Results of Proficiency Test
Biodiesel 100% FAME (B100)
October 2015

CONTENTS

Appendices:

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 the annual proficiency testing program of 2015-2016, it was decided to continue the proficiency test for the analysis of Biodiesel B100 in accordance with the latest applicable versions of the EN14214 and ASTM D6751 specifications. In this interlaboratory study 59 laboratories from 28 different countries have participated. See appendix 2 for a list of number of participants per country. In this report the results of the 2015 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 on 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
#15185	1.5	For regular analysis	-
#15186	0.1	Analysis of Phosphorus, Potassium, Sodium and Calcium & Magnesium	Phosphorus, Sodium, Calcium
#15187	0.85	Total Contamination test	Quartz material

table 1: three different Biodiesel B100 samples used in iis15G05EN

The test scope was set up according to 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 sending 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). This protocol is electronically available through the iis internet site www.iisnl.com, from the FAQ page.

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 for all three samples was obtained from a European producer.
After homogenisation in a precleaned metal drum, from the batch, 88 amber glass bottles of 1L and 88 amber glass bottles of 0.5L were filled and both labelled #15185.The homogeneity of the subsamples #15185 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 #15185-1	882.95
sample #15185-2	882.95
sample #15185-3	882.95
sample #15185-4	882.95
sample #15185-5	882.95
sample #15185-6	882.95
sample #15185-7	882.98
sample #15185-8	882.95

table 2: homogeneity test results of subsamples #15185

	Density at 15ºC in kg/m^3
r (sample #15185)	0.03
reference test	ISO12185:96
$0.3*R_{(reference\ test)}$	0.15

table 3: repeatability of subsamples #15185

For metals in Biodiesel B100, subsample #15186, a batch of approx. 5.1 kg was separated from the large batch and was spiked with Phosphorus (approx. 7 mg/kg) and Sodium (approx. 7 mg/kg). After homogenisation, out of the batch 60 HDPE bottles of 0.1L were filled and labelled #15186. The homogeneity of the subsamples #15186 was checked by determination of Sodium on 7 stratified randomly selected samples:

	Sodium in mg/kg
sample 1 #15186-1	7.7
sample 2 #15186-2	7.7
sample 3 #15186-3	7.8
sample 4 #15186-4	7.6
sample 5 #15186-5	7.7
sample 6 #15186-6	7.6
sample 7 #15186-7	7.4

table 4: homogeneity test results of subsamples #15186

	Sodium in mg/kg
r (sample #15186)	0.4
reference test	EN14538:06
0.3*R (reference test)	0.7

table 5: repeatability of subsamples #15186

For Total Contamination, out of the same batch of Biodiesel B100 as used for the regular sample (#15185), another 56 amber glass bottles of 1 litre with inner and outer caps were filled.
Each sample bottle was spiked (12.7 mg/kg) with a fresh prepared and well shaken particulate quartz material BCR-067 ($\varnothing$ 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 #15187.
After homogenization, a random sample was taken to check the Total Contamination.

The calculated repeatabilities for sample #15185 and #15186 were less than 0.3 times the corresponding reproducibility 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 #15185, and/or one 0.1 litre bottle labelled #15186, and/or 1 litre bottle labelled #15187, were dispatched to each of the participating laboratories on September 16, 2015.

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.

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 dispatch, 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 judgment 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: 2 participants reported test results after the final reporting date and 4 participants did not report any test results at all.
For the Total Contamination PT: 1 participant reported the test results after the final reporting date and 7 participants did not report any test results at all.
For the Metals in Biodiesel PT: 3 participants reported the test results after the final reporting date and 6 participants did not report any test results at all.

Finally, the 54 participants reported in total 788 numerical results. Observed were 19 outlying results, which is 2.4%. 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 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.

Not all original data sets proved to have a normal Gaussian distribution. These are referred to as "not OK" or "suspect". The statistical evaluation of these data sets should be used with due care, see also paragraph 3.1.

For Biodiesel B100 sample #15185

Acid Value (EN)	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 EN14104:03.
Acid Number (ASTM)	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 ASTM D664:11a (method B).
Cloud Point	This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ASTM D2500:11.
CFPP	This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in good agreement with the requirements of EN116:15.
Carbon Residue on 100%	The consensus value was near or below the application limit of ISO10370 (<0.1%M/M). Therefore no significant conclusions were drawn.
Copper Corrosion	No problems have been observed. All participants agreed on a result of 1.
Density at 15°C	This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of ISO12185:96.
Flash Point PMcc: EN Spec	This determination was problematic when ISO2719 was used. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ISO2719:02. However, when compared against ASTM D93 method C, the calculated reproducibility is in agreement with the requirements.
Flash Point conform EN spec.	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 ISO3679:04.

Iodine Number — This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN14111:03.

Kin.Visco. at 40°C — The determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of EN14214:12.

Oxidation Stability — This determination was not problematic. Two statistical outliers were observed. However, the calculated reproducibility after rejection of the statistical outliers is in good agreement with the requirements of EN14112:03 and EN15751:14.

Sulphated Ash — All reported results, except one, were near or below the application limit of ISO3987:10 (0.005% M/M). Therefore no significant conclusions were drawn.

Sulphur — This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO20846:11.

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

Methanol — 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 EN14110:03.

mono-Glycerides — This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN14105:11.

di-Glycerides — This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN14105:11.

tri-Glycerides — This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN14105:11.

Free Glycerol — This determination was not problematic. Two statistical outliers were observed and one result was excluded. However, 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. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14105:11.

Total Ester content   This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good 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 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 #15186

Calcium and   This determination was not problematic. One statistical outlier was
Magnesium   observed. The calculated reproducibility, after rejection of the statistical outlier is good in agreement with the requirements of EN141538:06. One false negative test result was reported.

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. Also two false negative test results were reported. The samples were spiked with Phosphorus. The average recovery of Phosphorus (theoretical increment of 7.11 mg/kg) may be good: "less then 98%" The actual blank concentration for Phosphorus is unknown.

Potassium   This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN14214:12.

Sodium   This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in good agreement with the requirements of EN14214:12. One false negative test result was reported. The samples were spiked with Sodium. The average recovery of Sodium (theoretical increment of 7.01 mg/kg) may be questionable: "less then 80%" The actual blank concentration for Sodium is unknown.

Potassium and
Sodium

This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of EN14214:12. One false negative test result was reported. Two participants probably made a calculation error.

For Biodiesel B100 sample #15187

Total Contamination

This determination was very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of EN12662:14. The average recovery of TC (increment of 12.70 mg/kg) may be satisfactory, "less then 174%".The actual blank concentration is unknown. All reporting laboratories, except two laboratories, found at least the spiked amount. When the reported test results of the different years (1998, 2008 and 2014) were evaluated separately, all calculated reproducibilities were not in agreement the requirements of the respective test methods. The consensus value for each group did not differ significantly from the others.

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	0.18	0.05	0.06
Acid Number (D664-B)	mg KOH/g	15	0.15	0.07	0.08
Cloud Point	°C	39	-5.0	2.0	3.0
Cold Filter Plugging Point	°C	36	-15.3	2.0	3.9
Carbon Residue on 100% FAME	%M/M	13	0.01	0.02	(0.01)
Copper Strip Corrosion		35	1(1A)	n.a.	n.a.
Density @ 15°C	kg/m^3	48	882.93	0.32	0.50
Flash Point - PMcc (ISO2719)	°C	30	164.5	12.9	11.7
Flash Point (ISO3679)	°C	11	173.0	12.9	15.0
Iodine Value	g I$_2$/100g	29	111.5	4.4	5.0
Kin. Viscosity @ 40°C	mm^2/s	41	4.464	0.043	0.045
Oxidation Stability (EN14112)	hours	31	7.7	1.1	2.2
Sulphated Ash	%M/M	21	<0.005	n.a.	n.a.
Sulphur (ISO20846)	mg/kg	32	3.7	1.1	1.5
Water	mg/kg	45	257	103	110
Methanol	%M/M	24	0.025	0.012	0.009
mono-Glycerides	%M/M	28	0.57	0.16	0.17
di-Glycerides	%M/M	27	0.12	0.05	0.05
tri-Glycerides	%M/M	23	0.08	0.06	0.08
Free Glycerol	%M/M	14	0.001	0.002	0.006
Total Glycerol	%M/M	27	0.173	0.042	0.044
Total Ester Content	%M/M	31	98.2	2.7	4.2
Linolenic Acid Methyl Ester	%M/M	29	8.9	0.6	0.6
Polyunsat. Methyl esters	%M/M	9	0.14	0.21	(0.27)

table 7: comparison of the observed and target reproducibilities of Biodiesel B100 sample #15185

Parameter	unit	n	average	R (Calc.)	R (lit)
Calcium & Magnesium	mg/kg	20	10.5	2.6	2.8
Phosphorus	mg/kg	16	7.0	2.3	1.4
Potassium	mg/kg	8	0.6	1.5	2.2
Sodium	mg/kg	20	5.6	3.1	3.7
Sum Potassium & Sodium	mg/kg	19	5.9	2.7	2.1

table 8: comparison of the observed and target reproducibilities of Biodiesel B100 sample #15186

Parameter	unit	n	average	R (Calc.)	R (lit)
Total Contamination	mg/kg	27	22.0	13.6	7.7

table 9: comparison of the observed and target reproducibilities of Biodiesel B100 sample #15187

Results between brackets should used with care, because the average was near or below the application range.

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 OCTOBER 2015 WITH PREVIOUS PTS

	October 2015	April 2015	September 2014	April 2014
Type of FAME	Rapeseed	Rapeseed	Rapeseed	Rapeseed
Number of reporting labs	54	60	54	68
Number of results reported	788	965	836	1093
Number of statistical outliers	19	23	35	54
Percentage statistical outliers	2.4%	2.4%	4.2%	5.2%

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	October 2015	April 2015	September 2014	April 2014
Acid Value (EN14104)	+	+	+	+
Acid Number (D664-B)	+	++	-	+
Cloud Point	+	+	-	+
Cold Filter Plugging Point	++	+/-	++	+
Carbon Residue on 100% FAME	(-)	n.e.	(++)	(++)
Density at15°C	++	+/-	++	+
Flash Point PMcc (ISO2719)	-	+	+	+/-
Flash Point EN spec. (ISO3679)	++	+	+	+/-
Iodine Value	+	+/-	-	+
Kinematic Viscosity at 40°C	+/-	-	+	+/-
Oxidation Stability	++	++	+	+
Sulphated Ash	n.e.	(--)	(--)	(--)
Sulphur (ISO20846)	+	+	+	+/-
Water	+	++	+	+
Methanol	-	-	+/-	+/-
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 #15185; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14104	0.14		-1.80	
311	EN14104	0.17		-0.40	
312	EN14104	0.151		-1.29	
323	EN14104	0.16		-0.87	
333	EN14104	0.19		0.53	
334	EN14104	0.18		0.07	
335		-----		-----	
336		-----		-----	
337	EN14104	0.20		1.00	
338		-----		-----	
343	EN14104	0.195		0.77	
351	EN14104	0.176		-0.12	
370		-----		-----	
420	EN14104	0.198		0.91	
445	EN14104	0.15		-1.33	
447	EN14104	0.19		0.53	
496	EN14104	0.16	C	-0.87	First reported 0.47
511		-----		-----	
540	EN14104	0.18		0.07	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14104	0.19		0.53	
1134	EN14104	0.1705		-0.38	
1161	EN14104	0.165		-0.63	
1167	EN14104	0.15		-1.33	
1199		-----		-----	
1201	EN14104	0.17		-0.40	
1213		-----		-----	
1240	EN14104	0.196		0.81	
1286		-----		-----	
1299	EN14104	0.16		-0.87	
1389	EN14104	0.182		0.16	
1397	EN14104	0.161		-0.82	
1419	EN14104	0.179		0.02	
1459	EN14104	0.19		0.53	
1468	EN14104	0.17		-0.40	
1485	EN14104	0.184		0.25	
1510	EN14104	0.21		1.47	
1543		-----		-----	
1546	EN14104	0.223		2.07	
1582		-----		-----	
1634		-----		-----	
1656	EN14104	0.19		0.53	
1667	EN14104	0.205		1.23	
1710	EN14104	0.19		0.53	
1739	EN14104	0.167		-0.54	
1744		-----		-----	
1807		-----		-----	
1976	EN14104	0.109	C,R(0.05)	-3.25	First reported 0.287
6007		-----		-----	

	normality	OK	
	n	33	
	outliers	1	
	mean (n)	0.1786	
	st.dev. (n)	0.01915	
	R(calc.)	0.0536	
	R(EN14104:03)	0.0600	

Kernel Density
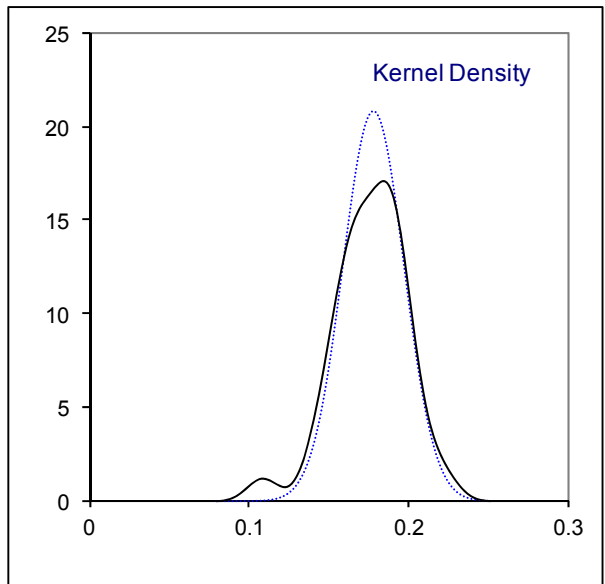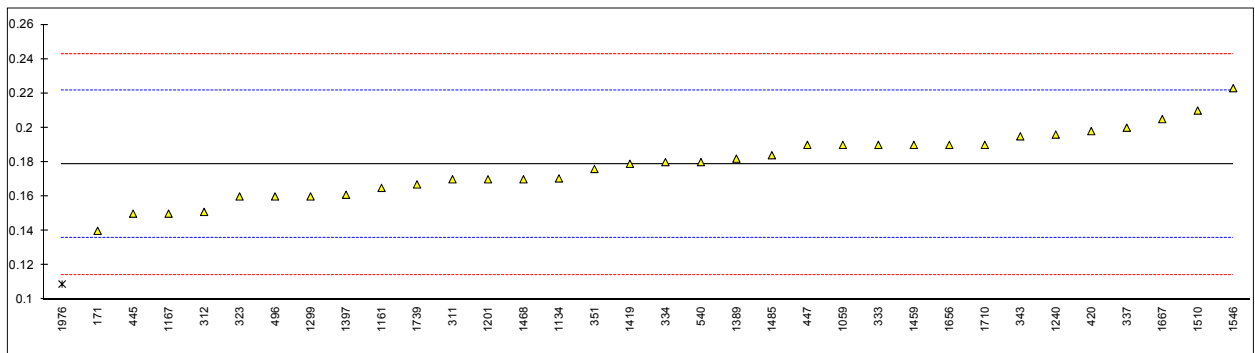
Determination of Acid Number conform ASTM spec. on sample #15185; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	D664	0.130		-0.72	
150	D664	0.14		-0.39	
171	D664	0.14		-0.39	
311		-----		-----	
312		-----		-----	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343		-----		-----	
351		-----		-----	
370		-----		-----	
420		-----		-----	
445	D664	0.171		0.66	
447	D664	0.34	G(0.01)	6.34	
496		-----		-----	
511		-----		-----	
540		-----		-----	
551	D664	0.1987		1.59	
558		-----		-----	
631	D664	0.176		0.82	
663	D664	0.128		-0.79	
1033	D974	0.17		0.62	
1059	ISO6619	0.16		0.28	
1134		-----		-----	
1161	D664	0.143		-0.29	
1167		-----		-----	
1199		-----		-----	
1201	D664	0.14		-0.39	
1213	D664	0.0993		-1.76	
1240		-----		-----	
1286		-----		-----	
1299	D664	0.19		1.29	
1389		-----		-----	
1397		-----		-----	
1419		-----		-----	
1459		-----		-----	
1468		-----		-----	
1485		-----		-----	
1510		-----		-----	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656		-----		-----	
1667		-----		-----	
1710	D664	0.150		-0.05	
1739		-----		-----	
1744	D664	0.137		-0.49	
1807		-----		-----	
1976		-----		-----	
6007		-----		-----	

	normality	OK
	n	15
	outliers	1
	mean (n)	0.1515
	st.dev. (n)	0.02608
	R(calc.)	0.0730
	R(D664B:11a)	0.0832

