



Certificate Of Analysis

ANALYSIS REQUESTED: ^{13}C Isotope Analysis by EA/LC-IRMS (C4/C3 Sugars) (101158)

Parameter	Result	Unit	Method
Protein	-25.66	$\delta^{13}\text{C}(\text{‰})$	PM DE01.026:2022-04 (a) ¹
Honey	-27.09	$\delta^{13}\text{C}(\text{‰})$	PM DE01.026:2022-04 (a) ¹
Fructose (F)	-27.44	$\delta^{13}\text{C}(\text{‰})$	PM DE01.094:2022-04 (a) ²
Glucose (G)	-26.69	$\delta^{13}\text{C}(\text{‰})$	PM DE01.094:2022-04 (a) ²
Disaccharides	-26.83	$\delta^{13}\text{C}(\text{‰})$	PM DE01.094:2022-04 (a) ²
Trisaccharides	-26.16	$\delta^{13}\text{C}(\text{‰})$	PM DE01.094:2022-04 (a) ²
Oligosaccharides	n.a.	$\delta^{13}\text{C}(\text{‰})$	PM DE01.094:2022-04 (a) ²
Delta $\delta^{13}\text{C}$ (F-G)	-0.75	$\delta^{13}\text{C}(\text{‰})$	PM DE01.094:2022-04 (a) ²
Delta $\delta^{13}\text{C}$ (max.)	1.78	$\delta^{13}\text{C}(\text{‰})$	PM DE01.094:2022-04 (a) ²
C4 Sugar Content	0.00	%	PM DE01.026:2022-04 (a) ¹
F/G Ratio	1.28		PM DE01.094:2022-04 (a) ²
Portion of Disaccharides	4.17	%	PM DE01.094:2022-04 (a) ³
Portion of Trisaccharides	1.04	%	PM DE01.094:2022-04 (a) ³
Portion of Oligosaccharides	n.d.	%	PM DE01.094:2022-04 (a) ³

LC-IRMS is not an official method for F/G ratio; n.a.: not analyzed; n.d.: not detected < 1.0 %;
 $\delta^{13}\text{C}$ value in permil. vs. V-PDB standard

SPECIFICATIONS OF PURE HONEY:

Delta $\delta^{13}\text{C}$ (F-G): not more than $\pm 1.0 \text{ ‰}$

Delta $\delta^{13}\text{C}$ (max.) of individual $\delta^{13}\text{C}$ values: not more than $\pm 2.1 \text{ ‰}$

C4 sugar content: $\leq 7.0 \text{ ‰}$; portion of oligosaccharides: n.d

Expanded measurement uncertainties are as follows: Protein: $\pm 0.4 \text{ ‰}$; Honey: $\pm 0.4 \text{ ‰}$; Fructose: $\pm 0.4 \text{ ‰}$;
Glucose: $\pm 0.4 \text{ ‰}$; Disaccharides: $\pm 0.6 \text{ ‰}$; Trisaccharides: $\pm 1.0 \text{ ‰}$; Oligosaccharides: $\pm 1.0 \text{ ‰}$ (at 1.0 % level);
Delta $\delta^{13}\text{C}$ [Protein-Honey]: $\pm 0.4 \text{ ‰}$

(a) : accredited method. (na) : not accredited method. (1) AOAC 998.12:2013 (2) Apidologie 39/5 (2008) 574-587
(3) Apidologie 39/5 (2008) 574-587; % related to total sugars.

This document may only be reproduced in full. The results given herein apply to the submitted sample only.

Interpretation:

Foreign sugars were not detected. Regarding the examined parameters, the sample meets the requirements for pure honey (Council Directive 2001/110/EC of 20 Dec 2001).

