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"HONEY IS GOOD FOR HEALTH": PATTERNS OF HONEY PURCHASING AND CONSUMPTION IN LOWER AMAZON

"Mel é bom para saúde": padrões de compra e consumo de mel no Baixo Amazonas

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Abstract
We investigated the consumption habits and purchase patterns of honeys in the Lower Amazon, in order to support the apicultural activity and honeys marketing. We interviewed 600 potential honey consumers in supermarkets and farmers' markets in the Metropolitan Region of Santarém, Northern Brazil. Most participants (57%) consume honey because it is a healthy (65%) or tasty (35%) product. Those who avoid consuming it

Resumo
Investigamos os hábitos de consumo e padrões de compra de méis no Baixo Amazonas, a fim de apoiar a atividade apícola e a comercialização de méis. Entrevistamos 600 potenciais consumidores de mel em supermercados e feiras livres na Região Metropolitana de Santarém, norte do Brasil. A maioria dos participantes (57%) consume mel porque é um produto saudável (65%) ou saboroso (35%). Quem evita consumi-lo

(43%) justify such choice by their lack of habit (51.2%) or because they do not like the taste (30.2%). Interestingly, 35% of consumers said they had never actually bought honey. Meanwhile, 91.8% of usual buyers prefer buying honey directly from producers or at farmers' markets. In this context, they mentioned color (48.6%) and texture (18.9%) as important characteristics for deciding to purchase honey. These consumers perceive honey as good for health and as a medicine and prefer to consume it pure. Finally, 44% of respondents did not consider honey a cheap product, although the price proved to be a less relevant criteria for purchasing. We conclude that the Metropolitan Region of Santarém provides consumers with limited information about regionally produced honey. However, we highlight that local producers transmit greater safety to consumers during the sale of honey.
Keywords: Beekeeping; Consumption decision; Consumption habits; Consumer profile; Consumer preference.

(43%) justifica essa escolha por falta de hábito (51,2%) ou por não gostar do sabor (30,2%). Curiosamente, 35% dos consumidores disseram que nunca haviam comprado mel. Enquanto isso, 91,8% dos compradores habituais preferem comprar mel diretamente dos produtores ou em feiras livres. Nesse contexto, citaram cor (48,6%) e textura (18,9%) como características importantes na decisão de comprar mel. Esses consumidores percebem o mel como bom para a saúde e como um medicamento e preferem consumi-lo puro. Finalmente, 44% dos entrevistados não consideraram o mel um produto barato, embora o preço tenha provado ser um critério menos relevante para a compra. Concluímos que a Região Metropolitana de Santarém fornece aos consumidores informações limitadas sobre o mel produzido regionalmente. No entanto, destacamos que os produtores locais transmitem maior segurança aos consumidores durante a venda de mel.
Palavras-chave: Apicultura, Decisão de consumo, Hábitos de consumo, Perfil do consumidor, Preferência do consumidor.

INTRODUCTION

Honey is the most popular item produced by bees. This is related to factors ranging from its nutritional characteristics, i.e., amino acids, carbohydrates, proteins and enzymes, to the growing concern about consuming foods with health benefits (Roman, Popiela-Pleban, & Kozak, 2013). According to the Brazilian Association of Honey Exporters (Abemel, 2018), Brazil exported 98.7 thousand tons of honey from 2014 to 2017, which corresponds to ~393.6 million dollars. The Brazilian Northern region accounts for 2.5% of the national honey production; however, the close relationship between native/exotic bees and the Amazon forest in the region highlights the attractiveness of honey from the Amazon.

Data on national honey production distinguish beekeeping in the Brazilian economy, especially because almost 60% of this production is exported. The *per capita* consumption of honey in Brazil is 250 g a year. In the United States, the largest importer of Brazilian honey, this value reaches up to 1 kg (Cheung & Gerber, 2009). The growing trend of consuming honey as a health food has increased the demand for this product. However, many consumers still do not have access to adequate information about the production, types and origins of honey (Yeow, Chin, Yeow, & Tan, 2013), especially in local businesses.

