Results of Proficiency Test
Used Lubricating Oil
April 2012

Organised by: Institute for Interlaboratory Studies
Spijkenisse, the Netherlands

Author: ing. L. Dijkstra
Correctors: dr. R.G. Visser & Ing. L. Sweere
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1 INTRODUCTION

Since 1997, a proficiency test for Lubricating Oil is organized every year by the Institute for Interlaboratory Studies. During the annual proficiency testing program 2011/2012, it was decided to continue the round robin for the analyses of used Lubricating Oil. In this interlaboratory study, 82 laboratories in 46 different countries have participated. See appendix 3 for the number of participants per country. In this report, the results of the used Lubricating Oil proficiency test are presented and discussed.

2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test. It was decided to send 2 different samples (1 bottle of 0.5L (labelled #12063) and 1 bottle of 100 mL, 50% filled (labelled #12064)) of used Lubricating Oil that was donated by one of the participating laboratories. The analyses for fit-for-use and homogeneity were subcontracted. Participants were requested to report rounded and unrounded results. The unrounded results were preferably used for statistical evaluation.

2.1 ACCREDITATION

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, is accredited in accordance with ISO/IEC17043:2010 and ILAC-G13:2007, (R007), since January 2000, by the Dutch Accreditation Council: RvA (Raad voor Accreditatie). This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentially 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 organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: 'Protocol for the Organisation, Statistics and Evaluation' of January 2010 (iis-protocol, version 3.2). This protocol can be downloaded from the iis website http://www.iisnl.com.

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

In this proficiency test two different samples were used. The necessary bulk material for the first sample, used Lubricating Oil, was donated by a third party laboratory. The necessary 60 litre bulk material was homogenised in a precleaned 60L drum. After homogenisation, 105 subsamples were transferred to 0.5 L brown glass bottles and labelled #12063. The homogeneity of the subsamples #12063 was checked by determination of Density @ 15 °C in accordance with ASTM D4052:11.

	Density @ 15 °C in kg/L
Sample #12063-1	0.89497
Sample #12063-2	0.89497
Sample #12063-3	0.89497
Sample #12063-4	0.89497
Sample #12063-5	0.89497
Sample #12063-6	0.89498
Sample #12063-7	0.89498

Table 1: homogeneity test results of subsamples #12063

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

	Density @ 15 °C in kg/L
r (sample #12063)	0.00001
reference test	ASTM D4052:11
0.3 * R (reference test)	0.00015

Table 2: evaluation of repeatabilities of the subsamples #12063

The second bulk material, used Lubricating Oil, enriched with several wear metals, was also obtained from a third party laboratory. The approximately 5 L bulk material was homogenised in a precleaned can. After homogenisation, 120 subsamples were transferred to 100 mL PE bottles, each filled with approximately 50 mL material and labelled #12064. The homogeneity of the subsamples #12064 was checked by determination of Density @ 15 °C in accordance with ASTM D4052:11 and Calcium in accordance with ASTM D5185:09 on 7 stratified randomly selected samples.

	Density @ 15 °C in kg/L	Calcium in mg/kg
Sample #12064-1	0.89134	2880
Sample #12064-2	0.89132	2940
Sample #12064-3	0.89134	2930
Sample #12064-4	0.89133	2900
Sample #12064-5	0.89133	2860
Sample #12064-6	0.89134	2870
Sample #12064-7	0.89134	2940

Table 3: homogeneity test results of subsamples #12064

From the above test results, the repeatabilities were calculated and compared with 0.3 times the corresponding reproducibilities in agreement with the procedure of ISO 13528, Annex B2 in the next table:

	Density @ 15 °C in kg/L	Calcium in mg/kg
r (sample #12064)	0.00004	95.2
reference test	ASTM D4052:11	ASTM D5185:09
0.3 * R (reference test)	0.00015	142.8

Table 4: evaluation of repeatabilities of the subsamples #12064

The calculated repeatabilities are all less than 0.3 times the corresponding reproducibilities of the reference methods. Therefore, homogeneity of the subsamples #12063 and #12064 was assumed.

To each of the participating laboratories 2 samples of Lubricating Oil (1*0.5 L brown glass bottle labelled #12063, 1*100 mL PE bottle labelled #12064) were sent on April 25, 2012.

2.5 STABILITY OF THE SAMPLES

The stability of Lubricating Oil, packed in the brown glass bottles and PE Bottles, was checked. The material was found sufficiently stable for the period of the proficiency test.

2.6 ANALYSES

The participants were requested to determine on sample #12063: Acid Number (Total), Base Number (Total), Density @ 15°C, Flash Point PMcc, Kinematic Viscosity @ 40°C and @ 100°C and Water.

On sample #12064 the participants were requested to determine 20 elements (Wear metals: Ag, Al, Ba, Cr, Cu, Fe, Pb, Li, Mg, Mn, Mo, Ni, Na, Si, Sn, Ti and V and the additives Ca, P and Zn).

To get comparable results a detailed report form, on which the units were prescribed as well as some of the required standards, was sent together with each set of samples. Also a letter of instructions and a SDS were added to the package.

3 RESULTS

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

Directly after the deadline, a reminder fax was sent to those laboratories that had not reported results at that moment.

Shortly after the deadline, the available results were screened for suspect data. A result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the results. Additional or corrected results are used for data analysis and original results are placed under 'Remarks' in the result tables in appendix 1.

3.1 STATISTICS

Statistical calculations were performed as described in the report ‘iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation’ (iis-protocol, version 3.2) of January 2010. For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. Results reported as '<…' or '>…' were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test. After removal of outliers, this check was repeated. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the results should be used with due care.

In accordance to ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon and Grubbs outlier tests. Outliers are marked by D(0.01) for the Dixon test, by G(0.01) or DG(0.01) for the Grubbs test. Stragglers are marked by D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs 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. When the uncertainty passed the evaluation no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

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

3.2 GRAPHICS

In order to visualize the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis results are plotted. The corresponding laboratory numbers are under the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a "x". Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. The Kernel Density is a method for producing a smooth density approximation to a set of data that avoids some problems associated with histograms (see appendix 3; nos.12 and 13).

3.3 Z-SCORES

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

The z-scores were calculated according to:

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

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

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 the fit-for-useness of the reported test result.

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

$\lvert z \rvert < 1$	good
$1 < \lvert z \rvert < 2$	satisfactory
$2 < \lvert z \rvert < 3$	questionable
$\lvert z \rvert > 3$	unsatisfactory

4 EVALUATION

In this proficiency test some problems with couriers and/or custom clearance were encountered during the execution. Eighteen participants reported after the final reporting date and five participants did not report any results at all. Not all laboratories were able to report all analyses requested. In total 77 participants reported 1216 results. Observed were 53 outlying results, which

is 4.4% of the numerical results. In proficiency studies, outlier percentages of 3% - 7.5% are quite normal.

Not all original data sets proved to have a normal distribution. Non-Gaussian distributions were found for the following determinations: Density @15°C, Flash Point, Water, Chromium, Iron, Lead, Molybdenum, Nickel, Sodium, Titanium and Vanadium. In these cases the statistical evaluation should be used with due care.

4.1 EVALUATION PER TEST

In this section, the results are discussed per test. The methods, which are used by the various laboratories, are taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the original data. The abbreviations, used in these tables, are listed in appendix 4.
For the metals on sample #12064, 7 of the 20 test results reported by laboratory 473 appeared to be either false negative or statistical outlier. Therefore it was decided to exclude also the other reported results for statistical evaluation.

Acid Number (Total): This determination was problematic. One statistical outlier was observed. After rejection of the statistical outlier, the calculated reproducibility is not in agreement with the requirements of ASTM D664:11a. Another three test results were excluded from the statistical evaluation, as the reported test method is not equivalent with ASTM D664. No correlation was found between the test results and the test details as reported by the participants (appendix 3).

Base Number (Total): This determination was problematic. Three statistical outliers were observed. After rejection of the statistical outliers, the calculated reproducibility is not in agreement with the requirements of ASTM D2896:11. One test result was excluded from the statistical evaluation, as the reported test method is not equivalent with ASTM D2896.

Base Number (Strong): This determination was not problematic. Two statistical outliers were observed. After rejection of the statistical outliers, the calculated reproducibility is in agreement with the requirements of ASTM D4739:11.

Density @ 15°C: This determination was problematic. Four statistical outliers were observed. After rejection of the statistical outliers, the calculated reproducibility is not in agreement with the requirements of ASTM D4052:11. The large spread may be explained by not correcting the test result for viscosity. (see density tables)

Flash Point PMcc: This determination was very problematic. Only one statistical outlier was observed. However, the calculated reproducibility is not at all in agreement with the requirements of ASTM D93:11 procedure B.
When the results for the different modes used (ie, automatic or manual, flame or electrically) were evaluated separately, no significant differences were observed for the manual/flame ignition and the automated/electric ignition

method. The calculated reproducibility is much smaller for the automated/flame ignition method.

Kin.Visco.@ 40°C: This determination was not problematic. Only one statistical outlier was observed. After rejection of the statistical outlier, the calculated reproducibility is in good agreement with the requirements of ASTM D445:12.

Kin.Visco.@ 100°C: This determination was not problematic. Three statistical outliers were observed. After rejection of the statistical outliers, the calculated reproducibility is in good agreement with the requirements of ASTM D445:12.

Water: This determination was problematic. No statistical outliers were observed. However, the majority of the reporting results were excluded for statistical evaluation, as the reported test method is not in agreement with the preferred test method ASTM D6304 method C. This method is applicable for oils with difficult matrix interferences (presence of additives). Direct coulometric titration will lead to incorrect high results for lubricating oil, containing strong base additives.
After exclusion of all data, except ASTM D6304 method C, the calculated reproducibility is not in agreement with the requirements of ASTM D6304:07.

Aluminium: This determination was not problematic at the low level of 5.7 mg/kg. No statistical outliers were observed And the calculated reproducibility, is in agreement with the requirements of ASTM D5185:09. The application range of this standard test method is 6 – 40 mg/kg.

Barium: This determination may be not problematic. Two statistical outliers were observed. Although all reported results are above the application range (0.5 - 4 mg/kg), the calculated reproducibility after the rejection of the statistical outliers is in good agreement with the estimated extrapolated requirements of ASTM D5185:09.

Chromium: 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 ASTM D5185:09. The application range of this standard test method is 1 – 40 mg/kg.

Copper: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D5185:09. The application range of this standard test method is 2 – 160 mg/kg.

Iron: This determination was problematic. Only one statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is not in agreement with the requirements of ASTM D5185:09. The application range of the method is 2 – 140 mg/kg.

Lead: This determination was not problematic. Two statistical outliers were observed. Although almost reported results are lower than the application range (10 – 160 mg/kg), the calculated reproducibility after the rejection of the statistical outliers is in good agreement with the estimated extrapolated requirements of ASTM D5185:09.

Lithium: Regretfully, for this element no test method with precision data was available, therefore, the Horwitz equation was used to estimate the reproducibility limits. This determination was not problematic. Two statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers is in agreement with the strict estimated requirements, calculated using the Horwitz equation.

Magnesium: This determination was problematic. No statistical outliers were observed. However, the calculated reproducibility is not in agreement with the requirements of ASTM D5185:09. The application range of the method is 5 – 1700 mg/kg.

Manganese: The application range of this method is 5 – 700 mg/kg. All reported results are lower than the mentioned the application range. Therefore no statistical conclusions were drawn.

Molybdenum: The application range of this method is 5 – 200 mg/kg. All reported results, except two, are lower than the mentioned the application range. Therefore no statistical conclusions were drawn.

Nickel: This determination was not problematic. Two statistical outliers were observed. Although almost reported results are lower than the application range (5 – 40 mg/kg), the calculated reproducibility after the rejection of the statistical outliers is in good agreement with the estimated extrapolated requirements of ASTM D5185:09.

Sodium: This determination was very problematic. No statistical outliers were observed. However, the calculated reproducibility is not at all in agreement with the requirements of ASTM D5185:09. The application range of the method is 7 – 70 mg/kg.

Silicon: 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 ASTM D5185:09. The application range of the method is 8 – 50 mg/kg.

Silver: This determination was very problematic. Three statistical outliers were observed. The calculated reproducibility, after rejection of the statistical outliers is not at all in agreement with the requirements of ASTM D5185:09. The application range of the method is 0.5 – 50 mg/kg.

Tin: This determination was not problematic. Three statistical outliers were observed. Although almost reported results are lower than the application range (10 – 40 mg/kg), the calculated reproducibility after the rejection of the statistical outliers is in good agreement with the estimated extrapolated requirements of ASTM D5185:09.

Titanium: This determination was not problematic. Two statistical outliers were observed. Although almost reported results are lower than the application range (5 – 40 mg/kg), the calculated reproducibility after the rejection of the statistical outliers is in good agreement with the estimated extrapolated requirements of ASTM D5185:09.

Vanadium: This determination was very problematic at the low level of 1.5 mg/kg. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier is not at all agreement with the requirements of D5185:09. The application range of this standard test method is 1 – 50 mg/kg.

Calcium: This determination was not problematic. Only one statistical outlier was observed. The calculated reproducibility after rejection of the statistical outlier is in agreement with the requirements of ASTM D5185:09. The application range of this standard test method is 40 – 9000 mg/kg.

Phosphorus: This determination was problematic. Only one statistical outlier was observed. However, the calculated reproducibility, after rejection of the statistical outlier is not in agreement with the requirements of D5185:09. The application range of this standard test method is 10 – 1000 mg/kg.

Zinc: This determination was problematic. Only one statistical outlier was observed. However, the calculated reproducibility after rejection of the statistical outlier is in not in agreement with the requirements of ASTM D5185:09. The application range of this standard test method is 60 – 1600 mg/kg.

As unused Lubricating Oil is a very difficult matrix to analyze, strict adherence to the test methods with regards to sample preparation, is advised. Improper sample preparation may be the cause of disagreement of the calculated reproducibility with the requirements of the respective reference standard.

4.2 PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES

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

Parameter	unit	n	average	2.8 * sd	R (lit)
Acid Number (Total)	mg KOH/g	42	3.10	1.92	1.36
Base Number (Total)	mg KOH/g	42	7.57	0.67	0.53
Base Number (Strong)	mg KOH/g	8	6.12	1.62	3.58
Density @ 15°C	kg/L	52	0.8951	0.0008	0.0005
Flash Point PMcc	^{o}C	56	203.3	23.8	10.0
Kinematic Viscosity @ 40°C	mm^2/s	65	126.93	1.82	9.39
Kinematic Viscosity @ 100°C	mm^2/s	61	13.959	0.310	0.878
Water	mg/kg	15	300.9	591.7	518.5

Table 5: reproducibilities of results of sample #12063

Parameter	Unit	n	Average	2.8 * sd	R (lit)
Aluminium as Al	mg/kg	45	5.69	3.95	5.97
Barium as Ba	mg/kg	36	15.07	4.38	7.16
Chromium as Cr	mg/kg	42	1.99	1.04	1.23
Copper as Cu	mg/kg	49	13.11	5.31	3.15
Iron as Fe	mg/kg	49	16.32	5.76	4.85
Lead as Pb	mg/kg	39	3.19	2.13	(4.55)
Lithium as Li	mg/kg	11	7.74	2.24	2.55
Magnesium as Mg	mg/kg	44	61.20	23.30	17.11
Manganese as Mn	mg/kg	28	2.10	0.36	(0.32)
Molybdenum as Mo	mg/kg	37	1.73	1.56	(0.94)
Nickel as Ni	mg/kg	39	1.59	1.59	(1.89)
Sodium as Na	mg/kg	40	14.15	14.24	7.22
Silicon as Si	mg/kg	44	9.37	4.64	6.94
Silver as Ag	mg/kg	35	1.47	1.14	0.52
Tin as Sn	mg/kg	29	1.76	1.37	(2.98)
Titanium as Ti	mg/kg	31	1.70	1.06	(3.21)
Vanadium as V	mg/kg	39	1.47	0.93	0.43
Calcium as Ca	mg/kg	48	2755	474	445
Phosphorus as P	mg/kg	44	801	153	122
Zinc as Zn	mg/kg	51	865	174	141

Table 6: reproducibilities of results of sample #12064

Results between brackets were under the application range of the method, therefore the results should be evaluated with care

Without further statistical calculations it can be concluded that for several tests there is a good compliance of the group of participants with the relevant standards. The tests, which are problematic, have been discussed in paragraph 4.1.

4.3 COMPARISON OF THE PROFICIENCY TEST OF MAY 2012 WITH PREVIOUS PTS

	May 2012	May 2011	May 2010	April 2009
Number of reporting participants	77	75	82	79
Number of results reported	1216	1257	1409	1125
Statistical outliers	53	52	88	74
Percentage outliers	4.4%	4.1%	6.2%	6.6%

Table 7: comparison with previous proficiency tests

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

Determination	May 2012	May 2011	May 2010	April 2009
Total Acid Number	-	--	--	-
Total Base Number	-	--	--	+/-
Base Number Strong	++	n.e.	n.e.	n.e.
Density @ 15 °C	-	--	--	--
Flash Point PMcc	--	--	--	--
Kinematic Viscosity @ 40 °C	++	++	++	--
Kinematic Viscosity @ 100 °C	-	++	++	--
Water	-	++	++	--
Metals (20 elements)	+	+/-	+/-	+

Table 8: comparison determinations against the standard

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

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

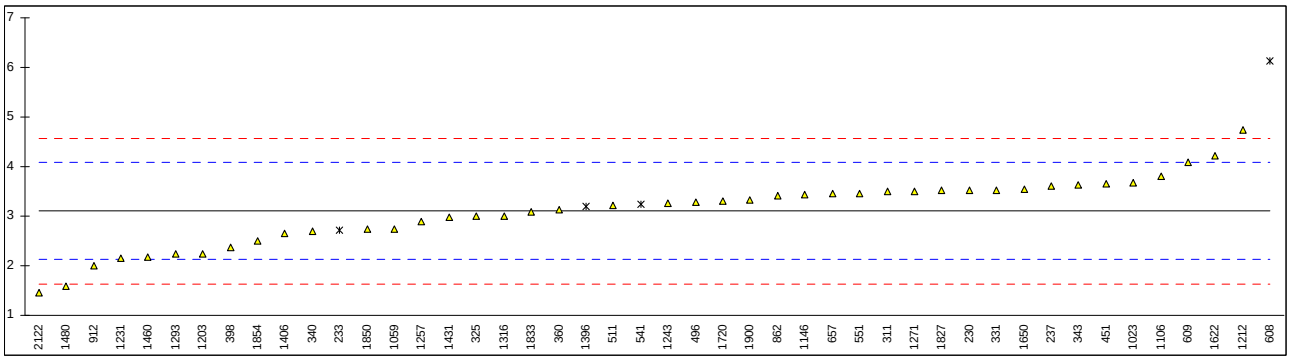
APPENDIX 1

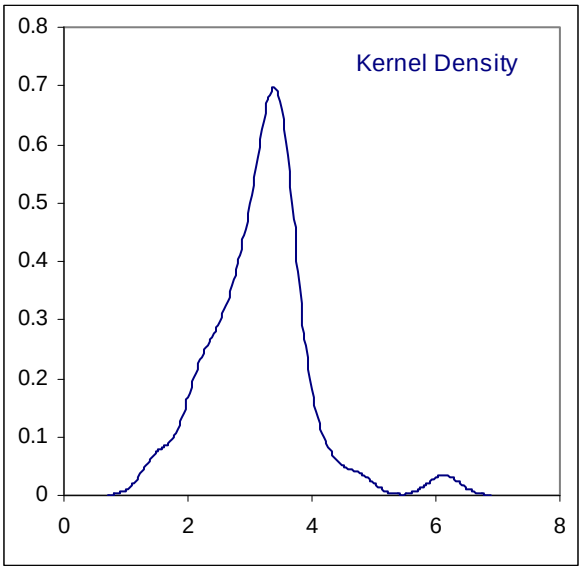
Determination of Acid Number (Total) on sample #12063; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
230	D664	3.5199		0.86	
233	D974	2.72	ex	-0.78	result excluded, D974 is not equal to D664, see §4.1
237	D664	3.60		1.02	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311	D664	3.50		0.82	
315		-----		-----	
325	D664	2.99		-0.23	
331	D664	3.5233		0.86	
340	D664	2.699		-0.83	
343	D664	3.62		1.06	
349		-----		-----	
360	D664	3.138		0.07	
398	D664	2.37		-1.50	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	IP177	3.648		1.12	
473		-----		-----	
496	D664	3.290		0.39	
511	D664	3.2150		0.23	
512		-----		-----	
513		-----		-----	
541	D974	3.23	ex	0.26	result excluded, D974 is not equal to D664, see §4.1
551	D664	3.46		0.73	
562		-----		-----	
593		-----		-----	
608	D664	6.131	G(0.01)	6.21	
609	D664	4.0871		2.02	
613		-----		-----	
614		-----		-----	
657	D664	3.45		0.71	
663		-----		-----	
823		-----		-----	
862	D664	3.404		0.62	
875		-----		-----	
902		-----		-----	
912	D664	2.0		-2.26	
963		-----		-----	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D664	3.67		1.17	
1059	ISO6619	2.75		-0.72	
1106	D664	3.81160		1.46	
1146	D664	3.43		0.67	
1173		-----		-----	
1203	D664	2.25		-1.75	
1212	D664	4.74		3.36	
1231	D664	2.16		-1.93	
1243	D664	3.26		0.32	
1257	D664	2.89		-0.44	
1271	D664	3.50		0.82	
1278		-----		-----	
1293	ISO12634	2.247		-1.75	
1316	D664	3.01		-0.19	
1396	D974	3.2019	ex	0.20	result excluded, D974 is not equal to D664, see §4.1
1402		-----		-----	
1406	D664	2.65		-0.93	
1431	D664	2.97		-0.27	
1452		-----		-----	
1460	D664	2.164		-1.92	
1472		-----		-----	
1480	D664	1.59		-3.10	
1526		-----		-----	
1622	D664	4.2203		2.29	
1650	D664	3.55		0.92	
1720	D664	3.30		0.41	
1722		-----		-----	
1730		-----		-----	
1800		-----		-----	
1827	D664	3.519		0.86	

