Results of Proficiency Test
Biodiesel B100 (100% FAME)
October 2020

Organized by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

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1 INTRODUCTION

Since 2001 the Institute for Interlaboratory Studies organizes proficiency tests (PT) for Fatty Acid Methyl Esters (FAME) used as Biodiesel B100 every year. Since 2008 two PTs are organized for Biodiesel 100% FAME (B100) per year. During the annual proficiency testing program of 2020/2021, it was decided to continue with the proficiency tests on Biodiesel B100 in accordance with the latest applicable version of ASTM D6751 and EN14214:12+A2:2019.

The number of participants registered per proficiency test of Biodiesel B100:
- 66 laboratories in 30 different countries for the regular round (iis20G07),
- 19 laboratories in 9 different countries for the Cetane Number (iis20G07CN),
- 33 laboratories in 17 different countries for the Metals in Biodiesel (iis20G07M),
- 46 laboratories in 23 different countries for the Total Contamination (iis20G07TC).

In this interlaboratory study in total 68 laboratories from 31 different countries registered for participation. See appendix 2 for a list of number of participants per country.
In this report the results of the Biodiesel B100 proficiency test are presented and discussed. This report is also electronically available through the iis website www.iisnl.com.

2 SET UP

In this proficiency test on Biodiesel B100 a sample of Rapeseed Methyl Ester was used. 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 for an overview of PT samples.

Samples	Amount in L	Purpose
#20205	1.5	For regular analyzes
#20206	2	Cetane Number & DCN
#20207	0.1	Analysis of Metals
#20208	1	Total Contamination

Table 1: Overview of the different Biodiesel B100 PT samples used in this PT

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

A batch of approximately 400 liters of Biodiesel B100 Rapeseed was obtained from a European producer. After homogenization 103 amber glass bottles of 1L and 85 amber glass bottles of 0.5L were filled for the regular round. Both the 1L and 0.5L bottles were labelled #20205. Together with the regular samples also 80 amber glass bottles of 1L for the Cetane Number & DCN round were filled and labelled #20206.
The homogeneity of the subsamples #20205 and #20206 was checked by the determination of Density in accordance with ASTM D4052 on 10 stratified randomly selected subsamples.

	Density at 15°C in kg/m^3
sample-1	883.20
sample-2	883.18
sample-3	883.19
sample-4	883.18
sample-5	883.18
sample-6	883.18
sample-7	883.19
sample-8	883.18
sample-9	883.18
sample-10	883.18

Table 2: homogeneity test results of subsamples #20205 and #20206

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

	Density at 15°C in kg/m^3
r (observed)	0.02
reference test method	ISO12185:96
0.3 x R (reference test method)	0.15

Table 3: evaluation of the repeatability of subsamples #20205 and #20206

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

From the remaining material approximately 6 kg was taken and spiked with Phosphorus and Sodium salts. After homogenization 66 PE bottles of 0.1L were filled and labelled #20207. The homogeneity of the subsamples was checked by the determination of the elements Phosphorus in accordance with EN14107 and Sodium in accordance with EN14108 on 8 stratified randomly selected samples.

	Phosphorus in mg/kg	Sodium in mg/kg
sample #20207-1	20.7	18.0
sample #20207-2	20.2	17.3
sample #20207-3	20.8	17.2
sample #20207-4	21.1	17.6
sample #20207-5	20.5	17.8
sample #20207-6	20.7	17.6
sample #20207-7	20.7	17.8
sample #20207-8	20.4	17.9

Table 4: homogeneity test results of subsamples #20207

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

	Phosphorus in mg/kg	Sodium in mg/kg
r (observed)	0.75	0.78
reference test method	EN14107:03	EN14108:03
0.3 x R (reference test method)	1.20	1.80

Table 5: evaluation of repeatability of subsamples #20207

The calculated repeatabilities were in agreement with 0.3 times the reproducibility of the corresponding reference test methods. Therefore, the homogeneity of the subsamples was assumed.

For the sample for Total Contamination determination a batch of approximately 65 liters of Biodiesel B100 was used. A defined volume of freshly prepared and well shaken dust suspension of Arizona Dust material in a lubricating oil was added to a 1L empty bottle by means of a calibrated pipette. The addition was checked by weighing the bottle before and after the addition. In total 62 bottles were prepared and subsequently filled with Biodiesel B100. Finally, the subsamples were labelled #20208. After homogenization, 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 September 30, 2020. 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 D6751:19.

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

Parameter	EN14214:12+A2:19	Parameter	ASTM D6751:19
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		

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

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 calculations.

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.

According to ISO5725 the original test results per determination were submitted to Dixon’s, Grubbs' or Rosner’s outlier tests. 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 was projected over the Kernel Density Graph for reference.

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 or 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. In some cases, a reproducibility based on former iis proficiency tests could be used.
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:

$z_{(target)}$ = (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

Some problems were encountered with the dispatch of the samples due to COVID-19 pandemic. Therefore, the reporting time on the data entry portal was extended with one week.

In the PT with the regular analyzes one participant reported the test results after the extended reporting date and five other participants did not report any test results at all.
In the Cetane Number & DCN PT one participant reported the test results after the final reporting date and one other participant did not report any test results at all.
In the Metals PT all reporting participants reported the test results before the final reporting time but six other participants did not report any test results at all.
In the Total Contamination PT one participant did not report any test results and five other participants reported before the final reporting date.
Not all participants were able to report all analyzes requested.

Finally, 63 participants reported in total 1080 numerical test results. Observed were 42 outlying test results, which is 3.9%. 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 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 reported data. The abbreviations used in these tables are explained in appendix 3.

In the iis PT reports the 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 will be used.

Sample #20205

Acid Value: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of EN14104:03 and EN14214:12+A2:19.

Total Acid Number: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D664:18e2 method B.

Cloud Point: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D2500:17a and EN14214:12+A2:19.

CFPP: 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.

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

Copper Corrosion: This determination was not problematic. All reporting participants agreed on a test result of 1(1A).

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

Flash Point PMcc: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ASTM D93-C:18 and ISO2719-C:16.

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

Iodine Value: 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 EN14111:03.

Kinematic Viscosity at 40°C: The determination was not problematic. Four statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in agreement with the requirements of ISO3104:94 and ASTM D445:19a.

Oxidation Stability: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN15751:14.

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

Sulfated Ash: This determination may not be problematic. All reported test results were near or below the application limit of ASTM D874:13a(2018). Therefore, no z-scores were calculated.

Sulfur: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of ISO20846:19 and with ASTM D5453:19a.

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

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

Calorific Value: Five participants submitted a test result for Gross Calorific Value at constant volume and two participants for Net Calorific Value at constant volume. One participant reported a test result for Net Calorific Value at constant pressure. The determination on Gross Calorific Value may be very problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not at all in agreement with the requirements of D240:19. Therefore, no z-scores were calculated.

Distillation at 10 mmHg: Only three participants submitted a test result for Distillation at 10mmHg. Therefore, no z-scores were calculated.

Methanol: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of EN14110:19.

Monoglycerides: 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 EN14105:11.

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

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

Free Glycerol: 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 EN14105:11.

Total Glycerol: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of 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 EN14103:11.

Linolenic Acid Methyl Ester: 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 EN14103:11.

Polyunsaturated Methyl Esters: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of EN15779:09+A1:13.

Sample #20206

Cetane Number: This determination was not problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D613:18a and EN14214:12+A2:19.

DCN (D7668): This determination was very problematic. One statistical outlier was observed over three parameters. The calculated reproducibilities of Derived Cetane Number, Ignition Delay and Combustion Delay after rejection of the statistical outlier are not at all in agreement with the requirements of ASTM D7668:17.

Sample #20207

Sum Ca + Mg: This determination was not problematic. Three statistical outliers were observed. The calculated reproducibility after rejection of the statistical outliers is in full agreement with the requirements of EN141538:06.

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

Potassium: This determination was not problematic. No statistical outliers were observed. The calculated reproducibility is in agreement with the requirements of EN14109:03.

Sodium: This determination was problematic. One statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of EN14108:03.

Sum K + Na: 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 EN14538:06.

Sample #20208

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. 17) 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.

Particulate Contamination: Only two laboratories reported a test result. Therefore, no z-scores were calculated.

Total Contamination: This determination was problematic. A known concentration of dust was added to the subsamples (see §2.4) and therefore the minimum of total contamination to be determined was known (8.9 mg/kg =15 mg/kg – 6.1 mg/kg (R EN14214:12+A2:19)). All laboratories reported a concentration higher than 8.9 mg/kg. Six test results were excluded as explained above. One statistical outlier was observed. The calculated reproducibility after rejection of the suspect data is still not in agreement with the requirements of EN12662:98 (or :08).

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

Parameter	unit	n	average	2.8 * sd	R(lit)
Acid Value	mg KOH/g	37	0.30	0.05	0.06
Total Acid Number	mg KOH/g	22	0.29	0.09	0.11
Cloud Point	°C	49	-7.1	3.7	5
Cold Filter Plugging Point (CFPP)	°C	48	-19.1	3.2	4.2
Carbon Residue on 100% sample	%M/M	24	<0.1	n.e.	n.e.
Copper Corrosion 3hrs at 50°C		44	1 (1A)	n.a.	n.a.
Density at 15°C	kg/m^3	55	883.2	0.2	0.5
Flash Point PMcc	°C	37	158.7	13.5	14.7
Flash Point recc	°C	13	171.4	15.4	15
Iodine Value	g I_2/100g	36	111.3	4.2	5
Kinematic Viscosity at 40°C	mm^2/s	46	4.513	0.034	0.045
Oxidation Stability Induction period	hours	42	6.3	1.2	1.6
Pour Point	°C	26	-36.5	3.6	9.0
Sulfated Ash	%M/M	29	<0.005	n.e.	n.e.
Sulfur	mg/kg	48	3.1	1.4	1.5
Water	mg/kg	56	441	92	144
Water and Sediment	%V/V	8	<0.05	n.e.	n.e.
Calorific Value, Gross	kJ/kg	4	40.0	1.1	(0.40)
80% recovered, as AET	°C	3	354.2	n.e.	n.e.
90% recovered, as AET	°C	3	358.0	n.e.	n.e.
95% recovered, as AET	°C	3	365.1	n.e.	n.e.
Methanol	%M/M	34	0.031	0.016	0.010
Monoglycerides	%M/M	39	0.501	0.163	0.159
Diglycerides	%M/M	37	0.117	0.058	0.051
Triglycerides	%M/M	33	0.056	0.045	0.070
Free Glycerol	%M/M	27	0.002	0.002	0.007
Total Glycerol	%M/M	38	0.155	0.047	0.041
Total Ester content (FAME)	%M/M	42	98.1	2.6	4.2
Linolenic Acid Methyl Ester	%M/M	38	8.81	0.53	0.64
Polyunsaturated Methyl Esters	%M/M	15	0.29	0.53	0.27

Table 7: reproducibilities of tests on sample #20205

Parameter	unit	n	average	2.8 * sd	R(lit)
Cetane Number		10	54.5	3.2	4.8
Derived Cetane Number		12	54.2	4.1	1.5
Ignition Delay		9	3.2	0.6	0.2
Combustion Delay		8	4.4	0.4	0.1

Table 8: reproducibilities of tests on sample #20206

Parameter	unit	n	average	2.8 * sd	R(lit)
Sum Calcium and Magnesium	mg/kg	19	30.5	6.0	5.7
Phosphorus	mg/kg	21	20.3	5.7	3.9
Potassium	mg/kg	22	16.4	6.0	8.8
Sodium	mg/kg	22	13.2	7.4	4.8
Sum Potassium and Sodium	mg/kg	19	31.1	8.6	6.9

Table 9: reproducibilities of tests on sample #20207

Parameter	unit	n	average	2.8 * sd	R(lit)
Particulate Contamination	mg/L	2	n.e.	n.e.	n.e.
Total Contamination	mg/kg	34	20.2	12.1	6.1

Table 10: reproducibilities of tests on sample #20208

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 OCTOBER 2020 WITH PREVIOUS PTS

	October 2020	April 2020	October 2019	May 2019	October 2018
Type of FAME	Rapeseed	Rapeseed	Soybean	Rapeseed	Rapeseed
Number of reporting laboratories	63	47	67	45	83
Number of test results	1080	737	1389	753	1332
Number of statistical outliers	42	37	40	30	33
Percentage statistical outliers	3.9%	5.0%	2.9%	4.0%	2.5%

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	October 2020	April 2020	October 2019	May 2019	October 2018
Acid Value	+	+/-	+/-	-	-
Total Acid Number	+	+	+/-	+	+
Cloud Point	+	+	+	++	+

Parameter	October 2020	April 2020	October 2019	May 2019	October 2018
Cold Filter Plugging Point (CFPP)	+	+	+	+	-
Carbon Residue on100% sample	n.e.	n.e.	n.e.	n.e.	n.e.
Density at 15°C	++	+	++	+/-	++
Flash Point PMcc	+	+/-	+	+/-	-
Flash Point recc.	+/-	-	+	+	+
Iodine Value	+	+	-	+	+/-
Kinematic Viscosity at 40°C	+	+/-	+	-	-
Oxidation Stability Induction period	+	+	+	+	+
Pour Point	++	+	+	+	+
Sulfated Ash	n.e.	n.e.	n.e.	n.e.	n.e.
Sulfur	+/-	+/-	+/-	+/-	+
Water	+	+	+	+	+
Calorific Value, Gross	(--)	+	(--)	--	+
Distillation at 10 mmHg	n.e.	+/-	+	+	-
Methanol	-	-	-	+/-	-
Monoglycerides	+/-	+	+	+	-
Diglycerides	-	-	+	+/-	+
Triglycerides	+	++	+	++	++
Free Glycerol	++	+	+	+	++
Total Glycerol	-	+/-	+/-	+/-	-
Total Ester content	+	+	+	+	+
Linolenic Acid Methyl Ester	+	+/-	+/-	+	+
Polyunsaturated Methyl Esters	-	n.e.	n.e.	+	+/-
Cetane Number	+	n.e.	-	n.e.	+/-
Derived Cetane Number	--	n.e.	--	n.e.	--
Sum of Calcium and Magnesium	+/-	-	+	--	-
Phosphorus	-	-	-	-	-
Potassium	+	+	+	-	+/-
Sodium	-	--	+	--	-
Sum of Potassium and Sodium	-	-	-	--	--
Total Contamination	--	-	--	--	-

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 performance of the determinations against the requirements of the reference test methods is listed in the above table. The following performance categories were used:

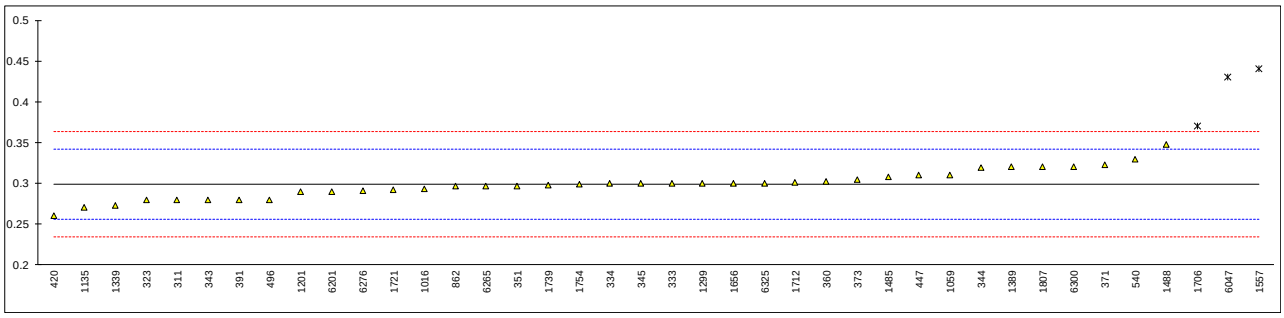
- ++: group performed much better than the reference test method
- + : group performed better than the reference test method
- +/-: group performance equals the reference test method
- - : group performed worse than the reference test method
- -- : group performed much worse than the reference test method
- n.e.: not evaluated

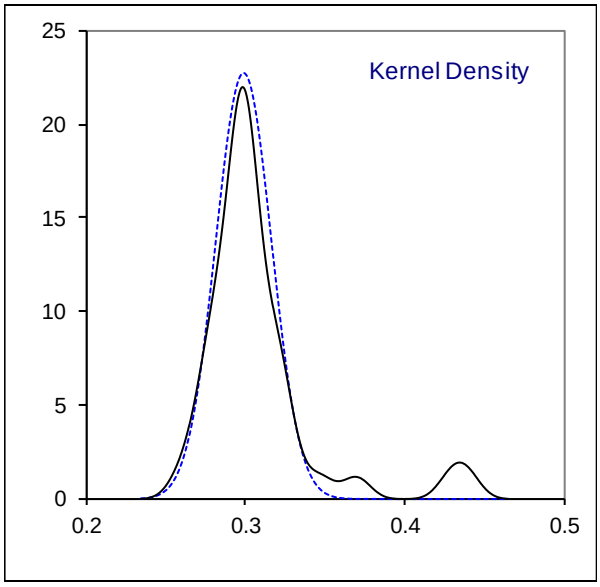
APPENDIX 1

Determination of Acid Value on sample #20205; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171		-----		-----	
311	EN14104	0.28		-0.88	
312		-----		-----	
323	EN14104	0.28		-0.88	
333	EN14104	0.30		0.05	
334	EN14104	0.30		0.05	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14104	0.28		-0.88	
344	EN14104	0.3197		0.97	
345	EN14104	0.30		0.05	
351	EN14104	0.297		-0.09	
360	EN14104	0.302		0.14	
370		-----		-----	
371	EN14104	0.323		1.12	
373	EN14104	0.305		0.28	
391	EN14104	0.28		-0.88	
398		-----		-----	
420	EN14104	0.26		-1.82	
447	EN14104	0.31		0.52	
463		-----		-----	
496	EN14104	0.28		-0.88	
511		-----		-----	
540	EN14104	0.329		1.40	
663		-----		-----	
862	EN14104	0.296		-0.14	
1011		-----		-----	
1016	EN14104	0.293		-0.28	
1059	EN14104	0.31		0.52	
1135	EN14104	0.27		-1.35	
1167		-----		-----	
1199		-----		-----	
1201	EN14104	0.29		-0.42	
1227		-----		-----	
1299	EN14104	0.30		0.05	
1339	EN14104	0.273		-1.21	
1389	EN14104	0.32		0.98	
1397		-----		-----	
1459		-----		-----	
1485	EN14104	0.308		0.42	
1488	EN14104	0.347	C	2.24	first reported 0.433
1557	EN14104	0.44	R(0.01)	6.58	
1586		-----		-----	
1656	EN14104	0.30		0.05	
1706	EN14104	0.37	R(0.05)	3.32	
1712	EN14104	0.301		0.10	
1721	EN14104	0.292		-0.32	
1739	EN14104	0.298		-0.04	
1744		-----		-----	
1754	EN14104	0.299		0.00	
1765		-----		-----	
1807	EN14104	0.32		0.98	
6047	EN14104	0.43	R(0.01)	6.12	
6201	EN14104	0.29		-0.42	
6238		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265	EN14104	0.29695		-0.09	
6276	EN14104	0.2913	C	-0.36	first reported 0.4255
6291		-----		-----	
6300	EN14104	0.32		0.98	
6325	EN14104	0.30		0.05	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	37
outliers	3
mean (n)	0.2989
st.dev. (n)	0.01754
R(calc.)	0.0491
st.dev.(EN14104:03)	0.02143
R(EN14104:03)	0.06
Compare	
R(EN14214:12+A2:19)	0.06

