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Study of the Honey Production Chain in the Cuesta Paulista Region as a Fundamental Element for the Recognition of Geographical Indication

Estudo da Cadeia Produtiva do Mel da Região da Cuesta Paulista como Elemento Fundamental para Reconhecimento de Indicação Geográfica

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Abstract

Beekeeping in the Pólo Cuesta is consolidating itself as a strategic activity for sustainable development, and relevant actions for its growth and identity are of great importance. Thus, the objective of this study was to analyze the development of beekeeping in the Pólo Cuesta region, its productive potential, challenges, and strategies for the recognition of the Geographical Indication (GI) of honey. The methodology adopted was qualitative, exploratory in nature, based on the case study method. The results indicated that the region has favorable natural conditions, a variety of flowering, and a tradition in honey production, with emphasis on the municipalities of Itatinga and Botucatu. The adoption of sustainable practiceshas contributed to the appreciation of the product in the national and international markets. It was concluded that beekeeping in the Pólo Cuesta region presents notoriety and unique characteristics that contribute to regional development with outstanding relevance for obtaining the GI for Honey from the Cuesta Paulista region.

Keywords: Beekeeping; Honey; Regional Development.

Resumo

A apicultura do Pólo Cuesta vem se consolidando como atividade estratégica para o desenvolvimento sustentável, e as ações relevantes para seu crescimento e identidade são de grande importância. Assim, o objetivo do estudo foi analisar o desenvolvimento da apicultura na região do Pólo Cuesta, suas potencialidades produtivas, desafios e estratégias para o reconhecimento da Indicação Geográfica (IG) do mel. A metodologia adotada foi qualitativa, de caráter exploratório, com base no método de estudo de caso. Os resultados indicaram que a região possui condições naturais favoráveis, variedade de floradas e tradição na produção de mel, com destaque para os municípios de Itatinga e Botucatu. A adoção de práticas sustentáveis tem contribuído para valorização do produto no mercado nacional e internacional. Concluiu-se que a apicultura no Pólo Cuesta apresenta notoriedade e características únicas que contribuem para o desenvolvimento regional com destacada relevância para a obtenção da IG do Mel da região da Cuesta Paulista.

Palavras-chave: Apicultura; Mel; Desenvolvimento Regional.

Technological Areas: Innovation, Intellectual Property, and Development.

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1 Introduction

Beekeeping is a productive activity of considerable socioeconomic and environmental importance. It contributes to environmental conservation, generates employment and income, and continues to experience steady growth. This activity involves the commercial management of Africanized *Apis mellifera* honey bees, primarily for honey production, while also serving as an essential pollination mechanism for flowering plants, thereby supporting biome conservation and increasing the productivity of commercially important crops. The main products obtained from beekeeping include honey, beeswax, bee pollen, royal jelly, propolis, and apitoxin, commonly known as bee venom (Naveira, 2017; Gela *et al*., 2021).

The development of beekeeping is favored by natural conditions suitable for honey bee cultivation, which are found throughout all regions of Brazil (Vidal, 2022). According to recent data, the State of São Paulo is home to more than 1,250 beekeepers managing approximately 177,000 Africanized honey bee colonies, in addition to nearly 2,000 meliponiculturists responsible for more than 24,000 native stingless bee colonies. Most beekeepers are organized into more than 50 associations and cooperatives (CATI, 2025).

In rural areas of Brazil, cooperatives and associations have emerged as important mechanisms for generating employment and income, contributing to improved quality of life in the countryside. A notable example is the Association of Beekeepers of the Cuesta Region (Apicuesta), located in the interior of the State of São Paulo (Conceição; Silva; Rocha, 2022), which has gained national recognition for honey production. The Cuesta Region is situated in the central-western portion of São Paulo State and is characterized by distinctive geographical, environmental, productive, and sociocultural attributes. Its geological formation directly influences the local climate, hydrology, soils, and regional biodiversity (Ab'Sáber, 2003; IBGE, 2016).

From a socioeconomic perspective, the Paulista Cuesta Region comprises municipalities with a strong agricultural tradition and a close connection to family-based and cooperative production systems, including Botucatu, Itatinga, São Manuel, Pardinho, and Pratânia. In addition to its productive significance, the region possesses a rich cultural, historical, and tourism heritage associated with rural, ecological, and gastronomic tourism (Setur-SP, 2021). The promotion of origin-based products, combined with territorial identity and sustainable practices, has fostered initiatives aimed at obtaining Geographical Indication (GI) recognition, establishing the region as a reference for quality, traceability, and sustainability, particularly within the honey production chain. The region offers abundant floral resources throughout the year, a strategic factor for beekeeping and for the production of honey with distinctive sensory and physicochemical characteristics (Sebrae, 2018; Silva; Camargo, 2019).

Honey produced in the Cuesta Region is recognized for its high quality, rich flavor profile, and the diversity of flowering sources that enable year-round production. Its reputation is distinguished by a strong and longstanding beekeeping tradition. This quality is largely attributable to the region's favorable environmental and climatic conditions, as well as to management practices carried out by local families using traditional methods developed by smallholders and community associations through knowledge transmitted across generations (Municipality of Itatinga, 2025). These practices enhance the product's reputation, strengthen regional identity, and ensure the quality and authenticity of the honey.

As stated in the Guide to Geographical Indications: "Human factors are the characteristic elements of the producing or service-providing community, such as local know-how, including the development, adaptation, or improvement of specific techniques" (Brazil, 2019, p. 16).

The reputation associated with a Geographical Indication (GI) is linked to the degree of recognition of specific attributes connected to a territory of origin, attributes that confer exclusivity, reputation, and market value upon a product. These attributes encompass historical, cultural, and socioeconomic aspects that strengthen local identity and contribute to regional development. To demonstrate such reputation, it is necessary to provide historical documentation, records of traditional know-how, and evidence that the territory is widely recognized as a center for the production, provision, extraction, or manufacture of the product in question. In simple terms, reputation exists when a GI is widely known and valued for both its distinctive qualities and its association with a specific geographical origin (Silva et al., 2025).

In this context, the Cuesta Region provides favorable conditions for establishing such reputation in honey production. Located in the interior of São Paulo State, the region is recognized for the quality of its honey and represents an area of considerable importance to the socioeconomic development of beekeeping in the state. It has helped build recognition for regional honey through a distinct identity and production standards that support the authentication of its geographical origin. Therefore, the quality of honey produced in this region is associated with its reputation, regional identity, authenticity, good management practices, and environmental stewardship. According to Ito et al. (2018), recognition of the quality of honey produced in the Cuesta Region may enable its differentiation as a product with unique characteristics linked to soil type, climate, environmental conditions, and

social and cultural factors, thereby adding value to the product.

Cooperation among beekeepers in the Cuesta Region generates tangible benefits, including collective purchasing of inputs, improved access to technical assistance, joint marketing initiatives, shared technologies and equipment, and the establishment of a strong market identity. These achievements are the direct result of beekeeper organization and the implementation of collective actions over time (INPI, 2017). Consequently, collective organization should not be viewed merely as a formal requirement but rather as an indispensable element for the success of a Geographical Indication. It is a participatory process in which stakeholders throughout the production chain play a central role in building and consolidating the initiative (Brazil, 2014).

