THE USE VALUE OF MEDICINAL PLANTS

O VALOR DE USO DAS PLANTAS MEDICINAIS

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Abstract: The study aimed to conduct an ethnobotanical survey of medicinal plants and their uses in the municipality of Cocal, located in the state of Piauí, Brazil. The methodology employed was the "snowball" technique to identify respondents through conversations with friends, neighbors, family members, the Department of Agriculture, and the Rural Workers' Union. Questionnaires containing both objective and descriptive questions about the cultivated plant species, the parts used, the preparation methods, and the diseases treated with the plants were administered. A total of 20 interviews were conducted, with 80% of the respondents being female. The age range of the interviewees varied from 18 to 85 years. Information was collected on 32 medicinal species, with the most frequently mentioned being boldo (Plectranthus barbatus). The most commonly used part of the plant was the leaf, and the most common method of consumption was tea (decoction). The medicinal plants were sought by respondents primarily to treat ailments such as general pain, colds, and fever. In conclusion, the municipality of Cocal has the potential to increase

the production of medicinal plants, with the knowledge and use of these plants being important for the local community in treating various health conditions.

Keywords: Agroecology, Health, Survey, Traditional Medicine.

Resumo: O estudo teve como objetivo realizar um levantamento etnobotânico das plantas medicinais e seus usos no município de Cocal, localizado no estado do Piauí. A metodologia utilizada foi a "bola de neve" para identificar os entrevistados, por meio de conversas com amigos, vizinhos, familiares, Secretaria de Agricultura e Sindicato dos Trabalhadores Rurais. Foram aplicados questionários contendo perguntas objetivas e descritivas sobre as espécies de plantas cultivadas, as partes utilizadas, as formas de preparo e as doenças tratadas com as plantas. Foram realizadas 20 entrevistas, com 80% dos respondentes sendo do sexo feminino. A faixa etária dos entrevistados variou de 18 a 85 anos. Foram coletadas informações sobre 32 espécies medicinais, sendo a mais citada o boldo (*Plectranthus barbatus*). A parte da planta mais utilizada foi a folha e a forma mais comum de consumo foi o chá (decocção). As plantas medicinais foram procuradas pelos entrevistados para tratar enfermidades, principalmente dores em geral, gripe e febre. Em conclusão, o município de Cocal apresenta potencial para aumentar a produção de plantas medicinais, sendo o conhecimento e uso dessas plantas importantes para a comunidade local no tratamento de diferentes condições de saúde.

Palavras-chave: Agroecologia, Saúde, Levantamento, Medicina Popular.

Introduction

Knowledge about the use of medicinal plants has a long ancestral tradition, being orally transmitted over millennia from one generation to another. However, over time, much of this knowledge, teachings, and memories related to the healing potential of plants have been lost, either with the passing of those who held this knowledge or through the forgetting by younger generations. This decline represents a significant loss since medicinal plants possess therapeutic properties and can offer relevant health benefits (ATAÍDES, 2022).

The World Health Organization (WHO, 2009) recognizes the importance of traditional medicine systems and encourages research and integration of these systems into conventional healthcare. This approach aims to leverage the potential benefits of traditional medicine, such as the use of medicinal plants, and ensure the safety, efficacy, and quality of these treatments, as well as promote the preservation of traditional knowledge associated with these practices.

Conducting ethnobotanical studies allows for the rescue and appreciation of traditional community knowledge, the conservation of local biodiversity, and the promotion of scientific research that can contribute to the development of new plant-based medicines and therapies. Thus, ethnobotanical studies play a fundamental role in preserving cultural and natural heritage, promoting health, and strengthening communities by recognizing and valuing ancestral knowledge related to medicinal plants (SGANZERLA et al., 2022).

It is important to highlight that the municipality of Cocal is located in a region characterized by ecological tension, featuring transitional vegetation and ecotone. Its plant

formations are influenced by biomes such as the Cerrado and the Caatinga (VASCONCELOS et al., 2021).

In the municipality of Cocal, a rich diversity of medicinal, edible, and ornamental plants can be found, widely used by local communities for various purposes. Among the most notable medicinal plants are boldo (*Plectranthus barbatus*), lemon balm (*Lippia alba*), chamomile (*Matricaria chamomilla*), and rosemary (*Rosmarinus officinalis*). These species play a crucial role in the community's health, frequently being used in the form of teas or infusions to treat a variety of illnesses and health conditions. The use of these plants reflects the region's rich ethnobotanical knowledge, demonstrating the importance of medicinal plants in the daily lives of the people of Cocal.

