**Institute for
Interlaboratory Studies**

Results of Proficiency Test
Biodiesel B100 (100% FAME)
April 2022

Organized by: **Institute for Interlaboratory Studies
Spijkenisse, the Netherlands**

Author: **ing. R.J. Starink**
Correctors: **ing. G.A. Oosterlaken-Buijs & ing. A. Ouwerkerk**
Approved by: **ing. A.S. Noordman-de Neef**

Report: **iis22G03**

August 2022

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1   INTRODUCTION

Since 2008 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Fatty Acid Methyl Esters (FAME) used as Biodiesel B100 in accordance with the latest version of ASTM D6751 and EN14214+A2 twice a year. During the annual proficiency testing program of 2021/2022 it was decided to continue the round robin for the analysis of Biodiesel B100.

In this interlaboratory study registered for participation:
-    59 laboratories in 26 countries on regular Biodiesel B100 iis22G03,
-    29 laboratories in 18 countries for the Metals in Biodiesel iis22G03M,
-    37 laboratories in 20 countries for the Total Contamination iis22G03TC,
-    21 laboratories in 11 countries for the Cold Soak Test iis22G03CST.

In total 63 laboratories in 27 countries registered for participation in one or more proficiency tests, see appendix 2 for the number of participants per country. In this report the results of the Biodiesel B100 proficiency tests are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2   SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test (PT). Sample analyzes for fit-for-use and homogeneity testing were subcontracted to an ISO/IEC17025 accredited laboratory.
In this proficiency test the participants received, depending on the registration, from one up to four different samples of Biodiesel B100, see table below.

Sample id.	PT id.	Quantity	Purpose
#22065	iis22G03	1 x 1 L + 1 x 0.5 L	Regular analyzes
#22066	iis22G03M	1 x 0.1 L	Analysis of Metals
#22067	iis22G03TC	1 x 1 L	Total Contamination
#22068	iis22G03CST	1 x 0.5 L	Cold Soak Test

Table 1: samples used in Biodiesel B100 iis22G03

Participants were requested to report rounded and unrounded test results. The unrounded test results were preferably used for statistical evaluation.

2.1   ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in agreement with ISO/IEC17043:2010 (R007), since January 2000, by the Dutch Accreditation Council (Raad voor Accreditatie). This PT falls under the accredited scope. This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentiality of participant's data. Feedback from the participants on the reported data is encouraged and customer's satisfaction is measured on regular basis by sending out questionnaires.

2.2   PROTOCOL

The protocol followed in the organization 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 June 2018 (iis-protocol, version 3.5). This protocol is electronically available through the iis website 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

For the preparation of the sample for the regular analyzes in Biodiesel B100 and the Cold Soak Test a batch of approximately 200 L of Rapeseed Methyl Ester (RME) was obtained from a European producer.
After homogenization 80 amber glass bottles of 1 L and 80 amber glass bottles of 0.5 L were filled for the regular round and labelled #22065. Another 30 amber glass bottles of 0.5 L were filled for the Cold Soak Test and labelled #22068.
The homogeneity of the subsamples was checked by the determination of Density at 15 °C in accordance with ISO12185 on 8 stratified randomly selected subsamples.

	Density at 15 °C in kg/m^3
sample 1	883.49
sample 2	883.49
sample 3	883.49
sample 4	883.49
sample 5	883.48
sample 6	883.49
sample 7	883.49
sample 8	883.49

Table 2: homogeneity test results of subsamples #22065 and #22068

From the above test results the repeatability was calculated and compared with 0.3 times the reproducibility of the reference test method in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Density at 15 °C in kg/m^3
r (observed)	0.01
reference test method	ISO12185:96
0.3 x R (reference test method)	0.15

Table 3: evaluation of the repeatability of subsamples #22065 and #22068

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, the homogeneity of the subsamples #22065 and #22068 was assumed.

For the preparation of the samples for the metals in Biodiesel PT a batch of approximately 5 kg biodiesel was taken and spiked with Phosphorus, Sodium, Potassium and Calcium as organic salts. After homogenization 50 PE bottles of 0.1 L were filled and labelled #22066. The homogeneity of the subsamples was checked by the determination of Phosphorus in accordance with EN14107 and Sodium in accordance with EN14538 on 8 stratified randomly selected subsamples.

	Phosphorus in mg/kg	Sodium in mg/kg
sample #22066-1	5.4	12.0
sample #22066-2	5.1	12.3
sample #22066-3	5.4	12.3
sample #22066-4	5.2	12.3
sample #22066-5	5.4	12.3
sample #22066-6	5.4	12.3
sample #22066-7	5.5	12.3
sample #22066-8	5.4	12.0

Table 4: homogeneity test results of subsamples #22066

From the above test results the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibility of the reference test methods in agreement with the procedure of ISO13528, Annex B2 in the next table.

	Phosphorus in mg/kg	Sodium in mg/kg
r (observed)	0.4	0.4
reference test method	EN14107:03	EN14108:03
0.3 x R (reference test method)	0.3	1.4

Table 5: evaluation of the repeatabilities of subsamples #22066

The calculated repeatability for Sodium is in agreement with 0.3 times the reproducibility of the reference test method. The calculated repeatability for Phosphorus is almost in agreement with 0.3 times the reproducibility of the reference test method. Therefore, the homogeneity of the subsamples was assumed.

For the preparation of the samples for Total Contamination 1 ml of a freshly prepared and ultrasonically homogenized Arizona Dust (medium) in oil suspension was pipetted into 55 amber glass bottles. The addition was checked by weighing each bottle before and after the addition of the oil suspension. Subsequently each bottle was filled with one liter Biodiesel B100 and labelled #22067. A random sample was taken to check the Total Contamination.

Depending on the registration of the participant the appropriate set of PT samples was sent on March 30, 2022. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

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

2.6 ANALYZES

The requested analyzes for the Biodiesel B100 samples are in accordance with the requirements of EN14214:12+A2:19 and/or ASTM D6751:20a.

Parameter	EN14214:12+A2:19	Parameter	ASTM D6751:20a
Acid Value	EN14104	Acid Number	ASTM D664
Calorific Value	DIN51900		
		Carb. Res. 100% FAME	ASTM D4530
CFPP	EN116		
Cloud Point	EN23015	Cloud Point	ASTM D2500
Copper Strip Corrosion	ISO2160	Copper Strip Corrosion	ASTM D130
Density at 15°C	ISO12185		
		Distillation	ASTM D1160
Flash Point (Recc)	ISO3679		
Flash Point (PMcc)	ISO2719	Flash Point	ASTM D93
Iodine Value	EN14111		
Kin. Viscosity at 40°C	ISO3104	Kin. Viscosity at 40°C	ASTM D445
Oxidation Stability	EN14112	Oxidation Stability	EN15751
Sulfated Ash	ISO3987	Sulfated Ash	ASTM D874
Sulfur	ISO20846	Sulfur	ASTM D5453
Water	ISO12937	Water and Sediment	ASTM D2709
Cetane Number	EN5165	Cetane Number	ASTM D613
		Derived Cetane Number	ASTM D7668
Calcium + Magnesium	EN14538	Calcium + Magnesium	EN14538
Phosphorus	EN14107	Phosphorus	ASTM D4951
Potassium + Sodium	EN14108/14109	Potassium + Sodium	EN14538
Polyunsaturated esters	EN15779		
Methanol	EN14110	Methanol	EN14110

Parameter	EN14214:12+A2:19	Parameter	ASTM D6751:20a
mono-, di-, tri-Glycerides	EN14105	Monoglyceride content	ASTM D6584
Free + Total Glycerol	EN14105	Free + Total Glycerol	ASTM D6584
Total ester content	EN14103		
Linolenic Acid	EN14103		
Total Contamination	EN12662		
Cold Soak Filterability			ASTM D7501

Table 6: requirements and test methods acc. to specifications EN14214:12+A2:19 and/or ASTM D6751:20a.

It was explicitly requested to treat the samples as if they were routine samples and to report the test results using the indicated units on the report form and not to round the test results but report as much significant figures as possible. It was also requested not to report 'less than' test results, which are above the detection limit, because such test results cannot be used for meaningful statistical evaluations.

To get comparable test results, a detailed report form and a letter of instructions are prepared. On the report form the reporting units are given as well as the reference test methods (when applicable) that will be used during the evaluation. The detailed report form and the letter of instructions are both made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The participating laboratories are also requested to confirm the sample receipt on this data entry portal. The letter of instructions can also be downloaded from the iis website www.iisnl.com.

3   RESULTS

During five weeks after sample dispatch, the test results of the individual laboratories were gathered via the data entry portal www.kpmd.co.uk/sgs-iis/. The reported test results are tabulated per determination in appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after the deadline, a reminder was sent to those laboratories that had not reported test results at that moment. Shortly after the deadline, the available test results were screened for suspect data. A test 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 reported test results (no reanalyzes). Additional or corrected test results are used for data analysis and the original test results are placed under 'Remarks' in the result tables in appendix 1. Test results that came in after the deadline were not taken into account in this screening for suspect data and thus these participants were not requested for checks.

3.1   STATISTICS

The protocol followed in the organization 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 June 2018 (iis-protocol, version 3.5).
For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded test results. Test 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. If a data set does not have a normal distribution, the (results of the) statistical evaluation should be used with due care.

The assigned value is determined by consensus based on the test results of the group of participants after rejection of the statistical outliers and/or suspect data.

According to ISO13528 all (original received or corrected) results per determination were submitted to outlier tests. In the iis procedure for proficiency tests, outliers are detected prior to calculation of the mean, standard deviation and reproducibility. For small data sets, Dixon (up to 20 test results) or Grubbs (up to 40 test results) outlier tests can be used. For larger data sets (above 20 test results) Rosner's outlier test can be used. Outliers are marked by D(0.01) for the Dixon's test, by G(0.01) or DG(0.01) for the Grubbs' test and by R(0.01) for the Rosner's test. Stragglers are marked by D(0.05) for the Dixon's test, by G(0.05) or DG(0.05) for the Grubbs' test and by R(0.05) for the Rosner's test. Both outliers and stragglers were not included in the calculations of averages and 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. In this PT, the criterion of ISO13528, paragraph 9.2.1. was met for all evaluated tests, therefore, the uncertainty of all assigned values may be negligible and need not be included in the PT report.

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 test results are plotted. The corresponding laboratory numbers are on 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 reference test method. Outliers and other data, which were excluded from the calculations, are represented as a cross. 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. Also, a normal Gauss curve (dotted line) was projected over the Kernel Density Graph (smooth line) for reference. The Gauss curve is calculated from the consensus value and the corresponding standard deviation.

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 (derived from e.g. ISO or ASTM test methods), the z-scores were calculated using a target standard deviation. This results in an evaluation independent of the variation in this interlaboratory study.

The target standard deviation was calculated from the literature reproducibility by division with 2.8. In case no literature reproducibility was available, other target values were used, like Horwitz or an estimated reproducibility based on former iis proficiency tests.

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 according to:

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

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

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

$$|z| < 1 \quad \text{good}$$
$$1 < |z| < 2 \quad \text{satisfactory}$$
$$2 < |z| < 3 \quad \text{questionable}$$
$$3 < |z| \quad \text{unsatisfactory}$$

4 EVALUATION

Some problems were encountered with the dispatch of the samples due to COVID-19 pandemic. Therefore, the reporting time on the data entry portal was extended with another week.
For the regular Biodiesel PT: two participants did not report any test results. Four other participants reported test results after the extended reporting date.
For the Metals in Biodiesel PT: three participants did not report any test results. One other participant reported test results after the extended reporting date.
For the Total Contamination PT: four participants did not report any test results. Two other participants reported test results after the extended reporting date.
For the Cold Soak Test PT: five participants did not report any test results. Two other participants reported test results after the extended reporting date.
Not all participants were able to report all tests requested.
In total 61 participants reported 892 numerical test results. Observed were 38 outlying test results, which is 4.3%. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

Not all 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.

4.1 EVALUATION PER SAMPLE AND PER TEST

In this section the reported test results are discussed per sample and per test. The test methods which were used by the various laboratories were taken into account for explaining the observed differences when possible and applicable. These test methods are also in the tables together with the original data in appendix 1. The abbreviations used in these tables are explained in appendix 3.

In the iis PT reports ASTM test methods are referred to with a number (e.g. D4530) and an added designation for the year that the test method was adopted or revised (e.g. D4530:15). When a method has been reapproved an "R" will be added and the year of approval (e.g. D4530:15R20).

Sample #22065

Acid Value: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN14104:21 and EN14214:12+A2:19.

Total Acid Number: 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 D664:18e2 method B.

Cloud Point: 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 D2500:17a and EN14214:12+A2:19.

Cold Filter Plugging Point: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN116:15 and EN14214:12+A2:19.

Carbon Residue on 100% sample: This determination may not be problematic. All reported test results were near or below the application range of ASTM D4530:15R20 or ISO10370:14. Therefore, no z-scores were calculated.

Copper Corrosion: This determination may not be problematic. All reporting participants agreed on a test result of 1(1a/1b).

Density at 15 °C: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is agreement with the requirements of ISO12185:96.

Flash Point PMcc: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not agreement with the requirements of ASTM D93-C:20 or ISO2719-C:16.

Flash Point recc: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO3679:15.

Iodine Value: This determination was problematic for a number of laboratories. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN14111:03.

Kinematic Viscosity at 40°C: This determination was problematic for a number of laboratories. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO3104:20 and ASTM D445:21a.

Oxidation Stability: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN15751:14 and EN14112:20.

Pour Point: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO3016:19.

Sulfated Ash: This determination may not be problematic. Almost all reported test results were near or below the application range of ASTM D874:13a(R18). Therefore, no z-scores were calculated.

Sulfur: 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 ISO20846:19 and with ASTM D5453:19a.

Water: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO12937:00 and ASTM D6304-A:20.

Water and Sediment: This determination may not be problematic. All reported test results were near or below the application range of ASTM D2709:16. Therefore, no z-scores were calculated.

Calorific Value: The determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of ASTM D240:19.

Distillation at 10 mmHg: This determination was not problematic for 80% and 90% recovered, but was very problematic for 95% recovered. In total two statistical outliers were observed. The calculated reproducibilities for 80% and 90% recovered after rejection of the statistical outliers are in agreement with the requirements of ASTM D1160:18.
For 95% recovered no z-scores were calculated as the calculated reproducibility was too large compared to the requirements of ASTM D1160:18.

Methanol: 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 EN14110:19.

Monoglycerides: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is agreement with the requirements of EN14105:20.

Diglycerides: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in full agreement with the requirements of EN14105:20.

Triglycerides: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is agreement with the requirements of EN14105:20.

Free Glycerol: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14105:20.

Total Glycerol: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14105:20.

Total Ester content (FAME): 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 EN14103:20.

Linolenic Acid Methyl Ester: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14103:20.

Polyunsaturated Methyl Esters: This determination was very problematic. No statistical outliers were observed. The calculated reproducibility is not at all in agreement with the requirements of EN15779:09+A1:13.

Sample #22066

Sum Ca + Mg: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of EN14538:06.

Phosphorus: This determination was problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is not in agreement with the requirements of EN14107:03.

Potassium: 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 EN14109:03.

Sodium: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of EN14108:03.

Sum K + Na: This determination was problematic. No statistical outliers were observed, but one test result was excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of EN14538:06.

Sample #22067

Some years ago, there was some discussion about method EN12662 version 2014 for determining Total Contamination in Biodiesel (neat FAME or B100). The CEN/TC 19 working group published a letter in September 2015 (see lit. 13) about this issue. In short, for FAME blends (B100) either EN12662:1998 or EN12662:2008 should be used and not EN12662:14. Also, the latest version of EN14214:12+A2:19 (February 2019) states that EN12662 version 2008 should be used or EN12662:1998 as alternative. The method EN12662:14 is not mentioned anymore in the specification (see also iis memo 1903, lit 14). It was therefore decided to exclude the test results which were determined according EN12662:14.

Total Contamination: This determination was problematic. Three statistical outliers were observed and five other test results were excluded. The calculated reproducibility after rejection of the suspect data is not in agreement with the requirements of EN12662:98 (or EN12662:08).

Sample #22068

Filter Blocking Potential by Cold Soak Test: 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 ASTM D7501:21.

Filter Blocking Tendency: 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 D2068-B:20 and IP387-B:14R22.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

A comparison has been made between the reproducibility as declared by the reference test method and the reproducibility as found for the group of participating laboratories. The number of significant test results, the average, the calculated reproducibility (2.8 * standard deviation) and the target reproducibility derived from reference methods are presented in the next tables.

Parameter	Unit	n	average	2.8 * sd	R(lit)
Acid Value	mg KOH/g	27	0.47	0.05	0.06
Total Acid Number	mg KOH/g	26	0.45	0.07	0.13
Cloud Point	°C	40	-5.0	3.3	5
Cold Filter Plugging Point	°C	38	-15.8	2.6	4.0
Carbon Residue (100% sample)	%M/M	21	<0.1	n.e.	n.e.
Copper Corrosion, 3 hrs at 50 °C		33	1(1a/1b)	n.a.	n.a.
Density at 15 °C	kg/m³	50	883.5	0.3	0.5
Flash Point PMcc	°C	30	152.1	19.3	14.7
Flash Point recc	°C	7	171.4	5.4	15.0
Iodine Value	g I$_2$/100g	30	113.4	4.3	5
Kinematic Viscosity at 40 °C	mm²/s	40	4.467	0.033	0.045
Oxidation Stab. Induction period	hours	32	4.2	0.7	1.2
Pour Point	°C	18	-38	4	9
Sulfated Ash	%M/M	27	<0.005	n.e.	n.e.
Sulfur	mg/kg	31	2.2	1.1	1.4
Water	mg/kg	51	385	97	135
Water and Sediment	%V/V	8	<0.01	n.e.	n.e.
Calorific Value Gross	MJ/kg	8	39.9	0.5	0.4
80% recovered, as AET	°C	7	353.9	4.5	4.6
90% recovered, as AET	°C	7	355.9	4.1	4.6
95% recovered, as AET	°C	8	368.2	27.0	(4.6)
Methanol	%M/M	26	0.043	0.017	0.012
Monoglycerides	%M/M	31	0.341	0.077	0.129
Diglycerides	%M/M	30	0.107	0.053	0.049
Triglycerides	%M/M	27	0.057	0.039	0.070
Free Glycerol	%M/M	30	0.002	0.004	0.007
Total Glycerol	%M/M	31	0.113	0.028	0.033
Total Ester content	%M/M	36	97.7	3.0	4.2
Linolenic Acid Methyl Ester	%M/M	27	9.68	0.66	0.66
Polyunsaturated Methyl Esters	%M/M	10	0.29	0.74	0.27

Table 7: reproducibilities of tests on sample #22065

For results between brackets no z-scores are calculated.

Parameter	unit	n	average	2.8 * sd	R(lit)
Sum of Calcium and Magnesium	mg/kg	20	12.9	4.1	3.1
Phosphorus	mg/kg	19	5.1	1.9	1.0
Potassium	mg/kg	18	8.6	4.3	4.9
Sodium	mg/kg	19	8.8	5.8	3.7
Sum of Potassium and Sodium	mg/kg	18	16.6	8.6	4.1
Total Contamination (EN12662)	mg/kg	24	18.1	9.6	5.4
Filter Blocking Potential (CSFT)	s	8	106.6	45.6	33.2
Filter Blocking Tendency (FBT)		6	1.04	0.06	0.07

Table 8: reproducibilities of tests on samples #22066, #22067 and #22068

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 reference test methods. The problematic tests have been discussed in paragraph 4.1.

4.3   COMPARISON OF THE PROFICIENCY TEST OF APRIL 2022 WITH PREVIOUS PTS

	April 2022	October 2021	April 2021	October 2020	April 2020
Type of FAME	Rapeseed	Rapeseed	Rapeseed	Rapeseed	Rapeseed
Number of reporting laboratories	61	63	67	63	47
Number of test results	892	962	1108	1080	737
Number of statistical outliers	38	31	45	42	37
Percentage of statistical outliers	4.3%	3.2%	4.1%	5.0%	5.0%

Table 9: 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 to the requirements of the reference test methods. The conclusions are given the following table.

Parameter	April 2022	October 2021	April 2021	October 2020	April 2020
Acid Value	+	+/-	-	+	+/-
Total Acid Number	++	+	+	+	+
Cloud Point	+	++	+	+	+
Cold Filter Plugging Point	+	+	+	+	+
Carbon Residue (100% sample)	n.e.	n.e.	n.e.	n.e.	n.e.
Density at 15 °C	+	+	+	++	+
Flash Point PMcc	-	-	-	+	+/-
Flash Point recc.	++	+	+	+/-	-
Iodine Value	+	+/-	-	+	+
Kinematic Viscosity at 40 °C	+	-	+/-	+	+/-

Parameter	April 2022	October 2021	April 2021	October 2020	April 2020
Oxidation Stab. Induction period	+	+/-	+	+	+
Pour Point	++	+	+	++	+
Sulfated Ash	n.e.	n.e.	n.e.	n.e.	n.e.
Sulfur	+	+	+	+/-	+/-
Water	+	++	+	+	+
Calorific Value Gross	-	--	--	(--)	+
Distillation at 10 mmHg	-	--	-	n.e.	+/-
Methanol	-	-	+/-	-	-
Monoglycerides	+	-	+	+/-	+
Diglycerides	+/-	+	-	-	-
Triglycerides	++	++	+	+	++
Free Glycerol	+	++	+	++	+
Total Glycerol	+	-	+	-	+/-
Total Ester content	+	+/-	+	+	+
Linolenic Acid Methyl Ester	+/-	--	+/-	+	+/-
Polyunsaturated Methyl Esters	--	-	n.e.	-	n.e.
Sum of Calcium and Magnesium	-	-	+	+	-
Phosphorus	--	--	-	--	-
Potassium	+	+	+	+/-	+
Sodium	-	-	-	-	--
Sum of Potassium and Sodium	--	+/-	-	+	-
Total Contamination ((EN12662)	-	--	--	-	-
Filter Blocking Potential (CSFT)	-	n.a.	(--)	n.a.	--
Filter Blocking Tendency (FBT)	+	n.a.	(--)	n.a.	-

Table 10: comparison of group performances to the reference test methods of all samples

For results between brackets no z-scores are calculated.

