

EBB

European Biodiesel Board

EBB EUROPEAN BIODIESEL QUALITY REPORT (EBBQR)

Results of the first round of tests

WINTER 2006-07

EBB – European Biodiesel Board



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EBBQR
1st Round of tests
Winter 2006 - 2007



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General Scope:

- secure that a high quality biodiesel fuel is produced and made available in the market by EBB Member companies level, specifically in the perspective of increasing from 5% to 10% the maximum FAME content in EN590
- monitor quality level attained using various kind of raw materials or blends of them ensuring that quality standard and requirements are always fulfilled
- gather and publish statistical data and reliable information about biodiesel quality from EBB members for and technical purposes.
- assess the overall European Biodiesel industry quality performances with respect to standardised quality requirements
- establish a clear and effective system providing reliable information and warranties about the quality of biodiesel marketed in Europe, serving as a reference for the other market players in the fuel sector and for public authorities



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EBB Biodiesel Quality Report

Basic assumptions

- Bi-annual sampling (beginning of summer and beginning winter)
- Member Companies to send to the selected lab a sample per operating plant
- Cost to be beard by companies through EBB
- Test results from the laboratory sent to EBB Secretariat on confidential basis
- EBB Secretariat sends to the concerned Company its/their own results
- A general bi-annual statement will be published – NO per company results published
- No unexpected sampling
- EBB web-site section on European Biodiesel Quality Report



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EBB Biodiesel Quality Report

Biodiesel to be tested and parameters

- EN14214 is considered the quality reference of biodiesel.
- All the parameters of the EN14214 are analysed
- in principle there should be no additive in the sample (except for oxidising stabiliser which is admitted – and should be declared), unless the addition of the additive cannot be avoided in the normal production process (the priority is given to the gathering of samples from the usual plant production)



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Contract being negotiated with ASG laboratory in Germany

- founded in 1992, since 1994 performed biodiesel analytical services for producers and organisations.
- today: leading independent institute for biofuel testing and consulting in Germany
- in 1998 was the first lab in Europe to obtain the EN 17025 accreditation for Biodiesel
- customers (users, traders, producers, car manufacturers and organisations) all over the world
- has been involved in setting the EN 14214 standard and to be still engaged in some CEN working groups and task forces



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Contract scheme

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Main contract

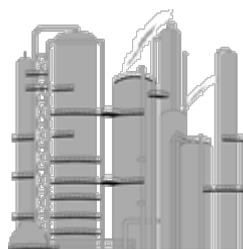
Lab

Analysis report:

- Results for plant code

(only EBB Secretariat can associate code and plant)

- Statistics



1 month before the analysis 3 metal container sent with label and seals for anonymity. The sending bag will have all the instruction to send back the samples.



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First sampling and analysis winter quality

- Start of sampling: January 2007
- Start of analysis: March 2007
- N° of samples (1x plant): 32
- Next round of analyses and sampling starting July 2007



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Ester content

EN 14214	>96,5 % m/m
Min.	96,5 % m/m
Max.	99,1 % m/m
Average	98,7 % m/m
Std. Deviation	0,6 % m/m
Range 95% max	99,8 % m/m
Range 95% min	97,5 % m/m
Out of spec	0,0 -

All values > 99 % rounded off 99,1 %



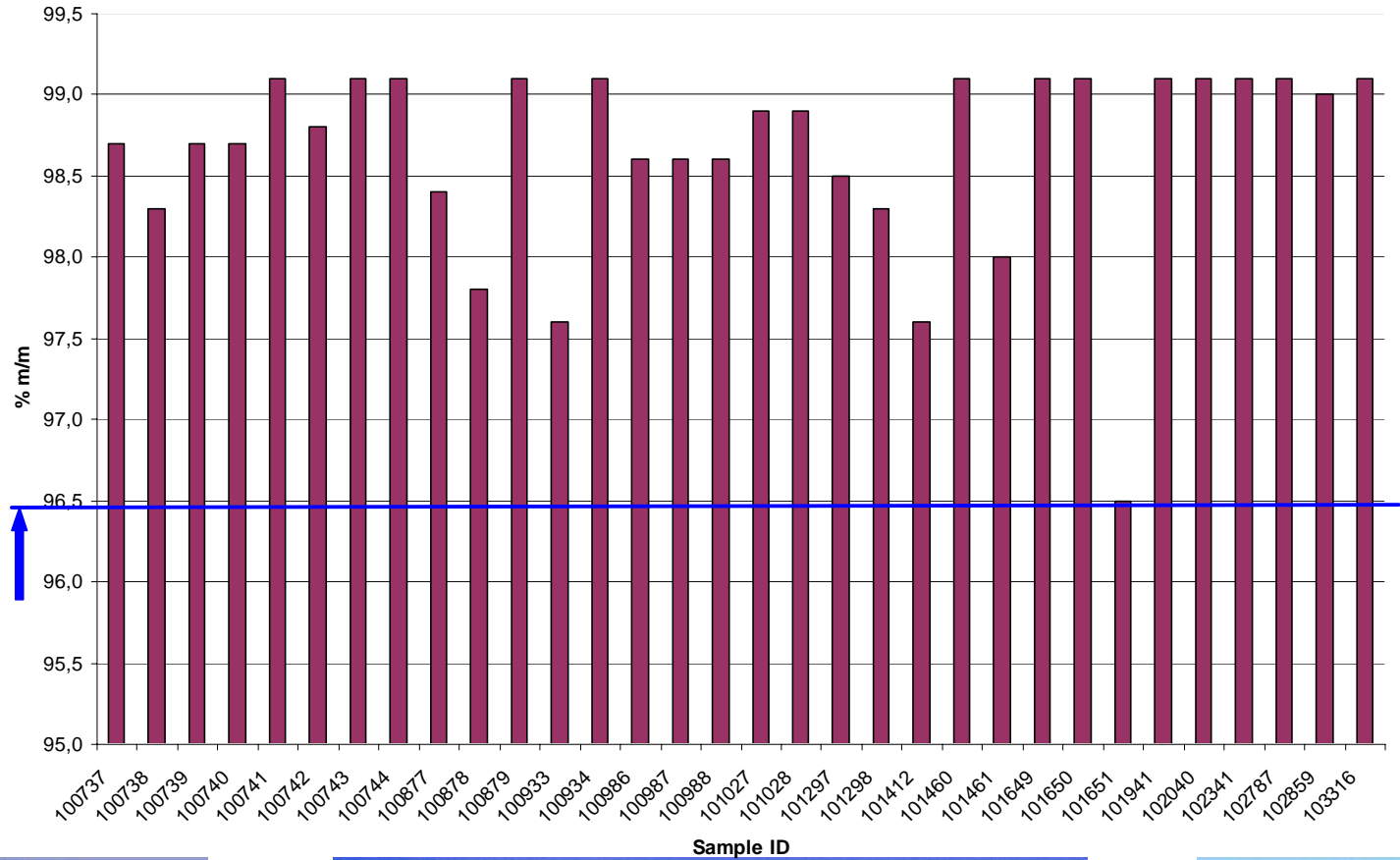
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Ester content



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Density

EN 14214	860 - 900 kg/m ³
Min.	878,8 kg/m ³
Max.	885,8 kg/m ³
Average	882,9 kg/m ³
Std. Deviation	1,4 kg/m ³
Range 95% max	885,8 kg/m ³
Range 95% min	880,1 kg/m ³
Out of spec	0 -



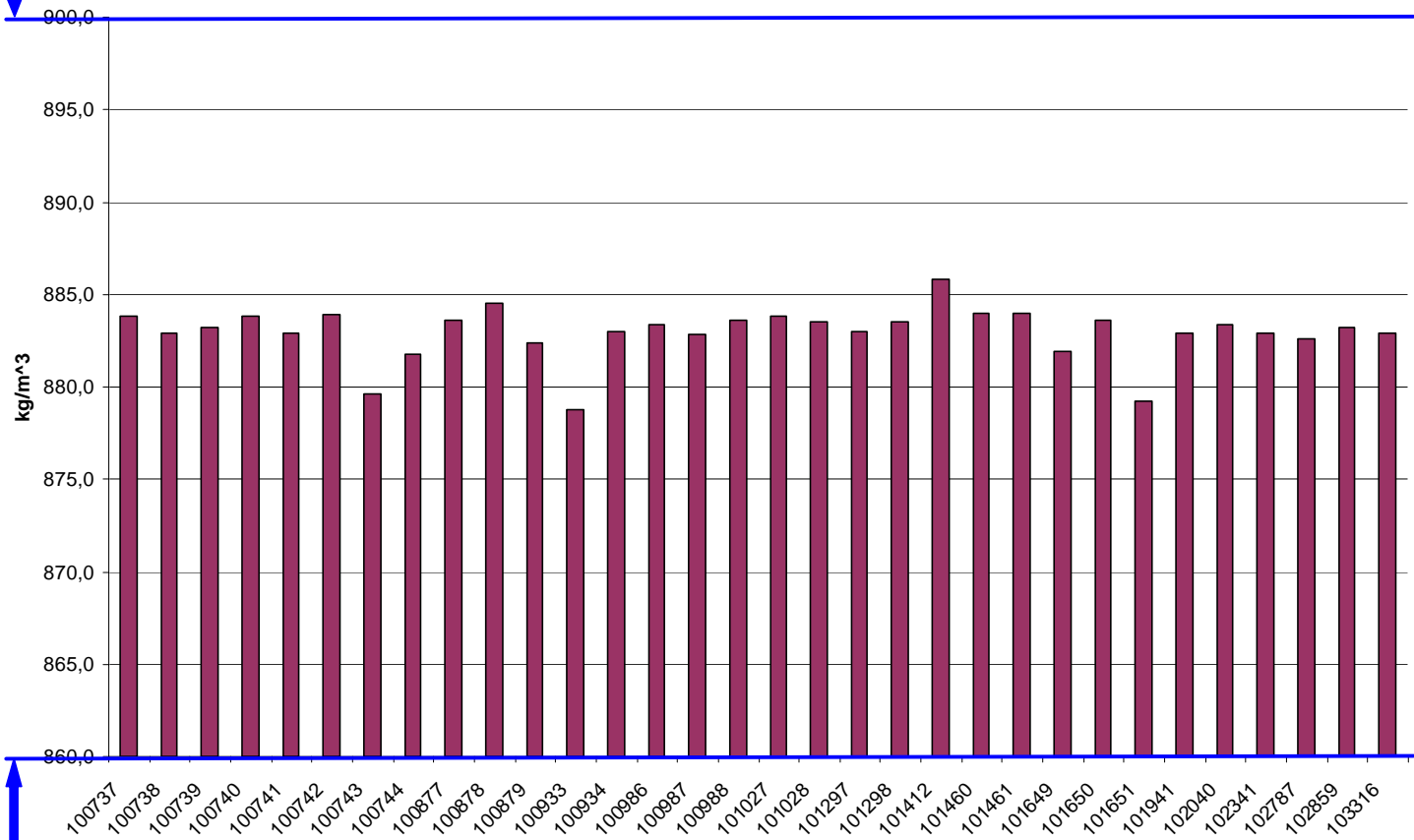
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Density 15°C