This study contributes to expanding knowledge about the medicinal plants present in Cocal, providing useful information for the community and researchers interested in ethnobotany and phytotherapy. Additionally, it will promote the appreciation of popular knowledge and the strengthening of local cultural identity.

The objective of this work is to understand the use value of medicinal plants in the municipality of Cocal, in the state of Piaui, comprehend their therapeutic uses, and promote the recording of popular knowledge.

Medicinal plants are those that contain bioactive substances that can be used naturally for therapeutic purposes or as a basis for the production of semi-synthetic medicines (PINHEIRO et al., 2020). These plants have medicinal properties and have been used for centuries by different cultures around the world.

According to Dresch, Libório, and Czermainski (2021), Brazil has significant diversity and rich medicinal biodiversity. These characteristics are relevant given the population's demand for the use of phytotherapy as a therapeutic alternative in the Unified Health System (SUS). Additionally, they highlight the importance of knowing and recording the use of medicinal plants as a basis for the preservation and sustainable use of these resources.

As highlighted by Carneiro et al. (2020), medicinal plants have been used throughout ancient civilizations as a means of preventing and treating various diseases. This traditional knowledge is passed down from generation to generation, often being the only therapeutic source available to certain communities. Therefore, medicinal plants play a fundamental role in maintaining the basic health conditions of a population.

As noted by Simões et al. (2021), medicinal plants play a crucial role as a health support tool. Through them, herbal medicines are developed, which are widely used in the treatment of primary health problems. The creation of a medicinal garden provides a playful and interactive space that can aid in the teaching-learning process. This practical approach allows people to learn about the medicinal properties of plants in an engaging and participatory manner.

The research by Melo, Santos, and Coelho-Ferreira (2021) highlights the importance of a comprehensive and multidisciplinary approach to health promotion, integrating popular and scientific knowledge. Health education strategies are necessary to empower individuals to care for themselves and disseminate information based on scientific evidence. Knowledge about medicinal plants plays a significant role in this process, allowing the dissemination and propagation of these practices for future generations. Scientific research helps to strengthen

people's empowerment, equipping them with skills and competencies for self-care and health promotion while valuing traditional knowledge and respecting the diversity of knowledge.

According to Ferreira, Pasa, and Nunez (2020), ethnobotanical rescue is the approach aimed at investigating the traditional knowledge of local communities about plants with therapeutic and medicinal properties. This empirical knowledge adds value to scientific studies, providing clues and directions for the research of active compounds and potential therapeutic applications. Thus, ethnobotanical rescue allows for the appreciation and preservation of traditional community knowledge while contributing to the advancement of scientific research in the field of phytotherapy and the development of new medicines.

Methodology

The research was conducted in the municipality of Cocal, located in the northern part of the state of Piauí. The estimated population of the municipality is 27,901 inhabitants, covering a territorial area of 1,294.133 km². Cocal is situated at coordinates 3º28'16" S and 41º33'18" W, with an average altitude of 160 m (IBGE, 2021).

The literature review was an essential step in the research project, playing a fundamental role in understanding the topic of medicinal plants. By consulting books, journals, scientific articles, dissertations, and theses available in national and international databases, it was possible to obtain information on the identification, medicinal properties, traditional uses, preparation methods, and other aspects related to medicinal plants.

Data collection was carried out using a semi-structured questionnaire and was conducted in 2022. This methodological choice allowed for the gathering of specific and detailed information about medicinal plants, their uses, preparation methods, popular knowledge, and other relevant aspects of the study.

The inclusion criteria for participation in this study were as follows: being a resident of the municipality of Cocal-PI, possessing knowledge of the medicinal use of local flora, and being at least 18 years old. No additional criteria regarding education level or other socioeconomic factors were required. Participation was voluntary and contingent upon signing the Informed Consent Form (ICF), in which participants expressed their informed consent and authorized their inclusion in the study.

The Department of Agriculture and Environment, Rural Workers' Union, Health Department, and Caritas Diocesana were consulted to identify the "key informants" who cultivate medicinal plants. These institutions, being involved with the local community, have information that facilitates the identification of individuals with specific knowledge about the medicinal use of plants.