1833	D664	3.08	-0.05
1842		-----	-----
1850	ISO6619	2.73	-0.76
1854	D664	2.51	-1.21
1900	D664	3.321	0.45
1915		-----	-----
1948		-----	-----
2122	IP177	1.45	-3.39
3166		-----	-----

normality	OK
n	42
outliers	1
mean (n)	3.102
st.dev. (n)	0.6852
R(calc.)	1.919
R(D664:11a)	1.365



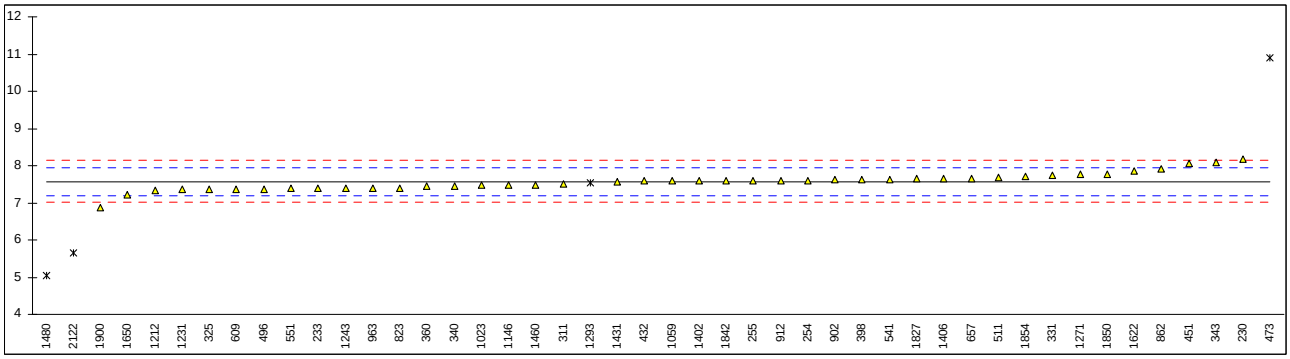


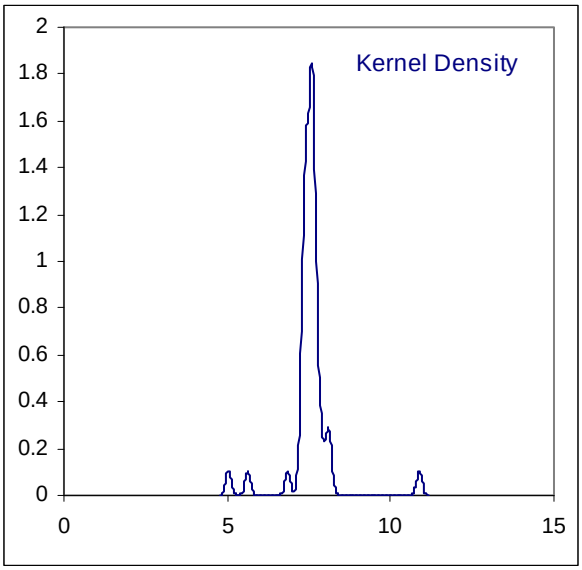
Determination of Base Number (Total) on sample #12063; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
230	D2896	8.1666		3.15	
233	D2896	7.38		-1.01	
237		-----		-----	
252		-----		-----	
254	D2896	7.60		0.16	
255	D2896	7.6		0.16	
311	D2896	7.50		-0.37	
315		-----		-----	
325	D2896	7.36		-1.11	
331	D2896	7.74		0.90	
340	D2896	7.447		-0.65	
343	D2896	8.09		2.75	
349		-----		-----	
360	D2896	7.44		-0.69	
398	D2896	7.62		0.26	
420		-----		-----	
432	D2896	7.585		0.08	
450		-----		-----	
451	D2896	8.07		2.64	
473	D2896	10.889	G(0.01)	17.53	
496	D2896	7.37		-1.06	
511	D2896	7.6701		0.53	
512		-----		-----	
513		-----		-----	
541	D2896	7.63	C	0.31	first reported under base number strong
551	D2896	7.38		-1.01	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D2896	7.3637		-1.09	
613		-----		-----	
614		-----		-----	
657	D2896	7.65		0.42	
663		-----		-----	
823	D2896	7.4		-0.90	
862	D2896	7.923		1.86	
875		-----		-----	
902	D2896	7.61		0.21	
912	D2896	7.6		0.16	
963	D2896	7.39	C	-0.95	first reported: 9.39
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D2896	7.48		-0.48	
1059	D2896	7.6		0.16	
1106		-----		-----	
1146	D2896	7.48		-0.48	
1173		-----		-----	
1203		-----		-----	
1212	D2896	7.33		-1.27	
1231	D2896	7.36		-1.11	
1243	ISO3771	7.39		-0.95	
1257		-----		-----	
1271	ISO3771	7.765		1.03	
1278		-----		-----	
1293	ISO12634	7.522	ex	-0.26	result excluded, ISO12634 not equal to D2896, see §4.1
1316		-----		-----	
1396		-----		-----	
1402	D2896	7.6		0.16	
1406	D2896	7.65		0.42	
1431	D2896	7.56		-0.05	
1452		-----		-----	
1460	D2896	7.49		-0.42	
1472		-----		-----	
1480	D2896	5.04	G(0.01)	-13.37	
1526		-----		-----	
1622	D2896	7.8410		1.43	
1650	D2896	7.23		-1.80	
1720		-----		-----	
1722		-----		-----	
1730		-----		-----	
1800		-----		-----	
1827	D2896	7.646		0.40	
1833		-----		-----	
1842	IP276	7.6		0.16	

1850	ISO3771	7.78		1.11
1854	D2896	7.71		0.74
1900	D2896	6.859		-3.76
1915		-----		-----
1948		-----		-----
2122	IP400	5.64	G(0.01)	-10.20
3166		-----		-----

normality	OK
n	42
outliers	3
mean (n)	7.570
st.dev. (n)	0.2380
R(calc.)	0.666
R(D2896:11)	0.530



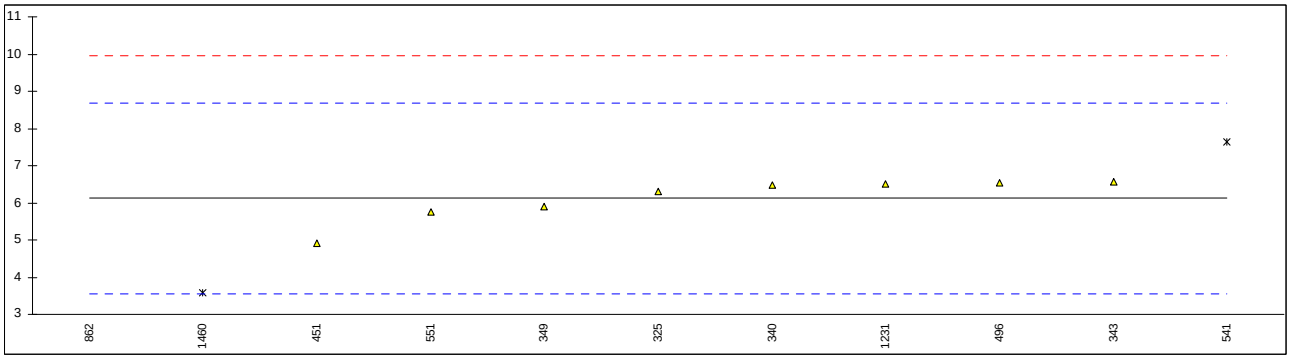


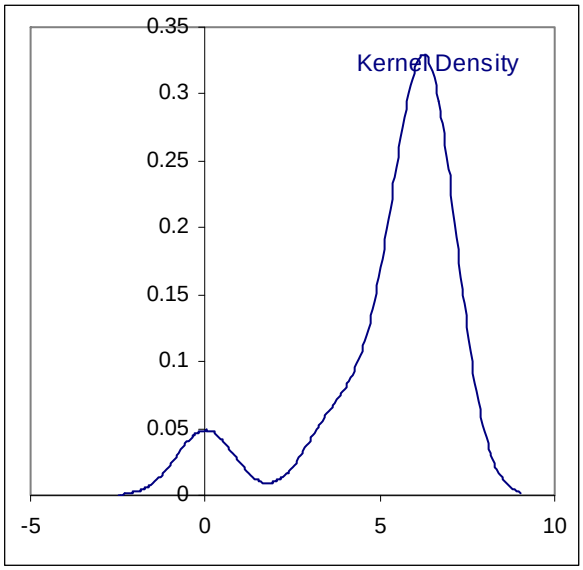
Determination of Base Number (Strong) on sample #12063; results in mg KOH/g

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325	D4739	6.30		0.14	
331		-----		-----	
340	D4739	6.49		0.29	
343	D4739	6.57		0.35	
349	D4739	5.89		-0.18	
360		-----		-----	
398		-----		-----	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D4739	4.91	C	-0.94	first reported: 5.34
473		-----		-----	
496	D4739	6.53		0.32	
511		-----		-----	
512		-----		-----	
513		-----		-----	
541	D2856	7.63	ex	1.18	see Base Number (Total)
551	D4739	5.74		-0.29	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609		-----		-----	
613		-----		-----	
614		-----		-----	
657		-----		-----	
663		-----		-----	
823		-----		-----	
862	D4739	0	G(0.01)	-4.78	
875		-----		-----	
902		-----		-----	
912		-----		-----	
963		-----		-----	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023		-----		-----	
1059		-----		-----	
1106		-----		-----	
1146		-----		-----	
1173		-----		-----	
1203		-----		-----	
1212		-----		-----	
1231	D4739	6.51		0.31	
1243		-----		-----	
1257		-----		-----	
1271		-----		-----	
1278		-----		-----	
1293		-----		-----	
1316		-----		-----	
1396		-----		-----	
1402		-----		-----	
1406		-----		-----	
1431		-----		-----	
1452		-----		-----	
1460	D4739	3.585	G(0.05)	-1.98	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730		-----		-----	
1800		-----		-----	
1827		-----		-----	
1833		-----		-----	
1842		-----		-----	

1850	-----	-----
1854	-----	-----
1900	-----	-----
1915	-----	-----
1948	-----	-----
2122	-----	-----
3166	-----	-----

normality	OK
n	8
outliers	2
mean (n)	6.117
st.dev. (n)	0.5798
R(calc.)	1.624
R(D4739:11)	3.584



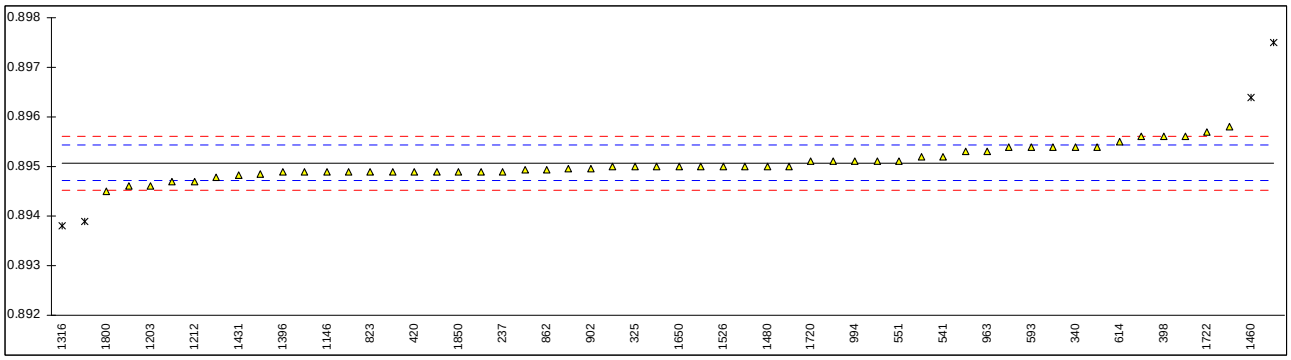


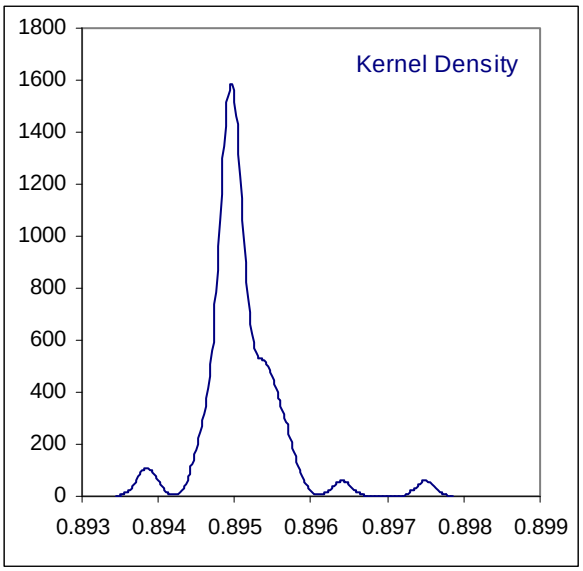
Determination of Density @ 15°C on sample #12063; results in kg/L

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233		-----		-----	
237	D4052	0.8949		-0.94	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311	D4052	0.8949		-0.94	
315	D4052	0.8954		1.86	
325	D4052	0.8950	C	-0.38	first reported: 0.8778
331		-----		-----	
340	D4052	0.8954	C	1.86	first reported: 895.40
343	D4052	0.89494		-0.72	
349		-----		-----	
360	D4052	0.8949		-0.94	
398	D4052	0.8956	C	2.98	first reported: 895.6
420	D7042	0.8949		-0.94	
432	D4052	0.89500		-0.38	
450		-----		-----	
451	D4052	0.89485		-1.22	
473	D4052	0.8954		1.86	
496	D4052	0.8947	C	-2.06	first reported: 894.70
511		-----		-----	
512		-----		-----	
513		-----		-----	
541	D4052	0.8952		0.74	
551	D4052	0.8951		0.18	
562		-----		-----	
593	D4052	0.8954	C	1.86	first reported: 895.4
608	D4052	0.8951		0.18	
609	D4052	0.8949		-0.94	
613		-----		-----	
614	D4052	0.8955		2.42	
657	D4052	0.8949		-0.94	
663	D4052	0.8950		-0.38	
823	D4052	0.8949		-0.94	
862	D4052	0.89494		-0.72	
875	D4052	0.8953	C	1.30	first reported: 0.8937
902	D4052	0.89495		-0.66	
912	D4052	0.895	C	-0.38	first reported: 895.0
963	D4052	0.8953		1.30	
994	D4052	0.8951		0.18	
1013		-----		-----	
1017		-----		-----	
1023	D4052	0.8950		-0.38	
1059	D4052	0.8949	C	-0.94	first reported: 894.9
1106	D5002	0.89520		0.74	
1146	D4052	0.89490		-0.94	
1173		-----		-----	
1203	ISO12185	0.8946		-2.62	
1212	D4052	0.8947	C	-2.06	first reported: 894.7
1231		-----		-----	
1243	D4052	0.8958		4.10	
1257		-----		-----	
1271		-----		-----	
1278		-----		-----	
1293	ISO12185	0.89478		-1.61	
1316	D4052	0.8938	G(0.05)	-7.10	
1396	IP365	0.8949		-0.94	
1402	D4052	0.8954		1.86	
1406	ISO12185	0.89495		-0.66	
1431	D4052	0.89482		-1.39	
1452		-----		-----	
1460	D7042	0.8964	G(0.05)	7.46	
1472	D4052	0.8975	G(0.01)	13.62	
1480	D4052	0.895		-0.38	
1526	D5002	0.895		-0.38	
1622	D4052	0.8946		-2.62	
1650	D4052	0.8950		-0.38	
1720	D4052	0.8951	C	0.18	first reported: 0.8966
1722	D4052	0.8957		3.54	
1730		-----		-----	
1800	in house	0.8945		-3.18	
1827		-----		-----	
1833	D4052	0.8939	G(0.05)	-6.54	
1842	IP365	0.8956		2.98	

1850	D4052	0.8949		-0.94	
1854	D4052	0.8956	C	2.98	first reported: 0.8936
1900	D4052	0.8951		0.18	
1915		-----		-----	
1948	D4052	0.895		-0.38	
2122		-----		-----	
3166		-----		-----	

normality	not OK
n	52
outliers	4
mean (n)	0.89507
st.dev. (n)	0.000291
R(calc.)	0.00081
R(D4052:11)	0.00050





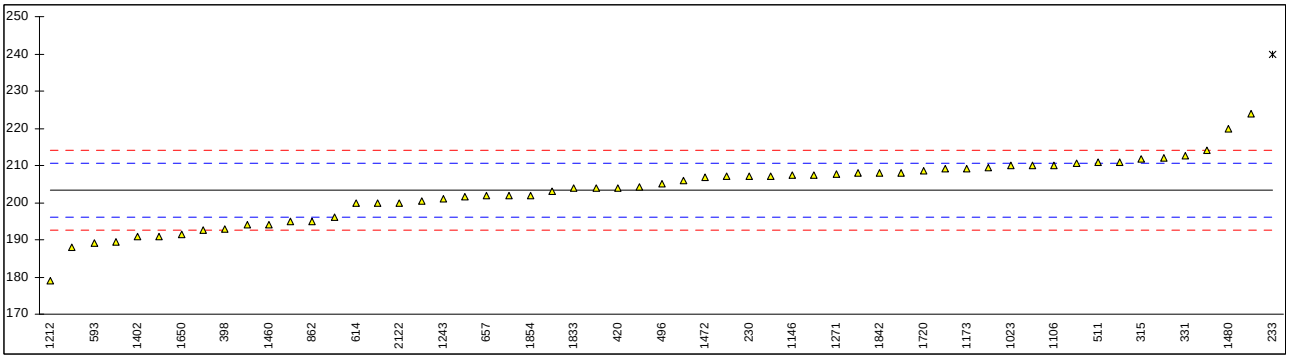
Determination of Flash Point PMcc on sample #12063; results in °C

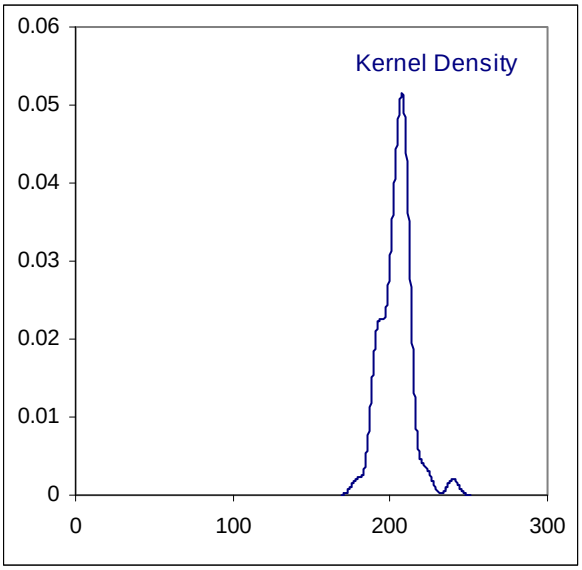
lab	method	value	mark	z(targ)	remarks
230	D93-AF	207.0		1.03	
233	D92	240	G(0.01)	10.27	
237		-----		-----	
252	D93-ME	204.0		0.19	
254		-----		-----	
255		-----		-----	
311	D93-AE	191.0		-3.45	
315	D93-AE	211.7		2.35	
325	D93-AE	214.0		2.99	
331	D93-AE	212.5		2.57	
340	D93-AF	210.5		2.01	
343	D93-AE	208.0		1.31	
349	D92	224		5.79	
360	D93-AE	203.0		-0.09	
398	D93-AE	193		-2.89	
420	ISO2719-AF	204		0.19	
432	D93-AE	189.5		-3.87	
450		-----		-----	
451	D93-AE	208.0		1.31	
473	D93-AE	207.0		1.03	
496	D93-AF	205.2		0.53	
511	D93-AF	211.0		2.15	
512		-----		-----	
513		-----		-----	
541	D93-M	196.0		-2.05	
551	D93-AF	211	C	2.15	first reported: 175
562		-----		-----	
593	D93-M	189		-4.01	
608	D93-	200.5		-0.79	
609	D3828-AF	204.2		0.25	
613		-----		-----	
614	D93-MF	199.8		-0.98	
657	D93-MF	202		-0.37	
663	D93-MF	195.0		-2.33	
823	D93-	188.0		-4.29	
862	D93-MF	195.0	C	-2.33	first reported: 182.0
875		-----		-----	
902	D93-AE	209		1.59	
912		-----		-----	
963	D93-MF	202.0		-0.37	
994	D93-MF	200		-0.93	
1013		-----		-----	
1017		-----		-----	
1023	D93-AE	210		1.87	
1059	ISO2719-AE	207.5		1.17	
1106	D93-AE	210.0		1.87	
1146	in house-AE	207.40		1.15	
1173	IP34-MF	209.25		1.66	
1203	ISO2719-AF	201.5		-0.51	
1212	D93-AE	179.0		-6.81	
1231		-----		-----	
1243	ISO2719	201		-0.65	
1257		-----		-----	
1271	ISO2719-AF	207.6		1.20	
1278		-----		-----	
1293	D6450-AE	210		1.87	
1316		-----		-----	
1396	IP523-AF	207.19		1.09	
1402	D93-AE	191.0		-3.45	
1406		-----		-----	
1431	D93-AF	209.5		1.73	
1452		-----		-----	
1460	D93-AE	194.0		-2.61	
1472	ISO2719-AE	206.7		0.95	
1480	D93-MF	220		4.67	
1526		-----		-----	
1622	D93-MF	206.0		0.75	
1650	D93-AE	191.5		-3.31	
1720	D93-AE	208.5		1.45	
1722		-----		-----	
1730		-----		-----	
1800		-----		-----	
1827		-----		-----	
1833	D93-MF	204		0.19	
1842	D93-	208		1.31	

