QDCS

Quality in Dairy Chemistry Scheme

Scheme Description

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Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
9	Sept 13	Removal of trial status from sample 60.	M. Whetton
10	July 14	Amend description of milks	W.Gaunt
11	Sept 14	Addition of lactose, sodium & ash to samples 37 & 59. Addition of sample 61 for contaminants in milk. Inclusion of traceability information in Appendix A. Inclusion of subcontracting information in 'Test Materials' section.	W.Gaunt
12	Sept 15	Appendices updated for milks Removed Hard Copy report information	W.Gaunt A.McCarthy
13	Sept 16	Removed sample 61, general update of appendices	W.Gaunt
14	Feb 17	Added trial sample 62.	S.Xystouris
15	Sept 17	Titratable acidity unit updated for 51 & 52. Saturated fat and cholesterol added to 37 & 59. Sample 60 renamed to aflatoxin M1	W.Gaunt S.Xystouris
16	Aug 18	Addition of solids-non-fat (SNF) to sample 36	W.Gaunt
17	Sep 18	Addition of cheese powder 63 and Amino acid profile sample 64. Minor changes to other samples. DP updated for 62	W.Gaunt S.Xystouris
18	Mar 18	Addition of nitrate/nitrite milk powder sample 65	S. Xystouris
19	Aug 19	27, 40, 53 & 54 sample description updated. Analytes for butter, cheese and yogurt (36, 37, 58 & 59) expanded. Sample 64 removed. New condensed milk sample added (66), new Staphylococcal enterotoxins in cheese added (68), new processed cheese added (67).	W.Gaunt S.Xystouris
20	Feb 20	Addition of moisture, pH and sorbic acid to processed cheese sample 67 Addition of Dry matter and Protein in sample 39 Updated UKAS logo Updated sample 66 from 100ml to 100g	S. Xystouris A.McCarthy
21	Sep 20	Galactose added to whey powder (38B). SDPA values updated for 60 & 62 Added colour into sample 63	W. Gaunt
22	Apr 21	Amended units for sample 65, updated methods for 68 Amended accreditation status for colour in sample 63	S Xystouris A Collins
23	July 21	Added Vitamin B12 & Vitamin E in sample 44. Removed A & M analyte from 31. Changed format of sample 68 Updated email address and UKAS LOGO	L.Fielding S Xystouris A Collins

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

Scheme Aims and Organisation

The primary aim of the Quality in Dairy Chemistry Scheme (QDCS) is to enable laboratories performing the analysis of dairy products to monitor their performance and compare it with that of their peers. QDCS also aims to provide information to participants on technical issues and methodologies relating to the chemical examination of foods.

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

Test Materials

Details of test materials available in QDCS 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 QDCS 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 QDCS 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 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.

Results and Reports

QDCS results are returned through our electronic reporting software, PORTAL, full instructions for which are provided by email.

QDCS 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 (median) of participant results (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.

Sample: **Milk Products for Chemical Analysis**

Supplied as: 250ml milk supplied.

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-27	Skimmed/ non fat milk	Fat	Gerber Rose Gottlieb Filter NIR FTMIR	0.10 to 0.50%	Median	0.03	%	2
PT-CH-40	Semi-skimmed/ low fat milk	Fat	Gerber Rose Gottlieb Filter NIR FTMIR	1.2 to 2.0%	Median	0.05	%	2
PT-CH-55	Whole milk	Fat	Gerber Rose Gottlieb Filter NIR FTMIR	2.8 to 5%	Median	0.05	%	2
PT-CH-28	Whole milk	Protein	Kjeldahl Dumas NIR	3 to 4%	Median	0.04	%	2
		Calcium	Various	All	Median	10% of AV	mg/100g	2
		Total solids	Various	All	Median	Robust SD	%	2
		Lactose	Various	All	Median	Robust SD	% lactose monohydrate	2
PT-CH-32A	Whole milk	pH	pH meter	All	Median	0.05	-	2
PT-CH-56	Whole milk	Titratable acidity	Titration	All	Median	Robust SD (Min 0.030)	% Lactic acid	3
		Freezing point	Cryoscope	All	Median	2.0	m°C	1