The "snowball" technique was used in selecting research participants, a commonly employed approach when aiming to reach a highly specialized and small population. This technique, developed by Bernard (2005), is based on the principle that initial participants refer other relevant individuals to the study, creating a network of referrals that gradually expands, with the research concluding when results start to repeat.

By using this approach, individuals with knowledge about the medicinal use of plants in the region were identified, starting with the first participant encountered and subsequently requesting referrals to other individuals.

Flexibility in defining dates, times, and locations for interviews and plant material collection, adapting to participants' availability, was an appropriate approach to ensure their collaboration without interfering with their daily activities. This demonstrated respect for the participants' availability and routines, favoring the acquisition of quality information.

Participants were informed about the research objectives, their free choice to participate, and the guarantee of anonymity after reading the Informed Consent Form (ICF). The research was submitted to the Research Ethics Committee (REC) of the Federal Institute of Education, Science, and Technology of Piaui (IFPI) and obtained the Certificate of Presentation for Ethical Consideration (CAAE): 59994622.8.0000.9207, with a favorable opinion number 5.795.069.

The research was registered in the National System for the Management of Genetic Heritage and Associated Traditional Knowledge with the SISGEN Registration Code: A867758 and in compliance with the Nairobi Protocol.

Adherence to the World Health Organization (WHO) safety and hygiene recommendations, such as social distancing, mask-wearing, and frequent hand sanitization with alcohol gel, was crucial to protect both researchers and participants during interviews and material collection.

Describing the used part of the plants (root, stem, leaves, etc.), preparation method (fresh plant, maceration, infusion, etc.), usage form (oral, topical, ophthalmic, etc.), and dosage (amount used, frequency of use, duration of treatment, etc.) were important aspects to understand how medicinal plants are used in practice.

Collecting additional data about interviewees, such as age, gender, and education level, helped understand if there are differences in medicinal plant usage practices related to these demographic characteristics.

By gathering this data, a solid foundation for analysis and interpretation of the results was constructed, allowing for a consistent and informative outcome from the conducted research.

Excel® was used to tabulate and organize the collected data efficiently. Excel® offers spreadsheet resources that facilitate data organization and manipulation, as well as the generation of charts and visualizations that aid in the analysis and interpretation of results.

Classifying data by relevant categories, such as plant names, therapeutic indications, used parts, preparation methods, usage forms, dosage, interviewees' demographic characteristics, traditional knowledge, among others, facilitated detailed analyses and the identification of patterns or trends.

The choice of use value (UV) as an indicator of local botanical knowledge is employed in ethnobotanical studies. The UV quantifies and compares the relative importance of medicinal plant species based on informant citations.

The adapted formula to calculate the UV, as mentioned by Araújo et al. (2012), considers the sum of citations for each species (U) divided by the total number of informants (n). This formula provides a measure of the knowledge and use of medicinal plants by the local community.

UV as an indicator in the ethnobotanical study provides a quantitative and objective approach to evaluating the importance of medicinal plants in the local culture. It complements other information collected during interviews and contributes to a broader understanding of traditional knowledge and the use of medicinal plants in the researched community.

Results and Discussion

The survey conducted in the municipality of Cocal, Piaui, identified ten localities involved in the production of medicinal plants: four neighborhoods in the urban area (São Pedro, Santa Teresinha, Santa Luzia, and São Francisco) and six communities in the rural area (Saco de São Francisco, Olho D'Água, Boíba, Birindibinha, Baixa do Cocal, and Assentamento Jacaré).

The identification of these areas suggests that Cocal has significant potential for the use and cultivation of medicinal plants. Both urban and rural areas are involved in the production of these plants, indicating the presence of traditional knowledge and practices related to the medicinal use of plants in the region.

This potential can be explored for domestic and familial use as well as for possible commercial activities, such as the production and sale of medicinal plant-based products. Additionally, identifying these production areas allows for better-directed actions for the preservation and sustainable management of these plants, contributing to the conservation of local biodiversity and the conscious use of plant resources with therapeutic properties.

The research identified a significant gender disparity, with 80% of participants being female and 20% male. This difference in participation indicates possible discrepancies in the knowledge of folk medicine between men and women. These results suggest that women have greater involvement and knowledge about the use of medicinal plants compared to men.

