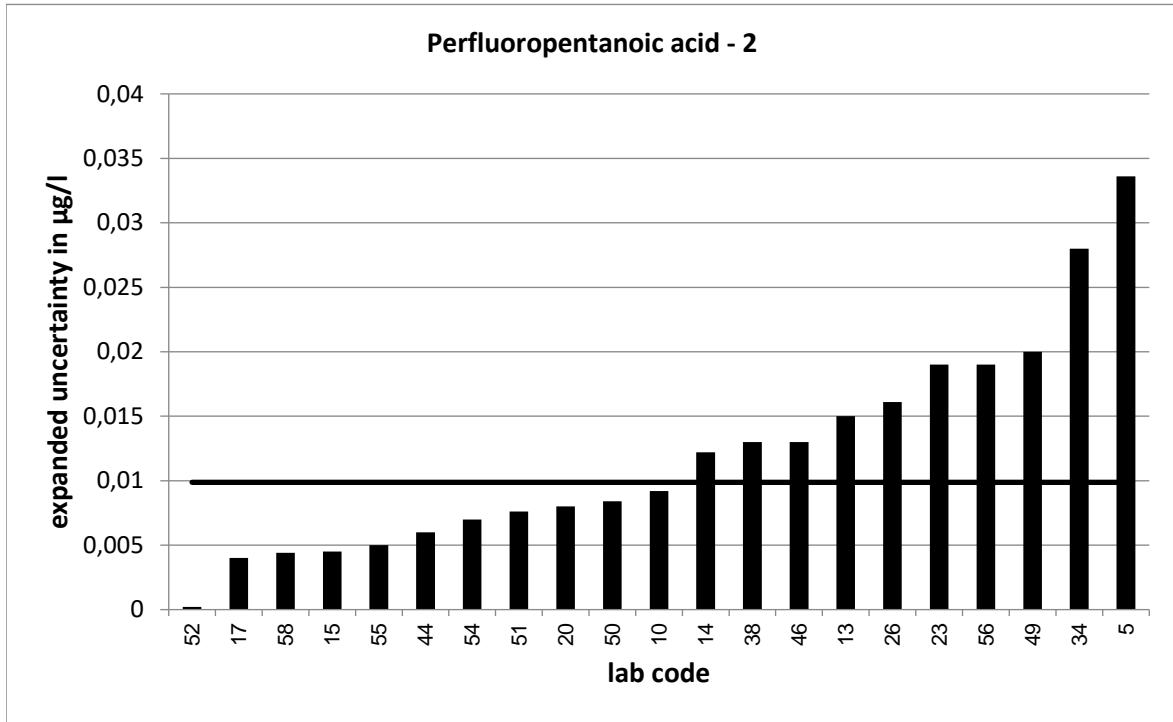


PT 6/17 - TW S4		Perfluoropentanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,06918 \pm 0,00373			
upper tolerance limit [$\mu\text{g/l}$]		0,09066			
lower tolerance limit [$\mu\text{g/l}$]		0,05071			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,067			-0,2	s
2	0,06389			-0,6	s
4	0,0809			1,1	s
5	0,084	0,034	0,9	1,4	s
7	0,0592			-1,1	s
8	0,122			4,9	u
10	0,0708	0,009	0,3	0,2	s
11	0,0665			-0,3	s
12	0,085			1,5	s
13	0,079	0,015	1,3	0,9	s
14	0,0645	0,012	-0,7	-0,5	s
15	0,0557	0,005	-4,6	-1,5	s
17	0,061	0,004	-3,0	-0,9	s
18	0,0579			-1,2	s
20	0,0545	0,008	-3,3	-1,6	s
21	0,0681			-0,1	s
22	0,081			1,1	s
23	0,168	0,019	10,2	9,2	u
24	0,0537			-1,7	s
25	0,0686			-0,1	s
26	0,0597	0,016	-1,1	-1,0	s
28	0,076			0,6	s
30	0,065			-0,5	s
33	0,072			0,3	s
34	0,064	0,028	-0,4	-0,6	s
35	0,051			-2,0	s
37	0,0542			-1,6	s
38	0,064	0,013	-0,8	-0,6	s
40	0,07			0,1	s
41	0,066			-0,3	s
42	0,071			0,2	s
43	0,053			-1,8	s
44	0,0574	0,006	-3,3	-1,3	s
46	0,065	0,013	-0,6	-0,5	s
48	0,063			-0,7	s
49	0,07	0,02	0,1	0,1	s
50	0,0575	0,008	-2,5	-1,3	s
51	0,0755	0,008	1,5	0,6	s
52	0,0596	2E-04	-5,1	-1,0	s
53	0,0625			-0,7	s
54	0,063	0,007	-1,6	-0,7	s
55	0,059	0,005	-3,3	-1,1	s
56	0,068	0,019	-0,1	-0,1	s
57	0,052			-1,9	s
58	0,061	0,004	-2,8	-0,9	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

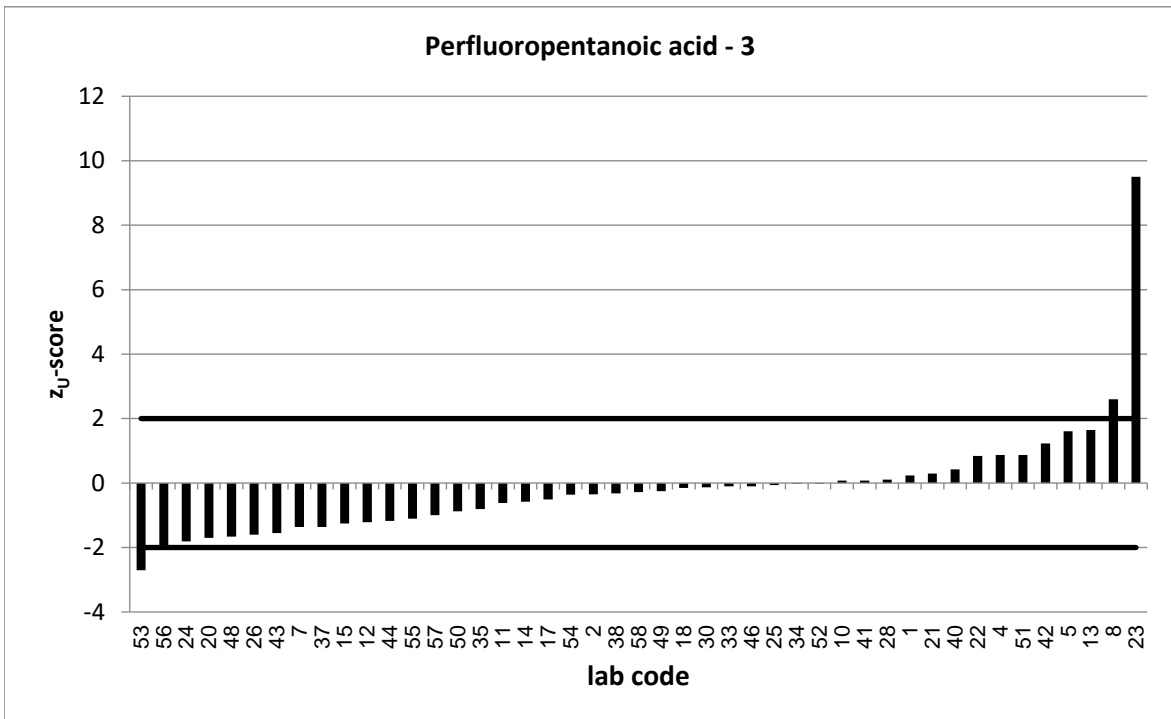
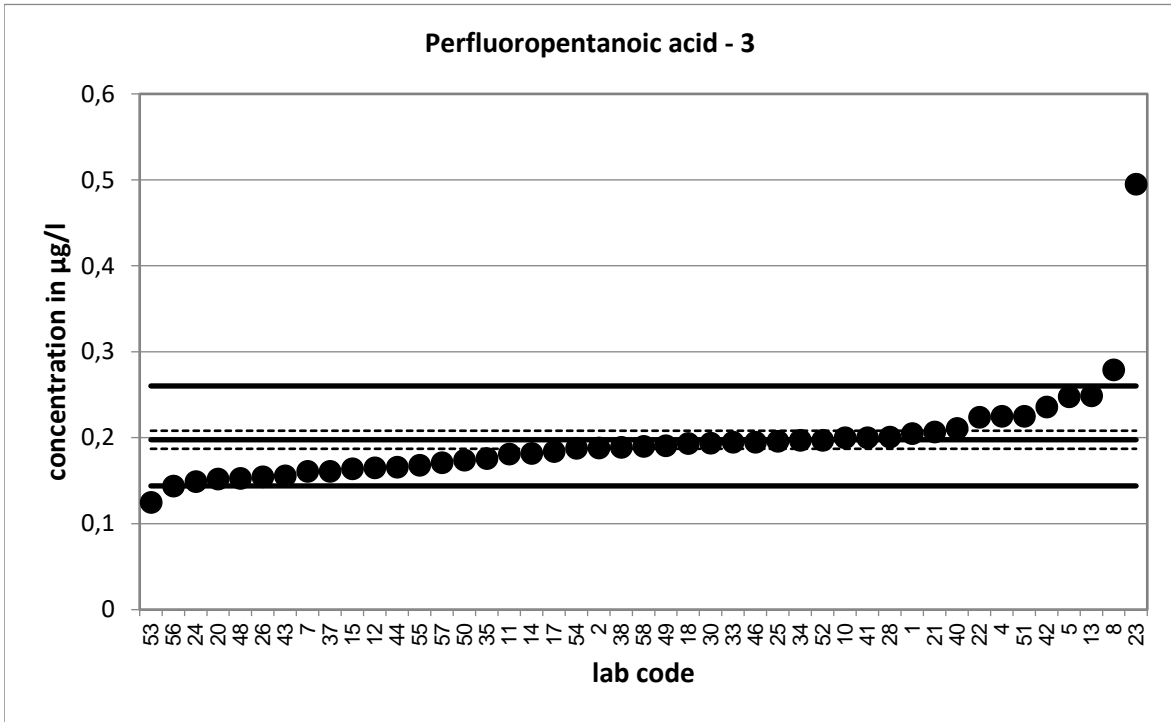


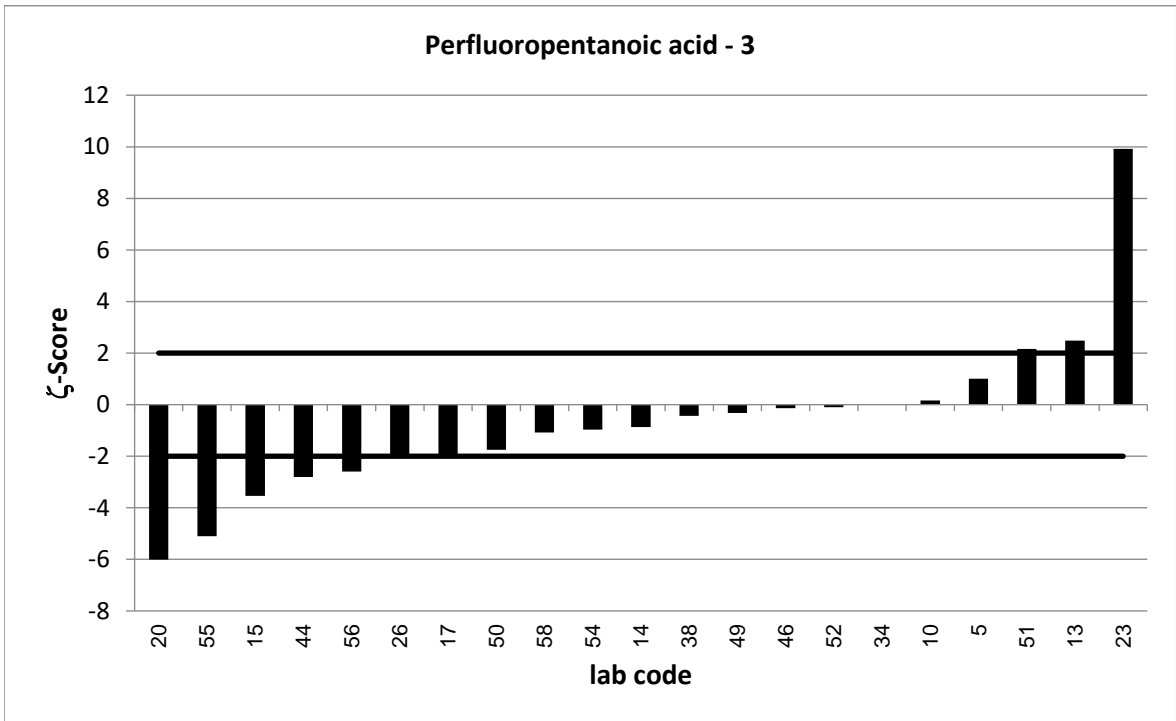
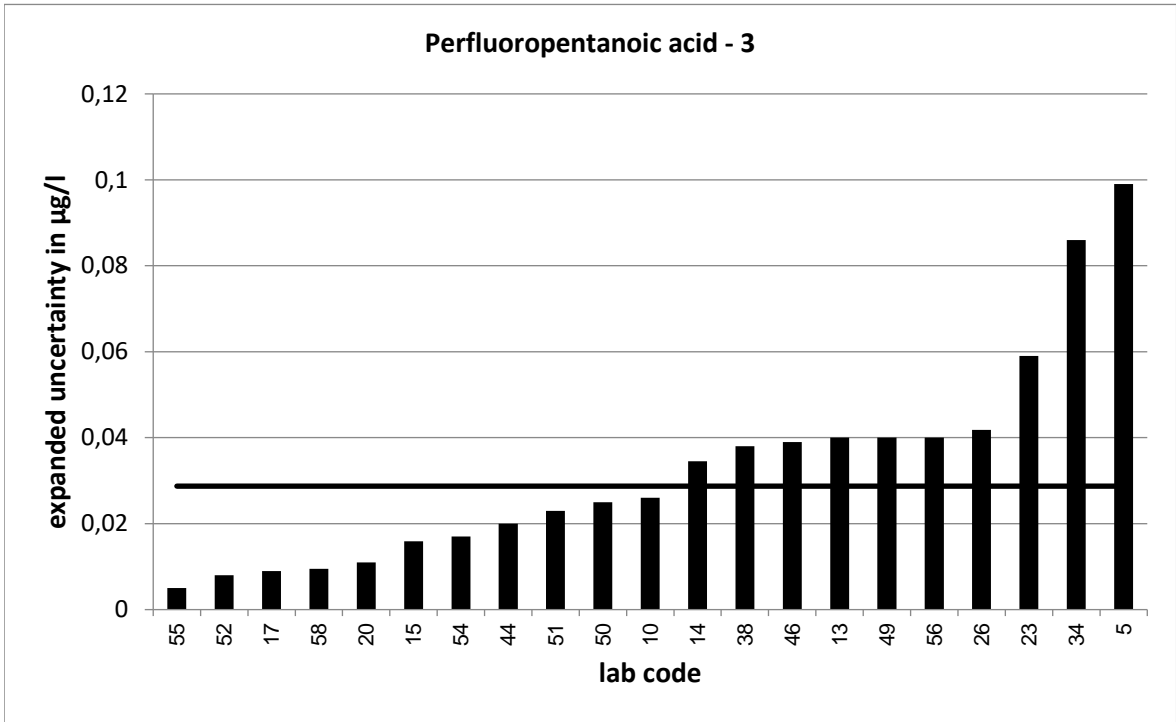


PT 6/17 - TW S4		Perfluoropentanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1976 \pm 0,0105			
upper tolerance limit [$\mu\text{g/l}$]		0,2602			
lower tolerance limit [$\mu\text{g/l}$]		0,1439			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,205			0,2	s
2	0,1883			-0,3	s
4	0,225			0,9	s
5	0,248	0,099	1,0	1,6	s
7	0,161			-1,4	s
8	0,279			2,6	q
10	0,2	0,026	0,2	0,1	s
11	0,181			-0,6	s
12	0,165			-1,2	s
13	0,249	0,04	2,5	1,6	s
14	0,182	0,035	-0,9	-0,6	s
15	0,164	0,016	-3,5	-1,3	s
17	0,184	0,009	-2,0	-0,5	s
18	0,1935			-0,2	s
20	0,152	0,011	-6,0	-1,7	s
21	0,207			0,3	s
22	0,224			0,8	s
23	0,495	0,059	9,9	9,5	u
24	0,149			-1,8	s
25	0,196			-0,1	s
26	0,1547	0,042	-2,0	-1,6	s
28	0,201			0,1	s
30	0,194			-0,1	s
33	0,195			-0,1	s
34	0,197	0,086	0,0	0,0	s
35	0,176			-0,8	s
37	0,161			-1,4	s
38	0,189	0,038	-0,4	-0,3	s
40	0,211			0,4	s
41	0,2			0,1	s
42	0,236			1,2	s
43	0,156			-1,6	s
44	0,166	0,02	-2,8	-1,2	s
46	0,195	0,039	-0,1	-0,1	s
48	0,153			-1,7	s
49	0,191	0,04	-0,3	-0,2	s
50	0,174	0,025	-1,7	-0,9	s
51	0,225	0,023	2,2	0,9	s
52	0,197	0,008	-0,1	0,0	s
53	0,125			-2,7	q
54	0,188	0,017	-1,0	-0,4	s
55	0,168	0,005	-5,1	-1,1	s
56	0,144	0,04	-2,6	-2,0	s
57	0,171			-1,0	s
58	0,19	0,01	-1,1	-0,3	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

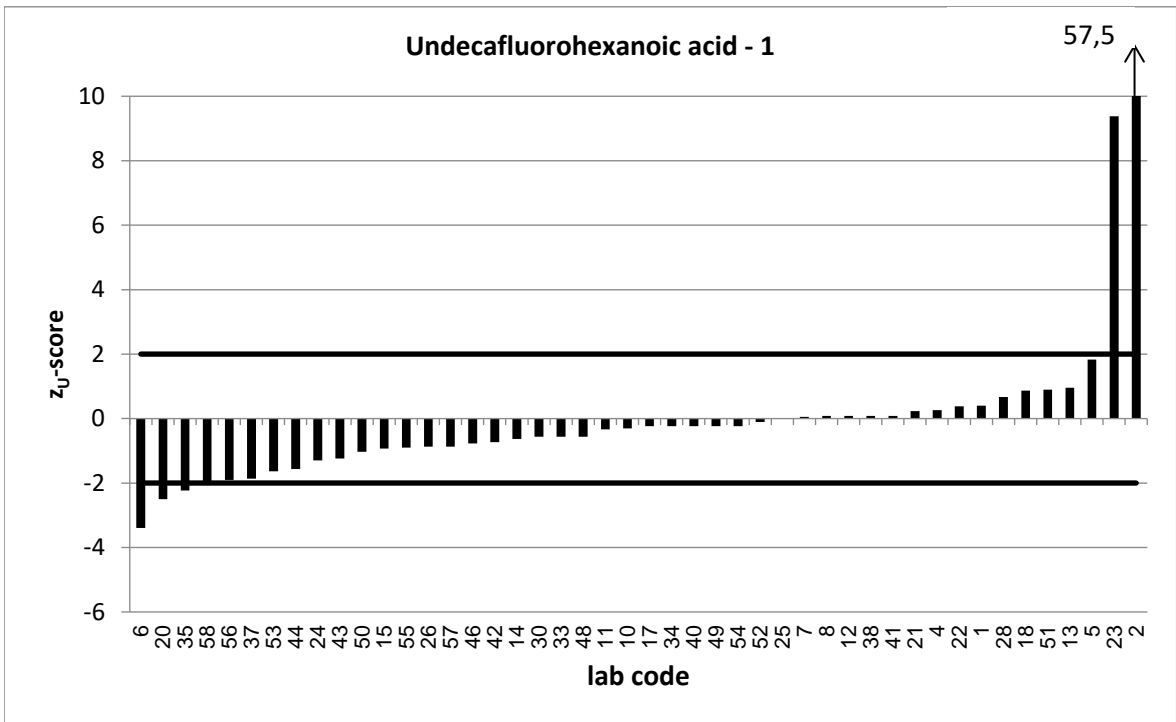
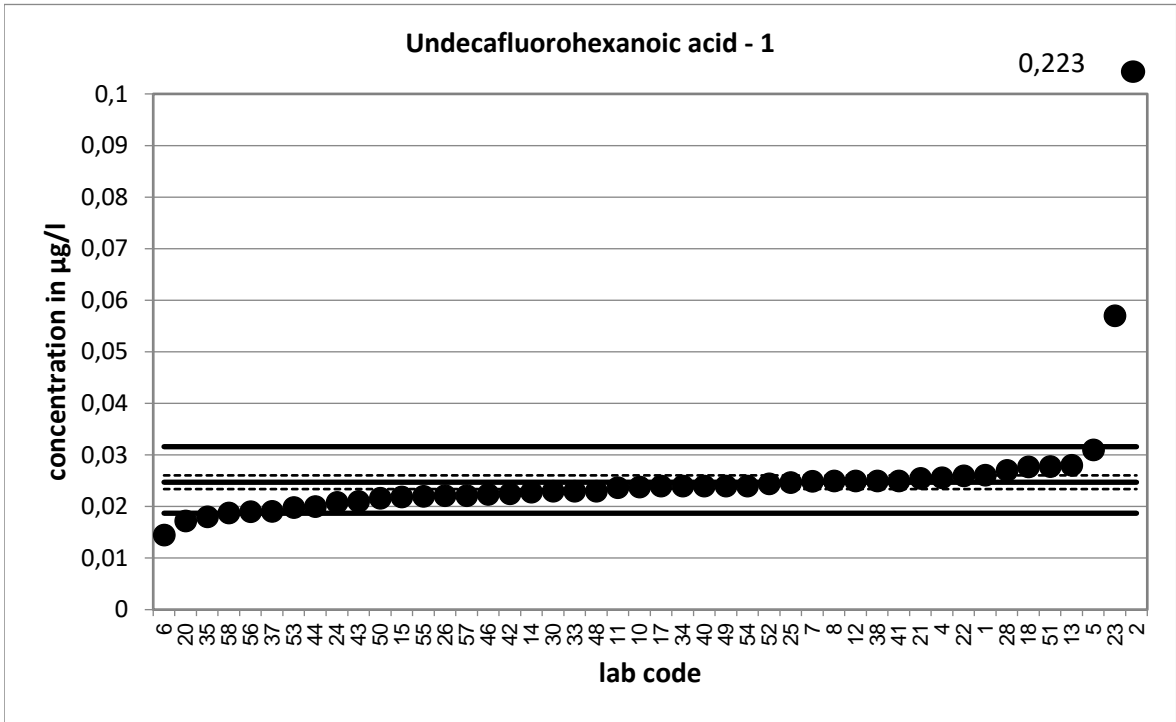


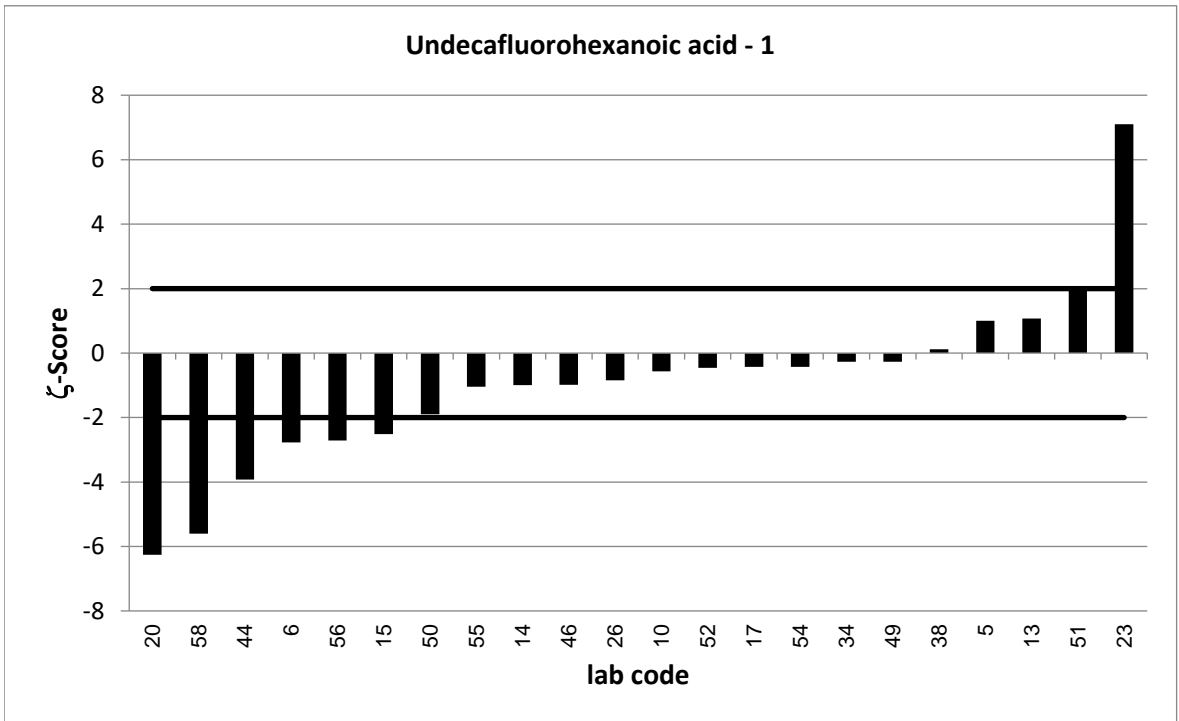
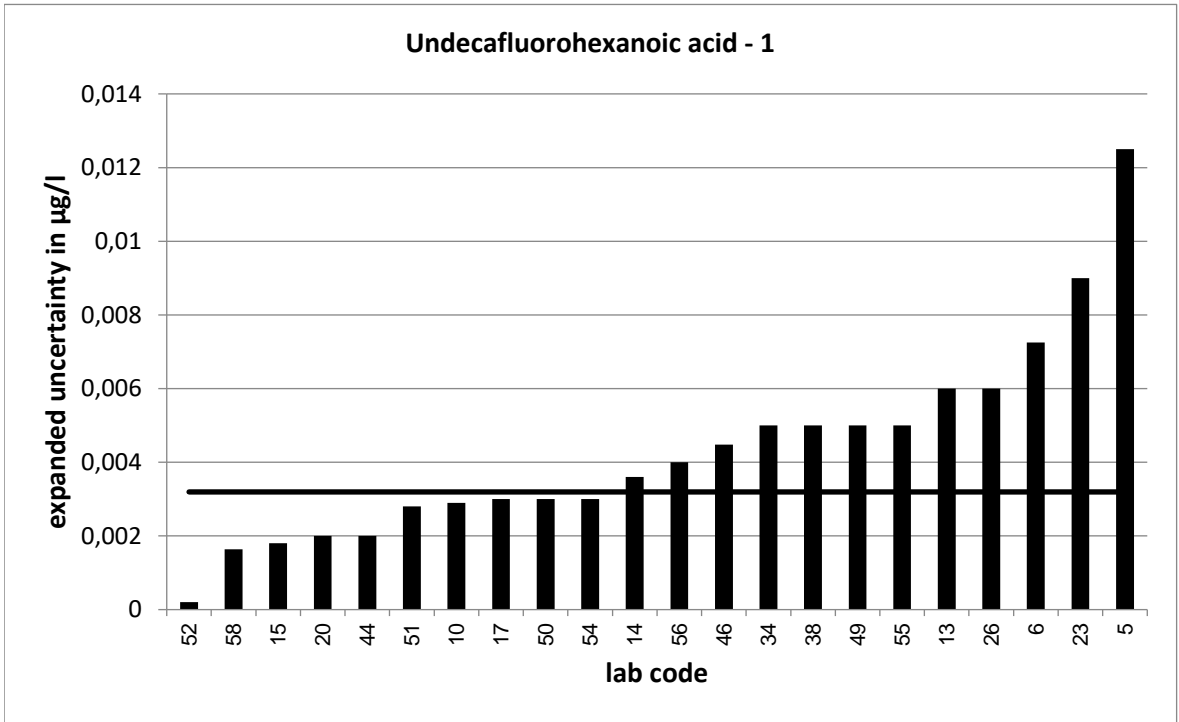


PT 6/17 - TW S4		Undecafluorohexanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,02471 \pm 0,00133			
upper tolerance limit [$\mu\text{g/l}$]		0,0316			
lower tolerance limit [$\mu\text{g/l}$]		0,0187			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0261			0,4	s
2	0,2229			57,5	u
4	0,0256			0,3	s
5	0,031	0,013	1,0	1,8	s
6	0,0145	0,007	-2,8	-3,4	u
7	0,0249			0,1	s
8	0,025			0,1	s
10	0,0238	0,003	-0,6	-0,3	s
11	0,0237			-0,3	s
12	0,025			0,1	s
13	0,028	0,006	1,1	1,0	s
14	0,0228	0,004	-1,0	-0,6	s
15	0,0219	0,002	-2,5	-0,9	s
17	0,024	0,003	-0,4	-0,2	s
18	0,0277			0,9	s
20	0,0172	0,002	-6,3	-2,5	q
21	0,0255			0,2	s
22	0,026			0,4	s
23	0,057	0,009	7,1	9,4	u
24	0,0208			-1,3	s
25	0,0247			0,0	s
26	0,0221	0,006	-0,8	-0,9	s
28	0,027			0,7	s
30	0,023			-0,6	s
33	0,023			-0,6	s
34	0,024	0,005	-0,3	-0,2	s
35	0,018			-2,2	q
37	0,0191			-1,9	s
38	0,025	0,005	0,1	0,1	s
40	0,024			-0,2	s
41	0,025			0,1	s
42	0,0225			-0,7	s
43	0,021			-1,2	s
44	0,02	0,002	-3,9	-1,6	s
46	0,0224	0,004	-1,0	-0,8	s
48	0,023			-0,6	s
49	0,024	0,005	-0,3	-0,2	s
50	0,0216	0,003	-1,9	-1,0	s
51	0,0278	0,003	2,0	0,9	s
52	0,0244	2E-04	-0,5	-0,1	s
53	0,0198			-1,6	s
54	0,024	0,003	-0,4	-0,2	s
55	0,022	0,005	-1,0	-0,9	s
56	0,019	0,004	-2,7	-1,9	s
57	0,0221			-0,9	s
58	0,0188	0,002	-5,6	-2,0	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

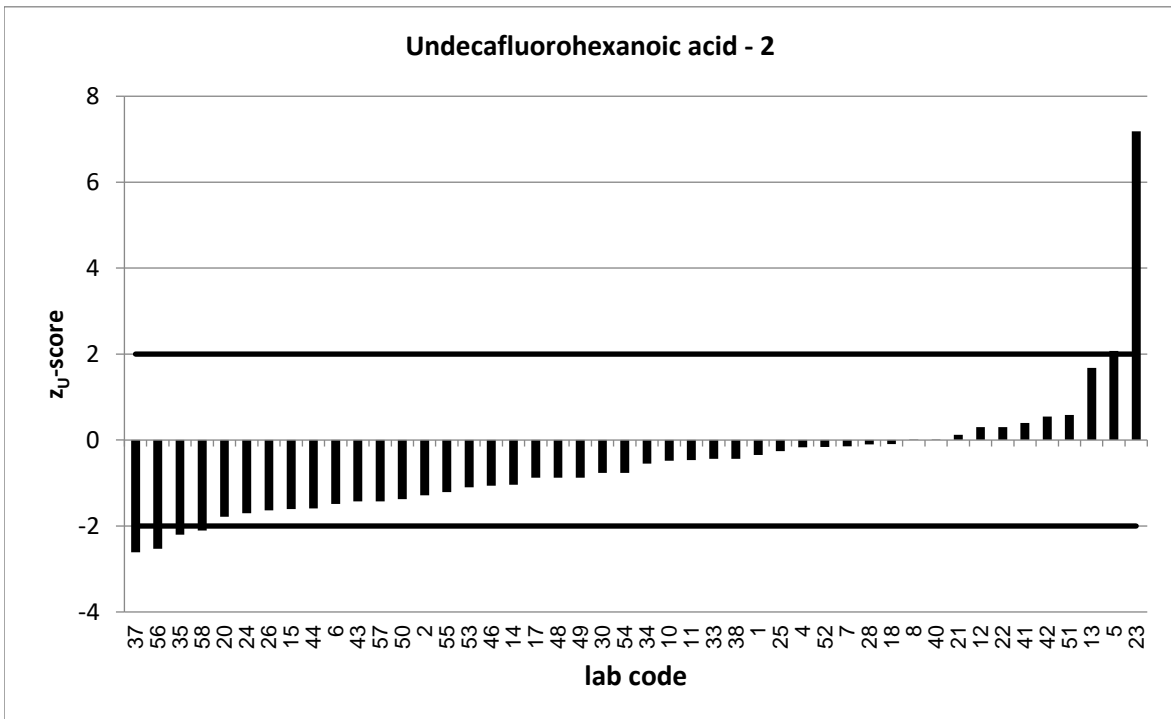
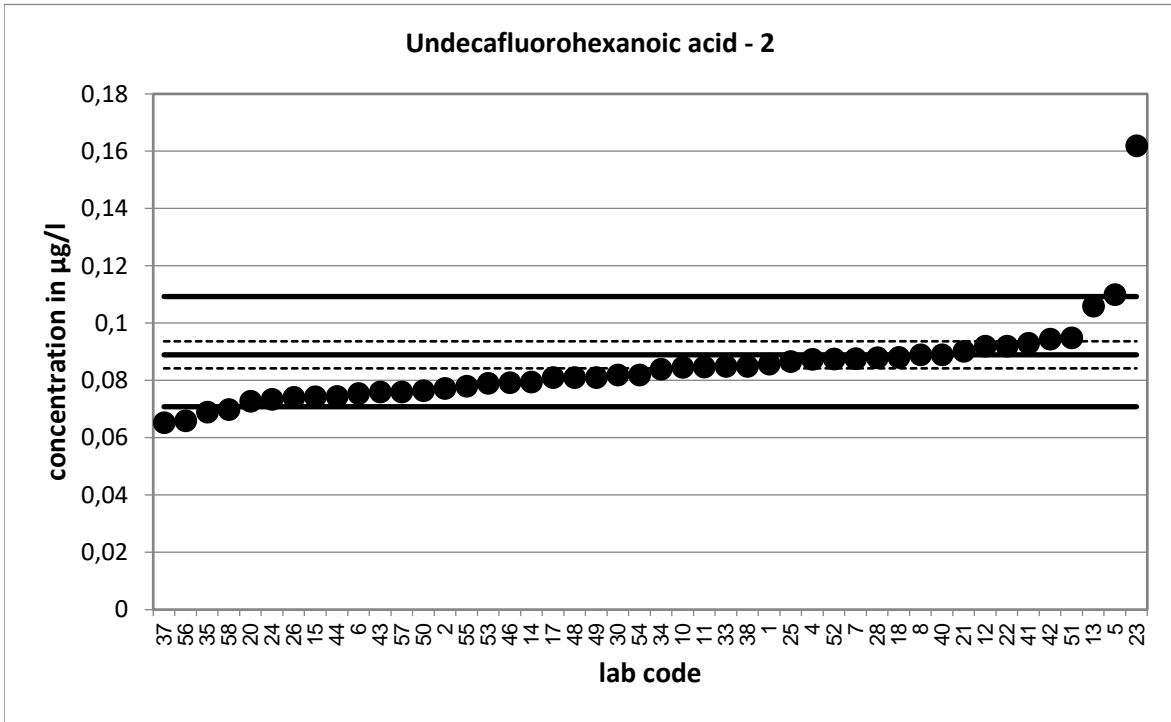


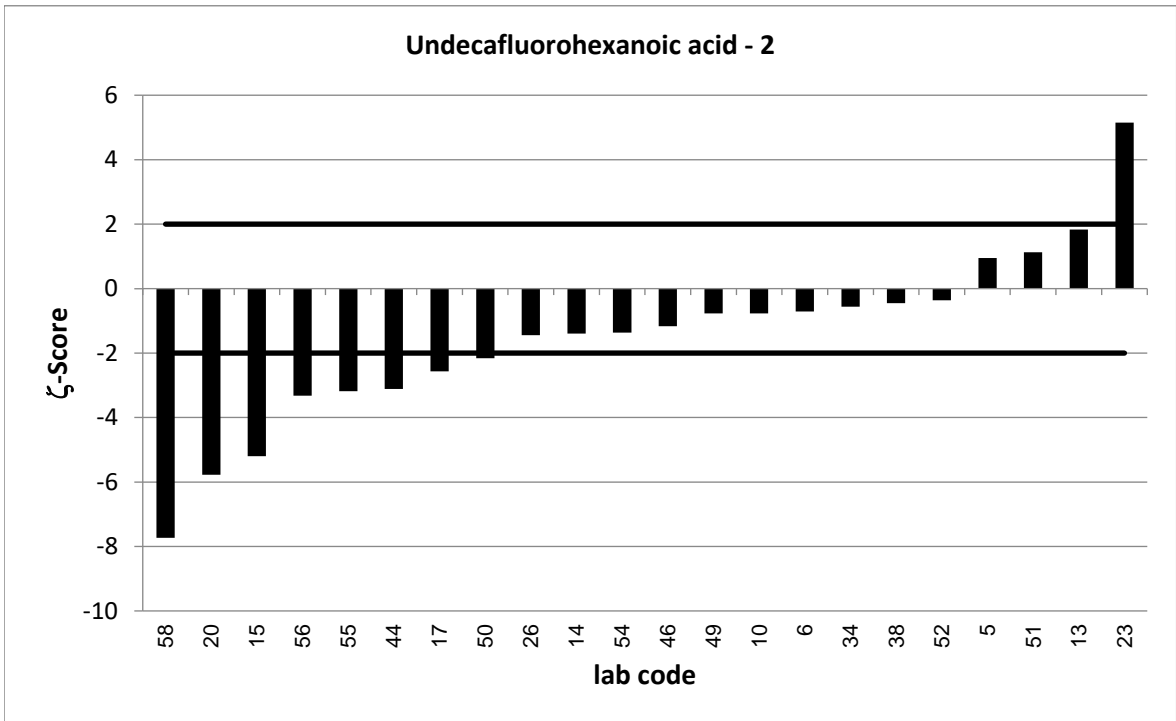
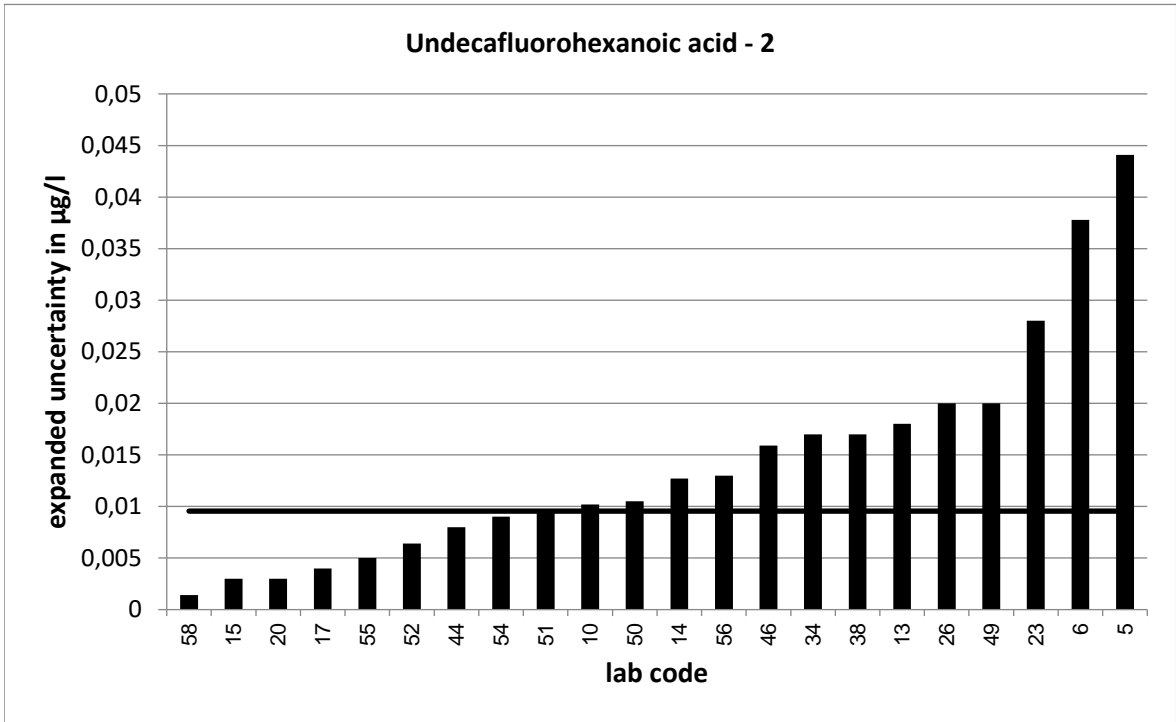


