Results of Proficiency Test
Biodiesel 100% FAME (B100)
September 2014

Organised by: Institute for Interlaboratory Studies
                Spijkenisse, the Netherlands

Author: ing. L. Dijkstra
Correctors: dr. R.G. Visser, ing R. Starink & ing. L. Sweere
Report no.:   iis14G05

December 2014

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1   INTRODUCTION

Since 2001, a proficiency test for Fatty Acid Methyl Esters (FAME) used as Biodiesel B100
is organised every year by the Institute for Interlaboratory Studies (iis).
In this interlaboratory study 67 laboratories from 27 different countries have participated.
See appendix 2 for a list of number of participants per country. In this report the results of
the 2014 Biodiesel B100 proficiency test are presented and discussed. This report is also
electronically available through the iis internet site www.iisnl.com.

2   SET UP

In this proficiency test Biodiesel B100, a sample Rapeseed methyl ester was used. Sample
analyses for fit-for-use and homogeneity testing were subcontracted. In this proficiency test,
the participants received, depending on the registration, from one up to three different
samples of Biodiesel B100, see table below.

Samples	Amount in L	Purpose	Spiked
#14185	1.5	For regular analysis	-
#14186	0.1	Analysis of Phosphorus, Potassium, Sodium and Calcium & Magnesium	Phosphorus, Sodium, Calcium
#14187	0.85	Total Contamination test	Quartz material

table 1: three different Biodiesel B100 samples used in iis14G05

The test scope was set up according to both EN14214:2012+A1:2014 and ASTM D6751:14
specifications. Participants were requested to report the analytical results as "rounded and
unrounded results".The unrounded results were preferably used for statistical evaluation.

2.1   QUALITY SYSTEM

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, has implemented a
quality system based on ISO/IEC17043:2010 (R007). This ensures strict adherence to
protocols for sample preparation and statistical evaluation and 100% confidentially of
participant's data. Also customer's satisfaction is measured on regular basis by the
distribution of questionnaires.

2.2   PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described
for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation,
Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3).

2.3 CONFIDENTIALITY STATEMENT

All data presented in this report must be regarded as confidential and for use by the participating companies only. Disclosure of the information in this report is only allowed by means of the entire report. Use of the contents of this report for third parties is only allowed by written permission of the Institute for Interlaboratory Studies. Disclosure of the identity of one or more of the participating companies will be done only after receipt of a written agreement of the companies involved.

2.4 SAMPLES

The necessary bulk material of Biodiesel B100 was obtained from a European producer. After fit-for-use testing and homogenisation in a precleaned metal drum, the B100 was divided over 86 amber glass bottles of 1L and 86 amber glass bottles of 500 ml and both labelled #14185.The homogeneity of the subsamples #14185 was checked by the determination of Density in accordance with ASTM D4052 on 8 stratified randomly selected samples:

	Density at 15ºC in kg/m^3
sample 1 #14185-1	883.07
sample 2 #14185-2	883.07
sample 3 #14185-3	883.06
sample 4 #14185-4	883.06
sample 5 #14185-5	883.07
sample 6 #14185-6	883.06
sample 7 #14185-7	883.06
sample 8 #14185-8	883.07

table 2: homogeneity test of subsamples #14185

	Density at 15ºC in kg/m^3
r (sample #14185)	0.01
reference test	ISO12185:96
0.3*R$_{(reference\ test)}$	0.15

table 3: repeatability of subsamples #14185

For subsample #14186, metals in Biodiesel only, a batch of approx. 6.5 kg made of previous PT samples was spiked with Phosphorus (approx. 7 mg/kg) and Sodium (approx. 7 mg/kg). After homogenisation, the material was subsequently divided over 60 HDPE bottles of 0.1L and labelled #14186. The homogeneity of the subsamples #14186 was checked by determination of Phosphorus on 8 stratified randomly selected samples:

	Phosphorus in mg/kg
sample 1 #14186-1	5.8
sample 2 #14186-2	5.6
sample 3 #14186-3	5.5
sample 4 #14186-4	5.3
sample 5 #14186-5	5.7
sample 6 #14186-6	5.8
sample 7 #14186-7	5.6
sample 8 #14186-8	5.4

table 4: homogeneity test of subsamples #14186

	Phosphorus in mg/kg
r (sample #14186)	0.51
reference test	EN14107:03
r (reference test)	0.60

table 5: repeatability of subsamples #14186

For Total Contamination, out of the same batch of Biodiesel B100, another 56 amber glass bottles of 1 litre with inner and outer caps were filled.
Each sample bottle was spiked (approx 15 mg/kg) with a fresh prepared and well shaken particulate quartz material BCR-070 ($\varnothing$ 2.4 – 32.0 µm) in oil suspension.
Therefore, an amount of the quartz suspension was weighed in the bottle. This bottle was filled up to 850 mL and subsequently labelled #14187.
After homogenization, a random sample was taken to check the Total Contamination.

The calculated repeatability for sample #14185 was less than 0.3 times the corresponding reproducibility of the respective reference method and for sample #14186 was the calculated repeatability less than repeatability of the respective reference method. Therefore, homogeneity of the subsamples was assumed.

Depending on the registration of the participant, one 1 litre bottle and 0.5 litre bottle both labelled #14185, and/or one 0.1 litre bottle labelled #14186, and/or 1 litre bottle labelled #14187, were dispatched to each of the participating laboratories on September 17, 2014.

2.5 STABILITY OF THE SAMPLES

The stability of the Biodiesel B100, packed in the brown glass bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6   ANALYSES

The tests methods to be used by the participating laboratories should be in accordance with the requirements of EN14214:12+A1:2014 and/or ASTM D6751:14, e.g.:

Parameter	EN14214:12+A1:201	Parameter	ASTM D6751:14
Acid Value	EN14104	Acid Number	ASTM D664
		Carbon Residue on 100% FAME	ASTM D4530
CFPP	EN116		
		Cloud Point	ASTM D2500
Copper Strip Corrosion	ISO2160	Copper Strip Corrosion	ASTM D130
Density @ 15°C	ISO12185		
Flash Point (Recc)	ISO3679	Flash Point	ASTM D93
Flash Point (PMcc)	ISO2719		
Iodine Value	EN14111		
Kin. Visc. @ 40°C	ISO3104	Kin. Visc. @ 40°C	ASTM D445
Oxidation Stability	EN14112	Oxidation Stability	EN15751
Sulphated Ash	ISO3987	Sulphated Ash	ASTM D874
Sulphur	ISO20846	Sulphur	ASTM D5453
Water	ISO12937	Water and Sediment	ASTM D2709
Calcium + Magnesium	EN14538	Calcium + Magnesium	EN14538
Phosphorus	EN14107	Phosphorus	ASTM D4951
Polyunsaturated esters	EN15779		
Potassium + Sodium	EN14108/14109	Potassium + Sodium	EN14538
Methanol	EN14110	Methanol	EN14110
mono-, di-, tri-Glycerides	EN14105		
Free + Total Glycerol	EN14105	Free + Total Glycerol	ASTM D6584
Total ester content	EN14103		
Linolenic Acid	EN14103		
Total Contamination	EN12662		

table 6: requirements and test methods acc. to specifications EN14214:12+A1:2014 and ASTM D6751:14

To get comparable results a detailed report form, on which the units were prescribed as well as the required standards and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The detailed report form was also made available for download on the iis website www.iisnl.com.
A SDS and a form to confirm receipt of the samples were added to the sample package.

3   RESULTS

During four weeks after sample despatch, the results of the individual laboratories were gathered. The original data are tabulated per determination in appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder fax was sent to the laboratories that had not reported results at that moment. Shortly after the deadline, the available results were screened for suspect data. A result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the results. Additional or corrected results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1.

3.1 STATISTICS

Statistical calculations were performed as described in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' (iis-protocol, April 2014 version 3.3). For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. Results reported as '<…' or '>…' were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'. After removal of outliers, this check was repeated. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the results should be used with due care.
In accordance to ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon, Grubbs and Rosner outlier tests. Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test and by R(0.01) for the Rosner General ESD test (see appendix 3, no.15). Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test and by R(0.05). Both outliers and stragglers were not included in the calculations of the averages and the standard deviations.

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

Finally, the reproducibilities were calculated from the standard deviations by multiplying them with a factor of 2.8.

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis results are plotted. The corresponding laboratory numbers are under the X-axis.
The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a "x". Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This is a method for producing a smooth density approximation to a set of data that avoids some problems associated with

histograms (see appendix 3; Nos.13 and 14). Also a normal Gauss curve was projected over the Kernel Density Graph.

3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM reproducibilities, the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the spread of this interlaboratory study. The target standard deviation was calculated from the literature reproducibility by division with 2.8.

When a laboratory did use a test method with a reproducibility that is significantly different from the reproducibility of the reference test method used in this report, it is strongly advised to recalculate the z-score, while using the reproducibility of the actual test method used, this in order to evaluate whether the reported test result is fit-for-use.
The z-scores were calculated in accordance with:

$z_{(target)}$ = (result - average of PT) / target standard deviation

The $z_{(target)}$ scores are listed in the result tables in appendix 1.

Absolute values for z<2 are very common and absolute values for z>3 are very rare. Therefore the usual interpretation of z-scores maybe as follows:

|z| < 1 good
1 < |z| < 2 satisfactory
2 < |z| < 3 questionable
3 < |z| unsatisfactory

4 EVALUATION

In this proficiency test some problems were encountered during the execution.
For the regular Biodiesel PT: 6 participants reported test results after the final reporting date and 8 participants did not report any test results at all.
For the Total Contamination PT: 4 participants reported the test results after the final reporting date and 10 participants did not report any test results at all.
For the Metals in Biodiesel PT: 2 participants reported the test results after the final reporting date and 6 participants did not report any test results at all.

Finally, 54 participants reported in total 836 numerical results. Observed were 35 outlying results, which is 4.2%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

4.1   EVALUATION PER TEST

In this section, the results are discussed per sample and per test. The specified test methods and requirements acc. to EN14214:12+A1:2014 and ASTM D6751:14 were taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the reported data. The abbreviations, used in these tables, are listed in appendix 3.

In the iis PT reports, ASTM methods are referred to with a number (e.g. D2086) and an added designation for the year that the method was adopted or revised (e.g. D2086-08). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D2086-08 (2013)). In the results tables of Appendix 1 only the method number and year of adoption or revision will be used.

The majority of the data sets proved to have a normal distribution. For some other tests the number of reported test results was too small to determine whether the data set was normally distributed. In these cases the results of the statistical evaluations should be used with care.

For Biodiesel B100 sample #14185

Acid Value (EN)	This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN14104:03.
Acid Number (ASTM)	This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D664:11a (method B).
Cloud Point	This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D2500:11.
CFPP	This determination was not problematic. No statistical outliers were observed and the calculated reproducibility is in good agreement with the requirements of EN116:97.
Carbon Residue on 100%	The consensus value found was near or below the applicable lower limit of D4530:11 (<0.1%M/M). Therefore no significant conclusions were drawn.
Copper Corrosion D130 / ISO2160	No problems have been observed. All participants agreed on a result of 1.
Density @15°C	This determination was problematic for number of laboratories. Five statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of ISO12185:96.

Note: API /ASTM tables do not apply when measured to EN14214:12+A1:2014. See Annex B of EN14214:12+A1:2014 for calculation of conversion factor.

Flash Point PMcc: ASTM

This determination was not problematic when ASTM D93:13 was used. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D93:13. However, when compared against ISO2719:02, the calculated reproducibility is not in agreement with the requirements.

Flash Point conform EN spec.

This determination was not problematic. No statistical outliers were observed. However, the calculated reproducibility is in agreement with the requirements of ISO3679:04.

Iodine Number

This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of EN14111:03.

Kin.Visco. @ 40°C

The determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO3104:96 and also with the requirements of ASTM D445:14e2.

Oxidation Stability

This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN14112:03. When the data of EN14112 and EN15721 were evaluated separately, both calculated reproducibilities meet the requirements of the respective standards.

Sulphated Ash

All reported results, except one, were near or below the applicable lower limit of ASTM D874:13a and/or ISO3987:10 (0.005% M/M). Therefore no significant conclusions were drawn.

Sulphur ISO20846/ ASTM D5453

This determination was not problematic. Three statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO20846:11 and almost in agreement with the requirements of ASTM D5453:12.
When the data of ISO20846 and ASTM D5453 were evaluated separately, the calculated reproducibility for the ISO20846 data is somewhat smaller and in agreement with the standard. The calculated reproducibility of the ASTM D5453 data is almost in agreement with the standard.

Water   This determination was not problematic. No statistical outliers were observed and the calculated reproducibility is in agreement with the requirements of ISO12937:00.

Methanol   This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of EN14110:03.

mono-Glycerides   This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14105:11.

di-Glycerides   This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14105:11.

tri-Glycerides   This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14105:11.

Free Glycerol   This determination was not problematic. One statistical outlier was observed and one result was excluded. The calculated reproducibility after rejection of the suspect data is in full agreement with the requirements of EN14105:11.

Total Glycerol   This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14105:11.
.
Total Ester content This determination was not problematic. No statistical outliers were observed and the calculated reproducibility is in agreement with the requirements of EN14103:11.

Linolenic Acid   This determination was not problematic. One statistical outlier was
Methyl Ester   observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of EN14103:11.

Polyunsaturated   All reported results, except one, were near or below the lower application limit of EN15779:09 (0.6 – 1.5 %M/M). Therefore no significant conclusions were drawn.

For Biodiesel B100 sample #14186

Calcium and Magnesium

This determination was problematic. One statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier is not in agreement with the requirements of EN141538:06.

Phosphorus

This determination was problematic. Two statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers, is not in agreement with the requirements of EN14107:03. The samples were spiked with Phosphorus. The average recovery of Phosphorus (theoretical increment of 7.08 mg/kg) may be satisfactory: "less then 93%" The actual blank concentration for Phosphorus is unknown.

Potassium

All reported results, except one, were near or below the lower application limit of EN14109:03 (0.5 mg/kg) and EN14538:06 (>1.0 mg/kg). Therefore no significant conclusions were drawn.

Sodium

This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of EN14108:03. The samples were spiked with Sodium. The average recovery of Sodium (theoretical increment of 7.14 mg/kg) may be unsatisfactory: "less then 74%" The actual blank concentration for Sodium is unknown.

For Biodiesel B100 sample #14187

Total Contamination

This determination was very problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not at all in agreement with the requirements of EN12662:14.

The average recovery of TC (increment of 14.94 mg/kg) may be satisfactory, "less then 147%".The actual blank concentration is unknown. All reporting laboratories, except one laboratory, found at least the spiked amount.

4.2   PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the relevant standard and the reproducibility as found for the group of laboratories that participated. The reproducibilities derived from literature standards (in casu the ASTM, EN, ISO and IP standards) and the calculated reproducibilities of the samples (see appendix 1) are compared in the next table.

Parameter	unit	n	average	R (Calc.)	R (lit)
Acid Value (EN14104)	mg KOH/g	33	0.184	0.045	0.060
Acid Number (D664-B)	mg KOH/g	15	0.168	0.097	0.087
Cloud Point	°C	44	-7.4	3.7	3.0
Cold Filter Plugging Point	°C	41	-20.8	2.4	4.7
Carbon Residue on 100% FAME	%M/M	13	0.01	0.02	(0.14)
Copper Strip Corrosion		37	1	n.a.	n.a.
Density @ 15°C	kg/m^3	47	883.0	0.2	0.5
Flash Point (PMcc) ASTM	°C	30	157.8	13.6	14.7
Flash Point EN spec.	°C	17	170.2	12.9	15.0
Iodine Value	g I$_2$/100g	35	112.0	7.5	5.0
Kin. Viscosity @ 40°C	mm^2/s	45	4.47	0.05	0.04
Oxidation Stability EN14112	hours	34	9.02	1.61	2.58
Sulphated Ash	%M/M	17	0.0009	0.0018	(0.0005)
Sulphur (ISO20846)	mg/kg	32	2.37	1.24	1.39
Water	mg/kg	47	302.8	71.5	119.7
Methanol	%M/M	27	0.022	0.008	0.008
mono-Glycerides	%M/M	31	0.56	0.14	0.17
di-Glycerides	%M/M	29	0.10	0.04	0.05
tri-Glycerides	%M/M	29	0.05	0.05	0.07
Free Glycerol	%M/M	25	0.003	0.007	0.007
Total Glycerol	%M/M	31	0.169	0.042	0.044
Total Ester Content	%M/M	37	98.0	3.2	4.2
Linolenic Acid Methyl Ester	%M/M	36	9.30	0.65	0.65
Polyunsat. Methyl esters	%M/M	12	0.27	0.62	(0.27)

table 7: comparison of the observed and target reproducibilities of Biodiesel B100 sample #14185

Parameter	unit	n	average	R (Calc.)	R (lit)
Calcium & Magnesium	mg/kg	21	9.1	3.5	2.5
Phosphorus	mg/kg	19	6.6	2.2	1.3
Potassium	mg/kg	7	0.5	1.1	(0.8)
Sodium	mg/kg	21	5.3	2.5	2.7

table 8: comparison of the observed and target reproducibilities of Biodiesel B100 sample #14186

Parameter	unit	n	average	R (Calc.)	R (lit)
Total Contamination	mg/kg	25	22.0	14.3	6.6

table 9: comparison of the observed and target reproducibilities of Biodiesel B100 sample #14187

Without further statistical calculations it can be concluded that for many tests there is a good compliance of the group of participating laboratories with the relevant standards. The problematic tests have been discussed in paragraph 4.1.