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Kin. Viscosity 40°C

EN 14214	3,5 - 5 mm ² /s
Min.	4,34 mm ² /s
Max.	4,60 mm ² /s
Average	4,45 mm ² /s
Std. Deviation	0,07 mm ² /s
Range 95% max	4,60 mm ² /s
Range 95% min	4,31 mm ² /s
Out of spec	0 -



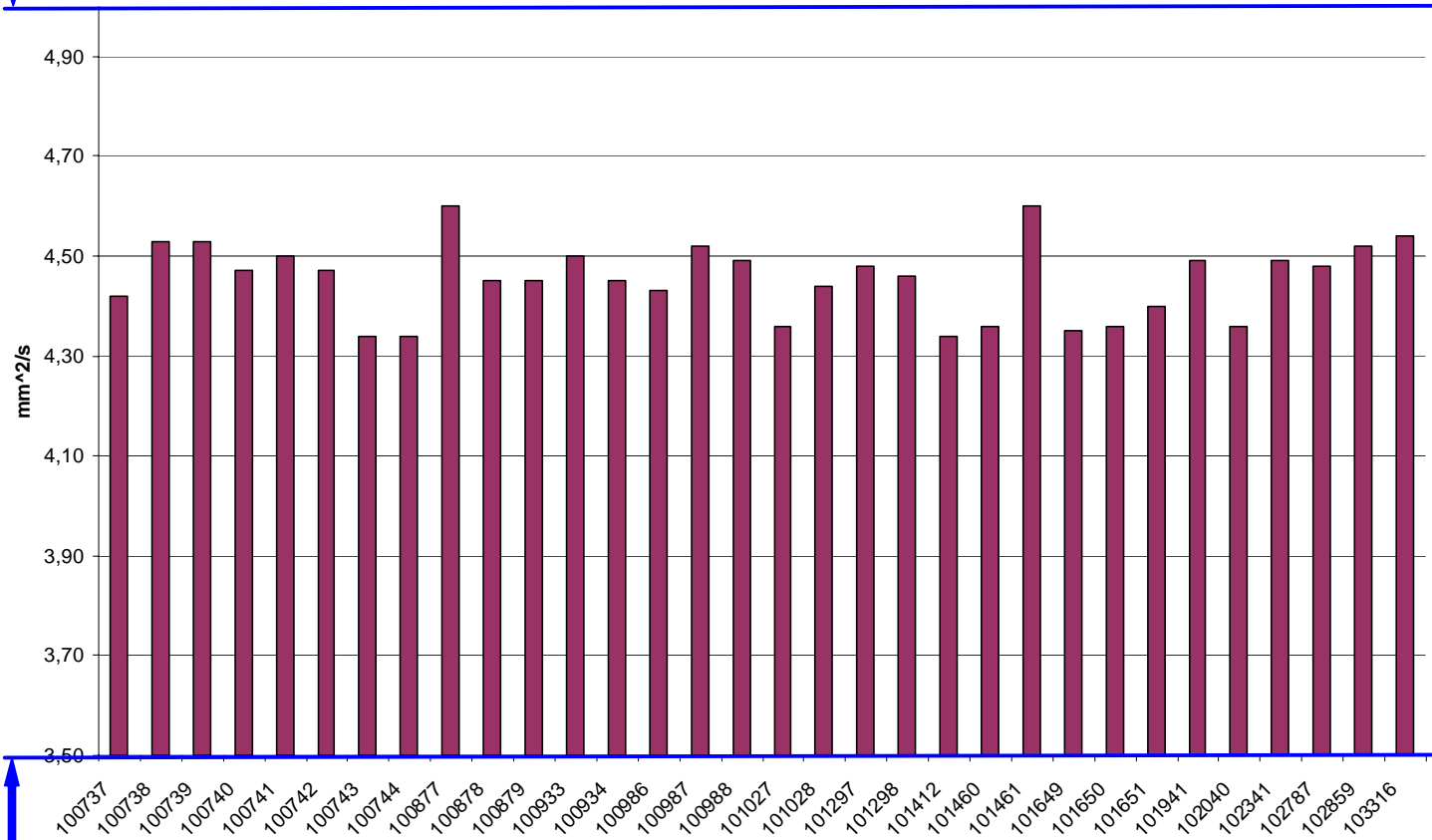
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Kin Viscosity 40°C



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Flash point

EN 14214	>120 °C
Min.	135 °C
Max.	190 °C
Average	174 °C
Std. Deviation	12 °C
Range 95% max	198 °C
Range 95% min	150 °C
Out of spec	0 -



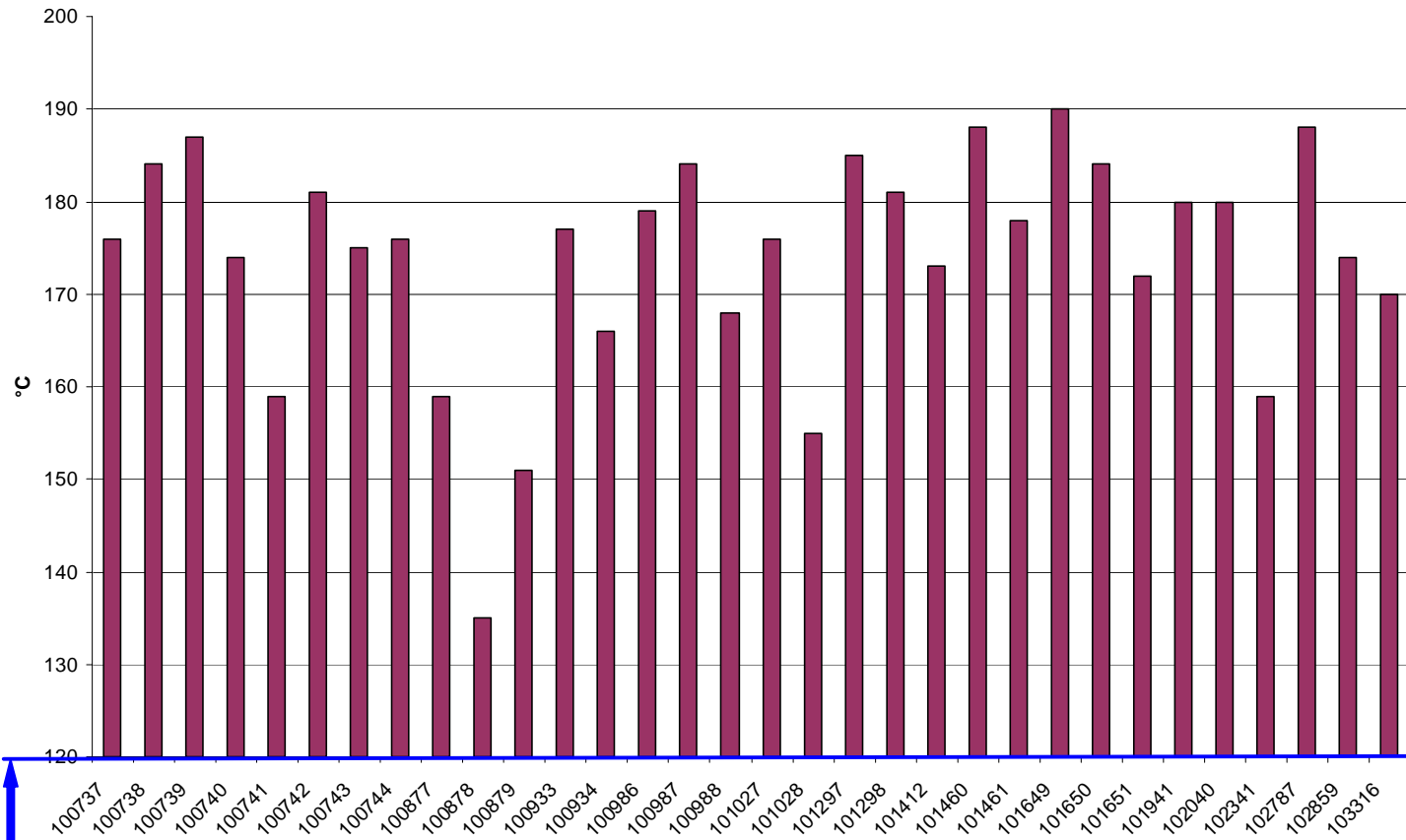
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Flash point



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Sulfur content

EN 14214	<10 mg/kg
Min.	0,9 mg/kg
Max.	18,0 mg/kg
Average	3,0 mg/kg
Std. Deviation	3,4 mg/kg
Range 95% max	9,9 mg/kg
Range 95% min	0,0 mg/kg
Out of spec	2 -

All values < 1 mg/kg rounded off 0,9 mg/kg

Test method minimal value = 3 mg/kg



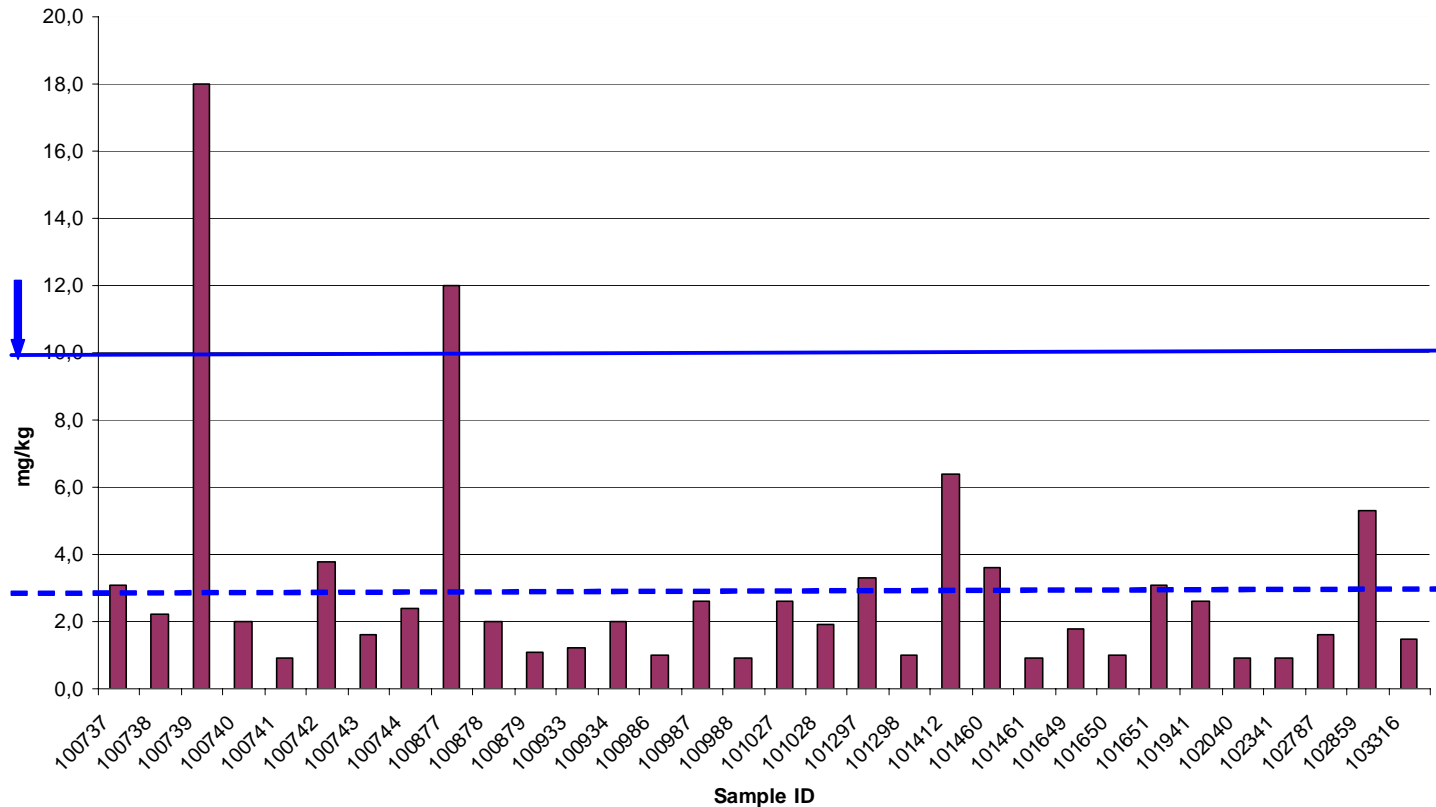
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Sulfur content



