LUMEN ET VIRTUS

MEDICINAL HERBS: PROMOTING SUSTAINABILITY AND INCOME IN FAMILY FARMING

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ABSTRACT

The research aimed to analyze the costs and feasibility of the cultivation of medicinal herbs Melissa (Melissa officinalis) from Passion Fruit (Passiflora edulis) in a rural property in the municipality of Prudentópolis, Paraná. It is based on the premise that crop diversification is essential for the economic self-sufficiency of small properties characterized as family farming. In addition to the economic aspects, the choice of plants for analysis is intrinsically linked to the symbolic and cultural value that medicinal herbs carry, being widely recognized for their therapeutic and healing properties. The cultivation of medicinal plants, therefore, not only contributes to physical health, but also acts as a practice that values the connection with nature and ancestral knowledge, promoting a balance between the physical, emotional, and spiritual well-being of farmers and the local community. Methodologically, the research is applied, descriptive, documentary, bibliographic and based on case studies. The locus of the research was defined by convenience and accessibility. After data collection and analysis, it was found that both crops are profitable, with a financial return of approximately 30.5% per year. In addition to their economic viability, these plants offer a holistic approach to well-being, contributing to the mental and emotional balance of farmers, who, through cultivation, also rescue traditional practices and strengthen the bond with the land and local culture. The cultivation of medicinal herbs, such as Melissa and Passion Fruit, thus stands out not only as an excellent option for generating income and work, but also as a path to sustainability and the rescue of harmony between human beings and nature, presenting plant alternatives with simple management, good acceptance in the market, ease of sale and attractive prices

Keywords: Income. Family Farming. Sustainability. Economic Viability. Crop Diversification.

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INTRODUCTION

The municipality of Prudentópolis, despite its large territorial extension, is characterized by the predominance of family farming practiced in small plots of land. In this context, crop diversification is essential and the choice of medicinal herbs can be considered a viable alternative for generating family income (Labiak; Stroparo, 2023; Stroparo; Suchodoliak; Suchodoliak, 2023, Stroparo, 2024)

The cultivation of medicinal herbs, such as Melissa (Melissa officinalis) and Passion fruit (Passiflora edulis), has grown significantly in recent years, both in the national and international markets (Oliveira & Santos, 2022; Rodrigues & Ferreira, 2022). In this way, these plants represent a promising alternative to be implanted in small rural properties, offering profit potential to farmers (Andriamparany et al., 2014; Pergola et al., 2024)

Medicinal herbs play a key role in the economic, social, cultural, and ecological spheres of local communities Pergola et al., (2024). In this sense, the cultivation of medicinal plants is justified by the fact that it represents diversification of crops on the rural property and is an attractive strategy, allowing the farmer to have multiple sources of income. The implementation of the cultivation of medicinal herbs, such as Melissa and Passion Fruit, which are easy to manage and have a good financial return, can improve the quality of life of farmers and their families (Souza; Birth; Silva, 2021). Therefore, this research aims to analyze the costs and feasibility of the cultivation of medicinal herbs Melissa (Melissa officinalis) from Passion Fruit (Passiflora edulis) in a rural property in the municipality of Prudentópolis, Paraná.

THEORETICAL FOUNDATION

FAMILY FARMING

Family farming plays a key role in rural development and food security, being responsible for a large part of food production in various regions of the world. In Brazil, family farming is characterized by the predominance of small properties, where the workforce is mostly composed of family members. This type of agriculture is essential not only for food production, but also for the maintenance of cultural traditions and the preservation of the environment (Stroparo, 2023; Stroparo; de Souza, 2022; Stroparo; Floriani, 2024a, 2024b). Studies indicate that crop diversification is a crucial strategy for the economic and environmental sustainability of family farms. By diversifying production, farmers are able to mitigate risks related to climate and market variations, in addition to promoting the most efficient use of available natural resources (Souza; Birth; Silva, 2021; Stroparo; Suchodoliak; Suchodoliak, 2023).

