

Analysis of the potential geographical indication for ovine and caprine from the semi-arid piauiense

Análise do potencial de indicação geográfica para a carne ovina e caprina do semiárido piauiense

Análisis del potencial indicación geográfica de carne de ovinas y caprinas en el semiárido piauiense

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Abstract

geographical indication is an intangible asset of industrial property that aims to distinguish the geographical origin of a given product or service, functioning as a collective instrument for the distinction, protection and enhancement of traditional products from a given region. This research aims to analyze the potential for certification by geographical indication for ovine and caprine meat produced in the semi-arid region of Piauí. Data collection was carried out from searches in the Google and Google Scholar databases, using two search protocols to verify the academic and informational notoriety of the production of ovine and caprine meat in the semi-arid region of Piauí. The data were analyzed considering the requirements and conditions for granting the Geographical Indication registration, defined by the National Institute of Industrial Property. More than 9,000 results for academic publications and 195,500 results for informational literature were identified from the search protocols, related to the productive chain of ovine and caprine in the semi-arid region of Piauí. The results showed that the semi-arid region of Piauí is recognized as a center for the production of ovine and caprines meat, one of the requirements for granting a Geographical Indication in the form of an Indication of Origin, in accordance with the concession legislation. As for the Designation of Origin, considering the requirements for granting the seal by the certifier, it is necessary to broaden the scope of the study in order to identify the qualities or characteristics of ovine and caprine meat that are due exclusively or essentially to the peculiarities of the geographical environment, including natural and human factors.

Keywords: Semi-arid; Territorial development; Distinctive signs; Protection mechanism.

Resumo

A indicação geográfica é um ativo intangível de propriedade industrial que busca distinguir a origem geográfica de determinado produto ou serviço, atuando como uma ferramenta coletiva de distinção, proteção e valorização de produtos tradicionais de determinada região. Esta pesquisa tem o objetivo de analisar o potencial de certificação por indicação geográfica para a carne ovina e caprina produzida no Semiárido Piauiense. A coleta de dados foi realizada a partir de buscas nas bases Google e Google Scholar, utilizando dois protocolos de buscas a fim de verificar a notoriedade acadêmica e informacional da produção da carne ovina e caprina do semiárido piauiense. Os dados foram analisados considerando os requisitos e condições de concessão do registro de Indicação Geográfica, definidos pelo Instituto Nacional de Propriedade Industrial (INPI). Identificou-se a partir dos protocolos de buscas mais de 9.000

resultados para publicações acadêmicas e 195.500 resultados para literatura informacional, relacionados a cadeia produtiva de ovinos e caprinos no semiárido piauiense. Os resultados evidenciaram que o Semiárido Piauiense é reconhecido como centro de produção de carne ovina e caprina, um dos requisitos para a concessão da Indicação Geográfica na espécie Indicação de Procedência, de acordo com a legislação de concessão. Quanto a Denominação de Origem, considerando os requisitos para concessão do selo pelo certificador, faz-se necessário ampliar o escopo do estudo a fim de identificar as qualidades ou características da carne ovina e caprina se devam exclusiva ou essencialmente às peculiaridades do meio geográfico, incluídos os fatores naturais e humanos.

Palavras-chave: Semiárido; Desenvolvimento territorial; Sinais distintivos; Mecanismo de proteção.

Resumen

Una indicación geográfica es un bien intangible de propiedad industrial que busca distinguir el origen geográfico de un determinado producto o servicio, actuando como una herramienta colectiva para distinguir, proteger y valorar los productos tradicionales de una determinada región. Esta investigación tiene como objetivo analizar el potencial de la certificación por indicación geográfica para la carne de ovino y caprino producida en la región semiárida de Piauí. La recolección de datos se realizó a partir de búsquedas en las bases de datos Google y Google Scholar, utilizando dos protocolos de búsqueda con el fin de verificar la notoriedad académica e informativa de la producción de carne ovina y caprina en la región semiárida de Piauí. Los datos fueron analizados considerando los requisitos y condiciones para otorgar el registro de Indicación Geográfica, definidos por el Instituto Nacional de la Propiedad Industrial (INPI). Se identificaron más de 9.000 resultados a partir de los protocolos de búsqueda de publicaciones académicas y 195.500 resultados de literatura informativa, relacionados con la cadena productiva de ovinos y caprinos en la región semiárida de Piauí. Los resultados mostraron que la región semiárida de Piauí es reconocida como productora de carne de ovino y caprino, uno de los requisitos para la concesión de una Indicación Geográfica en la Indicación de Origen, de acuerdo con la legislación de concesión. En cuanto a la Denominación de Origen, considerando los requisitos para el otorgamiento del sello por parte de la certificadora, es necesario ampliar el alcance del estudio para identificar las cualidades o características de la carne de ovino y caprino que se deban exclusiva o esencialmente a las peculiaridades de la zona geográfica. medio ambiente, incluidos los factores naturales y humanos.

Palabras clave: Semi árido; Desarrollo territorial; Signos distintivos; Mecanismo de protección.

