

Trends for the Internationalization and Technification of Gulupa in Colombia: A Bibliometric Review with Bibliometrix

Tendencias para la Internacionalización y tecnificación de la Gulupa en Colombia: Una revisión bibliométrica con Bibliometrix

Edward Enrique Escobar Quiñonez¹, Alexandra Collazos Restrepo², Gabriela García Molina³

¹ CACE Research Group, Cooperative University of Colombia, Cali, Colombia,
Orcid: <https://orcid.org/my-orcid?orcid=0000-0003-0358-3355>, Email: edward.escobarq@campusucc.edu.co

² CACE Research Group, Cooperative University of Colombia, Cali, Colombia,
Orcid: <https://orcid.org/0009-0002-1652-9171>, Email: alexandra.collazosr@campusucc.edu.co

³ CACE Research Group, Cooperative University of Colombia, Cali, Colombia,
Orcid: <https://orcid.org/0009-0006-1503-3106>, Email: gabriela.garciamo@campusucc.edu.co

How to cite: Escobar Quiñonez, E. E. ., & Collazos Restrepo, A. (2024). Tendencias para la Internacionalización y tecnificación de la Gulupa en Colombia: Una revisión bibliométrica con Bibliometrix. *Revista Científica Profundidad Construyendo Futuro*, 21(21), 50–61. <https://doi.org/10.22463/24221783.4369>

Received: March 29, 2024 / **Approved:** June 28, 2024

Abstract

This research focuses on examining the current patterns of global expansion and technological advances of Gulupa (*Passiflora ligularis* Juss.) in Colombia through a bibliometric analysis using the Bibliometrix tool. Gulupa, commonly known as mountain granadilla, is an exotic fruit of considerable economic importance in Colombia and there is growing interest in its introduction into foreign markets.

The internationalization and technification of gulupa in Colombia have been the subject of research interest due to the economic importance of the fruit in the country. The bibliometric analysis highlights trends covering the identification of export markets, promotion and marketing strategies, and the obstacles facing the international expansion of this fruit. This quantitative review provides a comprehensive description of the most influential topics and authors in this field.

Moreover, the technification of Gulupa production is essential to improve quality and competitiveness in a globalized market. The bibliometric analysis examines research related to sustainable agricultural practices, cutting-edge technologies, and improvements in post-harvest processes. This reveals the growing emphasis on optimizing the Gulupa supply chain and implementing more efficient and sustainable practices.

The results of this bibliometric analysis have substantial implications for interested researchers, producers, and those responsible for the production and marketing of Gulupa in Colombia. They identify key areas and prospects for future research and highlight the importance of technification in the fruit industry. Gulupa is emerging as a formidable competitor in international markets, and the knowledge gained from this analysis can serve as a guide for designing future strategies for its promotion and sustainable development.

Keywords: Gulupa, Internationalization, Technification, Bibliometric review, Sustainable agriculture



*Autor para correspondencia.

Correo electrónico: edward.escobarq@campusucc.edu.co

La revisión por pares es responsabilidad de la Universidad Francisco de Paula Santander Ocaña

Artículo bajo licencia CC BY-NC (<https://creativecommons.org/licenses/by-nc/4.0/>)

Resumen

La presente investigación se enfoca en el examen de los patrones actuales de la expansión global y los avances tecnológicos de Gulupa (*Passiflora ligularis* Juss.) en Colombia mediante un análisis bibliométrico utilizando el instrumento Bibliometrix. La gulupa, comúnmente conocida como granadilla de montaña, es una fruta exótica de considerable importancia económica en Colombia, con un interés creciente en su penetración en los mercados extranjeros.

La internacionalización y tecnificación de la Gulupa en Colombia ha constituido un interés de investigación debido a la importancia económica de la fruta en el país. El análisis bibliométrico pone de relieve las tendencias que abarcan la identificación de los mercados de exportación, las estrategias de promoción y comercialización, así como los obstáculos a los que se enfrenta la expansión internacional de esta fruta. Este examen cuantitativo proporciona una descripción completa de los temas y autores más impactantes en este ámbito.

