



# AFPS

## Animal Feeds Proficiency Testing Scheme

## Scheme Description

### LGC Standards

#### Proficiency Testing

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## Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
1	Jan 2010	New scheme description issued	M.Whetton
2	Jan 2011	Change of address details. Removed details regarding outliers in Appendix A.	M. Whetton
3	Jan 2012	Details of Robust Mean AV calculation amended. Inclusion of FAMES in Sample 3, removal of Sample 4 from scheme.	M. Whetton
4	Jan 2013	Change of scheme year from April-March to Jan-Dec. Introduction of fixed SDPAs for Samples 1 and 2.	M. Whetton
5	June 2013	Inclusion of Total Aflatoxins in Sample 5. Inclusion of additional FAMES to Sample 3	M. Whetton
6	Sept 2013	Included codes for microbiological methods	T.Noblett
7	Jan 2014	Amended units for PPD in Sample 1. Addition of Traceability information in Appendix A.	M.Whetton
8	Sept 2014	Amended units for analytes in Sample 1 (changed from g/kg to %) and split methods for crude fat. Amended number of decimal places for some analytes in Sample 2. Removal and addition of analytes in Sample 3 and inclusion of Karl Fischer as a method for water. Inclusion of trial samples for premix materials and wet pet food. Inclusion of subcontracting information in 'Test Materials' section.	M. Whetton
9	April 2015	Harmonisation of method names for moisture and water in Samples 1, 3 and 9. Addition of sample 10 for <i>Clostridium perfringens</i> and <i>Clostridium</i> species. Addition of analytes <i>E.Coli</i> and Coliforms to sample 7. Added UKAS logo and disclaimers.	M. Whetton T. Noblett
10	Sept 2015	Added new samples for Listeria (sample 11) & E.coli O157 (sample 12) Removed Hard copy Report information.	T.Noblett A.McCarthy
11	Sept 2016	Units changed to % for sample 1 analytes and sample 3 removed. Amended Sample 5 name from Aflatoxin to Mycotoxin	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 Animal Feeds Proficiency Testing Scheme (AFPS) is to enable laboratories performing the analysis of animal feeds to monitor their performance and compare it with that of their peers. AFPS also aims to provide information to participants on technical issues and methodologies relating to testing of animal feedstuffs.

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

### **Test Materials**

Details of test materials available in AFPS 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 AFPS 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 AFPS 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**

AFPS 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.

AFPS 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).

### **Units**

This indicates the units used for the assessment of data and 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 METHOD CODES**

DG18 = Dichloran 18% glycerol agar

DRBC = Dichloran rose bengal

chloramphenicol agar

MPCA = Milk plate count agar

MPN = Most probable number

OGYE = Oxytetracycline Glucose Yeast Extract agar

PCR = Polymerase chain reaction

VRBGA = Violet red bile glucose agar

YGC = Yeast glucose chloramphenicol agar

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

**Chemistry samples****Sample 1****Supplied as:****Proximate Analysis**

1 x 100-125g sample of animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Moisture	Oven drying, Vacuum oven, Other	RMean	1-95	0.5	%	2
Crude protein	Dumas, Kjeldahl, Other	RMean	1-85	5% of AV	%	2
Crude fat	Direct extraction	RMean	0.1-35	10% of AV	%	2
	Acid hydrolysis	RMean				
	Other	RMean				
Crude ash	AOAC 942-05, EC 152/2009 Other	RMean	1-35	5% of AV	%	2
Ash insoluble in hydrochloric acid	EC 152/2009, Other	RMean	0.1-25	20% of AV	%	3
Sugars	EC 152/2009, Other	RMean	0.5-70	20% of AV	%	3
Crude fibre	EC 152/2009, Fibre analyser (e.g. Fiiibretec), Gafta method10:0, ISO 6865, Other	RMean	0.5-50	10% of AV	%	3
Starch	Enzymetric, Polarimetric, Other	RMean	0.1-85	10% of AV	%	2
ADF	ISO 13906, Other	RMean	0.1-75	10% of AV	%	2
NDF	ISO 16472, Other	RMean	0.1-75	10% of AV	%	2
PPD (Pepsin protein digestibility)	AOAC 971.09, ISO 6655 Other	RMean	0.1-75	10% of AV	% of total protein	2

As these samples are real samples, the values given above are indicative, based on the range of materials used in previous rounds, and concentrations may sometimes fall outside of these ranges.

**Sample 2****Minerals and elements****Supplied as:**

1 x 100-125g sample of animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Arsenic	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-50	20%	mg/kg	3
Cadmium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-10	10%	mg/kg	3
Calcium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-500	10%	g/kg	2
Chloride	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-500	5%	g/kg	2
Chromium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-50	20%	mg/kg	2
Cobalt	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-100	20%	mg/kg	3
Copper	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	2-10000	10%	mg/kg	2
Iron	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	10-10000	10%	mg/kg	1
Lead	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-100	20%	mg/kg	3
Magnesium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-500	10%	g/kg	2
Manganese	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	10-10000	10%	mg/kg	1
Mercury	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-50	20%	mg/kg	3
Phosphorus	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-300	10%	g/kg	2
Potassium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-200	10%	g/kg	2
Selenium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-100	20%	mg/kg	3
Sodium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-100	10%	g/kg	2
Zinc	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	1-10000	10%	mg/kg	1

As these samples are real samples, the values given above are indicative, based on the range of materials used in previous rounds, and concentrations may sometimes fall outside of these ranges.

