



QMAS

Quality in Meat and Fish Analysis Scheme

Scheme Description

LGC Standards Proficiency Testing

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Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
2	01/09/08	Updated with UKAS logo for single scope (0001) and removed reference to scheme year. Additional sample types included.	T.Noblett
3	03/07/09	Operational issues common to all schemes moved into General Protocol. List of abbreviations added. New PORTAL system added. Trial samples added.	M. Whetton
4	Sept 10	Units updated for phosphate. General update of document format. Dietary fibre and total sugar added to 731	M. Whetton
5	23/03/11	Change of Address to Page 1	N.Stephenson
6	Aug 11	Updated to include new analytes for 2012 Updated to include sample 743 Name of scheme updated	M. Whetton R. Lathall N. Stephenson
7	July 2012	Added new samples 744 and 745 for micro	A.S.Eden
8	Sept 2012	Updated to include new analytes in 730 and 731 and new samples 747 and 748 Updated to include new sample 746	M. Whetton T. Noblett
9	Dec 2012	Updated to include new analytes in sample 745.	T. Noblett
10	Mar 2013	Updated to include new samples 749 & 750.	M. Whetton
11	July 2013	Updated to include new sample 751 for fish speciation.	M. Whetton
12	Sept 2013	pH added to sample 734. Information for 749, 751 & 752 updated. Included microbiological method codes	W.Gaunt S. Frisicaro
13	Sept 2014	Removal of <i>Vibrio cholerae</i> parameter from 745. New analytes added to 741, 742 & 747. Inclusion of traceability information in Appendix A. Inclusion of subcontracting information in 'Test Materials' section. Minor standardisation amendments, e.g. logo and email addresses.	S.Frisicaro W. Gaunt
14	Sept 2015	Added new trial sample Aeromonas species in fish (753). Updated test methods for all microbiology samples. Removed 751, revised sample 752 Removed Hard copy report information	A.Cheetham W. Gaunt A.McCarthy

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 Meat and Fish Analysis Scheme (QMAS) is to enable laboratories performing the analysis of meat and fish products to monitor their performance and compare it with that of their peers. QMAS also aims to provide information to participants on technical issues and methodologies relating to the chemical and microbiological examination of meat and fish.

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

Test Materials

Details of test materials available in QMAS 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 QMAS 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 QMAS 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 method codes can be found in Appendix A. The time and temperature of incubation does not need to be reported.

Results and Reports

QMAS 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.

QMAS 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

The 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).

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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.

Chemistry samples**Sample 730****Supplied as:****Chemical analysis of meat and meat based products**

150g of dried/cured meat test material

Analyte	Method	Range	AV	SDPA	Units	DP
Fat	All	All	Median	4% of AV	%	2
Ash	All	All	Median	0.10%	%	2
Salt	All	All	Median	5% of AV	%	2
Protein	All	All	Median	2% of AV	%	2
Moisture	All	All	Median	0.40%	%	2
Sodium	All	All	Median	0.10%	%	2
Phosphate	All	All	Median	Robust SD	%PO4	2
Carbohydrate	All	All	Median	Robust SD	%	2
Energy	All	All	Median	Robust SD	kcal/100g kJ/100g	0
Dietary fibre	All	All	Median	0.50%	%	2
Total sugars	All	All	Median	2.00%	%	2
pH	All	All	Median	0.10	pH units	2

Sample 731**Supplied as:****Chemical analysis of meat and meat based products**

150g of precooked, raw or processed meat test material

Analyte	Method	Range	AV	SDPA	Units	DP
Fat	All	All	Median	4% of AV	%	2
Ash	All	All	Median	0.10%	%	2
Salt	All	All	Median	5% of AV	%	2
Protein	All	All	Median	2% of AV	%	2
Moisture	All	All	Median	0.40%	%	2
Sodium	All	All	Median	0.10%	%	2
Phosphate	All	All	Median	Robust SD	%PO4	2
Carbohydrate	All	All	Median	Robust SD	%	2
Energy	All	All	Median	Robust SD	kcal/100g kJ/100g	0
Dietary fibre	All	All	Median	0.50%	%	2
Total sugars	All	All	Median	2.00%	%	2
Calcium	All	All	Median	Robust SD	mg/100g	2
Potassium	All	All	Median	Robust SD	mg/100g	2
pH	All	All	Median	0.10	pH units	2

Sample 732
Supplied as:

Nitrate and nitrite analysis of meat and meat based products
30g of lyophilised meat

Analyte	Method	Range	AV	SDPA	Units	DP
Nitrate	All	0 to 60ppm >60ppm	Median	15ppm 25% AV	mg/kg	1
Nitrite	All	0-20ppm >20ppm	Median	5ppm 25% AV	mg/kg	1

Sample 733
Supplied as:

Chemical analysis of meat and meat based products
150g of meat test material

Analyte	Method	Range	AV	SDPA	Units	DP
Hydroxyproline	All	All	Median	0.025%	%	2
Total fat	All	All	Median	4% of AV (min 0.15)	%	2
Saturates	All	All	Median	20% of AV	%	2
Mono-unsaturates	All	All	Median	20% of AV	%	2
Poly-unsaturates	All	All	Median	20% of AV	%	2
Total trans fatty acids	All	All	Median	Robust SD	%	2

Sample 734
Supplied as:

Chemical analysis of fish and fish based products
150g of fish test material

Analyte	Method	Range	AV	SDPA	Units	DP
Fat	All	All	Median	4% of AV (min 0.15%)	%	2
Ash	All	All	Median	0.20%	%	2
Salt	All	All	Median	5% of AV (min 0.15%)	%	2
Protein	All	All	Median	2% of AV (min 0.10%)	%	2
Moisture	All	All	Median	0.40%	%	2
pH	All	All	Median	0.10	pH units	2

Sample 741
Supplied as:

Contaminants analysis in shellfish
150g of shellfish test material

Analyte	Method	Range	AV	SDPA	Units	DP
Arsenic	All	All	Median	10% AV	mg/kg	2
Cadmium	All	All	Median	10% AV	mg/kg	2
Mercury	All	All	Median	10% AV	mg/kg	2
Lead	All	All	Median	10% AV	mg/kg	2

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Phosphorus	All	All	Median	Robust SD	mg/kg	2
Zinc	All	All	Median	Robust SD	mg/kg	2

Sample 742
Supplied as:

Contaminants analysis in fish and fish based products
150g of fish test material

Analyte	Method	Range	AV	SDPA	Units	DP
Arsenic	All	All	Median	10% AV	mg/kg	2
Cadmium	All	All	Median	10% AV	mg/kg	2
Mercury	All	All	Median	10% AV	mg/kg	2
Lead	All	All	Median	10% AV	mg/kg	2
Phosphorus	All	All	Median	Robust SD	mg/kg	2
Zinc	All	All	Median	Robust SD	mg/kg	2

Sample 747*
Supplied as:

Trace elements analysis in meat
150g of meat based test material

Analyte	Method	Range	AV	SDPA	Units	DP
Arsenic	All	All	Median	10% AV	mg/kg	2
Cadmium	All	All	Median	10% AV	mg/kg	2
Mercury	All	All	Median	10% AV	mg/kg	2
Lead	All	All	Median	10% AV	mg/kg	2
Phosphorus	All	All	Median	Robust SD	mg/kg	2
Zinc	All	All	Median	Robust SD	mg/kg	2

Sample 748*
Supplied as:

Quality parameters in fish
150g of fish based test material

Analyte	Method	Range	AV	SDPA	Units	DP
Histamine	All	All	Median	Robust SD	mg/kg	2
Total volatile nitrogen (TVN)	All	All	Median	Robust SD	mg/100g	2
Trimethylamine (TMA)	All	All	Median	Robust SD	mg/100g	2

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Sample 749*

Meat authenticity

Supplied as:

2 x set of 6 samples (2g each) - various concentrations

Analyte	Method	Range	AV	SDPA	Units	DP
Presence/Absence	PCR & ELISA	0-100%	Formulation	N/A	-	-
Quantification (% to 2 decimal places)	PCR & ELISA	0-100%	Median	Robust SD	%	2

Sample 752*

Fish identification

Supplied as:

4 x 20g samples

Analyte	Method	Range	AV	SDPA	Units	DP
Fish species identification	PCR & ELISA	-	Formulation	N/A	-	-

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

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Microbiological samples

Sample 735

Supplied as:

Indicator organisms in meat and meat-based products

10g of lyophilised meat

Analyte	Method	Range	AV	SDPA	Units	DP
Total aerobic mesophilic count	Plate count agar Milk plate count agar Impedance TEMPO Petrifilm	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Enterobacteriaceae	VRBGA Petrifilm MPN TEMPO	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Coliforms	VRBA Petrifilm MPN COLI ID Chromogenic agar	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of <i>Escherichia coli</i>	TBX COLI ID VRBA Petrifilm Chromogenic agar MPN	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0

Sample 736

Supplied as:

Presence/absence of Salmonella in meat and meat-based products

25g of lyophilised meat

Analyte	Method	Range	AV	SDPA	Units	DP
Detection of <i>Salmonella</i> species	Enrichment/culture VIDAS PCR ELISA TECRA Rapid test (various) Chromogenic agar	0 to 1000	Qual Form	N/A	cfu 25g ⁻¹	N/A

Sample 737
Supplied as:

Presence/absence of Listeria in meat and meat-based products
25g of lyophilised meat

