

**Working Group for the development of a framework for interrogation of honey
authenticity databases (IHAD WG)**

ANNEX 2

Apr-25

APPENDIX 1: QUALITY ASSURANCE OF THE DATABASE, REPORTING AND REFERENCE DATA SET			
PRELIMINARY QUESTIONS			
What analytical test data does the database hold? e.g. NMR data, HRMS data etc			
Which year was the database first used for commercial authenticity/adulteration assessment?			
TOTAL NUMBER OF REFERENCE SAMPLES IN THE DATABASE =			
NUMBER OF REFERENCE SAMPLES USED IN THIS INTERPRETATION =			
Question	Information Type (about the honey samples)	Yes/No/Unknown or N/A	Comments (continue on additional tabs or pages if required)
THE DATABASE & REPORTING			
1	Is the scope of the database defined? If so, please state in the comments.		
2	Has the scope of the database changed since it was first introduced commercially? If so, please provide details of how and why.		
3	Does the database have defined 'acceptance criteria' applied before a reference sample is accepted into it? If so, please provide details. If the answer to this question is 'yes' please also note this fact in the comments box against the corresponding test(s) listed in Appendix 3.		
4	Has the type and amount of metadata associated with reference samples in the database changed over time? e.g. additional tests added for reference samples obtained more recently. If changed over time briefly indicate how		
5	Has the database changed over time? e.g. additional tests added for reference samples obtained more recently? If changed over time briefly indicate how.		
6	Is a 'staged approach' adopted for interpretations? For example, is an assessment first made against all reference samples in the database, followed by interpretations made against only the most relevant reference samples in the database? If so, please provide brief details of how this may be carried out.		
7	In the event that only a percentage of the reference samples in the database are used in the interpretation(s) how do you gauge that as an appropriate number of reference samples for the assessment? For example, if the database contained a total of 1000 samples but only 12 were used in the assessment would this be deemed 'appropriate'? Please provide brief details on how this decision is justified.		
8	Are fixed algorithms used to provide the reported interpretation of the findings for the test sample? If so, please provide brief details.		
9	How are reports badged, e.g. as (a) a definitive opinion about the sample, or, (b) provided for 'intelligence', 'investigative' or 'technical' purposes so that further work can be undertaken? Or in some other way? (please provide details).		
10	Does the report include information to enable the recipient to interpret each datum (rather than a simple 'positive' or 'adulterated with sugar syrup' for example), including information such as quantitative data, the LOD and/or LOQ of the test(s), the measurement uncertainty and an indication of the strength of the findings?		
11	Is the the person who signed the report qualified to do so, i.e. do they have expertise in the test(s) and associated interpretation being reported? Please provide brief details of how this is justified and/or documented.		
12	Is the database regularly curated/reviewed? If yes, what actions are taken based on this curation? Please provide brief details.		
THE REFERENCE DATA SET			
13	Is the method validated and are performance characteristics generally known? If yes, note when it was validated in comments.		
14	Was / is the method accredited to ISO 17025? Please comment including year of accreditation and what aspects of the database are accredited e.g. analytical method, statistical interpretation etc.		
15	Has the method been collaboratively trialled? Provide brief details in comments		
16	Are there proficiency test (PT) schemes in which the method is enrolled? Provide details of scheme, first enrollment date, frequency and performance in comments		

N/A - not applicable

APPENDIX 2: REFERENCE SAMPLE TRACEABILITY METADATA

Reference: Protocol for the Collection of Honey Reference Samples for the Construction of Authenticity Databases October 2023 Defra
https://assets.publishing.service.gov.uk/media/66e816f210f8726dc23aa194/ANNEX_Forms_28_8_24_Final-honey_protocol_with_online_forms.pdf