Kearney, Dunne and Gibney (2000) and Murphy, Cowan and Henchion (2006) concluded that consumers with higher education and socioeconomic status are more concerned with having a healthy diet. Economic theories suggest that income level, honey price and education level play important roles in consumer decision-making. In addition, the desire to maintain a healthy lifestyle through nutrition is a crucial factor for understanding the honey market and consumption trends (Ismaiel, Al-Kahtani, Adgaba, Al-Ghamdi, & Zulail, 2014). In this context, Peter and Olson (2010) state that surveys

conducted directly with consumers represent one of the five main sources of information about a given product.

In recent years, the international production of studies profiling honey consumers has increased. Such studies aim to investigate consumer behavior and determine their preferences regarding honey by exploring the factors that influence their purchasing decisions, checking whether honey is considered an organic product and to what extent consumers are interested in paying more for it, analyzing the effect of socioeconomic factors on consumption patterns, among other aspects (Oliveira-Neto, Paiva & Novais, unpubl. data).

Arvanitoyannis and Krystallis (2006) identified four main motives that drove Italian consumers to purchase honey: medical benefits, quality of food, ethical character of honey and adaptation to a healthy lifestyle. Meanwhile, Pocol and Balboacă (2013) in Romania and Wu, Fooks, Messer and Delaney (2014) in the United States found that consumers had higher demands for honey from local producers, especially when they presented information about the product's origin.

Within this scope, we found that research about preferences regarding the purchasing and consumption of honey in Brazil is still very incipient. The works by Cheung and Gerber (2009) in Santa Catarina, Dantas, Correia-Oliveira, Poderoso, Gonçalves, Ferreira, Ribeiro and Araújo (2009) in Sergipe, and Modro, Souza, Aburaya and Maia (2009) in Mato Grosso investigated the honey purchasing and consumption patterns in these states. In Northern Brazil, only Pires, Silva, Viana, Alves-Chiba, Mendonça Neto and Costa (2017) have presented the profile of honey consumers from low-income housing in the municipality of Santarém, investigating the extent to which the origin of honey influenced the preference of such consumers. Even so, we found that similar data is scarce for the Brazilian Amazon region, contradicting the diverse regional communities that complement their income by keeping native and Africanized bees, including riverside areas such as the Tapajós–Arapiuns Extractive Reserve (Souza, Abreu, Novais, Pimentel, & Nogueira, 2017).

Strategies to increase honey production and trade are also important due to the environmental benefits arising from apiculture and meliponiculture, mainly pollination and food production. Considering that beekeeping helps conserve native flora and increases the potential income of many communities in the Amazon and other parts of the world, increasing honey consumption is a strategy that could maintain this sustainable activity. Thus, we aimed to characterize the honey purchasing and consumption patterns in the Metropolitan Region of Santarém, Brazilian Amazon. Such information will help identify how the honey market can be increased, thus, maximizing apiculture and meliponiculture activities in the Amazon.

MATERIALS AND METHODS

Study area

The study was carried out in the cities of Belterra, Mojuí dos Campos and Santarém, an urban cluster known as the Metropolitan Region of Santarém (MRS), instituted to boost the region's economy (Figure 1). According to the demographic estimate recorded by the IBGE in 2016, MRS municipalities contain ~330,000 inhabitants, most of whom reside in Santarém (296,302), followed by Belterra (17,249) and Mojuí dos Campos (15,646).

Belterra is a plateau region located on the banks of the Tapajós River, with areas conducive to agriculture due to the presence of *black lands*. Mojuí dos Campos is also part of the Santarém's plateau, being bathed by the Curuá-Una river basin. Meanwhile, Santarém is on the southern bank of the Tapajós River, with Mojuí dos Campos to the north and Belterra to the southwest, being bathed by the Tapajós River and confluence with the Amazon River in the south (Fapespa, 2016).