The following performance categories were used:

    ++:   group performed much better than the reference test method

    + :   group performed better than the reference test method

    +/-:   group performance equals the reference test method

    - :   group performed worse than the reference test method

    -- :   group performed much worse than the reference test method

  n.e.: not evaluated

APPENDIX 1

Determination of Acid Value on sample #22065; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14104	0.40	R(0.05)	-3.18	
323	EN14104	0.47		0.08	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	EN14104	0.467		-0.06	
381		-----		-----	
391	EN14104	0.460		-0.38	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN14104	0.47		0.08	
511		-----		-----	
540	EN14104	0.49		1.02	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14104	0.48		0.55	
863		-----		-----	
1011		-----		-----	
1134	EN14104	0.635	R(0.01)	7.78	
1135	EN14104	0.43		-1.78	
1227		-----		-----	
1237		-----		-----	
1299	EN14104	0.47		0.08	
1316		-----		-----	
1320	EN14104	0.48		0.55	
1389	EN14104	0.44		-1.32	
1468	EN14104	0.49		1.02	
1494		-----		-----	
1539		-----		-----	
1564	EN14104	0.45	C	-0.85	First reported 0.39
1569	EN14104	0.44		-1.32	
1643		-----		-----	
1706		-----		-----	
1707	EN14104	0.425		-2.02	
1710	EN14104	0.485		0.78	
1712	EN14104	0.47		0.08	
1739	EN14104	0.488		0.92	
1740		-----		-----	
1744		-----		-----	
1769		-----		-----	
1971	EN14104	0.4715		0.15	
1980	EN14104	0.457		-0.52	
1994	EN14104	0.738	R(0.01)	12.59	
6069		-----		-----	
6179		-----		-----	
6213	EN14104	0.49		1.02	
6259		-----		-----	
6265	EN14104	0.4627		-0.26	
6276	EN14104	0.465		-0.15	
6300	EN14104	0.48		0.55	
6325	EN14104	0.48		0.55	
6363	EN14104	0.49		1.02	
6373	EN14104	0.46		-0.38	
6447		-----		-----	
6456	EN14104	0.48		0.55	

	normality	OK	
	n	27	
	outliers	3	
	mean (n)	0.4682	
	st.dev. (n)	0.01844	
	R(calc.)	0.0516	
	st.dev.(EN14104:21)	0.02143	
	R(EN14104:21)	0.06	
Compare			
	R(EN14214:12+A2:19)	0.06	
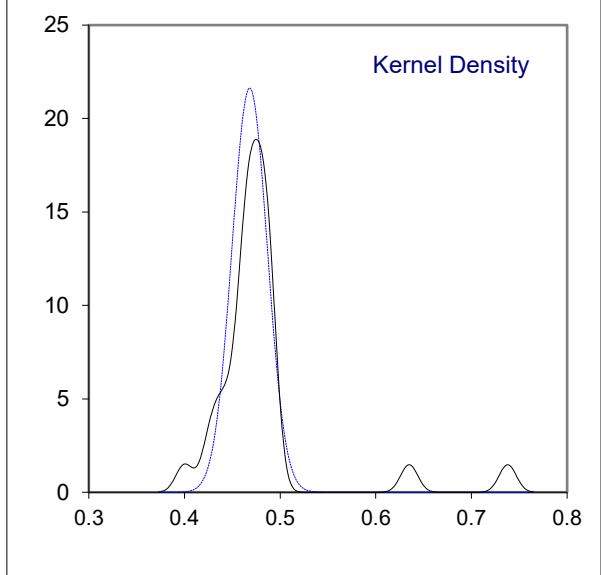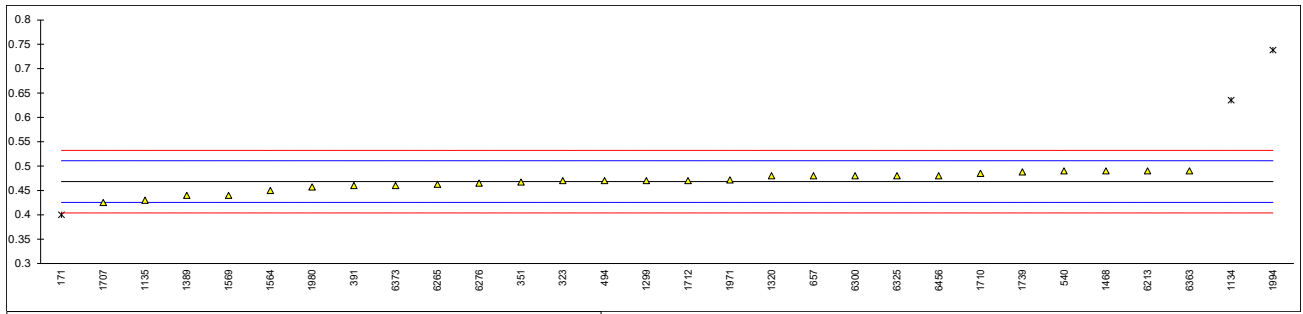
Determination of Total Acid Number on sample #22065; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	D664-B	0.41		-0.77	
323	D664-B	0.44		-0.11	
328		-----		-----	
334	D664-B	0.41		-0.77	
335		-----		-----	
351		-----		-----	
381	D974	0.40		-0.99	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	D664-B	0.468		0.50	
511		-----		-----	
540	D664-B	0.47		0.54	
551	D664-B	0.45	C	0.10	First reported 0.30
558		-----		-----	
621	D664-B	0.4563		0.24	
631	D974	0.423		-0.49	
657	D664-B	0.46		0.32	
863		-----		-----	
1011		-----		-----	
1134	D664-B	0.535	D(0.05)	1.96	
1135	D664-B	0.45		0.10	
1227	D664-B	0.44		-0.11	
1237		-----		-----	
1299	D664-B	0.490		0.98	
1316		-----		-----	
1320		-----		-----	
1389		-----		-----	
1468		0.45		0.10	
1494	D664-B	0.48		0.76	
1539	D664-B	0.46		0.32	
1564		-----		-----	
1569	D664-B	0.43		-0.33	
1643	D664-A	0.446		0.02	
1706		-----		-----	
1707		-----		-----	
1710	D664-B	0.461		0.35	
1712		-----		-----	
1739		-----		-----	
1740	D664-B	0.38		-1.43	
1744	D664-B	0.437		-0.18	
1769	D664-B	0.4425		-0.06	
1971		-----		-----	
1980		-----		-----	
1994		-----		-----	
6069	D664-B	0.4365		-0.19	
6179	D664-B	0.4424		-0.06	
6213		-----		-----	
6259	D664-B	0.4728		0.60	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325		-----		-----	
6363		-----		-----	
6373	D664-B	0.47		0.54	
6447		-----		-----	
6456		-----		-----	

normality	OK	
n	26	
outliers	1	
mean (n)	0.4452	
st.dev. (n)	0.02555	
R(calc.)	0.0715	
st.dev.(D664-B:18e2)	0.04573	
R(D664-B:18e2)	0.1281	
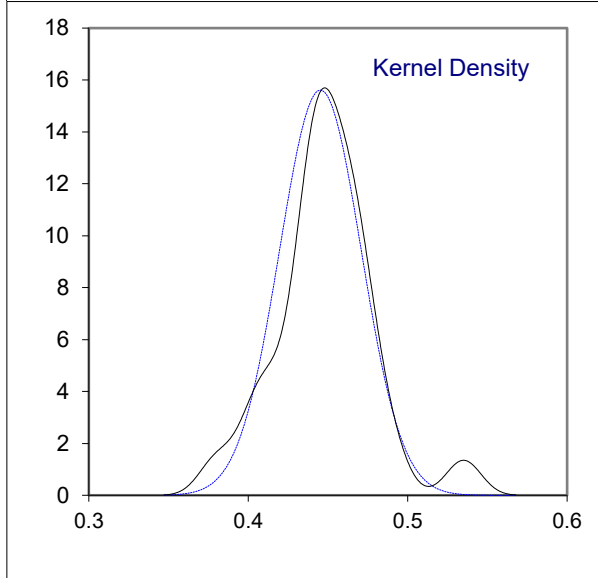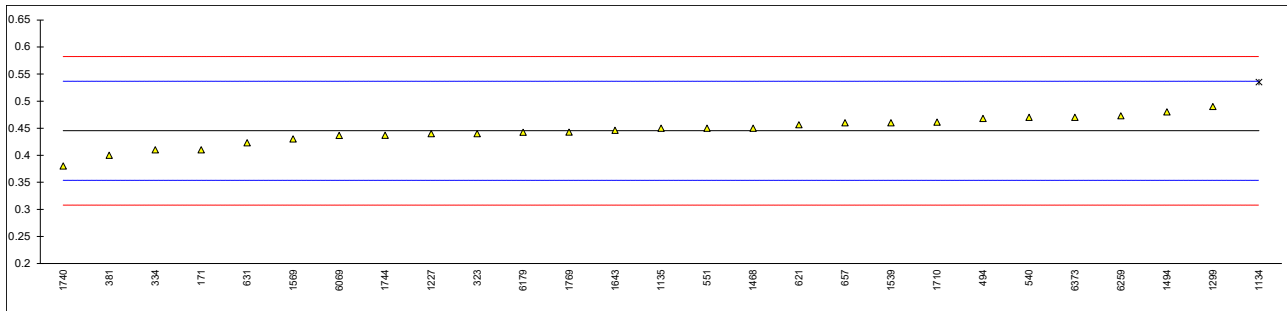
Determination of Cloud Point on sample #22065; results in °C

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	D2500	-5		-0.01	
323	D2500	-5		-0.01	
328	D2500	-5		-0.01	
334	D2500	-4		0.55	
335	D2500	-5.6		-0.34	
351	D7683	-6.0		-0.57	
381	ISO3015	-6		-0.57	
391	D2500	-4		0.55	
396	D2500	-5		-0.01	
445		-----		-----	
460		-----		-----	
494	D2500	-8		-1.69	
511		-----		-----	
540	D2500	<-6		-----	
551		-----		-----	
558		-----		-----	
621	D2500	2.0	R(0.01)	3.91	
631	D5773	-3.8		0.67	
657	D2500	-6		-0.57	
863		-----		-----	
1011	D2500	-3		1.11	
1134	IP219	-5		-0.01	
1135	EN23015	-4		0.55	
1227	D2500	-5		-0.01	
1237	ISO3015	-5		-0.01	
1299	D2500	-4		0.55	
1316	EN23015	-5.0		-0.01	
1320	D2500	-5		-0.01	
1389	D2500	-4		0.55	
1468	EN23015	-5		-0.01	
1494		-----		-----	
1539	ISO3015	-6		-0.57	
1564	D5772	-5.0		-0.01	
1569	EN23015	-6		-0.57	
1643	D2500	-2		1.67	
1706		-----		-----	
1707	ISO3015	-4		0.55	
1710	EN23015	-5		-0.01	
1712		-----		-----	
1739	EN23015	-5.5		-0.29	
1740	D2500	-5		-0.01	
1744	D2500	-5		-0.01	
1769		-----		-----	
1971	ISO3015	-5		-0.01	
1980	ISO3015	-4.0		0.55	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213	ISO3015	-6		-0.57	
6259		-----		-----	
6265	ISO3015	-4.8		0.11	
6276	ISO22995	-4.9		0.05	
6300	ISO3015	-5		-0.01	
6325	D2500	-7		-1.13	
6363	D2500	-8		-1.69	
6373	D2500	-3		1.11	
6447		-----		-----	
6456		-----		-----	

	normality	suspect
	n	40
	outliers	1
	mean (n)	-4.99
	st.dev. (n)	1.178
	R(calc.)	3.30
	st.dev.(D2500:17a)	1.786
	R(D2500:17a)	5
Compare		
	R(EN14214:12+A2:19)	4
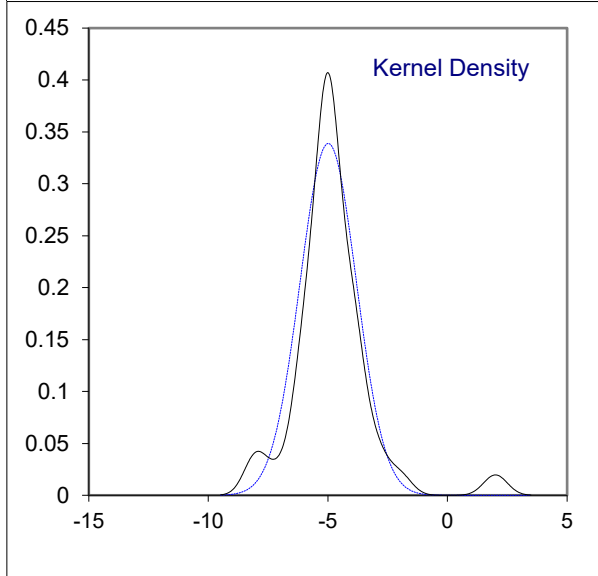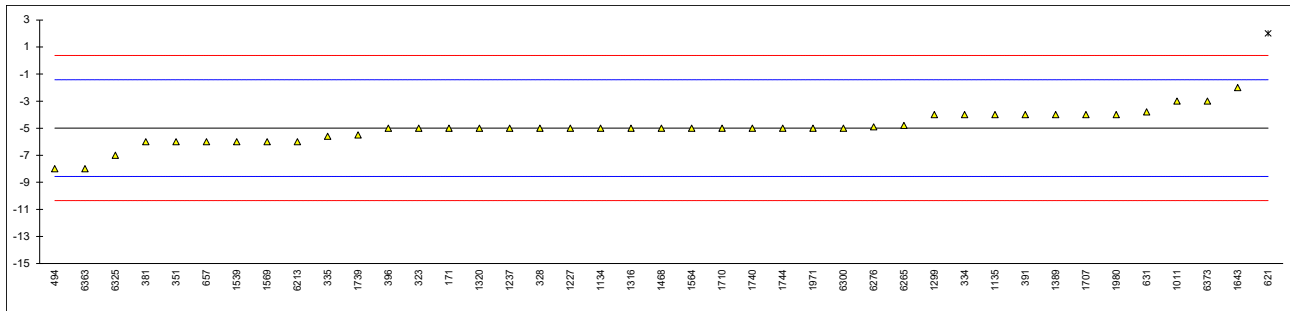
Determination of Cold Filter Plugging Point (CFPP) on sample #22065; results in °C

lab	method	value	mark	z(targ)	remarks
150	EN116	-17		-0.89	
171		-----		-----	
323	EN116	-16		-0.18	
328	EN116	-15		0.53	
334	EN116	-16		-0.18	
335	EN116	-16		-0.18	
351	EN116	-15		0.53	
381	EN116	-15		0.53	
391	EN116	-17		-0.89	
396	EN116	-14		1.24	
445		-----		-----	
460		-----		-----	
494	EN116	-15		0.53	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	IP309	-16		-0.18	
863		-----		-----	
1011	EN116	-15		0.53	
1134	EN116	-17		-0.89	
1135	EN116	-16		-0.18	
1227	EN116	-15		0.53	
1237	EN116	-16		-0.18	
1299	EN116	-16		-0.18	
1316	EN116	-18.0		-1.60	
1320	EN116	-16		-0.18	
1389	EN116	-16		-0.18	
1468	EN116	-15		0.53	
1494		-----		-----	
1539	EN116	-16		-0.18	
1564	EN116	-17		-0.89	
1569	EN116	-14		1.24	
1643		-----		-----	
1706		-----		-----	
1707	EN116	-16		-0.18	
1710	EN116	-16		-0.18	
1712		-----		-----	
1739	EN116	-16.5		-0.53	
1740	EN116	-14		1.24	
1744		-----		-----	
1769		-----		-----	
1971	EN116	-16		-0.18	
1980	EN116	-16		-0.18	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213	EN116	-16		-0.18	
6259		-----		-----	
6265	EN116	-17.0		-0.89	
6276	EN116	-14.5		0.89	
6300	EN116	-15		0.53	
6325	EN116	-16		-0.18	
6363	EN116	-16		-0.18	
6373	EN116	-16		-0.18	
6447		-----		-----	
6456	Calculation	-14.5		0.89	

	normality	OK
	n	38
	outliers	0
	mean (n)	-15.75
	st.dev. (n)	0.921
	R(calc.)	2.58
	st.dev.(EN116:15)	1.409
	R(EN116:15)	3.95
Compare		
	R(EN14214:12+A2:19)	3.95
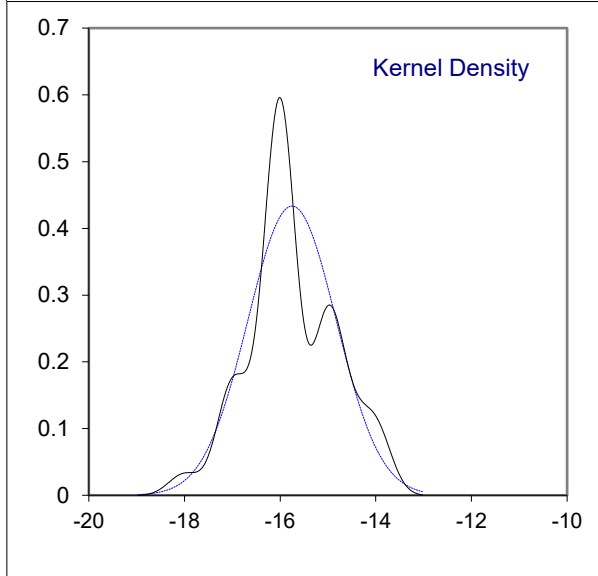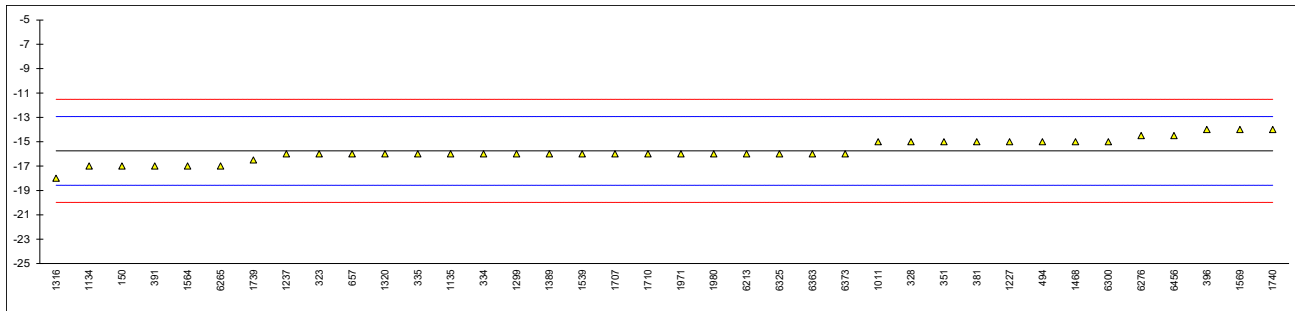
Determination of Carbon Residue on 100% sample on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150	D4530	<0.1		-----	
171	D4530	<0.10		-----	
323	D4530	< 0.10		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	ISO10370	<0,10		-----	
381		-----		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	D4530	<0,10		-----	
511	D189	<0.05		-----	
540		-----		-----	
551	D4530	<0.01		-----	
558		-----		-----	
621	D189	<0.1		-----	
631	D4530	0.01		-----	
657	D4530	<0.10		-----	
863		-----		-----	
1011		-----		-----	
1134	D4530	0.0136		-----	
1135		-----		-----	
1227	D4530	0.02		-----	
1237		-----		-----	
1299		-----		-----	
1316	D4530	0.01		-----	
1320	D4530	0.02		-----	
1389	D4530	<0.10		-----	
1468	ISO10370	0.008		-----	
1494		-----		-----	
1539	ISO10370	0.01		-----	
1564		-----		-----	
1569		-----		-----	
1643		-----		-----	
1706		-----		-----	
1707		-----		-----	
1710	EN10370	0.02		-----	
1712		-----		-----	
1739		-----		-----	
1740	D4530	<0.10		-----	
1744		-----		-----	
1769		-----		-----	
1971	ISO10370	<0,10		-----	
1980		-----		-----	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325		-----		-----	
6363		-----		-----	
6373		-----		-----	
6447	D4530	0.1		-----	
6456		-----		-----	
	n	21			
	mean (n)	<0.1			Application range ASTM D4530:15R20: 0.1 – 30%M/M
					Application range ISO10370:14: 0.10 – 30.0%M/M