The inclusion of medicinal plants, such as Melissa and Passion Fruit, in the production system is a viable alternative that can contribute significantly to income generation and improve the quality of life of rural families (Andriamparany et al., 2014, 2014; Souza; Birth; Silva, 2021) The choice to cultivate medicinal herbs on family farms is due not only to their economic potential, but also to the simplicity of management and the high demand in the market. Medicinal plants are widely accepted both in the national and international markets, offering small producers an opportunity to enter specialized niche markets with high added value (Souza; Birth; Silva, 2021; Stroparo; de Souza, 2022; Stroparo; Suchodoliak; Suchodoliak, 2023)

Stroparo research; Suchodoliak; Suchodoliak, (2023) reinforces the importance of crop diversification in family farming, highlighting that this practice not only improves the economic resilience of farmers, but also contributes to environmental conservation and the sustainable development of rural communities. Income diversification is a strategy encouraged in family farming properties, as it makes it possible to optimize the resources applied, have different sources of income and provide better use of the available territorial area. In addition, diversification is crucial for the livelihood of a significant portion of the rural population and promotes conditions for sustainable development.

Therefore, family farming, when associated with crop diversification strategies and the inclusion of medicinal plants, such as Melissa and Passion Fruit, presents itself as a promising alternative for income generation and the sustainability of small rural properties. Encouraging these practices can result in economic, social, and environmental benefits, contributing to sustainable rural development (Pergola et al., 2024)

SOCIOECONOMIC BENEFITS OF THE CULTIVATION OF MEDICINAL HERBS IN FAMILY FARMING IN PRUDENTÓPOLIS

The cultivation of medicinal herbs, such as Melissa and Passion Fruit, has proven to be a promising alternative for family farming in the municipality of Prudentópolis, Paraná. The introduction of these plants in the production system of small rural properties brings several socioeconomic benefits, contributing significantly to sustainability and improving the quality of life of farming families. One of the main advantages of growing medicinal herbs is the generation of additional income for farming families. Crop diversification allows farmers to have multiple sources of income, reducing dependence on a single crop and, consequently, the financial risks associated with possible losses. Studies indicate that the profitability of medicinal herb cultivation can be significant. This increase in income can be

directed towards improvements in property infrastructure, education, health, and well-being of rural families.

The cultivation of medicinal herbs also contributes to local development, strengthening the community's economy. The production and marketing of these plants generate direct and indirect jobs, from cultivation to the sale of final products. In addition, it encourages the creation of cooperatives and producer associations, which can negotiate better market conditions and add value to products. Cooperation among farmers promotes the sharing of knowledge and technologies, strengthening the social and economic fabric of the region (Souza; Birth; Silva, 2021; Stroparo, 2023; Stroparo; Suchodoliak; Suchodoliak, 2023) In Prudentópolis, a region with a strong influence of Ukrainian immigrants, family farming is intrinsically linked to the preservation of traditional and cultural knowledge. The cultivation of medicinal herbs rescues ancestral practices of therapeutic use of plants, keeping alive the cultural heritage of rural communities. The appreciation of this traditional knowledge also translates into differentiated products in the market, which are appreciated by consumers looking for natural and sustainable alternatives (Stroparo, 2021, 2023; Stroparo; Floriani, 2024a).

Adopting sustainable farming practices is another important benefit of growing medicinal herbs. These plants are often grown in an agroecological manner, respecting the principles of environmental sustainability. Crop rotation and reduced use of chemical inputs contribute to soil and water conservation, promoting a healthier and more balanced environment. In addition, biodiversity is maintained and enriched, favoring pollination and natural pest control (Pergola et al., 2024; Bari et al., 2017; Corroto et al., 2022; Kunwar et al., 2016; Wali et al., 2022).

Therefore, the cultivation of medicinal herbs in family farming in Prudentópolis offers multiple socioeconomic benefits, ranging from income generation and local development to environmental and cultural preservation. These advantages make this practice an effective strategy to promote sustainability and improve the quality of life of rural families, contributing to the harmonious and integrated development of the region.

Costs and Financial Feasibility of Growing Medicinal Herbs

Analyzing the costs and financial viability of growing Melissa and Passion Fruit on a rural property in Prudentópolis is essential to understand the economic potential of these plants in family farming. The initial investment for the cultivation of these herbs includes costs for seeds, seedlings, agricultural inputs, soil preparation, and irrigation. In addition, it is necessary to consider maintenance costs, such as fertilization, pest and disease control, and labor.

The profitability of medicinal herb farming is influenced by market demand, selling prices, and efficiency in production. Family farmers who adopt sustainable farming practices and invest in appropriate technologies can achieve substantial financial returns. In addition, direct marketing at fairs, cooperatives and specialized markets can increase the profit margin, eliminating intermediaries and adding value to the final product (Stroparo; Floriani, 2022; Stroparo; Hrycyna, 2024). The financial feasibility analysis should include projections of revenues and expenses throughout the cultivation cycle, considering factors such as productivity per hectare, average selling price, and operating costs. Financial planning tools, such as cash flow analysis and internal rate of return (IRR), can help farmers make informed investment decisions. In the research in question, the costs of production, handling, harvesting and post-production were determined according to the theory of costs.