We note that the MRS has stingless beekeeper associations, and several independent honey producers. Honey is commercialized by producers at farmers' markets, market exhibitions or through orders. Producers prefer the last option because, in addition to selling a specific quantity of honey, it strengthens the bond between producers and consumers for future purchases.

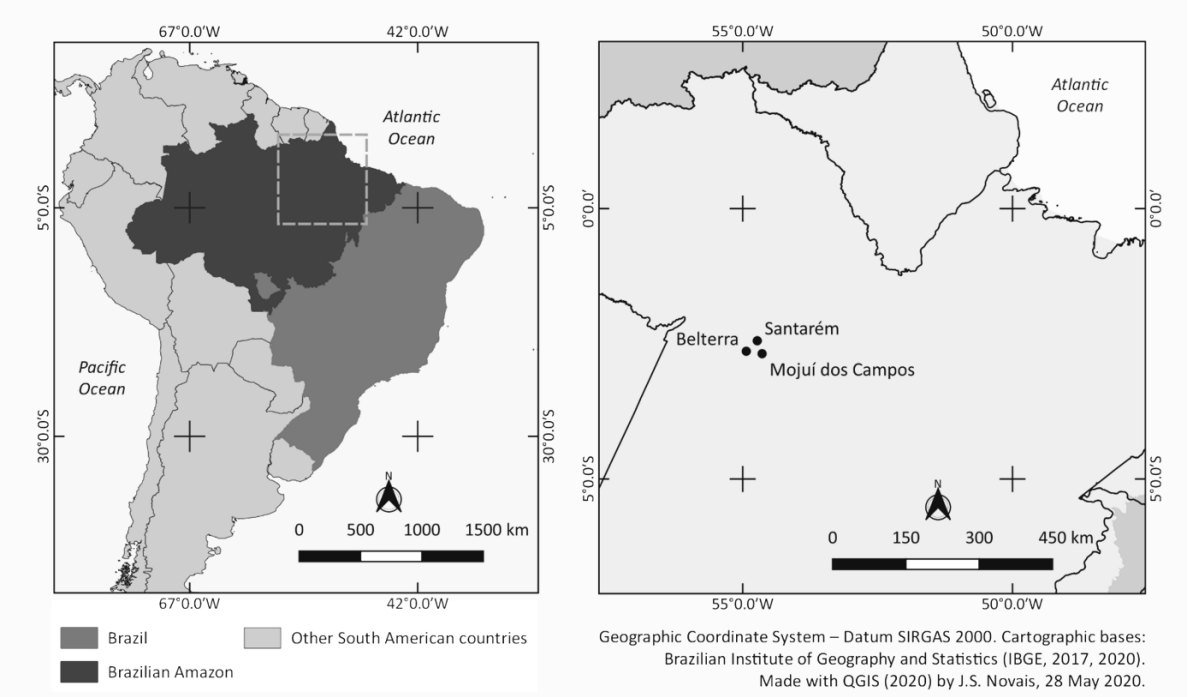

Figure 1. Map of South America highlighting Brazil and the original area of Brazilian Amazon – on the left –, and map of Pará state in the Brazilian Amazon, highlighting the municipalities composing the Metropolitan Region of Santarém – Belterra, Mojuí dos Campos and Santarém – on the right.

Sampling

We determined the sample using simple random sampling, with an error of approximately 4%. We used the following formula to calculate the minimum sample size required to achieve the research objective, where: n = required sample size; $t_{\alpha/2}$= critical value for a significance level of 5%; σ= maximum deviation for qualitative variables; e= value of tolerable sampling error (Pocol & Balboacă, 2013):

$$n = \frac{t_{\alpha/2}^2 \sigma^2}{e^2} = n = \frac{1.96^2 0.5^2}{0.04^2} = \mathbf{600}$$

We collected data from potential consumers approached at the main supermarkets and farmers' markets in the MRS, totaling 20 interview points. First, we mapped the supermarkets within the municipalities of MRS, seeking the widest possible coverage within each municipality. After identifying these establishments, we obtained authorization from each establishment, as well as from each interviewee, to apply the survey questionnaires. The procedure was similar for farmers' markets as we previously located the research locations in the three municipalities and returned to apply the questionnaires after the informed consent of each participant.