Determination of Copper Corrosion 3 hrs at 50 °C on sample #22065

lab	method	value	mark	z(targ)	remarks
150	D130	1A		-----	
171	D130	1a		-----	
323	D130	1A		-----	
328	D130	1		-----	
334	D130	1a		-----	
335	D130	1b		-----	
351	ISO2160	1a		-----	
381	ISO2160	1		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	D130	1A		-----	
511	D130	1a		-----	
540	D130	1a		-----	
551	D130	1A		-----	
558		-----		-----	
621	D130	1A		-----	
631	D130	1a		-----	
657	D130	1a		-----	
863		-----		-----	
1011	ISO2160	1a		-----	
1134	D130	1a		-----	
1135	ISO2160	1A		-----	
1227	D130	1A		-----	
1237		-----		-----	
1299	ISO2160	1a		-----	
1316	D130	1a		-----	
1320		-----		-----	
1389	D130	1A		-----	
1468		-----		-----	
1494		-----		-----	
1539	ISO2160	1a		-----	
1564	D130	1a		-----	
1569	ISO2160	1a		-----	
1643		-----		-----	
1706		-----		-----	
1707	ISO2160	1a		-----	
1710	ISO2160	1A		-----	
1712		-----		-----	
1739	ISO2160	1a		-----	
1740	D130	1		-----	
1744		-----		-----	
1769		-----		-----	
1971	ISO2160	1a		-----	
1980	ISO2160	1a		-----	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325	D130	1a		-----	
6363		-----		-----	
6373	D130	1A		-----	
6447		-----		-----	
6456		-----		-----	
	n	33			
	mean (n)	1 (1a/1b)			

Determination of Density at 15 °C on sample #22065; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
150	D4052	883.1	C,R(0.01)	-2.43	First reported 803.1
171	D4052	883.6		0.37	
323	ISO12185	883.6		0.37	
328	ISO12185	883.7		0.93	
334	ISO12185	883.5		-0.19	
335	ISO12185	883.4		-0.75	
351	ISO12185	883.54		0.04	
381	ISO12185	883.7	C	0.93	First reported 882.7
391	ISO12185	883.6		0.37	
396	ISO12185	883.6		0.37	
445		-----		-----	
460		-----		-----	
494	ISO12185	883.5		-0.19	
511		-----		-----	
540	D4052	883.5		-0.19	
551	D4052	883.5	C	-0.19	First reported 884.1
558	D4052	883.6		0.37	
621	D4052	883.6		0.37	
631	D4052	883.53		-0.02	
657	D4052	883.3		-1.31	
863		-----		-----	
1011	ISO12185	883.5		-0.19	
1134	D4052	883.7		0.93	
1135	D4052	883.6		0.37	
1227	D4052	883.5		-0.19	
1237	ISO12185	883.4		-0.75	
1299	ISO12185	883.6		0.37	
1316	ISO12185	883.5		-0.19	
1320	ISO12185	883.55		0.09	
1389	ISO12185	883.5		-0.19	
1468	ISO12185	883.6		0.37	
1494	D4052	883.55		0.09	
1539	ISO12185	883.6		0.37	
1564	ISO12185	883.6		0.37	
1569	ISO12185	883.6		0.37	
1643	D4052	883.3		-1.31	
1706	ISO12185	883.5		-0.19	
1707	ISO12185	883.6		0.37	
1710	ISO12185	883.5		-0.19	
1712		-----		-----	
1739	ISO3675	883.35		-1.03	
1740	ISO12185	883.4		-0.75	
1744	D4052	883.57		0.20	
1769	D4052	883.60		0.37	
1971	ISO12185	883.56		0.15	
1980	ISO12185	883.50		-0.19	
1994		-----		-----	
6069	D4052	883.540		0.04	
6179	D4052	883.55		0.09	
6213	ISO12185	883.62		0.48	
6259	D4052	883.54		0.04	
6265	ISO12185	883.47		-0.36	
6276	ISO12185	883.4		-0.75	
6300	ISO12185	883.6		0.37	
6325	ISO12185	883.5		-0.19	
6363	ISO12185	883.1	C,R(0.01)	-2.43	First reported 884.1
6373	ISO12185	883.5		-0.19	
6447	D4052	883.5		-0.19	
6456	ISO3675	880.0	R(0.01)	-19.79	

normality	OK	
n	50	
outliers	3	
mean (n)	883.534	
st.dev. (n)	0.0896	
R(calc.)	0.251	
st.dev.(ISO12185:96)	0.1786	
R(ISO12185:96)	0.5	
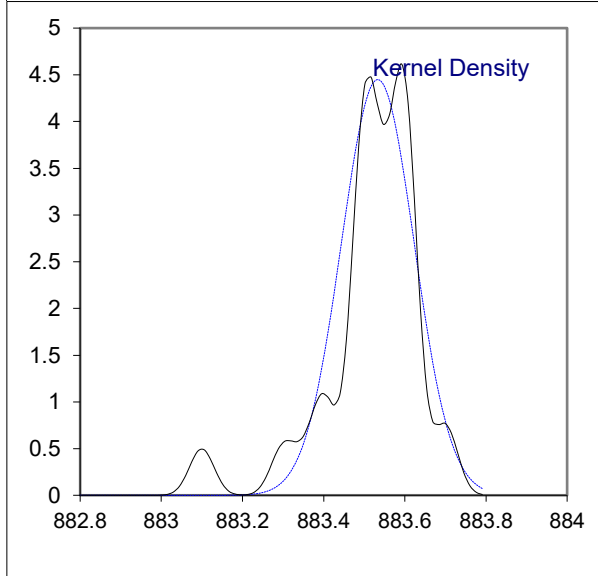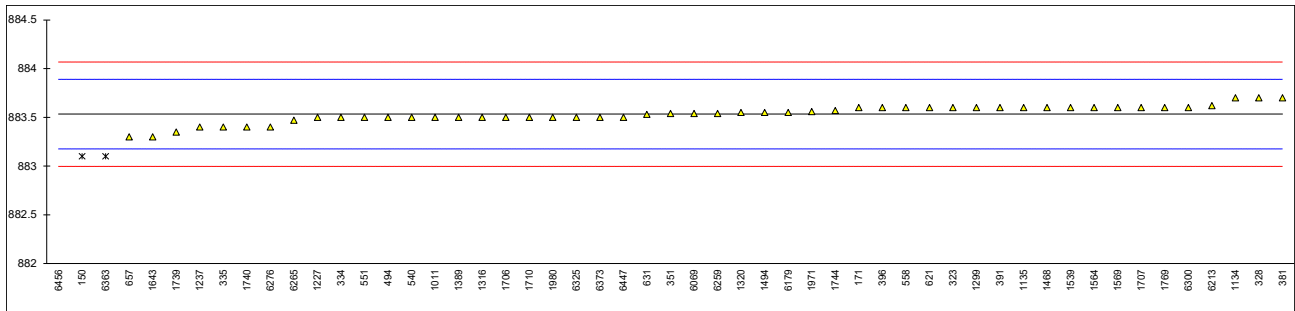
Determination of Flash Point PMcc on sample #22065; results in °C

lab	method	value	mark	z(targ)	remarks
150	D93-C	>110		-----	
171	D93-C	155.5		0.65	
323	D93-C	152.0		-0.01	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	ISO2719-C	154.0		0.37	
381	D93-C	162		1.89	
391	D93-A	154		0.37	
396	D93-C	166		2.65	
445		-----		-----	
460		-----		-----	
494	D93-C	151.0		-0.20	
511		-----		-----	
540		-----		-----	
551	D93-C	142.0		-1.92	
558		-----		-----	
621	D93-C	164.0		2.27	
631	D93-A	148.0		-0.77	
657	D93-C	150		-0.39	
863		-----		-----	
1011	ISO2719-C	151.0		-0.20	
1134	D93-C	138.5		-2.58	
1135	ISO2719-A	145.5		-1.25	
1227	D93-C	159		1.32	
1237		-----		-----	
1299		-----		-----	
1316	D93-C	146.0		-1.16	
1320	D93-C	149.5		-0.49	
1389	D93-C	150.0		-0.39	
1468	ISO2719-C	146.5		-1.06	
1494		-----		-----	
1539		-----		-----	
1564	D93-C	164		2.27	
1569	ISO2719-C	148.0		-0.77	
1643	D93-C	151		-0.20	
1706		-----		-----	
1707	D93-C	151		-0.20	
1710	ISO2719-C	152.5		0.08	
1712		-----		-----	
1739	ISO2719-C	142		-1.92	
1740	D93-C	143.5		-1.63	
1744		-----		-----	
1769		-----		-----	
1971		-----		-----	
1980	ISO2719-C	155.0		0.56	
1994	ISO2719-C	160		1.51	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325	ISO2719-C	158.5		1.23	
6363		-----		-----	
6373	D93-C	152.0		-0.01	
6447		-----		-----	
6456		-----		-----	

	normality	OK	
	n	30	
	outliers	0	
	mean (n)	152.07	
	st.dev. (n)	6.903	
	R(calc.)	19.33	
	st.dev.(D93-C:20)	5.250	
	R(D93-C:20)	14.7	
Compare			
	R(ISO2719-C:16)	14.7	

Kernel Density
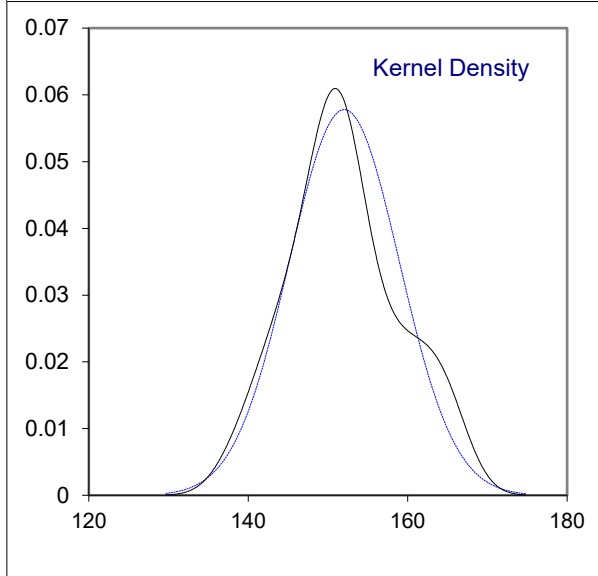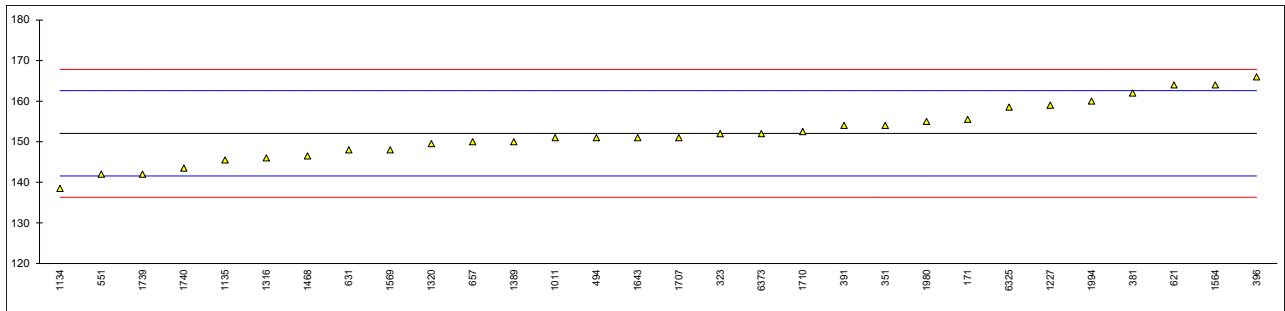
Determination of Flash Point recc on sample #22065; results in °C

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171		-----		-----	
323		-----		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494		-----		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134		-----		-----	
1135		-----		-----	
1227		-----		-----	
1237		-----		-----	
1299	ISO3679	170.5		-0.16	
1316		-----		-----	
1320		-----		-----	
1389		-----		-----	
1468		-----		-----	
1494		-----		-----	
1539	ISO3679	173.0		0.31	
1564		-----		-----	
1569		-----		-----	
1643		-----		-----	
1706		-----		-----	
1707	ISO3679	170		-0.25	
1710		-----		-----	
1712		-----		-----	
1739	ISO3679	169.19		-0.40	
1740		-----		-----	
1744		-----		-----	
1769		-----		-----	
1971		-----		-----	
1980	ISO3679	170.5		-0.16	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213	ISO3679	171.5		0.03	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325		-----		-----	
6363	ISO3679	174.8		0.64	
6373		-----		-----	
6447		-----		-----	
6456		-----		-----	
	normality	unknown			
	n	7			
	outliers	0			
	mean (n)	171.36			
	st.dev. (n)	1.940			
	R(calc.)	5.43			
	st.dev.(ISO3679:15)	5.357			
	R(ISO3679:15)	15.0			
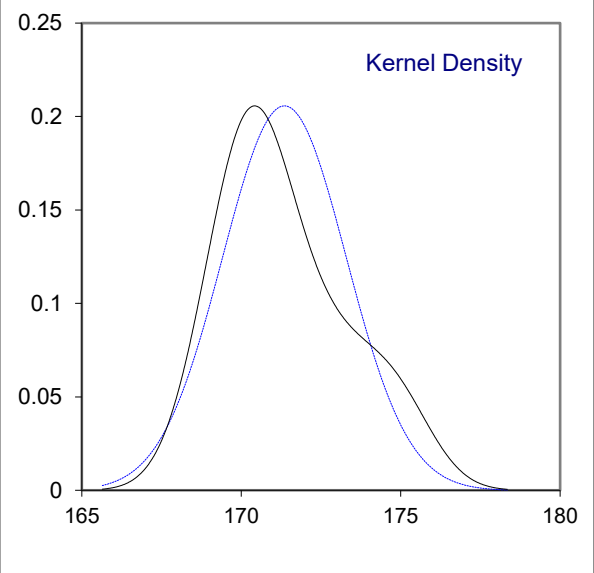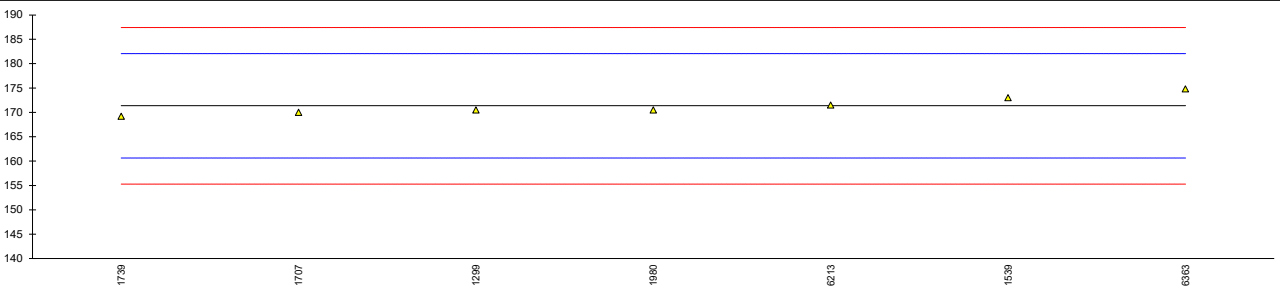
Determination of Iodine Value on sample #22065; results in g I_2/100g

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14111	113		-0.22	
323	EN14111	119	R(0.05)	3.14	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	EN14111	114.3		0.50	
381		-----		-----	
391	EN14111	122.5	R(0.05)	5.10	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN16300	111		-1.34	
511		-----		-----	
540	EN14111	114		0.34	
551	EN14111	112.6		-0.45	
558		-----		-----	
621	EN14111	112		-0.78	
631		-----		-----	
657	EN14111	115		0.90	
863		-----		-----	
1011		-----		-----	
1134		-----		-----	
1135	EN14111	113	C	-0.22	First reported 108
1227		-----		-----	
1237		-----		-----	
1299	EN14111	112.3		-0.62	
1316		-----		-----	
1320	EN14111	114		0.34	
1389	EN14111	114		0.34	
1468	EN14111	115		0.90	
1494	EN14111	114.2		0.45	
1539		-----		-----	
1564	EN14111	111		-1.34	
1569	EN16300	106.4	R(0.05)	-3.92	
1643		-----		-----	
1706		-----		-----	
1707	EN14111	114.7		0.73	
1710		-----		-----	
1712	EN14111	111.8		-0.90	
1739	EN14111	112.4		-0.56	
1740		-----		-----	
1744	EN14111	113.49		0.05	
1769	EN14111	114.63		0.69	
1971	EN14111	114.66		0.71	
1980	EN14111	114.5		0.62	
1994		-----		-----	
6069	EN14111	113.750		0.20	
6179	EN14111	113.8		0.22	
6213	EN14111	113.4		0.00	
6259	EN14111	112.53		-0.49	
6265		-----		-----	
6276	EN16300	109		-2.46	
6300	EN14111	115		0.90	
6325	EN14111	112		-0.78	
6363	EN14111	114.94		0.86	
6373	EN14111	116		1.46	
6447		-----		-----	
6456	EN14111	120	R(0.05)	3.70	

	normality	OK	
	n	30	
	outliers	4	
	mean (n)	113.40	
	st.dev. (n)	1.519	
	R(calc.)	4.25	
	st.dev.(EN14111:03)	1.786	
	R(EN14111:03)	5	
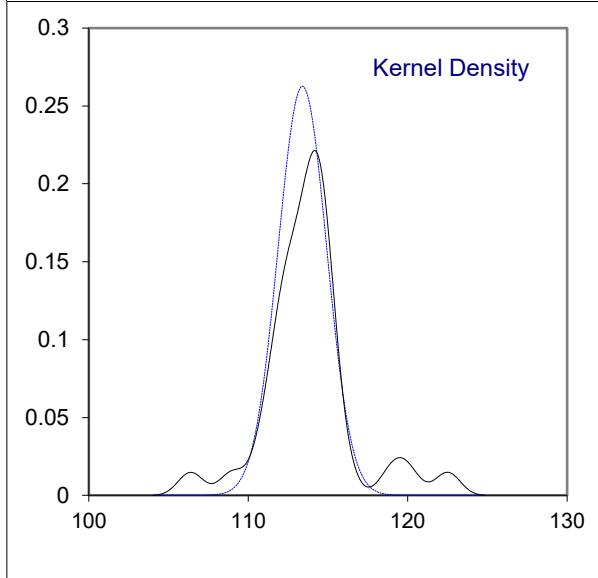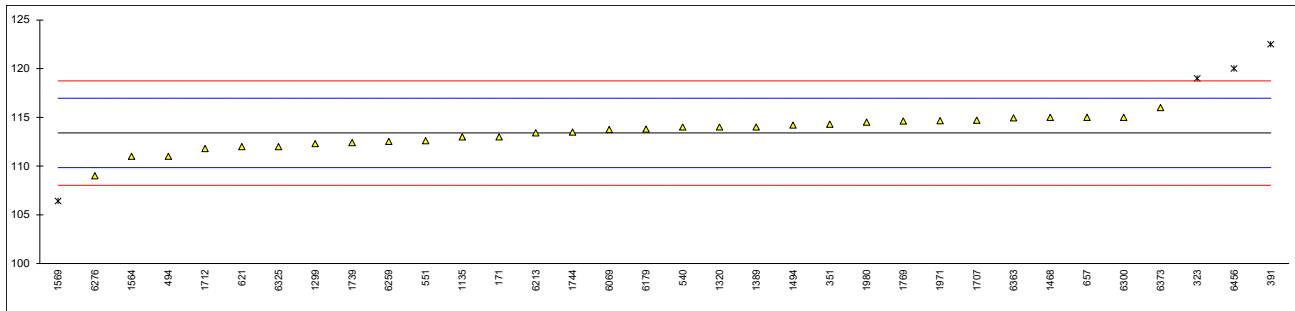
Determination of Kinematic Viscosity at 40 °C on sample #22065; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
150	D445	4.463		-0.25	
171	D445	4.464		-0.19	
323	ISO3104-A	4.470		0.19	
328		-----		-----	
334	ISO3104-B	4.468		0.06	
335	ISO3104-A	4.472		0.31	
351	ISO3104-A	4.460		-0.44	
381	D445	4.471		0.25	
391		-----		-----	
396	ISO3104	4.521	R(0.01)	3.37	
445		-----		-----	
460		-----		-----	
494	D445	4.478	C	0.69	First reported 4.508
511		-----		-----	
540	D445	4.467		0.00	
551	D445	4.455		-0.75	
558		-----		-----	
621	D445	4.467		0.00	
631	D445	4.4927		1.60	
657	D445	4.444		-1.44	
863		-----		-----	
1011		-----		-----	
1134	IP71	4.4353		-1.98	
1135	ISO3104-B	4.461		-0.37	
1227	D7042	4.4658		-0.08	
1237	ISO3104-A	4.4631		-0.24	
1299	ISO3104-B	4.334	R(0.01)	-8.31	
1316	ISO3104-B	4.466		-0.06	
1320	D445	4.472		0.31	
1389	ISO3104-A	4.450		-1.06	
1468	EN16896	4.516	R(0.01)	3.06	
1494	D445	4.4722		0.32	
1539	ISO3104-A	4.484		1.06	
1564	D445	4.538	R(0.01)	4.43	
1569	ISO3104-B	4.465		-0.13	
1643	D445	4.447		-1.25	
1706		-----		-----	
1707	ISO3104-B	4.456		-0.69	
1710	ISO3104-B	4.481		0.87	
1712		-----		-----	
1739	ISO3104-A	4.4619		-0.32	
1740	ISO3104-A	4.472		0.31	
1744	D445	4.4765		0.59	
1769	D445	4.4735		0.41	
1971	ISO3104-B	4.476		0.56	
1980	ISO3104-A	4.4624		-0.29	
1994		-----		-----	
6069	D445	4.4760		0.56	
6179	D445	4.474		0.44	
6213	ISO3104-A	4.44355		-1.46	
6259	D445	4.476		0.56	
6265	ISO3104	4.4748		0.49	
6276	EN16896	4.4753		0.52	
6300		-----		-----	
6325	ISO3104-A	4.481		0.87	
6363		-----		-----	
6373	D445	4.467		0.00	
6447		-----		-----	
6456		-----		-----	

	normality	OK	
	n	40	
	outliers	4	
	mean (n)	4.46700	
	st.dev. (n)	0.011725	
	R(calc.)	0.03283	
	st.dev.(ISO3104:20)	0.016011	
	R(ISO3104:20)	0.04483	
Compare			
	R(D445:21e1)	0.10006	
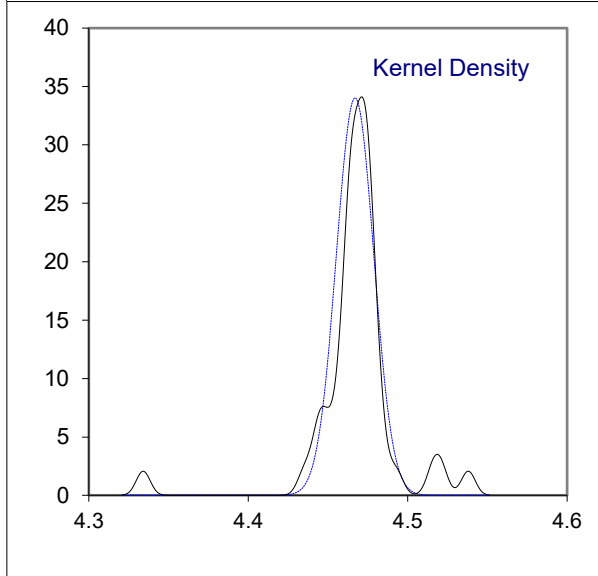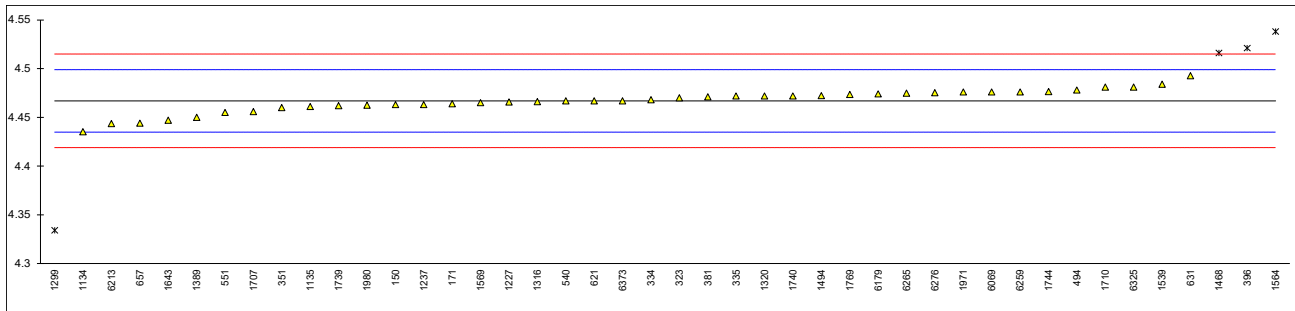
Determination of Oxidation Stability Induction period on sample #22065; results in hours