4.3   COMPARISON OF THE PROFICIENCY TEST OF SEPTEMBER 2014 WITH PREVIOUS PTS

	September 2014	April 2014	October 2013	April 2013
Type of FAME	Rapeseed	Rapeseed	Fat of Offal	Rapeseed
Number of reporting labs	54	68	58	75
Number of results reported	836	1093	768	1010
Number of statistical outliers	35	54	44	67
Percentage statistical outliers	4.2%	5.2%	5.7%	6.6%

table 10: comparison with previous proficiency tests

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.
The performance of the determinations of the proficiency tests was compared against the requirements of the respective standards. The conclusions are given the following table:

Determination	September 2014	April 2014	October 2013	April 2013
Acid Value (EN14104)	+	+	--	+
Acid Number (D664-B)	-	+	--	+
Cloud Point	-	+	+	+
Cold Filter Plugging Point	++	+	--	+
Carbon Residue on 100% FAME	(++)	(++)	n.e.	++
Density @15°C	++	+	++	++
Flash Point PMcc ASTM	+	+/-	+/-	-
Flash Point EN spec.	+	+/-	++	-
Iodine Value	-	+	--	+/-
Kin. Viscosity @ 40°C	+	+/-	--	-
Oxidation Stability	+	+	--	+
Sulphated Ash	(--)	(--)	(-)	(--)
Sulphur (ISO20846)/(D5453)	+	+/-	--	-
Water	+	+	+	++
Methanol	+/-	+/-	n.e.	--
mono-Glycerides	+	+	(-)	+
di-Glycerides	+/-	+/-	(-)	+
tri-Glycerides	+	+	(+)	+
Free Glycerol	+/-	+/-	+	+
Total Glycerol	+	+	--	+/-
Total Ester content	+	+	--	++
Linolenic Acid Methyl Ester	+/-	+/-	--	-
Polyunsat. Methyl esters	(--)	(-)	--	(--)
Sum of Calcium and Magnesium	-	-	(--)	(--)
Phosphorus	--	--	--	--
Potassium	(-)	(++)	(++)	+/-
Sodium	+	-	-	+/-
Total Contamination	--	--	--	--

table 11 : comparison of group performances against the standard requirements
* Signs between brackets are for assigned values below the application range of the respective reference test method and
  therefore should be used with due care

The performance of the determinations against the requirements of the respective standards is listed in the above table. The following performance categories were used:

    ++:   group performed much better than the standard

    + :   group performed better than the standard

    +/-:   group performance equals the standard

    - :   group performed worse than the standard

    -- :   group performed much worse than the standard

    n.e.:   not evaluated

APPENDIX 1

Determination of Acid Value conform EN spec. on sample #14185; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	EN14104	0.158		-1.22	
171	EN14104	0.1698	C	-0.67	First reported: 0.091
311	EN14104	0.19		0.27	
312	EN14104	0.17		-0.66	
323	EN14104	0.18		-0.20	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351	EN14104	0.168		-0.76	
370		-----		-----	
373	EN14104	0.206		1.02	
420	EN14104	0.190		0.27	
445	EN14164	0.2126		1.32	
447	EN14104	0.21		1.20	
496	EN14104	0.17		-0.66	
511		-----		-----	
540	EN14104	0.188		0.18	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14104	0.203		0.88	
1067	EN14104	0.16		-1.13	
1134	EN14134	0.173		-0.52	
1161	EN14104	0.184		-0.01	
1167	EN14104	0.25	R(0.05)	3.07	
1179	EN14104	0.188		0.18	
1199		-----		-----	
1201		-----		-----	
1203	EN14104	0.201		0.78	
1240	EN14104	0.171		-0.62	
1286		-----		-----	
1299		-----		-----	
1320		-----		-----	
1339	EN14104	0.197		0.60	
1389	EN14104	0.202		0.83	
1397	EN14104	0.162		-1.04	
1400	EN14104	0.198		0.64	
1459	EN14104	0.19		0.27	
1485	EN14104	0.198		0.64	
1510	EN14104	0.17		-0.66	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14104	0.212		1.30	
1634		-----		-----	
1656	EN14104	0.17		-0.66	
1710	EN14104	0.18		-0.20	
1739	EN14104	0.176		-0.38	
1744		-----		-----	
1769		-----		-----	
1878	EN14104	0.193		0.41	
1887	ISO660	0.26	R(0.05)	3.54	
1894	EN14104	0.168		-0.76	
1902		-----		-----	
1948	EN14104	0.1712		-0.61	
4043		-----		-----	

normality	OK	
n	33	
outliers	2	
mean (n)	0.1842	
st.dev. (n)	0.01610	
R(calc.)	0.0451	
R(EN14104:03)	0.0600	

Kernel Density
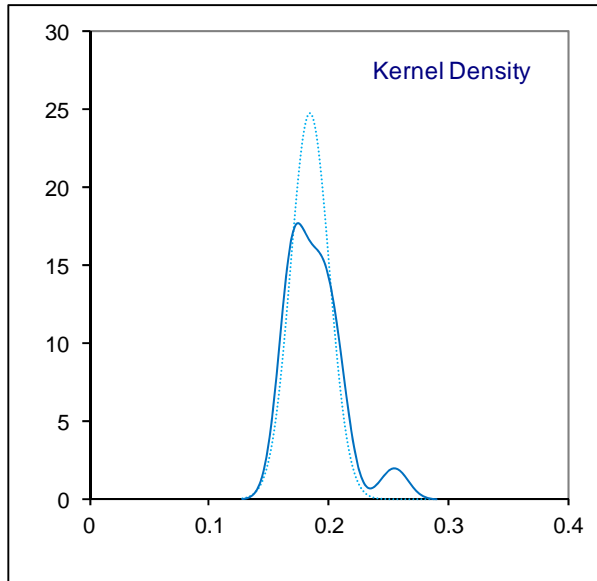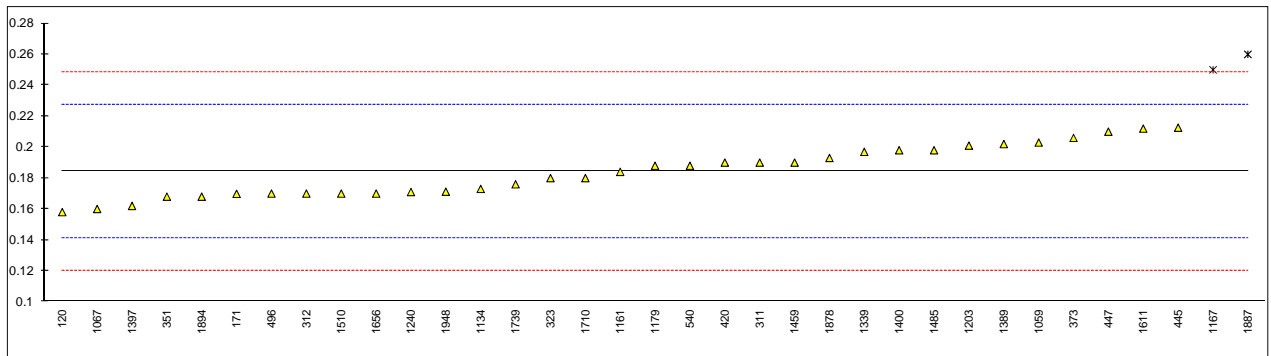
Determination of Acid Number conform ASTM spec. on sample #14185; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	D664	0.148		-0.63	
171	D664	0.099		-2.22	
311		-----		-----	
312		-----		-----	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373		-----		-----	
420		-----		-----	
445	D664	0.225		1.86	
447	D664	0.14		-0.89	
496		-----		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D664	0.192		0.79	
663	D664	0.159		-0.28	
1033	D664	0.185		0.57	
1059		-----		-----	
1067		-----		-----	
1134		-----		-----	
1161	D664	0.149		-0.60	
1167		-----		-----	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	D664	0.137		-0.99	
1240		-----		-----	
1286		-----		-----	
1299	D664	0.230		2.02	
1320		-----		-----	
1339		-----		-----	
1389	D664	0.15		-0.57	
1397		-----		-----	
1400		-----		-----	
1459		-----		-----	
1485		-----		-----	
1510		-----		-----	
1582		-----		-----	
1586	D664	0.2028		1.14	
1588		-----		-----	
1611		-----		-----	
1634		-----		-----	
1656	D664	0.17		0.08	
1710	D664	0.165		-0.08	
1739		-----		-----	
1744	D664	0.161		-0.21	
1769		-----		-----	
1878		-----		-----	
1887		-----		-----	
1894		-----		-----	
1902		-----		-----	
1948		-----		-----	
4043		-----		-----	

normality	OK	
n	15	
outliers	0	
mean (n)	0.1675	
st.dev. (n)	0.03474	
R(calc.)	0.0973	
R(D664B:11a)	0.0866	

Kernel Density
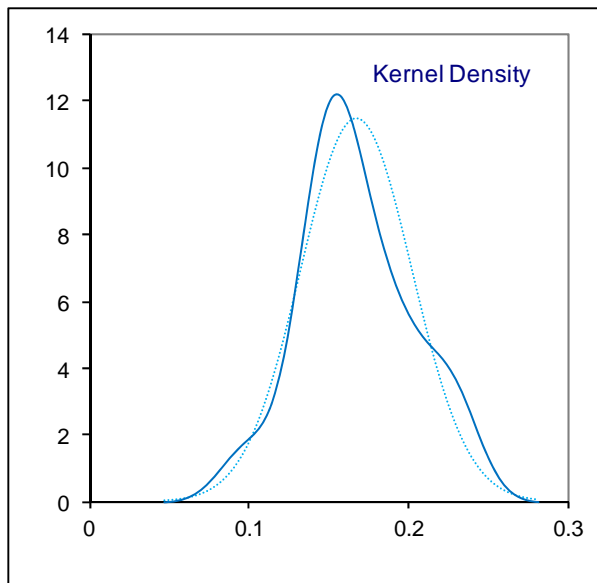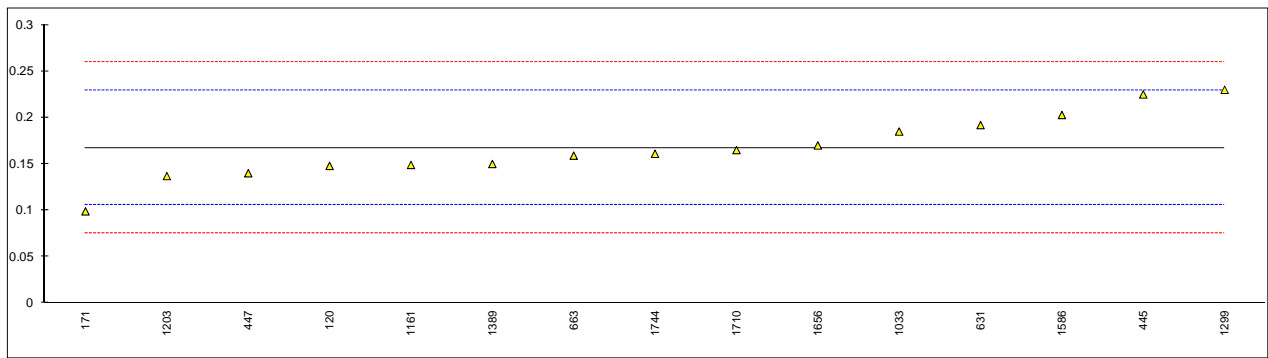
Determination of Cloud Point on sample #14185; results in °C

lab	method	value	mark	z(targ)	remarks
120	D2500	-8		-0.58	
171	D2500	-9.0		-1.51	
311	D5771	-8		-0.58	
312	EN23015	-8		-0.58	
323	D2500	-5		2.22	
333	EN23015	-9		-1.51	
334	D2500	-7		0.36	
335	EN23015	-9		-1.51	
337	D2500	-8		-0.58	
338	EN23015	-7.9		-0.48	
351	D7683	-8.0		-0.58	
370	D2500	-6		1.29	
373		-----		-----	
420		-----		-----	
445	D2500	-6		1.29	
447	D2500	-6		1.29	
496	D2500	-4.0		3.16	
511		-----		-----	
540	D5771	-8.3		-0.86	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D2500	-7		0.36	
663	D2500	-8		-0.58	
1033	IP219	-6		1.29	
1059	EN23015	-7		0.36	
1067	D5771	-5.0		2.22	
1134	D2500	-9		-1.51	
1161	D2500	-8		-0.58	
1167	EN23015	-7		0.36	
1179		-----		-----	
1199		-----		-----	
1201	D2500	-8		-0.58	
1203	EN23015	-5		2.22	
1240	EN23015	-8.0		-0.58	
1286		-----		-----	
1299	D2500	-6.3		1.01	
1320		-----		-----	
1339		-----		-----	
1389	D2500	-8		-0.58	
1397	D5771	-5		2.22	
1400	D5771	-8.3		-0.86	
1459	EN23015	-9		-1.51	
1485	D2500	-8.0		-0.58	
1510	D2500	-6		1.29	
1582		-----		-----	
1586	D2500	-8		-0.58	
1588		-----		-----	
1611	ISO3015	-9		-1.51	
1634		-----		-----	
1656	IP219	-7		0.36	
1710	EN23015	-9		-1.51	
1739	EN23015	-8		-0.58	
1744	D2500	-7		0.36	
1769		-----		-----	
1878	D2500	-7		0.36	
1887		-----		-----	
1894	D2500	-9		-1.51	
1902	D2500	-8		-0.58	
1948	D2500	-7		0.36	
4043		-----		-----	

normality	OK	
n	44	
outliers	0	
mean (n)	-7.38	
st.dev. (n)	1.314	
R(calc.)	3.68	
R(D2500:11)	3.00	

Kernel Density
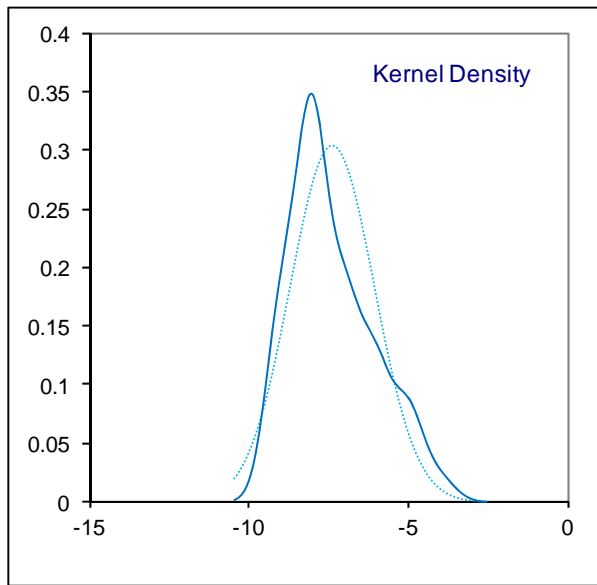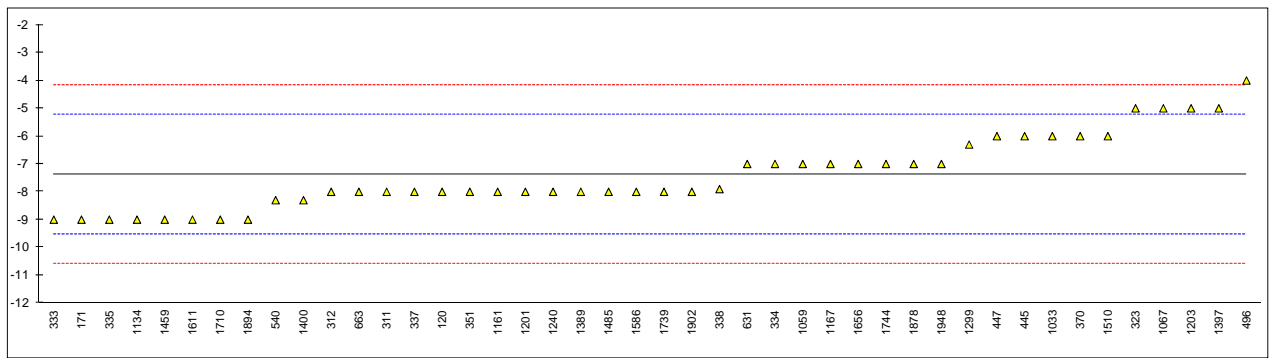
Determination of Cold Filter Plugging Point on sample #14185; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	D6371	-22.0		-0.69	
311	EN116	-20		0.50	
312	EN116	-20		0.50	
323	EN116	-20		0.50	
333	EN116	-20		0.50	
334	EN116	-21		-0.09	
335	EN116	-20		0.50	
337	EN116	-20		0.50	
338	EN116	-21		-0.09	
351		-----		-----	
370	EN116	-21		-0.09	
373	EN116	-20		0.50	
420	EN116	-21		-0.09	
445	IP309	-21		-0.09	
447	IP309	-20		0.50	
496	EN116	-21.0		-0.09	
511		-----		-----	
540	EN116	-21		-0.09	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033	IP309	-22		-0.69	
1059	EN116	-20		0.50	
1067	EN116	-20.0		0.50	
1134	EN116	-22		-0.69	
1161	EN116	-23		-1.28	
1167	EN116	-21		-0.09	
1179	EN116	-21		-----	
1199		-----		-----	
1201	EN116	-21		-0.09	
1203	EN116	-21		-0.09	
1240	EN116	-20.0		0.50	
1286	EN116	-20.0		0.50	
1299	EN116	-22		-0.69	
1320		-----		-----	
1339		-----		-----	
1389	EN116	-20		0.50	
1397	EN116	-21		-0.09	
1400	EN116	-22.1		-0.74	
1459	EN116	-20		0.50	
1485		-----		-----	
1510		-----		-----	
1582		-----		-----	
1586	EN116	-21		-0.09	
1588		-----		-----	
1611	EN116	-21		-0.09	
1634		-----		-----	
1656	EN116	-21		-0.09	
1710	EN116	-21		-0.09	
1739	EN116	-21.5		-0.39	
1744		-----		-----	
1769		-----		-----	
1878	EN116	-23		-1.28	
1887		-----		-----	
1894	EN116	-21		-0.09	
1902	IP309	-19		1.09	
1948	EN116	-21	C	-0.09	First reported: -17
4043		-----		-----	

	normality	OK			
	n	41			
	outliers	0			
	mean (n)	-20.84			
	st.dev. (n)	0.873			
	R(calc.)	2.44			
	R(EN116:97)	4.72			