1850	D93-AE	194	-2.61
1854	D93-MF	202	-0.37
1900	in house	212	2.43
1915		-----	-----
1948	D93-AF	192.5	-3.03
2122	D93-MF	200	-0.93
3166		-----	-----

			Only MF	Only AE	Only AF
	normality	not OK	OK	not OK	OK
	n	56	13	23	11
	outliers	1	0	0	0
	mean (n)	203.30	201.77	202.45	206.11
	st.dev. (n)	8.508	7.653	9.660	5.420
	R(calc.)	23.82	21.43	27.05	15.18
	R(D93B:11)	10.00	10.00	10.00	10.00

A	= automated mode	M	= manual mode
AE	= automated mode / electric ignition	ME	= manual mode / electric ignition
AF	= automated mode / flame ignition	MF	= manual mode / flame ignition



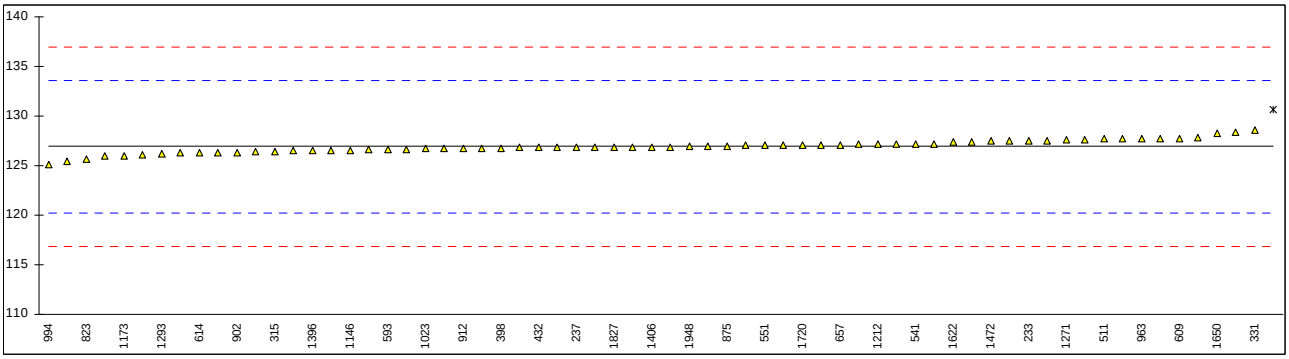


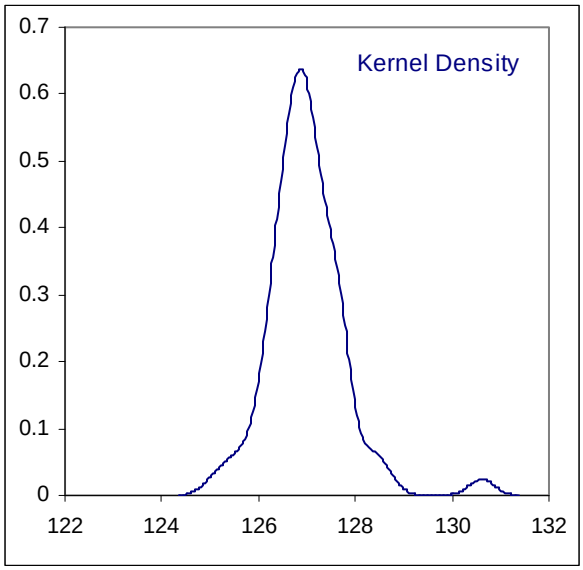
Determination of Kinematic Viscosity @ 40°C on sample #12063; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
230	D445	126.70		-0.07	
233	D7279	127.5		0.17	
237	D445	126.8		-0.04	
252	D445	126.50		-0.13	
254		-----		-----	
255	D7279	125.4709		-0.43	
311	D445	126.3		-0.19	
315	D445	126.43		-0.15	
325	D445	126.8		-0.04	
331	D7279	128.62		0.50	
340	D445	126.88		-0.01	
343	D445	127.14		0.06	
349	D445	130.6	G(0.01)	1.09	
360	D445	127.04		0.03	
398	D445	126.77		-0.05	
420	D7042	127.5		0.17	
432	D445	126.8		-0.04	
450		-----		-----	
451	D445	127.10		0.05	
473	D445	127.66		0.22	
496	D445	126.60		-0.10	
511	D445	127.68	C	0.22	first reported: 14.014
512		-----		-----	
513		-----		-----	
541	D445	127.2		0.08	also reported test result D7042: 127.4
551	D445	127.1		0.05	
562		-----		-----	
593	D445	126.6		-0.10	
608	D445	127.7		0.23	
609	D7042	127.740		0.24	
613		-----		-----	
614	D445	126.3		-0.19	
657	D7279	127.10		0.05	
663	D445	126.8		-0.04	
823	D445	125.6		-0.40	
862	D445	126.67		-0.08	
875	D445	127.0		0.02	
902	D445	126.32		-0.18	
912	D445	126.7		-0.07	
963	D445	127.7		0.23	
994	D445	125.1		-0.55	
1013		-----		-----	
1017		-----		-----	
1023	D445	126.7		-0.07	
1059		-----		-----	
1106		-----		-----	
1146	D445	126.52		-0.12	
1173	IP71	126.02		-0.27	
1203	ISO3104	127.2		0.08	
1212	D7042	127.16		0.07	
1231	D445	127.2		0.08	
1243	DIN51559	128.37		0.43	
1257	D445	126.99		0.02	
1271	ISO3104	127.56		0.19	
1278		-----		-----	
1293	ISO3104	126.20		-0.22	
1316	D445	126.9		-0.01	
1396	IP71	126.510		-0.12	
1402	D445	126.8		-0.04	
1406	D445	126.9		-0.01	
1431	D7042	126.3		-0.19	
1452		-----		-----	
1460	D445	127.69		0.23	
1472	ISO3104	127.46		0.16	
1480	D445	126.102		-0.25	
1526	D445	125.95		-0.29	
1622	D445	127.37		0.13	
1650	D445	128.26		0.40	
1720	D445	127.1		0.05	
1722	D445	126.5183		-0.12	
1730		-----		-----	
1800		-----		-----	
1827	D445	126.855		-0.02	
1833	D445	127.37		0.13	
1842	IP71	126.7		-0.07	

1850	ISO3104	127.5	0.17
1854	D445	127.1	0.05
1900	D445	126.4	-0.16
1915		-----	-----
1948	D445	126.96	0.01
2122	in house	127.8	0.26
3166		-----	-----

normality	OK
n	65
outliers	1
mean (n)	126.929
st.dev. (n)	0.6514
R(calc.)	1.824
R(D445:12)	9.393



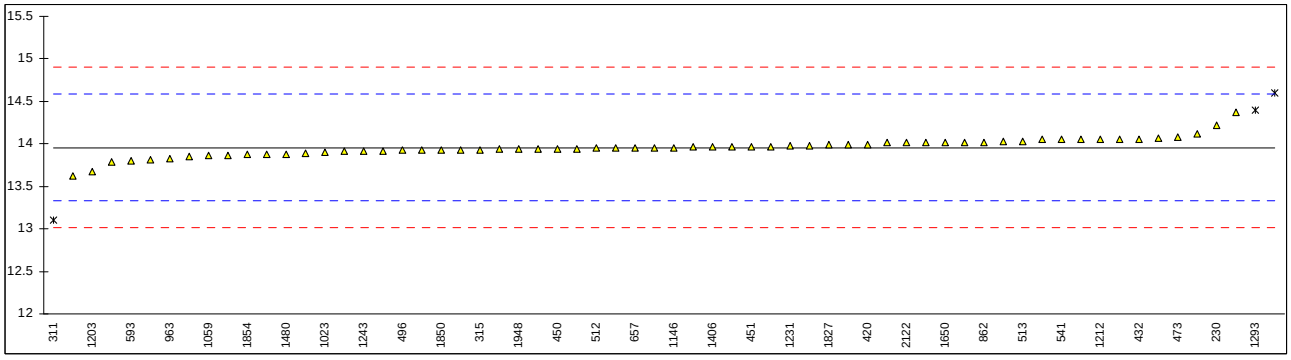


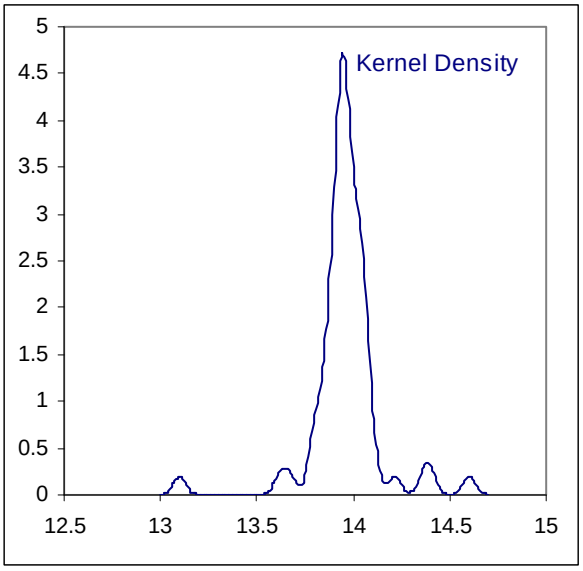
Determination of Kinematic Viscosity @ 100°C on sample #12063; results in mm^2/s

lab	method	value	mark	z(targ)	remarks
230	D445	14.217		0.83	
233	D7279	14.02		0.20	
237	D445	13.96		0.01	
252	D445	13.846		-0.36	
254		-----		-----	
255	D7279	14.37		1.31	
311	D445	13.10	G(0.01)	-2.73	
315	D445	13.933		-0.08	
325	D445	14.06		0.33	
331	D7279	14.03		0.23	
340	D445	13.928		-0.10	
343	D445	13.92		-0.12	
349	D445	14.6	G(0.05)	2.05	
360	D445	13.989		0.10	
398	D445	13.789		-0.54	
420	D7042	13.99		0.10	
432	D445	14.06		0.33	
450	D445	13.94		-0.06	
451	D445	13.961		0.01	
473	D445	14.080		0.39	
496	D445	13.922		-0.11	
511	D445	14.014	C	0.18	first reported: 127.68
512	D445	13.947		-0.03	
513	D445	14.031		0.23	
541	D445	14.05		0.29	also reported test result D7042: 14.08
551	D445	13.81		-0.47	
562		-----		-----	
593	D445	13.8		-0.50	
608		-----		-----	
609	D7042	14.050		0.29	
613		-----		-----	
614	D445	14.07		0.36	
657	D7279	13.95		-0.02	
663	D445	13.98		0.07	
823	D445	13.95		-0.02	
862	D445	14.022		0.20	
875	D445	13.94		-0.06	
902	D445	14.01		0.17	
912	D445	13.91		-0.15	
963	D445	13.82		-0.44	
994	D445	13.88		-0.25	
1013		-----		-----	
1017		-----		-----	
1023	D445	13.90		-0.18	
1059	ISO3104	13.87		-0.28	
1106		-----		-----	
1146	D445	13.952		-0.02	
1173		-----		-----	
1203	ISO3104	13.67		-0.92	
1212	D7042	14.056		0.31	
1231	D445	13.98		0.07	
1243	DIN51559	13.91		-0.15	
1257	D445	14.05		0.29	
1271	ISO3104	13.95		-0.02	
1278		-----		-----	
1293	ISO3104	14.40	G(0.05)	1.41	
1316	D445	13.93		-0.09	
1396		-----		-----	
1402	D445	13.89		-0.22	
1406	D445	13.96		0.01	
1431	D7042	13.96		0.01	
1452		-----		-----	
1460	D445	13.935		-0.07	
1472	ISO3104	13.94		-0.06	
1480	D445	13.883		-0.24	
1526		-----		-----	
1622	D445	14.115		0.50	
1650	D445	14.019		0.20	
1720		-----		-----	
1722		-----		-----	
1730		-----		-----	
1800		-----		-----	
1827	D445	13.988		0.10	
1833	D445	13.97		0.04	
1842	IP71	13.62		-1.08	

1850	ISO3104	13.93	-0.09
1854	D445	13.88	-0.25
1900	D445	13.87	-0.28
1915		-----	-----
1948	D445	13.939	-0.06
2122	in house	14.01	0.17
3166		-----	-----

normality	OK
n	61
outliers	3
mean (n)	13.9578
st.dev. (n)	0.110873
R(calc.)	0.31044
R(D445:12)	0.87831



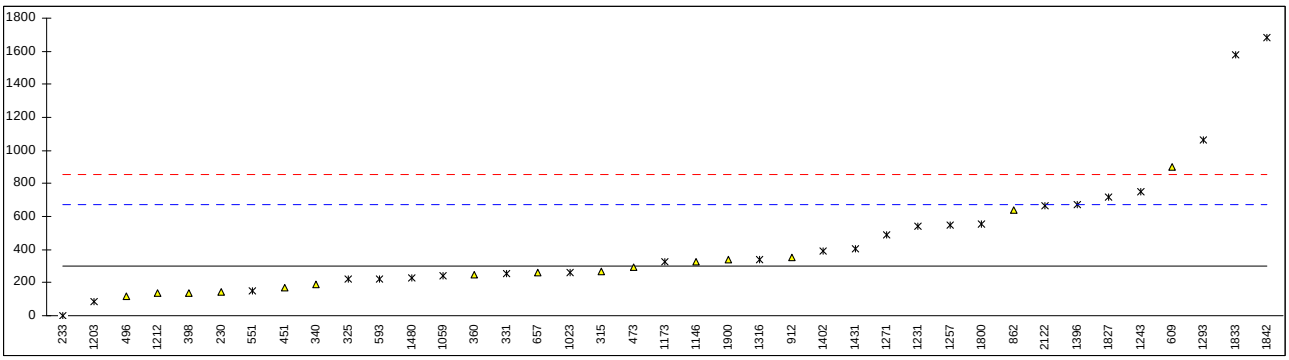


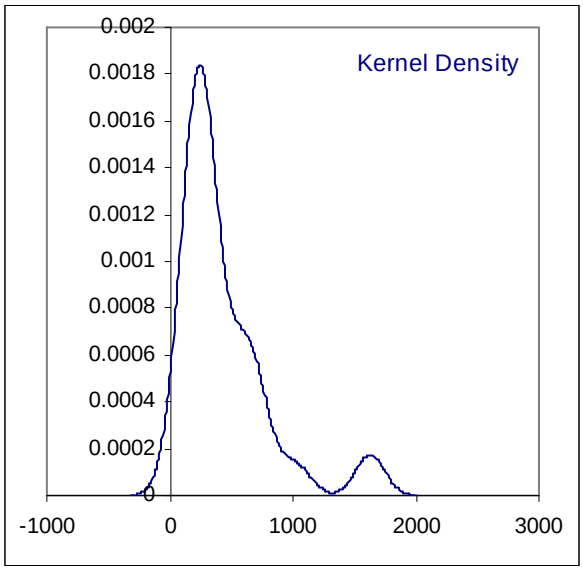
Determination of Water on sample #12063; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230	D6304-C	146.5		-0.83	
233	D7358	0.00	ex	-1.63	result excluded see §4.1
237		-----		-----	
252	D95	<1000		-----	
254	D95	<500		-----	
255		-----		-----	
311		-----		-----	
315	D6304-C	265		-0.19	
325	D6304-A	222	ex	-0.43	result excluded see §4.1
331	D6304-A	255.75	ex	-0.24	result excluded see §4.1
340	D6304-C	186.8		-0.62	
343		-----		-----	
349		-----		-----	
360	D6304-C	251.0		-0.27	
398	D6304-C	140		-0.87	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D6304-C	166.7		-0.72	
473	D6304-C	294.3		-0.04	
496	D6304-C	116.96		-0.99	
511		-----		-----	
512		-----		-----	
513		-----		-----	
541		-----		-----	
551	D6304-A	147.1	ex	-0.83	result excluded see §4.1
562		-----		-----	
593	D4006	223.8	ex,C	-0.42	result excluded see §4.1, first reported: 0.025
608		-----		-----	
609	D6304-C	900		3.24	
613		-----		-----	
614		-----		-----	
657	D6304-C	258.6		-0.23	
663		-----		-----	
823		-----		-----	
862	D6304-C	639.2		1.83	
875		-----		-----	
902		-----		-----	
912	D6304-C	350		0.27	
963		-----		-----	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D6304-A	260	ex	-0.22	result excluded see §4.1
1059	D6304-A	240	ex	-0.33	result excluded see §4.1
1106		-----		-----	
1146	D6304-C	325		0.13	
1173	in house	325	ex	0.13	result excluded see §4.1
1203	ISO12937	86.0	ex	-1.16	result excluded see §4.1
1212	D6304-C	135.6		-0.89	
1231	D6304-A	540.2	ex	1.29	result excluded see §4.1
1243	DIN51777	750	ex	2.43	result excluded see §4.1
1257	E203	550	ex	1.35	result excluded see §4.1
1271	ISO12937	486.9	ex	1.00	result excluded see §4.1
1278		-----		-----	
1293	ISO12937	1065.03	ex	4.13	first reported: 1232.48
1316	D6304-A	340	ex	0.21	result excluded see §4.1
1396	IP439	670	ex	1.99	result excluded see §4.1
1402	D6304-	389	ex	0.48	result excluded see §4.1
1406		-----		-----	
1431	D6304-A	407	ex	0.57	result excluded see §4.1
1452		-----		-----	
1460		-----		-----	
1472		-----		-----	
1480	D6304-A	230	ex	-0.38	result excluded see §4.1
1526	D4377	<5000		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730		-----		-----	
1800	in house	553	ex	1.36	result excluded see §4.1
1827	D6304-A	714.5	ex	2.23	result excluded see §4.1
1833	D6304-	1578	ex	6.90	result excluded see §4.1
1842	in house	1680	ex	7.45	result excluded see §4.1

1850		-----		-----	
1854		-----		-----	
1900	D6304-C	338		0.20	
1915		-----		-----	
1948		-----		-----	
2122	INH-KF	667	ex	1.98	result excluded see §4.1
3166		-----		-----	

normality	not OK
n	15
outliers	0
mean (n)	300.91
st.dev. (n)	211.333
R(calc.)	591.73
R(D6304:07)	518.48





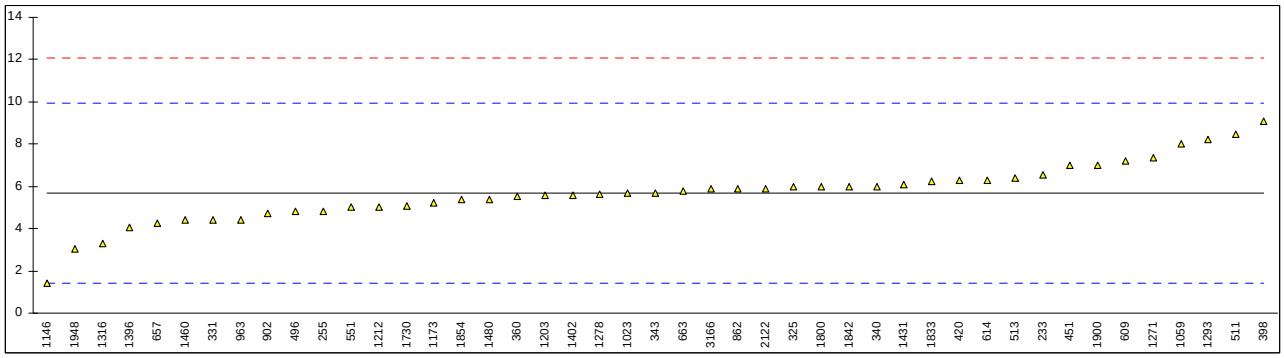
Determination of Aluminium (Al) on sample #12064; results in mg/kg

