Apimondia WBA
Honey competition 2023
Official report

1. Objective of the Apimondia Honey Competition

For several years, Apimondia has been doing its utmost to improve the situation of the honey market and the quality of honey, this exceptional product. The document produced on the adulteration of honeys is an outstanding example of this. Its active participation in the ISO working group on honey and its monitoring of European negotiations on the revision of European Directive 2001/110 on the labelling of honey are all part of the same effort.

As every beekeeper knows, honey is a highly variable product, with properties that set it apart from all other sugars. It is this diversity and its organoleptic and bioactive properties that must be at the heart of the work involved in a honey competition. These elements take precedence over aspects relating to presentation. For this reason, only stable, undegraded honeys produced in good conditions must be selected for this contest.

2. General context of the contest in 2023

As part of the 48th Apimondia International Apicultural Congress, the Chilean organizers insisted that a honey competition should be organized, despite the very tight deadline (5 months) and the major constraints imposed by the ban on importing honey into Chile. After negotiations with the local authorities, the solution was to request to each beekeeper to bring with them the honey or honeys they intended to present at the competition directly to the congress. Only beekeepers' own honeys were accepted this year (Raw honeys). Industrially packaged honeys could not take part in the competition. Each participant had to register the honey sample using a specific form containing data relating to the product (suspected botanical origin, production area, beekeeper(s) harvesting with full traceability) and its harvest conditions (harvest period, last feeding before extraction and type of feed used). On this basis, they were issued with an official customs document to allow them to cross the border.

In the ApiExpo at the congress, the honeys were placed on a special stand and given an anonymous number. It was this number that was used at each stage of the evaluation of the honeys. The information on the forms was used to allocate the honeys to the different tasting tables.

Only the organoleptic evaluation tests were carried out during the congress. All other analyses were subsequently carried out by three different laboratories. The basic analyses (humidity, HMF, diastase, conductivity, pH) were carried out in Chile by the Instituto de Investigaciones Agropecuarias - INIA, the analyses of antibiotics and glyphosate as well as invertase were carried out in Argentina by the Nexco laboratory and the analyses for the detection of added foreign sugars in honey were carried out with a delay (samples were sent in February 2024) by the European Commission laboratory, the Joint Research Centre in Geel. All these analyses were carried out free of charge by the three laboratories. All the results were available at the beginning of March. This report was written directly after the results of the last tests were disclosed.

As at last congress in Istanbul, the aim was to ensure that all the honeys awarded medals on the basis of organoleptic criteria met strict quality criteria and were free from undesirable substances above the thresholds recognized by many countries. Unlike the previous competition, where it was possible to analyse the quality criteria before the tasting, the physico-chemical analyses were carried out at a later stage and only on the honeys selected to receive a medal. Given the few problems encountered last year in relation to the botanical origin of the honeys, no specific pollen control was carried out. Only the organoleptic criteria were taken into account. This explains why it was not possible to announce the winning honeys at the congress.

1. Data on honeys

Number of honeys registered: 190
Number of honeys presented: 160

Here is the geographical distribution of these honeys (29 countries):

	Registered	Presented
Brazil	33	32
China	33	32
Chile	25	23
Slovakia	20	18
Saudi Arabia	19	9
Canada	8	8
Tanzania	7	6
United States	6	5
Argentina	6	3
Grenada	4	4
Australia	3	3
France	3	
Colombia	2	2
Germany	2	2

Kyrgyzstan	2	
Mexico	2	2
Myanmar	2	
New Zealand	2	2
Peru	2	2
Bolivia	1	1
Cambodia	1	1
Costa Rica	1	1
Dominican Republic	1	1
Ireland	1	
Japan	1	1
Norway	1	1
Togo	1	
Turkey	1	1
Denmark		1
	190	160

Classes

Honeys were presented in the following 5 classes:

Class 1. Multifloral honey, forest honey or honeydew from different botanical origins	49
Class 2. Monofloral liquid honey or specific honeydew	48
Class 3. Natural crystallized multifloral honey/forest/non-specific honeydew	30
Class 4. Naturally crystallised monofloral honey or specific honeydew	25
Class 5. Pieces of cut-comb honey displayed in cut-comb containers	8

Botanical origin

Multifloral	62
Forest	16
Monofloral	73
Honeydew	9

The 46 different botanical origins:

Rutacea (*Citrus sinensis* ...)	6
Assa-peixe (*Vernonia polysphaera*)	4
Bracatinga	4
Lavender (*Lavandula angustifolia* Mill.)	4
Linden (*Tila*)	4
Safflower (*Carthamus tinctorius* L.)	4
Ulmo (*Eucryphia cordifolia*)	4

Acacia vachellia tortilis	2
Alfalfa	2
Litchi chinensis	2
Salvia nemorosa L.	2
Silver Fir	2
Ziziphus nummularia	2
Jitirana (*Ipomoea cairica*)	1
Acacia hamulosa	1
Angico	1
Apple tree	1
Brea (*Tessaria absin thiroides*)	1
Carob (*Ceratonia siliqua*)	1
Chestnut (*Castanea sativa*)	1
Kapok tree (*Ceiba pentandra*)	1
Cherry blossom	1
Clethra scabra - carne de vaca - mel branco	1
Crucero (*Colletia spinosissima*)	1
Dzidzilche (*Gymnopodium floribundum*)	1
Eucalyptus citrodorus	1
Glass (*Mesembryanthemum crystallinum*)	1
Litre	1
Longan	1
Loquat	1
Manuka	1
Moringa	1
Myracrodruon urundeuva	1
Myrcia aff. mollis	1
Nipa Blanca (*Escallonia leucantha*)	1
Quillay (*Quillaja saponaria*)	1
Robinia pseudoacacia	1
Sanfoin	1
Sourwood	1
Sunflower	1
Talh	1
Tamarix	1
Tiaca (*Caldcluvia paniculata*)	1
Trebol blanco (*Trifolium repens*)	1
Vitex	1
Zizyphus mistol griseb	1
Honeydew with no declared botanical origin	1

2. Organoleptic evaluation

A series of experts were sought out and selected to take part at the tasting tables. For each table, we appointed a table manager. This manager had to have good experience of honey competitions. Additionally, one or more experts who knew the honeys were present at the table. Overall, each table had 5 assessors. Over 40 people with expertise in tasting honeys were registered, half of them from South America.

The honeys were divided into 15 different tables, each presenting honeys with similar organoleptic characteristics. The number of honeys to be assessed on each table ranged from 10 to 13.

The evaluation took place over two mornings. Half of the tasters were present on both days. Nearly 70 people took part in the evaluation.

Before the tasting began, there was a detailed explanation of what was to be judged and how it should be done. The assessors worked on the basis of 5 different organoleptic evaluation sheets relating to the honeys present on the table (liquid/crystallized multifloral and forest/honeydew honey without specific botanical origin; liquid/crystallized monofloral and specific honeydew and comb honey). The ratings assigned to the different criteria to be analysed (visual, smell, texture, flavours and sensations, aromas) varied slightly from one sheet to another.

The honeys were presented in their original packaging and transferred into glasses bearing only the honey number to enable a blind taste analysis.

On the basis of the results obtained, the assessors, assisted by their table managers, selected the honeys that could be awarded medals and proposed gold, silver or bronze medals for the honeys that stood out from the rest. To ensure a degree of consistency in the level of the medals, certain corrections were discussed between a small group of experts and each table manager when necessary.

On the basis of this competition, 61 honeys were selected to receive a medal, including 12 Gold, 22 Silver and 27 Bronze.

3. Verification of basic quality criteria

The analyses concern only to the honeys selected to receive a medal.

Water content
The acceptance threshold for honeys has been set at 18%, since beyond this level there is no guarantee that the honey will not ferment. This 18% base is used by a large number of quality labels and is the legal value in some countries.

The average of the analysed honeys was 17.6% (14.5 - 21%), with 45 out of 61 honeys fulfilling this criterion. This analysis was carried out by INIA. It was surprising to see so many honeys exceeding the 18% required for this competition.

HMF
For HMF (hydroxy-methyl-furfural, a product of degradation of fructose present in the honey), the level was set like last year at 20 mg/kg and 40 mg/kg for tropical areas. The average was of 3.9 mg/kg and all the honeys comply with this requirement (max 17.2). This analysis was carried out by INIA.

Diastase
All the honeys are in the international norms. The average was of 14.8. This analysis was carried out by INIA.