Kernel Density
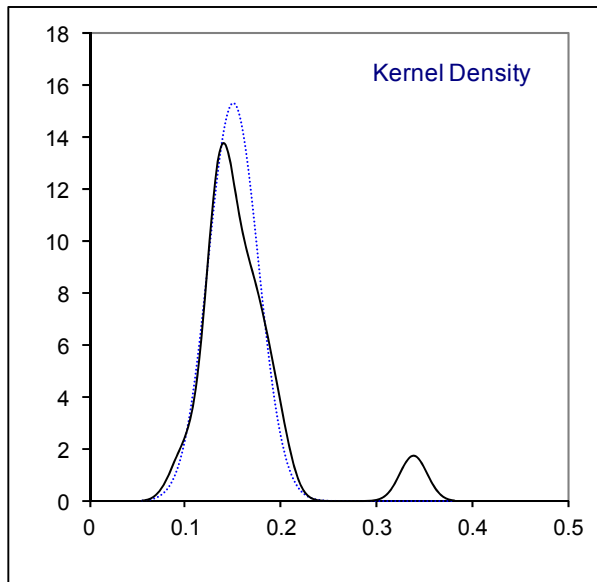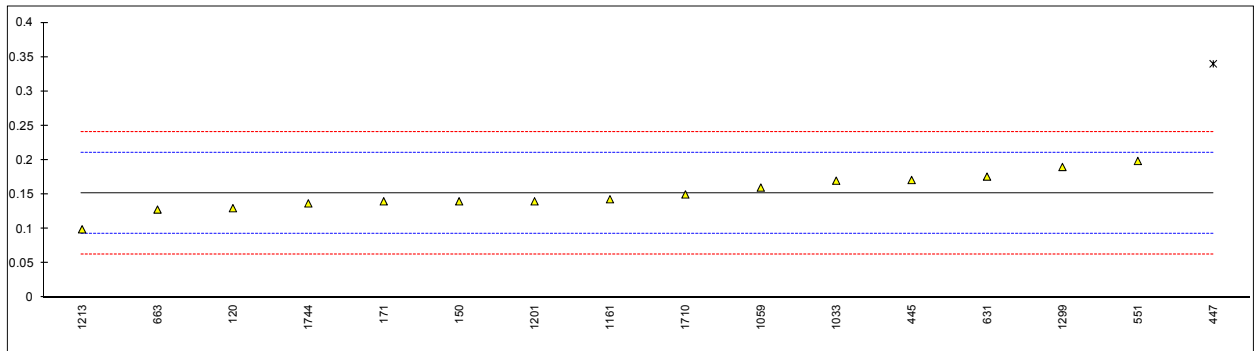
Determination of Cloud Point on sample #15185; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	D2500	-4		0.98	
171	D2500	-5		0.05	
311	D2500	-5		0.05	
312	EN23015	-5		0.05	
323	EN23015	-6		-0.89	
333		-----		-----	
334	EN23015	-6		-0.89	
335	EN23015	-6		-0.89	
336	EN23015	-5		0.05	
337	EN23015	-5		0.05	
338	EN23015	-5		0.05	
343	D2500	-5		0.05	
351	D7683	-4.0		0.98	
370	EN23015	-5		0.05	
420	EN23015	-5		0.05	
445	IP219	-4		0.98	
447	D2500	-5		0.05	
496	EN23015	-5		0.05	
511		-----		-----	
540	EN23015	-6		-0.89	
551		-----		-----	
558		-----		-----	
631	D2500	-4		0.98	
663	D2500	-5		0.05	
1033	IP219	-5.9		-0.79	
1059	EN23015	-5		0.05	
1134	IP219	-6		-0.89	
1161	EN23015	-5		0.05	
1167		-----		-----	
1199		-----		-----	
1201	EN23015	-4		0.98	
1213	D2500	-5		0.05	
1240	EN23015	-5.0		0.05	
1286		-----		-----	
1299	D2500	-5		0.05	
1389	D2500	-7		-1.82	
1397	D5771	-5		0.05	
1419	EN23015	-5		0.05	
1459	EN23015	-5		0.05	
1468	EN23015	-6		-0.89	
1485	D2500	-5.0		0.05	
1510	D2500	-5		0.05	
1543		-----		-----	
1546	EN23015	-3		1.91	
1582		-----		-----	
1634		-----		-----	
1656	D2500	-5		0.05	
1667		-----		-----	
1710	EN23015	-5		0.05	
1739	EN23015	-5		0.05	
1744		-----		-----	
1807		-----		-----	
1976		-----		-----	
6007		-----		-----	

normality	suspect
n	39
outliers	0
mean (n)	-5.05
st.dev. (n)	0.720
R(calc.)	2.02
R(D2500:11)	3.00

Kernel Density
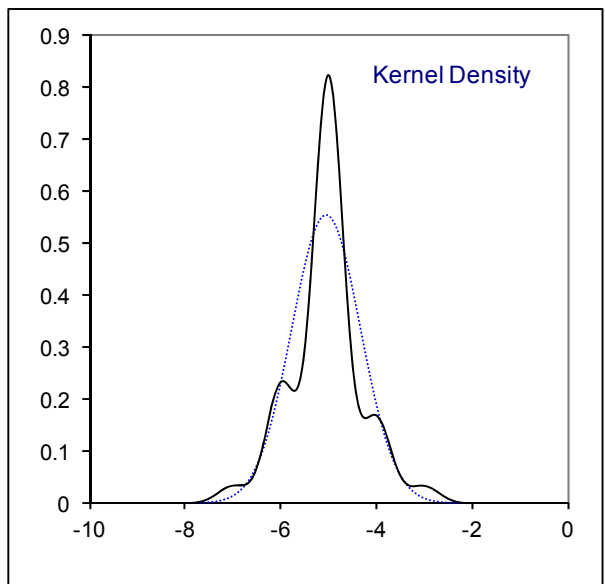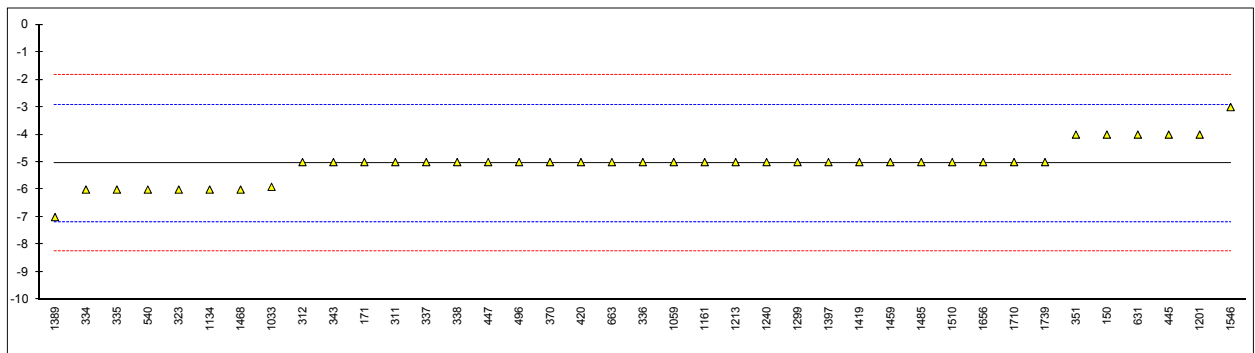
Determination of Cold Filter Plugging Point on sample #15185; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	EN116	-16.0		-0.50	
171	EN116	-14		0.93	
311	EN116	-15		0.22	
312	EN116	-15		0.22	
323	EN116	-15		0.22	
333		-----		-----	
334	EN116	-15		0.22	
335	EN116	-15		0.22	
336	EN116	-15		0.22	
337	EN116	-14		0.93	
338	EN116	-15		0.22	
343	EN116	-16		-0.50	
351		-----		-----	
370	EN116	-15		0.22	
420	EN116	-15		0.22	
445	IP309	-15		0.22	
447	IP309	-14		0.93	
496	EN116	-16		-0.50	
511		-----		-----	
540	EN116	-16		-0.50	
551	EN116	-16		-0.50	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033	IP309	-16		-0.50	
1059	EN116	-16		-0.50	
1134	IP309	-15		0.22	
1161	EN116	-15		0.22	
1167		-----		-----	
1199		-----		-----	
1201	EN116	-15		0.22	
1213		-----		-----	
1240	EN116	-15.7		-0.28	
1286		-----		-----	
1299	EN116	-15		0.22	
1389	EN116	-16		-0.50	
1397	EN116	-17		-1.21	
1419	EN116	-15		0.22	
1459	EN116	-14		0.93	
1468	EN116	-16		-0.50	
1485		-----		-----	
1510	IP309	-15		0.22	
1543		-----		-----	
1546	EN116	-16		-0.50	
1582		-----		-----	
1634		-----		-----	
1656	EN116	-15		0.22	
1667	EN116	-15.3		0.00	
1710	EN116	-16		-0.50	
1739	EN116	-18.0	R(0.05)	-1.93	
1744		-----		-----	
1807		-----		-----	
1976	EN116	-16		-0.50	
6007		-----		-----	

normality	OK	
n	36	
outliers	1	
mean (n)	-15.306	
st.dev. (n)	0.7014	
R(calc.)	1.964	
R(EN116:15)	3.918	
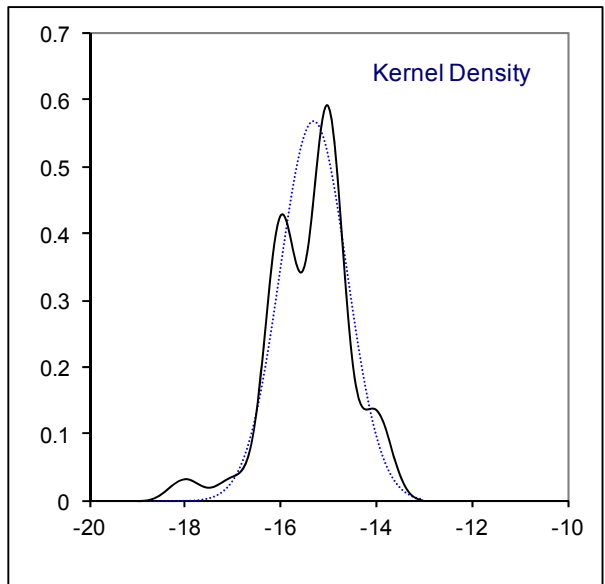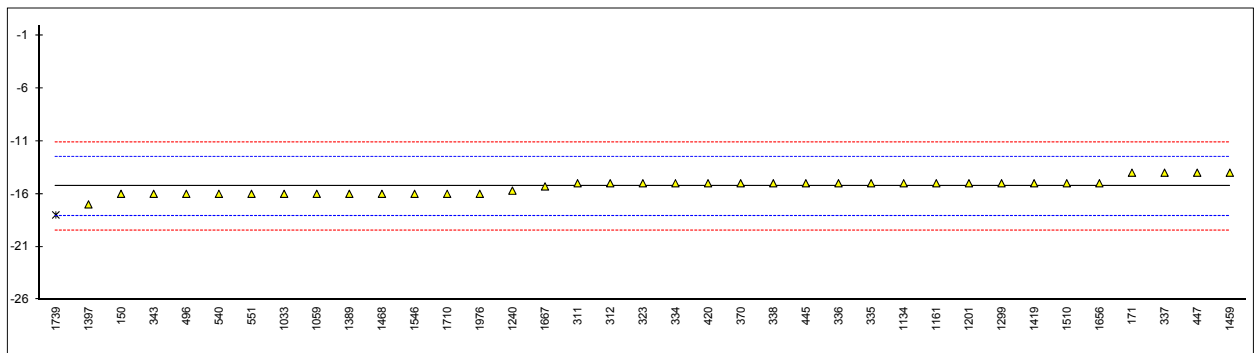
Determination of Carbon Residue on 100% FAME on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D4530	<0.01		-----	
150	D4530	<0.10		-----	
171	D4530	<0.1		-----	
311		-----		-----	
312		-----		-----	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343		-----		-----	
351		-----		-----	
370	EN10370	0.005		-----	
420	ISO6615	0.0082		-----	
445	D4530	<0.01		-----	
447	D4530	0.013		-----	
496	D4530	0.000		-----	
511		-----		-----	
540		-----		-----	
551	D4530	0.01		-----	
558		-----		-----	
631	D4530	0.012		-----	
663	D4530	0.005		-----	
1033		-----		-----	
1059		-----		-----	
1134	D4530	0.0008		-----	
1161	D4530	0.013		-----	
1167	ISO10370	0.1	G(0.01)	-----	
1199		-----		-----	
1201	D4530	<0.10		-----	
1213	D4530	<0.1		-----	
1240		-----		-----	
1286		-----		-----	
1299		-----		-----	
1389	D4530	0.020		-----	
1397		-----		-----	
1419	D4530	0.005		-----	
1459		-----		-----	
1468		-----		-----	
1485		-----		-----	
1510	D4530	0.02		-----	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	D4530	<0.1		-----	
1667		-----		-----	
1710	EN10370	0.027		-----	
1739		-----		-----	
1744		-----		-----	
1807		-----		-----	
1976		-----		-----	
6007		-----		-----	

normality	OK		
n	13		
outliers	1		
mean (n)	0.0107		
st.dev. (n)	0.00800		
R(calc.)	0.0224		
R(ISO10370:14)	(0.0119)		Application range: 0.10 – 30 %M/M

Kernel Density
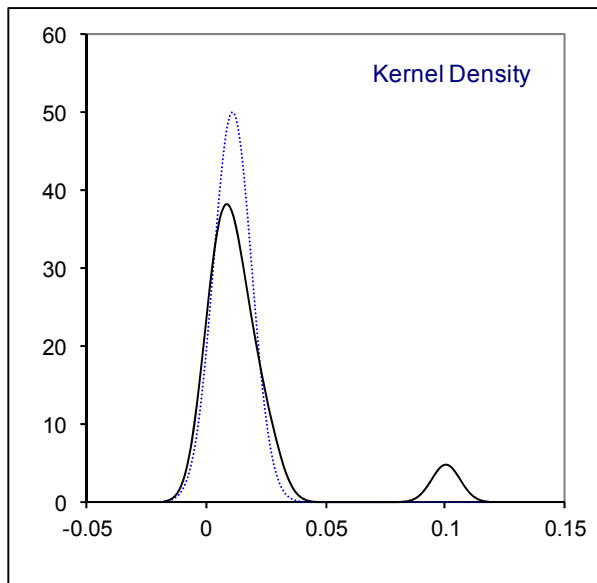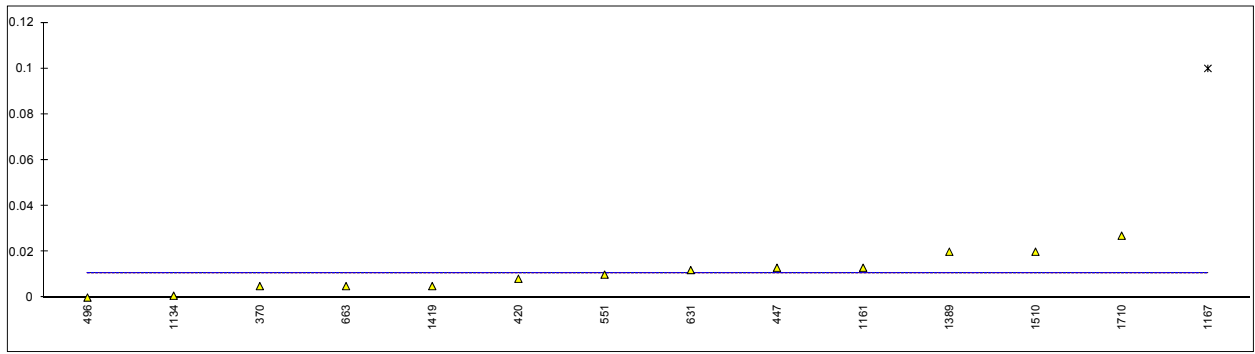
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Determination of Copper Strip Corrosion 3 hrs/50°C on sample #15185

lab	method	value	mark	z(targ)	remarks
120	D130	1A		-----	
150	D130	1A		-----	
171	D130	1A		-----	
311	ISO2160	1A		-----	
312		-----		-----	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335	ISO2160	1		-----	
336	D130	1		-----	
337	D130	1		-----	
338		-----		-----	
343	ISO2160	1A		-----	
351	ISO2160	1A		-----	
370	ISO2160	1A		-----	
420	ISO2160	1A		-----	
445	IP154	1A		-----	
447	D130	1A		-----	
496	ISO2160	1A		-----	
511		-----		-----	
540	D130	1A		-----	
551	D130	1A		-----	
558		-----		-----	
631	D130	1A		-----	
663	D130	1A		-----	
1033	IP154	1A		-----	
1059	ISO2160	1A		-----	
1134	IP154	1A		-----	
1161	ISO2160	1A		-----	
1167	ISO2160	1A		-----	
1199		-----		-----	
1201	D130	1A		-----	
1213	D130	1A		-----	
1240		-----		-----	
1286		-----		-----	
1299	ISO2160	1A		-----	
1389	ISO2160	1A		-----	
1397	ISO2160	1		-----	
1419		-----		-----	
1459		-----		-----	
1468	ISO2160	1A		-----	
1485		-----		-----	
1510	D130	1A		-----	
1543		-----		-----	
1546	ISO2160	1		-----	
1582		-----		-----	
1634	D130	1A		-----	
1656	D130	1		-----	
1667		-----		-----	
1710	ISO2160	1A		-----	
1739	ISO2160	1A		-----	
1744		-----		-----	
1807		-----		-----	
1976		-----		-----	
6007		-----		-----	

normality	n.a.	
n	35	
outliers	n.a.	
mean (n)	1(1A)	
st.dev. (n)	n.a.	
R(calc.)	n.a.	
R(ISO2160:98)	n.a.	