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Carbon Residue (10% D.)

EN 14214	<0,30 % (m/m)
Min.	0,009 % (m/m)
Max.	0,18 % (m/m)
Average	0,05 % (m/m)
Std. Deviation	0,04 % (m/m)
Range 95% max	0,14 % (m/m)
Range 95% min	0 % (m/m)
Out of spec	0 -

All values < 0,01 %(m/m) rounded off 0,009 %(m/m)



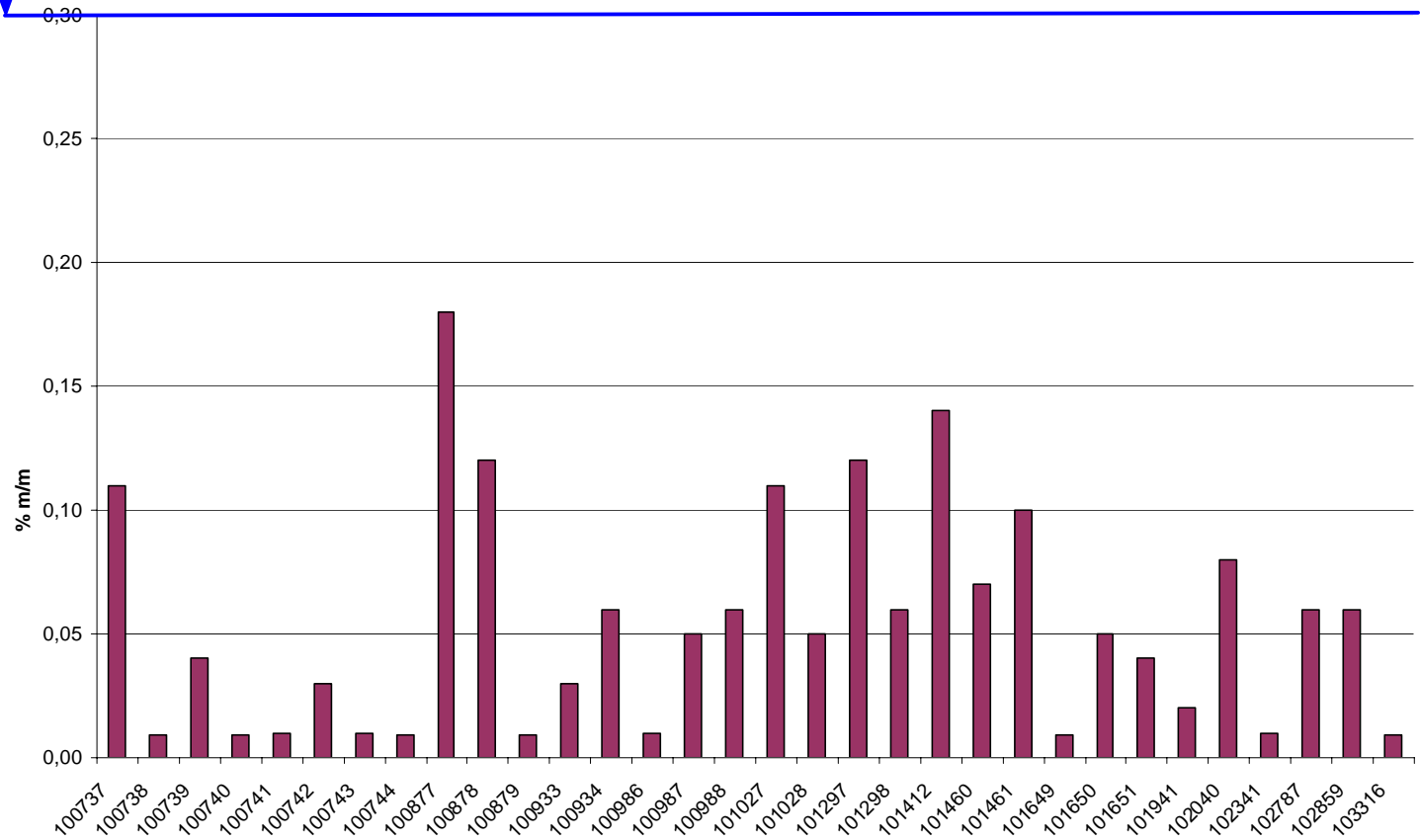
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Carbon Residue (10%D.)



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Cetane Number

EN 14214	>51 -
Min.	50,9 -
Max.	55,2 -
Average	52,2 -
Std. Deviation	1,2 -
Range 95% max	54,6 -
Range 95% min	49,8 -
Out of spec*	1

***1 sample border line**



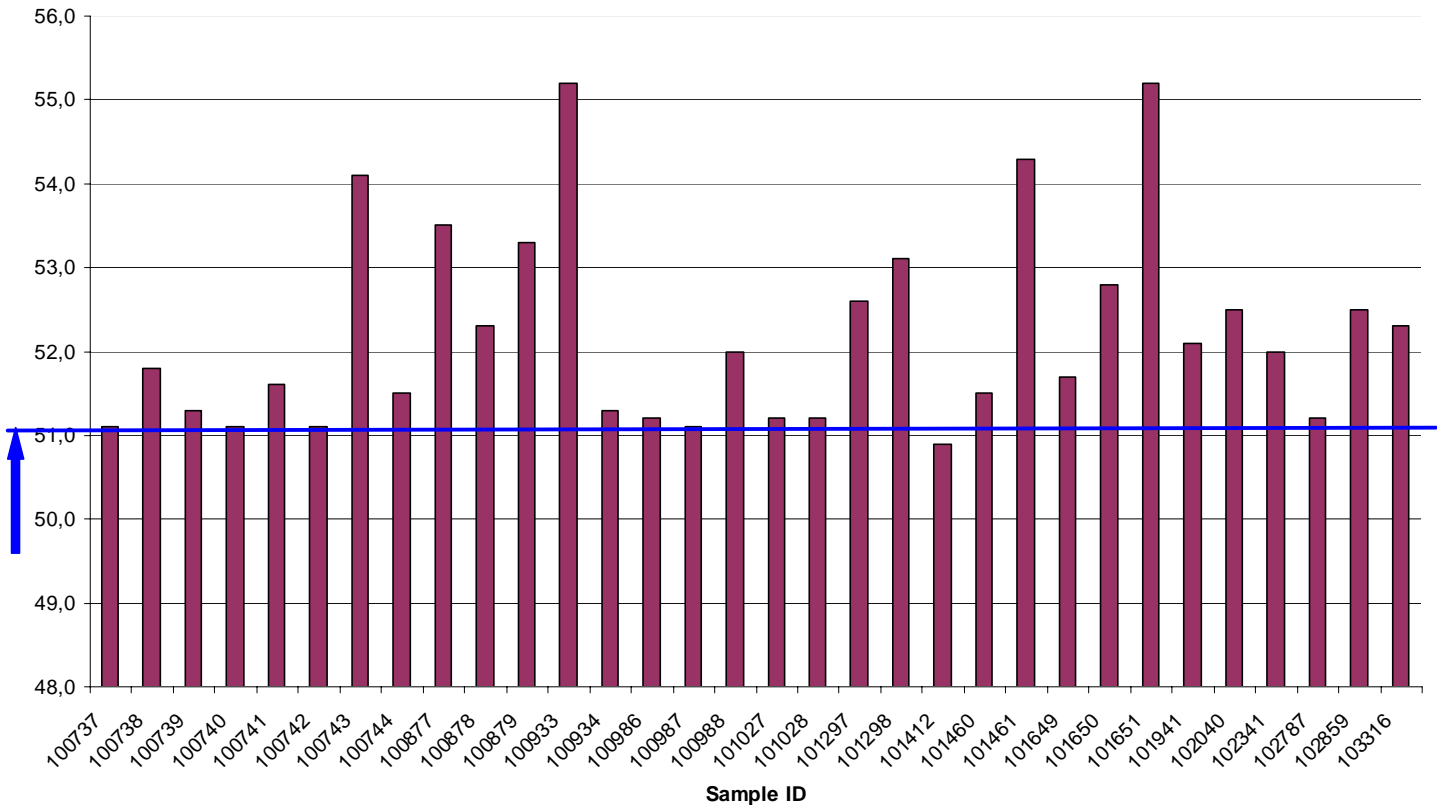
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Cetane Number



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Sulfated Ash

EN 14214	< 0,02 % m/m
Min.	0,001 % m/m
Max.	0,009 % m/m
Average	0,002 % m/m
Std. Deviation	0,002 % m/m
Range 95% max	0,006 % m/m
Range 95% min	0,000 % m/m
Out of spec	0

All values < 0,001 %(m/m) rounded off 0,0009 %(m/m)