This observation reinforces the importance of transmitting knowledge about medicinal plants through familial relationships, especially between mothers and children. This transmission of knowledge occurs within the family context, where women play a significant role in disseminating traditional knowledge to future generations. Previous studies, such as the one conducted by Badke et al. (2012), also highlighted the influence of affective relationships in the transmission of knowledge about medicinal plants.

These results are consistent with previous research, such as the study conducted by Brito and Evangelista (2020) in Campo Preto, Arneiroz, Ceará, where it was also observed that the majority of medicinal plant users were women (75%). This trend may be related to factors such as women's role in managing family healthcare and the cultural valuation of feminine knowledge about medicinal plants.

These gender differences highlight the importance of considering the perspectives and knowledge of both sexes in studying and promoting the use of medicinal plants to ensure an inclusive and comprehensive approach.

The survey revealed that the vast majority of respondents (95%) acquired knowledge about medicinal plants through their families, while only 5% gained knowledge from neighbors.

This result underscores families' interest in passing on knowledge about medicinal plants to future generations, emphasizing the importance of family relationships in this context.

This family relationship with medicinal plants was also observed in the study by Schek et al. (2021), which supports the findings of the present research. The transmission of knowledge about medicinal plants from generation to generation within the family can be explained by the fact that medicinal plants are often used as home remedies and are part of family culture and tradition.

Furthermore, about 80% of users reported having used medicinal plants since childhood, consistent with the findings of Brito and Evangelista (2020), who found that most medicinal plant users started using them from childhood. These results highlight the importance of exposing young people to medicinal plants from an early age so that they can acquire knowledge and skills related to the safe and appropriate use of these plants.

Introducing young people to knowledge about medicinal plants early allows them to develop a deeper understanding of the properties and uses of medicinal plants and maintain a personal connection with nature and ancestral wisdom. This can contribute to preserving traditional knowledge and promoting more integrative and sustainable health practices.

Regarding the frequency of use of medicinal plants, it was observed that only 40% of respondents frequently use these plants, while 60% use them only when they are sick or sporadically. This sporadic use pattern was also identified by Carvalho (2019) in his research, which found that 50% of participants used medicinal plants only when they felt unwell. These results suggest a decrease in the regular practice of using medicinal plants over time, perhaps due to factors such as increased access to industrialized medicines and changes in health care habits.

Regarding the number of medicinal plants in the interviewees' homes, it was found that 60% have between five to ten medicinal plants in their yards. This number represents a significant and diverse quantity of plants, indicating considerable interest and involvement in using home remedies based on plants. Having a variety of medicinal plants at home allows for greater autonomy in seeking natural treatments and can contribute to a greater connection with nature and self-care.

It is important to note that having medicinal plants at home does not automatically guarantee frequent use or an understanding of their properties and therapeutic indications. It is essential for users to have access to reliable information about the plants they possess and guidance on their safe and appropriate use. This way, it is possible to promote more conscious and effective use of medicinal plants in health promotion and well-being.

The research results indicated that the most common way to consume medicinal plants is through teas, corroborating previous studies, such as Brito and Evangelista (2020). This form of consumption can be attributed to its ease of preparation and administration, as well as being a practice traditionally rooted in popular culture.

The preparation method of medicinal plants is related to the part of the plant used for treatment. According to Oliveira et al. (2010), in Oeiras, Piauí, leaves represented 31.5% of treatment indications. These results align with other studies, such as Vieira (2008) in São Miguel, Piauí, and Baptistel et al. (2014) in Currais, Piauí, which also observed the use of leaves of medicinal plants.

It is important to highlight that the choice of the plant part to be used in the preparation of treatments can vary according to the species and the condition to be treated. Leaves are often used due to their medicinal properties, but other parts of the plant, such as roots, flowers, and barks, can also be used for therapeutic purposes, depending on local tradition and knowledge passed down by communities.

In total, 32 species used for medicinal purposes were mentioned by the respondents. Among the most cited were Plectranthus barbatus (14%), Lippia alba (12%), Cymbopogon citratus (9%), Plectranthus amboinicus (8%), and Dysphania ambrosioides (8%). These plants are valued for their medicinal properties and are frequently used to treat various health conditions (Graph 01).