1. Introduction

The Brazilian Northeast has a high production potential for ovine and caprine farming, especially in arid, semi-arid and mountainous regions, making the activity attractive and important for the economy of the northeastern semi-arid region, concentrating 91% of caprine production and 57% of ovine production in the territory National (Brasil, 2019 & Quadros, 2018).

Factors such as native pasture, little increase in productive management, diversity of commercially exploitable products, adaptive capacity, (Brasil, 2019; Magalhães, et al., 2020), “semi-arid region with low rainfall and difficult production of permanent crops”, (Quadros, 2018, p. 23) can justify this concentration of production in the northeastern semi-arid region.

According to the Northeast Development Superintendence, the Brazilian semi-arid region is made up of 1,262 municipalities in the states of Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia and Minas Gerais (Brasil, 2022) (Figure 1).

Figure 1 - Delimitation of the Brazilian semi-arid region.



Source: Piauí (2022).

Of this total, 185 municipalities belong to the State of Piauí, corresponding to approximately 83% of the total number of municipalities in the State. As can be seen in Figure 1, half of the states that make up the northeastern semi-arid region have more than 85% of their territory characterized as semi-arid (Brasil, 2021).

The territorial structure of the State of Piauí is subdivided into four mesoregions that group its 224 municipalities, although with regard to Public Development Policies, the State is subdivided into twelve Territories that unite the municipalities according to their characteristics and potential (Piauí, 2022).

The State is the third in territorial area of the Brazilian Northeast, having two predominant climates, tropical and semi-arid, and a diversity of biomes, where the Caatinga represents 28.4% of the total vegetation of the territory (Gomes, 2017; Leal, 2017).

The caatinga is a biome considered exclusively Brazilian and that stands out for offering a diversity of natural riches and production potential, with emphasis on animal production, due to the high nutritional value for complementing the animal diet provided by such vegetation (Dantas & Souza, 2015).

According to the diagnosis of the productive chain of ovine and caprine carried out by the Institute of Applied Economic Research, in 2018 Piauí was the third state in the largest herd of caprine and the fifth state in the largest herd of ovine. Considering the proportion between the size of the herd in relation to the size of the existing population, the State of Piauí stands out with the highest proportion among the other states in the Brazilian territory (Monteiro, et al., 2021).

In addition to promoting regional development, the ovine and caprine production chain directly and indirectly generates jobs and strengthens local production arrangements. In this sense, the Ministry of National Integration, in partnership with Brazilian agricultural research company, local, regional and national partners created the Rota do Cordeiro program (Brasil, 2022).

The program aims to strengthen Productive Arrangements associated with ovine and caprine farming, promoting regional and territorial development. The Ministry of Regional Development defined 15 priority poles for the development of actions to encourage ovine and caprine farming, of which 12 are located in the Northeast region (Brasil, 2017).

In Piauí, the Serra da Capivara Polo was created, having the city of Dom Inocencio-PI as the central city (Brasil, 2022). The Pole is made up of 10 municipalities, with the region of São Raimundo Nonato-PI being the newest member of the group (Cruz, 2022).

In 2021, the size of the ovine and caprine herd in the State occupied the second and third place in the agricultural ranking, respectively, totaling almost 3.5 million head. A growth of 7% compared to 2017, second only to the production of poultry, with the city of Jacobina do Piauí as the largest producer of ovine and Dom Inocência do Piauí-PI as the largest producer of caprines (Brazilian Institute of Geography and Statistics [IBGE], 2021).

In this sense, the activity has been growing in the semi-arid region of Piauí, whether in the economic context, in the generation of income for small producers or in the sociocultural context, in the perpetuation of the productive activity of the rural man, in the appreciation of management and tradition. This context makes it possible to adopt protection mechanisms for production and for producers, such as Geographical Indication (GI).

The GI is an intangible industrial property asset, granted by the National Institute of Industrial Property (INPI), which grants geographical distinction to products or services. This is an instrument of protection for the producing region and guarantee to the consumer by proving the origin of the products and characteristics inherent to it (Brazilian agricultural research company [Embrapa], s.d).

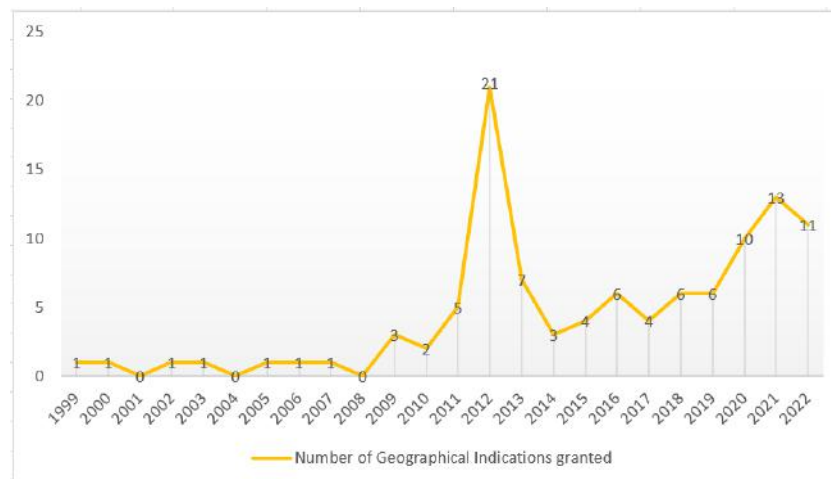
Thus, having as one of its main objectives the promotion of territorial development, especially in the rural area (Cei, et al., 2018), the GI strengthens the local economy, encourages the organization of producers, standardizes production and stimulates market competitiveness (Caldas, et al., 2017).