PT 6/17 - TW S4		Undecafluorohexanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,08894 \pm 0,00472			
upper tolerance limit [$\mu\text{g/l}$]		0,1093			
lower tolerance limit [$\mu\text{g/l}$]		0,07082			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0858			-0,3	s
2	0,07728			-1,3	s
4	0,0874			-0,2	s
5	0,11	0,044	0,9	2,1	q
6	0,0755	0,038	-0,7	-1,5	s
7	0,0876			-0,1	s
8	0,089			0,0	s
10	0,0846	0,01	-0,8	-0,5	s
11	0,0847			-0,5	s
12	0,092			0,3	s
13	0,106	0,018	1,8	1,7	s
14	0,0795	0,013	-1,4	-1,0	s
15	0,0744	0,003	-5,2	-1,6	s
17	0,081	0,004	-2,6	-0,9	s
18	0,0881			-0,1	s
20	0,0728	0,003	-5,8	-1,8	s
21	0,0902			0,1	s
22	0,092			0,3	s
23	0,162	0,028	5,1	7,2	u
24	0,0735			-1,7	s
25	0,0866			-0,3	s
26	0,0741	0,02	-1,4	-1,6	s
28	0,088			-0,1	s
30	0,082			-0,8	s
33	0,085			-0,4	s
34	0,084	0,017	-0,6	-0,5	s
35	0,069			-2,2	q
37	0,0653			-2,6	q
38	0,085	0,017	-0,4	-0,4	s
40	0,089			0,0	s
41	0,093			0,4	s
42	0,0945			0,5	s
43	0,076			-1,4	s
44	0,0745	0,008	-3,1	-1,6	s
46	0,0793	0,016	-1,2	-1,1	s
48	0,081			-0,9	s
49	0,081	0,02	-0,8	-0,9	s
50	0,0765	0,011	-2,2	-1,4	s
51	0,0949	0,01	1,1	0,6	s
52	0,0875	0,006	-0,4	-0,2	s
53	0,079			-1,1	s
54	0,082	0,009	-1,4	-0,8	s
55	0,078	0,005	-3,2	-1,2	s
56	0,066	0,013	-3,3	-2,5	q
57	0,076			-1,4	s
58	0,0699	0,001	-7,7	-2,1	q

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

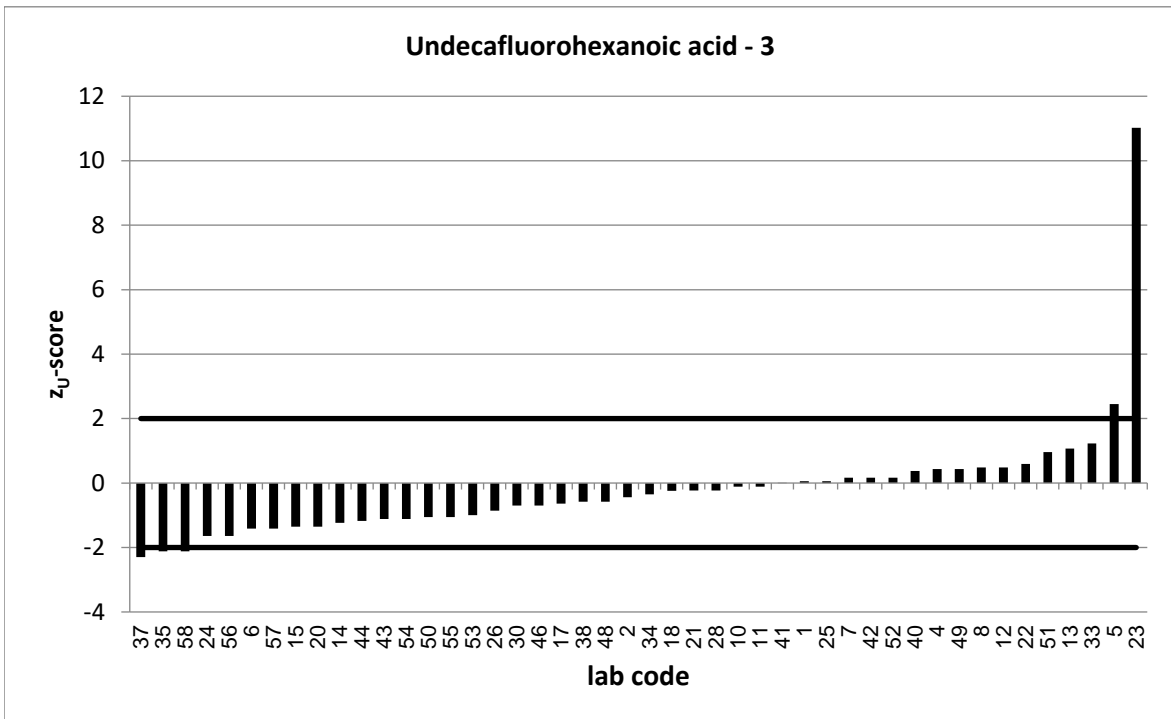
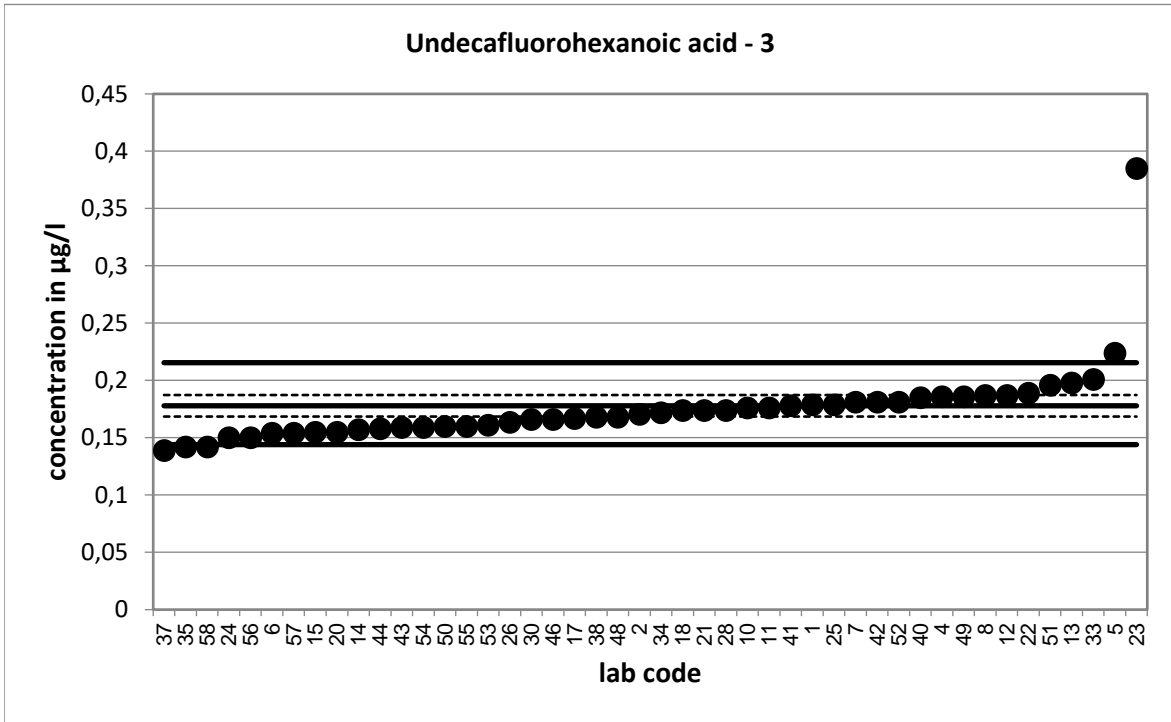


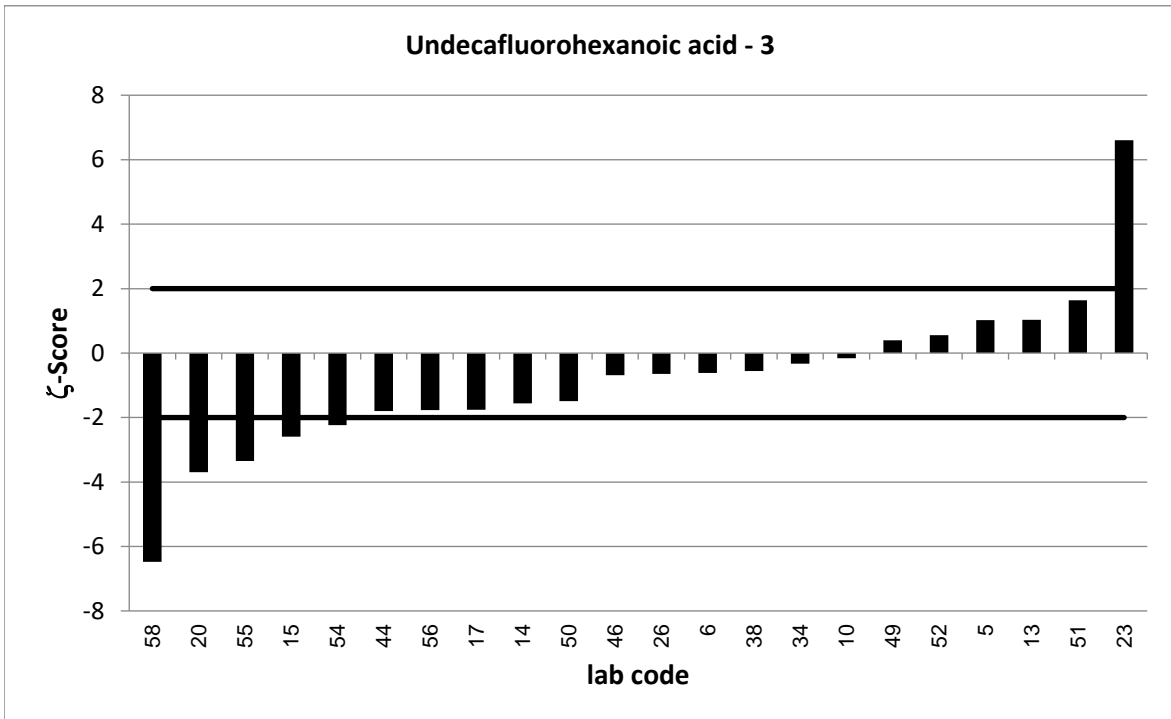
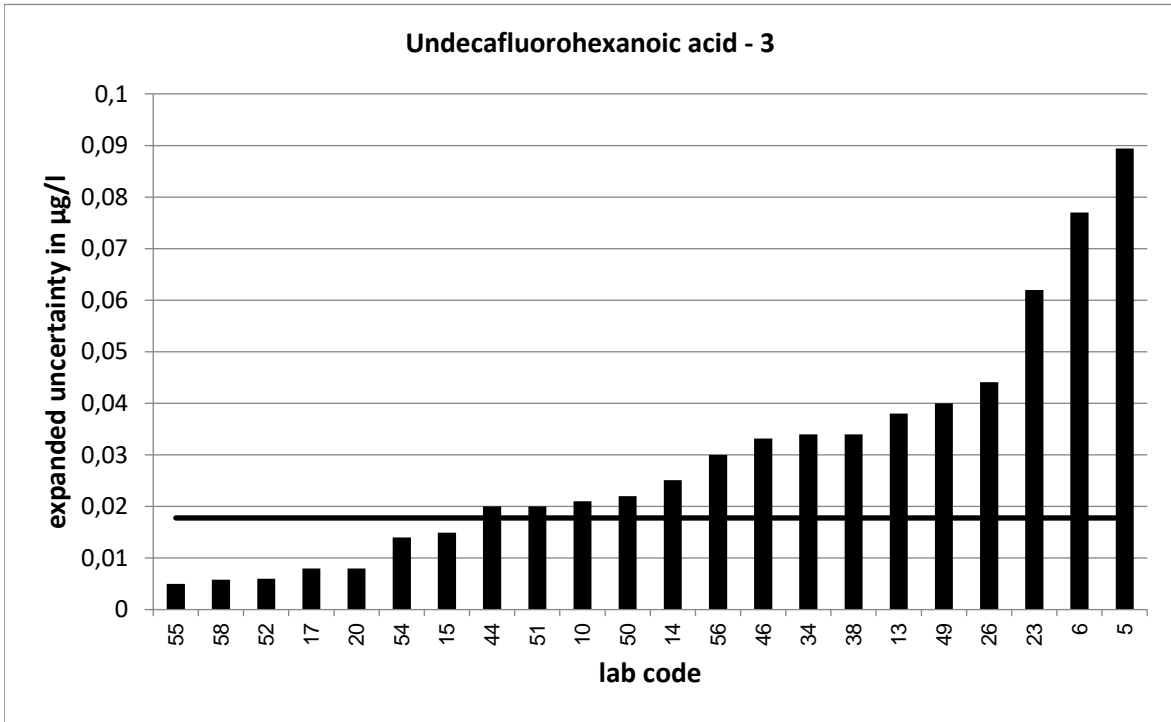


PT 6/17 - TW S4		Undecafluorohexanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1779 \pm 0,0094			
upper tolerance limit [$\mu\text{g/l}$]		0,2155			
lower tolerance limit [$\mu\text{g/l}$]		0,144			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,179			0,1	s
2	0,1705			-0,4	s
4	0,186			0,4	s
5	0,224	0,089	1,0	2,5	q
6	0,154	0,077	-0,6	-1,4	s
7	0,181			0,2	s
8	0,187			0,5	s
10	0,176	0,021	-0,2	-0,1	s
11	0,176			-0,1	s
12	0,187			0,5	s
13	0,198	0,038	1,0	1,1	s
14	0,157	0,025	-1,6	-1,2	s
15	0,155	0,015	-2,6	-1,4	s
17	0,167	0,008	-1,8	-0,6	s
18	0,1738			-0,2	s
20	0,155	0,008	-3,7	-1,4	s
21	0,174			-0,2	s
22	0,189			0,6	s
23	0,385	0,062	6,6	11,0	u
24	0,15			-1,6	s
25	0,179			0,1	s
26	0,1634	0,044	-0,6	-0,9	s
28	0,174			-0,2	s
30	0,166			-0,7	s
33	0,201			1,2	s
34	0,172	0,034	-0,3	-0,3	s
35	0,142			-2,1	q
37	0,139			-2,3	q
38	0,168	0,034	-0,6	-0,6	s
40	0,185			0,4	s
41	0,178			0,0	s
42	0,181			0,2	s
43	0,159			-1,1	s
44	0,158	0,02	-1,8	-1,2	s
46	0,166	0,033	-0,7	-0,7	s
48	0,168			-0,6	s
49	0,186	0,04	0,4	0,4	s
50	0,16	0,022	-1,5	-1,1	s
51	0,196	0,02	1,6	1,0	s
52	0,181	0,006	0,6	0,2	s
53	0,161			-1,0	s
54	0,159	0,014	-2,2	-1,1	s
55	0,16	0,005	-3,3	-1,1	s
56	0,15	0,03	-1,8	-1,6	s
57	0,154			-1,4	s
58	0,142	0,006	-6,5	-2,1	q

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory





PT 6/17 - TW S4		Perfluoroheptanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01976 \pm 0,00148			
upper tolerance limit [$\mu\text{g/l}$]		0,02628			
lower tolerance limit [$\mu\text{g/l}$]		0,01417			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,022			0,7	s
2	0,01878			-0,4	s
4	0,0295			3,0	u
5	0,022	0,009	0,5	0,7	s
7	0,0224			0,8	s
8	0,021			0,4	s
10	0,0205	0,003	0,5	0,2	s
11	0,0214			0,5	s
12	0,026			1,9	s
13	0,021	0,004	0,6	0,4	s
14	0,0184	0,003	-0,9	-0,5	s
15	0,0166	0,002	-2,9	-1,1	s
17	0,021	0,007	0,3	0,4	s
18	0,0245			1,5	s
20	0,0166	0,001	-3,5	-1,1	s
21	0,0197			0,0	s
22	0,02			0,1	s
23	0,041	0,008	5,2	6,5	u
24	0,018			-0,6	s
25	0,0212			0,4	s
26	0,0162	0,004	-1,5	-1,3	s
28	0,021			0,4	s
30	0,018			-0,6	s
33	0,024			1,3	s
34	0,018	0,004	-0,8	-0,6	s
35	0,018			-0,6	s
37	0,0174			-0,8	s
38	0,02	0,004	0,1	0,1	s
40	0,0188			-0,3	s
41	0,02			0,1	s
42	0,0215			0,5	s
43	0,02			0,1	s
44	0,0178	0,002	-1,6	-0,7	s
46	0,0191	0,004	-0,3	-0,2	s
48	0,02			0,1	s
49	0,021	0,003	0,7	0,4	s
50	0,0173	0,003	-1,6	-0,9	s
51	0,0221	0,002	1,8	0,7	s
52	0,0183	0,001	-1,6	-0,5	s
53	0,0186			-0,4	s
54	0,018	0,002	-1,4	-0,6	s
55	0,021	0,005	0,5	0,4	s
56	0,012	0,002	-6,2	-2,8	q
57	0,0156			-1,5	s

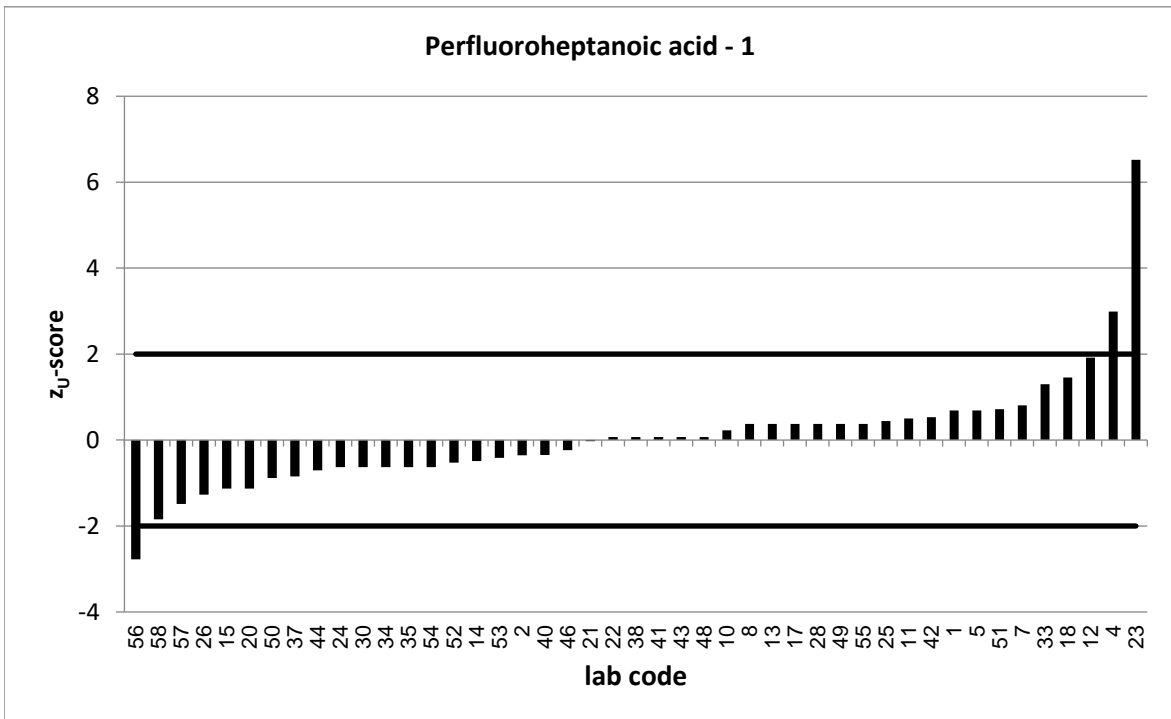
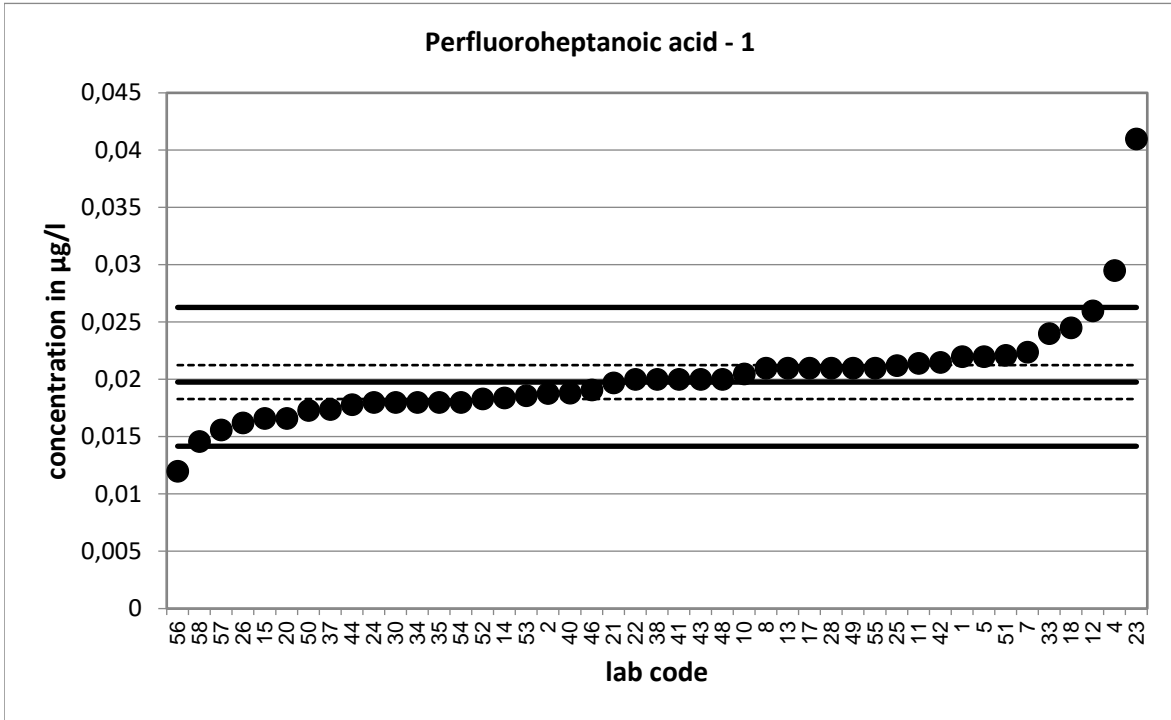
* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

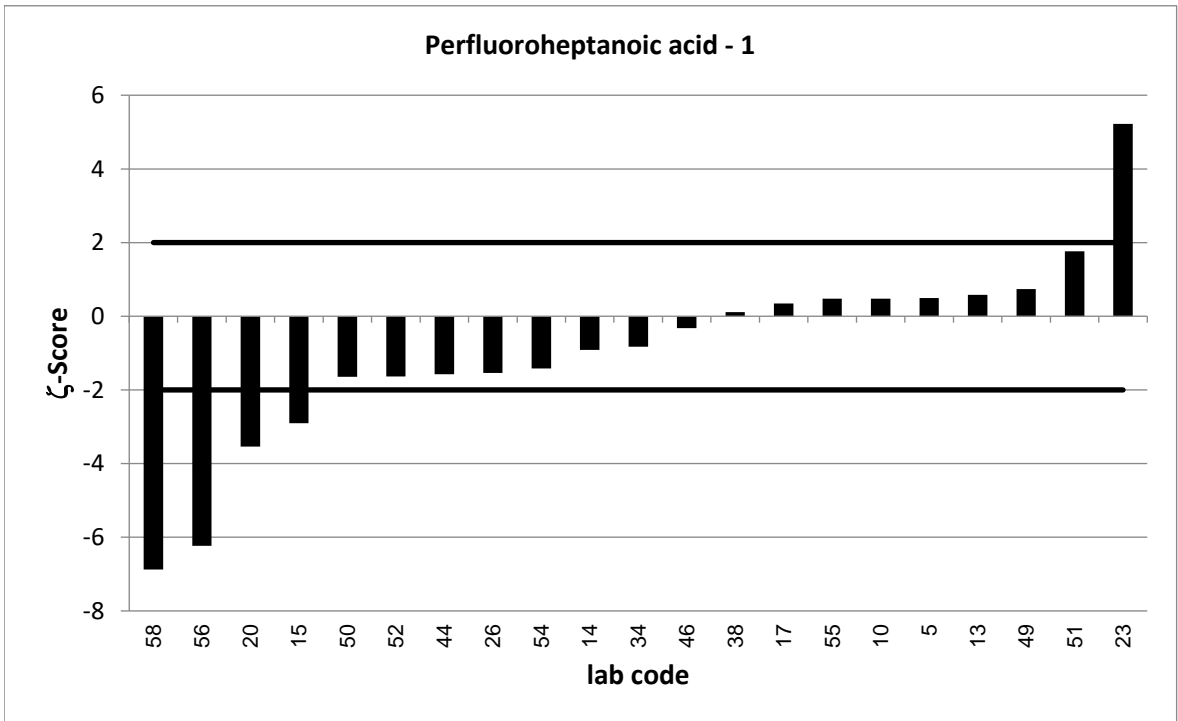
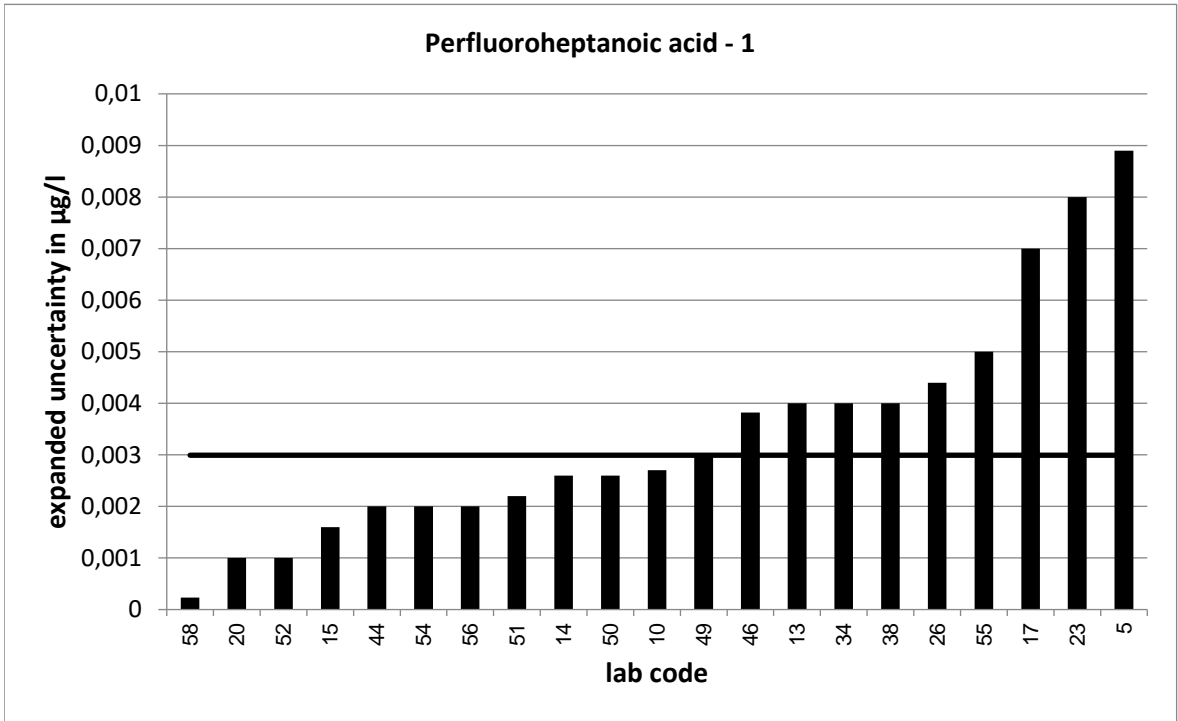
** s = satisfactory, q = questionable, u = unsatisfactory

PT 6/17 - TW S4		Perfluoroheptanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01976 \pm 0,00148			
upper tolerance limit [$\mu\text{g/l}$]		0,02628			
lower tolerance limit [$\mu\text{g/l}$]		0,01417			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
58	0,0146	2E-04	-6,9	-1,8	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

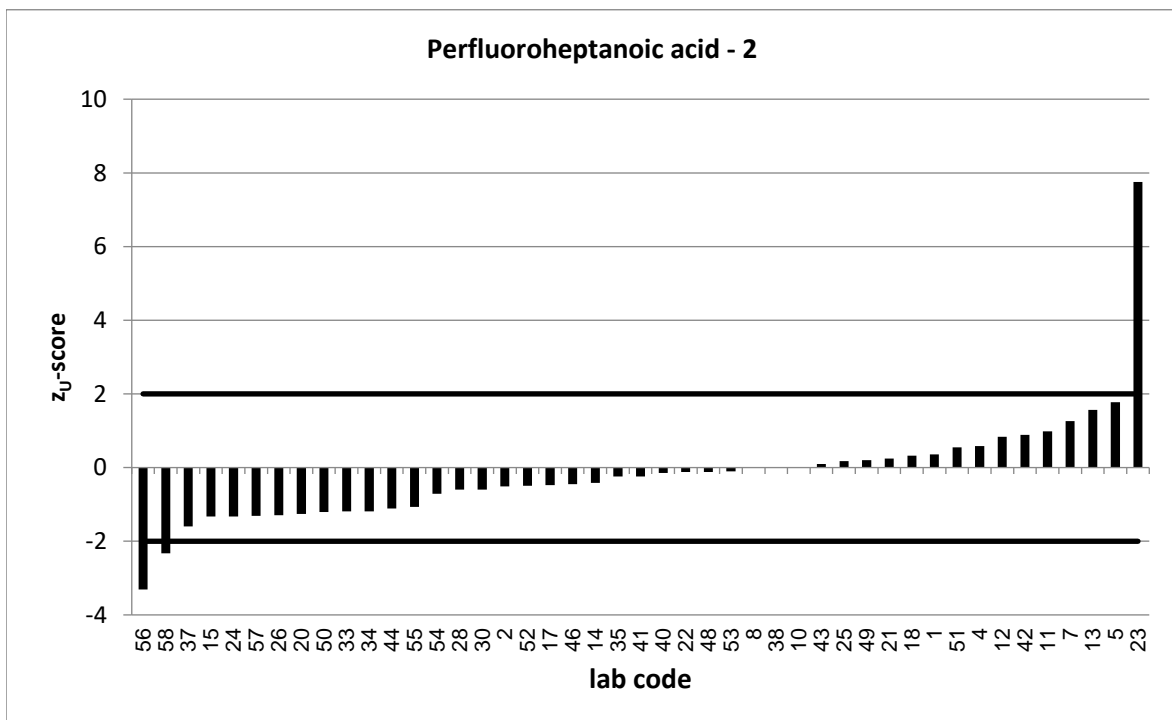
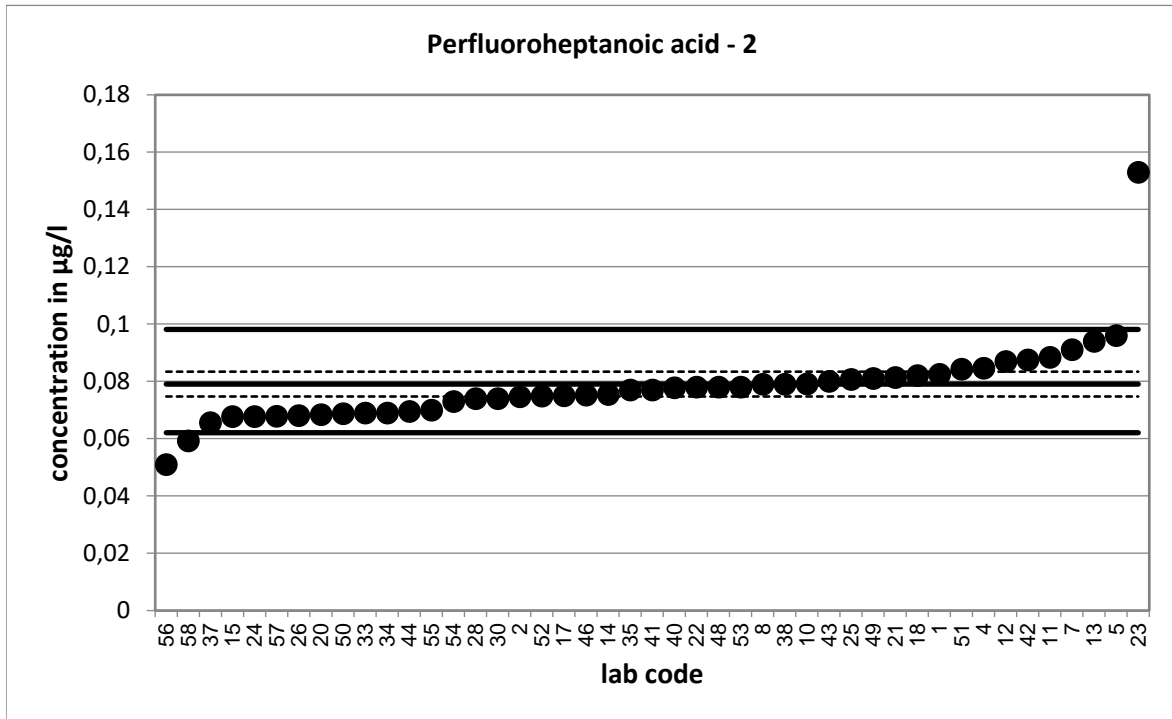


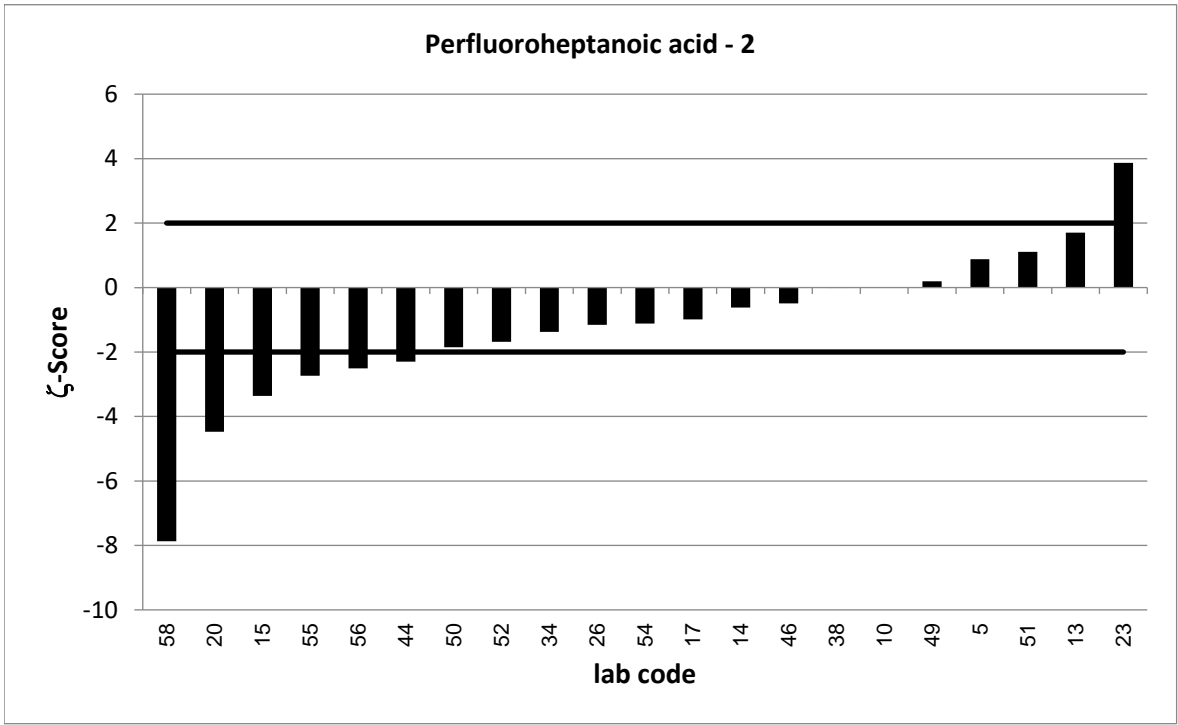
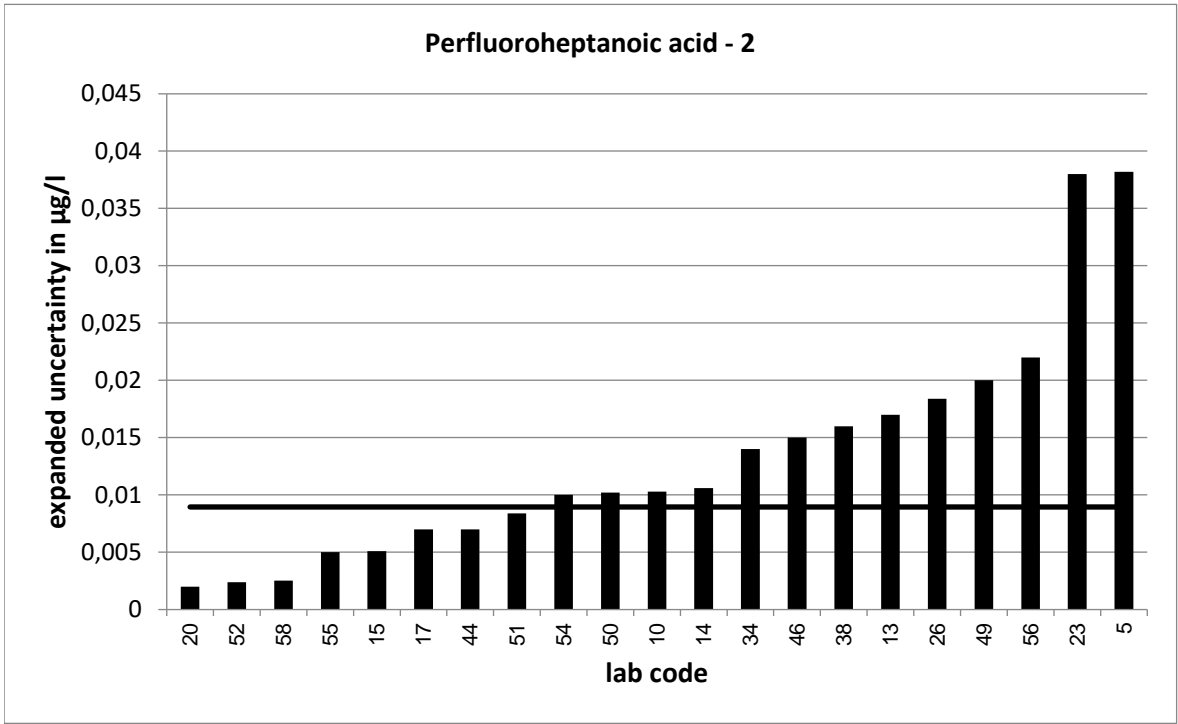