In the graph below, the citations of medicinal plants can be observed, where the vertical axis represents the percentage found, and the horizontal axis shows the scientific names of the plants.

Graph 01. Citations of Plants for Medicinal Use
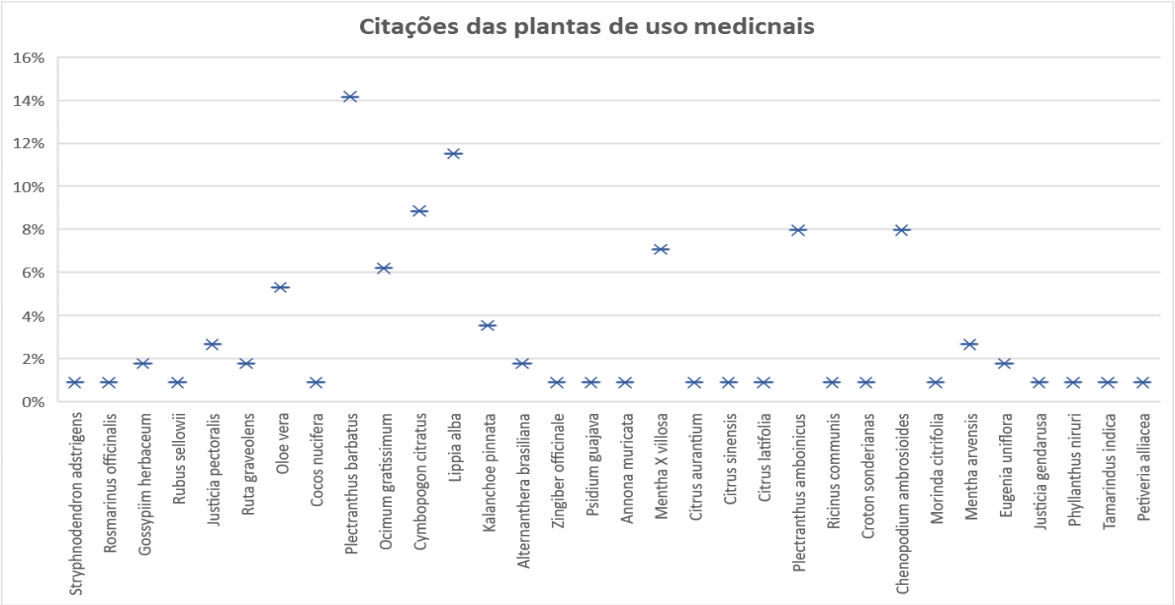
Source: Authors (2023)

Although the richness of medicinal plants cited in this research is considered low compared to some previous studies, such as Santos et al. (2007) in Monsenhor Gil, Piauí, who found 70 medicinal species, and Oliveira et al. (2010) in Oeiras, Piauí, who identified 167 medicinal species, it is important to note that the diversity of mentioned plants may vary according to factors such as the studied region, local culture, and availability of natural resources. Identifying medicinal plants by their common names can indeed be challenging, as these names may vary from region to region and even among local communities. Therefore, to ensure accurate communication and avoid confusion, the use of scientific nomenclature of plants is recommended.

The scientific nomenclature of plants is based on the binomial system, in which each plant is given a Latin name composed of a specific genus and species. This nomenclature is

universally recognized and standardized, allowing for precise identification of plants anywhere in the world.

In the case of the study in question, the researchers used the books "Farmácias Vivas" (MATOS, 2002) and "Plantas Medicinais no Brasil - nativas e exóticas" (LORENZI; MATOS, 2008) as references for the identification of medicinal plants. These works are known for providing comprehensive information about medicinal plants found in Brazil, including photos, botanical descriptions, traditional uses, medicinal properties, and preparation methods. By referring to these books, it was possible to use the scientific nomenclature of plants, which facilitates the understanding and communication of the study, both among researchers and with other professionals in the field of medicinal plants and health.

It is important to emphasize that the use of scientific nomenclature does not exclude the importance of common names of plants, as they are part of local culture and may be widely known and used by communities. However, for the purpose of precise identification and exchange of scientific knowledge, scientific nomenclature plays a fundamental role.

In the study conducted with twenty interviewees, a total of 32 different species used for medicinal purposes were cited. These plants encompassed native, exotic, fruit-bearing, and condiment plants. Among the mentioned plants, the five most cited by the interviewees were (Table 01):

Plectranthus barbatus - with 14% of the citations. This plant, also known as Brazilian boldo, is traditionally used to treat digestive problems such as indigestion and gas.