The differentiation conferred by the granting of the GI registration and the linking of the product or service to a certain region or territory, are presented as a collective strategic tool for territorial development, acting in the strengthening of local productive arrangements and in the valorization of regional and traditional products (Pelin, 2018).

In Brazil, Geographical Indications are regulated by the Industrial Property Law 9.279/1996. According to Ordinance 04/2022 of the INPI, which regulates the granting of registration and provides for other measures, registration can be granted in two modalities: Denomination of Origin (DO), when the characteristics or qualities present in the product or service are related to the geographical environment, natural and human factors and Indication of Origin (IP) when the geographical origin of the product or service has become known and recognized as a center of extraction, production or manufacture (Brazil, 1996; National Institute of Industrial Property [INPI], 2022).

The number of GIs has grown significantly in Brazil since the first registration granted to wine from Vale dos Vinhedos in 2000 (Caldas, 2019). A total of 108 certifications per IG were granted until mid-2022, of which 75 IPs (all national) and 33 DOs, of which 09 are international (Figure 2).

Figure 2 - Granted Geographical Indications.



Source: National Institute of Industrial Property (2022)

Figure 2 shows the evolution of the number of GI registration concessions in Brazil both in the Indication of Origin and Designation of Origin modes. The number of registrations granted over 23 years reached its peak in 2012. However, between 2013 and 2019 there was a drop in the number of registrations granted, growing again in 2020.

This scenario shows that, despite the oscillation in concessions between 2013 and 2019, the GI has become a strategic tool to enhance regional development, valuing national products and revitalizing the economy (Sakkis, 2021). In addition, the social and economic impacts generated by GI also began to be noticed by governments (Junior, 2013).

Silva (2020) highlights GI's performance for the multidimensional sustainability required by the current consumption model focused on the "quality economy" and on a new concept of competitive advantage that values qualitative issues (social, cultural, ethical, political-legal, economic and environmental) incorporating new values aimed at conscientious and sustainable consumption and production and new commercial and work practices.

The growth in the number of registration concessions shows that the productive sector and the government are waking up to the value perceived by the market in relation to certified products of guaranteed origin, demands of a more conscious and selective consumer market (Gonçalves, et al., 2018).

Thus, considering the GI's ability to act in territorial development, strengthen and promote the sustainable development of local production chains, research that seeks to identify the potential of certain products or services for certification is fundamental. In this sense, this research aims to analyze the potential for certification by geographical indication for ovine and caprine meat produced in the Piauí semi-arid region.

2. Methodology

This is an applied research that sought to generate information to support the request for a geographical indication for ovine and caprine meat produced in the semi-arid region of Piauí. According to Gil (2019), applied research, in addition to trying to solve society's problems, can contribute to the suggestion of new investigations and expand scientific knowledge.

It is a descriptive exploratory study with a qualitative and quantitative approach, as it seeks to deepen and describe the studied phenomena, explaining their causes, analyzing and interpreting their meaning and also elucidating the behavior of the phenomena through the cause and effect relationship.

Documentary research was adopted as a data collection and analysis procedure, which works with existing primary data from various sources to carry out comparisons and analyzes of the content produced and disseminated (Santos & Filho, 2017) in academic and gray literature.

For the analysis of the potential of the Geographical Indication for ovine and caprine meat in the semiarid region of Piauí, two search protocols were defined. The first protocol sought to identify the product's notoriety in the scientific/academic literature.

For that, four search strings were defined to expand the possibilities of returning scientific publications: "ovinocaprinocultura" AND "piauí" AND "semiárido"; "caprinos" AND "semiárido" AND "piauí"; "ovinos" AND "semiárido" AND "piauí"; "ovino" OR "caprine" AND "piauí" AND "semiárido", and the Google Scholar database was used.

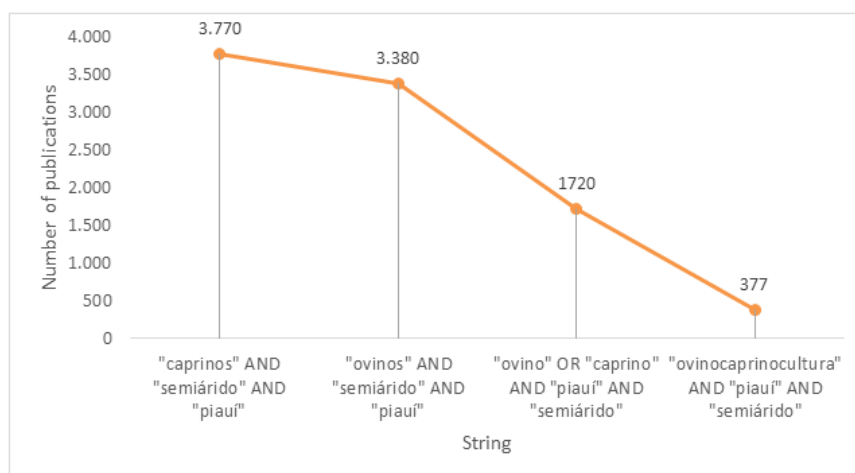
The second protocol sought to identify the product's notoriety in the informational literature. Three search strings were used to expand the possibilities of returning informational publications (news on official websites, newspapers, blogs and other communication channels): news caprinos semiárido AND "piauí"; news caprinos AND ovinos semiárido AND "piauí"; news ovinos semiárido AND "piauí", and the Google News database was used.