Kernel Density
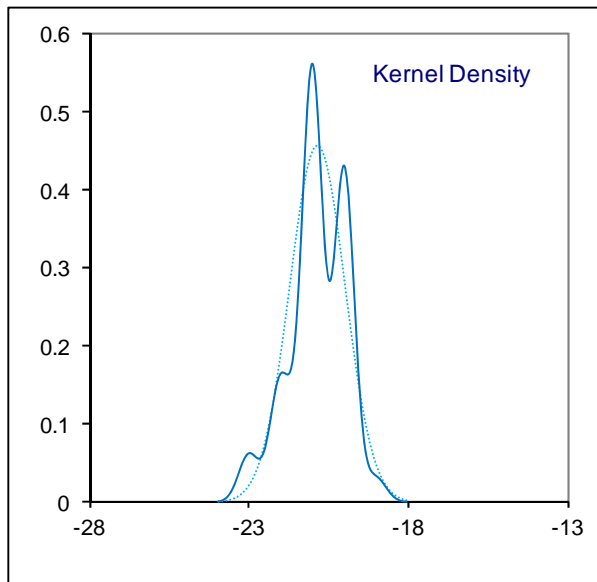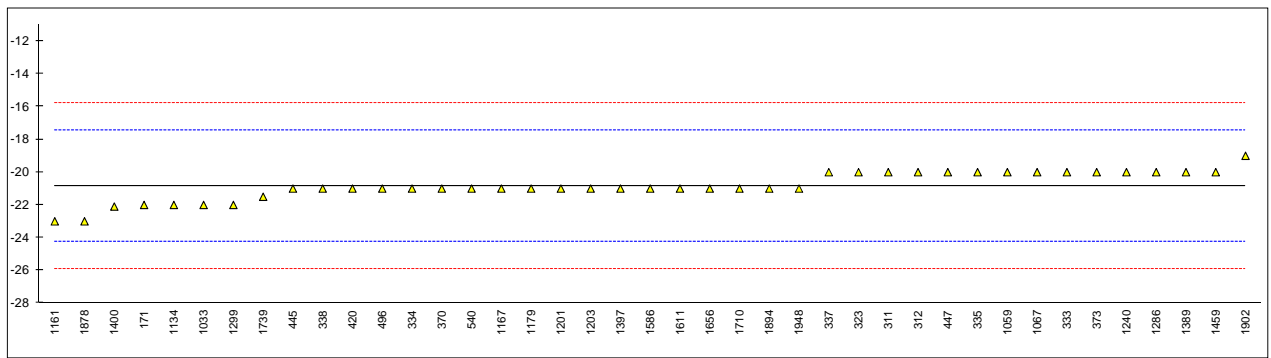
Determination of Carbon Residue on 100% FAME on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D4530	0.02		-----	
171	D4530	<0.10		-----	
311		-----		-----	
312		-----		-----	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370	D4530	0.005		-----	
373		-----		-----	
420		-----		-----	
445	D4530	0.01		-----	
447	D4530	<0.1		-----	
496		-----		-----	
511		-----		-----	
540	D4530	0.004		-----	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D4530	0.016		-----	
663	D4530	<0.01		-----	
1033		-----		-----	
1059	ISO10370	0.012		-----	
1067		-----		-----	
1134	IP13	0.002		-----	
1161	D4530	0.080	C,G(0.05)	-----	First reported: 0.159
1167		-----		-----	
1179		-----		-----	
1199		-----		-----	
1201	D4530	0		-----	
1203		-----		-----	
1240		-----		-----	
1286		-----		-----	
1299		-----		-----	
1320		-----		-----	
1339		-----		-----	
1389	D4530	0.01		-----	
1397	D4530	<0.01		-----	
1400		-----		-----	
1459		-----		-----	
1485		-----		-----	
1510	D4530	0.02		-----	
1582		-----		-----	
1586	D4530	0.02		-----	
1588		-----		-----	
1611		-----		-----	
1634		-----		-----	
1656	D4530	<0.1		-----	
1710	ISO10370	0.014	C	-----	First reported: 0.143
1739		-----		-----	
1744		-----		-----	
1769		-----		-----	
1878	D4530	0.004		-----	
1887		-----		-----	
1894		-----		-----	
1902		-----		-----	
1948	D4530	0.0704	C,G(0.01)	-----	First reported:0.1025
4043		-----		-----	

	normality	OK		
	n	13		
	outliers	2		
	mean (n)	0.0105		
	st.dev. (n)	0.00715		
	R(calc.)	0.0200		
	R(D4530:11)	(0.1409)		Application range: 0.1 – 30 %M/M

Kernel Density
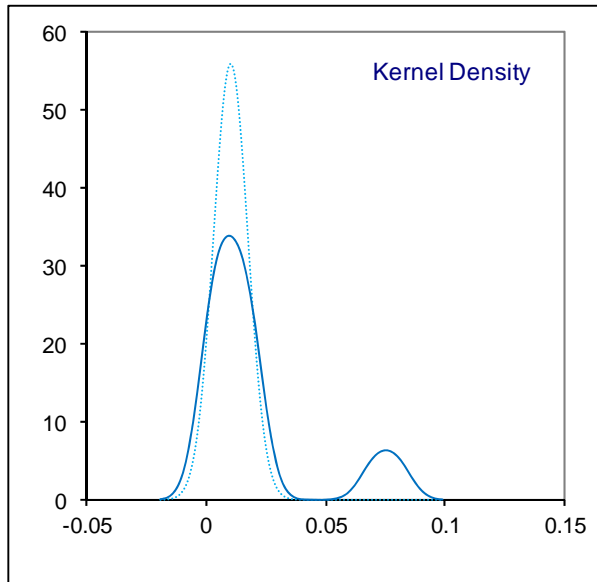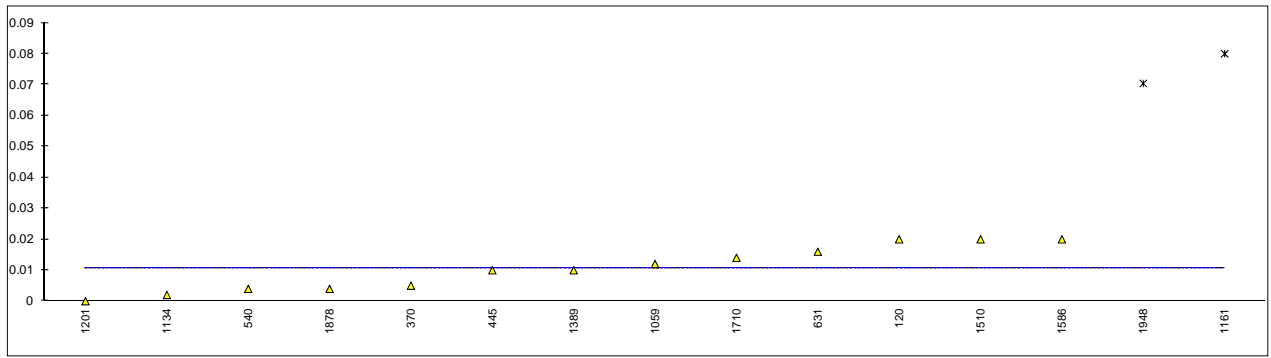
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Determination of Copper Strip Corrosion 3 hrs/50°C on sample #14185

lab	method	value	mark	z(targ)	remarks
120	D130	1A		-----	
171	D130	1A		-----	
311	ISO2160	1A		-----	
312		-----		-----	
323	D130	1A		-----	
333	D130	1		-----	
334		-----		-----	
335	D130	1B		-----	
337	D130	1		-----	
338		-----		-----	
351	ISO2160	1A		-----	
370	D130	1A		-----	
373		-----		-----	
420	ISO2160	1A		-----	
445	D130	1A		-----	
447	D130	1A		-----	
496	D130	1A		-----	
511	D130	1A		-----	
540	D130	1A		-----	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D130	1A		-----	
663	D130	1A		-----	
1033		-----		-----	
1059	ISO2160	1A		-----	
1067	D130	1A		-----	
1134	D130	1A		-----	
1161	D130	1A		-----	
1167	ISO2160	1A		-----	
1179		-----		-----	
1199		-----		-----	
1201	D130	1A		-----	
1203	D130	1		-----	
1240		-----		-----	
1286		-----		-----	
1299	D130	1A		-----	
1320		-----		-----	
1339	ISO2160	1A		-----	
1389	ISO2160	1A		-----	
1397	D130	1		-----	
1400		-----		-----	
1459		-----		-----	
1485		-----		-----	
1510	D130	1A		-----	
1582		-----		-----	
1586	D130	1A		-----	
1588		-----		-----	
1611	ISO2160	1		-----	
1634	D130	1A		-----	
1656	ISO2160	1		-----	
1710	ISO2160	1A		-----	
1739	ISO2160	1A		-----	
1744		-----		-----	
1769		-----		-----	
1878	D130	1A		-----	
1887		-----		-----	
1894	D130	1		-----	
1902	D130	1A		-----	
1948	D130	1A		-----	
4043		-----		-----	
	normality	n.a.			
	n	37			
	outliers	n.a.			
	mean (n)	1(1A)			
	st.dev. (n)	n.a.			
	R(calc.)	n.a.			
	R(D130:12)	n.a.			

Determination of Density @ 15°C conform EN spec. on sample #14185; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	ISO12185	882.8		-1.39	
171	D4052	883.1		0.29	
311	ISO12185	883.1		0.29	
312	ISO12185	883.0		-0.27	
323	ISO12185	883.0		-0.27	
333	D4052	883.0		-0.27	
334	D4052	883.08		0.17	
335	ISO12185	883.0		-0.27	
337	ISO12185	883.0		-0.27	
338	ISO12185	883.0		-0.27	
351	ISO12185	883.08		0.17	
370	D4052	883.1		0.29	
373	ISO12185	883.06		0.06	
420	ISO12185	883.07		0.12	
445	IP365	883.1		0.29	
447	D4052	883.0		-0.27	
496	ISO12185	883.01		-0.22	
511	D4052	883.01		-0.22	
540	ISO12185	883.1		0.29	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D4052	883.08		0.17	
663	D4052	883.1		0.29	
1033	IP365	882.0	R(0.01)	-5.87	
1059	ISO12185	883.1		0.29	
1067	ISO12185	883.05		0.01	
1134	ISO12185	883.0		-0.27	
1161	ISO12185	883.08		0.17	
1167	ISO12185	883.14		0.51	
1179	ISO12185	883.6	R(0.01)	3.09	
1199		-----		-----	
1201	D4052	883.1		0.29	
1203	ISO12185	883.1		0.29	
1240	ISO12185	883.1	C	0.29	First reported: 833.1
1286	ISO12185	883.093		0.25	
1299	ISO12185	883.0		-0.27	
1320		-----		-----	
1339	ISO3675	882.7	R(0.01)	-1.95	
1389	ISO12185	883.1		0.29	
1397	ISO12185	883.1		0.29	
1400	ISO12185	883.06		0.06	
1459	ISO12185	883.06		0.06	
1485	ISO12185	883.11		0.34	
1510	ISO12185	883.1		0.29	
1582		-----		-----	
1586	D4052	883.1		0.29	
1588		-----		-----	
1611	ISO12185	883.08	C	0.17	First reported:833.08
1634	ISO12185	883.057		0.05	
1656	ISO12185	882.9	C	-0.83	First reported: 883.7
1710	ISO12185	883.0		-0.27	
1739	ISO3675	882.82		-1.28	
1744	D4052	883.15		0.57	
1769		-----		-----	
1878	ISO12185	883.1		0.29	
1887	ISO6883	882.0	R(0.01)	-5.87	
1894	ISO12185	885	C, R(0.01)	10.93	Probably unit error, reported: 0.885
1902	ISO12185	882.9		-0.83	
1948	ISO12185	883.1		0.29	
4043		-----		-----	

normality	not OK	
n	47	
outliers	5	
mean (n)	883.05	
st.dev. (n)	0.075	
R(calc.)	0.21	
R(ISO12185:96)	0.50	

Kernel Density
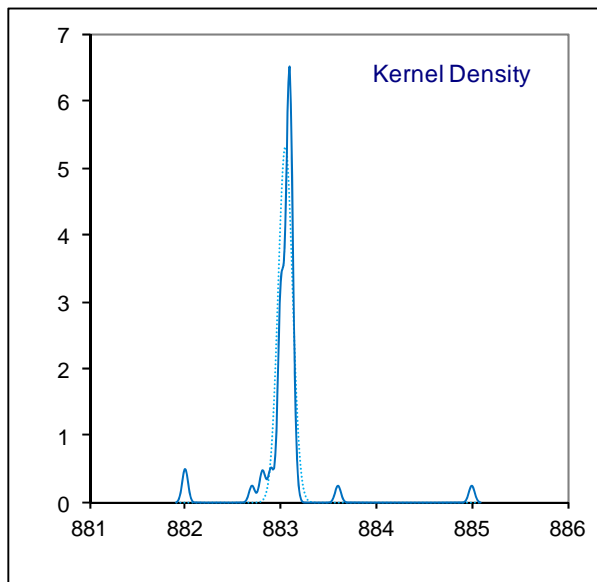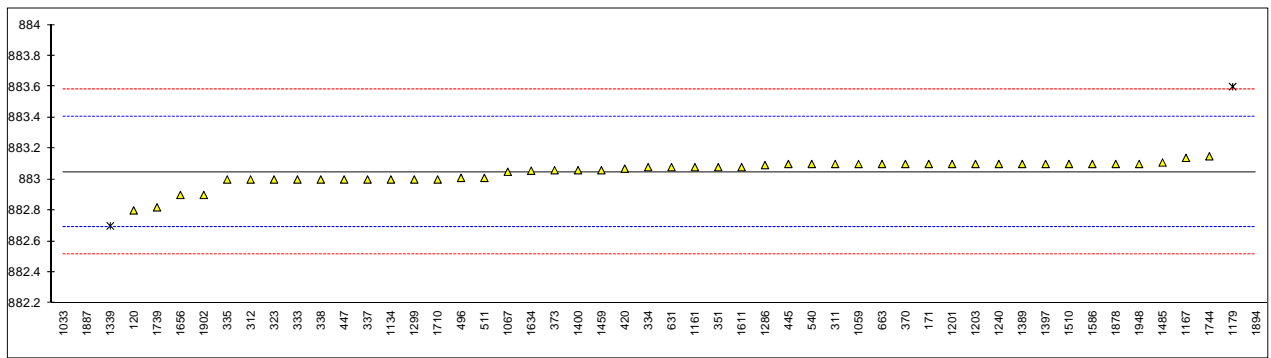
Determination of Flash Point (PMcc) conform ASTM spec. on sample #14185; results in °C

lab	method	value	mark	z(targ)	remarks
120	D93	158		0.04	
171	D93	162.8		0.95	
311		-----		-----	
312		-----		-----	
323	D93	155.0		-0.54	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337	D93	160		0.42	
338		-----		-----	
351	ISO2719	155.0		-0.54	
370	D93	152.0		-1.11	
373		-----		-----	
420	ISO2719	156		-0.35	
445	D93	150.0		-1.49	
447		-----		-----	
496	D93	155.0		-0.54	
511	D93	158.1		0.05	
540	D93	154.5		-0.63	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D93	157.0		-0.15	
663	D93	166.5		1.65	
1033		-----		-----	
1059	ISO2719	158.0		0.04	
1067	D93	147.5		-1.96	
1134	D93	152.5		-1.01	
1161		-----		-----	
1167		-----		-----	
1179	ISO2719	170		2.32	
1199		-----		-----	
1201	D93	164.0		1.18	
1203	ISO2719	158		0.04	
1240		-----		-----	
1286		-----		-----	
1299		-----		-----	
1320		-----		-----	
1339		-----		-----	
1389	D93	158.0		0.04	
1397	D93	152		-1.11	
1400		-----		-----	
1459	ISO2719	161.5		0.70	
1485		-----		-----	
1510	D93	157.0		-0.15	
1582		-----		-----	
1586	D93	162.0		0.80	
1588		-----		-----	
1611		-----		-----	
1634	D93	154.0		-0.73	
1656	ISO2719	162		0.80	
1710	ISO2719	158.0		0.04	
1739		-----		-----	
1744		-----		-----	
1769		-----		-----	
1878	D93	161.0		0.61	
1887	ISO15267	>121		-----	
1894		-----		-----	
1902	D93	162		0.80	
1948		-----		-----	
4043	ISO15267	157		-0.15	

normality	OK		
n	30		
outliers	0		
mean (n)	157.81		
st.dev. (n)	4.865		
R(calc.)	13.62		
R(ASTM D93:13)	14.70	Compare R(ISO2719:02) = 11.4	

Kernel Density
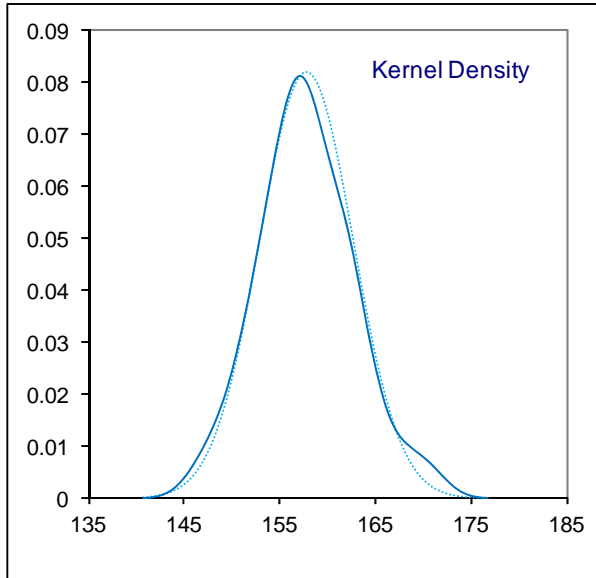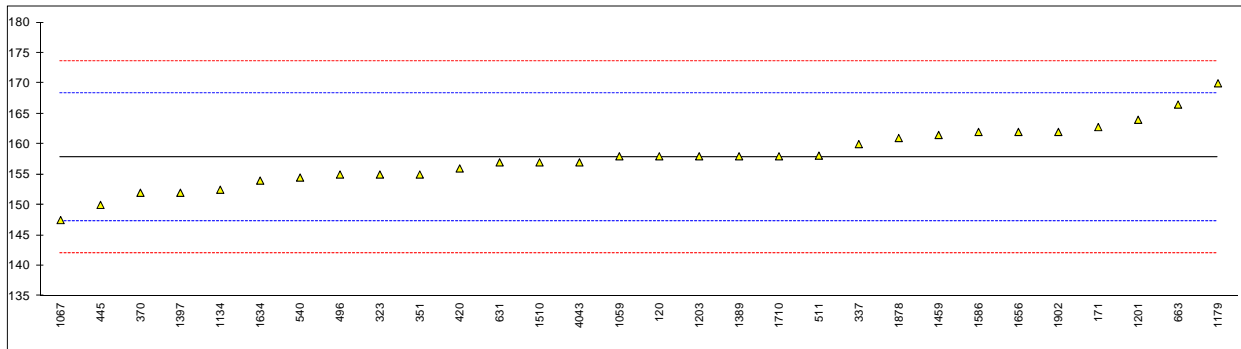
Determination of Flash Point conform EN spec. on sample #14185; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	ISO3679	174.0		0.72	
311	ISO3679	167.0		-0.59	
312	ISO3679	169.0		-0.22	
323		-----		-----	
333		-----		-----	
334	ISO3679	173		0.53	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	ISO3679	172		0.34	
420		-----		-----	
445		-----		-----	
447	ISO3679	173.0		0.53	
496	ISO3679	167.0		-0.59	
511		-----		-----	
540		-----		-----	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059		-----		-----	
1067		-----		-----	
1134	ISO3679	174.0		0.72	
1161	ISO3679	179.5		1.74	
1167	ISO3679	167.65		-0.47	
1179		-----		-----	
1199		-----		-----	
1201	ISO3679	168.0		-0.40	
1203		-----		-----	
1240	ISO3679	163.0		-1.34	
1286	ISO3679	164.1		-1.13	
1299		-----		-----	
1320		-----		-----	
1339	ISO3679	> 165		-----	
1389		-----		-----	
1397		-----		-----	
1400		-----		-----	
1459		-----		-----	
1485		-----		-----	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	ISO3679	177.0		1.28	
1634		-----		-----	
1656		-----		-----	
1710		-----		-----	
1739	ISO3679	170.56		0.08	
1744		-----		-----	
1769		-----		-----	
1878		-----		-----	
1887		-----		-----	
1894	ISO3679	164		-1.15	
1902		-----		-----	
1948	ISO3679	169.825		-0.06	
4043		-----		-----	

