











Scientific overview of *Buchada*: trends and impact on academic production

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Abstract

This study analyzed scientific research on *buchada*, a traditional dish from Northeast Brazil, highlighting its low academic and international representation. A total of 21 documents were identified in the Scopus database between 2004 and 2024, mainly concentrated in federal universities in the Northeast, such as the Universidade Federal da Paraíba and the Universidade Federal Rural de Pernambuco. International collaboration is limited, with only one study conducted in partnership with Spain. Journal analysis revealed that 15 journals have published studies on the topic, with the *Revista Brasileira de Zootecnia* being the most cited. The presence of *Food Science and Technology (Brazil)* suggests opportunities for research on food safety and microbiological quality. The five most-cited articles discuss dietary strategies and their effects on the organs and viscera of goats and sheep, while few studies focus on the microbiological quality of *buchada*. Food safety and technological innovation represent promising areas to enhance the appreciation of this product. This study reinforces the need to expand interdisciplinary research, encourage international collaborations, and develop improvements in *buchada* preservation. Such initiatives could strengthen its academic and economic significance, fostering greater recognition of this traditional food in Brazil and abroad.

Keywords: innovation; scientific research; food safety; sustainability; viscera.

Practical Application: Encouragement of sustainable practices in the utilization of *buchada* by-products, improvement of its conservation and processing techniques, and expansion of its gastronomic appreciation, making it more accessible to national and international markets.

1 INTRODUCTION

The raising of small ruminants plays a fundamental role for rural producers in developing countries, especially due to the high adaptability, hardiness, and low production costs of goats and sheep (Umaraw et al., 2015). Although meat production is the primary goal of the sector, the slaughter of these animals generates by-products that can have environmental and economic impacts (Albuquerque et al., 2019; Lafarga & Hayes, 2014). Among these by-products, viscera and blood are recognized as valuable nutritional sources, providing proteins, fats, and vitamins, especially those of the B complex, which play an essential role in human health (Ockerman & Basu, 2004).

The valorization of these by-products in the production of traditional foods is a common practice in various cultures, adding value to the production chain and minimizing the environmental impact associated with improper disposal (Toldrá et al., 2012). Several countries incorporate viscera and blood into the preparation of typical meat products, such as *Morcilla*

de Burgos in Spain (Santos et al., 2003); *Cavournas* in Greece (Arvanitoyannis, 2000); *Morcela de Arroz*, *Chouriço*, and *Beloura* in Portugal (Pereira et al., 2015; Todorov et al., 2010); *Krvavica* in Slovenia (Gašperlin et al., 2014); and *Buchada* in Brazil (Albuquerque et al., 2019; Brasil et al., 2014; Costa et al., 2025; Queiroz et al., 2013).

In Brazil, *buchada* is one of the most representative traditional meat products of Northeastern cuisine, predominantly composed of chopped viscera, blood, and organs such as the heart, lungs, liver, intestines, and stomach (Brasil et al., 2014; Queiroz et al., 2013). Its preparation dates back to food practices inherited from Indigenous peoples and early colonizers, reflecting the need for total animal utilization, especially in rural and semi-arid communities where food access was more restricted. Beyond its nutritional and economic significance, *buchada* plays a vital cultural role, symbolizing regional gastronomic identity and the creativity of the Brazilian people in valuing local ingredients. The dish is associated with festive events and traditional celebrations, such as *vaquejadas*, *festas juninas*,

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and family gatherings, strengthening social ties and preserving ancestral food practices (Costa et al., 2025).

The influence of *buchada* in Brazilian cuisine transcends tradition, gaining space in specialized restaurants and contemporary gastronomy, where chefs reinterpret the recipe to appeal to new tastes while maintaining its essential characteristics. Its recognition as an intangible heritage of food culture reinforces the need for preservation and promotion of this dish, ensuring that its preparation techniques and cultural value are passed on to future generations (Albuquerque et al., 2019).

Given this context, this bibliometric review aims to map and analyze the scientific production related to *buchada*, identifying trends, leading authors, and publication sources on the topic. To this end, publications indexed in relevant databases will be considered, providing a comprehensive overview of the evolution of knowledge regarding this traditional meat product.

1.1 Relevance of the work

Beyond cultural preservation, research on *buchada* paves the way for advancements in food safety, microbiological quality, and gastronomic innovation. Sustainable utilization of by-products and the improvement of processing techniques can enhance its commercial acceptance. Including this topic into multidisciplinary studies would strengthen both its academic and economic recognition, promoting greater awareness of *buchada* in national and international markets.