PT 6/17 - TW S4		Perfluoroheptanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,07906 \pm 0,00433			
upper tolerance limit [$\mu\text{g/l}$]		0,09813			
lower tolerance limit [$\mu\text{g/l}$]		0,06208			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0825			0,4	s
2	0,07472			-0,5	s
4	0,0846			0,6	s
5	0,096	0,038	0,9	1,8	s
7	0,0911			1,3	s
8	0,079			0,0	s
10	0,0791	0,01	0,0	0,0	s
11	0,0884			1,0	s
12	0,087			0,8	s
13	0,094	0,017	1,7	1,6	s
14	0,0755	0,011	-0,6	-0,4	s
15	0,0678	0,005	-3,4	-1,3	s
17	0,075	0,007	-1,0	-0,5	s
18	0,0821			0,3	s
20	0,0684	0,002	-4,5	-1,3	s
21	0,0814			0,2	s
22	0,078			-0,1	s
23	0,153	0,038	3,9	7,8	u
24	0,0678			-1,3	s
25	0,0807			0,2	s
26	0,0681	0,018	-1,2	-1,3	s
28	0,074			-0,6	s
30	0,074			-0,6	s
33	0,069			-1,2	s
34	0,069	0,014	-1,4	-1,2	s
35	0,077			-0,2	s
37	0,0656			-1,6	e
38	0,079	0,016	0,0	0,0	s
40	0,0778			-0,1	s
41	0,077			-0,2	s
42	0,0875			0,9	s
43	0,08			0,1	s
44	0,0696	0,007	-2,3	-1,1	s
46	0,0752	0,015	-0,5	-0,5	s
48	0,078			-0,1	s
49	0,081	0,02	0,2	0,2	s
50	0,0688	0,01	-1,9	-1,2	s
51	0,0843	0,008	1,1	0,5	s
52	0,0749	0,002	-1,7	-0,5	s
53	0,078			-0,1	e
54	0,073	0,01	-1,1	-0,7	s
55	0,07	0,005	-2,7	-1,1	s
56	0,051	0,022	-2,5	-3,3	u
57	0,0679			-1,3	s
58	0,0593	0,003	-7,9	-2,3	q

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

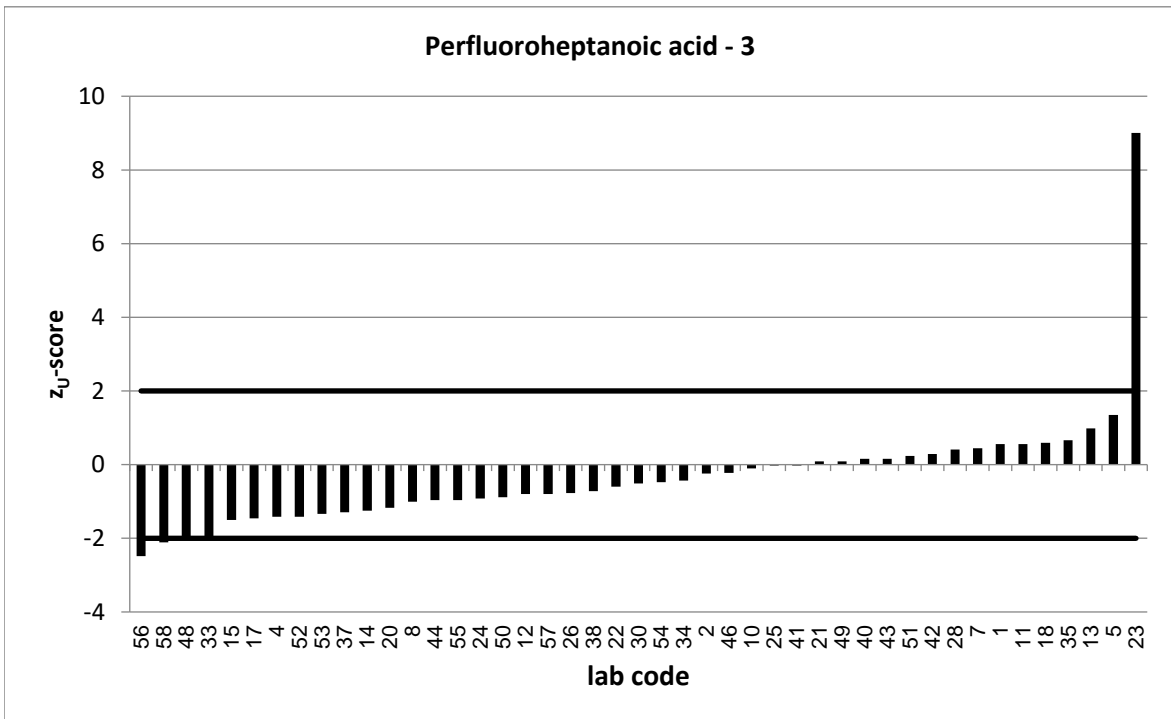
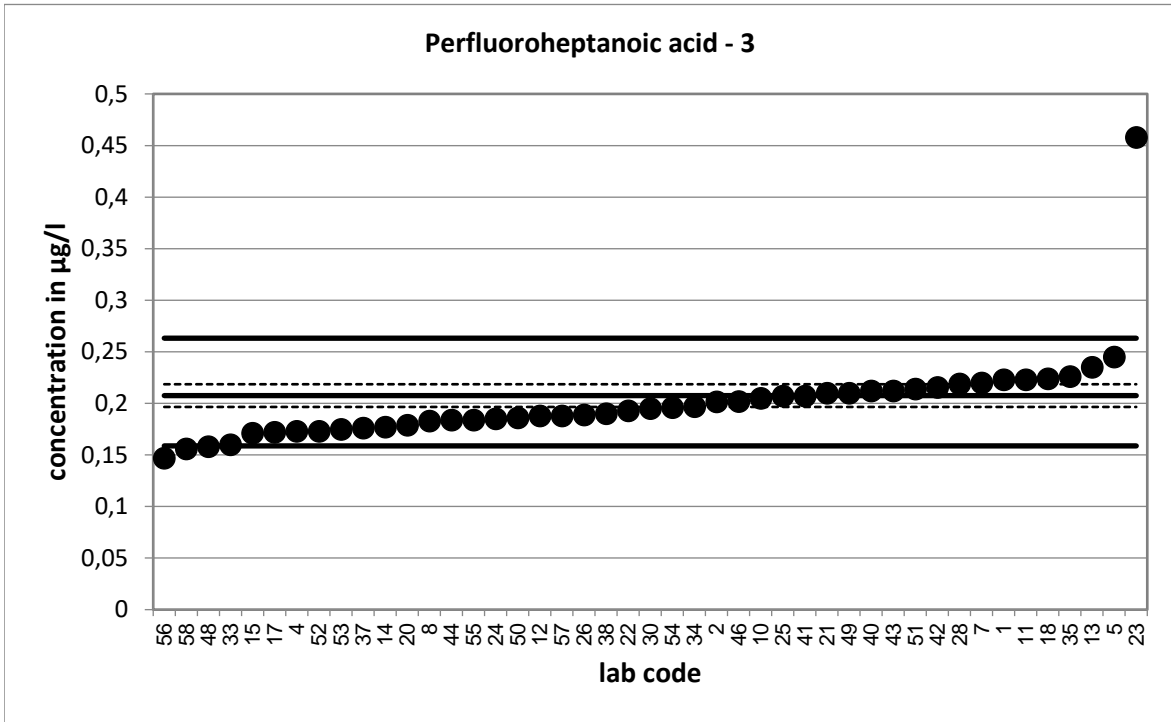


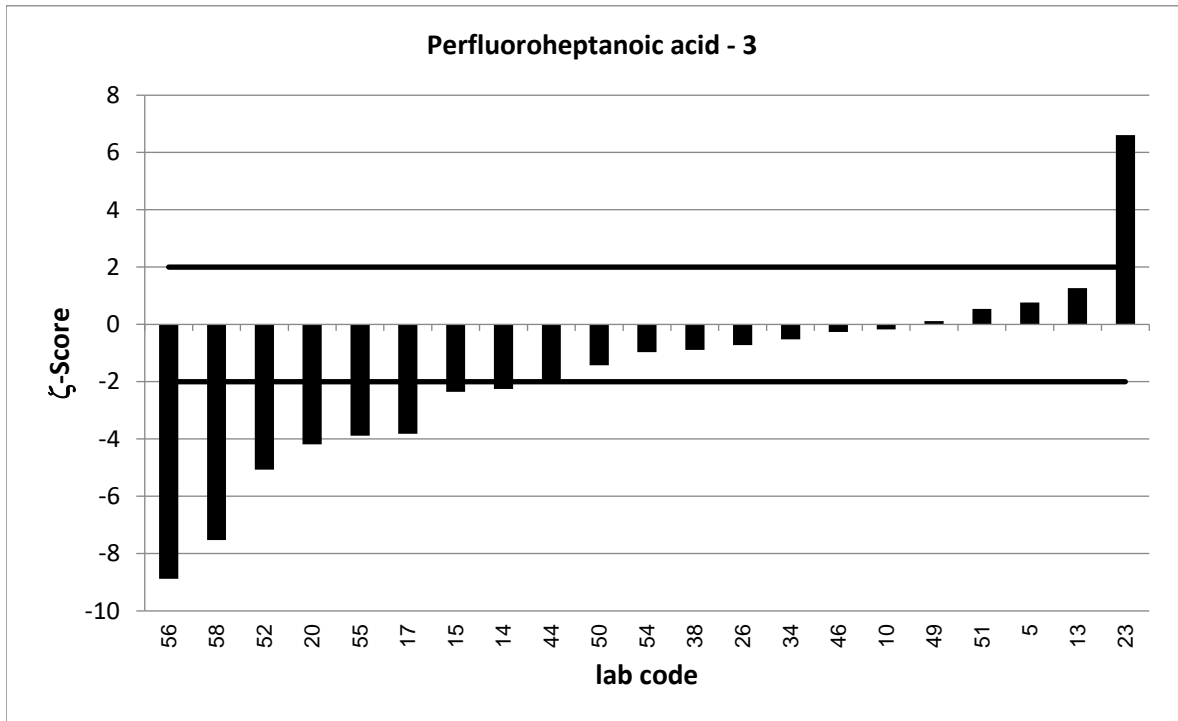
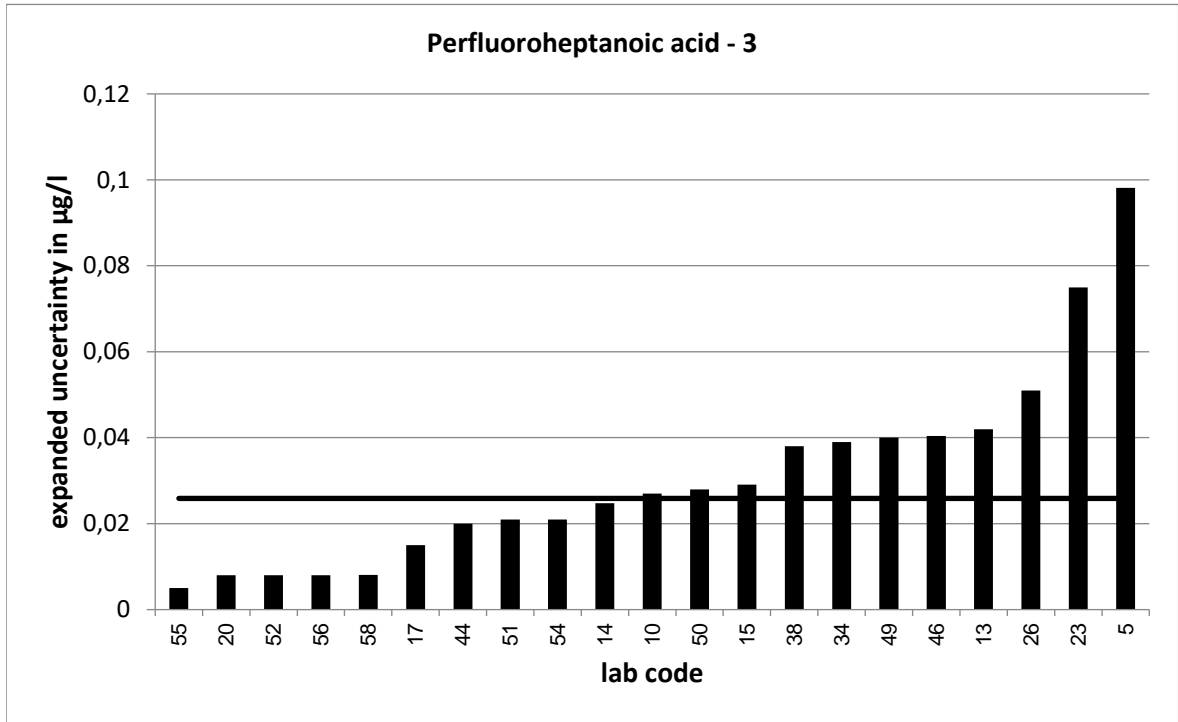


PT 6/17 - TW S4		Perfluoroheptanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,2075 \pm 0,011			
upper tolerance limit [$\mu\text{g/l}$]		0,2632			
lower tolerance limit [$\mu\text{g/l}$]		0,1588			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,223			0,6	s
2	0,2017			-0,2	s
4	0,173			-1,4	s
5	0,245	0,098	0,8	1,3	s
7	0,22			0,4	s
8	0,183			-1,0	s
10	0,205	0,027	-0,2	-0,1	s
11	0,223			0,6	s
12	0,188			-0,8	s
13	0,235	0,042	1,3	1,0	s
14	0,177	0,025	-2,2	-1,3	s
15	0,171	0,029	-2,3	-1,5	s
17	0,172	0,015	-3,8	-1,5	s
18	0,224			0,6	s
20	0,179	0,008	-4,2	-1,2	s
21	0,21			0,1	s
22	0,193			-0,6	s
23	0,458	0,075	6,6	9,0	u
24	0,185			-0,9	s
25	0,207			0,0	s
26	0,1888	0,051	-0,7	-0,8	s
28	0,219			0,4	s
30	0,195			-0,5	s
33	0,16			-1,9	s
34	0,197	0,039	-0,5	-0,4	s
35	0,226			0,7	s
37	0,176			-1,3	s
38	0,19	0,038	-0,9	-0,7	s
40	0,212			0,2	s
41	0,207			0,0	s
42	0,2155			0,3	s
43	0,212			0,2	s
44	0,184	0,02	-2,1	-1,0	s
46	0,202	0,04	-0,3	-0,2	s
48	0,158			-2,0	s
49	0,21	0,04	0,1	0,1	s
50	0,186	0,028	-1,4	-0,9	s
51	0,214	0,021	0,5	0,2	s
52	0,173	0,008	-5,1	-1,4	s
53	0,175			-1,3	s
54	0,196	0,021	-1,0	-0,5	s
55	0,184	0,005	-3,9	-1,0	s
56	0,147	0,008	-8,9	-2,5	q
57	0,188			-0,8	s
58	0,156	0,008	-7,5	-2,1	q

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory





PT 6/17 - TW S4		Perfluorooctanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01482 \pm 0,00082			
upper tolerance limit [$\mu\text{g/l}$]		0,0189			
lower tolerance limit [$\mu\text{g/l}$]		0,01124			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0161			0,6	s
2	0,0131			-1,0	s
4	0,016			0,6	s
5	0,018	0,007	0,9	1,6	s
6	0,0155	0,008	0,2	0,3	s
7	0,0215			3,3	u
8	0,013			-1,0	s
10	0,0154	0,002	0,6	0,3	s
11	0,0146			-0,1	s
12	0,02			2,5	q
13	0,015	0,004	0,1	0,1	s
14	0,013	0,002	-1,6	-1,0	s
15	0,0124	0,002	-2,2	-1,4	s
17	0,015	0,003	0,1	0,1	s
18	0,0185			1,8	s
20	0,0135	0,001	-2,0	-0,7	s
21	0,016			0,6	s
22	0,014			-0,5	s
23	0,027	0,006	4,0	6,0	u
24	0,0196			2,3	q
25	0,0133	0,004	-0,8	-0,9	s
26	0,0137	0,004	-0,6	-0,6	s
28	0,014			-0,5	s
30	0,013			-1,0	s
31	0,0191	0,006	1,4	2,1	q
33	0,014			-0,5	s
34	0,014	0,003	-0,5	-0,5	s
35	0,014			-0,5	s
37	0,0116			-1,8	s
38	0,015	0,003	0,1	0,1	s
40	0,0149			0,0	s
41	0,014			-0,5	s
42	0,0135			-0,7	s
43	0,014			-0,5	s
44	0,0216	0,002	6,3	3,3	u
46	0,0159	0,003	0,7	0,5	s
48	0,014			-0,5	s
49	0,015	0,003	0,1	0,1	s
50	0,0125	0,002	-2,1	-1,3	s
51	0,0172	0,002	2,5	1,2	s
52	0,0154	0,001	0,7	0,3	s
53	0,0128			-1,1	s
54	0,014	0,001	-1,3	-0,5	s
55	0,025	0,005	4,0	5,0	u
56	0,014	0,002	-0,8	-0,5	s
57	0,0132			-0,9	s

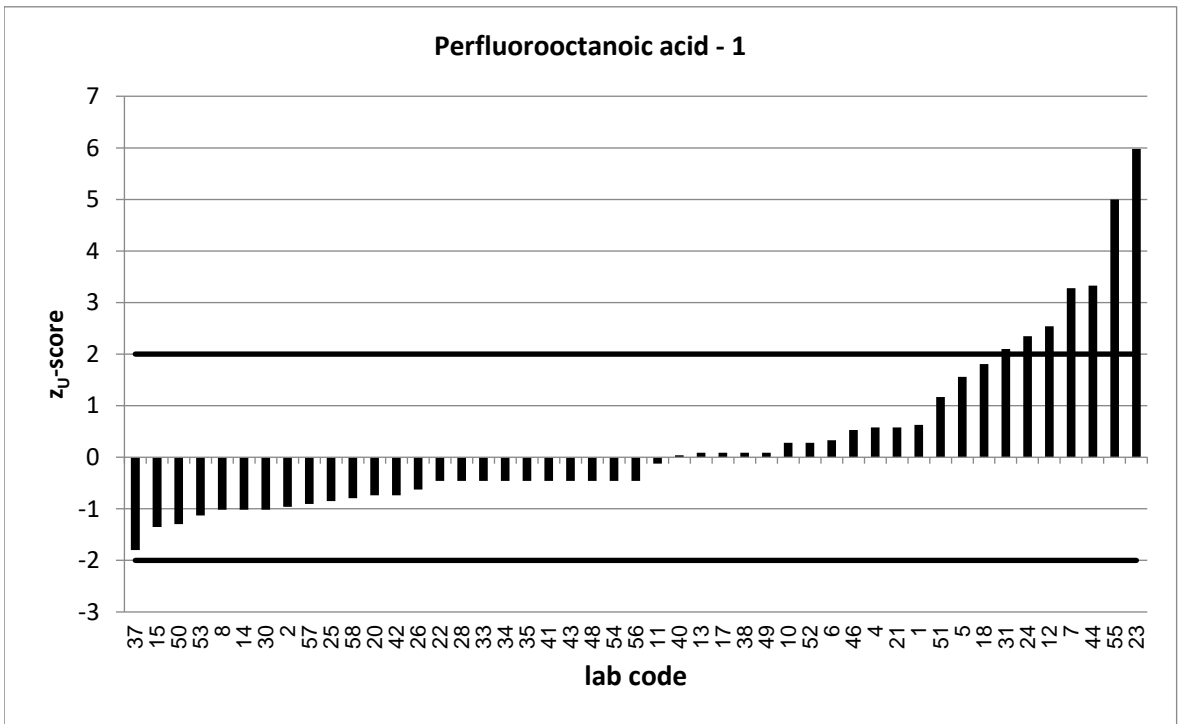
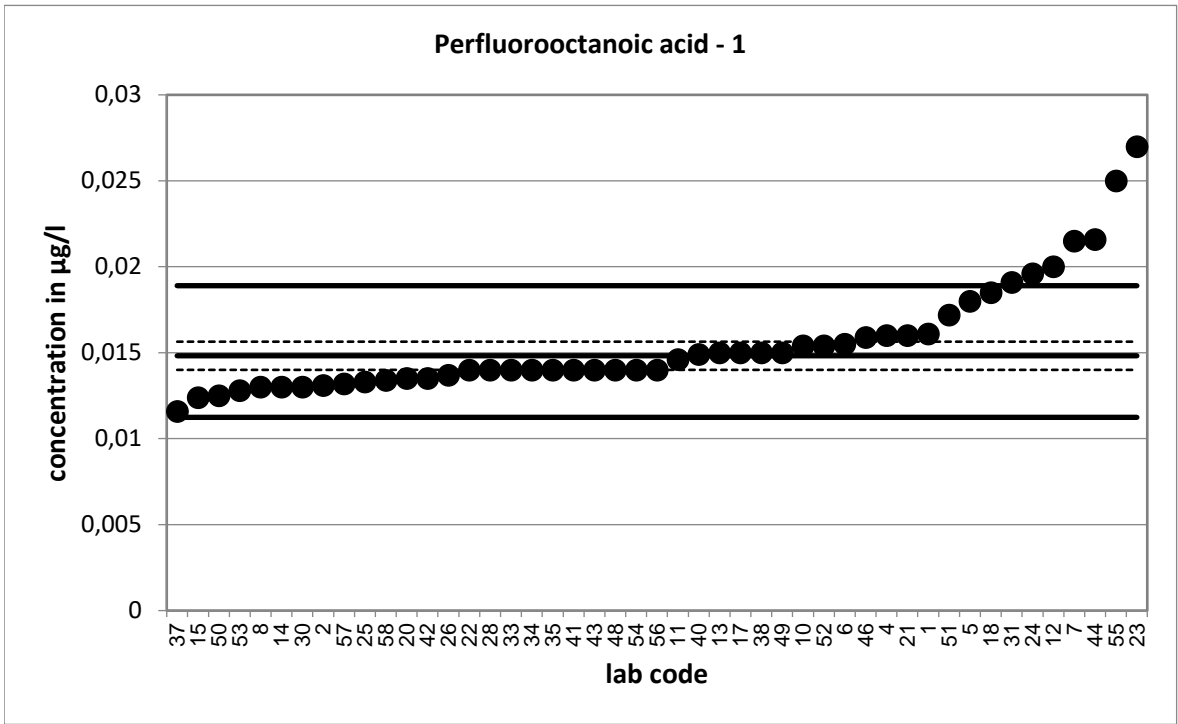
* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

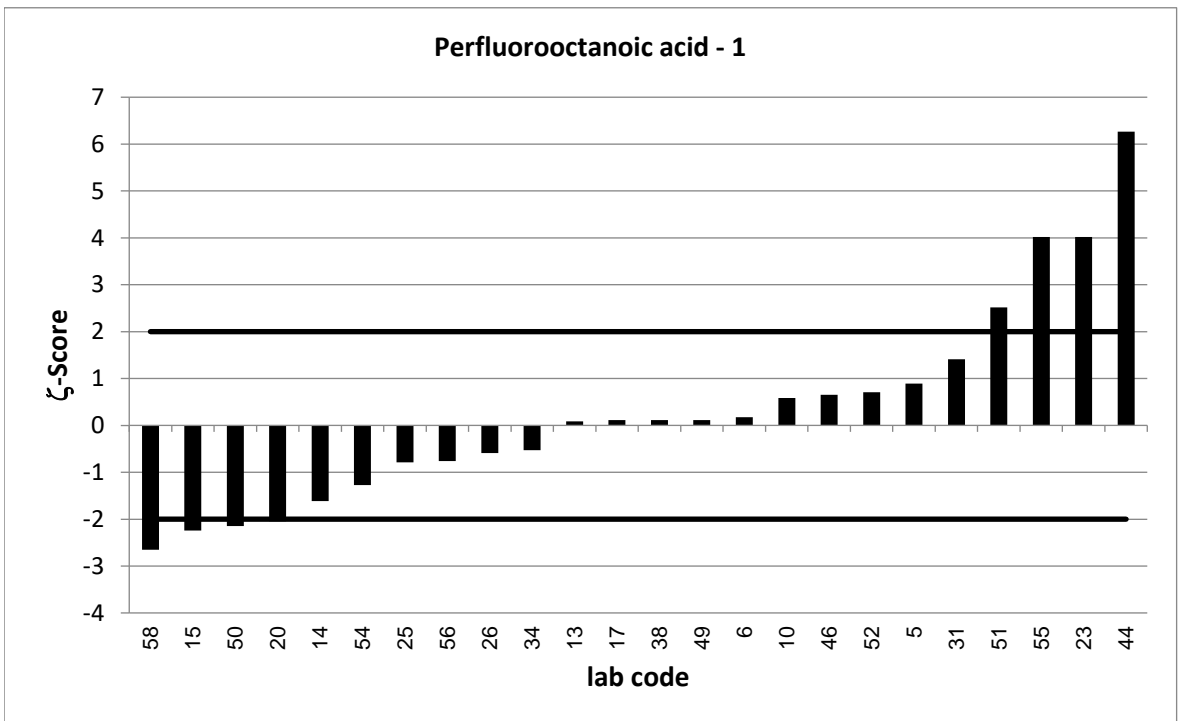
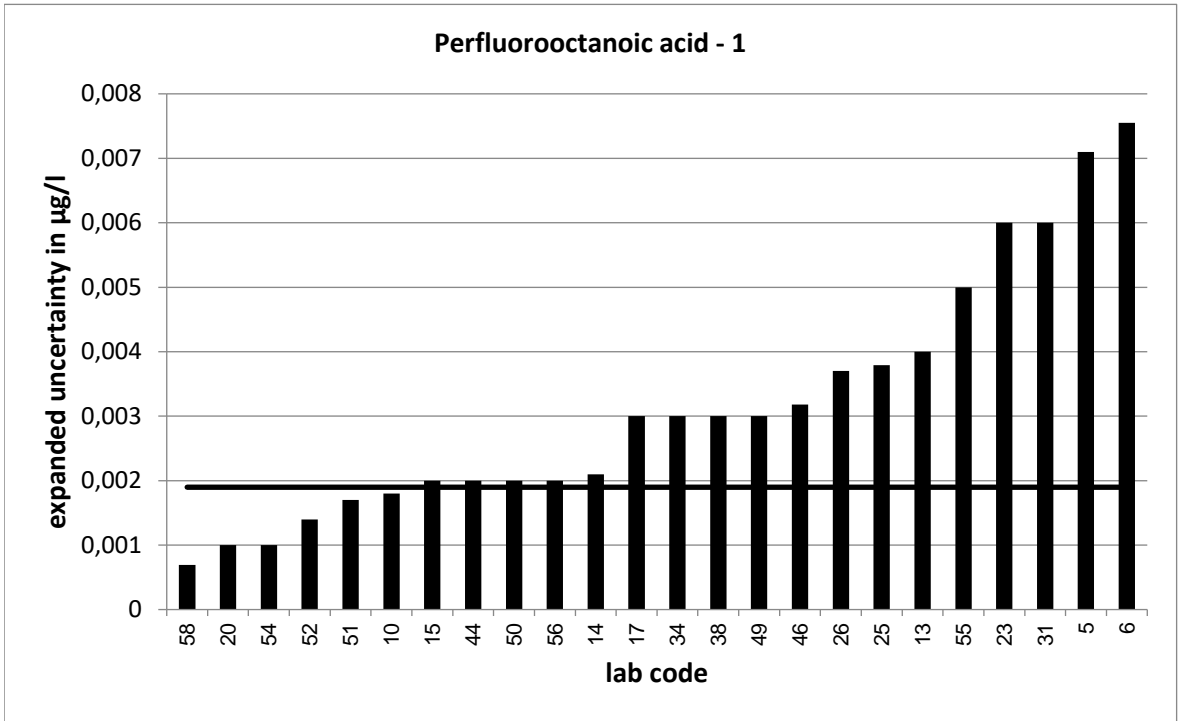
** s = satisfactory, q = questionable, u = unsatisfactory

PT 6/17 - TW S4		Perfluorooctanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01482		$\pm 0,00082$	
upper tolerance limit [$\mu\text{g/l}$]		0,0189			
lower tolerance limit [$\mu\text{g/l}$]		0,01124			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
58	0,0134	7E-04	-2,6	-0,8	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory





PT 6/17 - TW S4		Perfluorooctanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,06918 \pm 0,00369			
upper tolerance limit [$\mu\text{g/l}$]		0,08325			
lower tolerance limit [$\mu\text{g/l}$]		0,05643			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0754			0,9	s
2	0,06483			-0,7	s
4	0,0693			0,0	s
5	0,081	0,032	0,7	1,7	s
6	0,071	0,036	0,1	0,3	s
7	0,0768			1,1	s
8	0,076			1,0	s
10	0,066	0,008	-0,7	-0,5	s
11	0,0683			-0,1	s
12	0,096			3,8	u
13	0,063	0,015	-0,8	-1,0	s
14	0,0622	0,01	-1,3	-1,1	s
15	0,0556	0,003	-5,8	-2,1	q
17	0,065	0,007	-1,1	-0,7	s
18	0,0792			1,4	s
20	0,0552	0,001	-7,3	-2,2	q
21	0,0712			0,3	s
22	0,064			-0,8	s
23	0,092	0,017	2,6	3,2	u
24	0,0633			-0,9	s
25	0,0696	0,02	0,0	0,1	s
26	0,0639	0,017	-0,6	-0,8	s
28	0,068			-0,2	s
30	0,069			0,0	s
31	0,0521	0,016	-2,0	-2,7	q
33	0,057			-1,9	s
34	0,066	0,013	-0,5	-0,5	s
35	0,074			0,7	s
37	0,0664			-0,4	s
38	0,066	0,013	-0,5	-0,5	s
40	0,0741			0,7	s
41	0,066			-0,5	s
42	0,077			1,1	s
43	0,068			-0,2	s
44	0,069	0,007	0,0	0,0	s
46	0,0658	0,013	-0,5	-0,5	s
48	0,067			-0,3	s
49	0,07	0,02	0,1	0,1	s
50	0,0586	0,009	-2,1	-1,7	s
51	0,0695	0,007	0,1	0,0	s
52	0,0596	0,001	-4,9	-1,5	s
53	0,0675			-0,3	s
54	0,06	0,001	-4,8	-1,4	s
55	0,067	0,005	-0,7	-0,3	s
56	0,064	0,009	-1,1	-0,8	s
57	0,0551			-2,2	q

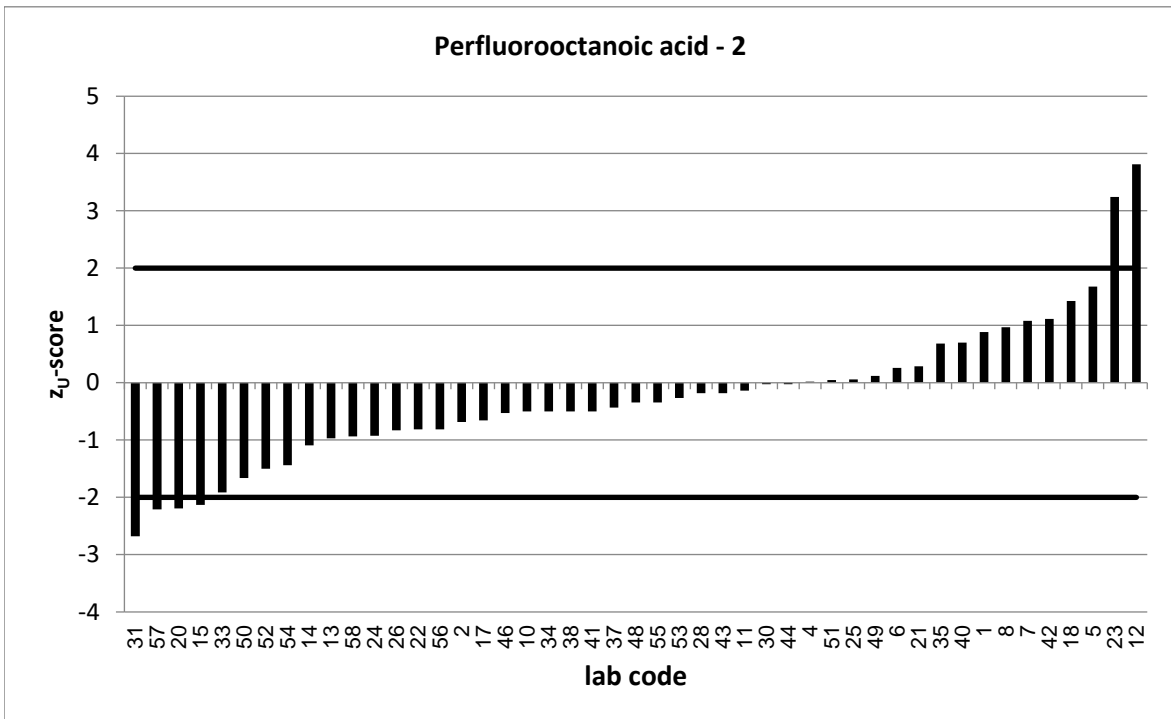
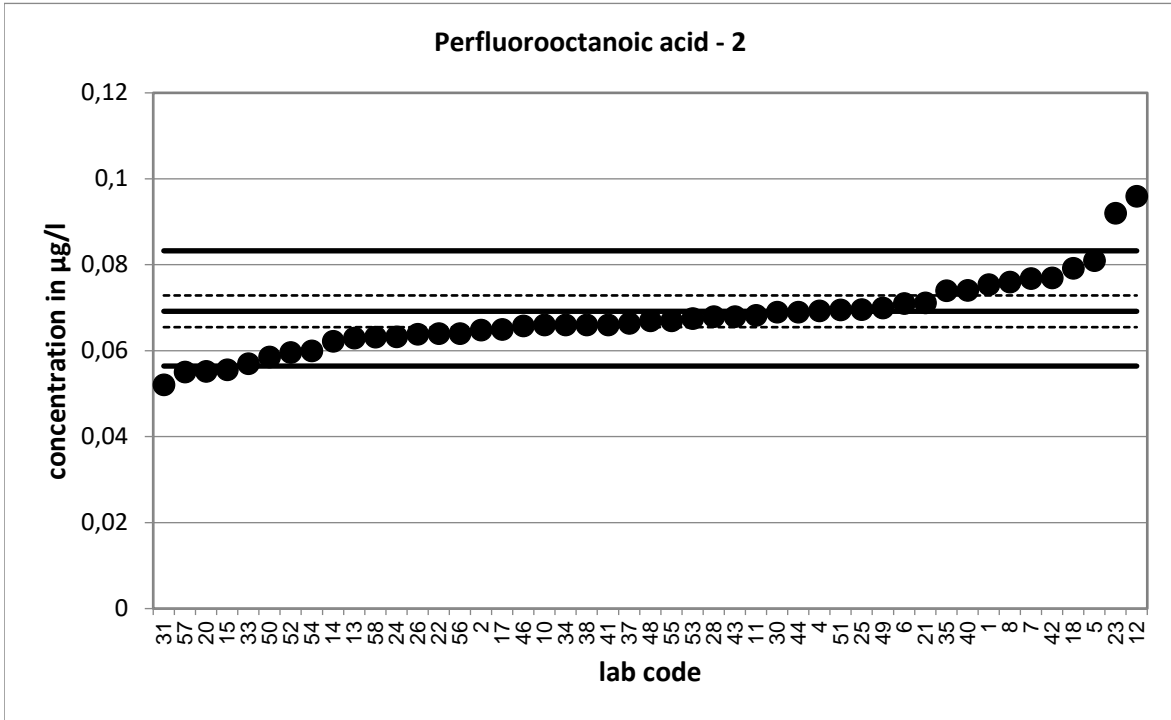
* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

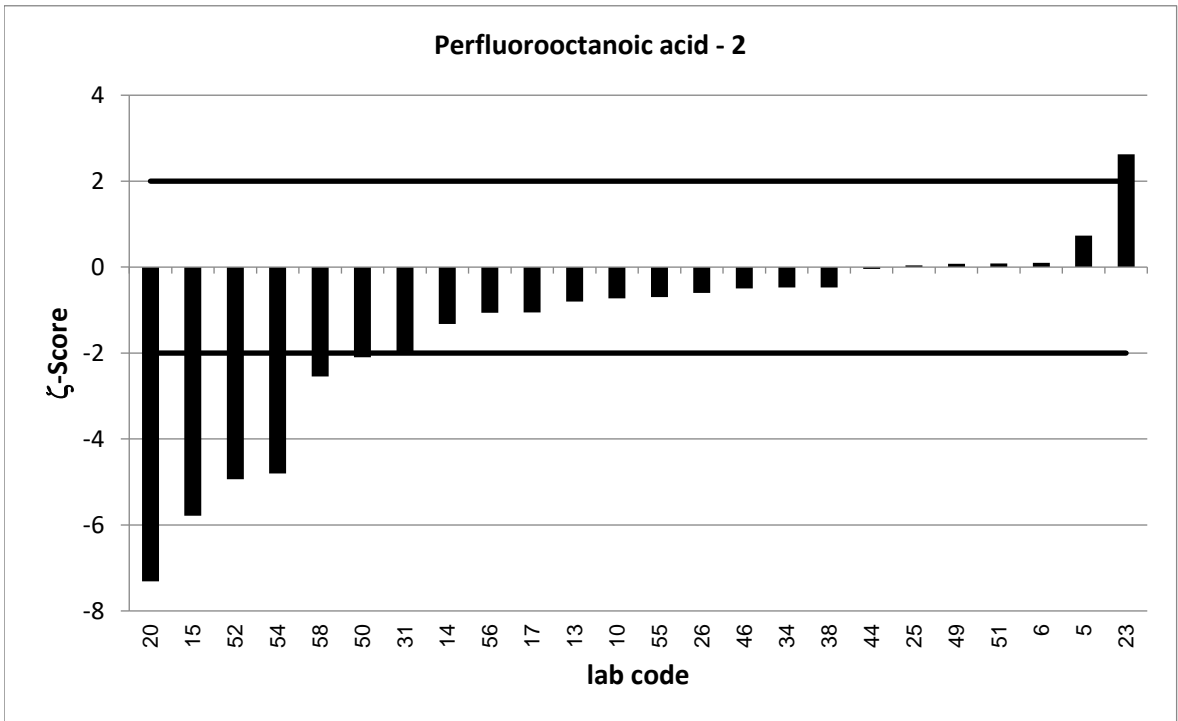
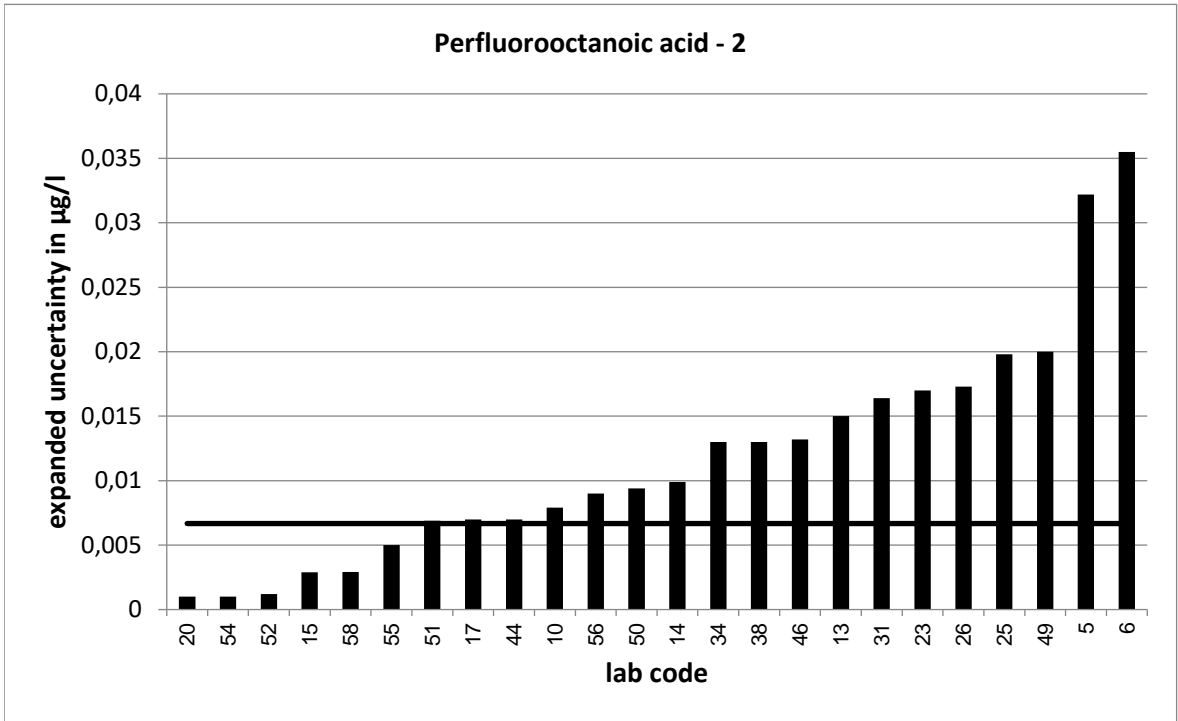
** s = satisfactory, q = questionable, u = unsatisfactory