QUESTION SET 1: REFERENCE SAMPLES INTEGRITY & CHAIN OF CUSTODY				
TOTAL NUMBER OF REFERENCE SAMPLES IN THE DATABASE =				
NUMBER OF REFERENCE SAMPLES USED IN THIS INTERPRETATION =				
Qn. No.	QUESTIONS	Yes/No/ Unknown (Y/N/U)	If 'yes', % of samples used in interpretation	Additional Comments (Continue on additional sheets or tabs if required)
1.1	Do reference samples have a unique database reference code?			
1.2	Is sampling date recorded for a reference sample?			
1.3	Are details of the person taking the reference sample recorded?			
1.4	Is the person taking the reference sample trained in the documented sampling procedure and is this fact recorded?			
1.5	Is the person taking the reference sample from an organisation independent of the honey producer/packer and database owners?			
1.6	Is the person taking the reference sample from the organisation responsible for the database?			
1.7	Is the person taking the reference sample from the honey producer/apiary/packer witnessed by a person from the organisation responsible for the database or from an independent organisation?			
1.8	Is the person taking the reference sample from the honey producer/apiary/packer?			
1.9	Are sampling details unknown or is sampling performed by untrained personnel and/or with no documented sampling procedure?			
1.10	Is the sampling of a reference sample recorded in full using digital technology (e.g., video/photo with linked time, date, and GPS data) uploaded directly to blockchain software (i.e., an immutable record)?			
1.11	Is the sampling of a reference sample recorded in full using digital technology (e.g., video/photo with linked time, date, and GPS data) and held as metadata associated with the sample (no blockchain record)?			
1.12	Is the sampling activity of a reference sample captured by an independent audit / certification mechanism?			
1.13	Is the sampling activity of a reference sample recorded as paper / electronic records only?			
1.14	Are there only partial records for sampling activity of a reference sample? i.e. where only some of the required metadata, according to the scope of the database (as defined by the database owner) is available.			
1.15	Are there no records of sampling activity of a reference sample available?			
1.16	Are there full records of chain of custody (CoC) for a reference sample from point of sampling to receipt by the database owner/laboratory? If so, which standards e.g. full forensic or more routine are applied to this CoC? (note in comments)			
1.17	Are there only partial records of chain of custody for a reference sample from point of sampling to receipt by the database owner/laboratory?			
1.18	Are there no records of chain of custody for a reference sample from point of sampling to receipt by the database owner/laboratory?			

Colour coding key:	General questions	Questions on sampling activities
	Questions on the integrity of records	Questions on chain of custody

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<https://www.gov.uk/government/news/protocol-for-the-collection-of-honey-reference-samples-update#:~:text=The%20Protocol%20for%20the%20Collection,%2FProjectDetails%3FProjectId%3D21120>

QUESTION SET 2: BEEKEEPER/APIARY DERIVED METADATA				
TOTAL NUMBER OF REFERENCE SAMPLES IN THE DATABASE =				
NUMBER OF REFERENCE SAMPLES USED IN THIS INTERPRETATION =				
Qn. No.	QUESTIONS	Yes/No	If 'yes', % of samples used in interpretation	Additional Comments (continue on additional sheets if required)
Preliminary questions:-				
2.1a	Does the database contain reference samples sourced directly from beehives, beekeepers ex hive or ex. apiary bulked honey batches.			
2.1b	If 2.1a is 'yes' then is beekeeper/apiary metadata (such as 2.3-2.17 below) available for reference samples sourced directly from beekeepers/apiaries?			
2.2a	Does the database contain samples sourced elsewhere in the honey supply chain? E.g. sampled from bulk honey on arrival at port in importing country, or sampled as a retail product.			
2.2b	If 2.2a is 'yes' then is beekeeper/apiary metadata (such as 2.3-2.17 below) available for reference samples sourced elsewhere in the honey supply chain? E.g. sampled from bulk honey on arrival at port in importing country, or sampled as a retail product.			
2.2c	Where 2.2a is yes, is beekeeper/apiary metadata such as 2.3-2.17 below) available for each honey lot/batch a bulked or retail honey is comprised of?			
If a 'yes' answer is provided for either of questions 2.1b or 2.2b then continue with each of the questions detailed below:-				
Apiary/Beekeeper Information: For the reference samples used in the interpretation:-				
2.3	Are Sampling Point(s) e.g. beehive number x; bulk mixing vessel reference recorded?			

2.4	Are Apiary/Beekeeper(s) Name and Number/Reference (if applicable) recorded?			
2.5	Is Apiary address (where applicable) or GPS Coordinates recorded?			
2.6	Is/are unique Hive Number(s)/Reference(s) recorded?			
Honey Reference Sample Information: For the reference samples used in the interpretation:-				
2.7	Is Honey Batch Reference recorded?			
2.8	Is Honey type (floral origin, polyflora or honeydew) recorded?			
2.9	Is bee species producing the reference sample recorded?			
2.10	Is country of origin recorded?			
2.11	Is the region (Geographic) the honey is sourced from recorded e.g. Chinese province or UK county			
2.12	Are extraction dates (inclusive, first and last) recorded?			
2.13	Is the number of hives comprising batch recorded?			
2.14	Is the weight of honey in the batch the reference sample was taken from recorded?			
Batch Processing Information: For the reference samples used in the interpretation:-				
2.15	Have details of any mixing/homogenisation been recorded?			
Bee-feeding & adverse pre-harvest weather information: For the reference samples used in the interpretation:-				
2.16	Have records of dates and details of bee feeding being recorded?			
2.17	Are details of any adverse or unusual weather conditions prior to harvest of this batch recorded?			