Por otro lado, la tecnificación de la producción de Gulupa es indispensable para mejorar la calidad y la competitividad en un mercado globalizado. El análisis bibliométrico analiza las investigaciones relacionadas con las prácticas agrícolas sostenibles, las tecnologías de vanguardia y las mejoras en los procesos posteriores a la cosecha. Esto revela el creciente énfasis en optimizar la cadena de suministro de Gulupa e implementar prácticas más eficientes y sostenibles.

Los resultados de este análisis bibliométrico tienen implicaciones sustanciales para los investigadores interesados, productores y responsables de la producción y comercialización del Gulupa en Colombia. Identifican las áreas de concentración y las perspectivas de futuras investigaciones, además de subrayar la importancia de la tecnificación en la industria frutícola. Gulupa se perfila como un competidor formidable en los mercados internacionales, y el conocimiento generado a través de este análisis puede servir de guía para diseñar estrategias futuras para su promoción y desarrollo sostenible.

Palabras claves: Gulupa, Internacionalización, Tecnificación, Revisión bibliométrica, Agricultura sostenible.

1. Introduction

Gulupa (*Passiflora ligularis* Juss.) is emerging as a crucial asset in Colombia's agricultural economy, catapulting it onto the international stage and demanding greater attention in terms of technification (Parra-Peña et al., 2017). Within the context of market globalization and technological advances, this document lays the groundwork for exploring the economic relevance of Gulupa, analyzing its growing internationalization and the urgent need for technification to meet the challenges of a constantly evolving agricultural market (Chaves-Barrantes & Gutiérrez-Soto, 2016).

In the recent evolution of the Colombian agricultural economy, Gulupa has emerged as an essential component (Diaz & Andrea, 2015). Consolidating its position in the domestic

market, its export potential has sparked renewed interest in the academic community and the agri-food industry. In this context, understanding global expansion patterns and technological advances is crucial to boosting its international competitiveness (Trujillo & Bacha, 2023).

The internationalization of Gulupa goes beyond Colombia's borders, taking advantage of the growing global demand for exotic fruits (Pérez & Gómez, 2022). This process requires not only an increase in production but also adaptation to international quality and marketing standards. When venturing into new markets, it is crucial to analyze expansion patterns and understand how these trends will affect its role in the Colombian agricultural economy (López-Rodríguez et al., 2020).

Technification is emerging as a vital component in raising the quality and

competitiveness of Gulupa in a globalized context. The application of advanced agricultural technology and sustainable practices drives efficiency and productivity in the production of this tropical fruit (Miñón Martínez, 2017). The optimization of the supply chain and the incorporation of innovative technologies in post-harvest processes are crucial aspects that this analysis addresses in detail (Rodjanatham & Rabgyal, 2020).

A search equation was implemented using key terminology associated with internationalization, technification, and the "agri-food" domain, covering the period from 2017 to 2023 and focusing on the fields of economics, business, and administration.

Several databases were used, including FAOSTAT, DANE, Agronet, Terridata, and Legiscomex. Data preparation was carried out using RStudio's Bibliometrix software, which facilitated the organization of information through the use of tables and graphs. The bibliometric analysis covered several aspects, such as co-authorship, co-occurrence, productivity, collaboration, density, centrality, and information structure.

In addition, statistical methods were applied to various databases to analyze agricultural, economic, and trade trends, evaluating data related to production, trade, and regulations.

This approach provides an understanding of agricultural and economic dynamics, thereby identifying fundamental patterns and trends that can inform strategies, agreements, and policies across a wide range of economic sectors.

2. Theoretical framework

Traditional trade theories, such as those proposed by Ricardo and Heckscher-Ohlin, offer explanations for trade patterns through

comparative advantage, based on low relative costs (Kuchai, 2022). Ricardo argues that technological disparities drive trade, while Heckscher-Ohlin shifts the focus to factor endowments (Liu, 2022). Despite their prominence, the validity of these theories has been questioned by empirical evidence, such as that provided by Leontief and subsequent studies (Chen, 2022). New trade theories, moving away from assumptions of perfect competition, introduce the concept of "intra-industry trade," explaining transactions between similar countries (Chandra, 2022). Krugman's models highlight economies of scale, product differentiation, and imperfect competition, highlighting the impact of trade liberalization (Uddin, 2021). These theories reveal new sources of trade benefits, emphasizing efficiency and consumer welfare.