PT 6/17 - TW S4		Perfluorooctanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,06918 \pm 0,00369			
upper tolerance limit [$\mu\text{g/l}$]		0,08325			
lower tolerance limit [$\mu\text{g/l}$]		0,05643			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
58	0,0632	0,003	-2,5	-0,9	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory





PT 6/17 - TW S4		Perfluorooctanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,168 \pm 0,0089			
upper tolerance limit [$\mu\text{g/l}$]		0,213			
lower tolerance limit [$\mu\text{g/l}$]		0,1284			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,179			0,5	s
2	0,1637			-0,2	s
4	0,167			-0,1	s
5	0,217	0,087	1,1	2,2	q
6	0,186	0,093	0,4	0,8	s
7	0,193			1,1	s
8	0,179			0,5	s
10	0,169	0,02	0,1	0,0	s
11	0,169			0,0	s
12	0,205			1,6	s
13	0,192	0,038	1,2	1,1	s
14	0,143	0,023	-2,0	-1,3	s
15	0,145	0,01	-3,4	-1,2	s
17	0,162	0,013	-0,8	-0,3	s
18	0,1842			0,7	s
20	0,137	0,007	-5,5	-1,6	s
21	0,183			0,7	s
22	0,157			-0,6	s
23	0,212	0,045	1,9	2,0	s
24	0,152			-0,8	s
25	0,173	0,049	0,2	0,2	s
26	0,1248	0,034	-2,5	-2,2	q
28	0,169			0,0	s
30	0,169			0,0	s
31	0,117	0,037	-2,7	-2,6	q
33	0,144			-1,2	s
34	0,163	0,033	-0,3	-0,3	s
35	0,191			1,0	s
37	0,137			-1,6	s
38	0,169	0,034	0,1	0,0	s
40	0,184			0,7	s
41	0,162			-0,3	s
42	0,169			0,0	s
43	0,169			0,0	s
44	0,154	0,02	-1,3	-0,7	s
46	0,162	0,032	-0,4	-0,3	s
48	0,163			-0,3	s
49	0,181	0,04	0,6	0,6	s
50	0,146	0,023	-1,8	-1,1	s
51	0,164	0,016	-0,4	-0,2	s
52	0,173	0,019	0,5	0,2	s
53	0,163			-0,3	s
54	0,154	0,018	-1,4	-0,7	s
55	0,132	0,005	-7,0	-1,8	s
56	0,15	0,021	-1,6	-0,9	s
57	0,142			-1,3	s

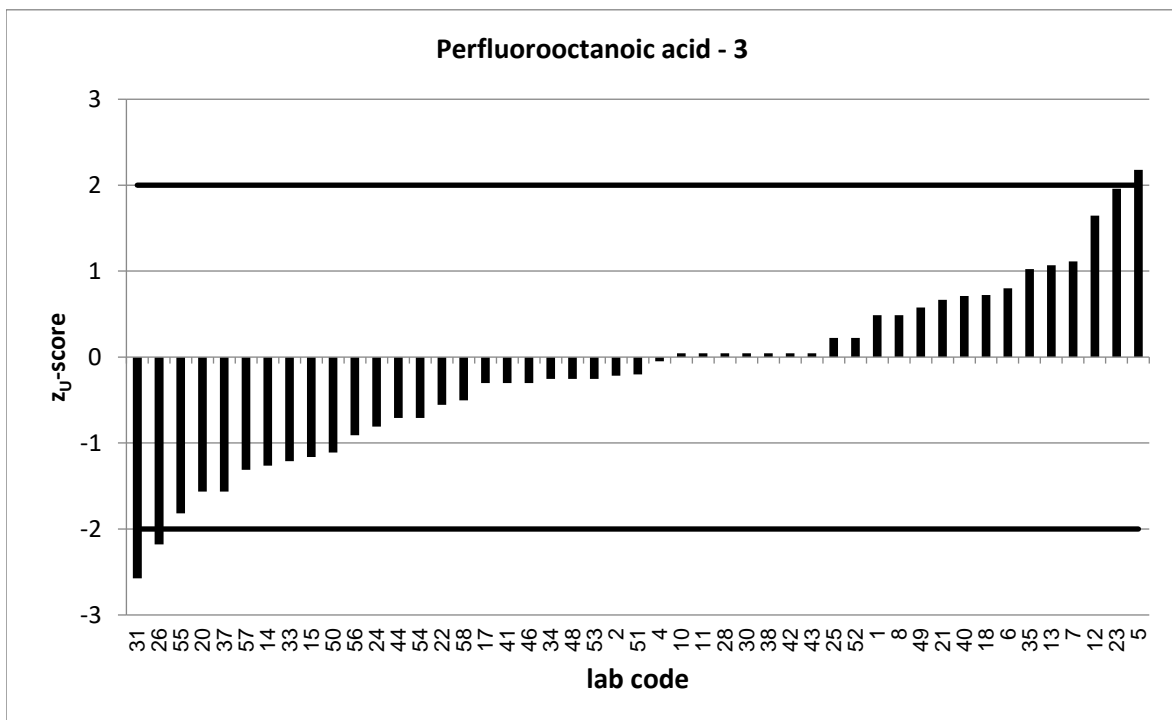
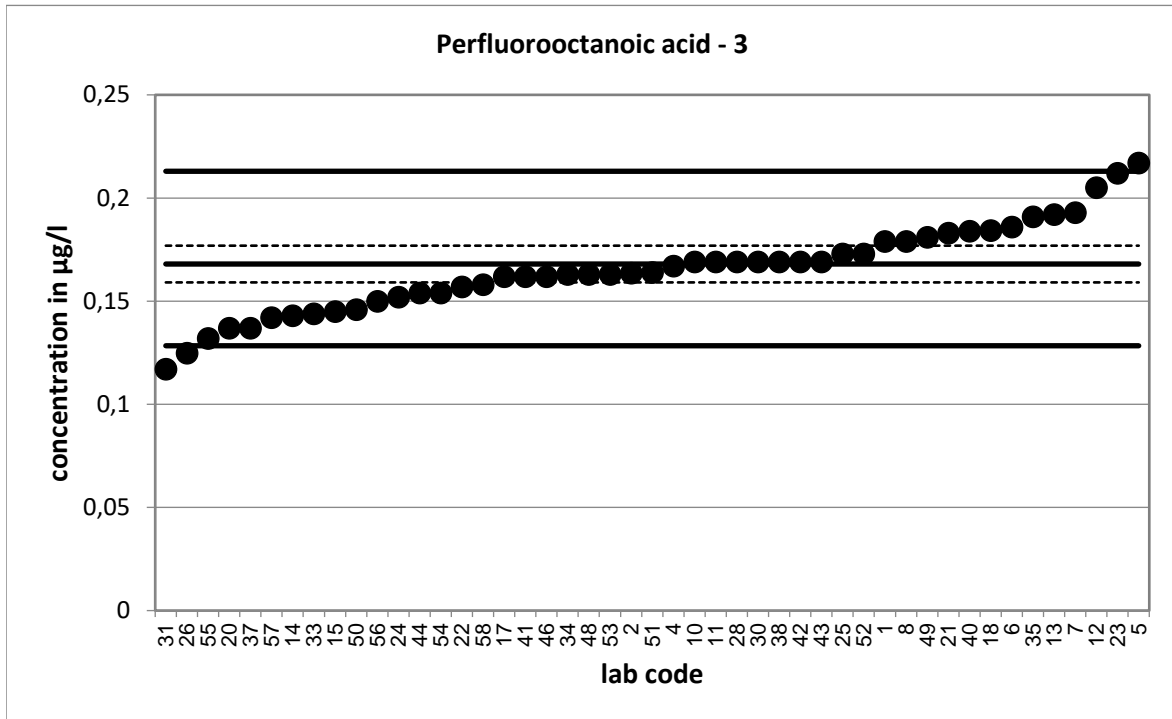
* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

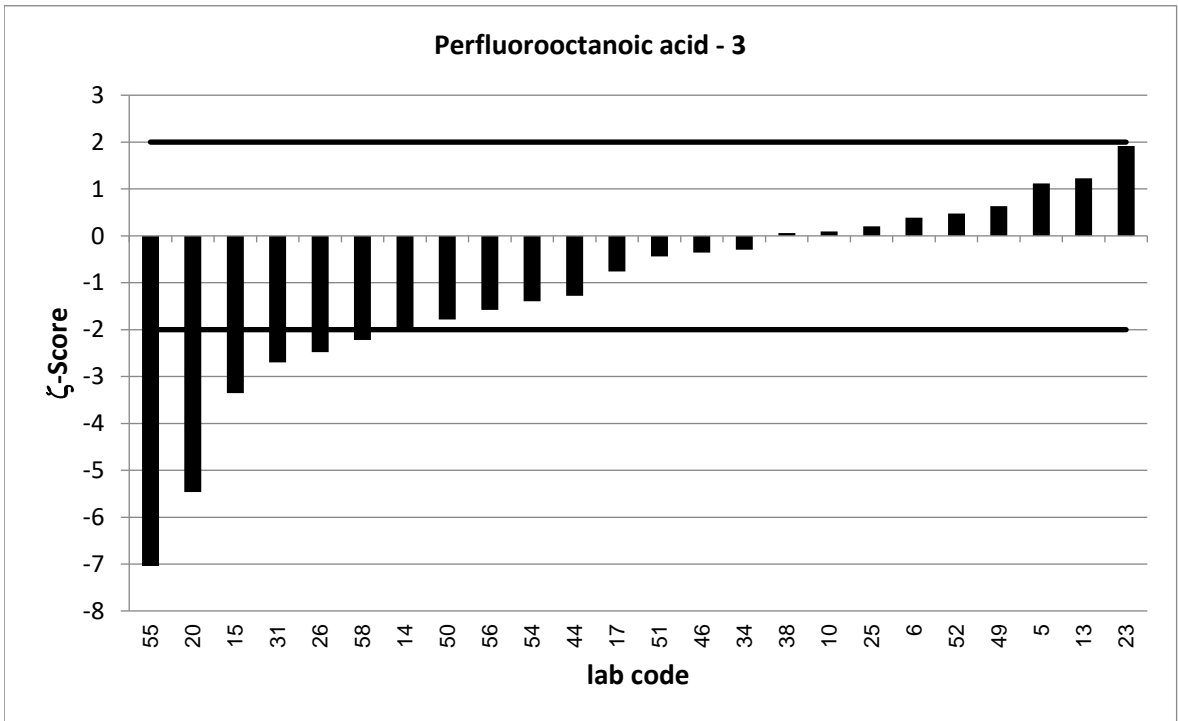
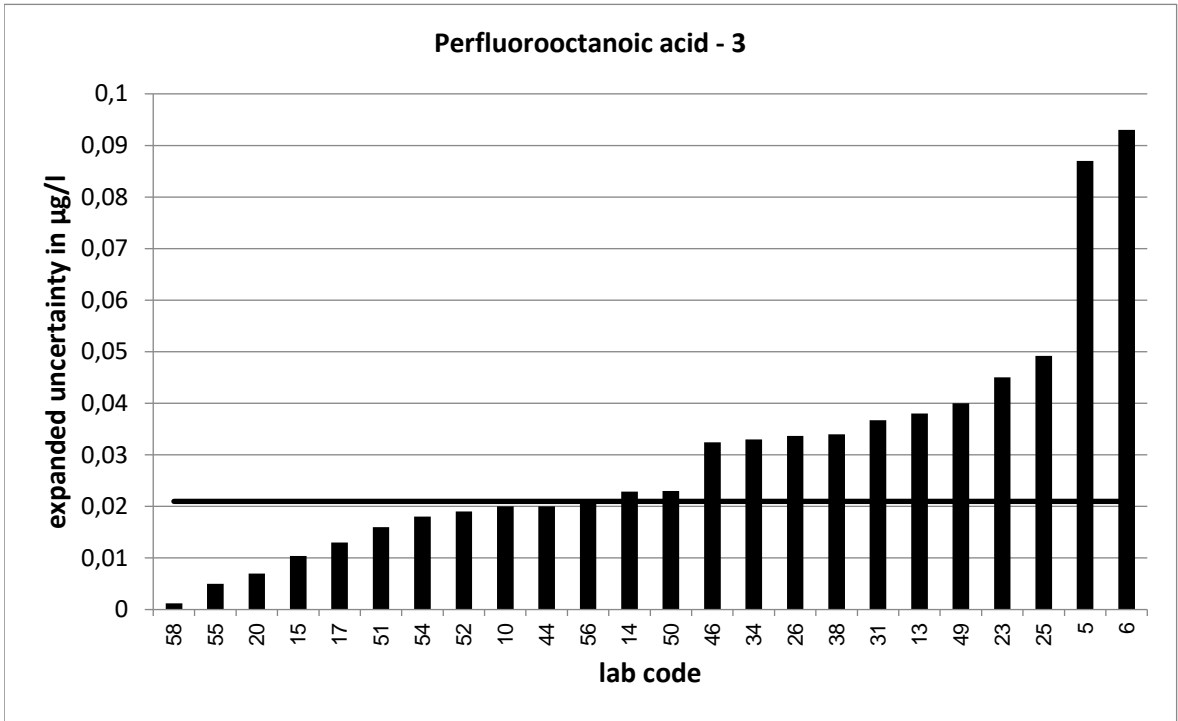
** s = satisfactory, q = questionable, u = unsatisfactory

PT 6/17 - TW S4		Perfluorooctanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,168		$\pm 0,0089$	
upper tolerance limit [$\mu\text{g/l}$]		0,213			
lower tolerance limit [$\mu\text{g/l}$]		0,1284			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
58	0,158	0,001	-2,2	-0,5	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

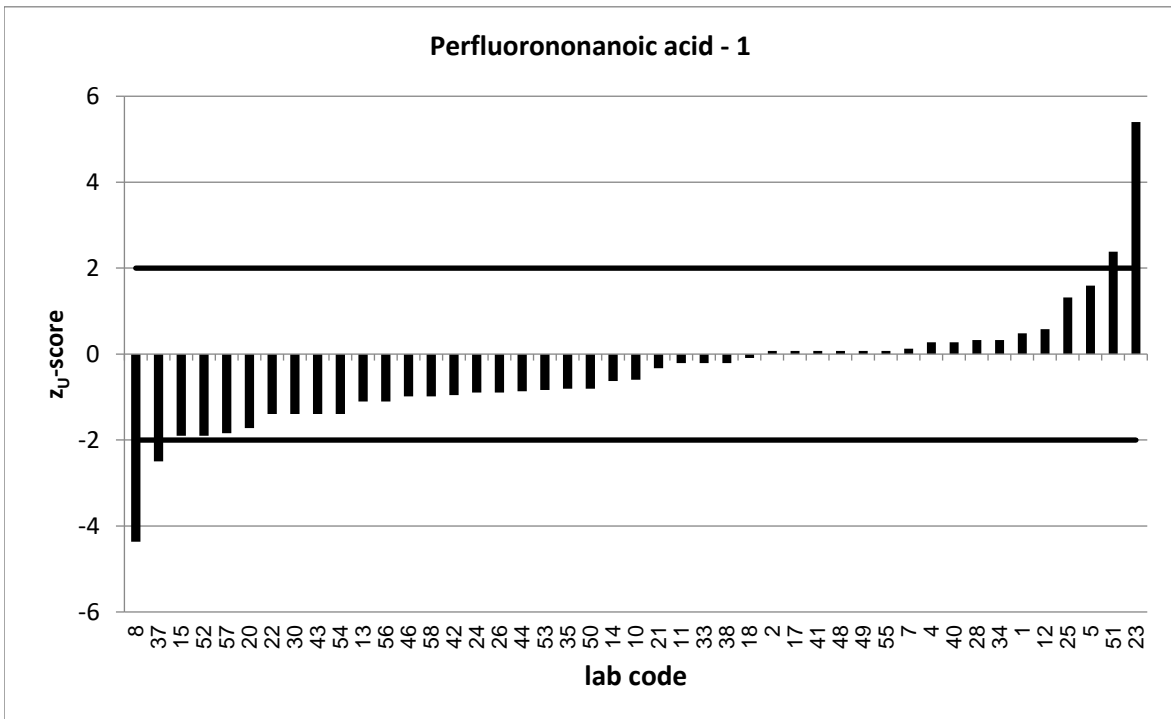
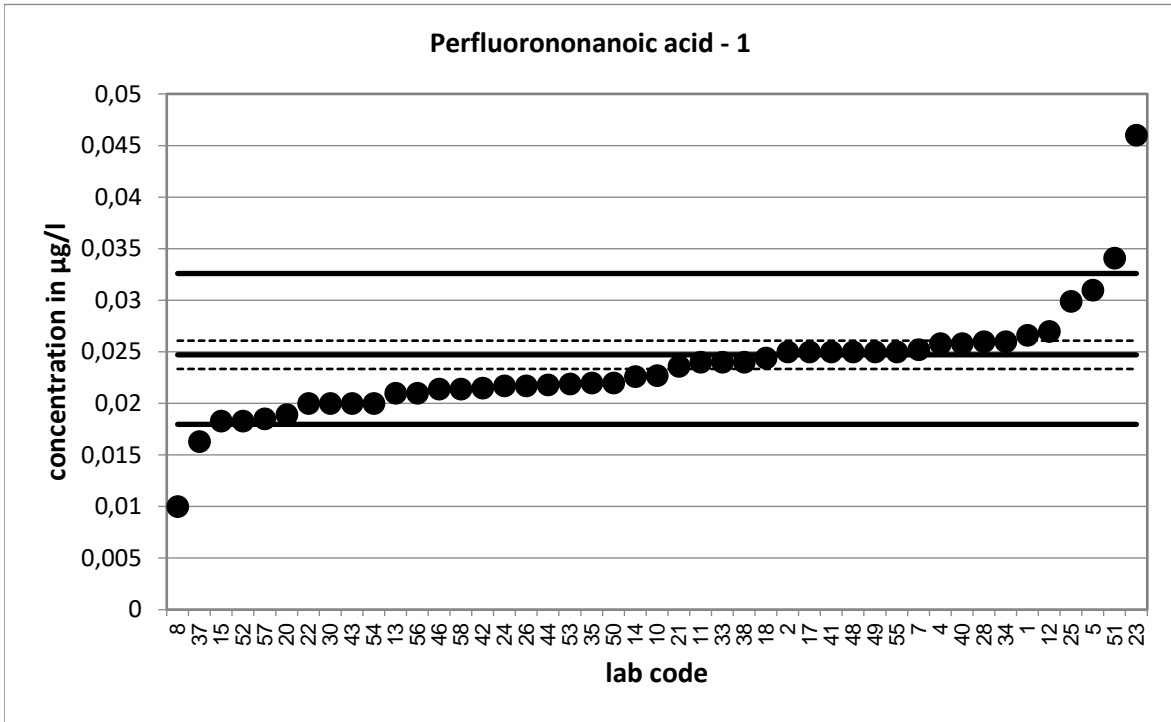


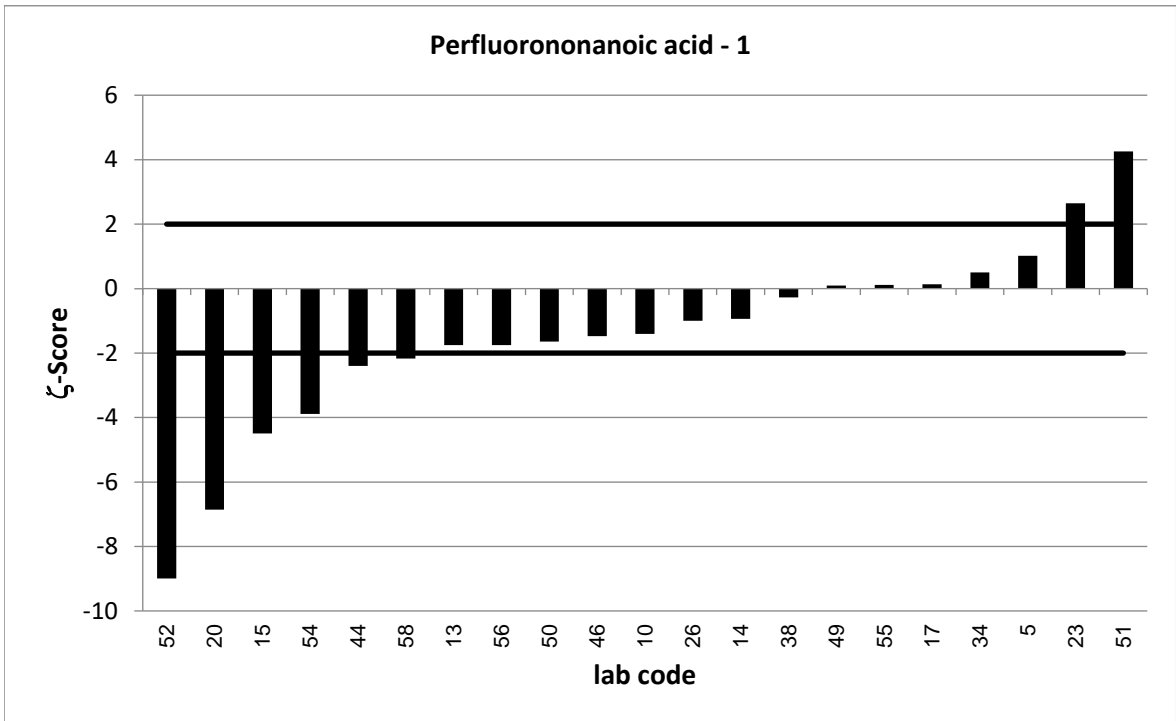
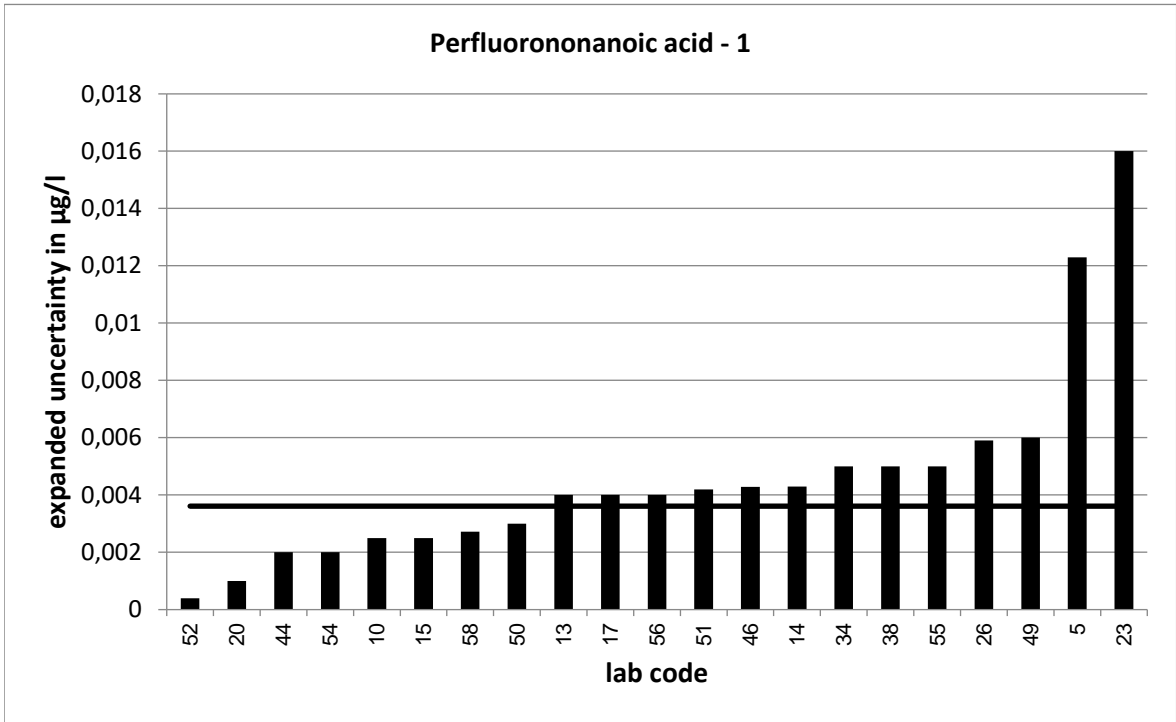


PT 6/17 - TW S4		Perfluorononanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,02471 \pm 0,00137			
upper tolerance limit [$\mu\text{g/l}$]		0,03259			
lower tolerance limit [$\mu\text{g/l}$]		0,01796			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0266			0,5	s
2	0,02499			0,1	s
4	0,0258			0,3	s
5	0,031	0,012	1,0	1,6	s
7	0,0252			0,1	s
8	0,01			-4,4	u
10	0,0227	0,003	-1,4	-0,6	s
11	0,024			-0,2	s
12	0,027			0,6	s
13	0,021	0,004	-1,8	-1,1	s
14	0,0226	0,004	-0,9	-0,6	s
15	0,0183	0,003	-4,5	-1,9	s
17	0,025	0,004	0,1	0,1	s
18	0,0244			-0,1	s
20	0,0189	0,001	-6,9	-1,7	s
21	0,0236			-0,3	s
22	0,02			-1,4	s
23	0,046	0,016	2,7	5,4	u
24	0,0217			-0,9	s
25	0,0299			1,3	s
26	0,0217	0,006	-1,0	-0,9	s
28	0,026			0,3	s
30	0,02			-1,4	s
33	0,024			-0,2	s
34	0,026	0,005	0,5	0,3	s
35	0,022			-0,8	s
37	0,0163			-2,5	q
38	0,024	0,005	-0,3	-0,2	s
40	0,0258			0,3	s
41	0,025			0,1	s
42	0,0215			-1,0	s
43	0,02			-1,4	s
44	0,0218	0,002	-2,4	-0,9	s
46	0,0214	0,004	-1,5	-1,0	s
48	0,025			0,1	s
49	0,025	0,006	0,1	0,1	s
50	0,022	0,003	-1,6	-0,8	s
51	0,0341	0,004	4,3	2,4	q
52	0,0183	4E-04	-9,0	-1,9	s
53	0,0219			-0,8	s
54	0,02	0,002	-3,9	-1,4	s
55	0,025	0,005	0,1	0,1	s
56	0,021	0,004	-1,8	-1,1	s
57	0,0185			-1,8	s
58	0,0214	0,003	-2,2	-1,0	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

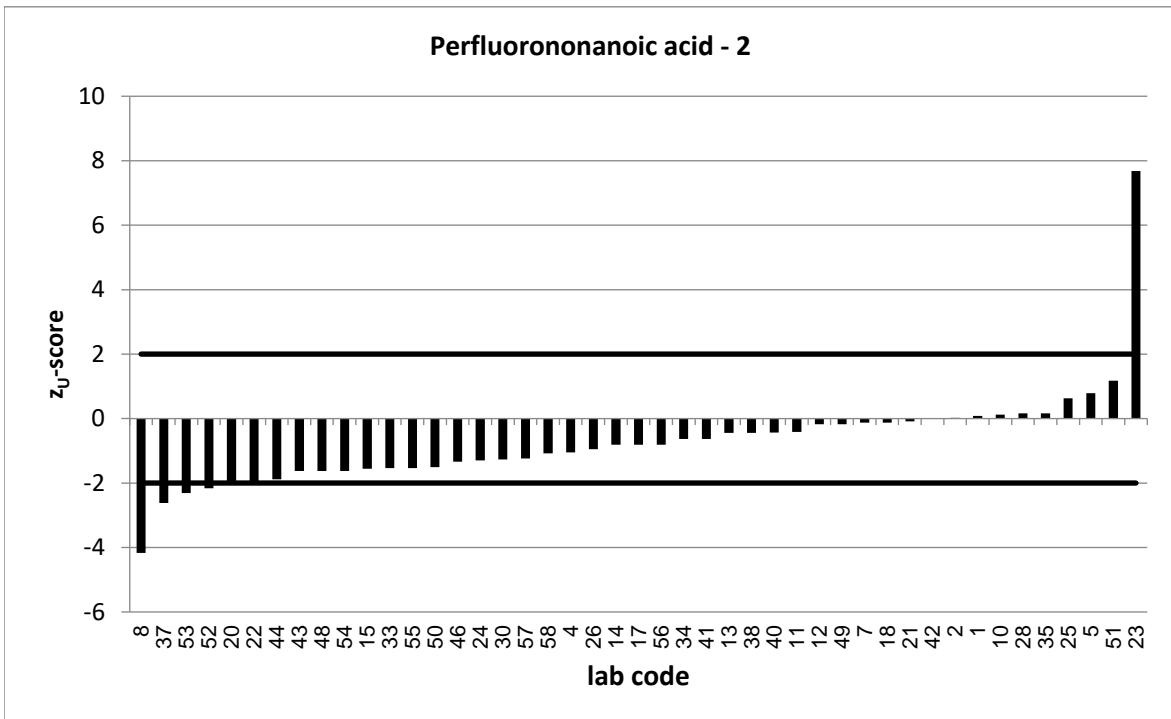
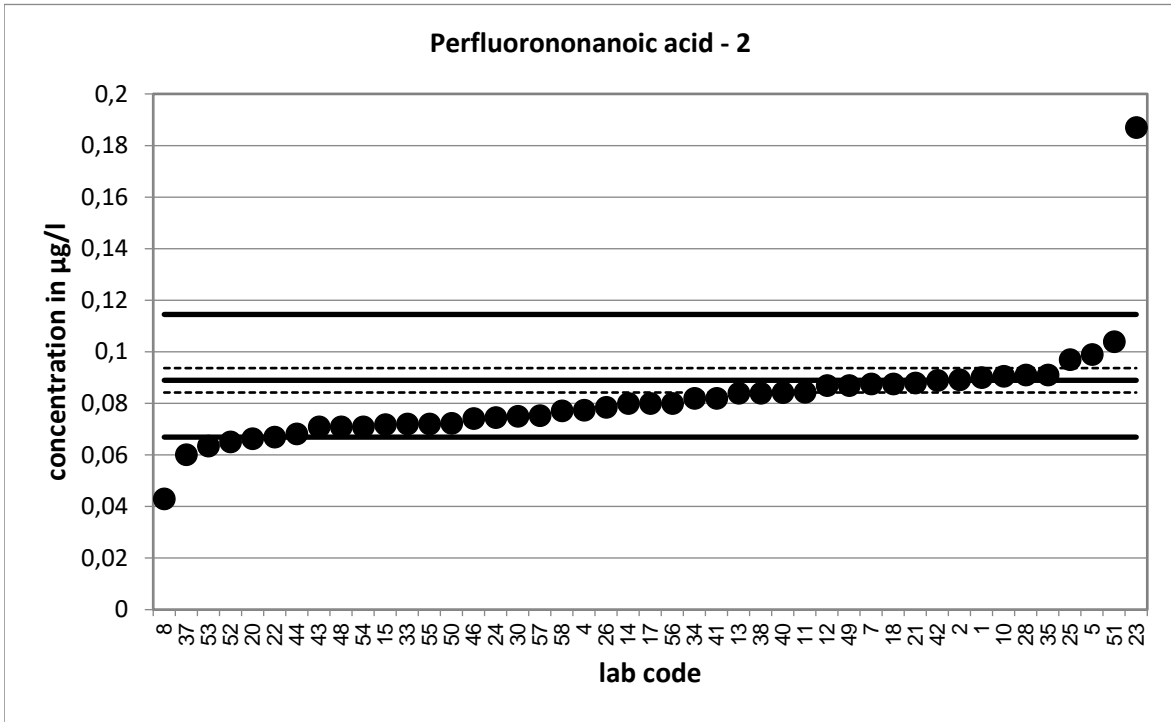


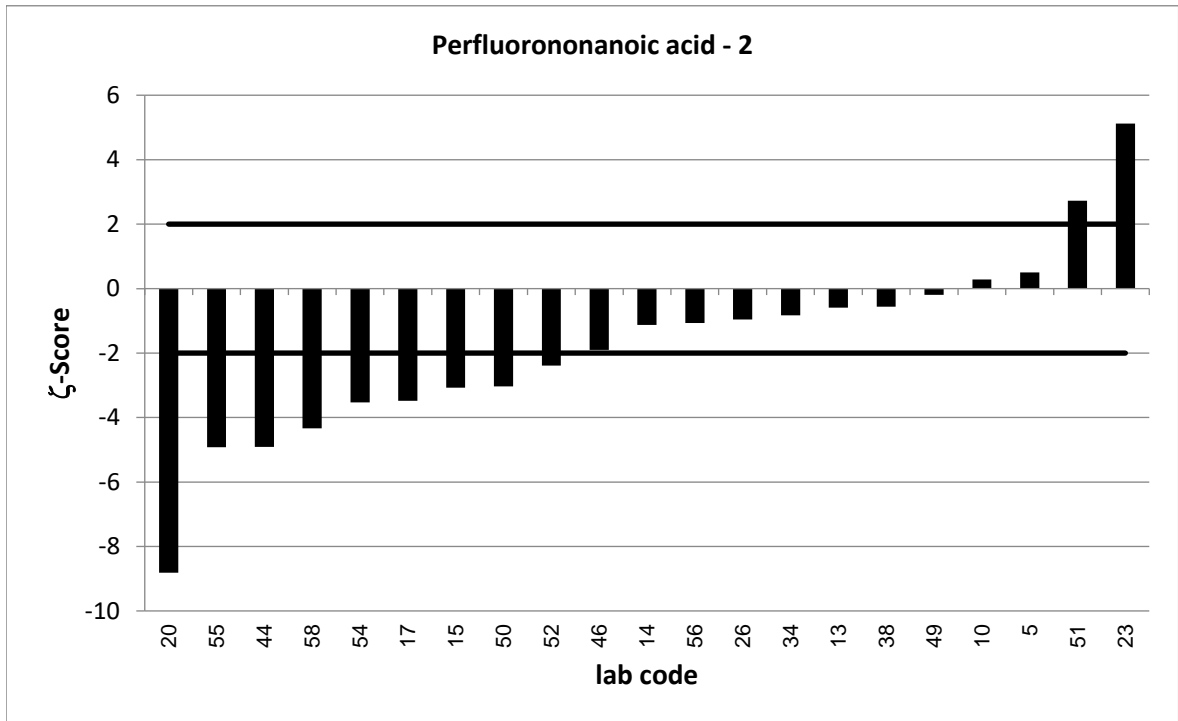
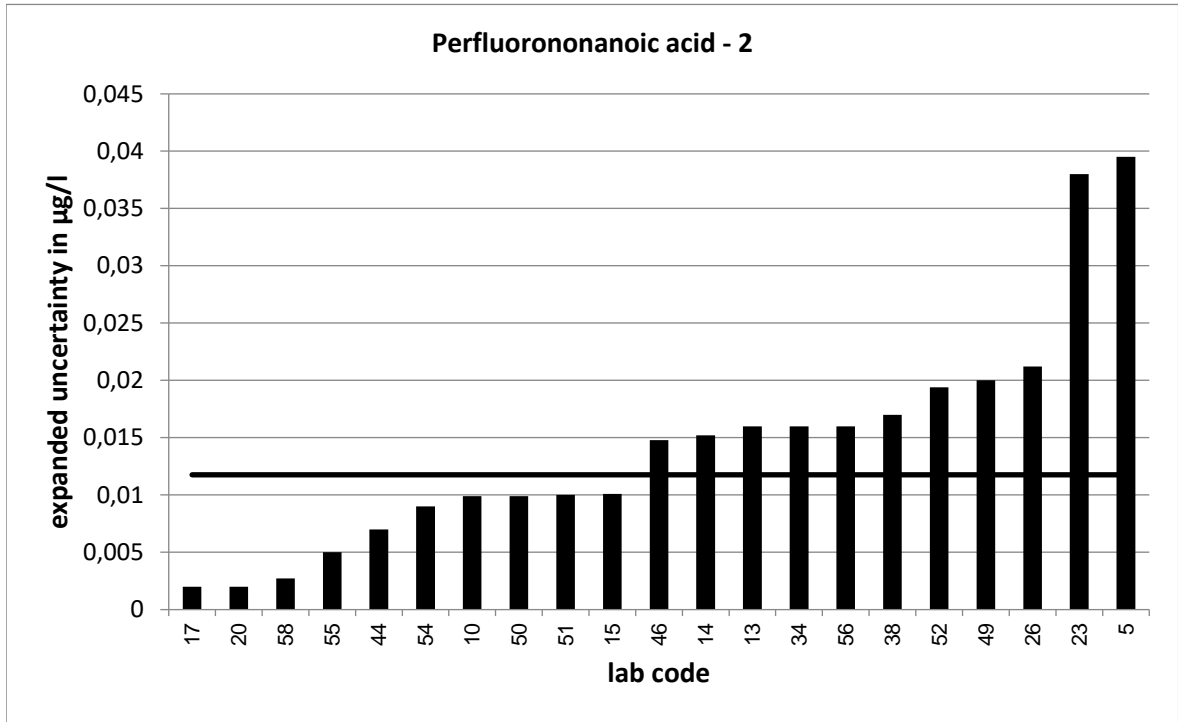