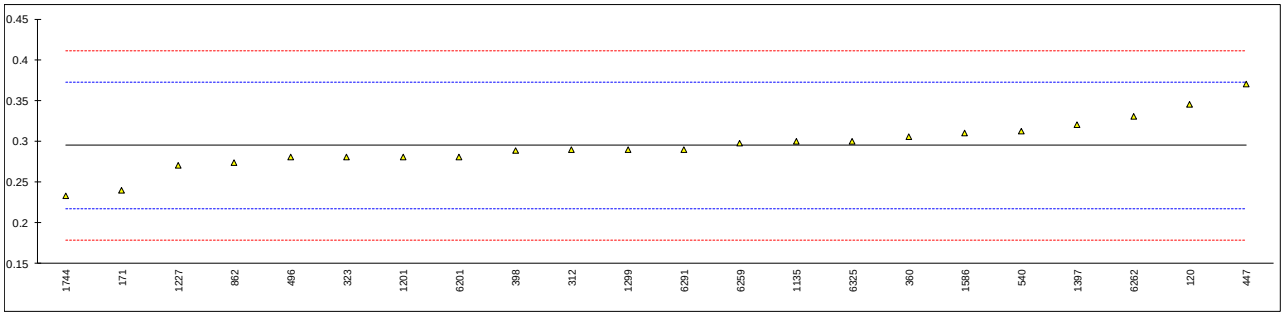


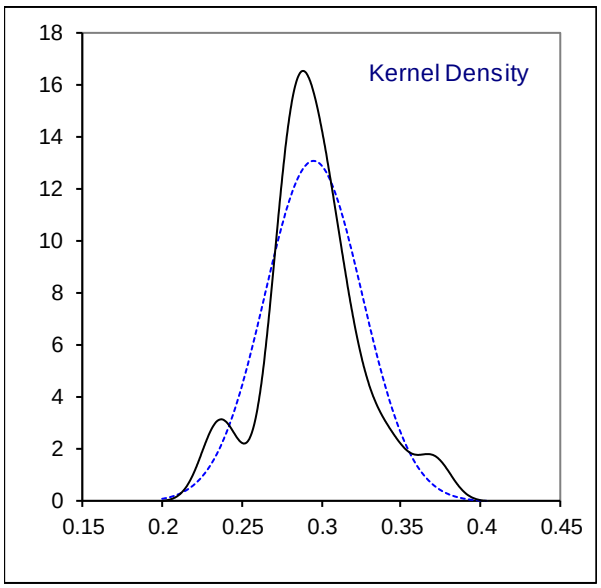


Determination of Total Acid Number on sample #20205; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
120	D664-B	0.345		1.29	
171	D664-B	0.24		-1.41	
311		-----		-----	
312	D974	0.29		-0.12	
323	D664-B	0.28		-0.38	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345		-----		-----	
351		-----		-----	
360	D664-B	0.306		0.29	
370		-----		-----	
371		-----		-----	
373		-----		-----	
391		-----		-----	
398	D664-B	0.288		-0.18	
420		-----		-----	
447	D974	0.37		1.94	
463		-----		-----	
496	D664-B	0.28		-0.38	
511		-----		-----	
540	D664-B	0.312		0.44	
663		-----		-----	
862	D664-B	0.274		-0.54	
1011		-----		-----	
1016		-----		-----	
1059		-----		-----	
1135	D664-B	0.30		0.13	
1167		-----		-----	
1199		-----		-----	
1201	D664-B	0.28		-0.38	
1227	D664-B	0.27		-0.64	
1299	D664-B	0.29		-0.12	
1339		-----		-----	
1389		-----		-----	
1397	D664-B	0.32		0.65	
1459		-----		-----	
1485		-----		-----	
1488		-----		-----	
1557		-----		-----	
1586	D664-B	0.31		0.39	
1656		-----		-----	
1706		-----		-----	
1712		-----		-----	
1721		-----		-----	
1739		-----		-----	
1744	D664-B	0.233		-1.59	
1754		-----		-----	
1765		-----		-----	
1807		-----		-----	
6047		-----		-----	
6201	D664-B	0.28		-0.38	
6238		-----		-----	
6259	D664-B	0.2974		0.07	
6262	D664-B	0.33		0.91	
6265		-----		-----	
6276		-----		-----	
6291	D664-B	0.29		-0.12	
6300		-----		-----	
6325	EN14104	0.30		0.13	
6337		-----		-----	
6341		-----		-----	

normality	suspect
n	22
outliers	0
mean (n)	0.2948
st.dev. (n)	0.03057
R(calc.)	0.0856
st.dev.(D664-B:18e2)	0.03878
R(D664-B:18e2)	0.1086

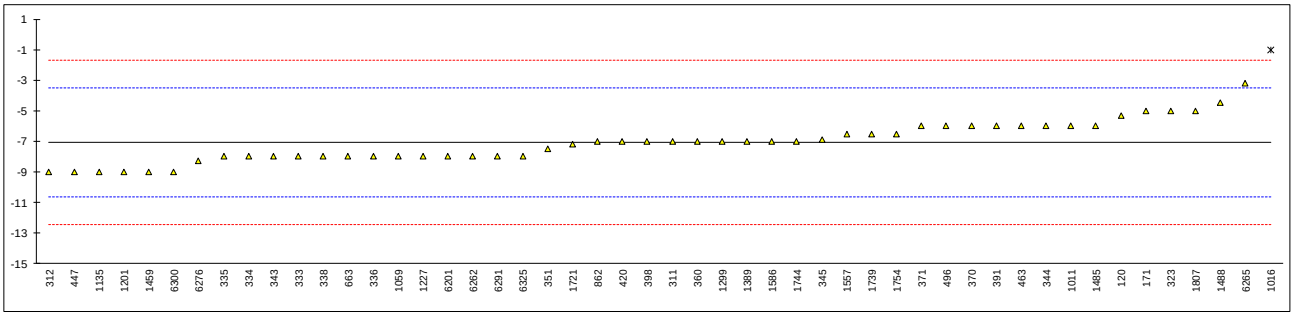


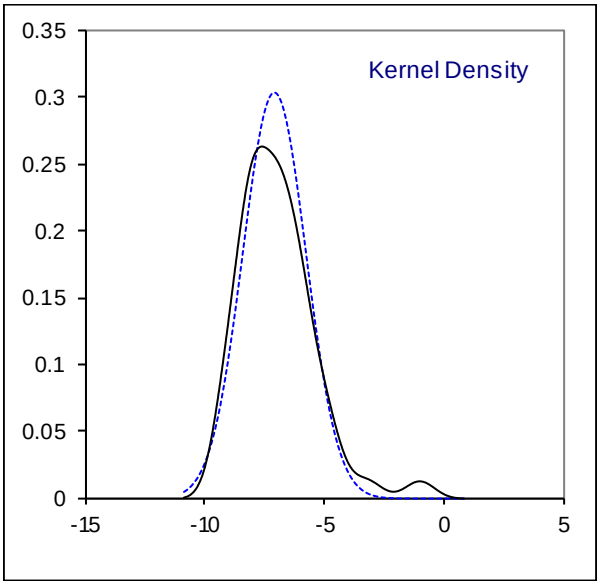


Determination of Cloud Point on sample #20205; results in °C

lab	method	value	mark	z(targ)	remarks
120	D5773	-5.3		0.99	
171	D2500	-5		1.16	
311	D2500	-7		0.04	
312	D5771	-9		-1.08	
323	D2500	-5		1.16	
333	EN23015	-8		-0.52	
334	D2500	-8		-0.52	
335	ISO3015	-8		-0.52	
336	D2500	-8		-0.52	
338	D2500	-8		-0.52	
343	D2500	-8		-0.52	
344	D2500	-6		0.60	
345	D5771	-6.9		0.09	
351	D7683	-7.50		-0.24	
360	D2500	-7.0		0.04	
370	ISO3015	-6		0.60	
371	ISO3015	-6		0.60	
373		-----		-----	
391	D2500	-6		0.60	
398	EN23015	-7		0.04	
420	EN23015	-7		0.04	
447	IP219	-9		-1.08	
463	D2500	-6		0.60	
496	D5771	-6		0.60	
511		-----		-----	
540	D2500	<-6		-----	
663	D2500	-8		-0.52	
862	D2500	-7		0.04	
1011	D2500	-6		0.60	
1016	ISO3015	-1.0	R(0.01)	3.40	
1059	ISO3015	-8		-0.52	
1135	EN23015	-9		-1.08	
1167		-----		-----	
1199		-----		-----	
1201	D2500	-9		-1.08	
1227	D2500	-8		-0.52	
1299	D2500	-7		0.04	
1339		-----		-----	
1389	D2500	-7		0.04	
1397		-----		-----	
1459	EN23015	-9.0		-1.08	
1485	D2500	-6.0		0.60	
1488	ISO3015	-4.5		1.44	
1557	ISO3015	-6.5		0.32	
1586	D2500	-7.0		0.04	
1656		-----		-----	
1706		-----		-----	
1712		-----		-----	
1721	D2500	-7.2		-0.07	
1739	EN23015	-6.5		0.32	
1744	D2500	-7		0.04	
1754	ISO3015	-6.5		0.32	
1765		-----		-----	
1807	D2500	-5	C	1.16	first reported -2
6047		-----		-----	
6201	D2500	-8		-0.52	
6238		-----		-----	
6259		-----		-----	
6262	D2500	-8		-0.52	
6265	ISO3015	-3.2		2.17	
6276	ISO3015	-8.3		-0.69	
6291	D2500	-8		-0.52	
6300	ISO3015	-9		-1.08	
6325	D2500	-8		-0.52	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	49
outliers	1
mean (n)	-7.07
st.dev. (n)	1.316
R(calc.)	3.68
st.dev.(D2500:17a)	1.786
R(D2500:17a)	5
Compare	
R(EN14214:12+A2:19)	4

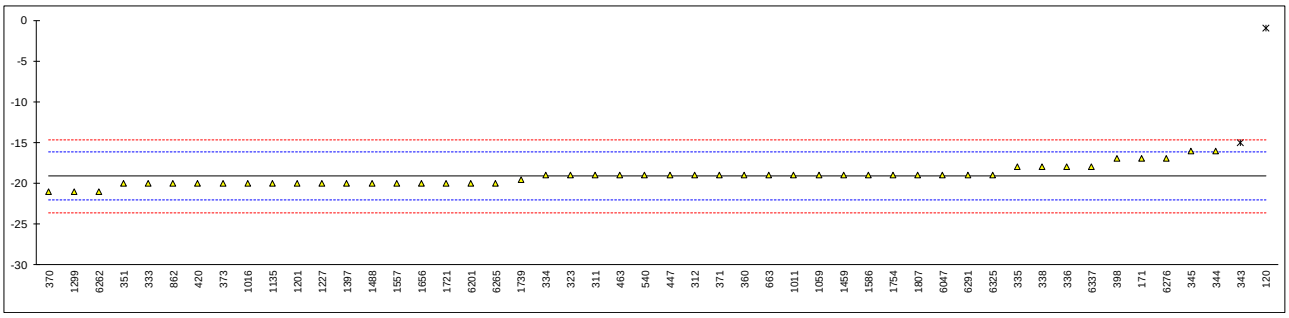


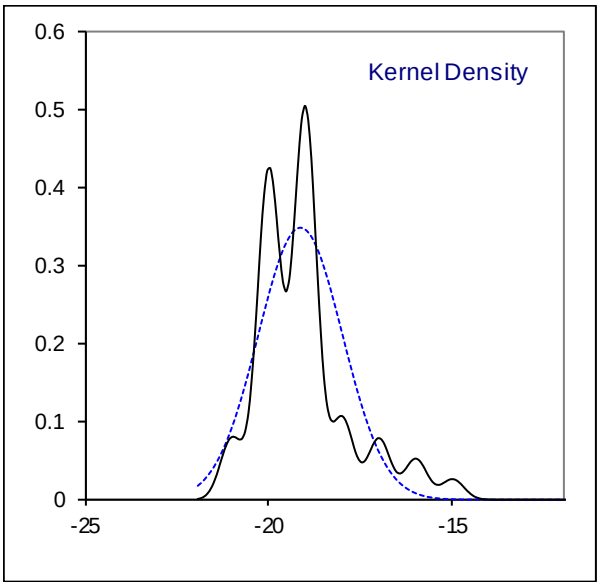


Determination of Cold Filter Plugging Point (CFPP) on sample #20205; results in °C

lab	method	value	mark	z(targ)	remarks
120	D6371	-1	R(0.01)	12.24	
171	D6371	-17		1.44	
311	EN116	-19		0.09	
312	D6371	-19		0.09	
323	EN116	-19		0.09	
333	EN116	-20		-0.58	
334	EN116	-19		0.09	
335	EN116	-18		0.77	
336	EN116	-18		0.77	
338	EN116	-18		0.77	
343	EN116	-15	R(0.05)	2.79	
344	EN116	-16		2.12	
345	EN116	-16		2.12	
351	EN116	-20		-0.58	
360	D6371	-19.0		0.09	
370	EN116	-21		-1.26	
371	EN116	-19		0.09	
373	EN116	-20		-0.58	
391		-----		-----	
398	EN116	-17		1.44	
420	EN116	-20		-0.58	
447	IP309	-19		0.09	
463	EN116	-19		0.09	
496		-----		-----	
511		-----		-----	
540	D6371	-19		0.09	
663	EN116	-19.0		0.09	
862	EN116	-20		-0.58	
1011	EN116	-19		0.09	
1016	EN116	-20		-0.58	
1059	EN116	-19		0.09	
1135	EN116	-20		-0.58	
1167		-----		-----	
1199		-----		-----	
1201	EN116	-20		-0.58	
1227	D6371	-20	C	-0.58	first reported -25
1299	EN116	-21		-1.26	
1339		-----		-----	
1389		-----		-----	
1397	EN116	-20		-0.58	
1459	EN116	-19.0		0.09	
1485		-----		-----	
1488	EN116	-20		-0.58	
1557	EN116	-20		-0.58	
1586	EN116	-19.0		0.09	
1656	EN116	-20		-0.58	
1706		-----		-----	
1712		-----		-----	
1721	EN116	-20		-0.58	
1739	EN116	-19.5		-0.25	
1744		-----		-----	
1754	EN116	-19.0		0.09	
1765		-----		-----	
1807	EN116	-19		0.09	
6047	EN116	-19.0		0.09	
6201	EN116	-20		-0.58	
6238		-----		-----	
6259		-----		-----	
6262	EN116	-21		-1.26	
6265	EN116	-20		-0.58	
6276	EN116	-17		1.44	
6291	EN116	-19		0.09	
6300		-----		-----	
6325	EN116	-19		0.09	
6337	EN116	-18		0.77	
6341		-----		-----	

normality	suspect
n	48
outliers	2
mean (n)	-19.14
st.dev. (n)	1.143
R(calc.)	3.20
st.dev.(EN116:15)	1.481
R(EN116:15)	4.15
Compare	
R(EN14214:12+A2:19)	4.15





Determination of Carbon Residue on 100% sample on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	D4530	<0.10		-----	
311		-----		-----	
312		-----		-----	
323	D4530	<0.10		-----	
333		-----		-----	
334	EN10370	<0.10		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345		-----		-----	
351	ISO10370	<0.10		-----	
360	D4530	0.01		-----	
370	ISO10370	0.011		-----	
371		-----		-----	
373		-----		-----	
391		-----		-----	
398		-----		-----	
420	ISO6615	0.01		-----	
447	EN10370	<0.10		-----	
463	D4530	0.01		-----	
496	D4530	<0.1		-----	
511		-----		-----	
540	D4530	<0.10		-----	
663		-----		-----	
862	D4530	<0.1		-----	
1011		-----		-----	
1016	ISO10370	0.012		-----	
1059	ISO10370	<0,01		-----	
1135	EN10370	0.01		-----	
1167		-----		-----	
1199		-----		-----	
1201		-----		-----	
1227	D4530	0		-----	
1299		-----		-----	
1339		-----		-----	
1389	D4530	<0.01		-----	
1397		-----		-----	
1459		-----		-----	
1485		-----		-----	
1488	ISO6615	0.018		-----	
1557	EN10370	0.0134		-----	
1586	D4530	<0.05		-----	
1656	ISO10370	<0.1		-----	
1706		-----		-----	
1712		-----		-----	
1721	D4530	<0.10		-----	
1739		-----		-----	
1744		-----		-----	
1754		-----		-----	
1765		-----		-----	
1807		-----		-----	
6047		-----		-----	
6201	D4530	0.03		-----	
6238		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291	D4530	0.01		-----	
6300		-----		-----	
6325		-----		-----	
6337		-----		-----	
6341		-----		-----	
	n	24			Application range D4530:15 0.1 – 0.3 %M/M
	mean (n)	<0.1			Application range ISO10370:14 0.10 – 30.0 %M/M

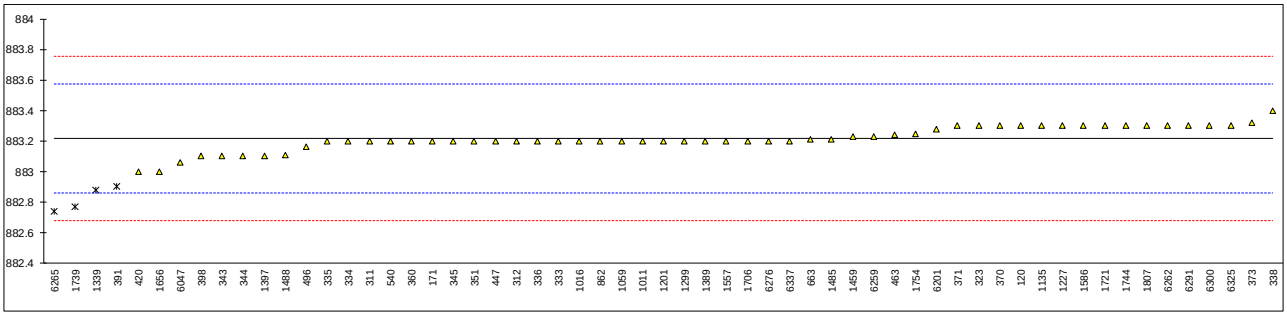
Determination of Copper Corrosion 3 hrs at 50°C on sample #20205

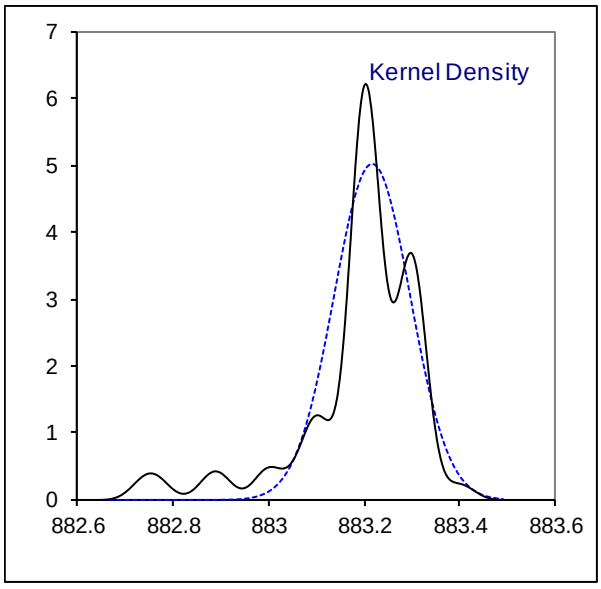
lab	method	value	mark	z(targ)	remarks
120	D130	1A		-----	
171	D130	1a		-----	
311	D130	1A		-----	
312		-----		-----	
323	D130	1A		-----	
333		-----		-----	
334	D130	1A		-----	
335	D130	1		-----	
336	D130	1		-----	
338		-----		-----	
343	ISO2160	1a		-----	
344	D130	1a		-----	
345	ISO2160	1a		-----	
351	ISO2160	1a		-----	
360	D130	1A		-----	
370	ISO2160	1A		-----	
371	ISO2160	1a		-----	
373		-----		-----	
391		-----		-----	
398		-----		-----	
420	ISO2160	class1		-----	
447	IP154	1a		-----	
463	D130	1A		-----	
496	ISO2160	1a		-----	
511		-----		-----	
540	D130	1a		-----	
663	D130	1a		-----	
862	D130	1a		-----	
1011	D130	1a		-----	
1016	ISO2160	1a		-----	
1059	ISO2160	1a		-----	
1135	ISO2160	1A		-----	
1167		-----		-----	
1199		-----		-----	
1201	D130	1A		-----	
1227	D130	1A		-----	
1299	ISO2160	1A		-----	
1339	ISO2160	1a		-----	
1389	D130	1A		-----	
1397	ISO2160	1		-----	
1459		-----		-----	
1485		-----		-----	
1488	ISO2160	1A		-----	
1557	ISO2160	1a		-----	
1586	D130	1A		-----	
1656	ISO2160	1a		-----	
1706		-----		-----	
1712		-----		-----	
1721	D130	1a		-----	
1739	ISO2160	1a		-----	
1744		-----		-----	
1754	ISO2160	1A		-----	
1765		-----		-----	
1807	D130	1A		-----	
6047		-----		-----	
6201	D130	1a		-----	
6238		-----		-----	
6259		-----		-----	
6262	D130	1A		-----	
6265		-----		-----	
6276		-----		-----	
6291	D130	1A		-----	
6300		-----		-----	
6325	D130	1A		-----	
6337	ISO2160	Klasa 1		-----	
6341		-----		-----	
	n	44			
	mean (n)	1 (1a)			

Determination of Density at 15°C on sample #20205; results in kg/m^3

lab	method	value	mark	z(targ)	remarks
120	D4052	883.3		0.47	
171	D4052	883.2		-0.09	
311	D4052	883.2		-0.09	
312	D4052	883.2		-0.09	
323	ISO12185	883.3		0.47	
333	ISO12185	883.2		-0.09	
334	ISO12185	883.2		-0.09	
335	ISO12185	883.2		-0.09	
336	ISO12185	883.2		-0.09	
338	ISO12185	883.4		1.03	
343	ISO12185	883.1		-0.65	
344	D4052	883.1		-0.65	
345	ISO12185	883.2		-0.09	
351	ISO12185	883.20		-0.09	
360	ISO12185	883.2		-0.09	
370	ISO12185	883.3		0.47	
371	ISO12185	883.3		0.47	
373	ISO12185	883.32		0.58	
391	ISO12185	882.9	R(0.05)	-1.77	
398	ISO12185	883.1	C	-0.65	first reported 833.1
420	ISO12185	883.0		-1.21	
447	IP365	883.2		-0.09	
463	ISO12185	883.24		0.13	
496	ISO12185	883.16		-0.32	
511		-----		-----	
540	D4052	883.2		-0.09	
663	D4052	883.21		-0.04	
862	ISO12185	883.2		-0.09	
1011	ISO12185	883.2		-0.09	
1016	ISO12185	883.2		-0.09	
1059	ISO12185	883.2		-0.09	
1135	ISO12185	883.3		0.47	
1167		-----		-----	
1199		-----		-----	
1201	D1298	883.2		-0.09	
1227	D4052	883.3		0.47	
1299	ISO12185	883.2		-0.09	
1339	ISO3675	882.88	R(0.05)	-1.88	
1389	ISO12185	883.2		-0.09	
1397	ISO12185	883.1		-0.65	
1459	ISO12185	883.23		0.08	
1485	ISO12185	883.21		-0.04	
1488	ISO3675	883.11		-0.60	
1557	ISO3675	883.2		-0.09	
1586	D4052	883.3		0.47	
1656	ISO12185	883.0		-1.21	
1706	ISO12185	883.2		-0.09	
1712		-----		-----	
1721	ISO12185	883.3		0.47	
1739	ISO3675	882.77	R(0.01)	-2.50	
1744	D4052	883.30		0.47	
1754	ISO12185	883.25		0.19	
1765		-----		-----	
1807	ISO12185	883.3	C	0.47	first reported 888.3
6047	ISO12185	883.06		-0.88	
6201	D4052	883.28		0.36	
6238		-----		-----	
6259	D4052	883.23		0.08	
6262	D4052	883.3		0.47	
6265	ISO12185	882.74	R(0.01)	-2.67	
6276	ISO12185	883.2		-0.09	
6291	ISO12185	883.3		0.47	
6300	ISO12185	883.3		0.47	
6325	ISO12185	883.3	C	0.47	first reported 833.3
6337	ISO12185	883.2		-0.09	
6341		-----		-----	

normality	OK
n	55
outliers	4
mean (n)	883.22
st.dev. (n)	0.080
R(calc.)	0.22
st.dev.(ISO12185:96)	0.179
R(ISO12185:96)	0.5