Analyte	Method	Range	AV	SDPA	Units	DP
Detection of <i>Listeria</i> species	Enrichment/culture	0 to 1000	Qual Form	N/A	cfu 25g ⁻¹	N/A
Detection of <i>Listeria monocytogenes</i>						

Sample 738
Supplied as:

Clostridium and staphylococci in meat and meat-based products
10g of lyophilised meat

Analyte	Method	Range	AV	SDPA	Units	DP
Enumeration of <i>Clostridium perfringens</i>	TSC agar OPSP agar IS agar	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Sulphite-reducing Clostridia	IS agar TSC agar OPSP agar	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Coagulase positive staphylococci	BP agar BP & RPF agar Petrifilm RAPID staph.	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0

Sample 739
Supplied as:

Indicator organisms in fish and fish-based products
10g of lyophilised fish or shellfish material plus vial

Analyte	Method	Range	AV	SDPA	Units	DP
Total aerobic mesophilic count	Plate count agar Petrifilm Impedance TEMPO	0 to 1000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Enterobacteriaceae	VRBGA Petrifilm MPN TEMPO	0 to 1000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of <i>Escherichia coli</i>	TBX COLI ID Petrifilm Chromogenic agar	0 to 100	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Coagulase positive staphylococci	BP agar BP & RPF agar Petrifilm Rapid Staph.	0 to 1000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0

Sample 740
Supplied as:

Presence/absence of Salmonella in fish and shellfish products
25g of lyophilised fish or shellfish material plus vial

Analyte	Method	Range	AV	SDPA	Units	DP
Detection of <i>Salmonella</i> species	Enrichment/culture VIDAS PCR ELISA TECRA	0 to 1000	Qual Form	N/A	cfu 25g ⁻¹	N/A

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Sample 743 **Presence/absence of Campylobacter in meat and meat-based products**
Supplied as: 25g of lyophilised meat plus vial

Analyte	Method	Range	AV	SDPA	Units	DP
Detection of <i>Campylobacter</i> species	Enrichment/culture PCR	0 to 1000	Qual Form	N/A	cfu 25g ⁻¹	N/A

Sample 744 **Presence/absence of E.coli O157 in meat and meat-based products**
Supplied as: 25g of lyophilised meat plus vial

Analyte	Method	Range	AV	SDPA	Units	DP
Detection of <i>E.coli</i> O157	Enrichment/culture PCR VIDAS ELISA REVEAL	0 to 1,000	Qual Form	N/A	cfu 25g ⁻¹	N/A

Sample 745 **Presence/absence of Vibrio in fish and shellfish products**
Supplied as: 25g of lyophilised fish or shellfish material plus vial

Analyte	Method	Range	AV	SDPA	Units	DP
Detection of <i>Vibrio</i> species	Enrichment/culture	0 to 1000	Qual Form	N/A	cfu 25g ⁻¹	N/A
Detection of <i>Vibrio parahaemolyticus</i>	Enrichment/culture	0 to 1000	Qual Form	N/A	cfu 25g ⁻¹	N/A

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Sample 746
Supplied as:

Spoilage organisms in meat and meat-based products
 10g of lyophilised meat

Analyte	Method	Range	AV	SDPA	Units	DP
Enumeration of <i>Pseudomonas</i>	CN agar CFC agar	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Lactic acid bacteria	MRS agar Petrifilm Rogosa agar	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0
Enumeration of Yeast Enumeration of Mould	DG18 agar DRBC agar RB agar YGC agar OGYE MEA Petrifilm	0 to 100,000	RMean	log ₁₀ 0.35	cfu g ⁻¹	0

Sample 753*
Supplied as:

Presence/absence of *Aeromonas* species in fish and shellfish products
 25g of lyophilised fish or shellfish material plus vial

Analyte	Method	Range	AV	SDPA	Units	DP
Detection of <i>Aeromonas</i> species	Enrichment/culture PCR	0 to 1000	Qual Form	N/A	cfu 25g ⁻¹	N/A

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ABBREVIATIONS FOR MICROBIOLOGICAL METHOD CODES

BP = Baird parker
 CFC = cetrimide, fucidin, cephalosporin agar
 CN = cetrimide, nalidixic acid agar
 DG18 = Dichloran 18% glycerol
 DRBC = Dichloran rose bengal chloramphenicol
 IS = Iron sulphite
 MPN = Most probable number
 PCR = Polymerase chain reaction
 OPSP=Oleandomycin Polymixin Sulphadiazine

RB = Rose bengal
 RPF = Rabbit plasma fibrinogen
 TBX = Tryptone bile x-glucuronide
 TSC = Tryptone sulphite cycloserine
 VRBA = Violet red bile
 VRBGA = Violet red glucose
 YGC = Yeast glucose chloramphenicol
 OGYE= Oxytetracycline glucose yeast extract
 MEA=Malt Extract Agar

Perfringens

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