|			
	normality	OK	
	n	17	
	outliers	0	
	mean (n)	170.15	
	st.dev. (n)	4.620	
	R(calc.)	12.94	
	R(ISO3679:04)	15.00	
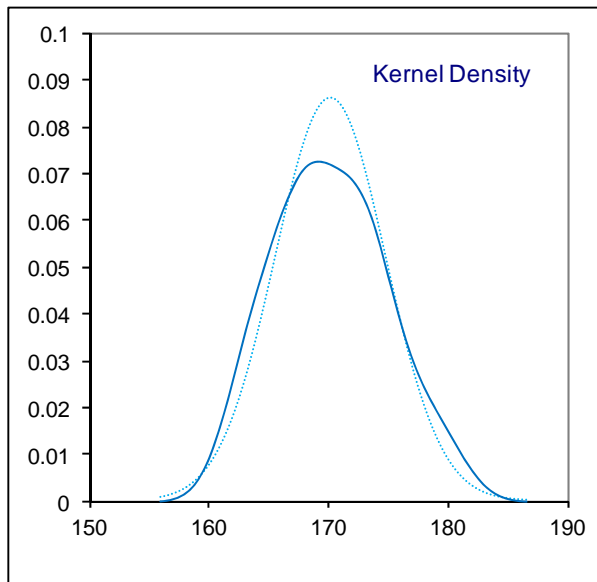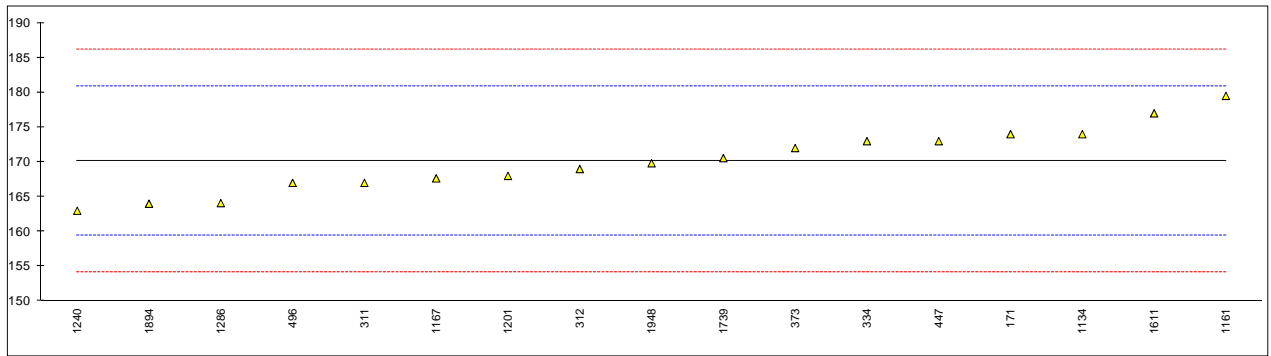
Determination of Iodine Value conform EN spec. on sample #14185; results in g I$_2$/100g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	EN14111	111.1		-0.50	
311	EN14111	115		1.68	
312	EN14111	113.9		1.07	
323	EN14111	113	C	0.56	First reported:99
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351	EN14111	114	C	1.12	First reported:93.8
370		-----		-----	
373	EN14111	104.74	C	-4.06	First reported:106.98
420	EN14111	113.2		0.67	
445	EN14111	112		0.00	
447	EN14111	112		0.00	
496	EN14111	115		1.68	
511		-----		-----	
540	EN14111	110.8		-0.67	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663	EN14111	113.6		0.90	
1033		-----		-----	
1059	EN14111	113		0.56	
1067	EN14111	114.1		1.18	
1134	EN14111	112		0.00	
1161	EN14111	113.4		0.79	
1167	EN14111	107.5		-2.52	
1179	EN14111	112.5		0.28	
1199		-----		-----	
1201		-----		-----	
1203	EN14111	109.95		-1.15	
1240	EN14111	113.0		0.56	
1286		-----		-----	
1299	EN14111	114.0		1.12	
1320	EN14111	117		2.80	
1339	EN14111	109.5		-1.40	
1389	EN14111	106.715		-2.96	
1397	EN16300	110		-1.12	
1400	EN16300	112.95		0.53	
1459	EN16300	113.6		0.90	
1485		-----		-----	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14111	114.4		1.35	
1634		-----		-----	
1656	EN14111	110		-1.12	
1710		-----		-----	
1739	EN14111	113.6		0.90	
1744	EN14111	113.21		0.68	
1769		-----		-----	
1878	EN14111	106.4		-3.13	
1887	ISO3961	59.5	R(0.01)	-29.40	
1894	EN14111	114		1.12	
1902	EN14111	110		-1.12	
1948	EN14111	110.66		-0.75	
4043		-----		-----	

	normality	OK			
	n	35			
	outliers	1			
	mean (n)	111.99			
	st.dev. (n)	2.680			
	R(calc.)	7.50			
	R(EN14111:03)	5.00			

Kernel Density
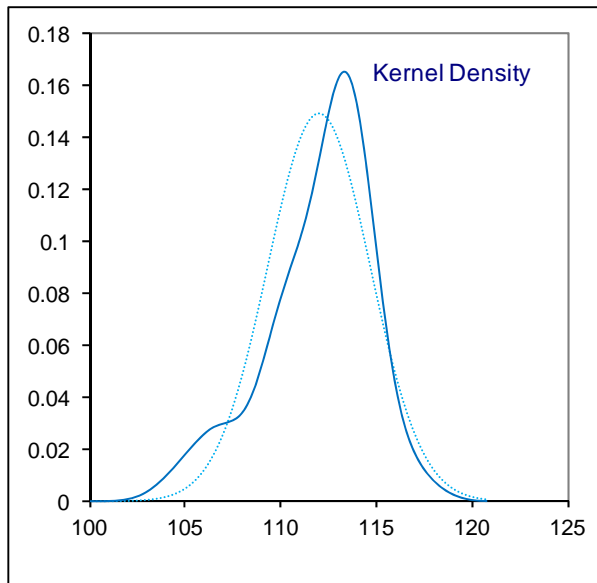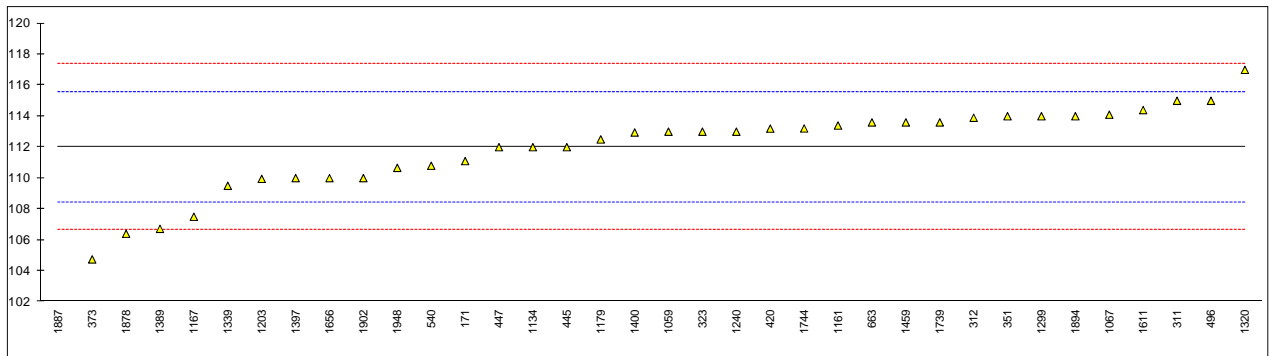
Determination of Kinematic Viscosity @ 40°C on sample #14185; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	4.471		-0.19	
171	D445	4.455		-1.19	
311	D445	4.477		0.19	
312	D445	4.467		-0.44	
323	D445	4.493		1.18	
333	D445	4.470		-0.25	
334	D445	4.482		0.50	
335	D445	4.493		1.18	
337	D445	4.504		1.87	
338		-----		-----	
351	ISO3104	4.456		-1.12	
370	D445	4.4802		0.39	
373	ISO3104	4.461		-0.81	
420	ISO3104	4.4999		1.61	
445	D445	4.474		0.00	
447	D445	4.490		1.00	
496	D445	4.4790		0.31	
511	D445	4.4740		0.00	
540	ISO3104	4.4486		-1.59	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D445	4.4656		-0.53	
663	D445	4.4734		-0.04	
1033	IP71	4.481		0.44	
1059	ISO3104	4.462		-0.75	
1067	D445	4.469		-0.31	
1134	D445	4.473		-0.06	
1161	D445	4.473		-0.06	
1167	ISO3104	4.4825		0.53	
1179	ISO3104	4.6596	R(0.01)	11.58	
1199		-----		-----	
1201	D445	4.469		-0.31	
1203	D445	4.468		-0.38	
1240	ISO3104	4.457		-1.06	
1286		-----		-----	
1299	D445	4.464		-0.63	
1320		-----		-----	
1339	ISO3104	4.43975		-2.14	
1389	ISO3104	4.468		-0.38	
1397	D7042	4.496		1.37	
1400	ISO3104	4.50721		2.07	
1459	D7042	4.506		1.99	
1485	D445	4.4423		-1.98	
1510	D445	4.448		-1.62	
1582		-----		-----	
1586	D445	4.474		0.00	
1588		-----		-----	
1611	ISO3104	4.4755		0.09	
1634		-----		-----	
1656	ISO3104	4.361	R(0.01)	-7.05	
1710	ISO3104	4.498		1.50	
1739	ISO3104	4.4712		-0.18	
1744	D445	4.4766		0.16	
1769		-----		-----	
1878	D445	4.5063		2.01	
1887		-----		-----	
1894	D445	4.35	C,R(0.01)	-7.74	First reported:4.42
1902	D445	4.441		-2.06	
1948	D445	4.469		-0.31	
4043		-----		-----	
	normality	OK			
	n	45			
	outliers	3			
	mean (n)	4.4740			
	st.dev. (n)	0.01740			
	R(calc.)	0.0487			
	R(ISO3104:96)	0.0449			Compare R(D445:14e2) = 0.1002
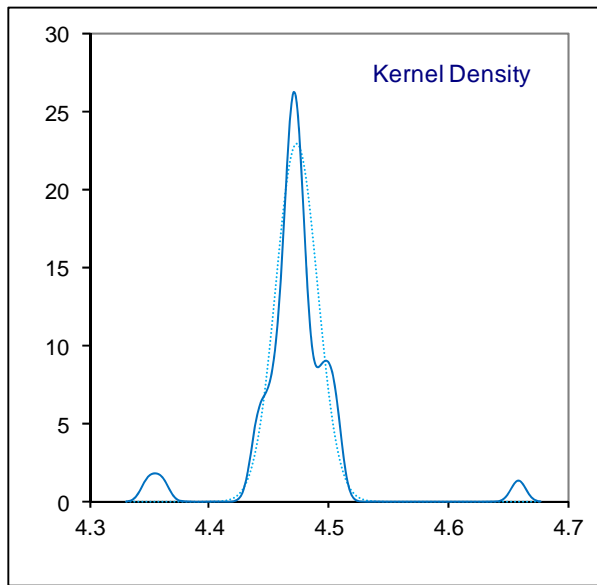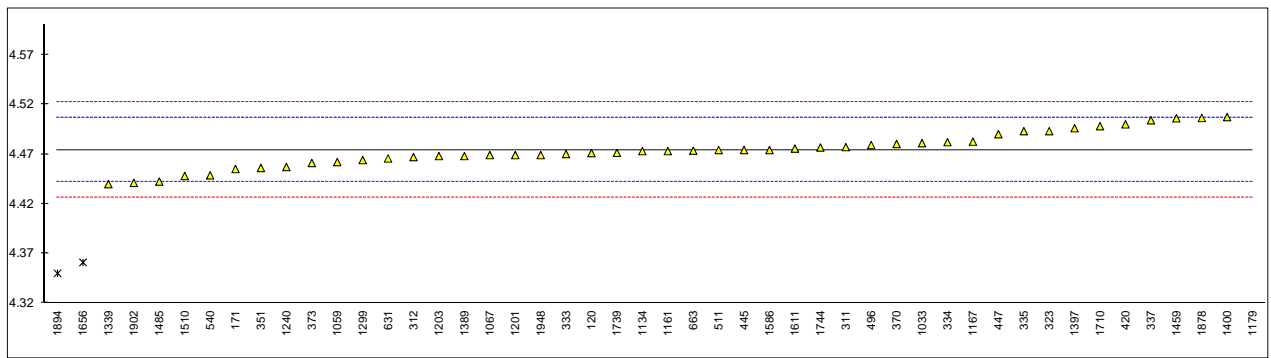
Determination of Oxidation Stability on sample #14185; results in hours

lab	method	value	mark	z(targ)	remarks
120	EN14112	9.3		0.30	
171	EN14112	9.1		0.09	
311	EN14112	8.3		-0.78	
312	EN14112	9.0		-0.02	
323	EN14112	9.0		-0.02	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14112	7.92		-1.20	
420	EN15751	8.76		-0.28	
445	EN14112	9.04		0.02	
447	EN15751	10.1		1.17	
496	EN15751	8.76		-0.28	
511		-----		-----	
540	EN14112	8.95		-0.08	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033	EN14112	8.905		-0.13	
1059	EN14112	9.61		0.64	
1067	EN14112	8.97		-0.06	
1134	EN14112	9.64		0.67	
1161	EN14112	7.8		-1.33	
1167	EN14112	13.23	R(0.01)	4.58	
1179	EN14112	9.22		0.22	
1199		-----		-----	
1201	EN14112	9.5		0.52	
1203	EN15751	8.7		-0.35	
1240	EN15751	9.80		0.85	
1286		-----		-----	
1299	EN14112	9.64		0.67	
1320	EN14112	7.68		-1.46	
1339	EN14112	8.99		-0.03	
1389	EN14112	8.645		-0.41	
1397	EN14112	8.8		-0.24	
1400	EN15751	9.85		0.90	
1459	EN15751	9.1		0.09	
1485	EN14112	8.60		-0.46	
1510	EN14112	8.9		-0.13	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN15751	9.60		0.63	
1634		-----		-----	
1656	EN14112	6.8	R(0.05)	-2.42	
1710	EN15751	9.9		0.96	
1739	EN14112	9.14		0.13	
1744		-----		-----	
1769		-----		-----	
1878	EN14112	8.96		-0.07	
1887	ISO6886	4.5	R(0.01)	-4.92	
1894		-----		-----	
1902		-----		-----	
1948	EN14112	8.55		-0.51	
4043		-----		-----	

				Only EN14112 data	Only EN15751 data
	normality	OK		OK	OK
	n	34		25	9
	outliers	3		2	0
	mean (n)	9.021		8.886	9.397
	st.dev. (n)	0.5759		0.5276	0.5636
	R(calc.)	1.612		1.477	1.578
	R(EN14112:03)	2.576		2.540	-----
	R(EN15751:14)	(2.090)		-----	2.162

Kernel Density
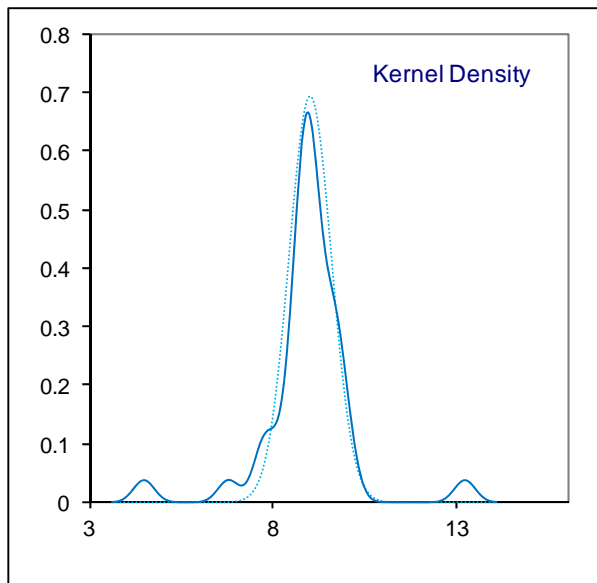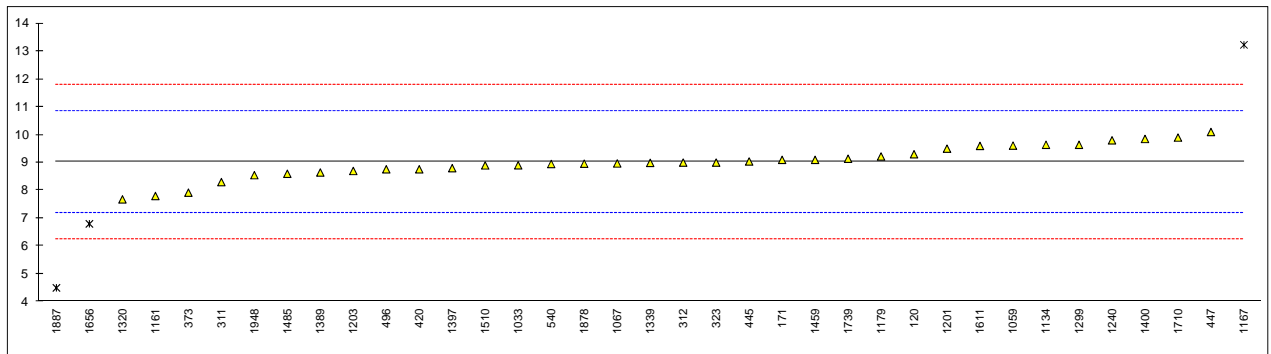
Determination of Sulphated Ash on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D874	0.001		-----	
171	D874	<0.005		-----	
311	ISO3987	<0.001		-----	
312		-----		-----	
323	D874	<0.005		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351	ISO3987	<0.005		-----	
370	D874	<0.001		-----	
373		-----		-----	
420	ISO3987	<0.005		-----	
445	D874	<0.01		-----	
447		-----		-----	
496	D874	0.0001		-----	
511	D874	0.0013		-----	
540	D874	<0.005		-----	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D874	0.0012		-----	
663	D874	<0.005		-----	
1033		-----		-----	
1059	ISO3987	0.00027		-----	
1067		-----		-----	
1134	D874	0.00019		-----	
1161	ISO3987	0.00136	C	-----	First reported: 0.0136
1167	ISO3987	0.0013		-----	
1179		-----		-----	
1199		-----		-----	
1201	D874	0		-----	
1203	D874	0.0002		-----	
1240		-----		-----	
1286		-----		-----	
1299	ISO3987	0.001		-----	
1320	D874	0.0091	R(0.01)	-----	False positive test result?
1339	D874	<0.001		-----	
1389		-----		-----	
1397		-----		-----	
1400	ISO3987	<0.005		-----	
1459	ISO3987	0.0008		-----	
1485		-----		-----	
1510		-----		-----	
1582		-----		-----	
1586	D874	0.002	C	-----	First reported:0.004
1588		-----		-----	
1611	ISO3987	0.0011		-----	
1634		-----		-----	
1656	ISO3987	<0.01		-----	
1710	ISO3987	0.001		-----	
1739	ISO3987	<0.01		-----	
1744		-----		-----	
1769		-----		-----	
1878	D874	<0.005		-----	
1887		-----		-----	
1894	D874	0.00229		-----	
1902		-----		-----	
1948	D874	0.0004		-----	
4043		-----		-----	

normality	OK	
n	17	
outliers	1	
mean (n)	0.00091	
st.dev. (n)	0.000658	
R(calc.)	0.00184	
R(D874:13a)	(0.00049)	Application limit: 0.005 %M/M