The incorporation of advanced technologies in agriculture is essential for addressing challenges such as climate change, resource scarcity, and market demands (Akudugu et al., 2023). In the case of Gulupa and other tropical fruits, this technification is in line with the Theory of Agricultural Technology Adoption, as evidenced by the implementation of advanced irrigation systems and innovative post-harvest practices (Dissanayake et al., 2022). The adoption of approaches such as precision agriculture underscores a commitment to sustainability and responsibility in agricultural production (Ruzzante et al, 2021).

The consolidation of technology adoption theory in agriculture reflects the need to understand the factors that influence the acceptance and effectiveness of innovations (EL BILALI et al., 2021). For Gulupa producers, adopting new technologies implies a comprehensive transformation in agricultural management and a new mindset towards more efficient and sustainable practices (Adams & Jumpah, 2021). This comprehensive approach

results in superior quality products that stand out in global markets.

Although agricultural technification brings benefits, it also poses challenges in terms of training and access to resources. The expansion of advanced technologies requires coordinated efforts in education and technical assistance to ensure an ethical transition to more sustainable practices (Ruzzante et al., 2021). Thus, technology adoption is not only strategic but also an investment in the sustainable future of food production (Cone & Myhre, 2000).

3. Methodology

The methodology used to perform the bibliometric analysis on the global expansion and technological advances of Gulupa (*Passiflora ligularis* Juss.) in Colombia was carried out in several key steps. Initially, the specific objectives of the study were defined, including the identification of main trends, prominent authors, and relevant topics in the literature on the internationalization and technification of Gulupa.

To carry out this analysis, we used Bibliometrix software in Rstudio, conducting searches in the Scopus database, which was selected as the primary data source due to its broad coverage and relevance in areas related to agriculture and agricultural technologies. This database provides access to a wide range of high-quality publications in economics, business, and management, which are crucial for this analysis.

Search ecology:

- Search terms: (internationalization OR international) AND (technification OR technology) AND "agri-food".

- Search period: 2017-2023.
- Fields of knowledge: Economics, business, and administration.
- Document type: Completed articles and articles under review.

With the help of Bibliometrix software, a bibliometric analysis will be carried out that will include:

- Co-citation analysis: To identify the most influential works in the field.
- Keyword co-occurrence analysis: To detect thematic trends and their evolution over time.
- Academic network analysis: To examine collaborations between authors, institutions, and countries.
- Productivity and impact analysis: To determine the most productive and influential authors, journals, and institutions.
- Trending topics: To discover emerging areas and changes in thematic approaches, tracing the evolution of fields of study through the frequency and temporal distribution of key terms.

Statistical techniques are applied to databases such as FAOSTAT, DANE, Agronet, Terridata, Legiscomex, etc., to analyze agricultural, economic, and trade trends. Production, trade, and regulation data are evaluated, identifying patterns, relationships, and trends relevant to informing strategies, agreements, and policies in various economic sectors.