Thus, of the 19 interview points, seven were farmers' markets and 12 were supermarkets. Five farmers' markets were located in Santarém – *Feira do Mercadão 2000*, *Feira da Candilha*, *Feira da Cohab*, *Feira da Prainha* and *Feira de Produtos Orgânicos Tapajós* –, one was located in Belterra and one in Mojuí dos Campos. Regarding supermarkets, nine were located in Santarém, two in Belterra and one in Mojuí dos Campos. Besides the organic products fair that occurs on Wednesdays in Santarém, the highest consumer flow happens during Saturday markets. Business hours vary according to population demand, usually occurring from 4:00 am to 3:00 pm. The fairs chosen for this study are widely known by the residents of the city and are easily accessible by public transportation, allowing residents from many neighborhoods to participate. The Belterra and Mojuí dos Campos farmers'

markets are similar, with greater flow on Saturdays, practically reaching the entire population within these municipalities.

Each interviewee was randomly approached and asked if he/she could participate in the research. If the person said no, another person was randomly invited, until someone agreed to participate in the interview (Arvanitoyannis & Krystallis, 2006; Batt & Liu, 2012).

Data collection

We prepared the questionnaire for data collection based on those used in national and international research related to honey purchasing and consumption habits (Arvanitoyannis & Krystallis, 2006; Batt & Liu, 2010; Ćirić, Ignjatijević, & Cvijanović, 2015; Cosmina, Gallenti, Maragon, & Troiano, 2016; Gyau, Akalakou, Degrande, & Biloso, 2014; Pocol & Bolboacă, 2013; Yeow et al., 2013). The questionnaire was semi-structured, with 13 open ended questions and 14 closed questions, distributed in four distinct sections: socioeconomic profile of the respondent, knowledge about types of honey, buying habits and consumption habits. Additionally, we used a 5-point Likert scale – where 1 means "Strongly disagree" and 5 " Strongly agree" – to determine general perceptions of respondents regarding the commercialized honeys in MRS. We used this scale for all respondents, including consumers and non-consumers of honey.

Before applying the questionnaire, we performed a semantic test with 30 people, 15 in supermarkets and 15 in farmers' markets. With this, we sought to verify whether the target audience understood the issues. In addition, we trained two interviewers who helped collect data to optimize application time. The interviews were performed every day of the week and, when possible, in the morning, afternoon and evening at supermarkets and farmers' markets. Thus, we achieved greater variability in the sample population and increased the chance of participation, considering the different work regime and/or study of potential participants (Batt & Liu, 2012). On average, each interview lasted for 15 minutes.

Data analysis

We systematized the data in Microsoft Excel® to standardize the terms and performed the descriptive statistics from the frequency distribution of the studied variables in the *Paleontological Statistics* (PAST) software, version 4.0 (Hammer, Harper & Ryan, 2001). Data are shown as percentage, followed by respective 95% confidence interval.

RESULTS

Socioeconomic profile

The 600 respondents included 342 women (53%) and 258 men (47%). Most participants lived in the urban area of MRS (53%) and completed high school (82%). Household residences held between four and six people (54%), and the most represented age range was 25-34 years old. Regarding occupation, 65% reported having a job, while 35% were unemployed. The most frequent occupation was self-employed (41.5%) and most respondents received more than four times the minimum monthly salary (41.5%) (Table 1).

Table 1.
Percentages related to the socioeconomic profile of the respondents in the Metropolitan Region of Santarém, Brazilian Amazon. CI 95% = confidence interval calculated with a confidence level of 5% (n = 600).