Kernel Density
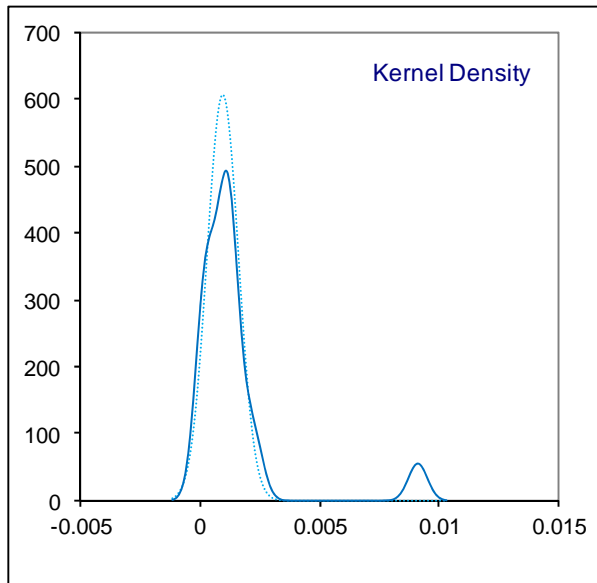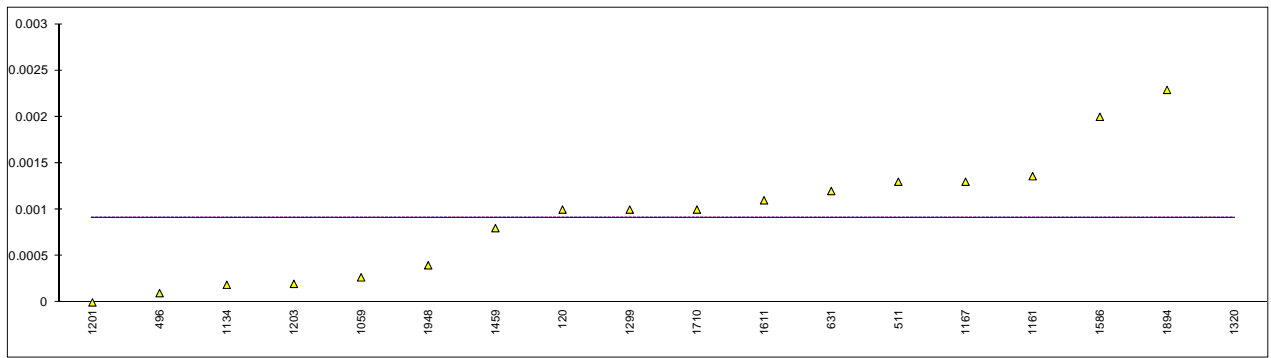
Determination of Sulphur (EN spec.) on sample #14185; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D5453	2.8		0.86	
171	D5453	1.93		-0.90	
311	ISO20846	<3		-----	
312	ISO20846	2.0		-0.76	
323	ISO20846	2.0		-0.76	
333	ISO20846	2.5		0.25	
334	ISO20846	2.2		-0.35	
335	ISO20846	2.4		0.05	
337		-----		-----	
338	ISO20846	2.3		-0.15	
351		-----		-----	
370	D5453	2.95		1.16	
373		-----		-----	
420	ISO20846	2.75		0.76	
445	D5453	2.29		-0.17	
447	IP490	<1		<-2.69	False negative test result?
496	ISO20846	2.19		-0.37	
511	D5453	2.1566		-0.44	
540		-----		-----	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D5453	4.6	C,R(0.01)	4.50	First reported:9.192
663	D5453	3.33		1.93	
1033		-----		-----	
1059	ISO20884	1.7		-1.36	
1067	D5453	1.90		-0.96	
1134	ISO20846	2.46		0.17	
1161	ISO20846	2.2		-0.35	
1167	ISO20846	1.83		-1.10	
1179	ISO20846	2.32		-0.11	
1199		-----		-----	
1201	D5453	2.59		0.44	
1203	ISO20846	2.6		0.46	
1240		-----		-----	
1286		-----		-----	
1299	ISO20846	1.7		-1.36	
1320		-----		-----	
1339		-----		-----	
1389	ISO20846	1.28	R(0.01)	-2.21	
1397	ISO20846	2.53		0.32	
1400	in house	22.6	C,R(0.01)	40.86	First reported:5.97
1459		-----		-----	
1485		-----		-----	
1510		-----		-----	
1582		-----		-----	
1586	D5453	2.3		-0.15	
1588		-----		-----	
1611	ISO20846	2.43		0.11	
1634		-----		-----	
1656	ISO20846	2.5		0.25	
1710	ISO20846	2.5		0.25	
1739		-----		-----	
1744		-----		-----	
1769		-----		-----	
1878	ISO20846	1.81		-1.14	
1887		-----		-----	
1894	ISO20846	3.67		2.62	
1902	D5453	2.3		-0.15	
1948	ISO20846	2.83		0.92	
4043		-----		-----	

Application range R(ISO20846:11) = 3 – 500 mg/kg

			Only ISO20846 data	Only D5453 data
normality	suspect		OK	OK
n	32		22	10
outliers	3		1	1
mean (n)	2.374		2.229	2.455
st.dev. (n)	0.4410		0.3855	0.4590
R(calc.)	1.235		1.079	1.285
R(ISO20846:11)	1.386		1.089	----
R(D5453:12)	(1.109)		----	1.137

Kernel Density
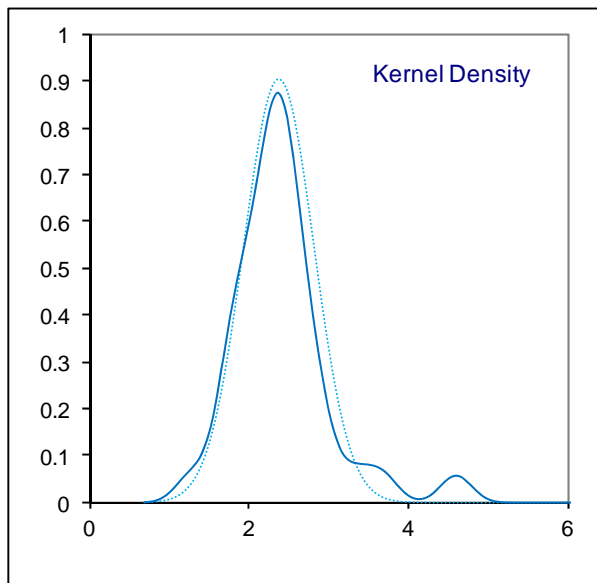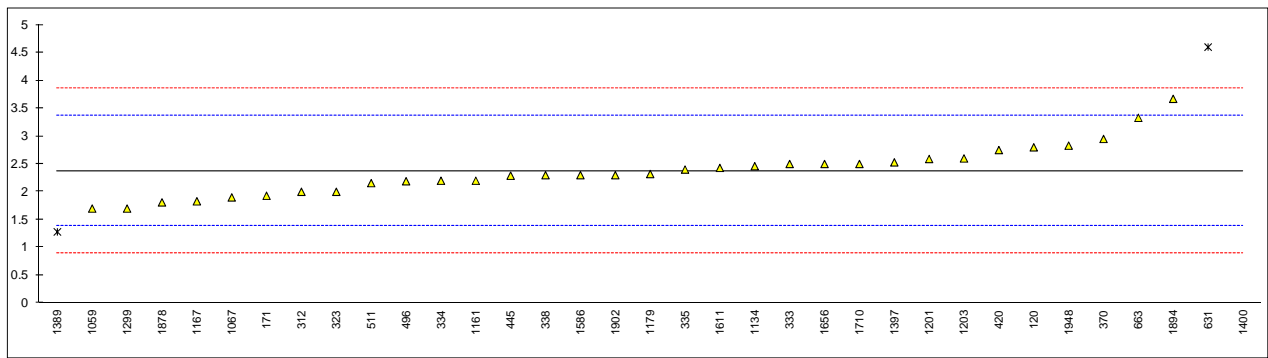
Determination of Water on sample #14185; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	ISO12937	312	C	0.22	First reported:392
171	D6304	331.0		0.66	
311	ISO12937	280		-0.53	
312	ISO12937	290		-0.30	
323	ISO12937	300		-0.06	
333	ISO12937	290		-0.30	
334		-----		-----	
335	ISO12937	300		-0.06	
337	ISO12937	290		-0.30	
338	ISO12937	295.56		-0.17	
351	ISO12937	307.5		0.11	
370	ISO12937	308		0.12	
373	ISO12937	288.9		-0.32	
420	ISO12937	306		0.08	
445	IP438	299		-0.09	
447	IP438	275		-0.65	
496	ISO12937	338		0.82	
511		-----		-----	
540	ISO12937	278		-0.58	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631	D6304	338.29		0.83	
663	ISO12937	290.7		-0.28	
1033	IP438	350		1.11	
1059	ISO12937	300		-0.06	
1067	ISO12937	296		-0.16	
1134	ISO12937	288.50		-0.33	
1161	ISO12937	290.75		-0.28	
1167	ISO12937	242.8		-1.40	
1179		-----		-----	
1199		-----		-----	
1201	ISO12937	305		0.05	
1203	ISO12937	278		-0.58	
1240	ISO12937	285.45		-0.41	
1286		-----		-----	
1299	ISO12937	300		-0.06	
1320		-----		-----	
1339	ISO12937	367.9		1.52	
1389	ISO12937	299		-0.09	
1397	ISO12937	323		0.47	
1400	ISO12937	268.8		-0.79	
1459	ISO12937	270		-0.77	
1485	ISO12937	291.8		-0.26	
1510	ISO12937	290		-0.30	
1582		-----		-----	
1586	D6304	296		-0.16	
1588		-----		-----	
1611	ISO12937	313		0.24	
1634	ISO12937	293		-0.23	
1656	ISO12937	370	C	1.57	Probably unit error, reported: 0.037
1710	ISO12937	298.4		-0.10	
1739	ISO12937	287.5		-0.36	
1744	E203	327		0.57	
1769		-----		-----	
1878	ISO12937	289.5		-0.31	
1887	ISO8534	300		-0.06	
1894	ISO12937	350	C	1.11	First reported:360
1902		-----		-----	
1948	ISO12937	340.38		0.88	
4043		-----		-----	

	normality	OK	
	n	47	
	outliers	0	
	mean (n)	302.76	
	st.dev. (n)	25.547	
	R(calc.)	71.53	
	R(ISO12937:00)	119.66	
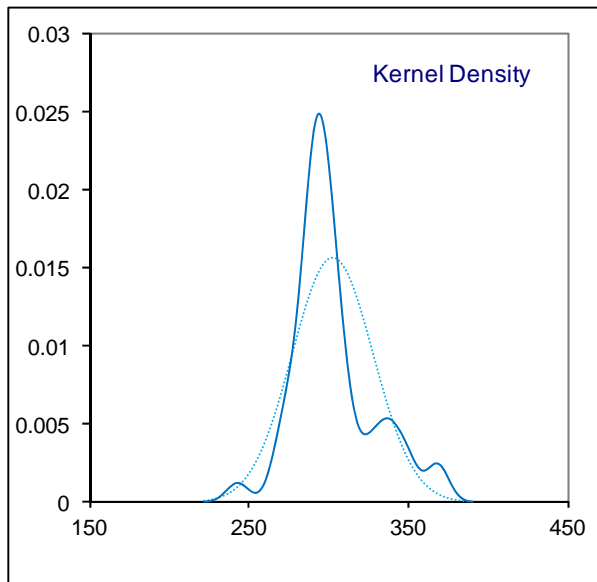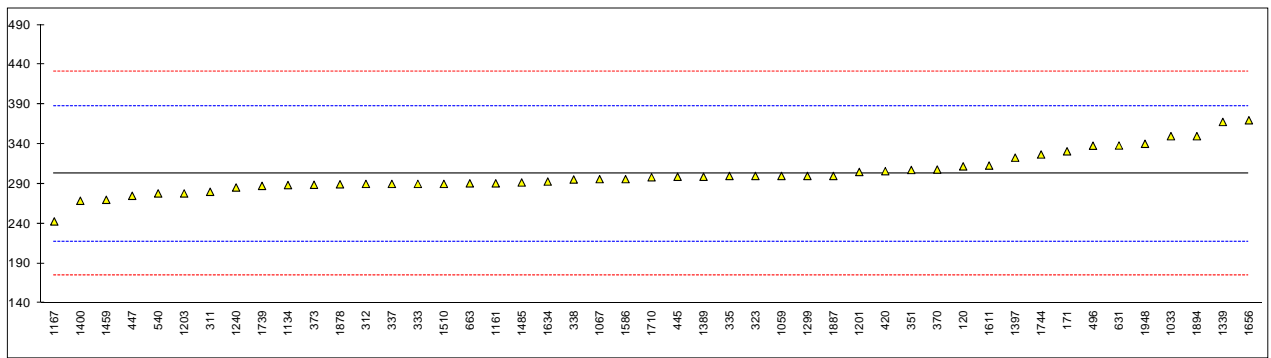
Determination of Methanol on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14110	0.021		-0.33	
171	EN14110	0.02		-0.69	
311	EN14110	0.02		-0.69	
312	EN14110	0.02		-0.69	
323	EN14110	0.02		-0.69	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14110	0.018	C	-1.40	First reported: 0.01
420	EN14110	0.017		-1.76	
445		-----		-----	
447		-----		-----	
496	EN14110	0.033	R(0.01)	3.95	
511		-----		-----	
540	EN14110	0.023		0.38	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14110	0.02		-0.69	
1067	EN14110	0.027		1.81	
1134	EN14110	0.021		-0.33	
1161	EN14110	0.028		2.16	
1167	EN14110	0.018		-1.40	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14110	0.0223		0.13	
1240	EN14110	0.022		0.02	
1286	EN14110	0.0328	R(0.01)	3.88	
1299	EN14110	0.02		-0.69	
1320	EN14110	0.021		-0.33	
1339	EN14110	0.022		0.02	
1389		-----		-----	
1397	EN14110	0.026		1.45	
1400	EN14110	0.026		1.45	
1459		-----		-----	
1485	EN14110	0.023		0.38	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14110	0.0269		1.77	
1634		-----		-----	
1656	EN14110	0.02	C	-0.69	First reported:0.01
1710		-----	W	-----	Result withdrawn, first reported: 0.01
1739	EN14110	0.023		0.38	
1744	EN14110	0.023		0.38	
1769		-----		-----	
1878	EN14110	0.021		-0.33	
1887		-----		-----	
1894		-----		-----	
1902	EN14110	<0.20		-----	
1948	EN14110	0.023		0.38	
4043		-----		-----	