2 MATERIAL AND METHODS

The bibliometric analysis was conducted during the last week of May 2025 using the Scopus database. The search term used was *buchada*, queried in the titles, abstracts, and keywords of the documents. Since it is a typical Brazilian dish, specifically from the Northeast, no time filters were applied, thus accounting for all studies published in the database since its inception. Additionally, there were no restrictions on document type due to the low number of indexed studies on the subject, totaling only 21 documents to date, according to the methodological criteria of Melo et al. (2021), which justified the inclusion of all available records.

Data related to the productivity of countries, institutions, authors, and the annual distribution of documents were collected using the “Analyze Results” tool available on the platform and were subsequently organized into graphs created in Excel. The analysis of collaborative networks between countries, their citations, as well as the examination of terms and journals, was performed using the VOSviewer® software (Java version 1.8.0_261). To provide a better understanding of the methodological process used, an illustrative search scheme was developed.

Additionally, data on the most cited documents were collected using the “Sort by” tool available on the platform.

3 RESULTS

The search resulted in a total of 21 scientific articles. Among them, 61.9% (13) were written in English, while 38.1% (8) were available in Portuguese.

3.1 Annual distribution of documents

The analysis of publications indexed in the Scopus database on *buchada* reveals a study period spanning from 2004 to 2024, totaling 20 years of research (Figure 1). It is observed that scientific production on the topic is limited, with a low number of documents published annually. Moreover, there is no clear and continuous trend of growth in the number of studies over time.

The years with the highest number of publications are 2008 and 2015, each recording three articles. In contrast, there are periods with no publications, such as 2009, 2014, 2017, and 2021, highlighting a discontinuity in academic production on the subject. In more recent years (2022–2024), there has been slight interest, with one article published each year. Although the number of studies is still minimal, this continuity may indicate a possible resurgence in the scientific exploration of the topic.

3.2 Countries, productivity, citations, and collaborative networks in research on *buchada*

Over the 20 years analyzed, only three countries have published studies on *buchada*, with Brazil being the main contributor, totaling 21 documents. Among these, one study has been conducted in partnership with the United States, while Spain accounts for only one document on the topic. Figure 2 presents this collaborative network among countries, highlighting that *buchada* is a scarcely explored field of study, both in Brazil and internationally.

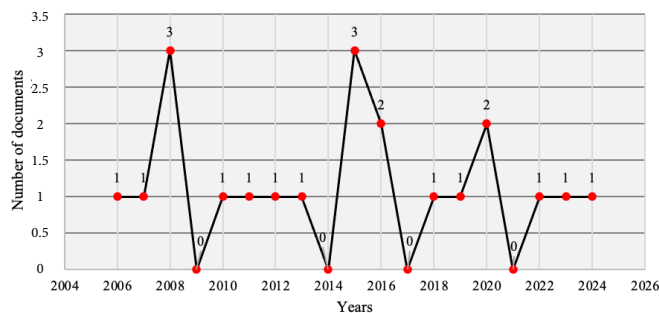


Figure 1. Annual distribution of documents on *buchada*.



Figure 2. Collaborative network of the most productive countries in *buchada* research.

The scarcity of research on the subject can be explained by the fact that *buchada* is a typical Brazilian product, particularly from the Northeast region, where studies are primarily concentrated. This regional characteristic limits its global visibility, restricting academic interest from other countries and resulting in low international scientific production.

Regarding citations, Brazil remains the most referenced country, totaling 191 citations, followed by Spain with 12 citations and the United States with only 2 citations. These data reflect the dominance of Brazilian research on the topic and indicate potential for expanding international collaboration, aiming for greater recognition and in-depth studies on this traditional product.

3.3 Most productive authors

According to the Scopus database, a total of 121 authors have published studies related to *buchada*. The 10 most productive researchers on the topic (Figure 3) are: Roberto Germano Costa, with a total of 6 documents, consolidating his relevance in research on this traditional food. Next, Francisco Fernando Ramos de Carvalho appears with five publications, ranking second. Marta Suely Madruga, with four studies, is in third place, while Ariosvaldo Nunes de Medeiros, with three documents, holds the fourth position.

The remaining listed researchers, from Ângela Maria Vieira Batista to Ronaldo Lopes de Oliveira, each have two publications. Other authors not included in the illustration contributed with only one published document, highlighting a concentration of scientific production among a few researchers.