Lippia alba - with 12% of the citations. This plant, popularly known as rosemary-of-the-field, is valued for its calming and digestive properties, being used to treat problems such as anxiety, stress, and digestive disorders.

Cymbopogon citratus - with 9% of the citations. This plant, popularly called lemongrass or lemon balm, is widely used in the form of tea due to its medicinal properties, including calming, digestive, and antioxidant action.

Plectranthus amboinicus - with 8% of the citations. This plant, known as Indian borage or country borage, is valued for its expectorant and antiseptic properties, being traditionally used to treat respiratory problems such as cough and bronchitis.

Dysphania ambrosioides - with 8% of the citations. This plant, popularly called wormseed or Jerusalem oak, is recognized for its antiparasitic and digestive properties, being used traditionally to treat worm infestations and digestive problems.

These plants were mentioned more frequently by the interviewees, which may indicate their relevance in local folk medicine and the recognition of their medicinal properties. However, it is important to emphasize that the effectiveness and safety of using these plants should be evaluated based on scientific evidence, and it is always recommended to seek professional guidance before using any medicinal plant for therapeutic purposes.

The Use Value (UV) indices present different approaches in determining the list of the most important species, as these indices are widely used in ethnobotanical studies of medicinal plants (AMORIM, 2022).

For example, Santos et al. (2007) identified 70 medicinal and forage species in typical cerrado vegetation in Monsenhor Gil, Piauí. Abreu (2000) recorded 73 species used by the Mimbó quilombolas in Amarante, Piauí, with 48% of them being used for medicinal therapy.

These comparisons highlight the diversity and richness of medicinal plants present in the Piauí region, and suggest that the present study may have addressed a more limited sample or focused on specific plants, which may explain the lower number of species cited. It is important to consider that the richness of medicinal plants may vary according to the study location, methodological approach, and local population's knowledge of these plants.

Table 01. Use Value, Scientific Name, and Percentage of Citations of Medicinal Plants

Use value	scientific name	citations
0,53	Plectranthus barbatus	14%
0,43	Lippia alba	12%
0,33	Cymbopogon citratus	9%
0,30	Plectranthus amboinicus	8%
0,30	Dysphania ambrosioides	8%
0,27	Mentha X villosa	7%
0,23	Ocimum gratissimum	6%
0,20	Oloe vera	5%
0,13	Kalanchoe pinnata	4%
0,10	Justicia pectoralis	3%
0,10	Mentha arvensis	3%
0,07	Gossypiim herbaceum	2%
0,07	Ruta graveolens	2%
0,07	Alternanthera brasiliana	2%
0,07	Eugenia uniflora	2%
0,03	Stryphnodendron adstrigens	1%
0,03	Rosmarinus officinalis	1%
0,03	Rubus sellowii	1%
0,03	Cocos nucifera	1%
0,03	Zingiber officinale	1%
0,03	Psidium guajava	1%
0,03	Annona muricata	1%
0,03	Citrus aurantium	1%
0,03	Citrus sinensis	1%
0,03	Citrus latifolia	1%
0,03	Ricinus communis	1%
0,03	Croton sonderianas	1%
0,03	Morinda citrifolia	1%
0,03	Justicia gendarusa	1%
0,03	Phyllanthus niruri	1%
0,03	Tamarindus indica	1%
0,03	Petiveria alliacea	1%

Source: Authors (2023)

The Usage Value (UV) calculated for each species is a measure that indicates the importance and frequency of use of a medicinal plant. In the present study, UV ranged from 0.03 to 0.53 for the cited species (Graph 02). This means that some plants were considered more important and widely used than others. By calculating UV for each species mentioned by the informants, it is possible to identify which plants are more frequently mentioned and therefore considered more important from a therapeutic point of view. This measure also allows for comparisons between informant responses and statistical inferences about botanical knowledge in the studied community.

In the graph below, the Use Value of the medicinal plants identified in this research can be observed, with the vertical axis representing the Use Value and the horizontal axis displaying the scientific names of the plants.