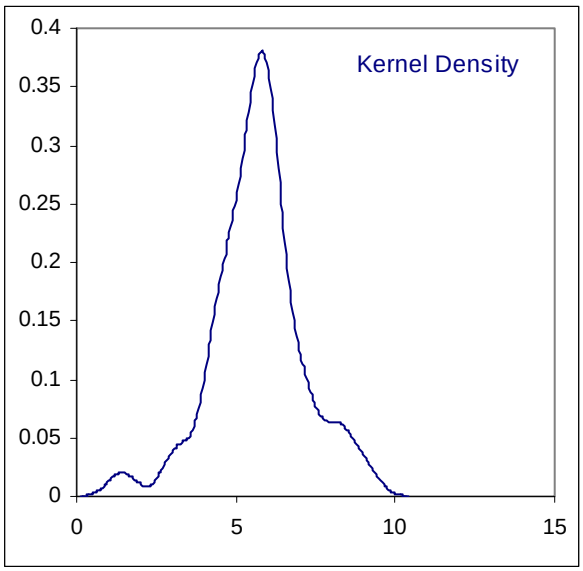
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	6.53		0.39	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	4.8366		-0.40	
311		-----		-----	
315		-----		-----	
325	D5185	6		0.14	
331	D5185	4.4		-0.61	
340	D5185	6		0.14	
343	D5185	5.7		0.00	
349		-----		-----	
360	D5185	5.55		-0.07	
398	D6595	9.1		1.60	
420	INH-207	6.3		0.28	
432		-----		-----	
450		-----		-----	
451	D5185	7		0.61	
473	D5185	<1	ex	<-2.20	result excluded, see §4.1
496	D5185	4.81		-0.41	
511	D6595	8.48		1.31	
512		-----		-----	
513	D6595	6.402		0.33	
541	D5185	<6		-----	
551	D5185	5		-0.33	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	7.187	C	0.70	first reported: 1.871
613		-----		-----	
614	D5185	6.3		0.28	
657	D5185	4.27		-0.67	
663	D5185	5.8		0.05	
823		-----		-----	
862	D5185	5.9		0.10	
875		-----		-----	
902	D5185	4.72		-0.46	
912		-----		-----	
963	D5185	4.42		-0.60	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	5.68		-0.01	
1059	in house	8		1.08	
1106		-----		-----	
1146	D5185	1.427		-2.00	
1173	in house	5.2		-0.23	
1203	D5185	5.6		-0.04	
1212	IP470	5.0		-0.33	
1231		-----		-----	
1243	DIN51391	<1.0		-----	
1257		-----		-----	
1271	in house	7.35		0.78	
1278	D5185	5.63		-0.03	
1293	D6595	8.210		1.18	
1316	D5185	3.29		-1.13	
1396	INH-12	4.07		-0.76	
1402	D5185	5.6		-0.04	
1406		-----		-----	
1431	in house	6.1		0.19	
1452		-----		-----	
1460	D5185	4.4		-0.61	
1472		-----		-----	
1480	D5185	5.4		-0.14	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	5.076		-0.29	
1800	in house	6.0		0.14	
1827		-----		-----	
1833	IP501	6.25		0.26	
1842	in house	6		0.14	

1850		-----	-----
1854	D5185	5.4	-0.14
1900	D6595	7	0.61
1915		-----	-----
1948	D5185	3.02	-1.25
2122	D5185	5.9	0.10
3166	INH-7040	5.9	0.10

normality	OK
n	45
outliers	0
mean (n)	5.69
st.dev. (n)	1.409
R(calc.)	3.95
R(D5185:09)	5.97

Application range: 6 - 40 mg/kg





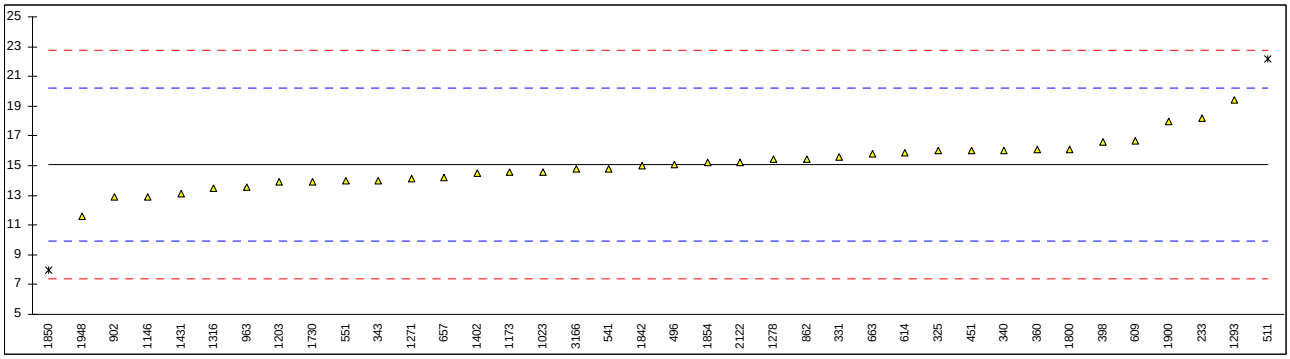
Determination of Barium (Ba) on sample #12064; results in mg/kg

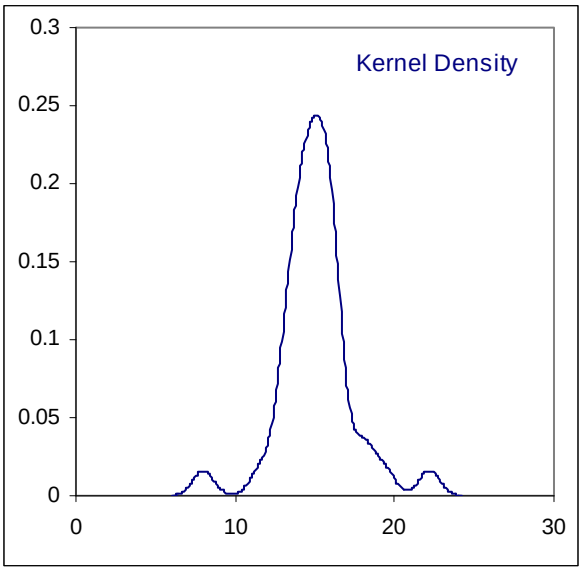
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	18.17		1.21	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325	D5185	16		0.36	
331	D5185	15.6		0.21	
340	D5185	16		0.36	
343	D5185	14.0		-0.42	
349		-----		-----	
360	D5185	16.06		0.39	
398	D6595	16.6		0.60	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	16		0.36	
473	D5185	<1	ex	<-5.50	result excluded, see §4.1
496	D5185	15.04		-0.01	
511	D6595	22.21	G(0.05)	2.79	
512		-----		-----	
513		-----		-----	
541	D5185	14.8		-0.11	
551	D5185	14		-0.42	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	16.633	C	0.61	first reported: 0.314
613		-----		-----	
614	D5185	15.9		0.32	
657	D5185	14.23		-0.33	
663	D5185	15.8		0.28	
823		-----		-----	
862	D5185	15.4		0.13	
875		-----		-----	
902	D5185	12.92		-0.84	
912		-----		-----	
963	D5185	13.57		-0.59	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	14.6		-0.18	
1059		-----		-----	
1106		-----		-----	
1146	D5185	12.92		-0.84	
1173	in house	14.6		-0.18	
1203	D5185	13.9		-0.46	
1212		-----		-----	
1231		-----		-----	
1243	DIN51391	<1.0		<-5.50	
1257		-----		-----	
1271	in house	14.115		-0.37	
1278	D5185	15.4		0.13	
1293	D6595	19.420		1.70	
1316	D5185	13.5		-0.61	
1396		-----		-----	
1402	D5185	14.5		-0.22	
1406		-----		-----	
1431	in house	13.1		-0.77	
1452		-----		-----	
1460		-----		-----	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	13.907		-0.46	
1800	in house	16.1		0.40	
1827		-----		-----	
1833		-----		-----	
1842	in house	15		-0.03	

1850	in house	8	G(0.05)	-2.77
1854	D5185	15.2		0.05
1900	D6595	18		1.15
1915		-----		-----
1948	D5185	11.6		-1.36
2122	D5185	15.2		0.05
3166	INH-7040	14.8		-0.11

normality	OK
n	36
outliers	2
mean (n)	15.072
st.dev. (n)	1.5650
R(calc.)	4.382
R(D5185:09)	7.157

Application range: 0.5 - 4 mg/kg





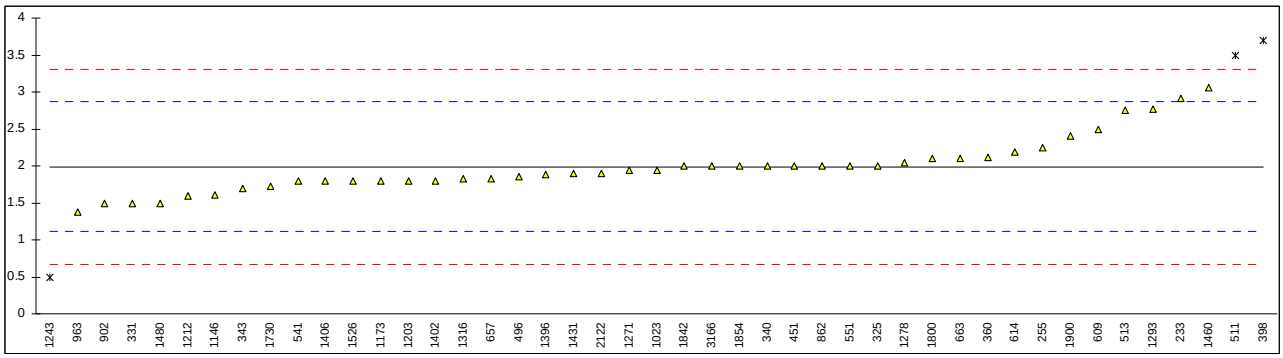
Determination of Chromium (Cr) on sample #12064; results in mg/kg

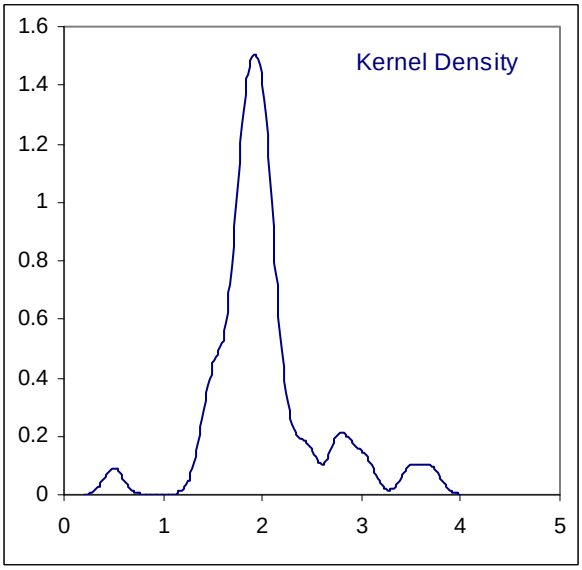
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	2.92		2.11	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	2.243		0.58	
311		-----		-----	
315		-----		-----	
325	D5185	2		0.02	
331	D5185	1.5		-1.11	
340	D5185	2		0.02	
343	D5185	1.7		-0.66	
349		-----		-----	
360	D5185	2.12		0.30	
398	D6595	3.7	DG(0.01)	3.89	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		0.02	
473	D5185	<1	ex	-----	result excluded, see §4.1
496	D5185	1.85		-0.32	
511	D6595	3.49	DG(0.01)	3.41	
512		-----		-----	
513	D6595	2.758		1.75	
541	D5185	1.8		-0.43	
551	D5185	2		0.02	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	2.488	C	1.13	first reported: 0.719
613		-----		-----	
614	D5185	2.19		0.46	
657	D5185	1.82		-0.38	
663	D5185	2.1		0.25	
823		-----		-----	
862	D5185	2.0		0.02	
875		-----		-----	
902	D5185	1.50		-1.11	
912		-----		-----	
963	D5185	1.38		-1.38	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	1.94		-0.11	
1059	in house	<3		-----	
1106		-----		-----	
1146	D5185	1.611		-0.86	
1173	in house	1.8		-0.43	
1203	D5185	1.8		-0.43	
1212	IP470	1.6		-0.88	
1231		-----		-----	
1243	DIN51391	0.5	G(0.05)	-3.38	
1257		-----		-----	
1271	in house	1.935		-0.12	
1278	D5185	2.04		0.11	
1293	D6595	2.767		1.77	
1316	D5185	1.82		-0.38	
1396	IP593	1.89		-0.23	
1402	D5185	1.8		-0.43	
1406	D4628	1.8		-0.43	
1431	in house	1.9		-0.20	
1452		-----		-----	
1460	D5185	3.06		2.43	
1472		-----		-----	
1480	D5185	1.5		-1.11	
1526	D5185	1.8		-0.43	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.723		-0.61	
1800	in house	2.1		0.25	
1827		-----		-----	
1833		-----		-----	
1842	in house	2		0.02	

1850	in house	<3	-----
1854	D5185	2.0	0.02
1900	D6595	2.4	0.93
1915		-----	-----
1948	D5185	n.d.	-----
2122	D5185	1.9	-0.20
3166	INH-7040	2.0	0.02

normality	not OK
n	42
outliers	3
mean (n)	1.99
st.dev. (n)	0.371
R(calc.)	1.04
R(D5185:09)	1.23

Application range: 1 - 40 mg/kg





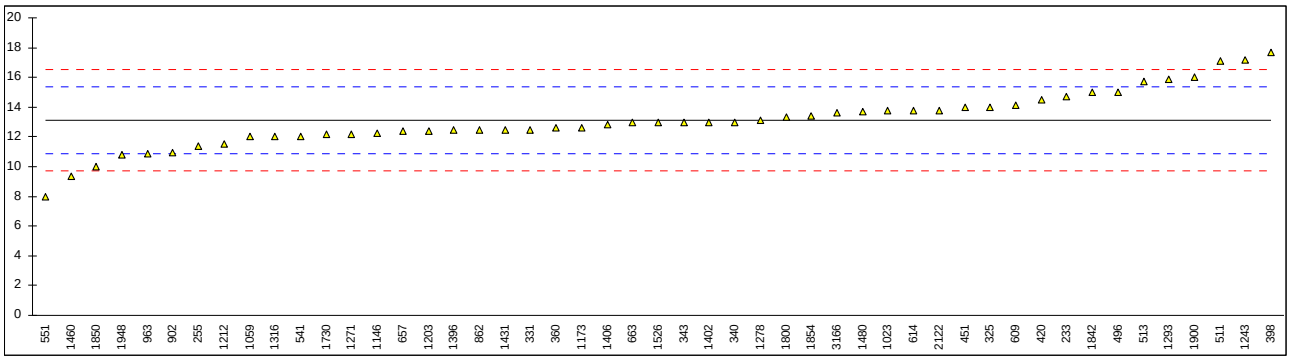
Determination of Copper (Cu) on sample #12064; results in mg/kg

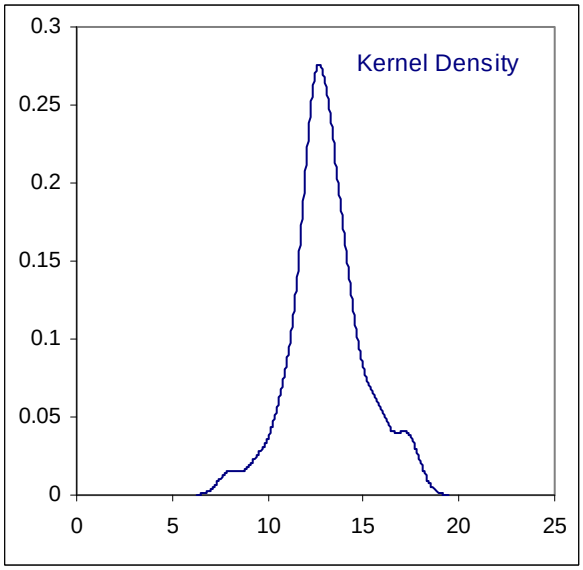
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	14.69		1.40	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	11.376		-1.55	
311		-----		-----	
315		-----		-----	
325	D5185	14		0.79	
331	D5185	12.5		-0.55	
340	D5185	13		-0.10	
343	D5185	13.0		-0.10	
349		-----		-----	
360	D5185	12.6		-0.46	
398	D6595	17.7		4.08	
420	DIN51404	14.5		1.23	
432		-----		-----	
450		-----		-----	
451	D5185	14		0.79	
473	D5185	<1	ex	<-10.78	result excluded, see §4.1
496	D5185	15.01		1.69	
511	D6595	17.07		3.52	
512		-----		-----	
513	D6595	15.726		2.32	
541	D5185	12		-0.99	
551	D5185	8		-4.55	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	14.153	C	0.92	first reported: 1.674
613		-----		-----	
614	D5185	13.8		0.61	
657	D5185	12.39		-0.64	
663	D5185	13		-0.10	
823		-----		-----	
862	D5185	12.5		-0.55	
875		-----		-----	
902	D5185	10.96		-1.92	
912		-----		-----	
963	D5185	10.90		-1.97	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	13.8		0.61	
1059	in house	12		-0.99	
1106		-----		-----	
1146	D5185	12.26		-0.76	
1173	in house	12.6		-0.46	
1203	D5185	12.4		-0.63	
1212	IP470	11.5		-1.44	
1231		-----		-----	
1243	DIN51391	17.2		3.64	
1257		-----		-----	
1271	in house	12.14		-0.87	
1278	D5185	13.1		-0.01	
1293	D6595	15.877		2.46	
1316	D5185	12.0		-0.99	
1396	IP593	12.46		-0.58	
1402	D5185	13		-0.10	
1406	D4628	12.8		-0.28	
1431	in house	12.5		-0.55	
1452		-----		-----	
1460	D5185	9.33		-3.37	
1472		-----		-----	
1480	D5185	13.7		0.52	
1526	D5185	13		-0.10	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	12.139		-0.87	
1800	in house	13.3		0.17	
1827		-----		-----	
1833		-----		-----	
1842	in house	15		1.68	

1850	in house	10	-2.77
1854	D5185	13.4	0.25
1900	D6595	16	2.57
1915		-----	-----
1948	D5185	10.78	-2.08
2122	D5185	13.8	0.61
3166	INH-7040	13.6	0.43

normality	OK
n	49
outliers	0
mean (n)	13.11
st.dev. (n)	1.898
R(calc.)	5.31
R(D5185:09)	3.15

Application range: 2 – 160 mg/kg





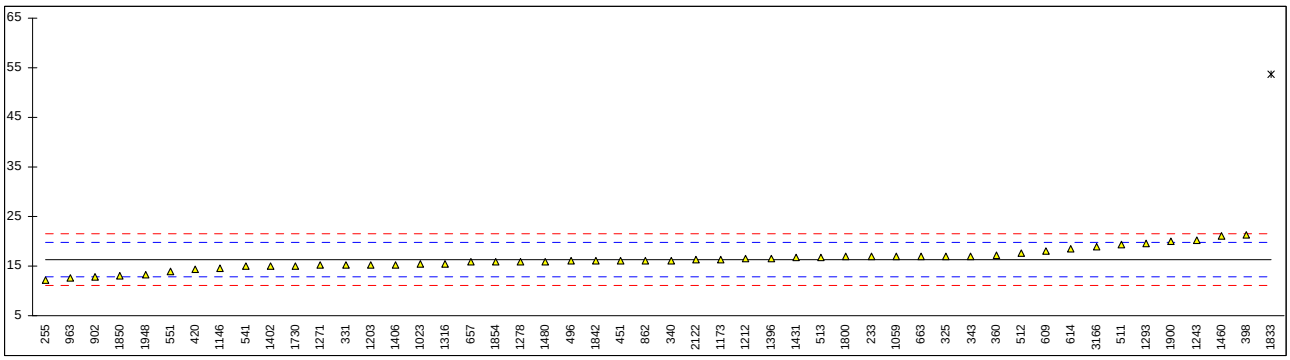
Determination of Iron (Fe) on sample #12064; results in mg/kg