Determination of Density at 15°C conform EN spec. on sample #15185; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	ISO12185	882.8		-0.72	
150	D4052	883.1		0.96	
171	D4052	882.8		-0.72	
311	ISO12185	882.9		-0.16	
312	ISO12185	882.9		-0.16	
323	ISO12185	882.9		-0.16	
333	ISO12185	882.9		-0.16	
334	ISO12185	883.0		0.40	
335	ISO12185	882.8		-0.72	
336	ISO12185	882.8		-0.72	
337	ISO12185	882.9		-0.16	
338	ISO12185	883.1		0.96	
343	ISO12185	882.94		0.06	
351	ISO12185	882.94		0.06	
370	ISO12185	882.8		-0.72	
420	ISO12185	882.8		-0.72	
445	ISO12185	883.0		0.40	
447	D4052	882.9		-0.16	
496	ISO12185	882.89		-0.22	
511	D4052	883.03		0.57	
540	ISO12185	883.1		0.96	
551	ISO12185	883.1		0.96	
558		-----		-----	
631	D4052	882.96		0.17	
663	D4052	882.97		0.23	
1033	IP365	883.1		0.96	
1059	ISO12185	882.9		-0.16	
1134	IP365	882.9		-0.16	
1161	ISO12185	882.9		-0.16	
1167	ISO12185	883.0		0.40	
1199		-----		-----	
1201	ISO12185	882.9		-0.16	
1213	D4052	882.91		-0.11	
1240	ISO12185	883.05		0.68	
1286	ISO12185	882.969		0.22	
1299	ISO12185	882.9		-0.16	
1389	ISO12185	883.0		0.40	
1397		-----		-----	
1419	ISO12185	882.99		0.34	
1459	ISO12185	882.93		0.01	
1468	ISO12185	883.0		0.40	
1485	ISO12185	883.08		0.85	
1510	IP365	883.1		0.96	
1543		-----		-----	
1546	ISO12185	883.0	C	0.40	First reported 882.4
1582		-----		-----	
1634	ISO12185	882.928		-0.01	
1656	D4052	882.8		-0.72	
1667	ISO3675	882.63		-1.67	
1710	ISO12185	882.9		-0.16	
1739	ISO3675	882.87		-0.33	
1744		-----		-----	
1807		-----		-----	
1976	ISO12185	882.9		-0.16	
6007	DIN51757	882.59	C	-1.90	First reported 0.88295

normality	suspect
n	48
outliers	0
mean (n)	882.929
st.dev. (n)	0.1129
R(calc.)	0.316
R(ISO12185:96)	0.500

Kernel Density
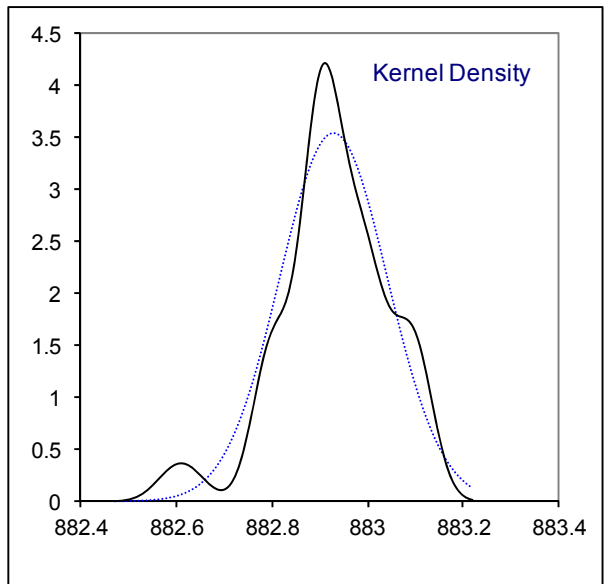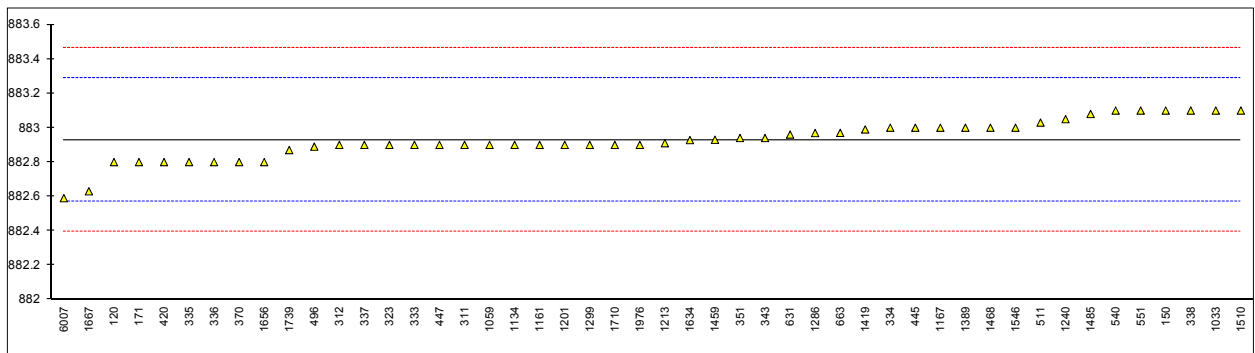
Determination of Flash Point, PMcc conform EN spec. on sample #15185; results in °C

lab	method	value	mark	z(targ)	remarks
120	ISO2719	158		-1.55	
150		-----		-----	
171	D93	171.1		1.59	
311		-----		-----	
312		-----		-----	
323	ISO2719	163.0		-0.35	
333	ISO2719	166.0		0.37	
334	D93	166		0.37	
335	ISO2719	167.0		0.61	
336	ISO2719	154.0		-2.51	
337		-----		-----	
338		-----		-----	
343	ISO2719	163		-0.35	
351	ISO2719	164.0		-0.11	
370	ISO2719	161.0		-0.83	
420	ISO2719	166.0		0.37	
445		-----		-----	
447		-----		-----	
496	ISO2719	160.8		-0.88	
511	D93	170.0		1.33	
540	ISO2719	166.0		0.37	
551	ISO2719	160		-1.07	
558		-----		-----	
631	D93	168.0		0.85	
663	D93	177.5		3.12	
1033	IP34	169.5		1.21	
1059	ISO2719	167.0		0.61	
1134		-----		-----	
1161		-----		-----	
1167		-----		-----	
1199		-----		-----	
1201	ISO2719	165.0		0.13	
1213		-----		-----	
1240		-----		-----	
1286		-----		-----	
1299		-----		-----	
1389	D93	161.0		-0.83	
1397	ISO2719	164.5		0.01	
1419		-----		-----	
1459	ISO2719	163.5		-0.23	
1468		-----		-----	
1485		-----		-----	
1510	IP34	166.0		0.37	
1543		-----		-----	
1546	ISO2719	163.5		-0.23	
1582		-----		-----	
1634	D93	166.05		0.38	
1656	D93	167.7		0.77	
1667	ISO2719	162.5		-0.47	
1710	ISO2719	159.5		-1.19	
1739		-----		-----	
1744		-----		-----	
1807		-----		-----	
1976	ISO2719	157		-1.79	
6007		-----		-----	

normality	suspect		
n	30		
outliers	0		
mean (n)	164.47		
st.dev. (n)	4.622		
R(calc.)	12.94		
R(ISO2719:02)	11.68	Compare R(D93C:15) = 14.70	

Kernel Density
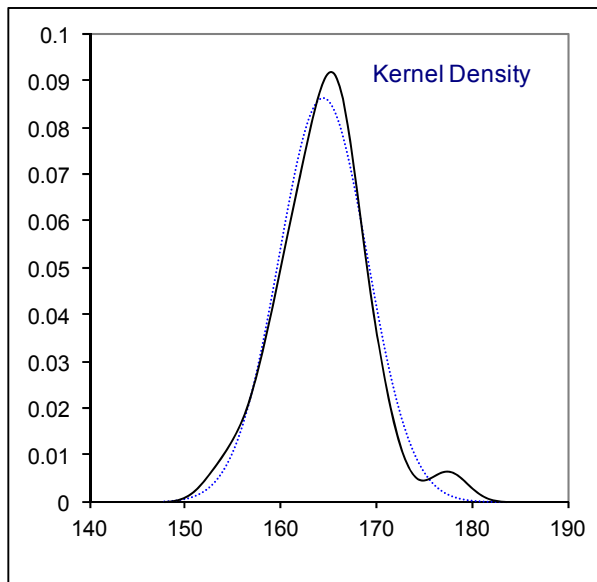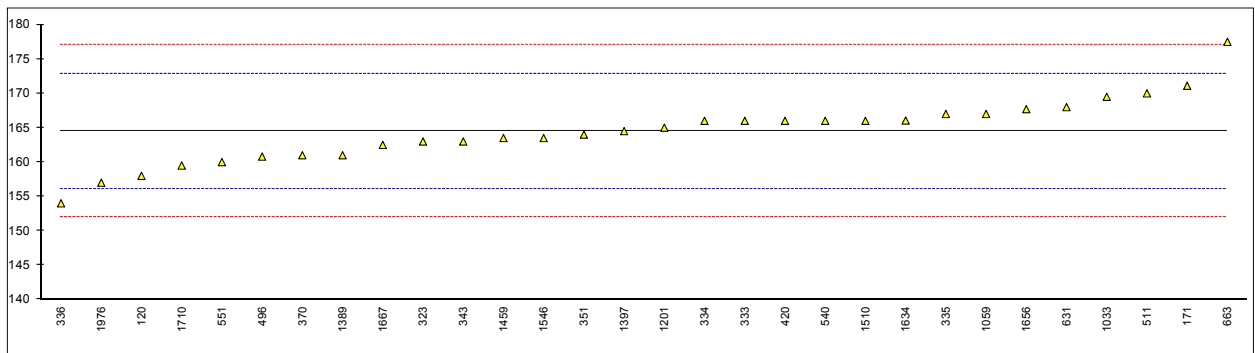
Determination of Flash Point, recc conform EN spec. on sample #15185; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150	ISO3679	>130.0		-----	
171	ISO3679	174.0		0.18	
311	ISO3679	172.0		-0.19	
312	ISO3679	176		0.56	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	ISO3679	164		-1.68	
351		-----		-----	
370		-----		-----	
420		-----		-----	
445	IP523	176.4		0.63	
447		-----		-----	
496	ISO3679	176.0		0.56	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059		-----		-----	
1134	IP523	173.0		0.00	
1161	ISO3679	171.0		-0.38	
1167		-----		-----	
1199		-----		-----	
1201	ISO3679	165.9		-1.33	
1213		-----		-----	
1240	ISO3679	154.50	C,G(0.05)	-3.46	First reported 161.26
1286		-----		-----	
1299	ISO3679	176.0		0.56	
1389		-----		-----	
1397		-----		-----	
1419		-----		-----	
1459		-----		-----	
1468		-----		-----	
1485		-----		-----	
1510		-----		-----	
1543		-----		-----	
1546	ISO3679	>130		-----	
1582		-----		-----	
1634		-----		-----	
1656		-----		-----	
1667		-----		-----	
1710		-----		-----	
1739	ISO3679	178.90		1.10	
1744		-----		-----	
1807		-----		-----	
1976		-----		-----	
6007		-----		-----	

	normality	OK
	n	11
	outliers	1
	mean (n)	173.02
	st.dev. (n)	4.591
	R(calc.)	12.85
	R(ISO3679:15)	15.00
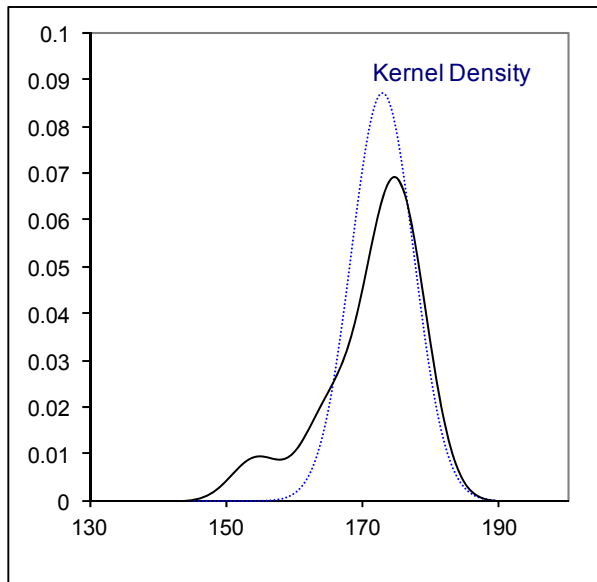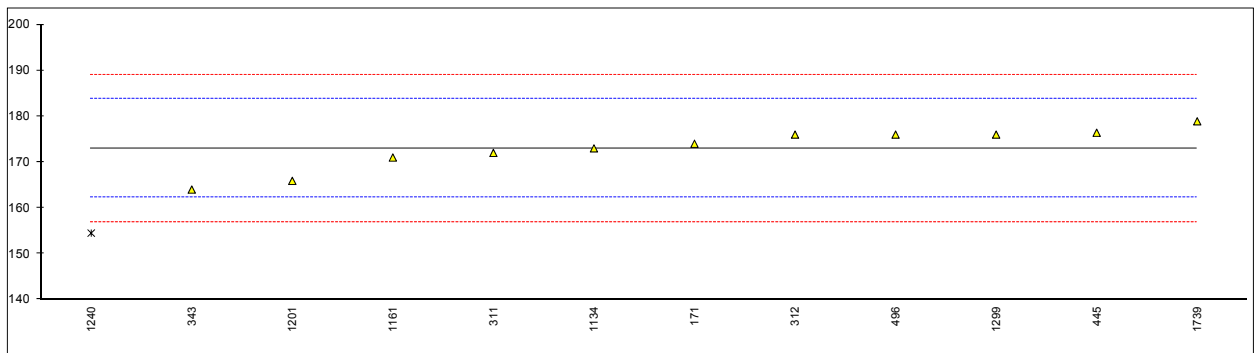
Determination of Iodine Value conform EN spec. on sample #15185; results in g I_2/100g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14111	114		1.42	
311	EN14111	113		0.86	
312	EN14111	111.6		0.08	
323	EN14111	112		0.30	
333	EN14111	108		-1.94	
334	EN14111	108		-1.94	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN16300	112		0.30	
351	EN14111	112.5		0.58	
370		-----		-----	
420	EN14111	110.6		-0.48	
445	EN14111	112.8		0.75	
447		-----		-----	
496	EN14111	112		0.30	
511		-----		-----	
540	EN14111	110		-0.82	
551	EN14111	113.1		0.92	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14111	111		-0.26	
1134	EN14111	113.7		1.26	
1161	EN14111	111.7		0.14	
1167	EN14111	110		-0.82	
1199		-----		-----	
1201		-----		-----	
1213	EN14111	111.0		-0.26	
1240	EN16300	111.23		-0.13	
1286		-----		-----	
1299	EN14111	111		-0.26	
1389	EN14111	112.41		0.53	
1397		-----		-----	
1419	EN14111	111.2		-0.14	
1459	EN16300	112.0		0.30	
1468	EN14111	112		0.30	
1485		-----		-----	
1510		-----		-----	
1543		-----		-----	
1546	EN14111	110		-0.82	
1582		-----		-----	
1634		-----		-----	
1656		-----		-----	
1667	EN14111	110.65		-0.45	
1710		-----		-----	
1739	EN14111	109.8		-0.93	
1744	EN14111	114.58		1.75	
1807		-----		-----	
1976	EN14111	110.34	C	-0.62	First reported 106.6
6007		-----		-----	

	normality	OK	
	n	29	
	outliers	0	
	mean (n)	111.46	
	st.dev. (n)	1.559	
	R(calc.)	4.37	
	R(EN14111:03)	5.00	