Graph 02. Variation of the Usage Value of Medicinal Plants
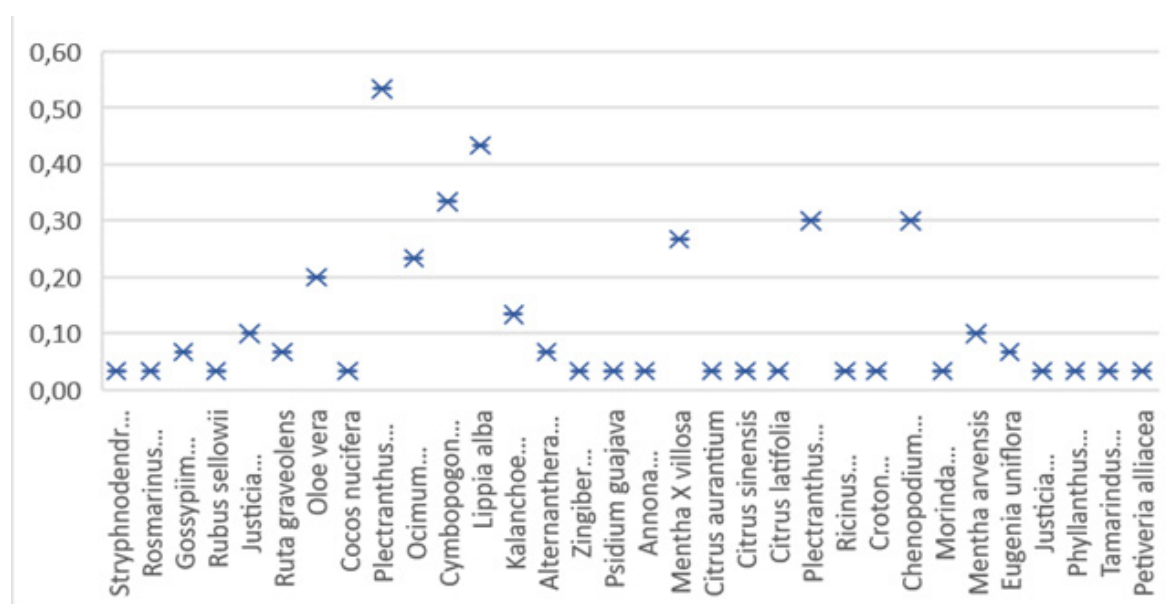
Source: Authors (2023)

The species Plectranthus barbatus and Lippia alba were the most cited by the informants, showing high usage value. This high valuation is due to the frequency with which these plants are collected and used, mainly because of their effectiveness in treating digestive and respiratory diseases.

These results are in line with the study by Costa and Marinho (2016) in the municipality of Picuí, Paraíba, which also identified Plectranthus barbatus and Lippia alba as the most cited plants by the respondents. The presence of these species as the most mentioned in both studies suggests that they play an important role in local folk medicine and are recognized for their therapeutic efficacy.

It is important to note that the usage value of a plant may vary in different contexts and regions, as it is related to the culture and traditional knowledge of a specific community.

It is interesting to note that the results of the present study are consistent with other works, such as Giraldi and Hanazaki (2010) and Franco and Barros (2006), which found a

greater number of indications for digestive system problems. This suggests that medicinal plants are widely used to treat these health conditions in the region.

Furthermore, the study by Franco and Barros (2006) recorded a high number of indications for respiratory system diseases, which is in line with the results found in the present study. These diseases represented a significant percentage of the indications, including conditions such as flu, asthma, sinusitis, throat inflammation, and cough.

This agreement between the studies reinforces the importance of medicinal plants in the treatment of digestive and respiratory problems. These plants have been traditionally used by the local population to alleviate symptoms and promote health in these specific areas. These results are relevant for the appreciation and preservation of traditional knowledge about medicinal plants and their application in daily practice.

Final Considerations

Based on the results obtained, the proposed objectives of the research were successfully achieved, which aimed to investigate local knowledge about medicinal plants in the studied region and their therapeutic potential. The importance of these plants to the community was evident, confirming the relevance of traditional practices and the vast richness of the local flora. What was initially suggested, namely the identification and valorization of the medicinal use of plants, was fully realized.

Furthermore, the lack of comprehensive studies on medicinal plants in this region highlights the importance of expanding research and approaches used. These studies can contribute to enriching scientific knowledge, as well as to valuing traditional knowledge associated with the use of medicinal plants.

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