Given these circumstances, small-scale honey producers and beekeeping associations in the Cuesta Region possess significant potential to pursue Geographical Indication protection. The application for GI registration must be submitted by a representative entity duly established within the geographical area concerned, such as an association, union, institute, or other legal organization representing the sector.

Accordingly, this study aims to analyze the development of beekeeping in the Cuesta Region, highlighting its reputation, productive potential, challenges, and collective organizational strategies through local associations as fundamental elements for achieving recognition through a Geographical Indication.

2 Methodology

The study adopted a qualitative and exploratory approach, employing the case study method. Qualitative research is characterized by its emphasis on understanding social phenomena from the perspectives of the individuals involved, valuing the meanings, interpretations, and experiences constructed within the context under investigation (Minayo, 2001). Exploratory research, in turn, seeks to provide greater familiarity with a given topic, enabling the development of hypotheses and the expansion of knowledge regarding issues that remain insufficiently understood (Gil, 2008).

The case study was selected as the methodological strategy because it allows for an in-depth investigation of the defined object of study. According to Yin (2015), the case study approach is particularly appropriate when the objective is to understand complex dynamics within real-world contexts, especially when the boundaries between the phenomenon and its context are not clearly defined.

To construct the empirical *corpus*, multiple sources of information were employed to ensure a comprehensive and multifaceted analysis. The materials consulted included newspaper reports, official statistical data provided by the Brazilian Institute of Geography and Statistics (IBGE), manuals and publications produced by beekeeping associations such as Apicuesta, as well as academic literature addressing beekeeping, sustainable rural development, and public policy.

3 Results and Discussion

This study is dedicated to presenting and analyzing the results obtained throughout the investigation of beekeeping development in the Paulista Cuesta Region, integrating the collected data with the theoretical framework that underpins the research. The findings are organized in a progressive and integrated manner to address the various dimensions of the topic under investigation. The discussion begins with a contextualization of Brazilian honey production and Geographical Indications, followed by an examination of the territorial characteristics and beekeeping potential of the region, and culminates in a discussion of the challenges faced by local producers and the most appropriate strategies for advancing the process of obtaining Geographical Indication recognition for honey produced in the Paulista Cuesta Region.

The discussion of the findings is conducted in light of previous studies, institutional documents, and the experiences of regions that have undergone similar trajectories. This approach provides a critical and forward-looking analysis that contributes not only to the academic field but also to practical decision-making by stakeholders involved in the regional beekeeping production chain.

3.1 Brazilian Honey Production and Geographical Indications

Brazil presents a highly promising scenario for beekeeping and stands out globally as one of the leading exporters of high-quality honey. Its native flora, characterized by low pesticide exposure, together with climatic conditions marked by low relative humidity, contributes to the production of organic honey (Vidal, 2020).

The majority of Brazilian beekeepers are small-scale producers. According to data from the Brazilian Confederation of Beekeeping (CBA, 2019), approximately 50% own up to 50 hives, while more than 90% manage no more than 200 hives. These producers account for 60.2% of the country's honey production. For many of them, beekeeping represents an important supplementary source

of income, particularly within the context of family farming, which encompasses 80% of agricultural establishments in Brazil (Vidal, 2022).

According to data from 2017, Brazil had 2,155,140 beehive boxes distributed across 101,947 rural properties (Landau, 2020). By 2019, the country produced approximately 46,000 tons of honey, ranking as the world's eleventh-largest producer and accounting for 4.8% of global honey exports (Moscatelli et al., 2025).

At the national level, as of December 2025, Brazil had reached the milestone of 150 recognized national Geographical Indications (GIs), comprising 119 Indications of Source and 31 Denominations of Origin. These are distributed across more than 1,862 municipalities in the Southeast, South, Northeast, North, and Central-West regions of the country, according to data from the Brazilian National Institute of Industrial Property (INPI, 2025) (Figure 1).

In turn, a Geographical Indication (GI) is an industrial property mechanism used to identify the geographical origin of a product or service. In Brazil, the regulation of GIs is established under the Industrial Property Law (LPI), Law No. 9,279 of May 14, 1996 (Brazil, 1996). According to Articles 177 and 178 of this legislation, GIs are classified into two categories: Indication of Source (IP) and Denomination of Origin (DO).

An IP refers to the name of a place or region that has become recognized as a center for the extraction, production, or manufacture of a particular product, or for the provision of a specific service. A DO, in contrast, is associated with locations whose products or services possess qualities or characteristics directly linked to their geographical origin, resulting exclusively from factors such as climate, soil, altitude, and human know-how (Brazil, 1996; INPI, 2025).

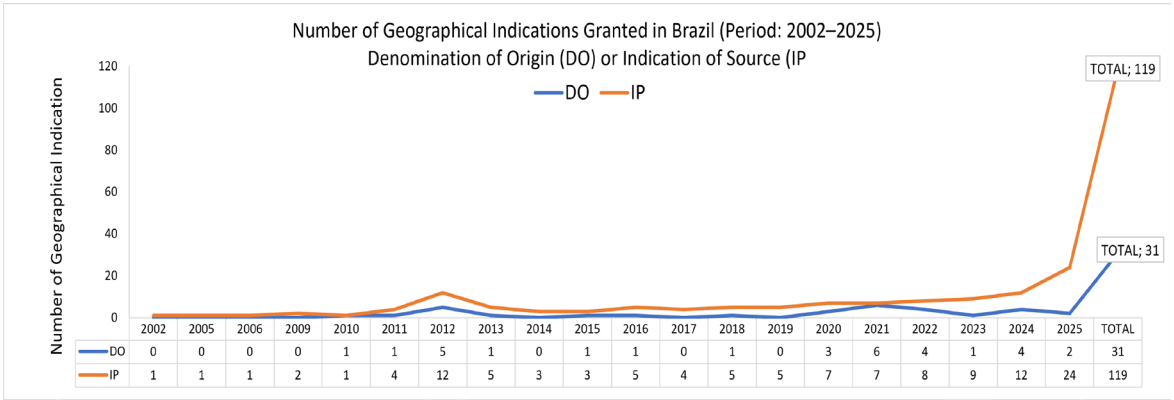
For an IP application, the applicant must demonstrate that the geographical area has become known for the declared product or service. In the case of a DO, it is necessary to prove that the geographical environment, including both natural and human factors, exerts a determining influence on the characteristics of the product or service provided (INPI, 2025).

The right to use a GI is granted to producers or service providers established within the designated geographical area, provided that they comply with the requirements set forth in the product specification document and are subject to the control mechanisms established under the GI framework (INPI, 2025).

Such regulatory protection could be applied to the Paulista Cuesta Region to ensure recognition of products originating from the designated geographical area. However, Samper and Quiñones-Ruiz (2017) argue that GIs should adopt sustainability as a central pillar, thereby creating a competitive advantage, particularly for regions with a longstanding history of sustainable practices. According to the authors, beyond the reputation associated with product quality, it is essential that these regions strengthen their distinctiveness through transparent sustainability indicators.

