Results of Proficiency Test
Biodiesel B100 (100% FAME)
April 2021

CONTENTS

Appendices:

1   INTRODUCTION

Since 2001 the Institute for Interlaboratory Studies (iis) organizes a proficiency scheme for the analysis of Fatty Acid Methyl Esters (FAME) used as Biodiesel B100 twice a year. During the annual proficiency testing program of 2020/2021 it was decided to continue the round robin for the analysis of tests Biodiesel B100 in accordance with the latest version of ASTM D6751 and EN14214+A2.

In this interlaboratory study registered for participation:
- 63 laboratories in 24 countries on regular Biodiesel B100   iis21G03,
- 31 laboratories in 16 countries for the Metals in Biodiesel PT   iis21G03M,
- 45 laboratories in 17 countries for the Total Contamination PT   iis21G03TC,
- 25 laboratories in 11 countries for the Cold Soak Test PT   iis21G03CST.

In total 68 laboratories in 25 different countries registered for participation in one or more PTs. 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	Quantity	Purpose
#21055	1 x 1L + 1 x 0.5L	Regular analyzes
#21056	1 x 0.1L	Analysis of Metals
#21057	1 x 1L	Total Contamination
#21058	1 x 0.5L	Cold Soak Test

Table 1: samples used in Biodiesel B100 iis21G03

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 samples for the Biodiesel B100 PT a batch of approximately 200L of Rapeseed Methyl Ester (RME) was obtained from a European producer.

After homogenization 94 amber glass bottles of 1L and 94 amber glass bottles of 0.5L for the regular round were filled and labelled #21055.
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 #21055-1	883.13
sample #21055-2	883.10
sample #21055-3	883.10
sample #21055-4	883.10
sample #21055-5	883.10
sample #21055-6	883.15
sample #21055-7	883.10
sample #21055-8	883.14

Table 2: homogeneity test results of subsamples #21055

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/m³
r (observed)	0.06
reference test method	ISO12185:96
0.3 x R (reference test method)	0.15

Table 3: evaluation of the repeatability of subsamples #21055

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, the homogeneity of the subsamples #21055 was assumed.

For the preparation of the samples for the Cold Soak Test PT a batch of approximately 65L of Rapeseed Methyl Ester (RME) was obtained from a European producer.
After homogenization 48 amber glass bottles of 0.5L and labelled #21058. 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/m³
sample #21058-1	883.63
sample #21058-2	883.63
sample #21058-3	883.64
sample #21058-4	883.64
sample #21058-5	883.63
sample #21058-6	883.63
sample #21058-7	883.63
sample #21058-8	883.64

Table 4: homogeneity test results of subsamples #21058

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/m³
r (observed)	0.01
reference test method	ISO12185:96
0.3 x R (reference test method)	0.15

Table 5: evaluation of the repeatability of subsamples #21058

The calculated repeatability is in agreement with 0.3 times the reproducibility of the reference test method. Therefore, the homogeneity of the subsamples #21058 was assumed.

For the preparation of the samples for the metals in Biodiesel PT a batch of approximately 4.5 kg biodiesel was taken and spiked with Phosphorus, Sodium, Potassium and Calcium as organic salts.

After homogenization 54 PE bottles of 0.1L were filled and labelled #21056. 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 #21056-1	6.4	4.6
sample #21056-2	6.2	4.5
sample #21056-3	6.1	4.6
sample #21056-4	6.2	4.4
sample #21056-5	6.0	4.7
sample #21056-6	6.0	4.7
sample #21056-7	6.1	4.7
sample #21056-8	6.0	4.8

Table 6: homogeneity test results of subsamples #21056

From the above test results the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities 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)	0.39	0.36
reference test method	EN14107:03	EN14108:03
0.3 x R (reference test method)	0.36	0.77

Table 7: evaluation of the repeatabilities of subsamples #21056

The calculated repeatabilities were in agreement with 0.3 times the corresponding reproducibilities of the reference test methods. 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 18.6 g/kg Arizona Dust (medium) in oil suspension was pipetted into 61 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 #21057. 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 31, 2021. An SDS was added to the sample package.

2.5 STABILITY OF THE SAMPLES

The stability of the Biodiesel B100 packed in the 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 analyses 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
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 8: 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 test 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, e.g. ISO, ASTM reproducibilities, 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:

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

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

4   EVALUATION

During the execution of this proficiency test no problems were occurred.
For the regular Biodiesel PT: all participants reported test results. Five participants reported test results after the final reporting date.
For the Metals in Biodiesel PT: two participants reported test results after the final reporting date and four other participants did not report any test result.
For the Total Contamination PT: three participants reported test results after the final reporting date and four other participants did not report any test result.
For the Cold Soak Test PT: one participant reported test results after the final reporting date and two other participants did not report any test result.
Not all participants were able to report all tests requested.

In total 67 participants reported 1108 numerical test results. Observed were 45 outlying test results, which is 4.1% of the numerical test results. In proficiency studies, outlier percentages of 3%-7.5% are quite normal.

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

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 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. D874) and an added designation for the year that the test method was adopted or revised (e.g. D874:13a). If applicable, a designation in parentheses is added to designate the year of reapproval (e.g. D874:13a (2018)). In the test results tables of appendix 1 only the test method number and year of adoption (e.g. D874:13a) will be used.

Sample #21055

<u>Acid Value</u>:   This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not in agreement with the requirements of EN14104:03 and EN14214:12+A2:19.

<u>Total Acid Number</u>: 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.

<u>Cloud Point</u>:   This determination was problematic for a number of laboratories. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ASTM D2500:17a and EN14214:12+A2:19.

<u>Cold Filter Plugging Point</u>: 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 EN116:15 or EN14214:12+A2:19.

<u>Carbon Residue on 100% FAME</u>: This determination may not be problematic. All reported results were near or below the application range of ASTM D4530:15(2020) or ISO10370:14. Therefore, no z-scores were calculated.

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

<u>Density at 15°C</u>: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is agreement with the requirements of ISO12185:96.

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

<u>Flash Point recc</u>: 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 ISO3679:15.

Iodine 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 EN14111:03.

Kinematic Viscosity at 40°C: The determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO3104:94 and ASTM D445:19a.

Oxidation Stability: 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 EN15751:14.

Pour Point: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility 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(2018). Therefore, no z-scores were calculated.

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

Water: 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 ISO12937:00.

Water and Sediment: This determination may not be problematic. Almost 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 very at all 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 problematic for 80% and 90% recovered and was very problematic for 95% recovered. No statistical outliers were observed. The calculated reproducibilities are not in agreement with the requirements of ASTM D1160:18. No z-scores were calculated for 95% recovered.

Methanol: This determination may be problematic for a number of laboratories. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in full in agreement with the requirements of EN14110:19.

Monoglycerides: This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is agreement with the requirements of EN14105:11.

Diglycerides: This determination was problematic. No statistical outliers were observed. The calculated reproducibility is not agreement with the requirements of EN14105:11.

Triglycerides: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is agreement with the requirements of EN14105:11.

Free Glycerol: 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 EN14105:11.

Total Glycerol: 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 EN14105:11.

Total Ester content (FAME): This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14103:20.

Linolenic Acid Methyl Ester: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in full agreement with the requirements of EN14103:20.

Polyunsaturated Methyl Esters: This determination may not be problematic. All reported test results were near or below the application range of EN15779:09+A1:13. Therefore, no z-scores were calculated.

Sample #21056

Sum Ca + Mg: 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 EN14538:06.

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

Potassium: 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 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.

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

Sample #21057

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 18). It was therefore decided to exclude the test results which were determined according EN12662:14.

<u>Particulate Contamination</u>: Only one laboratory reported a test result. Therefore, no z-scores were calculated.

<u>Total Contamination</u>: This determination was very problematic. One statistical outlier was observed and three 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 #21058

<u>Filter Blocking Potential by Cold Soak Test</u>: This determination was very problematic. No statistical outliers were observed. The calculated reproducibility of the group was very large. Therefore, no z-scores were calculated.

<u>Filter Blocking Tendency</u>: This determination was very problematic. No statistical outliers were observed. The calculated reproducibility of the group was very large. Therefore, no z-scores were calculated.

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 literature reference test methods (in casu ASTM, EN and ISO test methods) are presented in the next tables.

Parameter	unit	n	average	2.8 * sd	R(lit)
Acid Value	mg KOH/g	37	0.44	0.07	0.06
Total Acid Number	mg KOH/g	29	0.42	0.07	0.13
Cloud Point	°C	51	-7.1	3.4	5
Cold Filter Plugging Point (CFPP)	°C	49	-18.7	2.5	4.1
Carbon Residue (100% FAME)	%M/M	29	<0.1	n.e.	n.e.
Copper Corrosion, 3 hrs at 50°C		46	1 (1a)	n.a.	n.a.
Density at 15°C	kg/m^3	61	883.2	0.3	0.5
Flash Point PMcc	°C	35	147.3	19.2	14.7
Flash Point recc	°C	12	169.3	8.0	15
Iodine Value	g I$_2$/100g	39	113.0	5.5	5
Kinematic Viscosity at 40°C	mm^2/s	56	4.476	0.043	0.045
Oxidation Stability Induction period	hours	42	4.5	1.0	1.2
Pour Point	°C	36	-37.7	6.4	9
Sulfated Ash	%M/M	32	<0.005	n.e.	n.e.
Sulfur	mg/kg	40	1.7	1.1	1.3
Water	mg/kg	59	342	92	127
Water and Sediment	%V/V	12	<0.05	n.e.	n.e.
Calorific Value Gross	kJ/kg	12	40.0	0.9	0.4
80% recovered, as AET	°C	7	352.1	6.3	4.6
90% recovered, as AET	°C	7	354.8	8.4	4.6
95% recovered, as AET	°C	7	360.1	15.7	(4.6)
Methanol	%M/M	29	0.047	0.012	0.013
Monoglycerides	%M/M	32	0.327	0.079	0.126
Diglycerides	%M/M	34	0.115	0.058	0.051
Triglycerides	%M/M	32	0.046	0.047	0.067
Free Glycerol	%M/M	31	0.002	0.005	0.007
Total Glycerol	%M/M	32	0.106	0.027	0.032
Total Ester content	%M/M	43	97.5	3.2	4.2
Linolenic Acid Methyl Ester	%M/M	34	8.89	0.59	0.64
Polyunsaturated Methyl Esters	%M/M	16	<0.6	n.e.	n.e.

Table 9: reproducibilities of tests on sample #21055

Parameter	unit	n	average	2.8 * sd	R(lit)
Sum of Calcium and Magnesium	mg/kg	23	7.4	2.0	2.3
Phosphorus	mg/kg	19	4.5	1.5	0.9
Potassium	mg/kg	21	3.8	1.5	2.5
Sodium	mg/kg	23	4.3	3.1	2.5
Sum of Potassium and Sodium	mg/kg	21	8.4	4.2	2.5
Particulate Contamination (D7321)	mg/L	1	n.a.	n.e.	n.e.

Parameter	unit	n	average	2.8 * sd	R(lit)
Total Contamination (EN12662)	mg/kg	35	30.6	19.6	9.2
Filter Blocking Potential (CSFT)	s	12	179.2	309.3	(72.3)
Filter Blocking Tendency (FBT)		13	4.8	7.8	(1.4)

Table 10: reproducibilities of tests on samples #21056, #21057 and #21058

Sign between brackets the calculated reproducibility is much higher than the reference test method.

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

4.3 COMPARISON OF THE PROFICIENCY TEST OF APRIL 2021 WITH PREVIOUS PTS

	April 2021	October 2020	April 2020	October 2019	May 2019
Type of FAME	Rapeseed	Rapeseed	Rapeseed	Soybean	Rapeseed
Number of reporting laboratories	67	63	47	67	45
Number of test results	1108	1080	737	1389	753
Number of statistical outliers	45	42	37	40	30
Percentage of statistical outliers	4.1%	5.0%	5.0%	2.9%	4.0%

Table 11: comparison with previous proficiency tests

In proficiency tests, outlier percentages of 3% - 7.5% are quite normal.

The performance of the determinations of the proficiency tests was compared against the requirements of the reference test methods. The conclusions are given the following table.

Parameter	April 2021	October 2020	April 2020	October 2019	May 2019
Acid Value	-	+	+/-	+/-	-
Total Acid Number	+	+	+	+/-	+
Cloud Point	+	+	+	+	++
Cold Filter Plugging Point (CFPP)	+	+	+	+	+
Carbon Residue (110% FAME)	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	+/-	+	+/-	+	-
Oxidation Stability Induction period	+	+	+	+	+
Pour Point	+	++	+	+	+
Sulfated Ash	n.e.	n.e.	n.e.	n.e.	n.e.
Sulfur	+	+/-	+/-	+/-	+/-

Parameter	April 2021	October 2020	April 2020	October 2019	May 2019
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.	n.e.	+
Sum of Calcium and Magnesium	+	+	-	+	--
Phosphorus	-	--	-	-	-
Potassium	+	+/-	+	+	-
Sodium	-	-	--	+	--
Sum of Potassium and Sodium	-	+	-	-	--
Particle Contamination (D7321)	n.e.	-	n.e.	n.e.	n.e.
Total Contamination ((EN12662)	--	-	-	--	--
Filter Blocking Potential (CSFT)	(--)	--	--	--	(--)
Filter Blocking Tendency (FBT)	(--)	-	-	--	-

Table 12: comparison of group performances against the reference test methods of all samples

Sign between brackets the calculated reproducibility is much higher than the reference test method.

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 #21055; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14104	0.51		3.25	
323	EN14104	0.44		-0.01	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	EN14104	0.4261		-0.66	
396		-----		-----	
445	EN14104	0.4931		2.47	
460		-----		-----	
511		-----		-----	
540	EN14104	0.421		-0.90	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14104	0.46		0.92	
863	EN14104	0.414		-1.23	
1011		-----		-----	
1134	EN14104	0.4392		-0.05	
1135	EN14104	0.40		-1.88	
1167	EN14104	0.41		-1.41	
1189	EN14104	0.44		-0.01	
1212	EN14104	0.426		-0.67	
1227		-----		-----	
1299	EN14104	0.43		-0.48	
1316		-----		-----	
1320	EN14104	0.42		-0.95	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510	EN14104	0.435		-0.25	
1564	EN14104	0.41		-1.41	
1569	EN14104	0.41		-1.41	
1611	EN14104	0.458		0.83	
1618	EN14104	0.443		0.13	
1643		-----		-----	
1644	EN14104	0.43		-0.48	
1697	EN14104	0.421		-0.90	
1698		-----		-----	
1705	EN14104	0.460		0.92	
1713	EN14104	0.45		0.45	
1721	EN14104	0.420		-0.95	
1725	EN14104	0.44		-0.01	
1744		-----		-----	
1769		-----		-----	
1980	EN14104	0.444		0.17	
6057	EN14104	0.475		1.62	
6069		-----		-----	
6179		-----		-----	
6201	EN14104	0.416		-1.13	
6213		0.426		-0.67	
6227		-----		-----	
6259		-----		-----	
6262	EN14104	0.4897		2.31	
6265	EN14104	0.4240		-0.76	
6276	EN14104	0.438		-0.11	
6291		-----		-----	
6300	EN14104	0.45		0.45	
6325	EN14104	0.43		-0.48	
6363	EN14104	0.4705		1.41	
6373	EN14104	0.49		2.32	
6390	EN14104	0.43		-0.48	
	normality	OK			
	n	37			
	outliers	0			
	mean (n)	0.44026			
	st.dev. (n)	0.026107			
	R(calc.)	0.07310			
	st.dev.(EN14104:03)	0.021429			
	R(EN14104:03)	0.06			
Compare					
	R(EN14214:12+A2:19)	0.06			
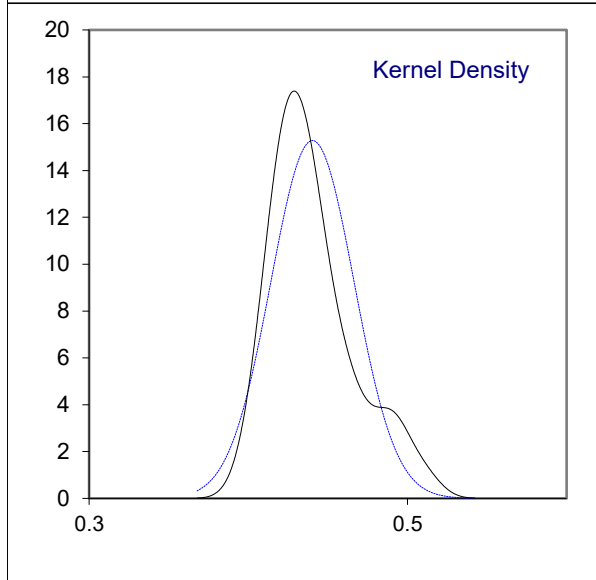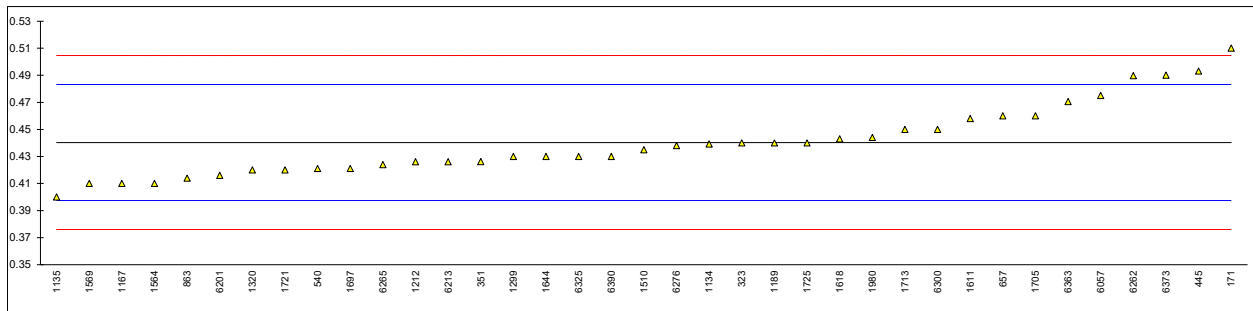
Determination of Total Acid Number on sample #21055; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
150	D664-B	0.43		0.16	
171		-----		-----	
323	D664-B	0.44		0.38	
328		-----		-----	
334	EN14104	0.39		-0.73	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445	D664-B	0.4060		-0.37	
460		-----		-----	
511	D664-B	0.420		-0.06	
540	D664-B	0.415		-0.17	
551	D664-B	0.57	R(0.01)	3.29	
558		-----		-----	
621	D664-B	0.427		0.09	
631	D974	0.367		-1.24	
657	D664-B	0.41		-0.28	
863		-----		-----	
1011		-----		-----	
1134	D664-B	0.42		-0.06	
1135	D664-B	0.44		0.38	
1167		-----		-----	
1189		-----		-----	
1212	D664-B	0.417		-0.13	
1227	D664-B	0.4		-0.51	
1299	D664-B	0.42		-0.06	
1316		-----		-----	
1320		-----		-----	
1399	D664-B	0.4377		0.33	
1459		-----		-----	
1494	D664-B	0.421		-0.04	
1510		-----		-----	
1564		-----		-----	
1569	D664-B	0.42		-0.06	
1611		-----		-----	
1618		-----		-----	
1643	D664-B	0.407		-0.35	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721		-----		-----	
1725		-----		-----	
1744	D664-B	0.372		-1.13	
1769	D664-B	0.4365		0.31	
1980		-----		-----	
6057	D664-B	0.465		0.94	
6069	D664-B	0.4295		0.15	
6179	D664-B	0.4387		0.36	
6201	D664-B	0.43		0.16	
6213		-----		-----	
6227		0.40		-0.51	
6259	D664-B	0.4433		0.46	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291	D664-B	0.4474		0.55	
6300		-----		-----	
6325	EN14104	0.43		0.16	
6363		-----		-----	
6373	D974	0.48		1.28	
6390		-----		-----	

normality	suspect	
n	29	
outliers	1	
mean (n)	0.42276	
st.dev. (n)	0.024042	
R(calc.)	0.06732	
st.dev.(D664-B:18e2)	0.044797	
R(D664-B:18e2)	0.12543	
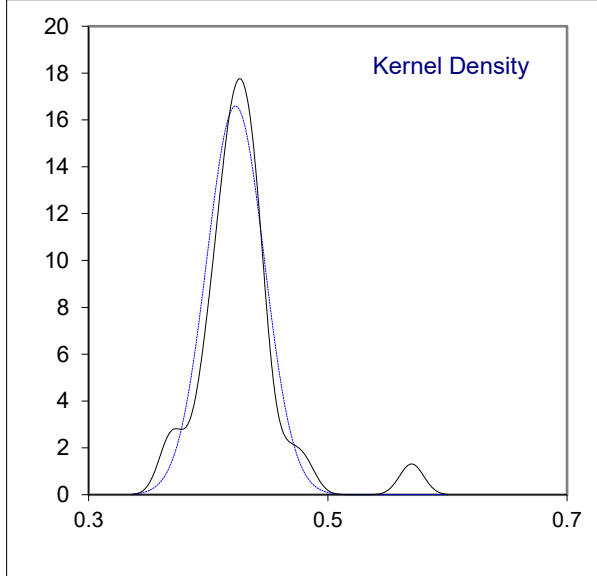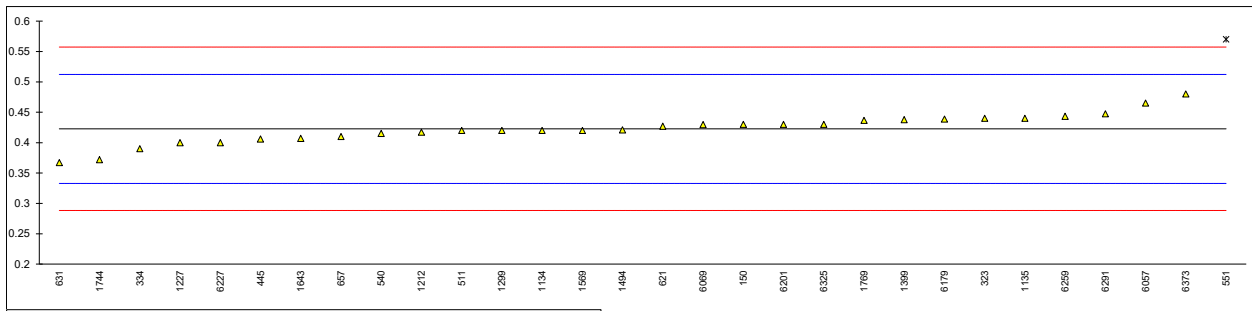
Determination of Cloud Point on sample #21055; results in °C