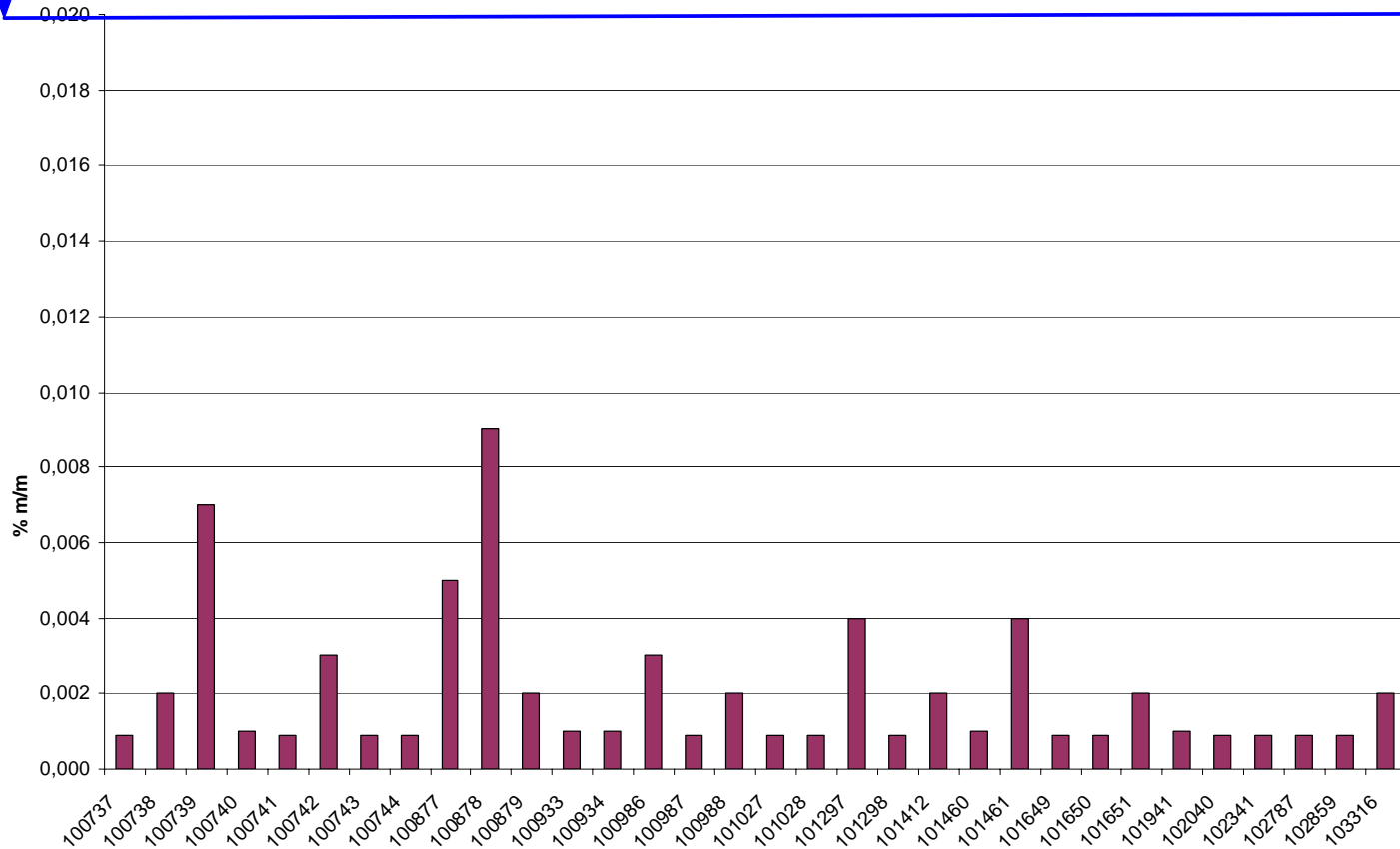
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Sulfated Ash



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Water Content

EN 14214	500 mg/kg
Min.	22 mg/kg
Max.	441 mg/kg
Average	131 mg/kg
Std. Deviation	81 mg/kg
Range 95% max	292 mg/kg
Range 95% min	0 mg/kg
Out of spec	0



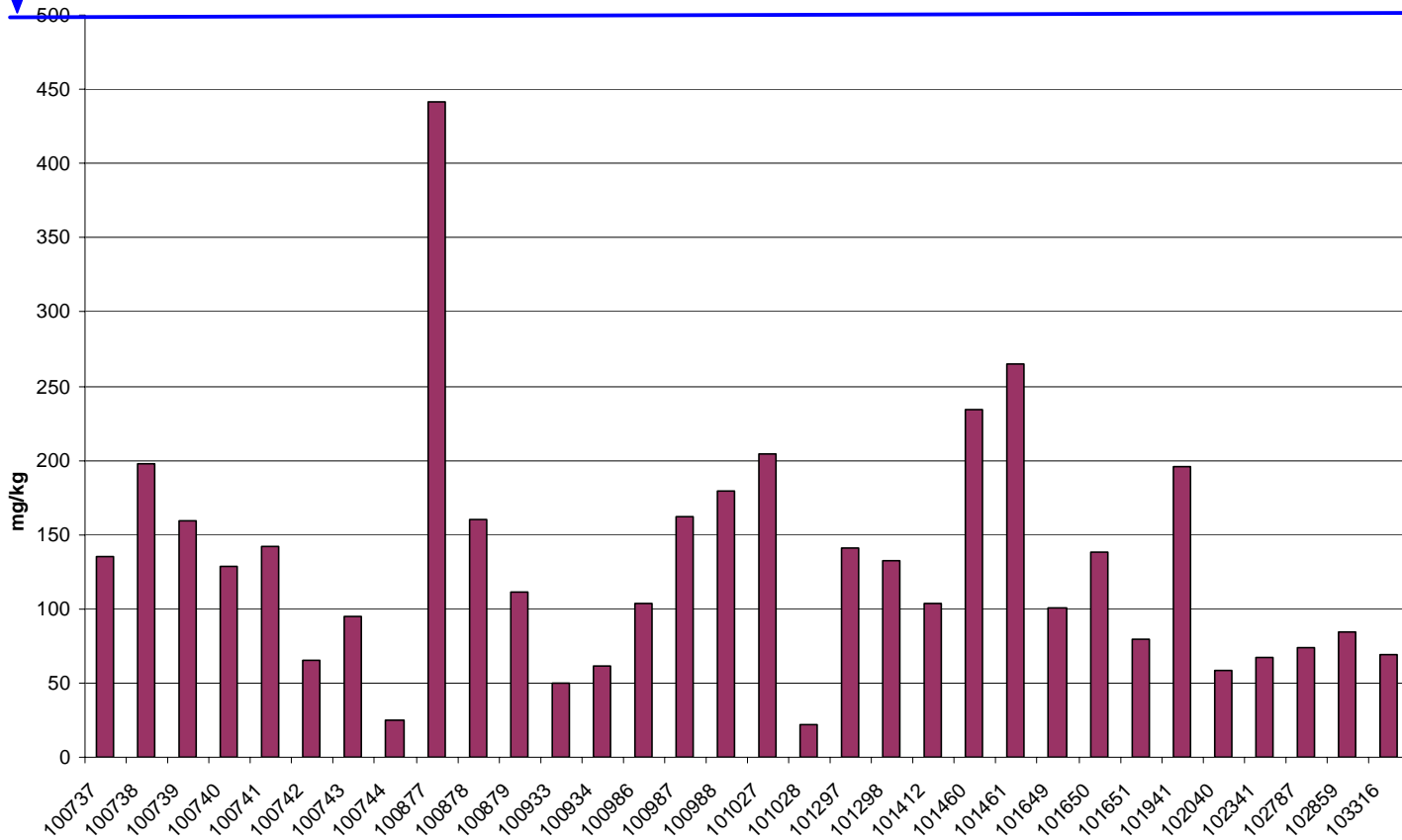
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Water Content



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Total Contamination

EN 14214	<24 mg/kg
Min.	1 mg/kg
Max.	24 mg/kg
Average	7 mg/kg
Std. Deviation	6 mg/kg
Range 95% max	18 mg/kg
Range 95% min	0 mg/kg
Out of spec	0



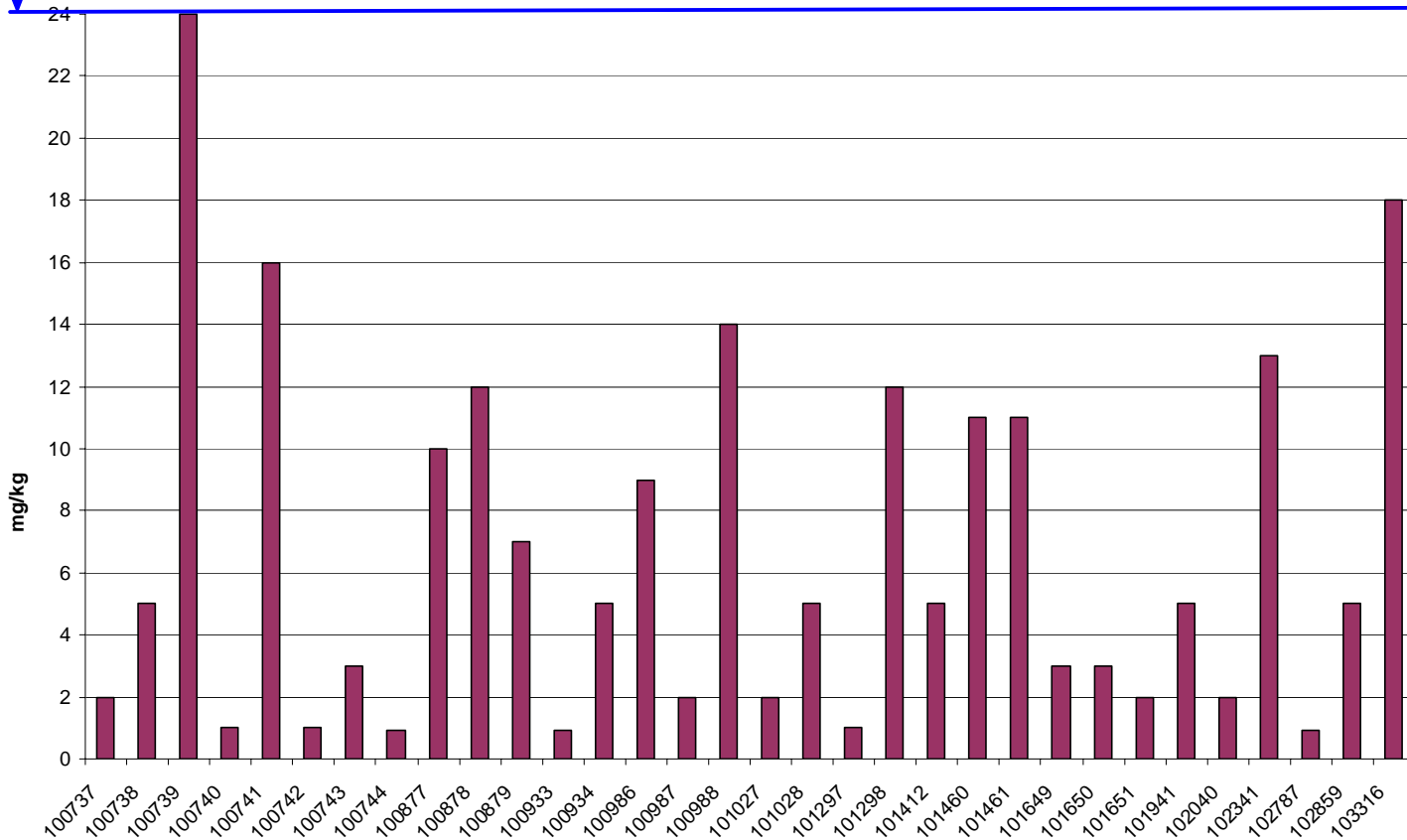
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Total Contamination