	normality	OK	
	n	27	
	outliers	2	
	mean (n)	0.0219	
	st.dev. (n)	0.00285	
	R(calc.)	0.0080	
	R(EN14110:03)	0.0078	
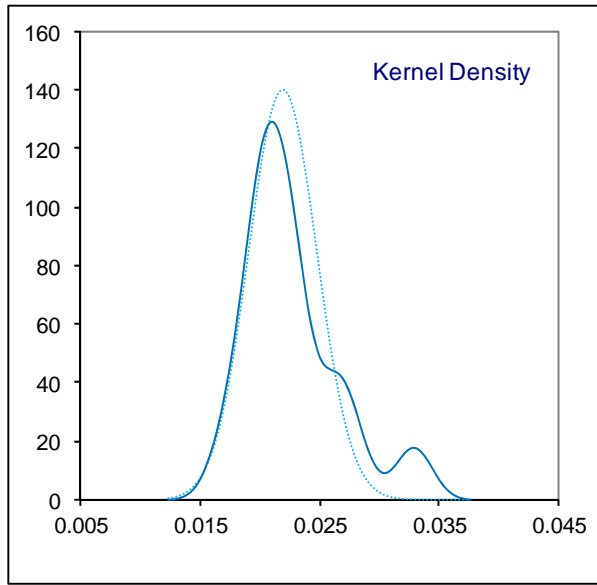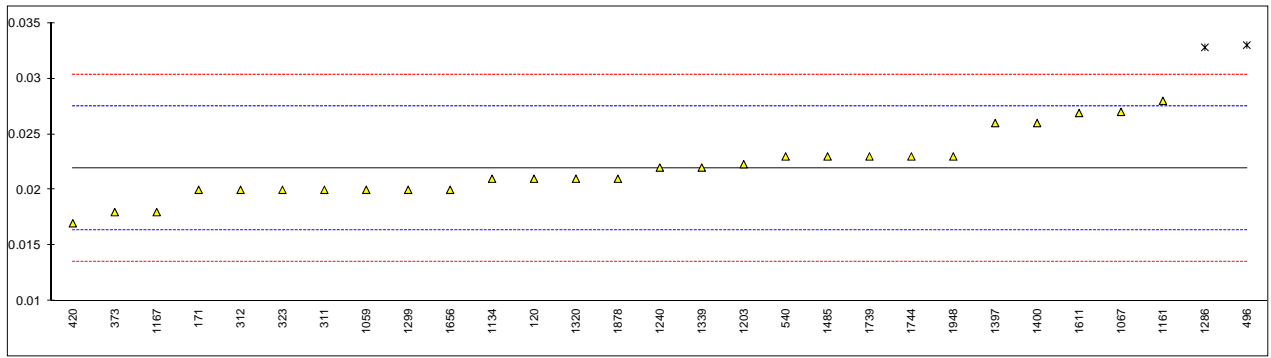
Determination of mono-Glycerides on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0.628		1.06	
171	EN14105	0.388	C,R(0.05)	-2.88	First reported:0.32
311	EN14105	0.56		-0.06	
312	EN14105	0.57		0.10	
323	EN14105	0.58		0.27	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14105	0.56		-0.06	
420	EN14105	0.645		1.34	
445		-----		-----	
447		-----		-----	
496	EN14105	0.5839		0.33	
511	D6584	0.622		0.96	
540	EN14105	0.559		-0.08	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.566		0.04	
1067	EN14105	0.46		-1.70	
1134	EN14105	0.47		-1.54	
1161	EN14105	0.55		-0.22	
1167	EN14105	0.611		0.78	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14105	0.619		0.91	
1240	EN14105	0.540		-0.39	
1286		-----		-----	
1299	EN14105	0.52	C	-0.72	First reported:0.05
1320	EN14105	0.562		-0.03	
1339	EN14105	0.473		-1.49	
1389	EN14105	0.550		-0.22	
1397	EN14105	0.66		1.58	
1400	EN14105	0.478		-1.40	
1459		-----		-----	
1485	EN14105	0.603		0.65	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14105	0.559		-0.08	
1634		-----		-----	
1656	EN14105	0.56	C	-0.06	First reported:0.41
1710	EN14105	0.55		-0.22	
1739	EN14105	0.5652		0.03	
1744	D6584	0.5773		0.22	
1769		-----		-----	
1878	EN14105	0.535		-0.47	
1887		-----		-----	
1894		-----		-----	
1902	EN14105	0.60		0.60	
1948	EN14105	0.5554		-0.13	
4043		-----		-----	
	normality	OK			
	n	31			
	outliers	1			
	mean (n)	0.564			
	st.dev. (n)	0.0489			
	R(calc.)	0.137			
	R(EN14105:11)	0.171			Application limit: >0.10 %M/M
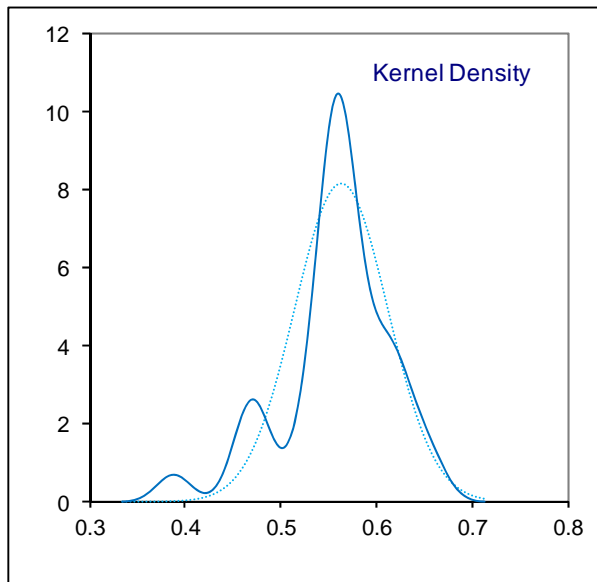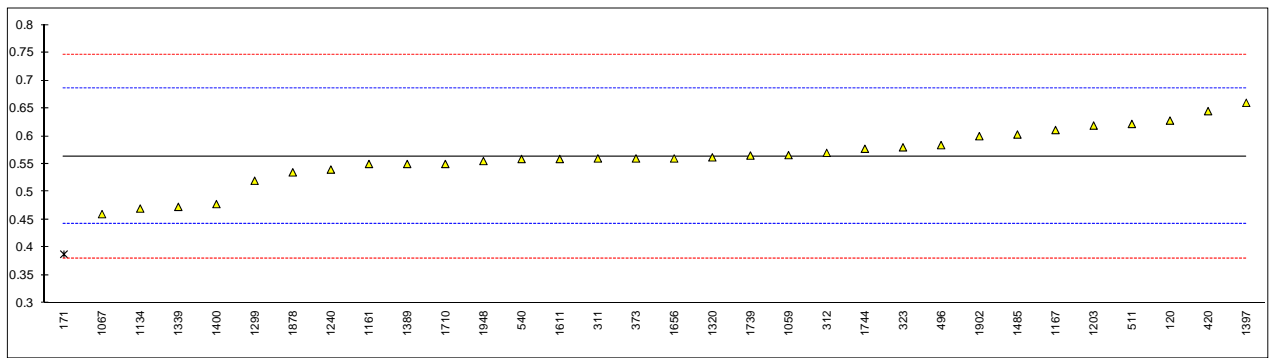
Determination of di-Glycerides on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0.106		0.12	
171	EN14105	<0.10		-----	
311	EN14105	0.11		0.35	
312	EN14105	<0.10		-----	
323	EN14105	0.10		-0.23	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14105	0.12		0.93	
420	EN14105	0.108		0.23	
445		-----		-----	
447		-----		-----	
496	EN14105	0.114		0.58	
511	D6584	0.114		0.58	
540	EN14105	0.104		0.00	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.072		-1.84	
1067	EN14105	0.09		-0.81	
1134	EN14105	0.14		2.08	
1161	EN14105	0.12		0.93	
1167	EN14105	0.086		-1.04	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14105	0.115		0.64	
1240	EN14105	0.111		0.41	
1286		-----		-----	
1299	EN14105	0.10		-0.23	
1320	EN14105	0.112		0.46	
1339	EN14105	0.085		-1.09	
1389	EN14105	0.085		-1.09	
1397	EN14105	0.18	R(0.01)	4.39	
1400	EN14105	0.130		1.50	
1459		-----		-----	
1485	EN14105	0.097		-0.40	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14105	0.099		-0.29	
1634		-----		-----	
1656	EN14105	0.09	C	-0.81	First reported:0.06
1710	EN14105	0.11		0.35	
1739	EN14105	0.1006		-0.19	
1744	D6584	0.1031		-0.05	
1769		-----		-----	
1878	EN14105	0.115		0.64	
1887		-----		-----	
1894		-----		-----	
1902	EN14105	0.10		-0.23	
1948	EN14105	0.0778		-1.51	
4043		-----		-----	
	normality	OK			
	n	29			
	outliers	1			
	mean (n)	0.104			
	st.dev. (n)	0.0151			
	R(calc.)	0.042			
	R(EN14105:11)	0.048		Application limit:> 0.10 %M/M	

Kernel Density
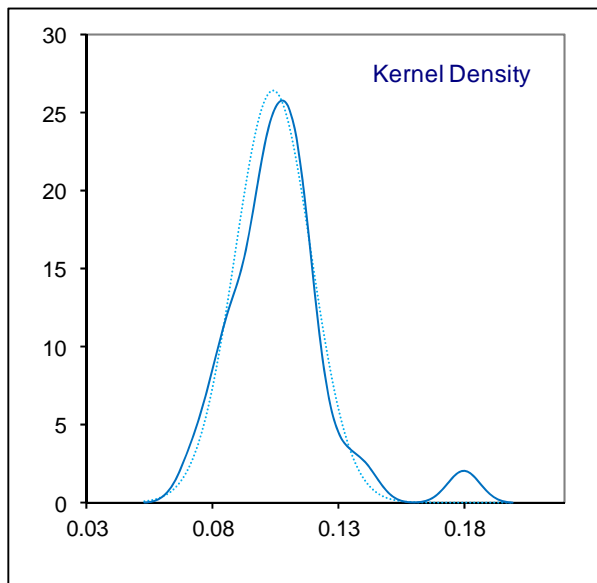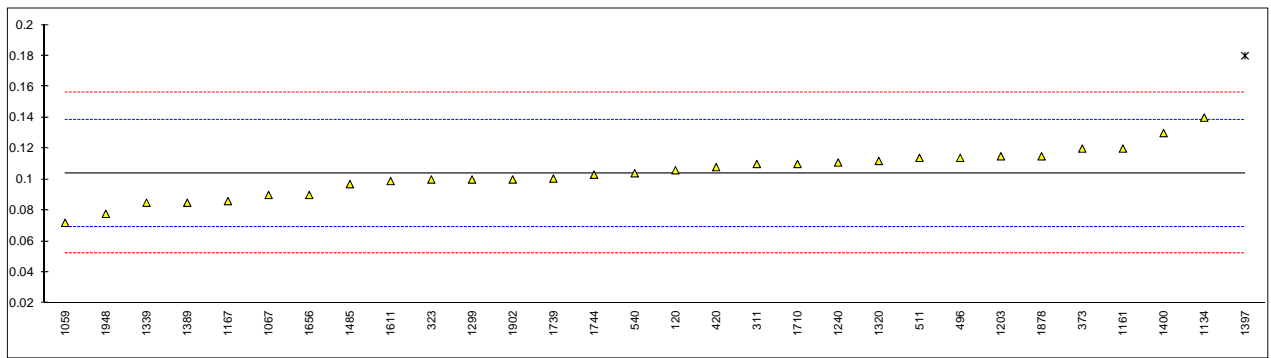
Determination of tri-Glyceriden on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0.072		0.72	
171	EN14105	<0.10		-----	
311	EN14105	0.07		0.64	
312	EN14105	<0.10		-----	
323	EN14105	0.04		-0.57	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14105	0.06		0.23	
420	EN14105	0.059		0.19	
445		-----		-----	
447		-----		-----	
496	EN14105	0.0655		0.46	
511	D6584	0.035		-0.78	
540	EN14105	0.063		0.36	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.054		-0.01	
1067	EN14105	0.05		-0.17	
1134	EN14105	0.06		0.23	
1161	EN14105	0.09		1.45	
1167	EN14105	0.033		-0.86	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14105	0.049		-0.21	
1240	EN14105	0.062		0.32	
1286		-----		-----	
1299	EN14105	0.04		-0.57	
1320	EN14105	0.045		-0.37	
1339	EN14105	0.035		-0.78	
1389	EN14105	0.045		-0.37	
1397	EN14105	0.09		1.45	
1400	EN14105	0.061		0.28	
1459		-----		-----	
1485	EN14105	0.058		0.15	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14105	0.043		-0.45	
1634		-----		-----	
1656	EN14105	0.03		-0.98	
1710	EN14105	0.09		1.45	
1739	EN14105	0.0459		-0.34	
1744	D6584	0.0353		-0.76	
1769		-----		-----	
1878	EN14105	0.041		-0.53	
1887		-----		-----	
1894		-----		-----	
1902	EN14105	0.05		-0.17	
1948	EN14105	0.1929	R(0.01)	5.61	
4043		-----		-----	
	normality	OK			
	n	29			
	outliers	1			
	mean (n)	0.054			
	st.dev. (n)	0.0169			
	R(calc.)	0.047			
	R(EN14105:11)	0.069		Application limit: 0.10 %M/M	

Kernel Density
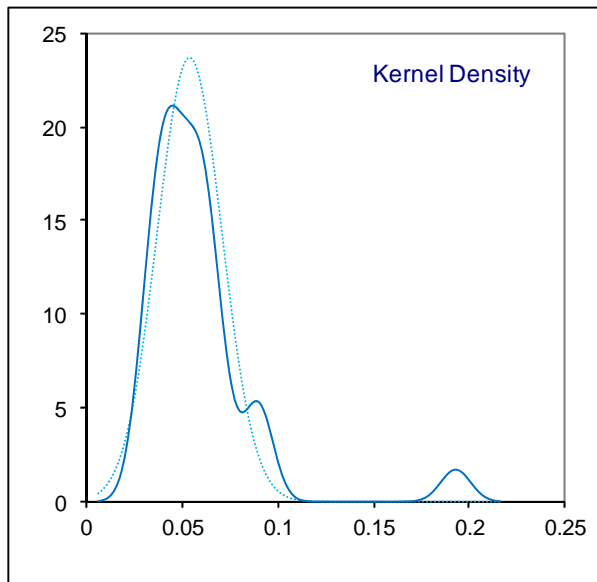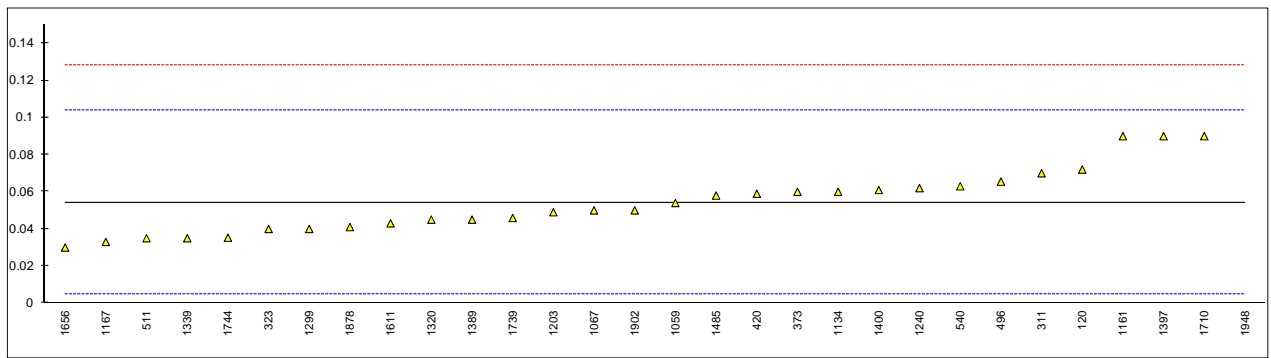
Determination of Free Glycerol on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0.008		1.99	
171	EN14105	0.001		-0.94	
311	EN14105	0.008		1.99	
312	EN14105	0.002		-0.52	
323	EN14105	<0.005		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14105	0.004		0.31	
420	EN14105	0.001		-0.94	
445		-----		-----	
447		-----		-----	
496	EN14105	0.0028		-0.19	
511	D6584	0.003		-0.11	
540	EN14105	0.0006		-1.11	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.006		1.15	
1067	EN14105	0.006		1.15	
1134	EN14105	0.003		-0.11	
1161	EN14105	0.003		-0.11	
1167	EN14105	0.0025		-0.31	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14105	<0.005		-----	
1240	EN14105	0.0040		0.31	
1286		-----		-----	
1299	EN14105	0	ex	-1.36	Result excluded, zero is not a real value
1320	EN14105	0.0036		0.15	
1339	EN14105	0.0028		-0.19	
1389	EN14105	0.0005		-1.15	
1397	EN14105	<0.005		-----	
1400	EN14105	<0.001		-----	
1459		-----		-----	
1485	EN14105	0.0007		-1.07	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14105	0.0088		2.32	
1634		-----		-----	
1656	EN14105	<0.01		-----	
1710	EN14105	0.00		-1.36	
1739	EN14105	0.0028		-0.19	
1744	D6584	0.0024		-0.36	
1769		-----		-----	
1878	EN14105	0.038	C,R(0.01)	14.53	First reported:0.0585
1887		-----		-----	
1894		-----		-----	
1902	EN14105	0.002		-0.52	
1948	EN14105	0.0028		-0.19	
4043		-----		-----	

normality	OK
n	25
outliers	1 + 1 excl.
mean (n)	0.0033
st.dev. (n)	0.00241
R(calc.)	0.0068
R(EN14105:11)	0.0067

Kernel Density
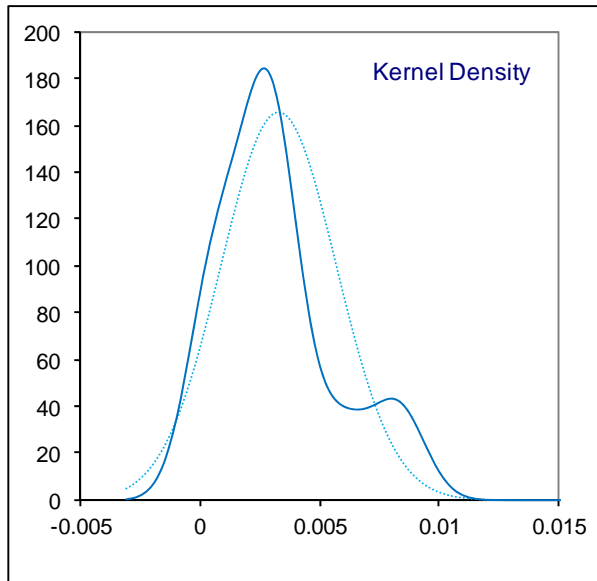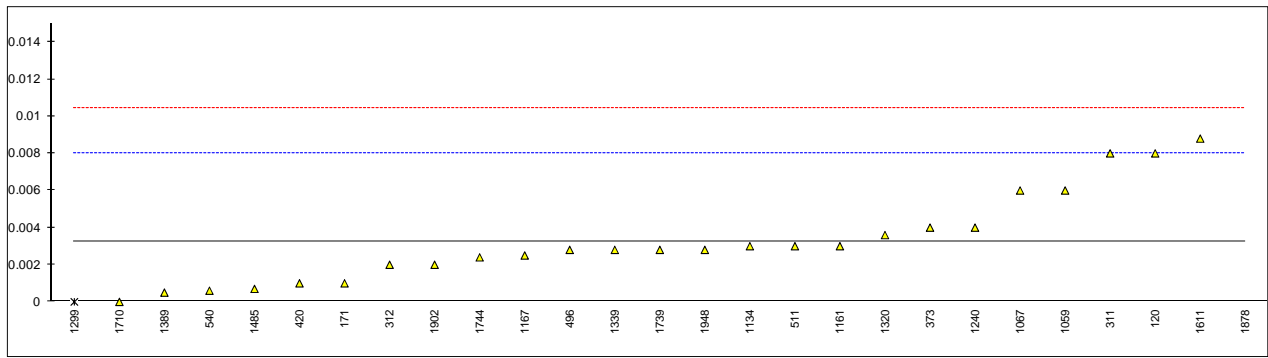
Determination of Total Glycerol on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14105	0.189		1.29	
171	EN14105	0.119	C, R(0.05)	-3.20	First reported:0.101
311	EN14105	0.171		0.13	
312	EN14105	0.165		-0.25	
323	EN14105	0.17		0.07	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14105	0.17		0.07	
420	EN14105	0.187		1.16	
445		-----		-----	
447		-----		-----	
496	EN14105	0.1742		0.34	
511	D6584	0.184		0.97	
540	EN14105	0.1648		-0.26	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.166		-0.19	
1067	EN14105	0.14		-1.86	
1134	EN14105	0.151		-1.15	
1161	EN14105	0.17		0.07	
1167	EN14105	0.1743		0.34	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14105	0.180		0.71	
1240	EN14105	0.1642		-0.30	
1286		-----		-----	
1299	EN14105	0.15		-1.21	
1320	EN14105	0.1679		-0.07	
1339	EN14105	0.1394	C	-1.89	First reported:0.1365
1389	EN14105	0.15		-1.21	
1397	EN14105	0.204		2.25	
1400	EN14105	0.1457		-1.49	
1459		-----		-----	
1485	EN14105	0.1748		0.38	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611	EN14105	0.1704		0.09	
1634		-----		-----	
1656	EN14105	0.16	C	-0.57	First reported:0.13
1710	EN14105	0.17		0.07	
1739	EN14105	0.1663		-0.17	
1744	D6584	0.1710		0.13	
1769		-----		-----	
1878	EN14105	0.195	C	1.67	First reported:0.2165
1887		-----		-----	
1894		-----		-----	
1902	EN14105	0.176		0.45	
1948	EN14105	0.1757		0.43	
4043		-----		-----	

normality	OK	
n	31	
outliers	1	
mean (n)	0.1689	
st.dev. (n)	0.01486	
R(calc.)	0.0416	
R(EN14105:11)	0.0436	