Variables		% (CI 95%)
Gender	Man	47 (43–51)
	Woman	53 (49–57)
Age	< 25	18 (14,9–21,1)
	25–34	44 (40–48)

	35–44	16 (13,1–18,9)
	45–54	15 (12,1–17,9)
	> 55	7 (5–9)
Education level	Elementary/Middle	7 (5–9)
	High school	53 (49–57)
	College	37 (33,1–40,9)
	Graduate	3 (1,6–4,4)
Marital status	Single	49 (45–53)
	Married	49 (45–53)
	Widow	2 (0,9–3,1)
Employment status	Employed	65 (61,2–68,8)
	Non-employed	35 (31,2–38,8)
Household members	1–3	41 (37,1–44,9)
	4–6	54 (50–58)
	> 6	5 (3,3–6,7)
Income (monthly salary)	< 1	33 (29,2–36,8)
	1–2	19 (15,9–22,1)
	3–4	21 (17,7–24,3)
	> 4	27 (23,4–30,6)
Municipality of residence	Belterra	4 (2,4–5,6)
	Mojuí dos Campos	3 (1,6–4,4)
	Santarém	93 (91–95)
Area type	Rural	13 (10,3–15,7)
	Urban	87 (84,3–89,7)

Source: Data collected by authors.

Consumption habits

We observed that only 57% of the interviewees reported consuming some type of honey – 50.8% men and 49.2% women. The reasons for consumption included honey being a healthy (65%) or tasty (35%) product. 77% of respondents consumed honey constantly in the last 12 months. In addition, most consumers proved to be indifferent as to the time of year in which they consumed honey (75.4%). For those who showed changes in consumption throughout the year, 14% said they consumed honey more frequently in the summer, while 10.6% consumed more in the rainy season. We also observed that 88% of the respondents only consumed honey, among the various products derived from bees. Those who claimed to consume other products cited propolis (7%) and royal jelly (5%) (Table 2).

Table 2
Percentages of consumer responses about honey consumption habits in the Metropolitan Region of Santarém, Brazilian Amazon. CI 95% = confidence interval calculated with a confidence level of 5% (n = 342).

Variables		% (CI 95%)
Do you consume any type of honey?	Yes	57 (51,8–62,3)
	No	43 (37,7–48,2)

What is the frequency of consumption?	Daily	10.6 (7,3–13,8)
	Once a week	22.8 (18,4–27,3)
	Once a month	66.6 (61,7–71,7)
In the last 12 months, your honey consumption...	Increased	12.3 (8,8–15,8)
	Remained constant	77.2 (73,1–81,9)
	Decreased	10.5 (7,3–13,8)
Do you increase the honey consumption in any specific season?	Yes	24.6 (20–29,1)
	No	75.4 (70,9–80)
Do you consume any other bee product?	Yes	12 (8,5–15,4)
	No	88 (84,6–91,5)

Source: Data collected by authors.

Among those who consumed honey, 57.8% preferred to consume it pure, 24.5% used it as a sweetener for juices and 66.7% consumed honey at least once a month. We also recorded that 40% of the respondents had a higher education or postgraduate degrees. In this group, 70% reported consuming honey. We sought to investigate reasons that could lead to a possible increase in consumption. However, more than half of the respondents (54.4%) stated that, for the time being, they disregarded any reason to increase their use of the product. The other respondents considered the following factors as ways to increase honey consumption: need for health (22.8%), more affordable price (14%) and larger product offering (5.3%).

The lack of habit (51.16%) or not liking the taste (30.2%) led 43% of the respondents to not consume honey. When asked about the factors that could make them consumers, most respondents (49%) demonstrated that they were unwilling to do so. However, in the event of an eventual need to improve health, 23.2% of non-consumers would start consuming honey.

Purchasing habits

Regarding the purchase of honey, 35% of those who consumed it had never bought it. On the other hand, 66.5% of usual honey buyers preferred to do buy directly from the producer and 25.3% preferred to buy from farmers' markets, as well as supermarkets (5.4%) and pharmacies (2.8%). Other locations, such as sports supplement, natural food and virtual stores were disregarded by respondents.