lab	method	value	mark	z(targ)	remarks
150	D2500	-7		0.08	
171	D2500	-4		1.76	
323	D2500	-7		0.08	
328	D2500	-8		-0.48	
334	D2500	-8		-0.48	
335	ISO3015	-8		-0.48	
351	D7683	-8.00		-0.48	
396	D2500	-9		-1.04	
445	D2500	-5		1.20	
460		-----		-----	
511	D2500	-5		1.20	
540	D2500	<-6		-----	
551	D2500	6.8	R(0.01)	7.80	
558		-----		-----	
621	D2500	-9.0		-1.04	
631	D5773	-3.9	C	1.81	first reported -1.9
657	D2500	-8		-0.48	
863	EN23015	-8		-0.48	
1011	D2500	-7		0.08	
1134	IP219	-6		0.64	
1135	EN23015	-6		0.64	
1167	ISO3015	-7		0.08	
1189	EN23015	-8		-0.48	
1212	D7689	-6		0.64	
1227	D2500	-7.5		-0.20	
1299	D2500	-7		0.08	
1316	EN23015	-8.0		-0.48	
1320	ISO3015	-8		-0.48	
1399	D2500	-5.6		0.86	
1459	EN23015	-8.0		-0.48	
1494		-----		-----	
1510	D2500	-8		-0.48	
1564	D5772	-6.0		0.64	
1569	EN23015	-6		0.64	
1611	ISO3015	-8		-0.48	
1618	ISO3015	-8		-0.48	
1643	D2500	-1	R(0.01)	3.44	
1644	ISO3015	-7		0.08	
1697	ISO3015	-8		-0.48	
1698	ISO3015	-7		0.08	
1705	ISO3015	-8		-0.48	
1713	ISO3015	-8		-0.48	
1721	D2500	-7.1		0.02	
1725	ISO3015	-8		-0.48	
1744	D2500	-6		0.64	
1769		-----		-----	
1980	ISO3015	-7.0		0.08	
6057	D2500	-8		-0.48	
6069		-----		-----	
6179		-----		-----	
6201	D2500	-7		0.08	
6213		-----		-----	
6227		-7		0.08	
6259		-----		-----	
6262	D2500	-6.0		0.64	
6265	ISO3015	-0.2	R(0.01)	3.88	
6276	ISO3015	-7.9		-0.43	
6291	ISO3015	-8		-0.48	
6300	ISO3015	-7		0.08	
6325	D2500	-9		-1.04	
6363	D2500	-8		-0.48	
6373	EN23015	-5		1.20	
6390	ISO3015	-7		0.08	

	normality	OK	
	n	51	
	outliers	3	
	mean (n)	-7.14	
	st.dev. (n)	1.197	
	R(calc.)	3.35	
	st.dev.(D2500:17a)	1.786	
	R(D2500:17a)	5	
Compare			
	R(EN14214:12+A2:19)	4	
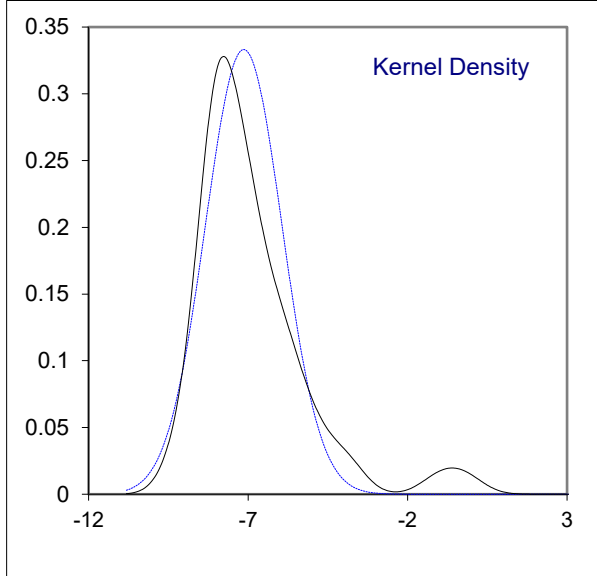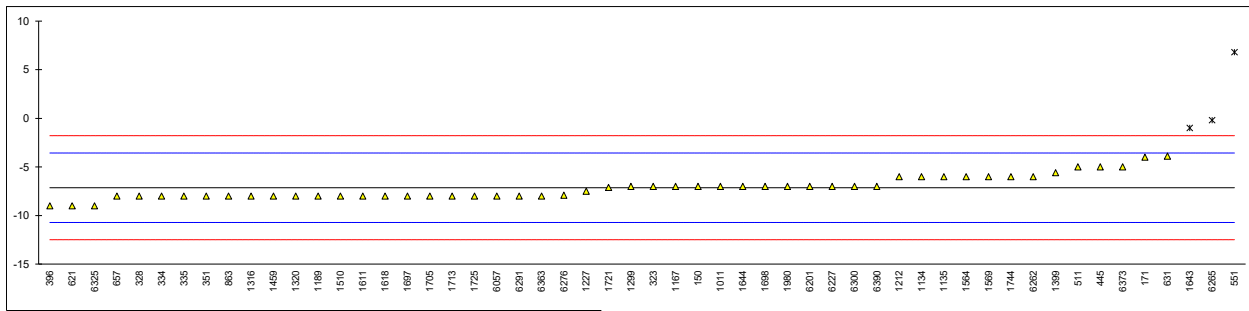
Determination of Cold Filter Plugging Point (CFPP) on sample #21055; results in °C

lab	method	value	mark	z(targ)	remarks
150	EN116	-17		1.15	
171	D6371	-15	R(0.01)	2.51	
323	EN116	-18		0.47	
328	EN116	-18		0.47	
334	EN116	-18		0.47	
335	EN116	-18		0.47	
351	EN116	-19		-0.21	
396	EN116	-19		-0.21	
445	IP309	-18		0.47	
460		-----		-----	
511	D6371	-18		0.47	
540	D6371	-19		-0.21	
551	D6371	-14	R(0.01)	3.19	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	IP309	-17		1.15	
863	EN116	-19		-0.21	
1011	EN116	-18		0.47	
1134	EN116	-19.0		-0.21	
1135	EN116	-18		0.47	
1167	EN116	-19		-0.21	
1189	EN116	-19		-0.21	
1212	EN116	-19		-0.21	
1227	EN116	-19		-0.21	
1299	EN116	-19		-0.21	
1316	EN116	-21.0		-1.57	
1320	EN116	-20		-0.89	
1399	IP309	-17		1.15	
1459	EN116	-19.0		-0.21	
1494		-----		-----	
1510	EN116	-19		-0.21	
1564	EN116	-20		-0.89	
1569	EN116	-18		0.47	
1611	EN116	-19		-0.21	
1618	EN116	-20		-0.89	
1643		-----		-----	
1644	EN116	-19		-0.21	
1697	EN116	-19		-0.21	
1698	EN116	-19		-0.21	
1705	EN116	-19		-0.21	
1713	EN116	-18		0.47	
1721	EN116	-19		-0.21	
1725	EN116	-19		-0.21	
1744		-----		-----	
1769		-----		-----	
1980	EN116	-18.0		0.47	
6057	EN116	-18		0.47	
6069		-----		-----	
6179		-----		-----	
6201	EN116	-19		-0.21	
6213	EN116	-18		0.47	
6227		-17		1.15	
6259		-----		-----	
6262	EN116	-19		-0.21	
6265	EN116	-20		-0.89	
6276	EN116	-17		1.15	
6291	EN116	-20		-0.89	
6300		-----		-----	
6325	EN116	-19		-0.21	
6363	EN116	-19		-0.21	
6373	EN116	-20		-0.89	
6390	EN116	-19		-0.21	

	normality	OK	
	n	49	
	outliers	2	
	mean (n)	-18.69	
	st.dev. (n)	0.895	
	R(calc.)	2.50	
	st.dev.(EN116:15)	1.472	
	R(EN116:15)	4.12	
Compare			
	R(EN14214:12+A2:19)	4.12	
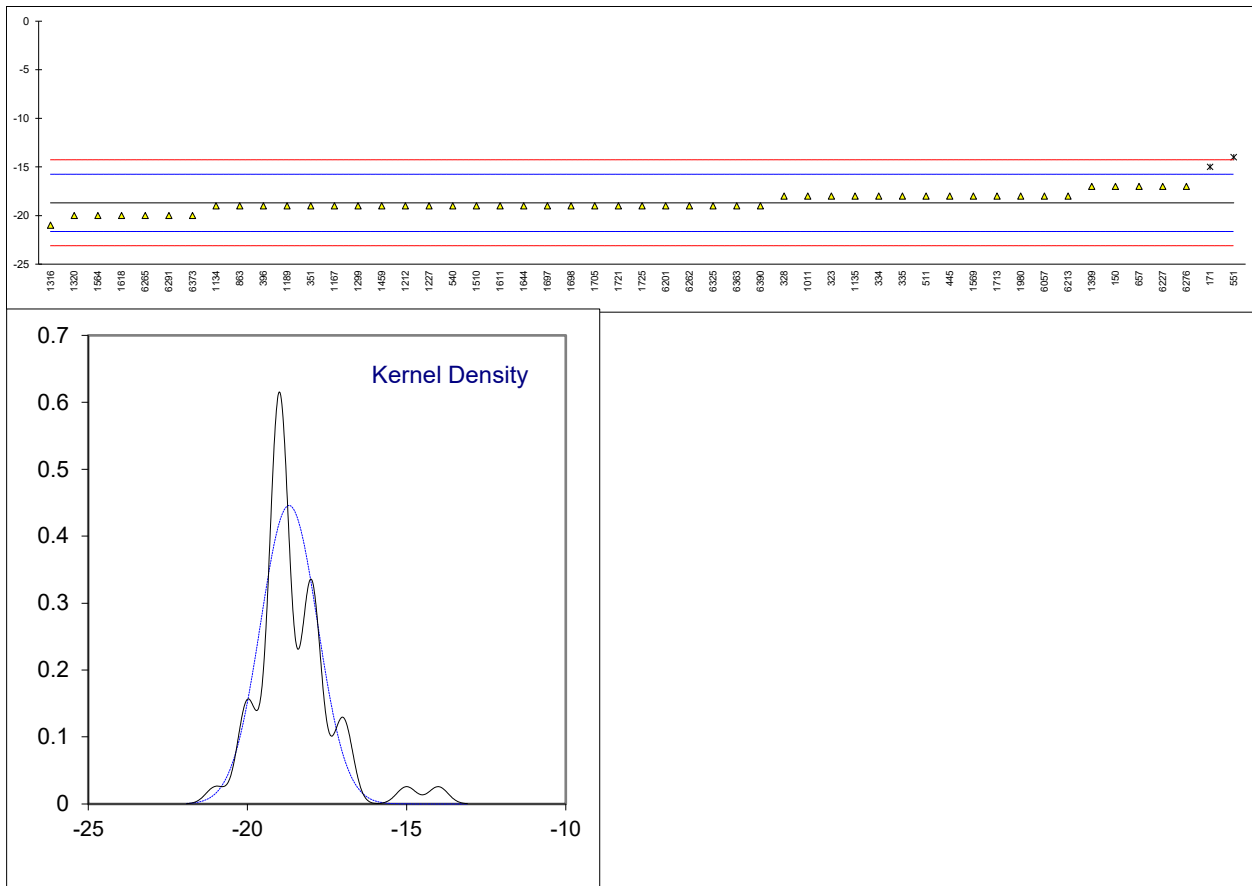
Determination of Carbon Residue on 100% FAME on sample #21055; results in %M/M

lab	method	Value	mark	z(targ)	remarks
150	D4530	<0.10		-----	
171		-----		-----	
323	D4530	0.01		-----	
328		-----		-----	
334	D4530	<0.10		-----	
335		-----		-----	
351	ISO10370	<0,10		-----	
396		-----		-----	
445	D4530	<0.01		-----	
460		-----		-----	
511	D189	<0.1		-----	
540	D4530	<0.10		-----	
551	D4530	0		-----	
558		-----		-----	
621	D189	0.0139		-----	
631	D4530	<0.1		-----	
657	D4530	<0.10		-----	
863	ISO10370	<0.1		-----	
1011		-----		-----	
1134	D4530	<0.01		-----	
1135	EN10370	0.025		-----	
1167		-----		-----	
1189		-----		-----	
1212	D4530	<0.10		-----	
1227	D4530	0.01		-----	
1299		-----		-----	
1316	D4530	<0.1		-----	
1320	D4530	0.01		-----	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510	D4530	0.01		-----	
1564		-----		-----	
1569	EN10370	<0,10		-----	
1611		-----		-----	
1618	EN10370	<0,01		-----	
1643		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721	D4530	<0.10		-----	
1725		-----		-----	
1744		-----		-----	
1769		-----		-----	
1980	ISO10370	0.102		-----	
6057		-----		-----	
6069		-----		-----	
6179		-----		-----	
6201	D4530	<0,1		-----	
6213		-----		-----	
6227		<0.10		-----	
6259		-----		-----	
6262	D4530	0.05		-----	
6265		-----		-----	
6276		-----		-----	
6291	EN10370	<0.1		-----	
6300		-----		-----	
6325		-----		-----	
6363		-----		-----	
6373	EN10370	<0.10		-----	
6390	ISO10370	<0.10		-----	
	n	29			Application range D4530:15 0.1 – 0.3 %M/M
	mean (n)	<0.1			Application range ISO10370:14 0.10 – 30.0 %M/M

Determination of Copper Corrosion 3 hrs at 50°C on sample #21055

lab	method	value	mark	z(targ)	remarks
150	D130	1a		-----	
171	D130	1a		-----	
323	D130	1A		-----	
328	D130	1a		-----	
334	D130	1A		-----	
335	D130	1a		-----	
351	ISO2160	1a		-----	
396	ISO2160	1A		-----	
445	D130	1a		-----	
460		-----		-----	
511	D130	1a		-----	
540	D130	1a		-----	
551	D130	1a		-----	
558		-----		-----	
621	D130	1A		-----	
631	D130	1a		-----	
657	D130	1a		-----	
863	ISO2160	1a		-----	
1011	ISO2160	1a		-----	
1134	D130	1a		-----	
1135	ISO2160	1A		-----	
1167	ISO2160	1a		-----	
1189	D130	1A		-----	
1212	D130	1A		-----	
1227	D130	1A		-----	
1299	ISO2160	1A		-----	
1316	D130	1a		-----	
1320		-----		-----	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510	D130	1A		-----	
1564	D130	1a		-----	
1569	ISO2160	1a		-----	
1611	ISO2160	1		-----	
1618	ISO2160	class 1a		-----	
1643		-----		-----	
1644	ISO2160	klasa 1 a		-----	
1697	ISO2160	1		-----	
1698	ISO2160	1		-----	
1705	ISO2160	1		-----	
1713	ISO2160	klasa 1a		-----	
1721	ISO2160	1a		-----	
1725	ISO2160	klasa 1a		-----	
1744		-----		-----	
1769		-----		-----	
1980	ISO2160	1a		-----	
6057	D130	1A		-----	
6069		-----		-----	
6179		-----		-----	
6201	ISO2160	1A		-----	
6213		-----		-----	
6227		1a		-----	
6259		-----		-----	
6262	D130	1A		-----	
6265		-----		-----	
6276		-----		-----	
6291	D130	1A		-----	
6300		-----		-----	
6325	D130	1		-----	
6363		-----		-----	
6373	ISO2160	1A		-----	
6390	ISO2160	1a		-----	
	n	46			
	mean (n)	1(1a)			

Determination of Density at 15°C on sample #21055; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
150	ISO12185	883.2		0.26	
171	D4052	883.2		0.26	
323	ISO12185	883.2		0.26	
328	ISO12185	883.1		-0.30	
334	ISO12185	883.2		0.26	
335	ISO12185	883.2		0.26	
351	ISO12185	883.17		0.10	
396	ENISO12185	883.3		0.82	
445	ISO12185	883.1		-0.30	
460		-----		-----	
511	D4052	883.1		-0.30	
540	D4052	883.2	C	0.26	reported 0.8832 kg/m^3
551	D4052	883.2		0.26	
558	D4052	883.31		0.88	
621	D4052	883.0		-0.86	
631	D4052	883.14		-0.07	
657	D4052	883.0	C	-0.86	first reported 882.1
863	ISO12185	883.2		0.26	
1011	ISO12185	883.1		-0.30	
1134	D1298	883.3		0.82	
1135	ISO12185	883.2		0.26	
1167	ISO12185	883.2		0.26	
1189	ISO12185	883.2		0.26	
1212	ISO12185	883.1		-0.30	
1227	D4052	883.2		0.26	
1299	D4052	883.1		-0.30	
1316	ISO12185	883.0		-0.86	
1320	ISO12185	883.17		0.10	
1399	D4052	882.9		-1.42	
1459	ISO12185	883.2		0.26	
1494	D4052	883.21		0.32	
1510	D4052	883.1		-0.30	
1564	ISO12185	882.9		-1.42	
1569	D4052	883.1		-0.30	
1611	ISO12185	883.18		0.15	
1618	ISO12185	883.23		0.43	
1643	D4052	883.0		-0.86	
1644	ISO12185	883.10		-0.30	
1697	ISO12185	883.04		-0.63	
1698	ISO12185	883.1		-0.30	
1705	ISO12185	883.156		0.02	
1713	ISO12185	883.19		0.21	
1721	ISO12185	883.0		-0.86	
1725	ISO12185	883.2		0.26	
1744	D4052	883.24		0.49	
1769	D4052	883.19		0.21	
1980	ISO12185	883.22		0.38	
6057	ISO12185	883.1		-0.30	
6069	D4052	883.180		0.15	
6179	D4052	883.31		0.88	
6201		-----		-----	
6213	ISO12185	883.23		0.43	
6227		883.2		0.26	
6259	D4052	883.17		0.10	
6262	ISO12185	883.2		0.26	
6265	ISO12185	882.9		-1.42	
6276	ISO12185	883.2		0.26	
6291	D4052	883.3		0.82	
6300	ISO12185	883.2		0.26	
6325	ISO12185	883.3		0.82	
6363	ISO12185	883.0	C	-0.86	first reported 883.7
6373	ISO12185	883.2		0.26	
6390	ISO12185	883.2		0.26	

	normality	OK	
	n	61	
	outliers	0	
	mean (n)	883.15	
	st.dev. (n)	0.099	
	R(calc.)	0.28	
	st.dev.(ISO12185:96)	0.179	
	R(ISO12185:96)	0.5	
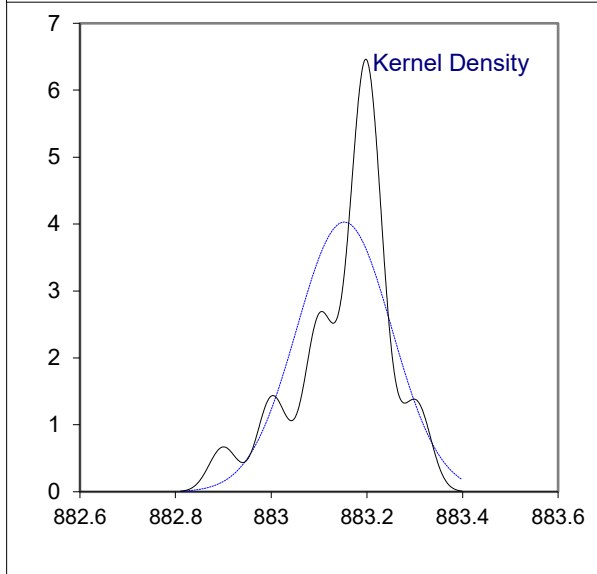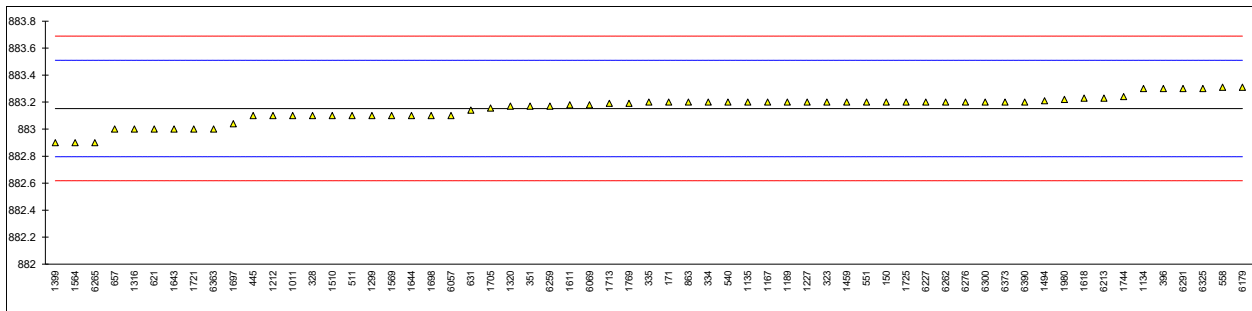
Determination of Flash Point PMcc on sample #21055; results in °C

