UNIVERSITY OF SÃO PAULO
PHARMACEUTICAL SCIENCE SCHOOL
FOOD DEPARTMENT

HONEY OF OTHER BEES:

Stingless Bees Brazilian Honey

Ligia Bicudo de Almeida Muradian

Introduction

Beekeeping in Brazil

- Traditional
  - *Apis mellifera (africanized)*
- Meliponiculture
  - Stingless bees: uruçu, jandaíra, mandaçaia , jurupá, tiúba and jataí.

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COMPOSITION OF STINGLESS BEE HONEY: SETTING QUALITY STANDARDS

BRUNO SOUZA, DAVID ROUBIK, ORTRUD BARTH, TIM HEARD, EUNICE ENRÍQUEZ, CARLOS CARVALHO, JERÔNIMO VILLAS-BÔAS, LUIS MARCHINI, JEAN LOCATELLI, LIVIA PERSANO-ODDO, LIGIA ALMEIDA-MURADIAN, STEFAN BOGDANOV and PATRICIA VIT

SUMMARY

Compositional data from 152 stingless bee (Meliponini) honey samples were compiled from studies since 1964, and evaluated to propose a quality standard for this product. Since stingless bee honey has a different composition than Apis mellifera *honey, some physicochemical parameters are presented according to stingless bee species. The entomological origin of the honey was known for 17 species of Meliponini from Brazil, one from Costa Rica, six from Mexico, 27 from Panama, one from Surinam, two from Trinidad & Tobago, and seven from Venezuela, mos from the genus Melipona. The results varied as follows: moistur (19.9-41.9g/100g), pH (3.15-4.66), free acidity (5.9-109.0meq Kg), ash (0.01-1.18g/100g), diastase activity (0.9-23.0DN), elec trical conductivity (0.49-8.77mS/cm), HMF (0.4-78.4mg/Kg), in vertase activity (19.8-90.1IU), nitrogen (14.34-144.00mg/100g) reducing sugars (58.0-75.7g/100g) and sucrose (1.1-4.8g/100g) Moisture content of stingless bee honey is generally higher than*

Meliponine honey is a valuable bee product with a long consumption tradition, to which several medical uses are attributed. Due to the scant knowledge about the product, meliponine honey is not included in the international standards for honey (CODEX, 2001) and it is not controlled by the food control authorities. Thus, there is no assurance for consumers. Since the aim of the International Honey Commission (IHC) is the establishment of quality standards of bee products other than *Apis mellifera* honey, stingless bee honey was considered, along with pollen, beewax, propolis and royal jelly.

Honey standards from Brazil (BRASIL, 2000), and Venezuela (COVENIN, 1984a, b) were established