PT 6/17 - TW S4		Perfluorononanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,08894 \pm 0,00473			
upper tolerance limit [$\mu\text{g/l}$]		0,1145			
lower tolerance limit [$\mu\text{g/l}$]		0,06691			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,09			0,1	s
2	0,0892			0,0	s
4	0,0774			-1,0	s
5	0,099	0,04	0,5	0,8	s
7	0,0876			-0,1	s
8	0,043			-4,2	u
10	0,0905	0,01	0,3	0,1	s
11	0,0844			-0,4	s
12	0,087			-0,2	s
13	0,084	0,016	-0,6	-0,4	s
14	0,08	0,015	-1,1	-0,8	s
15	0,0718	0,01	-3,1	-1,6	s
17	0,08	0,002	-3,5	-0,8	s
18	0,0876			-0,1	s
20	0,0663	0,002	-8,8	-2,1	q
21	0,088			-0,1	s
22	0,067			-2,0	s
23	0,187	0,038	5,1	7,7	u
24	0,0746			-1,3	s
25	0,097			0,6	s
26	0,0785	0,021	-1,0	-0,9	s
28	0,091			0,2	s
30	0,075			-1,3	s
33	0,072			-1,5	s
34	0,082	0,016	-0,8	-0,6	s
35	0,091			0,2	s
37	0,0601			-2,6	q
38	0,084	0,017	-0,6	-0,4	s
40	0,0842			-0,4	s
41	0,082			-0,6	s
42	0,089			0,0	s
43	0,071			-1,6	s
44	0,0682	0,007	-4,9	-1,9	s
46	0,0742	0,015	-1,9	-1,3	s
48	0,071			-1,6	s
49	0,087	0,02	-0,2	-0,2	s
50	0,0723	0,01	-3,0	-1,5	s
51	0,104	0,01	2,7	1,2	s
52	0,0651	0,019	-2,4	-2,2	q
53	0,0635			-2,3	q
54	0,071	0,009	-3,5	-1,6	s
55	0,072	0,005	-4,9	-1,5	s
56	0,08	0,016	-1,1	-0,8	s
57	0,0753			-1,2	s
58	0,0771	0,003	-4,3	-1,1	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

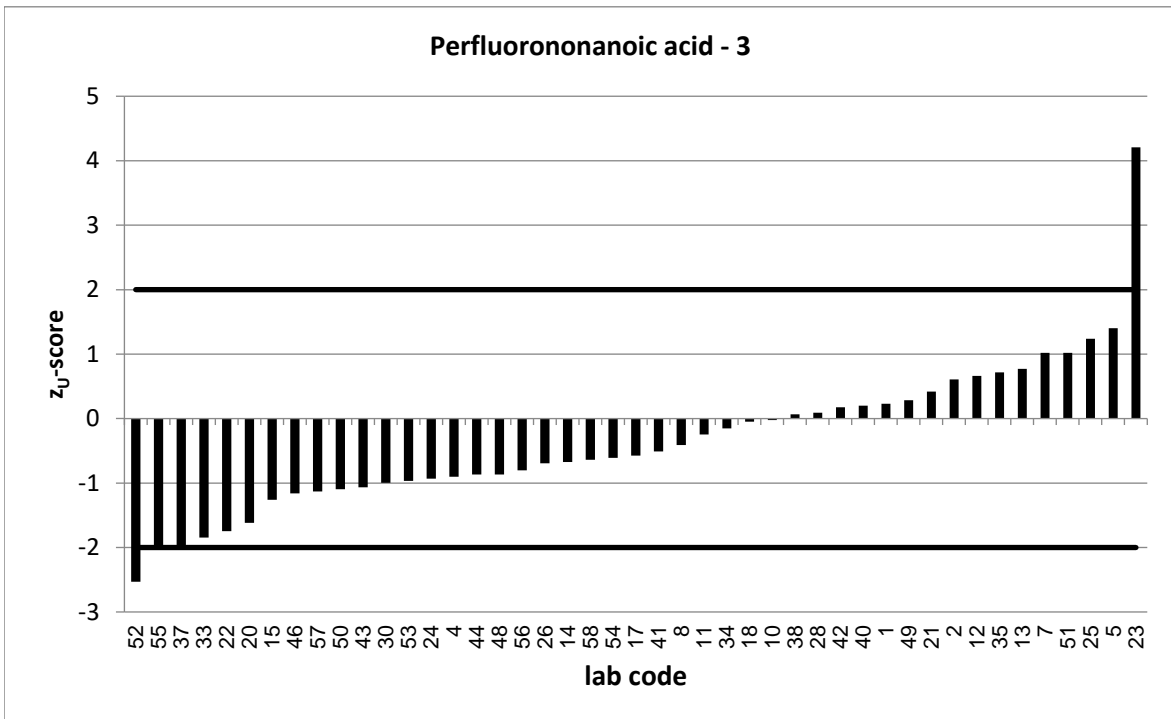
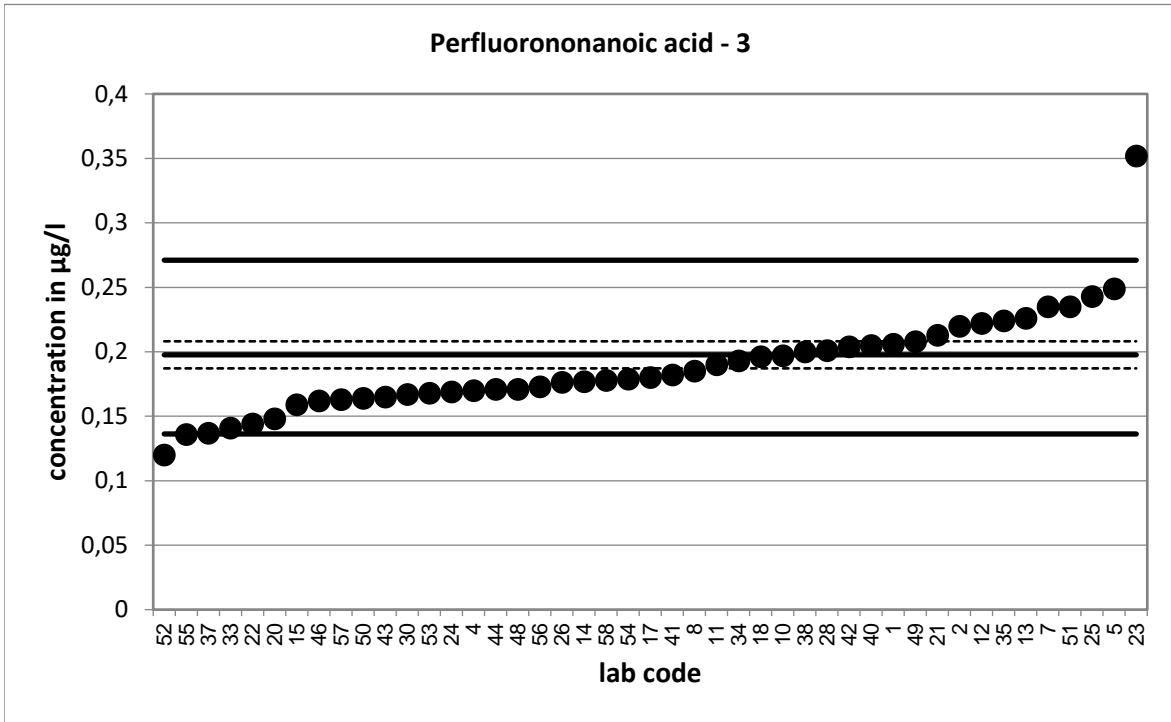


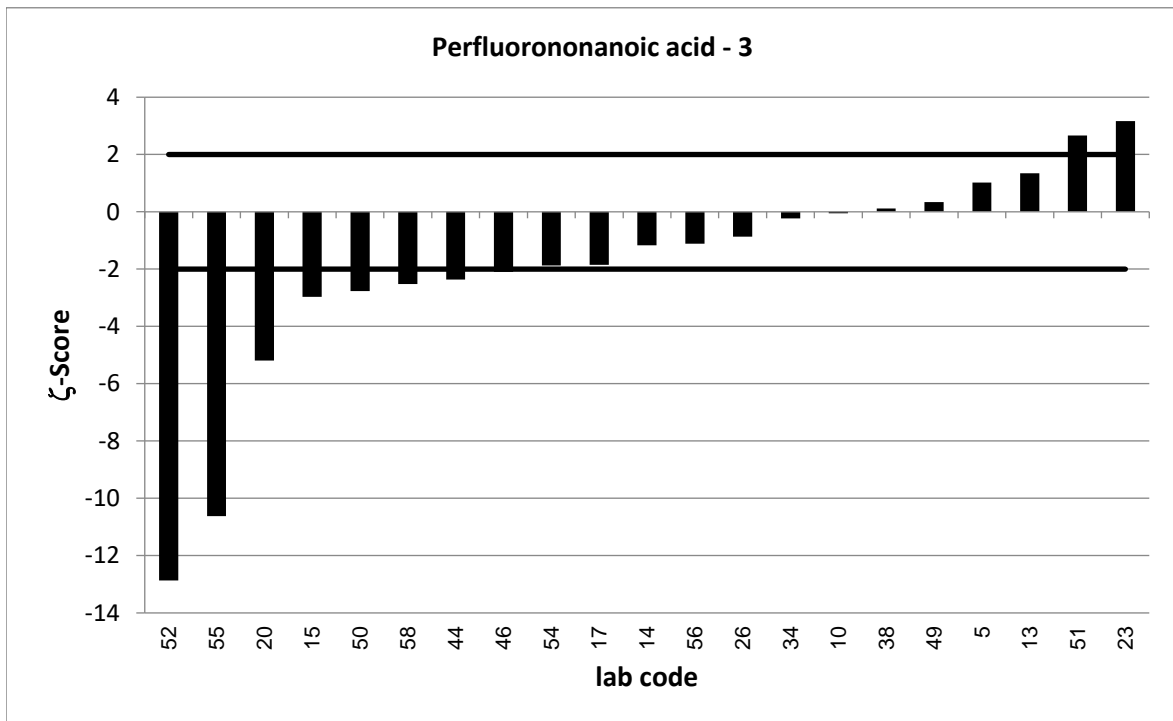
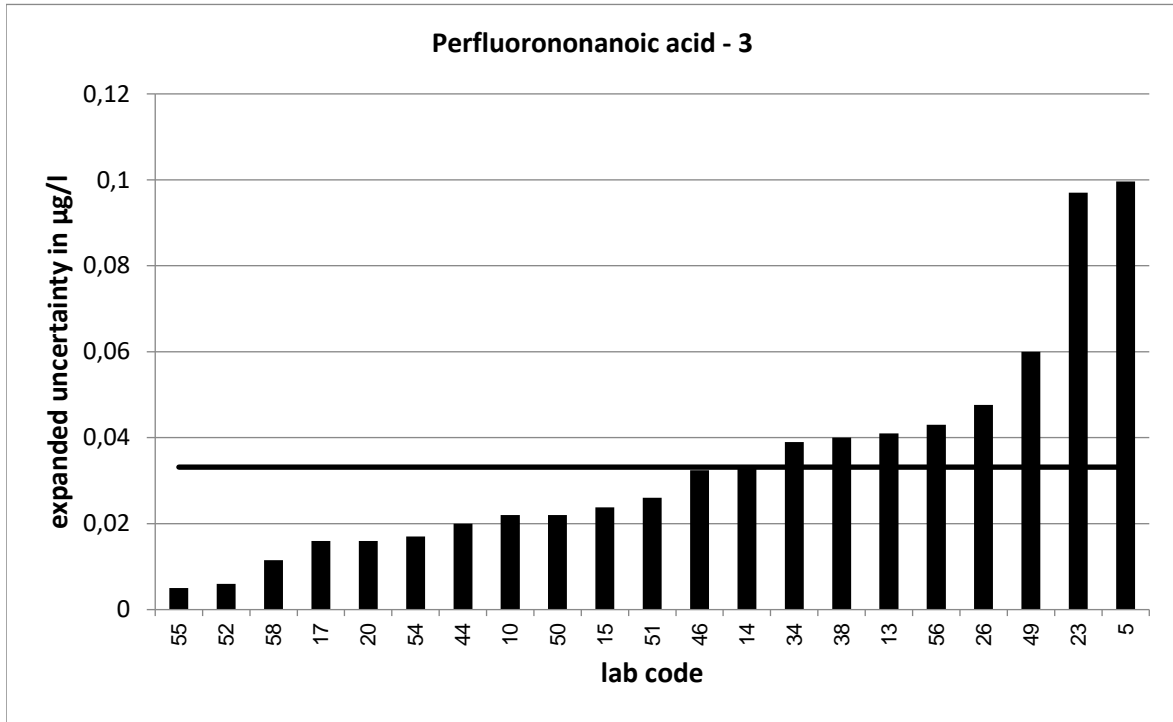


PT 6/17 - TW S4		Perfluorononanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1976 \pm 0,0105			
upper tolerance limit [$\mu\text{g/l}$]		0,271			
lower tolerance limit [$\mu\text{g/l}$]		0,1363			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,206			0,2	s
2	0,2199			0,6	s
4	0,17			-0,9	s
5	0,249	0,1	1,0	1,4	s
7	0,235			1,0	s
8	0,185			-0,4	s
10	0,197	0,022	-0,1	0,0	s
11	0,19			-0,2	s
12	0,222			0,7	s
13	0,226	0,041	1,3	0,8	s
14	0,177	0,034	-1,2	-0,7	s
15	0,159	0,024	-3,0	-1,3	s
17	0,18	0,016	-1,8	-0,6	s
18	0,1962			0,0	s
20	0,148	0,016	-5,2	-1,6	s
21	0,213			0,4	s
22	0,144			-1,7	s
23	0,352	0,097	3,2	4,2	u
24	0,169			-0,9	s
25	0,243			1,2	s
26	0,1764	0,048	-0,9	-0,7	s
28	0,201			0,1	s
30	0,167			-1,0	s
33	0,141			-1,8	s
34	0,193	0,039	-0,2	-0,2	s
35	0,224			0,7	s
37	0,137			-2,0	s
38	0,2	0,04	0,1	0,1	s
40	0,205			0,2	s
41	0,182			-0,5	s
42	0,204			0,2	s
43	0,165			-1,1	s
44	0,171	0,02	-2,4	-0,9	s
46	0,162	0,032	-2,1	-1,2	s
48	0,171			-0,9	s
49	0,208	0,06	0,3	0,3	s
50	0,164	0,022	-2,8	-1,1	s
51	0,235	0,026	2,7	1,0	s
52	0,12	0,006	-12,9	-2,5	q
53	0,168			-1,0	s
54	0,179	0,017	-1,9	-0,6	s
55	0,136	0,005	-10,6	-2,0	s
56	0,173	0,043	-1,1	-0,8	s
57	0,163			-1,1	s
58	0,178	0,012	-2,5	-0,6	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

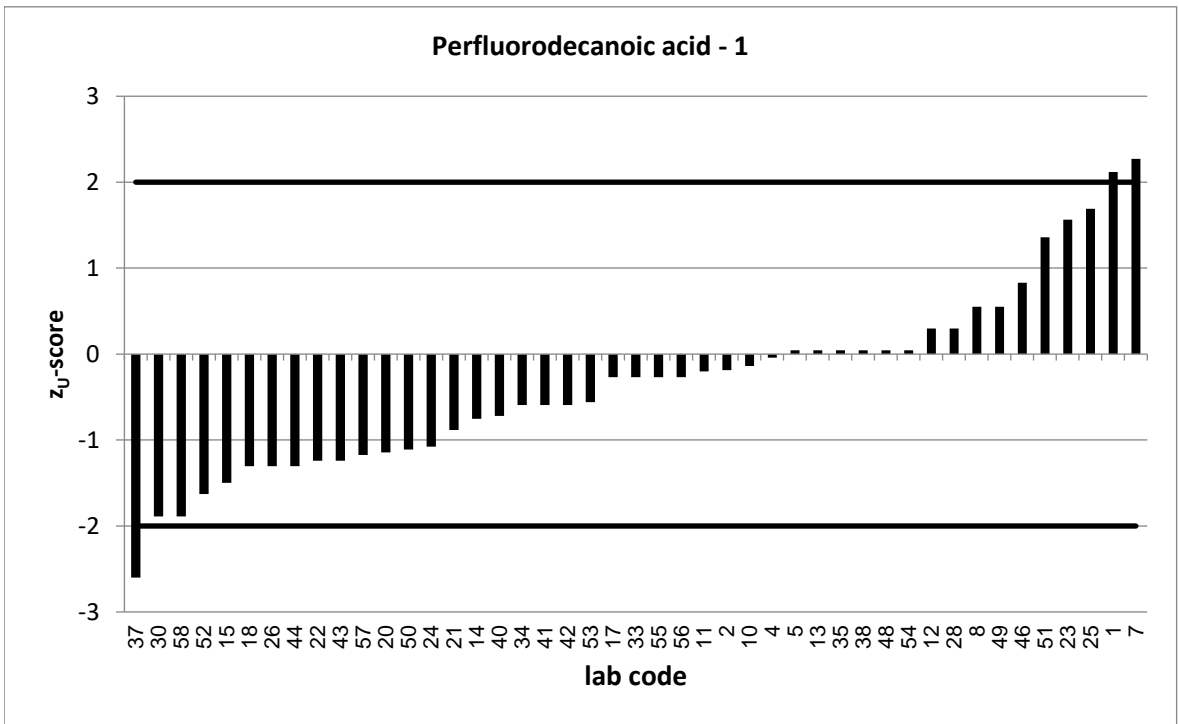
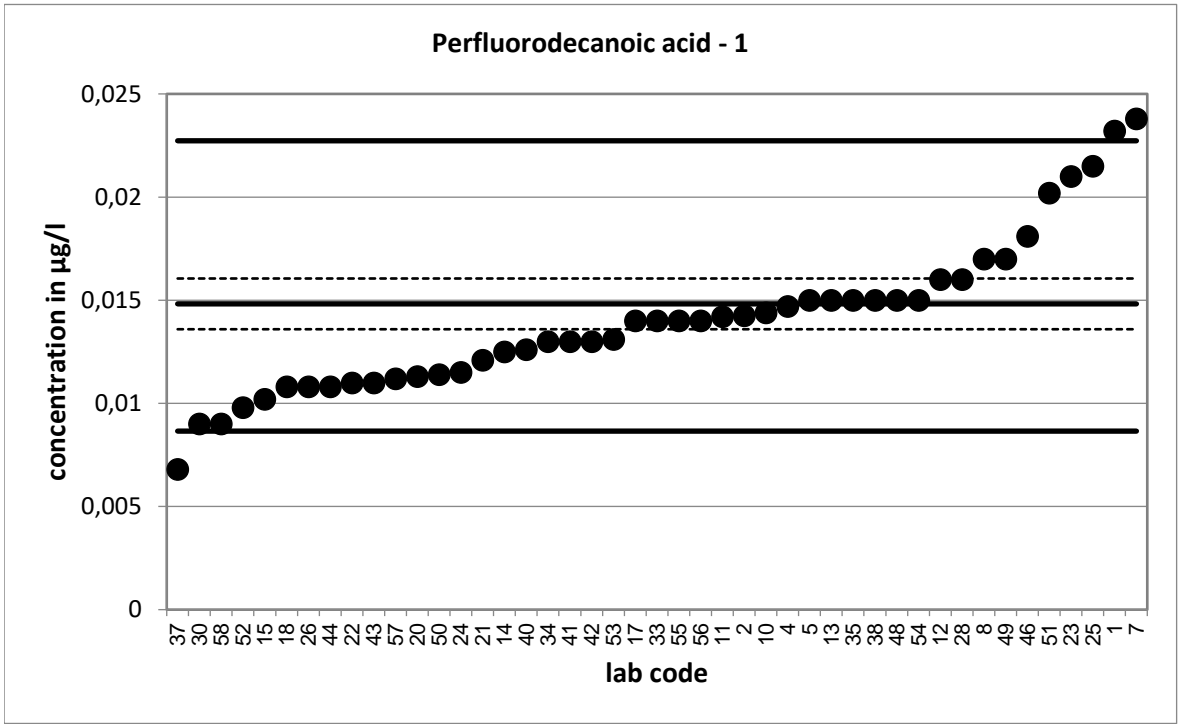


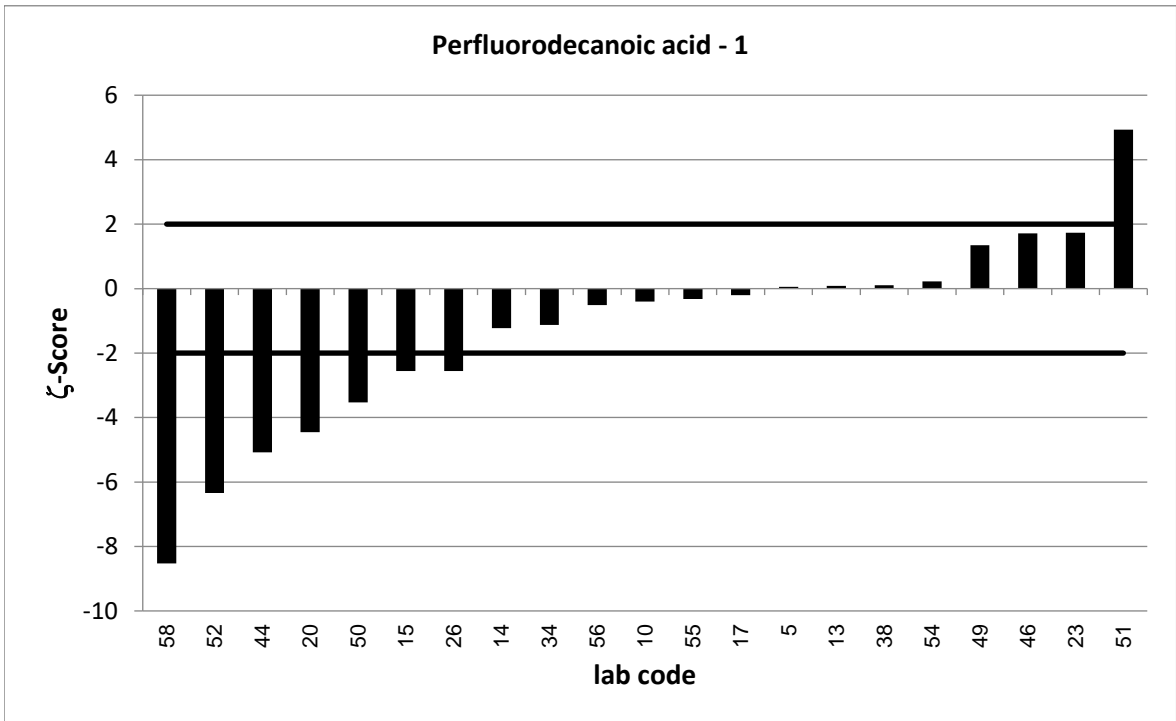
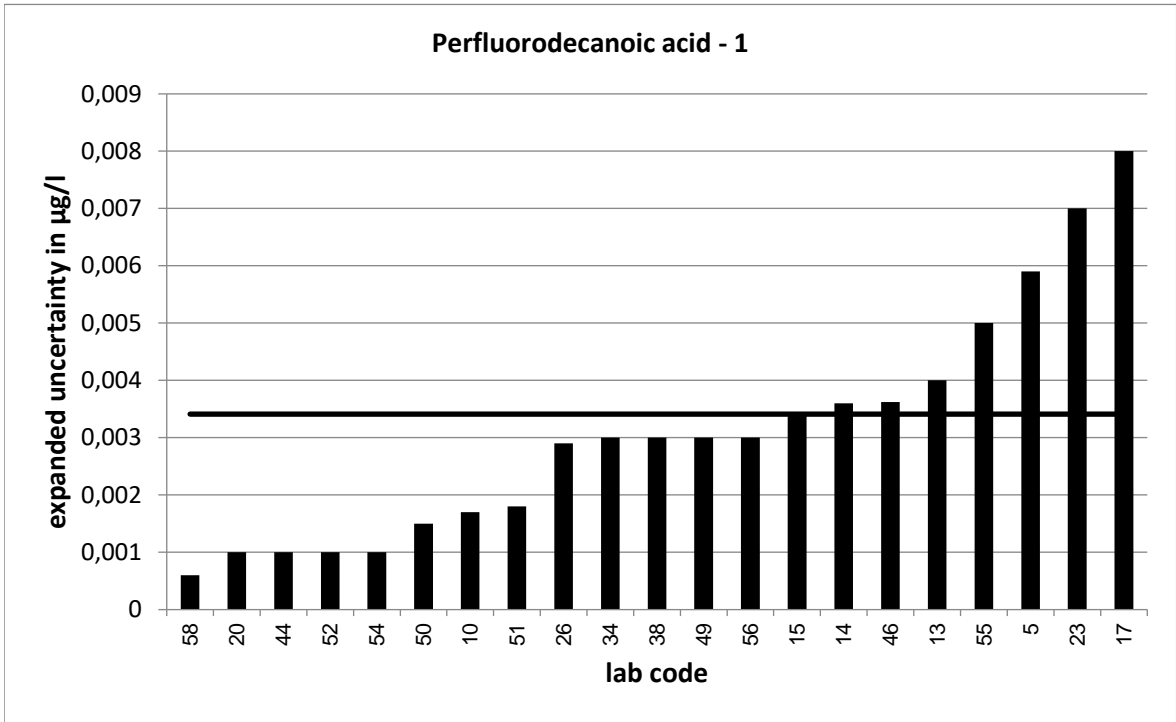


PT 6/17 - TW S4		Perfluorodecanoic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01482 \pm 0,00123			
upper tolerance limit [$\mu\text{g/l}$]		0,02273			
lower tolerance limit [$\mu\text{g/l}$]		0,008654			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0232			2,1	q
2	0,01425			-0,2	s
4	0,0147			0,0	s
5	0,015	0,006	0,1	0,0	s
7	0,0238			2,3	q
8	0,017			0,6	s
10	0,0144	0,002	-0,4	-0,1	s
11	0,0142			-0,2	s
12	0,016			0,3	s
13	0,015	0,004	0,1	0,0	s
14	0,0125	0,004	-1,2	-0,8	s
15	0,0102	0,003	-2,6	-1,5	s
17	0,014	0,008	-0,2	-0,3	s
18	0,0108			-1,3	s
20	0,0113	0,001	-4,5	-1,1	s
21	0,0121			-0,9	s
22	0,011			-1,2	s
23	0,021	0,007	1,7	1,6	s
24	0,0115			-1,1	s
25	0,0215			1,7	s
26	0,0108	0,003	-2,6	-1,3	s
28	0,016			0,3	s
30	0,009			-1,9	s
33	0,014			-0,3	s
34	0,013	0,003	-1,1	-0,6	s
35	0,015			0,0	s
37	0,0068			-2,6	q
38	0,015	0,003	0,1	0,0	s
40	0,0126			-0,7	s
41	0,013			-0,6	s
42	0,013			-0,6	s
43	0,011			-1,2	s
44	0,0108	0,001	-5,1	-1,3	s
46	0,0181	0,004	1,7	0,8	s
48	0,015			0,0	s
49	0,017	0,003	1,3	0,6	s
50	0,0114	0,002	-3,5	-1,1	s
51	0,0202	0,002	4,9	1,4	s
52	0,0098	0,001	-6,3	-1,6	s
53	0,0131			-0,6	s
54	0,015	0,001	0,2	0,0	s
55	0,014	0,005	-0,3	-0,3	s
56	0,014	0,003	-0,5	-0,3	s
57	0,0112			-1,2	s
58	0,009	6E-04	-8,5	-1,9	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

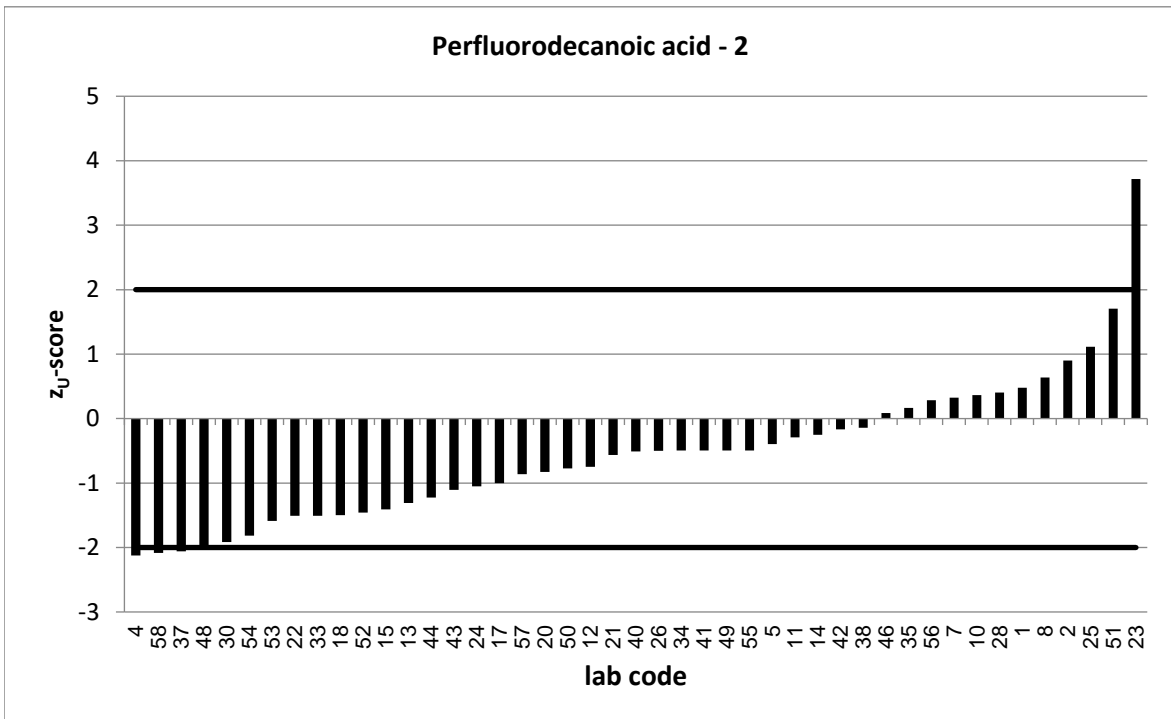
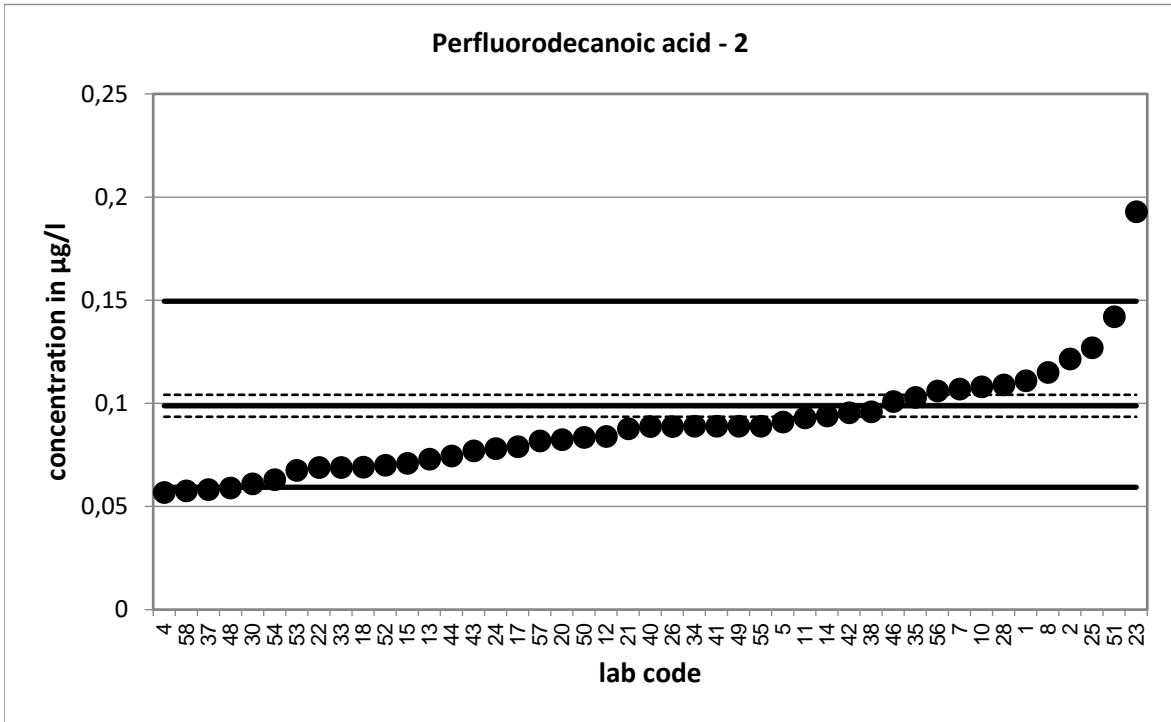


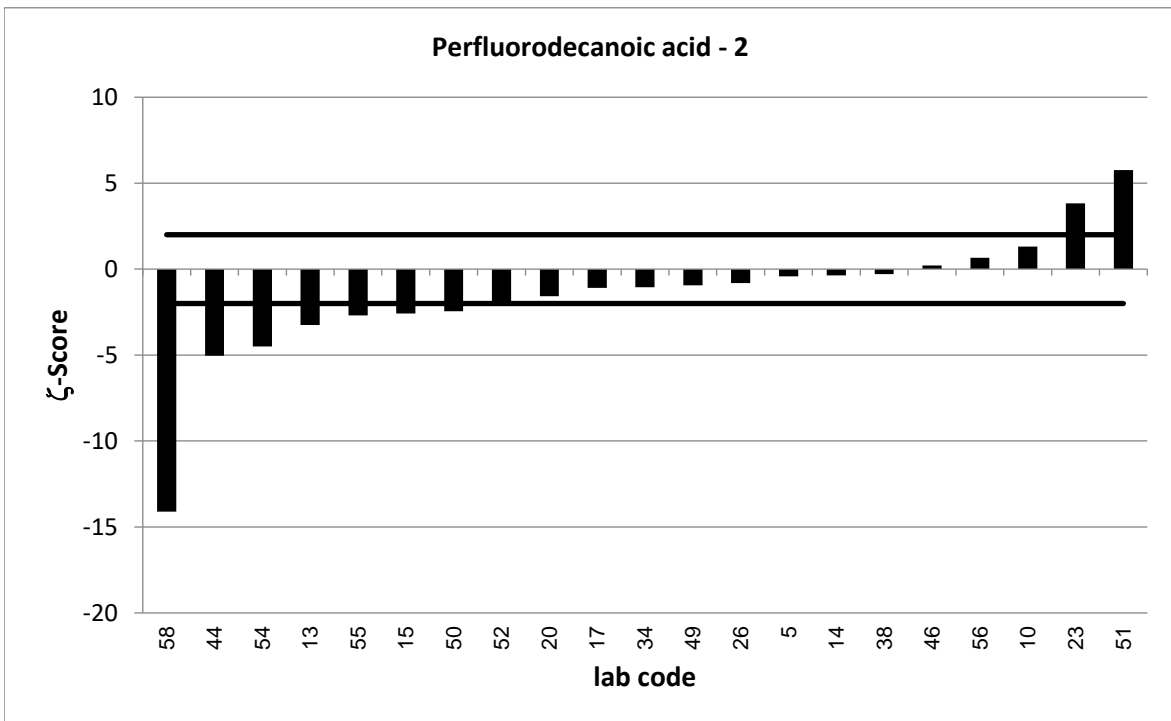
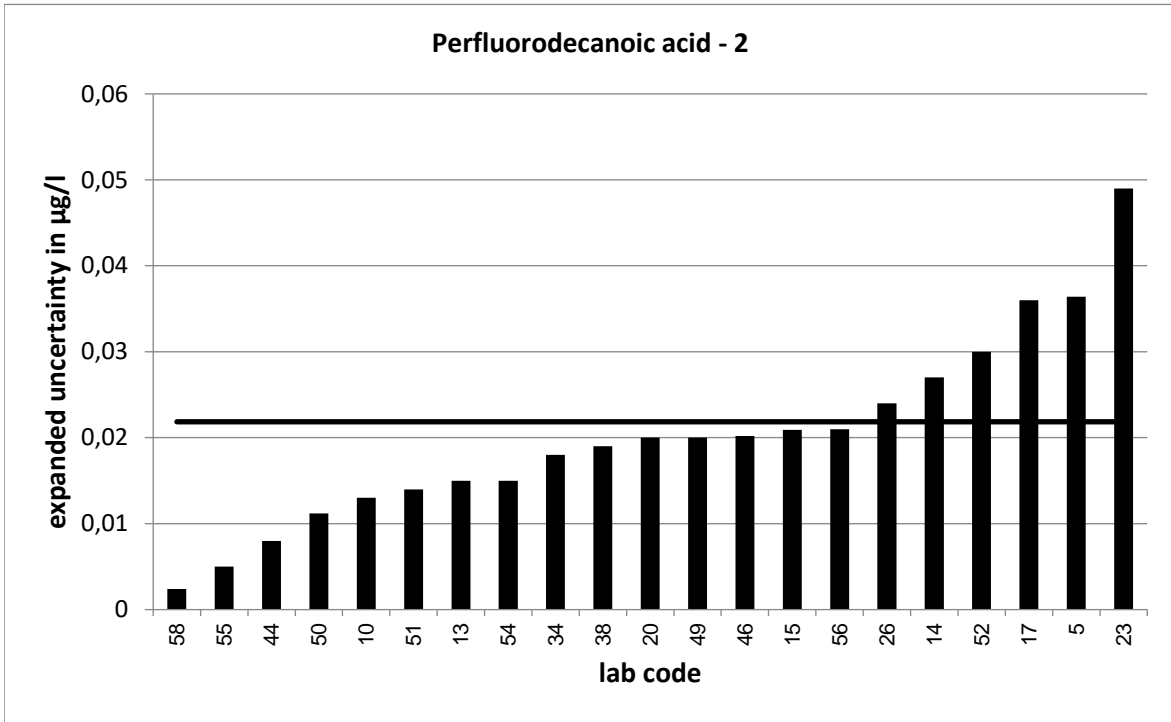


PT 6/17 - TW S4		Perfluorodecanoic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,09882 \pm 0,00532			
upper tolerance limit [$\mu\text{g/l}$]		0,1495			
lower tolerance limit [$\mu\text{g/l}$]		0,05932			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,111			0,5	s
2	0,1216			0,9	s
4	0,0569			-2,1	q
5	0,091	0,036	-0,4	-0,4	s
7	0,107			0,3	s
8	0,115			0,6	s
10	0,108	0,013	1,3	0,4	s
11	0,0931			-0,3	s
12	0,084			-0,8	s
13	0,073	0,015	-3,2	-1,3	s
14	0,0939	0,027	-0,4	-0,2	s
15	0,071	0,021	-2,6	-1,4	s
17	0,079	0,036	-1,1	-1,0	s
18	0,0692			-1,5	s
20	0,0825	0,02	-1,6	-0,8	s
21	0,0877			-0,6	s
22	0,069			-1,5	s
23	0,193	0,049	3,8	3,7	u
24	0,0781			-1,0	s
25	0,127			1,1	s
26	0,0889	0,024	-0,8	-0,5	s
28	0,109			0,4	s
30	0,061			-1,9	s
33	0,069			-1,5	s
34	0,089	0,018	-1,0	-0,5	s
35	0,103			0,2	s
37	0,0582			-2,1	q
38	0,096	0,019	-0,3	-0,1	s
40	0,0888			-0,5	s
41	0,089			-0,5	s
42	0,0955			-0,2	s
43	0,077			-1,1	s
44	0,0746	0,008	-5,0	-1,2	s
46	0,101	0,02	0,2	0,1	s
48	0,059			-2,0	s
49	0,089	0,02	-0,9	-0,5	s
50	0,0836	0,011	-2,5	-0,8	s
51	0,142	0,014	5,8	1,7	s
52	0,07	0,03	-1,9	-1,5	s
53	0,0675			-1,6	s
54	0,063	0,015	-4,5	-1,8	s
55	0,089	0,005	-2,7	-0,5	s
56	0,106	0,021	0,7	0,3	s
57	0,0818			-0,9	s
58	0,0577	0,002	-14,1	-2,1	q