The collected data were tabulated and analyzed according to the requirements and conditions for granting the GI registration, defined by the National Institute of Industrial Property.

3. Results

From the search expression "caprinos" AND "semiárido" AND "piauí", 3,770 scientific productions were identified. Using the search term "ovinos" AND "semiárido" AND "piauí", a total of 3,380 publications were identified. The expression "ovino" OR "caprino" AND "piauí" AND "semiárido" returned a total of 1720 productions, which corresponded to 18.6% of the identified publications. Together, the three expressions correspond to 95.9% of the total scientific production found (Figure 3).

Figure 3 – Number of identified academic publications.



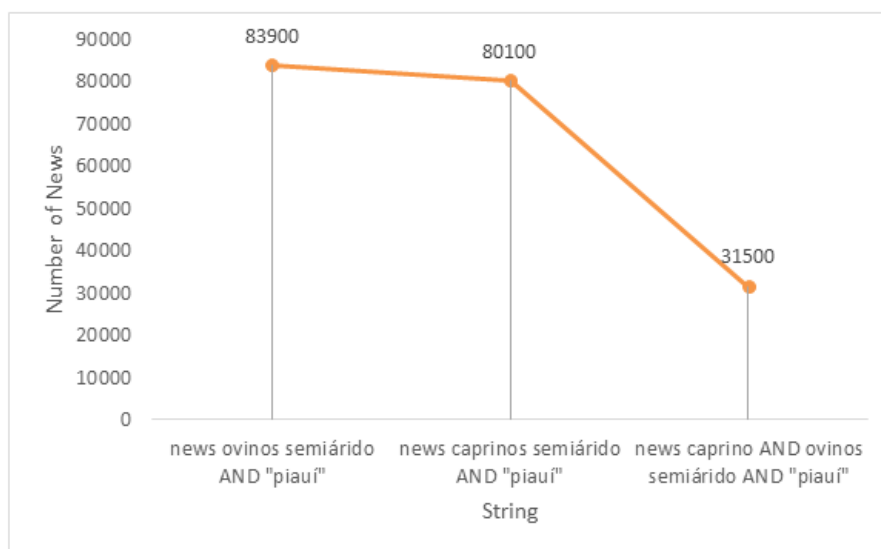
Source: Survey data (2022).

According to Figure 3, it is possible to identify that the volume of scientific publications related to the productive chain of sheep and goats in the semi-arid region of Piai is significant, especially when they are approached separately. These data show the academic interest in the subject and the relevance of this production for the State.

Using the search expressions *news* ovinos semiárido AND “piauí”; *news* caprinos semiárido AND “piauí”; *news* caprinos AND ovinos semiárido AND “piauí”, a total of 195,500 results were identified related to the productive chain of ovine and caprine in the semi-arid region of Piauí.

From the expression *news* ovinos semiárido AND “piauí”, 83,900 results were identified, followed by 80,100 results found with the expression *news* caprinos semiarid AND “piauí”, which corresponds to approximately 84% of the total volume found. The expression *news* caprinos AND ovinos semiárido AND “piauí” identified only 31,500 news related to the theme, which corresponds to 16% of the total number of identified publications (Figure 4).

Figure 4 – Number of identified informational publications.



Source: Survey data (2022).

Based on searches in the gray literature (Figure 4), a scenario similar to that identified when searches were carried out in the academic literature was verified (Figure3). There is a concentration of publications related to the productive chain of sheep and goats in the semi-arid region of Piauí. However, the volume of publications is greater when chains are searched separately.

4. Discussion

According to the results presented in Figure 3, it is observed that the potential of the semi-arid region of Piauí for the production of ovine and caprine meat has been a topic of interest for researchers. To expand the return possibilities, four different search strings were used.

There was a high percentage of publications from the use of the search strings "caprinos" AND "semiárido" AND "piauí", "ovinos" AND "semiárido" AND "piauí" e "ovino" OR "caprino" AND "piauí" AND "semiárido" a total of 95.9%. When analyzing the results returned by the search strings, there is an approximation between the volume of publications related to the productive chain of ovine and caprine, when searched individually.

The results suggest that most of the studies carried out treated the chains separately. This approach may be related to the existing balance between the size of herds (head), found in the State. According to IBGE (2021), the productive chains of ovine and caprine occupy a prominent place in the agricultural ranking of Piauí, presenting a balanced growth in the period from 2017 to 2021.