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Copper strip corrosion

EN 14214	Classe 1
Min.	Classe 1
Max.	Classe 1
Average	Classe 1
Std. Deviation	
Range 95% max	
Range 95% min	
Out of spec	0



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Oxidation Stability

EN 14214	>6 hours
Min.	6,9 hours
Max.	15,7 hours
Average	9,5 hours
Std. Deviation	1,8 hours
Range 95% max	13,1 hours
Range 95% min	5,9 hours
Out of spec	0



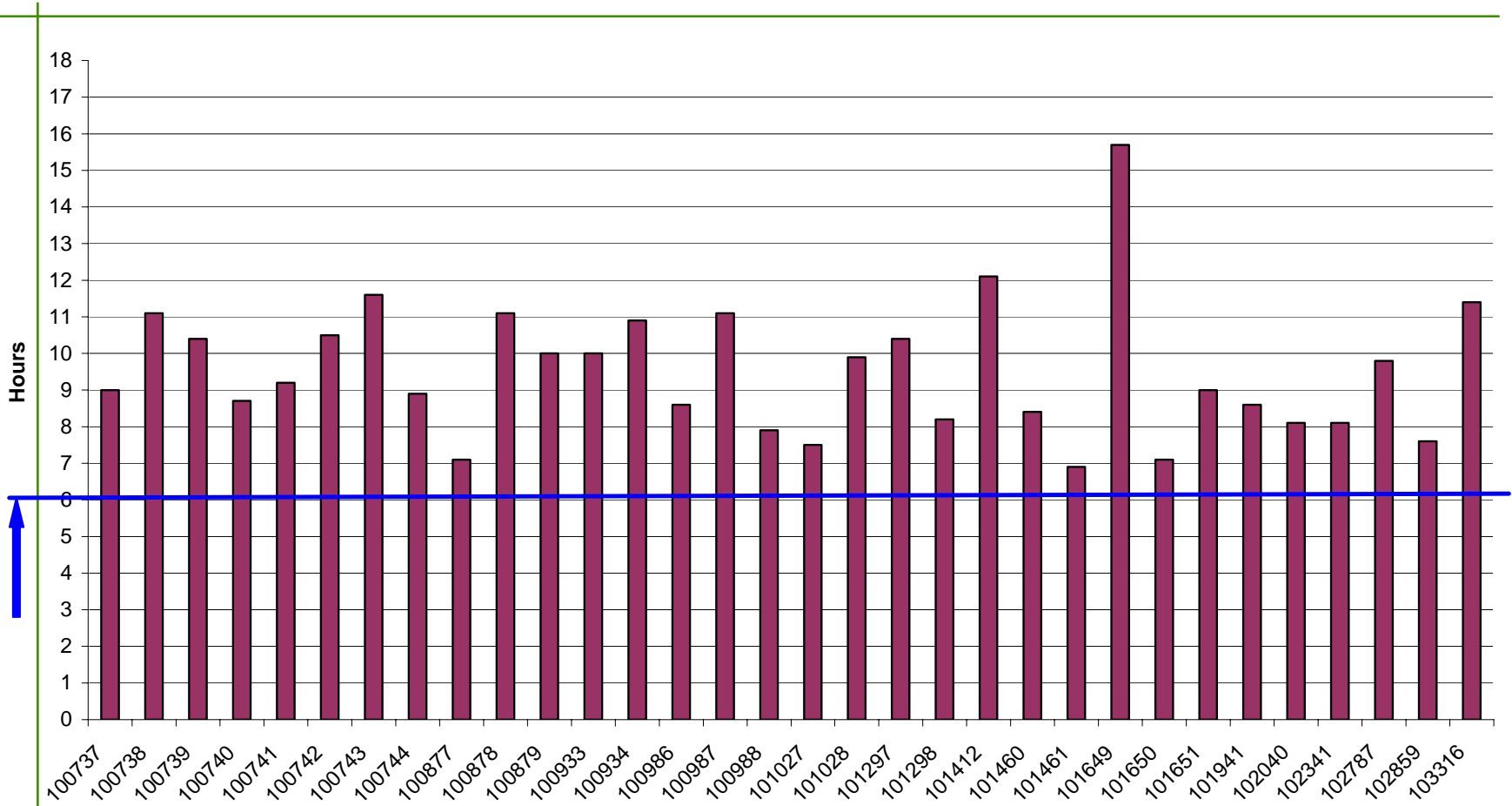
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Oxidation Stability



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Acid number

EN 14214	< 0,5 mg KOH/g
Min.	0,038 mg KOH/g
Max.	0,680 mg KOH/g
Average	0,280 mg KOH/g
Std. Deviation	0,139 mg KOH/g
Range 95% max	0,559 mg KOH/g
Range 95% min	0,001 mg KOH/g
Out of spec*	1



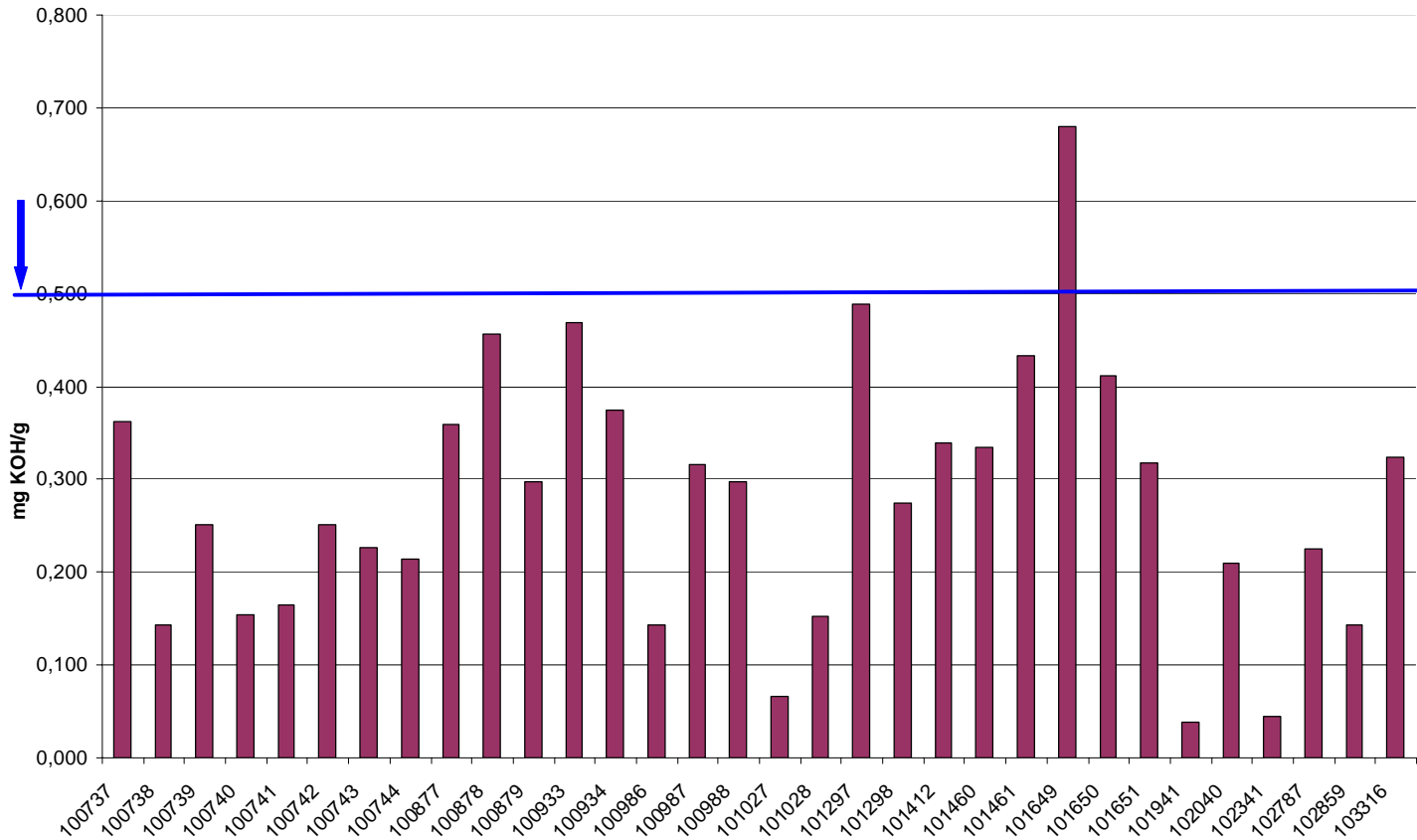
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Acid Number



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Iodine Value

EN 14214	< 120 g iodine/100g
Min.	77 g iodine/100g
Max.	129 g iodine/100g
Average	111 g iodine/100g
Std. Deviation	10 g iodine/100g
Range 95% max	131 g iodine/100g
Range 95% min	92 g iodine/100g
Out of spec	1