Color (48.6%) and texture (18.9%) were the main characteristics consumers cited for deciding to purchase honey. Regarding the criteria indicating honey quality in the MRS, the most frequently mentioned characteristics were color (54%) and texture (27.1%), along with flavor (18.9%). Other responses that were not mentioned by respondents were price, label, aroma and brand. In this context, 47.3% of respondents admitted to buying honey at least once a month, stating that they purchased at least one liter in the last 12 months. None of the buyers reported purchasing less than 500 mL of honey in the last year (Table 3).

Table 3.
Percentages of consumer responses about honey purchasing habits in the Metropolitan Region of Santarém, Brazilian Amazon. CI 95% = confidence interval calculated with a confidence level of 5% (n = 222).

Variables		% (CI 95%)
Purchasing frequency	Once a month	47.4 (40,7–53,9)
	Once in the semester	15.8 (11–20,6)
	Once a year	1.7*
	Never	35.1 (28,9–41,4)

Where do you prefer to buy honey?	Directly from the producer	66.5 (60,5–72,9)
	Open air markets	25.3 (19,5–30,9)
	Supermakets	5.4 (2,4–8,4)
	Pharmacies	2.8 (0,6–4,8)
Quantity of honey purchased in the last month	Between 0,5 and 1 liter	10.9 (6,7–14,9)
	More than 1 liter	89.1 (85,1–93,3)
Main characteristics for deciding to purchase honey	Color	48.6 (42,1–55,2)
	Texture	18.9 (13,8–24,1)
	Purity	13.5 (9–18)
	Label	10.8 (6,7–14,9)
	Flavor	8.2 (4,5–11,7)
Criteria indicating honey quality	Color	54 (47,5–60,6)
	Texture	27.1 (21,2–32,9)
	Flavor	18.9 (13,8–24,1)

* It was not possible to calculate the 95% confidence interval due to limitation of the statistical method (npq <5).
Source: Data collected by authors.

We sought to analyze the interest of consumers in paying more for a honey produced by the bee species of their choice and found that 77.5% declined paying more for this type of honey. We also questioned their willingness to pay more for a honey produced in the Metropolitan Region of Santarém. In this case, 70% of respondents were willing to pay a higher price. Of which, 67.8% would pay up to 10% more for a local product based on the current price of honey.

Knowledge and perceptions about bees and honeys

We only asked respondents who consumed honey about the types of honey-producing bees, as such participants would likely be more interested in such topics. Of the respondents, 70.1% knew some type of bee that produces honey, especially bees of the genus *Apis* L. (Apidae: Apinae) – popularly called the Italian bee (*Apis mellifera* L.), despite being Africanized – cited by 57.8% of the respondents. The native stingless bees (Apidae: Meliponinae) mentioned were *Uruçu* (24.5%, *Melipona* spp.), *Jandaíra* (22.8%, *Melipona* spp.) and *Jataí* (17.5%, *Tetragonisca angustula* Latreille). However, no participant cited such bees separately. Respondents preferred honey from Italian bees (70%), followed by *Uruçu* (15%), *Jandaíra* (10%) and *Jataí* (5%), following the knowledge pattern observed for these species.

Regarding the analysis of perceptions, we considered the respondents answers with total relative frequencies (RF) above 50% for "agree" and "strongly agree" as positive perceptions. In this case, people agreed that honey tastes good (53%), is good for health (77%), is a nutritious product (74%), serves as a medicine (67%), is safe to be consumed (81%), is a good dietary supplement (60%) and can be consumed at any age (52%). In addition, honey purchased directly from beekeepers is more reliable (59%), bee honey is easily found in the region (56%) and the honeys sold in the region are of good quality (61%) (Table 4).

Table 4.
Consumer perceptions about commercialized honeys in the Metropolitan Region of Santarém, Brazilian Amazon. SA - Strongly agree; A – Agree; N – Neither agree nor disagree; D – Disagree; SD – Strongly disagree (*n* = 600, values in %).