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171		-----		-----	
323	EN15751	3.8		-0.88	
328	EN15751	4.6		1.04	
334	EN15751	4.08		-0.20	
335		-----		-----	
351	EN15751	4.31		0.35	
381		-----		-----	
391	EN14112	4.39		0.54	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN15751	4.08		-0.20	
511		-----		-----	
540	EN14112	4.4		0.56	
551	EN14112	4.1		-0.16	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN15751	3.8		-0.88	
863		-----		-----	
1011	EN14112	4.5		0.80	
1134		-----		-----	
1135	EN14112	4.6		1.04	
1227	EN15751	4.08		-0.20	
1237	EN15751	5.63	R(0.01)	3.52	
1299	EN15751	4.18		0.04	
1316	EN14112	4.13		-0.08	
1320	EN15751	3.9		-0.64	
1389		-----		-----	
1468	EN15751	3.925		-0.58	
1494		-----		-----	
1539	EN15751	4.1		-0.16	
1564	EN14112	4.3		0.32	
1569	EN15751	3.3	R(0.05)	-2.08	
1643		-----		-----	
1706		-----		-----	
1707	EN14112	4.4		0.56	
1710	EN15751	4.2		0.08	
1712		-----		-----	
1739	EN14112	4.41		0.59	
1740	EN15751	3.96		-0.49	
1744		-----		-----	
1769		-----		-----	
1971	EN14112	3.67		-1.19	
1980	EN14112	4.10		-0.16	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213	EN14112	4.44		0.66	
6259		-----		-----	
6265	EN15751	4.05		-0.28	
6276	EN15751	3.85		-0.76	
6300	EN14112	4.1		-0.16	
6325	EN15751	4.3		0.32	
6363	EN15751	4.03		-0.32	
6373	EN15751	4.1		-0.16	
6447		-----		-----	
6456	EN14112	4.4		0.56	

	normality	OK	
	n	32	
	outliers	2	
	mean (n)	4.165	
	st.dev. (n)	0.2381	
	R(calc.)	0.667	
	st.dev.(EN15751:14)	0.4163	
	R(EN15751:14)	1.166	
Compare			
	R(EN14112:20)	1.313	
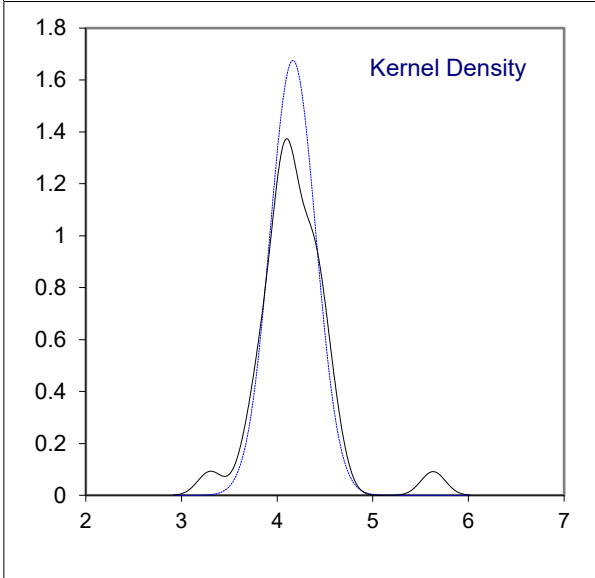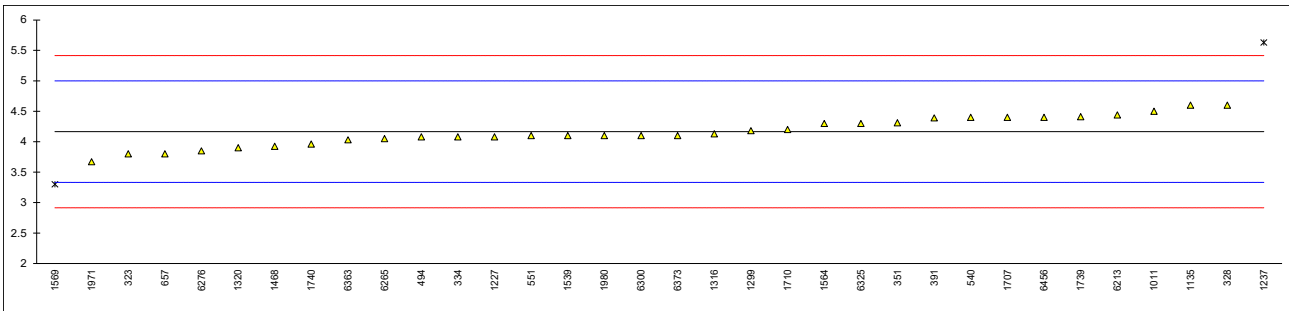
Determination of Pour Point on sample #22065; results in °C

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171		-----		-----	
323	ISO3016	-39		-0.28	
328	ISO3016	-39		-0.28	
334	ISO3016	-36		0.66	
335		-----		-----	
351	D6749	-21.0	R(0.01)	5.32	
381		-----		-----	
391	ISO3016	<-36		-----	
396	ISO3016	<-36		-----	
445		-----		-----	
460		-----		-----	
494	ISO3016	-35		0.97	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621	D97	<-24.0		-----	
631	D5949	-24	C,R(0.01)	4.39	First reported -18
657	D97	-39		-0.28	
863		-----		-----	
1011	ISO3016	<-21		-----	
1134	ISO3016	-39		-0.28	
1135	ISO3016	-36		0.66	
1227	D97	-37		0.35	
1237	ISO3016	-21	R(0.01)	5.32	
1299		-----		-----	
1316		-----		-----	
1320	ISO3016	-39		-0.28	
1389	D97	<-21		-----	
1468	ISO3016	-39		-0.28	
1494		-----		-----	
1539	ISO3016	-39		-0.28	
1564		-----		-----	
1569	D97	-38		0.03	
1643		-----		-----	
1706		-----		-----	
1707	ISO3016	-39		-0.28	
1710	ISO3016	<-30		-----	
1712		-----		-----	
1739		-----		-----	
1740	ISO3016	-39		-0.28	
1744		-----		-----	
1769		-----		-----	
1971		-----		-----	
1980	ISO3016	-39.0		-0.28	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259	D5950	-36		0.66	
6265		-----		-----	
6276		-----		-----	
6300	ISO3016	-39		-0.28	
6325	D97	<-24		-----	
6363		-----		-----	
6373	D97	-39		-0.28	
6447		-----		-----	
6456		-----		-----	

normality	suspect		
n	18		
outliers	3		
mean (n)	-38.11		
st.dev. (n)	1.410		
R(calc.)	3.95		
st.dev.(ISO3016:19)	3.214		
R(ISO3016:19)	9		
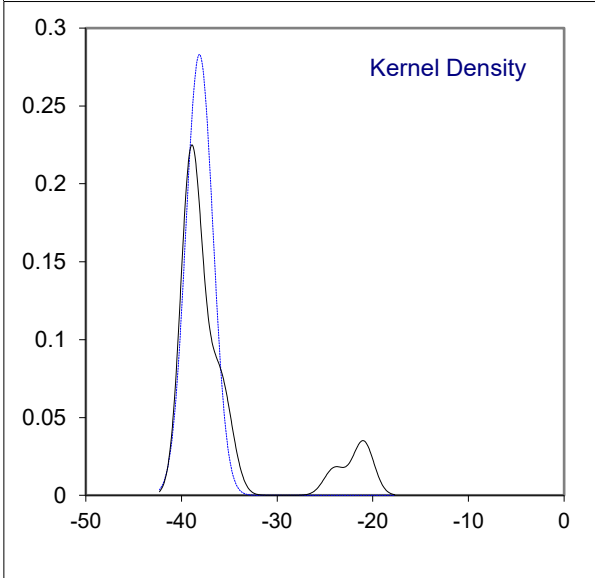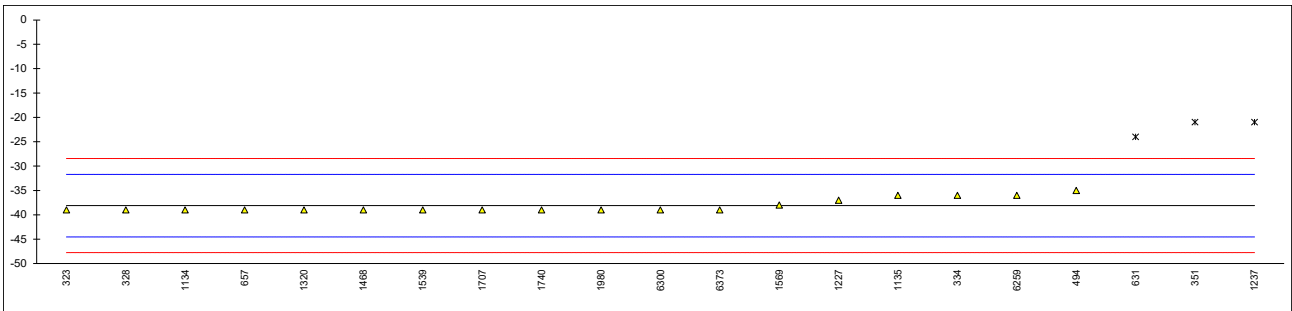
Determination of Sulfated Ash on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150	D874	<0.005		-----	
171	D874	<0.005		-----	
323	D874	< 0.005		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	ISO3987	<0,005		-----	
381		-----		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	D874	<0,005		-----	
511	D874	<0.005		-----	
540	ISO3987	0.008		-----	
551	D874	<0.005		-----	
558		-----		-----	
621	D874	<0.005		-----	
631	D874	<0.001		-----	
657	D874	<0.005		-----	
863		-----		-----	
1011		-----		-----	
1134		-----		-----	
1135	ISO3987	<0.005		-----	
1227		-----		-----	
1237		-----		-----	
1299	ISO3987	<0.005		-----	
1316	D874	0.00051		-----	
1320	D874	<0,001		-----	
1389	ISO3987	<0.005		-----	
1468	ISO3987	0.001		-----	
1494		-----		-----	
1539	ISO3987	<0,005		-----	
1564	D874	0.005		-----	
1569	D874	<0,005		-----	
1643		-----		-----	
1706		-----		-----	
1707	ISO3987	0.0022		-----	
1710	ISO3987	0.001		-----	
1712		-----		-----	
1739	ISO3987	0.0001		-----	
1740	D874	0.003		-----	
1744		-----		-----	
1769		-----		-----	
1971	ISO3987	<0,005		-----	
1980	ISO3987	<0.005	C	-----	First reported 0.0182
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325	ISO3987	0.001		-----	
6363		-----		-----	
6373	D874	<0.005		-----	
6447		-----		-----	
6456		-----		-----	
	n	27			
	mean (n)	<0.005			Application range ASTM D874:13aR18 >0.005%M/M

Determination of Sulfur on sample #22065; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D5453	2.17		-0.09	
171	D5453	2.0		-0.44	
323	ISO20846	3.3		2.22	
328	ISO20846	<3		-----	
334	ISO20846	<3		-----	
335	ISO20846	2.194		-0.04	
351	ISO20846	2.21		-0.01	
381	ISO20846	2.1		-0.24	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	ISO20846	2.3		0.17	
511		-----		-----	
540		-----		-----	
551	D4294	10.1	R(0.01)	16.14	
558		-----		-----	
621	D4294	<20		-----	
631		-----		-----	
657	D5453	2.0		-0.44	
863		-----		-----	
1011	ISO20846	2.2		-0.03	
1134	ISO20846	2.22		0.01	
1135	ISO20846	2.1		-0.24	
1227	D5453	1.7		-1.06	
1237	ISO20846	2.23		0.03	
1299	ISO20884	1.8		-0.85	
1316		-----		-----	
1320		-----		-----	
1389		-----		-----	
1468	ISO20846	2.0		-0.44	
1494		-----		-----	
1539	ISO20846	1.97		-0.50	
1564	ISO20846	2		-0.44	
1569	ISO20846	2.02		-0.40	
1643		-----		-----	
1706		-----		-----	
1707	ISO20846	2.3		0.17	
1710	ISO20846	2.1		-0.24	
1712		-----		-----	
1739	ISO13032	<LOQ		-----	
1740	ISO20846	2.2		-0.03	
1744		-----		-----	
1769		-----		-----	
1971	ISO20846	1.98		-0.48	
1980	ISO20846	2.1	C	-0.24	First reported 3.7
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213	In house	3.0	C	1.61	First reported 3.32
6259		-----		-----	
6265	ISO20846	3.3		2.22	
6276	ISO20846	2.34		0.25	
6300	ISO20846	2.7		0.99	
6325	ISO20846	2.2		-0.03	
6363	ISO13032	2.4		0.38	
6373	ISO20846	1.55		-1.36	
6447	D2622	2		-0.44	
6456		-----		-----	

	normality	not OK		
	n	31		
	outliers	1		
	mean (n)	2.216		
	st.dev. (n)	0.3912		
	R(calc.)	1.095		
	st.dev.(ISO20846:19)	0.4886		
	R(ISO20846:19)	1.368		Application range: 3 – 500 mg/kg
Compare				
	R(D5453:19a)	1.053		Application range: 1 – 8000 mg/kg
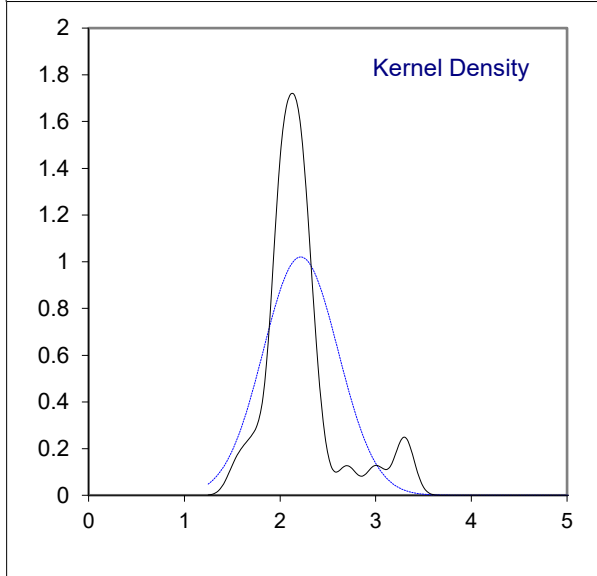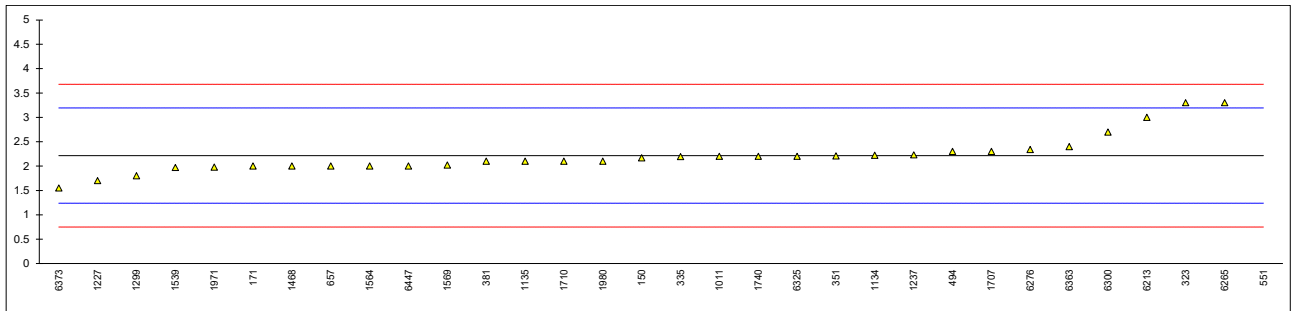
Determination of Water on sample #22065; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	ISO12937	427.87	C	0.90	First reported 652.15
171	D6304-A	380		-0.10	
323	ISO12937	360		-0.51	
328	ISO12937	400		0.32	
334	ISO12937	380		-0.10	
335	ISO12937	430		0.94	
351	ISO12937	370	C	-0.31	First reported 0.0232 %M/M
381	ISO12937	460		1.56	
391	ISO12937	370	C	-0.31	First reported 555
396	ISO12937	377		-0.16	
445		-----		-----	
460		-----		-----	
494	ISO12937	383		-0.04	
511		-----		-----	
540	ISO12937	338		-0.97	
551	D6304-A	389		0.09	
558	D6304	381.56		-0.07	
621	D6304-A	366		-0.39	
631	D6304-A	339.6		-0.94	
657	D6304-A	452		1.40	
863		-----		-----	
1011	ISO12937	340		-0.93	
1134	IP438	401		0.34	
1135	ISO12937	371		-0.28	
1227	D6304-A	372.7		-0.25	
1237	ISO12937	347.4		-0.77	
1299	ISO12937	390		0.11	
1316	ISO12937	370		-0.31	
1320	E203	346		-0.80	
1389	ISO12937	438		1.11	
1468	ISO12937	420		0.73	
1494	E203	383.5		-0.02	
1539	ISO12937	370		-0.31	
1564	ISO12937	414		0.61	
1569	ISO12937	375		-0.20	
1643	ISO6296	367		-0.37	
1706		-----		-----	
1707	ISO12937	365		-0.41	
1710	ISO12937	359		-0.53	
1712		-----		-----	
1739	ISO12937	337.25		-0.99	
1740	ISO12937	451		1.38	
1744	E203	392		0.15	
1769	ISO12937	379.4167		-0.11	
1971	ISO12937	402		0.36	
1980	ISO12937	439		1.13	
1994		-----		-----	
6069	ISO12937	384.2		-0.01	
6179	ISO12937	370		-0.31	
6213	ISO12937	373.9		-0.22	
6259	ISO12937	354.93		-0.62	
6265	In house	377.2		-0.16	
6276	ISO12937	424		0.82	
6300	ISO12937	378.4		-0.13	
6325	ISO12937	340		-0.93	
6363	ISO12937	328.8		-1.16	
6373	ISO12937	370		-0.31	
6447		-----		-----	
6456	ISO12937	484		2.06	

	normality	OK
	n	51
	outliers	0
	mean (n)	384.701
	st.dev. (n)	34.7775
	R(calc.)	97.377
	st.dev.(ISO12937:00)	48.1729
	R(ISO12937:00)	134.884
Compare		
	R(D6304-A:20)	600.823