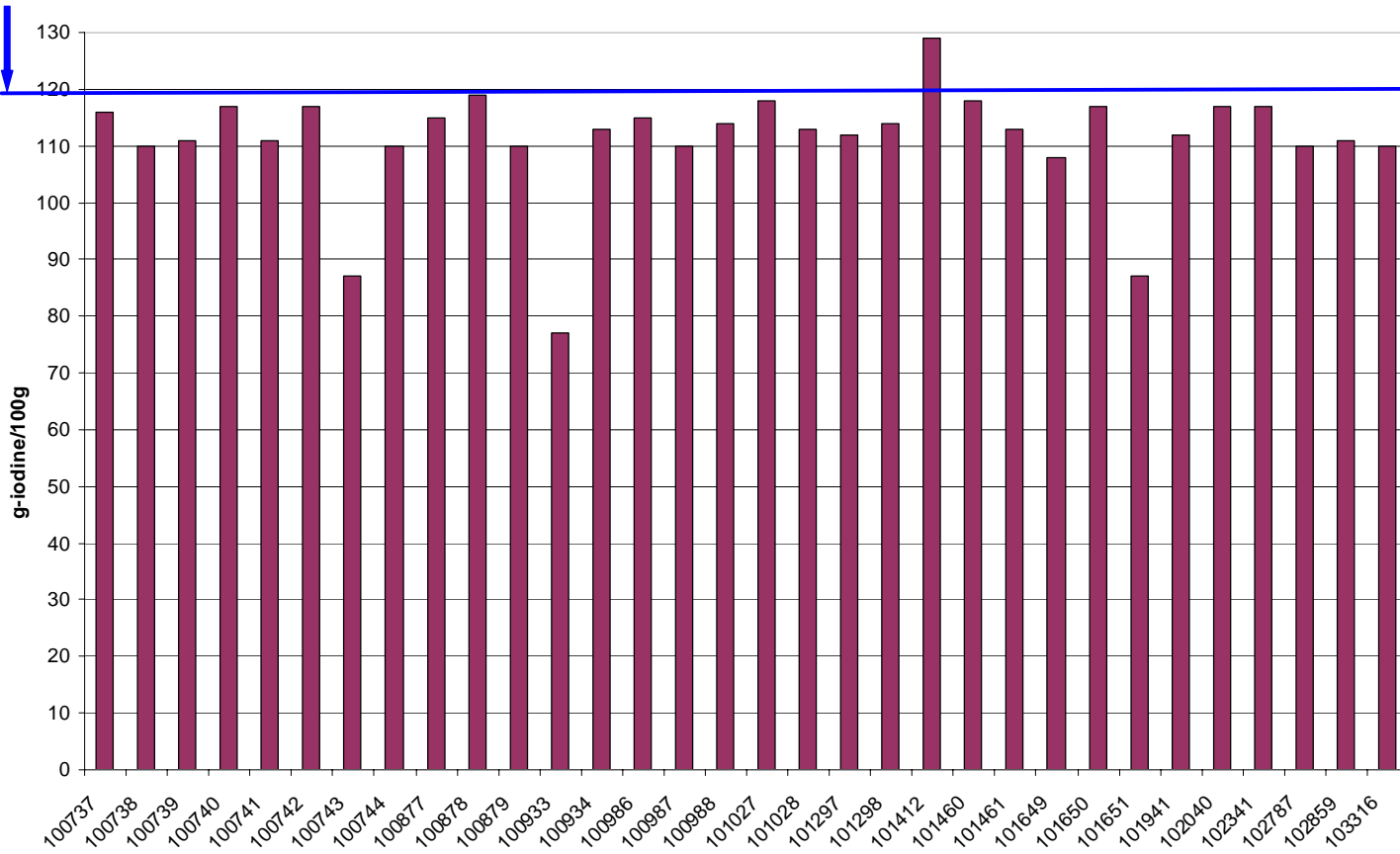
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Iodine Value



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Linolenic Acid Content

EN 14214	< 12 % m/m
Min.	0,7 % m/m
Max.	11,1 % m/m
Average	7,7 % m/m
Std. Deviation	2,3 % m/m
Range 95% max	12,3 % m/m
Range 95% min	3,2 % m/m
Out of spec	0



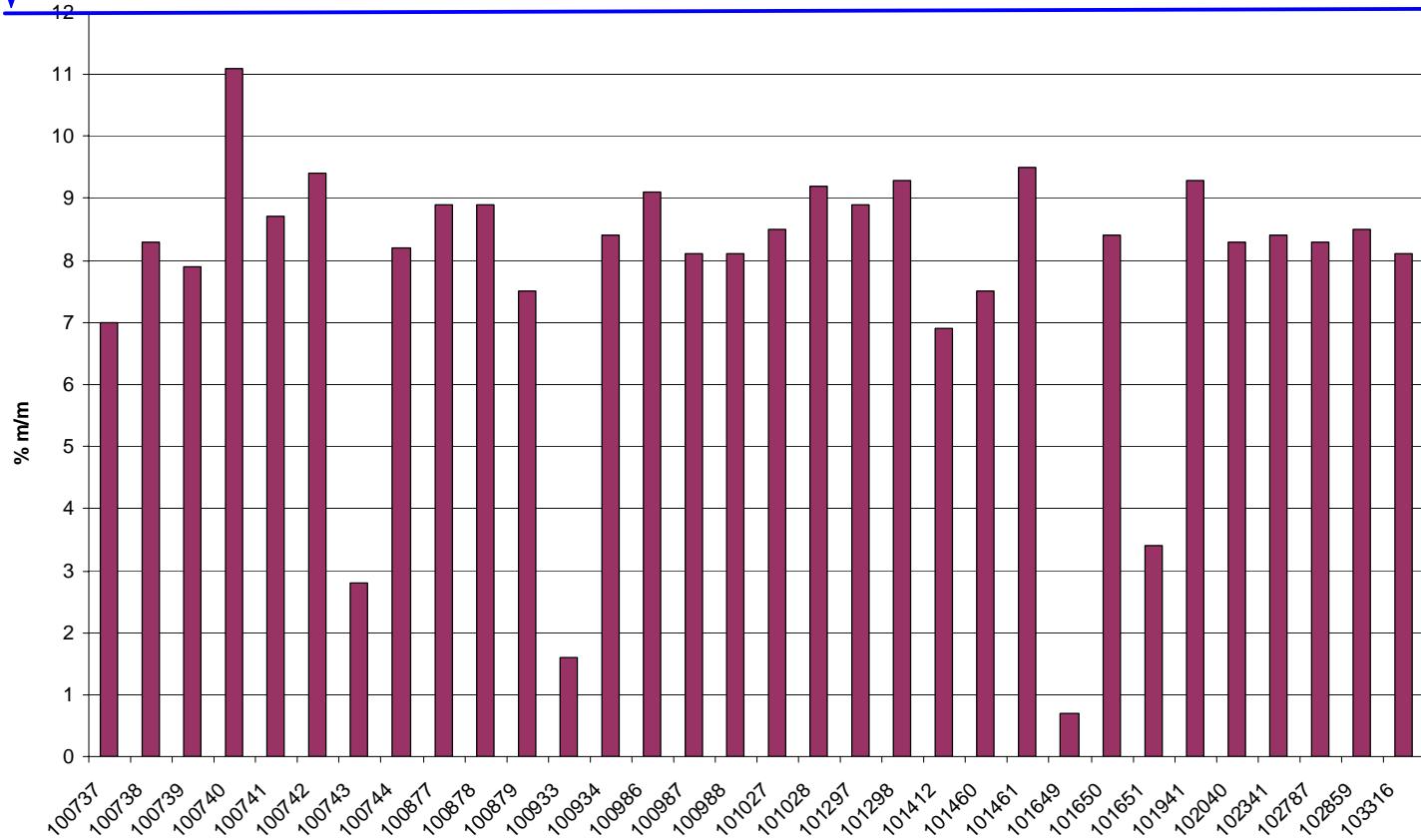
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Linolenic Acid Content



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Methanol Content

EN 14214	< 0,20 % m/m
Min.	0,009 % m/m
Max.	0,100 % m/m
Average	0,027 % m/m
Std. Deviation	0,025 % m/m
Range 95% max	0,078 % m/m
Range 95% min	0 % m/m
Out of spec	0

All values < 0,01 %(m/m) rounded off 0,009 %(m/m)



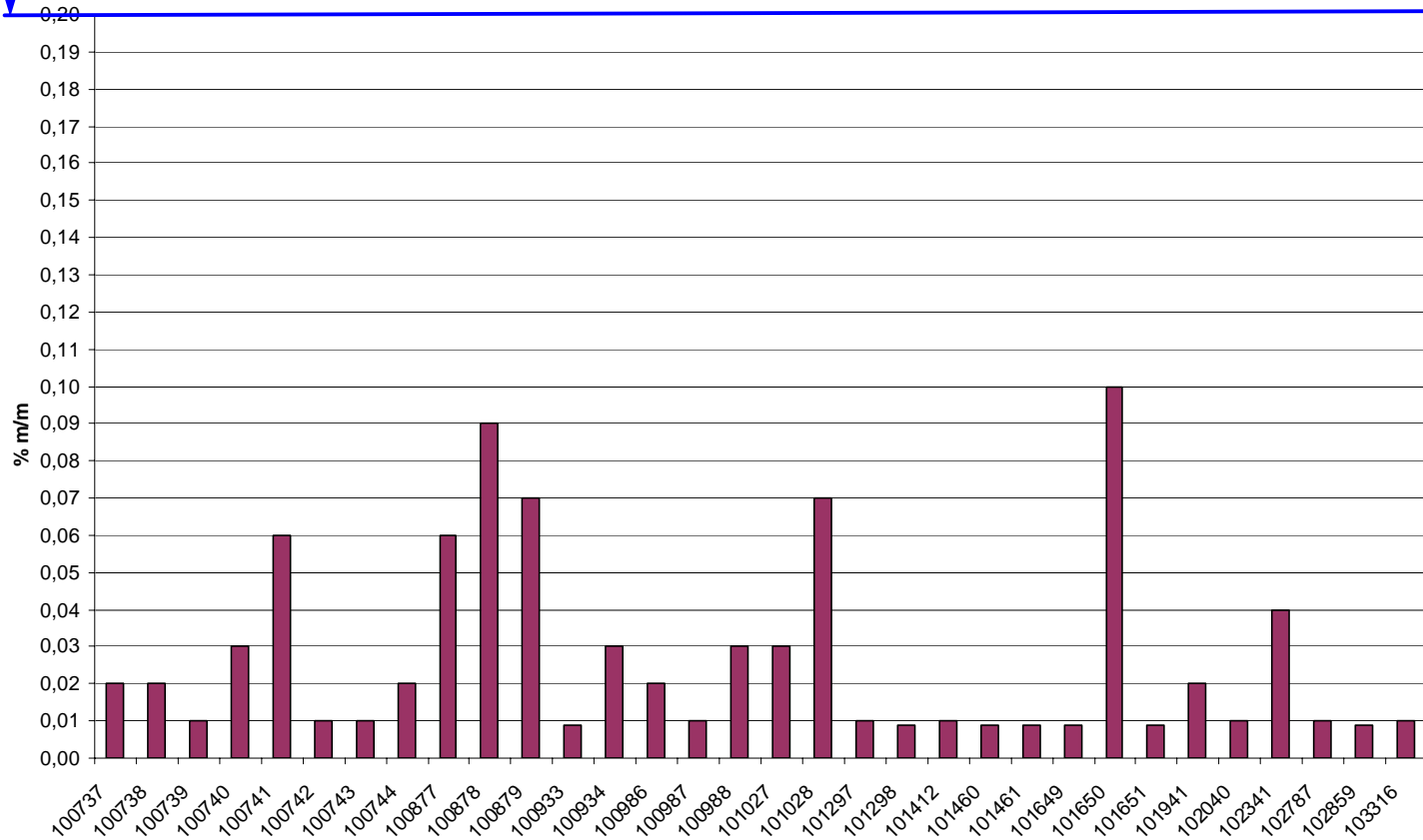
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Methanol Content



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Free Glycerol

EN 14214	< 0,20 % m/m
Min.	0,009 % m/m
Max.	0,030 % m/m
Average	0,010 % m/m
Std. Deviation	0,004 % m/m
Range 95% max	0,017 % m/m
Range 95% min	0 % m/m
Out of spec	1

All values < 0,01 %(m/m) rounded off 0,009 %(m/m)