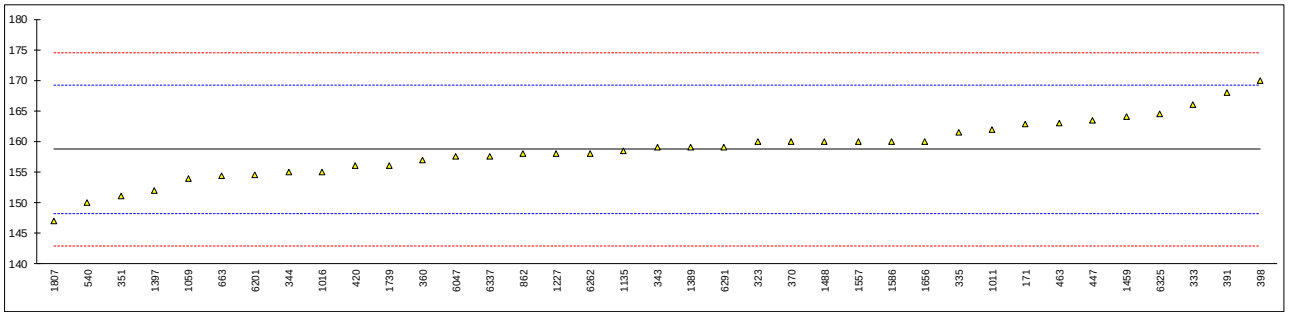


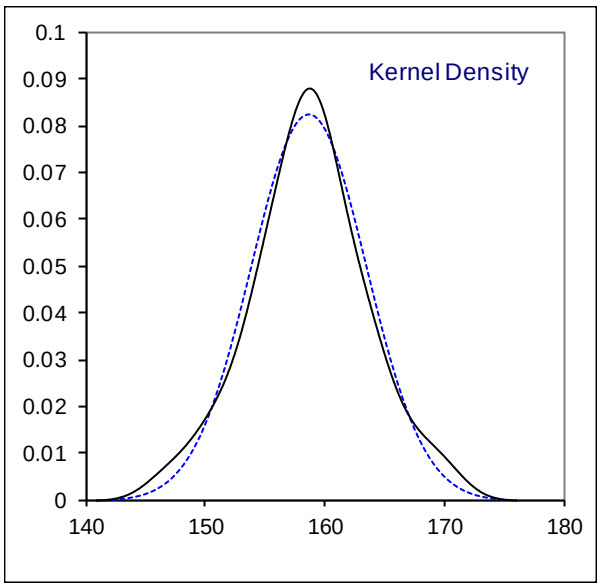
Determination of Flash Point PMcc on sample #20205; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	D93-C	162.8		0.78	
311		-----		-----	
312		-----		-----	
323	D93-C	160.0		0.25	
333	D93-C	166.0		1.39	
334		-----		-----	
335	D93-C	161.5		0.53	
336		-----		-----	
338		-----		-----	
343	ISO2719-A	159.0		0.06	
344	D93-A	155		-0.70	
345		-----		-----	
351	ISO2719-C	151.0		-1.47	
360	D93-C	157.0		-0.32	
370	D93-C	160.0		0.25	
371		-----		-----	
373		-----		-----	
391	ISO2719-C	168		1.77	
398	D93-A	170		2.15	
420	ISO2719-C	156.0		-0.51	
447	D93-C	163.5		0.92	
463	D93-C	163.0		0.82	
496		-----		-----	
511		-----		-----	
540	D93-C	150.00		-1.66	
663	D93-C	154.45		-0.81	
862	D93-C	158.0		-0.13	
1011	ISO2719-C	162		0.63	
1016	ISO2719-C	155.0		-0.70	
1059	ISO2719-C	154.0		-0.89	
1135	ISO2719-A	158.5		-0.04	
1167		-----		-----	
1199		-----		-----	
1201		-----		-----	
1227	D93-A	158		-0.13	
1299		-----		-----	
1339		-----		-----	
1389	D93-C	159.0		0.06	
1397	ISO2719-C	152		-1.28	
1459	ISO2719-A	164.0		1.01	
1485		-----		-----	
1488	ISO2719-C	160		0.25	
1557	ISO2719-C	160		0.25	
1586	D93-C	160.0		0.25	
1656	ISO2719-C	160		0.25	
1706		-----		-----	
1712		-----		-----	
1721		-----		-----	
1739	ISO2719-C	156.0		-0.51	
1744		-----		-----	
1754		-----		-----	
1765		-----		-----	
1807	ISO2719-C	147.0		-2.23	
6047	ISO2719-C	157.5		-0.23	
6201	D93-C	154.5		-0.80	
6238		-----		-----	
6259		-----		-----	
6262	D93-C	158.0		-0.13	
6265		-----		-----	
6276		-----		-----	
6291	D93-C	159		0.06	
6300		-----		-----	
6325	D93-C	164.5		1.11	
6337	ISO2719-C	157.5		-0.23	
6341		-----		-----	

normality	OK
n	37
outliers	0
mean (n)	158.70
st.dev. (n)	4.832
R(calc.)	13.53
st.dev.(D93-C:18)	5.250
R(D93-C:18)	14.7

Compare R(ISO2719-C:16) = 14.7

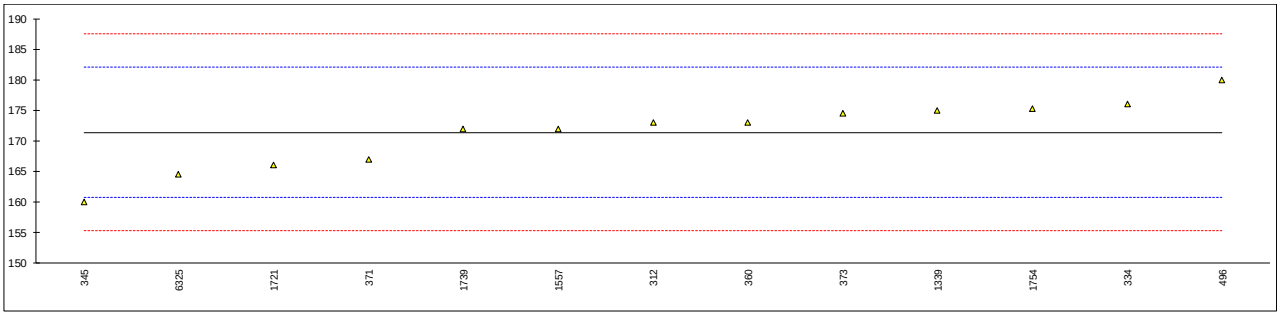


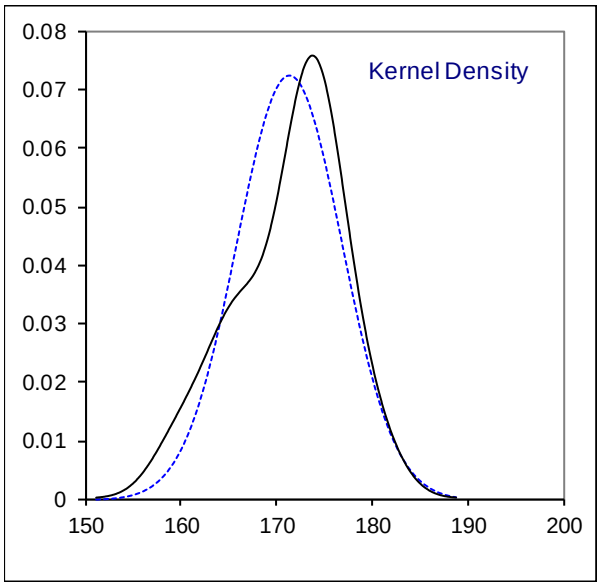


Determination of Flash Point recc on sample #20205; results in °C

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171		-----		-----	
311		-----		-----	
312	ISO3679	173		0.30	
323		-----		-----	
333		-----		-----	
334	ISO3679	176.0		0.86	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345	ISO3679	160		-2.13	
351		-----		-----	
360	ISO3679	173.0		0.30	
370		-----		-----	
371	ISO3679	167.0		-0.82	
373	ISO3679	174.5		0.58	
391		-----		-----	
398		-----		-----	
420		-----		-----	
447		-----		-----	
463		-----		-----	
496	ISO3679	180.0		1.61	
511		-----		-----	
540		-----		-----	
663		-----		-----	
862		-----		-----	
1011		-----		-----	
1016		-----		-----	
1059		-----		-----	
1135		-----		-----	
1167		-----		-----	
1199		-----		-----	
1201		-----		-----	
1227		-----		-----	
1299		-----		-----	
1339	ISO3679	175.0		0.67	
1389		-----		-----	
1397		-----		-----	
1459		-----		-----	
1485		-----		-----	
1488		-----		-----	
1557	ISO3679	172		0.11	
1586		-----		-----	
1656		-----		-----	
1706		-----		-----	
1712		-----		-----	
1721	ISO3679	166.0		-1.01	
1739	ISO3679	171.9		0.09	
1744		-----		-----	
1754	ISO3679	175.3		0.73	
1765		-----		-----	
1807		-----		-----	
6047		-----		-----	
6201		-----		-----	
6238		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325	ISO3679	164.5		-1.29	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	13
outliers	0
mean (n)	171.40
st.dev. (n)	5.513
R(calc.)	15.44
st.dev.(ISO3679:15)	5.357
R(ISO3679:15)	15

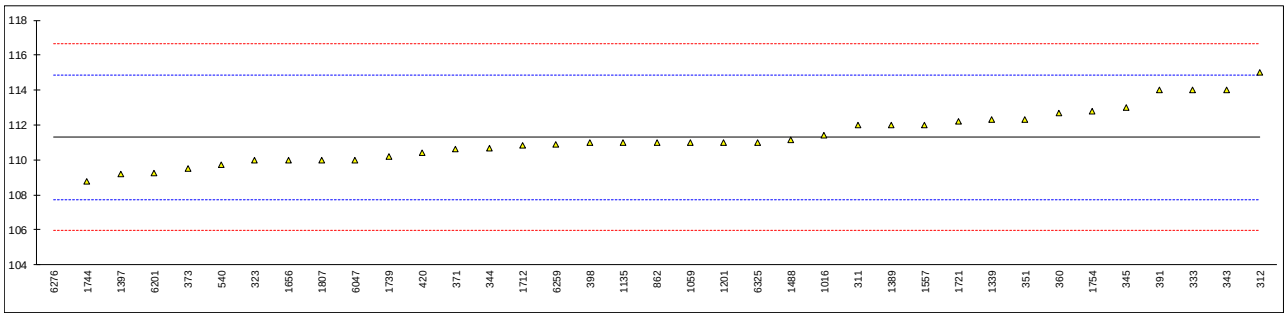


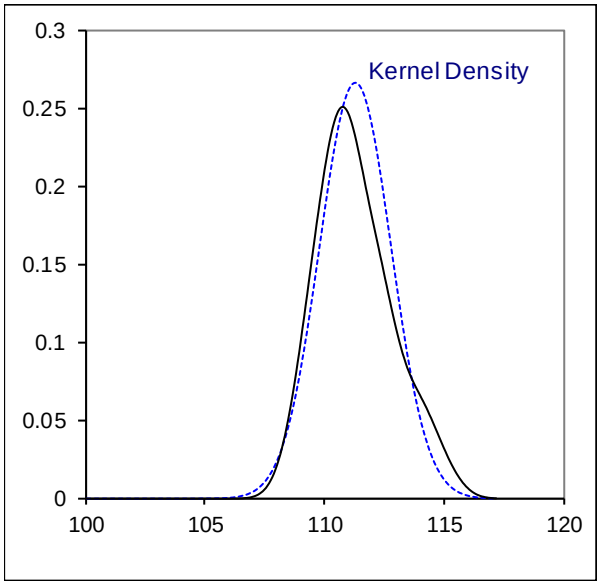


Determination of Iodine Value conform on sample #20205; results in g I_2/100g

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171		-----		-----	
311	EN14111	112		0.39	
312	EN14111	115		2.07	
323	EN14111	110		-0.73	
333	EN14111	114		1.51	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14111	114		1.51	
344	EN14111	110.66		-0.36	
345	EN14111	113		0.95	
351	EN14111	112.34		0.58	
360	EN14111	112.7		0.78	
370		-----		-----	
371	EN14111	110.6		-0.39	
373	EN14111	109.5		-1.01	
391	EN14111	114		1.51	
398	EN14111	111.0		-0.17	
420	EN14111	110.4		-0.51	
447		-----		-----	
463		-----		-----	
496		-----		-----	
511		-----		-----	
540	EN14111	109.7		-0.90	
663		-----		-----	
862	EN14111	111		-0.17	
1011		-----		-----	
1016	EN14111	111.43		0.07	
1059	EN14111	111		-0.17	
1135	EN14111	111		-0.17	
1167		-----		-----	
1199		-----		-----	
1201	EN14111	111		-0.17	
1227		-----		-----	
1299		-----		-----	
1339	EN14111	112.3		0.56	
1389	EN14111	112		0.39	
1397	EN16300	109.2		-1.18	
1459		-----	W	-----	test result withdrawn. first reported 111.0
1485		-----		-----	
1488	EN14111	111.17		-0.08	
1557	EN14111	112		0.39	
1586		-----		-----	
1656	EN14111	110		-0.73	
1706		-----		-----	
1712	EN14111	110.83		-0.27	
1721	EN14111	112.2		0.50	
1739	EN14111	110.2		-0.62	
1744	EN14111	108.78		-1.41	
1754	EN14111	112.8		0.84	
1765		-----		-----	
1807	EN16300	110		-0.73	
6047	EN14111	110.0		-0.73	
6201	EN14111	109.25		-1.15	
6238		-----		-----	
6259	EN14111	110.911		-0.22	
6262		-----		-----	
6265		-----		-----	
6276	EN14103	85.5	C,R(0.01)	-14.45	first reported 23.8
6291		-----		-----	
6300		-----		-----	
6325	EN14111	111		-0.17	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	36
outliers	1
mean (n)	111.30
st.dev. (n)	1.497
R(calc.)	4.19
st.dev.(EN14111:03)	1.786
R(EN14111:03)	5

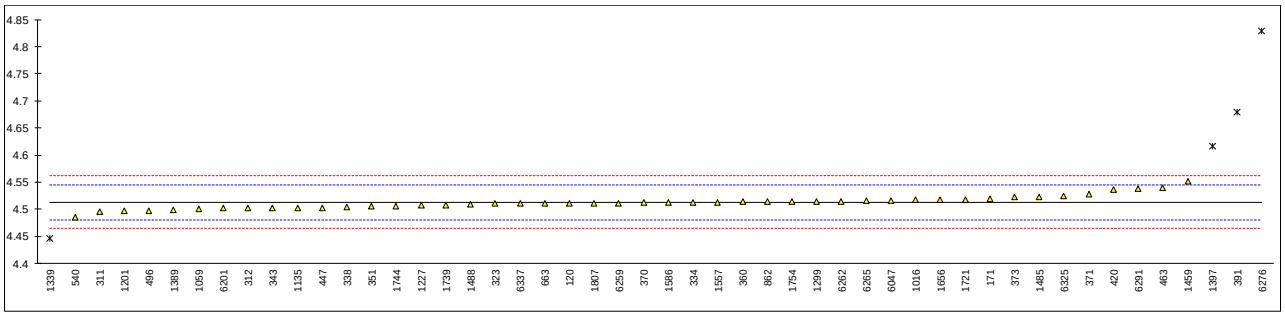


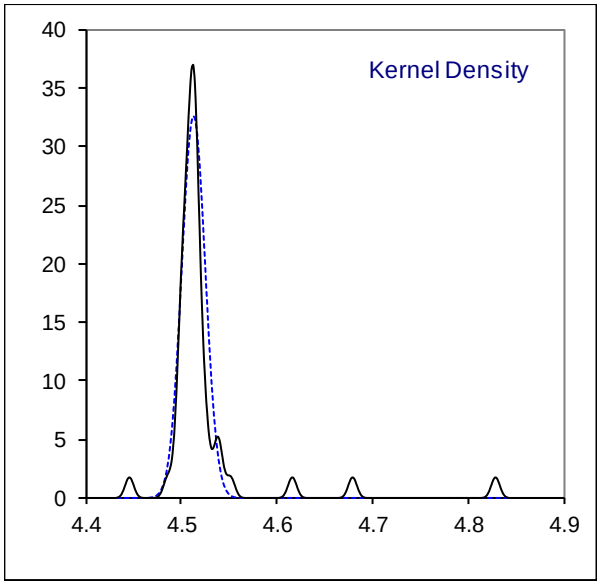


Determination of Kinematic Viscosity at 40°C on sample #20205; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
120	D445	4.5106	C	-0.13	first reported 4.5637
171	D445	4.519		0.39	
311	ISO3104	4.496		-1.04	
312	D445	4.5027		-0.62	
323	ISO3104	4.510		-0.17	
333		-----		-----	
334	ISO3104	4.513		0.02	
335		-----		-----	
336		-----		-----	
338	ISO3104	4.504		-0.54	
343	ISO3104	4.503		-0.60	
344		-----		-----	
345		-----		-----	
351	ISO3104	4.506		-0.42	
360	ISO3104	4.5136		0.05	
370	ISO3104	4.512		-0.05	
371	ISO3104	4.5278		0.93	
373	ISO3104	4.5224		0.60	
391	ISO3104	4.679	R(0.01)	10.30	
398		-----		-----	
420	ISO3104	4.537		1.50	
447	D445	4.503		-0.60	
463	D7042	4.5402		1.70	
496	D445	4.4980		-0.91	
511		-----		-----	
540	D445	4.486		-1.66	
663	D445	4.5103		-0.15	
862	D445	4.514		0.08	
1011		-----		-----	
1016	ISO3104	4.517		0.26	
1059	ISO3104	4.501		-0.73	
1135	ISO3104	4.503		-0.60	
1167		-----		-----	
1199		-----		-----	
1201	ISO3104	4.498		-0.91	
1227	D445	4.5076		-0.32	
1299	D445	4.515		0.14	
1339	ISO3104	4.4457	R(0.01)	-4.15	
1389	ISO3104	4.4983		-0.89	
1397	D7042	4.616	R(0.01)	6.40	
1459	D7042	4.5514	C	2.40	first reported 4.5583
1485	D445	4.5227		0.62	
1488	ISO3104	4.509751		-0.18	
1557	ISO3104	4.513		0.02	
1586	D445	4.512		-0.05	
1656	ISO3104	4.518		0.33	
1706		-----		-----	
1712		-----		-----	
1721	ISO3104	4.5183		0.35	
1739	ISO3104	4.5078		-0.31	
1744	D445	4.5062		-0.40	
1754	ISO3104	4.5141		0.09	
1765		-----		-----	
1807	D445	4.511		-0.11	
6047	ISO3104	4.5161		0.21	
6201	ISO3104	4.502		-0.66	
6238		-----		-----	
6259	D445	4.511		-0.11	
6262	D445	4.515		0.14	
6265	EN16896	4.5156		0.18	
6276	EN16896	4.8284	C,R(0.01)	19.55	first reported 4.648
6291	D445	4.538		1.57	
6300		-----		-----	
6325	ISO3104	4.525		0.76	
6337	ISO3104	4.510		-0.17	
6341		-----		-----	

		Only ISO3104	Only D445
normality	suspect	OK	not OK
n	46	26	17
outliers	4	2	0
mean (n)	4.5127	4.5114	4.5107
st.dev. (n)	0.01223	0.00984	0.01099
R(calc.)	0.0342	0.0276	0.0308
st.dev.(ISO3104:94)	0.01614	0.01614	0.01614
R(ISO3104:94)	0.0452	0.0452	---
Compare			
R(D445:19a)	0.0551	---	0.0550