Kernel Density
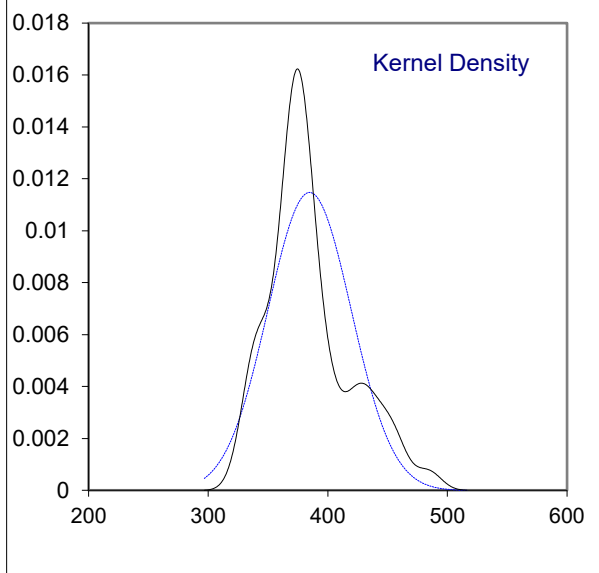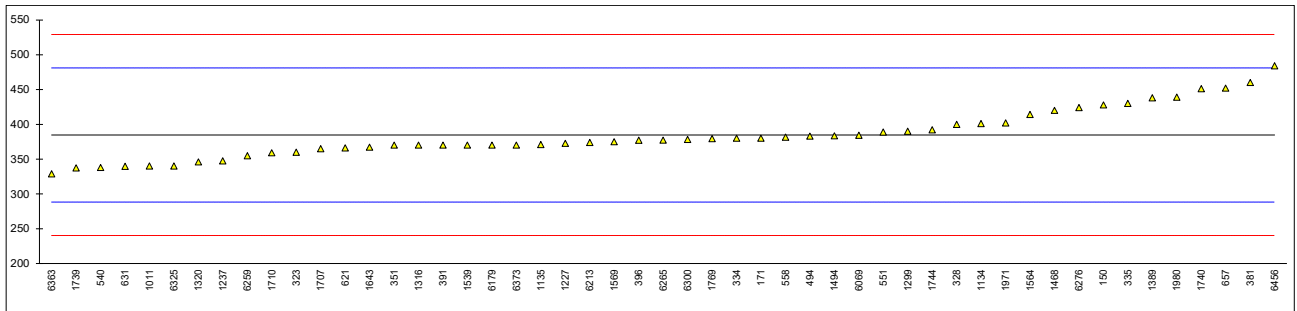
Determination of Water and Sediment on sample #22065; results in %V/V

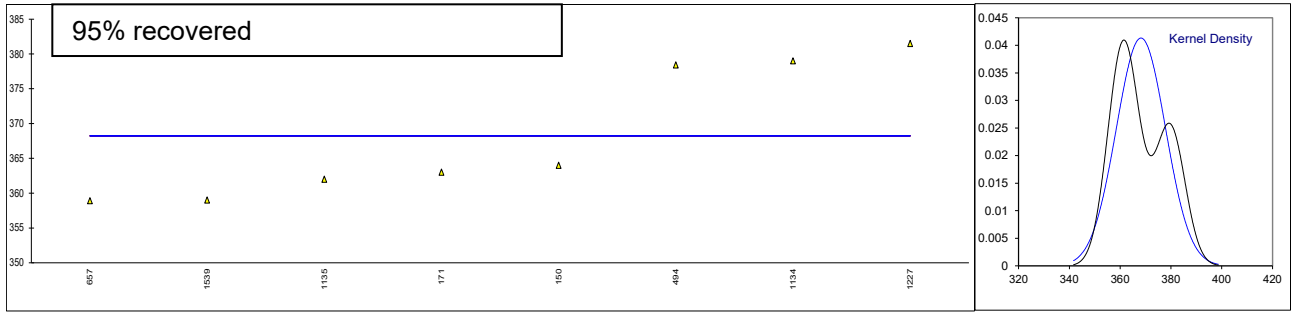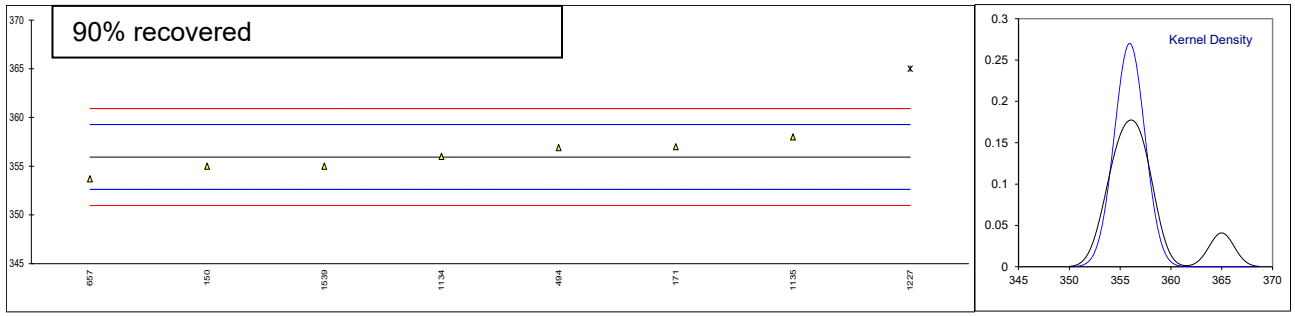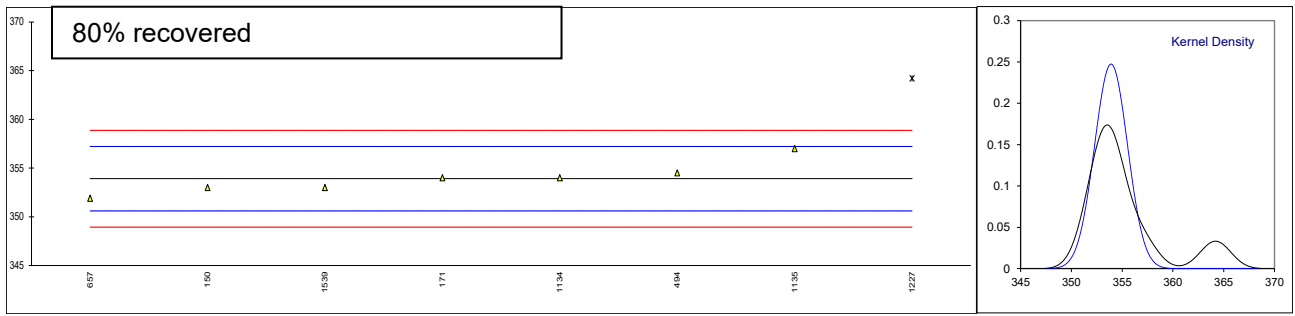| lab	method	value	mark	z(targ)	remarks
150	D2709	<0.01		-----	
171	D2709	<0.01		-----	
323		-----		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494		-----		-----	
511	D2709	<0.005		-----	
540		-----		-----	
551	D2709	<0.01		-----	
558		-----		-----	
621	D2709	<0.005		-----	
631	D2709	<0.01		-----	
657	D2709	<0.01		-----	
863		-----		-----	
1011		-----		-----	
1134		-----		-----	
1135		-----		-----	
1227		-----		-----	
1237		-----		-----	
1299		-----		-----	
1316		-----		-----	
1320		-----		-----	
1389		-----		-----	
1468		-----		-----	
1494		-----		-----	
1539		-----		-----	
1564		-----		-----	
1569		-----		-----	
1643		-----		-----	
1706		-----		-----	
1707		-----		-----	
1710		-----		-----	
1712		-----		-----	
1739		-----		-----	
1740	D2709	<0.01		-----	
1744		-----		-----	
1769		-----		-----	
1971		-----		-----	
1980		-----		-----	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325		-----		-----	
6363		-----		-----	
6373		-----		-----	
6447		-----		-----	
6456		-----		-----	
	outliers	8			
	mean (n)	<0.01			Application range ASTM D2709;16; >0.01%V/V

Determination of Calorific Value Gross at constant volume (H $_{o,v}$) on sample #22065; results in MJ/kg

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	D240	40.205		1.96	
323		-----		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494		-----		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621	D240	39.85		-0.53	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	D240	40.0971		1.20	
1135		-----		-----	
1227	D4809	39.6412		-1.99	
1237		-----		-----	
1299		-----		-----	
1316		-----		-----	
1320		-----		-----	
1389		-----		-----	
1468		-----		-----	
1494		-----		-----	
1539		-----		-----	
1564		-----		-----	
1569	D240	39.860		-0.46	
1643	D240	39.9669		0.29	
1706		-----		-----	
1707		-----		-----	
1710	D4809	39.890		-0.25	
1712		-----		-----	
1739		-----		-----	
1740	D240	39.890	C	-0.25	First reported 39890 MJ/kg
1744		-----		-----	
1769		-----		-----	
1971		-----		-----	
1980		-----		-----	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325		-----		-----	
6363		-----		-----	
6373		-----		-----	
6447		-----		-----	
6456		-----		-----	

|		
normality	unknown	
n	8	
outliers	0	
mean (n)	39.9250	
st.dev. (n)	0.17013	
R(calc.)	0.4764	
st.dev.(D240:19)	0.14286	
R(D240:19)	0.40	
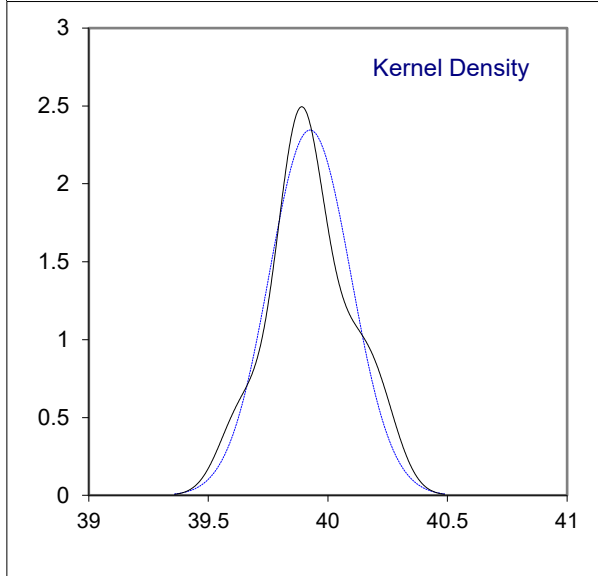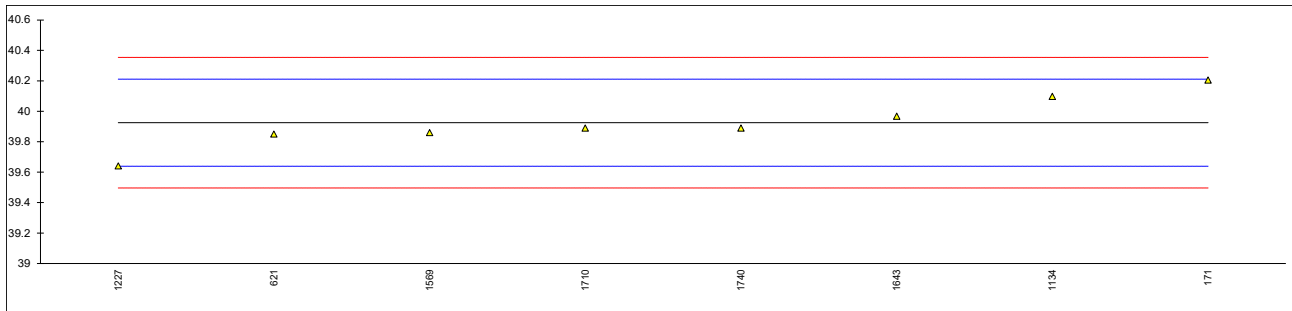
Determination of Distillation at 10 mmHg, % recovered as AET on sample #22065; results in °C

lab	method	80%rec.	mark	z(targ)	90%rec.	mark	z(targ)	95%rec.	mark	z(targ)
150	D1160	353		-0.55	355		-0.57	364		-----
171	D1160	354		0.05	357		0.64	363		-----
323		-----		-----	-----		-----	-----		-----
328		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
351		-----		-----	-----		-----	-----		-----
381		-----		-----	-----		-----	-----		-----
391		-----		-----	-----		-----	-----		-----
396		-----		-----	-----		-----	-----		-----
445		-----		-----	-----		-----	-----		-----
460		-----		-----	-----		-----	-----		-----
494	D1160	354.5		0.35	356.9		0.58	378.4		-----
511		-----		-----	-----		-----	-----		-----
540		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
558		-----		-----	-----		-----	-----		-----
621		-----		-----	-----		-----	-----		-----
631		-----		-----	-----		-----	-----		-----
657	D1160	351.9		-1.22	353.7		-1.35	358.9		-----
863		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1134	D1160	354		0.05	356		0.03	379		-----
1135	D1160	357		1.86	358		1.24	362		-----
1227	D6352	364.2	G(0.01)	6.21	365	G(0.01)	5.47	381.5		-----
1237		-----		-----	-----		-----	-----		-----
1299		-----		-----	-----		-----	-----		-----
1316		-----		-----	-----		-----	-----		-----
1320		-----		-----	-----		-----	-----		-----
1389		-----		-----	-----		-----	-----		-----
1468		-----		-----	-----		-----	-----		-----
1494		-----		-----	-----		-----	-----		-----
1539		353		-0.55	355		-0.57	359		-----
1564		-----		-----	-----		-----	-----		-----
1569		-----		-----	-----		-----	-----		-----
1643		-----		-----	-----		-----	-----		-----
1706		-----		-----	-----		-----	-----		-----
1707		-----		-----	-----		-----	-----		-----
1710		-----		-----	-----		-----	-----		-----
1712		-----		-----	-----		-----	-----		-----
1739		-----		-----	-----		-----	-----		-----
1740		-----		-----	-----		-----	-----		-----
1744		-----		-----	-----		-----	-----		-----
1769		-----		-----	-----		-----	-----		-----
1971		-----		-----	-----		-----	-----		-----
1980		-----		-----	-----		-----	-----		-----
1994		-----		-----	-----		-----	-----		-----
6069		-----		-----	-----		-----	-----		-----
6179		-----		-----	-----		-----	-----		-----
6213		-----		-----	-----		-----	-----		-----
6259		-----		-----	-----		-----	-----		-----
6265		-----		-----	-----		-----	-----		-----
6276		-----		-----	-----		-----	-----		-----
6300		-----		-----	-----		-----	-----		-----
6325		-----		-----	-----		-----	-----		-----
6363		-----		-----	-----		-----	-----		-----
6373		-----		-----	-----		-----	-----		-----
6447		-----		-----	-----		-----	-----		-----
6456		-----		-----	-----		-----	-----		-----

	normality	unknown			unknown			unknown		
	n	7			7			8		
	outliers	1			1			0		
	mean (n)	353.91			355.94			368.23		
	st.dev. (n)	1.613			1.476			9.650		
	R(calc.)	4.52			4.13			27.02		
	st.dev.(D1160:18)	1.657			1.657			(1.657)		
	R(D1160:18)	4.64			4.64			(4.64)		

80% recovered

90% recovered

95% recovered

Determination of Methanol on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14110	0.05		1.58	
323	EN14110	0.031		-2.68	
328		-----		-----	
334	EN14110	0.05		1.58	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494		-----		-----	
511		-----		-----	
540	EN14110	0.04		-0.66	
551	EN15794	0.032		-2.45	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14110	0.04		-0.66	
863		-----		-----	
1011		-----		-----	
1134		-----		-----	
1135	EN14110	0.04		-0.66	
1227		-----		-----	
1237		-----		-----	
1299	EN14110	0.041		-0.44	
1316		-----		-----	
1320	EN14110	0.042		-0.21	
1389		-----		-----	
1468	EN14110	0.035		-1.78	
1494		-----		-----	
1539		-----		-----	
1564	EN14110	0.0366	C	-1.42	First reported 0.07
1569		-----		-----	
1643		-----		-----	
1706		-----		-----	
1707	EN14110	0.051		1.80	
1710		-----	W	-----	Test result withdrawn, reported 0.02
1712	EN14110	0.05		1.58	
1739	EN14110	0.044		0.24	
1740		-----		-----	
1744	EN14110	0.045		0.46	
1769	EN14110	0.047		0.91	
1971	EN14110	0.043		0.01	
1980	EN14110	0.053		2.25	
1994		-----		-----	
6069	EN14110	0.0452		0.50	
6179	EN14110	0.046		0.68	
6213	EN14110	0.049		1.36	
6259	EN14110	0.0475		1.02	
6265	EN14110	0.045		0.46	
6276		-----		-----	
6300	EN14110	0.04		-0.66	
6325	EN14110	0.04		-0.66	
6363	EN14110	0.069	C,R(0.01)	5.84	First reported 0.086
6373	EN14110	0.0334		-2.14	
6447		-----		-----	
6456	EN14110	0.08	R(0.01)	8.30	

	normality	OK	
	n	26	
	outliers	2	
	mean (n)	0.04295	
	st.dev. (n)	0.006060	
	R(calc.)	0.01697	
	st.dev.(EN14110:19)	0.004461	
	R(EN14110:19)	0.01249	

Kernel Density
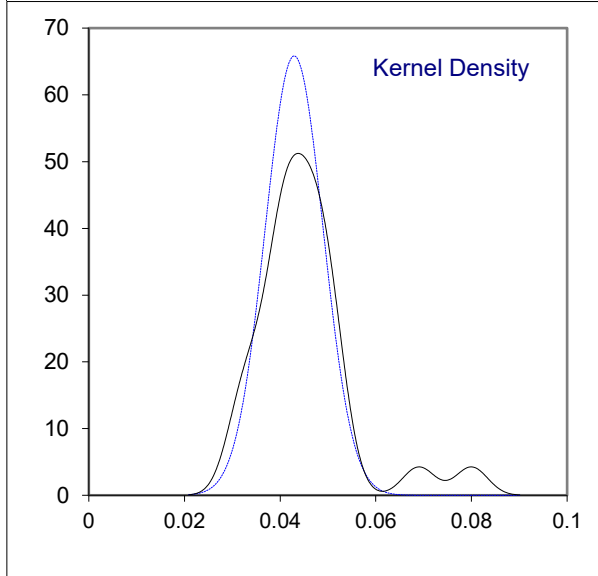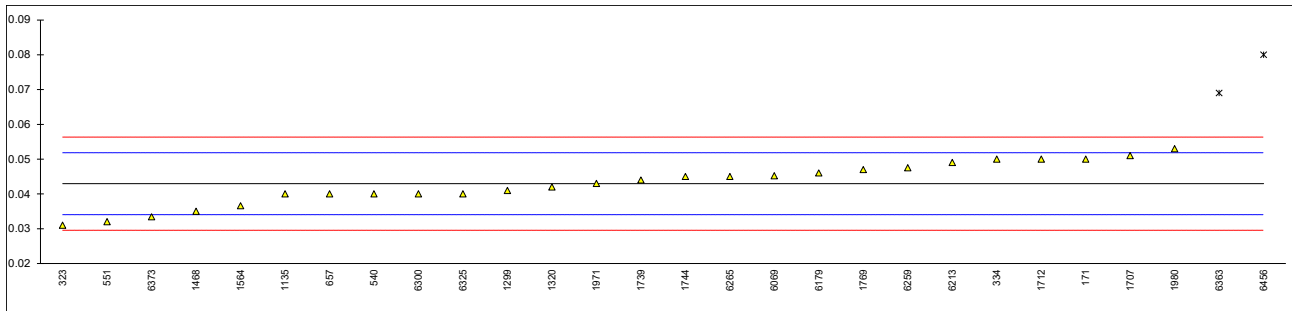
Determination of Monoglycerides on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.34		-0.03	
323		-----		-----	
328		-----		-----	
334	EN14105	0.28	C	-1.33	First reported 0.42
335		-----		-----	
351		-----		-----	
381		-----		-----	
391	EN14105	0.37		0.62	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN14105	0.396	C	1.19	First reported 0.428
511		-----		-----	
540	EN14105	0.36		0.41	
551	D6584	0.356		0.32	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	EN14105	0.29		-1.11	
1135	EN14105	0.35		0.19	
1227		-----		-----	
1237		-----		-----	
1299	EN14105	0.35		0.19	
1316		-----		-----	
1320	EN14105	0.36		0.41	
1389	EN14105	0.340		-0.03	
1468		-----		-----	
1494	D6584	0.3324		-0.19	
1539		-----		-----	
1564	EN14105	0.3815	C	0.87	First reported 0.178
1569	EN14105	0.310		-0.68	
1643		-----		-----	
1706		-----		-----	
1707	EN14105	0.385		0.95	
1710		-----		-----	
1712		-----		-----	
1739	EN14105	0.343		0.04	
1740		-----		-----	
1744	D6584	0.3353		-0.13	
1769	D6584	0.332		-0.20	
1971	EN14105	0.356		0.32	
1980	EN14105	0.32		-0.46	
1994		-----		-----	
6069	D6584	0.33392		-0.16	
6179	D6584	0.2839		-1.24	
6213	EN14105	0.34		-0.03	
6259	D6584	0.327		-0.31	
6265	EN14105	0.31		-0.68	
6276	EN14105	0.35		0.19	
6300	EN14105	0.333		-0.18	
6325	EN14105	0.36		0.41	
6363	EN14105	0.3619		0.45	
6373	EN14105	0.330		-0.24	
6447		-----		-----	
6456	EN14105	0.36		0.41	