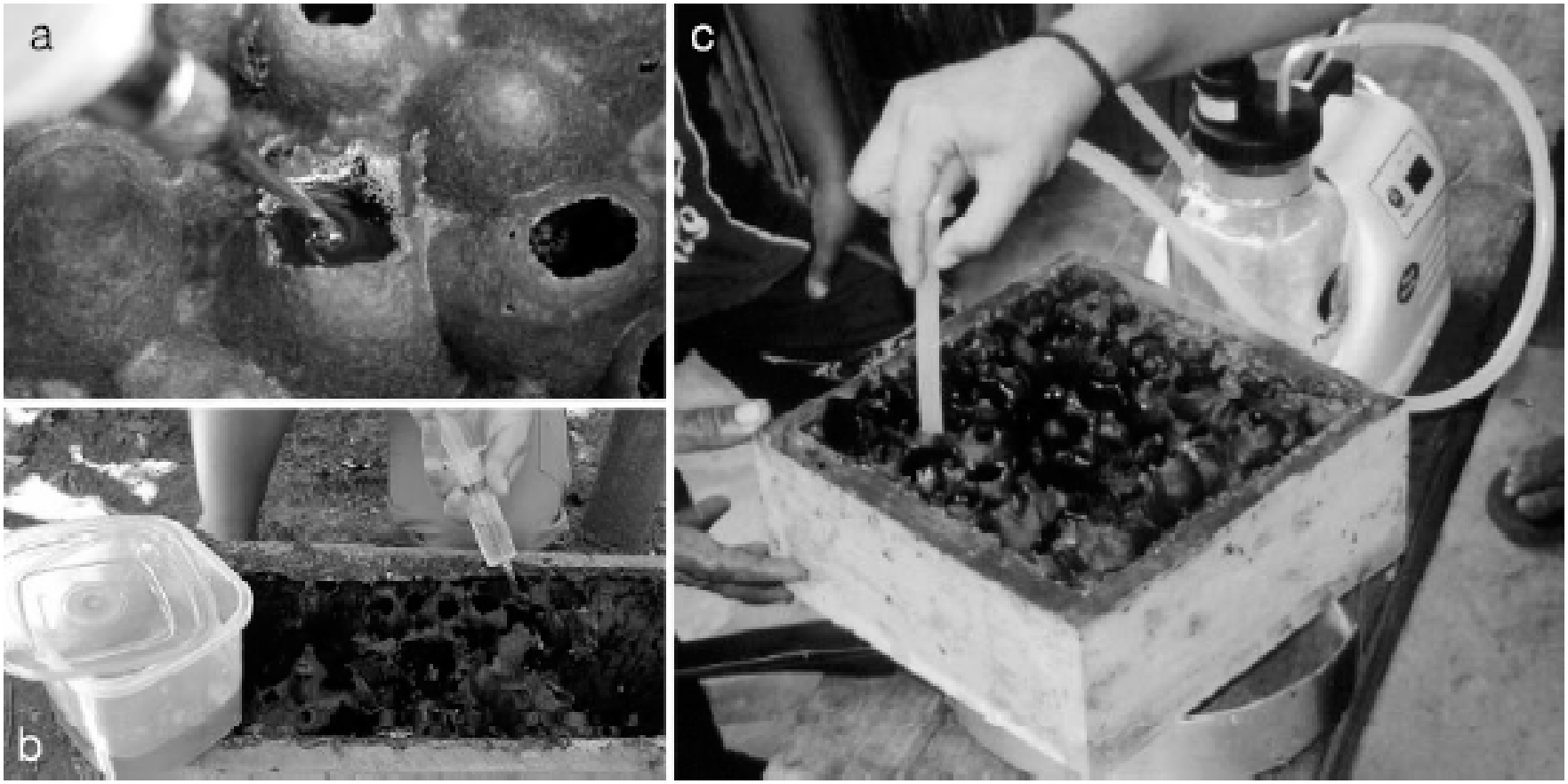

Figure 1. Stingless bee honey collection with disposable syringe (a, b) and with suction pump (c). (Souza BA) .

TABLE VI
SUMMARY OF STINGLESS BEE HONEY COMPOSITION

Bee species	Number of samples	Physico-chemical parameters [1]										
		pH	Free acidity (meq/K g honey)	Ash (g/100 g honey)	Diastase activity (DN)[2]	Electrical conductivity (mS/cm)	HMF (mg/Kg honey)	Invertase activity (IU)[3]	Nitrogen (mg/100 g honey)	Reducing sugars (g/100 g honey)	Sucrose (g/100 g honey)	Moistur (g/100 g honey)
Meliponini	152	3.81 (101)	44.8 (147)	0.34 (98)	6.7 (67)	2.34 (68)	14.4 (127)	48.7 (17)	58.31 (93)	66.0 (127)	2.3 (122)	26.7 (152)
Melipona spp.	97	3.82 (61)	41.8 (97)	0.20 (60)	3.1 (52)	2.62 (54)	16.0 (97)	56.3 (13)	40.78 (58)	69.1 (84)	2.2 (84)	27.2 (97)
other Meliponini	55	3.80 (40)	49.6 (50)	0.60 (38)	16.2 (15)	1.88 (14)	11.9 (30)	37.4 (4)	110.88 (35)	63.8 (43)	2.5 (38)	26.0 (55)
M. asilvai	11	3.27 (11)	41.6 (11)	-	-	3.63 (11)	2.4 (10)	-	-	68.9 (11)	4.7 (11)	29.5 (11)
M. compressipes	15	3.72 (10)	36.6 (15)	0.26 (13)	4.5 (13)	8.77 (1)	17.1 (15)	-	33.22 (13)	70.5 (13)	2.5 (13)	23.8 (15)
M. favosa	20	-	49.9 (20)	0.22 (20)	1.9 (20)	2.06 (6)	9.1 (21)	90.1 (6)	55.77 (20)	71.2 (20)	1.7 (20)	24.8 (20)
M. mandacaia	20	3.27 (20)	43.5 (20)	-	-	3.52 (20)	5.8 (20)	-	-	74.8 (20)	2.9 (20)	28.8 (20)
T. angustula	39	3.93 (31)	49.7 (34)	0.38 (29)	20.5 (8)	3.07 (8)	13.3 (14)	50.1 (3)	99.26 (3)	63.1 (34)	2.3 (29)	24.7 (39)

Mean values and (number of honey samples) are presented.
The diastase number (DN) indicates g starch hydrolysed/100g honey/h, at pH 5.2 and 40°C.
An invertase unit (IU) indicates µmoles p-nitrophenyl glucopyranoside hydrolysed/kg honey/min, at pH 6.0 and 40°C.