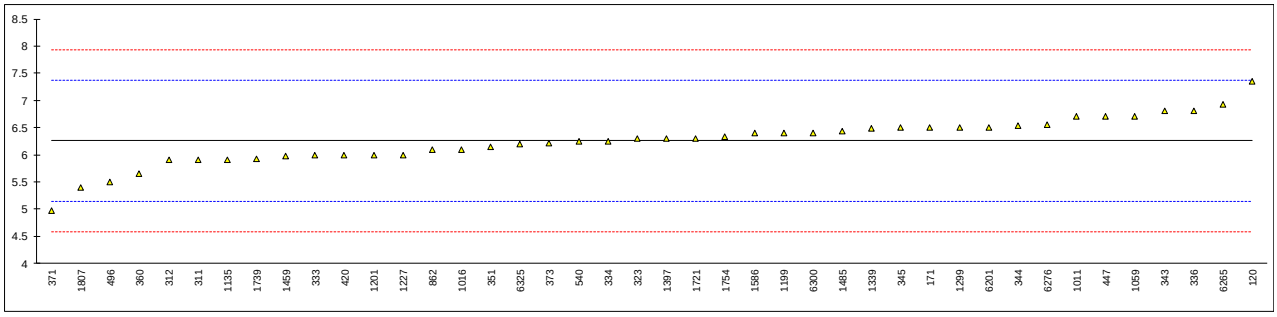


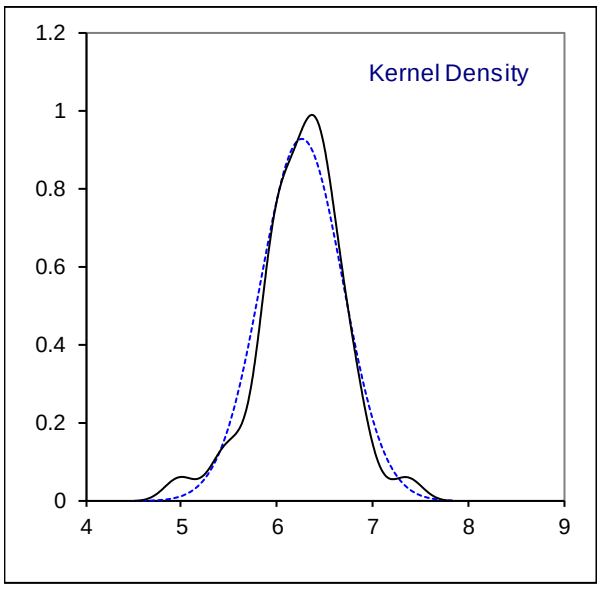


Determination of Oxidation Stability Induction period on sample #20205; results in hours

lab	method	value	mark	z(targ)	remarks
120	EN15751	7.36		1.97	
171	EN15751	6.5		0.43	
311	EN15751	5.9		-0.64	
312	EN15751	5.9		-0.64	
323	EN15751	6.3		0.08	
333	EN14112	6.0		-0.46	
334	EN15751	6.25		-0.01	
335		-----		-----	
336	EN15751	6.8		0.97	
338		-----		-----	
343	EN15751	6.8		0.97	
344	EN14112	6.53		0.49	
345	EN14112	6.5		0.43	
351	EN15751	6.15		-0.19	
360	EN14112	5.66		-1.07	
370		-----		-----	
371	EN14112	4.98		-2.29	
373	EN14112	6.21		-0.08	
391		-----		-----	
398		-----		-----	
420	EN15751	6.0		-0.46	
447	EN15751	6.7		0.79	
463		-----		-----	
496	EN15751	5.5		-1.36	
511		-----		-----	
540	EN14112	6.25		-0.01	
663		-----		-----	
862	EN14112	6.1		-0.28	
1011	EN14112	6.7		0.79	
1016	EN15751	6.1		-0.28	
1059	EN14112	6.7		0.79	
1135	EN15751	5.9		-0.64	
1167		-----		-----	
1199	EN14112	6.399		0.25	
1201	EN15751	6.0		-0.46	
1227	EN15751	6.00		-0.46	
1299	EN15751	6.5		0.43	
1339	EN14112	6.48		0.40	
1389		-----		-----	
1397	EN15751	6.3		0.08	
1459	EN15751	5.97		-0.51	
1485	EN14112	6.44		0.33	
1488		-----		-----	
1557		-----		-----	
1586	EN15751	6.395		0.25	
1656	EN14112	>6		-----	
1706		-----		-----	
1712		-----		-----	
1721	EN14112	6.3		0.08	
1739	EN14112	5.92		-0.60	
1744		-----		-----	
1754	EN14112	6.33		0.13	
1765		-----		-----	
1807	EN15751	5.4		-1.54	
6047		-----		-----	
6201	EN15751	6.5		0.43	
6238		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265	EN15751	6.93		1.20	
6276	EN15751	6.56		0.54	
6291		-----		-----	
6300	EN14112	6.4		0.26	
6325	EN15751	6.2		-0.10	
6337		-----		-----	
6341		-----		-----	

normality	suspect
n	42
outliers	0
mean (n)	6.257
st.dev. (n)	0.4308
R(calc.)	1.206
st.dev.(EN15751:14)	0.5586
R(EN15751:14)	1.564

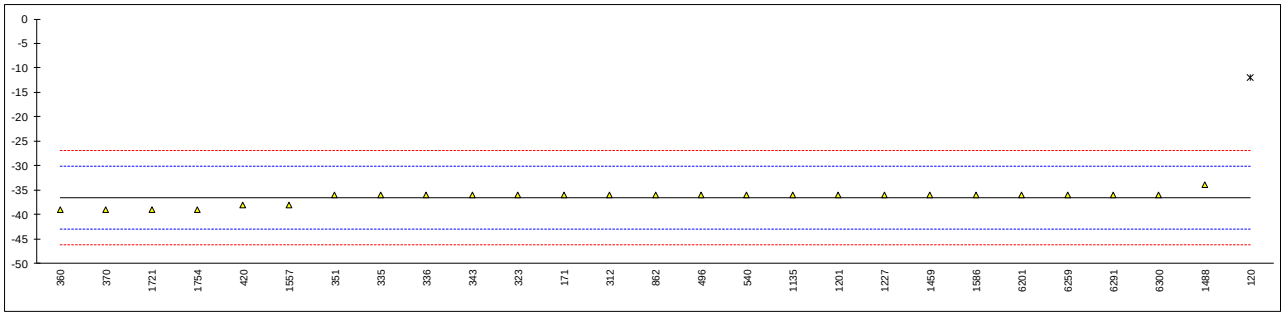


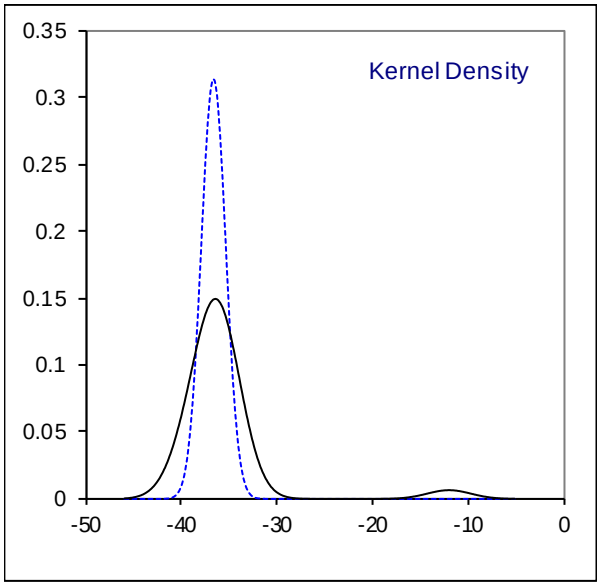


Determination of Pour Point on sample #20205; results in °C

lab	method	value	mark	z(targ)	remarks
120	D5949	-12	C,G(0.01)	7.63	first reported -21
171	D5950	-36		0.17	
311		-----		-----	
312	D5950	-36		0.17	
323	ISO3016	-36		0.17	
333		-----		-----	
334		-----		-----	
335	ISO3016	-36		0.17	
336	ISO3016	-36		0.17	
338		-----		-----	
343	ISO3016	-36		0.17	
344		-----		-----	
345		-----		-----	
351	D6749	-36.0		0.17	
360	D97	-39		-0.77	
370	ISO3016	-39		-0.77	
371		-----		-----	
373		-----		-----	
391		-----		-----	
398	ISO3016	<-36		-----	
420	ISO3016	-38		-0.45	
447		-----		-----	
463		-----		-----	
496	ISO3016	-36		0.17	
511		-----		-----	
540	D5950	-36		0.17	
663	D97	<-36		-----	
862	ISO3016	-36		0.17	
1011		-----		-----	
1016		-----		-----	
1059	ISO3016	<-36		-----	
1135	ISO3016	-36		0.17	
1167		-----		-----	
1199		-----		-----	
1201	ISO3016	-36		0.17	
1227	D97	-36.0		0.17	
1299		-----		-----	
1339		-----		-----	
1389	D97	<-21		-----	
1397		-----		-----	
1459		-36.0		0.17	
1485		-----		-----	
1488	ISO3016	-34		0.79	
1557	ISO3016	-38		-0.45	
1586	D5950	-36.0		0.17	
1656		-----		-----	
1706		-----		-----	
1712		-----		-----	
1721	D5950	-39		-0.77	
1739		-----		-----	
1744		-----		-----	
1754	ISO3016	-39.0		-0.77	
1765		-----		-----	
1807		-----		-----	
6047		-----		-----	
6201	ISO3016	-36		0.17	
6238		-----		-----	
6259	D5950	-36		0.17	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291	ISO3016	-36		0.17	
6300	ISO3016	-36		0.17	
6325	D97	<-24		-----	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	26
outliers	1
mean (n)	-36.5
st.dev. (n)	1.27
R(calc.)	3.6
st.dev.(ISO3016:19)	3.21
R(ISO3016:19)	9.0





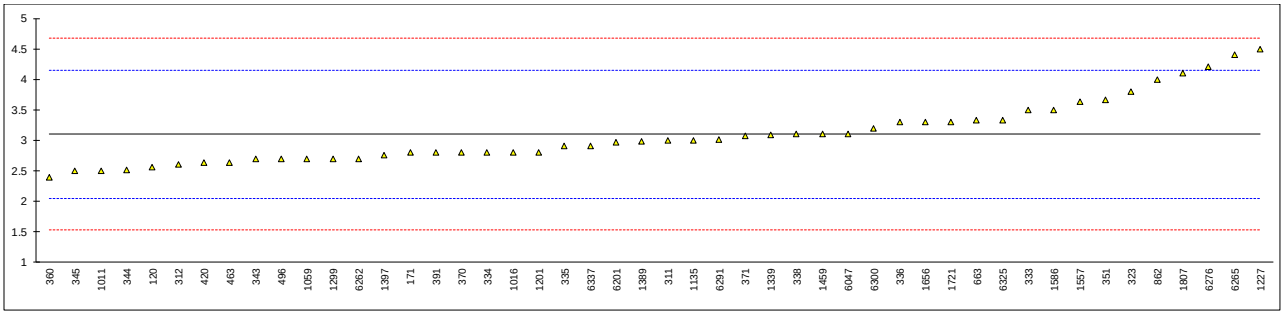
Determination of Sulfated Ash on sample #20205; results in %M/M

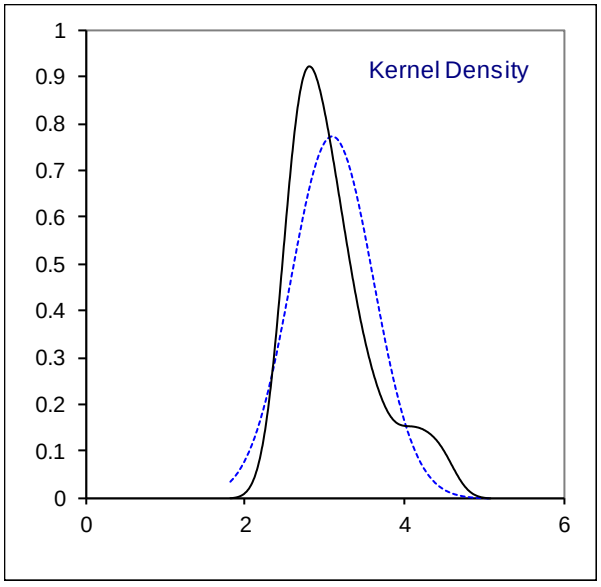
lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	D874	<0.005		-----	
311		-----		-----	
312		-----		-----	
323	D874	<0.001		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	ISO3987	<0,005		-----	
344	D874	<0.05		-----	
345	ISO3987	<0.005		-----	
351	ISO3987	<0.005		-----	
360	D874	0.001		-----	
370	ISO3987	less than 0.001		-----	
371	ISO3987	<0.005		-----	
373		-----		-----	
391		-----		-----	
398		-----		-----	
420	ISO3987	<0,005		-----	
447		-----		-----	
463		-----		-----	
496		-----		-----	
511		-----		-----	
540	ISO3987	<0.005		-----	
663	D874	<0.005		-----	
862	D874	<0.005		-----	
1011		-----		-----	
1016	ISO3987	0.002		-----	
1059	ISO3987	<0,005		-----	
1135	ISO3987	<0.005		-----	
1167		-----		-----	
1199		-----		-----	
1201	D874	<0.005		-----	
1227		-----		-----	
1299	ISO3987	<0.005		-----	
1339	ISO3987	<0.005		-----	
1389	ISO3987	<0.005		-----	
1397		-----		-----	
1459	ISO3987	0.000		-----	
1485		-----		-----	
1488	ISO3987	0.000406		-----	
1557	ISO3987	0.001		-----	
1586	D874	0.0008		-----	
1656	ISO3987	<0.01		-----	
1706		-----		-----	
1712		-----		-----	
1721	ISO3987	<0.005		-----	
1739	ISO3987	0.0007		-----	
1744		-----		-----	
1754	ISO3987	0.001		-----	
1765		-----		-----	
1807	D874	0		-----	
6047		-----		-----	
6201	D874	0.0003		-----	
6238		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325	ISO3987	0.001		-----	
6337		-----		-----	
6341		-----		-----	
	n	29			
	mean (n)	<0.005			Application range ASTM D874:13a >0.005%M/M

Determination of Sulfur on sample #20205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	D2622	2.555		-1.04	
171	D5453	2.8		-0.57	
311	ISO20846	3.0		-0.19	
312	D5453	2.6		-0.95	
323	ISO20846	3.8		1.34	
333	ISO20846	3.5		0.77	
334	ISO20846	2.8		-0.57	
335	ISO20846	2.9		-0.38	
336	ISO20846	3.3		0.39	
338	ISO20846	3.1		0.00	
343	ISO20846	2.7		-0.76	
344	ISO20846	2.51		-1.12	
345	ISO20846	2.5		-1.14	
351	ISO20846	3.66		1.07	
360	ISO20846	2.4		-1.33	
370	ISO20846	2.8		-0.57	
371	ISO20846	3.08		-0.03	
373		-----		-----	
391	ISO20846	2.8		-0.57	
398		-----		-----	
420	ISO20846	2.63		-0.89	
447	IP490	<3.0		-----	
463	ISO20846	2.64		-0.87	
496	ISO20846	2.7		-0.76	
511		-----		-----	
540	ISO20846	<3.0		-----	
663	D5453	3.33		0.44	
862	ISO20846	4.0		1.72	
1011	ISO20846	2.5		-1.14	
1016	ISO20846	2.8		-0.57	
1059	ISO20846	2.7		-0.76	
1135	ISO20846	3.0		-0.19	
1167		-----		-----	
1199	ISO20884	<5.0		-----	
1201	ISO20846	2.8		-0.57	
1227	D5453	4.5		2.68	
1299	ISO20884	2.7		-0.76	
1339	ISO20884	3.09		-0.01	
1389	ISO20846	2.98		-0.22	
1397	ISO20846	2.75		-0.66	
1459	ISO20884	3.1		0.00	
1485		-----		-----	
1488		-----		-----	
1557	ISO20846	3.63		1.02	
1586	ISO20846	3.5		0.77	
1656	ISO20846	3.3		0.39	
1706		-----		-----	
1712		-----		-----	
1721	ISO20846	3.30		0.39	
1739		-----		-----	
1744		-----		-----	
1754		-----		-----	
1765		-----		-----	
1807	ISO20846	4.1		1.91	
6047	ISO20846	3.1		0.00	
6201	D5453	2.97		-0.24	
6238		-----		-----	
6259		-----		-----	
6262	ISO20846	2.70		-0.76	
6265	ISO13032	4.4		2.49	
6276	ISO13032	4.21		2.12	
6291	D5453	3.01		-0.17	
6300	ISO20846	3.2		0.20	
6325	ISO20846	3.33		0.44	
6337	ISO20846	2.9	C	-0.38	first reported 0.9
6341		-----		-----	

normality	suspect	
n	48	
outliers	0	
mean (n)	3.097	
st.dev. (n)	0.5151	
R(calc.)	1.442	
st.dev.(ISO20846:19)	0.5239	
R(ISO20846:19)	1.467	Application range: 3 – 500mg/kg
Compare		
R(D5453:19a)	1.353	Application range: 1 – 8000mg/kg

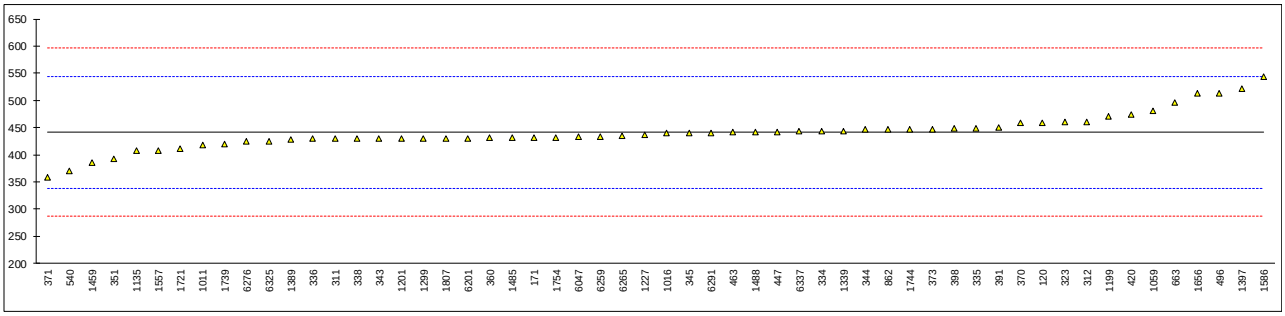


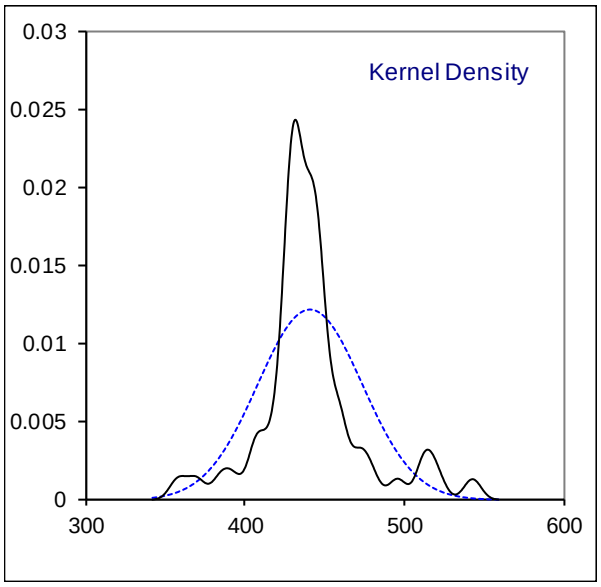


Determination of Water on sample #20205; results in mg/kg

lab	method	value	mark	z(targ)	remarks
120	E1064	458.9		0.34	
171	D6304-A	431		-0.20	
311	ISO12937	430		-0.22	
312	ISO12937	460		0.36	
323	ISO12937	460		0.36	
333		-----		-----	
334	ISO12937	444		0.05	
335	ISO12937	448		0.13	
336	ISO12937	430		-0.22	
338	ISO12937	430		-0.22	
343	ISO12937	430		-0.22	
344	ISO12937	446		0.09	
345	ISO12937	440		-0.02	
351	ISO12937	393	C	-0.93	first reported 0.0393 mg/kg
360	ISO12937	430.8		-0.20	
370	ISO12937	458		0.33	
371	ISO12937	358.6		-1.60	
373	ISO12937	447.4		0.12	
391	ISO12937	450		0.17	
398	ISO12937	448		0.13	
420	ISO12937	473.5		0.63	
447	IP438	442		0.02	
463	D6304-A	441.5		0.01	
496	ISO12937	513.5		1.40	
511		-----		-----	
540	ISO12937	370.0		-1.38	
663	ISO12937	496		1.06	
862	ISO12937	447		0.11	
1011	ISO12937	418		-0.45	
1016	ISO12937	439.69		-0.03	
1059	ISO12937	480		0.75	
1135	ISO12937	407		-0.66	
1167		-----		-----	
1199	ISO12937	471		0.58	
1201	ISO12937	430		-0.22	
1227	D6304-A	437.1		-0.08	
1299	IP438	430		-0.22	
1339	ISO12937	444		0.05	
1389	ISO12937	428		-0.26	
1397	ISO12937	521		1.55	
1459	ISO12937	385		-1.09	
1485	ISO12937	430.9		-0.20	
1488	ISO12937	441.54		0.01	
1557	ISO12937	407		-0.66	
1586	ISO12937	543		1.97	
1656	ISO12937	513		1.39	
1706		-----		-----	
1712		-----		-----	
1721	ISO12937	410.4		-0.60	
1739	ISO12937	419.3		-0.42	
1744	E203	447		0.11	
1754	ISO12937	431.8		-0.18	
1765		-----		-----	
1807	ISO12937	430		-0.22	
6047	ISO12937	434.0		-0.14	
6201	ISO12937	430		-0.22	
6238		-----		-----	
6259	ISO12937	434.03		-0.14	
6262		-----		-----	
6265	In house	434.66		-0.13	
6276	ISO12937	423.98		-0.33	
6291	D6304-A	440		-0.02	
6300		-----		-----	
6325	ISO12937	425		-0.31	
6337	ISO12937	443.2		0.04	
6341		-----		-----	

normality	not OK
n	56
outliers	0
mean (n)	441.19
st.dev. (n)	32.799
R(calc.)	91.84
st.dev.(ISO12937:00)	51.589
R(ISO12937:00)	144.45