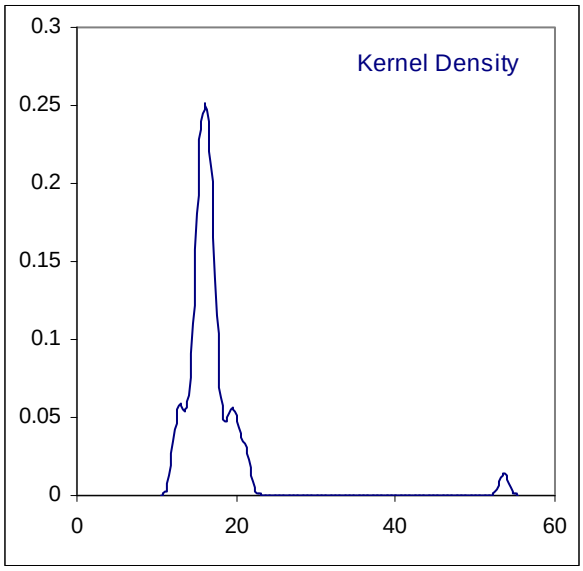
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	16.92		0.35	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	12.211		-2.37	
311		-----		-----	
315		-----		-----	
325	D5185	17		0.39	
331	D5185	15.2		-0.65	
340	D5185	16		-0.18	
343	D5185	17.0		0.39	
349		-----		-----	
360	D5185	17.2		0.51	
398	D6595	21.4		2.93	
420	DIN51397	14.4		-1.11	
432		-----		-----	
450		-----		-----	
451	D5185	16		-0.18	
473	D5185	<1	ex	<-8.84	result excluded, see §4.1
496	D5185	15.99		-0.19	
511	D6595	19.36		1.75	
512	D6595	17.630		0.76	
513	D6595	16.765		0.26	
541	D5185	15		-0.76	
551	D5185	14		-1.34	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	17.95	C	0.94	first reported: 8.055
613		-----		-----	
614	D5185	18.4		1.20	
657	D5185	15.86		-0.27	
663	D5185	17		0.39	
823		-----		-----	
862	D5185	16.0		-0.18	
875		-----		-----	
902	D5185	12.87		-1.99	
912		-----		-----	
963	D5185	12.51		-2.20	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	15.4		-0.53	
1059	in house	17		0.39	
1106		-----		-----	
1146	D5185	14.50		-1.05	
1173	in house	16.4		0.05	
1203	D5185	15.2		-0.65	
1212	IP470	16.5		0.10	
1231		-----		-----	
1243	DIN51391	20.19		2.23	
1257		-----		-----	
1271	in house	15.18		-0.66	
1278	D5185	15.9		-0.24	
1293	D6595	19.493		1.83	
1316	D5185	15.4		-0.53	
1396	INH-12	16.52		0.12	
1402	D5185	15		-0.76	
1406	D4628	15.3		-0.59	
1431	in house	16.7		0.22	
1452		-----		-----	
1460	D5185	21.0		2.70	
1472		-----		-----	
1480	D5185	15.9		-0.24	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	15.103		-0.70	
1800	in house	16.9		0.33	
1827		-----		-----	
1833	IP501	53.6	G(0.01)	21.50	
1842	in house	16		-0.18	

1850	in house	13	-1.91
1854	D5185	15.9	-0.24
1900	D6595	20	2.12
1915		-----	-----
1948	D5185	13.35	-1.71
2122	D5185	16.2	-0.07
3166	INH-7040	19	1.55

normality	not OK
n	49
outliers	1
mean (n)	16.320
st.dev. (n)	2.0589
R(calc.)	5.765
R(D5185:09)	4.855

Application range: 2 -140 mg/kg





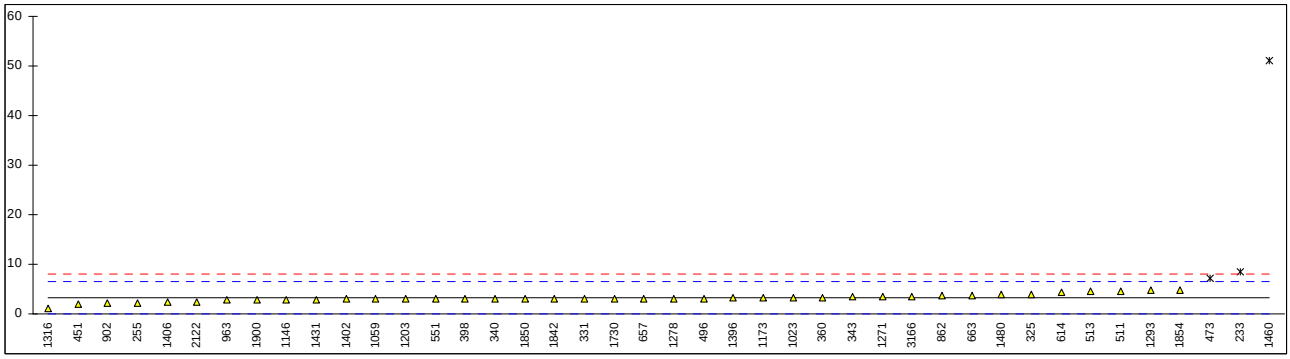
Determination of Lead (Pb) on sample #12064; results in mg/kg

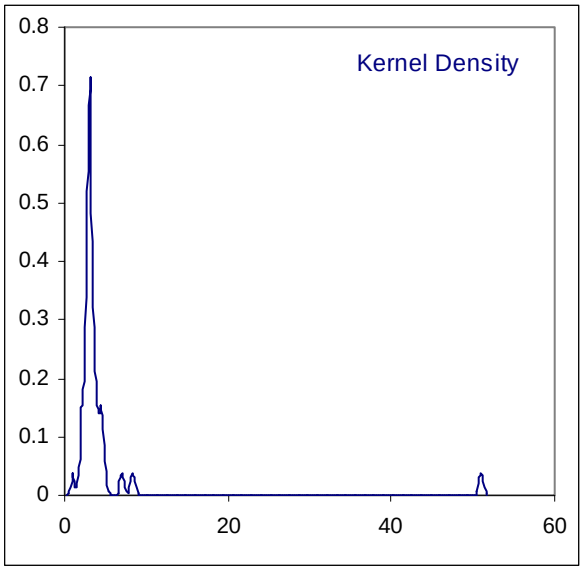
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	8.38	G(0.01)	3.19	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	2.1092		-0.66	
311		-----		-----	
315		-----		-----	
325	D5185	4		0.50	
331	D5185	3.0		-0.11	
340	D5185	3		-0.11	
343	D5185	3.4		0.13	
349		-----		-----	
360	D5185	3.36		0.11	
398	D6595	3		-0.11	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		-0.73	
473	D5185	7.1	ex	2.41	result excluded, see §4.1
496	D5185	3.14		-0.03	
511	D6595	4.53		0.83	
512		-----		-----	
513	D6595	4.482		0.80	
541	D5185	<10		-----	
551	D5185	3		-0.11	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	<1	C	-----	first reported: -4.360
613		-----		-----	
614	D5185	4.24		0.65	
657	D5185	3.03		-0.10	
663	D5185	3.7		0.32	
823		-----		-----	
862	D5185	3.6		0.25	
875		-----		-----	
902	D5185	2.09		-0.67	
912		-----		-----	
963	D5185	2.75		-0.27	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	3.33		0.09	
1059	in house	3		-0.11	
1106		-----		-----	
1146	D5185	2.851		-0.21	
1173	in house	3.3		0.07	
1203	D5185	3.0		-0.11	
1212		-----		-----	
1231		-----		-----	
1243	DIN51391	<1.0		-----	
1257		-----		-----	
1271	in house	3.50		0.19	
1278	D5185	3.13		-0.03	
1293	D6595	4.700		0.93	
1316	D5185	1.0		-1.34	
1396	IP593	3.20		0.01	
1402	D5185	3.0		-0.11	
1406	D4628	2.4		-0.48	
1431	in house	2.9		-0.18	
1452		-----		-----	
1460	D5185	51.03	G(0.01)	29.42	
1472		-----		-----	
1480	D5185	3.9		0.44	
1526	D5185	<10		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	3.002		-0.11	
1800	in house	<5		-----	
1827		-----		-----	
1833		-----		-----	
1842	in house	3		-0.11	

1850	in house	3	-0.11
1854	D5185	4.8	0.99
1900	D6595	2.8	-0.24
1915		-----	-----
1948	D5185	n.d.	-----
2122	D5185	2.5	-0.42
3166	INH-7040	3.52	0.21

normality	not OK
n	39
outliers	2
mean (n)	3.186
st.dev. (n)	0.7603
R(calc.)	2.129
R(D5185:09)	4.553

Application range: 10 - 160 mg/kg



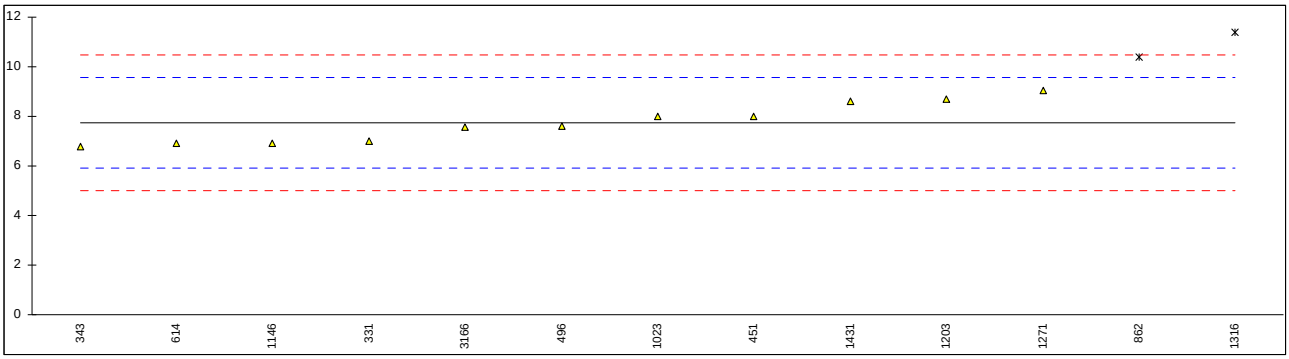


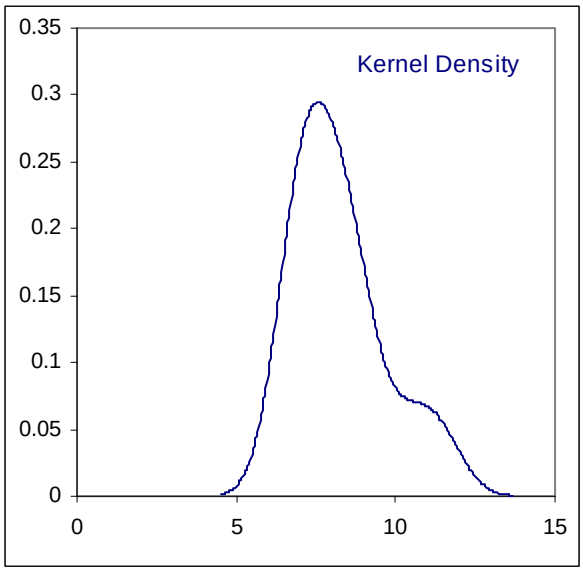
Determination of Lithium (Li) on sample #12064; results in mg/kg

lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233		-----		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325		-----		-----	
331	D5185	7.0		-0.81	
340		-----		-----	
343	INH-1180	6.8		-1.03	
349		-----		-----	
360		-----		-----	
398		-----		-----	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	8		0.28	
473		-----		-----	
496	INH-2535	7.63		-0.12	
511		-----		-----	
512		-----		-----	
513		-----		-----	
541		-----		-----	
551		-----		-----	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609		-----		-----	
613		-----		-----	
614	D5185	6.9		-0.92	
657		-----		-----	
663		-----		-----	
823		-----		-----	
862	D5185	10.4	DG(0.05)	2.92	
875		-----		-----	
902		-----		-----	
912		-----		-----	
963		-----		-----	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	8.00		0.28	
1059		-----		-----	
1106		-----		-----	
1146	D5185	6.900		-0.92	
1173		-----		-----	
1203	D5185	8.7		1.05	
1212		-----		-----	
1231		-----		-----	
1243		-----		-----	
1257		-----		-----	
1271	in house	9.05		1.44	
1278		-----		-----	
1293		-----		-----	
1316		11.4	DG(0.05)	4.02	
1396		-----		-----	
1402		-----		-----	
1406		-----		-----	
1431	in house	8.6		0.94	
1452		-----		-----	
1460		-----		-----	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730		-----		-----	
1800		-----		-----	
1827		-----		-----	
1833		-----		-----	
1842		-----		-----	

1850		-----	-----
1854		-----	-----
1900		-----	-----
1915		-----	-----
1948		-----	-----
2122		-----	-----
3166	INH-7040	7.57	-0.19

normality	OK
n	11
outliers	2
mean (n)	7.74
st.dev. (n)	0.800
R(calc.)	2.24
R(Horwitz)	2.55





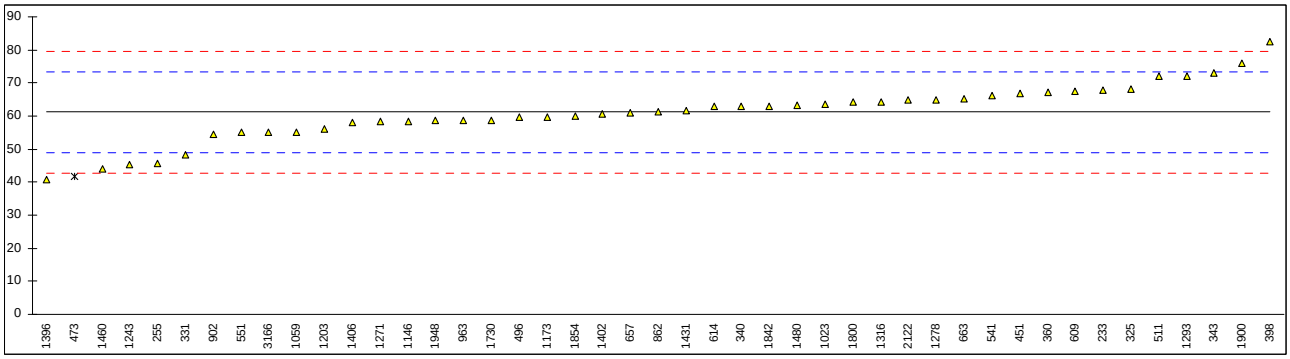
Determination of Magnesium (Mg) on sample #12064; results in mg/kg

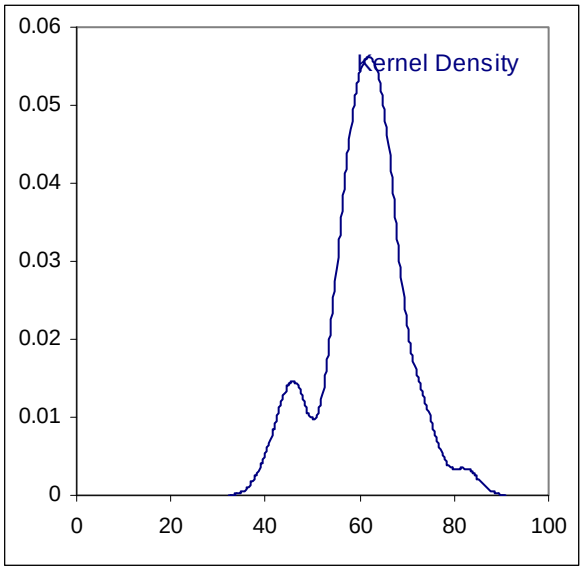
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	67.91		1.10	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	45.6895	C	-2.54	first reported: 5.828
311		-----		-----	
315		-----		-----	
325	D5185	68		1.11	
331	D5185	48.4		-2.10	
340	D5185	63		0.29	
343	D5185	73.0		1.93	
349		-----		-----	
360	D5185	67.07		0.96	
398	D6595	82.6		3.50	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	67		0.95	
473	D5185	41.9	ex	-3.16	result excluded, see §4.1
496	D5185	59.67		-0.25	
511	D6595	72.11		1.79	
512		-----		-----	
513		-----		-----	
541	D5185	66.3		0.83	
551	D5185	55		-1.02	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	67.44	C	1.02	first reported: 27.28
613		-----		-----	
614	D5185	62.9		0.28	
657	D5185	61.09		-0.02	
663	D5185	65.3		0.67	
823		-----		-----	
862	D5185	61.4		0.03	
875		-----		-----	
902	D5185	54.39		-1.12	
912		-----		-----	
963	D5185	58.68		-0.41	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	63.7		0.41	
1059	in house	55		-1.02	
1106		-----		-----	
1146	D5185	58.38		-0.46	
1173	in house	59.7		-0.25	
1203	D5185	56.0		-0.85	
1212		-----		-----	
1231		-----		-----	
1243	DIN51391	45.29		-2.60	
1257		-----		-----	
1271	in house	58.23		-0.49	
1278	D5185	64.8		0.59	
1293	D6595	72.220		1.80	
1316	D5185	64.4		0.52	
1396	INH-12	40.65		-3.36	
1402	D5185	60.5		-0.11	
1406	D4628	58.0		-0.52	
1431	in house	61.6		0.07	
1452		-----		-----	
1460	D5185	44.04		-2.81	
1472		-----		-----	
1480	D5185	63.2		0.33	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	58.682		-0.41	
1800	in house	64.1		0.47	
1827		-----		-----	
1833		-----		-----	
1842	in house	63		0.29	

1850		-----	-----
1854	D5185	60	-0.20
1900	D6595	76	2.42
1915		-----	-----
1948	D5185	58.66	-0.42
2122	D5185	64.8	0.59
3166	INH-7040	55.0	-1.02

normality	OK
n	44
outliers	0
mean (n)	61.20
st.dev. (n)	8.322
R(calc.)	23.30
R(D5185:09)	17.11

Application range: 5 – 1700 mg/kg





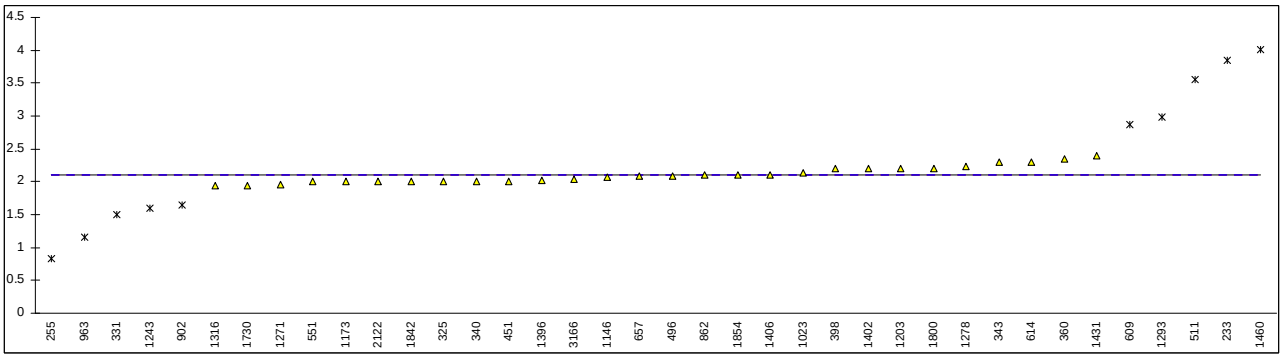
Determination of Manganese (Mn) on sample #12064; results in mg/kg

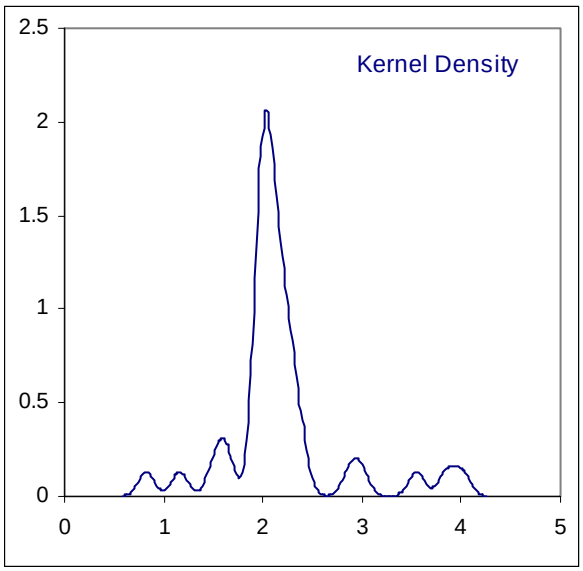
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	3.85	DG(0.01)	-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	0.82575	G(0.05)	-----	
311		-----		-----	
315		-----		-----	
325	D5185	2		-----	
331	D5185	1.5	DG(0.05)	-----	
340	D5185	2		-----	
343	D5185	2.3		-----	
349		-----		-----	
360	D5185	2.34		-----	
398	D6595	2.2		-----	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		-----	
473	D5185	<1	ex	-----	result excluded, see §4.1
496	D5185	2.09		-----	
511	D6595	3.55	G(0.05)	-----	
512		-----		-----	
513		-----		-----	
541	D5185	<5		-----	
551	D5185	2		-----	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	2.876	C, DG(0.05)	-----	first reported: 1.013
613		-----		-----	
614	D5185	2.3		-----	
657	D5185	2.08		-----	
663		-----		-----	
823		-----		-----	
862	D5185	2.1		-----	
875		-----		-----	
902	D5185	1.64	G(0.05)	-----	
912		-----		-----	
963	D5185	1.16	G(0.01)	-----	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	2.13		-----	
1059	in house	<3		-----	
1106		-----		-----	
1146	D5185	2.063		-----	
1173	in house	2.0		-----	
1203	D5185	2.2		-----	
1212		-----		-----	
1231		-----		-----	
1243	DIN51391	1.6	DG(0.05)	-----	
1257		-----		-----	
1271	in house	1.95		-----	
1278	D5185	2.23		-----	
1293	D6595	2.990	DG(0.05)	-----	
1316	D5185	1.94		-----	
1396	IP593	2.02		-----	
1402	D5185	2.2		-----	
1406	D4628	2.1		-----	
1431	in house	2.4		-----	
1452		-----		-----	
1460	D5185	4.01	DG(0.01)	-----	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.947		-----	
1800	in house	2.2		-----	
1827		-----		-----	
1833		-----		-----	
1842	in house	2		-----	