3.4 Most impactful journals in terms of citations in *buchada* research.

A total of 15 national and international journals have published studies on the topic of *buchada*. To visualize the relevance of these publications, a heatmap has been created (Figure 4), in which journals with a higher citation density are represented by a more reddish coloration.

The citation analysis reveals that the *Revista Brasileira de Zootecnia* is the most impactful journal on the topic, totaling 57 citations. Next are *Semina: Ciências Agrárias*, with 19 citations, and *Small Ruminant Research*, with 17 citations,

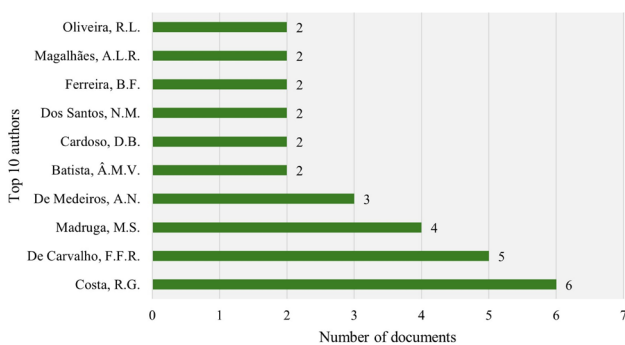


Figure 3. Most productive authors in *buchada* research.

demonstrating considerable scientific relevance. The journal *Animal Feed Science and Technology* obtained 16 citations, followed by *Ciencia y Tecnología Alimentaria*, *Journal of Food Processing and Preservation*, and *Pesquisa Agropecuária Brasileira*, each with 11 citations.

The *Brazilian Journal of Microbiology* has 10 citations, while *Brazilian Archives of Biology and Technology* and *Cerne* each have 9 citations. Other journals, such as *Revista Brasileira de Saúde e Produção Animal*, *Arquivo Brasileiro de Medicina Veterinária e Zootecnia*, and *Revista Caatinga*, recorded between five and eight citations. Finally, *Food Science and Technology (Brazil)* had the lowest number of citations among those listed, with only two, indicating a lower impact on *buchada* research.

3.5 Most productive research institutions and their collaborative networks

Among the institutions publishing research on *buchada*, a total of 26 institutions have presented documents on this topic (Table 1). Institutional analysis reveals a strong concentration of scientific production in Brazilian universities and institutes, particularly in the Northeast region, with emphasis on the Universidade Federal Rural de Pernambuco and the Universidade Federal da Paraíba. The National Institute of the Semi-Arid also appears as one of the main contributors, reflecting regional interest in topics related to the semi-arid environment.

This result aligns with the focus of the research on *buchada*, which is a typical dish from Northeast Brazil, making this region a hub for studies on the topic. Despite the predominance of research conducted in the Northeast, studies have been recorded in other regions of Brazil, indicating a limited but present diffusion of academic interest in the subject.

Brazilian institutions have few international collaborations, which occur sporadically, involving universities in Spain and the United States. This scenario suggests that, despite *buchada* being a traditional and culturally significant product, research on it remains largely confined to the national context, with limited global reach.

3.6 Analysis of study terms

The analysis of 21 documents reveals a total of 106 terms, from which those with at least two occurrences are selected, resulting in 19 terms (Figure 5).

The map shows that between 2010 and 2025, studies on *buchada* are strongly linked to the utilization of organs and viscera from goats (*Capra hircus*) and sheep (*Ovis aries*), with an emphasis on the use of animal by-products, sustainability, and alternative food sources. Additionally, there are connections with forage plants such as corn (*Zea mays*) and *maniçoba* (*Manihot*), indicating an interest in animal nutrition that may influence the quality of *buchada*. More recent research explores topics such as additives and organic acids, suggesting progress in investigations related to the quality and safety of this traditional dish.

3.7 Most cited documents on buchada

Among the 21 analyzed documents, a ranking of the five most cited is created (Table 2). The analysis reveals that these studies are primarily focused on dietary strategies and their effects on non-carcass components, such as viscera and organs of sheep and goats, under different confinement conditions or alternative feeding regimes.

Most of these articles investigate the impact of diets containing different ingredients, such as concentrates, cactus pear, cassava, and *Gliricidia*, on zootechnical performance, digestibility, carcass characteristics, and the utilization of edible by-products, including *buchada*. However, it is observed that only one study addresses aspects related to the microbiological and nutritional quality of *buchada*, highlighting a gap in research on this traditional product.