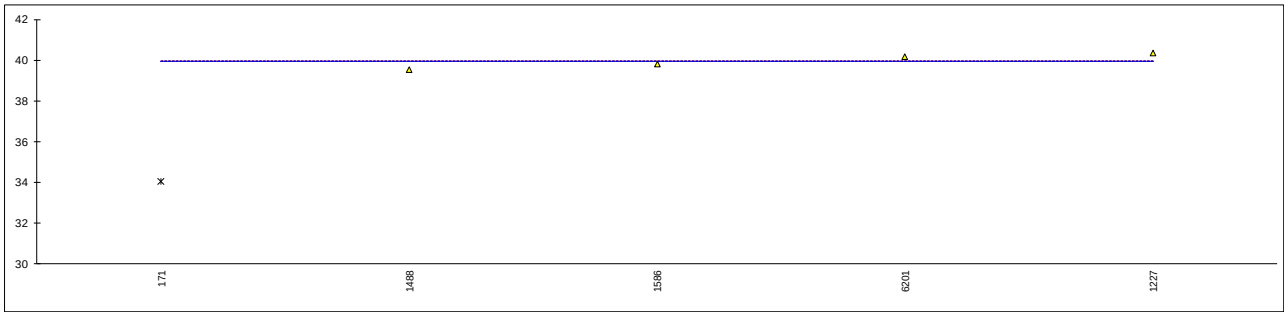
Determination of Water and Sediment on sample #20205; results in %V/V

lab	method	value	mark	z(targ)	remarks
120	D2709	<0.01		-----	
171	D2709	<0.01		-----	
311		-----		-----	
312		-----		-----	
323		-----		-----	
333		-----		-----	
334		-----		-----	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343		-----		-----	
344		-----		-----	
345		-----		-----	
351		-----		-----	
360		-----		-----	
370		-----		-----	
371		-----		-----	
373		-----		-----	
391		-----		-----	
398		-----		-----	
420		-----		-----	
447		-----		-----	
463		-----		-----	
496		-----		-----	
511		-----		-----	
540	D2709	<0.05		-----	
663	D2709	<0.01		-----	
862	D2709	<0.05		-----	
1011		-----		-----	
1016		-----		-----	
1059		-----		-----	
1135		-----		-----	
1167		-----		-----	
1199		-----		-----	
1201		-----		-----	
1227		-----		-----	
1299		-----		-----	
1339		-----		-----	
1389		-----		-----	
1397		-----		-----	
1459		-----		-----	
1485		-----		-----	
1488	ISO3734	<0,05		-----	
1557	D2709	less than 0,05		-----	
1586	D2709	<0.10		-----	
1656		-----		-----	
1706		-----		-----	
1712		-----		-----	
1721		-----		-----	
1739		-----		-----	
1744		-----		-----	
1754		-----		-----	
1765		-----		-----	
1807		-----		-----	
6047		-----		-----	
6201	D2709	<0,001		-----	
6238		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325		-----		-----	
6337		-----		-----	
6341		-----		-----	
	n	8			
	mean (n)	<0.05			

Determination of Calorific Value on sample #20205; results in kJ/kg

lab	method	Gross at const, vol.	mark	z(targ)	Net at const. vol.	Net at const. press
120		-----		-----	-----	-----
171	D240	34.055	G(0.01)	-----	-----	-----
311		-----		-----	-----	-----
312		-----		-----	-----	-----
323		-----		-----	-----	-----
333		-----		-----	-----	-----
334		-----		-----	-----	-----
335		-----		-----	-----	-----
336		-----		-----	-----	-----
338		-----		-----	-----	-----
343		-----		-----	-----	-----
344		-----		-----	-----	-----
345		-----		-----	-----	-----
351		-----		-----	-----	-----
360		-----		-----	-----	-----
370		-----		-----	-----	-----
371		-----		-----	-----	-----
373		-----		-----	-----	-----
391		-----		-----	-----	-----
398		-----		-----	-----	-----
420		-----		-----	-----	-----
447		-----		-----	-----	-----
463		-----		-----	-----	-----
496		-----		-----	-----	-----
511		-----		-----	-----	-----
540		-----		-----	-----	-----
663		-----		-----	-----	-----
862		-----		-----	-----	-----
1011		-----		-----	-----	-----
1016		-----		-----	-----	-----
1059		-----		-----	-----	-----
1135		-----		-----	-----	-----
1167		-----		-----	-----	-----
1199		-----		-----	-----	-----
1201		-----		-----	-----	-----
1227	DIN51900-1	40.360		-----	37.798	-----
1299		-----		-----	-----	-----
1339		-----		-----	-----	-----
1389		-----		-----	-----	-----
1397		-----		-----	-----	-----
1459		-----		-----	-----	-----
1485		-----		-----	-----	-----
1488	D4809	39.5115		-----	-----	38.2774
1557		-----		-----	-----	-----
1586		39.780		-----	-----	-----
1656		-----		-----	-----	-----
1706		-----		-----	-----	-----
1712		-----		-----	-----	-----
1721		-----		-----	-----	-----
1739		-----		-----	-----	-----
1744		-----		-----	-----	-----
1754		-----		-----	-----	-----
1765		-----		-----	-----	-----
1807		-----		-----	-----	-----
6047		-----		-----	-----	-----
6201	DIN51900-1	40.150		-----	37.604	-----
6238		-----		-----	-----	-----
6259		-----		-----	-----	-----
6262		-----		-----	-----	-----
6265		-----		-----	-----	-----
6276		-----		-----	-----	-----
6291		-----		-----	-----	-----
6300		-----		-----	-----	-----
6325		-----		-----	-----	-----
6337		-----		-----	-----	-----
6341		-----		-----	-----	-----

normality	unknown
n	4
outliers	1
mean (n)	39.95
st.dev. (n)	0.378
R(calc.)	1.06
st.dev.(D240:19)	(0.143)
R(D240:19)	(0.40)



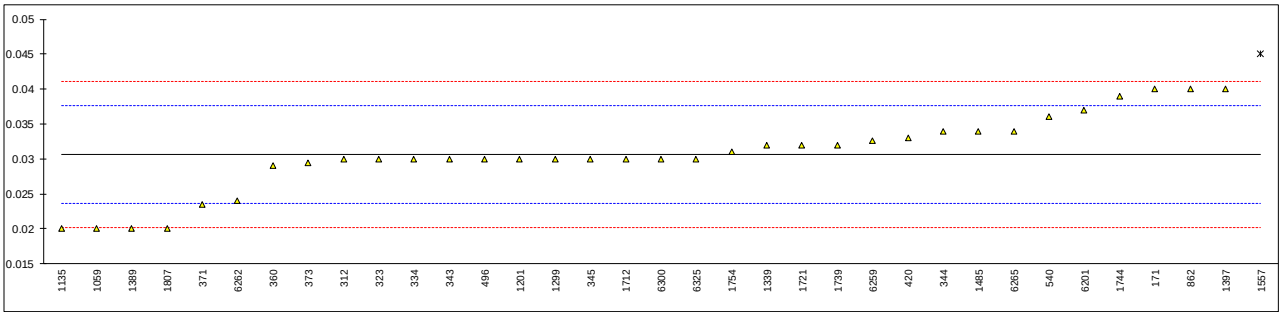
Determination of Distillation at 10 mmHg, % recovered as AET on sample #20205; results in °C

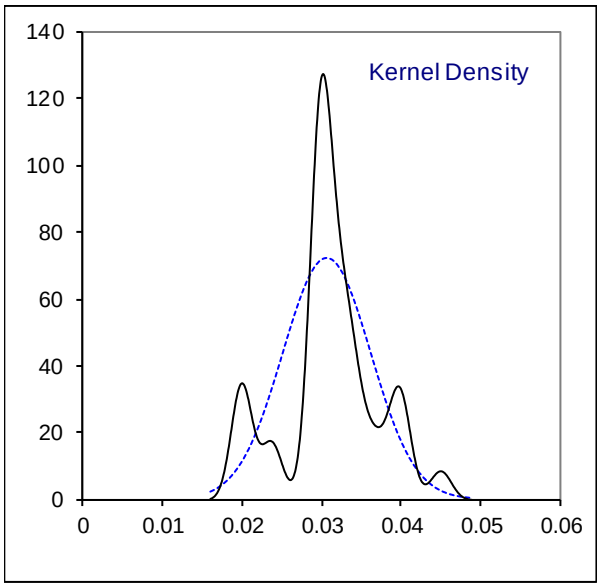
lab	method	80%rec.	mark	z(targ)	90%rec.	mark	z(targ)	95%rec.	mark	z(targ)
120		-----		-----	-----		-----	-----		-----
171		-----		-----	-----		-----	-----		-----
311		-----		-----	-----		-----	-----		-----
312		-----		-----	-----		-----	-----		-----
323		-----		-----	-----		-----	-----		-----
333		-----		-----	-----		-----	-----		-----
334		-----		-----	-----		-----	-----		-----
335		-----		-----	-----		-----	-----		-----
336		-----		-----	-----		-----	-----		-----
338		-----		-----	-----		-----	-----		-----
343		-----		-----	-----		-----	-----		-----
344		-----		-----	-----		-----	-----		-----
345		-----		-----	-----		-----	-----		-----
351		-----		-----	-----		-----	-----		-----
360		-----		-----	-----		-----	-----		-----
370		-----		-----	-----		-----	-----		-----
371		-----		-----	-----		-----	-----		-----
373		-----		-----	-----		-----	-----		-----
391		-----		-----	-----		-----	-----		-----
398		-----		-----	-----		-----	-----		-----
420		-----		-----	-----		-----	-----		-----
447		-----		-----	-----		-----	-----		-----
463	D1160	349		-----	350		-----	351		-----
496		-----		-----	-----		-----	-----		-----
511		-----		-----	-----		-----	-----		-----
540		-----		-----	-----		-----	-----		-----
663		-----		-----	-----		-----	-----		-----
862		-----		-----	-----		-----	-----		-----
1011		-----		-----	-----		-----	-----		-----
1016		-----		-----	-----		-----	-----		-----
1059		-----		-----	-----		-----	-----		-----
1135	D1160	357		-----	361		-----	375		-----
1167		-----		-----	-----		-----	-----		-----
1199		-----		-----	-----		-----	-----		-----
1201		-----		-----	-----		-----	-----		-----
1227		-----		-----	-----		-----	-----		-----
1299		-----		-----	-----		-----	-----		-----
1339		-----		-----	-----		-----	-----		-----
1389		-----		-----	-----		-----	-----		-----
1397		-----		-----	-----		-----	-----		-----
1459		-----		-----	-----		-----	-----		-----
1485		-----		-----	-----		-----	-----		-----
1488		-----		-----	-----		-----	-----		-----
1557		-----		-----	-----		-----	-----		-----
1586	D1160	356.5		-----	362.9		-----	369.4		-----
1656		-----		-----	-----		-----	-----		-----
1706		-----		-----	-----		-----	-----		-----
1712		-----		-----	-----		-----	-----		-----
1721		-----		-----	-----		-----	-----		-----
1739		-----		-----	-----		-----	-----		-----
1744		-----		-----	-----		-----	-----		-----
1754		-----		-----	-----		-----	-----		-----
1765		-----		-----	-----		-----	-----		-----
1807		-----		-----	-----		-----	-----		-----
6047		-----		-----	-----		-----	-----		-----
6201		-----		-----	-----		-----	-----		-----
6238		-----		-----	-----		-----	-----		-----
6259		-----		-----	-----		-----	-----		-----
6262		-----		-----	-----		-----	-----		-----
6265		-----		-----	-----		-----	-----		-----
6276		-----		-----	-----		-----	-----		-----
6291		-----		-----	-----		-----	-----		-----
6300		-----		-----	-----		-----	-----		-----
6325		-----		-----	-----		-----	-----		-----
6337		-----		-----	-----		-----	-----		-----
6341		-----		-----	-----		-----	-----		-----
	n	3			3			3		
	mean (n)	354.2			358.0			365.1		

Determination of Methanol on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	EN14110	0.04		2.67	
311		-----		-----	
312	EN14110	0.03		-0.19	
323	EN14110	0.03		-0.19	
333		-----		-----	
334	EN14110	0.03		-0.19	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14110	0.03		-0.19	
344	EN14110	0.034		0.96	
345	EN14110	0.03		-0.19	
351		-----		-----	
360	EN14110	0.029		-0.48	
370		-----		-----	
371	EN14110	0.0235		-2.05	
373	EN14110	0.0294		-0.36	
391		-----		-----	
398		-----		-----	
420	EN14110	0.033		0.67	
447		-----		-----	
463		-----		-----	
496	EN14110	0.030		-0.19	
511		-----		-----	
540	EN14110	0.036		1.53	
663		-----		-----	
862	EN14110	0.04		2.67	
1011		-----		-----	
1016		-----		-----	
1059	EN14110	0.02		-3.05	
1135	EN14110	0.02		-3.05	
1167		-----		-----	
1199		-----		-----	
1201	EN14110	0.03		-0.19	
1227		-----		-----	
1299	EN14110	0.03		-0.19	
1339	EN14110	0.032		0.38	
1389	EN14110	0.02		-3.05	
1397	EN14110	0.04		2.67	
1459		-----		-----	
1485	EN14110	0.034		0.96	
1488		-----		-----	
1557	EN14110	0.045	R(0.01)	4.11	
1586		-----		-----	
1656	EN14110	<0.05		-----	
1706		-----		-----	
1712	EN14110	0.03		-0.19	
1721	EN14110	0.032		0.38	
1739	EN14110	0.032		0.38	
1744	EN14110	0.039		2.39	
1754	EN14110	0.031		0.10	
1765		-----		-----	
1807	EN14110	0.02		-3.05	
6047		-----		-----	
6201	EN14110	0.037		1.82	
6238		-----		-----	
6259	EN14110	0.0326		0.56	
6262	EN14110	0.024		-1.91	
6265	EN14110	0.034		0.96	
6276		-----		-----	
6291		-----		-----	
6300	EN14110	0.03		-0.19	
6325	EN14110	0.03		-0.19	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	34
outliers	1
mean (n)	0.0307
st.dev. (n)	0.00553
R(calc.)	0.0155
st.dev.(EN14110:19)	0.00349
R(EN14110:19)	0.0098

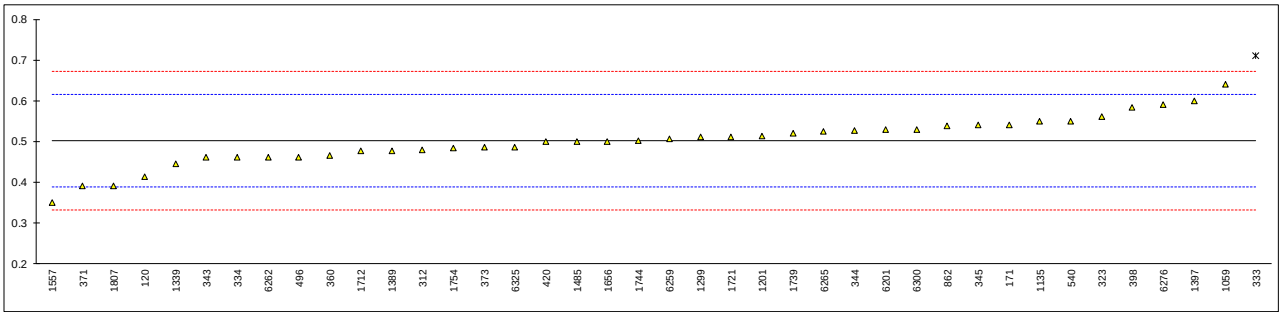


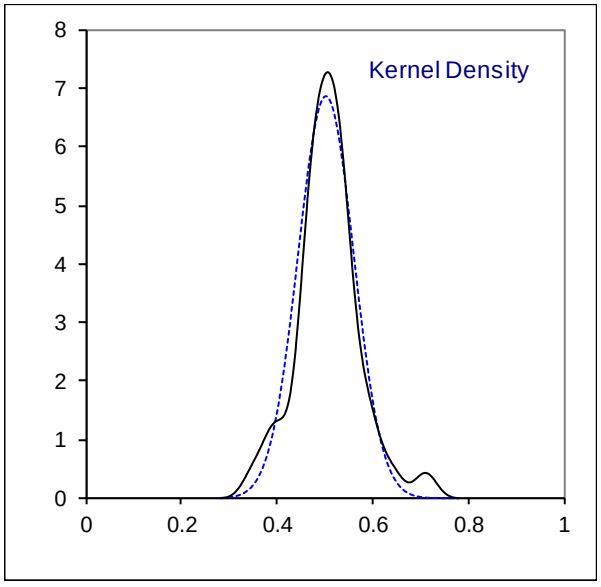


Determination of Monoglycerides on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D6584	0.413	C	-1.56	first reported 0.0532
171	EN14105	0.54		0.68	
311		-----		-----	
312	EN14105	0.48		-0.38	
323	EN14105	0.56		1.03	
333	EN14105	0.71	R(0.05)	3.68	
334	EN14105	0.46		-0.73	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14105	0.46		-0.73	
344	EN14105	0.5275		0.46	
345	EN14105	0.54		0.68	
351		-----		-----	
360	EN14105	0.465		-0.64	
370		-----		-----	
371	EN14105	0.39		-1.96	
373	EN14105	0.485		-0.29	
391		-----		-----	
398	EN14105	0.584		1.46	
420	EN14105	0.50		-0.02	
447		-----		-----	
463		-----		-----	
496	EN14105	0.462		-0.69	
511		-----		-----	
540	EN14105	0.550		0.86	
663		-----		-----	
862	EN14105	0.538		0.65	
1011		-----		-----	
1016		-----		-----	
1059	EN14105	0.64		2.44	
1135	EN14105	0.55		0.86	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.513		0.21	
1227		-----		-----	
1299	EN14105	0.51		0.15	
1339	EN14105	0.445	C	-0.99	first reported 0.299
1389	EN14105	0.478		-0.41	
1397	EN14105	0.6		1.74	
1459		-----		-----	
1485	EN14105	0.500		-0.02	
1488		-----		-----	
1557	EN14105	0.35		-2.66	
1586		-----		-----	
1656	EN14105	0.50		-0.02	
1706		-----		-----	
1712	EN14105	0.476		-0.45	
1721	EN14105	0.51		0.15	
1739	EN14105	0.521		0.35	
1744	D6584	0.5017		0.01	
1754	EN14105	0.484		-0.30	
1765		-----		-----	
1807	EN14105	0.39		-1.96	
6047		-----		-----	
6201	EN14105	0.53		0.51	
6238		-----		-----	
6259	D6584	0.507		0.10	
6262	EN14105	0.46	C	-0.73	first reported 0.20
6265	EN14105	0.5245		0.41	
6276	EN14105	0.59		1.56	
6291		-----		-----	
6300	EN14105	0.53		0.51	
6325	EN14105	0.486		-0.27	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	39
outliers	1
mean (n)	0.5013
st.dev. (n)	0.05823
R(calc.)	0.1630
st.dev.(EN14105:11)	0.05678
R(EN14105:11)	0.1590

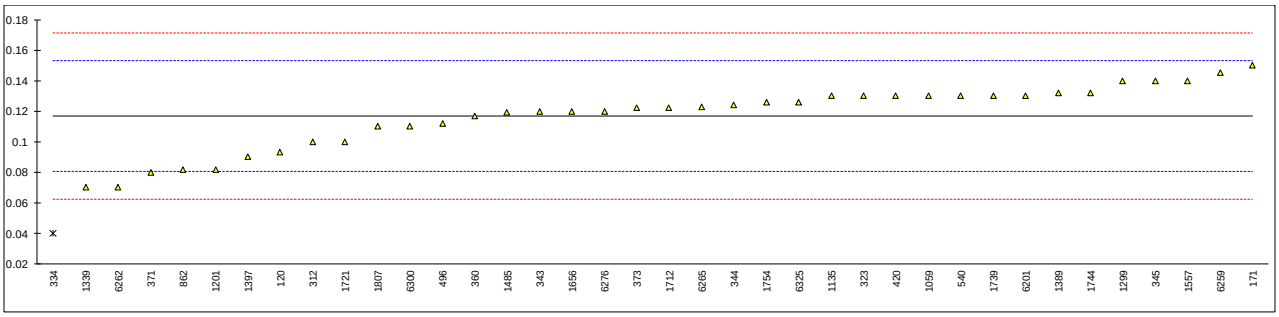


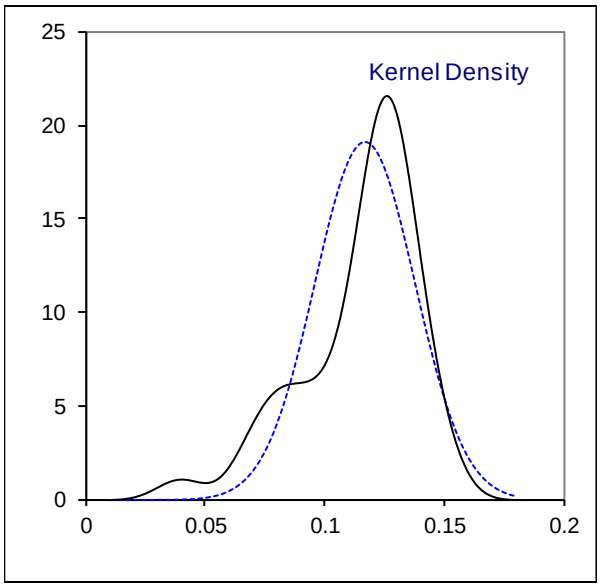


Determination of Diglycerides on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D6584	0.093		-1.32	
171	EN14105	0.15		1.82	
311		-----		-----	
312	EN14105	0.10		-0.93	
323	EN14105	0.13		0.72	
333	EN14105	<0.10		-----	
334	EN14105	0.04	R(0.05)	-4.23	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14105	0.12		0.17	
344	EN14105	0.1240		0.39	
345	EN14105	0.14		1.27	
351		-----		-----	
360	EN14105	0.117		0.00	
370		-----		-----	
371	EN14105	0.08		-2.03	
373	EN14105	0.122		0.28	
391		-----		-----	
398	EN14105	<0.10		-----	
420	EN14105	0.13		0.72	
447		-----		-----	
463		-----		-----	
496	EN14105	0.112		-0.27	
511		-----		-----	
540	EN14105	0.130		0.72	
663		-----		-----	
862	EN14105	0.082		-1.92	
1011		-----		-----	
1016		-----		-----	
1059	EN14105	0.13		0.72	
1135	EN14105	0.13		0.72	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.082		-1.92	
1227		-----		-----	
1299	EN14105	0.14		1.27	
1339	EN14105	0.070		-2.58	
1389	EN14105	0.132		0.83	
1397	EN14105	0.09		-1.48	
1459		-----		-----	
1485	EN14105	0.119		0.11	
1488		-----		-----	
1557	EN14105	0.14		1.27	
1586		-----		-----	
1656	EN14105	0.12		0.17	
1706		-----		-----	
1712	EN14105	0.122		0.28	
1721	EN14105	0.10		-0.93	
1739	EN14105	0.130		0.72	
1744	D6584	0.1320		0.83	
1754	EN14105	0.126		0.50	
1765		-----		-----	
1807	EN14105	0.11		-0.38	
6047		-----		-----	
6201	EN14105	0.13		0.72	
6238		-----		-----	
6259	D6584	0.145		1.54	
6262	EN14105	0.07		-2.58	
6265	EN14105	0.1226		0.31	
6276	EN14105	0.12		0.17	
6291		-----		-----	
6300	EN14105	0.11		-0.38	
6325	EN14105	0.126		0.50	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	37
outliers	1
mean (n)	0.1169
st.dev. (n)	0.02086
R(calc.)	0.0584
st.dev.(EN14105:11)	0.01819
R(EN14105:11)	0.0509