lab	method	value	mark	z(targ)	remarks
150	D93-C	>130		-----	
171	D93-C	140.5		-1.29	
323	D93-C	151.0		0.71	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	ISO2719-C	146.25		-0.20	
396	ISO2719	140		-1.39	
445	D93-C	149.0		0.33	
460		-----		-----	
511	D93-C	155.5		1.56	
540	D93-C	144.5		-0.53	
551	D93-C	143.8		-0.66	
558		-----		-----	
621	D93-C	156.0		1.66	
631	D93-A	142.0		-1.01	
657	D93-C	154		1.28	
863	ISO2719-C	140		-1.39	
1011	ISO2719-C	141		-1.20	
1134	D93-C	136.0		-2.15	
1135	D93-A	147.0		-0.05	
1167		-----		-----	
1189		-----		-----	
1212	D93-A	151		0.71	
1227	D93-C	149		0.33	
1299	D93-A	140.0		-1.39	
1316	D93-C	140.0		-1.39	
1320	ISO2719-C	150		0.52	
1399		-----	W	-----	Test result withdrawn 105
1459	ISO2719-A	159.5		2.33	
1494		-----		-----	
1510	D93-A	160.0		2.42	
1564	D93-C	160		2.42	
1569	ISO2719-C	138.0		-1.77	
1611		-----		-----	
1618	ISO2719-C	142.0		-1.01	
1643	D93-C	141.85		-1.04	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705	ISO2719-C	149.625		0.45	
1713		-----		-----	
1721		-----		-----	
1725		-----		-----	
1744		-----		-----	
1769		-----		-----	
1980	ISO2719-C	153.0		1.09	
6057	D93-C	157.0		1.85	
6069		-----		-----	
6179		-----		-----	
6201	D93-C	144.5		-0.53	
6213		-----		-----	
6227		>150.0		-----	
6259		-----		-----	
6262	D93-A	154.0		1.28	
6265		-----		-----	
6276		-----		-----	
6291	D93-C	140		-1.39	
6300		-----		-----	
6325	ISO2719-C	146.5	C	-0.15	first reported 148.0
6363		-----		-----	
6373	ISO2719-C	150.5		0.61	
6390	ISO2719-C	142.0		-1.01	

normality	OK	
n	35	
outliers	0	
mean (n)	147.29	
st.dev. (n)	6.854	
R(calc.)	19.19	
st.dev.(D93-C:20)	5.250	
R(D93-C:20)	14.7	
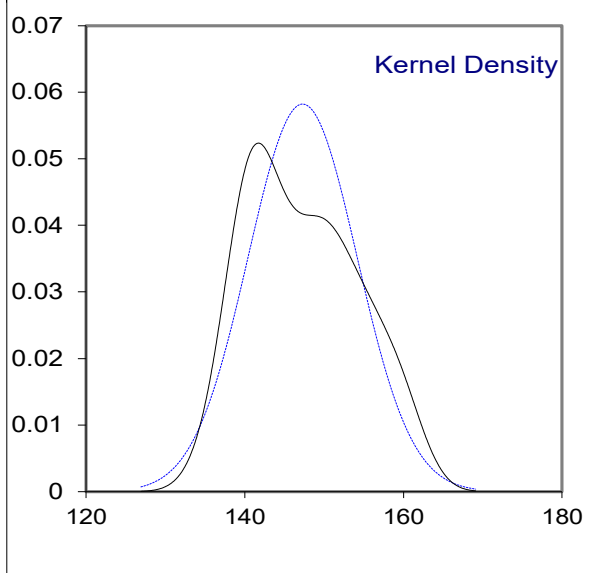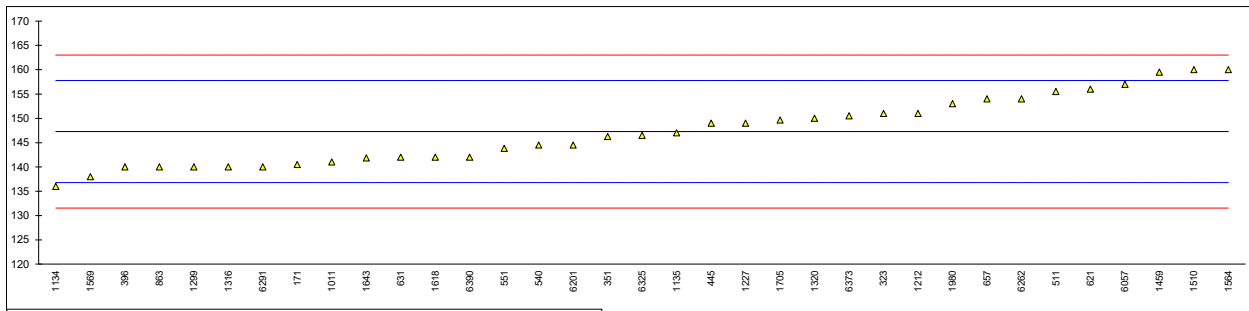
Determination of Flash Point recc on sample #21055; results in °C

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171		-----		-----	
323		-----		-----	
328		-----		-----	
334	ISO3679	177.5		1.53	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445	ISO3679	167.0		-0.43	
460		-----		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134		-----		-----	
1135		-----		-----	
1167	ISO3679	168.0		-0.24	
1189		-----		-----	
1212		-----		-----	
1227		-----		-----	
1299	ISO3679	171.0		0.32	
1316		-----		-----	
1320		-----		-----	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510		-----		-----	
1564		-----		-----	
1569		-----		-----	
1611	ISO3679	154.5	DG(0.05)	-2.76	
1618	ISO3679	168.0		-0.24	
1643		-----		-----	
1644	ISO3679	155.0	G(0.01)	-2.67	
1697	ISO3679	168.1		-0.22	
1698		-----		-----	
1705		-----		-----	
1713	ISO3679	167.2		-0.39	
1721	ISO3679	170.0		0.13	
1725	ISO3679	168.8		-0.09	
1744		-----		-----	
1769		-----		-----	
1980	ISO3679	169.5		0.04	
6057		-----		-----	
6069		-----		-----	
6179		-----		-----	
6201		-----		-----	
6213		-----		-----	
6227		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325	ISO3679	148.0	DG(0.05)	-3.98	
6363	ISO3679	169		-0.06	
6373		-----		-----	
6390	ISO3679	167.5		-0.34	

	normality	not OK	
	n	12	
	outliers	3	
	mean (n)	169.30	
	st.dev. (n)	2.841	
	R(calc.)	7.95	
	st.dev.(ISO3679:15)	5.357	
	R(ISO3679:15)	15	
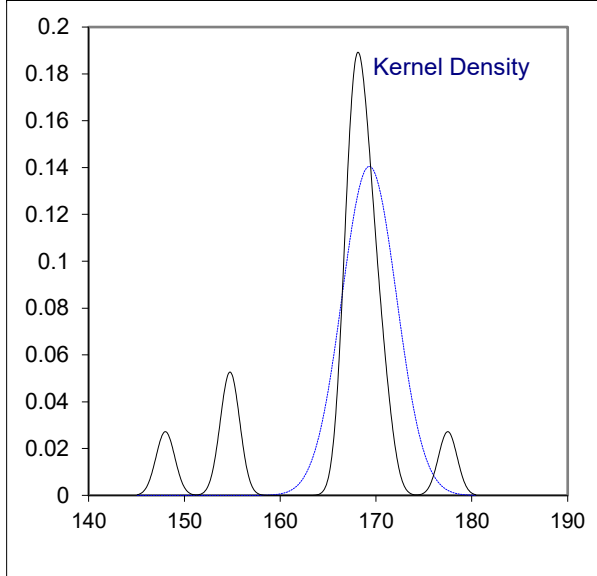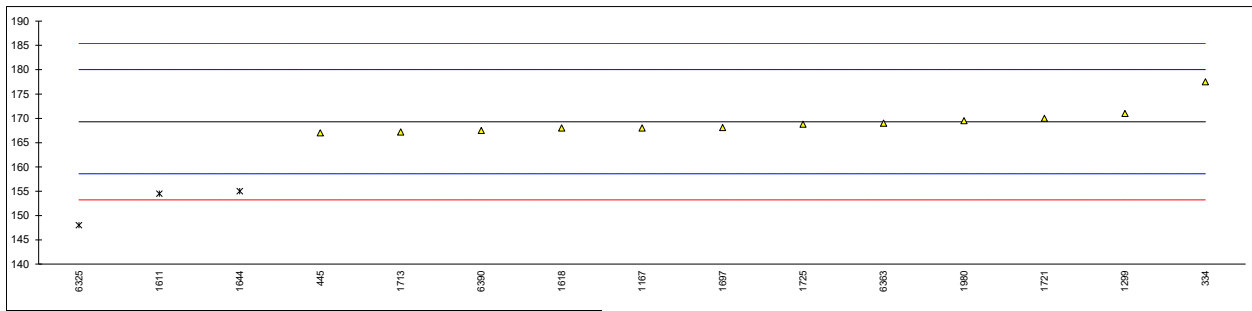
Determination of Iodine Value on sample #21055; results in g I$_2$/100g

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14111	112		-0.58	
323	EN14111	114		0.54	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351	EN14111	111.99		-0.58	
396		-----		-----	
445	EN14111	111.1		-1.08	
460		-----		-----	
511		-----		-----	
540	EN14111	111.1		-1.08	
551	EN14111	111.3		-0.97	
558		-----		-----	
621	EN14111	112.4		-0.35	
631		-----		-----	
657	EN14111	115		1.10	
863	EN14111	115.7		1.49	
1011		-----		-----	
1134	EN16300	106	DG(0.05)	-3.94	
1135	EN14111	113		-0.02	
1167	EN14111	112.2		-0.47	
1189	EN14111	112		-0.58	
1212	EN14111	113.7		0.37	
1227		-----		-----	
1299	EN14111	110.3		-1.53	
1316		-----		-----	
1320	EN14111	117.2		2.33	
1399		-----		-----	
1459		-----		-----	
1494	EN14111	112.99		-0.02	
1510	EN14111	101	G(0.01)	-6.74	
1564	EN14111	110.3		-1.53	
1569	EN16300	111.1		-1.08	
1611	EN14111	114.9		1.05	
1618	EN14111	113.57		0.30	
1643		-----		-----	
1644	EN14111	115		1.10	
1697		-----		-----	
1698		-----		-----	
1705	EN14111	115		1.10	
1713	EN14111	115		1.10	
1721	EN14111	113.3		0.15	
1725	EN14111	115		1.10	
1744	EN14111	109.63		-1.90	
1769	EN14111	112.81		-0.12	
1980	EN14111	112.2		-0.47	
6057	EN16300	107	DG(0.05)	-3.38	
6069	EN14111	112.773		-0.14	
6179	EN14111	111.9		-0.63	
6201	EN16300	115		1.10	
6213	EN14111	115.4		1.33	
6227		117		2.22	
6259	EN14111	112.56		-0.26	
6262	EN14111	109.3		-2.09	
6265		-----		-----	
6276		-----	W	-----	Test result withdrawn 100.1
6291		-----		-----	
6300		-----		-----	
6325	EN14111	113		-0.02	
6363	EN14111	114.48		0.81	
6373	EN16300	113		-0.02	
6390	EN14111	110		-1.70	
	normality	OK			
	n	39			
	outliers	3			
	mean (n)	113.03			
	st.dev. (n)	1.966			
	R(calc.)	5.50			
	st.dev.(EN14111:03)	1.786			
	R(EN14111:03)	5			
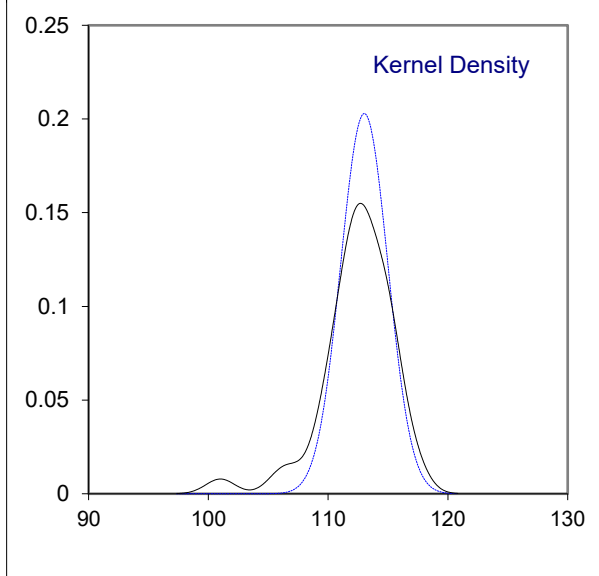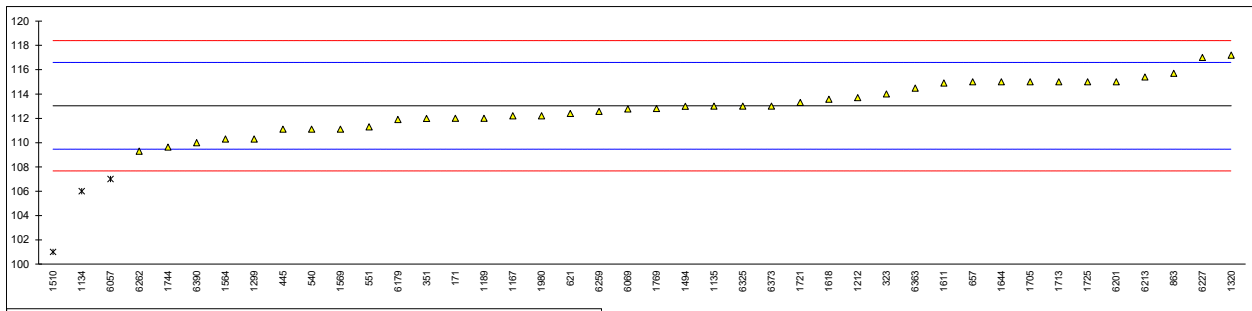
Determination of Kinematic Viscosity at 40°C on sample #21055; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
150	D445	4.488		0.73	
171	D445	4.488		0.73	
323	ISO3104	4.479		0.17	
328	ISO3104	4.490		0.85	
334	ISO3104	4.475		-0.08	
335		-----		-----	
351	ISO3104	4.473		-0.21	
396	ISO3104	4.511		2.16	
445	D445	4.4715		-0.30	
460		-----		-----	
511	D445	4.449		-1.71	
540	D445	4.445		-1.95	
551	D445	4.462		-0.89	
558		-----		-----	
621	D445	4.4461		-1.89	
631	D445	4.4865		0.63	
657	D445	4.467		-0.58	
863	ISO3104	4.484		0.48	
1011		-----		-----	
1134	ISO3104	4.4535		-1.42	
1135	ISO3104	4.468		-0.52	
1167	ISO3104	4.468		-0.52	
1189	ISO3104	4.463		-0.83	
1212	EN16896	4.5098		2.09	
1227	D445	4.487		0.66	
1299	D445	4.452		-1.52	
1316	ISO3104	4.471		-0.33	
1320	ISO3104	4.476		-0.02	
1399		-----	W	-----	Test result withdrawn 4.5885
1459	D7042	4.4947		1.14	
1494	D445	4.4701		-0.39	
1510	D445	4.479		0.17	
1564	D445	4.510		2.10	
1569	ISO3104	4.470		-0.40	
1611	ISO3104	4.4720		-0.27	
1618	ISO3104	4.4846		0.51	
1643	D445	4.452		-1.52	
1644	ISO3104	4.474		-0.15	
1697	ISO3104	4.4608		-0.97	
1698	ISO3104	4.472		-0.27	
1705	ISO3104	4.4714		-0.31	
1713	ISO3104	4.4757		-0.04	
1721	ISO3104	4.4833		0.43	
1725	ISO3104	4.4826		0.39	
1744	D445	4.4614		-0.93	
1769	D445	4.4775		0.07	
1980	ISO3104	4.490		0.85	
6057	ISO3104	4.465	C	-0.71	first reported 4.564
6069	D445	4.4770		0.04	
6179	D445	4.471		-0.33	
6201	ISO3104	4.483		0.41	
6213	ISO3104	4.4977		1.33	
6227		4.500	C	1.47	first reported 4.562
6259	D445	4.473		-0.21	
6262	ISO3104	4.4758		-0.03	
6265	ISO3104	4.4633		-0.81	
6276	EN16896	4.506	C	1.85	first reported 4.595
6291		4.482		0.35	
6300		-----		-----	
6325	ISO3104	4.490		0.85	
6363		-----		-----	
6373	ISO3104	4.473		-0.21	
6390	ISO3104	4.474		-0.15	

	normality	OK			
	n	56			
	outliers	0			
	mean (n)	4.47634			
	st.dev. (n)	0.015395			
	R(calc.)	0.04311			
	st.dev.(ISO3104:94)	0.016038			
	R(ISO3104:94)	0.04491			
Compare					
	R(D445:19a)	0.05461			
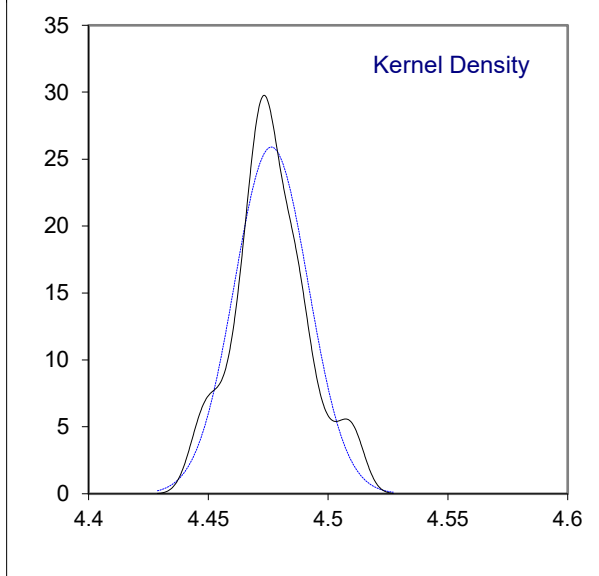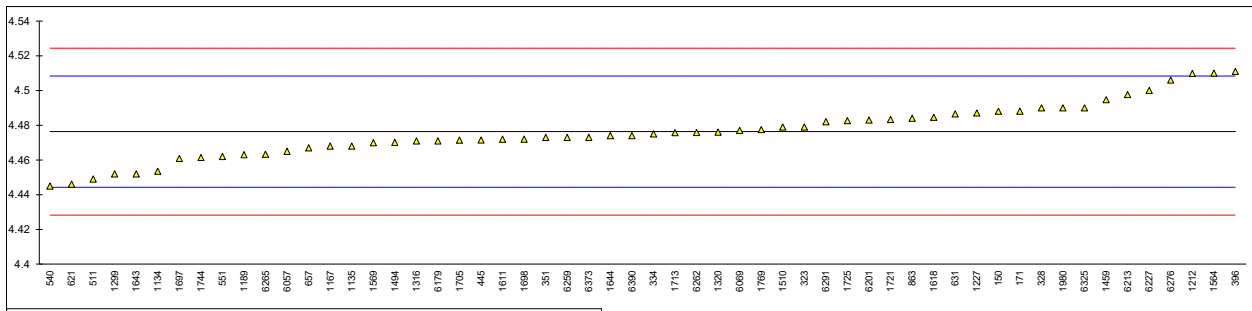
Determination of Oxidation Stability Induction period on sample #21055; results in hours