4. Results and discussion

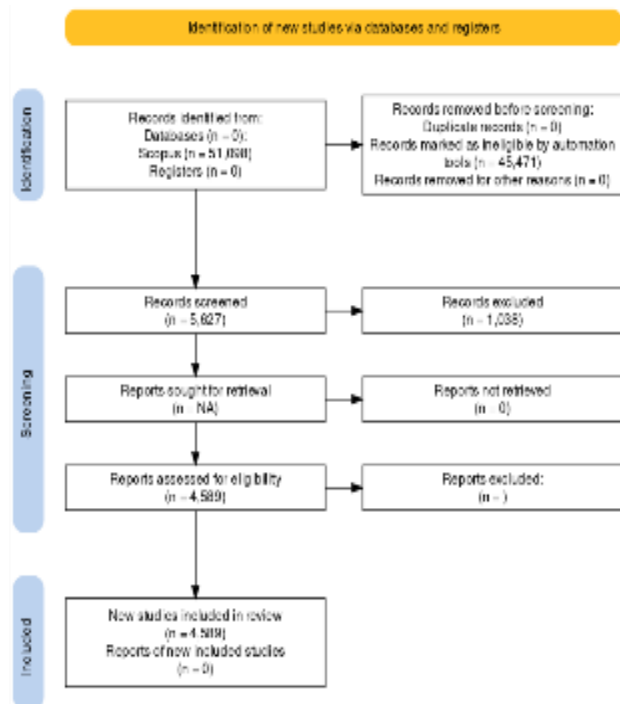


Figure 1. PRISMA flow chart. Source: own elaboration

Note: Document selection strategy based on the PRISMA approach (Haddaway et al., 2022). Preferred articles for systematic reviews and bibliometric analysis

Figure 1 shows a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart, which is a consolidated standard for reporting in systematic reviews and meta-analyses, as detailed in the PRISMA 2020 guidelines (Page et al., 2021) and in the original PRISMA statement (Moher et al., 2009). We addressed a total of 51,098 records identified through Scopus, as no other databases or registries were consulted. After automatically removing 45,471 duplicate records and reviewing 5,627 records, we excluded 1,038 for not meeting the initial relevance criteria. Subsequently, the eligibility of 4,589 full reports was evaluated. This process ensures that only the most relevant studies are included in our review,

reinforcing the validity and reliability of our findings and conclusions.

Figure 2 presents the results of the review conducted between 2017 and 2024, which included 4,544 documents from 719 sources. The annual growth rate was 51.28%. The average age of the documents was 3.02 years, and each paper had an average of 21.79 citations. A total of 9,285 plus keywords and 11,634 author keywords were identified. In terms of collaboration, there were 12,077 authors, with 257 documents written by a single author and an average collaboration of 3.63 co-authors per document. A remarkable 37.28% of the collaborations were international. The document classification revealed the presence of 4,138 articles and 361 reviews, highlighting the breadth of topics and diversity of approaches in the research.



Figure 2. Main Bibliometrix information. Source: Bibliometrix from Rstudio Aria & Cuccurullo (2017), data from Scopus

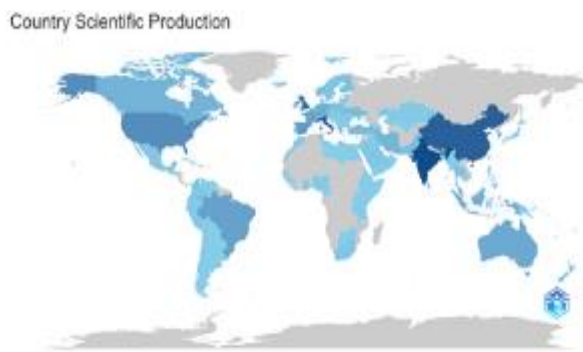


Figure 3. Scientific output by country. Source: Bibliometrix from Rstudio Aria & Cuccurullo (2017), data from Scopus

Figure 3, based on data visualization obtained using Bibliometrix, shows the distribution of

scientific output by country. India tops the list with 1,273 contributions, followed by Italy (1,096) and China (1,068). The United Kingdom and the United States also stand out with 947 and 611 contributions, respectively. Spain, Brazil, France, Australia, and Germany complete the ranking with 491, 410, 396, 334, and 305 contributions, respectively. These results highlight the geographical diversity in scientific output, reflecting a global commitment to research in the region studied.

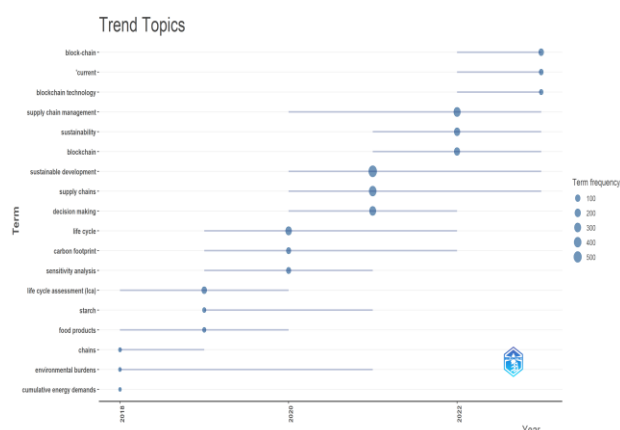


Figure 4. Trending topics. Source: Bibliometrix by Rstudio Aria & Cuccurullo (2017), data from Scopus.