1850	in house	<3	-----
1854	D5185	2.1	-----
1900		-----	-----
1915		-----	-----
1948	D5185	n.d.	-----
2122	D5185	2.0	-----
3166	INH-7040	2.03	-----

normality	OK
n	28
outliers	10
mean (n)	2.10
st.dev. (n)	0.128
R(calc.)	0.36
R(D5185:09)	(0.32)

Application range: 5 - 700 mg/kg





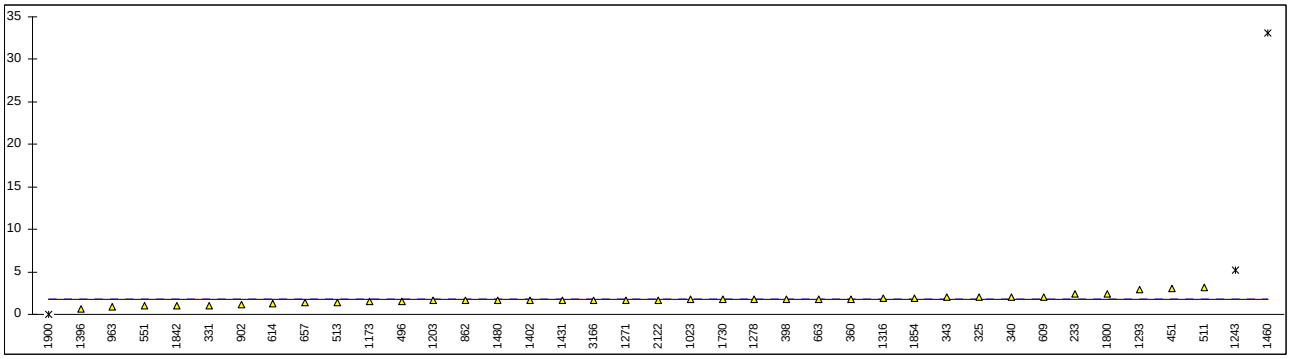
Determination of Molybdenum (Mo) on sample #12064; results in mg/kg

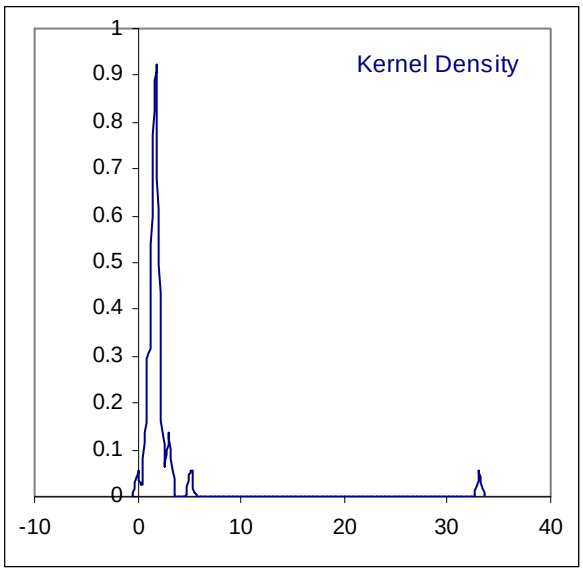
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	2.37		-----	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325	D5185	2		-----	
331	D5185	1.0		-----	
340	D5185	2		-----	
343	D5185	2.0		-----	
349		-----		-----	
360	D5185	1.81		-----	
398	D6595	1.8		-----	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	3		-----	
473	D5185	<1	ex	-----	result excluded, see §4.1
496	D5185	1.52		-----	
511	D6595	3.20		-----	
512		-----		-----	
513	D6595	1.437		-----	
541	D5185	<5		-----	
551	D5185	1		-----	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	2.032	C	-----	first reported: 0.270
613		-----		-----	
614	D5185	1.29		-----	
657	D5185	1.38		-----	
663	D5185	1.8		-----	
823		-----		-----	
862	D5185	1.6		-----	
875		-----		-----	
902	D5185	1.12		-----	
912		-----		-----	
963	D5185	0.88		-----	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	1.73		-----	
1059	in house	<3		-----	
1106		-----		-----	
1146		-----		-----	
1173	in house	1.5		-----	
1203	D5185	1.6		-----	
1212		-----		-----	
1231		-----		-----	
1243	DIN51391	5.14	G(0.01)	-----	
1257		-----		-----	
1271	in house	1.66		-----	
1278	D5185	1.79		-----	
1293	D6595	2.933		-----	
1316	D5185	1.88		-----	
1396	INH-12	0.68		-----	
1402	D5185	1.6		-----	
1406		-----		-----	
1431	in house	1.6		-----	
1452		-----		-----	
1460	D5185	33.1	G(0.01)	-----	
1472		-----		-----	
1480	D5185	1.6		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.779		-----	
1800	in house	2.4		-----	
1827		-----		-----	
1833		-----		-----	
1842	in house	1		-----	

1850	in house	<3		-----	
1854	D5185	1.9		-----	
1900	D6595	0	ex	-----	result excluded, zero is not a real value
1915		-----		-----	
1948	D5185	n.d.		-----	
2122	D5185	1.7		-----	
3166	INH-7040	1.64		-----	

	normality	not OK
	n	36
	outliers	3
	mean (n)	1.73
	st.dev. (n)	0.557
	R(calc.)	1.56
	R(D5185:09)	(0.94)

Application range 5 - 200 mg/kg





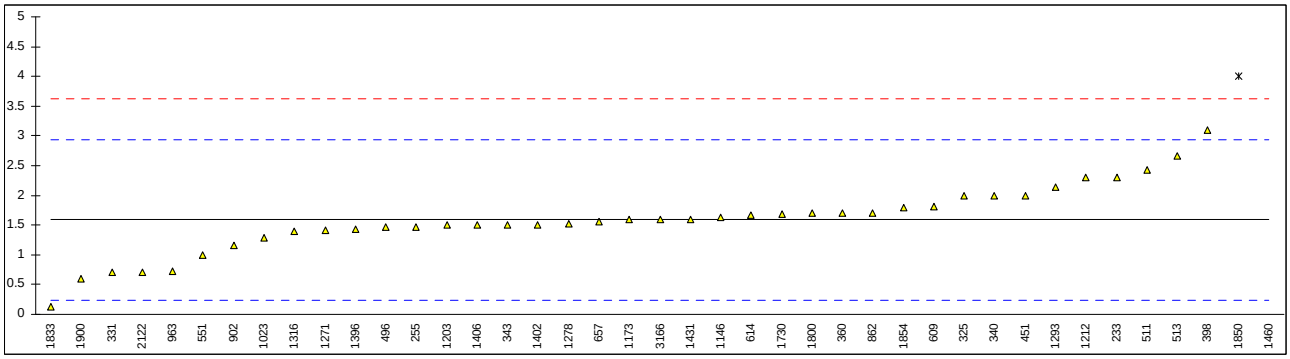
Determination of Nickel (Ni) on sample #12064; results in mg/kg

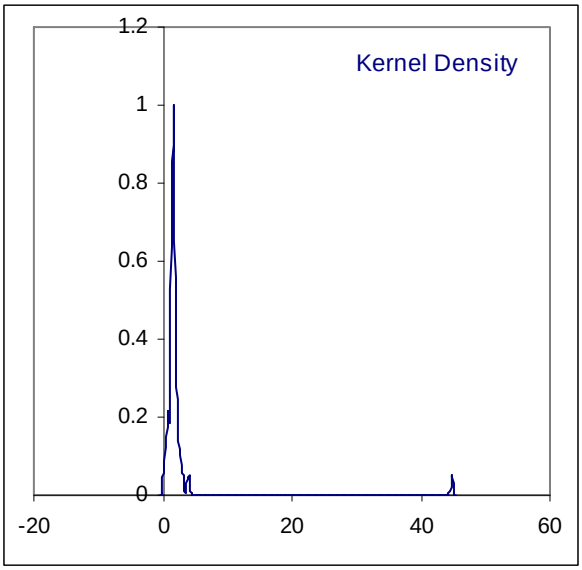
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	2.30		1.05	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	1.4763		-0.17	
311		-----		-----	
315		-----		-----	
325	D5185	2		0.61	
331	D5185	0.7		-1.32	
340	D5185	2		0.61	
343	D5185	1.5		-0.13	
349		-----		-----	
360	D5185	1.70		0.16	
398	D6595	3.1		2.24	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		0.61	
473	D5185	<1	ex	-----	result excluded, see §4.1
496	D5185	1.47		-0.18	
511	D6595	2.42		1.23	
512		-----		-----	
513	D6595	2.659		1.58	
541	D5185	<5		-----	
551	D5185	1		-0.87	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	1.814	C	0.33	first reported: 0.101
613		-----		-----	
614	D5185	1.67		0.12	
657	D5185	1.56		-0.04	
663		-----		-----	
823		-----		-----	
862	D5185	1.7		0.16	
875		-----		-----	
902	D5185	1.16		-0.64	
912		-----		-----	
963	D5185	0.73		-1.27	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	1.28		-0.46	
1059	in house	<3		-----	
1106		-----		-----	
1146	D5185	1.639		0.07	
1173	in house	1.6		0.01	
1203	D5185	1.5		-0.13	
1212	IP470	2.3		1.05	
1231		-----		-----	
1243	DIN51391	<1.0		-----	
1257		-----		-----	
1271	in house	1.413		-0.26	
1278	D5185	1.52		-0.10	
1293	D6595	2.137		0.81	
1316	D5185	1.40		-0.28	
1396	IP593	1.44		-0.22	
1402	D5185	1.5		-0.13	
1406	D4628	1.5		-0.13	
1431	in house	1.6		0.01	
1452		-----		-----	
1460	D5185	44.85	G(0.01)	64.04	
1472		-----		-----	
1480		-----		-----	
1526	D5185	<2		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.691		0.15	
1800	in house	1.7		0.16	
1827		-----		-----	
1833	IP501	0.13		-2.16	
1842	in house	<1.5		-----	

1850	in house	4	G(0.01)	3.57
1854	D5185	1.8		0.31
1900	D6595	0.6		-1.47
1915		-----		-----
1948	D5185	n.d.		-----
2122	D5185	0.7		-1.32
3166	INH-7040	1.6		0.01

normality	not OK
n	39
outliers	2
mean (n)	1.59
st.dev. (n)	0.569
R(calc.)	1.59
R(D5185:09)	1.89

Application range: 5 – 40 mg/kg





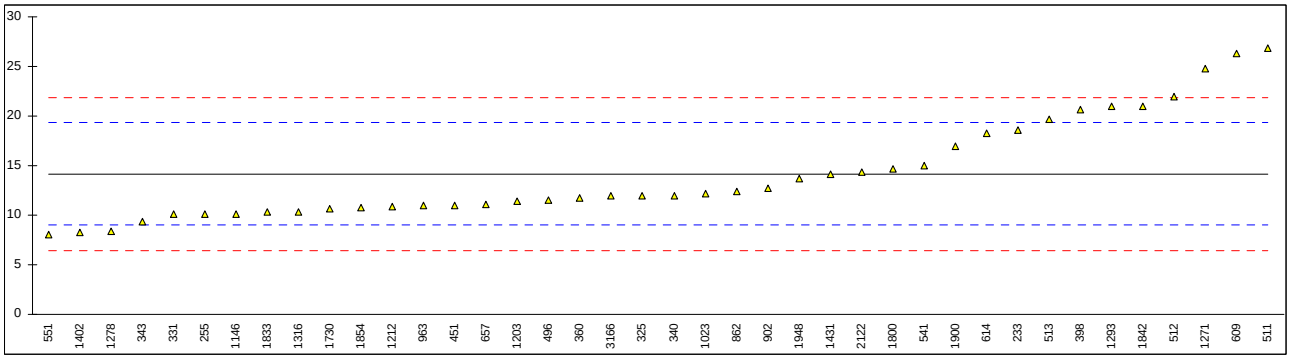
Determination of Sodium (Na) on sample #12064; results in mg/kg

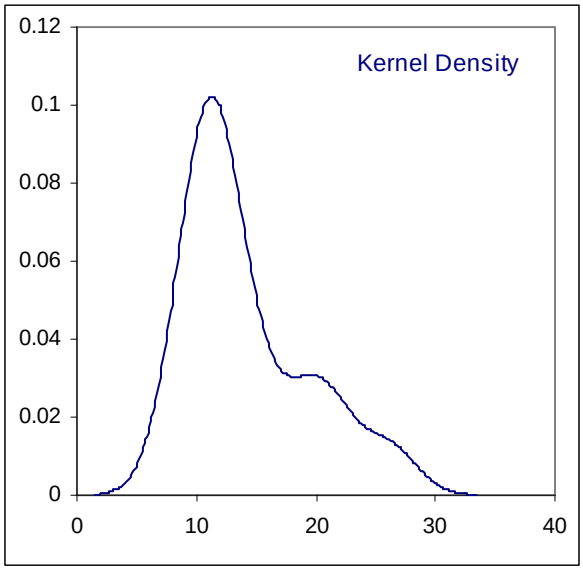
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	18.63		1.74	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	10.107		-1.57	
311		-----		-----	
315		-----		-----	
325	D5185	12		-0.83	
331	D5185	10.1		-1.57	
340	D5185	12		-0.83	
343	D5185	9.3		-1.88	
349		-----		-----	
360	D5185	11.7		-0.95	
398	D6595	20.6		2.50	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	11		-1.22	
473	D5185	<1	ex	<-5.10	result excluded, see §4.1
496	D5185	11.47		-1.04	
511	D6595	26.87		4.93	
512	D6595	21.947		3.02	
513	D6595	19.720		2.16	
541	D5185	15		0.33	
551	D5185	8		-2.39	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	26.253	C	4.69	first reported: 17.49
613		-----		-----	
614	D5185	18.3		1.61	
657	D5185	11.09		-1.19	
663		-----		-----	
823		-----		-----	
862	D5185	12.4		-0.68	
875		-----		-----	
902	D5185	12.72		-0.56	
912		-----		-----	
963	D5185	10.98		-1.23	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	12.2		-0.76	
1059		-----		-----	
1106		-----		-----	
1146	D5185	10.13		-1.56	
1173		-----		-----	
1203	D5185	11.4		-1.07	
1212	IP470	10.9		-1.26	
1231		-----		-----	
1243		-----		-----	
1257		-----		-----	
1271	in house	24.79		4.13	
1278	D5185	8.32		-2.26	
1293	D6595	20.937		2.63	
1316	D5185	10.3		-1.49	
1396		-----		-----	
1402	D5185	8.3		-2.27	
1406		-----		-----	
1431	in house	14.1		-0.02	
1452		-----		-----	
1460		-----		-----	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	10.697		-1.34	
1800	in house	14.7		0.21	
1827		-----		-----	
1833	IP501	10.3		-1.49	
1842	in house	21		2.66	

1850		-----	-----
1854	D5185	10.8	-1.30
1900	D6595	17	1.10
1915		-----	-----
1948	D5185	13.72	-0.17
2122	D5185	14.3	0.06
3166	INH-7040	12	-0.83

normality	not OK
n	40
outliers	0
mean (n)	14.15
st.dev. (n)	5.087
R(calc.)	14.24
R(D5185:09)	7.22

Application range: 7 - 70 mg/kg





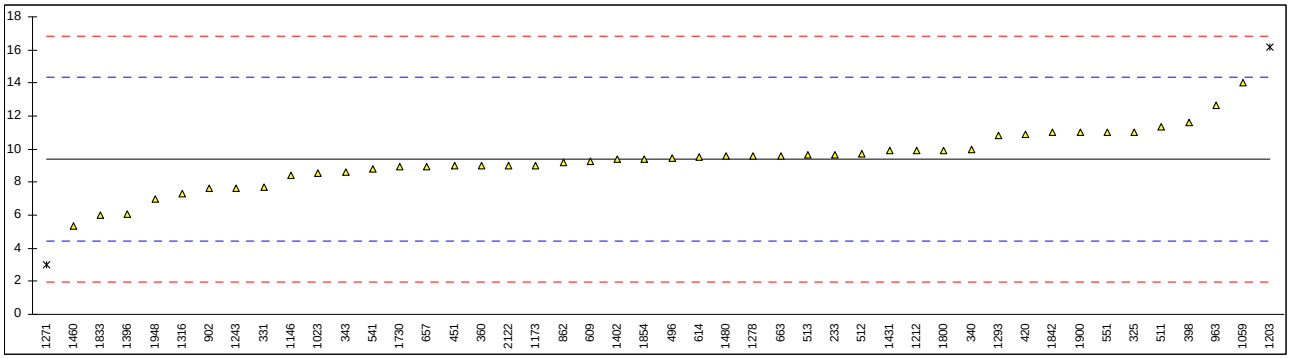
Determination of Silicon (Si) on sample #12064; results in mg/kg

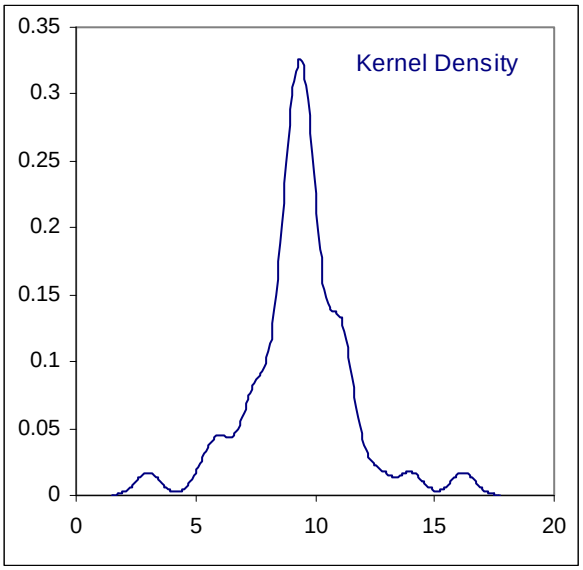
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	9.66		0.12	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325	D5185	11		0.66	
331	D5185	7.7		-0.67	
340	D5185	10		0.26	
343	D5185	8.6		-0.31	
349		-----		-----	
360	D5185	9.00		-0.15	
398	D6595	11.6		0.90	
420	INH-208	10.9		0.62	
432		-----		-----	
450		-----		-----	
451	D5185	9		-0.15	
473	D5185	<1	ex	<-3.38	result excluded, see §4.1
496	D5185	9.46		0.04	
511	D6595	11.35		0.80	
512	D6595	9.720		0.14	
513	D6595	9.651		0.11	
541	D5185	8.8		-0.23	
551	D5185	11		0.66	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	9.273	C	-0.04	first reported: 0.262
613		-----		-----	
614	D5185	9.52		0.06	
657	D5185	8.96		-0.16	
663	D5185	9.6		0.09	
823		-----		-----	
862	D5185	9.2		-0.07	
875		-----		-----	
902	D5185	7.62		-0.70	
912		-----		-----	
963	D5185	12.63	C	1.32	first reported: 22.63
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	8.56		-0.33	
1059	in house	14		1.87	
1106		-----		-----	
1146	D5185	8.406		-0.39	
1173	in house	9.0		-0.15	
1203	D5185	16.2	G(0.05)	2.76	
1212	IP470	9.9		0.22	
1231		-----		-----	
1243	DIN51391	7.65		-0.69	
1257		-----		-----	
1271	in house	3.00	G(0.05)	-2.57	
1278	D5185	9.6		0.09	
1293	D6595	10.857		0.60	
1316	D5185	7.29		-0.84	
1396	INH-12	6.08		-1.33	
1402	D5185	9.4		0.01	
1406		-----		-----	
1431	in house	9.9		0.22	
1452		-----		-----	
1460	D5185	5.36		-1.62	
1472		-----		-----	
1480	D5185	9.6		0.09	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	8.939		-0.17	
1800	in house	9.9		0.22	
1827		-----		-----	
1833	IP501	6.02		-1.35	
1842	in house	11		0.66	

1850		-----	-----
1854	D5185	9.4	0.01
1900	D6595	11	0.66
1915		-----	-----
1948	D5185	7.01	-0.95
2122	D5185	9.0	-0.15
3166	INH-7040	<60	-----

normality	OK
n	44
outliers	2
mean (n)	9.37
st.dev. (n)	1.657
R(calc.)	4.64
R(D5185:09)	6.94

Application range: 8 - 50 mg/kg





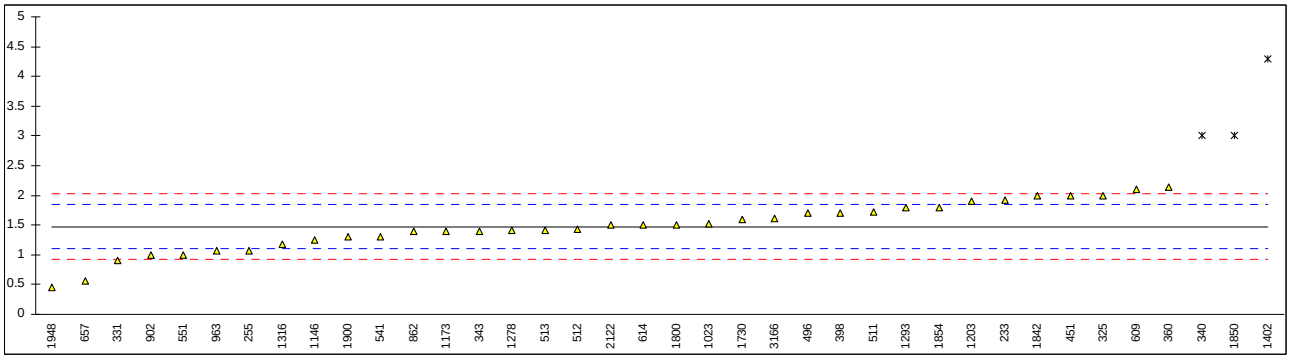
Determination of Silver (Ag) on sample #12064; results in mg/kg