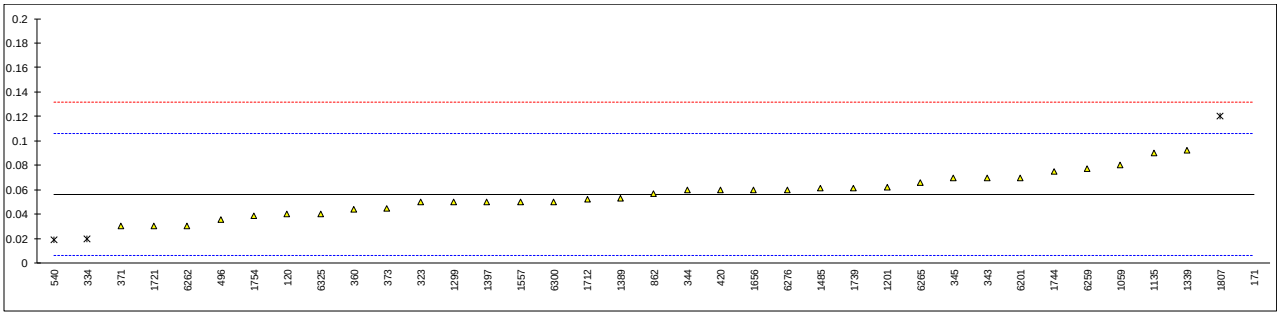


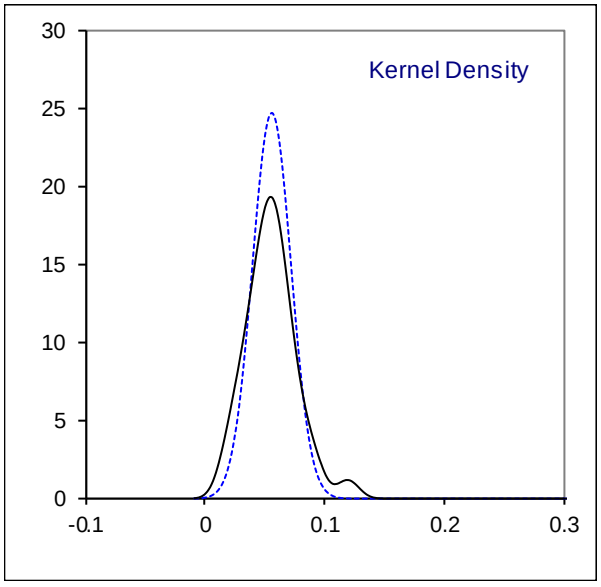


Determination of Triglycerides on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D6584	0.040		-0.65	
171	EN14105	0.58	R(0.01)	20.97	
311		-----		-----	
312	EN14105	<0.10		-----	
323	EN14105	0.05		-0.25	
333	EN14105	<0.10		-----	
334	EN14105	0.02	R(0.05)	-1.46	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14105	0.07		0.55	
344	EN14105	0.0597		0.13	
345	EN14105	0.07		0.55	
351		-----		-----	
360	EN14105	0.044		-0.49	
370		-----		-----	
371	EN14105	0.03		-1.06	
373	EN14105	0.0448		-0.46	
391		-----		-----	
398	EN14105	<0.10		-----	
420	EN14105	0.06		0.15	
447		-----		-----	
463		-----		-----	
496	EN14105	0.036		-0.81	
511		-----		-----	
540	EN14105	0.019	R(0.05)	-1.50	
663		-----		-----	
862	EN14105	0.057		0.03	
1011		-----		-----	
1016		-----		-----	
1059	EN14105	0.08		0.95	
1135	EN14105	0.09		1.35	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.062		0.23	
1227		-----		-----	
1299	EN14105	0.05		-0.25	
1339	EN14105	0.092		1.43	
1389	EN14105	0.053		-0.13	
1397	EN14105	0.05		-0.25	
1459		-----		-----	
1485	EN14105	0.061		0.19	
1488		-----		-----	
1557	EN14105	0.05		-0.25	
1586		-----		-----	
1656	EN14105	0.06		0.15	
1706		-----		-----	
1712	EN14105	0.052		-0.17	
1721	EN14105	0.03		-1.06	
1739	EN14105	0.061		0.19	
1744	D6584	0.0753		0.76	
1754	EN14105	0.039		-0.69	
1765		-----		-----	
1807	EN14105	0.12	R(0.05)	2.55	
6047		-----		-----	
6201	EN14105	0.07		0.55	
6238		-----		-----	
6259	D6584	0.077		0.83	
6262	EN14105	0.03		-1.06	
6265	EN14105	0.0658		0.38	
6276	EN14105	0.06		0.15	
6291		-----		-----	
6300	EN14105	0.05		-0.25	
6325	EN14105	0.040		-0.65	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	33
outliers	4
mean (n)	0.0564
st.dev. (n)	0.01618
R(calc.)	0.0453
st.dev.(EN14105:11)	0.02497
R(EN14105:11)	0.0699

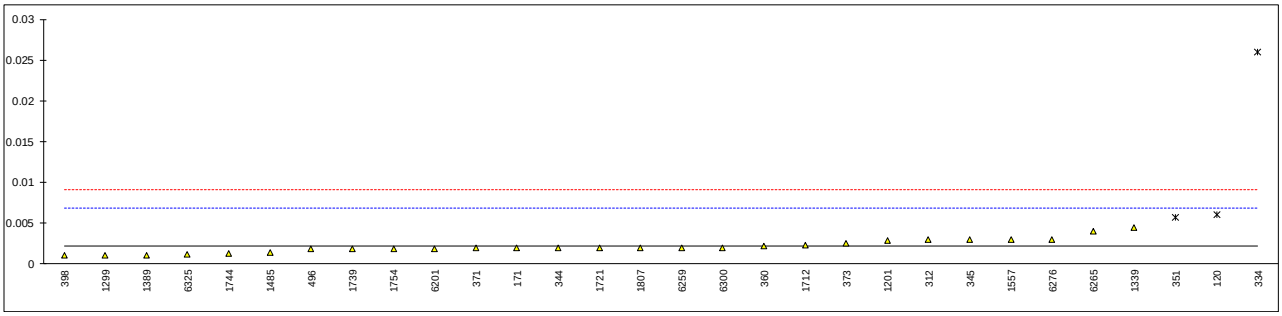


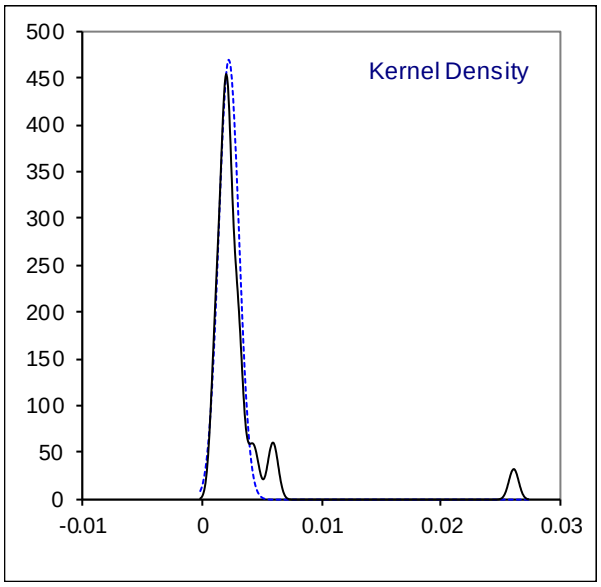


Determination of Free Glycerol on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D6584	0.006	R(0.05)	1.66	
171	EN14105	0.002		-0.07	
311		-----		-----	
312	EN14105	0.003		0.36	
323	EN14105	<0.010		-----	
333	EN14105	<0.001		-----	
334	EN14105	0.026	R(0.01)	10.28	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14105	<0,005		-----	
344	EN14105	0.0020		-0.07	
345	EN14105	0.003		0.36	
351	EN14105	0.0057	R(0.05)	1.53	
360	EN14105	0.0022		0.02	
370		-----		-----	
371	EN14105	0.002	C	-0.07	first reported 0.016
373	EN14105	0.0025		0.15	
391		-----		-----	
398	EN14105	0.001		-0.50	
420	EN14105	<0,005		-----	
447		-----		-----	
463		-----		-----	
496	EN14105	0.0018		-0.15	
511		-----		-----	
540	EN14105	<0.01		-----	
663		-----		-----	
862	EN14105	<0.005		-----	
1011		-----		-----	
1016		-----		-----	
1059	EN14105	<0,001		-----	
1135	EN14105	<0.010		-----	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.0028		0.28	
1227		-----		-----	
1299	EN14105	0.001		-0.50	
1339	EN14105	0.0044		0.97	
1389	EN14105	0.001		-0.50	
1397	EN14105	<0,005		-----	
1459		-----		-----	
1485	EN14105	0.0014		-0.33	
1488		-----		-----	
1557	EN14105	0.003		0.36	
1586		-----		-----	
1656	EN14105	<0.01		-----	
1706		-----		-----	
1712	EN14105	0.0023		0.06	
1721	EN14105	0.002		-0.07	
1739	EN14105	0.0018		-0.15	
1744	D6584	0.0013		-0.37	
1754	EN14105	0.0018		-0.15	
1765		-----		-----	
1807	EN14105	0.002		-0.07	
6047		-----		-----	
6201	EN14105	0.0018		-0.15	
6238		-----		-----	
6259	D6584	0.002		-0.07	
6262	EN14105	<0,01		-----	
6265	EN14105	0.004		0.79	
6276	EN14105	0.003		0.36	
6291		-----		-----	
6300	EN14105	0.002		-0.07	
6325	EN14105	0.0012		-0.41	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	27
outliers	3
mean (n)	0.0022
st.dev. (n)	0.00085
R(calc.)	0.0024
st.dev.(EN14105:11)	0.00232
R(EN14105:11)	0.0065

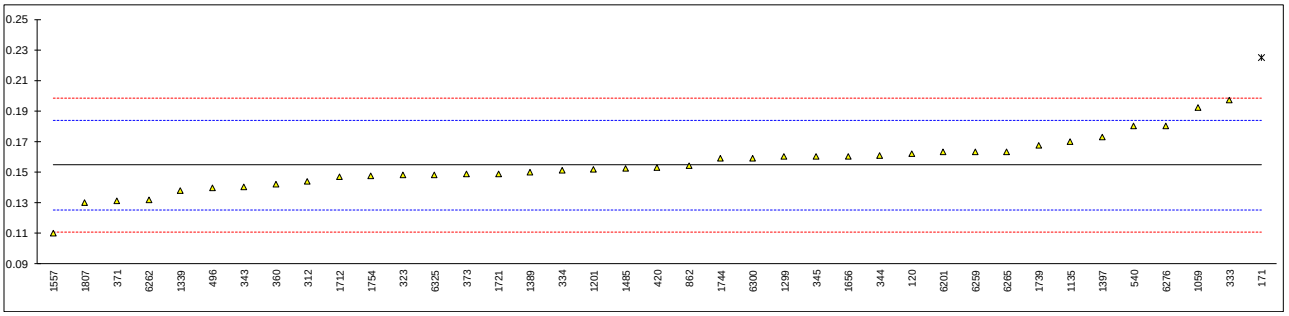


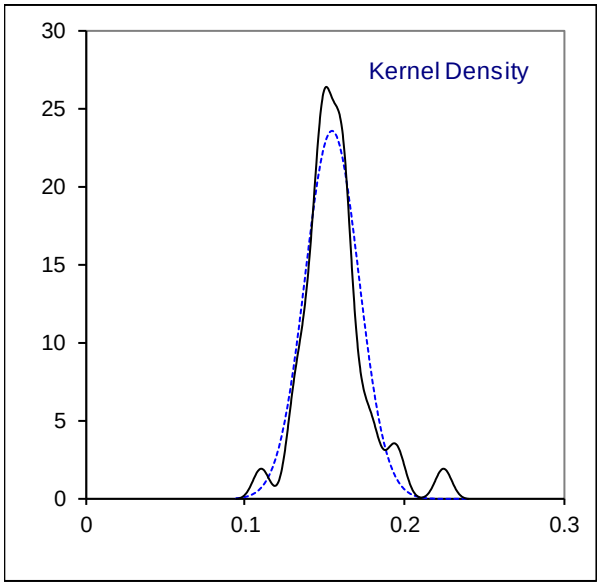


Determination of Total Glycerol on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120	D6584	0.162		0.50	
171	EN14105	0.225	R(0.01)	4.81	
311		-----		-----	
312	EN14105	0.144		-0.73	
323	EN14105	0.148		-0.46	
333	EN14105	0.197		2.90	
334	EN14105	0.151		-0.25	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14105	0.14		-1.00	
344	EN14105	0.1608		0.42	
345	EN14105	0.16		0.37	
351		-----		-----	
360	EN14105	0.1422		-0.85	
370		-----		-----	
371	EN14105	0.1315		-1.58	
373	EN14105	0.1489		-0.39	
391		-----		-----	
398		-----		-----	
420	EN14105	0.153		-0.11	
447		-----		-----	
463		-----		-----	
496	EN14105	0.1395		-1.04	
511		-----		-----	
540	EN14105	0.180		1.73	
663		-----		-----	
862	EN14105	0.154		-0.05	
1011		-----		-----	
1016		-----		-----	
1059	EN14105	0.192		2.56	
1135	EN14105	0.170		1.05	
1167		-----		-----	
1199		-----		-----	
1201	EN14105	0.152		-0.18	
1227		-----		-----	
1299	EN14105	0.160		0.37	
1339	EN14105	0.138	C	-1.14	first reported 0.101
1389	EN14105	0.15		-0.32	
1397	EN14105	0.173		1.26	
1459		-----		-----	
1485	EN14105	0.1526		-0.14	
1488		-----		-----	
1557	EN14105	0.11		-3.06	
1586		-----		-----	
1656	EN14105	0.16		0.37	
1706		-----		-----	
1712	EN14105	0.1468		-0.54	
1721	EN14105	0.149		-0.39	
1739	EN14105	0.1673		0.86	
1744	D6584	0.1588		0.28	
1754	EN14105	0.1477		-0.48	
1765		-----		-----	
1807	EN14105	0.130		-1.69	
6047		-----		-----	
6201	EN14105	0.163		0.57	
6238		-----		-----	
6259	D6584	0.163		0.57	
6262	EN14105	0.132	C	-1.55	first reported 0.064
6265	EN14105	0.163		0.57	
6276	EN14105	0.18		1.73	
6291		-----		-----	
6300	EN14105	0.159		0.30	
6325	EN14105	0.148		-0.46	
6337		-----		-----	
6341		-----		-----	

normality	suspect
n	38
outliers	1
mean (n)	0.1547
st.dev. (n)	0.01691
R(calc.)	0.0474
st.dev.(EN14105:11)	0.01461
R(EN14105:11)	0.0409

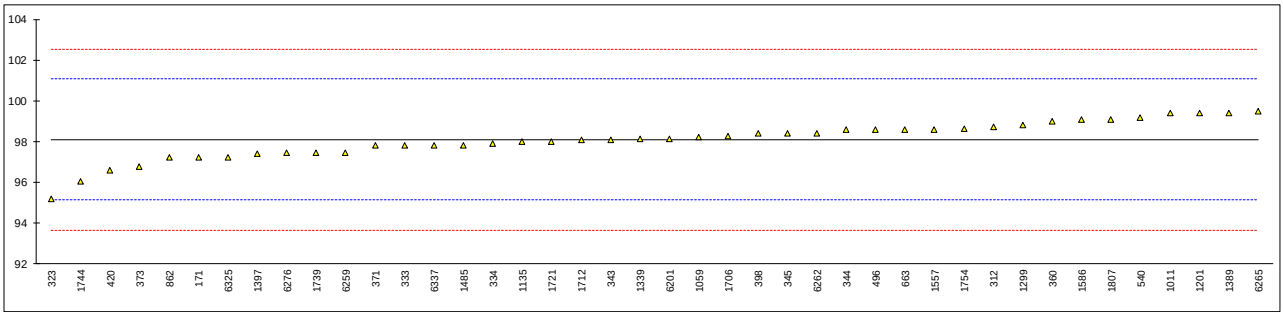


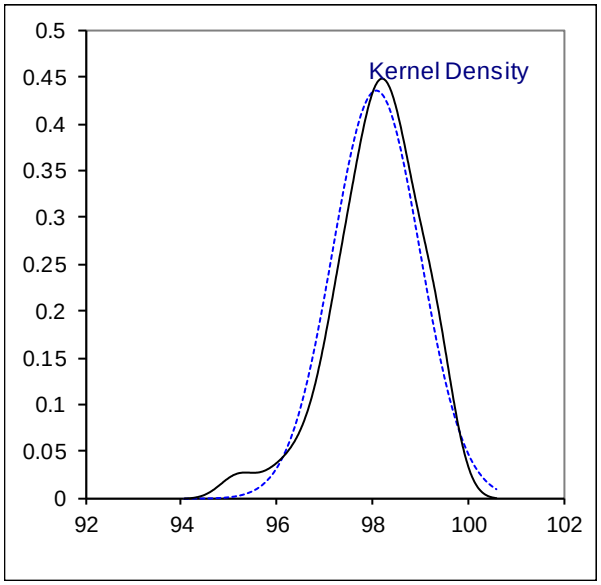


Determination of Total Ester content (FAME) on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	EN14103	97.2		-0.60	
311		-----		-----	
312	EN14103	98.7		0.41	
323	EN14103	95.2		-1.94	
333	EN14103	97.8		-0.19	
334	EN14103	97.89		-0.13	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14103	98.1		0.01	
344	EN14103	98.57		0.32	
345	EN14103	98.4		0.21	
351		-----		-----	
360	EN14103	99.00		0.61	
370		-----		-----	
371	EN14103	97.792		-0.20	
373	EN14103	96.78		-0.88	
391		-----		-----	
398	EN14103	98.4		0.21	
420	EN14103	96.6		-1.00	
447		-----		-----	
463		-----		-----	
496	EN14103	98.57		0.32	
511		-----		-----	
540	EN14103	99.15		0.71	
663	EN14103	98.58		0.33	
862	EN14103	97.2		-0.60	
1011	EN14103	99.4		0.88	
1016		-----		-----	
1059	EN14103	98.2		0.08	
1135	EN14103	98.0		-0.06	
1167		-----		-----	
1199		-----		-----	
1201	EN14103	99.4		0.88	
1227		-----		-----	
1299	EN14103	98.8		0.48	
1339	EN14103	98.12		0.02	
1389	EN14103	99.4		0.88	
1397	EN14103	97.4		-0.46	
1459		-----	W	-----	test result withdrawn. first reported 99.0
1485	EN14103	97.83		-0.17	
1488		-----		-----	
1557	EN14103	98.60		0.34	
1586	EN14103	99.10		0.68	
1656	EN14103	>99.0		-----	
1706	EN14103	98.253		0.11	
1712	EN14103	98.09		0.00	
1721	EN14103	98.0		-0.06	
1739	EN14103	97.46		-0.42	
1744	EN14103	96.04		-1.38	
1754	EN14103	98.63		0.36	
1765		-----		-----	
1807	EN14103	99.1		0.68	
6047		-----		-----	
6201	EN14103	98.15		0.04	
6238		-----		-----	
6259	EN14103	97.46		-0.42	
6262	EN14103	98.40		0.21	
6265	EN14103	99.47		0.93	
6276	EN14103	97.45		-0.43	
6291		-----		-----	
6300		-----		-----	
6325	EN14103	97.2		-0.60	
6337	EN14103	97.8		-0.19	
6341		-----		-----	

normality	suspect
n	42
outliers	0
mean (n)	98.0877
st.dev. (n)	0.91641
R(calc.)	2.5660
st.dev.(EN14103:11)	1.48571
R(EN14103:11)	4.16