METHODOLOGY

The present research is classified as an applied research, of a descriptive nature, using qualitative and quantitative, bibliographic and documentary approaches (Cooper & Schindler, 2011; Gray, 2012)

The research uses a qualitative approach, combining integrative literature review with case study. An integrative literature review was conducted to identify and synthesize the main studies and findings related to the cultivation of medicinal herbs, specifically Melissa officinalis (Melissa) and Passiflora edulis (Passion fruit), with a focus on economic viability and socioeconomic benefits for family farming. To this end, searches were carried out for scientific articles in the Web of Science, Scopus and ScienceDirect databases, using descriptors such as "Medicinal Herb Cultivation," "Economic Viability of Family Farming," "Sustainable Farming Practices," "Herbal Medicine Production," and "Socioeconomic Impact of Medicinal Plants." The literature review focused on the identification of studies that address the management of these crops, their economic viability and the socio-environmental impact on family farming.

The inclusion criteria involved the selection of articles published in peer-reviewed journals; studies that discuss the cultivation of Melissa officinalis and Passiflora edulis or that address medicinal herbs in similar contexts; publications in English or Portuguese; current or classic studies, here understood as those with a significant number of academic citations, to ensure the timeliness of the data; and texts related to sustainability and production efficiency. Articles that did not directly address sustainability, duplicate publications, and studies with insufficient methodology or inconclusive data were excluded from the portfolio.

The case study was carried out in a rural property in the municipality of Prudentópolis, Paraná, characterized by the practice of family farming. Data collection included information on the costs of cultivation, management, harvesting, and the financial returns of Melissa officinalis and Passiflora edulis crops. A structured interview with the owners was chosen to identify the main difficulties and opportunities in the cultivation of these medicinal herbs, as well as their perceptions about the socioeconomic benefits and sustainability associated with the cultivation.

DATA PRESENTATION AND ANALYSIS

Table 01 shows the dimensions of the property, as well as the area used for cultivation, how many people live on this property and how many work in the agricultural sector.

Table 1 – Characterization of the Property

CHARACTERIZATION OF THE PROPERTY	
Family members	4 people (2 children)
Family members working in agriculture	2 people
Territorial extension of the property	2 bushels
Area intended for cultivation	76 liters (45,904 m²)

Source: Survey Data, (2024)

It is observable in Table 01 that out of a total area of 2 bushels, 76 liters are used for cultivation and that in this area two people from the family work, considering that the other two people from the family are still children. After the characterization of the property, the production stages of the Melissa and Passion Fruit crops were verified: Land preparation; Handling; Harvesting and processing.

Table 2 below shows the costs of "Land Preparation" which covers all costs related to the purchase of seeds, seedlings, labor, and fertilizers and fodder.

Table 2 – Land Preparation

Cost Type	Melissa	Passion fruit
	R$	R$
Seeds and seedlings	15.224,00	3.806,00
Hired labor	27.200,00	6.800,00
Fertilisers and fodder	14.400,00	3.600,00
Subtotal	56.824,00	14.206,00
Total	71.030,00	

Source: Survey Data, (2019)

As can be seen, the total cost for preparing the land for Melissa is R$ 56,824.00, and this amount consists of R$ 15,224.00 for the purchase of seeds and seedlings, R$

27,200.00 for the payment of the labor necessary for the development of these activities and R$ 14,400.00 for the purchase of fertilizers and fodder. For the preparation of Passion Fruit, the cost is lower, representing a total of R$ 14,206.00, and this amount consists of R$ 3,806.00 for the purchase of seeds and seedlings, R$ 6,800.00 for the payment of the labor necessary for the development of these activities and R$ 3,600.00 for the purchase of fertilizers and fodder. This first part of the costs for land preparation represents approximately 30% of the total cost in the year for the production of these two medicinal herbs. The management, the second stage of the production process, comprises the costs related to the purchase of tarpaulins, irrigation tapes and labor, totaling a cost for the two herbs in the amount of R$ 49,400.00, as shown in Table 3:

Table 3 - Manejo

Cost Type	Melissa	Passion fruit
	R$	R$
Canvases	7.520,00	1.880,00
Irrigation Tapes	16.800,00	4.200,00
Hired labor	15.200,00	3.800,00
Subtotal	39.520,00	9.880,00
Total	49.400,00	

Source: Survey Data, (2024)

Analyzing Table 03 above, it can be seen that the total cost for handling Melissa is R$ 39,520.00, and this amount consists of R$ 7,520.00 for the purchase of tarpaulins, R$ 15,200.00 for the payment of the labor necessary for the development of these activities and R$ 16,800.00 for the purchase of irrigation tapes. For the preparation of Passion Fruit, the cost represents a total of R$ 9,880.00, and this amount consists of R$ 1,880.00 for the purchase of tarpaulins, R$ 3,800.00 for the payment of the labor necessary for the development of these activities and R$ 4,200.00 for the purchase of irrigation tapes.