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

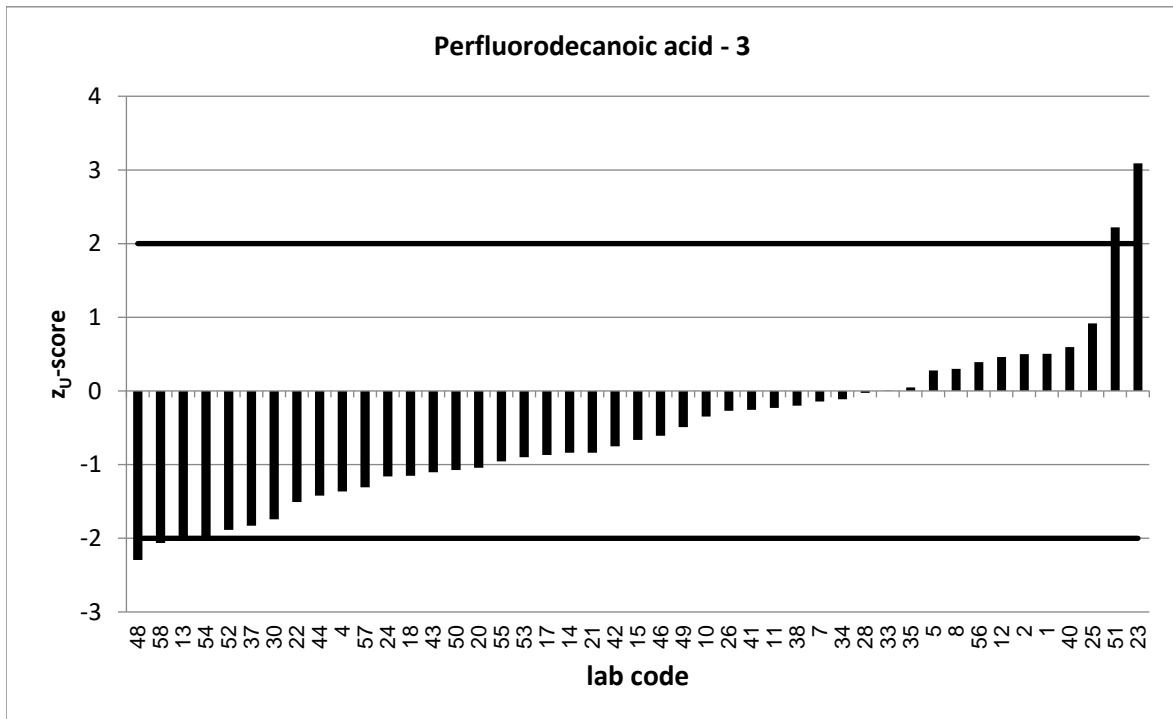
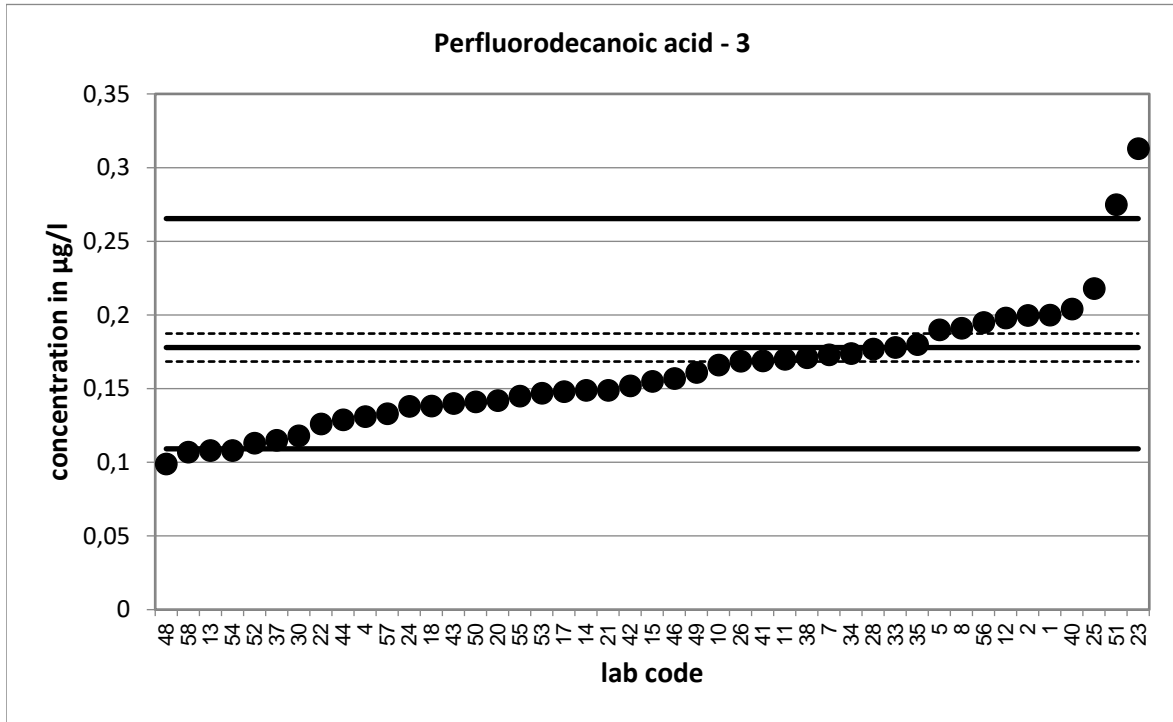


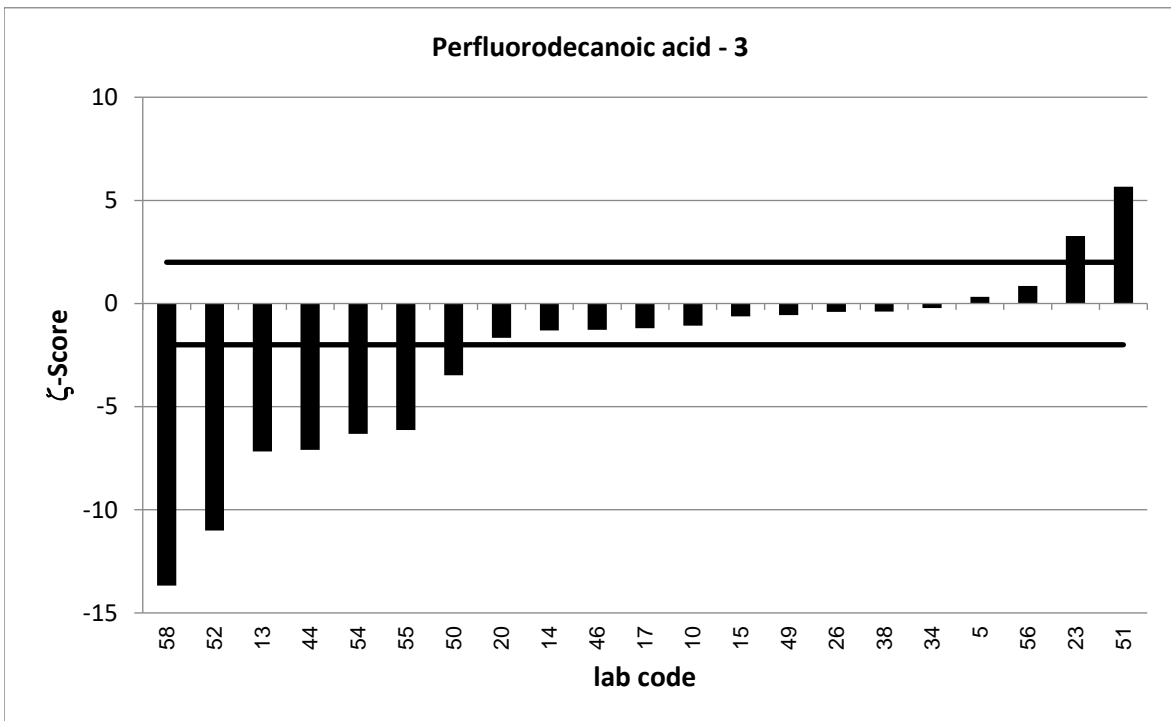
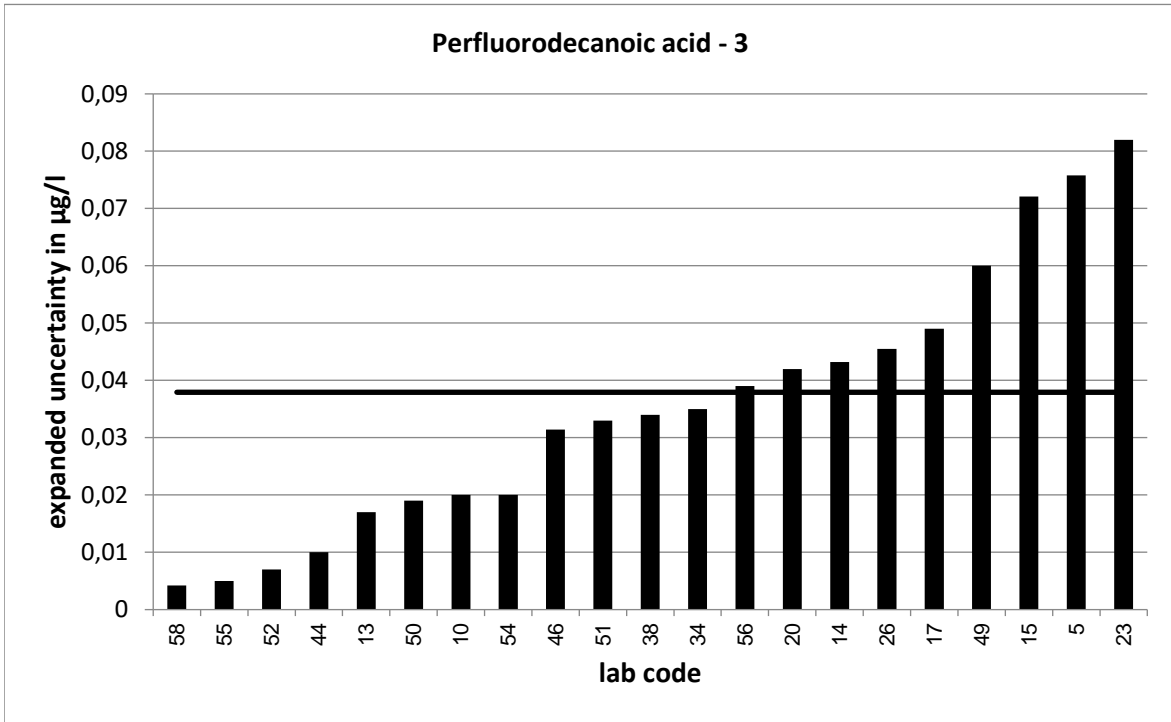


PT 6/17 - TW S4		Perfluorodecanoic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1779 \pm 0,0095			
upper tolerance limit [$\mu\text{g/l}$]		0,2654			
lower tolerance limit [$\mu\text{g/l}$]		0,1091			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,2			0,5	s
2	0,1997			0,5	s
4	0,131			-1,4	s
5	0,19	0,076	0,3	0,3	s
7	0,173			-0,1	s
8	0,191			0,3	s
10	0,166	0,02	-1,1	-0,3	s
11	0,17			-0,2	s
12	0,198			0,5	s
13	0,108	0,017	-7,2	-2,0	s
14	0,149	0,043	-1,3	-0,8	s
15	0,155	0,072	-0,6	-0,7	s
17	0,148	0,049	-1,2	-0,9	s
18	0,1383			-1,2	s
20	0,142	0,042	-1,7	-1,0	s
21	0,149			-0,8	s
22	0,126			-1,5	s
23	0,313	0,082	3,3	3,1	u
24	0,138			-1,2	s
25	0,218			0,9	s
26	0,1686	0,046	-0,4	-0,3	s
28	0,177			0,0	s
30	0,118			-1,7	s
33	0,178			0,0	s
34	0,174	0,035	-0,2	-0,1	s
35	0,18			0,0	s
37	0,115			-1,8	s
38	0,171	0,034	-0,4	-0,2	s
40	0,204			0,6	s
41	0,169			-0,3	s
42	0,152			-0,8	s
43	0,14			-1,1	s
44	0,129	0,01	-7,1	-1,4	s
46	0,157	0,031	-1,3	-0,6	s
48	0,099			-2,3	q
49	0,161	0,06	-0,6	-0,5	s
50	0,141	0,019	-3,5	-1,1	s
51	0,275	0,033	5,7	2,2	q
52	0,113	0,007	-11,0	-1,9	s
53	0,147			-0,9	s
54	0,108	0,02	-6,3	-2,0	s
55	0,145	0,005	-6,1	-1,0	s
56	0,195	0,039	0,9	0,4	s
57	0,133			-1,3	s
58	0,107	0,004	-13,7	-2,1	q

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

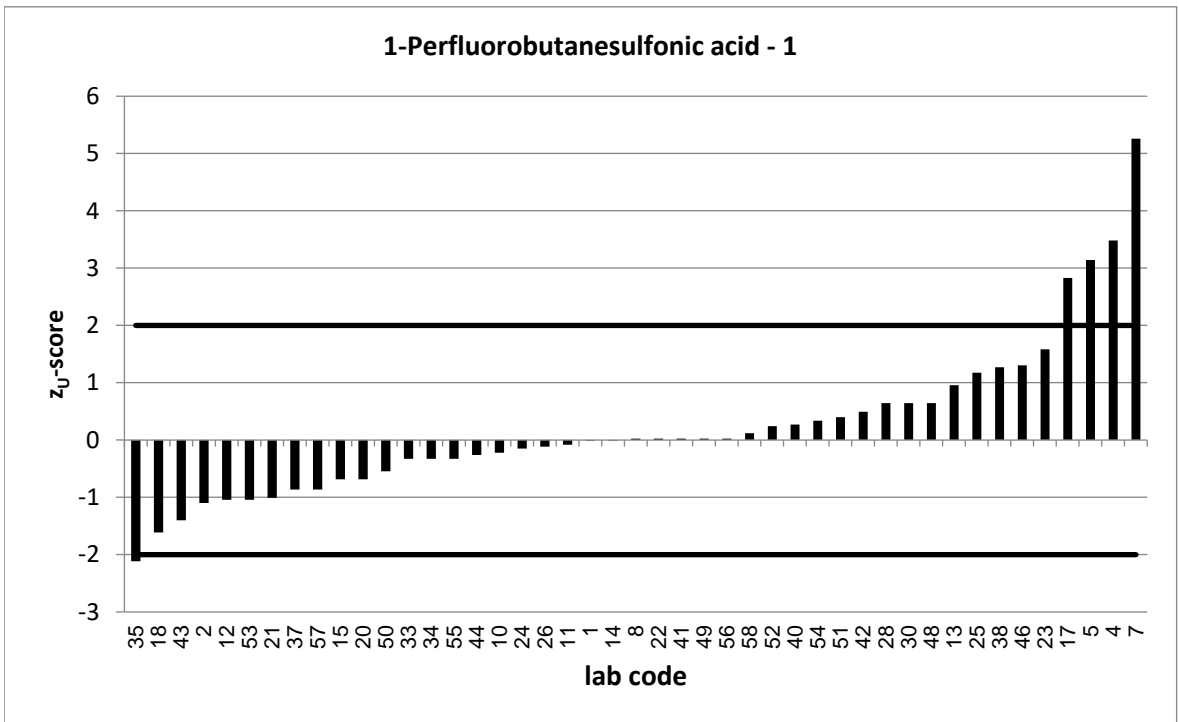
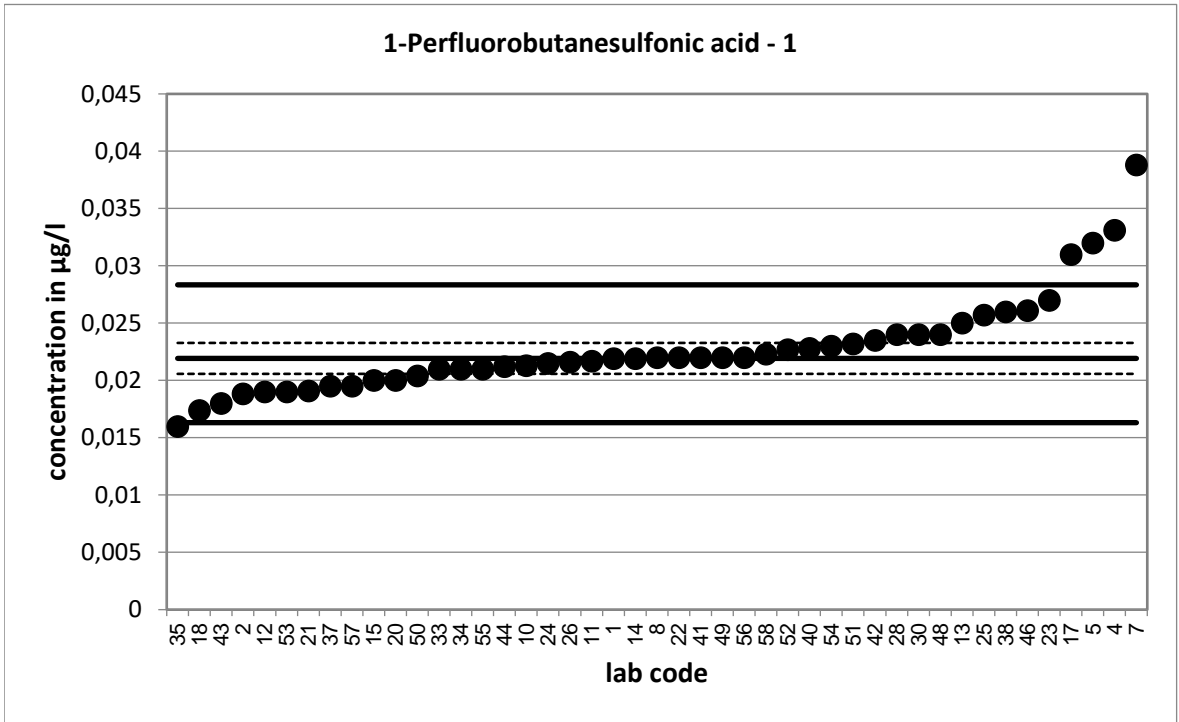


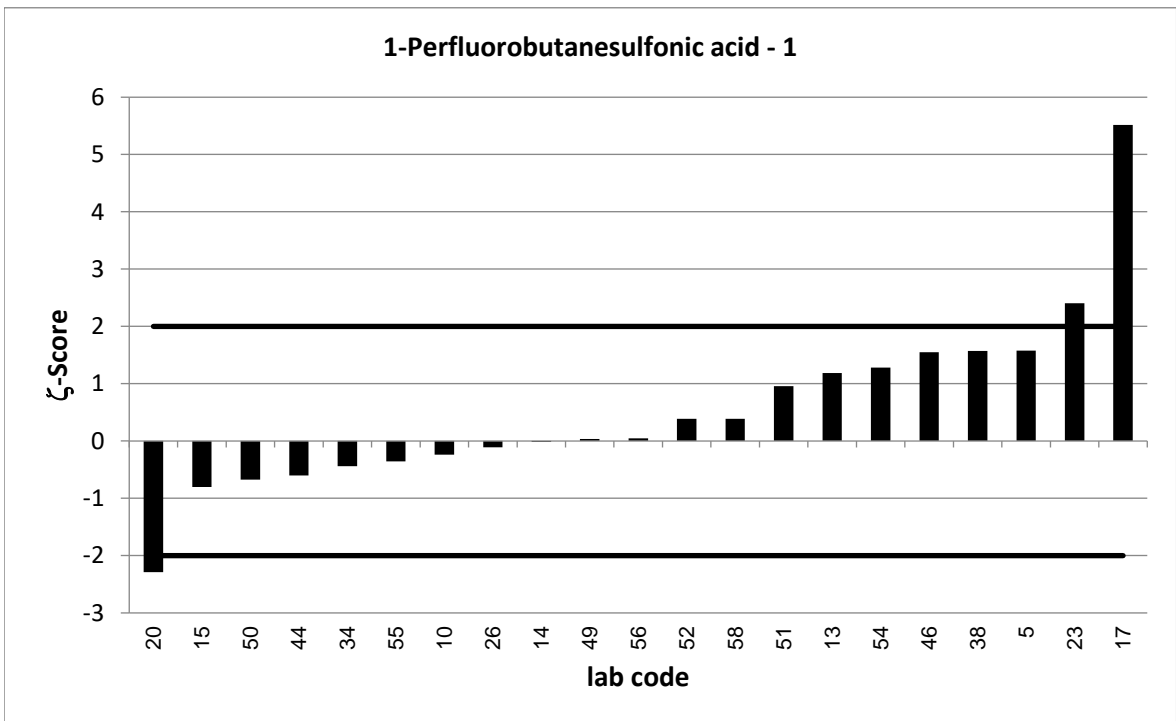
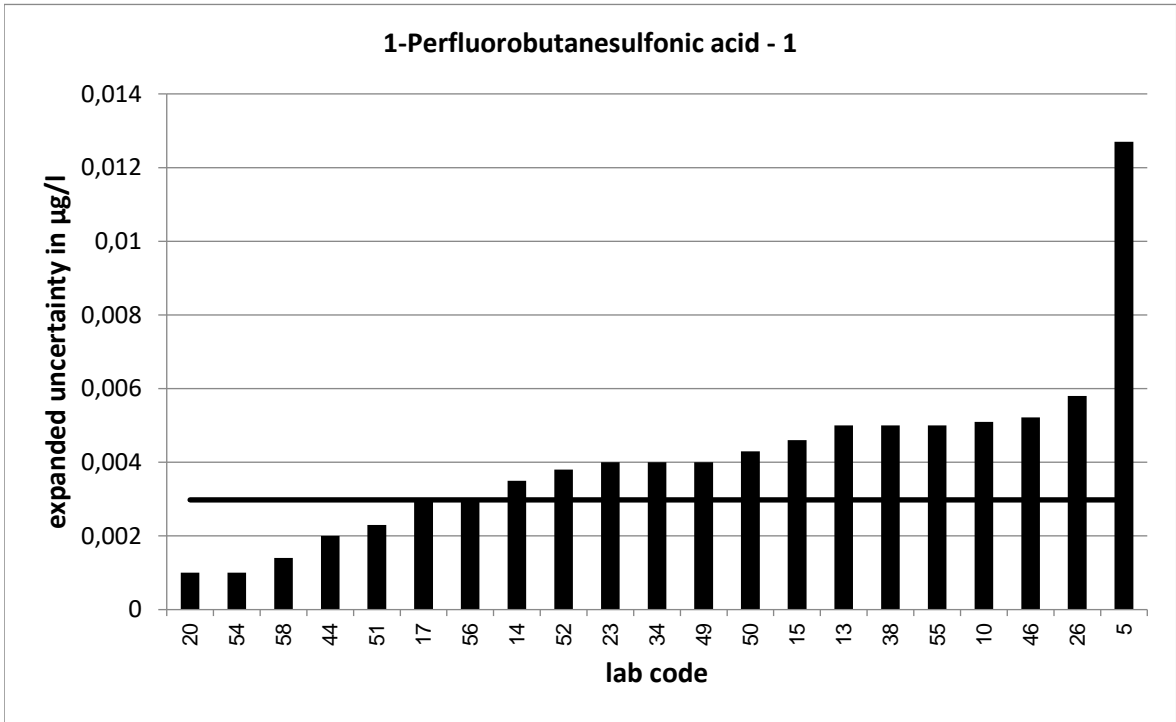


PT 6/17 - TW S4		1-Perfluorobutanesulfonic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,02192 \pm 0,00135			
upper tolerance limit [$\mu\text{g/l}$]		0,02834			
lower tolerance limit [$\mu\text{g/l}$]		0,01632			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0219			0,0	s
2	0,01884			-1,1	s
4	0,0331			3,5	u
5	0,032	0,013	1,6	3,1	u
7	0,0388			5,3	u
8	0,022			0,0	s
10	0,0213	0,005	-0,2	-0,2	s
11	0,0217			-0,1	s
12	0,019			-1,0	s
13	0,025	0,005	1,2	1,0	s
14	0,0219	0,004	0,0	0,0	s
15	0,02	0,005	-0,8	-0,7	s
17	0,031	0,003	5,5	2,8	q
18	0,0174			-1,6	s
20	0,02	0,001	-2,3	-0,7	s
21	0,0191			-1,0	s
22	0,022			0,0	s
23	0,027	0,004	2,4	1,6	s
24	0,0215			-0,2	s
25	0,0257			1,2	s
26	0,0216	0,006	-0,1	-0,1	s
28	0,024			0,6	s
30	0,024			0,6	s
33	0,021			-0,3	s
34	0,021	0,004	-0,4	-0,3	s
35	0,016			-2,1	q
37	0,0195			-0,9	s
38	0,026	0,005	1,6	1,3	s
40	0,0228			0,3	s
41	0,022			0,0	s
42	0,0235			0,5	s
43	0,018			-1,4	s
44	0,0212	0,002	-0,6	-0,3	s
46	0,0261	0,005	1,5	1,3	s
48	0,024			0,6	s
49	0,022	0,004	0,0	0,0	s
50	0,0204	0,004	-0,7	-0,5	s
51	0,0232	0,002	1,0	0,4	s
52	0,0227	0,004	0,4	0,2	s
53	0,019			-1,0	s
54	0,023	0,001	1,3	0,3	s
55	0,021	0,005	-0,4	-0,3	s
56	0,022	0,003	0,0	0,0	s
57	0,0195			-0,9	s
58	0,0223	0,001	0,4	0,1	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

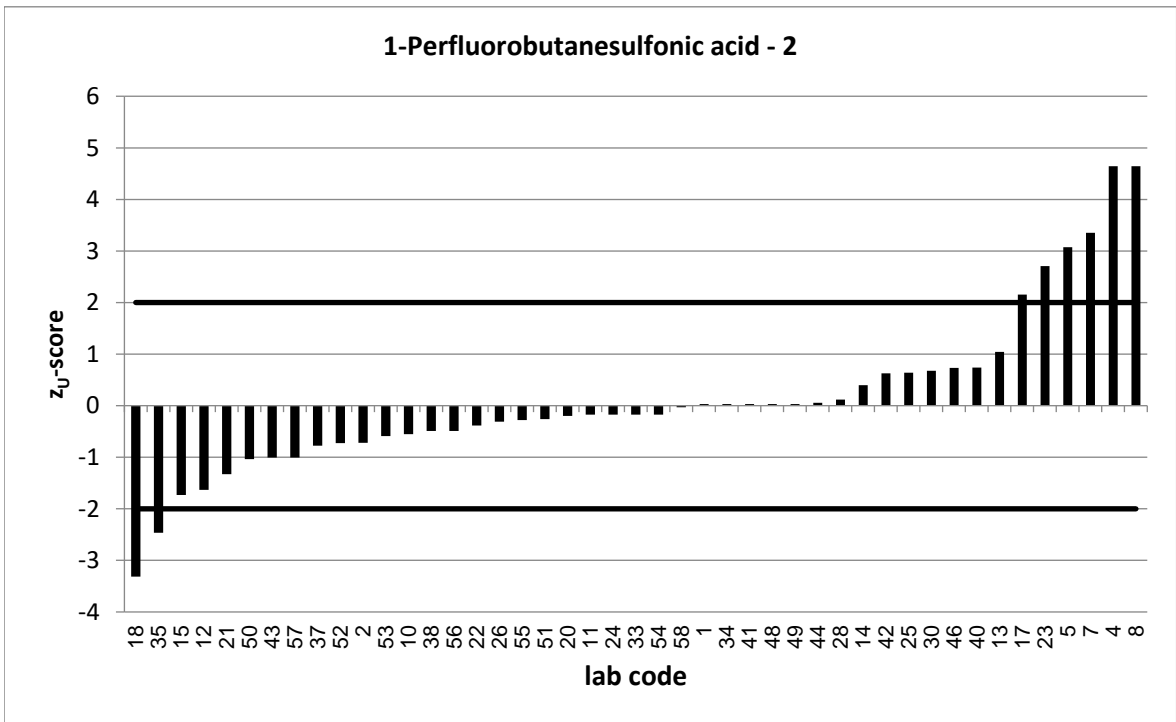
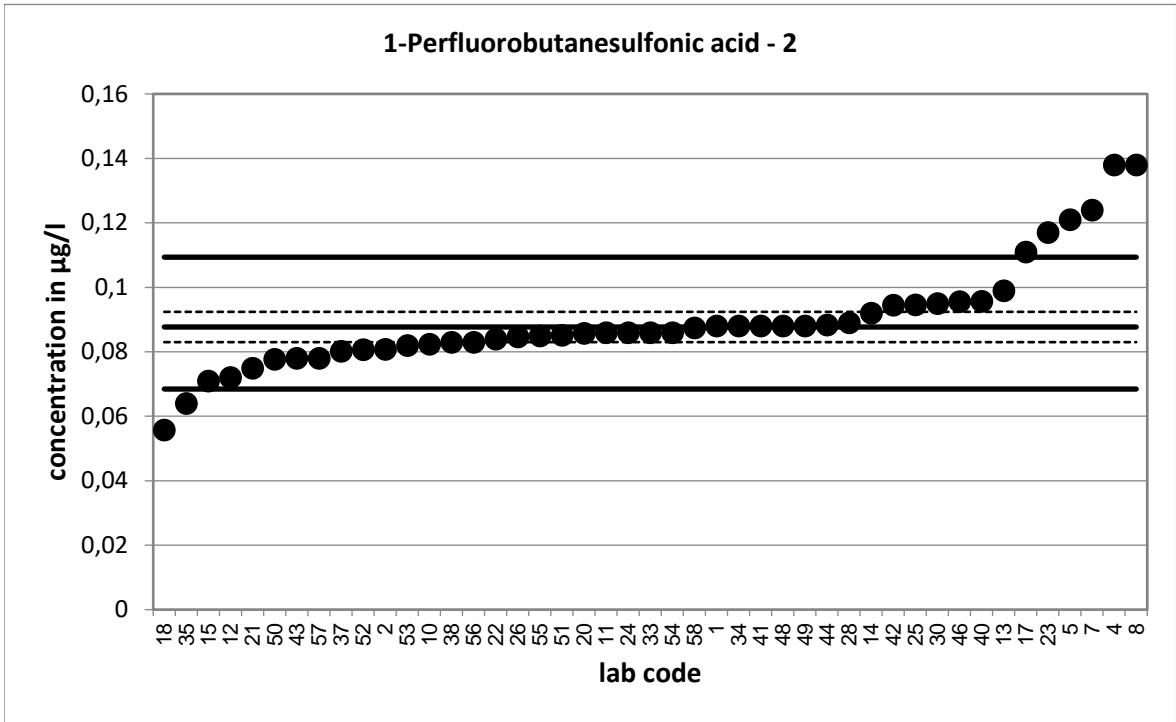


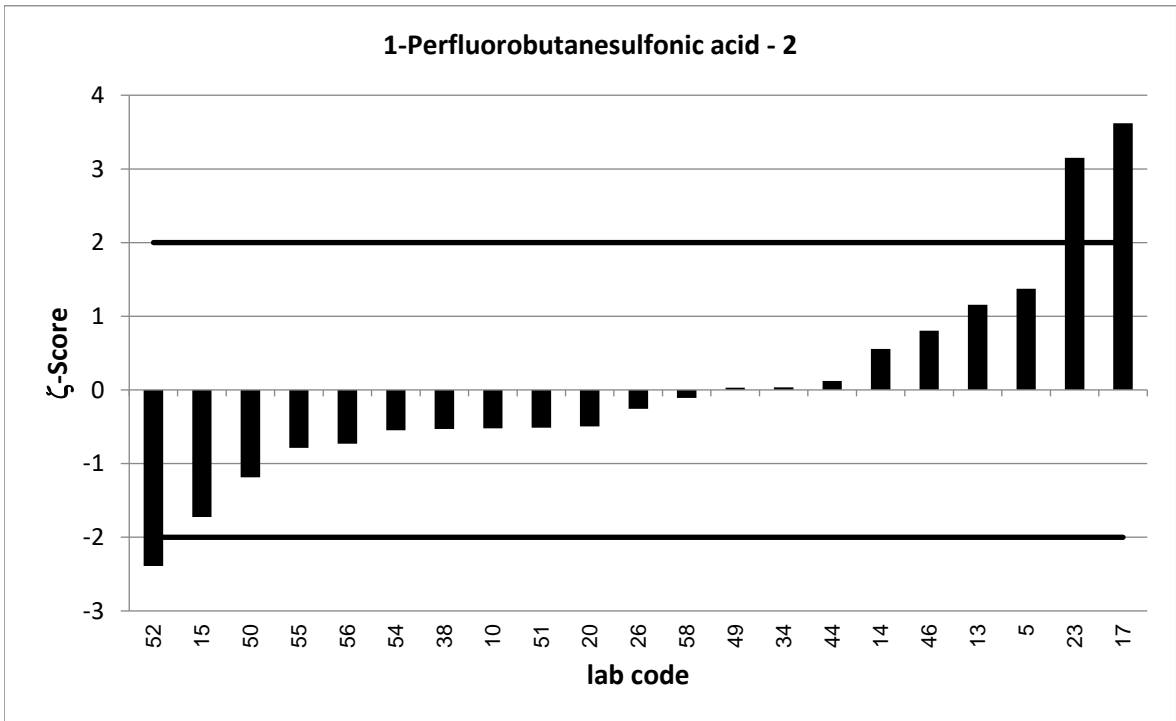
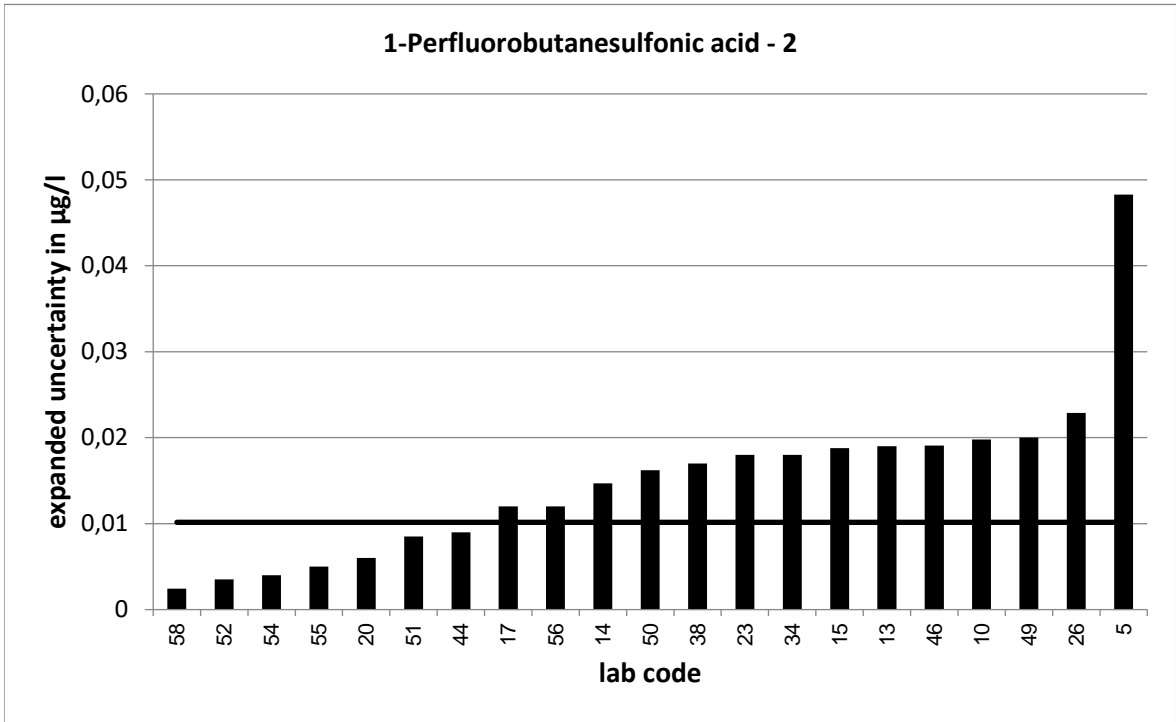


PT 6/17 - TW S4		1-Perfluorobutanesulfonic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,08769 \pm 0,0047			
upper tolerance limit [$\mu\text{g/l}$]		0,1093			
lower tolerance limit [$\mu\text{g/l}$]		0,06844			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,088			0,0	s
2	0,08075			-0,7	s
4	0,138			4,6	u
5	0,121	0,048	1,4	3,1	u
7	0,124			3,4	u
8	0,138			4,6	u
10	0,0824	0,02	-0,5	-0,5	s
11	0,086			-0,2	s
12	0,072			-1,6	s
13	0,099	0,019	1,2	1,0	s
14	0,092	0,015	0,6	0,4	s
15	0,071	0,019	-1,7	-1,7	s
17	0,111	0,012	3,6	2,2	q
18	0,0558			-3,3	u
20	0,0858	0,006	-0,5	-0,2	s
21	0,0749			-1,3	s
22	0,084			-0,4	s
23	0,117	0,018	3,2	2,7	q
24	0,086			-0,2	s
25	0,0946			0,6	s
26	0,0847	0,023	-0,3	-0,3	s
28	0,089			0,1	s
30	0,095			0,7	s
33	0,086			-0,2	s
34	0,088	0,018	0,0	0,0	s
35	0,064			-2,5	q
37	0,0802			-0,8	s
38	0,083	0,017	-0,5	-0,5	s
40	0,0957			0,7	s
41	0,088			0,0	s
42	0,0945			0,6	s
43	0,078			-1,0	s
44	0,0883	0,009	0,1	0,1	s
46	0,0956	0,019	0,8	0,7	s
48	0,088			0,0	s
49	0,088	0,02	0,0	0,0	s
50	0,0777	0,016	-1,2	-1,0	s
51	0,0852	0,009	-0,5	-0,3	s
52	0,0807	0,004	-2,4	-0,7	s
53	0,082			-0,6	s
54	0,086	0,004	-0,5	-0,2	s
55	0,085	0,005	-0,8	-0,3	s
56	0,083	0,012	-0,7	-0,5	s
57	0,078			-1,0	s
58	0,0874	0,002	-0,1	0,0	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

