SUPS

Sugar Proficiency Testing Scheme

Scheme Description

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Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
3	13/11/08	Homogeneity requirements updated. Microbiology information added.	T. Noblett
4	27/3/09	Details in appendix A updated to reflect current methodology	M. Whetton
5	07/08/09	Operational issues common to all schemes moved into General Protocol. List of abbreviations added. New PORTAL system added. Amended microbiology test parameters	M. Whetton
6	08/01/10	SDPA values updated for 2010	M. Whetton
7	24/09/10	SDPA values updated for 2011	M. Whetton
8	23/03/11	Change Of Address on page 1	N.Stephenson
9	10/05/11	Changes to sample 2 metals in sugar (according to SUPS AG)	K. Baryla
10	31/08/11	Change to the robust mean description of abbreviations	M. Whetton
11	13/04/12	Method for turbidity sample 1 updated. SDPA for sample 5 (sucrose) updated. Sample 7 Raw sugar trial included.	M. Whetton
12	Sept 2012	Additional methods included for sample 2. The purpose of cooperation with the ICUMSA defined.	M.Whetton
13	March 2013	Changes to the SDPAs for sample 5 dry substance and sucrose in molasses and sample 3 sulfur dioxide. Added trial sample 8.	M. Whetton & T. Noblett
14	Sept 2013	Removed trial status of sample 8 and amended accreditation status for samples 7 and 8. Added microbiological methods. Additional methods included for sample 5 (sucrose).	T. Noblett & M. Whetton
15	June 2014	Inclusion of Stevia sample 9 and polarisation to sample 3. Inclusion of a fit for purpose SDPA for polarisation in sample 7. Addition of information for traceability of assigned values.	M. Whetton
16	Sept 2014	Minor standardisation amendments, e.g. logo and email addresses. Inclusion of traceability information in Appendix A. Inclusion of subcontracting information in 'Test Materials'	N. Mason
17	Sept 2015	Inclusion of cadmium and mercury to sample 2. Addition of sulfated ash to sample 5. New sample 10 Moisture in white sugar added to the scheme. Changes to the SDPA for sample 7 Raw sugar. Removed Hard copy report information.	K. Baryla A. McCarthy
18	March 2016	Inclusion of fermentable sugars to sample 5. A new method added to sample 2.	K. Baryla
19	Sept 2016	A new method added to sample 2. Sample 9 Stevia removed.	K. Baryla

Notes:
Where this document has been translated, the English version shall remain the definitive version

Scheme Aims and Organisation
The primary aim of the sugar proficiency testing scheme (SUPS) is to enable laboratories performing the analysis of sugar and other natural sweeteners to monitor their performance and compare it with that of their peers. SUPS also aims to provide information to participants on technical issues and methodologies relating to testing of these materials.

The SUPS scheme year operates from January to December. Further information about SUPS, including test material availability, round despatch dates and reporting deadlines, are available on the current SUPS application form.

LGC Standards cooperates with the International Commission for Uniform Methods of Sugar Analysis (ICUMSA) and the International Stevia Council (ISC). The purpose of these organisations is to provide robust, internationally developed methods of analysis to aid the trade in sugar and sugar products, and Stevia and Stevia products, respectively. The ICUMSA and ISC representatives are involved in the review of progress and performance of the scheme and provide advice on operation and future development of the scheme.

Test Materials
Details of test materials available in SUPS are given in Appendix A. The test parameters are continually reviewed to ensure they meet the needs of current laboratory testing and regulatory requirements.

Test material batches are tested for homogeneity for at least one test parameter where deemed appropriate. Details of homogeneity tests performed and results are given in the SUPS Scheme Reports.

Some aspects of the scheme, such as test material production, homogeneity testing and stability assessment, can from time to time be subcontracted. When subcontracting occurs, it is placed with a competent subcontractor and LGC is responsible for this work. The planning of the scheme, the evaluation of performance and the authorisation of the final report will never be subcontracted.

Statistical Analysis
Information on the statistics used in SUPS can be found in the General Protocol and in the Scheme Report. Methods for determining assigned values and the values for SDPA used for individual samples are given in Appendix A.

Methods
Methods are listed in Appendix A and PORTAL. Please select the most appropriate method from the list. If none of the methods are appropriate, then please report your method as ‘Other’ and record a brief description in the Comments Section in PORTAL.
Abbreviations for microbiological methods codes can be found in Appendix A. The time and temperature of incubation does not need to be reported.

Results and Reports
SUPS results are returned through our electronic reporting software, PORTAL, full instructions for which are provided by email. However, participants may request result submission forms on which to report and return results if they are unable to report through electronic means. This will incur an additional charge.