Kernel Density
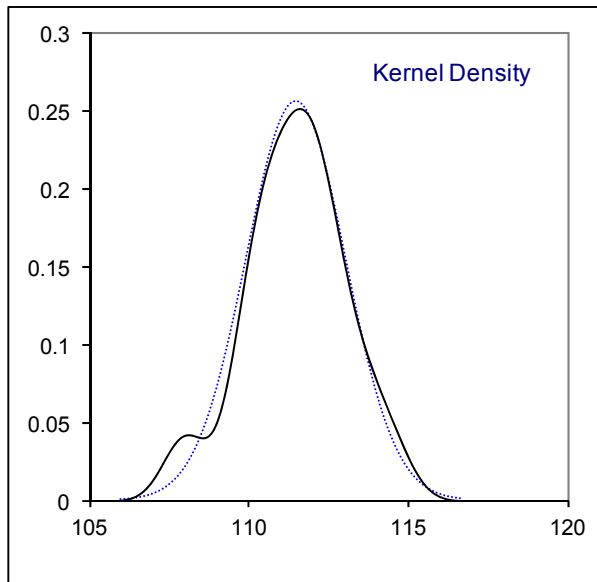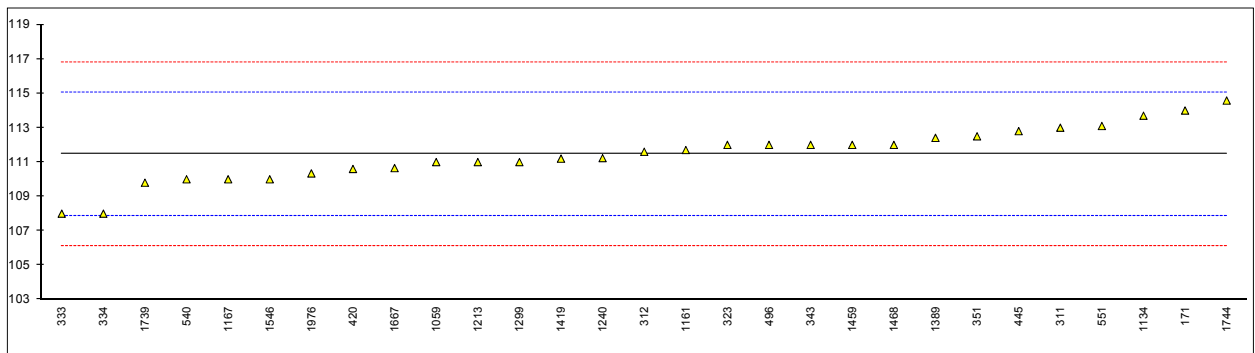
Determination of Kinematic Viscosity at 40°C on sample #15185; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	ISO3104	4.423		-2.53	
150	D445	4.460		-0.22	
171	D445	4.462		-0.10	
311	ISO3104	4.472		0.53	
312	D445	4.454		-0.60	
323	ISO3104	4.477		0.84	
333		-----		-----	
334	ISO3104	4.475		0.72	
335	D445	4.463		-0.03	
336	ISO3104	4.479		0.97	
337	ISO3104	4.488		1.53	
338		-----		-----	
343	ISO3104	4.4562		-0.46	
351	ISO3104	4.445		-1.16	
370	ISO3104	4.4485		-0.94	
420	ISO3104	4.5022	C	2.42	First reported 4.5244
445	ISO3104	4.4569		-0.42	
447	D445	4.452		-0.72	
496	ISO3104	4.470		0.40	
511	D445	4.488		1.53	
540	ISO3104	4.467		0.22	
551	ISO3104	4.5618	R(0.01)	6.14	
558		-----		-----	
631	D445	4.4646		0.07	
663	D445	4.4654		0.12	
1033	IP71	4.466		0.15	
1059	ISO3104	4.447		-1.03	
1134	D445	4.477		0.84	
1161	ISO3104	4.462		-0.10	
1167		-----		-----	
1199		-----		-----	
1201	ISO3104	4.439		-1.53	
1213	D445	4.474		0.65	
1240	ISO3104	4.451		-0.78	
1286		-----		-----	
1299	D445	4.627	R(0.01)	10.22	
1389	ISO3104	4.454		-0.60	
1397		-----		-----	
1419	ISO3104	4.458		-0.35	
1459	D7042	4.4924		1.80	
1468	ISO3104	4.45		-0.85	
1485	D445	4.4650		0.09	
1510	D445	4.453		-0.66	
1543		-----		-----	
1546	ISO3104	4.4640		0.03	
1582		-----		-----	
1634		-----		-----	
1656	D445	4.466		0.15	
1667	ISO3104	4.46134	C	-0.14	First reported 4.33136
1710	ISO3104	4.460		-0.22	
1739	ISO3104	4.4676		0.25	
1744		-----		-----	
1807		-----		-----	
1976	ISO3104	4.4458		-1.11	
6007	DIN51562	4.4838		1.27	

normality	OK
n	41
outliers	2
mean (n)	4.4636
st.dev. (n)	0.01522
R(calc.)	0.0426
R(EN14214:12)	0.0448
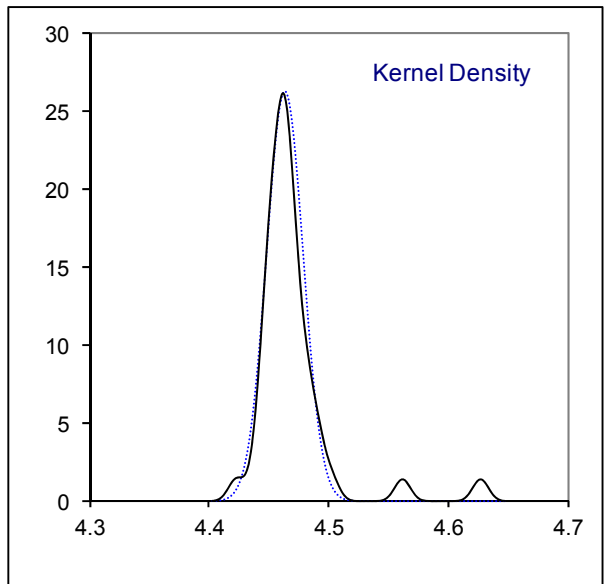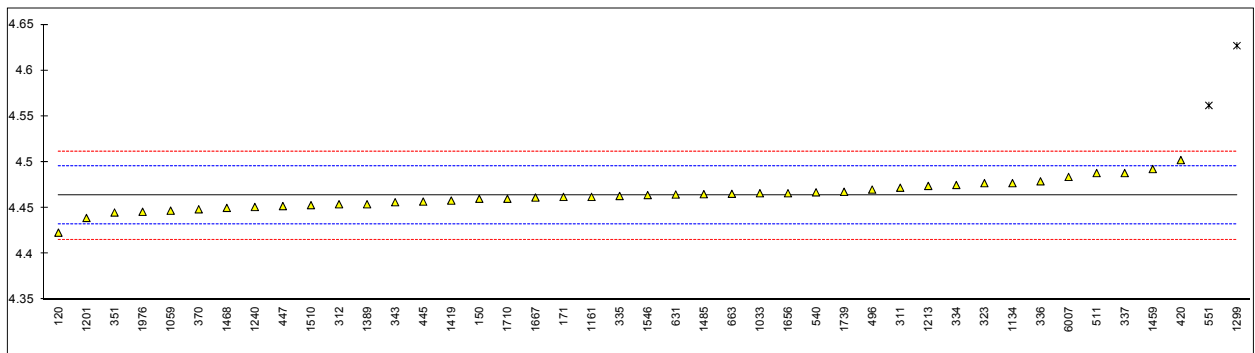
Determination of Oxidation Stability on sample #15185; results in hours

lab	method	value	mark	z(targ)	remarks
120	EN15751	7.98		0.31	
150	EN14112	7.9		0.21	
171	EN14112	7.5		-0.29	
311	EN14112	7.3		-0.54	
312	EN14112	8.1		0.46	
323	EN14112	7.9		0.21	
333	EN14112	7.7		-0.04	
334	EN14112	7.5		-0.29	
335		-----		-----	
336	EN15751	7.8		0.08	
337		-----		-----	
338		-----		-----	
343	EN15751	7.695		-0.05	
351		-----		-----	
370		-----		-----	
420	EN15751	7.36		-0.47	
445	EN14112	7.688		-0.06	
447		-----		-----	
496	EN14112	7.55		-0.23	
511		-----		-----	
540		-----		-----	
551	EN14112	4.62	R(0.01)	-3.89	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033	EN15751	8.00		0.33	
1059	EN14112	8.5		0.96	
1134	EN14112	7.1		-0.79	
1161	EN14112	8.1		0.46	
1167	EN14112	9.9	R(0.01)	2.71	
1199	EN14112	7.94		0.26	
1201	EN14112	7.9	C	0.21	First reported 21.8
1213		-----		-----	
1240	EN15751	8.01		0.34	
1286		-----		-----	
1299		-----		-----	
1389	EN14112	7.66		-0.09	
1397	EN14112	8.1		0.46	
1419	EN14112	7.0		-0.92	
1459	EN15751	8.15		0.52	
1468	EN14112	8.0		0.33	
1485	EN14112	7.81		0.09	
1510	EN14112	6.6		-1.42	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14112	7.1		-0.79	
1667		-----		-----	
1710	EN15751	8.3		0.71	
1739	EN14112	7.84		0.13	
1744		-----		-----	
1807		-----		-----	
1976	EN15751Conv.	7.7	C	-0.04	First reported 28.08
6007		-----		-----	

normality	OK		
n	31		
outliers	2		
mean (n)	7.735		
st.dev. (n)	0.4090		
R(calc.)	1.145		
R(EN14112:03)	2.241		Compare R(EN15751:14) = 1.845

Kernel Density
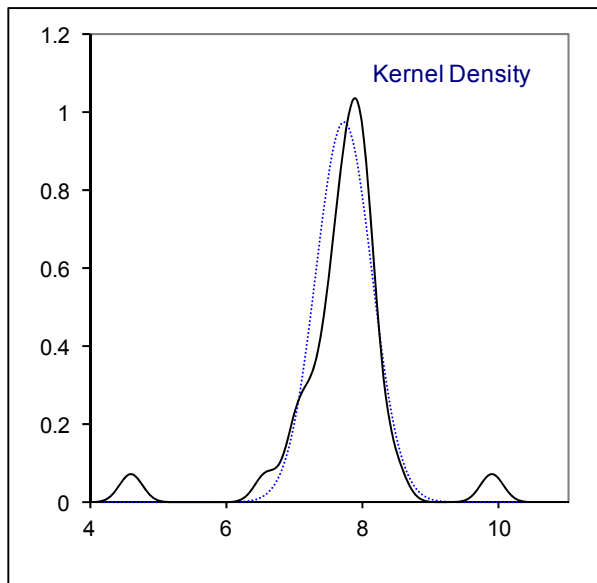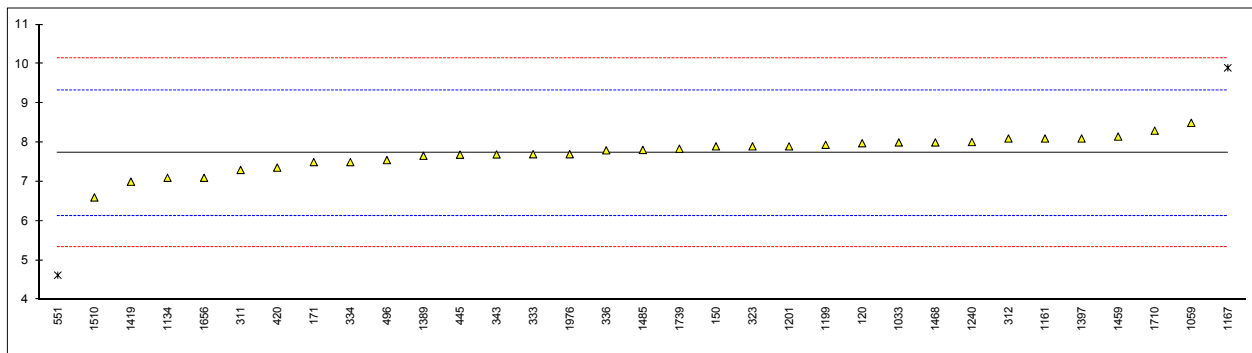
Determination of Sulphated Ash on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D874	<0.001		-----	
150	D874	<0.005		-----	
171	D874	<0.005		-----	
311	ISO3987	<0.001		-----	
312		-----		-----	
323	ISO3987	<0.001		-----	
333	ISO3987	<0.005		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	ISO3987	<0.005		-----	
351		-----		-----	
370	ISO3987	<0.001		-----	
420	ISO3987	<0.005		-----	
445	ISO3987	0.009	G(0.01)	-----	
447		-----		-----	
496	ISO3987	0.0005		-----	
511		-----		-----	
540	ISO3987	<0.005		-----	
551	ISO3987	0.004		-----	
558		-----		-----	
631	D874	0.0023		-----	
663		-----		-----	
1033		-----		-----	
1059	ISO3987	0.00028		-----	
1134	ISO3987	<0.01		-----	
1161	ISO3987	0.00137		-----	
1167		-----		-----	
1199		-----		-----	
1201	ISO3987	<0.005		-----	
1213	D874	<0.01		-----	
1240		-----		-----	
1286		-----		-----	
1299	ISO3987	<0.001		-----	
1389	ISO3987	0.001		-----	
1397		-----		-----	
1419		-----		-----	
1459		-----		-----	
1468	ISO3987	<0.005		-----	
1485		-----		-----	
1510		-----		-----	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	ISO3987	<0.01		-----	
1667		-----		-----	
1710	ISO3987	0.001		-----	
1739	ISO3987	0.0002		-----	
1744		-----		-----	
1807		-----		-----	
1976		-----		-----	
6007		-----		-----	

normality	n.a.	
n	21	
outliers	1	
mean (n)	<0.0050	
st.dev. (n)	n.a.	
R(calc.)	n.a.	
R(ISO3987:10)	n.a.	Application range: 0.005 – 0.100 %M/M

Kernel Density
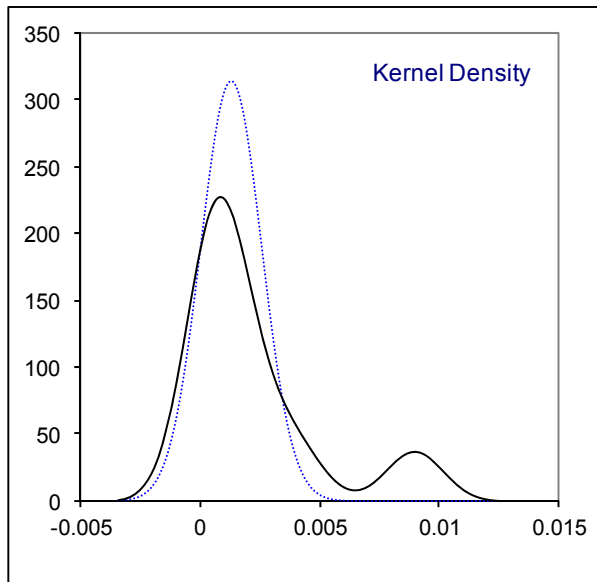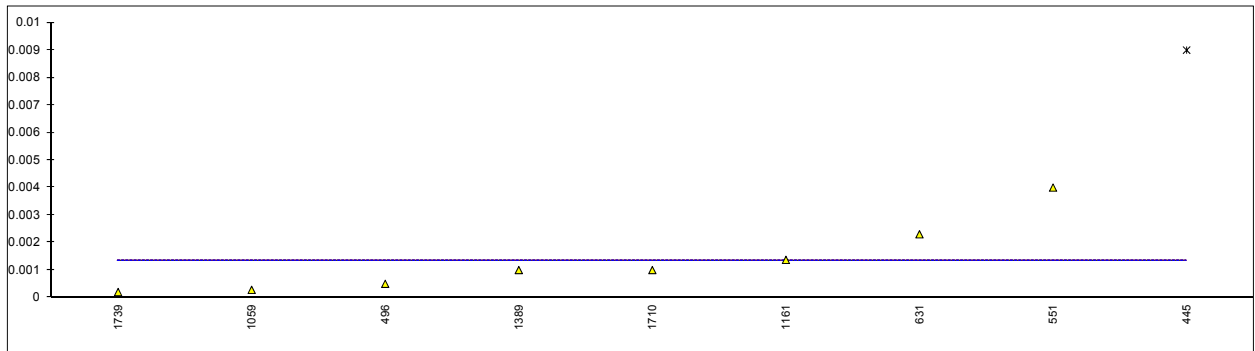
Determination of Sulphur conform EN spec. on sample #15185; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	ISO20846	3.0		-1.28	
150	D5453	3.6		-0.19	
171	D5453	3.3		-0.73	
311	ISO20846	3.8		0.18	
312	D5453	3.6		-0.19	
323	ISO20846	3.5		-0.37	
333	ISO20846	4.2		0.91	
334	ISO20846	3.0		-1.28	
335		-----		-----	
336	ISO20846	3.6		-0.19	
337	ISO20846	4.3		1.09	
338		-----		-----	
343	ISO20846	4.03		0.60	
351		-----		-----	
370	ISO20846	3.72		0.03	
420	ISO20846	3.8		0.18	
445		-----		-----	
447	D5453	3.851		0.27	
496	ISO20846	4.05		0.64	
511	D5453	3.935		0.43	
540	ISO20846	2.7	C	-1.83	First reported 5.4
551	ISO20846	3.43		-0.50	
558		-----		-----	
631	D5453	3.698		-0.01	
663		-----		-----	
1033		-----		-----	
1059	ISO20846	3.6		-0.19	
1134	IP490	3.95		0.45	
1161	ISO20846	4.09		0.71	
1167	ISO20846	3.7		0.00	
1199		-----		-----	
1201	D5453	3.9		0.36	
1213		-----		-----	
1240		-----		-----	
1286		-----		-----	
1299	ISO20846	<5		-----	
1389	ISO20846	3.884		0.33	
1397	ISO20846	3.1		-1.10	
1419	ISO20846	3.78		0.14	
1459	ISO8754	4.0		0.54	
1468	ISO20846	3.6		-0.19	
1485		-----		-----	
1510		-----		-----	
1543		-----		-----	
1546	ISO20846	3.445		-0.47	
1582		-----		-----	
1634		-----		-----	
1656	D5453	4.1		0.73	
1667		-----		-----	
1710	ISO20846	4.2		0.91	
1739		-----		-----	
1744		-----		-----	
1807		-----		-----	
1976		-----	W	-----	Result withdrawn reported 2.1
6007		-----		-----	

normality	OK	
n	32	
outliers	0	
mean (n)	3.702	
st.dev. (n)	0.3794	
R(calc.)	1.062	
R(ISO20846:11)	1.535	Application range: 3 – 500 mg/kg