Furthermore, when using the search expression "ovincaprinocultura" AND "piauí" AND "semiárido", there is a low return on academic productions, reaching only 4.1% of the volume of publications found, which reinforces the individual approach of the productive chains.

The publications found have varied objectives, but may be related to the analysis of aspects of management, commercialization and organization of producers. (Campos, et al., (2017), discuss food and nutrition alternatives for ovines and caprines raised in the semi-arid region. Sidersky (2017) carried out a study focused on the Territory of Chapada do Vale do Itaim on the productive chain of caprine and ovine farming in Piauí's hinterland.

Consumption preferences and the production system were also addressed by the researchers. Batista et al. (2019), sought to evaluate the preferences of caprine and lamb meat consumers in São Raimundo Nonato-PI. Gama (2021) discussed the management of caprines for herd reproduction in the semi-arid region.

The productive potential and adequacy of the productive system to the climatic conditions of semi-arid regions were highlighted in the work of Vieira et al. (2016) when discussing bioclimatic and physiological factors for ovine and caprine production in semi-arid regions. Neto (2022), also addressing the adaptive perspective of herds in these regions, sought to analyze the adaptive physiological response of exotic ovine and caprines herds in experiments carried out in Brazil over 10 years (2010 to 2020).

The notoriety of ovine and caprine meat production in the semi-arid region of Piauí was also pointed out in a study carried out by Embrapa researchers on the potential of products of animal origin for certification by Geographical Indication. According to the researchers, this certification may be due to the animal's relationship with the biome, edaphoclimatic and management characteristics (Filho & Silva, 2014), in addition to the notoriety of the geographic area as a production center.

However, despite certification representing a competitive differentiation strategy for ovine and caprine meat from the semi-arid region of Piauí, nothing has been done in this regard. This inactivity in relation to obtaining certification may be a consequence of some factors, such as management, which is considered rudimentary, limited organizational capacity of producers and insufficient specialized technical assistance (Filho & Silva, 2014).

The results presented in Figure 4 demonstrate that the production of ovine and caprine meat in the semi-arid region of Piauí has also been the subject of journalistic publications. To increase the probabilities of returning informative publications, 3 different search strings were used. It was found that the search term *news* ovinos semiárido AND "piauí" was responsible for the return of 43% of the publications, while the expression *news* caprinos semiárido AND "piauí" returned 41% of the total volume of informative publications.

When analyzing the data, a scenario similar to that found in relation to academic publications was verified. There is a balance between the volume of informative publications related to the productive chains when searched individually. This scenario changes when searches are performed by concatenating the two chains, reducing the percentage of publications to 16% of the total volume.

Among the subjects presented by the informative literature are several topics related to the theme. Maroni (2019), for example, wrote about the importance of cooperativism to boost caprines farming in the semi-arid region of Piauí, especially in Queimada Nova and Betânia do Piauí.

The Milkpoint Portal, based on information from the Brazilian Micro and Small Business Support Service and the Piauí Network, in addition to highlighting the advances in agribusiness in the semi-arid region of Piauí, reports on the development of actions through projects. In general, these projects aim to promote competitiveness, sustainability of rural enterprises, dissemination of new social management and production technologies, in addition to fostering rural entrepreneurship and good practices for coexistence with the semi-arid region (Milkpoint, 2018).

Still dealing with incentives and investments in technologies, the agribusiness portal, based on information from Embrapa highlighted the investment by the Ministry of Agriculture in the production of ovine and caprine in the Northeast region with the aim of improving production in the region and increasing the income of producers (Portal do Agronegócio, 2019).

Nóbrega (2021), highlighted the incentives for the production of ovine and caprines in the Brazilian semi-arid region based on agreements and partnerships that promote actions such as training, genetic improvement, animal health, animal nutrition and food security for herds.

Actions and programs such as the caprine and ovine Learning Route in the Semiarid Region, Viva o Semiarid Project and Rota do Cordeiro Program were also highlighted in the informational literature. These actions foster the training of producers, sustainability, social development and organizational strengthening of rural families (Portal mundo agro Brasil, 2022; Brasil, 2022; Centro de Informação das Nações Unidas no Brasil [UNICRIO], 2019; Instituto Interamericano de Cooperação para a Agricultura [IICA], n.d.).

The G1 PI News Portal, based on data from the 2020 Municipal Livestock Survey (PPM), highlighted that in 2020 the State of Piauí had the 3rd largest caprine herd in the country, representing 15.8% of the Brazilian herd. The Portal also pointed out that the sale of caprine is the main source of income for several families in the municipality of Dom Inocêncio, in the semi-arid region of Piauí, and that natural factors in the region positively influence the productive potential (GP PI, 21).

Cardoso (2022) pointed out that in 2022 several families in the State of Piauí were contemplated with matrices for raising caprine and ovine. Around 30,000 breeding stock were delivered through the Rural Employment and Income Generation Program (PROGERE) and the Viva o Semiarid Program.