Honey COA



PRODUCT GROUP:	FOOD & AGRICULTURAL PRODUCTS
----------------	------------------------------

DETAILS PROVIDED BY CUSTOMER:

NAME OF THE PRODUCT	Honey
SAMPLE DETAILS	Batch no :- 520
TEST REQUIRED	Chemical Test
ANY OTHER INFORMATION	N/A

LAB INFORMATION:

SAMPLE REGISTRATION NUMBER	IFS-250325026		
SAMPLE REGISTRATION DATE	25/03/2025		
ANALYSIS STARTING DATE	25/03/2025	ANALYSIS COMPLETION DATE	29/03/2025
SAMPLE QUANTITY RECEIVED	250 gm in plastic bottle		
MODE OF SAMPLING	Sample not collected by Intertek		
SAMPLING PROTOCOL/ METHOD	N/A	SAMPLE CONDITION	Good
SAMPLING DATE & TIME	N/A		
SAMPLING LOCATION	N/A		
SAMPLING DONE BY	N/A	REPORTING CODE	PK
OTHER INFORMATION: N/A			
SAMPLE TESTED AS RECEIVED			

ANALYTICAL RESULTS

Sr. No	Test Parameter	Unit of Measurement	Result	Specification	Limit of Quantification	Method of Testing
	Chemical Parameter					
1.	Specific marker for Rice Syrup (SMR)	mg/kg	Absent	-	1.0	FSSAI order File No 11023/53/2018-QA) dated 06-07-2020

ANALYTICAL RESULTS

Sr. No.	Test Parameters	Units of Measurement	Result	Specification as per FSSAI	Limit of Quantification	Method of testing
	13C Isotopic Analysis of Honey by (EA-LC/IRMS)					
1.	$\delta^{13}\text{C}$ Protein	$\delta^{13}\text{C}$ (‰)	-25.64	-	-	IFSG/SOP/C/TE/200
2.	$\delta^{13}\text{C}$ Honey	$\delta^{13}\text{C}$ (‰)	-24.77	-	-	IFSG/SOP/C/TE/200
3.	$\Delta\delta^{13}\text{C}$ Protein – Honey	$\delta^{13}\text{C}$ (‰)	-0.87	≥ -1.0		IFSG/SOP/C/TE/200
4.	$\delta^{13}\text{C}$ Fructose (F)	$\delta^{13}\text{C}$ (‰)	-25.39	-	-	IFSG/SOP/C/TE/200
5.	$\delta^{13}\text{C}$ Glucose (G)	$\delta^{13}\text{C}$ (‰)	-24.43	-	-	IFSG/SOP/C/TE/200
6.	$\delta^{13}\text{C}$ Disaccharides	$\delta^{13}\text{C}$ (‰)	-25.99	-	-	IFSG/SOP/C/TE/200
7.	$\delta^{13}\text{C}$ Trisaccharide	$\delta^{13}\text{C}$ (‰)	NA	-	-	IFSG/SOP/C/TE/200
8.	$\delta^{13}\text{C}$ Oligosaccharides	$\delta^{13}\text{C}$ (‰)	NA	-	-	IFSG/SOP/C/TE/200
9.	$\Delta\delta^{13}\text{C}_{\text{Fru}} - \text{Glu}$	$\delta^{13}\text{C}$ (‰)	-0.96	± 1.0	-	IFSG/SOP/C/TE/200
10.	$\Delta\delta^{13}\text{C}$ Max	$\delta^{13}\text{C}$ (‰)	1.21	± 2.1	-	IFSG/SOP/C/TE/200
11.	C4 Sugar Content	%	5.45	Max 7.0	-	IFSG/SOP/C/TE/198
12.	F/G Ratio	-	1.15	-	-	IFSG/SOP/C/TE/200
13.	Portion of Disaccharides	%	5.89	-	-	IFSG/SOP/C/TE/200
14.	Portion of Trisaccharide	%	BLQ	-	-	IFSG/SOP/C/TE/200
15.	Portion of Oligosaccharides	%	BLQ	-	-	IFSG/SOP/C/TE/200

Interpretation:

Sample comply with specification of the honey as per 2.8.3.1 of Food Safety and Standards (Food Products Standards and Food Additives) Regulation, 2011 for above tested parameters.

Below limit of Quantification (BLQ)

Note: The above results pertain only to the sample tested and applicable parameter.