This step represents approximately 21% of the total cost in the year for the production of the two medicinal herbs.

The next stage refers to "Harvesting and Processing" which deals with the costs related to the purchase of materials for irrigation and tarpaulins, electricity, drying in the kiln and labor, totaling a cost for the two herbs in the amount of R$ 84,400.00, as shown in Table 04:

Table 4 – Harvesting and Processing

Cost Type	Melissa	Passion fruit
	R$	R$
Irrigation material and tarpaulins	24.320,00	6.080,00
Hired labor	23.800,00	3.200,00
Electricity and drying in the oven	21.600,00	5.400,00

Subtotal	69.720,00	14.680,00
Total	84.400,00	

Source: Survey Data, (2019)

Table 04 above shows that the total cost for harvesting and processing Melissa is R$ 69,720.00, and this amount consists of R$ 24,320.00 for the purchase of materials for irrigation and tarpaulins, R$ 23,800.00 for the payment of the labor necessary for the development of these activities and R$ 21,600.00 for the payment of electricity and drying in the oven. For the preparation of Passion Fruit, the cost represents a total of R$ 14,680.00, consisting of R$ 6,080.00 for the purchase of materials for irrigation and tarpaulins, R$ 3,200.00 for the payment of the labor necessary for the development of these activities and R$ 5,400.00 for the payment of electricity and drying in the oven. The total costs of harvesting and processing represent approximately 35% of the total cost in the year for the production of the two medicinal herbs.

It was also verified that there were costs related to financing with a greenhouse and tractor, totaling an annual cost in the amount of R$ 30,000.00, as shown in Table 05:

Table 5 – Amortization of Financing (equipment, greenhouse and machinery)

Type of funding	R$
Greenhouse	20.000,00
Tractor	10.000,00
Total	30.000,00

Source: Survey Data, (2019)

Table 05 presents the total annual cost with financing totaling R$ 30,000.00, related to the acquisition of the necessary structure for crop management, as well as a tractor used on the property. Financing costs represent approximately 14% of the total annual cost for the production of medicinal herbs. Because it is a significant value, we chose to consider it as a cost and, therefore, we adopted, as an analysis criterion, a comprehensive view of the process. The results of the productive activity were then calculated, as shown in Table 6:

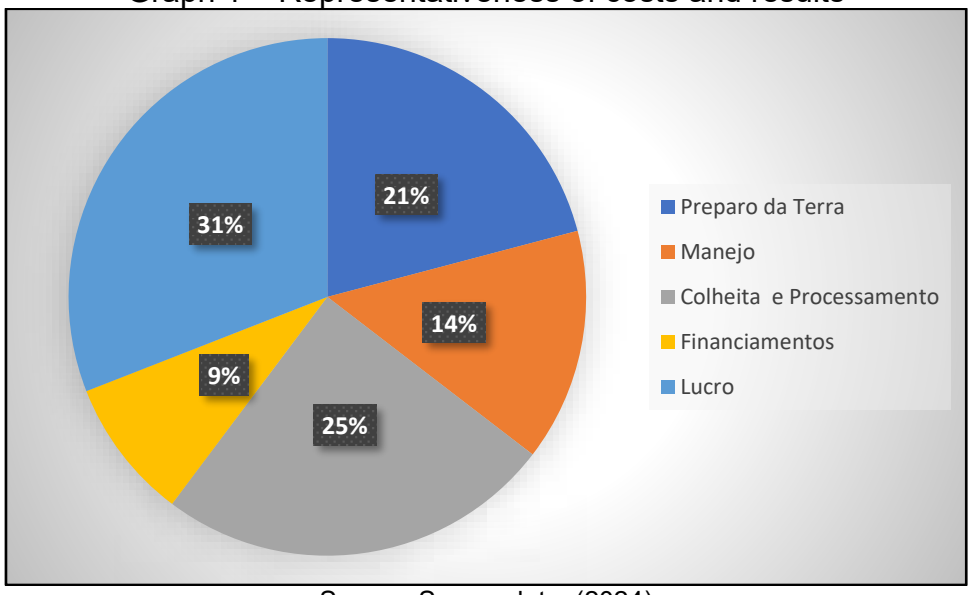
Table 6 – Calculation of Results

ITEM	Values in R$ and %	
RECIPES		
Gross income	R$ 340,000.00	
TOTAL REVENUE	R$ 340,000.00	
EXPENDITURE		
I prepare from the ground	R$ 71.030,00	21%
Handling	R$ 49.400,00	15%
Harvesting and Processing	R$ 84.400,00	25%
Financing	R$ 30.000,00	9%
TOTAL EXPENDITURE	R$ 234,830.00	
TOTAL RESULT	R$ 105,170.00	

Source: Survey Data, (2024)

According to Table 06, it is possible to analyze that during the year the total revenues were R$ 340,000.00, with a total expense of R$ 234,830.00, expenses detailed above, reaching a result at the end of the year of R$ 105,170.00 of profit, at the end of the four harvests, a profit of approximately 30.5%, According to the percentages presented in graph 01:

Graph 1 – Representativeness of costs and results



Source: Survey data, (2024)

Based on the graph above, it is possible to verify the percentages of costs and revenues in relation to the annual result, where the family obtained approximately a margin of 30.5% of profit compared to 69.5% of total expenses.

FINAL CONSIDERATIONS

In the Municipality of Prudentópolis/PR, there are initiatives for the cultivation of medicinal herbs aimed at improving the income of the property and proposing to other small farmers an alternative to replace the tobacco crop. Specifically, in this study, the viability of Melissa and Passion Fruit was verified, identifying the costs and results of the activity as well as the cultivation process.

It was found that in addition to the highly positive results with expressive profitability, the crops are easy to manage, can be implanted in small plots of land, use labor in very specific phases of the process, and the family itself can be responsible for the processes, if they so wish.

From the perspective of the economic viability of the cultivation of medicinal herbs, it was found that it is a highly profitable diversification alternative, whose return of approximately 30.5% per year reinforces the capacity of these crops to generate a

significant income for small family farmers. It should also be noted the low relative cost when compared to other small crops, the initial investment cost, added to the management and processing, still allows a significant financial return in the short term.

Regarding Sustainability and Crop Diversification there is potential risk reduction: The study suggests that crop diversification, by including medicinal herbs, allows smallholder farmers to reduce dependence on monocultures and, consequently, the risks associated with market variations or specific climatic problems. It is found that medicinal herbs, especially when cultivated with sustainable practices, promote crop rotation, reduction in pesticide use and better soil conservation, benefiting the health of the local ecosystem and safeguarding biodiversity.

Local job creation and social inclusion can be cited as examples of socioeconomic benefits related to the activity. The study highlights the intensive use of labor in various phases, such as planting, handling and harvesting. This creates local employment opportunities, strengthening the community economy and encouraging young people to stay in the countryside. In addition, the cultivation of medicinal herbs often involves different family members in productive activities, which can include women and young people, contributing to social inclusion and the improvement of living conditions.

From the perspective of market potential, there is an evident growth in the demand for natural products: The study highlights the increase in demand for natural and herbal products, both in the national and international markets. This growth creates a promising market niche for smallholder farmers, especially in agroecological contexts with the possibility of expansion into value-added products: In addition to the sale of raw herbs, the study suggests that there is great potential to add value through the transformation of herbs into medicinal, cosmetic or food products, which can further increase the profit margin.

Environmental benefits such as soil conservation and biodiversity, linked to agroecological practices can help in the recovery and preservation of the soil, in addition to maintaining local biodiversity and the sustainability of the property. The fact of the low need for chemical inputs provides management with less dependence on fertilizers and pesticides, minimizing the environmental impact.

Also consider the relationship with traditional knowledge, as culture enables cultural rescue, reinforcing the connection with ancestral knowledge. This not only promotes the sustainable use of natural resources, but also strengthens the cultural bond of rural communities with their historical practices and consequent appreciation of ancestral practices, which can be translated as a market differential for small farmers, generating competitiveness, use of seals of origin and, finally, added value.

In this way, it is suggested that new studies be carried out in comparison with other crops that use the same territorial spaces, analysing the various variables involved such as insurance, technical assistance, access to credit, etc.