Sample: **Cream Products for Chemical Analysis**

Supplied as: All creams supplied as 240g

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-39	Whipping cream	Fat	Gerber Rose Gottlieb Filter NIR FTMIR	30 to 40%	Median	0.5	%	2
		Protein	Dumas Kjeldahl NIR	All	Median	Robust SD	%	2
		Dry matter	Oven drying	All	Median	Robust SD	%	2
		Titratable acidity	Titration	All	Median	Robust SD (Min 0.03)	% Lactic acid	2
PT-CH-53	Single/light cream	Fat	Gerber Rose Gottlieb Filter NIR FTMIR	12 to 25%	Median	0.5	%	2
PT-CH-54	Double/heavy cream	Fat	Gerber Rose Gottlieb Filter NIR FTMIR	40 to 50%	Median	0.5	%	2

Sample: **Freeze Dried Milk Products for Phosphatase and Antibiotic Testing**

Supplied as: 31: 10ml of freeze dried milk (pack of 2 samples supplied)
34 & 57: 5ml of freeze dried milk (pack of 3 samples supplied)

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-31 (A & B)	Freeze-dried milk	Phosphatase	Fluorescence	$\leq$ 200	Median	12% of AV	mU/L	1
				> 200	Median	10% of AV	mU/L	1
			Luminescence	All	Median	20% of AV	mU/L	1
PT-CH-34 (A,B&C)	Freeze-dried milk	Antibiotics (beta lactam based)	Test kits	All	Formulation	-	-	-
PT-CH-57 (A,B&C)	Freeze-dried milk	Antibiotics (penicillin and sulphur based)	Test kits	All	Formulation	-	-	-

Sample: **Butter, Yogurt, Cheeses, and Milk Powders for chemical analysis**

Supplied as:
36: 250g butter
37 & 59: 100g cheese
38A & 38B: 120g milk powder
41, 42 & 44: 20g whole milk powder
43: 120g whey protein concentrate
51 & 52: 120g milk powder
58: 100g yogurt
63: 100g cheese powder
66: 100g condensed milk
67: 100g processed cheese

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-36	Butter	Energy	Various	All	Median	Robust SD	kcal or kJ/100g	0
		Fat	Various	All	Median	Robust SD	%	2
		Saturates	Various	All	Median	Robust SD	%	2
		Salt	Various	All	Median	0.05	% (NaCl)	2
		Sodium	Various	All	Median	Robust SD	% (Na)	2
		Moisture	Various	All	Median	0.20	%	2
		pH	Various	All	Median	0.10	-	2
		Solids-non-fat (SNF)	Various	All	Median	Robust SD	%	2
PT-CH-37	Hard cheese	Energy	Various	All	Median	Robust SD	kcal or kJ/100g	0
		Fat	Various	All	Median	0.50	%	2
		Saturates	Various	All	Median	Robust SD	%	2
		Protein	Various	All	Median	0.5	%	2
		Salt *(from chloride)*	Various	All	Median	0.08	%	2
		Sodium	Various	All	Median	Robust SD	%	2
		Moisture	Various	All	Median	0.45	%	2
		pH	Various	All	Median	0.06	-	2
		Cholesterol	Various	All	Median	Robust SD	%	2
		Calcium	Various	All	Median	Robust SD	%	2
		Lactose	Various	All	Median	Robust SD	% lactose monohydrate	2
		Ash	Various	All	Median	Robust SD	%	2
PT-CH-59	Soft cheese	Energy	Various	All	Median	Robust SD	kcal or kJ/100g	0
		Fat	Various	All	Median	0.50	%	2
		Saturates	Various	All	Median	Robust SD	%	2
		Protein	Various	All	Median	0.5	%	2
		Salt *(from chloride)*	Various	All	Median	0.08	% (NaCl)	2
		Sodium	Various	All	Median	Robust SD	% (Na)	2
		Moisture	Various	All	Median	0.45	%	2
		pH	Various	All	Median	0.06	-	2
		Cholesterol	Various	All	Median	Robust SD	%	2
		Calcium	Various	All	Median	Robust SD	%	2