Kernel Density
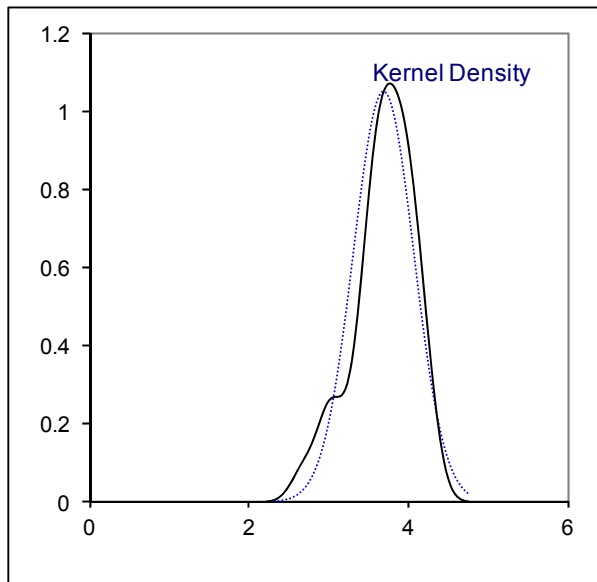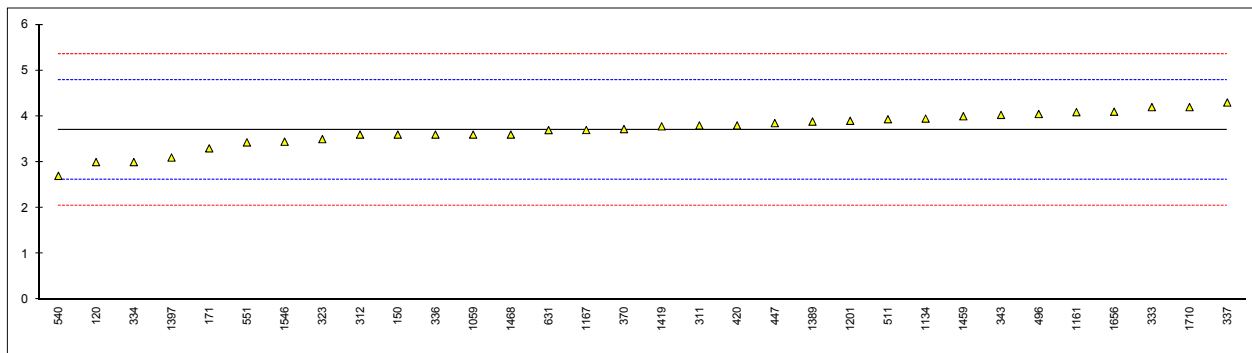
Determination of Water content by KF on sample #15185; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	ISO12937	313		1.41	
150	ISO12937	278		0.52	
171	ISO12937	285		0.70	
311	ISO12937	220		-0.95	
312	ISO12937	250		-0.19	
323	ISO12937	240		-0.44	
333		-----		-----	
334	ISO12937	260		0.06	
335	ISO12937	250		-0.19	
336	ISO12937	260		0.06	
337	ISO12937	241.9		-0.39	
338	ISO12937	168.99		-2.24	
343	ISO12937	288		0.77	
351	ISO12937	164		-2.37	
370	ISO12937	265		0.19	
420	ISO12937	263		0.14	
445	ISO12937	269		0.29	
447	IP438	238		-0.49	
496	ISO12937	322		1.64	
511		-----		-----	
540	ISO12937	240		-0.44	
551	ISO12937	247.8		-0.24	
558		-----		-----	
631	D6304	228.5		-0.73	
663	ISO12937	315.4		1.47	
1033	IP438	260.17		0.07	
1059	ISO12937	240		-0.44	
1134	ISO12937	242.26		-0.39	
1161	ISO12937	242	C	-0.39	First reported 0.0242 (unit error)
1167		-----		-----	
1199		-----		-----	
1201	ISO12937	240		-0.44	
1213	D6304	350		2.35	
1240	ISO12937	239.471		-0.46	
1286		-----		-----	
1299	ISO12937	280		0.57	
1389	ISO12937	245		-0.32	
1397	ISO12937	225		-0.82	
1419	ISO12937	235		-0.57	
1459	ISO12937	233		-0.62	
1468	ISO12937	240		-0.44	
1485	ISO12937	243.3		-0.36	
1510	IP438	254		-0.09	
1543		-----		-----	
1546	ISO12937	277.4		0.51	
1582		-----		-----	
1634	ISO12937	228.6		-0.73	
1656	E1064	310		1.33	
1667	ISO12937	298.7		1.05	
1710	ISO12937	267.5		0.25	
1739	ISO12937	230.0		-0.70	
1744	E203	255		-0.06	
1807		-----		-----	
1976	ISO12937	341.46		2.13	
6007		-----		-----	

	normality	suspect
	n	45
	outliers	0
	mean (n)	257.45
	st.dev. (n)	36.962
	R(calc.)	103.49
	R(ISO12937:00)	110.34

Kernel Density
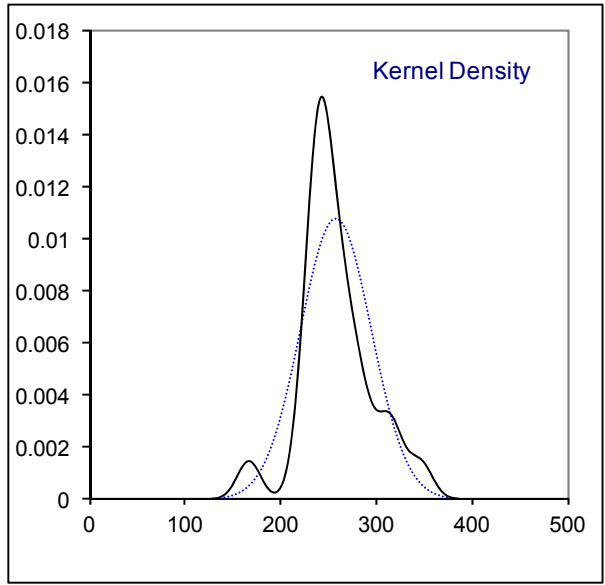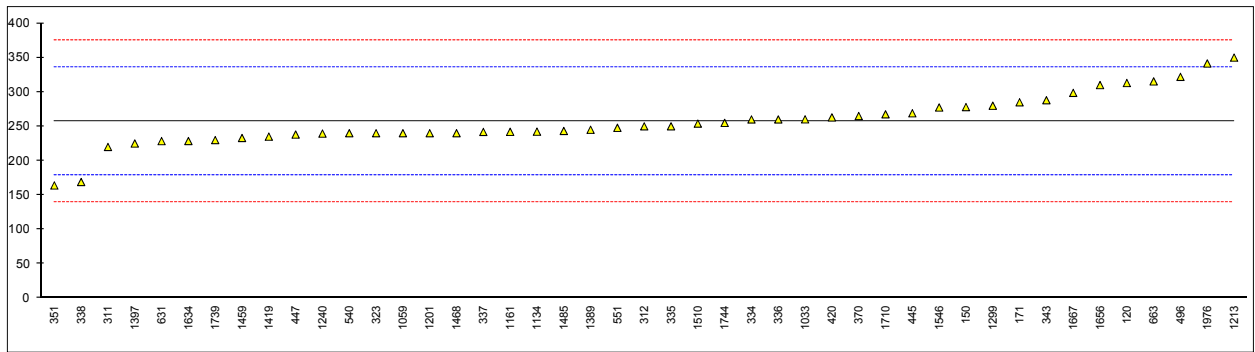
Determination of Methanol on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14110	0.022		-1.09	
150		-----		-----	
171	EN14110	0.03		1.51	
311	EN14110	0.03		1.51	
312	EN14110	0.024		-0.44	
323	EN14110	0.03		1.51	
333		-----		-----	
334	EN14110	0.02		-1.74	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14110	0.02		-1.74	
351		-----		-----	
370		-----		-----	
420	EN14110	0.021		-1.42	
445		-----		-----	
447		-----		-----	
496	EN14110	0.026		0.21	
511		-----		-----	
540	EN14110	0.03		1.51	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14110	0.02		-1.74	
1134	EN14110	0.024		-0.44	
1161	EN14110	0.0021	C,R(0.01)	-7.57	First reported 0.0026
1167	EN14110	0.023		-0.77	
1199		-----		-----	
1201	EN14110	0.03		1.51	
1213		-----		-----	
1240	EN14110	0.027		0.53	
1286	EN14110	0.03367		2.70	
1299	EN14110	0.030		1.51	
1389		-----		-----	
1397	EN14110	0.03		1.51	
1419		-----		-----	
1459		-----		-----	
1468	EN14110	0.022		-1.09	
1485	EN14110	0.026		0.21	
1510		-----		-----	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14110	0.02		-1.74	
1667		-----		-----	
1710	EN14110	0.02		-1.74	
1739	EN14110	0.024		-0.44	
1744	EN14110	0.026		0.21	
1807		-----		-----	
1976	EN14110	<0.01		<-5.00	False negative result?
6007		-----		-----	

normality	OK	
n	24	
outliers	1	
mean (n)	0.0254	
st.dev. (n)	0.00427	
R(calc.)	0.0120	
R(EN14110:03)	0.0086	
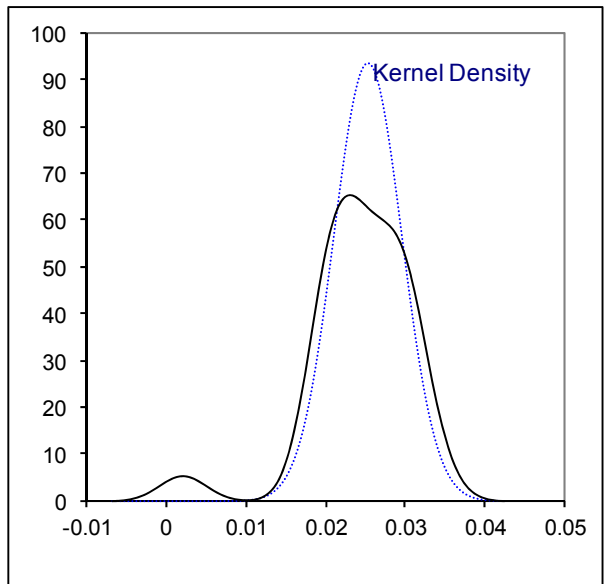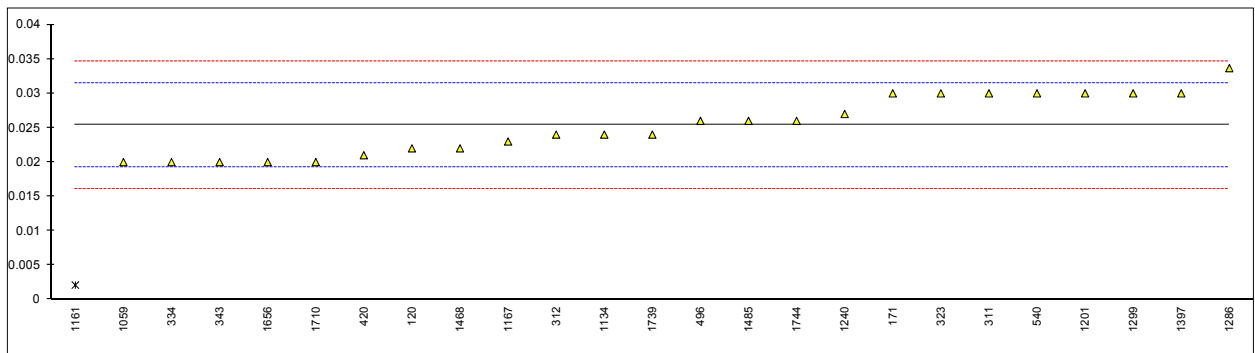
Determination of mono-Glycerides on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14105	0.46	C	-1.78	First reported 484.89 (unit error?)
311	EN14105	0.58		0.17	
312	EN14105	0.49		-1.29	
323	EN14105	0.55		-0.31	
333	EN14105	0.60		0.50	
334	EN14105	0.58		0.17	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.568		-0.02	
351		-----		-----	
370		-----		-----	
420	EN14105	0.56		-0.15	
445		-----		-----	
447		-----		-----	
496	EN14105	0.622		0.86	
511		-----		-----	
540	EN14105	0.61		0.66	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.66		1.48	
1134	EN14105	0.500		-1.13	
1161	EN14105	0.61		0.66	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.56	C	-0.15	First reported 0.36
1213	D6584	0.576		0.11	
1240	EN14105	0.566		-0.05	
1286		-----		-----	
1299	EN14105	0.54		-0.48	
1389	EN14105	0.596		0.44	
1397	EN14105	0.67		1.64	
1419	EN14105	0.64		1.15	
1459		-----		-----	
1468	EN14105	0.64		1.15	
1485	EN14105	0.587		0.29	
1510	EN14105	0.55		-0.31	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14105	0.49		-1.29	
1667		-----		-----	
1710	EN14105	0.49		-1.29	
1739	EN14105	0.5829		0.22	
1744	D6584	0.5922		0.37	
1807		-----		-----	
1976	EN14105	0.47		-1.62	
6007		-----		-----	

normality	OK	
n	28	
outliers	0	
mean (n)	0.5693	
st.dev. (n)	0.05600	
R(calc.)	0.1568	
R(EN14105:11)	0.1717	

Kernel Density
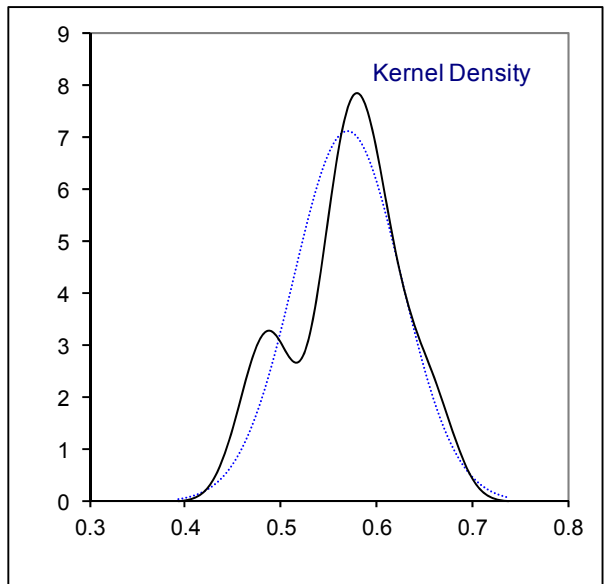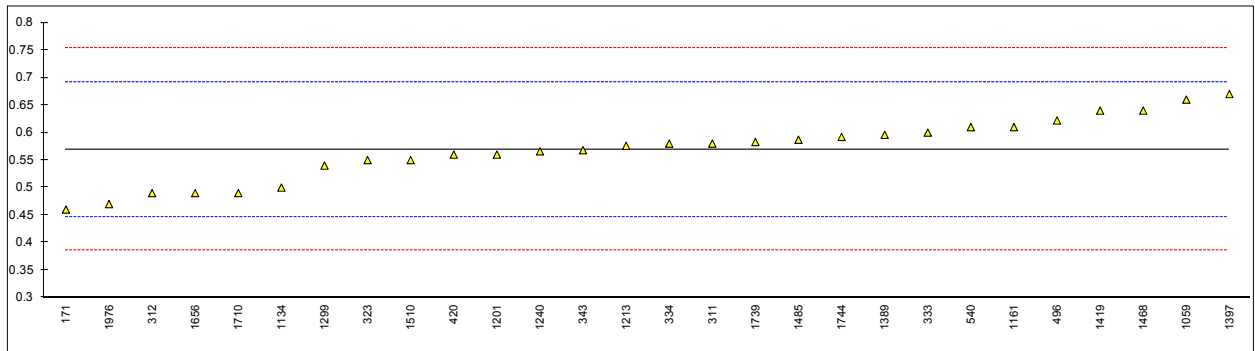
Determination of di-Glycerides on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14105	0.11	C	-0.35	First reported 114.66 (unit error?)
311	EN14105	0.13		0.75	
312	EN14105	<0.10		-----	
323	EN14105	0.11		-0.35	
333	EN14105	0.12	C	0.20	First reported 0.18
334	EN14105	0.12		0.20	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.115		-0.08	
351		-----		-----	
370		-----		-----	
420	EN14105	0.13		0.75	
445		-----		-----	
447		-----		-----	
496	EN14105	0.132		0.86	
511		-----		-----	
540	EN14105	0.11		-0.35	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.08		-2.00	
1134	EN14105	0.092		-1.34	
1161	EN14105	0.12		0.20	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.09		-1.45	
1213	D6584	0.146		1.63	
1240	EN14105	0.125		0.48	
1286		-----		-----	
1299	EN14105	0.13		0.75	
1389	EN14105	0.112		-0.24	
1397	EN14105	0.08		-2.00	
1419	EN14105	0.14		1.30	
1459		-----		-----	
1468	EN14105	0.12		0.20	
1485	EN14105	0.113		-0.19	
1510	EN14105	0.12		0.20	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14105	0.09		-1.45	
1667		-----		-----	
1710	EN14105	0.13		0.75	
1739	EN14105	0.1192		0.16	
1744	D6584	0.1376		1.17	
1807		-----		-----	
1976	EN14105	0.12		0.20	
6007		-----		-----	

normality	OK
n	27
outliers	0
mean (n)	0.1164
st.dev. (n)	0.01734
R(calc.)	0.0486
R(EN14105:11)	0.0508

