2/82	Stingless bee honey from the world 006:	Venezuela 05
***Melipona fuscopilosa* n=1** ***Tetragona clavipes* n=1**		

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KEYWORDS
Amazonas, honey, *Melipona,* physicochemical analyses, stingless bees, *Tetragona*, Venezuela.

ORIGINAL WORK

Lab collaborations

PUBLISHED ABSTRACT

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Table 1. Stingless bee identification

Nr.	SB species	Author, year	Entomologist	Common name
1	*Melipona fuscopilosa*	Moure & Kerr, 1950	Camargo JMF USP, Ribeirão Preto, Brasil	isabittö
2	*Tetragona clavipes*	Fabricius, 1804	Camargo JMF USP, Ribeirão Preto, Brasil	ajavitta

Table 2. Geographical origin of honey samples

Nr.	Date ddmmyy	Location	GPS	Country
1	13.09.05	Paria Grande, estado Amazonas	-	Venezuela
2	13.09.05	Paria Grande, estado Amazonas	-	Venezuela

Table 3. Type of stingless bee management and technology

Nr.	Hive, model	Extraction	Processing	Storage tempearture
1	Box	Pressed	Natural	Frozen
2	Box	Pressed	Natural	Frozen

Table 4. Physicochemical composition
(see method and units in the reference section)

Nr.	SB species	Free Acidity	Ash	Electrical conduct.	HMF	Invertase activity	Fructose	Glucose	Maltose	Nitrogen	Water	Pb	Hg
1	1	391.57	0.14	58.07	10.57	13.9	25.40	25.63	5.40	5.40	30.3	65.92	114.65
2	2	694.90	0.47	180.90	6.93	3.63	15.97	11.03	12.07	12.07	29.8	942.31	83.47
	Method	**1**	**2**	**3**	**4**	**5**	**6**			**7**	**8**	**9**	**10**

Table 5. Sensory evaluation
(see method and units in the reference section)

Nr.	SB species	Color
1	1	150
2	2	150
	Method	**11**

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Table 6. Bioactivity
(see method and units in the reference section)

Nr.	SB species	Antioxidant activity	Flavonoids	Polyphenols	Vitamin C
1	1	81.53	4.26	68.7	17.05
2	2	135.01	12.08	201.5	22.53
	Method	**12**	**13**	**14**	**15**

Table 7. Melissopalynology.
Not available.

Table 8. Analysts

Parameter	Free Acidity	Ash	Nitrogen	Water	HMF	Electrical conductivity	Invertase activity	Sugars HPLC	Hg	Pb	Total antioxidant activity	Flavonoids	Polyphenols	Vitamin C
Analysts	Vit P				Bednář M Titěra D				Gutiérrez L Rondón C Saavedra A SaavedraO		Rodríguez-Malaver AJ			

REFERENCES

Method	Parameter	Technique	Units
1	Free acidity	Titrimetric[1]	g water/100 g honey
2	Ash	Gravimetric[1]	g ash/100 g honey

3	Electrical conductivity	Conductimetric[1]	mS/cm
4	HMF	Spectrophotometric[1]	mg HMF/kg honey
5	Invertase activity	Spectrophotometric[1]	IN
6	Sugars	HPLC[1]	g sugars/100 g honey
7	Nitrogen	Titrimetric[2]	mg nitrogen/100 g honey
8	Water	Refractometric[1]	g water/100 g honey
9	Pb	Spectroscopic[3] ETAAS	μg Pb/kg miel
10	Hg	Spectroscopic[4] FAAS	μg Hg/kg miel
11	Color	Instrumental[5]	mm Pfund
12	Total antioxidant activity	Spectrophotometric[6]	μmol Trolox equivalents/100 g honey
13	Flavonoids	Spectrophotometric[7]	mg quercetine equivalents/100 g honey
14	Polyphenols	Spectrophotometric[8]	mg gallic acid equivalents/100 g honey
15	Vitamin C	Spectrophotometric[9]	mg vitamin C/ 100 g honey

1. Bogdanov S, Martin P, Lullmann C. 1997. Harmonised methods of the European Honey Commission. Apidologie (Suppl. 1):3-59.

2. Association of Official Analytical Chemists (AOAC). 1990. Official Methods of Analysis. 15th., supl 2.

3. Electrothermal Atomic Absorption Spectroscopy (EAAS), Perkin Elmer ®, modelo 4100ZL, coupled to a PC Epson EL-486UC, software PE-4100ZL, version PC 3.7

4. Flame Atomic Absorption Spectroscopy (FAAS) by cold Hg vapor generation, Perkin Elmer modelo 3100, coupled to a PC, Gem Desktop, Gem/3.

5. Honey Color Analyzer C221, Hanna Instruments.

12. Re R, Pellegrini N, Proteggente A, Pannala A, Yang M, Rice-Evans A. 1999. Antioxidant activity applying an improved ABTS radical cation decolorization assay. Free Radical Biology & Medicine 26(9/10):1231-1237.

13. Singleton V, Orthofer R, Lamuela-Raventos R. 1999. Analysis of total phenols and other oxidation substrates and antioxidants by means of folin-ciocalteu reagent. Methods of Enzimology 299:152-178.

14. Woisky R, Salatino A. 1998. Analysis of propolis: some parameters and procedures for chemical quality control. Journal of Agricultural Research 37: 99-105.

15. Pesce AJ, Kaplan LA. 1990. Química Clínica. Métodos. Buenos Aires: Médica Panamericana; Buenos Aires, Argentina; 590 p.

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