**Sample 5\***  
**Supplied as:**

**Mycotoxin**  
 1 x 100-125g sample of animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Aflatoxin B <sub>1</sub>	HPLC, LC-MS, LC-MS/MS, ELISA, Other	RMean	0.3-100	Robust SD	µg/kg	2
Aflatoxin B <sub>2</sub>	HPLC, LC-MS, LC-MS/MS, ELISA, Other	RMean	0.2-50	Robust SD	µg/kg	2
Aflatoxin G <sub>1</sub>	HPLC, LC-MS, LC-MS/MS, ELISA, Other	RMean	0.3-25	Robust SD	µg/kg	2
Aflatoxin G <sub>2</sub>	HPLC, LC-MS, LC-MS/MS, ELISA, Other	RMean	0.5-50	Robust SD	µg/kg	2
Ochratoxin	HPLC, LC-MS, LC-MS/MS, ELISA, Other	RMean	1-100	Robust SD	µg/kg	2
Total Aflatoxins	HPLC, LC-MS, LC-MS/MS, ELISA, Other	RMean	2-325	Robust SD	µg/kg	2

As these samples are real samples, the values given above are indicative, based on the range of materials used in previous rounds, and concentrations may sometimes fall outside of these ranges.

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



**Sample 8\***  
**Supplied as:****Minerals and trace elements in Premix Materials**  
1 x 100-125g sample of premix

Analyte	Method	AV	Range	SDPA	Units	DP
Arsenic	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-50	20%	mg/kg	2
Cadmium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-10	10%	mg/kg	2
Calcium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-500	10%	g/kg	2
Chloride	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-500	5%	g/kg	2
Chromium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-50	20%	mg/kg	2
Cobalt	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-100	20%	mg/kg	2
Copper	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	2-10000	10%	mg/kg	2
Iron	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	10-10000	10%	mg/kg	2
Lead	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-100	20%	mg/kg	2
Magnesium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-500	10%	g/kg	2
Manganese	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	10-10000	10%	mg/kg	2
Mercury	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-50	20%	mg/kg	2
Phosphorus	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-300	10%	g/kg	2
Potassium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-200	10%	g/kg	2
Selenium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0-100	20%	mg/kg	2
Sodium	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	0.1-100	10%	g/kg	2
Zinc	AAS, Colorimetry, ICP-OES, ICP-MS, Other	RMean	1-10000	10%	mg/kg	2

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**Sample 9\***  
**Supplied as:**

**Proximate Analysis of Wet Pet Food**  
 1 x 100-125g sample of wet pet food

Analyte	Method	AV	Range	SDPA	Units	DP
Moisture	Oven drying, Vacuum oven, Other	RMean	-	5	g/kg	2
Crude protein	Dumas, Kjeldahl, Other	RMean	-	5%	g/kg	2
Crude fat	Direct extraction, Acid hydrolysis, Other	RMean	-	10%	g/kg	2
Crude ash	Various	RMean	-	5%	g/kg	2
Ash insoluble in hydrochloric acid	Various	RMean	-	20%	g/kg	2
Sugars	Various	RMean	-	20%	g/kg	2
Crude fibre	Various	RMean	-	10%	g/kg	2
Starch	Enzymatic, Polarimetric, Other	RMean	-	10%	g/kg	2

As these samples are real samples, the values given above are indicative, based on the range of materials used in previous rounds, and concentrations may sometimes fall outside of these ranges.

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

**Microbiological samples**

**Sample 6**                                      **Salmonella presence/absence**  
**Supplied as:**                                      1 x 25g sample of simulated animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Detection of <i>Salmonella</i> species	Enrichment/culture VIDAS PCR ELISA	Qual Form	0 to 1,000	N/A	N/A	N/A

**Sample 7**                                      **Indicator organisms**  
**Supplied as:**                                      1 x 10g sample of simulated animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Total viable count	Plate count agar Milk plate count agar Petrifilm	RMean	0 to 100,000	$\log_{10}$ 0.35	cfu/g	0
Enumeration of Enterobacteriaceae	VRBGA Petrifilm MPN	RMean	0 to 100,000	$\log_{10}$ 0.35	cfu/g	0
Enumeration of coliforms	VRBA Petrifilm MPN	RMean	0 to 100,000	$\log_{10}$ 0.35	cfu/g	0
Enumeration of <i>Escherichia coli</i>	TBX agar Petrifilm MPN	RMean	0 to 100,000	$\log_{10}$ 0.35	cfu/g	0
Enumeration of Yeast Enumeration of Mould	OGYE DG18 Malt extract agar Rose Bengal agar DRBC YGC Potato dextrose agar Petrifilm	RMean	0 to 100,000	$\log_{10}$ 0.35	cfu/g	0

**Sample 10**                      **Clostridium perfringens/species**  
**Supplied as:**                1 x 10g sample of simulated animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Enumeration of <i>Clostridium perfringens</i> Enumeration of <i>Clostridium</i> species	TSC agar OPSP agar IS agar RC agar	RMean	0 to 100,000	log <sub>10</sub> 0.35	cfu/g	0

**Sample 11**                      **Listeria monocytogenes/species**  
**Supplied as:**                1 x 25g sample of simulated animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Detection of <i>Listeria</i> species Detection of <i>L.monocytogenes</i>	Enrichment/culture PCR RAPID L.MONO	Qual Form	0 to 1000	NA	cfu 25g <sup>-1</sup>	NA

**Sample 12**                      **E.coli O157**  
**Supplied as:**                1 x 25g sample of simulated animal feed

Analyte	Method	AV	Range	SDPA	Units	DP
Detection of <i>E.coli</i> O157	Enrichment/culture IMS PCR ELISA VIDAS	Qual Form	0 to 1000	NA	cfu 25g <sup>-1</sup>	NA