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN15751	4.0		-1.09	
323	EN15751	4.1		-0.86	
328	EN15751	5.0		1.19	
334		-----		-----	
335		-----		-----	
351	EN15751	4.35		-0.29	
396		-----		-----	
445	EN14112	3.91		-1.30	
460		-----		-----	
511		-----		-----	
540	EN14112	4.65		0.39	
551	EN14112	4.21		-0.61	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN15751	4.66		0.42	
863		-----		-----	
1011	EN15751	4.9		0.97	
1134	EN15751	3.713		-1.75	
1135	EN14112	4.6		0.28	
1167	EN14112	5.0		1.19	
1189	EN15751	4.1		-0.86	
1212	EN15751	3.86		-1.41	
1227	EN14112	3.91		-1.30	
1299	EN15751	4.84		0.83	
1316	EN14112	4.5		0.05	
1320	EN15751	4.3		-0.41	
1399		-----		-----	
1459	EN15751	4.4		-0.18	
1494		-----		-----	
1510	EN15751	4.4		-0.18	
1564	EN14112	4.24		-0.54	
1569	EN15751	0.04	R(0.01)	-10.14	
1611	EN15751	4.58		0.23	
1618	EN15751	4.42		-0.13	
1643		-----		-----	
1644	EN15751	4.5		0.05	
1697	EN15751	5.56		2.47	
1698	EN15751	4.5		0.05	
1705	EN15751	4.48		0.01	
1713	EN15751	4.66		0.42	
1721	EN14112	4.6		0.28	
1725	EN15751	5.01		1.22	
1744		-----		-----	
1769		-----		-----	
1980	EN14112	4.155		-0.74	
6057	EN15751	4.2		-0.63	
6069		-----		-----	
6179		-----		-----	
6201	EN14112	4.5		0.05	
6213	EN15751	4.75		0.62	
6227		-----	W	-----	Test result withdrawn >18
6259		-----		-----	
6262	EN14112	4.06		-0.95	
6265	EN15751	4.8		0.74	
6276		-----		-----	
6291		4.5		0.05	
6300	EN14112	4.8		0.74	
6325	EN15751	4.8		0.74	
6363	EN15751	4.735		0.59	
6373	EN15751	4.4		-0.18	
6390	EN15751	4.4		-0.18	
	normality	OK			
	n	42			
	outliers	1			
	mean (n)	4.4775			
	st.dev. (n)	0.36906			
	R(calc.)	1.0334			
	st.dev.(EN15751:14)	0.43754			
	R(EN15751:14)	1.2251			
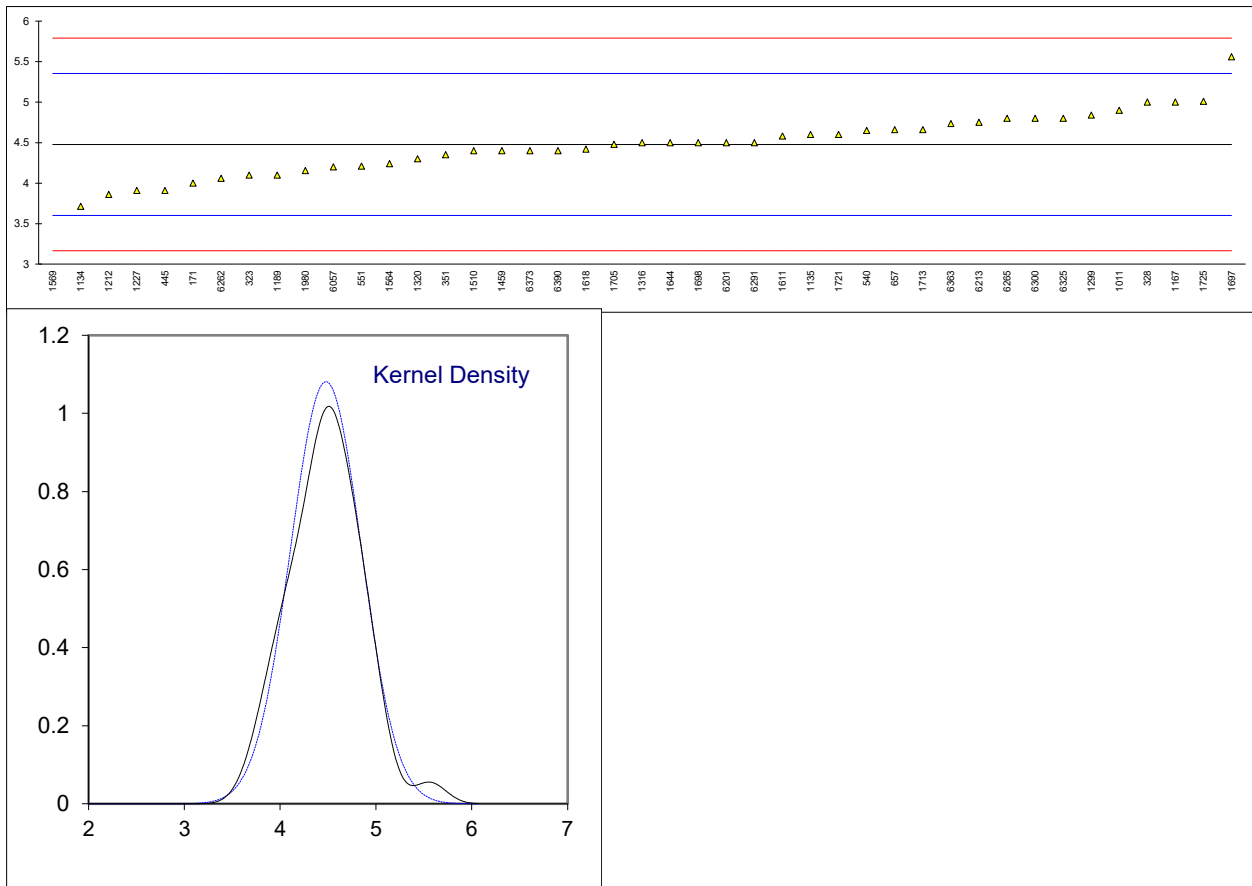
Determination of Pour Point on sample #21055; results in °C

lab	method	value	mark	z(targ)	remarks
150	ISO3016	<-36		-----	
171	D5950	-39		-0.41	
323		-----		-----	
328	ISO3016	-36		0.52	
334	ISO3016	-36		0.52	
335		-----		-----	
351	D6749	-33.0		1.45	
396		-----		-----	
445	D97	-39		-0.41	
460		-----		-----	
511	D97	-38		-0.10	
540	D5950	-39		-0.41	
551	D5950	-36		0.52	
558		-----		-----	
621	D97	< -21.0		-----	
631	D5950	-42.0		-1.35	
657	D97	-39	C	-0.41	first reported -48
863		-----		-----	
1011	D97	<-30		-----	
1134	ISO3016	<-30		-----	
1135	ISO3016	-36		0.52	
1167		-----		-----	
1189	ISO3016	-39		-0.41	
1212	ISO3016	-30		2.39	
1227	D97	-39		-0.41	
1299		-----		-----	
1316		-----		-----	
1320		-----		-----	
1399		-----		-----	
1459	D97	-39.0		-0.41	
1494		-----		-----	
1510	D97	-39		-0.41	
1564		-----		-----	
1569	D97	-36		0.52	
1611	ISO3016	-38		-0.10	
1618	ISO3016	-39		-0.41	
1643		-----		-----	
1644	ISO3016	-38		-0.10	
1697	ISO3016	-39		-0.41	
1698	ISO3016	-39		-0.41	
1705	ISO3016	-38		-0.10	
1713	ISO3016	-39		-0.41	
1721	D5950	-39		-0.41	
1725		-----		-----	
1744		-----		-----	
1769	D5950	-36		0.52	
1980	ISO3016	-40		-0.73	
6057	ISO3016	-36		0.52	
6069		-----		-----	
6179		-----		-----	
6201	ISO3016	-39		-0.41	
6213		-----		-----	
6227		-33		1.45	
6259	D5950	-36		0.52	
6262	D97	-39		-0.41	
6265		-----		-----	
6276		-----		-----	
6291		-39		-0.41	
6300	ISO3016	-39		-0.41	
6325	D97	<-24		-----	
6363		-----		-----	
6373	ISO3016	-36		0.52	
6390	ISO3016	-39		-0.41	

	normality	not OK	
	n	36	
	outliers	0	
	mean (n)	-37.7	
	st.dev. (n)	2.29	
	R(calc.)	6.420	
	st.dev.(ISO3016:19)	3.21	
	R(ISO3016:19)	9	
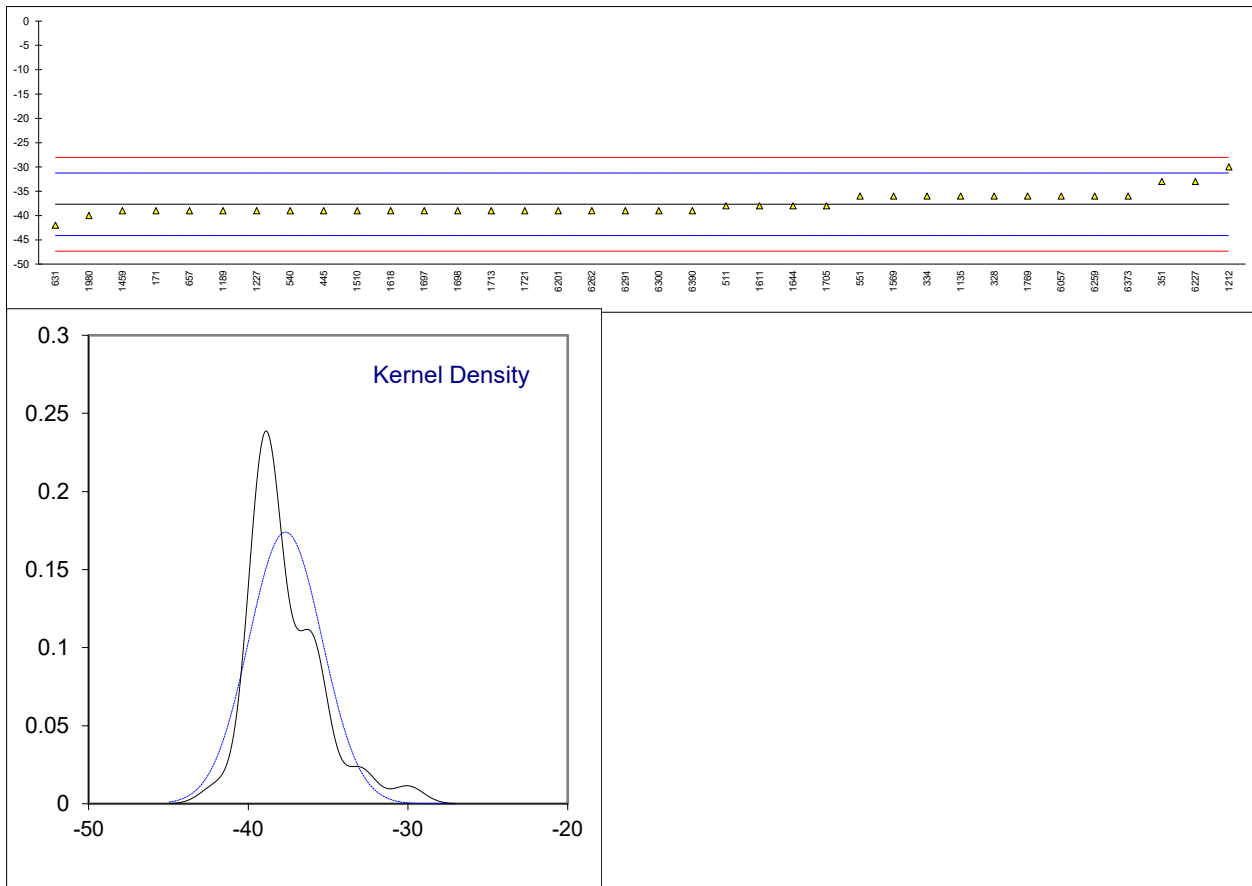
Determination of Sulfated Ash on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	D874	<0.005		-----	
323	D874	< 0.001		-----	
328		-----		-----	
334	D874	<0.005		-----	
335		-----		-----	
351	ISO3987	<0,005		-----	
396		-----		-----	
445	D874	<0.005		-----	
460		-----		-----	
511		-----		-----	
540	ISO3987	<0.005		-----	
551	D874	<0.005		-----	
558		-----		-----	
621	D874	< 0.01		-----	
631	D874	<0.001		-----	
657	D874	<0.005		-----	
863	ISO3987	<0.005		-----	
1011		-----		-----	
1134	D874	<0.001		-----	
1135	ISO3987	0.00025		-----	
1167	ISO3987	0.0015		-----	
1189	ISO3987	0		-----	
1212	D874	0.0003		-----	
1227		-----		-----	
1299	ISO3987	<0.005		-----	
1316	D874	<0.001		-----	
1320	D874	0.001		-----	
1399		-----		-----	
1459	ISO3987	<0.001		-----	
1494		-----		-----	
1510	D874	0.04		-----	
1564	D874	0.007		-----	
1569	D874	<0,005		-----	
1611	ISO3987	0.004		-----	
1618	ISO3987	<0,005		-----	
1643		-----		-----	
1644	ISO3987	0.005		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713	ISO3987	<0,005		-----	
1721	ISO3987	<0.005		-----	
1725	ISO3987	0.004		-----	
1744		-----		-----	
1769		-----		-----	
1980	ISO3987	<0,005		-----	
6057		-----		-----	
6069		-----		-----	
6179		-----		-----	
6201	D874	<0,005		-----	
6213		-----		-----	
6227		-----		-----	
6259		-----		-----	
6262	D874	0		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325	ISO3987	0.001		-----	
6363		-----		-----	
6373	ISO3987	<0.005		-----	
6390	ISO3987	<0.005		-----	
	n	32			
	mean (n)	<0.005			Application range ASTM D874:13a: >0.005%M/M

Determination of Sulfur on sample #21055; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	D5453	1.3		-0.82	
323	ISO20846	2.6	C	1.96	first reported 4.4
328	ISO20846	1.6		-0.18	
334	ISO20846	1.9	C	0.46	first reported 3.2
335		-----		-----	
351	ISO20846	1.53		-0.33	
396		-----		-----	
445	ISO20846	2.21		1.13	
460		-----		-----	
511		-----		-----	
540	D5453	1.33		-0.76	
551	D5453	2		0.68	
558		-----		-----	
621	D4294	< 20		-----	
631	D4294	2.776		2.34	
657	D5453	1.6	C	-0.18	first reported 4.1
863	ISO20846	1.2		-1.03	
1011		-----		-----	
1134	IP490	1.88256		0.43	
1135	ISO20846	1.6		-0.18	
1167	ISO20846	1.83		0.31	
1189	ISO20846	1.1		-1.25	
1212	ISO20846	1.5		-0.39	
1227	D5453	1.2		-1.03	
1299	ISO20884	1.7		0.04	
1316		-----		-----	
1320	ISO20846	1.67		-0.03	
1399	D5453	1.25		-0.93	
1459	ISO20884	1.6		-0.18	
1494		-----		-----	
1510	ISO20846	<3		-----	
1564	ISO20846	1.10	C	-1.25	first reported 13.23
1569	ISO20846	1.07		-1.31	
1611	ISO20846	1.92		0.51	
1618	ISO20846	1.26		-0.91	
1643		-----		-----	
1644	ISO20846	2.02		0.72	
1697	ISO20846	1.65		-0.07	
1698	ISO20846	1.6		-0.18	
1705	ISO20846	1.81		0.27	
1713	ISO20846	1.64		-0.09	
1721	ISO20846	1.86		0.38	
1725	ISO20846	2.0		0.68	
1744		-----		-----	
1769		-----		-----	
1980	ISO20846	<3		-----	
6057	ISO20846	4.3	C,R(0.01)	5.60	first reported 5.5
6069		-----		-----	
6179		-----		-----	
6201	ISO20846	1.75		0.14	
6213	in house	2.25		1.21	
6227		1.9	C	0.46	first reported 3.5
6259		-----		-----	
6262	ISO20846	1.22		-0.99	
6265	ISO13032	5.65	R(0.01)	8.49	
6276	ISO20846	1.86		0.38	
6291		1.35		-0.71	
6300		-----		-----	
6325	ISO20846	1.7		0.04	
6363	ISO13032	6.6	C,R(0.01)	10.52	first reported 3.6
6373	ISO20846	<3.0		-----	
6390	ISO20846	2.0		0.68	

	normality	OK	
	n	40	
	outliers	3	
	mean (n)	1.683	
	st.dev. (n)	0.3898	
	R(calc.)	1.091	
	st.dev.(ISO20846:19)	0.4673	
	R(ISO20846:19)	1.309	Application range: 3 – 500 mg/kg
Compare			
	R(D5453:19a)		Application range: 1 – 8000 mg/kg

Kernel Density
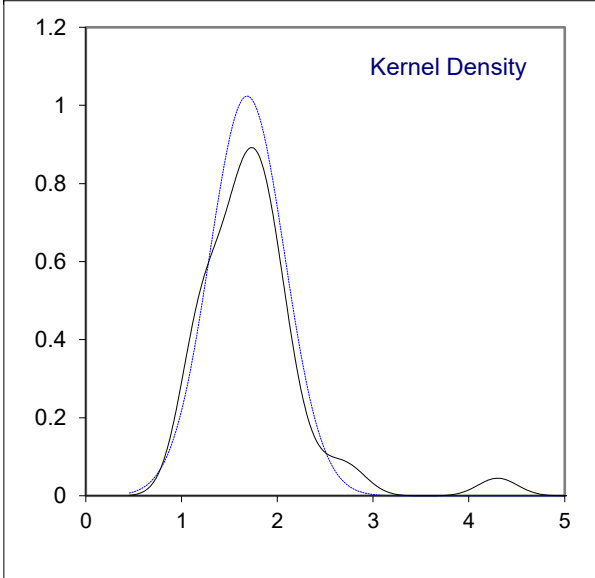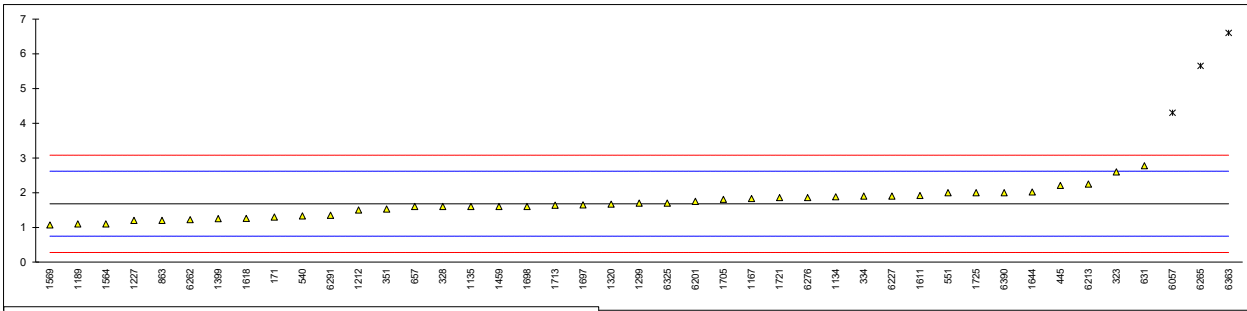
Determination of Water on sample #21055; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	D6304-A	358		0.35	
171	D6304-A	460		2.59	
323	ISO12937	320		-0.49	
328	ISO12937	600	G(0.01)	5.67	
334	ISO12937	350		0.17	
335		-----		-----	
351	ISO12937	302.0		-0.89	
396	ISO12937	402		1.31	
445	ISO12937	340.0		-0.05	
460		-----		-----	
511	D6304-A	341		-0.03	
540	ISO12937	304.5		-0.83	
551	D6304-A	346		0.08	
558	D6304	346.68		0.10	
621	D6304-B	322		-0.45	
631	D6304-B	303		-0.86	
657	D6304-A	334		-0.18	
863	ISO12937	380		0.83	
1011	ISO12937	330		-0.27	
1134	ISO12937	325		-0.38	
1135	ISO12937	341		-0.03	
1167	ISO12937	442.6		2.21	
1189	ISO12937	340		-0.05	
1212	ISO12937	346.2		0.09	
1227	D6304-A	320	C	-0.49	first reported 32
1299	ISO12937	307		-0.78	
1316	ISO12937	340		-0.05	
1320		-----		-----	
1399	IP438	353		0.24	
1459	ISO12937	292		-1.11	
1494	E203	359.87		0.39	
1510	IP438	371		0.63	
1564	ISO12937	307.6	C	-0.76	first reported 102.4
1569		341.792		-0.01	
1611	ISO12937	364		0.48	
1618	ISO12937	320		-0.49	
1643	ISO6296	338.5		-0.08	
1644	ISO12937	338.6		-0.08	
1697	ISO12937	308.1		-0.75	
1698	ISO12937	332		-0.23	
1705	ISO12937	319.5		-0.50	
1713	ISO12937	332		-0.23	
1721	ISO12937	318.3		-0.53	
1725	ISO12937	340		-0.05	
1744	E203	370		0.61	
1769	ISO12937	356.2773		0.31	
1980	ISO12937	341		-0.03	
6057	ISO12937	339		-0.07	
6069	E203	369.0		0.59	
6179	ISO12937	322.3		-0.44	
6201	ISO12937	330		-0.27	
6213	ISO12937	336.2		-0.13	
6227		270		-1.59	
6259	ISO12937	331.924		-0.23	
6262	ISO12937	335		-0.16	
6265	ISO12937	345.98		0.08	
6276	ISO12937	366.4		0.53	
6291		340		-0.05	
6300	ISO12937	430.3		1.94	
6325	ISO12937	320		-0.49	
6363	ISO12937	345.4		0.07	
6373	ISO12937	340		-0.05	
6390	ISO12937	370		0.61	
	normality	not OK			
	n	59			
	outliers	1			
	mean (n)	342.31			
	st.dev. (n)	32.903			
	R(calc.)	92.13			
	st.dev.(ISO12937:00)	45.441			
	R(ISO12937:00)	127.23			
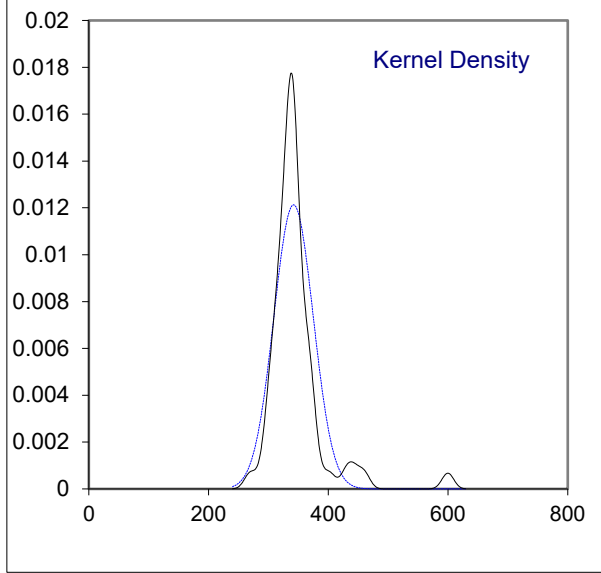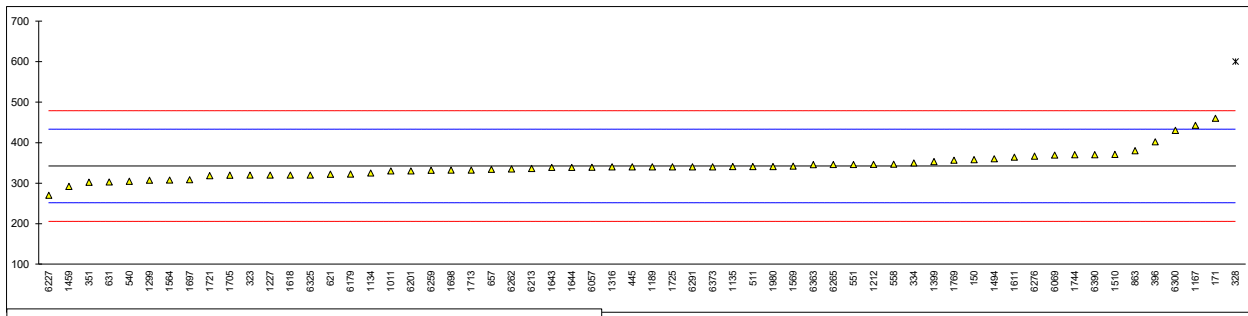
Determination of Water and Sediment on sample #21055; results in %V/V