Invertase
This enzyme is more sensible than diastase and is quickly degraded if the honey is exposed to temperature upper than 50 °C. Invertase was analysed to verify the absence of excessive heating of honey or age-related degradation. Invertase must be up to 50 UE and up to 25 UE for some monoflorals honey with low enzymatic content. This analysis was carried out by the Nexco laboratory.

The average was of 72 enzymatic units (4 to 217) which is relatively low. Eight samples were below the threshold of 25 and 9 others were between 25 and 50 units but with sufficient enzymatic activity revealed by the level of diastase activity. These 17 honeys cannot therefore be awarded a medal.

4. Analysis of residues in honey

These analyses were carried out by the Nexco laboratory in Argentina. They tested 61 honeys for:
Nitrofuranes (**SEM**-5, AHD, AOZ, AMOZ) LOQ 0,5µg/kg
Tetracyclines (Oxytetracycline, Tetracycline, Chlortetracycline, **Doxitetracycline**-3) LOQ 2µg/kg
Sulfonamides (Sulfathiazole, Sulfamethazine, **Sulfamethoxazole-2**, Sulfadimethoxine) LOQ 2µg/kg, Other Sulfonamides LOQ5µg/kg
Trimethoprim-3 LOQ 2µg/kg

Macrolides (**Tylosin A**-2, **Tylosin B**-1, Erytromycin) LOQ 2µg/kg
Quinolones (Enrofloxacin, Ciprofloxacin, Norfloxacin) LOQ 2µg/kg, other Quinolones LOQ5µg/kg
Phenicols (Florfenicol, Thiamphenicol, **Chloramphenicol**-2) LOQ 0,1µg/kg
Nitroimidazol (Metronidazole, Ronidazole, Dimetridazole) LOQ 0,1µg/kg
Aminoglucosides (Streptomycin, Dihydrostreptomycin) LOQ5µg/kg
Pesticides (**Amitraz**-4) LOQ 20µg/kg, (**Carbendazim**-1, Fluvalinate, Coumaphos, **Glyphosate**-11, other pesticides) LOQ 10µg/kg
The substances in bold were detected and the number of detections is indicated following their name.

8 honeys were excluded because their content exceeded the legal thresholds (SEM-5, Chloramphenicol - 2, Carnedazim - 1, Amitraz - 1). One honey contained two substances in excess of the accepted limits.

5. Analysis of syrup additions

The Joint Research Centre of the European Commission in Geel carried out two tests on all the 59 samples received (2 arrived broken).

They used the most effective techniques to date, namely:

- Elemental Analyser/Liquid Chromatography – Isotope Ratio Mass Spectrometry (EA/LC-IRMS)
The combination of elemental analyser with an isotope ratio mass spectrometer (EA-IRMS) to determine the $\delta^{13}C$ values of protein isolated from honey together with liquid chromatography coupled to an isotope ratio mass spectrometer (LC-IRMS) to determine the $\delta^{13}C$ values of fructose, glucose, disaccharides and trisaccharides was used to detect addition of sugar syrups made from C4 plants, notably from maize, and from C3 plants, notably from rice, wheat or potato.
Three honey samples had anomalies detected by this technique and were rejected.

- Liquid Chromatography – High Resolution Mass Spectrometry (LC-HRMS)
LC-HRMS was used to identify the presence of mannose[1], difructose anhydride (DFA) and 2-acetylfuran-3-glucopyranoside (AFGP)[2]).
Two honeys were rejected because they contained mannose. One *Zizyphus* contained also mannose but this sugar can be naturally present in this botanical origin.

[1] J. Missler, T. Wiezorek and G. Beckh: Mannose: a marker for adulteration with syrup or resin treatment of blossom honey. Magnetic Resonance in Food Science 2016 Proceedings. doi: 10.1255/mrfs.4

[2] Bing Du, Liming Wu, Xiaofeng Xue, Lanzhen Chen, Yi Li, Jing Zhao, and Wei Cao: Rapid Screening of Multiclass Syrup Adulterants in Honey by Ultrahigh-Performance Liquid Chromatography/Quadrupole Time of Flight Mass Spectrometry. J. Agric. Food Chem. 2015, 63, 6614−6623

Thus 5 out of the 59 honeys were withdrawn from the competition for adulteration. The 2 broken honeys were rejected for other criteria.