normality	OK	
n	31	
outliers	0	
mean (n)	0.34119	
st.dev. (n)	0.027438	
R(calc.)	0.07683	
st.dev.(EN14105:20)	0.046107	
R(EN14105:20)	0.12910	
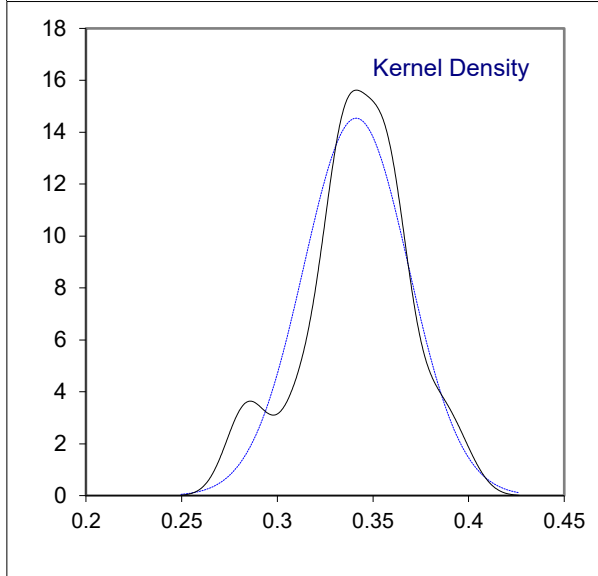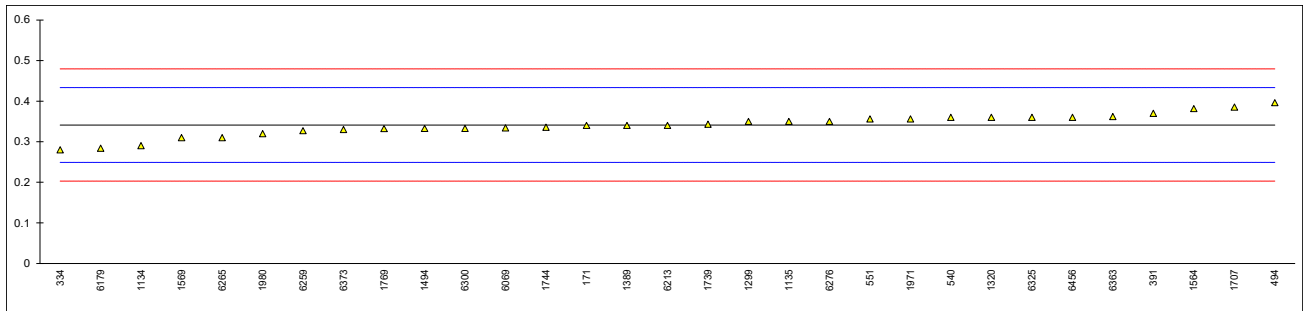
Determination of Diglycerides on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.13		1.32	
323		-----		-----	
328		-----		-----	
334	EN14105	<0.10		-----	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391	EN14105	0.14		1.89	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN14105	0.113		0.35	
511		-----		-----	
540	EN14105	0.10		-0.39	
551	D6584	0.121		0.80	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	EN14105	0.07		-2.11	
1135	EN14105	0.10		-0.39	
1227		-----		-----	
1237		-----		-----	
1299	EN14105	0.112		0.29	
1316		-----		-----	
1320	EN14105	0.12		0.75	
1389	EN14105	0.112		0.29	
1468		-----		-----	
1494	D6584	0.1213		0.82	
1539		-----		-----	
1564	EN14105	0.068		-2.22	
1569	EN14105	0.116		0.52	
1643		-----		-----	
1706		-----		-----	
1707	EN14105	0.080		-1.54	
1710		-----		-----	
1712		-----		-----	
1739	EN14105	0.114		0.40	
1740		-----		-----	
1744	D6584	0.1120		0.29	
1769	D6584	0.118		0.63	
1971	EN14105	0.10	C	-0.39	First reported 0.059
1980	EN14105	0.09		-0.97	
1994		-----		-----	
6069	D6584	0.11477		0.45	
6179	D6584	0.1138		0.39	
6213	EN14105	0.10		-0.39	
6259	D6584	0.114		0.40	
6265	EN14105	0.1		-0.39	
6276	EN14105	0.0997		-0.41	
6300	EN14105	0.108		0.06	
6325	EN14105	0.10		-0.39	
6363	EN14105	0.15	C	2.46	First reported 0.1656
6373	EN14105	0.100		-0.39	
6447		-----		-----	
6456	EN14105	0.07		-2.11	

normality	OK	
n	30	
outliers	0	
mean (n)	0.10692	
st.dev. (n)	0.018780	
R(calc.)	0.05258	
st.dev.(EN14105:20)	0.017519	
R(EN14105:20)	0.04905	
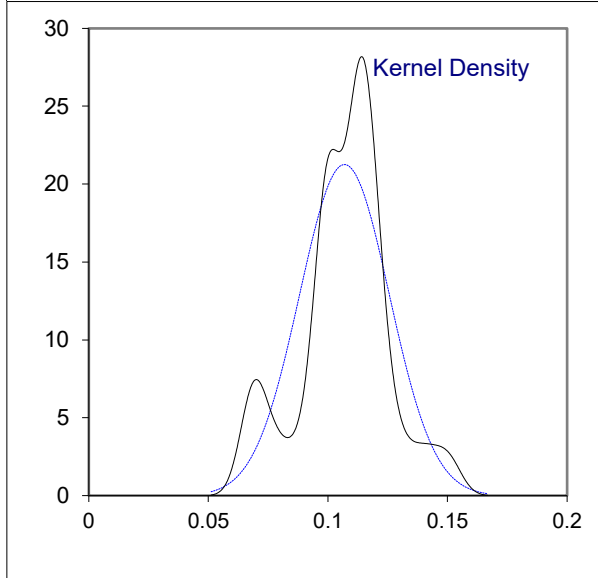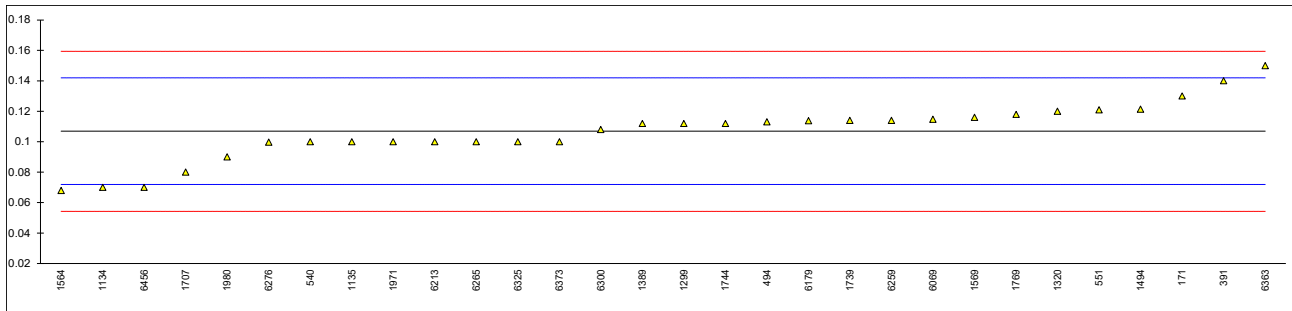
Determination of Triglycerides on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.055		-0.06	
323		-----		-----	
328		-----		-----	
334	EN14105	<0.10		-----	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391	EN14105	0.05		-0.26	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN14105	0.089	C	1.30	First reported 0.103
511		-----		-----	
540	EN14105	0.08		0.94	
551	D6584	0.051		-0.22	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	EN14105	0.03		-1.06	
1135	EN14105	<0.10		-----	
1227		-----		-----	
1237		-----		-----	
1299	EN14105	<0.1		-----	
1316		-----		-----	
1320	EN14105	0.05		-0.26	
1389	EN14105	0.068		0.46	
1468		-----		-----	
1494	D6584	0.0513		-0.21	
1539		-----		-----	
1564	EN14105	0.0577	C	0.04	First reported 0.012
1569	EN14105	0.052		-0.18	
1643		-----		-----	
1706		-----		-----	
1707	EN14105	0.052		-0.18	
1710		-----		-----	
1712		-----		-----	
1739	EN14105	0.050		-0.26	
1740		-----		-----	
1744	D6584	0.0556		-0.04	
1769	D6584	0.052		-0.18	
1971	EN14105	0.041		-0.62	
1980	EN14105	0.04		-0.66	
1994		-----		-----	
6069	D6584	0.05474		-0.07	
6179	D6584	0.0587		0.08	
6213	EN14105	0.05		-0.26	
6259	D6584	0.053		-0.14	
6265	EN14105	0.07		0.54	
6276	EN14105	0.0697		0.52	
6300	EN14105	0.057		0.02	
6325	EN14105	0.06	C	0.14	First reported 0.08
6363	EN14105	0.09	C	1.34	First reported 0.101
6373	EN14105	0	R(0.05)	-2.26	
6447		-----		-----	
6456	EN14105	0.04		-0.66	

	normality	suspect	
	n	27	
	outliers	1	
	mean (n)	0.05658	
	st.dev. (n)	0.013910	
	R(calc.)	0.03895	
	st.dev.(EN14105:20)	0.024998	
	R(EN14105:20)	0.06999	
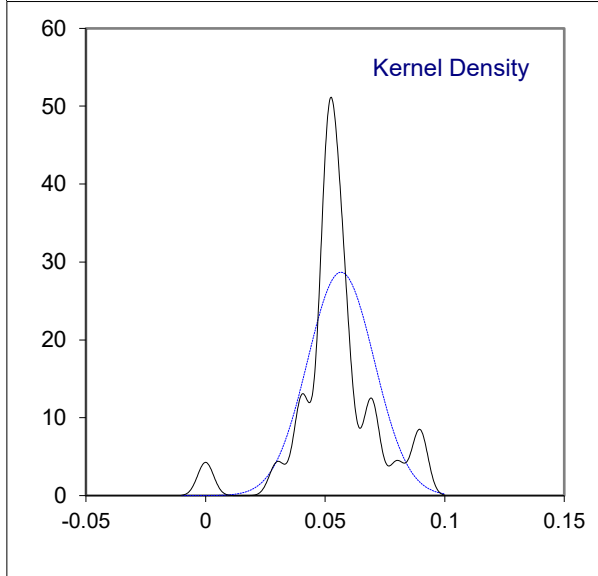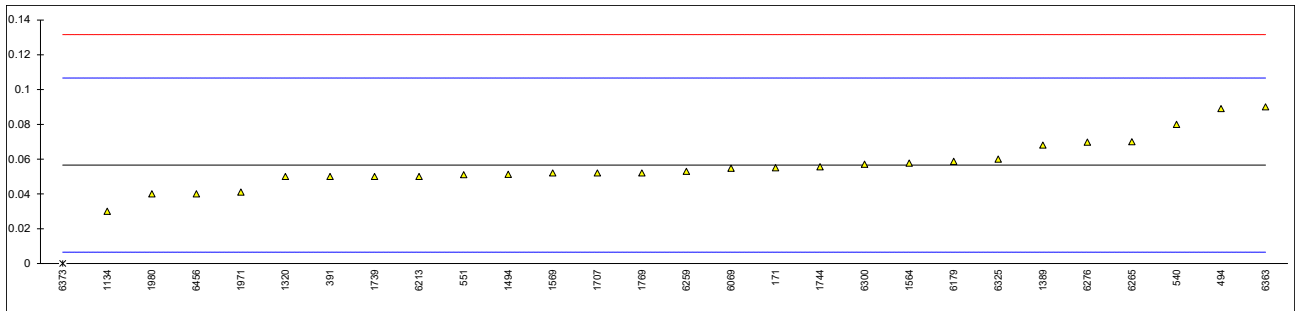
Determination of Free Glycerol on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.004		0.78	
323		-----		-----	
328		-----		-----	
334	EN14105	0.001		-0.51	
335		-----		-----	
351	EN14105	0.005		1.21	
381		-----		-----	
391	EN14105	0.001		-0.51	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN14105	0.006		1.64	
511		-----		-----	
540	EN14105	<0.01		-----	
551	D6584	0.005		1.21	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	EN14105	0.004		0.78	
1135	EN14105	0.001		-0.51	
1227		-----		-----	
1237		-----		-----	
1299	EN14105	0.001		-0.51	
1316		-----		-----	
1320	EN14105	0.001		-0.51	
1389	EN14105	0.001		-0.51	
1468		-----		-----	
1494	D6584	0.0021		-0.04	
1539		-----		-----	
1564	EN14105	0.002		-0.08	
1569	EN14105	0.002		-0.08	
1643		-----		-----	
1706		-----		-----	
1707	EN14105	0.0020		-0.08	
1710		-----		-----	
1712		-----		-----	
1739	EN14105	0.0016		-0.26	
1740		-----		-----	
1744		-----		-----	
1769	D6584	0.002		-0.08	
1971	EN14105	0.002		-0.08	
1980	EN14105	0.002		-0.08	
1994		-----		-----	
6069	D6584	0.00216		-0.02	
6179	D6584	0.0016		-0.26	
6213	EN14105	0.002		-0.08	
6259	D6584	0.001		-0.51	
6265	EN14105	0.005		1.21	
6276	EN14105	0.001		-0.51	
6300	EN14105	0.003		0.35	
6325	EN14105	0.0004		-0.77	
6363	EN14105	0.003		0.35	
6373	EN14105	0.001		-0.51	
6447		-----		-----	
6456	EN14105	0.00		-0.95	

normality	suspect	
n	30	
outliers	0	
mean (n)	0.00220	
st.dev. (n)	0.001529	
R(calc.)	0.00428	
st.dev.(EN14105:20)	0.002322	
R(EN14105:20)	0.00650	

Kernel Density
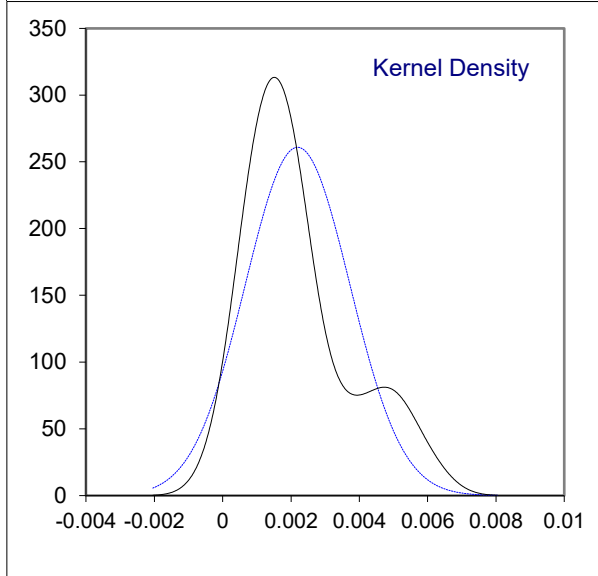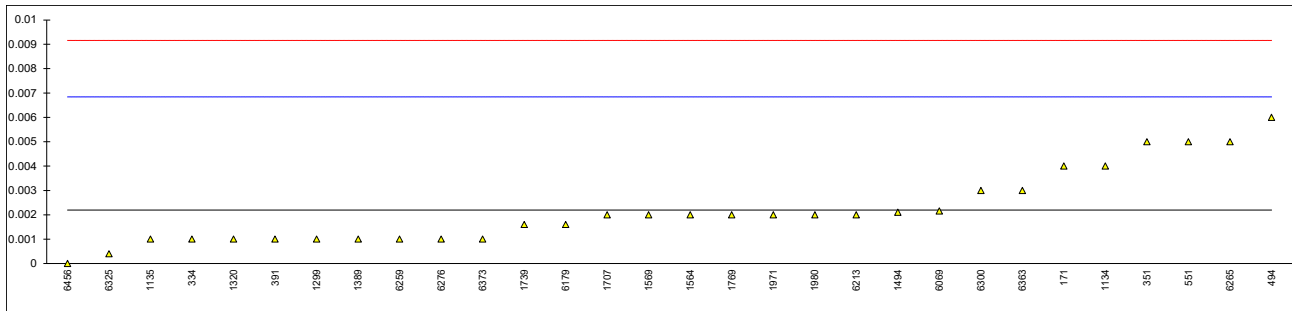
Determination of Total Glycerol on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.116		0.27	
323		-----		-----	
328		-----		-----	
334	EN14105	0.122		0.78	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391	EN14105	0.122		0.78	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN14105	0.131	C	1.55	First reported 0.142
511		-----		-----	
540	EN14105	0.12		0.61	
551	D6584	0.121		0.70	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	EN14105	0.091		-1.85	
1135	EN14105	0.110		-0.24	
1227		-----		-----	
1237		-----		-----	
1299	EN14105	0.113		0.02	
1316		-----		-----	
1320	EN14105	0.115		0.19	
1389	EN14105	0.11		-0.24	
1468		-----		-----	
1494	D6584	0.1117		-0.09	
1539		-----		-----	
1564	EN14105	0.136	C	1.97	First reported 0.059
1569	EN14105	0.098		-1.26	
1643		-----		-----	
1706		-----		-----	
1707	EN14105	0.117		0.36	
1710		-----		-----	
1712		-----		-----	
1739	EN14105	0.1194		0.56	
1740		-----		-----	
1744	D6584	0.1104		-0.20	
1769	D6584	0.112		-0.07	
1971	EN14105	0.115	C	0.19	First reported 0.1071
1980	EN14105	0.103		-0.83	
1994		-----		-----	
6069	D6584	0.11188		-0.08	
6179	D6584	0.0982		-1.24	
6213	EN14105	0.108		-0.41	
6259	D6584	0.109		-0.32	
6265	EN14105	0.105		-0.66	
6276	EN14105	0.11198		-0.07	
6300	EN14105	0.110		-0.24	
6325	EN14105	0.118		0.44	
6363	EN14105	0.1299		1.45	
6373	EN14105	0.101		-1.00	
6447		-----		-----	
6456	EN14105	0.10		-1.09	

|		
normality	OK	
n	31	
outliers	0	
mean (n)	0.11279	
st.dev. (n)	0.009993	
R(calc.)	0.02798	
st.dev.(EN14105:20)	0.011769	
R(EN14105:20)	0.03295	
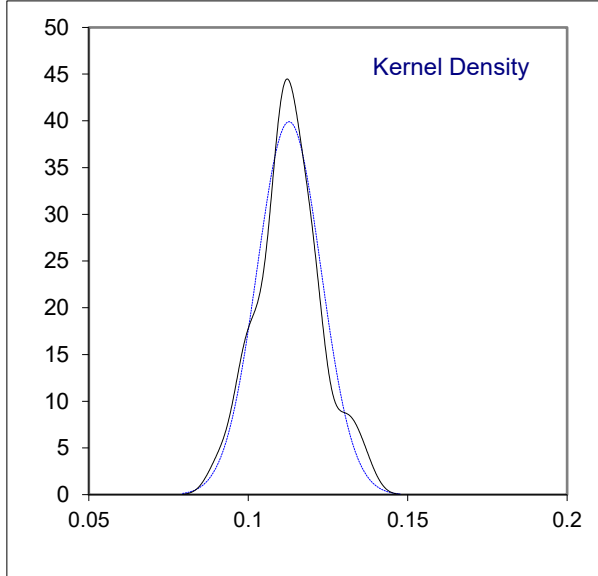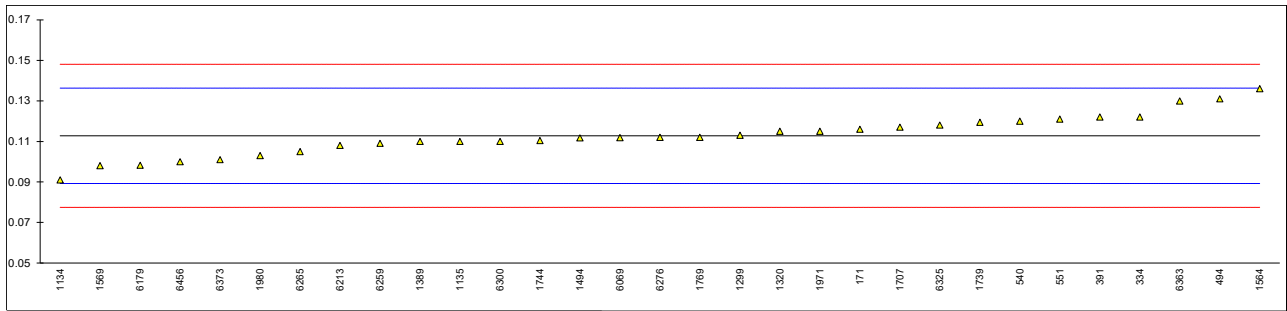
Determination of Total Ester content (FAME) on sample #22065; results in %M/M