Although Brazil possesses vast territorial extension and a wide diversity of ecosystems suitable for honey production, the number of registered honey-related Geographical Indications remains relatively low. Currently, only ten GIs have been recognized, a modest number considering the country's productive potential. This discrepancy highlights structural challenges related to collective producer organization, the need for technical and scientific studies demonstrating territorial uniqueness, and the limited dissemination of intellectual property protection practices among producers.

Figure 1 – Number of Geographical Indication registrations by product category in Brazil



	2002	2005	2006	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
DO	0	0	0	0	1	1	5	1	0	1	1	0	1	0	3	6	4	1	4	2	31
IP	1	1	1	2	1	4	12	5	3	3	5	4	5	5	7	7	8	9	12	24	119

Source: INPI (2025)

Figure 2 shows that the Southeast and South regions have the highest number of honey-related Geographical Indications in Brazil, with three registrations each. The Central-West and North regions each have only one GI, while the Northeast has two. There is also a balanced distribution between the two forms of protection, with five Indications of Source and five Denominations of Origin, each representing 50% of the total. These data suggest a higher level of institutional and organizational development within the beekeeping sector in the South and Southeast regions, as well as a diversity of products with distinct territorial characteristics, which helps explain the balance between IP and DO registrations.

Another noteworthy aspect concerns the geographical names associated with honey and propolis Geographical Indications across different regions of Brazil. Regions such as the Pantanal, the Amazon, the Northeastern Semi-Arid region, and areas of the Atlantic Forest and Cerrado biomes offer products with distinctive attributes linked to environmental conditions and human factors, including local know-how. These characteristics reinforce the role of GIs as intellectual property assets that enhance territorial identity and promote the value of Brazilian biodiversity.

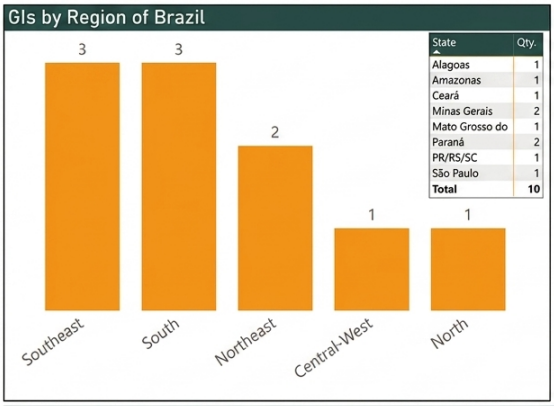
Therefore, Figure 2 demonstrates that, despite the significant progress achieved in the registration of honey and propolis GIs in Brazil, several regions with considerable potential remain underexplored. The expansion of these Geographical Indications depends on institutional support, technical training for producers, organizational strengthening, and the development of public policies aimed at territorial socioeconomic growth. In this context, Geographical Indications become an essential instrument for sustainable regional development and for enhancing the value of Brazilian apicultural products.

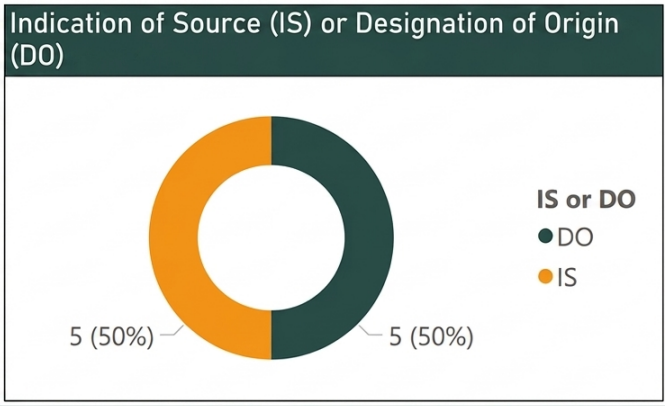
3.2 Overview of Honey Production in the Cuesta Region

The Cuesta Region is a tourism consortium founded in 2001 as a non-profit association with the mission of promoting sustainable regional tourism development through cooperation and integration among its member municipalities. The area known as the Paulista Cuesta Region, located in the south-central portion of the State of São Paulo, is distinguished by its elevated terrain and asymmetric relief, as well as by its waterfalls and natural landscapes, which have become important local tourist attractions (Rosa, 2024).

The consortium currently comprises the municipalities of Anhembi, Areiópolis, Avaré, Bofete, Botucatu, Conchas, Itatinga, Pardinho, Pereiras, Porangaba, Pratânia, and São Manuel (Figure 3). The name "Cuesta" refers to the characteristic landform of the region, which features a steep escarpment on one side and a gentle slope on the other, forming

Figure 2 – Number of Honey and Propolis Geographical Indications Across the Regions of Brazil





State	Geographical Name	Representative Entity
AM	Boa Vista do Ramos	Associação de Meliponicultores de BVR
CE	Inhamuns	Associação Apicultores do Mel de Aroeira dos Inhamuns
AL	Manguezais de Alagoas	União dos Produtores de Própolis Vermelha do Estado de Alagoas
MG	Norte de Minas	Conselho de Desenvolvimento da Apicultura Norte Mineira
PR	Oeste do Paraná	COOFAMEL Cooperativa Agro Familiar Solidária
PR	Ortigueira	Associação dos Produtores Ortigueirenses de Mel - Apomel
MS/MT	Pantanal	Conselho das Cooperativas, Associações, Entrepostos e Empresas de Afins a Apicultura do Pantanal do Brasil - CONFENAL
PR/RS...	Planalto Sul Brasileiro	Federação das Associações de Apicultores e Meliponicultores de Santa Catarina – FAASC
MG	Região da Própolis Verde de Minas Gerais	Federação Mineira de Apicultura - FEMAP
SP	Vale do Paraíba	Associação Sócio Educativa de Pequenos Produtores Rurais de Redenção da Serra

Source: Sebrae (2025)

a geological "step" that rises to approximately one thousand meters in altitude and creates extensive cliffs with relatively flat plateaus at their summits (Moscatelli et al., 2025).

The Multifunctional Consortium of the Cuesta Region aims primarily to represent its member municipalities in matters of common interest, both before public institutions at all levels of government and in dealings with private-sector initiatives. Its responsibilities include providing services to associated municipalities in the areas of planning, capacity building, regulatory support, construction and maintenance of tourism infrastructure, as well as regional promotion and dissemination through marketing initiative (Pólo Cuesta, 2025).