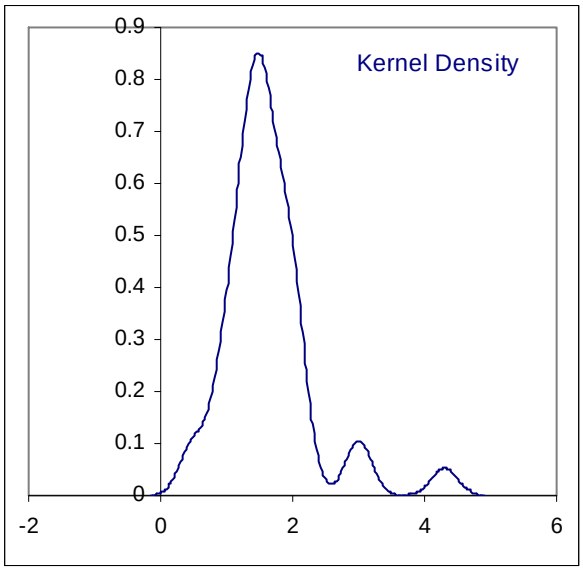
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	1.92		2.43	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	1.0656		-2.21	
311		-----		-----	
315		-----		-----	
325	D5185	2		2.87	
331	D5185	0.9		-3.11	
340	D5185	3	DG(0.01)	8.30	
343	D5185	1.4		-0.39	
349		-----		-----	
360	D5185	2.13		3.58	
398	D6595	1.7		1.24	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		2.87	
473	D5185	<1	ex	------	result excluded, see §4.1
496	D5185	1.70		1.24	
511	D6595	1.73		1.40	
512	D6595	1.440		-0.17	
513	D6595	1.411		-0.33	
541	D5185	1.3		-0.94	
551	D5185	1		-2.57	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	2.098	C	3.40	first reported: 0.419
613		-----		-----	
614	D5185	1.5		0.15	
657	D5185	0.56		-4.96	
663		-----		-----	
823		-----		-----	
862	D5185	1.4		-0.39	
875		-----		-----	
902	D5185	1.00		-2.57	
912		-----		-----	
963	D5185	1.06		-2.24	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	1.52		0.26	
1059		-----		-----	
1106		-----		-----	
1146	D5185	1.252		-1.20	
1173	in house	1.4		-0.39	
1203	D5185	1.9		2.33	
1212		-----		-----	
1231		-----		-----	
1243		-----		-----	
1257		-----		-----	
1271		-----		-----	
1278	D5185	1.41		-0.34	
1293	D6595	1.790		1.73	
1316	D5185	1.18		-1.59	
1396		-----		-----	
1402	D5185	4.3	G(0.01)	15.37	
1406		-----		-----	
1431		-----		-----	
1452		-----		-----	
1460	D5185	<0.1		-----	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.587		0.62	
1800	in house	1.5		0.15	
1827		-----		-----	
1833		-----		-----	
1842	in house	2		2.87	

1850	in house	3	DG(0.01)	8.30
1854	D5185	1.8		1.78
1900	D6595	1.3		-0.94
1915		-----		-----
1948	D5185	0.45		-5.55
2122	D5185	1.5		0.15
3166	INH-7040	1.62		0.80

normality	OK
n	35
outliers	3
mean (n)	1.47
st.dev. (n)	0.408
R(calc.)	1.14
R(D5185:09)	0.52

Application range: 0.5 -50 mg/kg





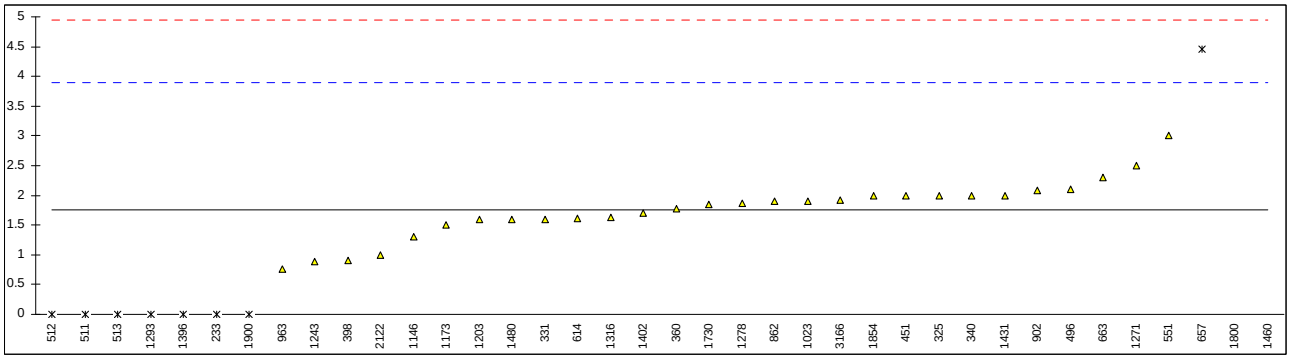
Determination of Tin (Sn) on sample #12064; results in mg/kg

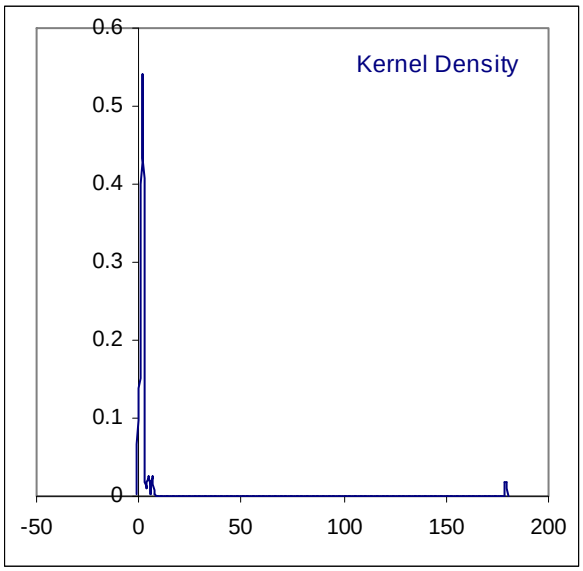
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	0.00	ex	-1.65	result excluded, zero is not a real value
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325	D5185	2		0.23	
331	D5185	1.6		-0.15	
340	D5185	2		0.23	
343	D5185	<1.0		-----	
349		-----		-----	
360	D5185	1.78		0.02	
398	D6595	0.9		-0.81	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		0.23	
473	D5185	<1	ex	-----	result excluded, see §4.1
496	D5185	2.10		0.32	
511	D6595	0.00	ex	-1.65	result excluded, zero is not a real value
512	D6595	0.0	ex	-1.65	result excluded, zero is not a real value
513	D6595	0.0	ex	-1.65	result excluded, zero is not a real value
541	D5185	<10		-----	
551	D5185	3		1.16	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	<1	C	-----	first reported: -4128
613		-----		-----	
614	D5185	1.62		-0.13	
657	D5185	4.46	G(0.01)	2.54	
663	D5185	2.3		0.51	
823		-----		-----	
862	D5185	1.9		0.13	
875		-----		-----	
902	D5185	2.08		0.30	
912		-----		-----	
963	D5185	0.76		-0.94	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	1.90		0.13	
1059	in house	<6		-----	
1106		-----		-----	
1146	D5185	1.297		-0.43	
1173	in house	1.5		-0.24	
1203	D5185	1.6		-0.15	
1212		-----		-----	
1231		-----		-----	
1243	DIN51391	0.88		-0.83	
1257		-----		-----	
1271	in house	2.495		0.69	
1278	D5185	1.87		0.10	
1293	D6595	0	ex	-1.65	result excluded, zero is not a real value
1316	D5185	1.63		-0.12	
1396	INH-12	0	ex	-1.65	result excluded, zero is not a real value
1402	D5185	1.7		-0.06	
1406		-----		-----	
1431	in house	2.0		0.23	
1452		-----		-----	
1460	D5185	179.3	G(0.01)	166.74	
1472		-----		-----	
1480	D5185	1.6		-0.15	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.845		0.08	
1800	in house	6.6	G(0.01)	4.55	
1827		-----		-----	
1833		-----		-----	
1842	in house	<1		-----	

1850	in house	<3		-----	
1854	D5185	2.0		0.23	
1900	D6595	0	ex	-1.65	result excluded, zero is not a real value
1915		-----		-----	
1948	D5185	n.d.		-----	
2122	D5185	1.0		-0.71	
3166	INH-7040	1.92		0.15	

	normality	OK
	n	28
	outliers	3
	mean (n)	1.76
	st.dev. (n)	0.489
	R(calc.)	1.37
	R(D5185:09)	2.98

Application range: 10 – 40 mg/kg





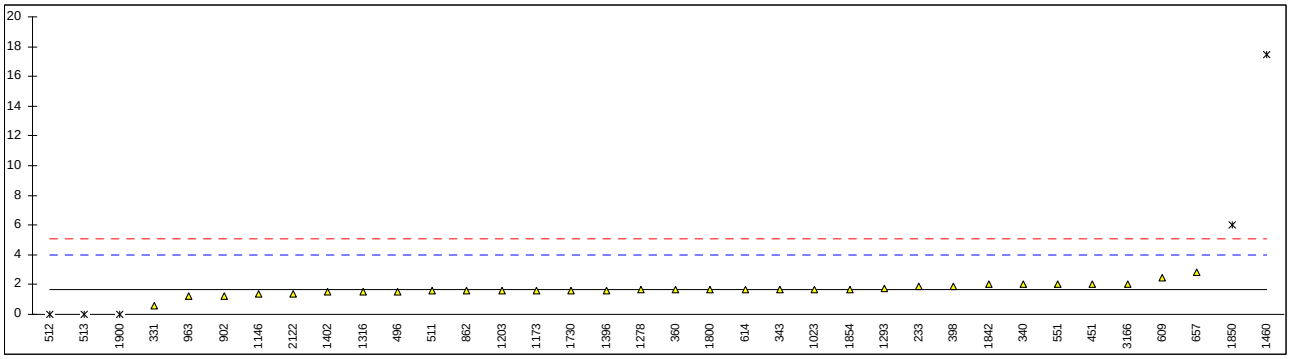
Determination of Titanium (Ti) on sample #12064; results in mg/kg

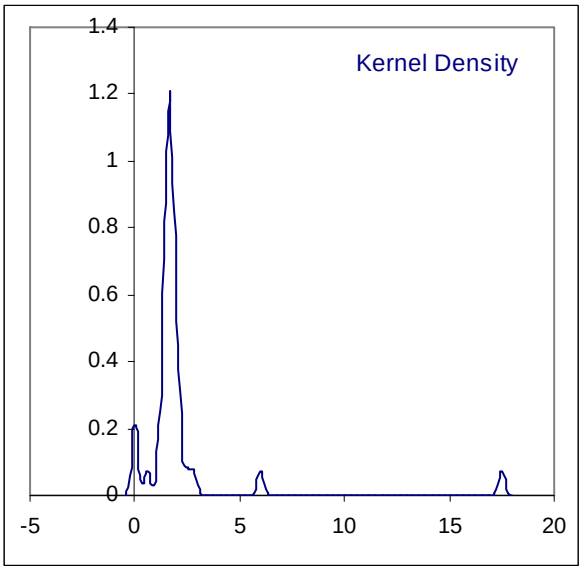
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	1.87		0.15	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325		-----		-----	
331	D5185	0.6		-0.96	
340	D5185	2		0.26	
343	D5185	1.7		0.00	
349		-----		-----	
360	D5185	1.66		-0.03	
398	D6595	1.9		0.18	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		0.26	
473	D5185	<1	ex	-----	result excluded, see §4.1
496	D5185	1.52		-0.16	
511	D6595	1.58		-0.10	
512	D6595	0.0	ex	-1.48	result excluded, zero is not a real value
513	D6595	0.0	ex	-1.48	result excluded, zero is not a real value
541	D5185	<5		-----	
551	D5185	2		0.26	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	2.447	C	0.65	first reported: 0.586
613		-----		-----	
614	D5185	1.7		0.00	
657	D5185	2.79		0.95	
663		-----		-----	
823		-----		-----	
862	D5185	1.6		-0.09	
875		-----		-----	
902	D5185	1.23		-0.41	
912		-----		-----	
963	D5185	1.21		-0.43	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	1.70		0.00	
1059		-----		-----	
1106		-----		-----	
1146	D5185	1.390		-0.27	
1173	in house	1.6		-0.09	
1203	D5185	1.6		-0.09	
1212		-----		-----	
1231		-----		-----	
1243		-----		-----	
1257		-----		-----	
1271		-----		-----	
1278	D5185	1.651		-0.04	
1293	D6595	1.763		0.06	
1316	D5185	1.52		-0.16	
1396	INH-12	1.63		-0.06	
1402	D5185	1.5		-0.17	
1406		-----		-----	
1431		-----		-----	
1452		-----		-----	
1460	D5185	17.5	G(0.01)	13.80	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.622		-0.07	
1800	in house	1.7		0.00	
1827		-----		-----	
1833		-----		-----	
1842	in house	2		0.26	

1850	in house	6	G(0.01)	3.76	
1854	D5185	1.7		0.00	
1900	D6595	0	ex	-1.48	result excluded, zero is not a real value
1915		-----		-----	
1948	D5185	n.d.		-----	
2122	D5185	1.4		-0.26	
3166	INH-7040	2.04		0.30	

	normality	not OK
	n	31
	outliers	2
	mean (n)	1.70
	st.dev. (n)	0.379
	R(calc.)	1.06
	R(D5185:09)	3.21

Application range: 5 – 40 mg/kg





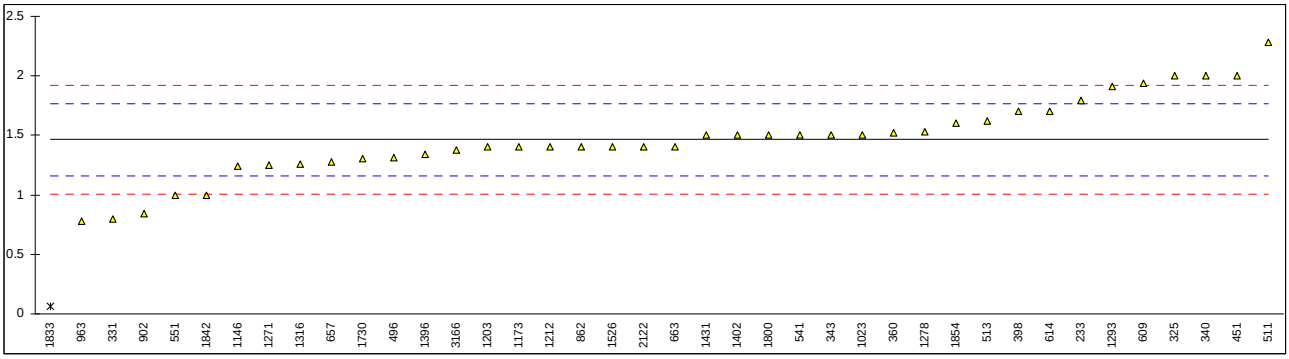
Determination of Vanadium (V) on sample #12064; results in mg/kg

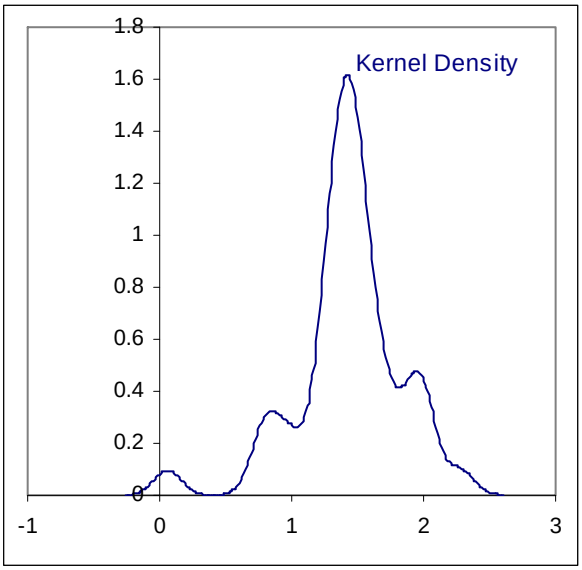
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	1.79		2.13	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311		-----		-----	
315		-----		-----	
325	D5185	2		3.51	
331	D5185	0.8		-4.37	
340	D5185	2		3.51	
343	D5185	1.5		0.23	
349		-----		-----	
360	D5185	1.52		0.36	
398	D6595	1.7		1.54	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	2		3.51	
473	D5185	<1	ex	-----	result excluded, see §4.1
496	D5185	1.31		-1.02	
511	D6595	2.28		5.35	
512		-----		-----	
513	D6595	1.621		1.02	
541	D5185	1.5		0.23	
551	D5185	1		-3.06	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	1.934	C	3.08	first reported: 0.354
613		-----		-----	
614	D5185	1.7		1.54	
657	D5185	1.28		-1.22	
663	D5185	1.4		-0.43	
823		-----		-----	
862	D5185	1.4		-0.43	
875		-----		-----	
902	D5185	0.84		-4.11	
912		-----		-----	
963	D5185	0.78		-4.50	
994		-----		-----	
1013		-----		-----	
1017		-----		-----	
1023	D5185	1.50		0.23	
1059	in house	<3		-----	
1106		-----		-----	
1146	D5185	1.240		-1.48	
1173	in house	1.4		-0.43	
1203	D5185	1.4		-0.43	
1212	IP470	1.4		-0.43	
1231		-----		-----	
1243	DIN51391	<1.0		-----	
1257		-----		-----	
1271	in house	1.25		-1.42	
1278	D5185	1.527		0.40	
1293	D6595	1.910		2.92	
1316	D5185	1.26		-1.35	
1396	IP593	1.34		-0.83	
1402	D5185	1.5		0.23	
1406		-----		-----	
1431	in house	1.5		0.23	
1452		-----		-----	
1460	D5185	<0.1		-----	
1472		-----		-----	
1480		-----		-----	
1526	D5185	1.4		-0.43	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	1.300		-1.09	
1800	in house	1.5		0.23	
1827		-----		-----	
1833	IP501	0.06	G(0.01)	-9.23	
1842	in house	1		-3.06	

1850	in house	<3	-----
1854	D5185	1.6	0.88
1900		-----	-----
1915		-----	-----
1948	D5185	n.d.	-----
2122	D5185	1.4	-0.43
3166	INH-7040	1.38	-0.56

normality	not OK
n	39
outliers	1
mean (n)	1.47
st.dev. (n)	0.333
R(calc.)	0.93
R(D5185:09)	0.43

Application range: 1 – 50 mg/kg





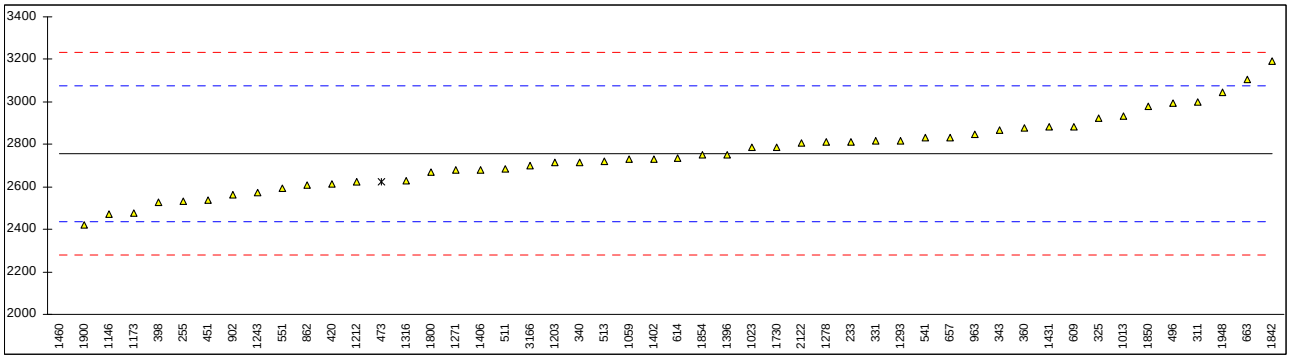
Determination of Calcium (Ca) on sample #12064; results in mg/kg