*****END OF TEST REPORT*****



Results Summary

Type of Analysis	Result	Status
Origin, Type and Variety		
Type of Honey	Blossom	○
Botanical Variety	Not Applied	○
Country of Origin: India	Consistent	●
Test of Markers of Foreign Sugars	Pass	●
Composition and Comparison to Reference Group	Requires Interpretation	●
Compliance for EU Market for		
HMF	Compliant	●
Sucrose	Compliant	●
Glucose + Fructose	Compliant	●

The data analysis is performed at Bruker BioSpin GmbH & Co. KG (Ettlingen, Germany) according to testing method AA-72-03-19 (Honey-Profiling 3.1.4), released on 16-Jan-2025 (DIN EN ISO/IEC 17025:2018 Accreditation Certificate D-PL-22753-01-00). All results solely refer to the tested sample as provided by the customer.

Test of Markers of Foreign Sugars

(Analysis-ID: HD-TA)

Following tests have been applied in order to detect foreign sugars:

ID	Description	Value	Graphics	Result
2	3.8113 / (1.95-2.02)	18.09		pass
3	3.9238 / (3.16-4.14)	0.0005280		pass
4	3.2890 / (1.95-2.02)	1.785		pass
5	4.0363 / (3.75-3.80)	0.00517		pass
6	5.3324 / (5.27-5.30)	0.1017		pass
7	3.0123 / (1.95-2.02)	0.01820		pass
8	3.5929	989		pass
9	5.0745 / (4.07-4.12)	0.006449		pass
10	3.2753	243.1		pass
11	3.7490 / (1.95-2.02)	0.52		pass
13	4.1961 / (3.16-4.14)	0.0001002		pass
14	3.3135 / (5.27-5.30)	0.0766		pass
15	4.6809 / (3.65-3.73)	0.00018778		pass
16	3.7715 / (3.65-3.73)	0.05027		pass
17	5.4913 / (4.60-4.67)	0.001886		pass
18	4.6327 / (3.16-4.14)	0.0004904		pass
19	4.2569 / (1.95-2.02)	0.2058		pass
20	3.2797	172.1		pass
102	5.3608 / (5.27-5.30)	0.0776		pass
103	5.4047 / (4.07-4.12)	0.0005431		pass
104	3.1817 / (1.95-2.02)	0.3599		pass
105	3.3476 / (5.27-5.30)	0.0537		pass
107	4.4974 / (5.27-5.30)	0.2325		pass
109	5.3901 / (1.95-2.02)	3.334		pass
110	5.4126 / (4.07-4.12)	0.001517		pass
127	4.2487	149.1		pass
128	5.3045 / (1.95-2.02)	0.1818		pass
129	3.5884 / (3.75-3.80)	0.002732		pass
130	4.9421 / (4.93-4.97)	0.1645		pass
131	3.5929 / (4.07-4.12)	0.00796		pass
133	4.9433 / (4.93-4.97)	0.07613		pass
134	4.2501	62.5		pass
135	3.9156 / (4.07-4.12)	0.03326		pass
136	5.2876 / (4.07-4.12)	0.002891		pass
140	3.2852 / (4.07-4.12)	0.005913		pass

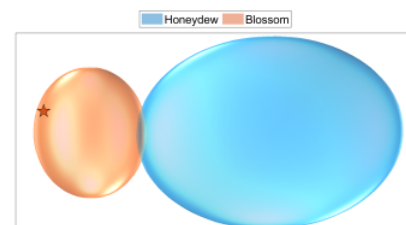
Origin, Type and Variety

Type of Honey

(Analysis-ID: HS3-CC-1000-18151)

This model is based on 14146 samples, thereof 1993 samples of reference group *Honeydew*.

Result: Consistent with *Blossom*. The probability of consistency is 100.0%.



Botanical Variety

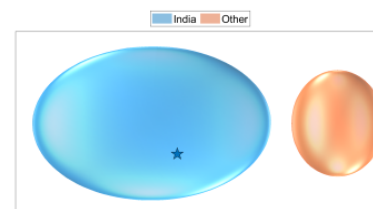
Verification of consistency is not possible as the declared botanical variety of the sample is unknown or Polyfloral.