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
		Lactose	Various	All	Median	Robust SD	% lactose monohydrate	2
		Ash	Various	All	Median	Robust SD	%	2
		Total dietary fibre	Various	All	Median	Robust SD	%	2
PT-CH-38A	Skimmed milk powder	Moisture	Various	All	Median	0.10	%	2
		Ash	Various	All	Median	0.07	%	2
		Scorched particles	BS1743: Pt 19	All	Formulation	-	-	-
PT-CH-38B	Whey powder	Moisture	Various	All	Median	0.12	%	2
		Scorched particles	BS1743: Pt 19	All	Formulation	-	-	-
		Fat	Various	All	Median	Robust SD	%	2
		Protein	Various	All	Median	Robust SD	%	2
		Ash	Various	All	Median	Robust SD	%	2
		Lactose	Various	All	Median	Robust SD	% lactose monohydrate	2
		Galactose	Various	All	Median	Robust SD	%	2
PT-CH-41	Whole milk powder	Calcium	Various	All	Median	5% of AV	mg/100g	1
		Potassium	Various	All	Median	5% of AV	mg/100g	1
		Copper	Various	All	Median	5% of AV (min 0.1)	mg/kg	2
		Sodium	Various	All	Median	5% of AV	mg/100g	1
PT-CH-42	Whole milk powder	Chloride	Various	All	Median	5% of AV	mg/100g	1
		Iron	Various	All	Median	5% of AV (min 5.0)	mg/kg	1
		Magnesium	Various	All	Median	5% of AV	mg/100g	1
		Manganese	Various	All	Median	5% of AV	µg/100g	2
		Phosphorus	Various	All	Median	5% of AV	mg/100g	1
		Zinc	Various	All	Median	5% of AV (min 5.0)	mg/kg	1
PT-CH-43	Whey protein concentrate	Fat	Various	All	Median	0.20	%	2
		Protein	Various	All	Median	0.75	%	2
		Moisture	Various	All	Median	0.75	%	2
		Ash	Various	All	Median	0.10	%	2
		pH	Various	All	Median	Robust SD	-	2
		Bulk density	Various	All	Median	Robust SD	g/ml	2
		Lactose	Various	All	Median	Robust SD	% lactose monohydrate	2
		Insolubility index	Various	All	Median	Robust SD	ml	2
PT-CH-44	Milk powder	Vitamin A	Various	All	Median	Robust SD	µg/100g	2
		Vitamin B12	Various	All	Median	Robust SD	µg/100g	2
		Vitamin C	Various	All	Median	Robust SD	mg/100g	2
		Vitamin D	Various	All	Median	Robust SD	µg/100g	2
		Vitamin E	Various	All	Median	Robust SD	mg/100g	2
PT-CH-51	Skimmed milk powder	Fat	Various	All	Median	0.20	%	2
		Protein	Various	All	Median	0.50	%	2
		WPNI	Various	All	Median	Robust SD	mg/g	2

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
		Titratable acidity (rehydrated)	ISO 6091: 2010 (IDF 86: 2010)	All	Median	Robust SD	% lactic acid (rehydrated)**	2
			GEA Niro method A19a					
			BS 1741: part 10: section 10.1					
			Titration (other)					
			FT-IR					
		Titratable acidity (milk powder)	BS 1743-7.2: 1982, ISO 6092:1980	All	Median	Robust SD	% lactic acid (milk powder)	2
		Insolubility index	Various	All	Median	Robust SD	ml	2
PT-CH-52	Whole milk powder	Fat	Various	All	Median	0.50	%	2
		Protein	Various	All	Median	0.50	%	2
		Moisture	Various	All	Median	0.15	%	2
		WPNI	Various	All	Median	Robust SD	mg/g	2
		Titratable acidity (rehydrated)	ISO 6091: 2010 (IDF 86: 2010)	All	Median	Robust SD	% lactic acid (rehydrated)**	2
			GEA Niro method A19a					
			BS 1741: part 10: section 10.1					
			Titration (other)					
			FT-IR					
		Titratable acidity (milk powder)	BS 1743-7.2: 1982, ISO 6092:1980	All	Median	Robust SD	% lactic acid (milk powder)	2
		Insolubility index	Various	All	Median	Robust SD	ml	2
PT-CH-58	Yogurt	Energy	Various	All	Median	Robust SD	kcal or kJ/100g	0
		Fat	Various	All	Median	0.15	%	2
		Protein	Various	All	Median	0.08	%	2
		Salt	Various	All	Median	0.08	% (NaCl)	2
		Sodium	Various	All	Median	Robust SD	% (Na)	2
		Total solids	Various	All	Median	0.25	%	2
		pH	Various	All	Median	0.06	-	2
		Calcium	Various	All	Median	Robust SD	%	2
PT-CH-63	Cheese powder	Salt	Various	All	Median	Robust SD	%	2
		Moisture	Various	All	Median	Robust SD	%	2
		pH	Various	All	Median	Robust SD	-	2
		Fat	Various	All	Median	Robust SD	%	2
		Protein	Various	All	Median	Robust SD	%	2
		Ash	Various	All	Median	Robust SD	%	2
		Sodium	Various	All	Median	Robust SD	%	2
		Colour***	Lovibond	All	Median	Robust SD	Lovibond	1
PT-CH-66	Condensed milk	Energy	Various	All	Median	Robust SD	kcal or kJ/100g	0
		Fat	Various	All	Median	Robust SD	% (g/100g)	2
		Saturates	Various	All	Median	Robust SD	% (g/100g)	2
		Carbohydrate	All	All	Median	Robust SD	% (g/100g)	2
		Total sugars	All	All	Median	Robust SD	% (g/100g)	2