Kernel Density
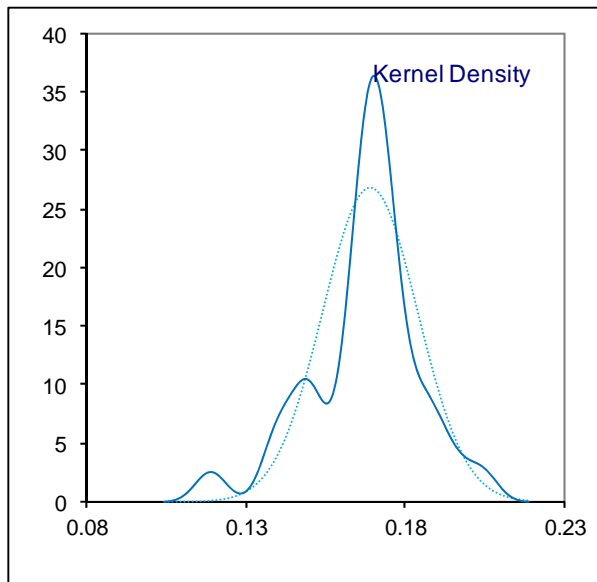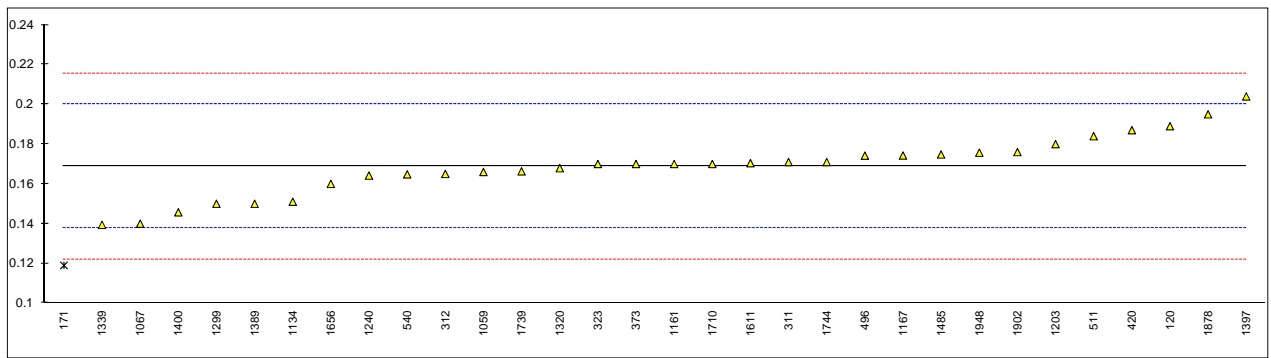
Determination of Total Ester content on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14103	95.04		-1.99	
171	EN14103	97.2		-0.54	
311	EN14103	97.0		-0.67	
312	EN14103	98.0		0.00	
323	EN14103	99.5		1.01	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14103	97.88		-0.08	
420	EN14103	96.91		-0.73	
445		-----		-----	
447		-----		-----	
496	EN14103	98.06		0.04	
511	EN14103	95.69		-1.56	
540	EN14103	98.6		0.40	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663	EN14103	97.0		-0.67	
1033		-----		-----	
1059	EN14103	100.0		1.35	
1067	EN14103	99.5		1.01	
1134	EN14103	97.95		-0.03	
1161	EN14103	98.9		0.61	
1167	EN14103	98.21		0.14	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14103	98.47		0.32	
1240	EN14103	99.28		0.86	
1286		-----		-----	
1299	EN14103	98.5		0.34	
1320	EN14103	98.04		0.03	
1339	EN14103	96.87		-0.76	
1389	EN14103	98.11		0.07	
1397	EN14103	97.1		-0.61	
1400	EN14103	97.07		-0.63	
1459	EN14103	98.5		0.34	
1485	EN14103	97.97		-0.02	
1510	EN14103	99.81		1.22	
1582		-----		-----	
1586	EN14103	96.5		-1.01	
1588		-----		-----	
1611	EN14103	99.56		1.05	
1634		-----		-----	
1656	EN14103	98.2		0.13	
1710	EN14103	98.6		0.40	
1739	EN14103	99.2		0.81	
1744	EN14103	98.67		0.45	
1769		-----		-----	
1878	EN14103	96.72		-0.86	
1887		-----		-----	
1894	EN14103	96.8		-0.81	
1902	EN14103	98.3		0.20	
1948	EN14103	98.32		0.21	
4043		-----		-----	

|		
normality	OK	
n	37	
outliers	0	
mean (n)	98.001	
st.dev. (n)	1.1366	
R(calc.)	3.182	
R(EN14103:11)	4.160	

Kernel Density
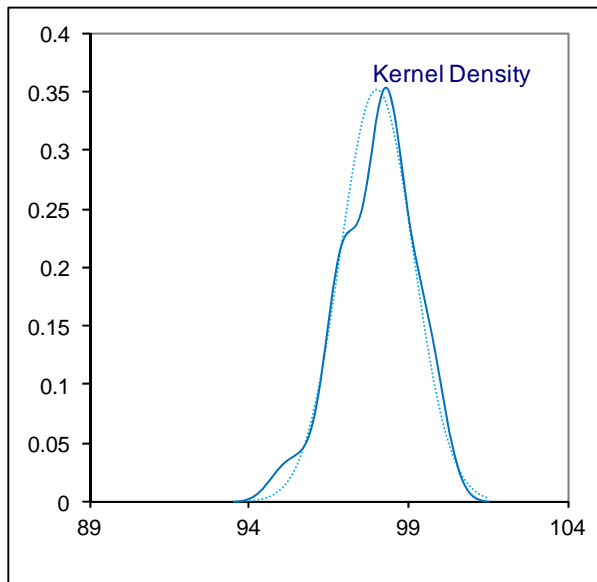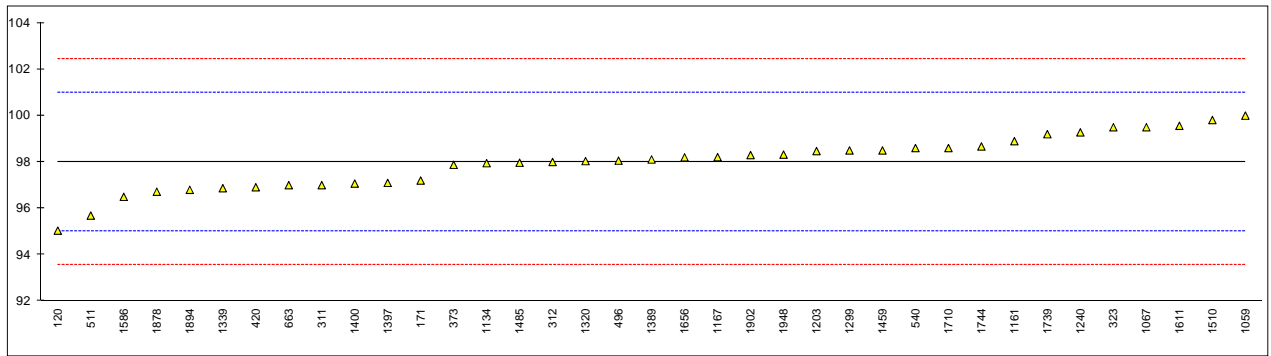
Determination of Linolenic Acid Methyl Ester content on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14103	9.21	C	-0.40	First reported:7.76
171	EN14103	9.21	C	-0.40	First reported:72.9
311	EN14103	9.0		-1.30	
312	EN14103	9.1		-0.87	
323	EN14103	9.70		1.71	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN14103	9.45		0.63	
420	EN14103	9.15		-0.65	
445		-----		-----	
447		-----		-----	
496	EN14103	9.46		0.68	
511	EN14103	9.47		0.72	
540	EN14103	9.3		-0.01	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663	EN14103	9.4		0.42	
1033		-----		-----	
1059	EN14103	9.6	C	1.28	First reported:10.1
1067	EN14103	9.50		0.85	
1134	EN14103	9.01		-1.26	
1161	EN14103	9.4		0.42	
1167	EN14103	9.12		-0.78	
1179				-----	
1199		-----		-----	
1201		-----		-----	
1203	EN14103	9.27		-0.14	
1240	EN14103	9.448		0.62	
1286		-----		-----	
1299	EN14103	9.3		-0.01	
1320	EN14103	9.26		-0.18	
1339	EN14103	9.38		0.33	
1389	EN14103	9.42		0.50	
1397	EN14103	9		-1.30	
1400	EN14103	9.45		0.63	
1459	EN14103	9.8		2.14	
1485	EN14103	9.22		-0.35	
1510	EN14103	9.78	C	2.05	First reported:10.04
1582		-----		-----	
1586	EN14103	8.9		-1.73	
1588		-----		-----	
1611	EN14103	9.315		0.05	
1634		-----		-----	
1656	EN14103	9.36		0.25	
1710	EN14103	9.4		0.42	
1739	EN14103	9.4		0.42	
1744		-----		-----	
1769		-----		-----	
1878	EN14103	8.92		-1.64	
1887	ISO5508	10.64	R(0.01)	5.74	
1894	EN14103	9	C	-1.30	First reported:4.60
1902	EN14103	9.3		-0.01	
1948	EN14103	8.89		-1.77	
4043		-----		-----	
	normality	OK			
	n	36			
	outliers	1			
	mean (n)	9.303			
	st.dev. (n)	0.2332			
	R(calc.)	0.653			
	R(EN14103:11)	0.652			
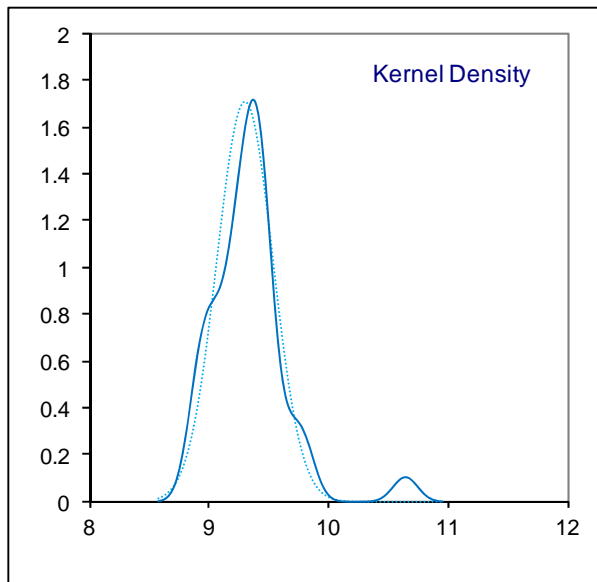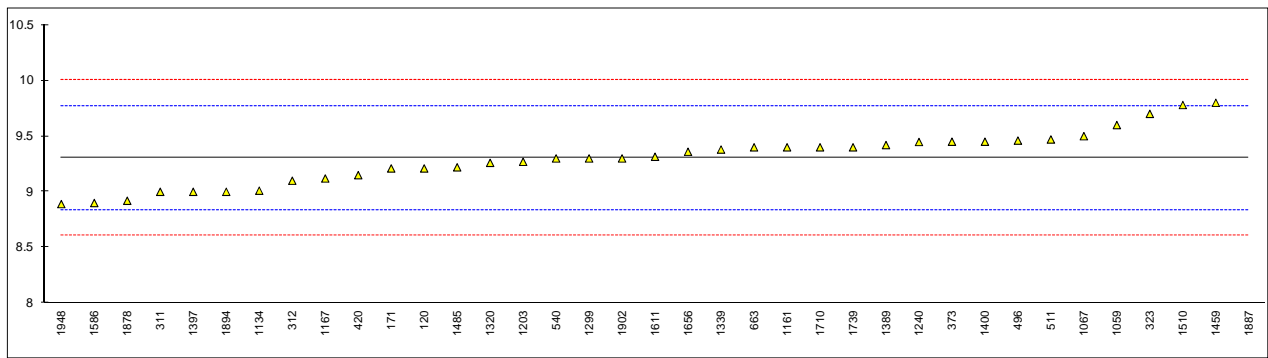
Determination of Polyunsaturated Methyl Esters content on sample #14185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	EN15779	<0.30		-----	
311		-----		-----	
312	EN15779	<0.6		-----	
323	EN15779	<0.6		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
337		-----		-----	
338		-----		-----	
351		-----		-----	
370		-----		-----	
373	EN15779	<0.6		-----	
420	EN15779	<0.05		-----	
445		-----		-----	
447		-----		-----	
496	EN15779	<0.6		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
554		-----		-----	
558		-----		-----	
603		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN15779	0.113		-----	
1067	EN15779	0.17		-----	
1134	EN15779	0.097		-----	
1161	EN15779	0.21		-----	
1167	EN15779	0.189		-----	
1179		-----		-----	
1199		-----		-----	
1201		-----		-----	
1203	EN15779	0.019		-----	
1240		-----		-----	
1286		-----		-----	
1299	EN15779	0.1		-----	
1320	EN15779	<0.01		-----	
1339		-----		-----	
1389	EN15779	0.52		-----	
1397		-----		-----	
1400	EN15779	<0.1		-----	
1459		-----		-----	
1485		-----		-----	
1510		-----		-----	
1582		-----		-----	
1586		-----		-----	
1588		-----		-----	
1611		-----		-----	
1634		-----		-----	
1656	EN15779	0.66		-----	False positive test result?
1710		-----		-----	
1739	EN15779	<0.6		-----	
1744		-----		-----	
1769		-----		-----	
1878	EN15779	0.521		-----	
1887		-----		-----	
1894		-----		-----	
1902	EN15779	0.11		-----	
1948	EN15779	0.52		-----	
4043		-----		-----	

normality	OK	
n	12	
outliers	0	
mean (n)	0.269	
st.dev. (n)	0.2200	
R(calc.)	0.616	
R(EN15779:09)	(0.270)	Application range 0.6 – 1.5 %M/M

Kernel Density
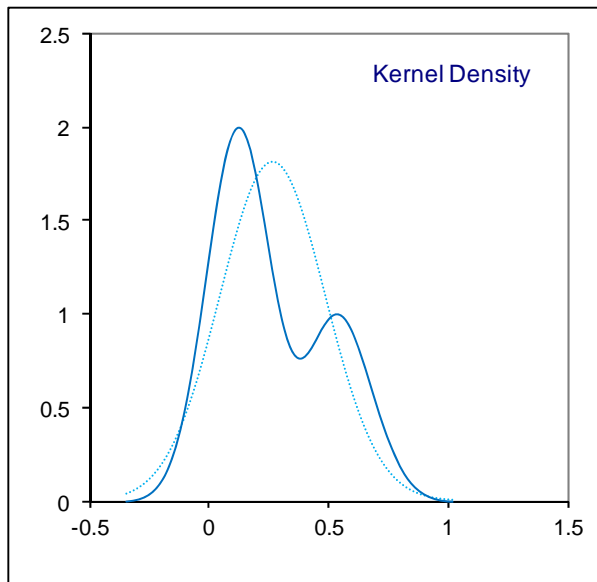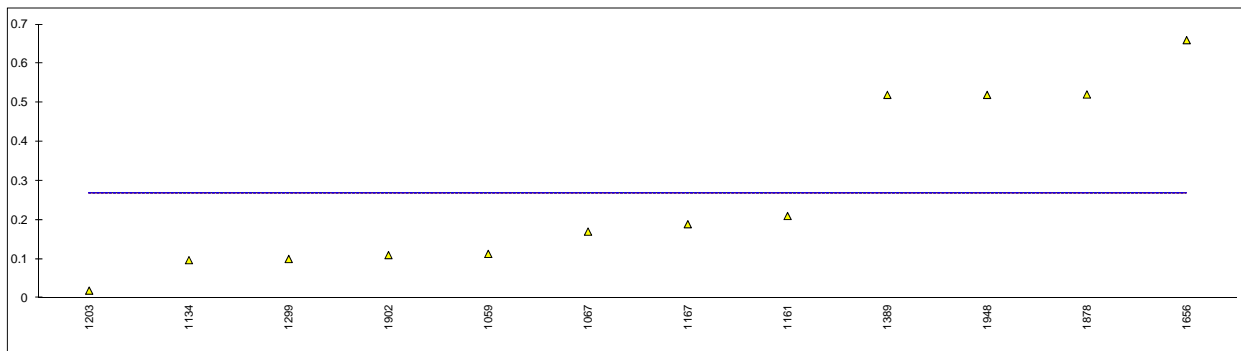
Determination of sum of Calcium and Magnesium on sample #14186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14538	9.3	C	0.26	First reported: 0.10
171	EN14538	8.2		-0.95	
311	EN14538	8.7		-0.40	
312	EN14538	7.6		-1.61	
323	EN14538	8.6		-0.51	
333	EN14538	8.8		-0.29	
445	EN14538	9.50		0.49	
494	EN14538	2.4	R(0.01)	-7.35	
496	EN14538	11.08		2.23	
540	EN14538	8.62		-0.49	
551		-----		-----	
603		-----		-----	
1067	EN14538	9.00		-0.07	
1134		-----		-----	
1179	EN14538	10.33		1.40	
1201	EN14538	6		-3.38	
1203	EN14538	9.3		0.26	
1240	EN14538	10.705		1.82	
1268		-----		-----	
1299		-----		-----	
1320	EN14538Mod.	8.24		-0.91	
1389		-----		-----	
1400	EN14538	9.29		0.25	
1510	EN14538	9.0		-0.07	
1611	EN14538	11.43		2.62	
1656	EN14538	7.6		-1.61	
1739	EN14538	9.739		0.75	
1878	EN14538	9.23		0.19	