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	D2709	<0.01		-----	
323	D2709	< 0.01		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445	D2709	0.035		-----	
460		-----		-----	
511	D2709	<0.05		-----	
540	D2709	<0.05		-----	
551		-----		-----	
558		-----		-----	
621	D2709	0		-----	
631	D2709	<0.01		-----	
657	D2709	<0.01		-----	
863		-----		-----	
1011		-----		-----	
1134	D2709	<0.01		-----	
1135		-----		-----	
1167		-----		-----	
1189		-----		-----	
1212		-----		-----	
1227		-----		-----	
1299		-----		-----	
1316		-----		-----	
1320		-----		-----	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510		-----		-----	
1564		-----		-----	
1569		-----		-----	
1611		-----		-----	
1618		-----		-----	
1643		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721		-----		-----	
1725		-----		-----	
1744		-----		-----	
1769		-----		-----	
1980		-----		-----	
6057		-----		-----	
6069		-----		-----	
6179		-----		-----	
6201	D2709	<0,01		-----	
6213		-----		-----	
6227		<0.005		-----	
6259		-----		-----	
6262	D2709	<0.05		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325		-----		-----	
6363		-----		-----	
6373		-----		-----	
6390		-----		-----	
	n	12			
	mean (n)	<0.05			

Determination of Calorific Value Gross at constant volume (H $_{o,v}$) on sample #21055; results in MJ/kg

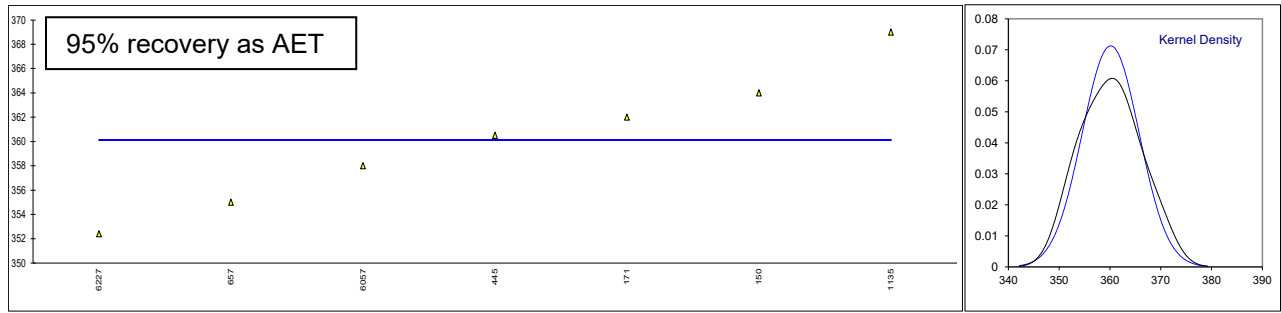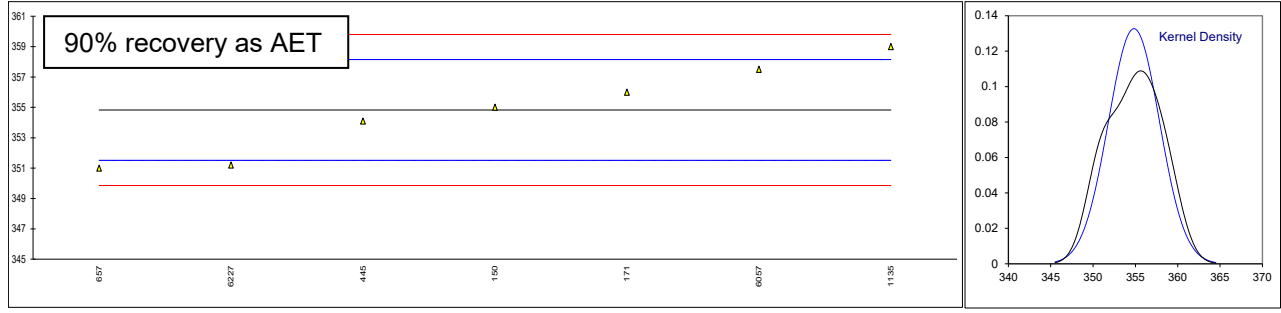| lab	method	value	mark	z(targ)	remarks
150	D240	40.240		1.94	
171	D240	40.212		1.74	
323		-----		-----	
328		-----		-----	
334		-----		-----	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445	D240	39.775		-1.32	
460		-----		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657		-----		-----	
863		-----		-----	
1011		-----		-----	
1134	D240	39.8951		-0.48	
1135		-----		-----	
1167	DIN51900-2	39.605		-2.51	
1189		-----		-----	
1212	D240	39.82		-1.00	
1227	D4809	40.63		4.67	
1299		-----		-----	
1316		-----		-----	
1320		-----		-----	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510	D240	40.09		0.89	
1564		-----		-----	
1569		-----		-----	
1611		-----		-----	
1618		-----		-----	
1643	D240	40.0652		0.71	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721		-----		-----	
1725		-----		-----	
1744		-----		-----	
1769		-----		-----	
1980		-----		-----	
6057		-----		-----	
6069		-----		-----	
6179		-----		-----	
6201	D240	39.609		-2.48	
6213		-----		-----	
6227		39.45		-3.59	
6259		-----		-----	
6262	D240	40.1683		1.44	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325		-----		-----	
6363		-----		-----	
6373		-----		-----	
6390		-----		-----	

normality	OK	
n	12	
outliers	0	
mean (n)	39.963	
st.dev. (n)	0.3343	
R(calc.)	0.936	
st.dev.(D240:19)	0.14286	
R(D240:19)	0.4	
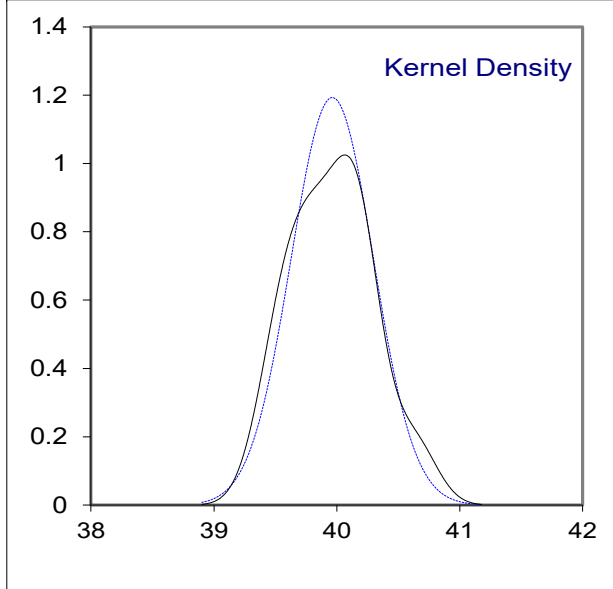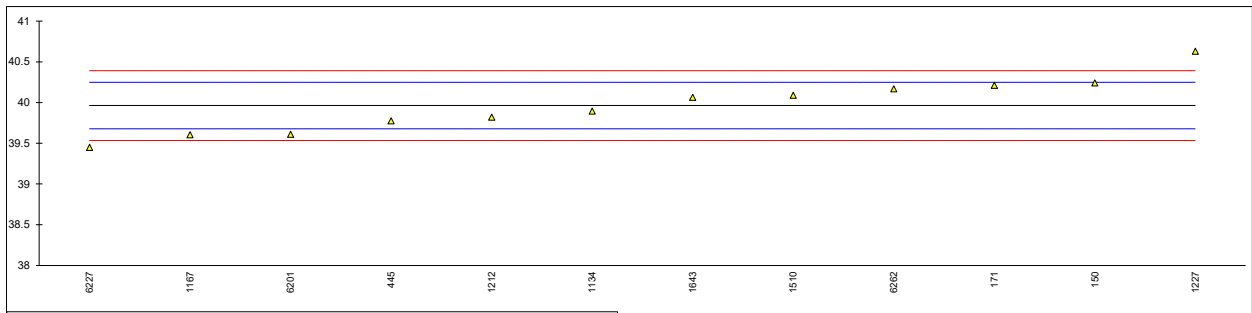
Determination of Distillation at 10 mmHg, % recovered as AET on sample #21055; results in °C

lab	method	80%rec.	mark	z(targ)	90%rec.	mark	z(targ)	95%rec.	mark	z(targ)
150	D1160	353		0.55	355		0.10	364		-----
171	D1160	354		1.16	356		0.71	362		-----
323		-----		-----	-----		-----	-----		-----
328		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
351		-----		-----	-----		-----	-----		-----
396		-----		-----	-----		-----	-----		-----
445	D1160	352.5		0.25	354.1		-0.44	360.5		-----
460		-----		-----	-----		-----	-----		-----
511		-----		-----	-----		-----	-----		-----
540		-----		-----	-----		-----	-----		-----
551		-----		-----	-----		-----	-----		-----
558		-----		-----	-----		-----	-----		-----
621		-----		-----	-----		-----	-----		-----
631		-----		-----	-----		-----	-----		-----
657	D1160	349		-1.86	351		-2.31	355		-----
863		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1134		-----		-----	-----		-----	-----		-----
1135	D1160	353		0.55	359		2.52	369		-----
1167		-----		-----	-----		-----	-----		-----
1189		-----		-----	-----		-----	-----		-----
1212		-----		-----	-----		-----	-----		-----
1227		-----		-----	-----		-----	-----		-----
1299		-----		-----	-----		-----	-----		-----
1316		-----		-----	-----		-----	-----		-----
1320		-----		-----	-----		-----	-----		-----
1399		-----		-----	-----		-----	-----		-----
1459		-----		-----	-----		-----	-----		-----
1494		-----		-----	-----		-----	-----		-----
1510		-----		-----	-----		-----	-----		-----
1564		-----		-----	-----		-----	-----		-----
1569		-----		-----	-----		-----	-----		-----
1611		-----		-----	-----		-----	-----		-----
1618		-----		-----	-----		-----	-----		-----
1643		-----		-----	-----		-----	-----		-----
1644		-----		-----	-----		-----	-----		-----
1697		-----		-----	-----		-----	-----		-----
1698		-----		-----	-----		-----	-----		-----
1705		-----		-----	-----		-----	-----		-----
1713		-----		-----	-----		-----	-----		-----
1721		-----		-----	-----		-----	-----		-----
1725		-----		-----	-----		-----	-----		-----
1744		-----		-----	-----		-----	-----		-----
1769		-----		-----	-----		-----	-----		-----
1980		-----		-----	-----		-----	-----		-----
6057	D1160	354.3		1.34	357.5		1.61	358.0		-----
6069		-----		-----	-----		-----	-----		-----
6179		-----		-----	-----		-----	-----		-----
6201		-----		-----	-----		-----	-----		-----
6213		-----		-----	-----		-----	-----		-----
6227	D1160	348.8		-1.98	351.2		-2.19	352.4		-----
6259		-----		-----	-----		-----	-----		-----
6262		-----		-----	-----		-----	-----		-----
6265		-----		-----	-----		-----	-----		-----
6276		-----		-----	-----		-----	-----		-----
6291		-----		-----	-----		-----	-----		-----
6300		-----		-----	-----		-----	-----		-----
6325		-----		-----	-----		-----	-----		-----
6363		-----		-----	-----		-----	-----		-----
6373		-----		-----	-----		-----	-----		-----
6390		-----		-----	-----		-----	-----		-----
	normality	unknown			unknown			unknown		
	n	7			7			7		
	outliers	0			0			0		
	mean (n)	352.09			354.83			360.13		
	st.dev. (n)	2.2631			3.008			5.596		
	R(calc.)	6.34			8.42			15.67		
	st.dev.(D1160:18)	1.657			1.657			(1.657)		
	R(D1160:18)	4.64			4.64			(4.64)		
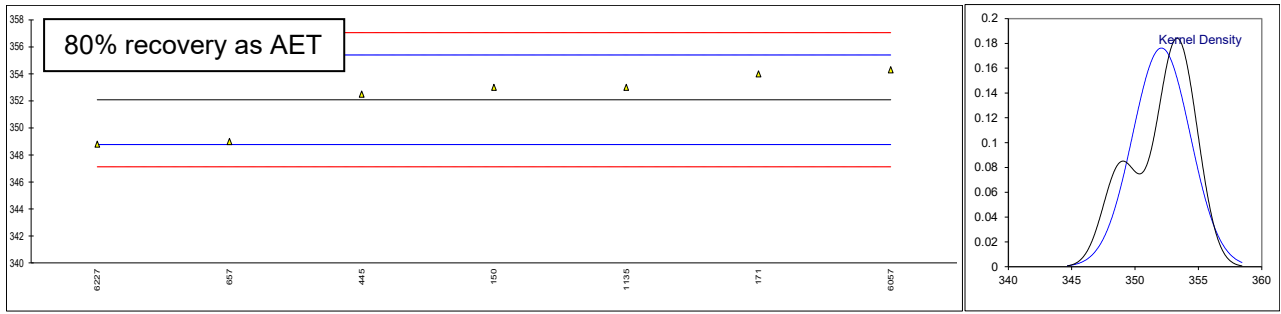
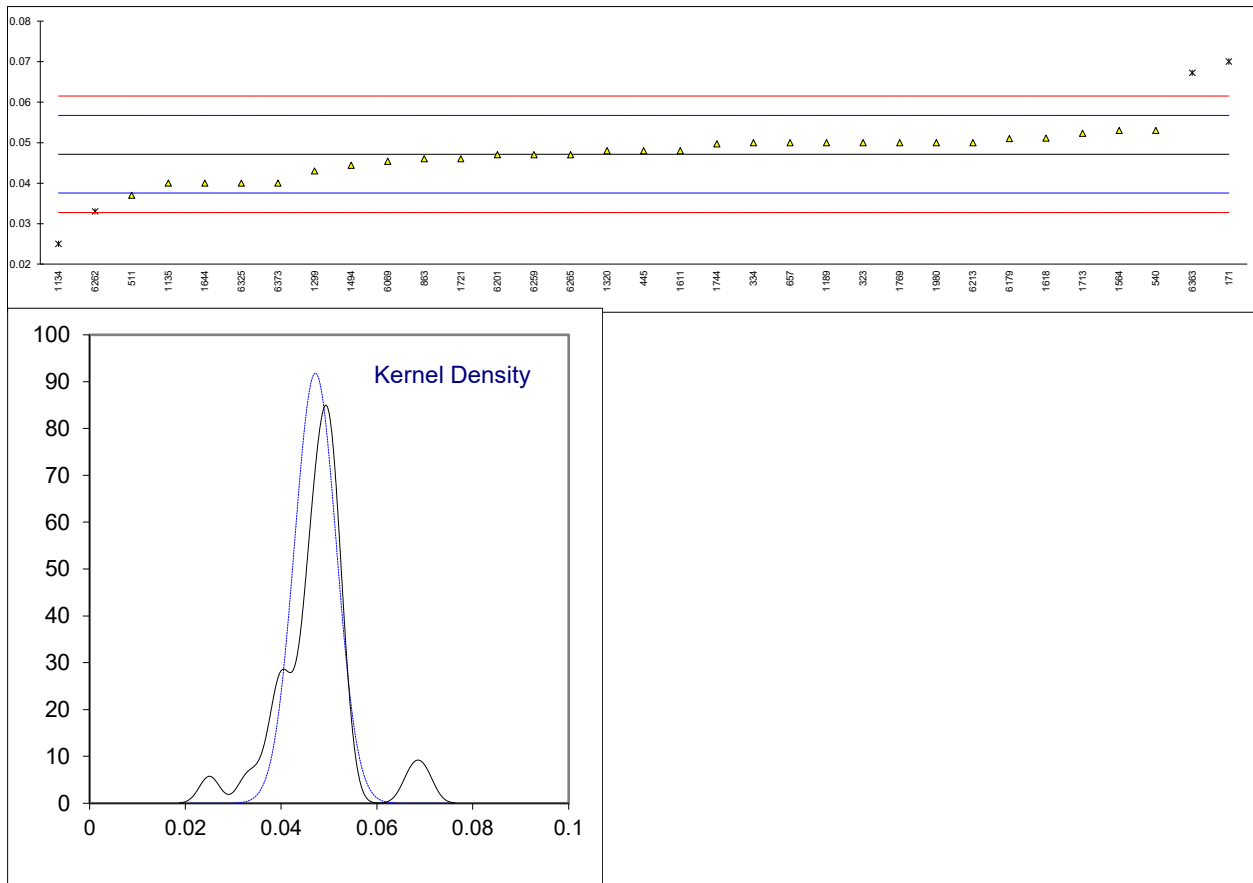## Determination of Methanol on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14110	0.07	R(0.05)	4.77	
323	EN14110	0.05		0.60	
328		-----		-----	
334	EN14110	0.05		0.60	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445	EN14110	0.048		0.18	
460		-----		-----	
511	EN14110	0.037		-2.12	
540	EN14110	0.053		1.22	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14110	0.05		0.60	
863	EN14110	0.046		-0.24	
1011		-----		-----	
1134	EN14110	0.025	R(0.05)	-4.62	
1135	EN14110	0.04		-1.49	
1167		-----		-----	
1189	EN14110	0.05		0.60	
1212		-----		-----	
1227		-----		-----	
1299	EN14110	0.043		-0.86	
1316		-----		-----	
1320	EN14110	0.048		0.18	
1399		-----		-----	
1459		-----		-----	
1494	EN14110	0.0444		-0.57	
1510		-----		-----	
1564	EN14110	0.053		1.22	
1569		-----		-----	
1611	EN14110	0.048		0.18	
1618	EN14110	0.0511		0.83	
1643		-----		-----	
1644	EN14110	0.04		-1.49	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713	EN14110	0.0523		1.08	
1721	EN14110	0.046		-0.24	
1725		-----		-----	
1744	EN14110	0.0497		0.54	
1769	EN14110	0.050		0.60	
1980	EN14110	0.050	C	0.60	first reported 0.075
6057		-----		-----	
6069	EN14110	0.0454		-0.36	
6179	EN14110	0.051		0.81	
6201	EN14110	0.047		-0.03	
6213	EN14110	0.05		0.60	
6227		-----		-----	
6259	EN14110	0.047		-0.03	
6262	EN14110	0.033	R(0.05)	-2.95	
6265	EN14110	0.047		-0.03	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325	EN14110	0.04	C	-1.49	first reported 0.03
6363	EN14110	0.0672	C,R(0.05)	4.19	first reported 0.0711
6373	EN14110	0.04	C	-1.49	first reported 0.09
6390		-----		-----	

	normality	OK	
	n	29	
	outliers	4	
	mean (n)	0.0471	
	st.dev. (n)	0.00435	
	R(calc.)	0.0122	
	st.dev.(EN14110:19)	0.00479	
	R(EN14110:19)	0.0134	