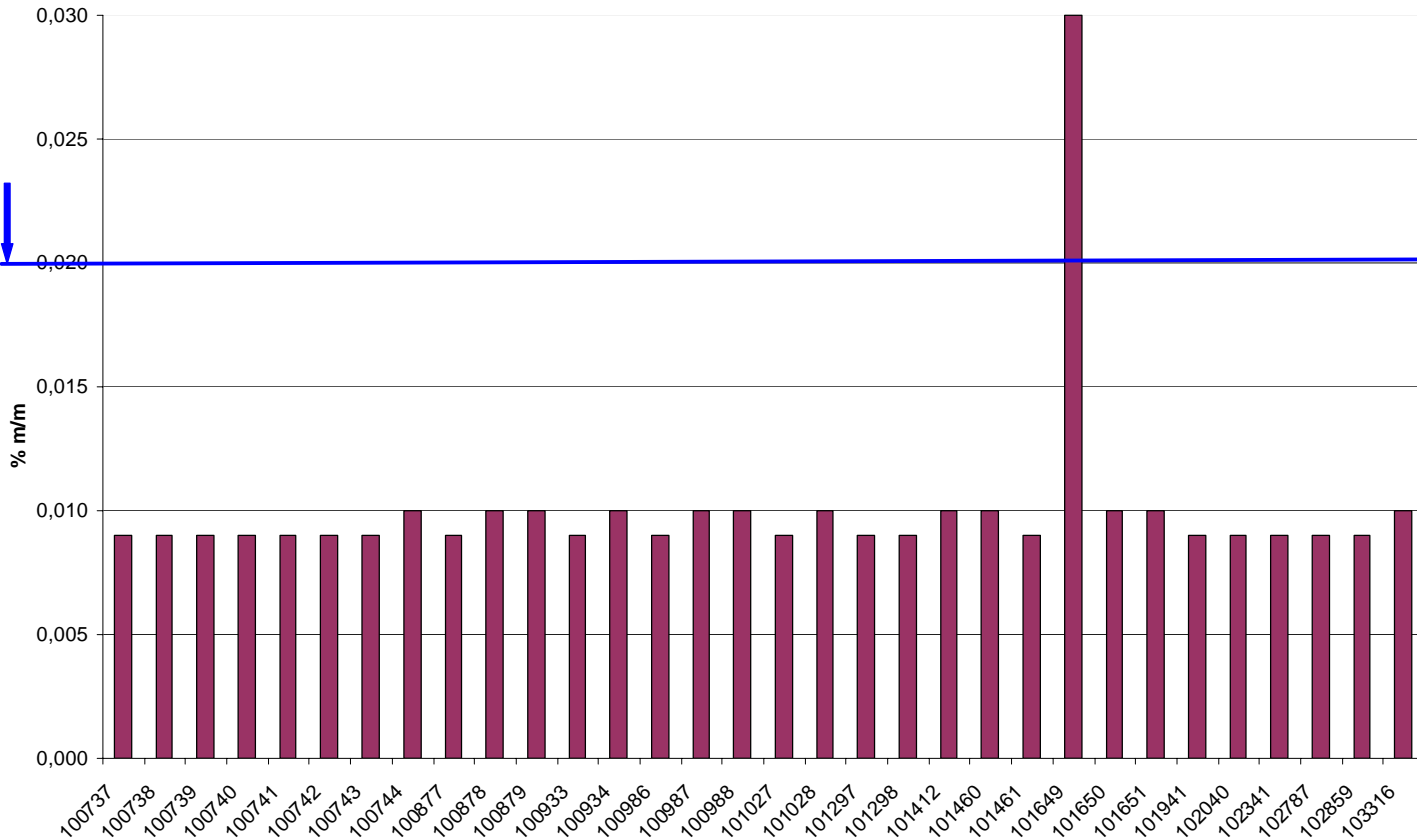
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Free Glycerol



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	Monoglycerides	Diglycerides	Triglycerides
EN 14214	<0,80	<0,20	<0,20 % m/m
Min.	0,009	0,009	0,009 % m/m
Max.	0,78	0,62	1,80 % m/m
Average	0,44	0,12	0,10 % m/m
Std. Deviation	0,19	0,10	0,31 % m/m
Range 95% max	0,82	0,32	0,72 % m/m
Range 95% min	0	0	0 % m/m
Out of spec	0	2	1

All values < 0,01 %(m/m) rounded off 0,009 %(m/m)



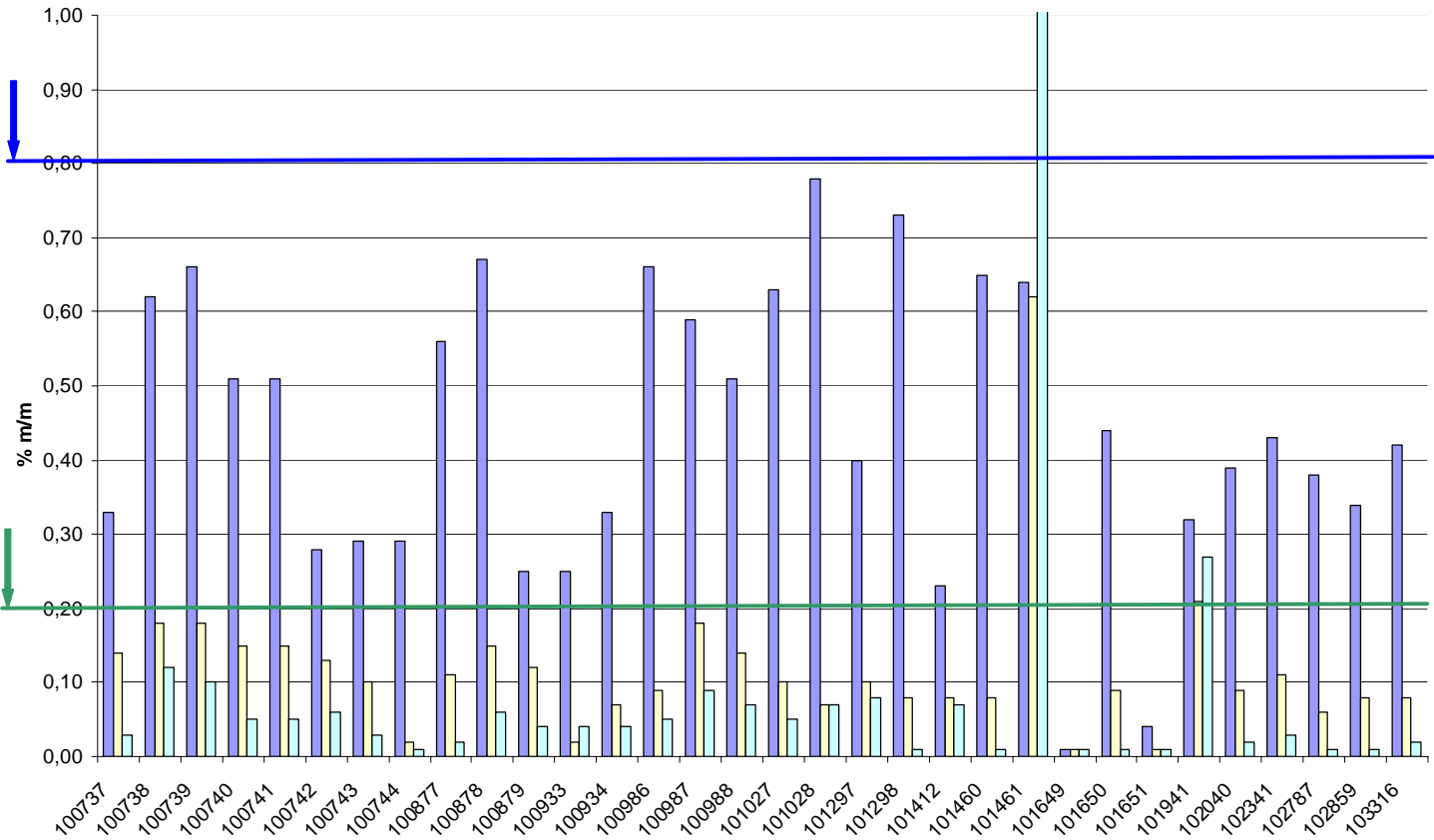
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Mono - Di - Tri Glyceride



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Total Glycerol

EN 14214	< 0,25 % m/m
Min.	0,020 % m/m
Max.	0,440 % m/m
Average	0,146 % m/m
Std. Deviation	0,073 % m/m
Range 95% max	0,293 % m/m
Range 95% min	0 % m/m
Out of spec	1



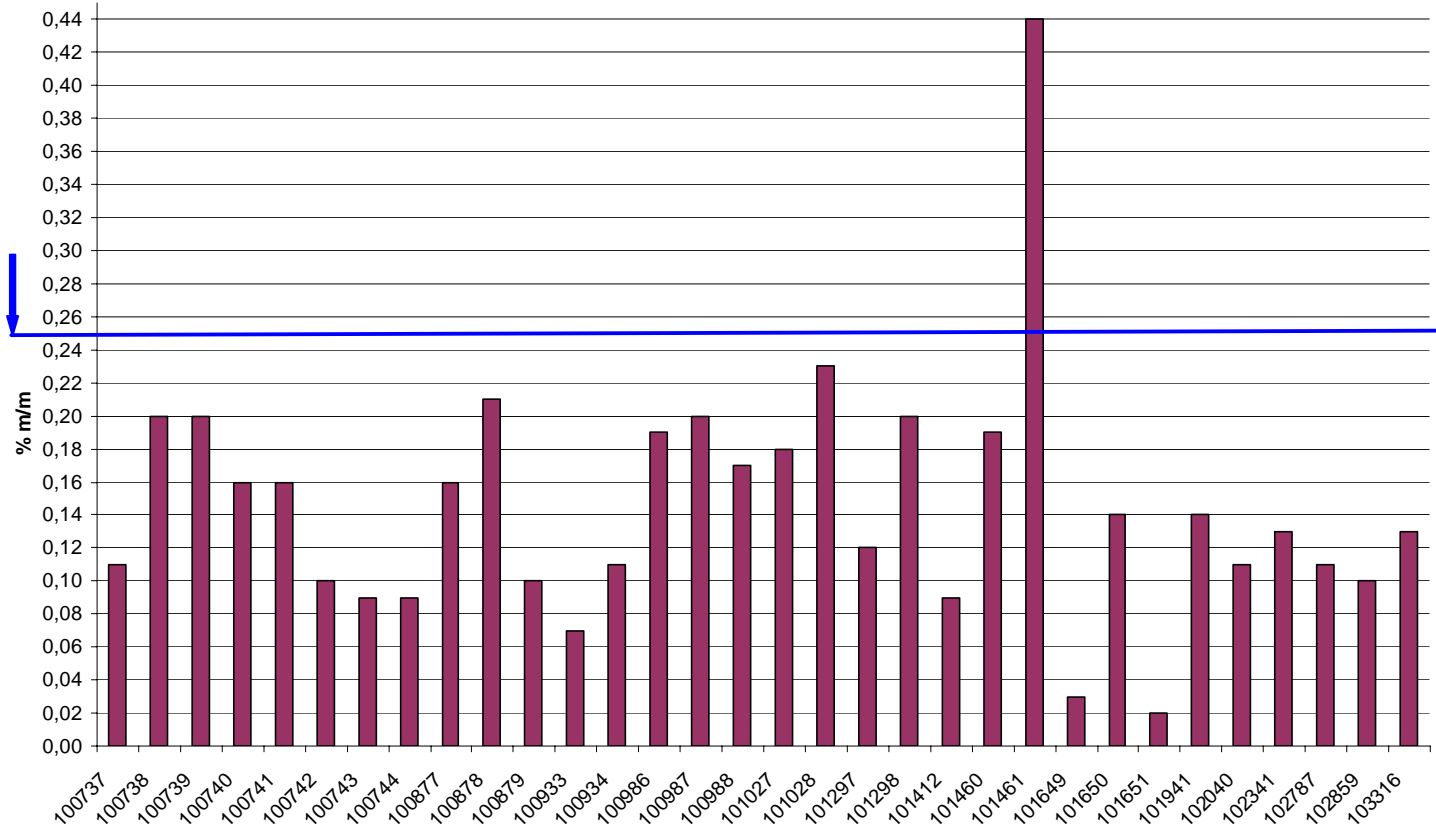
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Total Glycerol