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
		Protein	Various	All	Median	Robust SD	% (g/100g)	2
		Salt	Various	All	Median	Robust SD	% (NaCl)	2
		Sodium	Various	All	Median	Robust SD	% (Na)	2
PT-CH-67	Processed cheese	Energy	Various	All	Median	Robust SD	kcal or kJ/100g	0
		Fat	Various	All	Median	Robust SD	% (g/100g)	2
		Saturates	Various	All	Median	Robust SD	% (g/100g)	2
		Cholesterol	GC	All	Median	Robust SD	% (g/100g)	2
		Carbohydrate	Calculation	All	Median	Robust SD	% (g/100g)	2
		Total sugars	All	All	Median	Robust SD	% (g/100g)	2
		Protein	Various	All	Median	Robust SD	% (g/100g)	2
		Salt	Various	All	Median	Robust SD	% (NaCl)	2
		Sodium	Various	All	Median	Robust SD	% (Na)	2
		Sorbic acid	HPLC	All	Median	Robust SD	mg/kg	2
		Moisture	Oven drying	All	Median	Robust SD	%	2
		pH	pH meter	All	Median	Robust SD	-	2

**reported on the reconstituted milk powder
*** analytes marked with an asterisk are not included in the LGC's UKAS scope of accreditation

Sample: **Standard Solutions for Chemical analysis**

Supplied as: 29: 125ml acid solution
32B: 250ml buffer solution
35: 100ml potassium hydrogen phthalate solution

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-29	HCl solution	Titratable Acidity	Titration	All	Median	Robust SD (Min 0.03)	% Lactic acid	2
PT-CH-32B	Buffer solution	pH	pH meter	All	Median	0.05	-	2
PT-CH-35	Potassium hydrogen phthalate	COD	Various	All	Median	10% of AV	mg/L	1

Sample: **Aflatoxin M_1 in milk**

Supplied as: 25ml of freeze dried milk

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-60*	Freeze-dried milk	Aflatoxin M_1	ELISA Lateral flow (e.g. Charm, Neogen) HPLC	20-200 (ng/kg)	Median	25% of AV	ng/kg	1

Sample: **Aflatoxin M_1 in cheese**

Supplied as: 70g of soft cheese

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-62*	Soft cheese	Aflatoxin M_1	Various	All	Median	25% of AV	µg/kg	2

Sample: **Nitrate & Nitrite in milk powder**

Supplied as: 50g of milk powder

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-65*	Milk powder	Nitrate	Various	All	Median	Robust SD	mg $NaNO_3$/kg	2
		Nitrite					mg $NaNO_2$/kg	

Sample: **Staphylococcal enterotoxins in cheese**

Supplied as: 2 samples of 50g of freeze-dried cheese (A & B)

Sample	Material	Analyte	Method	Range	AV	SDPA	Units	DP
PT-CH-68*	Freeze-dried cheese	Staphylococcal enterotoxins	VIDAS SET 2 (BioMérieux) Ridascreen SET Total (R-Biopharm) Transia Plate SET (Sigma) ISO 19020:2017 BAM Chapter 13B	-	Formulation	-		-

*currently not included in LGC's UKAS Scope of Accreditation