Kernel Density

Determination of Monoglycerides on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.38		1.18	
323	EN14105	0.32	C	-0.15	first reported 32
328		-----		-----	
334	EN14105	0.36		0.74	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
511		-----		-----	
540	EN14105	0.325		-0.04	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14105	0.35		0.52	
863	EN14105	0.328		0.03	
1011		-----		-----	
1134	EN14105	0.38		1.18	
1135	EN14105	0.34		0.29	
1167		-----		-----	
1189	EN14105	0.265		-1.37	
1212	EN14105	0.38		1.18	
1227		-----		-----	
1299	EN14105	0.34		0.29	
1316		-----		-----	
1320	EN14105	0.34		0.29	
1399		-----		-----	
1459		-----		-----	
1494	D6584	0.3186		-0.18	
1510	EN14105	0.20	R(0.01)	-2.81	
1564	EN14105	0.3357		0.20	
1569		-----		-----	
1611	EN14105	0.293		-0.75	
1618		-----		-----	
1643		-----		-----	
1644	EN14105	0.2770		-1.10	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721	EN14105	0.32		-0.15	
1725		-----		-----	
1744	D6584	0.3247		-0.04	
1769	D6584	0.292		-0.77	
1980	EN14105	0.32		-0.15	
6057	EN14105	0.35		0.52	
6069	D6584	0.32523		-0.03	
6179	D6584	0.2637		-1.40	
6201	EN14105	0.34		0.29	
6213	EN14105	0.32		-0.15	
6227		0.011	C,R(0.01)	-6.99	first reported 0.016
6259	D6584	0.331		0.10	
6262	EN14105	0.33		0.07	
6265	EN14105	0.3286		0.04	
6276	EN14105	0.32		-0.15	
6291		-----		-----	
6300		-----		-----	
6325	EN14105	0.32		-0.15	
6363	EN14105	0.3071		-0.43	
6373	EN14105	0.33		0.07	
6390		-----		-----	

normality	OK	
n	32	
outliers	2	
mean (n)	0.3267	
st.dev. (n)	0.02832	
R(calc.)	0.0793	
st.dev.(EN14105:11)	0.04514	
R(EN14105:11)	0.1264	
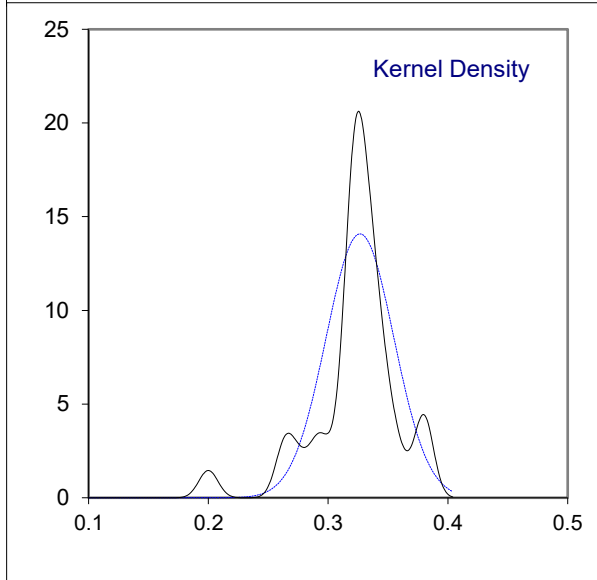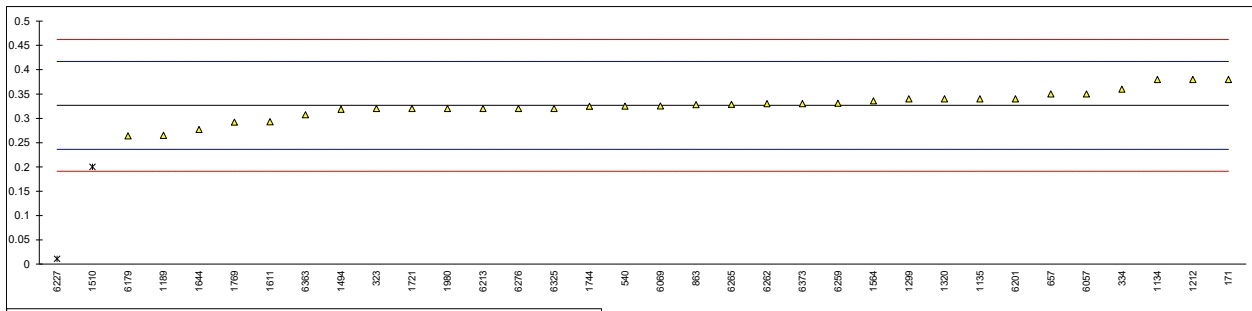
Determination of Diglycerides on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.15		1.97	
323	EN14105	0.12		0.31	
328		-----		-----	
334	EN14105	0.08		-1.91	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
511		-----		-----	
540	EN14105	0.13		0.86	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14105	0.11		-0.25	
863	EN14105	0.123		0.47	
1011		-----		-----	
1134	EN14105	0.10		-0.80	
1135	EN14105	0.12		0.31	
1167		-----		-----	
1189	EN14105	0.082		-1.80	
1212	EN14105	0.13		0.86	
1227		-----		-----	
1299	EN14105	0.13		0.86	
1316		-----		-----	
1320	EN14105	0.12		0.31	
1399		-----		-----	
1459		-----		-----	
1494	D6584	0.1150		0.03	
1510	EN14105	0.07		-2.47	
1564	EN14105	0.0874		-1.50	
1569		-----		-----	
1611	EN14105	0.091		-1.30	
1618		-----		-----	
1643		-----		-----	
1644	EN14105	0.0809		-1.86	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721	EN14105	0.11		-0.25	
1725		-----		-----	
1744	D6584	0.1278		0.74	
1769	D6584	0.120		0.31	
1980	EN14105	0.11		-0.25	
6057	EN14105	0.11		-0.25	
6069	D6584	0.11023		-0.24	
6179	D6584	0.1067		-0.43	
6201	EN14105	0.11		-0.25	
6213	EN14105	0.13		0.86	
6227		0.154	C	2.19	first reported 0.334
6259	D6584	0.120		0.31	
6262	EN14105	0.11		-0.25	
6265	EN14105	0.1195		0.28	
6276	EN14105	0.118		0.20	
6291		-----		-----	
6300		-----		-----	
6325	EN14105	0.12		0.31	
6363	EN14105	0.1669		2.91	
6373	EN14105	0.11		-0.25	
6390		-----		-----	

	normality	OK	
	n	34	
	outliers	0	
	mean (n)	0.1145	
	st.dev. (n)	0.02065	
	R(calc.)	0.0578	
	st.dev.(EN14105:11)	0.01803	
	R(EN14105:11)	0.0508	
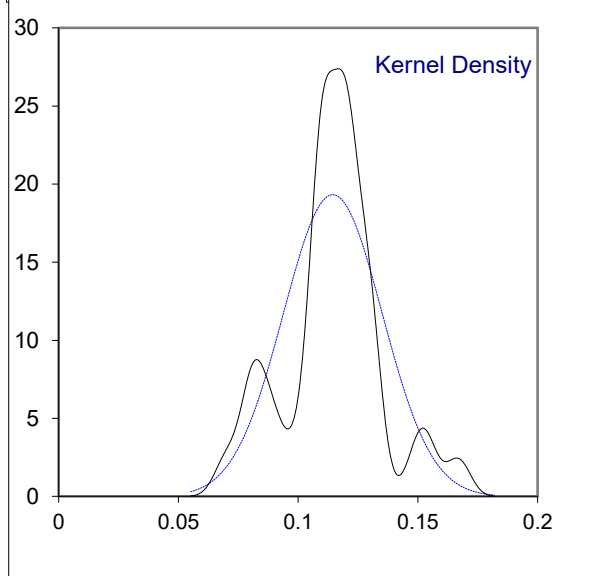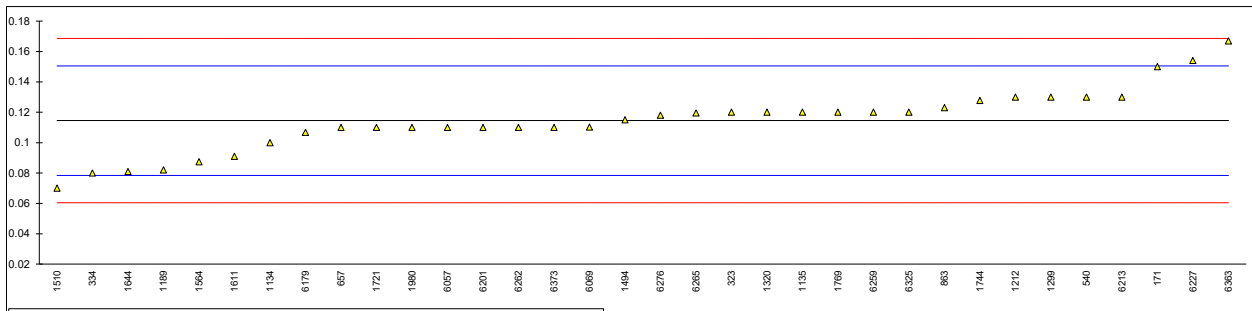
Determination of Triglycerides on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	<0.10		-----	
323	EN14105	0.04		-0.26	
328		-----		-----	
334	EN14105	0.04		-0.26	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
511		-----		-----	
540	EN14105	0.08		1.42	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14105	<0.10		-----	
863	EN14105	0.046		-0.01	
1011		-----		-----	
1134	EN14105	0.04		-0.26	
1135	EN14105	0.07		1.00	
1167		-----		-----	
1189	EN14105	0.048		0.08	
1212	EN14105	0.05		0.16	
1227		-----		-----	
1299	EN14105	0.04		-0.26	
1316		-----		-----	
1320	EN14105	0.04		-0.26	
1399		-----		-----	
1459		-----		-----	
1494	D6584	0.0412		-0.21	
1510	EN14105	0.03		-0.68	
1564	EN14105	0.0623		0.68	
1569		-----		-----	
1611	EN14105	0.036		-0.43	
1618		-----		-----	
1643		-----		-----	
1644	EN14105	0.0324		-0.58	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721	EN14105	0.05		0.16	
1725		-----		-----	
1744	D6584	0.0742		1.18	
1769	D6584	0.053		0.29	
1980	EN14105	0.02		-1.10	
6057	EN14105	0.04		-0.26	
6069	D6584	0.05292		0.28	
6179	D6584	0.0528		0.28	
6201	EN14105	0.06		0.58	
6213	EN14105	0.05		0.16	
6227		0.001	C	-1.90	first reported 0.102
6259	D6584	0.057		0.46	
6262	EN14105	0.07		1.00	
6265	EN14105	0.0544		0.35	
6276	EN14105	0.055		0.37	
6291		-----		-----	
6300		-----		-----	
6325	EN14105	0.04		-0.26	
6363	EN14105	0.0105		-1.50	
6373	EN14105	0.04		-0.26	
6390		-----		-----	

normality	suspect
n	32
outliers	0
mean (n)	0.0461
st.dev. (n)	0.01689
R(calc.)	0.0473
st.dev.(EN14105:11)	0.02381
R(EN14105:11)	0.0667
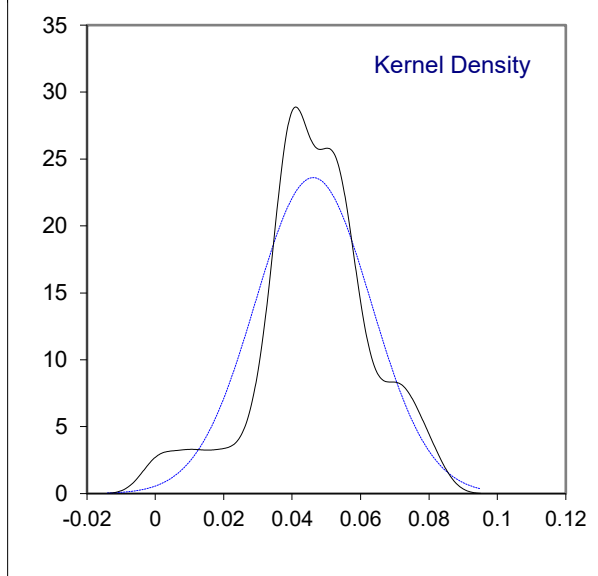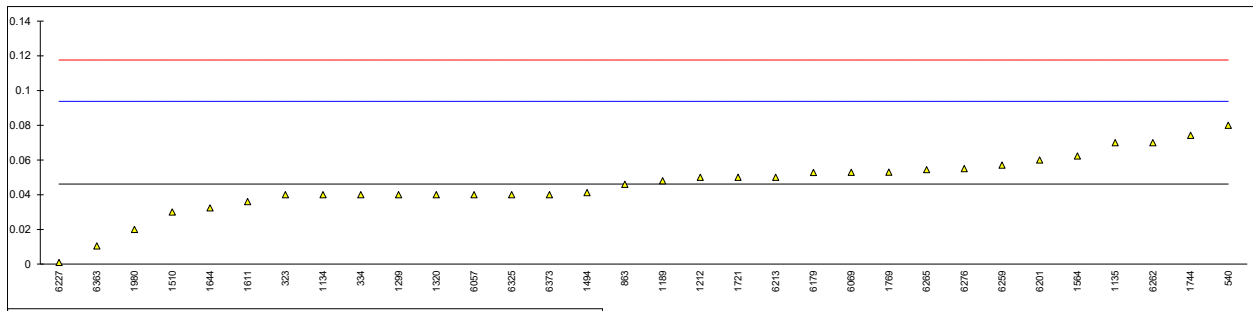
Determination of Free Glycerol on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.001		-0.61	
323	EN14105	< 0.001		-----	
328		-----		-----	
334	EN14105	0.005		1.10	
335		-----		-----	
351	EN14105	0.0084		2.55	
396		-----		-----	
445		-----		-----	
460		-----		-----	
511		-----		-----	
540	EN14105	<0.01		-----	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14105	0.003		0.24	
863	EN14105	0.002		-0.19	
1011		-----		-----	
1134	EN14105	0.039	R(0.01)	15.64	
1135	EN14105	0.001		-0.61	
1167		-----		-----	
1189	EN14105	0.0019		-0.23	
1212	EN14105	0.001		-0.61	
1227		-----		-----	
1299	EN14105	0.00077		-0.71	
1316		-----		-----	
1320	EN14105	0.003		0.24	
1399		-----		-----	
1459		-----		-----	
1494	D6584	0.0017		-0.31	
1510	EN14105	0.051	R(0.01)	20.77	
1564	EN14105	0.0024		-0.01	
1569		-----		-----	
1611	EN14105	0.0029		0.20	
1618		-----		-----	
1643		-----		-----	
1644	EN14105	0.0032		0.33	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721	EN14105	0.002		-0.19	
1725		-----		-----	
1744	D6584	0.0014		-0.44	
1769	D6584	0.002		-0.19	
1980	EN14105	0.003		0.24	
6057	EN14105	0.001		-0.61	
6069	D6584	0.00184		-0.25	
6179	D6584	0.0031		0.29	
6201	EN14105	0.0014		-0.44	
6213	EN14105	0.003		0.24	
6227		0.005		1.10	
6259	D6584	0.002		-0.19	
6262	EN14105	0		-1.04	
6265	EN14105	0.005		1.10	
6276	EN14105	0.002		-0.19	
6291		-----		-----	
6300		-----		-----	
6325	EN14105	0.002		-0.19	
6363	EN14105	0.0014		-0.44	
6373	EN14105	0.002		-0.19	
6390		-----		-----	

normality	not OK	
n	31	
outliers	2	
mean (n)	0.0024	
st.dev. (n)	0.00164	
R(calc.)	0.0046	
st.dev.(EN14105:11)	0.00234	
R(EN14105:11)	0.0065	
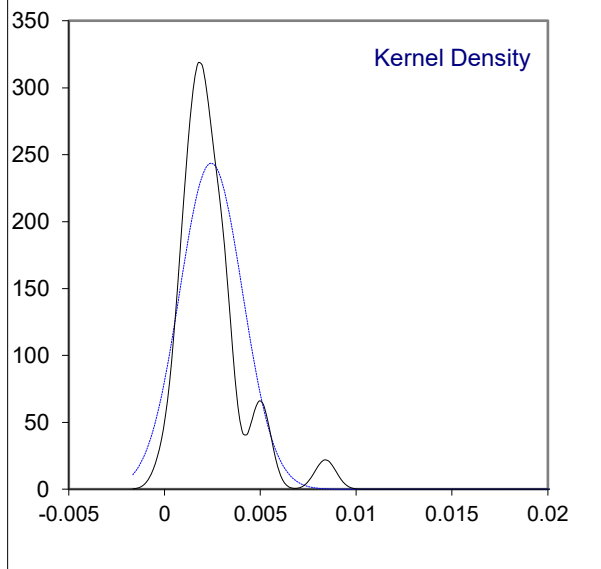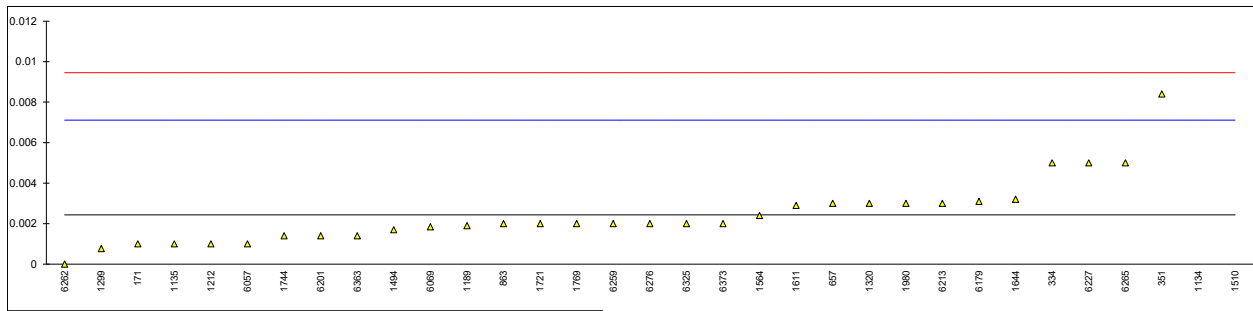
Determination of Total Glycerol on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14105	0.126		1.73	
323	EN14105	0.08		-2.33	
328		-----		-----	
334	EN14105	0.113		0.58	
335		-----		-----	
351		-----		-----	
396		-----		-----	
445		-----		-----	
460		-----		-----	
511		-----		-----	
540	EN14105	0.115		0.76	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN14105	0.112		0.49	
863	EN14105	0.108		0.14	
1011		-----		-----	
1134	EN14105	0.155	R(0.01)	4.28	
1135	EN14105	0.113		0.58	
1167		-----		-----	
1189	EN14105	0.086		-1.80	
1212	EN14105	0.122		1.37	
1227		-----		-----	
1299	EN14105	0.11		0.31	
1316		-----		-----	
1320	EN14105	0.110		0.31	
1399		-----		-----	
1459		-----		-----	
1494	D6584	0.1060		-0.04	
1510	EN14105	0.115		0.76	
1564	EN14105	0.107		0.05	
1569		-----		-----	
1611	EN14105	0.0939		-1.11	
1618		-----		-----	
1643		-----		-----	
1644	EN14105	0.0891		-1.53	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721	EN14105	0.105		-0.13	
1725		-----		-----	
1744	D6584	0.1123		0.52	
1769	D6584	0.098		-0.74	
1980	EN14105	0.102		-0.39	
6057	EN14105	0.110		0.31	
6069	D6584	0.10795		0.13	
6179	D6584	0.0929		-1.19	
6201	EN14105	0.111		0.40	
6213	D6584	0.1095		0.27	
6227		0.166	C,R(0.01)	5.25	first reported 0.457
6259	D6584	0.112		0.49	
6262	EN14105	0.107		0.05	
6265	EN14105	0.111		0.40	
6276	EN14105	0.106		-0.04	
6291		-----		-----	
6300		-----		-----	
6325	EN14105	0.104		-0.21	
6363	EN14105	0.1063		-0.01	
6373	EN14105	0.105		-0.13	
6390		-----		-----	

|		
normality	suspect	
n	32	
outliers	2	
mean (n)	0.1064	
st.dev. (n)	0.00968	
R(calc.)	0.0271	
st.dev.(EN14105:11)	0.01134	
R(EN14105:11)	0.0317	
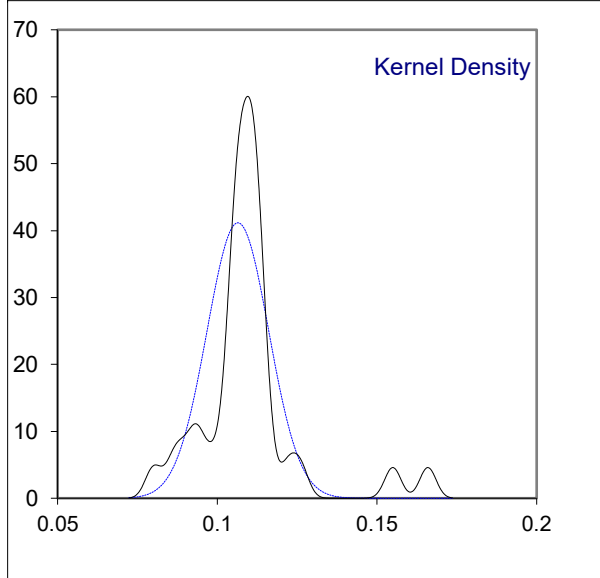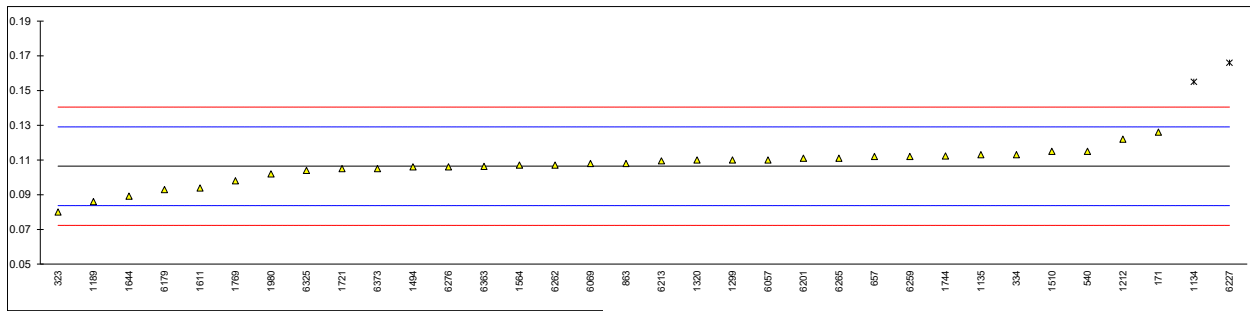
Determination of Total Ester content (FAME) on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	Remarks
150		-----		-----	
171	EN14103	96.1		-0.95	
323	EN14103	97.1		-0.27	
328		-----		-----	
334	EN14103	97.6		0.06	
335		-----		-----	
351		-----		-----	
396	EN14103	97.06		-0.30	
445	EN14103	99.2		1.14	
460	EN14078-B	99.5		1.34	
511		-----		-----	
540	EN14103	98.2		0.47	
551		-----		-----	
558		-----		-----	
621	EN14103	97.81		0.21	
631		-----		-----	
657	EN14103	97.2		-0.20	
863	EN14103	97.7		0.13	
1011	EN14103	97.9		0.27	
1134	EN14103	96.19		-0.88	
1135	EN14103	96.9		-0.41	
1167		-----		-----	
1189	EN14103	99.6		1.41	
1212	EN14103	98.1		0.40	
1227		-----		-----	
1299	EN14103	98.7		0.80	
1316		-----		-----	
1320	EN14103	97.18		-0.22	
1399		-----	W	-----	Test result withdrawn 13.35
1459		-----		-----	
1494	EN14103	97.41		-0.06	
1510	EN14103	99.2		1.14	
1564	EN14103	99.7		1.48	
1569	EN14103	98.95		0.97	
1611	EN14103	96.0		-1.01	
1618	EN14103	96.03		-0.99	
1643		-----		-----	
1644	EN14103	96.0		-1.01	
1697	EN14103	96.9		-0.41	
1698		-----		-----	
1705		-----		-----	
1713	EN14103	96.0		-1.01	
1721	EN14103	98.4		0.60	
1725		-----		-----	
1744	EN14103	97.2		-0.20	
1769	EN14103	96.866		-0.43	
1980	EN14103	96.5		-0.68	
6057	EN14103	97.1		-0.27	
6069	EN14103	96.950		-0.37	
6179	EN14103	96.62		-0.60	
6201	EN14103	99.1		1.07	
6213	EN14103	96.06		-0.97	
6227		98.2		0.47	
6259	EN14103	97.59		0.06	
6262	EN14103	96.2955		-0.81	
6265	EN14103	95.3		-1.48	
6276		-----	W	-----	Test result withdrawn 92.2
6291		-----		-----	
6300	EN14103	97.80		0.20	
6325	EN14103	98.5		0.67	
6363	EN14103	97.185		-0.22	
6373	EN14103	98.8		0.87	
6390		-----		-----	
	normality	OK			
	n	43			
	outliers	0			
	mean (n)	97.5046			
	st.dev. (n)	1.14880			
	R(calc.)	3.2166			
	st.dev.(EN14103:20)	1.48571			
	R(EN14103:20)	4.16			
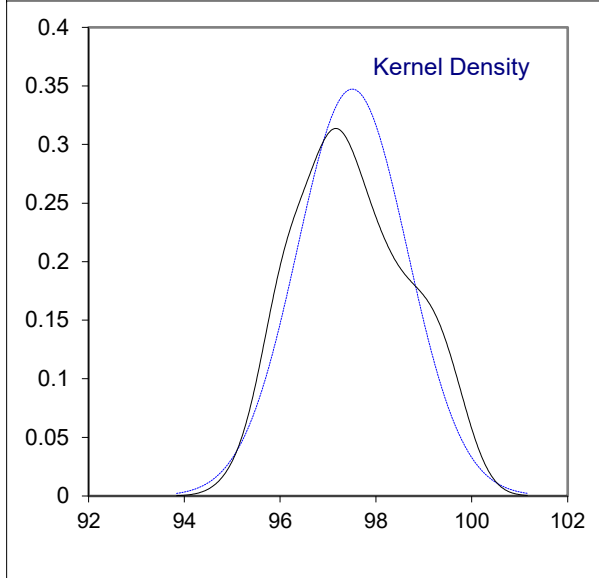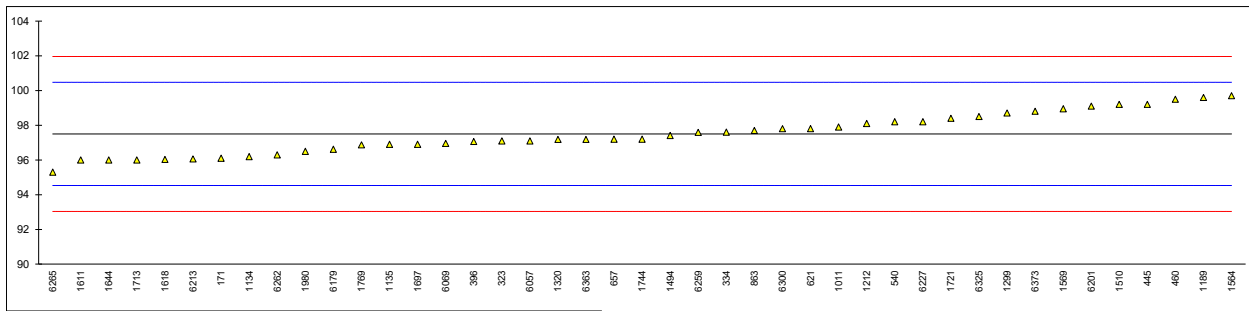
Determination of Linolenic Acid Methyl Ester content on sample #21055; results in %M/M

lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171	EN14103	8.8		-0.39	
323	EN14103	8.7		-0.83	
328		-----		-----	
334	EN14103	8.8		-0.39	
335		-----		-----	
351		-----		-----	
396	EN14103	8.72		-0.74	
445	EN14103	9.1		0.92	
460		-----		-----	
511		-----		-----	
540	EN14103	9.2		1.36	
551		-----		-----	
558		-----		-----	
621	EN14103	9.35		2.02	
631		-----		-----	
657	EN14103	8.9		0.05	
863	EN14103	8.88		-0.04	
1011		-----		-----	
1134	EN14103	8.64		-1.09	
1135	EN14103	8.5		-1.70	
1167		-----		-----	
1189	EN14103	9.0		0.49	
1212	EN14103	9.1		0.92	
1227		-----		-----	
1299	EN14103	9.1		0.92	
1316		-----		-----	
1320	EN14103	8.817		-0.31	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510	EN14103	9.8	R(0.01)	3.98	
1564	EN14103	9.07		0.79	
1569	EN14103	9.1		0.92	
1611	EN14103	8.7		-0.83	
1618	EN14103	8.78		-0.48	
1643		-----		-----	
1644	EN14103	8.7		-0.83	
1697	EN14103	8.8		-0.39	
1698		-----		-----	
1705		-----		-----	
1713	EN14103	8.8		-0.39	
1721	EN14103	8.73		-0.69	
1725		-----		-----	
1744		-----		-----	
1769		-----		-----	
1980	EN14103	8.6		-1.26	
6057	EN14103	9.1		0.92	
6069		-----		-----	
6179		-----		-----	
6201	EN14103	9.3	C	1.93	first reported 9.9
6213	EN14103	8.80		-0.39	
6227		8.8	C	-0.39	first reported 19.8
6259		-----		-----	
6262	EN14103	8.7864		-0.45	
6265	EN14103	8.7		-0.83	
6276		-----	W	-----	Test result withdrawn 7.91
6291		-----		-----	
6300	EN14103	9.05		0.70	
6325	EN14103	8.8		-0.39	
6363	EN14103	8.766		-0.54	
6373	EN14103	9.2		1.36	
6390		-----		-----	

|		
normality	OK	
n	34	
outliers	1	
mean (n)	8.889	
st.dev. (n)	0.2122	
R(calc.)	0.594	
st.dev.(EN14103:20)	0.2288	
R(EN14103:20)	0.641	
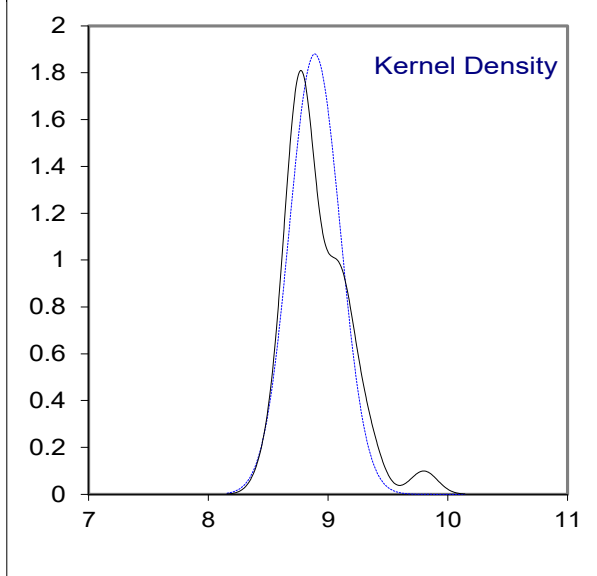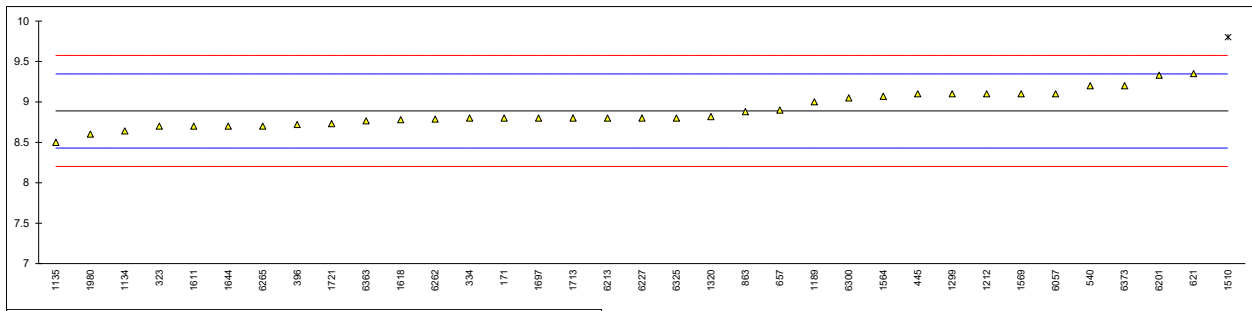
Determination of Polyunsaturated (multiple double bonds) Methyl Esters on sample #21055; results in %M/M

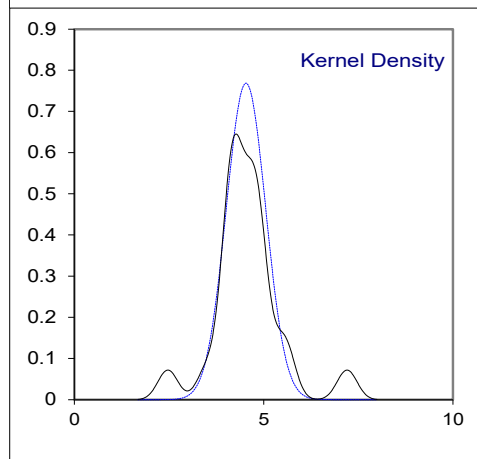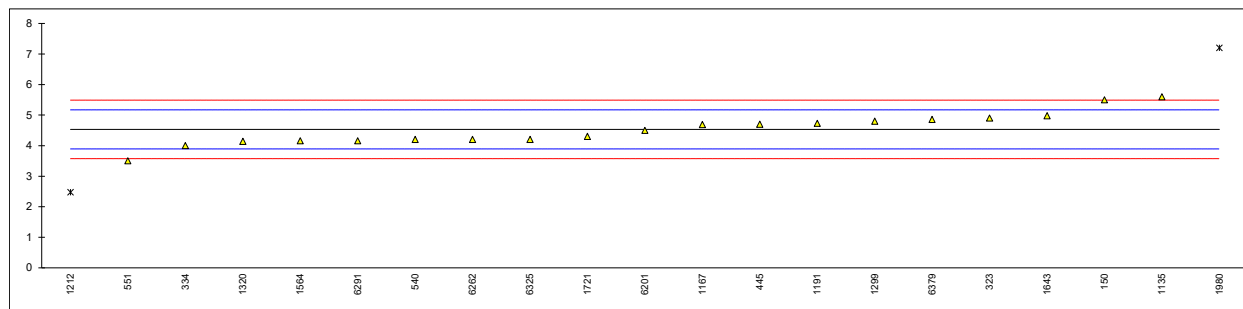| lab	method	value	mark	z(targ)	remarks
150		-----		-----	
171		-----		-----	
323	EN15779	< 0.6		-----	
328		-----		-----	
334	EN15779	< 0.60		-----	
335		-----		-----	
351		-----		-----	
396	EN15779	0.61		-----	
445	EN15779	0.16		-----	
460		-----		-----	
511		-----		-----	
540		-----		-----	
551		-----		-----	
558		-----		-----	
621		-----		-----	
631		-----		-----	
657	EN15779	<0.6		-----	
863	EN15779	<0.60		-----	
1011		-----		-----	
1134	EN14103Mod	0.105		-----	
1135	EN15779	0.23		-----	
1167		-----		-----	
1189	EN15779	0.14		-----	
1212		-----		-----	
1227		-----		-----	
1299	EN15779	<0.6		-----	
1316		-----		-----	
1320	EN15779	<0.1		-----	
1399		-----		-----	
1459		-----		-----	
1494		-----		-----	
1510		-----		-----	
1564		-----		-----	
1569		-----		-----	
1611		-----		-----	
1618		-----		-----	
1643		-----		-----	
1644		-----		-----	
1697		-----		-----	
1698		-----		-----	
1705		-----		-----	
1713		-----		-----	
1721	EN15779	0.20		-----	
1725		-----		-----	
1744		-----		-----	
1769		-----		-----	
1980		-----		-----	
6057	EN15779	<0,60		-----	
6069		-----		-----	
6179		-----		-----	
6201	EN15779	0.36		-----	
6213		-----		-----	
6227		-----		-----	
6259		-----		-----	
6262	EN15779	0.1030		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325	EN15779	0.42		-----	
6363		-----		-----	
6373	EN15779	<0.60		-----	
6390		-----		-----	
	n	16			
	mean (n)	<0.6			Application range EN15779:09+A1:13 is 0.6 -1.5%M/M

Determination of sum of Calcium and Magnesium as Ca + Mg on sample #21056; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	EN14538	6.4		-1.18	
171	EN14538	8.1		0.91	
323	EN14538	7.4		0.05	
334	EN14538	8.2		1.03	
445	EN14538	7.3		-0.07	
540	EN14538	6.10		-1.55	
551	EN14538	8		0.79	
657	EN14538	2.3	C,R(0.01)	-6.21	first reported 2.6
1134		-----		-----	
1135	EN14538	8.0		0.79	
1167	EN14538	7.11		-0.31	
1189	EN14538	6.6		-0.93	
1191	D5185	7.69		0.40	
1212	EN14538	4.64	R(0.05)	-3.34	
1299	EN14538	7.6		0.29	
1316		-----		-----	
1320	D4628	6.70		-0.81	
1510		-----		-----	
1564	EN14538	9.30		2.38	
1643	D5185	7.141		-0.27	
1721	EN14538	7.1		-0.32	
1980	EN14538	7.9		0.66	
6057		-----		-----	
6201	EN14538	6.7		-0.81	
6262	EN14538	7.0		-0.44	
6265		-----		-----	
6276		-----		-----	
6291	EN14538	6.65		-0.87	
6325	EN14538	7.3		-0.07	
6373	EN14538	7		-0.44	
6379	D8110	7.987		0.77	

	normality	OK
	n	23
	outliers	2
	mean (n)	7.360
	st.dev. (n)	0.7260
	R(calc.)	2.033
	st.dev.(EN14538:06)	0.8152
	R(EN14538:06)	2.283
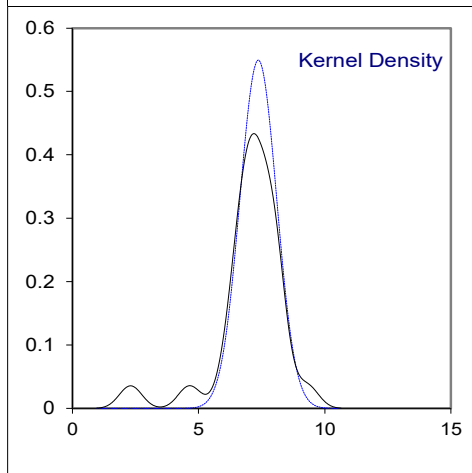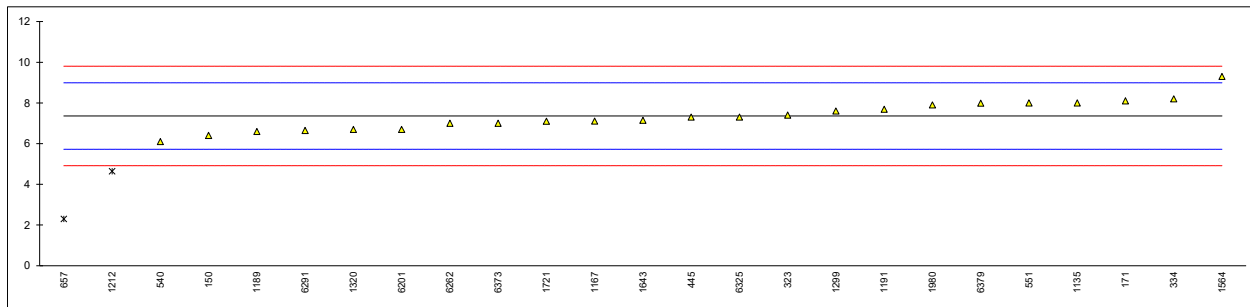
Determination of Phosphorus as P on sample #21056; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	EN14107	5.5		3.03	
171		-----		-----	
323	EN14107	4.9		1.15	
334	EN14107	4.0		-1.66	
445	EN14107	4.7		0.52	
540	EN14107	4.20		-1.04	
551	EN14107	3.5		-3.23	
657	EN14107	<4.0		-----	
1134		-----		-----	
1135	EN14107	5.6		3.34	
1167	EN14107	4.69		0.49	
1189		-----		-----	
1191	D5185	4.73		0.62	
1212	EN14107	2.47	R(0.05)	-6.45	
1299	EN14107	4.8		0.84	
1316		-----		-----	
1320	EN14107	4.14		-1.23	
1510		-----		-----	
1564	EN14107	4.156		-1.18	
1643	D5185	4.978		1.39	
1721	EN14107	4.3	C	-0.73	first reported 3.1
1980	EN14107	7.2	C,R(0.05)	8.34	first reported 7.9
6057		-----		-----	
6201	EN14107	4.5		-0.10	
6262	EN14107	4.2		-1.04	
6265		-----		-----	
6276		-----		-----	
6291	EN14107	4.16		-1.16	
6325	EN14107	4.2		-1.04	
6373	EN14107	<4		-----	
6379	D8110	4.8590		1.02	

	normality	OK	
	n	19	
	outliers	2	
	mean (n)	4.532	
	st.dev. (n)	0.5191	
	R(calc.)	1.453	
	st.dev.(EN14107:03)	0.3197	
	R(EN14107:03)	0.895	

Determination of Potassium as K on sample #21056; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	EN14538	3.7		-0.14	
171	EN14109	3.7		-0.14	
323	EN14109	4.4		0.66	
334	EN14538	4.3		0.55	
445	EN14538	4.4		0.66	
540		-----		-----	
551	EN14109	4.2		0.44	
657	EN14538	1.7	R(0.05)	-2.42	
1134		-----		-----	
1135	EN14109	4.5		0.78	
1167	EN14109	4.7		1.01	
1189		-----		-----	
1191	D8110	3.309		-0.58	
1212	EN14538	3.43		-0.44	
1299	EN14538	5.9	R(0.05)	2.38	
1316		-----		-----	
1320	EN14109	4.09		0.31	
1510		-----		-----	
1564	EN14538	2.760		-1.21	
1643	D5185	4.156		0.39	
1721	EN14109	3.10		-0.82	
1980		-----		-----	
6057		-----		-----	
6201	EN14109	3.6		-0.25	
6262	EN14538	4.2		0.44	
6265		-----		-----	
6276	In house	3.25		-0.65	
6291	EN14109	3.85		0.04	
6325	EN14538	3.6		-0.25	
6373	EN14538	3		-0.94	
6379	D8110	3.9380		0.14	

normality	OK	
n	21	
outliers	2	
mean (n)	3.818	
st.dev. (n)	0.5389	
R(calc.)	1.509	
st.dev.(EN14109:03)	0.8751	
R(EN14109:03)	2.450	
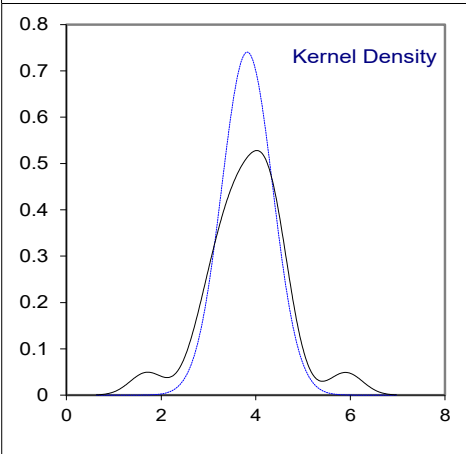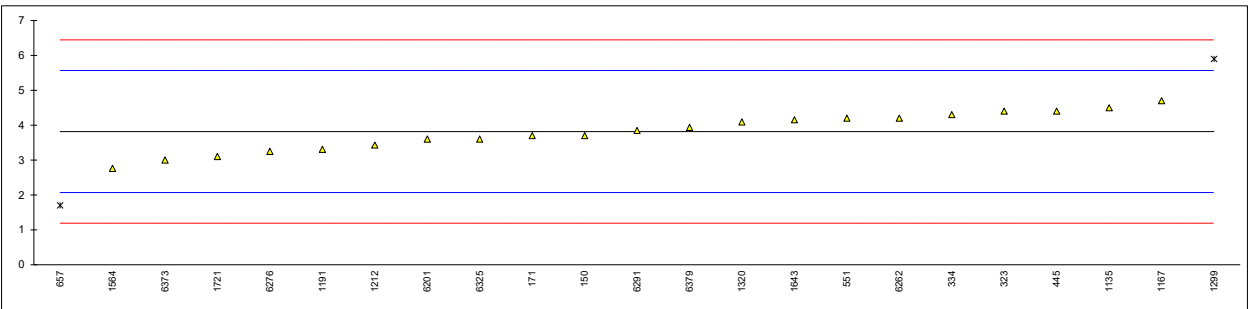
Determination of Sodium as Na on sample #21056; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	EN14538	4.3		0.05	
171	EN14108	3.2		-1.19	
323	EN14108	5.0		0.84	
334	EN14538	4.8		0.62	
445	EN14538	4.9		0.73	
540		-----		-----	
551	EN14108	6		1.97	
657	EN14538	2.1		-2.44	
1134		-----		-----	
1135	EN14108	5.1		0.96	
1167	EN14108	6.2		2.20	
1189		-----		-----	
1191	D5185	5.14		1.00	
1212	EN14538	2.36		-2.14	
1299	EN14538	5.1		0.96	
1316		-----		-----	
1320	EN14108	4.31		0.06	
1510		-----		-----	
1564	EN14538	4.545		0.33	
1643	D5185	5.069		0.92	
1721	EN14108	3.90		-0.40	
1980		-----		-----	
6057		-----		-----	
6201	EN14108	4.2		-0.06	
6262	EN14538	5.0		0.84	
6265	In house	3.2		-1.19	
6276		-----		-----	
6291	EN14108	3.89		-0.41	
6325	EN14538	2.8		-1.65	
6373	EN14538	3		-1.42	
6379	D8110	3.7545		-0.57	

normality	OK	
n	23	
outliers	0	
mean (n)	4.2552	
st.dev. (n)	1.0930	
R(calc.)	3.060	
st.dev.(EN14108:03)	0.8836	
R(EN14108:03)	2.474	