4 DISCUSSION

The bibliometric analysis results on *buchada* reveal a scenario of low scientific production on the topic, which may be related to various factors, such as the specific niche of research, the predominant focus of scientific literature on other aspects

of animal production, and the lesser academic appreciation of traditional meat products. The absence of a continuous growth trend in studies over the analyzed period reflects a gap in scientific research on this food, suggesting that the topic has not yet received the necessary attention from researchers.

The irregular distribution of publications over the 20 years analyzed also indicates that academic interest in *buchada* has not been consistent. The fact that some years showed no studies at all, such as 2009, 2014, 2017, and 2021, reinforces the need for initiatives that encourage research on the topic, promoting its appreciation from gastronomic, cultural, and economic perspectives.

Furthermore, the reduced number of publications in recent years (2022–2024), with only one article per year, may indicate a slight increase in interest in the topic, albeit in an incipient manner. This scenario creates opportunities for future investigations that explore the importance of *buchada* from different perspectives, including its nutritional, social, and historical significance.

Another relevant aspect is the language of publications, with most studies (61.9%) written in English and Portuguese (38.1%). This suggests that, despite being a typical Brazilian and regional dish, authors are making an effort to disseminate their research in an international context, increasing the

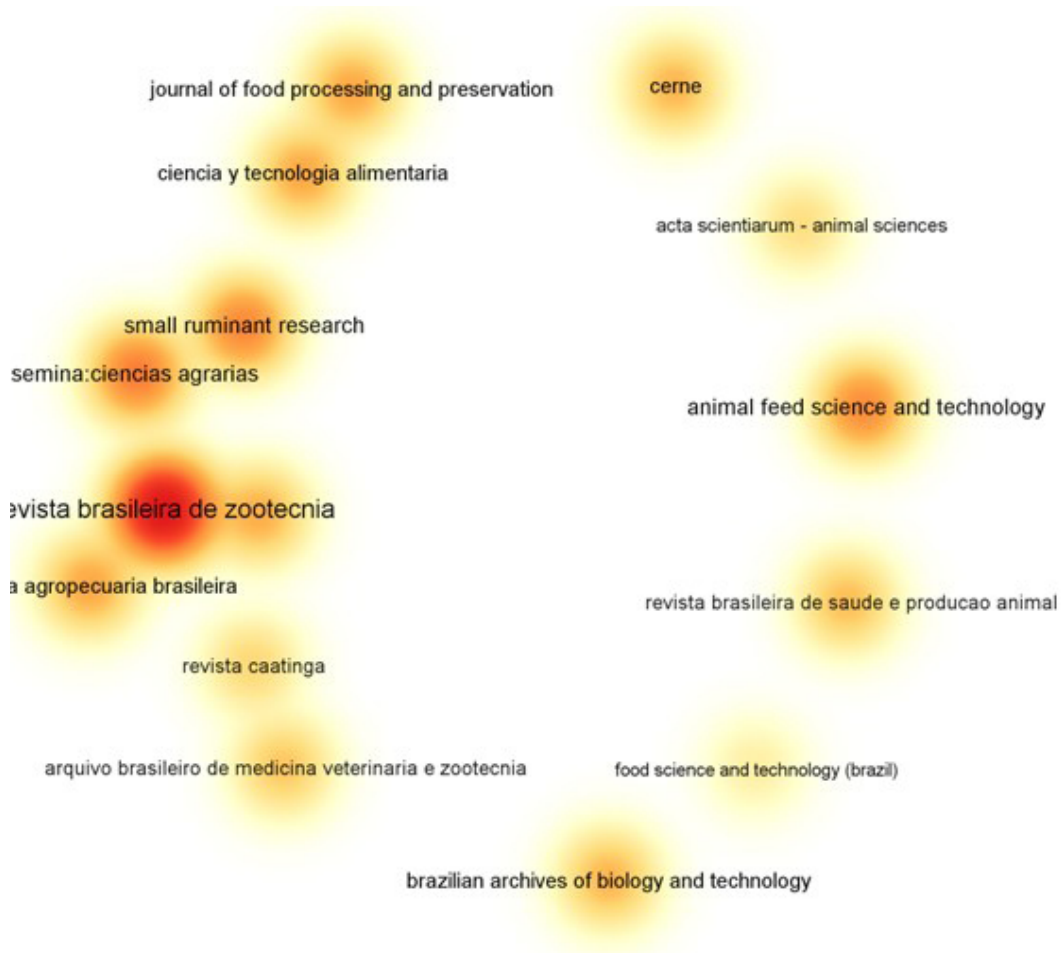


Figure 4. Heatmap of the most-cited journals on *buchada*.

topic's visibility. However, the limited number of studies also highlights an opportunity for greater academic exploration, particularly in Brazil and in countries with similar traditions of consuming viscera.