Statements	SA	A	N	D	SD
Honey tastes good	18	35	20	16	11
Honey is good for health	31	46	19	4	0

Honey is a food	5	24	36	24	11
Honey is a nutritious product	26	48	22	4	0
Honey is a product with low calories	1	11	58	20	10
Honey serves as a medicine	18	49	25	7	1
Honey is a cheap product	0	13	43	36	8
Honey is safe to be consumed	8	73	16	3	0
Honey is a good dietary supplement	20	40	35	5	0
Honey can replace sugar	7	31	39	23	0
Honey can be consumed at any age	12	40	37	11	0
Honey purchased directly from beekeepers is more reliable	17	42	26	4	11
Honey crystallizes naturally	1	16	78	4	1
Crystallized honey is not fake or bad	0	19	51	21	9
Honey is easily found in the region	20	36	29	13	2
It is easy to find honey produced in the region	1	15	52	25	7
When purchasing honey, product packaging is highly important	4	26	51	17	2
I consider honey a basic product	0	9	49	37	5
Honey sold in the region are of good quality	6	55	23	15	1

Source: Data collected by authors.

We also observed that the statements "honey is a product with low calories" (58%), "honey crystallizes naturally" (78%), "crystallized honey is not fake or bad" (51%), "it is easy to find bee honey produced in the region" (52%) and "when purchasing honey, product packaging is important" (51%) presented RF above 50% for "neither agree nor disagree" (Tab. 4).

On the other hand, we observed that no statement obtained RF above 50% for "disagree" and "totally disagree", which would point to predominantly negative perceptions. Despite this, the statements "honey is a food" (35%), "honey is a cheap product" (44%) and "I consider honey a basic product" (42%), presented higher RF for the options "disagree" and "totally disagree", when compared to the agreement options. When these are added to the opinions "neither agree nor disagree", which may denote uncertainty about the subject requested, these statements present RF higher than 50%, inferring a mostly negative perception (Tab. 4). On the other hand, the statement "honey can replace sugar" presented higher RF for "neither agree nor disagree" (39%). All agreement options (38%) had higher RF than disagreement (23%), indicating an overall positive perception.

DISCUSSION

Considering that most respondents would pay more for a regional honey, labels should present local products with information about their production and origin. Our data can be applied to increase consumption among the most educated population, since respondents with higher education levels presented higher levels of honey consumption. Additionally, our data indicates that 35% of respondents who declared consuming honey never bought this product, revealing that consumption is not always linked to honey purchase. However, we recall that half of these consumers declared no fixed income, which may explain why they did not purchase honey.

Respondents consider honey to be a good dietary supplement, however, indecisive or dissenting opinions prevailed when stating that honey is a food. Such contradiction raises two possibilities; first, we can infer that interviewees do not relate dietary supplements to food itself; secondly, they do relate dietary supplements to medicine. The high percentage of agreement with the statements "honey is considered a medicine" (67%) and "honey is good for health" (77%) affirms that honey is still considered a priority as a medicine. Studies carried out in Brazil, such as Dantas et al. (2009) in Sergipe and Modro et al. (2009) in Mato Grosso, reported a similar trend in honey consumption as medicine. Meanwhile, in other countries, consumers prefer to use honey as food, as

shown in the studies by Arvanitoyannis and Krystallis (2006) in Romania, Brščić, Šugar and Poljuha (2017) in Croatia, and Kowalczuk, Jezewska-Zychowicz and Trafialek (2017) in Poland.

We observed doubts from consumers regarding statements about the calories of honey, the crystallization process of the product, the availability of honeys produced in the region and the relevance of packaging during purchase. These points should be explored by producers and traders, so the public can develop a positive view of honey. For example, crystallization is a natural process and does not affect the honey's properties. It occurs when the product is stored below the average hive temperature (37 ºC), or can be caused by the origin of nectar, among other factors (Kuroishi, Queiroz, Almeida, & Quast, 2012). Thus, crystallized honey does not necessarily indicate low quality.