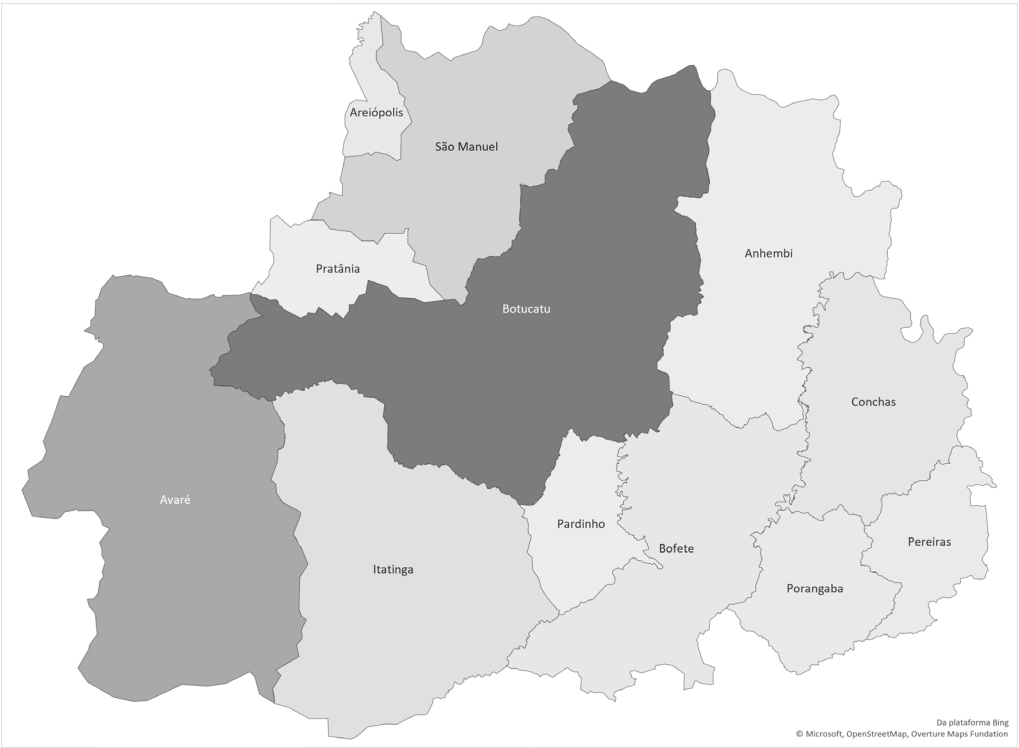
The Cuesta Region is widely recognized for its strong beekeeping activity, bringing together beekeepers from more than ten municipalities and positioning itself as one of the leading honey-producing and honey-harvesting regions in both the State of São Paulo and Brazil. According to Joel Santiago de Andrade, president of the Cuesta Beekeepers Association, this distinction is attributed to the quality of the honey and the sustainable practices adopted throughout the production process. Genuine honey is characterized by its viscosity, distinctive aroma, and low solubility in water (Nosso Campo, 2024).

Among the municipalities in the region, Itatinga and Botucatu stand out as the leading honey producers in São Paulo State. Itatinga, located 221 km from the state capital, has achieved national prominence due to its ability to maintain honey production throughout the entire year (Pinheiro, 2024). In recognition of its importance, the municipality may receive the title of "Honey Capital" from the São Paulo State Legislative Assembly (Alesp), as it ranks among the largest honey-producing municipalities in the country (Alesp, 2019).

In 2014, Itatinga ranked first both within São Paulo State and nationally, reaching a production volume of 600,000 kg of honey. This achievement demonstrates its strong productive capacity and strategic importance to both Paulista and Brazilian beekeeping. In the same year, Botucatu ranked third at both the state and national levels, with a production volume of 450,000 kg (IBGE, 2014).

According to data from the Brazilian Institute of Geography and Statistics (IBGE), presented in Figure 4, the municipalities of Itatinga and Botucatu continued to occupy the first and second positions, respectively, in the state honey production ranking in 2024. Although both municipalities declined slightly in the national ranking, they remained among the ten largest honey producers in the country (IBGE, 2024).

Figure 3 – Map of the Cuesta Region in the State of São Paulo



Source: Prepared by the authors based on data from the Cuesta Region (2025)

These results reinforce the discussion regarding territorial protection through instruments such as Geographical Indications. The consistency of production, closely reflected in their leading positions within the state ranking, indicates favorable conditions for value-adding strategies, particularly when associated with environmental characteristics, good production practices, and territorial identity. In this context, honey production in Itatinga and Botucatu can be understood as part of a broader process of territorial development and the strengthening of regional beekeeping, providing a solid foundation for the key factors required to sustain national competitiveness.

The combined presence of both municipalities among Brazil's leading honey producers highlights the Paulista Cuesta Region as an area of high productivity, strong recognition, and significant competitive capacity within the beekeeping sector.

Within the framework of regional development policies in the State of São Paulo, the Cuesta Region was recognized as a Local Productive Arrangement (LPA) for beekeeping, which, in 2024, was reclassified as a Local Productive Chain (LPC). The management of the Cuesta Region Beekeeping LPC is coordinated by Apicuesta, which works in collaboration with two other representative organizations in the sector: the Beekeepers Association of Botucatu (AAB) and the Beekeepers and Meliponiculturists Association of Avaré and Region (AAMARE), both of which are members of the LPC management committee.

The regional production structure also includes three honey processing and distribution facilities, a manufacturing unit dedicated to beehive boxes, a specialized garment producer focused on beekeeping apparel, and a factory dedicated to beeswax molding and processing (Apicuesta, 2025).

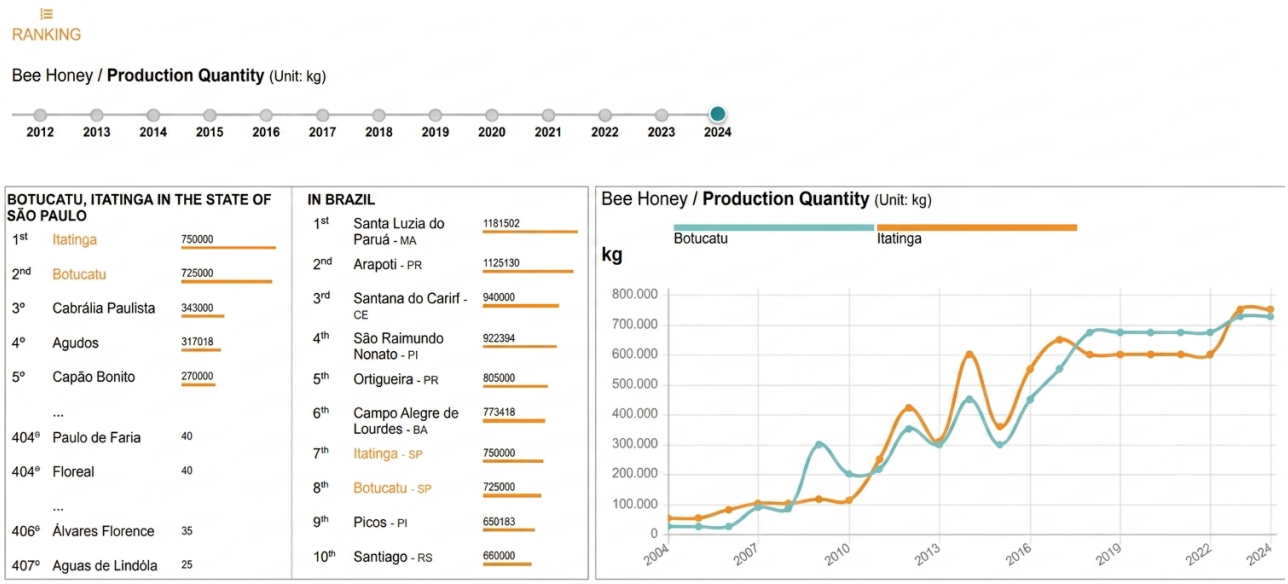
The economic feasibility study conducted by Andrade (2012) demonstrated that honey production carried out through an associative model is significantly more advantageous than individual production. One of the primary reasons is cost reduction, as affiliated beekeepers gain easier access to inputs and equipment through collective purchasing arrangements. Furthermore, partnerships with land-leasing companies enable the association to provide production areas at more affordable rates than those typically available through private lease agreements (Andrade, 2012).