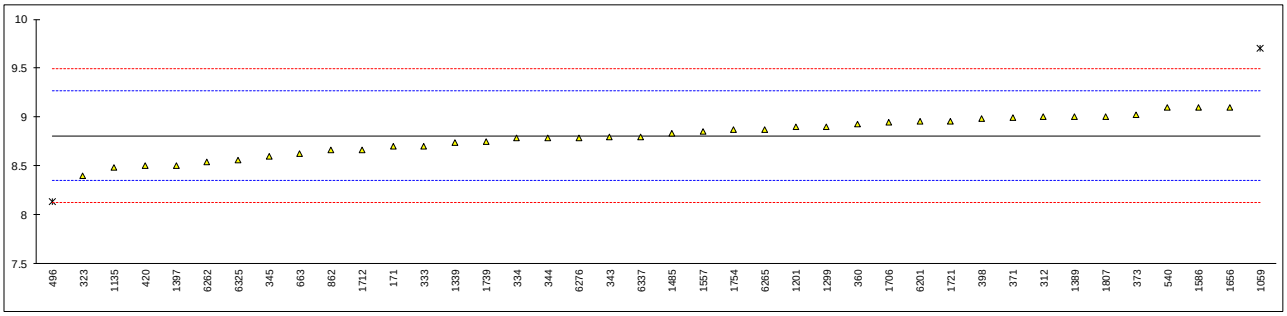


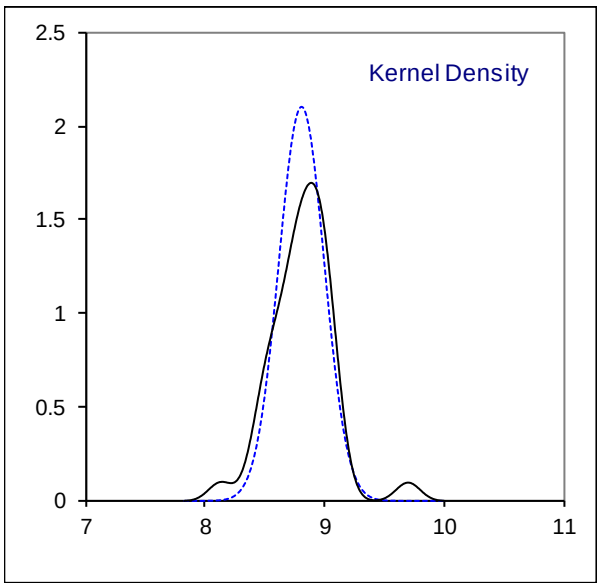


Determination of Linolenic Acid Methyl Ester on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171	EN14103	8.7		-0.47	
311		-----		-----	
312	EN14103	9.0		0.84	
323	EN14103	8.4		-1.79	
333	EN14103	8.70	C	-0.47	first reported 7.3
334	EN14103	8.79		-0.08	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN14103	8.8		-0.03	
344	EN14103	8.79		-0.08	
345	EN14103	8.6		-0.91	
351		-----		-----	
360	EN14103	8.93		0.54	
370		-----		-----	
371	EN14103	8.995		0.82	
373	EN14103	9.02		0.93	
391		-----		-----	
398	EN14103	8.98		0.76	
420	EN14103	8.5		-1.35	
447		-----		-----	
463		-----		-----	
496	EN14103	8.13	R(0.05)	-2.97	
511		-----		-----	
540	EN14103	9.10		1.28	
663	EN14103	8.63		-0.78	
862	EN14103	8.66		-0.65	
1011		-----		-----	
1016		-----		-----	
1059	EN14103	9.7	R(0.01)	3.91	
1135	EN14103	8.48		-1.44	
1167		-----		-----	
1199		-----		-----	
1201	EN14103	8.9		0.40	
1227		-----		-----	
1299	EN14103	8.9		0.40	
1339	EN14103	8.74		-0.30	
1389	EN14103	9.0		0.84	
1397	EN14103	8.5		-1.35	
1459		-----	W	-----	test result withdrawn. first reported 9.9
1485	EN14103	8.83		0.10	
1488		-----		-----	
1557	EN14103	8.85		0.19	
1586	EN14103	9.1		1.28	
1656	EN14103	9.1		1.28	
1706	EN14103	8.949		0.62	
1712	EN14103	8.66		-0.65	
1721	EN14103	8.96	C	0.67	first reported 9.5
1739	EN14103	8.75		-0.25	
1744		-----		-----	
1754	EN14103	8.87		0.27	
1765		-----		-----	
1807	EN14103	9.0		0.84	
6047		-----		-----	
6201	EN14103	8.955		0.65	
6238		-----		-----	
6259		-----		-----	
6262	EN14103	8.5371		-1.19	
6265	EN14103	8.87		0.27	
6276	EN14103	8.79		-0.08	
6291		-----		-----	
6300		-----		-----	
6325	EN14103	8.56		-1.09	
6337	EN14103	8.8		-0.03	
6341		-----		-----	

normality	OK
n	38
outliers	2
mean (n)	8.808
st.dev. (n)	0.1897
R(calc.)	0.531
st.dev.(EN14103:11)	0.2279
R(EN14103:11)	0.638



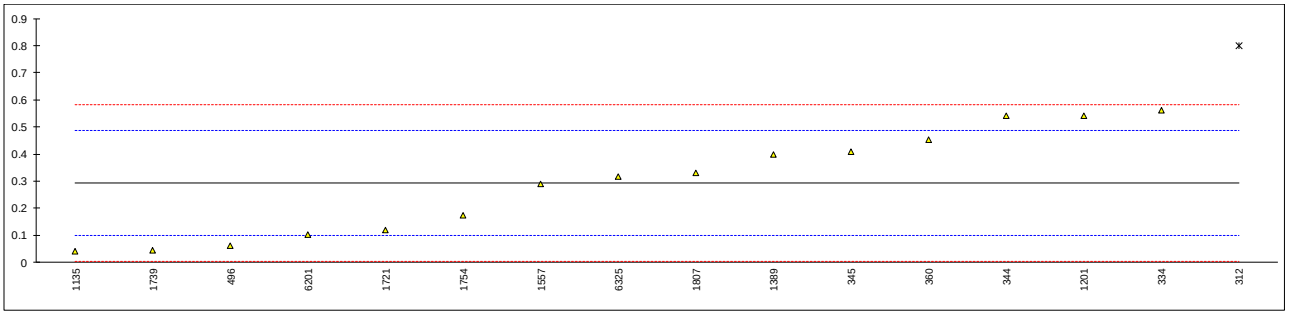


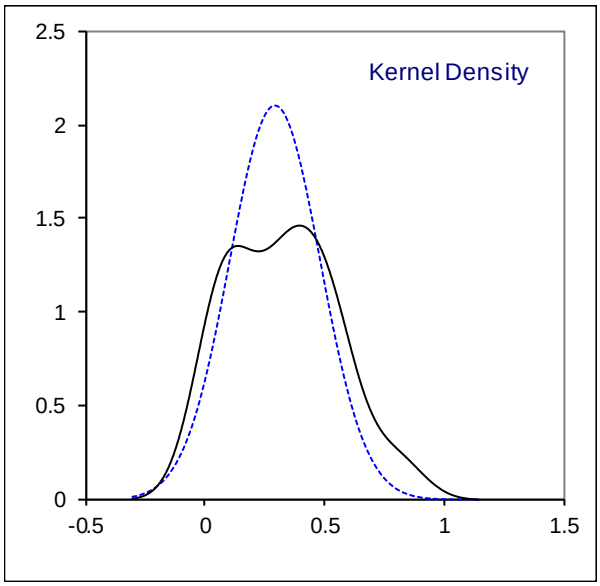
Determination of Polyunsaturated (more or 4 double bonds) Methyl Esters on sample #20205; results in %M/M

lab	method	value	mark	z(targ)	remarks
120		-----		-----	
171		-----		-----	
311		-----		-----	
312	EN15779	0.8	D(0.05)	5.26	
323	EN15779	<1.0		-----	
333	EN15779	<0.6		-----	
334	EN15779	0.56		2.78	
335		-----		-----	
336		-----		-----	
338		-----		-----	
343	EN15779	<0,30		-----	
344	EN15779	0.54		2.57	
345	EN15779	0.41		1.22	
351		-----		-----	
360	EN15779	0.453		1.67	
370		-----		-----	
371		-----		-----	
373	EN15779	<0,6		-----	
391		-----		-----	
398	EN15779	<0.1		-----	
420		-----		-----	
447		-----		-----	
463		-----		-----	
496	EN15779	0.063		-2.38	
511		-----		-----	
540		-----		-----	
663		-----		-----	
862	EN15779	<1		-----	
1011		-----		-----	
1016		-----		-----	
1059	EN15779	<0,3		-----	
1135	EN15779	0.04		-2.62	
1167		-----		-----	
1199		-----		-----	
1201	EN15779	0.54		2.57	
1227		-----		-----	
1299	EN15779	<0.6		-----	
1339		-----		-----	
1389	EN15779	0.40		1.12	
1397		-----		-----	
1459		-----		-----	
1485		-----		-----	
1488		-----		-----	
1557	EN15779	0.29		-0.02	
1586		-----		-----	
1656		-----		-----	
1706		-----		-----	
1712	EN15779	<0,30		-----	
1721	EN15779	0.12		-1.79	
1739	EN15779	0.044		-2.58	
1744		-----		-----	
1754	EN15779	0.175		-1.22	
1765		-----		-----	
1807	EN15779	0.33		0.39	
6047		-----		-----	
6201	EN15779	0.103		-1.96	
6238		-----		-----	
6259		-----		-----	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291		-----		-----	
6300		-----		-----	
6325	EN15779	0.318		0.27	
6337		-----		-----	
6341		-----		-----	

normality	OK
n	15
outliers	1
mean (n)	0.292
st.dev. (n)	0.1899
R(calc.)	0.532
st.dev.(EN15779:09+A1:13)	0.0964
R(EN15779:09+A1:13)	0.270

Application range EN15779:13 is 0.6 – 1.5%M/M

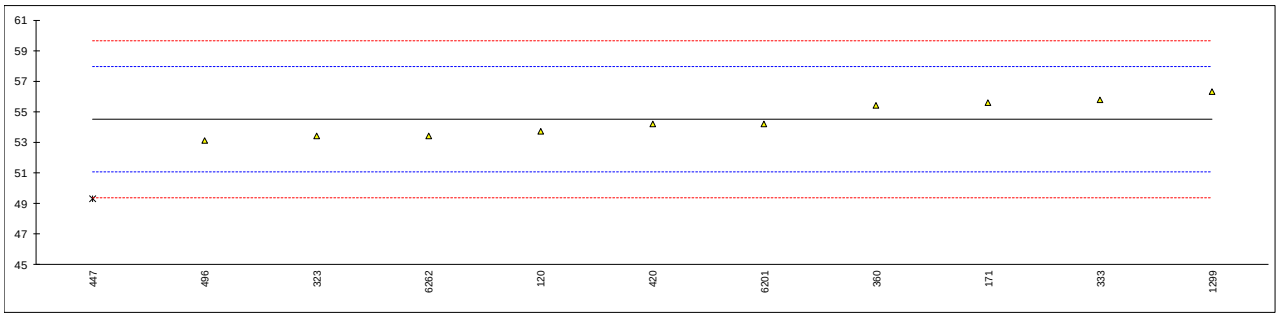


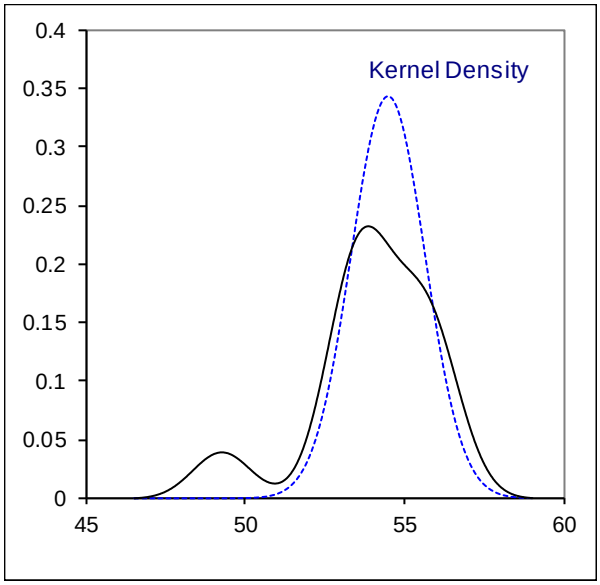


Determination of Cetane Number of sample #20206

lab	method	value	mark	z(targ)	remarks
120	D613	53.73		-0.46	
171	D613	55.6		0.63	
311		-----		-----	
323	D613	53.4		-0.65	
333	ISO5165	55.8		0.75	
336		-----		-----	
343		-----		-----	
360	D613	55.40		0.52	
420	ISO5165	54.2		-0.18	
447	IP41	49.3	D(0.05)	-3.04	
496	D613	53.1		-0.82	
1016		-----		-----	
1135		-----		-----	
1201		-----		-----	
1299	D613	56.3		1.04	
1807		-----		-----	
6201	D613	54.2		-0.18	
6262	D613	53.4		-0.65	
6291		-----		-----	

	normality	OK
	n	10
	outliers	1
	mean (n)	54.513
	st.dev. (n)	1.1596
	R(calc.)	3.247
	st.dev.(D613:18a)	1.7143
	R(D613:18a)	4.8
Compare		
	R(EN14214:12+A2:19)	5.0

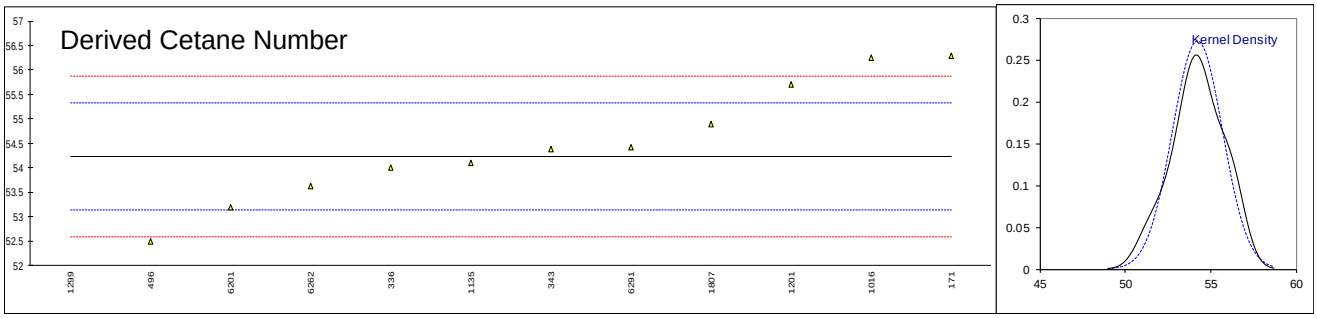


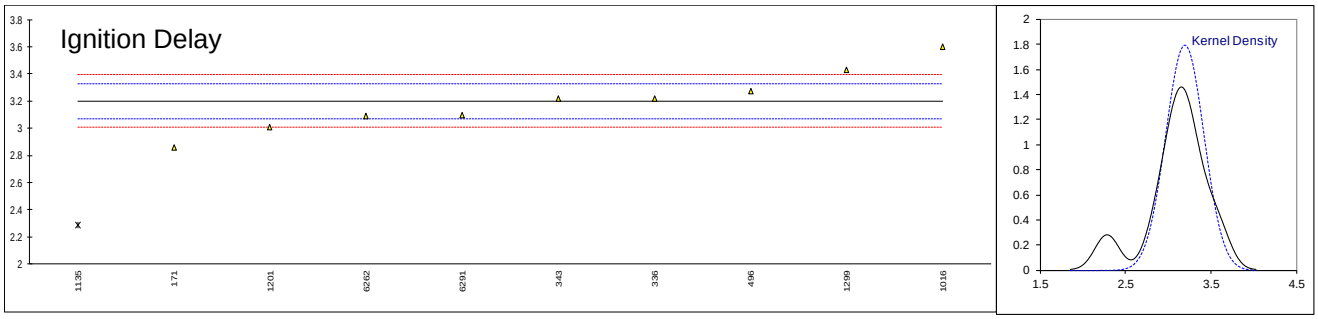


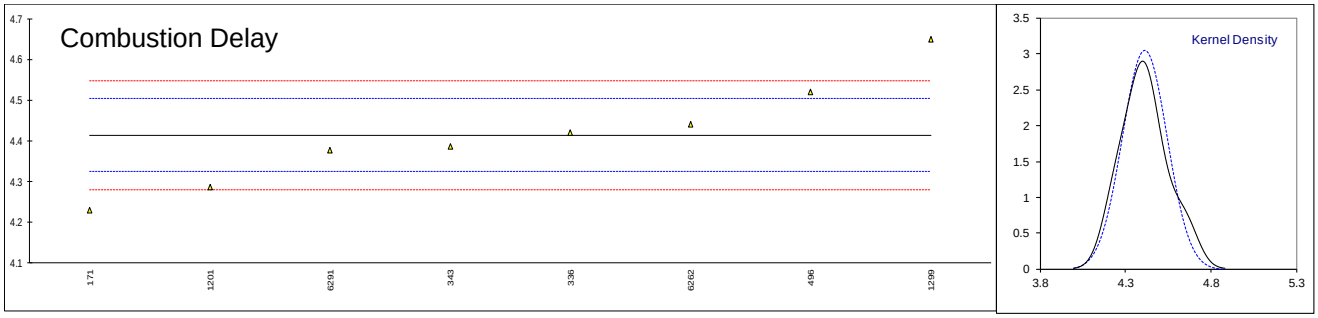
Determination of Derived Cetane Number of sample #20206

lab	Method	DCN	mark	z(targ)	ID	mark	z(targ)	CD	mark	z(targ)	W.T.
120		-----		-----	-----		-----	-----		-----	-----
171	D7668	56.3		3.76	2.86		-5.26	4.23		-4.10	617.3
311		-----		-----	-----		-----	-----		-----	-----
323		-----		-----	-----		-----	-----		-----	-----
333		-----		-----	-----		-----	-----		-----	-----
336	D7668	54.0		-0.42	3.22		0.32	4.42		0.14	593.3
343	D7668	54.38		0.27	3.2182		0.29	4.3860		-0.62	-----
360		-----		-----	-----		-----	-----		-----	-----
420		-----		-----	-----		-----	-----		-----	-----
447		-----		-----	-----		-----	-----		-----	-----
496	D7668	52.5		-3.15	3.27		1.10	4.52		2.37	-----
1016	EN15195	56.26		3.69	3.602		6.25	-----		-----	-----
1135	IP617	54.1		-0.24	2.29	G(0.05)	-14.10	-----		-----	579.7
1201	D7668	55.7		2.67	3.0106		-2.93	4.2860		-2.85	-----
1299	D7668	51.4		-5.15	3.43		3.58	4.65		5.27	584.7
1807	EN17155	54.9		1.21	-----		-----	-----		-----	-----
6201	EN17155	53.2		-1.88	-----		-----	-----		-----	-----
6262	D7668	53.62		-1.11	3.09		-1.70	4.44		0.59	606.03
6291	D7668	54.43		0.36	3.0928		-1.65	4.3774		-0.81	598.59
	normality	OK			OK			unknown			
	n	12			9			8			
	outliers	0			1			0			
	mean (n)	54.232			3.199			4.414			
	st.dev. (n)	1.4642			0.2223			0.1309			
	R(calc.)	4.100			0.622			0.367			
	st.dev.(D7668:17)	0.5495			0.0645			0.0448			
	R(D7668:17)	1.539			0.181			0.125			

W.T. = Chamber Wall Temperature



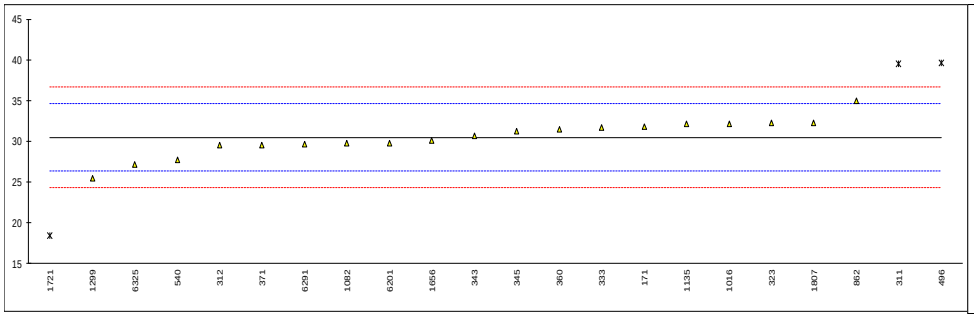


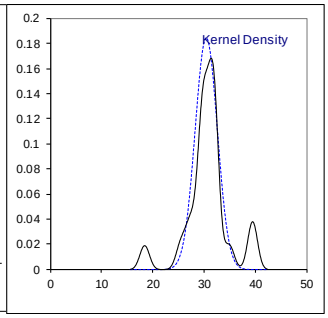


Determination of sum of Calcium and Magnesium (as Ca + Mg) on sample #20207; results in mg/kg

lab	method	value	mark	z(targ)	remarks
171	EN14538	31.8		0.64	
311	EN14538	39.5	C,DG(0.01)	4.41	first reported >20
312	EN14538	29.5		-0.48	
323	EN14538	32.2		0.84	
333	EN14538	31.7		0.59	
334	EN14538	<1		<-14.41	possibly a false negative test result?
343	EN14538	30.7		0.10	
345	EN14538	31.2		0.35	
360	EN14538	31.47		0.48	
371	EN14538	29.56	C	-0.45	first reported 23.91
391		-----		-----	
398		-----		-----	
463		-----		-----	
496	EN14538	39.56	DG(0.01)	4.44	
540	EN14538	27.75		-1.34	
663		-----		-----	
862	EN14538	35		2.21	
1016	EN14538	32.153		0.82	
1082	D8110	29.731		-0.37	
1135	EN14538	32.097		0.79	
1167		-----		-----	
1201		-----		-----	
1299	EN14538	25.5		-2.44	
1656	EN14538	30.1		-0.19	
1721	EN14538	18.46	C,G(0.05)	-5.88	first reported 22.64
1765		-----		-----	
1807	EN14538	32.2		0.84	
6201	EN14538	29.8		-0.33	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291	EN14538	29.66		-0.40	
6325	EN14538	27.1		-1.65	

normality	OK
n	19
outliers	3
mean (n)	30.485
st.dev. (n)	2.1585
R(calc.)	6.044
st.dev.(EN14538:06)	2.0458
R(EN14538:06)	5.728