5. Conclusion

The results obtained from academic and informative sources point to the notoriety of the semi-arid region of Piauí as a major producer of ovine and caprine meat. According to Ordinance 04/2022 of the National Institute of Industrial Property, which deals with the requirements for granting a GI and other measures, for certification by Indication of Origin, it is necessary that the geographical name has become known when mentioned, by various sources, such as the extraction, production or manufacture center of the product or service that certification is sought.

In this sense, the geographic area meets one of the main requirements for requesting a Geographical Indication in the Indication of Origin modality, which is proof that the territory is recognized as a center for the extraction or production of a given product.

In order for the Denomination of Origin registration to be granted, it is necessary to prove that the characteristics of the production are exclusively or essentially linked to the peculiarities of the geographical environment, including natural and human factors, which is one of the essential requirements for this certification in accordance with the INPI.

Thus, in view of the analyzed literature, not enough studies were found that signaled the potential for certification by Denomination of Origin for ovine and caprine meat produced in the semi-arid region of Piauí.

In view of the importance of GI as an instrument of territorial development, support for the competitiveness of traditional products on the market and also a strategy for promoting and strengthening local productive arrangements, it is necessary to encourage the formation of a collaboration network around discussions on the subject in order to identify products with potential for certification and construction of registration requests for such products.

As suggestions for future research, it is recommended to carry out research with the objective of analyzing the influence of natural and human factors on the specificity of ovine and caprine meat produced in the semi-arid region of Piauí, seeking to verify the potential for certification by Denomination of Origin.

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References

- Alencar, M. T. (2010). *Caracterização da Macrorregião do Semiárido piauiense*. INSA.
- Batista, P. B., Rodrigues, E. A., Albuquerque, Í. R., Pessoa, E. N., Carvalho, J. A., Ferreira, S. B., & Santos, P. E. (2019, jul./set.). Caracterização do consumo e comercialização de carnes caprina e ovina na região de São Raimundo Nonato – Piauí. *Brazilian Journal of Animal and Environmental Research*, 2(4), pp. 1237-1241.
- Brasil. (1996). Lei nº 9.279, de 14 de maio de 1996. Regulamenta direitos e obrigações relativos à propriedade industrial. Brasília. https://www.planalto.gov.br/ccivil_03/leis/19279.htm
- Brasil, Ministério da Integração Nacional. Secretaria de Desenvolvimento Regional. (2017). *Bases para o plano nacional de desenvolvimento da rota do cordeiro*. <https://www.bibliotecaagpta.org.br/zootecnia/caprinocultura/livros/ROTA%20DO%20CORDEIRO.pdf>
- Brasil, Ministério do Desenvolvimento Regional. (2019, junho 19). *Rota do cordeiro - Semiárido nordestino*. <https://antigo.mdr.gov.br/component/content/article/316-secretaria-nacional-de-programas-urbanos/rotas-da-integracao-nacional/6074-rota-do-cordeiro-semiarido-nordestino#:~:text=A%20ovino%20caprinocultura%20representa%20importante%20atividade,peles%2C%20le>
- Brasil, Ministério do Desenvolvimento Regional. (2022). Rota do Cordeiro promove o desenvolvimento de 225 municípios. <https://www.gov.br/mdr/pt-br/ultimas-noticias/rota-do-cordeiro-promove-o-desenvolvimento-de-225-municipios>
- Brasil, Superintendência do Desenvolvimento do Nordeste. (novembro de 2017). Delimitação do Semiárido. <http://antigo.sudene.gov.br/delimitacao-do-semiarido/#%3A~%3Atext%3DO%20Semi%C3%A1rido%20Brasileiro%20C3%A9%20composto%2CSergipe%2CBahia%20e%20Minas%20Gerais>
- Brasil, Superintendência do Desenvolvimento do Nordeste. (2021). Delimitação do Semiárido - 2021: Relatório final. <https://www.gov.br/sudene/pt-br/centrais-de-conteudo/02semiaridorelatorionv.pdf>
- Caldas, A. d. (2019). Indicações Geográficas: valorização e saber fazer nos territórios da propriedade intelectual. *Encontro Nacional de Pós-graduação e pesquisa em geografia*, XIII. São Paulo. http://www.enanpege.ggf.br/2019/recursos/anais/8/1562631876_ARQUIVO_ALCIDESDOSSANTOSCALDASANPEGE2019.pdf
- Caldas, A. d., Araújo, C. C., & Coury, R. d. (2017). As indicações geográficas (igs) como estratégia de desenvolvimento territorial: desafios e potencialidades no distrito de maragogipinho, aratuípe, BA. *Revista de Desenvolvimento Econômico – RDE*, 3(38), pp. 81-108.
- Campos, F. S., Gois, G. C., Vicente, S. L., Macedo, A. d., & Matias, A. G. (mar./abr. de 2017). Alternativa de forragem para caprinos e ovinos criados no semiárido. *Nutritime Revista Eletrônica*, 14(2), pp. 5004-5013. Acesso em 10 de dezembro de 2022
- Cardoso, I. (2022). Programas entregam cerca de 30 mil matrizes de ovinos e caprinos no Piauí. <https://www.meionorte.com/noticias/economia/programas-entregam-cerca-de-30-mil-matrizes-de-ovinos-e-caprinos-no-piaui-443430>
- Cei, L., Defrancesco, E., & Stefani, G. (2018). From Geographical Indications to Rural Development: A Review of the Economic Effects of European Union Policy. *Sustainability*, 10(10), pp. 1-21.
- Centro de Informações das Nações Unidas no Brasil. (2019). Projeto no semiárido do Piauí eleva em 32% renda das famílias do sertão. <https://unicrio.org.br/projeto-no-semiarido-do-piaui-eleva-em-32-renda-das-familias-do-sertao/>
- Cruz, T. (2022). Governo federal inclui região de São Raimundo Nonato na Rota Nacional do Cordeiro. <https://portalodia.com/noticias/piaui/governo-federal-insere-regiao-de-sao-raimundo-nonato-na-rota-nacional-do-cordeiro-393995.html>
- Dantas, N. L., & Souza, B. B. (2015). Potencialidades da caatinga: uso de plantas nativas na alimentação animal. <https://www.milkpoint.com.br/artigos/producao-de-leite/potencialidades-da-caatinga-uso-de-plantas-nativas-na-alimentacao-animal-93668n.aspx#%3A~%3Atext%3DA%20vegeta%C3%A7%C3%A3o%20caatinga%2C%20recurso%20forrageiro%2C%20alto%20custo%20dos%20insumos%20agr%C3%>
- Embrapa. (s.d). Indicações Geográficas de Vinhos do Brasil. <https://www.embrapa.br/uva-e-vinho/indicacoes-geograficas-de-vinhos-do-brasil>
- Filho, C. G., & Silva, P. C. (2014, out./dez.). Indicação geográfica, uma certificação estratégica para os produtos de origem animal da agricultura familiar do semiárido. *Rev. Econ. NE, Fortaleza*, 45, pp. 133-141.
- Gama, R. J. (2021). Gestão de Caprinos na Reprodução do Rebanho no Semiárido. <https://repositorio.animaeducacao.com.br/bitstream/ANIMA/18860/1/MONOGRAFIA.%27%27agro%20Raimundo%20jos%20c3%a9%20da%20gama%27%27.pdf>
- Gil, A. C. (2019). *Como elaborar projetos de pesquisa* (6th ed.). Atlas.
- Gomes, R. R. (2017). *InfoEscola Navegando e aprendendo*. <https://www.infoescola.com/geografia/vegetacao-do-piaui/>