Country of Origin: India

(Analysis-ID: HS3-CC-116-74243)

This model is based on 25067 samples, thereof 744 samples of reference group *India*.

Result: Consistent with declared country *India*. The probability of consistency is 100.0%.



ID	Description	Value	Graphics	Result
142	4.3176 / (5.27-5.30)	0.02328		pass
143	5.3371 / (5.27-5.30)	0.02543		pass
144	4.4347 / (4.07-4.12)	0.0003027		pass
155	4.1511	696.6		pass
156	3.3701 / (3.20-3.22)	0.09042		pass
157	4.1781 / (4.07-4.12)	0.0009795		pass
158	3.9283 / (5.27-5.30)	0.1223		pass
159	3.9246 / (5.20-5.25)	0.02443		pass
162	3.1784 / (5.20-5.25)	0.004349		pass
163	3.5929 / (3.16-4.14)	0.0003795		pass
166	3.6627 / (4.07-4.12)	0.02520		pass
167	3.2977 / (4.07-4.12)	0.004015		pass
168	3.3753 / (4.60-4.67)	0.1716		pass
169	3.7579 / (3.65-3.73)	0.12162		pass
170	3.8885 / (3.75-3.80)	0.04812		pass
171	4.1651 / (1.95-2.02)	2.777		pass
172	3.1637	27.472		pass
186	3.6579 / (1.95-2.02)	13.18		pass
188	5.3236 / (1.95-2.02)	0.03623		pass
189	2.3484 / (1.95-2.02)	0.02565		pass
191	3.7932 / (4.07-4.12)	0.2444		pass
1000	min. fructose/glucose	1.21		pass
1001	max. fructose/glucose	1.21		pass
1002	turanose [g/100g]	1.92		pass
1003	sucrose [g/100g]	0.0		pass
1004	total sugar [g/100g]	69.8		pass
1005	proline [mg/kg]	395		pass
1006	DHA(D), mannose(M) [mg/kg]	D=0.0, M=0		pass

Result: There are no indications for the presence of foreign sugars.

Notes:

- The column *ID* is the marker's identification number.
- The column *Description* indicates either the NMR spectral region(s) (in ppm) concerned by the marker, or the molecule when it has been identified.
- The column *Value* is the result obtained for the marker.
- For columns *Graphics* and *Result* please refer to detailed description in section "General Remarks" at the end of this report.

**DHA and Mannose**

Compound	Value	Unit	LOQ	Reference Range	Flag	
mannose	<LOQ	g/100g	0.01	<0.01 	0.02	
dihydroxyacetone (DHA)	<LOQ	mg/kg	5	<5 	16	

Note: the reference range is based on [327 India](#) samples in the Honey-Profiling Database.

Guideline:

- Mannose is a mono saccharide not found in honeys with a pH value lower than 5, but that is regularly found in industrial sugars. In rare cases, however, the presence of mannose cannot be excluded for certain geographic origins and/or botanical varieties. A concentration of mannose exceeding 0.02 g/100g in honey with a pH < 5 could indicate the presence of foreign sugars or industrial processing practices which are not suitable for honey. An expert interpretation is suggested when mannose is present in the honey.
- Dihydroxyacetone and/or methylglyoxal are only known to be naturally present in *Leptospermum* genus honeys from Australia and New Zealand. A concentration exceeding 5 mg/kg in other types of honey is not typical and could indicate the presence of foreign sugars or industrial processing practices which are not suitable for honey. An expert interpretation is suggested in such cases.
- DHA and mannose are often observed simultaneously in various types of sugar syrups.

Deviations in the sugar profile, fermentation parameters and comparison to reference group could also indicate adulterations. Please check the section "Composition and Comparison to reference group" in addition.