The period of highest honey consumption varied in the MRS. In the present study, consumption was constant throughout the last year, with no preferred season. However, Pires et al. (2017) performed a similar survey in a housing development in Santarém and found that most respondents consumed honey more often in the rainy season (54.3%). More than half of the people surveyed by Pires et al. (2017) belonged to traditional or riverside communities and held customs related to the use of honey as a medicine, which could explain the differences in consumption habit noted herein. In addition, Pires et al. (2017) stated that the higher frequency of congestion during the rainy season justifies greater use of honey at this time.

We emphasize that marketing strategies would help increase the number of honey consumers, add greater value to regional products, and, consequently, increase the income of beekeepers. The lack of such strategies is evident by the finding that more than half of non-consumers of honey declared that they did not have a habit of consuming honey. However, these people would opt for local honeys if they were to start consuming them. Regarding regional prices, Wu et al. (2015) found that consumers in the United States would pay more for local honeys when compared to imported ones. Similarly, Batt and Liu (2012) observed consumer preference for Australian honeys in Australia and Cosmina et al. (2016) identified the same preference patterns for honeys produced in Italy, revealing the importance of identifying locally produced honey in different countries. Our study in the Amazon showed that consumers had doubts about the ease of finding honeys produced in the region. Quality marketing strategies that promote campaigns to popularize honey, apiaries and regional meliponaries among different consumer audiences could solve this issue.

The respondents positively related the quality of the honey to obtaining it directly from the producer, as they either agreed (42%) or strongly agreed (17%) with the statement "honey purchased directly from the beekeeper is more reliable". In addition, the statement "honeys sold in the region are of good quality" had more than 60% agreement. Several works reinforce the reliability of honey purchased from the producer. For example, Arvanitoyannis and Krystallis (2006) and Brščić, Šugar and Poljuha (2017) found an increasing amount of imported honeys available to consumers in Romania and Croatia, respectively. Even so, they found that directly purchasing honey from producers still dominated and guaranteed product quality. The trust related to local honey represents an interesting option for inserting this product into the market, especially for independent producers and riverside communities that produce honey as a source of income.

The amount of honey purchased by the respondents in the last 12 months was also linked to their preference for purchasing directly from the producer. Thus, when honey is purchased under these conditions, the consumer tends to purchase more than half a liter of honey, which was observed in the municipalities studied herein. The price of honey was not included among the criteria used to decide to purchase or to indicate quality of honey. However, 14% of consumers said that more affordable pricing could increase consumption, demonstrating a potential for increasing the honey market in the region. While most consumers considered honey an expensive product in the MRS, they would invest more money in local products. Such data is important for our study in the Amazon since the consumer does not always intend to pay more for a higher quality honey (Zavodna & Propisil, 2016), especially when it is considered an expensive product (Roman, Popiela-Pleban & Kozak, 2013).

CONCLUSIONS

Most respondents in the Metropolitan Region of Santarém consume honey pure and consider it to be a healthy and tasty product, although they still treat it as a medicine. The color and texture mainly influence purchasing decisions as such attributes indicate a quality honey. Additionally, flavor can indicate quality, but is less frequently used since it can only be analyzed after purchase.

Locally, the honey market must provide the consumer with more information about the characteristics of honeys produced and commercialized in the Amazon. However, we found that local producers transmit greater security when selling the product, which can boost the market of regional honeys. Therefore, we suggest investing in qualified marketing strategies to strengthen the producer-seller-consumer relationship. This will boost the beekeeping market when we consider that people are willing to pay more for a regional product, regardless of the bee species.

By enhancing the production and beekeeping market in the Amazon, we directly support effective strategies that conserve regional ecosystems, especially flora that serves as bee pasture and provides pollen and nectar resources: the main constituents of honey. Future studies that expand our understanding of honey purchasing and consumption patterns in specific strata of the population may further qualify the data presented here. In addition, we observed many native bee species reared in meliponaries in the Amazon. However, most respondents were unaware of such bee species. Studies that promote and disseminate information about native Amazonian bees could stimulate the purchase and consumption of honey from such species, leading to positive economic and environmental consequences.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this article.

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