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Phosphorus content

EN 14214	<10 mg/kg
Min.	0,5 mg/kg
Max.	1,5 mg/kg
Average	0,6 mg/kg
Std. Deviation	0,2 mg/kg
Range 95% max	1,0 mg/kg
Range 95% min	0 mg/kg
Out of spec	0

All values < 0,5 mg/kg rounded off 0,49 mg/kg

Test method minimal value = 4 mg/kg



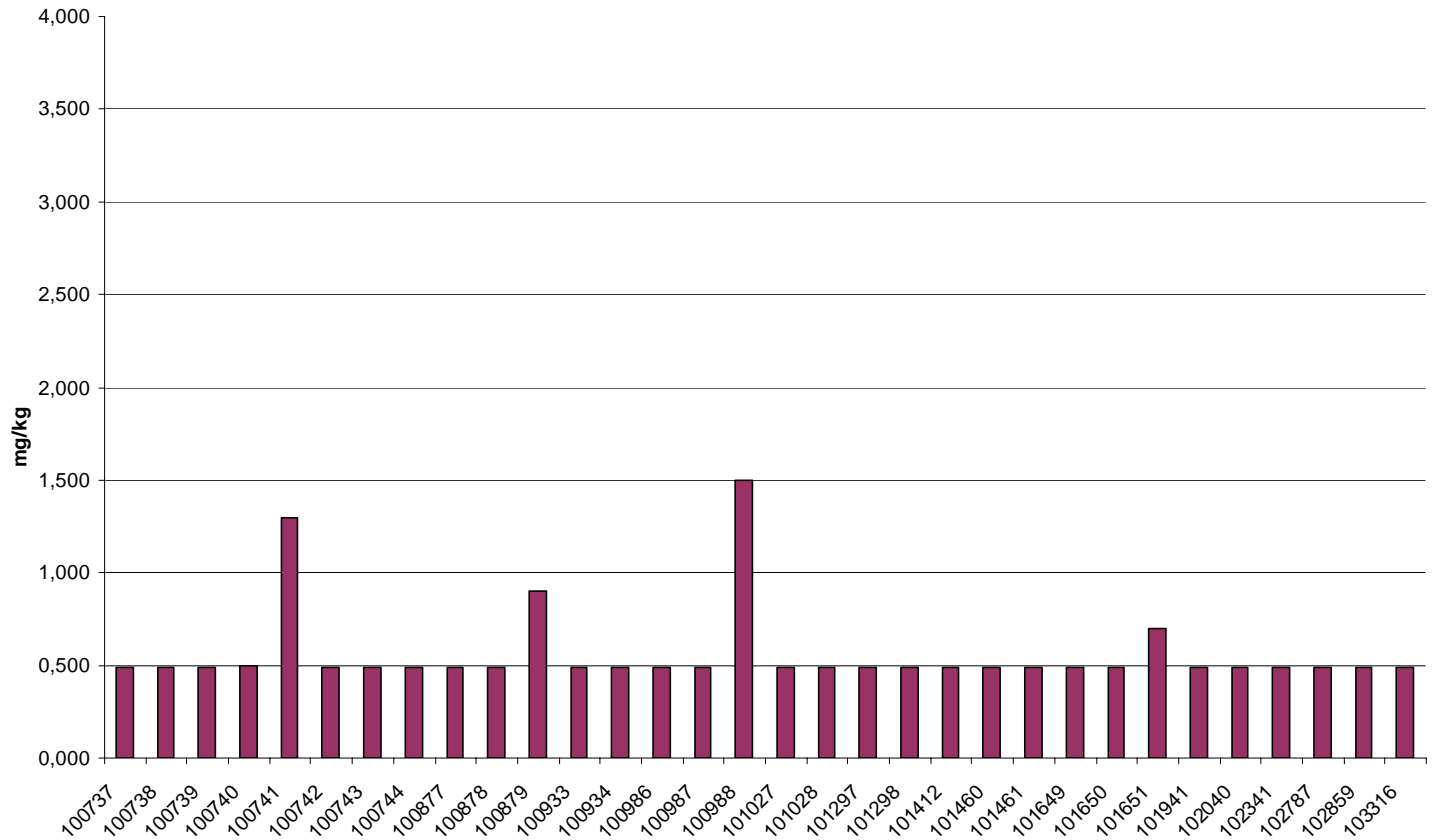
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Phosphorous Content



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	Metals I (Na+K)	Metals II (Ca+Mg)	
EN 14214	<5,0	<5,0	mg/kg
Min.	0,5	<0,5	mg/kg
Max.	5,0	<0,5	mg/kg
Average	1,1	<0,5	mg/kg
Std. Deviation	1,1		
Range 95% max	3,2		mg/kg
Range 95% min	0		mg/kg
Out of spec	0	0	

All values < 0,5 mg/kg rounded off 0,49 mg/kg



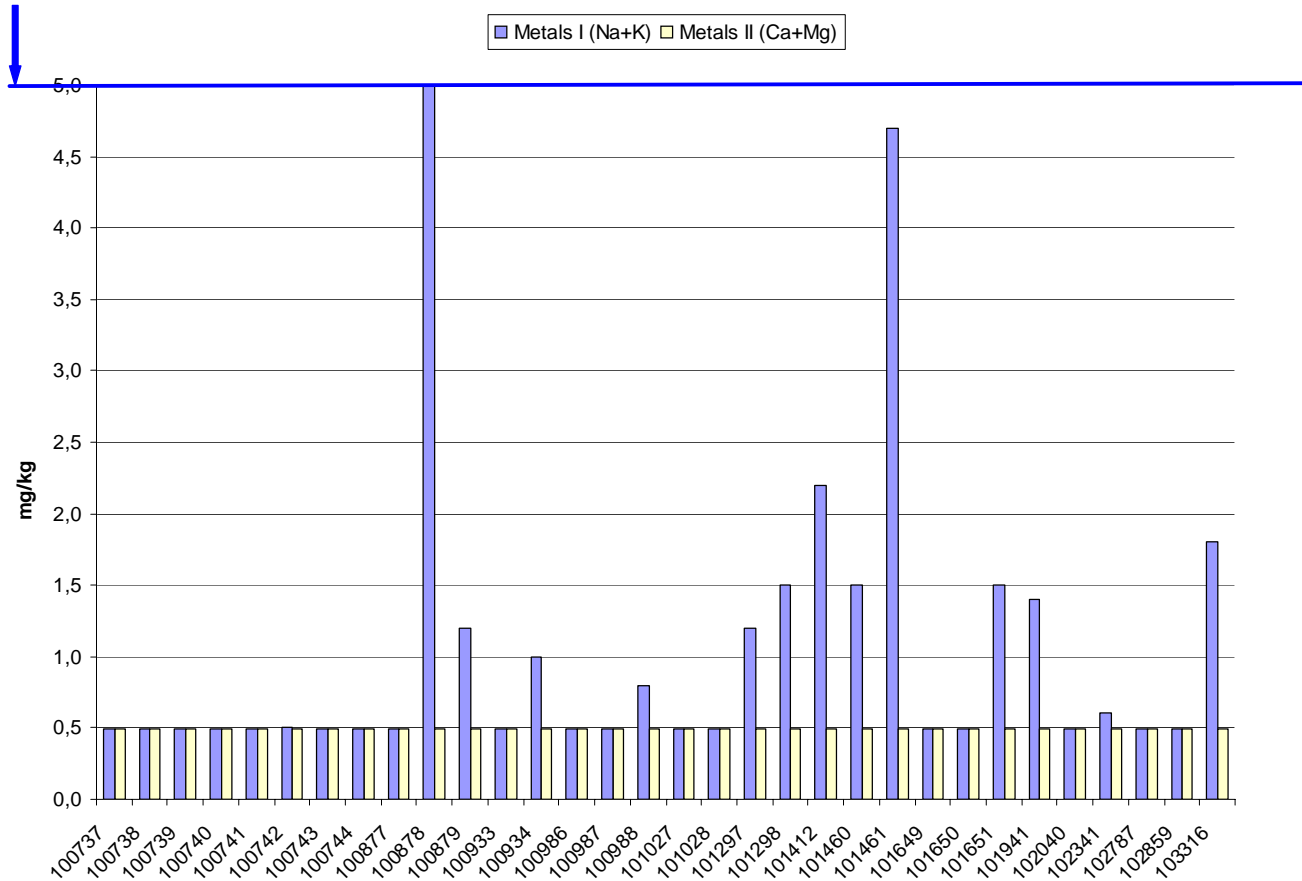
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Metals I (Na+K) + Metals II (Ca+Mg)



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First sampling and analysis winter quality 2006-07

Final General Comments

EBB members' production (32 plants monitored) is well within the EN14214 limits with 4 border-line samples on only one parameter and 1 sample out of EN14214 with one or more parameters. The 95% range show the respect of the EN14214 and the good quality achieved from the European producers.

The results which are not in range (borderline or out of spec) with respect to the EN14214 concern:

Compositional parameters:

1 result for the iodine number parameter (but some exception in local national legislations exist (e.g. Spain)

Production parameters:

1 result for the acidity and total glycerol parameter

1 result for the total glycerol and conversion parameter

Other problems (internal logistic, cleaning, previous cargo, etc):

2 results with respect to the sulphur content parameter

Although the result of this first round of tests are considered as quite satisfactory EBB has taken specific ad hoc measures with the concerned member companies and respective production units in order to further improve the quality of the final biodiesel product and will continue to monitor the progress in the frame of the next rounds of tests



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