Thus, the results reveal a largely unexplored area of study, indicating the need for more research on *buchada*, especially to strengthen its appreciation as a gastronomic and cultural heritage of Brazil. Encouraging scientific investigations can help

Table 1. Research institutions and their productivity in *buchada* studies.

No.	Institutions	Documents	Country
1	Universidade Federal Rural de Pernambuco	10	Brazil
2	Universidade Federal da Paraíba	8	Brazil
3	Universidade Federal de Alagoas	4	Brazil
4	Instituto Nacional do Semiárido	4	Brazil
5	Universidade Federal de Campina Grande	2	Brazil
6	Universidade Federal da Bahia	2	Brazil
7	Instituto Agronômico de Pernambuco	1	Brazil
8	Universidade Federal do Vale do São Francisco	1	Brazil
9	Unidade Descentralizada de Parauapebas	1	Brazil
10	Universidade Estadual da Paraíba	1	Brazil
11	Universidade Federal do Amazonas	1	Brazil
12	Universitat de València	1	Spain
13	Universidade Federal de Sergipe	1	Brazil
14	Universidade Federal do Recôncavo da Bahia	1	Brazil
15	NC State University	1	United States
16	Universidade Estadual do Sudoeste da Bahia	1	Brazil
17	Universidade Federal do Rio Grande do Norte	1	Brazil
18	Universidade de Brasília	1	Brazil
19	Universidade Federal do Piauí	1	Brazil
20	Universidade Federal Rural do Rio de Janeiro	1	Brazil
21	Universidade Federal de Pernambuco	1	Brazil
22	Universidade Federal Rural do Semi-Árido	1	Brazil
23	Embrapa Semiárido	1	Brazil
24	Instituto Federal de Alagoas	1	Brazil
25	Fundación Centro Tecnológico da Carne	1	Spain
26	Universidade Federal do Oeste do Pará	1	Brazil

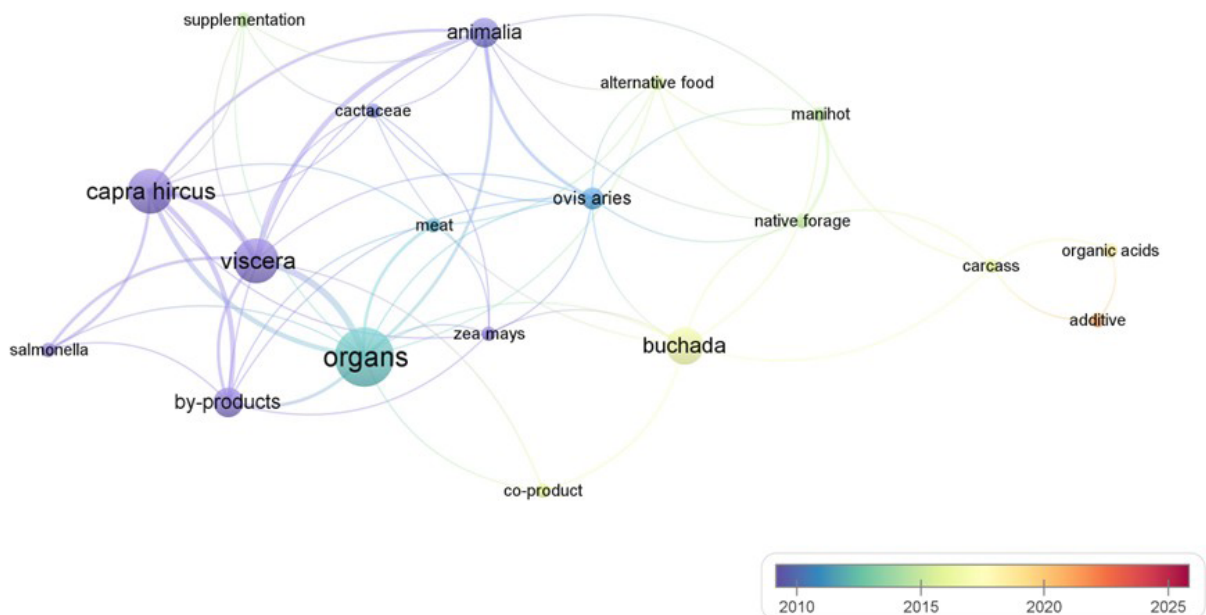


Figure 5. Network of terms with at least two occurrences related to *buchada*.