Table 1 shows a substantial number of beekeepers affiliated with the associations operating in the Cuesta Region. Apicuesta, located in Itatinga, has the largest membership, with 85 affiliated beekeepers, followed by the Beekeepers Association of Botucatu (AAB), with 53 members, and AAMARE of Avaré, with 11 members, totaling 149 beekeepers. These figures reflect the strong organizational structure of the Local Productive Chain of Beekeepers in the Cuesta Region and demonstrate significant potential for obtaining Geographical Indication registration.

3.3 Challenges in the Honey Market

Honey consumption in Brazil remains relatively low compared with that of other countries, highlighting the significant growth potential of the sector. For beekeeping

Figure 4 – Honey Production in 2024: Municipal Ranking Relative to Other States of Brazil



Source: IBGE (2025)

Tabela 1 – Associations of the Cuesta Region Beekeeping Local Productive Chain (LPC)

Association Name	City	Number of Members	Date of Establishment
Association of Beekeepers and Meliponiculturists of Avaré and Region (Aamare)	Avaré	11	January 31, 2019
Botucatu Beekeepers Association (AAB)	Botucatu	53	April 19, 2010
Cuesta Hub Beekeepers Association (Apicuesta)	Itatinga	85	October 23, 2004
Total		149	

Source: Prepared by the authors based on data provided by Apicuesta (2025)

to continue expanding, it is essential to increase domestic consumption, improve productivity, and invest in professionalized management practices (G1, 2024).

One of the main obstacles to increasing consumption is honey adulteration. Many consumers struggle to distinguish authentic honey from counterfeit products, a problem exacerbated by companies that market adulterated versions lacking the nutritional and medicinal properties of natural honey. To ensure authenticity, consumers should verify whether the product packaging bears official inspection seals, such as those issued by the Federal Inspection Service (SIF), the Municipal Inspection Service (SIM), or the Inspection System of the State of São Paulo (SISP) (Municipality of Itatinga, 2025).

In an effort to access specialized markets, many cooperatives have adopted certification mechanisms. Among these, the Geographical Indication (GI) label stands out as an important value-adding tool, as it reinforces the cultural and historical identity associated with products originating from local communities (Lopes et al., 2023).

Most beekeepers participating in the honey production chain are located within municipalities of the Paulista Cuesta Region. However, one of the challenges associated with a potential GI application is demonstrating that all participating beekeepers effectively operate within the defined geographical area. Establishing this territorial linkage is essential for validating the geographical scope of the indication and ensuring compliance with the requirements for Geographical Indication registration.

3.4 Reputation as a Basis for the Geographical Indication of Honey from the Paulista Cuesta Region

According to Conceição et al. (2022), the definition of the appropriate Geographical Indication (GI) category is based on criteria established through a socio-spatial analysis conducted by supporting institutions that carry out studies with producers. In this context, the connection between the characteristics of honey and its geographical origin not only enables product recognition but also generates economic benefits for beekeepers. However, for a GI to be effectively granted, the cooperation of all stakeholders within the production chain is essential, beginning with the active engagement of the producers themselves.

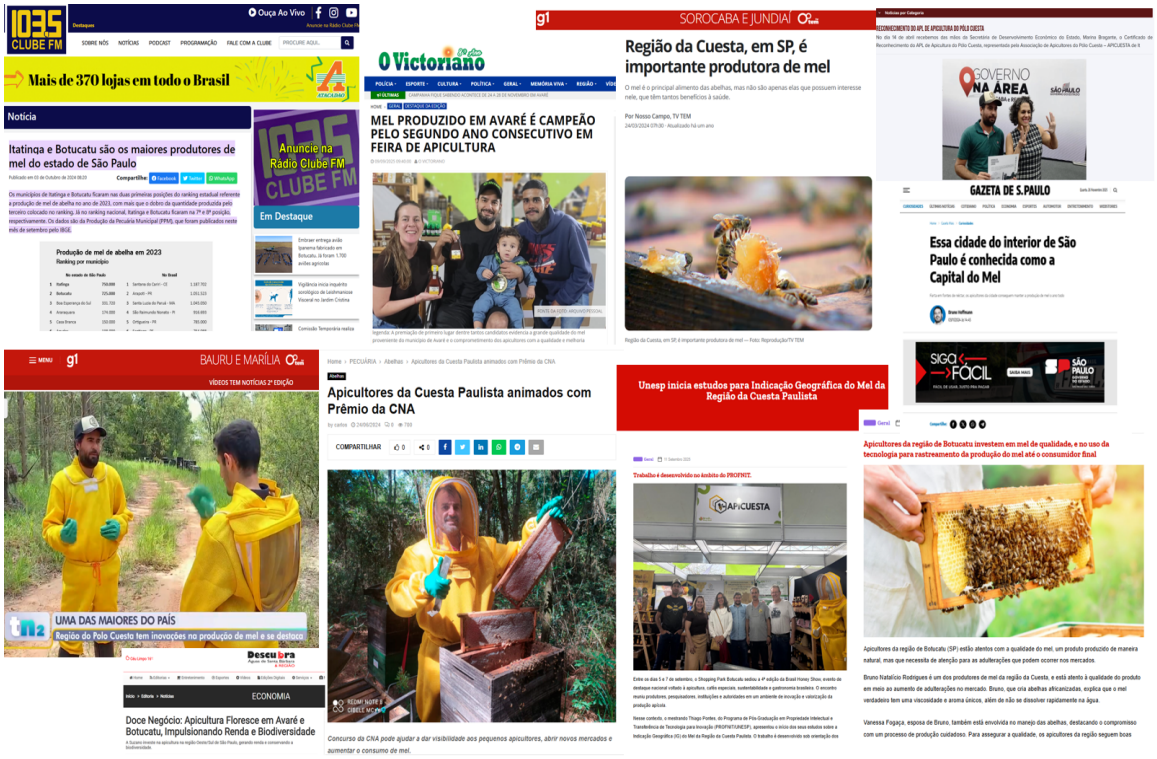
For honey produced in the Paulista Cuesta Region, pursuing a Geographical Indication could offer substantial advantages. A GI would help emphasize the distinctive attributes that make the region's honey unique, thereby increasing its market value. In addition, it would enhance the appreciation of the region's history, traditions, and cultural heritage. Figure 5 illustrates the degree of recognition achieved by the region through media coverage that promotes its honey both locally and nationwide. The figure brings together various news reports and journalistic materials that reinforce the reputation of honey produced in the Paulista Cuesta Region. These reports highlight awards, institutional recognition, progress toward obtaining a Geographical Indication, and the role of local beekeepers in establishing the region as a state and national reference in honey production. The dissemination of such news through radio broadcasts, online media outlets, and television networks demonstrates the growing visibility of beekeeping activities in the Cuesta Region, underscoring their economic, social, and cultural significance.