- Gonçalves, L. A., Almeida, B. d., & Bastos, E. M. (2018, dez.). Panorama das Indicações Geográficas no Brasil. *Revista de Desenvolvimento Econômico – RDE*, 3(41), pp. 130-144.
- Guerra, E. L. d. A. (2014). *Manual pesquisa qualitativa*. Anima Educação. <https://docente.ifsc.edu.br/luciane.oliveira/MaterialDidatico/P%C3%B3s%20Gest%C3%A3o%20Escolar/Legisla%C3%A7%C3%A3o%20e%20Pol%C3%ADticas%20P%C3%BAblicas/Manual%20de%20Pesquisa%20Qualitativa.pdf>
- Instituto Brasileiro de Geografia e Estatística. (2021). Rebanho de Caprinos (Bodes e Cabras). <https://www.ibge.gov.br/explica/producao-agropecuaria/caprinos/pi>
- Instituto Brasileiro de Geografia e Estatística. (2021). Rebanho de Ovinos (Ovelhas e Carneiros). <https://www.ibge.gov.br/explica/producao-agropecuaria/ovino/pi>
- Instituto Interamericano de Cooperação para a Agricultura. (2022). Projeto Viva o Semiárido reduziu a pobreza rural no Piauí. <https://www.iica.int/pt/prensa/noticias/projeto-viva-o-semiarido-reduziu-pobreza-rural-no-piaui>
- Instituto Nacional da Propriedade Industrial. (2022). Manual de Indicações Geográficas. https://www.gov.br/inpi/pt-br/servicos/indicacoes-geograficas/arquivos/legislacao-ig/PORT_INPI_PR_04_2022.pdf
- Júnior, C. E. (2013). Da imortância das Indicações Geográficas no atual contexto da empresa agrária. https://www.teses.usp.br/teses/disponiveis/2/2131/tde-09112015-115413/publico/DissertacaoMestrado_Integral_Carlos_Edson_Strasburg_Junior.pdf
- Leal, H. R. (2017). Fórum mudanças Climáticas e Justiça Socioambiental. *Biomass do Piauí*. <https://fmclimaticas.org.br/biomass-do-piaui/#%3A-%3Atext%3DOs%20biomas%20que%20est%C3%A3o%20presentes%20territ%C3%B3rio%20e%20envolve%2063%20munic%C3%ADpios>
- Magalhães, K. A., Filho, Z. F., & Martins, E. C. (2020, DEZEMBRO). Caprinos e ovinos no Brasil: análise da Produção da Pecuária Municipal 2019. *Centro de Inteligência e Mercado de Caprinos e Ovinos, II*. <https://ainfo.cnptia.embrapa.br/digital/bitstream/item/219493/1/CNPC-2020-BCIM-n11.pdf>
- Maroni, J. R. (2019). Produtores abraçam cooperativismo para impulsionar criação de cabras no Semiárido. <https://www.gazetadopovo.com.br/agronegocio/agricultura-familiar/produtores-abracam-cooperativismo-para-impulsionar-criacao-de-cabras-no-semiarido/>
- Monteiro, M. G., Brisola, M. V., & Filho, J. E. (2021). Diagnóstico da Cadeia Produtiva de Caprinos e Ovinos no Brasil. http://repositorio.ipea.gov.br/bitstream/11058/10621/2/td_2660.pdf
- Neto, N. F. (2022). Parâmetros fisiológicos e índices bioclimatológicos para pequenos ruminantes no semiárido: estudo metanalítico. http://bia.ifpi.edu.br:8080/jspui/bitstream/123456789/1186/1/2022_tcc_nfgomesneto.pdf
- Nóbrega, A. (2021). Produção de caprinos e ovinos no Semiárido brasileiro ganha novo incentivo. <https://ruralpecuaria.com.br/noticia/producao-de-caprinos-e-ovinos-no-semiarido-brasileiro-ganha-novo-incentivo.html>