REFERENCES

1. Andriamparany, J. N., et al. (2014). Effects of socio-economic household characteristics on traditional knowledge and usage of wild yams and medicinal plants in the Mahafaly region of south-western Madagascar. *Journal of Ethnobiology and Ethnomedicine, 10*(1), 82.

2. Bari, M. R., et al. (2017). Medicinal plants and their contribution in socio-economic condition of the household in Haluaghat upazila, Mymensingh. *International Journal of Business, Management and Social Research, 4*(01), 215-228.

3. Cooper, D. R., & Schindler, P. S. (2011). *Métodos de pesquisa em administração* (10th ed.). Porto Alegre: Bookman.

4. Corroto, F., Gamarra Torres, O., & Macía, M. J. (2022). Understanding the influence of socioeconomic variables on medicinal plant knowledge in the Peruvian Andes. *Plants, 11*(20), 2681.

5. Creswell, J. W. (2007). *Projeto de pesquisa: métodos qualitativo, quantitativo e misto*.

6. Gray, D. E. (2012). *Pesquisa no mundo real* (2nd ed.). Porto Alegre: Penso.

7. Kunwar, R. M., et al. (2016). Land-use and socioeconomic change, medicinal plant selection and biodiversity resilience in far Western Nepal. *PLoS One, 11*(12), e0167812.

8. Labiak, G., & Stroparo, T. R. (2023). Análise de custos e rentabilidade da atividade leiteira em uma propriedade familiar. *Revista Ibero-Americana de Humanidades, Ciências e Educação, 9*(7), 1657–1673.

9. Pergola, M., et al. (2024). The most relevant socio-economic aspects of medicinal and aromatic plants through a literature review. *Agriculture, 14*(3), 405.

10. Souza, A. L. de, Nascimento, A. L. B., & Silva, T. C. da. (2021). Do socioeconomic variables explain medicinal plant knowledge and the diseases they treat? A case study in the Boa Vista community, Alagoas, Northeastern Brazil. *Rodriguésia, 72*, e02222019.

11. Stroparo, T. R. (2021). Slow Food e organização social como promotores de desenvolvimento em tempos de pandemia. *Boletim de Conjuntura (BOCA), 7*(20), 116–123.

12. Stroparo, T. R. (2024). Transformação digital na agricultura: Impactos da Internet das Coisas (IoT) na eficiência produtiva e sustentabilidade. *LUMEN ET VIRTUS, 15*(38), 1573-1581.

13. Stroparo, T. R. (2023a). Território, agroecologia e soberania alimentar: significações e repercussões sob a égide decolonial. *Boletim de Conjuntura (BOCA), 13*(39), 462–472.

14. Stroparo, T. R., & De Souza, S. T. (2022). Plantas alimentícias não convencionais (PANC): renda, soberania alimentar e sustentabilidade. *Cadernos de Agroecologia,

17*(3). Disponível em http://cadernos.aba-agroecologia.org.br/cadernos/article/view/6846.

15. Stroparo, T. R., & Floriani, N. (2024a). Agroecology, slow food and sustainable development goals (SDGs): resilience of agro-food systems, combat hunger, and local governance. *Revista Engenharia na Agricultura - REVENG, 32*(Contínua), 27–36.

16. Stroparo, T. R., & Floriani, N. (2022). Certificações agroecológicas: análise custo-benefício, competitividade e valor agregado. In *Anais do Congresso Brasileiro Interdisciplinar em Ciência e Tecnologia*. Diamantina (MG): Online.

17. Stroparo, T. R., & Floriani, N. (2024b). Sustainable development goals (SDGs) and total cost of ownership (TCO): a holistic approach. *Revista de Gestão e Secretariado, 15*(9), e4236–e4236.

18. Stroparo, T. R., & Hrycyna, H. M. (2024). Ecoinovação, inteligência artificial e internet das coisas na cadeia de valor do mel e da erva-mate: Repercussões e perspectivas para a sustentabilidade. In *Anais do Congresso Brasileiro Interdisciplinar em Ciência e Tecnologia*. Diamantina (MG): Online.

19. Stroparo, T. R., Suchodoliak, M., & Suchodoliak, L. (2023). Diversificação e desenvolvimento rural: agricultura familiar, erva-mate e mel. *Open Science Research X*, 1ª ed.: Editora Científica, 10, 2047–2058.

20. Wali, A. F., et al. (2022). Account of some important edible medicinal plants and their socio-economic importance. In *Edible Plants in Health and Diseases: Volume 1: Cultural, Practical and Economic Value* (pp. 325-367).