Table 2. Top five most-cited articles.

No.	Title	Main authors	Journal	Year	Citations
1	Effect of concentrate levels on non-carcass components of Morada Nova hair sheep in confinement	Medeiros et al. (2008)	Revista Brasileira de Zootecnia	2008	40
2	Effect of ensiling <i>Gliricidia</i> with cassava on silage quality, growth performance, digestibility, behavior, and carcass	Oliveira et al. (2018)	Ciência e Tecnologia de Alimentação Animal	2018	16
3	Microbiological and nutritional quality of goat <i>buchada</i>	Queiroz et al. (2013)	Pesquisa de Pequenos Ruminantes	2013	14
4	Characteristics of carcass and non-carcass components of lambs fed with cassava wastewater residues	Cardoso et al. (2016)	Semina: Ciências Agrárias	2016	13
5	Use of prickly pear (<i>Opuntia ficus-indica</i> (L.) Mill) as a substitute for corn in carcass and non-carcass components of lambs	Pinto et al. (2011)	Revista Brasileira de Zootecnia	2011	12

expand knowledge about this food and promote its recognition in different contexts, both academic and commercial.

The results presented highlight the low representation of *buchada* in international scientific production, with publications concentrated almost exclusively in Brazil. The fact that only three countries, Brazil, the United States, and Spain, have published studies on the topic reinforces its characterization as a regional dish predominantly associated with Brazilian Northeastern culture. The lack of global recognition limits research progress and restricts its appreciation as an academic subject.

Although Brazil accounts for the totality of publications and is the most cited country (191 citations), international collaboration remains incipient, with only one study developed in partnership with the United States and Spain. The article published in collaboration with Spain originates from a master's dissertation by a student at the Universidade Federal da Paraíba, linked to the Center for Human, Social, and Agricultural Sciences. This fact reinforces that, despite international collaboration, the research has been conceived and developed in Brazil, highlighting the relevance of national academic production on traditional gastronomy. Moreover, it underscores the potential of Brazilian universities in generating knowledge about traditional foods, even with the limited presence of this field in international scientific networks.

This suggests that *buchada* is not widely investigated in other countries, even in contexts where there is interest in traditional gastronomy and the valorization of animal by-products. The low number of published documents over the 20 years analyzed also indicates that this topic remains marginalized within scientific literature, possibly due to its regional nature and the lower prioritization of research on typical and traditional products.

In terms of academic impact, the disparity in citations among countries shows that, despite the scarcity of studies on *buchada*, those published in Brazil have some relevance within the national context. However, the reduced number of citations from other countries suggests that this knowledge has not been widely disseminated or used as a reference by foreign researchers. This may be related to the absence of publications in high-impact international journals or the lack of integration of the topic into global collaboration networks.

This analysis suggests opportunities for expanding research on *buchada*, particularly through initiatives that promote its relevance in gastronomic, nutritional, and cultural contexts. Encouraging collaboration between national and international institutions could facilitate the production of new studies, increasing visibility and strengthening scientific understanding of this traditional Brazilian product. Additionally, integrating the topic into academic debates on food sustainability, full utilization of by-products, and preservation of gastronomic heritage could enhance its recognition on a broader scale.

Therefore, despite the scarce scientific production on *buchada*, the data indicate potential for growth if incentives for new investigations and greater integration of the topic into global discussions on food and culture are provided. The challenge lies in overcoming the regional barrier and establishing connections between researchers from different countries to expand knowledge and appreciation of this traditional Northeastern dish.

The bibliometric analysis results reveal that scientific production on *buchada* is heavily concentrated among researchers from Northeastern federal universities. These data highlight the academic significance of the region in valuing traditional meat products, particularly those associated with Northeastern culture. The predominance of these authors indicates that research on *buchada* is essentially local, reinforcing the importance of Northeastern institutions in preserving, studying, and promoting this gastronomic heritage.