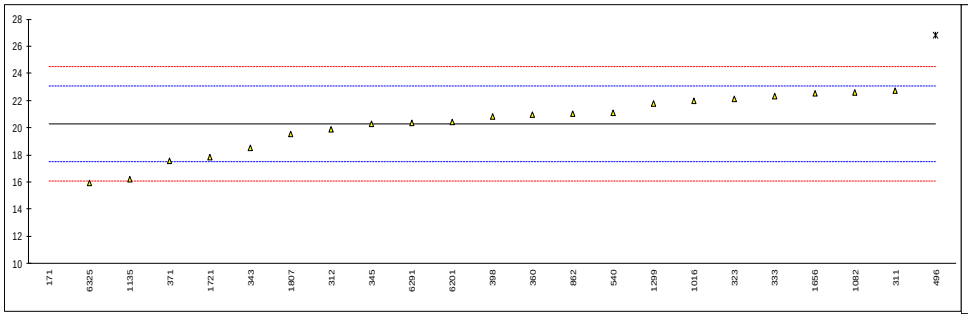


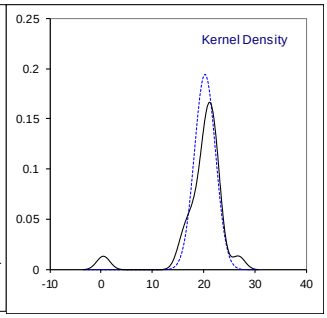


Determination of Phosphorus as P on sample #20207; results in mg/kg

lab	method	value	mark	z(targ)	remarks
171	D7111	0.47	R(0.01)	-14.15	
311	EN14107	22.7	C	1.71	first reported >20
312	EN14107	19.9		-0.29	
323	EN14107	22.1		1.29	
333	EN14107	22.3		1.43	
334	EN14107	<4		<-11.64	possibly a false negative test result?
343	EN14107	18.5		-1.28	
345	EN14107	20.3		0.00	
360	EN14107	20.96		0.47	
371	EN14107	17.55		-1.96	
391		-----		-----	
398	EN14107	20.8		0.36	
463		-----		-----	
496	EN14107	26.81	R(0.01)	4.65	
540	EN14107	21.07		0.55	
663		-----		-----	
862	EN14107	21		0.50	
1016	EN14538	21.968		1.19	
1082	D8110	22.617		1.65	
1135	EN14107	16.168		-2.95	
1167		-----		-----	
1201		-----		-----	
1299	EN14107	21.8		1.07	
1656	EN14107	22.5		1.57	
1721	EN14107	17.85		-1.75	
1765		-----		-----	
1807	EN16294	19.56	C	-0.53	first reported 29.17
6201	EN14107	20.4		0.07	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291	EN14107	20.35		0.04	
6325	EN14107	15.9		-3.14	

normality	OK
n	21
outliers	2
mean (n)	20.300
st.dev. (n)	2.0490
R(calc.)	5.737
st.dev.(EN14107:03)	1.4009
R(EN14107:03)	3.923

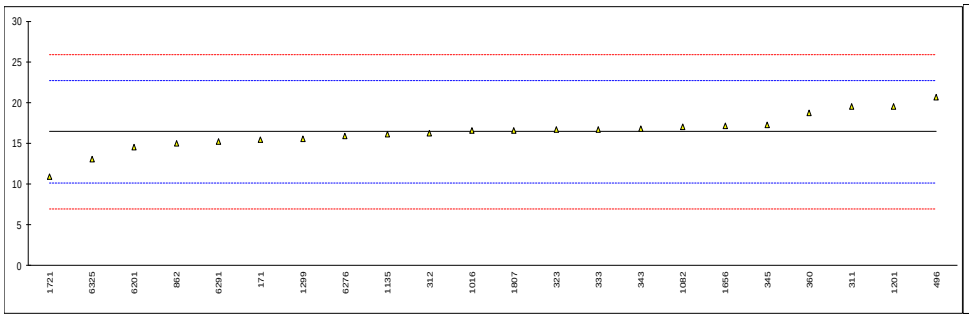


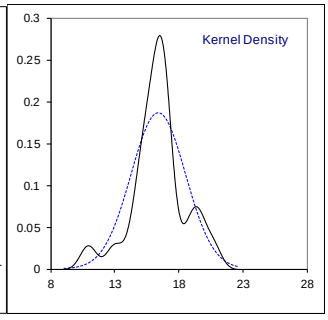


Determination of Potassium as K on sample #20207; results in mg/kg

lab	method	value	mark	z(targ)	remarks
171	D7111	15.46		-0.30	
311	EN14538	19.5	C	0.98	first reported >10
312	EN14538	16.2		-0.07	
323	EN14538	16.7		0.09	
333	EN14538	16.7		0.09	
334	EN14538	<1		<-4.90	possibly a false negative test result?
343	EN14538	16.8		0.12	
345	EN14538	17.3		0.28	
360	EN14538	18.69		0.72	
371		-----		-----	
391		-----		-----	
398		-----		-----	
463		-----		-----	
496	EN14538	20.70		1.36	
540		-----		-----	
663		-----		-----	
862	EN14109	15		-0.45	
1016	EN14538	16.546		0.04	
1082	D8110	16.995		0.19	
1135	EN14109	16.148		-0.08	
1167		-----		-----	
1201	EN14109	19.5		0.98	
1299	EN14538	15.6		-0.26	
1656	EN14109	17.1		0.22	
1721	EN14109	10.95		-1.74	
1765		-----		-----	
1807	EN14538	16.62		0.07	
6201	EN14109	14.5		-0.61	
6262		-----		-----	
6265		-----		-----	
6276	In house	15.90		-0.16	
6291	EN14109	15.17		-0.39	
6325	EN14538	13.0		-1.08	

normality	suspect
n	22
outliers	0
mean (n)	16.413
st.dev. (n)	2.1296
R(calc.)	5.963
st.dev.(EN14109:03)	3.1466
R(EN14109:03)	8.810

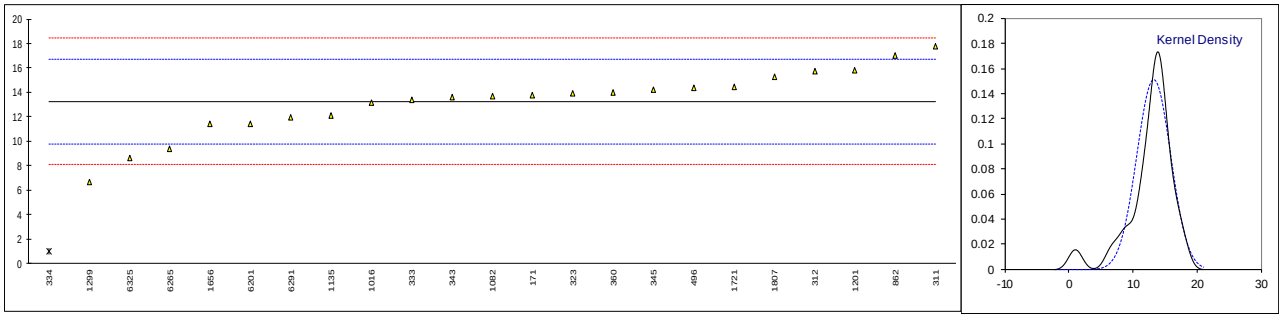




Determination of Sodium as Na on sample #20207; results in mg/kg

lab	method	value	mark	z(targ)	remarks
171	D7111	13.80		0.31	
311	EN14538	17.8	C	2.63	first reported >10
312	EN14538	15.7		1.41	
323	EN14538	13.9		0.37	
333	EN14538	13.4		0.08	
334	EN14538	1.0	R(0.01)	-7.09	
343	EN14538	13.6		0.20	
345	EN14538	14.2		0.55	
360	EN14538	14.00		0.43	
371		-----		-----	
391		-----		-----	
398		-----		-----	
463		-----		-----	
496	EN14538	14.38		0.65	
540		-----		-----	
663		-----		-----	
862	EN14108	17		2.16	
1016	EN14538	13.134		-0.07	
1082	D8110	13.662		0.23	
1135	EN14108	12.070		-0.69	
1167		-----		-----	
1201	EN14108	15.8		1.47	
1299	EN14538	6.7		-3.79	
1656	EN14108	11.4		-1.07	
1721	EN14108	14.43		0.68	
1765		-----		-----	
1807	EN14538	15.31		1.19	
6201	EN14108	11.4		-1.07	
6262		-----		-----	
6265	In house	9.4		-2.23	
6276		-----		-----	
6291	EN14108	11.98		-0.74	
6325	EN14538	8.6	C	-2.69	first reported 8.1

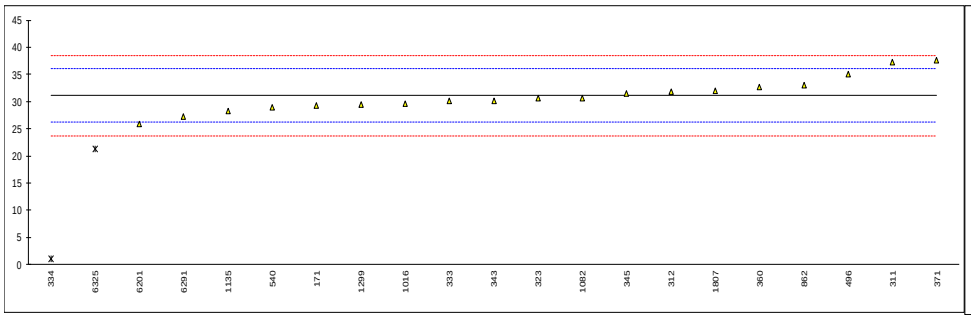
normality	OK
n	22
outliers	1
mean (n)	13.258
st.dev. (n)	2.6358
R(calc.)	7.380
st.dev.(EN14108:03)	1.7292
R(EN14108:03)	4.842

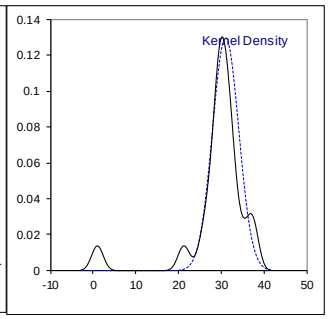


Determination of Sum of Potassium and Sodium (as K + Na) on sample #20207; results in mg/kg

lab	method	value	mark	z(targ)	remarks
171	D7111	29.26		-0.75	
311	EN14538	37.3	C	2.52	first reported >20
312	EN14538	31.9		0.32	
323	EN14538	30.6		-0.20	
333	EN14538	30.1		-0.41	
334	EN14538	1.0	R(0.01)	-12.25	
343	EN14538	30.2		-0.37	
345	EN14538	31.5		0.16	
360	EN14538	32.69		0.65	
371	EN14538	37.54		2.62	
391		-----		-----	
398		-----		-----	
463		-----		-----	
496	EN14538	35.08		1.62	
540	EN14538	28.85		-0.92	
663		-----		-----	
862	EN14538	33		0.77	
1016	EN14538	29.68		-0.58	
1082	D8110	30.657		-0.18	
1135	EN14538	28.218		-1.17	
1167		-----		-----	
1201		-----		-----	
1299	EN14538	29.5	E	-0.65	calculation difference, iis calculated 22.3
1656		-----		-----	
1721		-----		-----	
1765		-----		-----	
1807	EN14538	31.93		0.34	
6201	EN14538	25.8		-2.16	
6262		-----		-----	
6265		-----		-----	
6276		-----		-----	
6291	EN14538	27.15		-1.61	
6325	EN14538	21.3	C,R(0.01)	-3.99	first reported 21.1

normality	OK
n	19
outliers	2
mean (n)	31.103
st.dev. (n)	3.0791
R(calc.)	8.622
st.dev.(EN14538:06)	2.4577
R(EN14538:06)	6.882





Determination of Particulate Contamination on sample #20208; results in mg/L

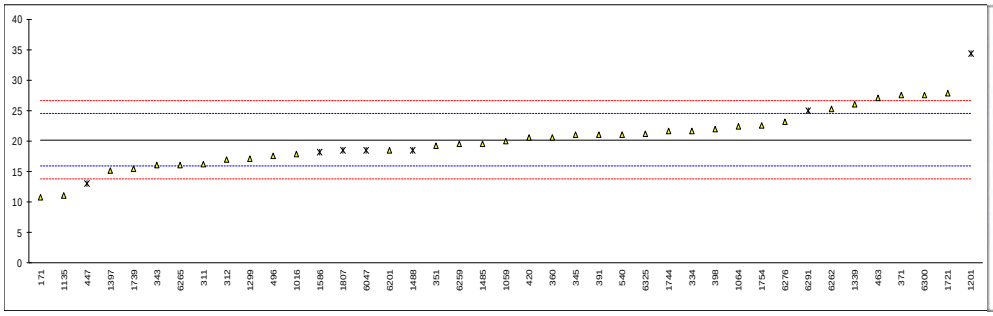
lab	method	value	mark	z(targ)	Vol. filtered	Number of filtrations	remarks
171	D7321	7.3		-----	400	1	
311		-----		-----	-----	-----	
312		-----		-----	-----	-----	
323		-----		-----	-----	-----	
334		-----		-----	-----	-----	
343		-----		-----	-----	-----	
345		-----		-----	-----	-----	
351		-----		-----	-----	-----	
360		-----		-----	-----	-----	
371		-----		-----	-----	-----	
391		-----		-----	-----	-----	
398		-----		-----	-----	-----	
420		-----		-----	-----	-----	
447		-----		-----	-----	-----	
463		-----		-----	-----	-----	
496		-----		-----	-----	-----	
540		-----		-----	-----	-----	
663		-----		-----	-----	-----	
862		-----		-----	-----	-----	
1016		-----		-----	-----	-----	
1059		-----		-----	-----	-----	
1064		-----		-----	-----	-----	
1135		-----		-----	-----	-----	
1167		-----		-----	-----	-----	
1201		-----		-----	-----	-----	
1299		-----		-----	-----	-----	
1339		-----		-----	-----	-----	
1397		-----		-----	-----	-----	
1485		-----		-----	-----	-----	
1488		-----		-----	-----	-----	
1586		-----		-----	-----	-----	
1721		-----		-----	-----	-----	
1739		-----		-----	-----	-----	
1744		-----		-----	-----	-----	
1754		-----		-----	-----	-----	
1765		-----		-----	-----	-----	
1807		-----		-----	-----	-----	
6047		-----		-----	-----	-----	
6201	D7321	17.25		-----	400	1	
6259		-----		-----	-----	-----	
6262		-----		-----	-----	-----	
6265		-----		-----	-----	-----	
6276		-----		-----	-----	-----	
6291		-----		-----	-----	-----	
6300		-----		-----	-----	-----	
6325		-----		-----	-----	-----	

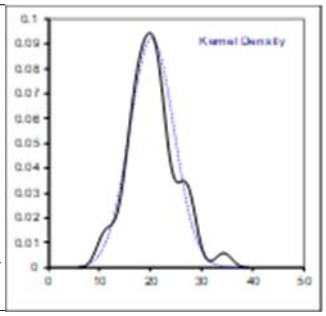
Determination of Total Contamination (EN12662) on sample #20208; results in mg/kg

lab	method	value	mark	z(targ)	Complete	Volume filt. mL	Stopped minutes	remark
171	EN12662:2008	10.8		-4.34	Yes	300	-----	
311	EN12662:1998	16.2		-1.85	Yes	350	-----	
312	EN12662:2008	16.9		-1.53	Yes	300	-----	
323		-----		-----		-----	-----	
334	EN12662:1998	21.7		0.69	Yes	300	-----	
343	EN12662:1998	16.0		-1.94		-----	-----	
345	EN12662:1998	21		0.37	Yes	-----	-----	
351	EN12662:1998	19.18		-0.47	Yes	350	-----	
360	EN12662:1998	20.6		0.18	Yes	300	-----	
371	EN12662:2008	27.51		3.38	Yes	800	-----	
391	EN12662:2008	21.0		0.37	Yes	-----	-----	
398	EN12662:1998	22.0		0.83	Yes	-----	-----	
420	EN12662:1998	20.6	C	0.18		-----	-----	first reported. 29.6
447	EN12662:2014	13.0	ex	-3.33	Yes	-----	-----	
463	EN12662:2008	27.13		3.20	Yes	800	78	
496	EN12662:2008	17.58		-1.21	Yes	-----	-----	
540	EN12662:1998	21.05		0.39	Yes	400	20	
663		-----		-----		-----	-----	
862		-----		-----		-----	-----	
1016	EN12662:1998	17.8		-1.11	Yes	344	-----	
1059	EN12662:1998	20.0		-0.09	Yes	263.3	-----	
1064	EN12662:1998	22.448		1.04	Yes	-----	-----	
1135	EN12662:1998	11		-4.25	Yes	286	-----	
1167		-----		-----		-----	-----	
1201	EN12662:1998	34.3	R(0.01)	6.51	Yes	-----	-----	
1299	EN12662:1998	17.1		-1.43	Yes	300	-----	
1339	EN12662:1998	26.09		2.72		-----	-----	
1397	EN12662:1998	15.2		-2.31		-----	-----	
1485	EN12662:1998	19.55		-0.30	Yes	-----	-----	
1488	EN12662:2014	18.523	ex	-0.78	Yes	300	-----	
1586	EN12662:2014	18.1	ex	-0.97	Yes	300	-----	
1721		27.86		3.54		800	79	
1739	EN12662:1998	15.4		-2.22	Yes	-----	-----	
1744	EN12662:2008	21.57		0.63	Yes	-----	-----	
1754	EN12662:2008	22.48		1.05		-----	-----	
1765		-----		-----		-----	-----	
1807	EN12662:2014	18.5	ex	-0.79		-----	-----	
6047	EN12662:2014	18.5	ex	-0.79	Yes	300.0	20.0	
6201	EN12662:1998	18.5		-0.79		-----	-----	
6259	EN12662:2008	19.45		-0.35		-----	-----	
6262	EN12662:2008	25.3		2.35	Yes	-----	-----	
6265	EN12662:1998	16.00		-1.94	Yes	566.5	5	
6276	EN12662:1998	23.09	C	1.33	Yes	316.32	-----	first reported 5.547
6291	EN12662:2014	24.9	ex	2.17		-----	-----	
6300	EN12662:2008	27.6		3.42	Yes	-----	-----	
6325	EN12662:1998	21.2		0.46	Yes	-----	-----	

	normality	OK
	n	34
	outliers	1+6ex
	mean (n)	20.203
	st.dev. (n)	4.3180
	R(calc.)	12.090
	st.dev.(EN12662:08)	2.1646
	R(EN12662:08)	6.061
Compare		
	R(EN12662:98)	6.061

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.





APPENDIX 2

Number of participants per country

2 labs in	ARGENTINA
1 lab in	AUSTRIA
3 labs in	BELGIUM
4 labs in	BULGARIA
1 lab in	CHINA, People's Republic
3 labs in	COLOMBIA
1 lab in	CONGO Brazzaville
1 lab in	CROATIA
1 lab in	CZECH REPUBLIC
1 lab in	FINLAND
6 labs in	FRANCE
2 labs in	GERMANY
1 lab in	GREECE
1 lab in	HONG KONG
2 labs in	ITALY
2 labs in	LATVIA
2 labs in	LITHUANIA
1 lab in	MALTA
1 lab in	MONTENEGRO
7 labs in	NETHERLANDS
1 lab in	PERU
3 labs in	POLAND
4 labs in	PORTUGAL
1 lab in	SERBIA
1 lab in	SLOVENIA
7 labs in	SPAIN
1 lab in	SWEDEN
1 lab in	THAILAND
1 lab in	TURKEY
3 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)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
R(0.01)	= outlier in Rosner's outlier test
R(0.05)	= straggler in Rosner's outlier test
E	= a difference in calculations
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
SDS	= Safety Data Sheet

Literature

1 iis Interlaboratory Studies, Protocol for the Organisation, Statistics & Evaluation, June 2018
2 ASTM E178:16
3 ASTM E1301:95(2003)
4 ISO5725:86 (1994)
5 ISO5725, parts 1-6, 1994
6 ISO13528:05
7 M. Thompson and R. Wood, J. AOAC Int, 76, 926, (1993)
8 W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)
9 IP367:84
10 DIN38402 T41/42
11 P.L. Davies, Fr. Z. Anal. Chem, 331, 513, (1988)
12 J.N. Miller, Analyst, 118, 455, (1993)
13 Analytical Methods Committee, Technical Brief, No 4, January 2001
14 P.J. Lowthian and M. Thompson, The Royal Society of Chemistry, Analyst, 127, 1359-1364, (2002)
15 Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics, 25(2), 165-172, (1983)
16 Horwitz W. and Albert R., J. AOAC Int, 79.3, 589, (1996)
17 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).
18 iis Memo 1903, Biodiesel B100 (100% FAME) for Total Contamination EN12662