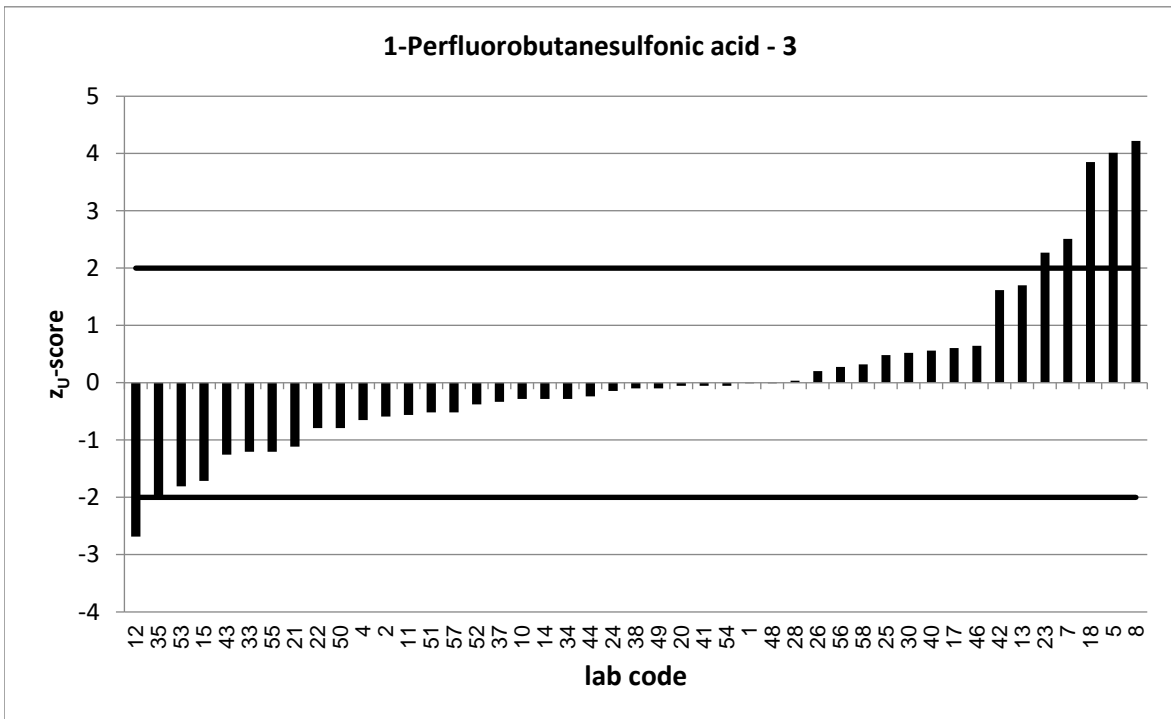
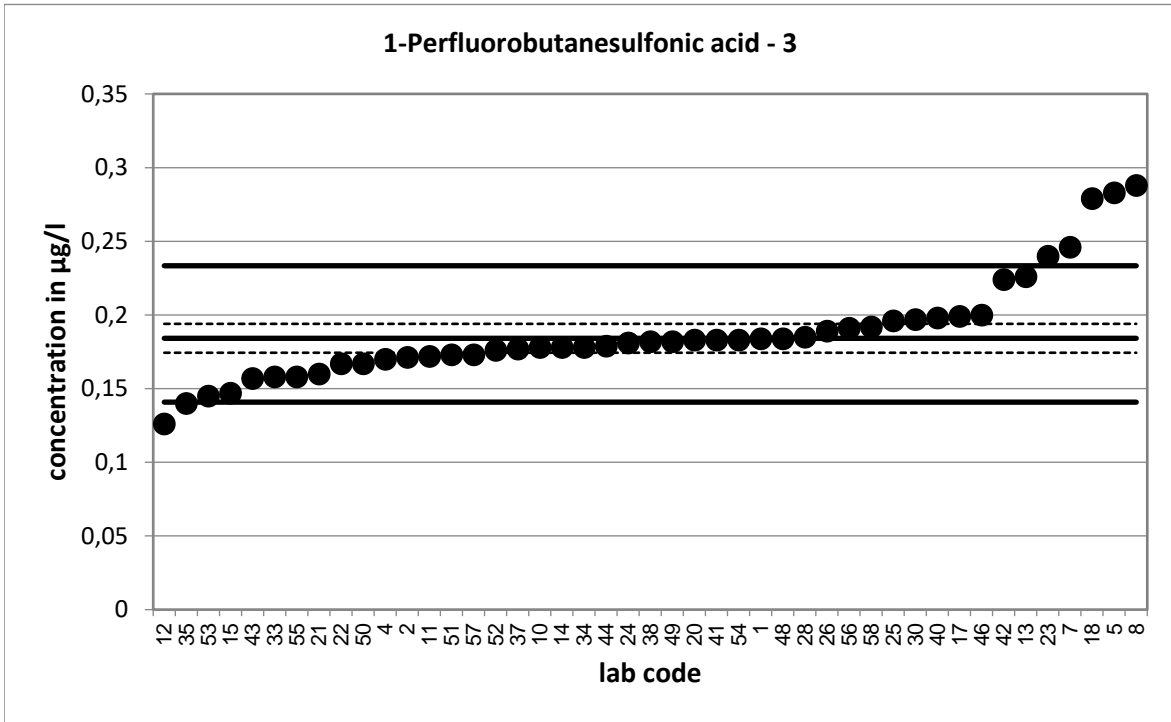


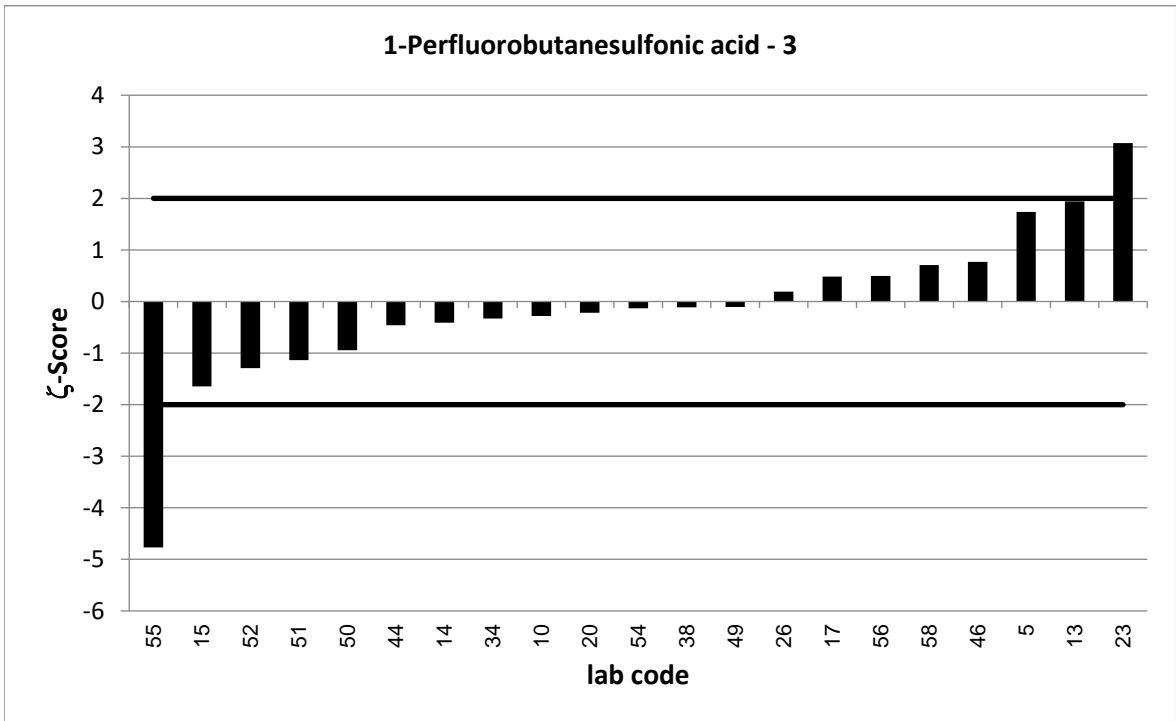
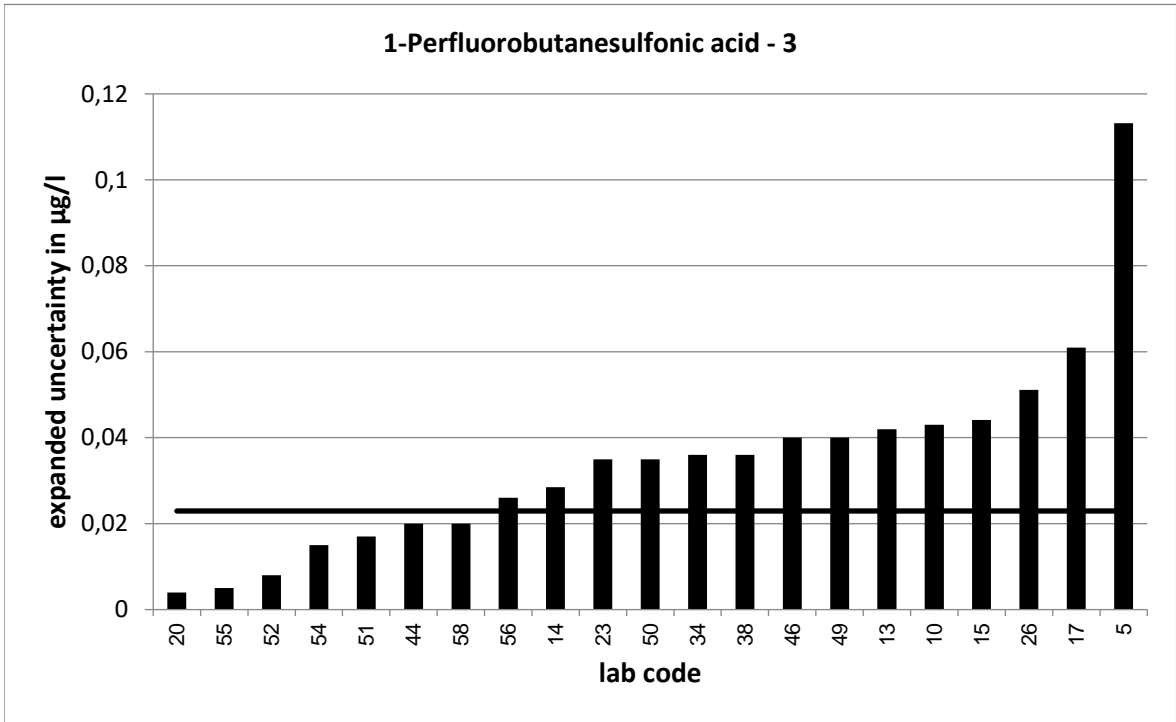


PT 6/17 - TW S4		1-Perfluorobutanesulfonic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1842 \pm 0,0098			
upper tolerance limit [$\mu\text{g/l}$]		0,2334			
lower tolerance limit [$\mu\text{g/l}$]		0,1408			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,184			0,0	s
2	0,1714			-0,6	s
4	0,17			-0,7	s
5	0,283	0,113	1,7	4,0	u
7	0,246			2,5	q
8	0,288			4,2	u
10	0,178	0,043	-0,3	-0,3	s
11	0,172			-0,6	s
12	0,126			-2,7	q
13	0,226	0,042	1,9	1,7	s
14	0,178	0,029	-0,4	-0,3	s
15	0,147	0,044	-1,6	-1,7	s
17	0,199	0,061	0,5	0,6	s
18	0,279			3,9	u
20	0,183	0,004	-0,2	-0,1	s
21	0,16			-1,1	s
22	0,167			-0,8	s
23	0,24	0,035	3,1	2,3	q
24	0,181			-0,1	s
25	0,196			0,5	s
26	0,1892	0,051	0,2	0,2	s
28	0,185			0,0	s
30	0,197			0,5	s
33	0,158			-1,2	s
34	0,178	0,036	-0,3	-0,3	s
35	0,14			-2,0	s
37	0,177			-0,3	s
38	0,182	0,036	-0,1	-0,1	s
40	0,198			0,6	s
41	0,183			-0,1	s
42	0,224			1,6	s
43	0,157			-1,3	s
44	0,179	0,02	-0,5	-0,2	s
46	0,2	0,04	0,8	0,6	s
48	0,184			0,0	s
49	0,182	0,04	-0,1	-0,1	s
50	0,167	0,035	-0,9	-0,8	s
51	0,173	0,017	-1,1	-0,5	s
52	0,176	0,008	-1,3	-0,4	s
53	0,145			-1,8	s
54	0,183	0,015	-0,1	-0,1	s
55	0,158	0,005	-4,8	-1,2	s
56	0,191	0,026	0,5	0,3	s
57	0,173			-0,5	s
58	0,192	0,02	0,7	0,3	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

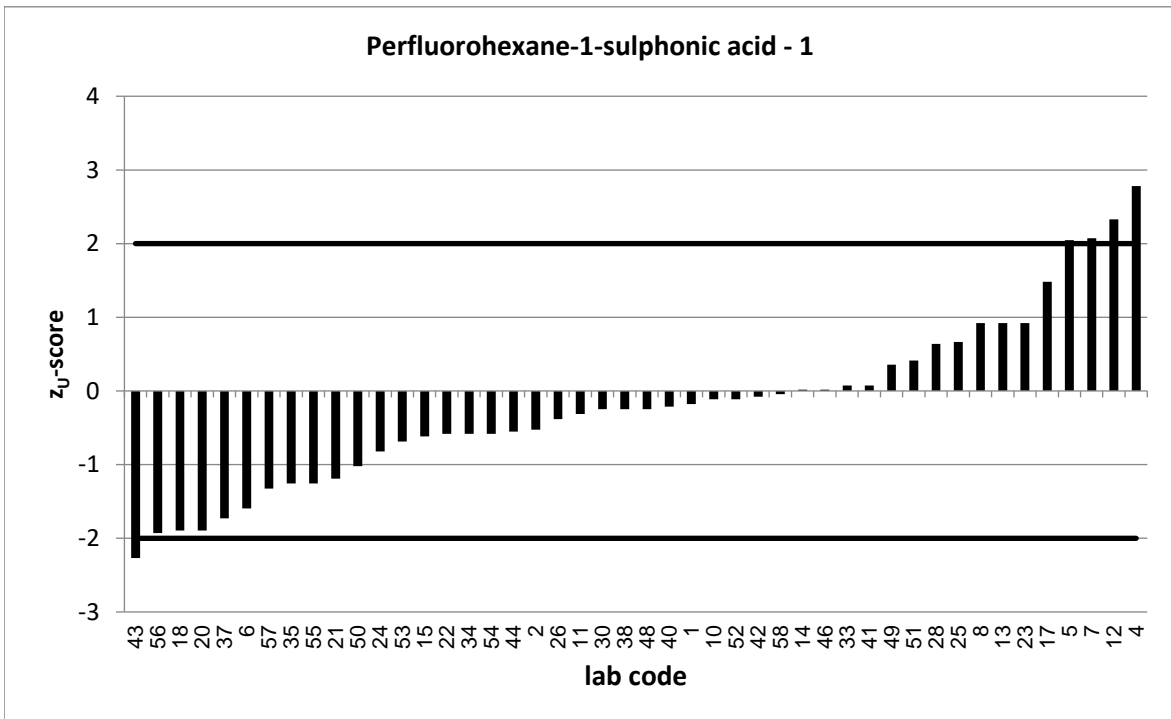
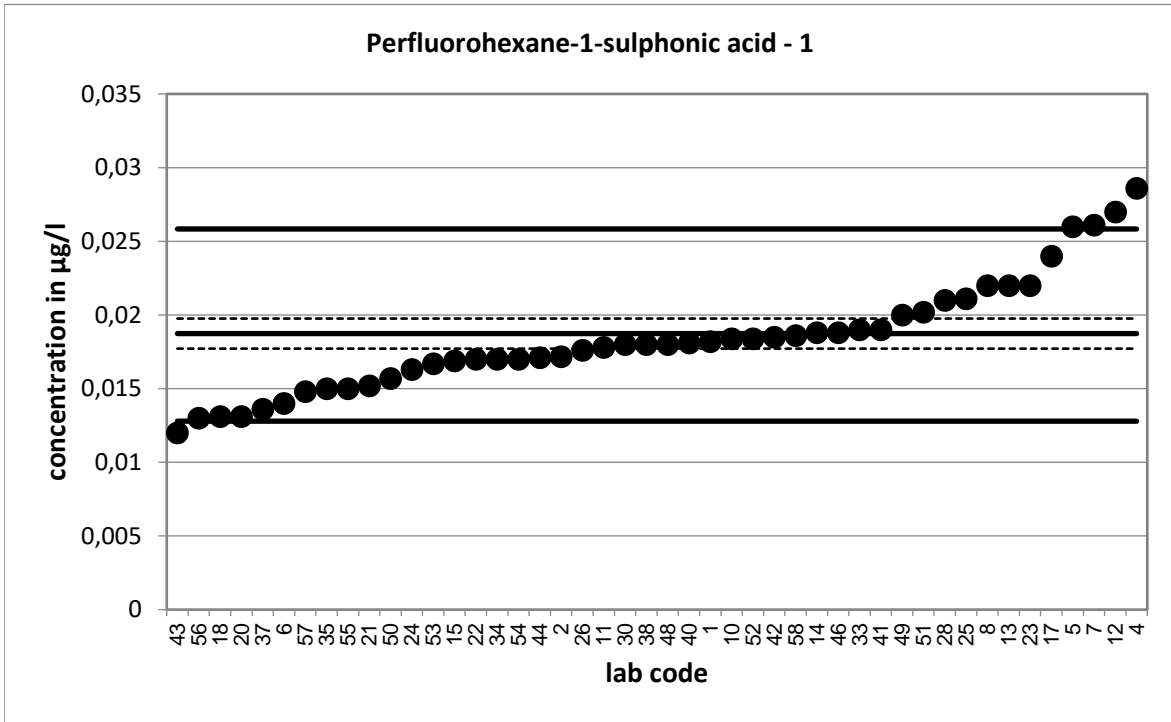


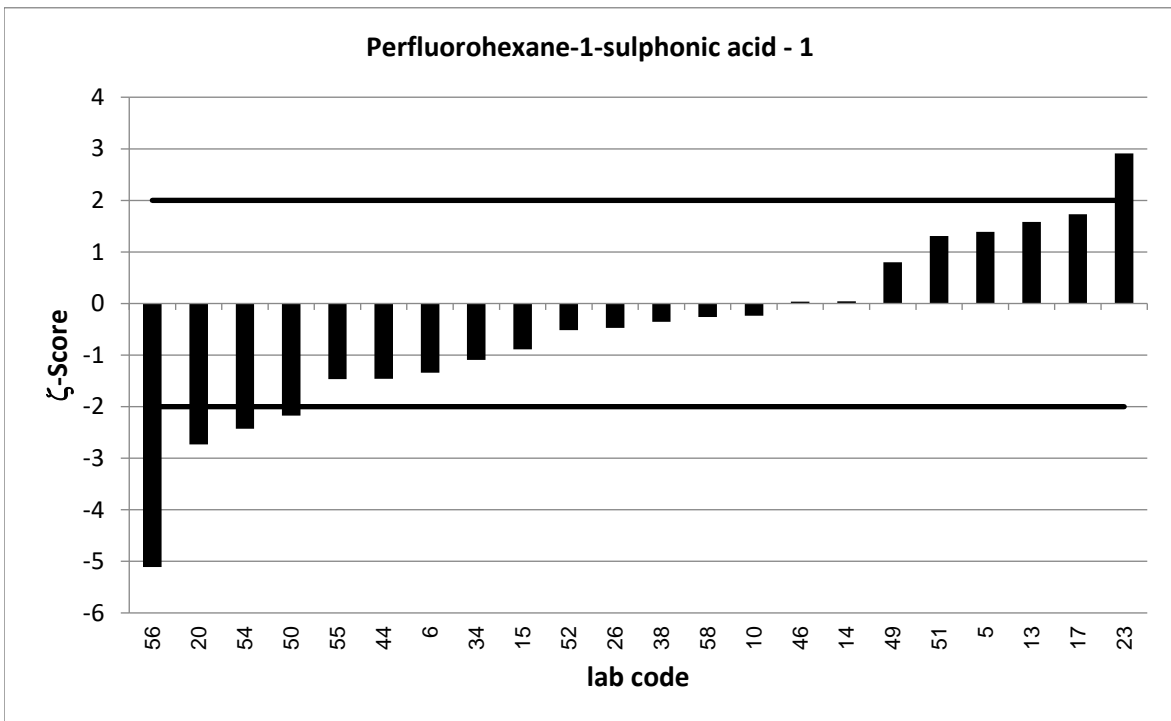
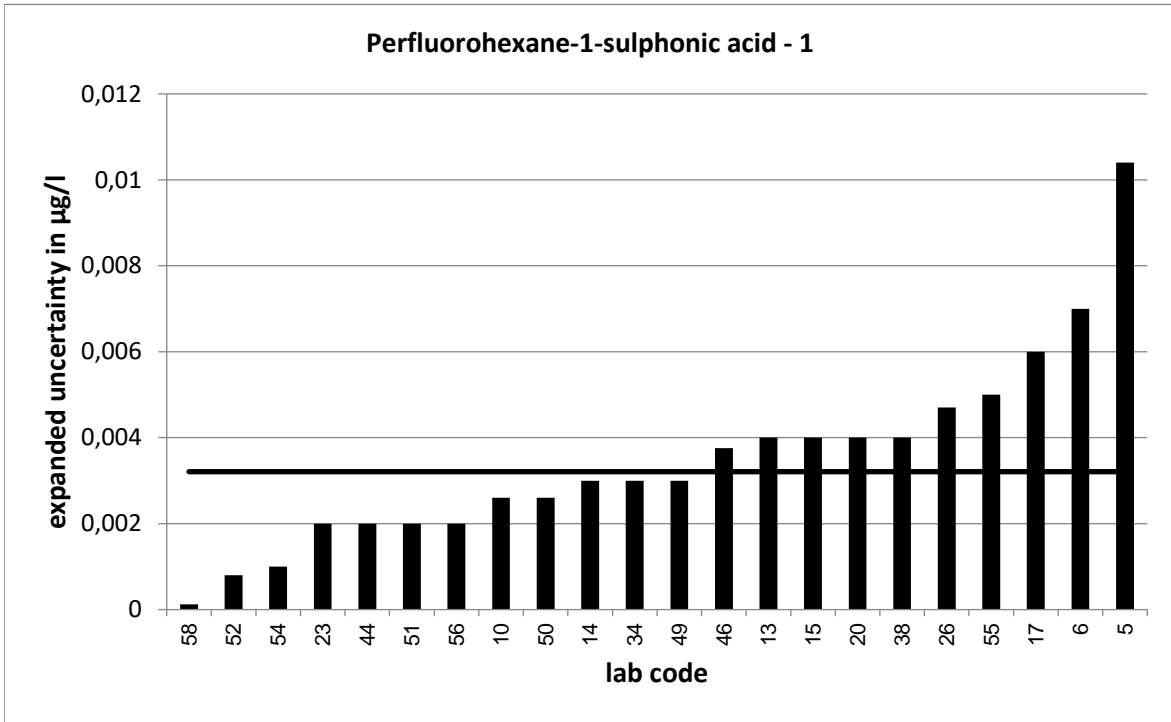


PT 6/17 - TW S4		Perfluorohexane-1-sulphonic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01873 \pm 0,00102			
upper tolerance limit [$\mu\text{g/l}$]		0,02583			
lower tolerance limit [$\mu\text{g/l}$]		0,01279			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0182			-0,2	s
2	0,01717			-0,5	s
4	0,0286			2,8	q
5	0,026	0,01	1,4	2,0	s
6	0,014	0,007	-1,3	-1,6	s
7	0,0261			2,1	q
8	0,022			0,9	s
10	0,0184	0,003	-0,2	-0,1	s
11	0,0178			-0,3	s
12	0,027			2,3	q
13	0,022	0,004	1,6	0,9	s
14	0,0188	0,003	0,0	0,0	s
15	0,0169	0,004	-0,9	-0,6	s
17	0,024	0,006	1,7	1,5	s
18	0,0131			-1,9	s
20	0,0131	0,004	-2,7	-1,9	s
21	0,0152			-1,2	s
22	0,017			-0,6	s
23	0,022	0,002	2,9	0,9	s
24	0,0163			-0,8	s
25	0,0211			0,7	s
26	0,0176	0,005	-0,5	-0,4	s
28	0,021			0,6	s
30	0,018			-0,2	s
33	0,019			0,1	s
34	0,017	0,003	-1,1	-0,6	s
35	0,015			-1,3	s
37	0,0136			-1,7	s
38	0,018	0,004	-0,4	-0,2	s
40	0,0181			-0,2	s
41	0,019			0,1	s
42	0,0185			-0,1	s
43	0,012			-2,3	q
44	0,0171	0,002	-1,5	-0,6	s
46	0,0188	0,004	0,0	0,0	s
48	0,018			-0,2	s
49	0,02	0,003	0,8	0,4	s
50	0,0157	0,003	-2,2	-1,0	s
51	0,0202	0,002	1,3	0,4	s
52	0,0184	8E-04	-0,5	-0,1	s
53	0,0167			-0,7	s
54	0,017	0,001	-2,4	-0,6	s
55	0,015	0,005	-1,5	-1,3	s
56	0,013	0,002	-5,1	-1,9	s
57	0,0148			-1,3	s
58	0,0186	1E-04	-0,3	0,0	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

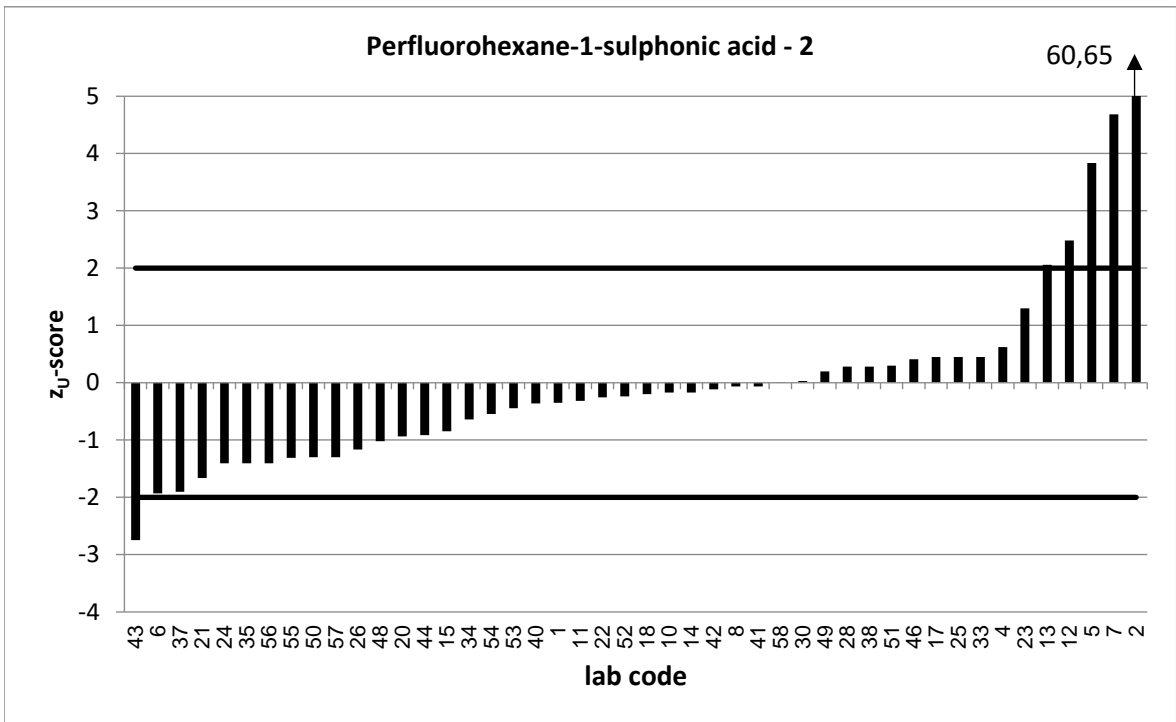
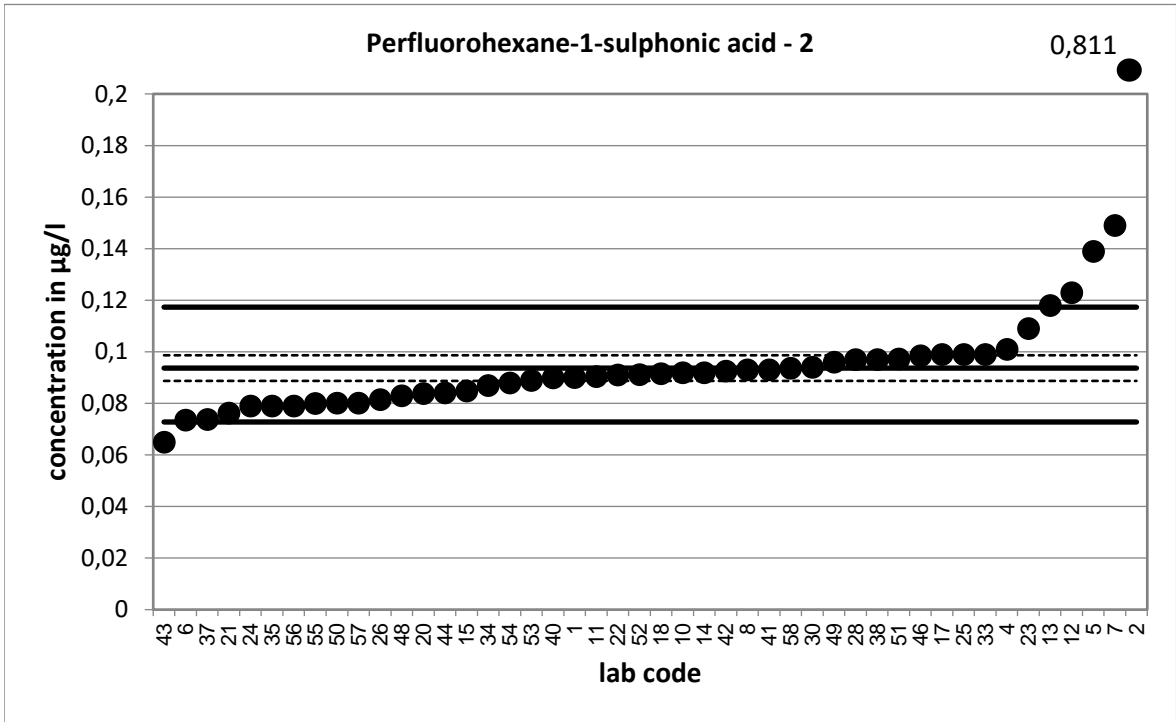


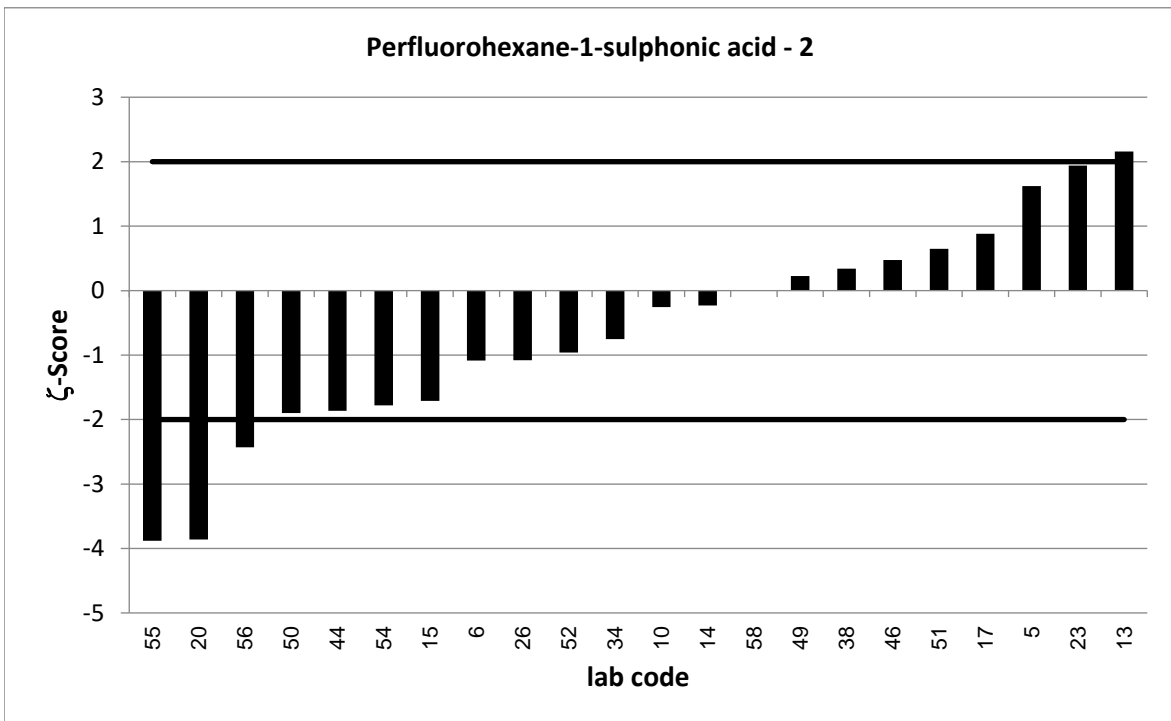
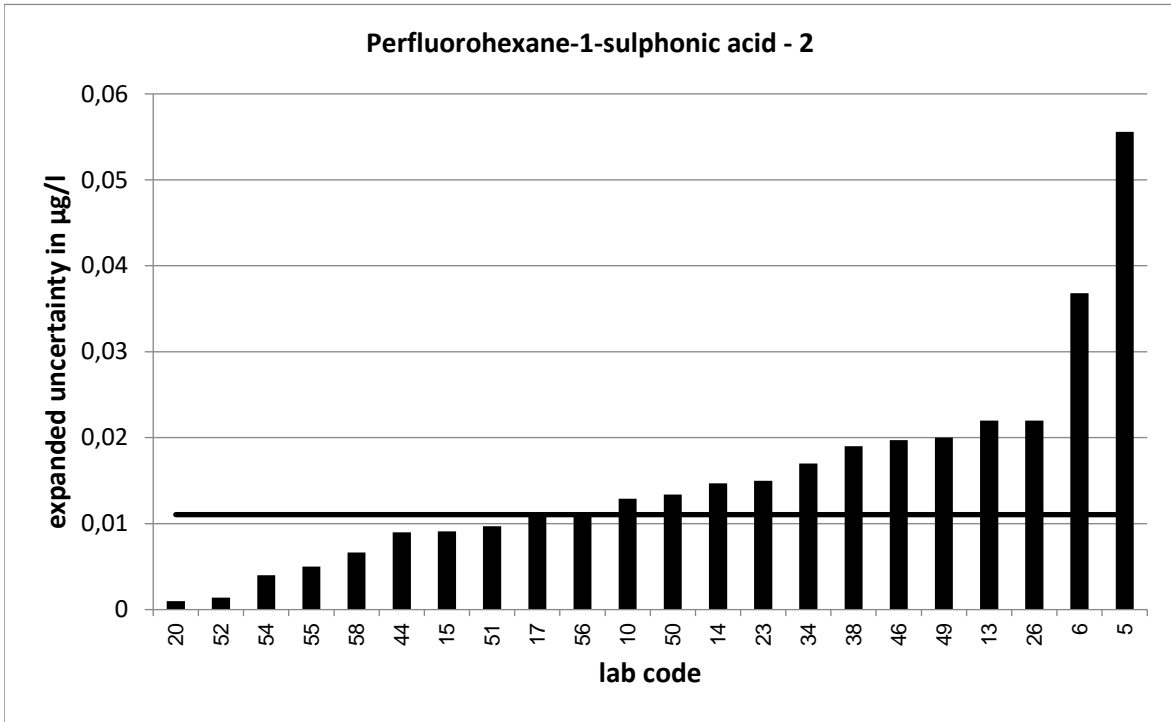


PT 6/17 - TW S4		Perfluorohexane-1-sulphonic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,09367 \pm 0,00497			
upper tolerance limit [$\mu\text{g/l}$]		0,1173			
lower tolerance limit [$\mu\text{g/l}$]		0,07277			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,09			-0,4	s
2	0,8105			60,7	u
4	0,101			0,6	s
5	0,139	0,056	1,6	3,8	u
6	0,0735	0,037	-1,1	-1,9	s
7	0,149			4,7	u
8	0,093			-0,1	s
10	0,0919	0,013	-0,3	-0,2	s
11	0,0904			-0,3	s
12	0,123			2,5	q
13	0,118	0,022	2,2	2,1	q
14	0,0919	0,015	-0,2	-0,2	s
15	0,0848	0,009	-1,7	-0,8	s
17	0,099	0,011	0,9	0,5	s
18	0,0916			-0,2	s
20	0,0839	0,001	-3,9	-0,9	s
21	0,0763			-1,7	s
22	0,091			-0,3	s
23	0,109	0,015	1,9	1,3	s
24	0,079			-1,4	s
25	0,099			0,5	s
26	0,0815	0,022	-1,1	-1,2	s
28	0,097			0,3	s
30	0,094			0,0	s
33	0,099			0,5	s
34	0,087	0,017	-0,8	-0,6	s
35	0,079			-1,4	s
37	0,0738			-1,9	s
38	0,097	0,019	0,3	0,3	s
40	0,0899			-0,4	s
41	0,093			-0,1	s
42	0,0925			-0,1	s
43	0,065			-2,7	q
44	0,0841	0,009	-1,9	-0,9	s
46	0,0985	0,02	0,5	0,4	s
48	0,083			-1,0	s
49	0,096	0,02	0,2	0,2	s
50	0,0801	0,013	-1,9	-1,3	s
51	0,0972	0,01	0,6	0,3	s
52	0,0912	0,001	-1,0	-0,2	s
53	0,089			-0,4	s
54	0,088	0,004	-1,8	-0,5	s
55	0,08	0,005	-3,9	-1,3	s
56	0,079	0,011	-2,4	-1,4	s
57	0,0801			-1,3	s
58	0,0937	0,007	0,0	0,0	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

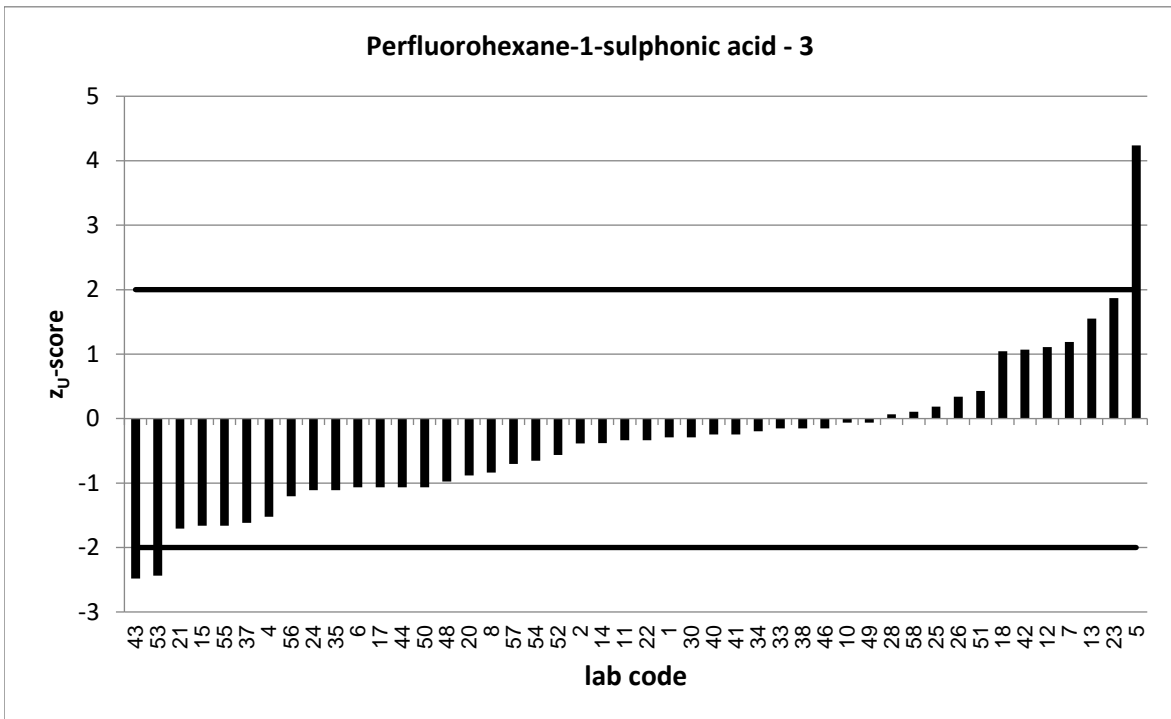
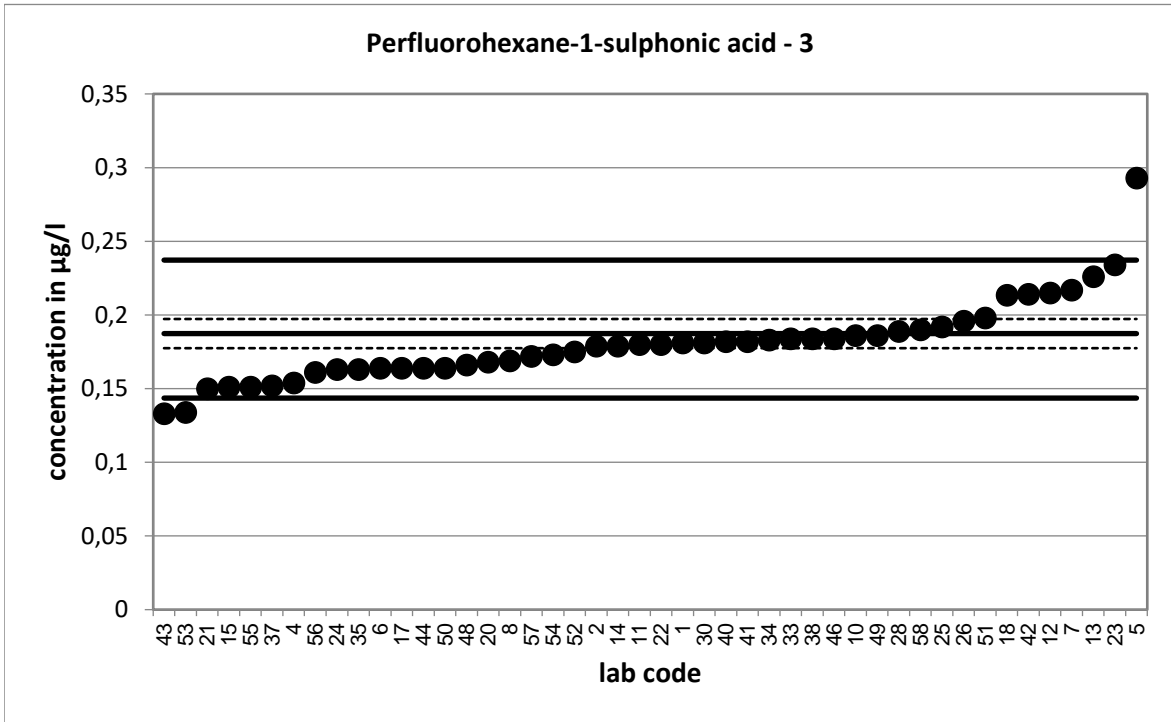


