FIRMS

Forensic Isotope Ratio Mass Spectrometry Scheme

Scheme Description

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LGC is the accredited PT provider of this scheme

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Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
1	Feb 2013	First issue created.	M. Whetton
2	Sept 2013	Amendments made to sample types and analytes. Methods section added on page 3.	M. Whetton
3	Mar 2014	Additional information regarding traceability of the assigned value included. Note regarding the availability of individual analytes included.	M. Whetton
4	July 2014	'LGC is the accredited PT provider of this scheme' on page 1 amended to be 'LGC is the PT provider of this scheme'	M. Whetton
5	Sept 2014	Amendments to email address and website on front page. Addition of subcontractor information in 'Test Materials' section.	N. Mason
6	Jan 2015	SDPA updated for 2015	W Gaunt
7	July 2015	Addition of UKAS logo	A McCarthy
8	Sept 2015	Removed Hard copy report information.	A McCarthy
9	Oct 2016	Amended FIRMS logo	A McCarthy
10	Sept 2018	SDPA values updated, sample descriptions updated (addition of Honey (bulk))	W Gaunt

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

Scheme Aims and Organisation

The primary aim of the Forensic Isotope Ratio Mass Spectrometry Proficiency Testing Scheme (FIRMS) is to enable laboratories performing isotope ratio analysis of a range of test materials to monitor their performance and compare it with that of their peers. FIRMS also aims to provide information to participants on technical issues and methodologies relating to isotope ratio analysis.

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

Test Materials

Details of test materials available in FIRMS are given in Appendix A. The measurands available are continually reviewed to ensure that they meet the needs of current laboratory testing and regulatory requirements.

Test material batches are tested for homogeneity for at least one measurand where it is deemed appropriate. Details of homogeneity tests performed and results are given in the FIRMS 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 FIRMS 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

FIRMS 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.

FIRMS 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 and indicated in the report tables.
  For some measurands, where there is a recognised reference method for that type of measurement, this may be used as the assigned value for a particular measurand 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 (Form). This denotes the use of an assigned value derived from sample preparation details, where known and exact quantities of the measurand of interest 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 measurand 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 measurand 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 measurand may be present in the test material. For some measurands, only the maximum is quoted. In these cases, the minimum will be 20% of the maximum value.

SDPA
SDPA represents the 'standard deviation for proficiency assessment' which is used to assess participant performance for the measurement of each measurand. 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).

Two values may be included in the tables for the SDPA; a percentage value and a fixed value; given in brackets. Where the percentage SDPA would be less than the fixed value, the fixed value will be used in calculation of participants' performance scores. The fixed values shown are in the units in which the measurands should be reported.

Units
This indicates the units used for the assessment of data. These are the units in which participants should report their results. For some measurands, 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.

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

Samples 1/2/3 **Analysis of**
Supplied as: 0.5g various products (waxes, oils, plant material, chitin, etc.) in a sealed amber vial
5g honey in a sealed amber vial*

Analyte	Method	AV	Range	SDPA	Units	DP
$\delta^{2}H_{VSMOW}$	All	RMean	All	1.5	-	2
$\delta^{13}C_{VPDB}$	All	RMean	All	0.15	-	2
$\delta^{15}N_{AIR}$	All	RMean	All	0.15	-	2
$\delta^{18}O_{VSMOW}$	All	RMean	All	0.25	-	2

Due to the nature of the materials provided, not all measurands in the table above will be present in each of the samples provided within the FIRMS scheme.

*Honey isotope analysis is to be performed on the bulk honey not the protein isotope ratio.