normality	suspect	
n	21	
outliers	1	
mean (n)	9.060	
st.dev. (n)	1.2352	
R(calc.)	3.459	
R(EN14538:06)	2.536	Application range: 1- 10 mg/kg
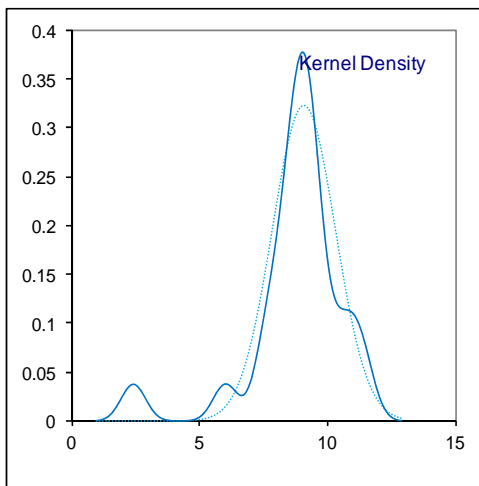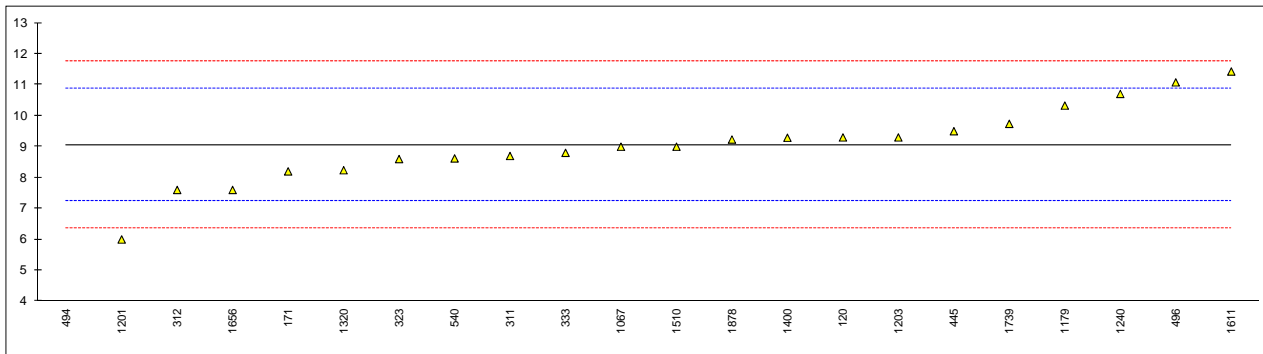
Determination of Phosphorus on sample #14186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14107	7.5	C	1.93	First reported: 1.00
171	EN14107	1.4	R(0.01)	-11.27	
311	EN14107	6.4		-0.45	
312	EN14107	6.2		-0.88	
323	EN14107	6.4		-0.45	
333	EN14107	6.7		0.20	
445	EN14107	5.99		-1.34	
494	EN14107	5.5		-2.40	
496	EN14107	7.68		2.32	
540	EN14107	8.46		4.01	
551		-----		-----	
603		-----		-----	
1067	EN14107	6.10		-1.10	
1134		-----		-----	
1179		-----		-----	
1201	EN14107	6		-1.32	
1203	EN14107	6.7		0.20	
1240	EN16294	7.20		1.28	
1268		-----		-----	
1299		-----		-----	
1320	EN14107	5.89		-1.55	
1389		-----		-----	
1400	EN14107	5.97		-1.38	
1510	EN14107	7.1		1.07	
1611	EN14107	6.96		0.76	
1656	EN14107	5.4		-2.61	
1739	EN14107	7.397		1.71	
1878	EN14107	10.85	R(0.01)	9.18	

normality	OK			
n	19			
outliers	2	Spike		
mean (n)	6.608	7.08		Recovery: <93%
st.dev. (n)	0.8029			
R(calc.)	2.248			
R(EN14107:03)	1.294			Application range: 4 -20 mg/kg
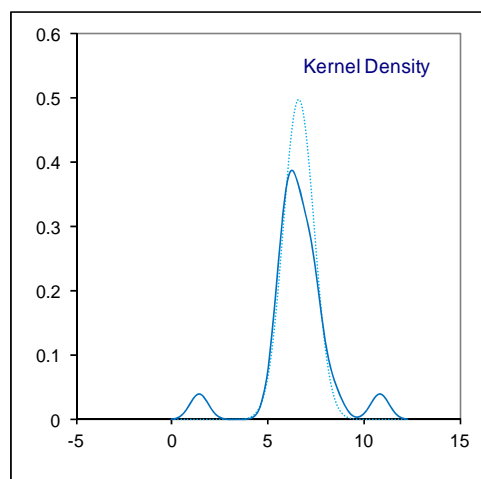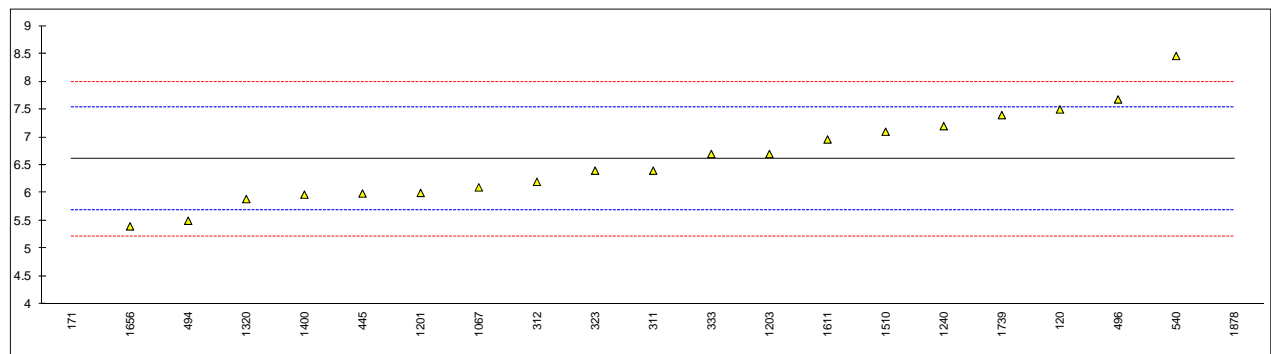
Determination of Potassium on sample #14186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14109	0.1	C	-----	First reported:<0.1
171	EN14109	<0.5		-----	
311	EN14538	<1		-----	
312	EN14109	<1.0		-----	
323	EN14538	<1.0		-----	
333	EN14538	<0.1		-----	
445	EN14538	<1		-----	
494	EN14538	<1		-----	
496	EN14538	<1		-----	
540	EN14538	<1		-----	
551		-----		-----	
603		-----		-----	
1067	EN14538	0.7		-----	
1134		-----		-----	
1179	EN14109	<1		-----	
1201	EN14109	1		-----	
1203	EN14538	<0.5		-----	
1240	EN14538	<1.0		-----	
1268		-----		-----	
1299		-----		-----	
1320	EN14109Mod.	<0.01		-----	
1389		-----		-----	
1400	EN14538	0.92		-----	
1510	EN14109	0.2		-----	
1611	EN14109	0.08		-----	
1656	EN14109	0.2		-----	
1739	EN14538	<0.5		-----	
1878	EN14538	<0.5		-----	

normality	unknown
n	7
outliers	0
mean (n)	0.457
st.dev. (n)	0.4021
R(calc.)	1.126
R(EN14109:03)	(0.753)

Compare R(EN14538:06) = 1.028, application range >1.0 mg/kg
Application range: >0.5 mg/kg
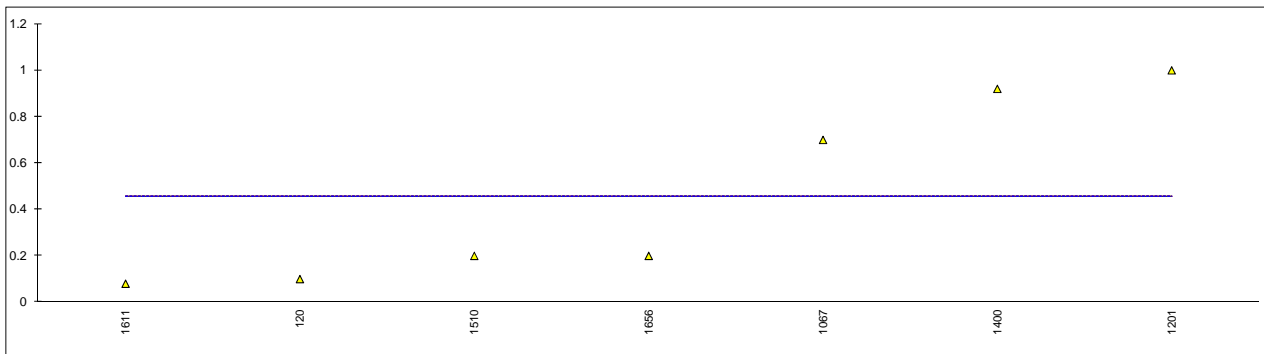
## Determination of Sodium on sample #14186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14108	5.4	C	0.13	First reported:0.11
171	EN14108	1.2	R(0.01)	-4.16	
311	EN14538	5.5		0.24	
312	EN14108	4.7		-0.58	
323	EN14538	5.2		-0.07	
333	EN14538	5.4		0.13	
445	EN14538	4.10		-1.19	
494	EN14538	4.8		-0.48	
496	EN14538	7.11		1.88	
540	EN14538	5.33		0.06	
551		-----		-----	
603		-----		-----	
1067	EN14538	4.64		-0.64	
1134		-----		-----	
1179	EN14108	4.86		-0.42	
1201	EN14108	5		-0.27	
1203	EN14538	4.0		-1.30	
1240	EN14538	5.40		0.13	
1268		-----		-----	
1299		-----		-----	
1320	EN14108Mod.	4.84		-0.44	
1389		-----		-----	
1400	EN14538	5.31		0.04	
1510	EN14108	4.0		-1.30	
1611	EN14108	4.93		-0.35	
1656	EN14108	6.3		1.05	
1739	EN14108	6.91		1.68	
1878	EN14108	6.91		1.68	

	normality	OK			
	n	21			
	outliers	1	Spike		
	mean (n)	5.269	7.14		Recovery: <74%
	st.dev. (n)	0.8949			
	R(calc.)	2.506			
	R(EN14108:03)	2.741			

Kernel Density
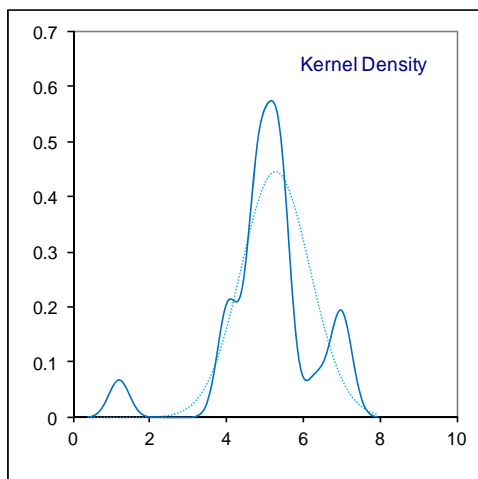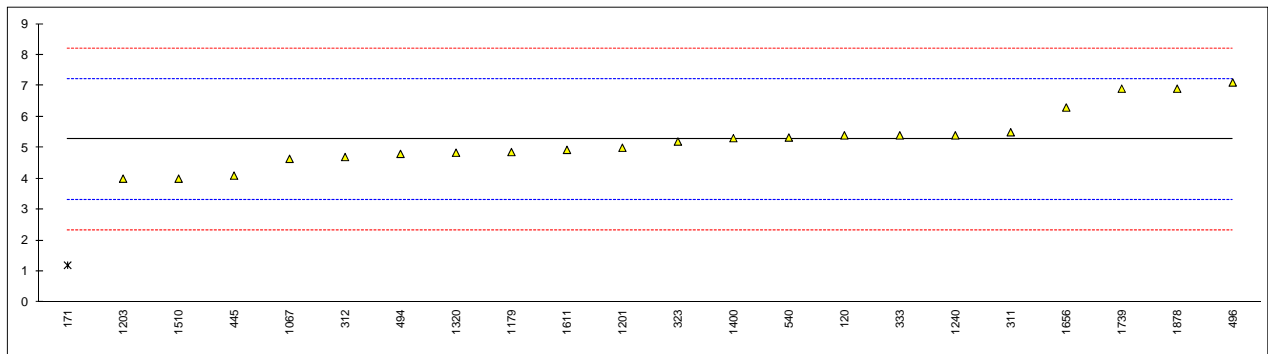
Determination of Total Contamination on sample #14187; results in mg/kg

lab	method	version	value	mark	z(targ)	vol. used	mark	diluted	remarks
120			-----		-----	n		-----	
171	EN12662	2014	31.9		4.17	300		-----	
311	EN12662	2014	25.2		1.34	300		-----	
312	EN12662	2014	26.6		1.93	300		No	
323	EN12662	1998	20.0	C	-0.87	284		-----	First reported:<6
335	EN12662	2013	22.5		0.19	300		-----	
337	EN12662	2008	22.7		0.28	800		No	
343	EN12662	1998	15.255		-2.87	327.76 (g)		No	
351	EN12662	2014	65	R(0.01)	18.19	400		-----	
420	EN12662	1998	23.19		0.49	291 + 285		-----	
445	EN12662	1998	16.55		-2.33	403.6		-----	
447	EN12662	2008	58.7	R(0.01)	15.52	n		-----	
540	EN12662	1998	22.1		0.02	400		-----	
551			-----		-----	n		-----	
603			-----		-----	n		-----	
1033			-----		-----	n		-----	
1059	EN12662	1998	23.4		0.57	300		No	
1064	EN12662	2014	20.59		-0.62	264		Yes	
1067	EN12662	1998	26.1		1.72	300		-----	
1095			-----		-----	n		-----	
1134	EN12662	1998	13.6		-3.58	800		No	
1179			-----		-----	n		-----	
1199			-----		-----	n		-----	
1201			-----		-----	n		-----	
1203	EN12662	2014	17.55		-1.90	300		Yes	
1240	EN12662	2008	42.0	R(0.05)	8.45	450	C	No	First reported: 800
1299	EN12662	1998	15.3		-2.86	300		-----	
1339	EN12662	1998	35.79		5.82	250 (g)		No	
1389	EN12662	1998	22.64		0.25	n		-----	
1400	EN12662	1998	22.98		0.40	431.65		No	
1485	EN12662	1998	22.89		0.36	400		No	
1510	EN12662	1998	23.7		0.70	n		No	
1582			-----		-----	n		-----	
1586	EN12662	1998	23.2		0.49	274		-----	
1710	EN12662	2008	18.4		-1.54	800		No	
1739	EN12662	1998	15.29		-2.86	200		-----	
1744	EN12662	2008	23.67		0.69	800		No	
1769			-----		-----	n		-----	

						Only 1998 data	Only 2008 data	Only 2014 data
normality		suspect				not OK	not OK	OK
n		25				16	4	6
outliers		3	Spike			0	1	1
mean (n)		22.04	14.94	Recovery: <147%		21.37	26.69	24.06
st.dev. (n)		5.100				5.479	10.459	5.021
R(calc.)		14.28				15.34	29.28	14.06
R(EN12662:14)		6.61				6.41	8.00	7.21
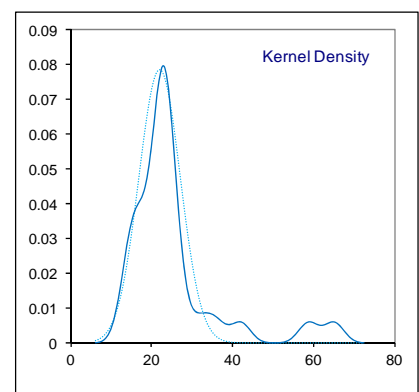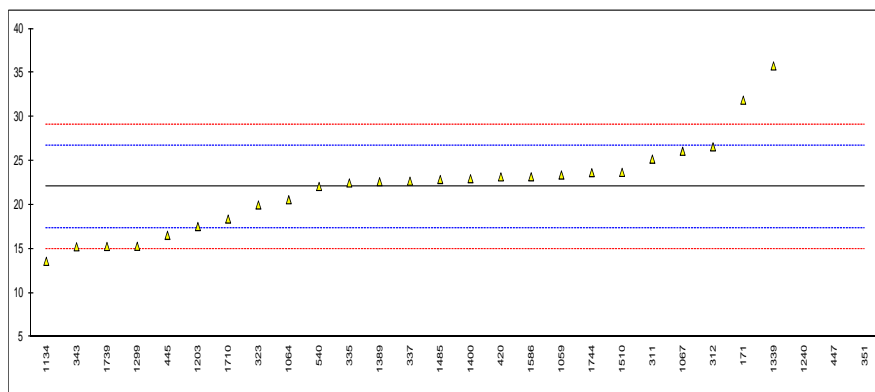
APPENDIX 2

Number of participants per country

2 labs in   ARGENTINA
1 lab in   BELGIUM
3 labs in   BRAZIL
3 labs in   COLOMBIA
1 lab in   CROATIA
1 lab in   CZECH REPUBLIC
8 labs in   FRANCE
3 labs in   GERMANY
2 labs in   HONG KONG
2 labs in   HUNGARY
2 labs in   LITHUANIA
1 lab in   MALAYSIA
1 lab in   MALTA
6 labs in   NETHERLANDS
1 lab in   NORWAY
1 lab in   PERU
1 lab in   PHILIPPINES
1 lab in   POLAND
5 labs in   PORTUGAL
1 lab in   SINGAPORE
1 lab in   SLOVAKIA
1 lab in   SLOVENIA
6 labs in   SPAIN
1 lab in   THAILAND
4 labs in   TURKEY
6 labs in   UNITED KINGDOM
2 labs in   UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations:

C	= final result after checking of first reported suspect result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner outlier test
R(0.05)	= straggler in Rosner outlier test
ex	= excluded from calculations
S	= scope of the reported method is not applicable
U	= reported in different unit
n.a.	= not applicable
n.e.	= not evaluated
SDS	= Safety Data Sheet

Literature:

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