6. Global rejection

1 honey was excluded for 3 reasons
11 honeys were excluded for 2 reasons
20 honeys were excluded for 1 reason

Globally, 32 honeys were rejected out of the 61 honeys presented for analysis and the main reasons for rejection were thermal degradation or excessive humidity, which should easily be avoided in the future.

WBA Honey 2023 Results

Awarding of medals
6 gold medals are awarded
9 silver medals are awarded
14 bronze medals are awarded

Medal	Botanical origin	Botanical name	Country	Surname	Name	Company
Monofloral/honeydew liquid						
Gold	Monofloral	Mistol (zizyphus mistol Griseb)	Bolivia	Saldias Urzagaste	Guido Ernesto	Colmenares del Monte
Gold	Monofloral	Litchi	China	Huang	Zhonglian	Guangxi Wuzhou Tianmijia Bee Industry Co., Ltd
Gold	Monofloral	Linden	China	Huang	Zhonglian	Guangxi Wuzhou Tianmijia Bee Industry Co., Ltd
Gold	Honeydew	Bracatinga	Brazil	Breyer	Henrique Felix Erick	Breyer e Cia Ltda
Silver	Monofloral	Linden	Slovakia	Vargapalova	Jana	Promed - vcelie produkty, s.r.o.
Silver	Monofloral	Castanea sativa "Chestnut"	Slovakia	Holub	Marian	Slovensky Zvaz Vcelarov
Silver	Honeydew	Bracatinga	Brazil	Hercilio Marcos da Silva	Celio	
Bronze	Monofloral	“Assa-peixe” (Vernonia polysphaera)	Brazil	Xanthopulo	Tito Matheus	
Bronze	Monofloral	Salvia "Sage"	United States	Taff	Alisha L	Rock Front Ranch Honey
Bronze	Monofloral	Acacia negrii	Saudi Arabia	Alnahalaliwal		
Bronze	Honeydew	Linden	Slovakia	Toth	Alexander	
Bronze	Honeydew	Silver fir	Slovakia	Vargapal	Tibor	Tibor Vargapal - Promed

Monofloral/honeydew crystalized

Silver	Honeydew	Silver Fir	Slovakia	Vargapal	Marek	Honey Tradition
Bronze	Monofloral	Safflower	China	An	Chuan Yuan	Beitun Xinyuan Beekeeping Farmers Specialized Coorperation
Bronze	Monofloral	Linden	Slovakia	Vargapal	Tibor	Tibor Vargapal - Promed
Bronze	Honeydew	Bracatinga	Brazil	Gomes Bristot	Catiane	
Bronze	Monofloral	Moringa	Saudi Arabia	Algethami	Ahmed	Alnahalaliwal

Multifloral/Forest/ non specific Honeydew liquid

Gold	Multifloral		Australia	Weber	Barbara	
Silver	Multifloral		Brazil	Santos da Silva	Tarciano	Apis Nativa Agroindustrial Exportadora Ltda
Silver	Multifloral		Australia	Weber	Barbara	
Silver	Honeydew		Slovakia	Filo	Pavel	SOŠ Pod Bánošom
Bronze	Forest		Brazil	Martins Delfim	Augusto	Melbras

Multifloral/Forest/non specific Honeydew crystalized

Silver	Multifloral		Brazil	Santos da Silva	Tarciano	Apis Nativa Agroindustrial Exportadora Ltda
Bronze	Multifloral		Argentina	Sosa	Maximiliano	Miel Kinturray
Bronze	Multifloral		Canada	Wendell	Tim	Wendell Estate Honey
Bronze	Forest		Chile	Airola	Adolfo	Petras Bees Airola y HalnaLtda

Comb honeys

Gold	Multifloral		Canada	Ladouceur	Anne	Anna's Bee-licious Honey Products
Silver	Multifloral		Slovakia	Vargapal	Marek	Honey Tradition
Bronze	Multifloral		Slovakia	Vargapal	Tibor	Tibor Vargapal - Promed

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In 2025, we hope that this formula will be improved in Denmark, the host country of the 2025 Apimondia Congress, allowing the results to be available by the end of the congress.

Etienne Bruneau
Past President of the Apimondia Scientific Commission on Beekeeping Technology and Quality

Louvain-la-Neuve (Belgium), 13 March 2024