Sugars:

Compound	Value	Unit	LOQ	Reference Range	Flag
glucose + fructose *	69.8	g/100g	20.0	60.0 77.2	●
fructose / glucose *	1.21	-	-	0.96 1.55	●
fructose	38.2	g/100g	10.0	31.4 42.2	●
glucose	31.6	g/100g	10.0	26.9 38.6	●
sucrose	<LOQ	g/100g	0.5	<0.5 g/100g in reference dataset	●
turanose	1.92	g/100g	0.2	0.5 2.2	●
maltose	1.8	g/100g	0.5	<0.5 2.0	●
melezitose	<LOQ	g/100g	1.0	<1.0 g/100g in reference dataset	●
maltotriose	<LOQ	g/100g	1.0	<1.0 g/100g in reference dataset	●
gentiobiose	<LOQ	g/100g	0.3	<0.3 g/100g in reference dataset	●
raffinose	0.1	g/100g	0.1	0.1 0.3	●

Acids:

Compound	Value	Unit	LOQ	Reference Range	Flag
citric acid	95	mg/kg	50	<50 162	●
malic acid	<LOQ	mg/kg	100	<100 115	●
quinic acid	<LOQ	mg/kg	300	<300 mg/kg in reference dataset	●

Amino Acids:

Compound	Value	Unit	LOQ	Reference Range	Flag
alanine	9	mg/kg	5	<5 24	●
aspartic acid	<LOQ	mg/kg	150	<150 mg/kg in reference dataset	●
glutamine	<LOQ	mg/kg	200	<200 mg/kg in reference dataset	●
leucine	<LOQ	mg/kg	40	<40 110	●
proline	395	mg/kg	200	225 863	●
valine	<LOQ	mg/kg	10	<10 14	●
tyrosine	156	mg/kg	50	<50 150	●
phenylalanine	235	mg/kg	100	<100 568	●

Markers:

Compound	Value	Unit	LOQ	Reference Range	Flag
3-phenyllactic acid	<LOQ	mg/kg	300	<300 mg/kg in reference dataset	●
methylglyoxal (MGO)	<LOQ	mg/kg	30	<30 33	●
kynurenic acid	<LOQ	mg/kg	60	<60 mg/kg in reference dataset	●
shikimic acid	<LOQ	mg/kg	80	<80 mg/kg in reference dataset	●

Guideline:

- Values of fructose/glucose ratio exceeding 1.95 or below 0.85 are not typical for honey and could indicate the presence of sugar syrups.
- Low concentrations of turanose (less than 0.35 g/100g) is a marker for the presence of foreign sugars (see section "Markers of Foreign Sugars").
- Atypical concentrations of sugars in comparison to reference range can be related to foreign sugars/adulteration or to the botanical varieties present in the honey. Expert interpretation is suggested.
- The presence of gentiobiose is common for Linden Tree honey.
- The presence of quinic acid is common for honeydew.
- HMF is a sugar degradation product formed under influence of heat. According to EU-Directive (2001/110/EC), HMF can be found naturally in honey in concentrations up to 80 mg/kg in regions with tropical climate. A higher concentration of HMF is due to processing of honey which can sometime correlate with adulterations. A concentration of HMF exceeding 200 mg/kg should be regarded as suspicious.
- Concentration of ethanol exceeding 400 mg/kg indicates fermentation of the honey, which could be related to unripe honey.
- Acetoin can be elevated in Eucalyptus honey.
- The presence of kynurenic acid is common for Chestnut honey.
- The presence of shikimic acid is common for honeydew.

Statistical Comparison with the Reference Group

The models are based on 327 samples from [India](#) in the Honey-Profiling Database.

Univariate Verification

(Analysis ID: H53-NTV-116-74261)

Applied Model: India

Result: Typical for India.

Multivariate Verification

(Analysis ID: H53-NTV-116-74261)

Applied Model: India

Result: Typical for India.

Codex Alimentarius and EU-Directive 2001/110/EC:

Following parameters are required according to Codex Alimentarius and EU-Directive 2001/110/EC. The concentrations are obtained by direct quantification. Parameters labelled with * are calculated parameters.

Compound	Value	Unit	LOQ	Official Reference min	Official Reference max	Flag
glucose + fructose *	69.8	g/100g	20.0	45	-	●
sucrose	<LOQ	g/100g	0.5	-	15	●
5-hydroxymethylfurfural (HMF)	36	mg/kg	5	-	80	●