Kernel Density
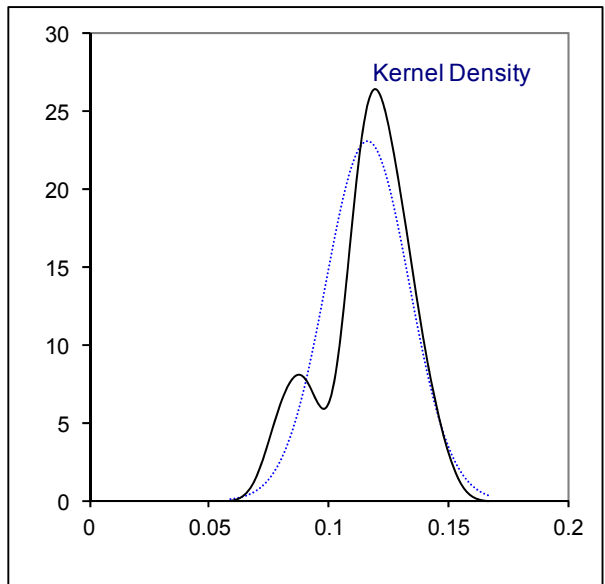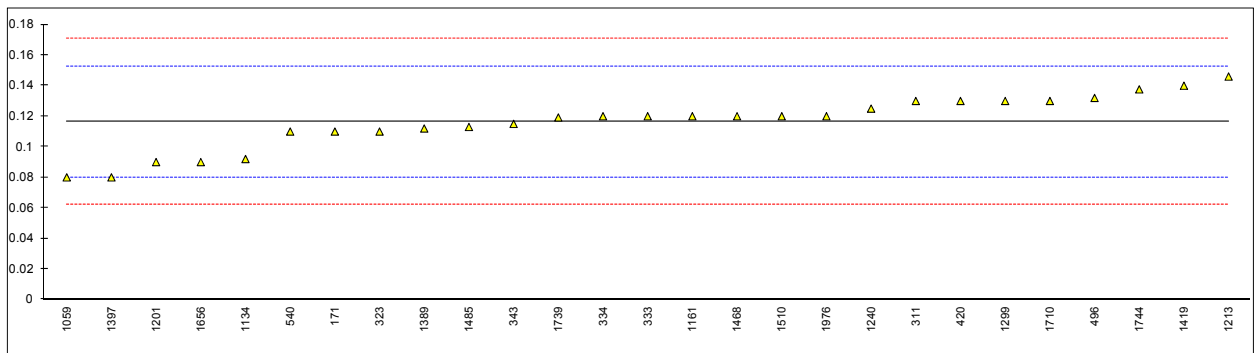
Determination of tri-Glyceriden on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14105	<0.10	C	-----	First reported 65.65 (unit error?)
311	EN14105	0.07		-0.29	
312	EN14105	<0.10		-----	
323	EN14105	0.08		0.07	
333	EN14105	0.08		0.07	
334	EN14105	0.06		-0.65	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.068		-0.36	
351		-----		-----	
370		-----		-----	
420	EN14105	0.08		0.07	
445		-----		-----	
447		-----		-----	
496	EN14105	0.071		-0.25	
511		-----		-----	
540	EN14105	<0.10		-----	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.10		0.80	
1134	EN14105	0.056		-0.80	
1161	EN14105	0.077		-0.03	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.08		0.07	
1213	D6584	0.125		1.72	
1240	EN14105	0.086		0.29	
1286		-----		-----	
1299	EN14105	0.075		-0.11	
1389	EN14105	0.054		-0.87	
1397	EN14105	<0.01		-----	
1419	EN14105	0.08		0.07	
1459		-----		-----	
1468	EN14105	0.08		0.07	
1485	EN14105	0.067		-0.40	
1510	EN14105	0.03		-1.75	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14105	0.07		-0.29	
1667		-----		-----	
1710	EN14105	0.11		1.17	
1739	EN14105	0.0740		-0.14	
1744	D6584	0.1200		1.53	
1807		-----		-----	
1976	EN14105	<0.10		-----	
6007		-----		-----	

normality	suspect	
n	23	
outliers	0	
mean (n)	0.0780	
st.dev. (n)	0.02098	
R(calc.)	0.0587	
R(EN14105:11)	0.0768	

Kernel Density
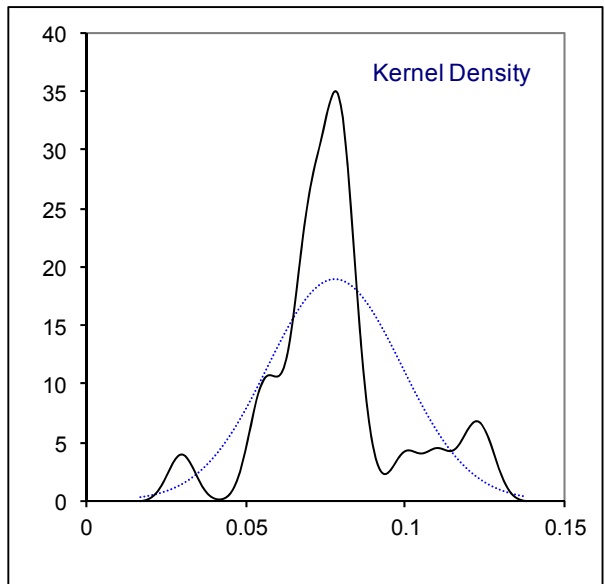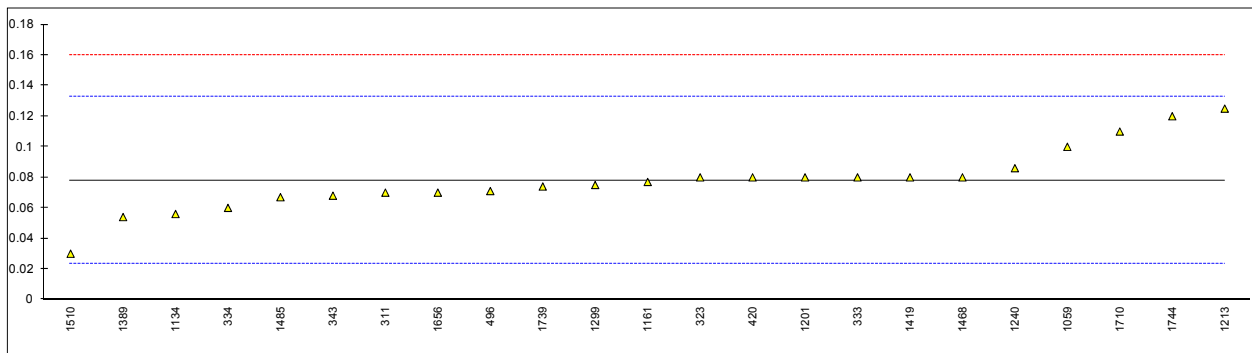
Determination of Free Glycerol on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14105	<0.001		-----	
311	EN14105	0.001		-0.08	
312	EN14105	0.001		-0.08	
323	EN14105	0.004	C,DG(0.05)	1.25	First reported 0.01
333	EN14105	0.00		-0.53	
334	EN14105	0	ex	-0.53	Result exclude, zero is not a real result
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	<0.001	C	-----	First reported 0.009
351		-----		-----	
370		-----		-----	
420	EN14105	<0.005		-----	
445		-----		-----	
447		-----		-----	
496	EN14105	0.0011		-0.04	
511		-----		-----	
540	EN14105	<0.005		-----	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.004	DG(0.05)	1.25	
1134	EN14105	0.0018		0.27	
1161	EN14105	0.002		0.36	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	<0.001		-----	
1213	D6584	<0.001		-----	
1240	EN14105	0.002		0.36	
1286		-----		-----	
1299	EN14105	0.001		-0.08	
1389	EN14105	0.001		-0.08	
1397	EN14105	<0.005		-----	
1419	EN14105	0.001		-0.08	
1459		-----		-----	
1468	EN14105	<0.005		-----	
1485	EN14105	<0.0005		-----	
1510	EN14105	0.002	C	0.36	First reported 0.02
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14105	<0.01		-----	
1667		-----		-----	
1710	EN14105	0.00		-0.53	
1739	EN14105	0.0013		0.05	
1744	D6584	0.0014		0.09	
1807		-----		-----	
1976	EN14105	<0.005		-----	
6007		-----		-----	

normality	OK	
n	14	
outliers	2 (+ 1excl)	
mean (n)	0.0012	
st.dev. (n)	0.00065	
R(calc.)	0.0018	
R(EN14105:11)	0.0063	

Kernel Density
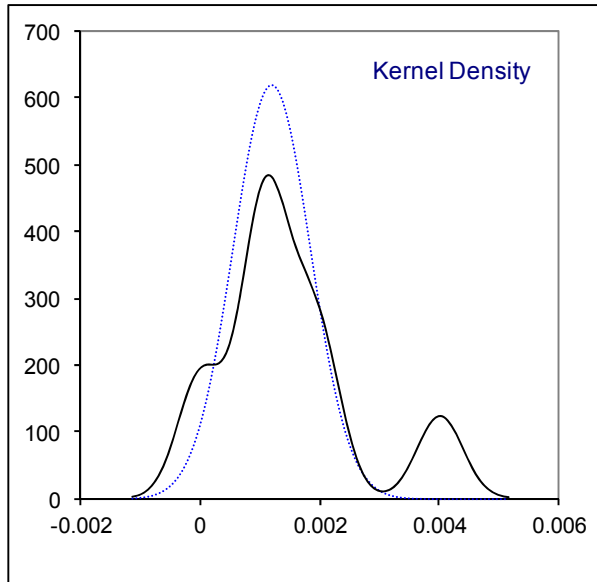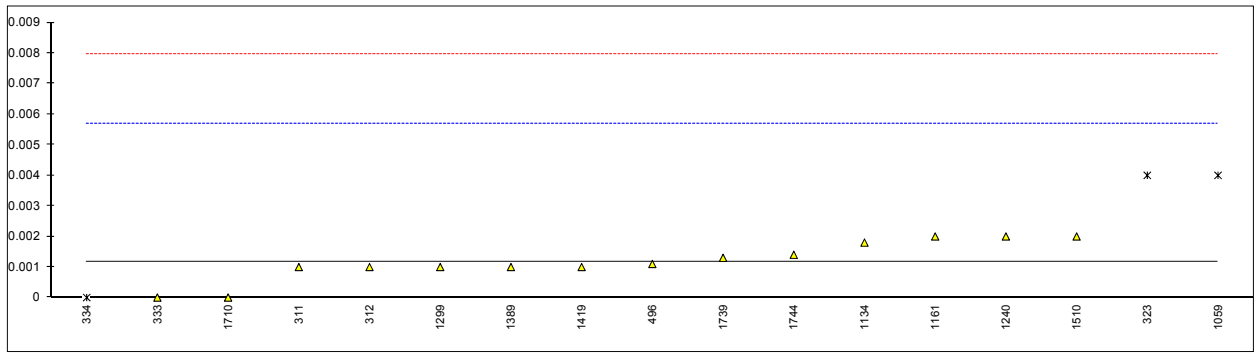
Determination of Total Glycerol on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN14105	0.140	C	-2.08	First reported 147.15 (unit error?)
311	EN14105	0.176		0.19	
312	EN14105	0.143		-1.89	
323	EN14105	0.17		-0.19	
333	EN14105	0.186		0.82	
334	EN14105	0.172		-0.06	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14105	0.178		0.32	
351		-----		-----	
370		-----		-----	
420	EN14105	0.169		-0.25	
445		-----		-----	
447		-----		-----	
496	EN14105	0.1853		0.78	
511		-----		-----	
540	EN14105	0.17		-0.19	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN14105	0.196		1.45	
1134	EN14105	0.1485		-1.54	
1161	EN14105	0.183		0.63	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.166		-0.44	
1213	D6584	0.184		0.69	
1240	EN14105	0.173		0.00	
1286		-----		-----	
1299	EN14105	0.16		-0.82	
1389	EN14105	0.180		0.44	
1397	EN14105	0.183		0.63	
1419	EN14105	0.192		1.20	
1459		-----		-----	
1468	EN14105	0.19		1.07	
1485	EN14105	0.1731		0.01	
1510	EN14105	0.18		0.44	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14105	0.15		-1.45	
1667		-----		-----	
1710	EN14105	0.16		-0.82	
1739	EN14105	0.1749		0.12	
1744	D6584	0.1878		0.93	
1807		-----		-----	
1976	EN14105	<0.05		<-7.76	False negative result?
6007		-----		-----	

normality	OK	
n	27	
outliers	0	
mean (n)	0.1730	
st.dev. (n)	0.01483	
R(calc.)	0.0415	
R(EN14105:11)	0.0444	

Kernel Density
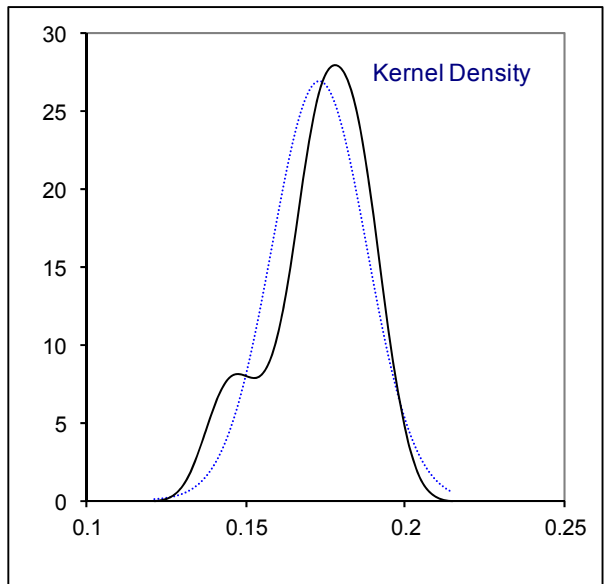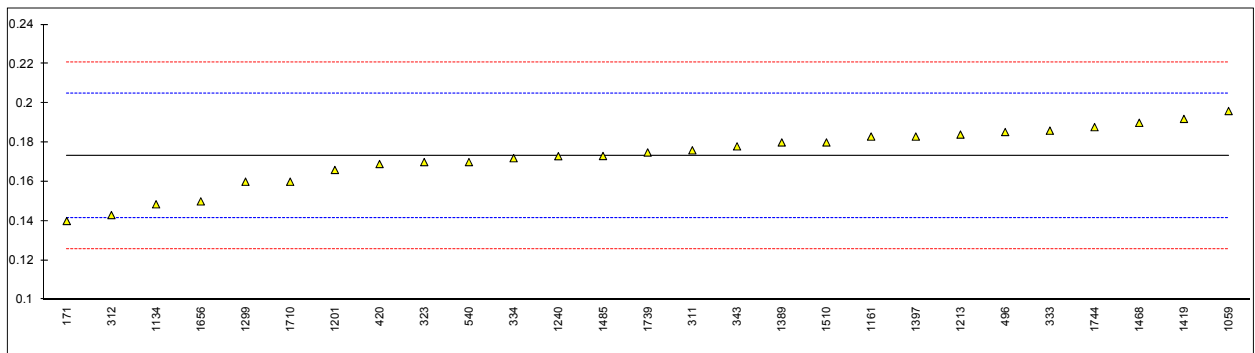
Determination of Total Ester content on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14103	98.9		0.44	
150		-----		-----	
171	EN14103	97.0		-0.84	
311	EN14103	97.7		-0.37	
312	EN14103	99.81		1.05	
323	EN14103	99.2		0.64	
333	EN14103	97.2		-0.70	
334	EN14103	97.1		-0.77	
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14103	98.1		-0.10	
351		-----		-----	
370		-----		-----	
420	EN14103	99.1		0.58	
445		-----		-----	
447		-----		-----	
496	EN14103	99.39		0.77	
511	EN14103	96.34		-1.28	
540	EN14103	98.2		-0.03	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663	EN14103	97.9		-0.23	
1033		-----		-----	
1059	EN14103	100.0		1.18	
1134	EN14103	97.6		-0.43	
1161	EN14103	98.02		-0.15	
1167	EN14103	99.07		0.56	
1199		-----		-----	
1201		-----		-----	
1213	EN14103	97.04		-0.81	
1240	EN14103	98.624		0.25	
1286		-----		-----	
1299	EN14103	98.5		0.17	
1389	EN14103	98.73		0.33	
1397	EN14103	98.9		0.44	
1419	EN14103	97.87		-0.25	
1459	EN14103	95.8		-1.65	
1468	EN14103	98.0		-0.17	
1485	EN14103	98.19		-0.04	
1510	EN14103	98.8		0.37	
1543		-----		-----	
1546	EN14078	98.2		-0.03	
1582		-----		-----	
1634		-----		-----	
1656	EN14103	>99		-----	
1667		-----		-----	
1710		-----		-----	
1739	EN14103	98.68		0.29	
1744	EN14103	99.14		0.60	
1807		-----		-----	
1976	EN14103	98.50		0.17	
6007		-----		-----	

|		
normality	OK	
n	31	
outliers	0	
mean (n)	98.245	
st.dev. (n)	0.9653	
R(calc.)	2.703	
R(EN14103:11)	4.160	