Kernel Density
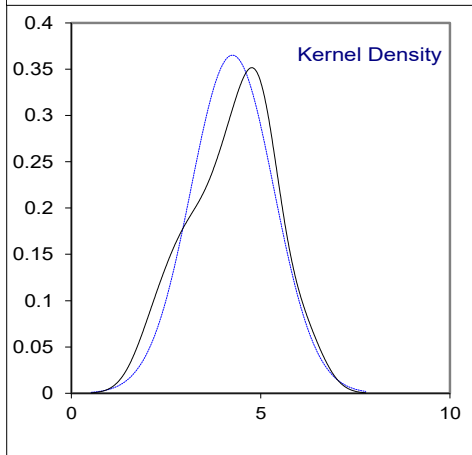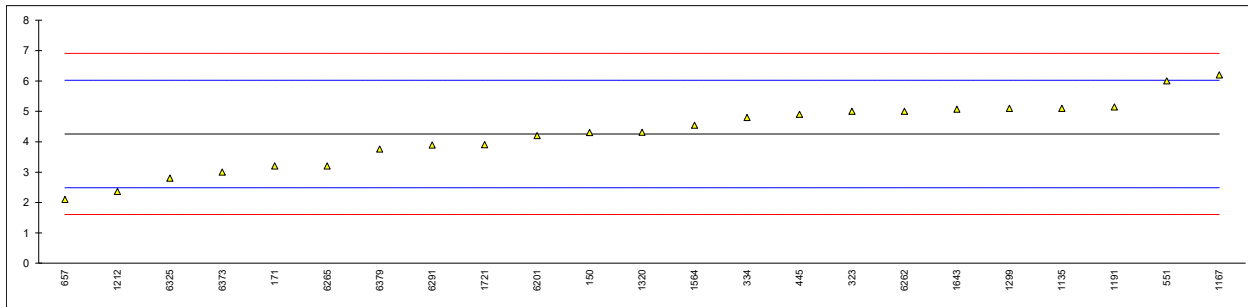
Determination of Sum of Potassium and Sodium as K + Na on sample #21056; results in mg/kg

lab	method	value	mark	z(targ)	remarks
150	EN14538	8.0		-0.42	
171	EN14538	6.01		-2.61	
323	EN14538	9.4		1.12	
334	EN14538	9.1		0.79	
445	EN14538	9.3		1.01	
540	EN14538	8.12		-0.29	
551	EN14538	10.2		2.01	
657	EN14538	3.9	C,ex	-4.94	fr. 3.8, test result excluded as outlier in Potassium as K
1134		-----		-----	
1135	EN14538	9.6		1.34	
1167	EN14108/14109	10.9		2.78	
1189	EN14538	10.5		2.34	
1191		-----		-----	
1212	EN14538	5.79		-2.85	
1299	EN14538	11.0	ex	2.89	test result excluded as outlier in Potassium as K
1316		-----		-----	
1320	In house	8.40		0.02	
1510		-----		-----	
1564	EN14538	7.30		-1.19	
1643	D5185	9.225		0.93	
1721		-----		-----	
1980	EN14538	9.3		1.01	
6057		-----		-----	
6201	EN14538	7.8		-0.64	
6262	EN14538	9.2		0.90	
6265		-----		-----	
6276		-----		-----	
6291	EN14538	7.74		-0.70	
6325	EN14538	6.4		-2.18	
6373	EN14538	6		-2.62	
6379	D8110	7.6925		-0.76	

|		
normality	OK	
n	21	
outliers	0 +2ex	
mean (n)	8.380	
st.dev. (n)	1.4965	
R(calc.)	4.190	
st.dev.(EN14538:06)	0.9077	
R(EN14538:06)	2.542	
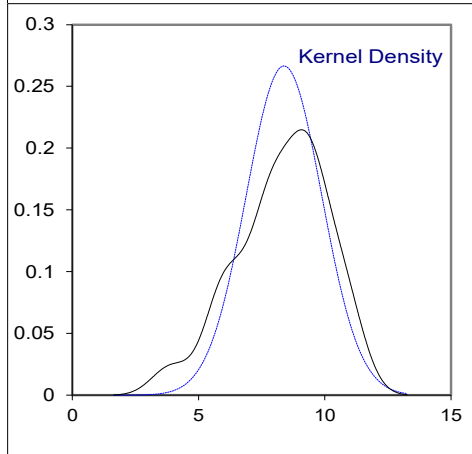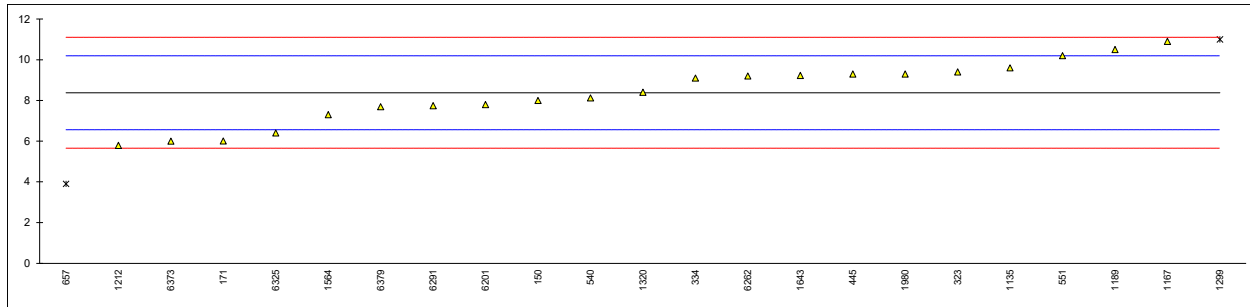
Determination of Particulate Contamination on sample #21057; results in mg/L

lab	method	value	mark	z(targ)	Vol. filtered	Number of filtrations	remarks
150		-----		-----	-----	-----	
171		-----		-----	-----	-----	
323		-----		-----	-----	-----	
334		-----		-----	-----	-----	
335		-----		-----	-----	-----	
351		-----		-----	-----	-----	
445		-----		-----	-----	-----	
540		-----		-----	-----	-----	
551		-----		-----	-----	-----	
621		-----		-----	-----	-----	
657		-----		-----	-----	-----	
1134		-----		-----	-----	-----	
1135		-----		-----	-----	-----	
1167		-----		-----	-----	-----	
1189		-----		-----	-----	-----	
1299		-----		-----	-----	-----	
1316		-----		-----	-----	-----	
1494		-----		-----	-----	-----	
1510		-----		-----	-----	-----	
1564		-----		-----	-----	-----	
1611		-----		-----	-----	-----	
1618		-----		-----	-----	-----	
1644		-----		-----	-----	-----	
1697		-----		-----	-----	-----	
1698		-----		-----	-----	-----	
1705		-----		-----	-----	-----	
1713		-----		-----	-----	-----	
1721		-----		-----	-----	-----	
1725		-----		-----	-----	-----	
1744		-----		-----	-----	-----	
1769		-----		-----	-----	-----	
1980		-----		-----	-----	-----	
6057		-----		-----	-----	-----	
6069		-----		-----	-----	-----	
6179		-----		-----	-----	-----	
6201	D7321	153.5		-----	-----	-----	
6213		-----		-----	-----	-----	
6262		-----		-----	-----	-----	
6265		-----		-----	-----	-----	
6276		-----		-----	-----	-----	
6291		-----		-----	-----	-----	
6325		-----		-----	-----	-----	
6373		-----		-----	-----	-----	
6390		-----		-----	-----	-----	
	n	1					
	mean (n)	n.a.					

Determination of Total Contamination (EN12662) on sample #21057; results in mg/kg

lab	method	value	mark	z(targ)	Complete	Vol.filtered (mL)	Stopped after (min)	
150		-----		-----		-----	-----	
171		-----		-----		-----	-----	
323	EN12662:2014	35.3	ex	1.43		300	-----	
334	EN12662:1998	28		-0.79	Yes	300	-----	
335		-----		-----		-----	-----	
351	EN12662:1998	30.08		-0.16	Yes	300	-----	
445	EN12662:2008	38.59		2.43	Yes	-----	-----	
540	EN12662:1998	22.15		-2.58	Yes	400	14	
551	EN12662:2008	17.3		-4.06		300	20	
621	EN12662:2014	12.4	ex	-5.55	Yes	250	-----	
657	EN12662:2008	30.6		0.00	Yes	800	21	
1134	EN12662:1998	27.3		-1.01	Yes	310	-----	
1135	EN12662:1998	3	R(0.05)	-8.42	Yes	300	122	
1167	EN12662:2014	36.3	ex	1.74	Yes	300	-----	
1189	EN12662:1998	32.3		0.52	No	-----	-----	
1299	EN12662:1998	27.4		-0.98	Yes	300	-----	
1316	EN12662:2008	43.44		3.91	No	400	10	
1494	EN12662:2008	25.81		-1.46		-----	-----	
1510	EN12662:2014	<12		<-5.67	Yes	-----	-----	f-?
1564	EN12662:2008	24		-2.01	Yes	800	30	
1611	EN12662:2008	35.4		1.46	Yes	-----	-----	
1618	EN12662:2008	32.42		0.55	Yes	-----	-----	
1644	EN12662:2008	35.2		1.40	Yes	-----	-----	
1697	EN12662:2008	35.64		1.53	Yes	-----	-----	
1698	EN12662:2008	38.6		2.44	Yes	-----	-----	
1705	EN12662:2008	37.98		2.25	Yes	800	-----	
1713	EN12662:2008	35.4		1.46	Yes	-----	-----	
1721		35.81		1.59		800	-----	
1725	EN12662:2008	40.1		2.89		-----	-----	
1744		-----		-----		-----	-----	
1769	EN12662:2008	27.4		-0.98		-----	-----	
1980	EN12662:2008	38.04		2.27	Yes	800	-----	
6057	EN12662:1998	17		-4.15	Yes	-----	-----	
6069	EN12662:2008	26.50		-1.25		-----	-----	
6179	EN12662:2008	19.94		-3.25	Yes	-----	-----	
6201	EN12662:1998	26.3		-1.31		-----	-----	
6213	EN12662:2008	34.38		1.15	Yes	-----	-----	
6259	EN12662:2008	26.31		-1.31		-----	-----	
6262	EN12662:1998	15		-4.76	Yes	300	-----	
6265	EN12662:1998	30.65		0.01	Yes	350	5 min	
6276	EN12662:1998	29.6		-0.31		-----	-----	
6291	EN12662:2008	64.0	R(0.05)	10.18		-----	-----	
6325	EN12662:1998	34		1.03	Yes	-----	-----	
6373	EN12662:1998	38.1		2.28	Yes	-----	-----	
6390	EN12662:2008	34.5		1.19	Yes	-----	-----	

	normality	OK	
	n	35	
	outliers	1 +3ex	
	mean (n)	30.607	
	st.dev. (n)	6.9998	
	R(calc.)	19.60	
	st.dev.(EN12662:08)	3.2793	
	R(EN12662:08)	9.182	
Compare			
	R(EN12662:98)	9.182	

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.
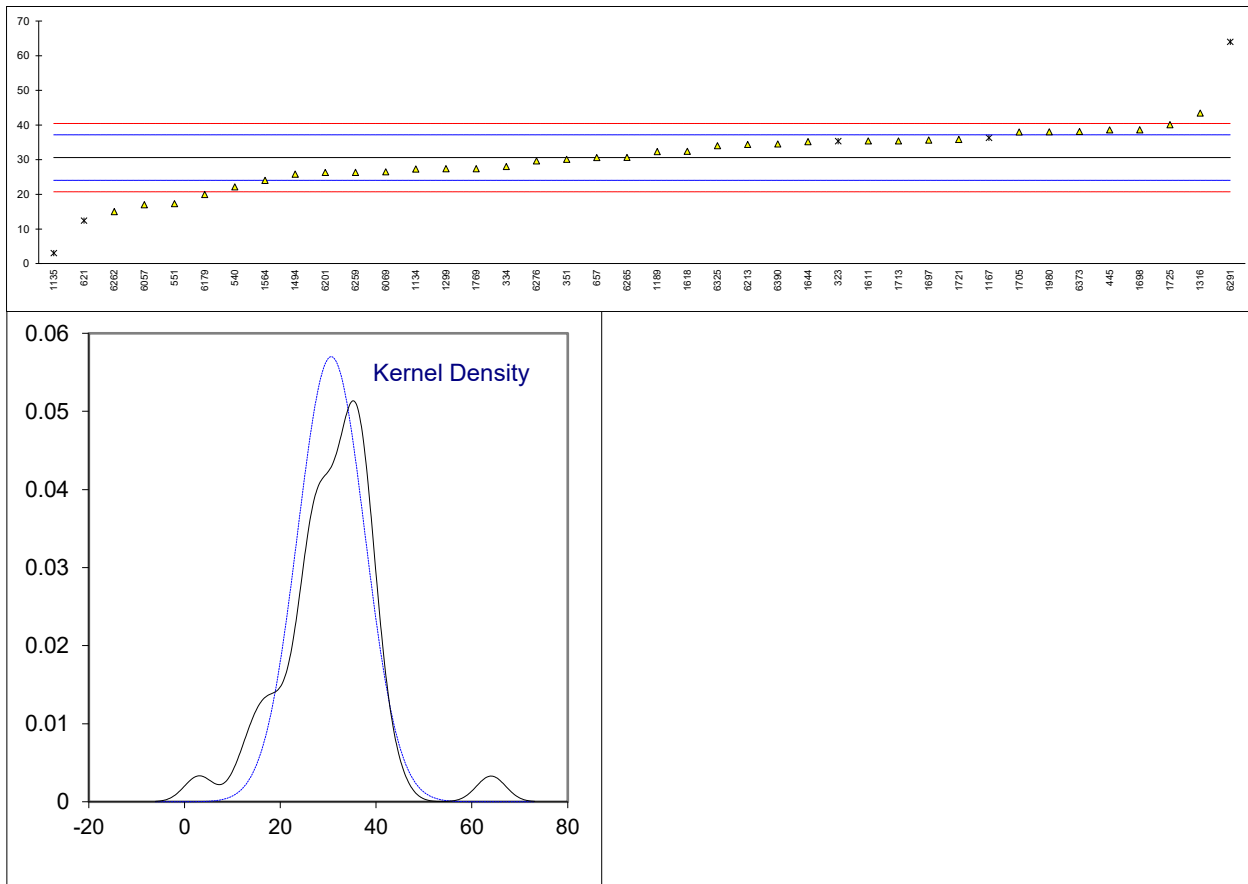
Determination of Filter Blocking Potential by Cold Soak Filterability Test (CSFT) on sample #21058; results in s

lab	method	value	mark	z(targ)	Vol. (mL) at time >720sec	remarks
150	D7501	333		-----	300	
171	D7501	45		-----	300	
323		-----		-----	-----	
540	D7501	61		-----	0	
657		-----		-----	-----	
1134		-----		-----	-----	
1135	D7501	286		-----	-----	
1212		-----		-----	-----	
1402		-----		-----	-----	
1494	D7501	248		-----	-----	
1739		-----		-----	-----	
1769	D7501	245		-----	-----	
1953		-----		-----	-----	
6057	D7501	58.3		-----	-----	
6069	D7501	225.0		-----	-----	
6179	D7501	260		-----	-----	
6201	IP PM-EA	5.10	C	-----	30	first reported 10.05
6259	D7501	238		-----	-----	
6262		-----		-----	-----	
6265		-----		-----	-----	
6276		-----		-----	-----	
6291		-----		-----	-----	
6300	D7501	146		-----	-----	
6373		-----		-----	-----	
6390		-----		-----	-----	

normality	OK
n	12
outliers	0
mean (n)	179.2
st.dev. (n)	110.46
R(calc.)	309.3
st.dev.(D7501:18a)	(25.82)
R(D7501:18a)	(72.3)
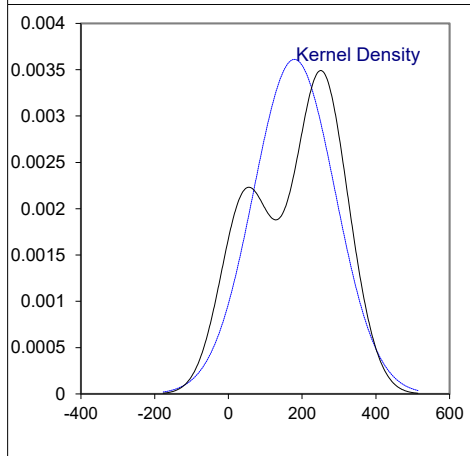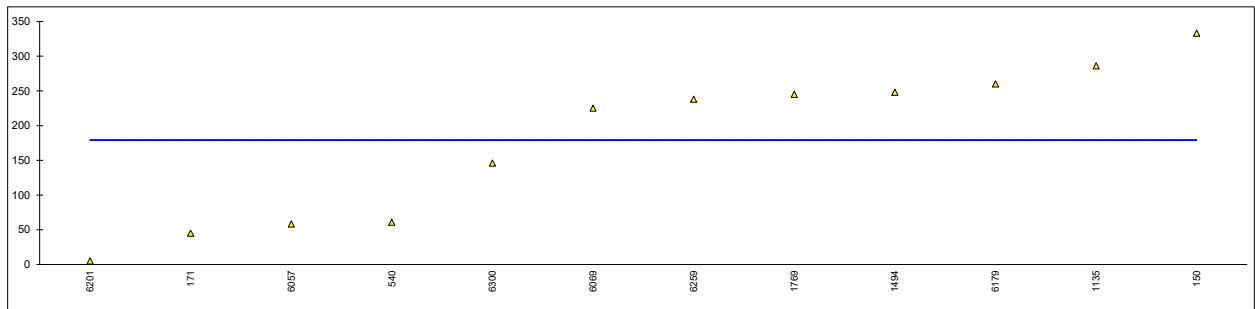
Determination of Filter Blocking Tendency (FBT) on sample #21058

lab	method	value	mark	z(targ)	press. end test (kPa)	vol. pumped (mL)	remarks
150		-----		-----	-----	-----	
171		-----		-----	-----	-----	
323	D2068-B	3.16		-----	105	100	
540		-----		-----	-----	-----	
657	IP387-B	1.35		-----	95	-----	
1134		-----		-----	-----	-----	
1135		-----		-----	-----	-----	
1212	IP387-B	5.64		-----	105	54	
1402	IP387-B	6.82		-----	105	46	
1494		-----		-----	-----	-----	
1739	IP387-B	4.40		-----	105	70	
1769		-----		-----	-----	-----	
1953		-----		-----	-----	-----	
6057	IP387-B	7.57		-----	105	40	
6069		-----		-----	-----	-----	
6179		-----		-----	-----	-----	
6201	IP387-B	10.05	C	-----	105	60	fr. 5.10
6259		-----		-----	-----	-----	
6262	IP387-B	1.86		-----	105	189	
6265	IP387-B	1.55		-----	105	255	
6276	IP387-A	1.8		-----	-----	-----	
6291	IP387-A	7.57		-----	105	40	
6300		-----		-----	-----	-----	
6373	IP387-B	6.08		-----	105	50	
6390	D2068-B	5.10		-----	105	60	

normality	OK
n	13
outliers	0
mean (n)	4.842
st.dev. (n)	2.7743
R(calc.)	7.768
st.dev.(D2068-B:20)	(0.5159)
R(D2068-B:20)	(1.444)
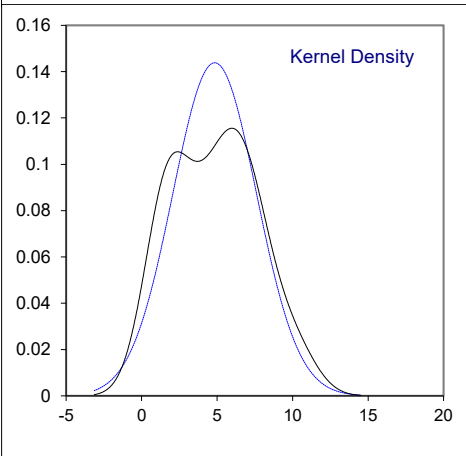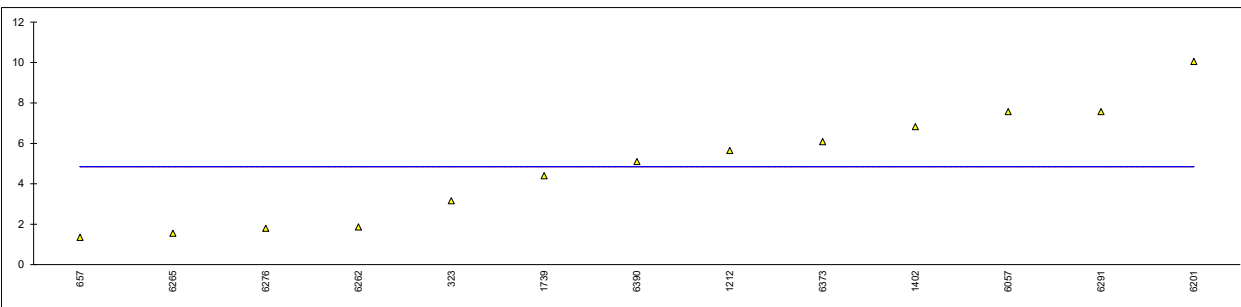
APPENDIX 2

Number of participants per country

    1 lab in ARGENTINA
    4 labs in BELGIUM
    2 labs in BRAZIL
    2 labs in CHINA, People's Republic
    6 labs in COLOMBIA
    2 labs in FINLAND
    4 labs in FRANCE
    1 lab in GERMANY
    1 lab in GREECE
    1 lab in INDONESIA
    1 lab in ITALY
    1 lab in LATVIA
    4 labs in NETHERLANDS
    1 lab in PERU
    1 lab in PHILIPPINES
  12 labs in POLAND
    4 labs in PORTUGAL
    1 lab in SINGAPORE
    1 lab in SLOVAKIA
    1 lab in SOUTH AFRICA
    4 labs in SPAIN
    3 labs in SWEDEN
    1 lab in TURKEY
    7 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.