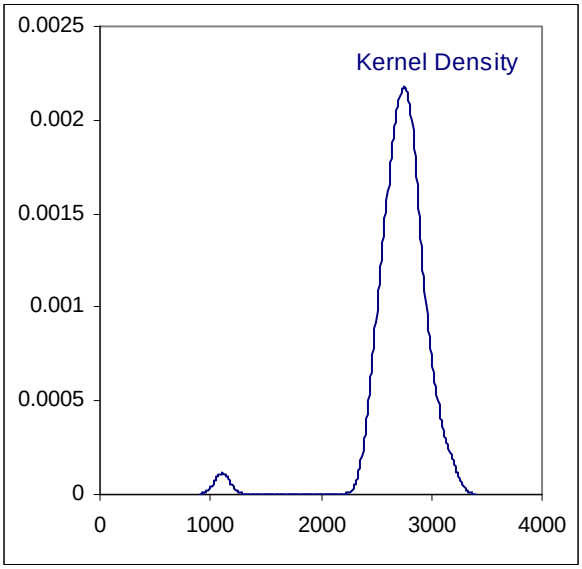
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	2812		0.36	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255	INH-021	2532.75		-1.40	
311	D5185	3000		1.54	
315		-----		-----	
325	D5185	2921		1.04	
331	D5185	2818.3		0.40	
340	D5185	2716		-0.25	
343	D5185	2869		0.72	
349		-----		-----	
360	D5185	2877		0.77	
398	D6595	2526.3		-1.44	
420	DIN51391	2613		-0.90	
432		-----		-----	
450		-----		-----	
451	D5185	2538		-1.37	
473	D5185	2626	ex	-0.81	result excluded, see §4.1
496	D5185	2996		1.51	
511	D6595	2683.11		-0.45	
512		-----		-----	
513	D6595	2721.52		-0.21	
541	D5185	2830		0.47	
551	D5185	2593		-1.02	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	2884	C	0.81	first reported: 3009
613		-----		-----	
614	D5185	2737		-0.12	
657	D5185	2832.5		0.49	
663	D5185	3107		2.21	
823		-----		-----	
862	D5185	2606.4		-0.94	
875		-----		-----	
902	D5185	2560.95		-1.22	
912		-----		-----	
963	D5185	2848		0.58	
994		-----		-----	
1013	D5185	2935		1.13	
1017		-----		-----	
1023	D5185	2785		0.19	
1059	in house	2729		-0.17	
1106		-----		-----	
1146	D5185	2470		-1.80	
1173	in house	2475.5		-1.76	
1203	D5185	2713		-0.27	
1212	IP470	2625.5		-0.82	
1231		-----		-----	
1243	DIN51391	2575		-1.14	
1257		-----		-----	
1271	D6481	2680		-0.47	
1278	D5185	2810		0.34	
1293	D6595	2819.000		0.40	
1316	D5185	2630		-0.79	
1396	INH-12	2753.22		-0.01	
1402	D5185	2730		-0.16	
1406	D4628	2680		-0.47	
1431	in house	2882		0.80	
1452		-----		-----	
1460	D5185	1109	G(0.01)	-10.36	
1472		-----		-----	
1480		-----		-----	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	2785.436		0.19	
1800	in house	2667.8		-0.55	
1827		-----		-----	
1833		-----		-----	
1842	in house	3190		2.73	

1850	in house	2977	1.39
1854	D5185	2750	-0.03
1900	D6595	2422	-2.10
1915		-----	-----
1948	D5185	3044.0	1.82
2122	D5185	2806.5	0.32
3166	INH-7040	2700	-0.35

normality	OK
n	48
outliers	1
mean (n)	2755.37
st.dev. (n)	169.282
R(calc.)	473.99
R(D5185:09)	444.96

Application range: 40 – 9000 mg/kg





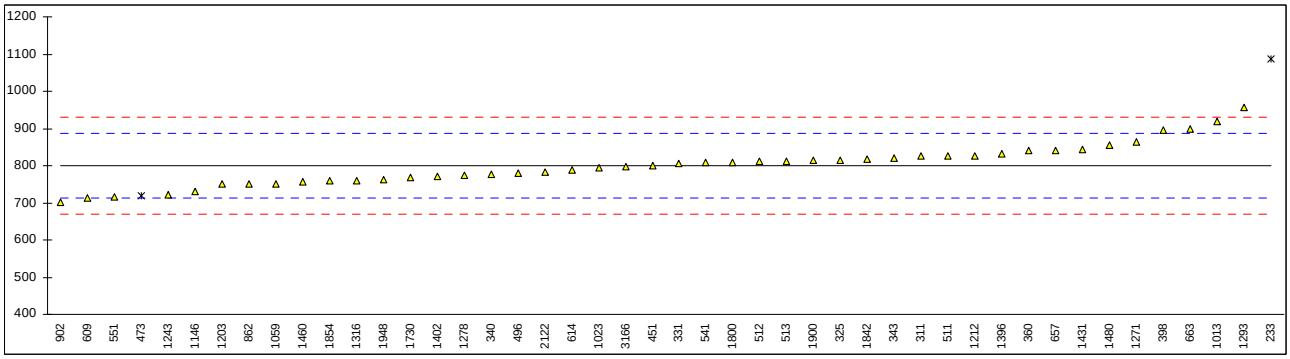
Determination of Phosphorus (P) on sample #12064; results in mg/kg

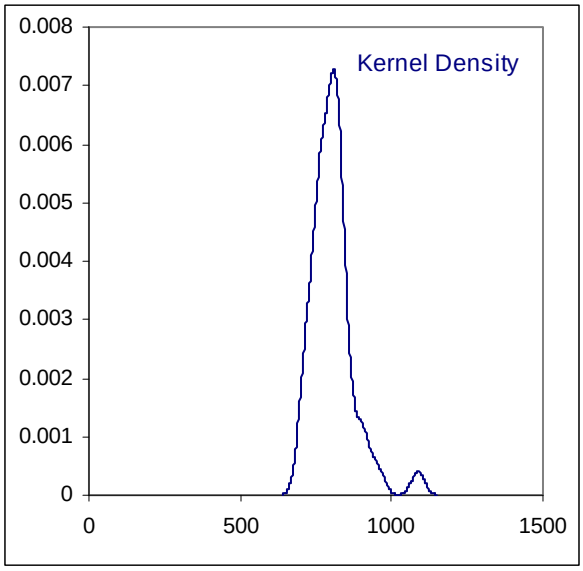
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	1088	G(0.01)	6.60	
237		-----		-----	
252		-----		-----	
254		-----		-----	
255		-----		-----	
311	D5185	825		0.55	
315		-----		-----	
325	D5185	814		0.30	
331	D5185	806.0		0.11	
340	D5185	777		-0.55	
343	D5185	821		0.46	
349		-----		-----	
360	D5185	840		0.89	
398	D6595	896.4		2.19	
420		-----		-----	
432		-----		-----	
450		-----		-----	
451	D5185	801		0.00	
473	D5185	720	ex	-1.87	result excluded, see §4.1
496	D5185	780.6		-0.47	
511	D6595	825.41		0.56	
512	D6595	812.69		0.27	
513	D6595	812.69		0.27	
541	D5185	809		0.18	
551	D5185	715		-1.98	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	714	C	-2.00	first reported: 824.4
613		-----		-----	
614	D5185	789.7		-0.26	
657	D5185	840.8		0.91	
663	D5185	898		2.23	
823		-----		-----	
862	D5185	750.3		-1.17	
875		-----		-----	
902	D5185	702.04		-2.28	
912		-----		-----	
963		-----		-----	
994		-----		-----	
1013	D5185	920		2.74	
1017		-----		-----	
1023	D5185	793		-0.19	
1059	in house	752		-1.13	
1106		-----		-----	
1146	D5185	731.4		-1.60	
1173		-----		-----	
1203	D5185	750		-1.18	
1212	in house	827.4		0.60	
1231		-----		-----	
1243	DIN51391	722		-1.82	
1257		-----		-----	
1271	D6481	865		1.47	
1278	D5185	773		-0.65	
1293	D6595	957.023		3.59	
1316	D5185	760		-0.95	
1396	INH-12	832.16		0.71	
1402	D5185	772		-0.67	
1406		-----		-----	
1431	in house	843		0.96	
1452		-----		-----	
1460	D5185	757		-1.01	
1472		-----		-----	
1480	D5185	854.1		1.22	
1526		-----		-----	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	769.174		-0.73	
1800	in house	809.6		0.20	
1827		-----		-----	
1833		-----		-----	
1842	in house	816		0.34	

1850		-----	-----
1854	D5185	760	-0.95
1900	D6595	814	0.30
1915		-----	-----
1948	D5185	760.9	-0.93
2122	D5185	781.4	-0.45
3166	INH-7040	798	-0.07

normality	OK
n	44
outliers	1
mean (n)	801.11
st.dev. (n)	54.469
R(calc.)	152.51
R(D5185:09)	121.71

Application range: 10 – 1000 mg/kg





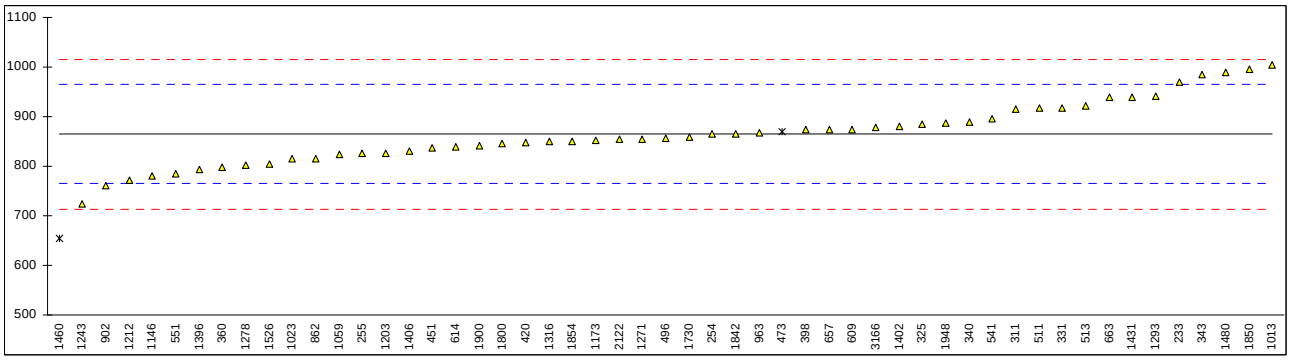
Determination of Zinc (Zn) on sample #12064; results in mg/kg

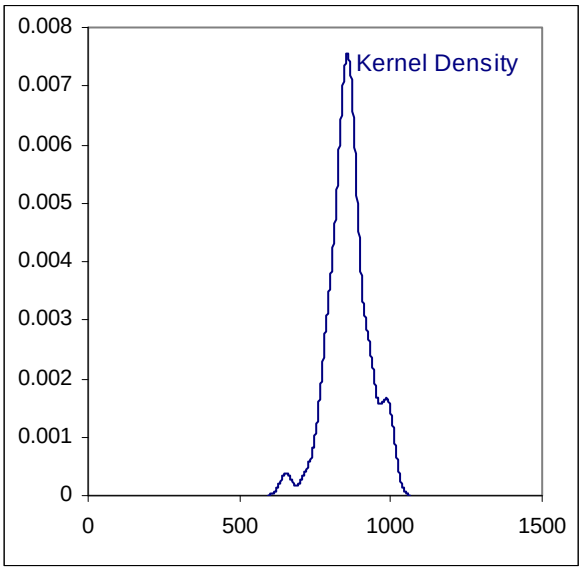
lab	method	value	mark	z(targ)	remarks
230		-----		-----	
233	D6595	968.57		2.05	
237		-----		-----	
252		-----		-----	
254	IP308	864.8355		0.00	
255	INH-021	826.49		-0.76	
311	D5185	915		0.99	
315		-----		-----	
325	D5185	884		0.38	
331	D5185	918.0		1.05	
340	D5185	889		0.48	
343	D5185	985		2.38	
349		-----		-----	
360	D5185	798		-1.33	
398	D6595	873.8		0.17	
420	DIN51391	848		-0.34	
432		-----		-----	
450		-----		-----	
451	D5185	837		-0.56	
473	D5185	869	ex	0.08	result excluded, see §4.1
496	D5185	856.1		-0.18	
511	D6595	916.41		1.02	
512		-----		-----	
513	D6595	921.36		1.12	
541	D5185	895		0.59	
551	D5185	785		-1.59	
562		-----		-----	
593		-----		-----	
608		-----		-----	
609	D5185	874	C	0.18	first reported: 1055
613		-----		-----	
614	D5185	839.4		-0.51	
657	D5185	873.8		0.17	
663	D5185	939		1.47	
823		-----		-----	
862	D5185	816.1		-0.97	
875		-----		-----	
902	D5185	759.9		-2.08	
912		-----		-----	
963	D5185	867.5		0.05	
994		-----		-----	
1013	D5185	1005		2.78	
1017		-----		-----	
1023	D5185	815		-0.99	
1059	in house	825		-0.79	
1106		-----		-----	
1146	D5185	780.9		-1.67	
1173	in house	851.6		-0.27	
1203	D5185	827		-0.75	
1212	IP470	772.1		-1.84	
1231		-----		-----	
1243	DIN51391	725		-2.78	
1257		-----		-----	
1271	D6481	855		-0.20	
1278	D5185	803		-1.23	
1293	D6595	940.380		1.49	
1316	D5185	850		-0.30	
1396	IP593	793.27		-1.42	
1402	D5185	881		0.32	
1406	D4628	830		-0.69	
1431	in house	940		1.49	
1452		-----		-----	
1460	D5185	655	G(0.05)	-4.16	
1472		-----		-----	
1480	D5185	988.9		2.46	
1526	D5185	804		-1.21	
1622		-----		-----	
1650		-----		-----	
1720		-----		-----	
1722		-----		-----	
1730	D5185	858.966		-0.12	
1800	in house	845.0		-0.40	
1827		-----		-----	
1833		-----		-----	
1842	in house	866		0.02	

1850	in house	995	2.58
1854	D5185	850	-0.30
1900	D6595	842	-0.46
1915		-----	-----
1948	D5185	888.0	0.46
2122	D5185	854.1	-0.22
3166	INH-7040	878	0.26

normality	OK
n	51
outliers	1
mean (n)	865.01
st.dev. (n)	61.990
R(calc.)	173.57
R(D5185:09)	141.19

Application range: 60 – 1600 mg/kg





APPENDIX 2

Analytical details acid number determination via ASTM D664

lab	method	type of apparatus	KOH solution			type electrodes	pH4/pH7 (mV)	drift of electrode	blank titration	sample size (g)	unit reading
			A	B	C						
230	2009a, A	799 Titrino	Yes	Yes	Yes	Ag/AgCl, LiCl sat in EtOH	174	1	Yes	5.0832	mV
233											
237	2009a, A	848 Titrino Plus	Yes	Yes	Yes	LiCl sat in EtOH	162.9	1	Yes	5.05	mV
252											
254											
255											
311											
315											
325	2009, A	automatic - autosampler	No	Yes	No	LiCl sat in EtOH	175	1	Yes	ca. 1	mV
331											
340		798 MPT	Yes	Yes	paper filter	Ag/AgCl with LiCl in EtOH 1m-3m	180	2	Yes	5.089	mV
343	2009, A	automatic titrator 1.907.0010	*)	*)	*)	pH electrode nonaqueous (LiCl 3m EtOH)	173.4	1	Yes	5	mV
349											
360	V2.00.113,A	Mettler Toledo titrator DL28	Yes	Yes	Yes	DG 113-SC	164.0	1	Yes	5	mV
398											
420											
432											
450											
451											
473											
496	2011a, A	Metrohm 730 Sampler Changer, Metrohm 721 Net titrino, Metrohm Tiamo 2.2	*)	*)	*)	Metrohm Pt-Titrode, Ag/AgCl Metrohm Ag/AgCl Electrode reference	170	2	Yes	1.637 & 1.622	mV
511	2011a, A	848 Titrino Plus	Yes	Yes	Yes		172	1	Yes	12.0238	mV
512											
513											
541											
551	2007, A	Potentiometer	No	Yes	No	Ag/AgCl	163	1	Yes	2.04	pH
562											
593											
608	2011a, A	809 titrando	Yes	Yes	Yes	Combined pH electrode, ground joint diaphragm	174.2	turned off	Yes	4 to 5	mV
609	2011a, A	automatic Potentiometer	No	No	No	AgCl	177.4	1	Yes	120 mL	mV
613											
614											
657	2011a, A	Titrino Plus 848	*)	*)	*)	LL solvotrode Metrohm	177.5	1	Yes	5	mV
663											
823											
862	2011a, A	809 Titrando	Yes	Yes	Yes		167.2		Yes	2.1/2.2	mV
875											
902											
912											
963											
994											
1013											
1017											
1023											
1059											
1106	2011a,A	Automatic Potentiometric titrator	Yes	Yes	Yes	Ag/AgCl	207		Yes	1.0254	mV
1146	2009a,A	716 DMS Titrino	*)	*)	*)	pH glas, Ag/AgCl with	163.3	3	Yes	18.54	mV

1173						LiCl in EtOH, pH ring electrode					
1203	2001, A	KEM Automatic Titrator AT-510	Yes	Yes	No	Combination electrode Thermus 8172 BNWP	171.7	0	Yes	ca. 3	mV
1212	2007, A	Metrohm Tiamo	Yes	Yes	Munktell filter grade 3	Metrohm solvotrode 6.0229.100	180	1-2	Yes	2	mV
1231	2009, A		Yes	Yes	Yes	Combination electrode	216		Yes	ca. 5	mV
1243											
1257											
1271	2009, A	Titrino 716	Yes	Yes	paper filter	LL Solvotrode Metrohm	177	zie rep form	No	5.0	mV
1278											
1293											
1316											
1396											
1402											
1406											
1431											
1452											
1460	2009, A	Mettler Toledo titrator DL28	Yes	Yes	Yes	Combination electrode MT DG-113	183.5	2	Yes	5.000	mV
1472											
1480											
1526											
1622	2009, A	Titrino 794	Yes	Yes	Yes	LiCl sat in EtOH Methrohm 6.0229.100		1	Yes	5	mV
1650	2009a, A	Titrino 798	No	No	No	Combination electrode (Solvotrode)	152		Yes	5.0224	mV
1720	2007, A	Mettler/Toledo D50	Yes	Yes	Yes	DG113	165		Yes	5	mV
1722											
1730											
1800											
1827	2011a, A	Titrino 702	*)	*)	*)	Metrohm solvotrode	182	1	Yes	1	mV
1833											
1842											
1850											
1854	2011a, A		No	No	No	LiCl	***280***		No	4.5442	mV
1900		Metrohm automatic titrator	*)	*)	*)		168	2	Yes	1.801	mV
1915			Yes	Yes	Yes	Ag/AgCl filled (1m-3m) LiCl sat in EtOH	174		Yes	5.0832	mV
1948								1			
2122			Yes	Yes	Yes	LiCl sat in EtOH	162.9	1	Yes	5.05	mV
3166											

A = boiled for 10 minutes

B = stand for 2 days

C = filtered

*) a commercial “ready for use” KOH standard solution was used

APPENDIX 3

Number of participants per country

1 lab in ARGENTINA
2 labs in AUSTRALIA
1 lab in AUSTRIA
1 lab in AZERBAIJAN
2 labs in BELGIUM
1 lab in BOSNIA and HERZEGOVINA
1 lab in BRAZIL
1 lab in BULGARIA
1 lab in CHILE
1 lab in CROATIA
1 lab in CZECH REPUBLIC
1 lab in ECUADOR
1 lab in FINLAND
2 labs in FRANCE
3 labs in GERMANY
1 lab in GHANA
4 labs in GREECE
1 lab in HUNGARY
1 lab in INDIA
1 lab in INDONESIA
1 lab in ITALY
2 labs in KENYA
1 lab in KOREA
3 labs in MALAYSIA
1 lab in MAURITIUS
1 lab in NEGARA BRUNEI DARUSSALAM
1 lab in NIGERIA
3 labs in NORWAY
1 lab in P.R. of CHINA
3 labs in PERU
1 lab in PORTUGAL
1 lab in REPUBLIC OF MACEDONIA
1 lab in RUSSIA
3 labs in SAUDI ARABIA
1 lab in SINGAPORE
1 lab in SLOVENIA
5 labs in SPAIN
1 lab in SUDAN
2 labs in SWEDEN
1 lab in TANZANIA
3 labs in THAILAND
3 labs in THE NETHERLANDS
4 labs in TURKEY
1 lab in U.A.E.
1 lab in U.S.A.
8 labs in UNITED KINGDOM

APPENDIX 4

Abbreviations:

C	= final result after checking of first reported suspect result
D(0.01)	= outlier in Dixon's outlier test
D(0.05)	= straggler in Dixon's outlier test
G(0.01)	= outlier in Grubbs' outlier test
G(0.05)	= straggler in Grubbs' outlier test
DG(0.01)	= outlier in Double Grubbs' outlier test
DG(0.05)	= straggler in Double Grubbs' outlier test
ex	= excluded from calculations
W	= results withdrawn on request of the participants
fr.	= first reported
S	= scope of the reported method is not applicable
n.a.	= not applicable
SDS	= Safety Data Sheet

Literature:

1 iis. Interlaboratory Studies, Protocol for the Organization, Statistics and Evaluation, January 2010
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3 ASTM E1301-89
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11 J.N. Miller, Analyst, 118, 455, (1993)
12 Analytical Methods Committee Technical brief, No4 January 2001.
13 The Royal Society of Chemistry 2002, Analyst 2002, 127 pages 1359-1364, P.J. Lowthian and M. Thompson (see http://www.rsc.org/suppdata/an/b2/b205600n/).