Kernel Density
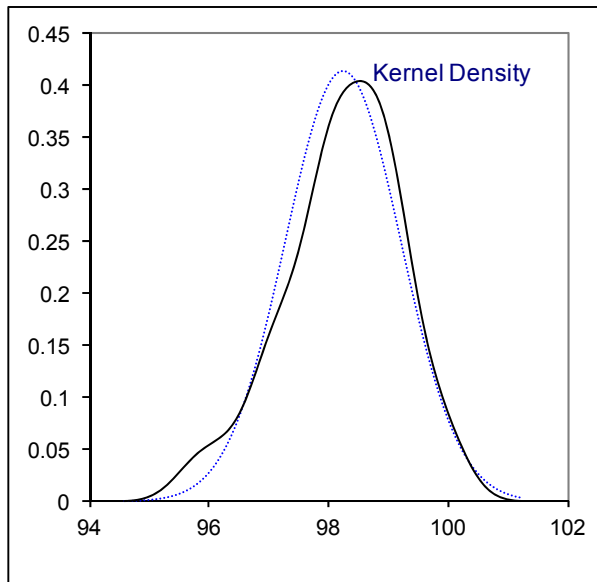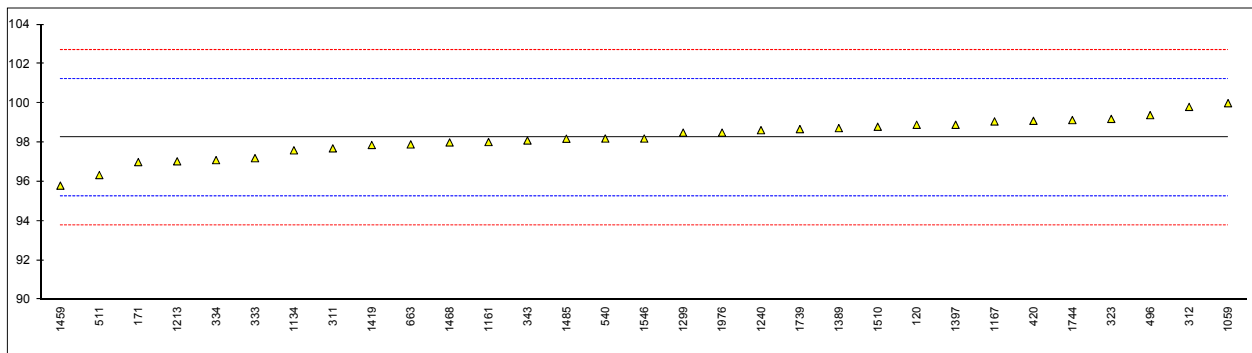
Determination of Linolenic Acid Methyl Ester content on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	EN14103	8.89		-0.08	
150		-----		-----	
171	EN14103	8.7		-0.91	
311	EN14103	8.7		-0.91	
312	EN14103	8.93		0.10	
323	EN14103	9.12		0.93	
333	EN14103	8.7		-0.91	
334	EN14103	8.7	C	-0.91	First reported 7.1
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN14103	9		0.40	
351		-----		-----	
370		-----		-----	
420	EN14103	8.85		-0.25	
445		-----		-----	
447		-----		-----	
496	EN14103	9.21		1.32	
511	EN14103	8.42		-2.13	
540	EN14103	9.1		0.84	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663	EN14103	8.8		-0.47	
1033		-----		-----	
1059	EN14103	9.2		1.28	
1134	EN14103	8.6		-1.34	
1161	EN14103	9.07		0.71	
1167	EN14103	8.964		0.25	
1199		-----		-----	
1201		-----		-----	
1213	EN14103	8.83		-0.34	
1240	EN14103	9.052		0.63	
1286		-----		-----	
1299	EN14103	8.9		-0.03	
1389	EN14103	8.97		0.27	
1397	EN14103	8.7		-0.91	
1419	EN14103	8.84		-0.29	
1459	EN14103	9.8	R(0.01)	3.90	
1468	EN14103	9.1		0.84	
1485	EN14103	8.85		-0.25	
1510	EN14103	8.8		-0.47	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656	EN14103	8.98		0.32	
1667		-----		-----	
1710		-----		-----	
1739	EN14103	8.88		-0.12	
1744		-----		-----	
1807		-----		-----	
1976	EN14103	9.46		2.41	
6007		-----		-----	

normality	OK
n	29
outliers	1
mean (n)	8.907
st.dev. (n)	0.2121
R(calc.)	0.594
R(EN14103:11)	0.641

Kernel Density
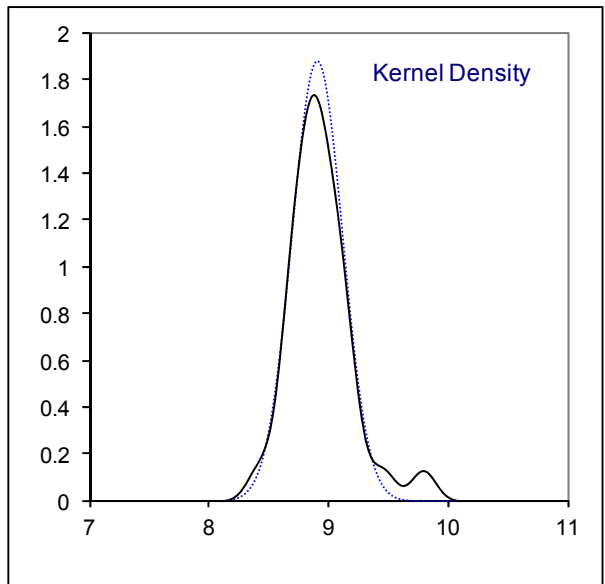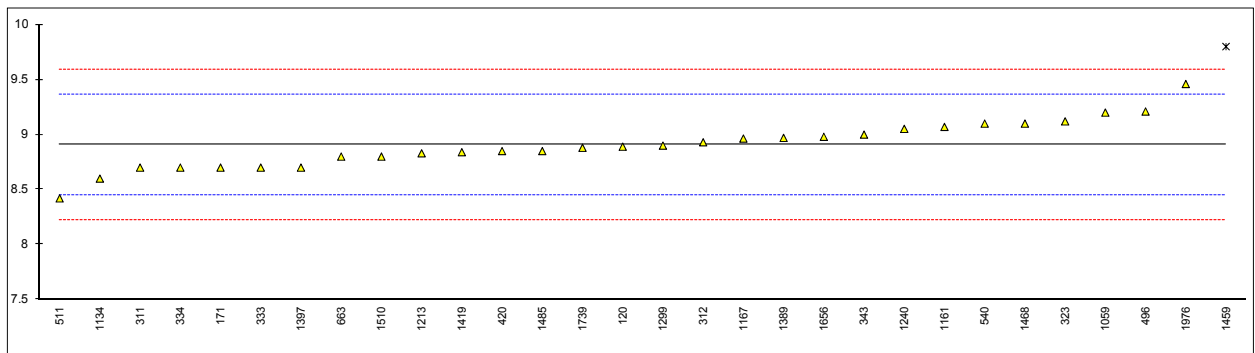
Determination of Polyunsaturated Methyl Esters content on sample #15185; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
150		-----		-----	
171	EN15779	<0.30		-----	
311		-----		-----	
312	EN15779	<0.6		-----	
323	EN15779	<0.6		-----	
333	EN15779	<0.6		-----	
334	EN15779	0.56	C,G(0.01)	-----	First reported 0.76
335		-----		-----	
336		-----		-----	
337		-----		-----	
338		-----		-----	
343	EN15779	<0.30		-----	
351		-----		-----	
370		-----		-----	
420	EN15779	<0.05		-----	
445		-----		-----	
447		-----		-----	
496	EN15779	<0.1		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
631		-----		-----	
663		-----		-----	
1033		-----		-----	
1059	EN15779	0.16		-----	
1134	EN14103	0.08		-----	
1161	EN15779	0.25		-----	
1167	EN15779	0.180		-----	
1199		-----		-----	
1201		-----		-----	
1213		-----		-----	
1240		-----		-----	
1286		-----		-----	
1299	EN15779	0.09		-----	
1389	EN15779	0.24	C	-----	First reported 0.54
1397		-----		-----	
1419		-----		-----	
1459		-----		-----	
1468	EN15779	0.10		-----	
1485		-----		-----	
1510		-----		-----	
1543		-----		-----	
1546		-----		-----	
1582		-----		-----	
1634		-----		-----	
1656		-----		-----	
1667		-----		-----	
1710		-----		-----	
1739	EN15779	0.039		-----	
1744		-----		-----	
1807		-----		-----	
1976	EN15779	0.09		-----	
6007		-----		-----	
	normality	OK			
	n	9			
	outliers	1			
	mean (n)	0.137			
	st.dev. (n)	0.0745			
	R(calc.)	0.209			
	R(EN15779:09)	(0.270)			Application range: 0.6 – 1.5 %M/M

Kernel Density
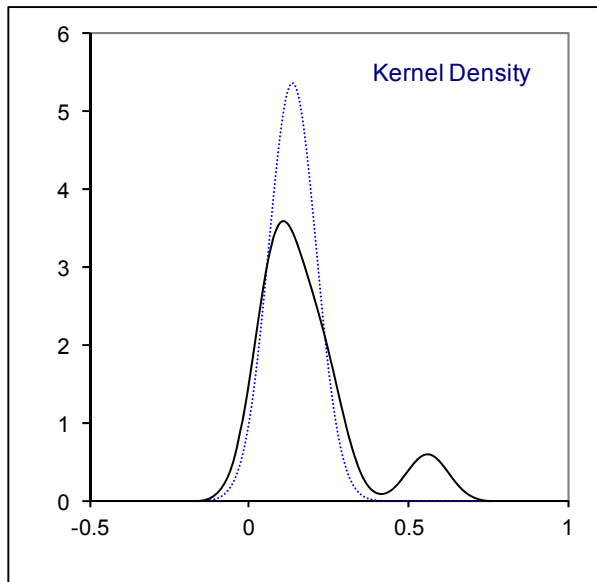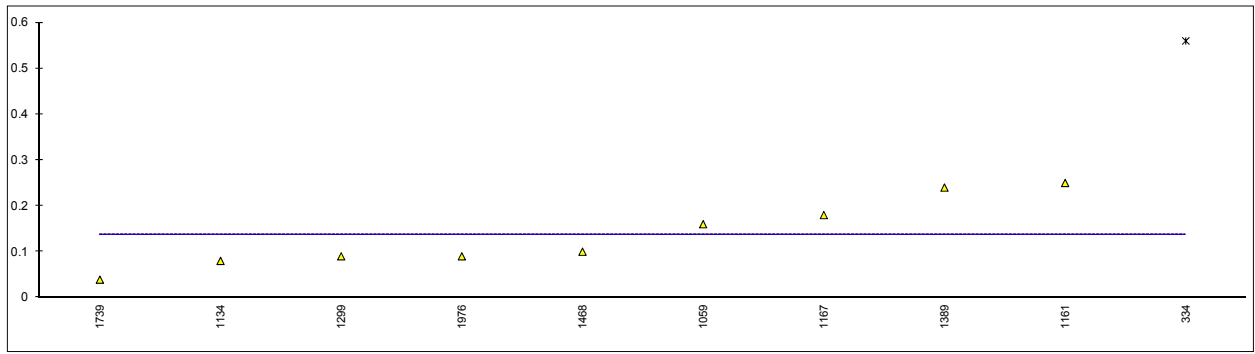
Determination of sum of Calcium and Magnesium on sample #15186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14538	9.7		-0.86	
150	EN14538	10.8		0.26	
171	EN14538	12.728		2.22	
311	EN14538	11.0		0.46	
312	EN14538	10.6		0.06	
323	EN14538	9.5		-1.06	
333	EN14538	9.2		-1.36	
340	EN14538	10.4		-0.15	
343	EN14538	10.3		-0.25	
445	EN14538	9.89		-0.66	
447		-----		-----	
496	EN14538	11.45		0.92	
540	EN14538	10.1		-0.45	
551	UOP389	9.65		-0.91	
663		-----		-----	
1134	EN14538	<2		<-8.68	False negative result?
1161	EN14538	12.21		1.69	
1201	EN14538	5.2	C,R(0.01)	-5.43	First reported 4.5
1240	EN14538	10.55		0.01	
1268		-----		-----	
1299	EN14538	9.2		-1.36	
1389		-----		-----	
1443		-----		-----	
1468	EN14538	11.14		0.61	
1510		-----		-----	
1656	EN14538	11.3		0.77	
1739	EN14538	10.77		0.23	
1995	IP501	10.37		-0.18	

|			
normality	OK		
n	20		
outliers	1		
mean (n)	10.543		
st.dev. (n)	0.9339		
R(calc.)	2.615		
R(EN14538:06)	2.757		Application range: 1 – 10 mg/kg
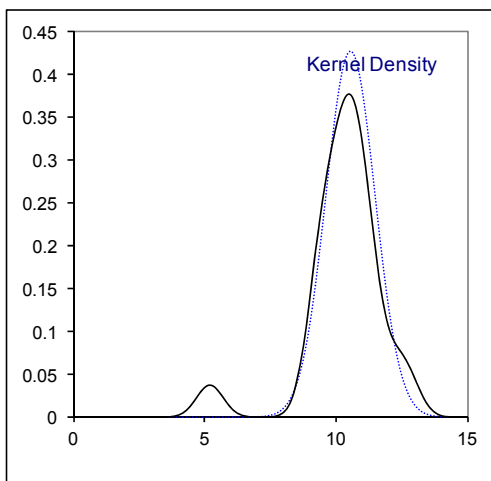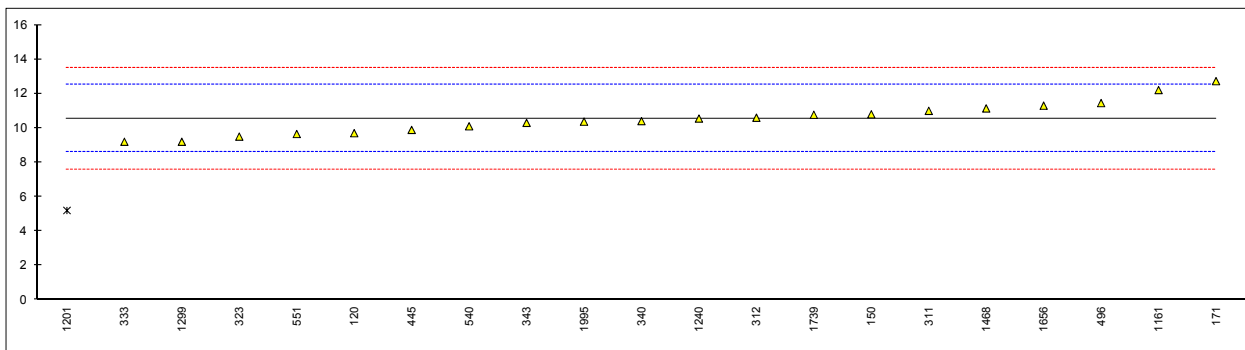
Determination of Phosphorus on sample #15186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14107	6.9		-0.19	
150		-----		-----	
171	D4951	<0.1		<-14.11	False negative result?
311	EN14107	7.2		0.42	
312	EN14107	7.8		1.65	
323	EN14107	7.7		1.45	
333		-----		-----	
340		-----		-----	
343	EN14107	5.65		-2.75	
445	EN14107	6.82		-0.35	
447		-----		-----	
496	EN14107	7.69		1.43	
540	EN14107	7.3		0.63	
551	UOP389	6.30		-1.42	
663		-----		-----	
1134	EN14107	<4		<-6.13	False negative result?
1161	EN14107	6.8		-0.40	
1201	EN14107	6.3		-1.42	
1240	EN16294	8.22		2.51	
1268		-----		-----	
1299	EN14107	5.3		-3.47	
1389		-----	W	-----	Result withdrawn, reported 2.0
1443	EN14107	11.60	C,DG(0.01)	9.43	First reported 13.66
1468	EN14107	7.8		1.65	
1510		-----		-----	
1656	EN14107	10.9	C,DG(0.01)	8.00	First reported 10.0
1739	EN14107	7.46		0.96	
1995	IP501	6.652		-0.70	

	normality	OK			
	n	16			
	outliers	2	Spike		
	mean (n)	6.993	7.11		Recovery <98%
	st.dev. (n)	0.8153			
	R(calc.)	2.283			
	R(EN14107:03)	1.368			Application range: 4 – 20 mg/kg