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PHYSICOCHEMICAL PARAMETERS OF AMAZON MELIPONA HONEY

Ligia Bicudo de Almeida-Muradian* e Adriana Hitomi Matsuda
Departamento de Alimentos e Nutrição Experimental, Faculdade de Ciências Farmacêuticas, Universidade de São Paulo, Av. Prof. Lineu Prestes, 580, 05508-900 São Paulo - SP, Brasil
Deborah Helena Markowicz Bastos
Departamento de Nutrição, Faculdade de Saúde Pública, Universidade de São Paulo, Av. Dr. Arnaldo,715, 01246-904 São Paulo - SP, Brasil

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Stingless bees produce a honey that is different from the Apis honey in terms of composition. There aren't enough data to establish quality control parameters for this product, mainly due to lack of research results. The aim of this work is to evaluate some physicochemical parameters that can be used for the characterization and for the quality control of the Meliponinae honey. Four different samples were collected in the Amazon region of Brazil in 2004 (*Melipona compressipes manaoense* bee and *Melipona seminigra merribae* bee). Honey analyses were performed as described by the official methods. The mean results were: moisture (30.13%), pH (3.65), acidity (24.57 mEq/kg), water activity (0.75), fructose (31.91%), glucose (29.30%) and sucrose (0.19%). These results reinforce the need for a specific regulation for stingless bee honey. This will only be feasible when enough data is available to establish upper and lower limits for the physicochemical parameters used for quality control.

Keywords: stingless bees; Amazon Melipona honey; quality control.

Table 1. Physicochemical parameters of melipona honey*

Samples	1		2		3		4		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	General Me
Moisture (%)	28.60	0.36	30.60	0.20	30.20	0.10	24.80	0.20	28.55
pH	3.41	0.020	4.03	0.020	3.52	0.020	4.06	0.04	3.75
Acidity (%)	20.63	0.30	27.82	0.27	25.25	0.15	27.13	0.11	25.21
Water activity	0.74	0.001	0.75	0.001	0.76	0.001	0.75	0.001	0.75
Glucose (%)	28.59	0.50	29.50	0.53	29.80	0.48	29.44	0.41	29.33
Fructose (%)	32.04	0.25	31.95	0.16	31.73	0.20	30.72	0.20	31.61
Sucrose (%)	0.21	0.03	0.18	0.02	0.18	0.02	0.08	0.03	0.16
Ratio Fructose/Glucose	1.12		1.10		1.06		1.04		

*Number of replicates for each sample = 3; samples 1 and 4 = Jupará honey; sample 2 and 3 = Jandaíra honey

Sugestion for limits

	Apis melifera Brazlian (regulation)	Meliponinae (Brazil)	Meliponinae (Vit
Reducing sugars (%)	Min. 65.0	Min. 50.0	Min. 50.0
Moisture (%)	Max. 20.0	Max. 35.0	Max. 30.0
Ap. Sucrose (%)	Max. 6.0	Max. 6.0	Max. 6.0
Insoluble solids (%)	Max. 0.1	Max. 0.4	-
Minerals (%)	Max. 0.6	Max. 0.6	Max. 0.5
Acidity (meq/Kg)	Max. 50.0	Max. 85.0	Max. 85.0
Diastase Number (DN)	Min. 8.0	Min. 3.0	Min. 3.0
HMF (mg/kg)	Max. 60.0	Max. 40.0	Max. 40.0

Source: (VILLAS-BÔAS and MALASPINA, 2004)

MS Thesis - Graziela Leal
Comparison between *Apis mellifera* and *Tetragonisca angustula* (Jataí) bee honey