This recognition has been further strengthened by national-level awards, such as the distinction granted to honey produced in Avaré, a municipality within the Paulista Cuesta Region, which was recognized as the best honey in Brazil at the Brazil Honey Show. This award highlights not only the outstanding sensory and production quality of the local honey but also the expertise of the region's beekeepers, reinforcing the image of the Paulista Cuesta as a distinguished honey-producing region. Such external recognition strengthens the case for obtaining a Geographical Indication, as it demonstrates that the product is already known and respected by specialists, consumers, and organizations within the sector (Jornal Sudoeste do Estado, 2025).

Figure 6 presents different commercial brands and product formats of honey produced in the Paulista Cuesta Region, illustrating both the diversity of products available and the consolidation of the region's reputation and recognition within the beekeeping market. The

variety of visual identities, labels, and packaging designs reflects producers' efforts to enhance product quality and strengthen regional positioning, demonstrating both the expansion of the sector and the creation of value associated with geographical origin. These elements reinforce the perception of quality linked to honey from the Paulista Cuesta Region and support initiatives aimed at obtaining formal recognition through a Geographical Indication.

Figure 5 – News Reports and Media Coverage Highlighting the Reputation of Honey from the Paulista Cuesta Region



Source: Rádio Clube FM – Botucatu (2024); Jornal O Victoriano (2025); G1/TV TEM (2024); Itatinga Tourism Portal (2022); Gazeta de S. Paulo (2024); Nosso Campo, TV TEM (2024); Descubra Águas de Santa Bárbara e Região (2024); Revista Attalea Agronegócios (2024); Acontece Botucatu (2025); Acontece Botucatu (2024)

Figure 6 – Brands and Products Demonstrating the Reputation and Recognition of Honey from the Paulista Cuesta Region

Source: Apicuesta (2025)

Examples include eucalyptus honey, characterized by its dark color and intense flavor, and traditionally associated with beneficial effects in the treatment of bronchitis, coughs, and asthma; orange blossom honey, which has a light color and mild flavor and is commonly regarded as a natural intestinal regulator and calming agent; and wildflower honey, a dark honey derived from multiple floral sources, with a strong flavor and high mineral content, traditionally recommended for supporting the nervous system, respiratory health, and skin care, while also being associated with calming, laxative, and detoxifying properties (Municipality of Itatinga, 2025; Carvalho, 2024).

4 Final Considerations

The study gathered evidence indicating that honey produced in the Paulista Cuesta Region may qualify for recognition as a Geographical Indication, given its high market appreciation and its reputation for quality. The findings suggest that, at present, the most appropriate form of protection would be an Indication of Source (IP), since the region is widely recognized for the production and processing of honey. Progressing toward a Denomination of Origin (DO) would require additional evidence demonstrating that the distinctive characteristics of the honey are essentially attributable to the geographical environment.

In this context, beekeeping in the State of São Paulo, particularly within the Cuesta Region, represents a model that successfully combines tradition and innovation, generating benefits for the local economy, environmental conservation, and public well-being. As such, it encompasses the elements that confer reputation upon the product and, consequently, support its potential for obtaining a Geographical Indication. The strengthening of beekeeping associations, together with the promotion of good production practices, constitutes a fundamental factor for the continuity of this sustainable development process and for enhancing the value of honey as a premium natural product.

Finally, this study presented a body of evidence highlighting the socioeconomic, historical, and cultural values associated with both the product and the territory, as well as indicators demonstrating the potential of honey produced in the Paulista Cuesta Region as a key candidate for Geographical Indication recognition. These findings substantiate its reputation and reinforce its potential to become a valuable intellectual property asset.

5 Future Perspectives

The present study extends its focus beyond the results achieved, looking toward the horizons that emerge from the evidence and reflections developed throughout the research process. The investigation of beekeeping development in the Paulista Cuesta Region and the possibilities for obtaining Geographical Indication recognition for its honey does not conclude with the findings presented here. Rather, it opens a range of promising avenues that deserve further exploration through future research, public policies, and collective initiatives.

In this regard, the perspectives outlined herein should not be viewed as mere speculation. Instead, they represent natural and necessary extensions of a research and action agenda that is both urgent and strategic for strengthening the regional beekeeping production chain.

5.1 Perspectives for Geographical Indication Recognition

The consolidation of a Geographical Indication (GI) for honey produced in the Cuesta Region requires a sequence of technical, organizational, and legal steps. Among the most important next stages are: a more comprehensive territorial diagnosis; precise mapping of producers and their production practices; the preparation of the Product Specification Document; the collection of documentary evidence demonstrating the product's reputation and its association with a specific geographical origin; and the strengthening of institutional coordination among producer associations, research institutions, and development agencies.

In this context, the present study seeks to contribute by providing both theoretical and practical foundations for assessing the feasibility of a Geographical Indication, based on an analysis of the production chain, institutional governance, and territorial identity associated with honey from the Paulista Cuesta Region. By systematizing relevant data and proposing strategic guidelines, this study aims to strengthen the collective organization of beekeepers in the Cuesta Region, support the appreciation of traditional know-how, and guide future actions that may facilitate the registration process before the Brazilian National Institute of Industrial Property (INPI).

5.2 Technological and Innovation Perspectives

Advances in hive monitoring technologies have the potential to improve both productivity and operational safety within the beekeeping sector. Likewise, the development of innovative honey processing equipment may contribute to greater efficiency, product quality, traceability, and value addition throughout the production chain.

5.3 Socioeconomic Development Perspectives

The consolidation of the honey production chain can contribute significantly to the diversification of income-

generating opportunities for family farmers and traditional communities.

5.4 Environmental and Sustainability Perspectives

Technical training that incorporates sustainable practices is essential for maintaining the production chain and a Geographical Indication, while encouraging the adoption of sustainable practices to strengthen it.

5.5 Market and Commercialization Perspectives

A Geographical Indication adds value to the production chain and offers prospects for increasing the income of those involved in the chain. The development of a strong territorial brand, linked to the unique characteristics of the biome and local traditional knowledge, can establish sustainable competitive differentiation in the international market.

References

AB'SÁBER, A. N. **Os domínios de natureza no Brasil**: potencialidades paisagísticas. São Paulo: Ateliê Editorial, 2003.

ACONTECE BOTUCATU. **Combate a mel adulterado é um dos desafios da apicultura**. 15 set. 2024. Disponível em: https://acontecebotucatu.com.br/geral/combate-a-mel-adulterado-e-um-dos-desafios-da-apicultura/?utm_source. Acesso em: 13 jun. 2025.

ACONTECE BOTUCATU. **Unesp inicia estudos para Indicação Geográfica do Mel da Região da Cuesta Paulista**. 11 set. 2025. Disponível em: https://acontecebotucatu.com.br/geral/unesp-inicia-estudos-para-indicacao-geografica-do-mel-da-regiao-da-cuesta-paulista/. Acesso em: 16 out. 2025.