Kernel Density
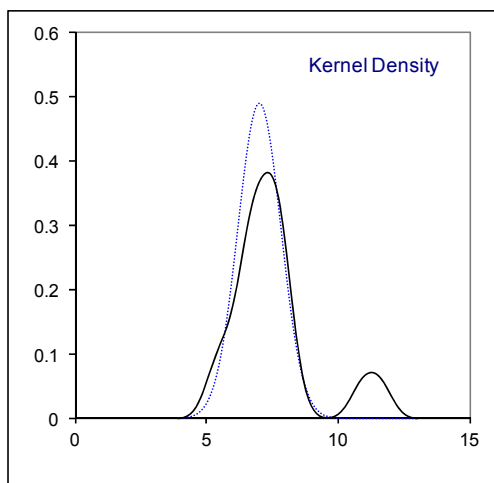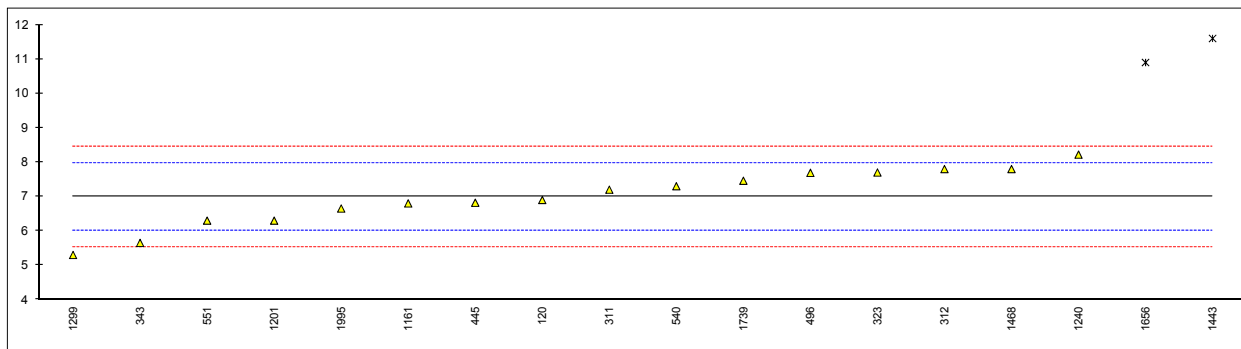
Determination of Potassium on sample #15186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14109	1.0		0.57	
150	EN14109	<1.0		-----	
171	EN14538	<0.1		-----	
311	EN14538	<1.0		-----	
312	EN14109	<0.5		-----	
323	EN14109	<0.5		-----	
333	EN14538	<1.0		-----	
340	EN14538	<1.0		-----	
343	EN14538	<1		-----	
445	EN14109	0.06		-0.65	
447		-----		-----	
496	EN14538	0.01		-0.72	
540		-----		-----	
551	UOP389	1.41		1.10	
663		-----		-----	
1134	EN14109	<1		-----	
1161	EN14109	0.328		-0.30	
1201	EN14538	1.0		0.57	
1240	EN14538	<1		-----	
1268		-----		-----	
1299	EN14538	0.6		0.05	
1389		-----		-----	
1443		-----		-----	
1468	EN14538	<0.5		-----	
1510		-----		-----	
1656	EN14109	<1		-----	
1739	EN14538	0.09		-0.61	
1995		-----		-----	

normality	unknown	
n	8	
outliers	0	
mean (n)	0.562	
st.dev. (n)	0.5262	
R(calc.)	1.473	
R(EN14214:12)	2.151	Application range ≥0.5mg/kg

Kernel Density
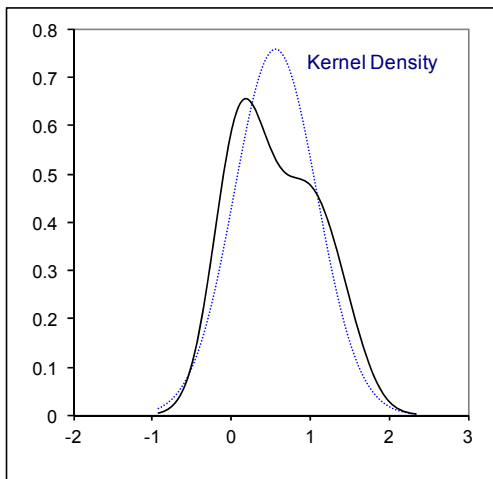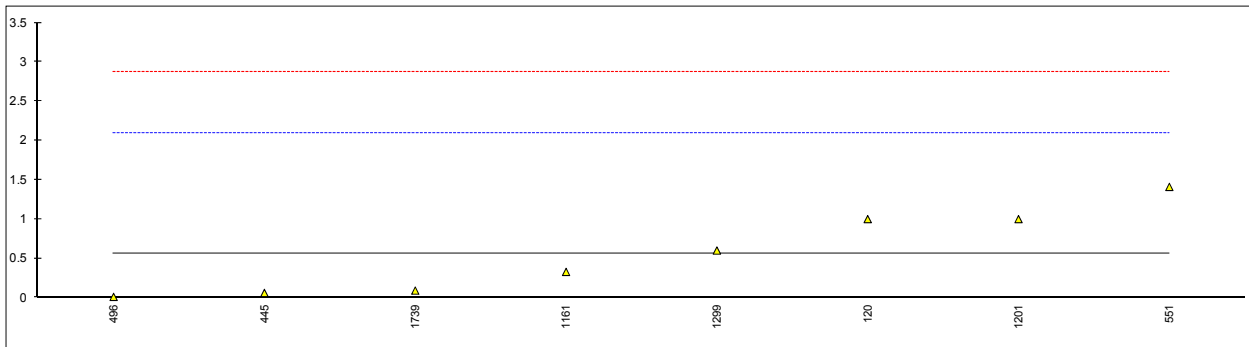
Determination of Sodium on sample #15186; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	EN14108	6.0		0.28	
150	EN14108	6.9		0.96	
171	EN14538	6.89		0.95	
311	EN14538	6.7		0.81	
312	EN14108	6.5		0.66	
323	EN14108	5.6		-0.03	
333	EN14538	4.0		-1.24	
340	EN14538	5.1		-0.40	
343	EN14538	6		0.28	
445	EN14108	4.68		-0.72	
447		-----		-----	
496	EN14538	7.35		1.30	
540		-----		-----	
551	UOP389	5.07		-0.43	
663		-----		-----	
1134	EN14108	<1		<-3.51	False negative result?
1161	EN14108	4.35		-0.97	
1201	EN14538	3.5		-1.62	
1240	EN14538	4.92		-0.54	
1268		-----		-----	
1299	EN14538	4.1		-1.16	
1389		-----		-----	
1443		-----		-----	
1468	EN14538	5.9		0.20	
1510		-----		-----	
1656	EN14108	6.9		0.96	
1739	EN14538	6.41		0.59	
1995	IP501	5.820		0.14	
	normality	OK			
	n	20			
	outliers	0	Spike		
	mean (n)	5.634	7.01		Recovery <80%
	st.dev. (n)	1.1201			
	R(calc.)	3.136			
	R(EN14214:12)	3.699			Application range ≥1 mg/kg
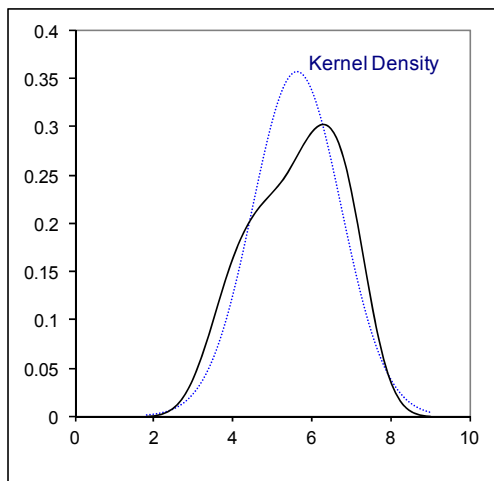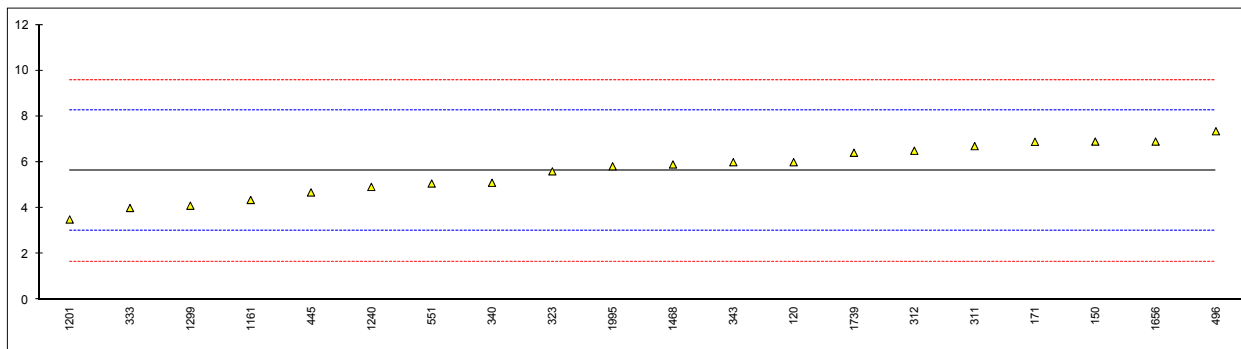
Determination of Sum of Potassium and Sodium on sample #15186; results in mg/kg

lab	method	value	mark	z(targ)	Value calc by iis	remarks
120	EN14538	7.0		1.47	7.0	
150	EN14538	6.9		1.33	6.9	
171	EN14538	6.89		1.32	6.9	
311		-----		-----	6.7	
312	EN14538	6.5		0.79	6.5	
323	EN14538	5.5		-0.56	5.6	
333	EN14538	4.0		-2.59	4.0	
340	EN14538	5.1		-1.10	5.1	
343	EN14538	6		0.12	6.0	
445	EN14538	4.74		-1.59	4.7	
447		-----		-----	-----	
496	EN14538	7.35		1.94	7.4	
540	EN14538	5.5		-0.56	5.5	
551	UOP389	6.48		0.77	6.5	
663		-----		-----	-----	
1134	EN14538	<2		<-5.29	<2	False negative result?
1161	EN14538	5.65581	E	-0.35	4.7	Calculation error made?
1201	EN14538	4.5		-1.91	4.5	
1240	EN14538	6.23	E	0.43	4.9	Calculation error made?
1268		-----		-----	-----	
1299	EN14538	4.7		-1.64	4.7	
1389		-----		-----	-----	
1443		-----		-----	-----	
1468	EN14538	5.9		-0.02	5.9	
1510		-----		-----	-----	
1656		6.9		1.33	6.9	
1739	EN14538	6.50		0.79	6.5	
1995		-----		-----	5.8	
	normality	OK			OK	
	n	19			21	
	outliers	0			0	
	mean (n)	5.913			5.843	
	st.dev. (n)	0.9672			0.9978	
	R(calc.)	2.708			2.794	
	R(EN14214:12)	2.070			2.057	

Kernel Density
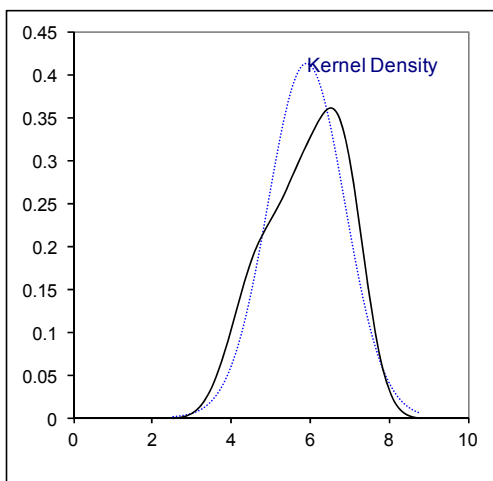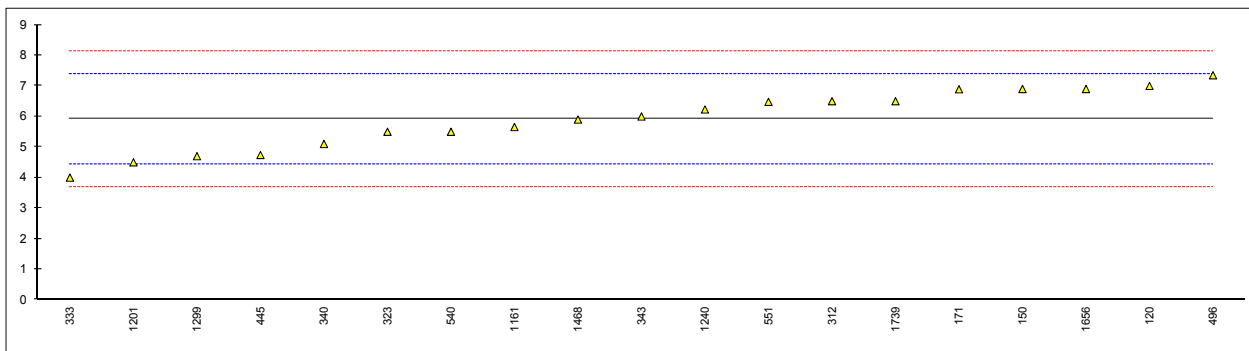
Determination of Total Contamination on sample #15187; results in mg/kg

lab	method	value	mark	z(targ)	Volume	remarks
120	EN12662:2014	18.0		-1.47	500	
150	EN12662:2014	13.45		-3.11	300	
171		-----		-----	-----	
311	EN12662:2014	22.2		0.05	305	
312	EN12662:2014	27.5		1.97	300	
323	EN12662:1998	23		0.34	340	
334	EN12662:2014	29.5		2.69	290	
335	EN12662:2014	17.5		-1.65	293	
337	EN12662:2014	26.0		1.43	300	
343	EN12662:1998	15.65		-2.32	300	
351	EN12662:1998	23.8		0.63	300	
420	EN12662:1998	25.6		1.28	306	
445	EN12662:2014	23.60		0.56	900	
447		-----		-----	-----	
496	EN12662:1998	22.7		0.23	400	
540	EN12662:1998	22.0		-0.02	400	
551		-----		-----	-----	
663		-----		-----	-----	
1033	IP440	11.2		-3.93	385.1	
1059	EN12662:1998	25.0		1.07	294.42	
1134	EN12662:2008	4.8	R(0.05)	-6.24	-----	
1161	EN12662:2014	17.7		-1.58	300	
1201	EN12662:1998	31.6		3.45	300	
1240	EN12662:2008	28.2		2.22	800	
1299	EN12662:2008	20.2		-0.67	800	
1389	EN12662:1998	17.8		-1.54	-----	
1397		-----		-----	-----	
1419	EN12662:2014	23.5		0.52	300	
1468		-----		-----	-----	
1485	EN12662:1998	23.44		0.50	400.0	
1510	EN12662:1998	25.5		1.25	-----	
1582		-----		-----	-----	
1710	EN12662:2008	23.2		0.41	800	
1739	EN12662:1998	17.71		-1.57	250	
1744	EN12662:2014	19.92		-0.77	300	

					Only 2014	Only 2008	Only 1998
normality	OK				OK	not OK	OK
n	27				11	4	12
outliers	1	Spike			0	1	0
mean (n)	22.05	12.70		Recovery <174%	21.72	20.70	22.82
st.dev. (n)	4.839				4.885	7.141	4.280
R(calc.)	13.55				13.68	20.00	11.99
R(EN12662:14)	7.74				7.68	6.21	6.85

Compare R(EN12662:08) and R(EN12662:98) = 6.62

Kernel Density
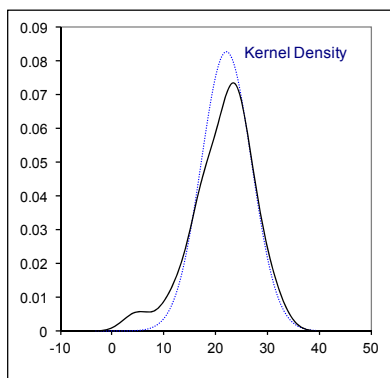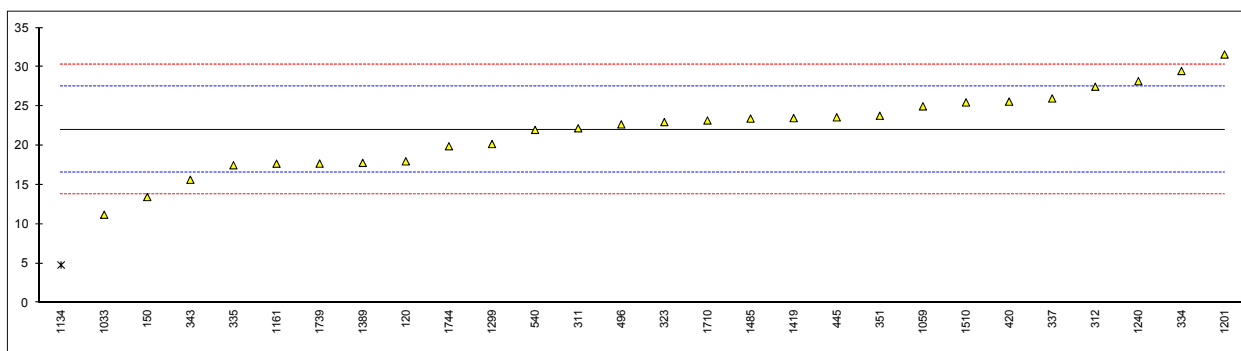
APPENDIX 2

Number of participants per country

2 labs in ARGENTINA

1 lab in AUSTRIA

1 lab in BELGIUM

2 labs in BRAZIL

3 labs in BULGARIA

2 labs in COLOMBIA

1 lab in CROATIA

1 lab in CZECH REPUBLIC

1 lab in EGYPT

8 labs in FRANCE

2 labs in GERMANY

2 labs in HONG KONG

1 lab in HUNGARY

1 lab in LITHUANIA

3 labs in NETHERLANDS

1 lab in PERU

1 lab in PHILIPPINES

1 lab in POLAND

3 labs in PORTUGAL

1 lab in SLOVAKIA

1 lab in SLOVENIA

6 labs in SPAIN

1 lab in SUDAN

1 lab in THAILAND

2 labs in TURKEY

6 labs in UNITED KINGDOM

3 labs in UNITED STATES OF AMERICA

1 lab in VIETNAM

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:

1   iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, April 2014
2   ASTM E178-02
3   ASTM E1301-03
4   ISO13528-05
5   ISO 5725-86
6   ISO 5725, parts 1-6, 1994
7   M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8   W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9   IP 367/84
10   DIN 38402 T41/42
11   P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12   J.N. Miller, Analyst, 118, 455, (1993)
13   Analytical Methods Committee Technical Brief, No4 January 2001
14   The Royal Society of Chemistry 2002, Analyst 2002, 127 page1359-1364, P.J. Lowthian and M.
         Thompson. (see http://www.rsc.org/suppdata/an/b2/b205600n/)
15   Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure,
         Technometrics, 25(2), pp. 165-172, (1983).