Figure 4. Trending Topics highlights the relevance of blockchain technology and sustainability in agricultural supply chains, reflecting a global focus on the internationalization and technification of agriculture. According to Saberi et al. (2019) and Treiblmaier (2018), blockchain is essential for improving the transparency and efficiency of supply chains, while Newman et al. (2021) highlight its potential for advancing the Sustainable Development Goals. In addition, Yadav et al. (2020) and Spadoni et al. (2020) underscore the importance of overcoming barriers to technology adoption and promoting sustainable business models. This analysis highlights how the integration of advanced technologies and sustainable practices can strengthen the global competitiveness of

agriculture, providing a consistent theoretical basis for future marketing and expansion strategies.

The review of the main products exported by the Vegetables, Fruits, Cereals, Seeds, and Nuts sector in FOB value, based on data provided by the Colombian Tax and Customs Directorate (DIAN), focuses on the export of fresh Gulupa (Purple Passion Fruit) (*Passiflora Edulis Varo Edulis*). During the period from July to December 2023, 8,549,707.48 kilograms of Gulupa were exported, generating an FOB value of USD 24,209,948.48. This figure represents a significant increase of 34.77% compared to the same period last year. See Figure 5.

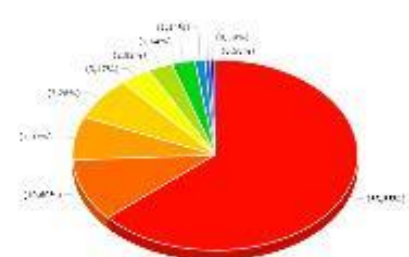


Figure 5. Main products exported by the Vegetables, Fruits, Cereals, Seeds, and Nuts sector in FOB value. Source: Legiscomex (2024)

Note: Exports of Gulupa (Purple Passion Fruit) (*Passiflora Edulis Varo Edulis*), Fresh. Colombia

Gulupa ranks fifth on the list of exported products, led by fresh Cavendish Valery bananas, with a FOB value of 443,172,309.6 USD and a 60.02% share. The Hass variety, with 73,896,619.14 USD, Lima Tahiti with

51,403,559.78 USD, and Plantains with 50,765,220.44 USD occupy the following positions in the ranking. These results highlight the importance of Gulupa in the sector's exports, emphasizing its significant growth in the period analyzed.

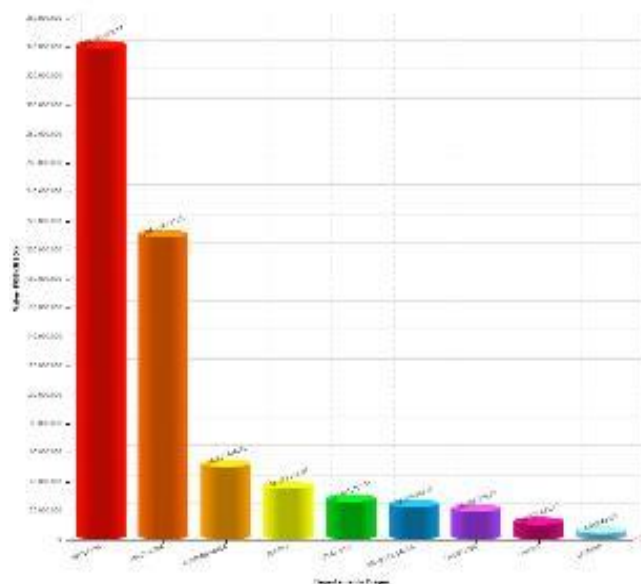


Figure 6. Departments of export origin.
Source: Legiscomex (2024)

Figure 6 shows the FOB value in USD of the departments of origin. Antioquia leads with USD 339.95 million, followed by Magdalena with USD 209.16 million. This approach facilitates comparison between departments and allows for quick identification of the main exporters in terms of FOB value. It provides a clear overview of each department's contribution to the total value of exports, making it a valuable tool for understanding the distribution of FOB value in the context of specific product exports.