SUPS reports will be available on the website within 10 working days of round closure. Participants will be emailed a link to the report when it is available.

APPENDIX A - Description of abbreviations used

Assigned Value (AV)

The assigned value may be derived in the following ways:

- From the robust mean (RMean). This is the median of participant results after the removal of test results that are inappropriate for statistical evaluation, e.g. miscalculations, transpositions and other gross errors. Generally, the assigned value will be set using results from all methods, unless the measurement is considered method-dependant, in which case the assigned value will be set by method as illustrated in the report tables.
  For some analytes, where there is a recognised reference method for that type of measurement, this may be used as the assigned value for a particular analyte i.e. it would be applied to results obtained by any method.

  Traceability: Assigned values which are derived from the participant results, or a sub-set of the results are not traceable to an international measurement standard. The uncertainty of assigned values derived in this way is estimated from the participant results, according to ISO 13528.

- From a formulation value (Formulation). This denotes the use of an assigned value derived from sample preparation details, where known and exact quantities of analyte have been used to prepare the sample.

  Traceability: Assigned values calculated from the formulation of the test sample are traceable, via an unbroken metrological traceability chain, to an international measurement standard. The measurement uncertainty of the assigned value is calculated using the contributions from each calibration in the traceability chain.

- From a qualitative formulation (Qual Form). This applies to qualitative tests where the assigned value is simply based on the presence/absence of the analyte in the test material.

  Traceability: Assigned values calculated from the qualitative formulation of the test sample are traceable to a certified reference standard or a microbiological reference strain.

- From expert labs (Expert). The assigned value for the analyte is provided by an 'expert' laboratory.

  Traceability: Assigned values provided by an 'expert' laboratory may be traceable to an international measurement standard, according to the laboratory and the method used. The uncertainty of measurement for an assigned value produced in this way will be provided by the laboratory undertaking the analysis. Details of traceability and the associated uncertainty will be provided in the report for the scheme/round.

Range

This indicates the concentration range at which the analyte may be present in the test material.

SDPA

SDPA represents the 'standard deviation for proficiency assessment' which is used to assess participant performance for the measurement of each analyte. This may be a fixed value (as stated), a percentage (%) of the assigned value or based on the robust standard deviation of the participant measurement results, either across all methods or by method depending on whether the measurement made is method dependent (see assigned value).

Units
This indicates the units used for the assessment of data. These are the units in which participants should report their results. For some analytes in some schemes participants may have a choice of which units to report their results, however, the units stipulated in this scheme description are the default units to which any results reported using allowable alternative results will be converted to.

DP
This indicates the number of decimal places to which participants should report their measurement results.

ABBREVIATIONS FOR MICROBIOLOGICAL METHODS
MF = Membrane filtration
PCA = Plate count agar
DG18 = Dichloran 18% glycerol

All analytes will also have ‘OTHER’ as a method choice in case your method is not listed

Sample 1 **Chemical analysis of sugar**

Participants will receive 300ml pot of cane or beet sugar

Analyte	Method	Range	AV	SDPA	Units	DP
Colour	GS2 / 3-9	0 to 20 21 or above	RMean	15% of AV 10% of AV (min value 1)	IU	0
	GS2 / 3-10				IU	0
	GS9 / 1 / 2 / 3-8				IU	0
Turbidity	GS2 / 3-18 4cm	0 to 20 21 or above	RMean	20% of AV (min value 1) 15% of AV	IU	0
	GS2 / 3-18 5cm					
	GS2 / 3-18 10cm					
	GS2 / 3-18 flow cell					
	GS2 / 3-18 other					
Ash	GS2 / 3-17	All	RMean	10% of AV (min 0.001)	% m/m	3
Reflectance grade	GS2 / 13	≤1 >1	RMean	25% of AV 10% of AV	-	1

Sample 2 **Metals analysis in sugar**

Participants will receive 200g bag of cane or beet sugar

Analyte	Method	Range	AV	SDPA	Units	DP
As	GS2 / 3 / 9-25	All	RMean	20% of AV	mg/kg	2
	GS2 / 3-23					
	GS2-51					
	AAS					
	ICP-MS					
	ICP-OES					
Pb	GS2 / 1 / 3-27	All	RMean	20% of AV	mg/kg	2
	GS2 / 3-24					
	GS2-51					
	AAS					
	ICP-MS					
	ICP-OES					
Cu	GS2 / 3-29	All	RMean	20% of AV	mg/kg	2
	GS2-51					

	AAS ICP-MS ICP-OES					
Fe	GS2 / 3 / 7 / 8-31 GS2-51 AAS ICP-MS ICP-OES	All	RMean	20% of AV	mg/kg	2
Cd*	AAS ICP-MS ICP-OES	All	RMean	20% of AV	mg/kg	2
Hg*	HG-AAS AAS ICP-MS ICP-OES	All	RMean	20% of AV	mg/kg	2