The leadership of Roberto Germano Costa, with six publications, demonstrates his significant contribution to advancing knowledge on the topic. Additionally, his partnership with Spain shows an effort to expand research beyond national borders, promoting international visibility for a typical Brazilian product. This type of collaboration can be crucial for establishing the topic in global research networks, stimulating knowledge exchange, and strengthening the significance of *buchada* in a broader context.

The analysis of journals that have published studies on *buchada* reveals a concentration of research in periodicals focused on animal science, livestock production, and food science. This pattern suggests that the topic is still primarily addressed from an agricultural perspective, focusing on small ruminant farming and the utilization of slaughter by-products.

However, the presence of journals related to food science and technology, such as *Food Science and Technology (Brazil)*, indicates potential for expanding the topic to areas such as food safety, gastronomic innovation, and sustainable ingredient utilization.

The analysis of terms associated with studies on *buchada* reveals a growing interest in aspects related to food quality and safety, including microbiological quality and the use of additives and organic acids. These factors are essential for ensuring product safety and optimizing its sensory and preservation characteristics.

From a microbiological perspective, *buchada*, being composed of viscera and organs, presents a higher risk of contamination by pathogenic microorganisms such as *Salmonella spp.*, *Escherichia coli*, and *Listeria monocytogenes*. Improper handling during processing and the lack of sanitary control can compromise product safety, making the implementation of good manufacturing practices essential. The use of organic acids in *buchada*, mentioned in recent research, may be related to efforts to improve food preservation, reduce microbial load, and extend shelf life.

Thus, to ensure food safety and expand *buchada*'s commercialization, future studies should delve deeper into these issues, incorporating detailed microbiological analyses and developing technologies that ensure the hygienic and sanitary quality of this traditional dish.

The analysis of the five most-cited articles reveals a predominance of studies focused on dietary strategies and their effects on non-carcass components of sheep and goats, including viscera and organs used in *buchada* production. These studies investigate how different types of diets, such as those based on concentrates, cactus pear, cassava, and *Gliricidia*, influence zootechnical performance, food digestibility, and the quality of edible by-products.

This overview highlights that the predominant approach in scientific literature on *buchada* is strongly related to animal nutrition and the impact of diet on carcass composition. However, a critical point to note is that only one of the five most-cited studies explored the microbiological and nutritional quality of *buchada*, indicating a significant gap in research on this product.

Food safety is a crucial issue when it comes to *buchada*, as the consumption of viscera can pose microbiological risks if processing and preservation are not properly managed. The lack of in-depth studies on sanitary and nutritional aspects limits the understanding of the quality of this food and restricts its commercial and academic acceptance in a broader context. Research focused on microbiological control, the influence of diet on nutritional composition, and technological improvements in *buchada* processing can significantly contribute to enhancing its value and safety.

Moreover, most of the cited studies approach the topic from an agricultural perspective, indicating that *buchada* research is still closely linked to animal sciences and zootechnics. While this approach is relevant, it does not fully address key aspects such as consumer perception, gastronomic innovation, and potential improvements in product formulation and preservation.

There is an opportunity to expand *buchada* investigations into other fields, such as food science and food engineering, fostering a broader understanding of its significance and impact.

Therefore, the analyzed data point to a relatively narrow field of study with considerable potential for expansion. Encouraging multidisciplinary research that includes food safety, microbiological quality, and technological innovation can help strengthen knowledge about *buchada* and increase its academic and commercial relevance.

5 CONCLUSION

The bibliometric analysis of *buchada* reveals that, despite its cultural and gastronomic importance in Brazil, especially in the Northeast region, scientific research on the topic remains limited and scarcely explored on an international scale. Academic production is concentrated in Northeastern federal universities, and the published studies primarily focus on animal nutrition and the utilization of by-products, leaving gaps in key areas such as microbiological quality, food safety, and technological innovation.

Buchada has significant potential for scientific and technological advancements. Research could evolve to address more effective preservation methods, the development of specific food safety standards, and the exploration of new ingredients and processing techniques to enhance its sensory and microbiological quality.

Thus, while research on *buchada* is still limited, there is substantial potential for expansion, particularly in areas such as food safety, gastronomic innovation, and sustainability. The appreciation of this traditional product can be strengthened through new studies exploring its quality, preservation, and acceptance in different markets, reinforcing its presence in scientific literature and the food industry.

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