Apis mellifera

Jataí bee

Main characteristics

Size:12-13 mm

Sting

From South of Argentina till southweast of Nevada EUA

Size: 5 mm

Atrophied sting

From Rio Grande do Sul (Brasil) till Mexic

⇨ Honey combs

⇨ Honey pots

⇨ Comb entranc

⇨ protection

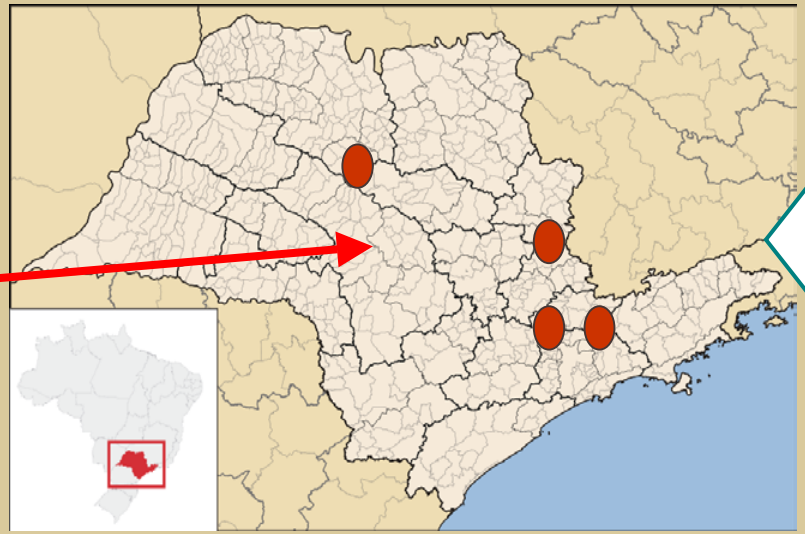
⇨ seringe

no protection

Samples

Brazil

Sao Paulo State



Cities

LINS
AMPARO
PEDREIRA
GUARULHO

Tetragonisca angustula (Jataí) bee honey composition

	Moisture	Acidity	RS	AS	TS	HMF	DN	IS	Ashes
	%	mEq/Kg	%	%	%	mg/Kg		%	%
Lins	25.60	48.13	67.25	0.43	67.68	0.60	16.60	0.10	0.17
Amparo	23.40	40.71	44.78	0.79	45.57	0.45	17.19	0.05	0.25
Pedreira	23.80	63.85	57.13	1.60	58.73	0.75	18.69	0.10	0.42
uarulhos	24.20	22.38	61.92	1.15	63.08	0.60	22.45	0.02	0.20
egulation	max 20	max 50	min 65	max 6		max 60	min 8	max 0.1	max 0.
uggested	max 35	max 85	min 50	max 6		max 40	min 3	max 0.4	max 0.

RS = Reducing Sugars; AS = Apparent sucrose; TS – Total sugars;
HMF- Hydroximetilfurfural ; DN – Diastase Number; IS – Insoluble solidss

LINS

AMPARO

PEDREIRA

GUARULHOS

Heterofloral

(Schinus, Apcynacea)

Bifloral

(Asteracea, Eucalyptus)

Monofloral

(Fabracea)

Monofloral

(Mimosacea)

Interlaboratorial trial (26)

INTI Instituto Nacional de Tecnolog Industrial

l Wolf
larcelo T de Alvear788
uidad de Bs.As.-Argentina

PAC- Senasa
v. Fleming 1653
lartínez- Argentina

sociación de Cooperativas
rgentinas Coop. Ltda.
alle 4 Fracción 4 Lote 3
arque Industrial Pilar, Buenos Aires.
rgentina

ámara Arbitral de Cereales de Bahía Blanca
aavedra 636 3º piso
ahía Blanca, Buenos Aires.
rgentina

omercial Analab Chile S.A.
zequiel Fernández 3592 Macul
antiago- Chile

stancia La Elisa S.A.
avalle 710, 7º piso
iudad Autónoma de Buenos Aires
rgentina

acultad de Ciencias de la Alimentación
niv. Nacional de Entre Ríos
lons. Tavella 1450
oncordia, Entre Ríos
rgentina

ACA Laboratorios – Lab. Apícola.
an Martín 68
ahía Blanca, Buenos Aires
rgentina

NAL
stados Unidos 25
uidad de Bs.As.- Argentina

nstituto Adolfo Lutz
v. Dr Arnaldo 355
ao Paulo- Brasil

Instituto Superior Experimental de Tecnología Alimentaria - ISETA
H. Irigoyen 931
9 de Julio, Buenos Aires
Argentina

INTA - EEA Rafaela
Ruta Nac. 34 Km. 227
Rafaela, Santa Fe
Argentina

INTI Cereales y Oleaginosas
Av. Gral Paz 5445, Edif.40
San Martín, Buenos Aires
Argentina

INTI Frutas y Hortalizas
Acceso Sur y Aráoz 1511
Luján de Cuyo, Mendoza
Argentina

INTI Neuquén
Mercado Concentrador de Neuquén
Neuquén
Argentina

Laboratorio Biomédico Dr. Rapela.
Ramón Falcón 2534
Flores, Capital Federal, CP.1406
Buenos Aires, Argentina

Laboratorio de Análise de Alimentos da Facultad de Ciéncias Farmacéuticas da Universida de de Sao Paulo .
Av. Prof. Lineu Prestes 580. Bloco 14
Sao Paulo- SP
Brasil.