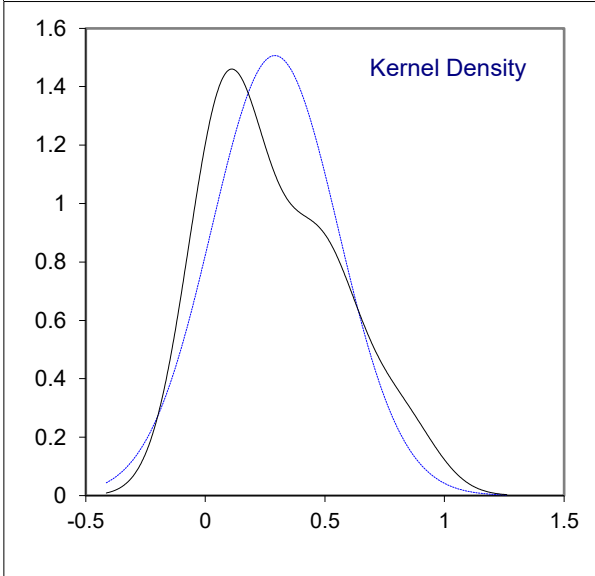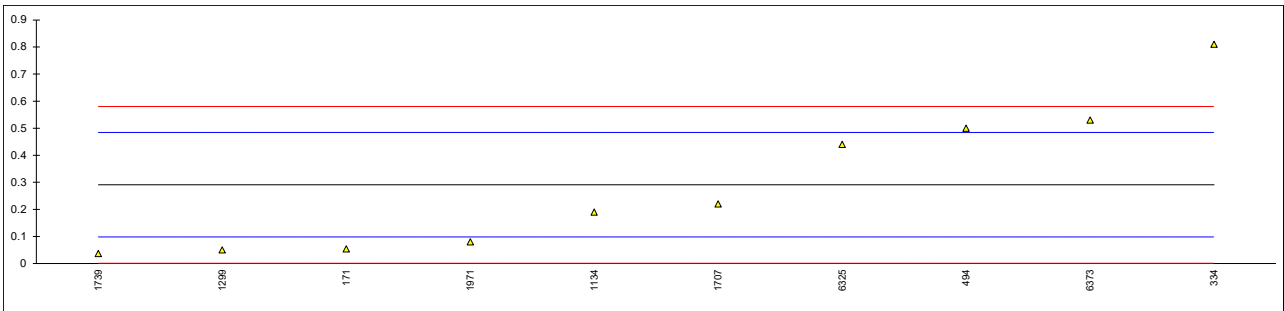| lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14103:2011	96.7		-0.65	
323		-----		-----	
328		-----		-----	
334	EN14103:2020	96.7		-0.65	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391	EN14103:2020	98.2		0.36	
396		-----		-----	
445		-----		-----	
460	EN14078	99.2	C	1.04	First reported 92.2
494	EN14103:2020	99.9		1.51	
511		-----		-----	
540	EN14103	97.3		-0.24	
551	NBR15764	93.2	R(0.01)	-3.00	
558		-----		-----	
621	EN14103:2011	99.01		0.91	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011	EN14103:2011	96.5		-0.78	
1134	EN14103:2020	96.015		-1.11	
1135	EN14103:2020	97.2		-0.31	
1227		-----		-----	
1237	EN14103:2011	96.65		-0.68	
1299	EN14103:2020	97.7		0.03	
1316		-----		-----	
1320	EN14103:2020	97.05		-0.41	
1389	EN14103:2003	98.43		0.52	
1468	EN14103:2011	97.9		0.16	
1494	EN14103:2011	97.64		-0.01	
1539		-----		-----	
1564	EN14103:2011	97.9		0.16	
1569	EN14103:2020	96.0		-1.12	
1643		-----		-----	
1706	EN14103:2011	97.732		0.05	
1707	EN14103:2020	99.2		1.04	
1710	EN14103:2011	99.2		1.04	
1712		-----		-----	
1739	EN14103:2011	97.64		-0.01	
1740		-----		-----	
1744	EN14103:2020	97.16		-0.34	
1769	EN14103:2020	97.124		-0.36	
1971	EN14103:2020	97.40		-0.17	
1980	EN14103:2020	96.3		-0.91	
1994		-----		-----	
6069	EN14103:2020	97.250		-0.28	
6179	EN14103:2020	97.14		-0.35	
6213	EN14103:2020	96.45		-0.81	
6259	EN14103:2020	96.8		-0.58	
6265	EN14103	99.75		1.41	
6276	EN14103:2011	97.41		-0.17	
6300		-----		-----	
6325	EN14103:2011	98.2		0.36	
6363	EN14103:2011	99.8876		1.50	
6373	EN14103:2011	97.6		-0.04	
6447		-----		-----	
6456	EN14103:2011	97.5		-0.11	
	normality	OK			
	n	36			
	outliers	1			
	mean (n)	97.6594			
	st.dev. (n)	1.07113			
	R(calc.)	2.9992			
	st.dev.(EN14103:20)	1.48571			
	R(EN14103:20)	4.16			
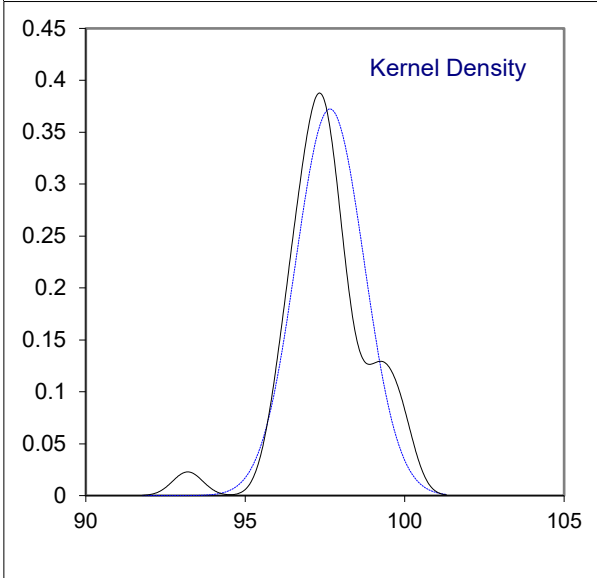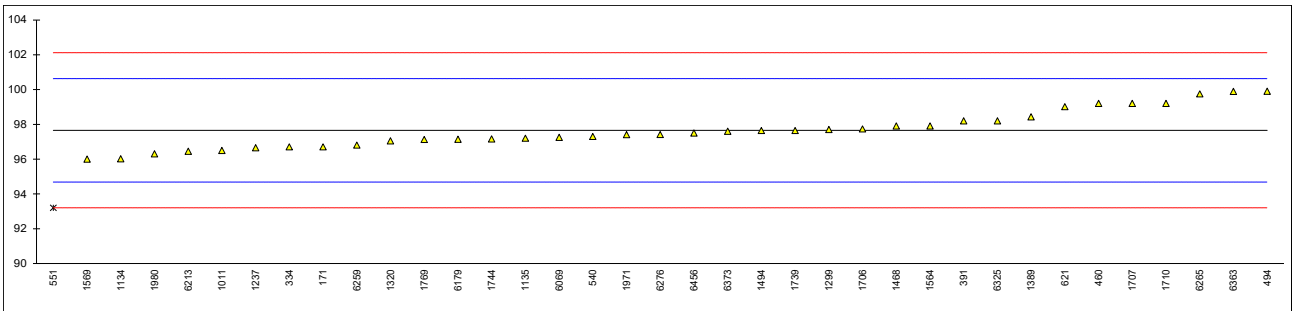
Determination of Linolenic Acid Methyl Ester content on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14103:2011	9.5		-0.77	
323		-----		-----	
328		-----		-----	
334	EN14103:2020	9.4		-1.19	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391	EN14103:2020	9.8		0.49	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN14103:2020	10.1		1.76	
511		-----		-----	
540	EN14103	9.6		-0.35	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	EN14103:2020	9.2075		-2.01	
1135	EN14103:2020	9.4		-1.19	
1227		-----		-----	
1237	EN14103:2011	9.55		-0.56	
1299	EN14103:2020	9.69		0.03	
1316		-----		-----	
1320	EN14103:2020	9.500		-0.77	
1389	EN14103:2003	9.93		1.04	
1468	EN14103:2011	10.1		1.76	
1494		-----		-----	
1539		-----		-----	
1564	EN14103:2011	9.7		0.07	
1569	EN14103:2020	9.6		-0.35	
1643		-----		-----	
1706	EN14103:2011	9.885		0.85	
1707	EN14103:2020	9.9	C	0.92	First reported 10.4
1710	EN14103:2011	9.7		0.07	
1712		-----		-----	
1739	EN14103:2011	9.64		-0.18	
1740		-----		-----	
1744		-----		-----	
1769		-----		-----	
1971	EN14103:2020	9.53		-0.65	
1980	EN14103:2020	9.6		-0.35	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213	EN14103:2020	9.65		-0.14	
6259		-----		-----	
6265	EN14103	10.29		2.56	
6276	EN14103:2011	9.55		-0.56	
6300		-----		-----	
6325	EN14103:2011	9.6		-0.35	
6363	EN14103:2011	9.5674		-0.49	
6373	EN14103:2011	9.7		0.07	
6447		-----		-----	
6456	EN14103:2011	9.75		0.28	

|				
	normality	OK		
	n	27		
	outliers	0		
	mean (n)	9.6830		
	st.dev. (n)	0.23535		
	R(calc.)	0.6590		
	st.dev.(EN14103:20)	0.23684		
	R(EN14103:20)	0.6632		

Kernel Density
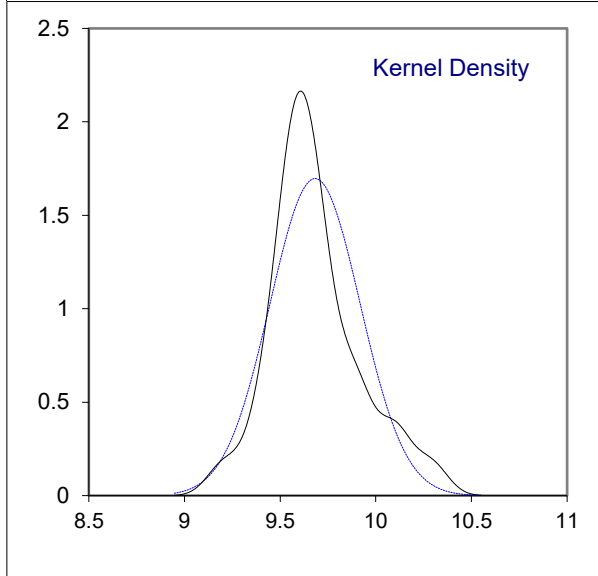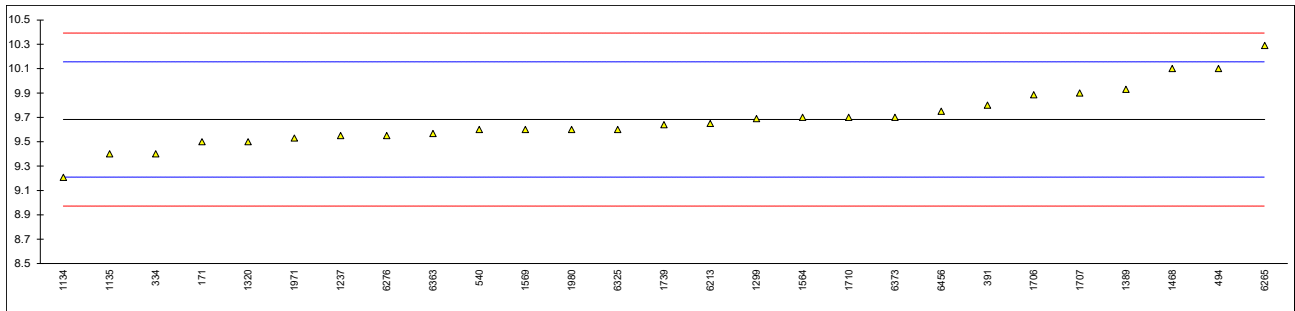
Determination of Polyunsaturated (multiple double bonds) Methyl Esters on sample #22065; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN15779	0.054		-2.46	
323		-----		-----	
328		-----		-----	
334	EN15779	0.81		5.38	
335		-----		-----	
351		-----		-----	
381		-----		-----	
391		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
494	EN15779	0.50	C	2.17	First reported 1.38
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN15779	<0.6		-----	
863		-----		-----	
1011		-----		-----	
1134	EN14103Mod.	0.190		-1.05	
1135	EN15779	<0.60		-----	
1227		-----		-----	
1237		-----		-----	
1299	EN15779	0.05		-2.50	
1316		-----		-----	
1320	EN15779	<0,1		-----	
1389		-----		-----	
1468	EN15779	<0,6		-----	
1494		-----		-----	
1539		-----		-----	
1564		-----		-----	
1569		-----		-----	
1643		-----		-----	
1706		-----		-----	
1707	EN15779	0.22		-0.74	
1710		-----		-----	
1712		-----		-----	
1739	EN15779	0.037		-2.64	
1740		-----		-----	
1744		-----		-----	
1769		-----		-----	
1971	EN15779	0.08		-2.19	
1980		-----		-----	
1994		-----		-----	
6069		-----		-----	
6179		-----		-----	
6213		-----		-----	
6259		-----		-----	
6265		-----		-----	
6276		-----		-----	
6300		-----		-----	
6325	EN15779	0.44		1.54	
6363		-----		-----	
6373		0.53		2.48	
6447		-----		-----	
6456	EN15779	<0.01	C	-----	First reported 30.1

|		
normality	OK	
n	10	
outliers	0	
mean (n)	0.2911	
st.dev. (n)	0.26476	
R(calc.)	0.7413	
st.dev.(EN15779:09+A1:13)	0.09643	
R(EN15779:09+A1:13)	0.27	

Determination of sum of Calcium and Magnesium as Ca + Mg on sample #22066; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14538	14.8		1.72	
323	EN14538	13.4		0.46	
334	EN14538	>10.0		-----	
381		-----		-----	
445		-----		-----	
494		-----		-----	
540		-----		-----	
551	EN14538	10.70	C	-1.97	First reported 7.5
657	EN14538	13.2		0.28	
1080	EN14538	9.73		-2.85	
1134	EN14538	12.633		-0.23	
1135	EN14538	14.9		1.81	
1191	D5185	10.36		-2.28	
1299		-----		-----	
1468	EN14538	12.35		-0.48	
1539	EN14538	14.34		1.31	
1564	EN14538	14.10		1.09	
1643	D5185	12.468		-0.38	
1707	EN14538	13.968		0.97	
1740	EN14538	15		1.90	
1971	EN14538	11.91		-0.88	
1980	EN14538	13.08		0.17	
6213	EN14538	12.65		-0.21	
6265		-----		-----	
6276		-----		-----	
6300	EN14538	13.3		0.37	
6373	EN14538	12.333		-0.50	
6379	D8110	12.5195		-0.33	

	normality	OK
	n	20
	outliers	0
	mean (n)	12.887
	st.dev. (n)	1.4620
	R(calc.)	4.094
	st.dev.(EN14538:06)	1.1093
	R(EN14538:06)	3.106
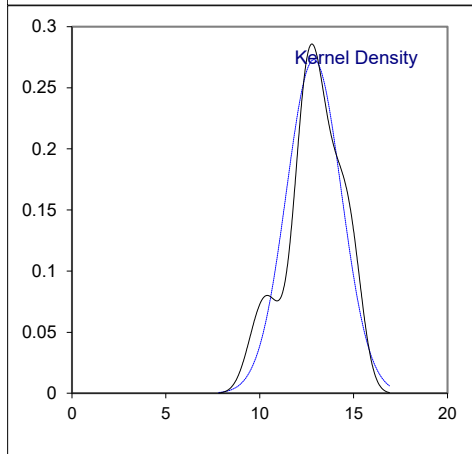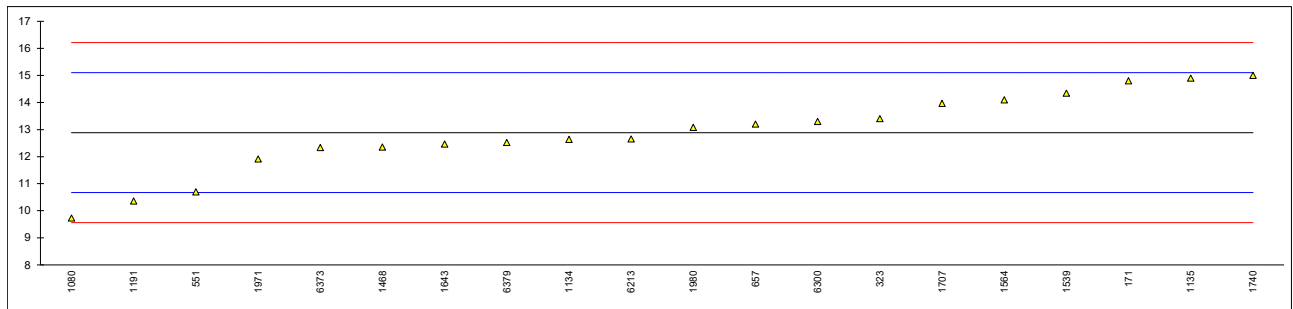
Determination of Phosphorus as P on sample #22066; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14107	8.1	C,R(0.05)	8.35	First reported 2.8
323	EN14107	5.3		0.55	
334	EN14107	<4.0		<-3.07	Possibly a false negative test result?
381	D7111	5.3		0.55	
445		-----		-----	
494		-----		-----	
540		-----		-----	
551	EN14107	4.01	C	-3.05	First reported 1.64
657	EN14107	5.2		0.27	
1080	D4918	5.81		1.97	
1134	EN14107	9.22	R(0.05)	11.47	
1135	EN14107	5.371		0.75	
1191	D5185	5.248		0.40	
1299	EN14107	5.1		-0.01	
1468	EN14107	4.4	C	-1.96	First reported 3.2
1539	EN14107	5.58		1.33	
1564	EN14107	5.4		0.83	
1643	D5185	3.787		-3.67	
1707	EN14107	5.368		0.74	
1740	EN14107	3.8		-3.63	
1971	EN14107	5.08		-0.07	
1980	EN14107	5.67		1.58	
6213	EN14107	5.32		0.60	
6265		-----		-----	
6276		-----		-----	
6300	EN14107	6.5		3.89	
6373	EN14107	1.76	R(0.05)	-9.32	
6379	D8110	4.723		-1.06	

normality	OK	
n	19	
outliers	3	
mean (n)	5.104	
st.dev. (n)	0.6932	
R(calc.)	1.941	
st.dev.(EN14107:03)	0.3589	
R(EN14107:03)	1.005	

Kernel Density
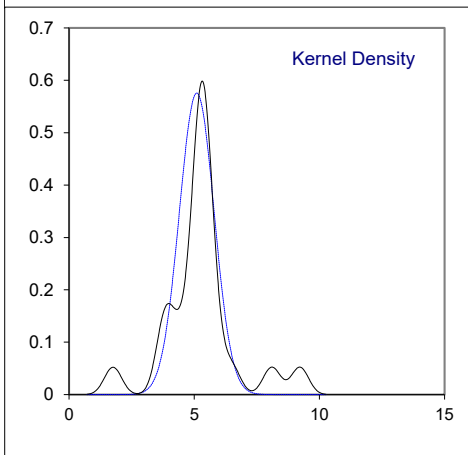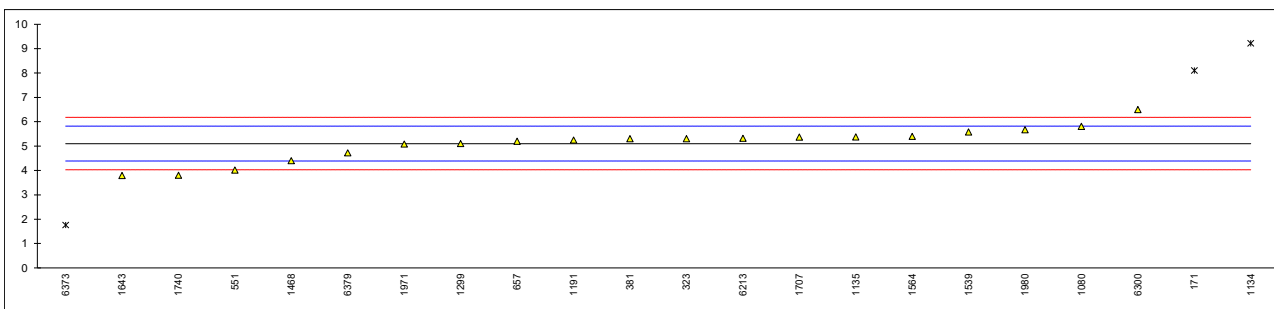
Determination of Potassium as K on sample #22066; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14109	8.6		0.00	
323	EN14538	10.0		0.81	
334	EN14538	>10.0		-----	
381	D7111	7.5		-0.63	
445		-----		-----	
494		-----		-----	
540		-----		-----	
551	EN14109	5.38	C	-1.85	First reported 0.48
657	EN14538	8.5		-0.06	
1080	EN14538	6.86		-1.00	
1134	EN14538	0.915	G(0.01)	-4.42	
1135	EN14109	8.699		0.06	
1191	D8110	9.3569		0.44	
1299		-----		-----	
1468	EN14538	7.5		-0.63	
1539		-----		-----	
1564	EN14538	10.0		0.81	
1643	D5185	11.48		1.66	
1707	EN14538	8.494		-0.06	
1740	EN14538	11.3		1.55	
1971		-----		-----	
1980		-----		-----	
6213	EN14538	8.09		-0.29	
6265		-----		-----	
6276	In house	9.38		0.45	
6300	EN14538	8.7		0.06	
6373	EN14538	7.996		-0.35	
6379	D8110	6.942		-0.95	
	normality	OK			
	n	18			
	outliers	1			
	mean (n)	8.599			
	st.dev. (n)	1.5323			
	R(calc.)	4.291			
	st.dev.(EN14109:03)	1.7373			
	R(EN14109:03)	4.864			
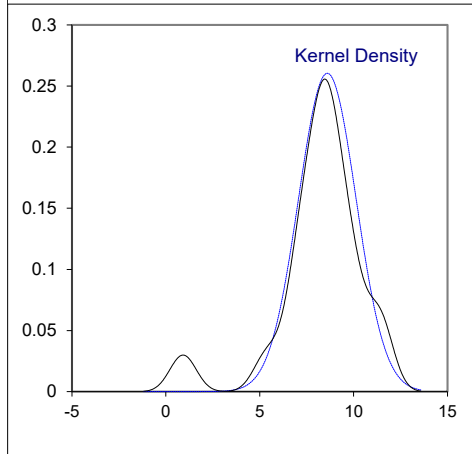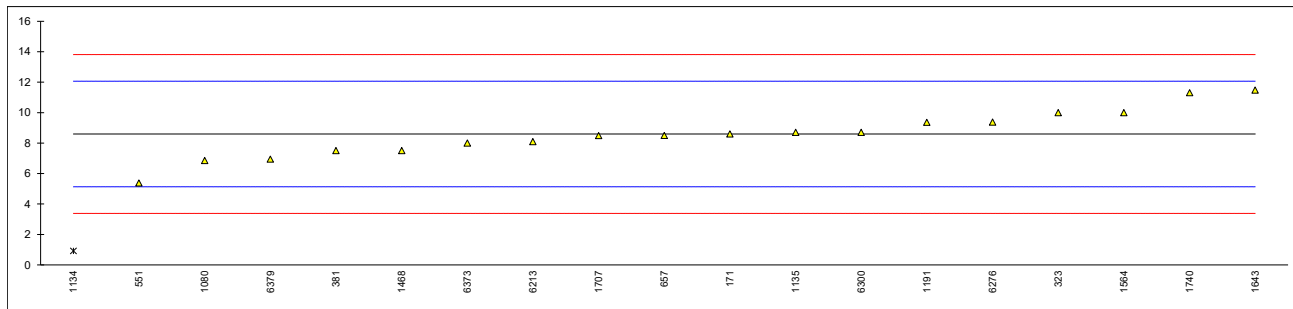
Determination of Sodium as Na on sample #22066; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14108	8.5		-0.23	
323	EN14538	9.7		0.68	
334	EN14538	>10.0		-----	
381	D7111	13.5		3.58	
445		-----		-----	
494		-----		-----	
540		-----		-----	
551	EN14108	6.17		-2.01	
657	EN14538	8.3		-0.38	
1080	EN14538	7.10		-1.30	
1134	EN14538	11.30		1.91	
1135	EN14108	6.200		-1.99	
1191	D5185	11.716		2.22	
1299		-----		-----	
1468	EN14538	7.5	C	-0.99	First reported 3.2
1539		-----		-----	
1564	EN14538	9.1		0.23	
1643	D5185	10.77		1.50	
1707	EN14538	8.795		-0.01	
1740	EN14538	10.9		1.60	
1971		-----		-----	
1980		-----		-----	
6213	EN14538	8.32		-0.37	
6265	In house	6.5		-1.76	
6276		-----		-----	
6300	EN14538	9.0		0.15	
6373	EN14538	6.43		-1.81	
6379	D8110	7.4455		-1.04	