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QUESTION SET 3: POST 'FACTORY PROCESSING' DERIVED METADATA				
TOTAL NUMBER OF REFERENCE SAMPLES IN THE DATABASE =				
NUMBER OF REFERENCE SAMPLES USED IN THIS INTERPRETATION =				
Qn. No.	QUESTIONS	Yes/No	If 'yes', % of samples used in interpretation	Additional Comments
Preliminary questions:-				
3.1a	Does the database contain reference samples derived from 'factory' or 'processing facility' blending/homogenisation/processing facilities?			
3.1b	If 3.1a is 'yes' then is 'factory processing' metadata (such as 3.3 - 3.12 below) available for reference samples sourced post 'factory processing'?			
3.2a	Does the database contain samples sourced further down the honey supply chain? E.g. sampled from bulk honey on arrival at port in importing country, or sampled as a retail product.			
3.2b	If 3.2a is 'yes' then is 'factory processing' metadata (3.3 - 3.12 below) available for reference samples sourced further down the honey supply chain? E.g. sampled from bulk honey on arrival at port in importing country, or sampled as a retail product.			
If a 'yes' answer is provided for either of questions 3.1b or 3.2b then continue with each of the questions detailed below:-				
Factory/Processing Centre Sampling Information: For the reference samples used in the interpretation:-				
3.3	Are sampling Point(s) recorded? e.g. post homogenisation tank, post-bulking filling line, post-bulking storage			

Factory/Processing Centre Information: For the reference samples used in the interpretation:-				
3.4	Is factory/processing facility name recorded?			
3.5	Is/are factory/processing facility address or GPS Coordinates recorded?			
Load Processing Information: For the reference samples used in the interpretation:-				
3.6	Is the number of batches in the load from which the reference sample was taken recorded?			
3.7	Is/are the reference code(s) for each batch in load recorded?			
3.8	Are the total number of containers/IBCs/drums in load recorded?			
3.9	Is the total weight/volume of the bulked load from which the reference sample was taken recorded?			
3.10	Where a bulk load from which a reference sample is taken has been mixed/homogenised is this fact recorded?			
3.11	Where a bulk load from which a reference sample is taken has been sieved/filtered is this fact recorded?			
3.12	Where a bulk load from which a reference sample is taken has been subjected to moisture reduction beyond the hive is this fact recorded?			

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update#:~:text=The%20Protocol%20for%20the%20Collection,%2FProjectDetails%3FProjectId%3D21120

QUESTION SET 4: 'POST ARRIVAL IN IMPORTING COUNTRY' METADATA				
TOTAL NUMBER OF REFERENCE SAMPLES IN THE DATABASE =				
NUMBER OF REFERENCE SAMPLES USED IN THIS INTERPRETATION =				
Qn. No.	QUESTIONS	Yes/No	% of samples used in interpretation 'yes'	Additional Comments
Preliminary questions:-				
4.1a	Does the database contain reference samples sourced post-arrival in importing country e.g. at port of arrival, at warehouse?			
4.1b	If 4.1a is 'yes' then is post-arrival in importing country load/lot metadata (such as 4.3 - 4.11 below) available?			
4.2a	Does the database contain samples sourced further down the honey supply chain? E.g. sampled from packing facility, or sampled as a retail product.			
4.2b	If 4.2a is 'yes' then is post-arrival in importing country load/lot metadata (such as 4.3 - 4.11 below) available for reference samples sourced further down the honey supply chain? E.g. sampled from packing facility, or sampled as a retail product.			
If a 'yes' answer is provided for either of questions 4.1b or 4.2b then continue with each of the questions deailed below:-				
Honey Packer/Importer Information: For the reference samples used in the interpretation:-				
4.3	Is packer/Importer name recorded for a reference sample?			
4.4	Is/are packer/importer address or GPS location coordinates recorded?			
Honey Load Information: For the reference samples used in the interpretation:-				
4.5	Is/are sampling point(s) where a reference sample is taken recorded? e.g. barrel number(s), drum number(s)			
4.6	Is the bulked Honey Load Reference/Number from which the reference sample was taken recorded			

4.7	Is the honey product name for a reference sample recorded? E.g. Chinese ELA			
4.8	Is the country of origin for a reference sample recorded?			
4.9	Is the packer/Importer Lot/Batch Reference/Number for a reference sample recorded?			
4.10	Is the shipment container number the load from which a reference sample is taken recorded?			
4.11	Is the total number of drums/IBCs/drum in load from which a reference sample is taken recorded?			