*analytes marked with an asterisk are not included in LGC's UKAS scope of accreditation

Sample 3 **Chemical analysis of sugar**

Participants will receive 300ml pot of cane or beet sugar

Analyte	Method	Range	AV	SDPA	Units	DP
Sulfur dioxide	GS2 / 1 / 7-33	<1 ≥1	RMean	0.30 25% of AV	mg/kg (as SO_2)	1
Reducing sugars	GS2 / 3 / 9-5 GS2 / 9-6	All	RMean	25% of AV (min 0.001)	% m/m	3
Polarisation	GS2/3-1	All	RMean	0.06	˚Z	2

Sample 4 **Sediment analysis in sugar**

Participants will receive 500ml pot of cane or beet sugar

Analyte	Method	Range	AV	SDPA	Units	DP
Sediment (insoluble)	GS2 / 3 / 9-19	All	RMean	25% of AV	mg/kg	1

Sample 5 **Chemical analysis of molasses**

Participants will receive 200g molasses

Analyte	Method	Range	AV	SDPA	Units	DP
Sucrose	GS4/3-7*	All	RMean	0.75	% m/m	2
	GS4/3-9*					
	GS4/7-1					
	HPLC-IC					
Reducing Sugars	GS4 / 3-3	All	RMean	10% of AV	% m/m	2
	GS4-5					
pH	GS1/2/3/4/7/8-23	All	RMean	0.10	-	2
Dry Substance	GS4 / 3-13	All	RMean	1.5	% m/m	1
	GS4 / 7-11					
Sulfated ash	GS3/4/7/8-11	All	RMean	Robust SD	% m/m	2
Fermentable sugars**	AOAC	All	RMean	Robust SD	%	2

* Method requires correction for the amount of invert glucose and fructose present in order to report sucrose and not total sugars.
** Not included in LGC's UKAS scope of accreditation.

Sample 6 **Microbiological analysis of sugar**

Participants will receive Lyophilised material

Analyte	Method	Range	AV	SDPA	Units	DP
Total aerobic mesophilic count	MF Plate count agar	0 - 1000	RMean	0.35	cfu per 100ml	0
Enumeration of Yeast	MF Wort agar	0 - 1000	RMean	0.35	cfu per 100ml	0
Enumeration of Mould	MF Wort agar	0 - 1000	RMean	0.35	cfu per 100ml	0
Enumeration of Osmophilic yeast	MF DG18 agar	0 - 1000	RMean	0.35	cfu per 100ml	0
Enumeration of Osmophilic mould	MF DG18 agar	0 - 1000	RMean	0.35	cfu per 100ml	0

Sample 7 **Chemical analysis of raw sugar**

Participants will receive 500g of raw sugar sample

Analyte	Method	Range	AV	SDPA	Units	DP
Ash	GS1-10 GS1/3/4/7/8-11 GS1/3/4/7/8-13	All	RMean	10% of AV	% m/m	3
Colour	GS1/3-7 GS9/1/2/3-8	All	RMean	10% of AV	IU	0
Dextran	GS1/2/9-15	All	RMean	Robust SD	mg/kg	0
Moisture	GS2/1/3/9-15	All	RMean	0.03	% m/m	2
Polarisation	GS1/2/3/9-1 GS1/2/3-2	All	RMean	0.15	˚Z	2
Reducing sugars	GS1/3/7-3 GS1/2/3-4 GS1-5	All	RMean	15% of AV	% m/m	2
Starch	GS1-16 GS1-17	All	RMean	20% of AV	mg/kg	0

All the methods listed can be obtained from ICUMSA website at http://www.icumsa.org

Sample 8 **Microbiological analysis of sugar**

Participants will receive Lyophilised material

Analyte	Method	Range	AV	SDPA	Units	DP
Enumeration of thermophilic acidophilic bacteria	MF BAT AGAR	0 - 1000	RMean	0.35	cfu per 100ml	0
Detection of guaiacol producing thermophilic acidophilic bacteria	MF BAT AGAR	0 - 1000	Qual form	NA	cfu per 100ml	NA

Sample 10* **Chemical analysis of sugar**

Participants will receive 75g of cane or beet sugar

Analyte	Method	Range	AV	SDPA	Units	DP
Moisture	GS2/1/3-15	All	RMean	Robust SD	%(m/m)	3
	Karl Fischer					
	IR drying					
	NIR					
	Other					

Notes:
where: $\mathbf{W_X}$ = test parameter in question such as total steviol glycosides or rebaudioside B.
* **Not included in LGC's UKAS Scope of Accreditation**