There are also various companies

Table 1. *Gulupa exporting companies.*

NIT	Company	FOB value (USD)
80002684 5	OCATI S A	7,515,058.7 9

NIT	Company	FOB value (USD)
90065322 9	JARDIN EXOTICS S.A.S. FRUTAS	3,137,428.5 3
80017300 4	COMERCIALES S.A. EN REORGANIZACION COMERCIALIZADOR A INTERNACIONAL	1,996,661.2 3
80017642 8	CARIBBEAN EXOTICS S. A.	1,665,026.5 7
90098326 0	SAN BASILIO FRUIT'S S.A.S.	1,664,300.3 9

Source: Legiscomex (2024)

Table 1 presents information for five specific companies in the export sector. OCATI S A tops the list with a figure of 7,515,058.79 USD, followed by JARDIN EXOTICS S.A.S. with 3,137,428.53 USD. Next are FRUTAS COMERCIALES S.A. EN REORGANIZACION, COMERCIALIZADORA INTERNACIONAL CARIBBEAN EXOTICS S. A., and SAN BASILIO FRUIT'S S.A.S. with values of \$1,996,661.23, \$1,665,026.57, and \$1,664,300.39, respectively. These amounts represent the FOB value of these companies' exports during a specific period, demonstrating their individual contribution to international trade.

The discussion regarding the internationalization and technification of Gulupa in Colombia offers an opportunity to challenge traditional and modern trade theories with the empirical results presented in the article. The theories of Ricardo and Heckscher-Ohlin, which explain trade patterns through comparative advantages and factor endowments, respectively, have historically been fundamental to understanding international trade (Kuchai, 2022; Liu, 2022). However, the findings of the bibliometric analysis suggest that these theories do not fully capture the complexity of modern

trade, especially in the case of agricultural products such as Gulupa.

In contrast, new trade theories, which include intra-industry trade and emphasize economies of scale, product differentiation, and imperfect competition, seem to offer a more robust explanation for the global expansion of Gulupa (Chandra, 2022; Uddin, 2021). These theories highlight the importance of adapting production to international quality and marketing standards, a key aspect identified in the bibliometric analysis for the internationalization of Gulupa (Escobar Quiñonez et al., 2023).

Furthermore, the technification of Gulupa production in Colombia is aligned with the Theory of Agricultural Technology Adoption, highlighting the need to incorporate advanced technologies and sustainable practices to improve competitiveness in the global market (Dissanayake et al., 2022; EL BILALI et al., 2021). The results of the bibliometric analysis reflect significant growth in Gulupa exports and an increase in international collaborations (Aria & Cuccurullo, 2017; Legiscomex, 2024), underscoring that the adoption of advanced technology is critical to success in international markets.

Finally, the successful internationalization of Gulupa in Colombia seems to reflect new dynamics in international trade that go beyond the explanations provided by traditional trade theories. Technological advancement and quality strategies are essential for competing in a globalized and sustainable market, which is consistent with modern theoretical approaches and supported by the empirical data collected in the article.

5. Conclusions

Gulupa (*Passiflora ligularis* Juss.) has emerged as a key economic asset in Colombia,

with considerable potential for expansion into international markets. This requires the implementation of strategies focused on improving quality and adapting to global marketing standards.

The bibliometric analysis carried out highlights the crucial importance of internationalization and technification in the production and marketing of Gulupa. Key trends have been identified in the adoption of advanced technologies, such as blockchain and sustainable agricultural practices, which are essential for optimizing the supply chain and post-harvest processes.

Emerging trends, such as the focus on sustainability and transparency in supply chains through technologies such as blockchain, have become increasingly relevant. This suggests that the integration of these technologies is critical for improving efficiency, traceability, and facilitating access to demanding international markets.