ALESP – ASSEMBLEIA LEGISLATIVA DO ESTADO DE SÃO PAULO. **Itatinga pode se tornar a capital do mel no Estado**. 20 maio 2019. Disponível em: https://www.al.sp.gov.br/noticia/?id=399343. Acesso em: 13 jun. 2025.

ANDRADE, J. S. **Análise de viabilidade econômica da produção de mel da associação de apicultores do Polo Cuesta, Itatinga-SP**. 2012. 112p. Trabalho de Conclusão de Curso (Graduação em Tecnologia em Agronegócio) – Faculdade de Tecnologia de Botucatu, Botucatu, 2012. Disponível em: https://ric.cps.sp.gov.br/handle/123456789/16527. Acesso em: 13 jun. 2025.

APICUESTA – APICULTORES DO PÓLO CUESTA. **CPL de Apicultura do Polo Cuesta**. Itatinga: Apicuesta, 2025. Disponível em: https://www.apicuesta.com/cpl-de-apicultura-do-polo-cuesta/. Acesso em: 6 dez. 2025.

BAURU E MARÍLIA. **Região da Cuesta, em SP, é importante produtora de mel**. G1, 24 mar. 2024. Disponível em: https://g1.globo.com/sp/bauru-marilia/videos-tem-noticias-2-edicao/video/regiao-da-cuesta-se-destaca-como-importante-produtora-de-mel-12483849.ghtml. Acesso em: 13 jun. 2025.

BRASIL. Lei n. 9.279, de 14 de maio de 1996. Regula direitos e obrigações relativos à propriedade industrial. **Diário Oficial da União**, Brasília, DF, 1996.

BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. **Curso de propriedade intelectual e inovação no agronegócio**: módulo II – indicação geográfica. 4. ed. Florianópolis: FUNJAB, 2014.

BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. **Guia das indicações geográficas***: conceitos*. Brasília, DF, 2019. Disponível em: https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/indicacao-geografica/arquivos-publicacoes-ig/guia-das-igs-conceitos/view. Acesso em: 21 dez. 2025.

CARLOS, J. Apicultores da Cuesta Paulista animados com Prêmio da CNA. **Revista Attalea Agronegócios**, 2024. Disponível em: https://revistadeagronegocios.com.br/apicultores-da-cuesta-paulista-animados-com-premio-da-cna/. Acesso em: 14 jun. 2025.

CARVALHO, C. Essa cidade se destaca como um polo de produção de mel no interior de São Paulo. **Perfil**, 16 dez. 2024. Disponível em: https://brasil.perfil.com/brasil/essa-cidade-se-destaca-como-um-polo-de-producao-de-mel-no-interior-de-sao-paulo.phtml. Acesso em: 13 jun. 2025.

CATI – COORDENADORIA DE ASSISTÊNCIA TÉCNICA INTEGRAL. **As Abelhas e as Cadeias Produtivas da Apicultura e Meliponicultura**. 2025. Disponível em: https://www.cati.sp.gov.br/portal/projetos-e-programas/apicultura-e-meliponicultura. Acesso em: 13 jun. 2025.

CBA – CONFEDERAÇÃO BRASILEIRA DE APICULTURA. José Aragão de Brito. **XV Seminário Piauiense de Apicultura,** I Seminário Piauiense de Meliponicultura, Floriano (PI), 2019.

CONCEIÇÃO, V. S. *et al.* Geographic indication of bee honey from Alagoinhas-Bahia: a possibility. **Revista INGI – Indicação Geográfica e Inovação**, v. 6, n. 3, p. 1787-1800, 2022.

CONCEIÇÃO, V. S.; SILVA, D. F.; ROCHA, Â. Ma. Potencial de Indicação Geográfica para o Mel Produzido por Abelha sem Ferrão de Alagoinhas-Bahia. **Cadernos de Prospecção,** Salvador, v. 15, n. 2, p. 618-633, 2022.

DOCE Negócio: Apicultura floresce em Avaré e Botucatu, impulsionando renda e biodiversidade. **Descubra Águas de Santa Bárbara e Região**, 2024. Disponível em: https://descubraasb.com.br/noticia/59/doce-negocio-apicultura-floresce-em-avare-e-botucatu-impulsionando-renda-e-biodiversidade. Acesso em: 13 jun. 2025.

G1. Região da Cuesta, em SP, é importante produtora de mel. **Nosso Campo,** 24 mar. 2024. Disponível em: https://g1.globo.com/sp/sorocaba-jundiai/nosso-campo/noticia/2024/03/24/regiao-da-cuesta-em-sp-e-importante-produtora-de-mel.ghtml. Acesso em: 13 jun. 2025.

GELA, A. *et al.* Physico-chemical characteristics of honey produced by stingless bees (Meliponula beccarii) from West Showa zone of Oromia Region, Ethiopia. **Heliyon**, v. 7, n. 1, p. 1-7, 15 jan. 2021.

GIL, A. C. **Métodos e técnicas de pesquisa social**. 6. ed. São Paulo: Atlas, 2008.

HOFFMANN, B. Essa cidade do interior de São Paulo é conhecida como a Capital do Mel. **Gazeta de São Paulo**, 3 nov. 2024. Disponível em: https://www.gazetasp.com.br/gazeta-mais/curiosidades/essa-cidade-do-interior-de-sao-paulo-e-conhecida-como-a-capital-do-mel/1145920/. Acesso em: 13 jun. 2025.

IBGE – INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. **Botucatu (SP)**: produção agropecuária – mel de abelha (*ranking*). 2024. Disponível em: https://cidades.ibge.gov.br/brasil/sp/botucatu/pesquisa/18/0?tipo=ranking&indicador=16575&ano=2024&localidade1=352350. Acesso em: 22 maio 2025.

IBGE – INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. **Geografia do Brasil**: Região Sudeste. Rio de Janeiro: IBGE, 2016.

IBGE – INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. **Mel de Abelha/Quantidade produzida (Unidade: kg)**: Botucatu, Itatinga no Estado de São Paulo 2014. Brasília, DF: IBGE, 2014. Disponível em: https://cidades.ibge.gov.br/brasil/sp/botucatu/pesquisa/18/0?tipo=ranking&indicador=16575&ano=2014&localidade1=352350. Acesso em: 6 dez. 2025.

IBGE – INSTITUTO BRASILEIRO DE GEROGRAFIA E ESTATÍSTICA. **Produção da Pecuária Municipal 2024**. Rio de Janeiro: IBGE, 2025.

INPI – INSTITUTO NACIONAL DE PROPRIEDADE INDUSTRIAL. Diretoria de Marcas, Desenhos Industriais e Indicações Geográficas. **Manual de Indicações Geográficas**. 2025. Disponível em: https://manualdeig.inpi.gov.br/projects/manual-de-indicacoes-geograficas/wiki. Acesso em: 22 mai. 2025.

INPI – INSTITUTO NACIONAL DA PROPRIEDADE INDUSTRIAL. **Nota Técnica INPI/CPAPD n. 04/2017, de 21 de dezembro de 2017**: Indicações Geográficas – Nome geográfico. Rio de Janeiro, 21 dez. 2017.