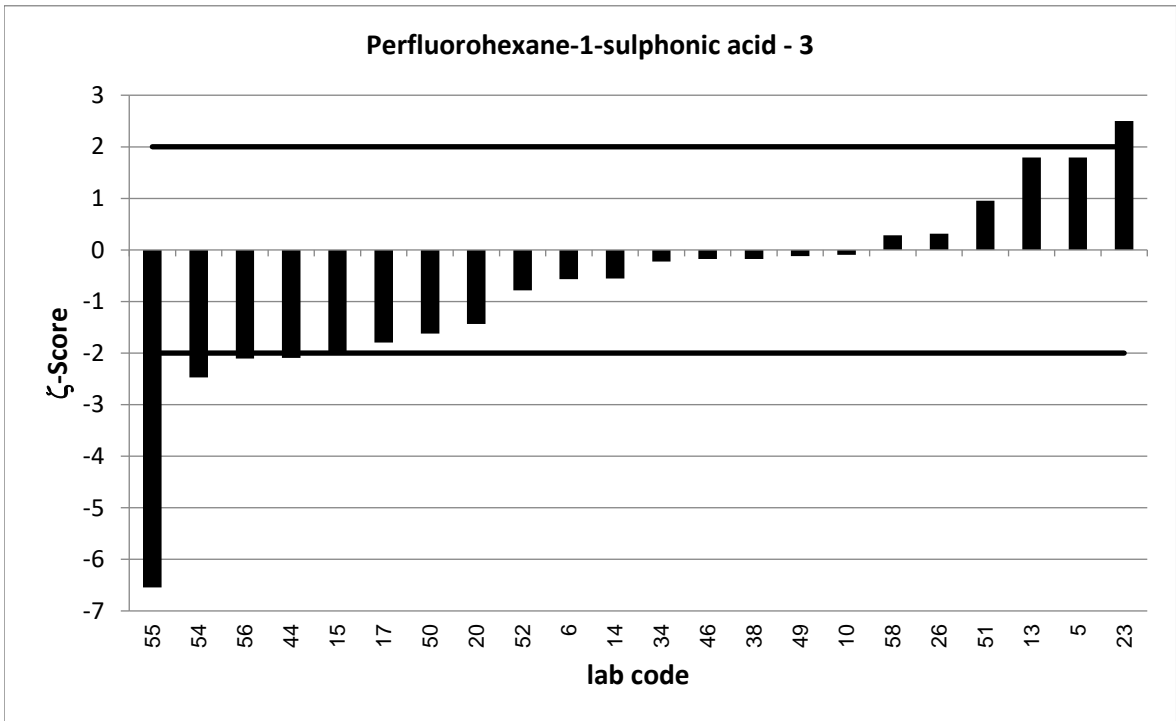
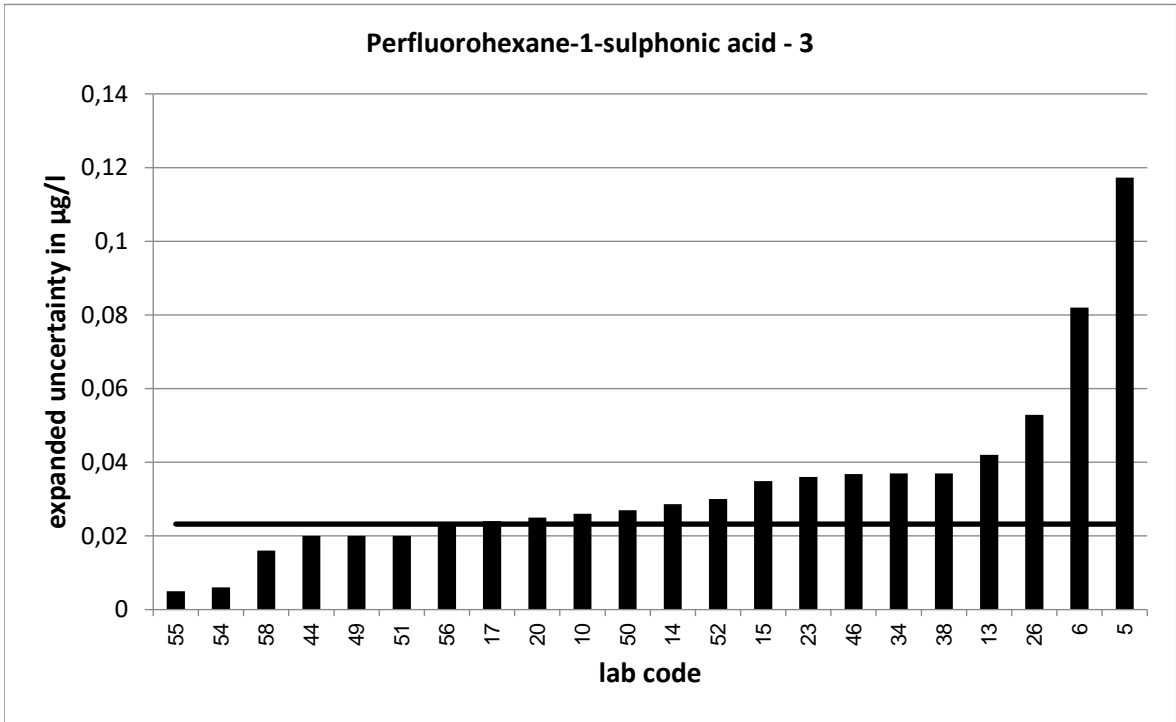


PT 6/17 - TW S4		Perfluorohexane-1-sulphonic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1873 \pm 0,0099			
upper tolerance limit [$\mu\text{g/l}$]		0,2372			
lower tolerance limit [$\mu\text{g/l}$]		0,1436			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,181			-0,3	s
2	0,1789			-0,4	s
4	0,154			-1,5	s
5	0,293	0,117	1,8	4,2	u
6	0,164	0,082	-0,6	-1,1	s
7	0,217			1,2	s
8	0,169			-0,8	s
10	0,186	0,026	-0,1	-0,1	s
11	0,18			-0,3	s
12	0,215			1,1	s
13	0,226	0,042	1,8	1,6	s
14	0,179	0,029	-0,6	-0,4	s
15	0,151	0,035	-2,0	-1,7	s
17	0,164	0,024	-1,8	-1,1	s
18	0,2134			1,0	s
20	0,168	0,025	-1,4	-0,9	s
21	0,15			-1,7	s
22	0,18			-0,3	s
23	0,234	0,036	2,5	1,9	s
24	0,163			-1,1	s
25	0,192			0,2	s
26	0,1958	0,053	0,3	0,3	s
28	0,189			0,1	s
30	0,181			-0,3	s
33	0,184			-0,2	s
34	0,183	0,037	-0,2	-0,2	s
35	0,163			-1,1	s
37	0,152			-1,6	s
38	0,184	0,037	-0,2	-0,2	s
40	0,182			-0,2	s
41	0,182			-0,2	s
42	0,214			1,1	s
43	0,133			-2,5	q
44	0,164	0,02	-2,1	-1,1	s
46	0,184	0,037	-0,2	-0,2	s
48	0,166			-1,0	s
49	0,186	0,02	-0,1	-0,1	s
50	0,164	0,027	-1,6	-1,1	s
51	0,198	0,02	1,0	0,4	s
52	0,175	0,03	-0,8	-0,6	s
53	0,134			-2,4	q
54	0,173	0,006	-2,5	-0,7	s
55	0,151	0,005	-6,5	-1,7	s
56	0,161	0,023	-2,1	-1,2	s
57	0,172			-0,7	s
58	0,19	0,016	0,3	0,1	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory





PT 6/17 - TW S4		Perfluorooctane sulfonic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01893 \pm 0,00137			
upper tolerance limit [$\mu\text{g/l}$]		0,02836			
lower tolerance limit [$\mu\text{g/l}$]		0,01139			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0242			1,1	s
2	0,01551			-0,9	s
4	0,0221			0,7	s
5	0,023	0,009	0,9	0,9	s
6	0,0165	0,003	-1,3	-0,6	s
7	0,0274			1,8	s
8	0,017			-0,5	s
10	0,0203	0,003	0,8	0,3	s
11	0,0178			-0,3	s
12	0,022			0,7	s
13	0,025	0,006	2,0	1,3	s
14	0,0183	0,003	-0,4	-0,2	s
15	0,0149	0,005	-1,6	-1,1	s
17	0,026	0,016	0,9	1,5	s
18	0,0132			-1,5	s
20	0,0147	0,004	-2,0	-1,1	s
21	0,015			-1,0	s
22	0,023			0,9	s
23	0,02	0,004	0,5	0,2	s
24	0,0145			-1,2	s
25	0,0256	0,007	1,8	1,4	s
26	0,0198	0,005	0,3	0,2	s
28	0,02			0,2	s
30	0,014			-1,3	s
31	0,0208	0,012	0,3	0,4	s
33	0,02			0,2	s
34	0,018	0,004	-0,4	-0,2	s
35	0,016			-0,8	s
37	0,0111			-2,1	q
38	0,02	0,004	0,5	0,2	s
40	0,0161			-0,8	s
41	0,018			-0,2	s
42	0,016			-0,8	s
43	0,014			-1,3	s
44	0,0152	0,002	-3,1	-1,0	s
46	0,0172	0,003	-0,9	-0,5	s
48	0,016			-0,8	s
49	0,017	0,003	-1,2	-0,5	s
50	0,0153	0,002	-2,8	-1,0	s
51	0,0286	0,003	5,9	2,1	q
52	0,022	0,006	1,0	0,7	s
53	0,0143			-1,2	s
54	0,015	0,002	-3,2	-1,0	s
55	0,025	0,005	2,3	1,3	s
56	0,019	0,003	0,0	0,0	s
57	0,0151			-1,0	s

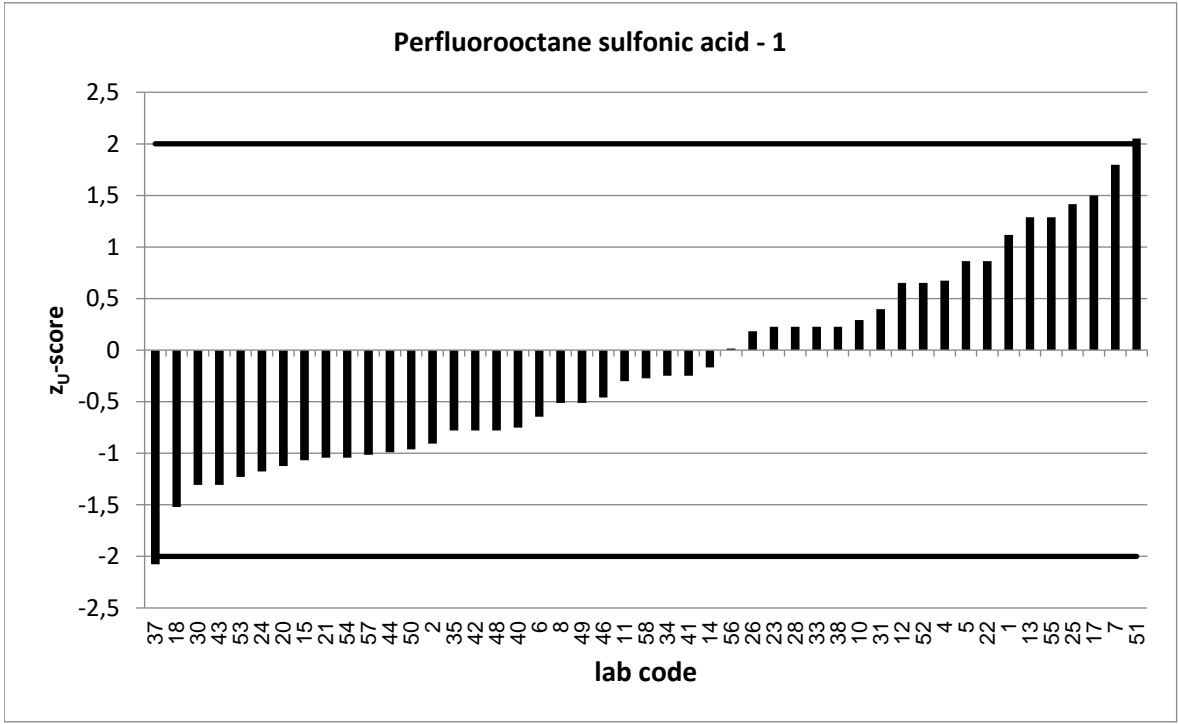
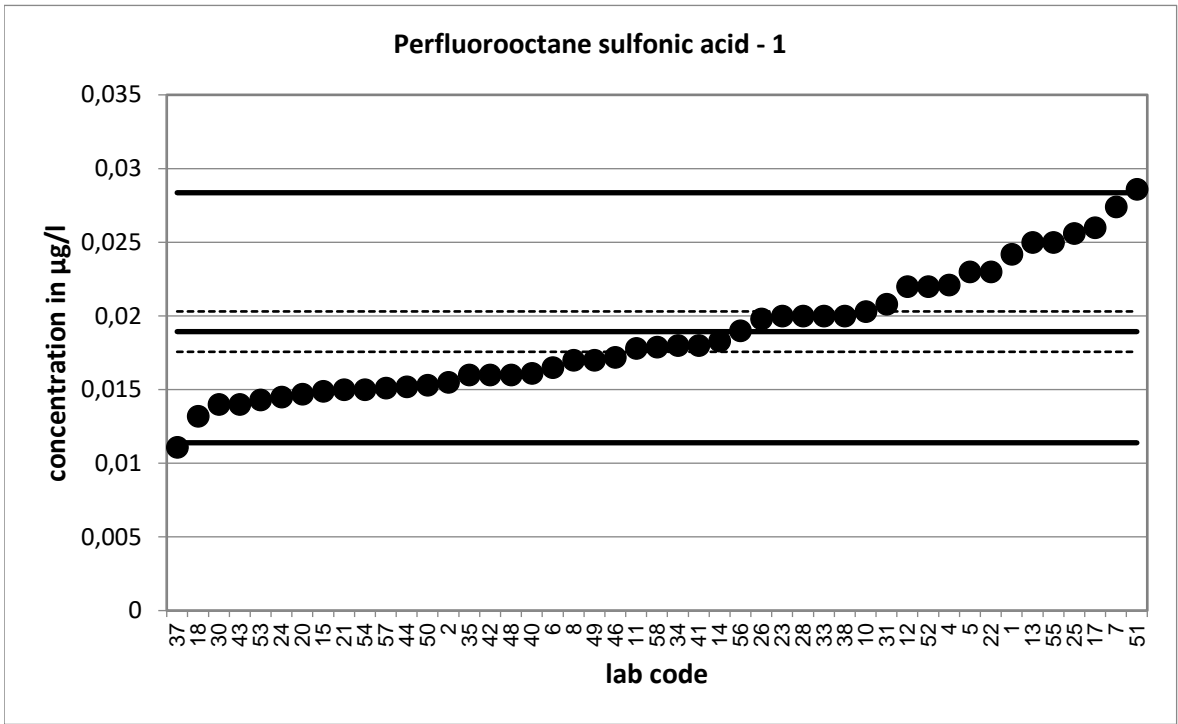
* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

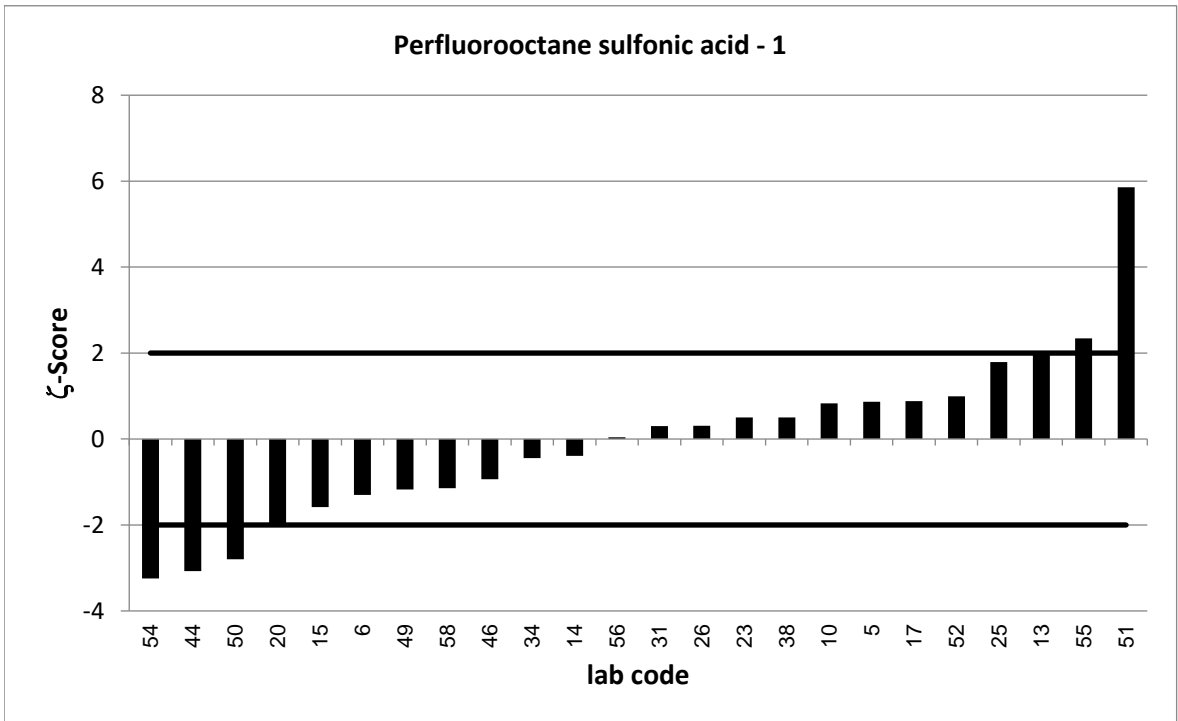
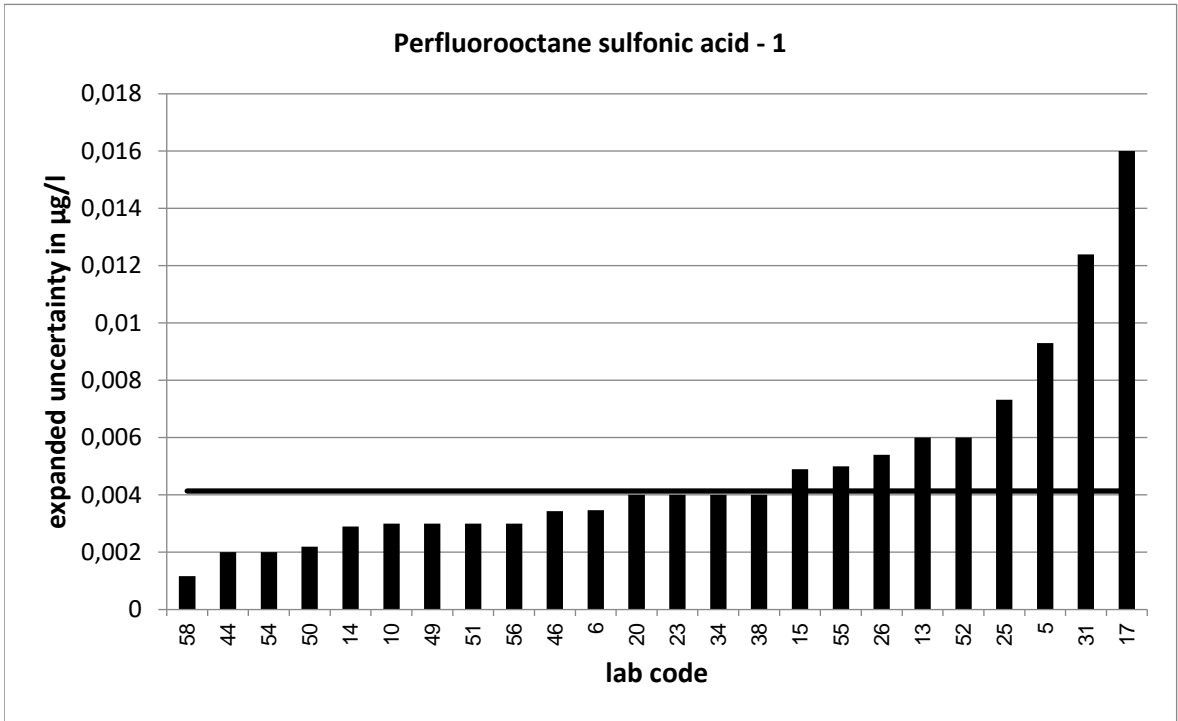
** s = satisfactory, q = questionable, u = unsatisfactory

PT 6/17 - TW S4		Perfluorooctane sulfonic acid - 1			
assigned value [$\mu\text{g/l}$]*		0,01893 \pm 0,00137			
upper tolerance limit [$\mu\text{g/l}$]		0,02836			
lower tolerance limit [$\mu\text{g/l}$]		0,01139			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
58	0,0179	0,001	-1,1	-0,3	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory





PT 6/17 - TW S4		Perfluorooctane sulfonic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,0852 \pm 0,00461			
upper tolerance limit [$\mu\text{g/l}$]		0,117			
lower tolerance limit [$\mu\text{g/l}$]		0,05866			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,0953			0,6	s
2	0,08551			0,0	s
4	0,0868			0,1	s
5	0,1	0,04	0,7	0,9	s
6	0,0645	0,014	-2,9	-1,6	s
7	0,106			1,3	s
8	0,096			0,7	s
10	0,0774	0,012	-1,2	-0,6	s
11	0,0786			-0,5	s
12	0,099			0,9	s
13	0,082	0,017	-0,4	-0,2	s
14	0,0821	0,013	-0,4	-0,2	s
15	0,063	0,034	-1,3	-1,7	s
17	0,079	0,035	-0,4	-0,5	s
18	0,0601			-1,9	s
20	0,0631	0,018	-2,4	-1,7	s
21	0,061			-1,8	s
22	0,102			1,1	s
23	0,084	0,014	-0,2	-0,1	s
24	0,0676			-1,3	s
25	0,103	0,029	1,2	1,1	s
26	0,0839	0,023	-0,1	-0,1	s
28	0,086			0,1	s
30	0,068			-1,3	s
31	0,108	0,064	0,7	1,4	s
33	0,06			-1,9	s
34	0,076	0,015	-1,2	-0,7	s
35	0,067			-1,4	s
37	0,0531			-2,4	q
38	0,079	0,016	-0,7	-0,5	s
40	0,098			0,8	s
41	0,087			0,1	s
42	0,0855			0,0	s
43	0,066			-1,4	s
44	0,0685	0,007	-4,0	-1,3	s
46	0,077	0,015	-1,0	-0,6	s
48	0,085			0,0	s
49	0,078	0,02	-0,7	-0,5	s
50	0,0644	0,009	-4,0	-1,6	s
51	0,0869	0,016	0,2	0,1	s
52	0,067	0,002	-7,2	-1,4	s
53	0,0695			-1,2	s
54	0,062	0,004	-7,6	-1,7	s
55	0,079	0,005	-1,8	-0,5	s
56	0,085	0,012	0,0	0,0	s
57	0,0639			-1,6	s

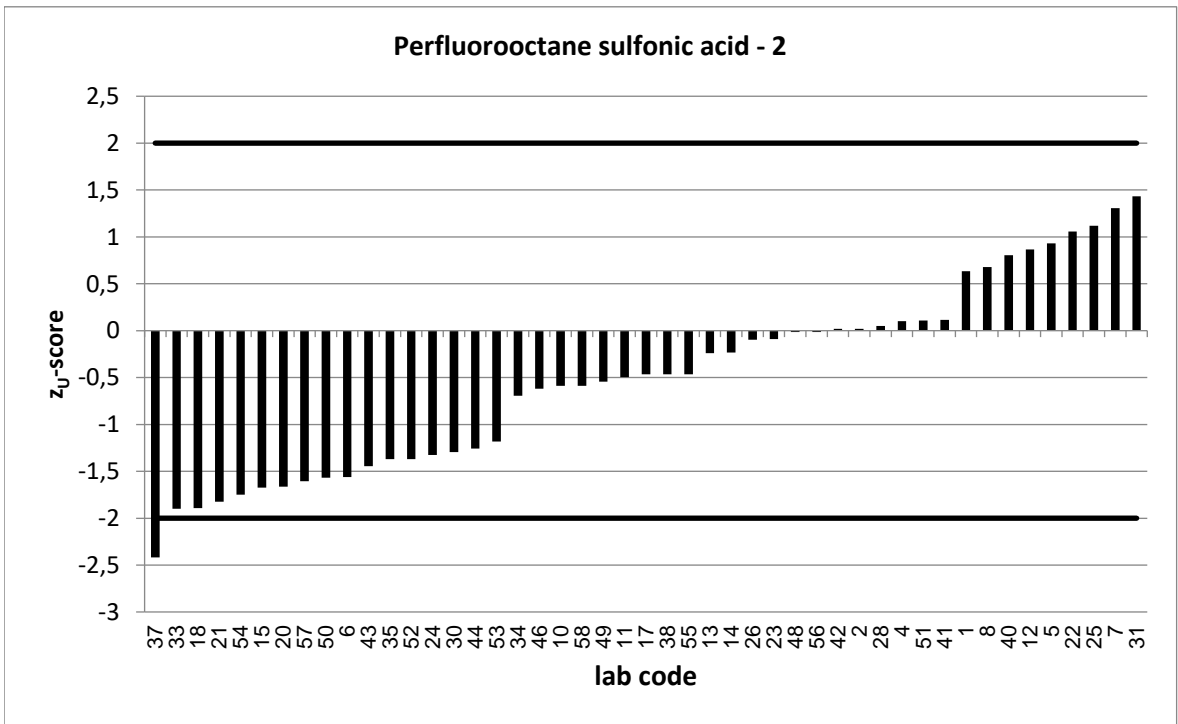
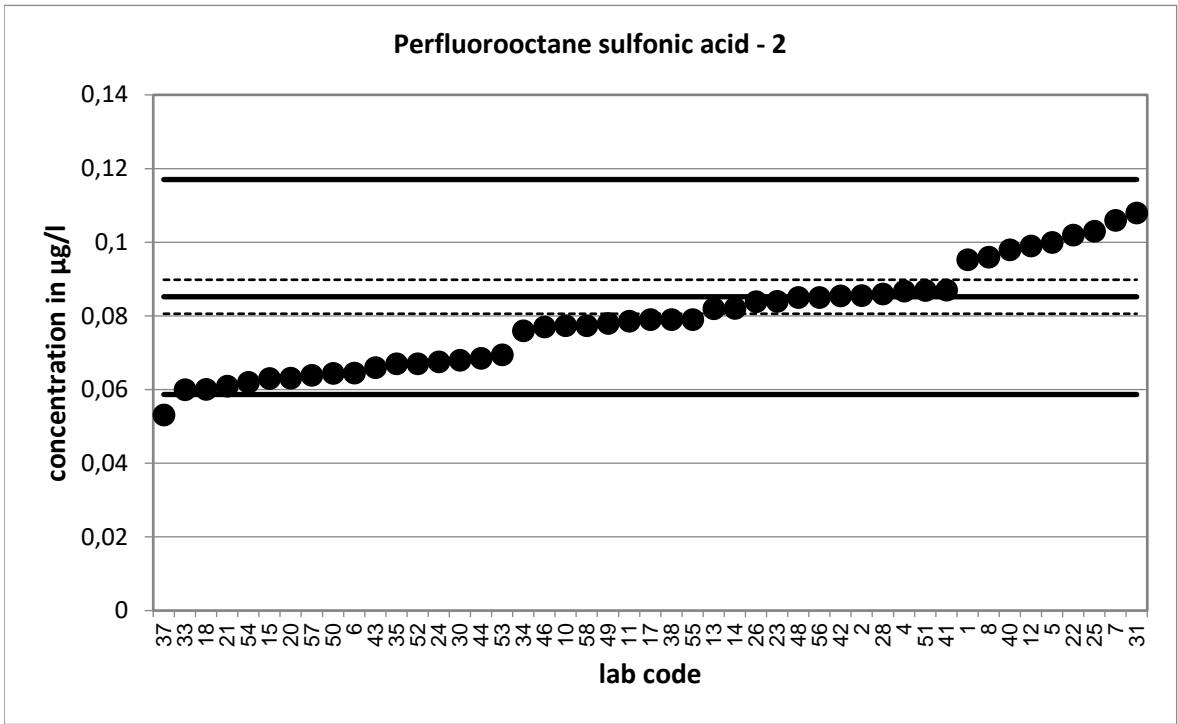
* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

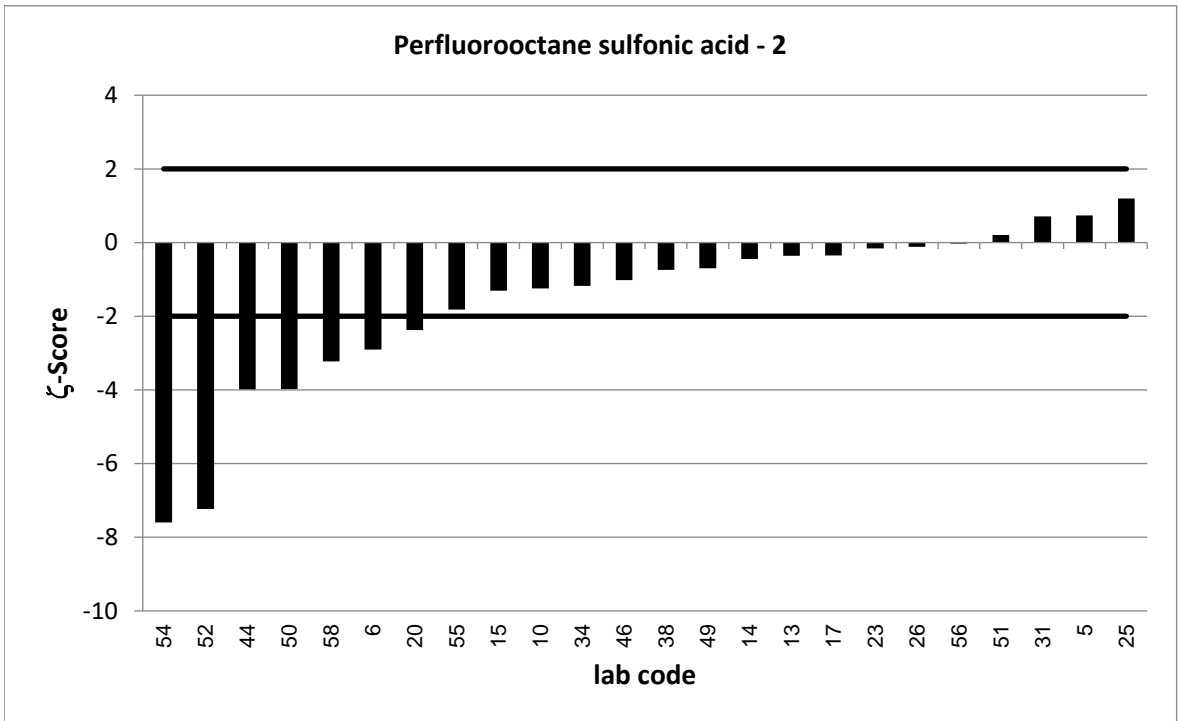
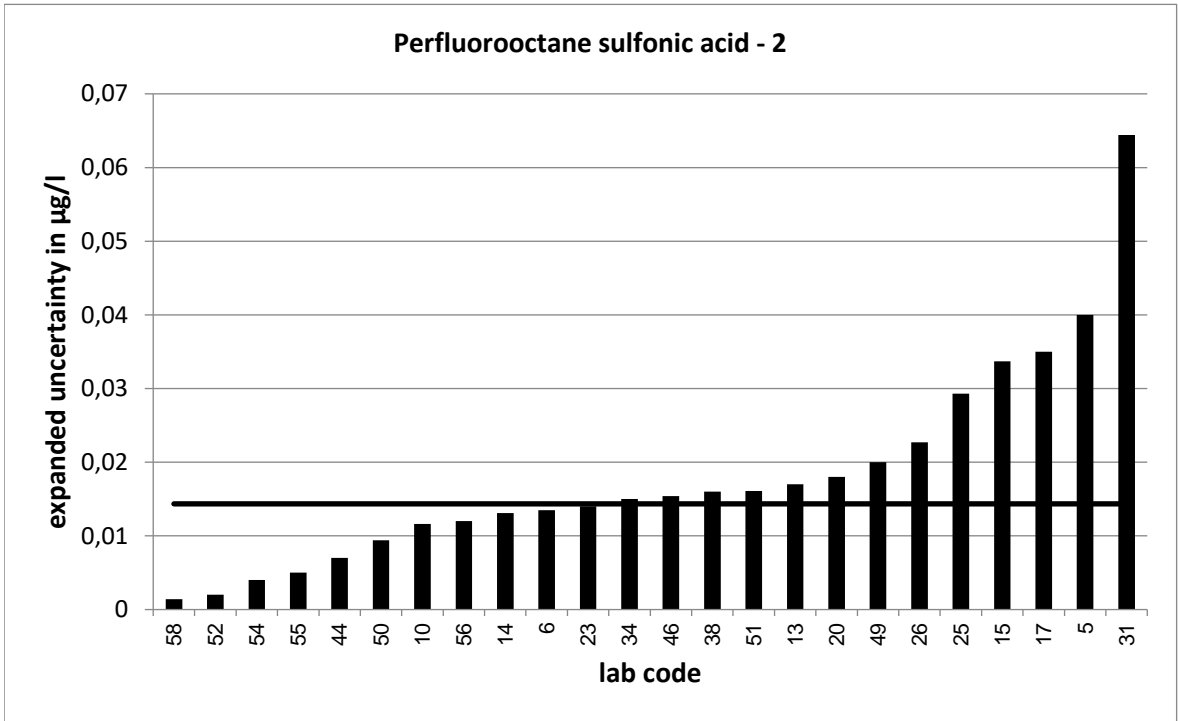
** s = satisfactory, q = questionable, u = unsatisfactory

PT 6/17 - TW S4		Perfluorooctane sulfonic acid - 2			
assigned value [$\mu\text{g/l}$]*		0,0852 \pm 0,00461			
upper tolerance limit [$\mu\text{g/l}$]		0,117			
lower tolerance limit [$\mu\text{g/l}$]		0,05866			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
58	0,0774	0,001	-3,2	-0,6	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory





PT 6/17 - TW S4		Perfluorooctane sulfonic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1988 \pm 0,0106			
upper tolerance limit [$\mu\text{g/l}$]		0,2732			
lower tolerance limit [$\mu\text{g/l}$]		0,1366			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
1	0,235			1,0	s
2	0,2583			1,6	s
4	0,2			0,0	s
5	0,234	0,094	0,7	0,9	s
6	0,172	0,036	-1,4	-0,9	s
7	0,225			0,7	s
8	0,236			1,0	s
10	0,193	0,029	-0,4	-0,2	s
11	0,194			-0,2	s
12	0,231			0,9	s
13	0,373	0,07	4,9	4,7	u
14	0,193	0,031	-0,4	-0,2	s
15	0,156	0,053	-1,6	-1,4	s
17	0,208	0,067	0,3	0,2	s
18	0,1759			-0,7	s
20	0,151	0,036	-2,5	-1,5	s
21	0,137			-2,0	s
22	0,251			1,4	s
23	0,189	0,028	-0,7	-0,3	s
24	0,167			-1,0	s
25	0,268	0,077	1,8	1,9	s
26	0,1847	0,05	-0,6	-0,5	s
28	0,205			0,2	s
30	0,143			-1,8	s
31	0,181	0,108	-0,3	-0,6	s
33	0,152			-1,5	s
34	0,188	0,038	-0,5	-0,3	s
35	0,177			-0,7	s
37	0,132			-2,1	q
38	0,208	0,042	0,4	0,2	s
40	0,184			-0,5	s
41	0,187			-0,4	s
42	0,19			-0,3	s
43	0,155			-1,4	s
44	0,162	0,02	-3,3	-1,2	s
46	0,199	0,04	0,0	0,0	s
48	0,177			-0,7	s
49	0,2	0,06	0,0	0,0	s
50	0,164	0,024	-2,7	-1,1	s
51	0,194	0,039	-0,2	-0,2	s
52	0,195	0,082	-0,1	-0,1	s
53	0,165			-1,1	s
54	0,155	0,015	-4,8	-1,4	s
55	0,129	0,005	-11,9	-2,2	q
56	0,221	0,031	1,4	0,6	s
57	0,167			-1,0	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

PT 6/17 - TW S4		Perfluorooctane sulfonic acid - 3			
assigned value [$\mu\text{g/l}$]*		0,1988 \pm 0,0106			
upper tolerance limit [$\mu\text{g/l}$]		0,2732			
lower tolerance limit [$\mu\text{g/l}$]		0,1366			
lab code	result [$\mu\text{g/l}$]	\pm	ζ -score	z_U -score	assessm.**
58	0,195	0,007	-0,6	-0,1	s

* The stated uncertainty of the assigned value is the expanded uncertainty with a coverage factor $k=2$ corresponding to a confidence level of about 95%

** s = satisfactory, q = questionable, u = unsatisfactory