In addition, the technification of Gulupa production is emerging as an essential factor for its international competitiveness. The bibliometric analysis reveals a growing emphasis being placed on the adoption of more efficient and sustainable agricultural practices, which is necessary to meet the demands of a globalized market.

The results of the study offer significant implications for researchers, producers, and those responsible for the production and marketing of Gulupa in Colombia. Several key areas are identified, including the integration of new technologies and the enhancement of supply chain sustainability, which should be prioritized in future research and development strategies.

Finally, Gulupa is projected to be a strong competitor in international markets. The

knowledge derived from bibliometric analysis provides a solid basis for designing future strategies that promote its sustainable development and promotion, aligning with emerging trends and strengthening Colombia's position in the global trade of agricultural products.

6. References

- Adams, A., & Jumpah, E. T. (2021). Agricultural technologies adoption and smallholder farmers' welfare: Evidence from Northern Ghana. *Cogent Economics & Finance*, 9(1). <https://doi.org/10.1080/23322039.2021.2006905>
- Akudugu, M. A., Nkegbe, P. K., Wongnaa, C. A., & Millar, K. K. (2023). Technology adoption behaviors of farmers during crises: What are the key factors to consider? *Journal of Agriculture and Food Research*, 14, 100694. <https://doi.org/10.1016/j.jafr.2023.100694>
- Aria, M., & Cuccurullo, C. (2017). bibliometrix : An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975. <https://doi.org/10.1016/j.joi.2017.08.007>
- Chandra, R. (2022). Paul Krugman, New Trade Theory and New Economic Geography (pp. 221–249). https://doi.org/10.1007/978-3-030-83761-7_8
- Chaves-Barrantes, N. F., & Gutiérrez-Soto, M. V. (2016). Respuestas al estrés por calor en los cultivos. II. Tolerancia y tratamiento agronómico. *Agronomía Mesoamericana*, 28(1), 255. <https://doi.org/10.15517/am.v28i1.21904>
- Chen, Z. (2022). Research on International Trade Theory and the Status Quo of World International Trade. *American Journal of Industrial and Business Management*, 12(06), 1079–1087. <https://doi.org/10.4236/ajibm.2022.126057>
- Cone, C. A., & Myhre, A. (2000). Community-supported agriculture: A sustainable alternative to industrial agriculture? *HUMAN ORGANIZATION*, 59(2), 187–197. <https://doi.org/10.17730/humo.59.2.715203t206g2j153>
- Diaz, Q., & Andrea, P. (2015). La biodiversidad agrícola como estrategia y crecimiento en Colombia, tres casos de estudio: La gulupa, artesanías y araza. <https://api.semanticscholar.org/CorpusID:129595821>
- Dissanayake, C. A. K., Jayathilake, W., Wickramasuriya, H. V. A., Dissanayake, U., Kopyawattage, K. P. P., & Wasala, W. M. C. B. (2022). Theories and Models of Technology Adoption in Agricultural Sector. *Human Behavior and Emerging Technologies*, 2022, 1–15. <https://doi.org/10.1155/2022/9258317>
- EL BILALI, H., BEN HASSEN, T., BOTTALICO, F., BERJAN, S., & CAPONE, R. (2021). ACCEPTANCE AND ADOPTION OF