INPI – INSTITUTO NACIONAL DA PROPRIEDADE INDUSTRIAL. **Pedidos de indicação geográfica no Brasil**. Disponível em: https://www.gov.br/inpi/pt-br/servicos/indicacoes-geograficas/pedidos-de-indicacao-geografica-no-brasil. Acesso em: 22 dez. 2025.

ITO, E. H. *et al*. Características físico-químicas dos méis de abelhas Apis mellifera produzidos na região do Pólo Cuesta, São Paulo, Brasil. **Boletim de Indústria Animal**, v. 75, 2018.

JORNAL SUDOESTE DO ESTADO. **Mel de Avaré é eleito o melhor do país no Brasil Honey Show**. Avaré, 2025. Disponível em: https://www.jsudoeste.com.br/page/noticia/mel-de-avare-e-eleito-o-melhor-do-pais-no-brasil-honey-show. Acesso em: 18 dez. 2025.

LANDAU, E. C. Variação Geográfica da Apicultura (*Apis mellifera, Apidae*). *In*: LANDAU, E. C. **Dinâmica da produção agropecuária e da paisagem natural do Brasil nas últimas décadas**. Brasília, DF: Embrapa, 2020.cap. 50, p. 1703-1760.

LOPES, Marcio Rodrigo Caetano de Azevedo *et al.* Indicação Geográfica na Cooperativa Agrofamiliar Solidária (Coofamel): um estudo de caso baseado em cinco dimensões da sustentabilidade. **Revista Thêma et Scientia,** v. 13, n. 1, p. 8-26, 2023.

MINAYO, M. C. de S. **O desafio do conhecimento**: pesquisa qualitativa em saúde. 7. ed. São Paulo: Hucitec, 2001.

MOSCATELLI, H. F. *et al*. Análise das Condições para a Instituição de Indicação Geográfica na Região da Cuesta Paulista. **Cadernos de Prospecção**, Salvador, v. 18, n. 2, p. 593-601, 2025.

NAVEIRA, R. Mel de abelhas. **Rede Educativa,** MS, 18 jul. 2017. Disponível em: https://bit.ly/3G19406. Acesso em: 13 jun. 2025.

NOSSO CAMPO. **Combate a mel adulterado é um dos desafios da apicultura**. 15 set. 2024. Disponível em: https://g1.globo.com/sp/sorocaba-jundiai/nosso-campo/noticia/2024/09/15/combate-a-mel-adulterado-e-um-dos-desafios-da-apicultura.ghtml. Acesso em: 13 jun. 2025.

O VICTORIANO. **Mel produzido em Avaré é campeão pelo segundo ano consecutivo em feira de apicultura**. O Victoriano, 9 set. 2025. Disponível em: https://www.ovictoriano.com.br/page/noticia/mel-produzido-em-avare-e-campeao-pelo-segundo-ano-consecutivo-em-feira-de-apicultura. Acesso em: 18 jul. 2025.

PINHEIRO, C. CATI realiza primeira oficina destinada a mulheres da apicultura no município de Itatinga. **Coordenadoria de Assistência Técnica Integral (CATI),** 27 set. 2024. Disponível em: https://www.cati.sp.gov.br/portal/imprensa/noticia/cati-realiza-primeira-oficina-destinada-a-mulheres-da-apicultura-no-municipio-de-itatinga. Acesso em: 13 jun. 2025.

PÓLO CUESTA. **Pólo Regional de Desenvolvimento Turístico**. 2025. Disponível em: https://polocuesta.com.br/quem-somos/. Acesso em: 12 jun. 2025.

PREFEITURA MUNICIPAL DE ITATINGA. **Cidade do mel**: o guia oficial dos nossos apicultores e suas receitas. 2025.

PREFEITURA MUNICIPAL DE ITATINGA. Secretaria de Turismo. **Reconhecimento do APL de Apicultura do Polo Cuesta**. Em 4 de maio de 2022. Disponível em: https://www.turismo.itatinga.sp.gov.br/noticia/2268/-reconhecimento-do-apl-de-apicultura-do-polo-cuesta/.Acesso em: 12 jun. 2025.

RÁDIO CLUBE FM. **Itatinga e Botucatu são os maiores produtores de mel do estado de São Paulo**. Rádio Clube FM, 3 out. 2024. Disponível em: https://www.radioclubefm.com.br/noticia/itatinga-e-botucatu-continuam-sao-os-maiores-produtores-de-mel-do-estado-de-sao-paulo-916. Acesso em: 18 jul 2025.

ROSA, S. S. **Cafeicultores do Polo Cuesta buscam selo de Indicação Geográfica**. 2024. Disponível em: https://www.fca.unesp.br/#!/noticia/2348/cafeicultores-do-polo-cuesta-buscam-selo-de-indicacao-geograica/. Acesso em: 15 set. 2024.

SAMPER, L. F.; QUIÑONES-RUIZ, X. F. Towards a balanced sustainability vision for the coffee industry. **Resources**, v. 6, n. 17, p. 1-28, 2017.

SEBRAE – SERVIÇO BASILEIRO DE APOIO ÀS MICRO E PEQUENAS EMEPRESAS. **Indicação Geográfica como instrumento de valorização territorial e desenvolvimento regional**. Brasília: SEBRAE, 2018.

SEBRAE – SERVIÇO BASILEIRO DE APOIO ÀS MICRO E PEQUENAS EMEPRESAS. **Panorama das IGs Brasileiras Registradas**. 2025. Disponível em: https://app.powerbi.com/view?r=eyJrIjoiZDA2MDk0M2YtYjBmYS00ZTFjLThiOWQtOGI1ZDQ0MTA3YWExIiwidCI6Ijk3Mjk4Mjcx LTFiZDctNGFjNS05MzViLTg4YWRkZWY2MzZjYyIsImMiOjR9. Acesso em: 14 mar. 2025. (Painel de dados (Power BI)).

SETUR-SP – SECRETARIA DE TURISMO E VIAGENS DO ESTADO DE SÃO PAULO. **Mapa do Turismo Paulista: Região Turística Cuesta Paulista**. São Paulo: Setur-SP, 2021.

SILVA, F. C. *et al*. Indicações geográficas como ferramenta de desenvolvimento e reconhecimento do artesanato brasileiro. **Aracê**, v. 7, n. 4, p. 16285-16295, 6 abr. 2025. Disponível em: https://doi.org/10.56238/arev7n4-038. Acesso em: 13 jul. 2025.

SILVA, M. B.; CAMARGO, R. C. R. Influência da flora e do território nas características físico-químicas e sensoriais do mel. **Revista Brasileira de Zootecnia**, Viçosa, v. 48, p. 1–10, 2019.

VIDAL, M. de F. Mel natural. **Caderno Setorial ETENE**, Fortaleza: Banco do Nordeste do Brasil, ano 7, n. 219, abr. 2022.

VIDAL, M. F. Evolução da produção de mel na área de atuação do BNB. **Caderno Setorial ETENE**, Fortaleza, n. 112, p. 10, 2020.

YIN, R. K. **Estudo de caso**: planejamento e métodos. 5. ed. Porto Alegre: Bookman, 2015.

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