normality	OK	
n	19	
outliers	0	
mean (n)	8.802	
st.dev. (n)	2.0769	
R(calc.)	5.815	
st.dev.(EN14108:03)	1.3107	
R(EN14108:03)	3.670	
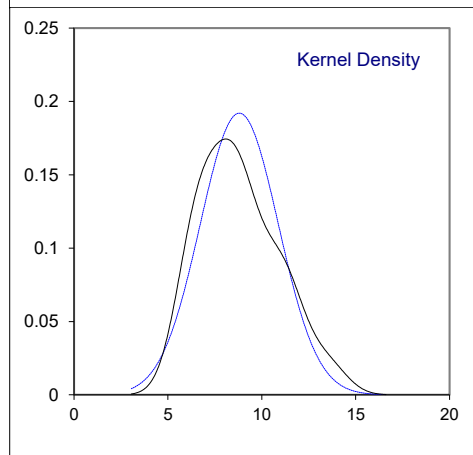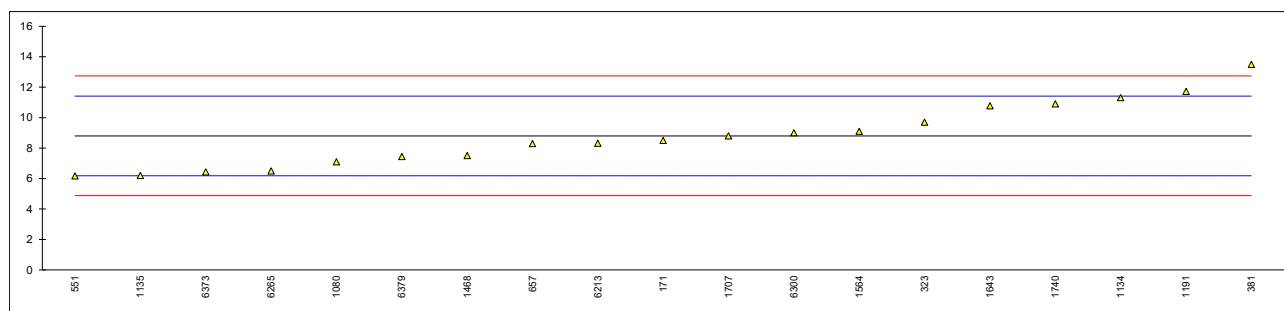
Determination of Sum of Potassium and Sodium as K + Na on sample #22066; results in mg/kg
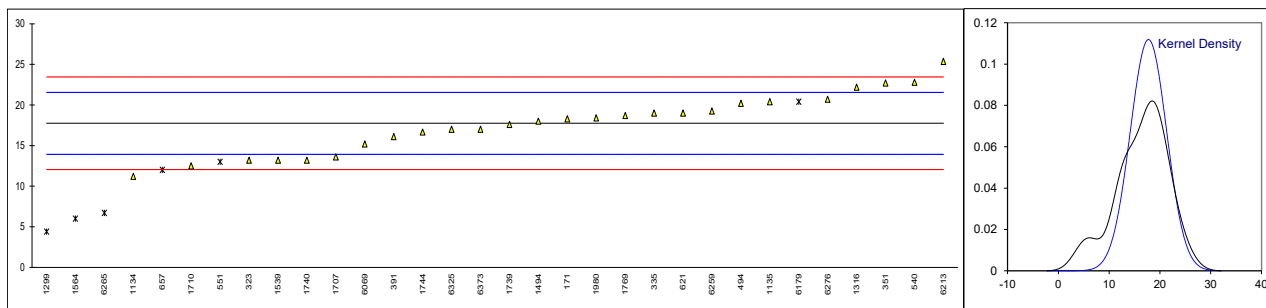
lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14538	16.3	E	-0.22	iis calculated 17.1
323	EN14538	19.7		2.10	
334	EN14538	>10.0		-----	
381		-----		-----	
445		-----		-----	
494		-----		-----	
540		-----		-----	
551	EN14538	9.73	C, E	-4.69	f.r. 6.65. iis calculated 11.55.
657	EN14538	16.8		0.12	
1080	EN14538	13.96		-1.81	
1134	EN14538	12.215	ex	-3.00	Test result excluded, outlier in K
1135	EN14538	13.2	E	-2.33	iis calculated 14.90
1191		-----		-----	
1299		-----		-----	
1468	EN14538	15.0	C	-1.10	First reported 10.7
1539	EN14538	17.18		0.38	
1564	EN14538	19.1		1.69	
1643	D5185	22.25		3.83	
1707	EN14538	17.289		0.46	
1740	EN14538	22.2		3.80	
1971	EN14538	15.74		-0.60	
1980	EN14538	17.78		0.79	
6213	EN14538	16.41		-0.14	
6265		-----		-----	
6276		-----		-----	
6300	EN14538	17.7		0.73	
6373	EN14538	14.43		-1.49	
6379	D8110	14.3874		-1.52	

	normality	OK
	n	18
	outliers	0 (+1ex)
	mean (n)	16.620
	st.dev. (n)	3.0807
	R(calc.)	8.626
	st.dev.(EN14538:06)	1.4698
	R(EN14538:06)	4.115
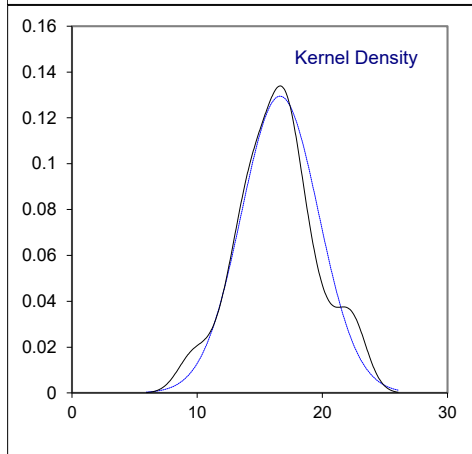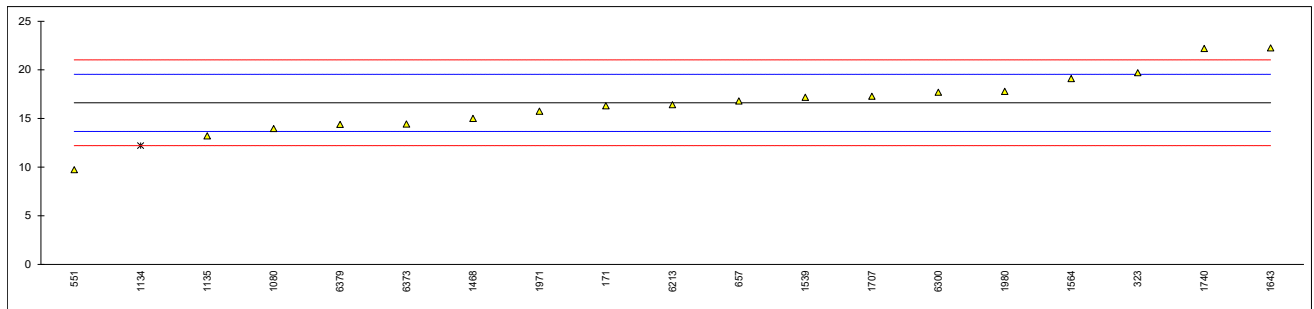
Determination of Total Contamination (EN12662) on sample #22067; results in mg/kg

lab	method	value	mark	z(targ)	Complete	Vol.filtered (mL)	Stopped (min)	
150		-----		-----	-----	-----	-----	
171	EN12662:2008	18.3		0.08	-----	-----	-----	
323	EN12662:2008	13.2		-2.54	Yes	800	-----	
334		-----		-----	-----	-----	-----	
335	EN12662:1998	19		0.44	Yes	-----	-----	
351	EN12662:1998	22.7		2.35	Yes	300	yes	
391	EN12662:2008	16.1		-1.05	-----	-----	-----	
445		-----		-----	-----	-----	-----	
494	EN12662:1998	20.2		1.06	Yes	-----	-----	
540	EN12662:1999	22.8		2.40	No	400	2400	
551	EN12662:2014	13.0	ex	-2.65	Yes	309	4	
621	EN12662:2008	19		0.44	Yes	300	25	
657	EN12662:2014	12	ex	-3.16	Yes	300	1.28	
1134	EN12662:1998	11.2		-3.57	Yes	-----	-----	
1135	EN12662:1998	20.4		1.16	Yes	282.51	155	
1299	EN12662:1998	4.4	R(0.05)	-7.07	Yes	300	-----	
1316	EN12662:2008	22.2		2.09	No	350	30	
1320		-----		-----	-----	-----	-----	
1494	EN12662:2008	18.0		-0.07	-----	-----	-----	
1539	EN12662:2008	13.2		-2.54	-----	-----	-----	
1564	EN12662:2008	6	R(0.05)	-6.25	Yes	858.9	15	
1707	EN12662:2014	13.6	ex	-2.34	Yes	300	-----	
1710	EN12662:2014	12.5	ex	-2.90	Yes	800	-----	
1739	EN12662:1998	17.60		-0.28	Yes	-----	-----	
1740	EN12662:2008	13.2		-2.54	-----	800	-----	
1744	EN12662:2008	16.66		-0.76	Yes	800	-----	
1769	EN12662:2008	18.7		0.29	-----	-----	-----	
1971		-----		-----	No	500	60	
1980	EN12662:2008	18.4		0.13	Yes	800	-----	
6069	EN12662:2008	15.20		-1.51	-----	-----	-----	
6179	EN12662:2014	20.4	ex	1.16	Yes	-----	-----	
6213	EN12662:1998	25.37	C	3.72	No	588	137	fr 28.47
6259	EN12662:2008	19.26		0.58	-----	-----	-----	
6265	EN12662:1998	6.70	R(0.05)	-5.89	Yes	313.35g	3	
6276	EN12662:1998	20.7		1.32	Yes	-----	-----	
6325	EN12662:1998	17		-0.59	Yes	-----	-----	
6373	EN12662:1998	17		-0.59	Yes	-----	-----	

normality	OK
n	24
outliers	3 (+5ex)
mean (n)	18.141
st.dev. (n)	3.4236
R(calc.)	9.586
st.dev.(EN12662:08)	1.9437
R(EN12662:08)	5.442

ex = excluded from statistical analysis. Test result has been excluded because EN12662:2014 is not applicable to FAME (B100) according to CEN/TC 19 Committee, instead either method EN12662:1998 or EN12662:2008 should be used. See also iis memo 1903.

Determination of Filter Blocking Potential by Cold Soak Filterability Test (CSFT) on sample #22068; results in s

lab	method	value	mark	z(targ)	Vol. (mL) at time >720sec	remarks
150		-----		-----	-----	
171	D7501	92		-1.23	<1mL	
323		-----		-----	-----	
494	D7501	23	D(0.05)	-7.05	-----	
540	D7501	121		1.21	-----	
657		-----		-----	-----	
1134		-----		-----	-----	
1135		-----		-----	-----	
1320		-----		-----	-----	
1494	D7501	108		0.12	-----	
1539	D7501	88		-1.57	-----	
1739		-----		-----	-----	
1769	D7501	121		1.21	-----	
1953		-----		-----	-----	
1971	D7501	84		-1.91	-----	
6069	D7501	115.0		0.71	-----	
6179	D7501	124	C	1.47	-----	First reported 224
6213	D7501	175	D(0.05)	5.77	-----	
6259		-----		-----	-----	
6265		-----		-----	-----	
6276		-----		-----	-----	

normality	OK	
n	8	
outliers	2	
mean (n)	106.63	
st.dev. (n)	16.300	
R(calc.)	45.64	
st.dev.(D7501:21)	11.856	
R(D7501:21)	33.20	

Kernel Density
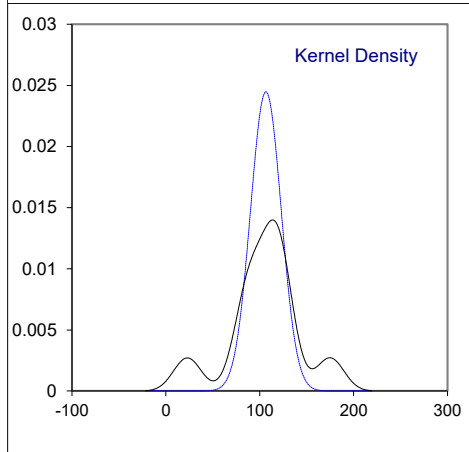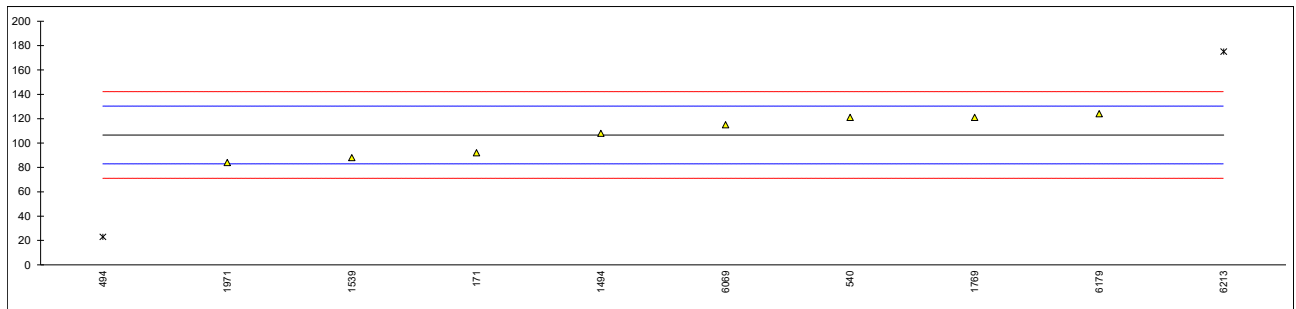
Determination of Filter Blocking Tendency (FBT) on sample #22068

lab	method	value	mark	z(targ)	press. end test (kPa)	vol. pumped (mL)	remarks
150		-----		-----	-----	-----	
171		-----		-----	-----	-----	
323		-----		-----	-----	-----	
494	D2068-B	1.03		-0.28	25	-----	
540		-----		-----	-----	-----	
657	IP387-B	1.03		-0.28	25	300	
1134		-----		-----	-----	-----	
1135	IP387-B	1.04		0.14	30	300	
1320		-----		-----	-----	-----	
1494		-----		-----	-----	-----	
1539		-----		-----	-----	-----	
1739	IP387-B	1.07		1.41	40	300	
1769		-----		-----	-----	-----	
1953	D2068-A	1.01		-1.13	15	-----	
1971		-----		-----	-----	-----	
6069		-----		-----	-----	-----	
6179		-----		-----	-----	-----	
6213		-----		-----	-----	-----	
6259		-----		-----	-----	-----	
6265	IP387	1.35	G(0.01)	13.25	95	300	
6276	IP387-B	1.04		0.14	30	300	

normality	unknown
n	6
outliers	1
mean (n)	1.037
st.dev. (n)	0.0197
R(calc.)	0.055
st.dev.(D2068-B:20)	0.0236
R(D2068-B:20)	0.07
Compare	
R(IP387-B:14(R22)	0.075

Kernel Density
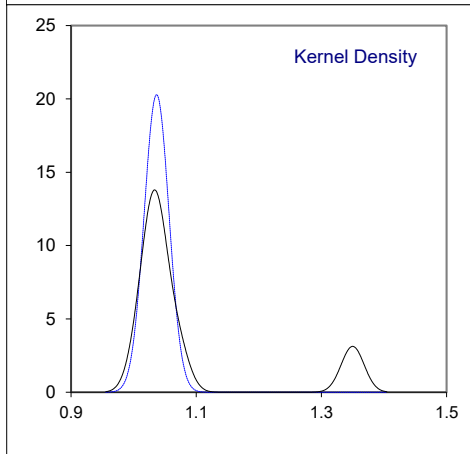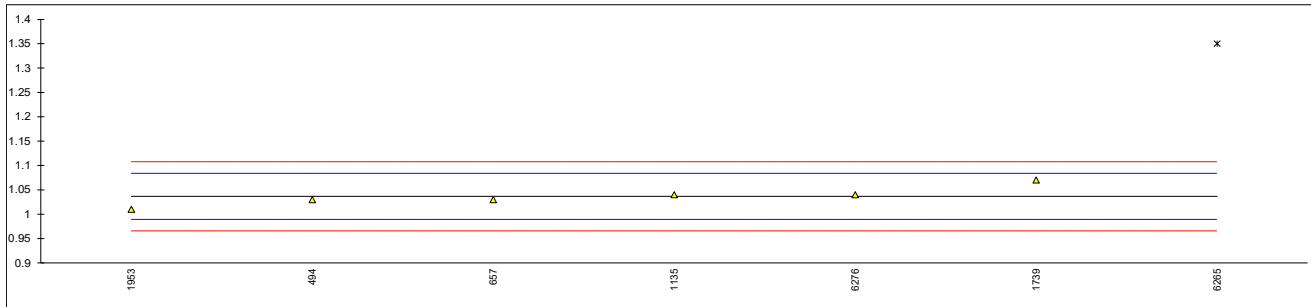
APPENDIX 2

Number of participants per country

1 lab in ARGENTINA

2 labs in AUSTRIA

3 labs in BELGIUM

2 labs in BRAZIL

1 lab in CHINA, People's Republic

6 labs in COLOMBIA

3 labs in FRANCE

2 labs in FINLAND

1 lab in GERMANY

3 labs in GREECE

2 labs in HUNGARY

1 lab in INDONESIA

2 labs in ITALY

2 labs in NETHERLANDS

1 lab in PERU

1 lab in PHILIPPINES

6 labs in POLAND

4 labs in PORTUGAL

1 lab in SERBIA

1 lab in SINGAPORE

1 lab in SLOVAKIA

1 lab in SLOVENIA

5 labs in SPAIN

2 labs in SWEDEN

1 lab in TURKEY

6 labs in UNITED KINGDOM

2 labs in UNITED STATES OF AMERICA

APPENDIX 3

Abbreviations

C	= final test result after checking of first reported suspect test result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01), G(1)	= outlier in Grubbs' outlier test
G(0.05), G(5)	= straggler in Grubbs' outlier test
DG(0.01), DG(1)	= outlier in Double Grubbs' outlier test
DG(0.05), DG(5)	= straggler in Double Grubbs' outlier test
R(0.01), R(1)	= outlier in Rosner's outlier test
R(0.05), R(5)	= straggler in Rosner's outlier test
E	= calculation difference between reported test result and result calculated by iis
W	= test result withdrawn on request of participant
ex	= test result excluded from statistical evaluation
n.a.	= not applicable
n.e.	= not evaluated
n.d.	= not detected
fr.	= first reported
f+?	= possibly a false positive test result?
f-?	= possibly a false negative test result?
SDS	= Safety Data Sheet

Literature

1   iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018

2   ISO5725:86

3   ISO5725 parts 1-6:94

4   ISO13528:05

5   M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)

6   W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)

7   P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)

8   J.N. Miller, Analyst, 118, 455, (1993)

9   Analytical Methods Committee, Technical Brief, No 4, January 2001

10   P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)

11   W. Horwitz and R. Albert, J. AOAC Int, 79, 3, 589-621, (1996)

12   Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)

13   Letter of CEN: CEN/TC 19 explanation on total contamination test result and applicability for FAME, dated 16-9-2015 and issued by Ortwin Costenoble on behalf of Liesbeth Jansen (CEN/TC 19 Chairman) and Nigel Elliot (CEN/TC 19/WG 24 Convenor).

14   iis memo 1903, Biodiesel B100 (100% FAME) for Total Contamination EN12662.