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QUESTION SET 5: METADATA FOR RETAIL UNITS SAMPLED AT FILLING OR POST PACKING				
TOTAL NUMBER OF REFERENCE SAMPLES IN THE DATABASE =				
NUMBER OF REFERENCE SAMPLES USED IN THIS INTERPRETATION =				
Qn. No.	QUESTIONS	Yes/No	% of samples used in interpretation 'yes'	Additional Comments
Preliminary questions:-				
5.1a	Does the database contain reference samples sourced at retail unit filling e.g jar, bottle , bucket, or from retail units themselves?			
5.1b	If 5.1a is 'yes' then is metadata (such as 5.2 - 5.12 below) for these reference samples available?			
If a 'yes' answer is provided for either of questions 5.1b then continue with each of the questions deailed below:-				
Pack-derived information: For the reference samples used in the interpretation:-				
5.2	Is/are the sampling point(s) from which the reference sample was obtained recorded? E.g. retail outlet or packer name/address			
5.3	Is the product brand recorded for a reference sample?			

5.4	Is the product description (as indicated on the label) for a reference sample recorded?			
5.5	Is the botanical origin e.g. Acacia or floral description e.g. wildflower for a reference sample recorded?			
5.6	Is the geographic origin (country, countries, and region where stated) for a reference sample recorded?			
5.7	Is the product lot Number/Batch Number for a reference sample recorded?			
5.8	Is the Best Before Date for a reference sample recorded?			
Information from Brand Owner (obtained from the honey products' packer): For the reference samples used in the interpretation:-				
5.9	Is the honey blend composition in % (where applicable) recorded for a reference sample?			
5.10	Is the date of filling recorded for a reference sample?			
5.11	Is any information on the blending, homogenisation and/or filling processes associated with the reference sample lot recorded?			
5.12	Is/are batch references for each honey in a retail blend reference sample recorded, where applicable?			

APPENDIX 3: REFERENCE SAMPLE ANALYTICAL METADATA				
TOTAL NUMBER OF REFERENCE SAMPLES IN THE DATABASE =				
NUMBER OF REFERENCE SAMPLES USED IN THIS INTERPRETATION =				
NOTE: ANY OF THE BELOW QUESTIONS RELATING TO THE ANALYTICAL TECHNIQUE OF THE DATABASE UNDER INTERROGATION SHOULD BE IGNORED. FOR EXAMPLE, IF A NMR DATABASE IS BEING INTERROGATED THEN				
Qn. No.	QUESTIONS	Yes/No/U nknown (Y/N/U)	If 'yes', % of samples used in interpretation	Additional Comments (Continue on additional sheets or tabs if required)
1	Do reference samples have analytical metadata associated with them?			
If the answer to Qn 1 is 'yes' then continue from question 2: -				
2	Do reference samples have associated conventional ' commercial/trade ' analys is metadata (see qns. 2a - 2e below)?			
2a	Moisure/water content			
2b	Diastase			
2c	pH/acidity			
2d	Hydroxymethylfurfural (HMF)			
2e	Sugar profile (glucose, fructose, sucrose etc.)			
2f	Colour			
2g	Proline			
2h	Invertase			
2i	Ethanol			
2j	Other (state test in comment)			
2k	Other (state test in comment)			
3	Do reference samples have associated pollen analysis test data?			
4	Do reference samples have associated results for other authenticity/adulteration tests (see below)?			
4a	Isotopic techniques: EA-IRMS (C4 sugars)			
4b	Isotopic techniques: LC-IRMS (C3 sugars)			
4c	Spectrometric techniques: NMR profiling			

4d	Spectroscopic techniques: Other techniques including Fourier transform infrared (FTIR) and NIR (state test in comments)			
4e	Spectrometric techniques: Liquid chromatography- high-resolution mass spectrometry (LC-HRMS) profiling			
4f	Specific marker tests:-			
4f1	Rice syrup marker (SM-R)			
4f2	Mannose			
4f3	Turanose			
4f4	Difructose anhydrides (DFAs)			
4f5	Beet syrup marker (SM-B)			
4f6	Oligosaccharide profiling			
4f7	Caramal colour (E150d)			
4f8	Psicose			
4g	Enzymic profiling adulteration indicator tests:-			
4g1	Betafructofuranosidase (BFF)			
4g2	beta-gamma-amylase test			
4g3	Thermoresistant amylase test			
4g4	Foreign alpha-amylase (FAmyP) test			
4h	Spectrometric techniques: GC-MS or GC-MS/MS aroma profiling			
4i	Trace elements profiling by, for example, inductively coupled plasma-mass spectrometry (ICP-MS).			
4j	Molecular biology, DNA barcoding and/or Next Generation Sequencing.			
4k	Other (state test in comment)			
4l	Other (state test in comment)			