- Pellin, V. (2019). Indicações Geográficas e desenvolvimento regional no Brasil: a atuação dos principais atores e suas metodologias de trabalho. *Interações*, 20(1), pp. 63-78.
- Piauí. Secretaria do Desenvolvimento Econômico. (2022). *Potencialidades: Territórios e potencialidades*. <http://www.sde.pi.gov.br/potencialidades.php>
- Portal do Agronegócio. (2019). *AgroNordeste: Mapa investirá R\$ 7 milhões em inovação tecnológica na produção de caprinos e ovinos no Nordeste*. <https://www.portaldogronegocio.com.br/politica-rural/governo/noticias/agronordeste-mapa-investira-r-7-milhoes-em-inovacao-tecnologica-na-producao-de-caprinos-e-ovinos-no-nordeste-191283>
- Portal G1 PI. (2021). Conhecida como 'Cidade do Bode', Dom Inocêncio tem o maior rebanho de caprinos do estado. <https://g1.globo.com/pi/piaui/piaui-de-riquezas/noticia/2021/04/10/conhecida-como-cidade-do-bode-dom-inocencio-tem-o-maior-rebanho-de-caprinos-do-estado.ghtml>
- Portal G1 PI. (2021). Piauí tem o 3º maior rebanho de caprinos do país, diz IBGE. <https://g1.globo.com/pi/piaui/noticia/2021/09/29/piaui-tem-o-3o-maior-rebanho-de-caprinos-do-pais-diz-ibge.ghtml>
- Portal Milkpoint. (2018). Ovinocaprinocultura e mel movimentam a economia do sertão piauiense. <https://www.milkpoint.com.br/noticias-e-mercado/giro-noticias/ovino-caprinocultura-e-mel-movimentam-a-economia-do-sertao-piauiense-207839/>
- Portal Mundo Agro Brasil. (2022). Rota de Aprendizagem de Caprinos e Ovinos no Semiárido faz percurso no PE, PI e PB. <https://mundoagrobrasil.com.br/rota-aprendizagem-caprinos-ovinos/>
- Quadros, D. G. (2018). *Cadeia produtiva da ovinocultura e da caprinocultura*. Indaial: UNIASSELVI.
- Santos, J. A., & Filho, D. P. (2017). *Metodologia Científica* (2nd ed.). Cengage Learning.
- Sakkis, A. (2021). *Concessão de Indicações Geográficas bate recorde no Brasil em 2021*. <https://noticias.portaldaindustria.com.br/noticias/politica-industrial/concessao-de-indicacoes-geograficas-bate-recorde-no-brasil-em-2021/#:~:text=Um%20levantamento%20da%20Confedera%C3%A7%C3%A3o%20Nacional,86%20produtos%20e%20servi%C3%A7os%20protegidos.%2>
- Sidersky, P. R. (2017). Sobre a cadeia produtiva da caprinovinocultura no sertão do Piauí: um estudo centrado no Território da Chapada do Vale do Itaim (região de Paulistana). Brasília. <https://repositorio.iica.int/bitstream/handle/11324/8135/BVE19040264p.pdf?sequence=1&isAllowed=y>
- Silva, C. M. (2020). As indicações geográficas e os possíveis impactos nas relações de consumo no Brasil: uma análise a partir dos vieses da sustentabilidade. https://repositorio.ufsm.br/bitstream/handle/1/23378/DIS_PPGDIREITO_2020_SILVA_CAMILA.pdf?sequence=1&isAllowed=y
- Vieira, M. M., Furtado, F. M., Cândido, M. J., Filho, J. A., Cavalcante, A. C., Magalhães, J. A., & Costa, N. d. (2016, Mai.). Aspectos fisiológicos e bioclimáticos de caprinos nas regiões semiáridas. *Publicações em Medicina Veterinária e Zootecnia - PUBVET*, 10(5), 356-369.