Laboratorio de Análisis Industriales
Ruta Nac. Nº11 km 479,7
Santa Fe- Argentina

Laboratorio de Calidad de Miel- Facultad de Ciencias Veterinarias de Tandil
Arroyo seco S/N, CP.7000
Tandil, Buenos Aires.

LATU
Av. Italia 6201 Carrasco
Montevideo- Uruguay

MELACROM - Laboratorio de Control de Calidad
Calle 37 Nº 215
Mercedes, Buenos Aires
Argentina

NEXCO S.A.
Calle 223, entre 228 y 230
Lobos, Buenos Aires
Argentina

SGS Argentina S.A.
Adolfo Alsina 1382
Ciudad Autónoma de Buenos Aires
Argentina

Sudhonig SRL
Ruta 9 1258 Río Segundo
Córdoba- Argentina

Universidad del Centro Educativo Latinoamericano - UCEL.
Av. Pellegrini 1332
Rosario, Santa Fe
Argentina

Universidad Nacional de Río Cuarto
Ruta 36, Km. 601
Río Cuarto, Córdoba
Argentina

Instituto
Nacional
de Tecnolog
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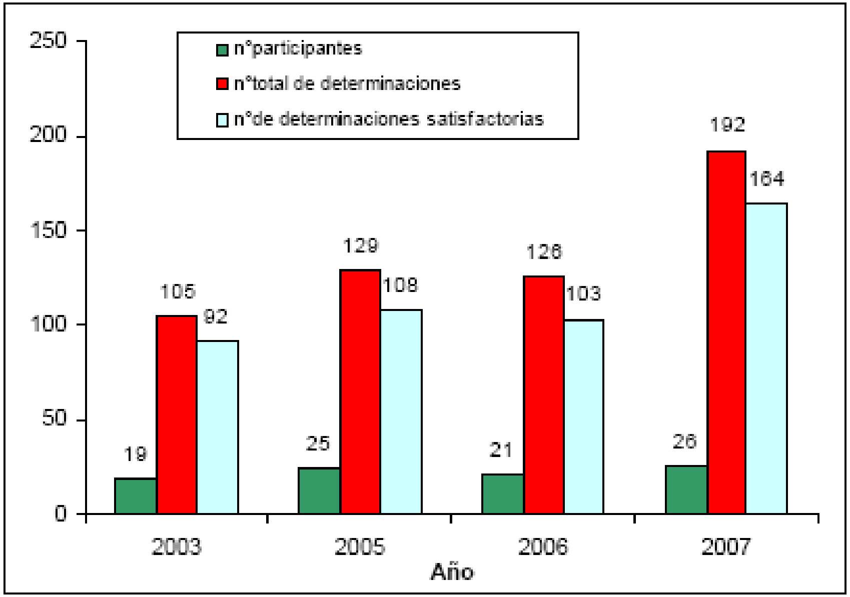


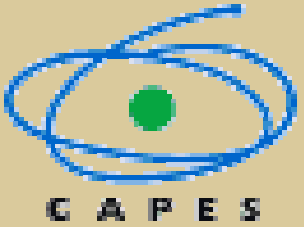
Interlaboratorial trial

n la tabla siguiente se resume el número de determinaciones satisfactorias, cuestionables no satisfactorias, evaluadas mediante el parámetro z para el presente interlaboratorio.

Miel 2007	$\|Z\| \leq 2$	$2 < \|Z\| < 3$	$\|Z\| \geq 3$
Humedad Refractométrica	25	2	2
Cenizas	14	1	4
Cenizas conductimétricas	10	-	1
Azúcares reductores	12	1	1
Fructosa por HPLC	11	-	-
Glucosa por HPLC	10	1	-
Acidez libre	23	-	-
Índice de diastasa	13	1	1
HMF	28	2	2
Color Pfund	19	2	7

quellos participantes que hayan obtenido valores de z mayores que 2 deberían revisar la

Acknowlegments




Faculdade de Ciências Farmacêuticas
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