- TECHNOLOGIES IN AGRICULTURE. *AGROFOR*, 6(1). <https://doi.org/10.7251/AGRENG2101135E>
- Escobar Quiñonez, E. E., Narváez Sánchez, Y. L., & Cifuentes-Gonzalez, A. L. (2023). Panorama de la competitividad y políticas públicas en el sector agropecuario frente a la crisis del COVID-19 en Colombia. *INGENIERÍA Y COMPETITIVIDAD*, 25(3). <https://doi.org/10.25100/iyc.v25i3.12902>
- Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). PRISMA2020 : An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimised digital transparency and Open Synthesis. *Campbell Systematic Reviews*, 18(2). <https://doi.org/10.1002/cl2.1230>
- Kuchai, O. (2022). Theories of international trade in modern tourism business. *Вісник Київського національного лінгвістичного університету. Серія Історія, економіка, філософія*, 25, 40–55. <https://doi.org/10.32589/2412-9321.25.2020.264222>
- Legiscomex. (2024). Principales productos exportados por el sector Hortalizas, Frutas, Cereales Y Semillas Y Frutos en valor FOB. <https://www-legiscomex-com.bd.univalle.edu.co/Home/MiMercado?id=fcd8ba1098e4294b1196493ec72ee6a>
- Liu, X. (2022). NEW DEVELOPMENT OF INTERNATIONAL TRADE THEORY AND DIFFERENTIATION OF INTERNATIONAL TRADE PATTERN. *INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH*, 1–2. <https://doi.org/10.36106/ijsr/8623221>
- López-Rodríguez, C. E., Castro Barón, L. T., Quito Pérez, K. T., & Bocanegra Canacué, L. F. (2020). Beneficios y oportunidades de mejoramiento para la internacionalización de empresas comercializadoras de lulo en Colombia. *Revista Economía y Política*, 55–71. <https://doi.org/10.25097/rep.n32.2020.03>
- Miñón Martínez, J. (2017). Desarrollo y análisis técnico-económico de la gestión de nutrientes residuales en la producción de biomasa de algas para fines agrícolas y ganaderos [Universidad de Valladolid]. <https://doi.org/10.35376/10324/23049>
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*, 339(jul21 1), b2535–b2535. <https://doi.org/10.1136/bmj.b2535>
- Newman, A., Obschonka, M., Moeller, J., & Chandan, G. G. (2021). Entrepreneurial Passion: A Review, Synthesis, and Agenda for Future Research. *Applied Psychology*, 70(2), 816–860. <https://doi.org/10.1111/apps.12236>

- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, n71. <https://doi.org/10.1136/bmj.n71>
- Parra-Peña, R. I., Puyana, R., & Chica, F. Y. (2017). Análisis de la productividad del sector agropecuario en Colombia y su impacto en temas como: encadenamientos productivos, sostenibilidad e internacionalización, en el marco del programa Colombia más competitiva. En *FEDESARROLLO - Centro de Investigación Económica y Social*. https://www.scielo.sa.cr/scielo.php?pid=S1659-13212017000100021&script=sci_arttext
- Pérez, L. F., & Gómez, M. I. (2022). Public-private strategies to establish a successful avocado export cycle: cases from Colombia. *Journal of Agribusiness in Developing and Emerging Economies*, 12(4), 620–640. <https://doi.org/10.1108/JADEE-11-2021-0275>
- Rodjanatham, T., & Rabgyal, T. (2020). Quality Assurance of International Fruit Supply Chains via Techno-Management. *Agriculture*, 10(4), 107. <https://doi.org/10.3390/agriculture10040107>
- Ruzzante, S., Labarta, R., & Bilton, A. (2021). Adoption of agricultural technology in the developing world: A meta-analysis of the empirical literature. *World Development*, 146, 105599. <https://doi.org/10.1016/j.worlddev.2021.105599>
- Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research*, 57(7), 2117–2135. <https://doi.org/10.1080/00207543.2018.1533261>
- Treiblmaier, H. (2018). The impact of the blockchain on the supply chain: a theory-based research framework and a call for action. *Supply Chain Management: An International Journal*, 23(6), 545–559. <https://doi.org/10.1108/SCM-01-2018-0029>
- Trujillo, H. A., & Bacha, C. J. C. (2023). Agricultural Research in Colombia: Counterpoint with the Brazilian System. *Research on World Agricultural Economy*, 4(2), 18–31. <https://doi.org/10.36956/rwae.v4i2.848>
- Uddin, G. (2021). A Critique of Modern Theories of Trade. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3763875>
- Yadav, V. S., Singh, A. R., Raut, R. D., & Govindarajan, U. H. (2020). Blockchain technology adoption barriers in the Indian agricultural supply chain: an integrated approach. *Resources*,

Conservation and Recycling, 161,
104877.
[https://doi.org/10.1016/j.resconrec.2020
.104877](https://doi.org/10.1016/j.resconrec.2020.104877)