

**ETHNOBOTANICAL AND SOCIO-ENVIRONMENTAL KNOWLEDGE SCIENCE
EDUCATION AT A PRIVATE SCHOOL IN BREVES, PARÁ, MARAJÓ MESOREGION**

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Abstract

Traditional knowledge of medicinal plants has prevailed in society for decades, but it is still little explored in schools. Therefore, this study aimed to discuss, in a playful and didactic way, with 6th-grade students from a private school located in the urban area of the municipality of Breves, Marajó Mesoregion, Pará, the importance of these botanical species for the promotion of health and sustainability. The methodologies adopted were the application of questionnaires for prior investigation into the students' ethnobotanical knowledge, and the use of experiments and the holding of a science fair that brought together traditional and scientific knowledge with the students' experiences in relation to ethnobotany. Finally, the results of this research were positive because these practices strengthened socio-environmental education in the Marajó school context, sparked curiosity, and stimulated active

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participation in the teaching-learning process so that students become critical, engaged citizens committed to issues related to the intangible and cultural heritage of Marajó, environmental preservation, and biodiversity conservation.

Keywords: Medicinal plants, Active methodologies, Ethnobotanical knowledge, Health promotion, Socio-environmental education, Marajó Mesoregion.

INTRODUCTION

The use of medicinal plants is a historical practice of health care linked to traditional knowledge, community contexts, and sustainability strategies (Gomes et al., 2026). This body of knowledge, developed through empirical observation and collective experience, has been transmitted across generations, mainly through oral tradition and everyday practices, forming unique systems of health care that predate the institutionalization of modern medicine (Ding et al., 2024).

In Brazil and in different sociocultural contexts, the use of plant species for therapeutic purposes remains a recurrent practice, intertwined with traditional knowledge, community-based care strategies, and specific forms of biodiversity management (Bezerra & Oliveira, 2024). These practices are not limited to curative purposes but are embedded in ways of life, cultural identities, and expanded conceptions of health, even in contexts marked by the hegemony of the biomedical model (Vallejo et al., 2024). The persistence of such knowledge reveals the need to understand it in dialogue with contemporary scientific production, avoiding dichotomous approaches between tradition and science (Matos et al., 2024).

The use of medicinal plants is a cultural practice shared across generations among residents of the Marajó Archipelago, and many species are cultivated in home gardens due to a sense of safety, trust, and belief in their therapeutic potential. Thus, the use of these botanical species plays a central role in health, territorial identity, and sociocultural and environmental preservation, as reported by Pinheiro et al. (2025).

Brandão et al. (2024) suggest implementing pedagogical methodologies that incorporate

traditional knowledge about medicinal plants into school curricula, since this has a significant impact on children's development and enriches education through the integration of cultural and environmental practices.

Lack of contact with nature directly affects children's health and overall development, making them more vulnerable to extreme climate events. According to specialists, children's disconnection from green spaces, plants, and animals hinders the formation of respectful and even affective bonds with the environment (Lima & Fajardo, 2024). Therefore, schools must serve as environments in which children learn to interact, develop, and access new knowledge about the world, people, and the environment (Costa et al., 2024).

The implementation of pedagogical practices that stimulate the use of medicinal plants in educational settings through an interdisciplinary approach helps foster students' cognitive skills, strengthen bonds of environmental respect, and promote quality of life and differentiated learning (Nascimento et al., 2023). In this regard, Environmental Education (EA) is relevant for raising awareness about sustainability and fostering subjects engaged in environmental conservation (Rodrigues & Fonseca, 2026).

Science education in early childhood has been the focus of important studies, especially those aiming to create or refine more effective teaching methods and practices that develop new ways of thinking about science education. These approaches broaden discussions from an investigative and participatory perspective, encourage curiosity, exploration, wonder, inquiry, and children's understanding of the physical, social, and natural world, and promote interaction, self-care, sustainability, and biodiversity preservation (Ferreira et al., 2026).

Studying medicinal plants in Science classes in Elementary Education is crucial for connecting students to the relationships between nature and human health. When exploring these botanical species, students reclaim family and community knowledge, strengthening their sense of belonging and environmental responsibility (Jacyntho, 2025). Thus, the teaching-learning process must consider

students' unique characteristics and life experiences, stimulating them to seek new knowledge and become autonomous, critical socio-environmental agents with rights and responsibilities (Santos & Macedo, 2026). However, teaching about medicinal plants faces challenges due to the complexity of its concepts and technical procedures, requiring innovative didactic-pedagogical approaches that promote contextualization, scientific literacy, and sustainability (Lima et al., 2022).

Observation and experimentation are valuable didactic-pedagogical practices that aim to rescue and reinforce the cultural use of medicinal plants by communities, enabling interactive educational actions that connect cultural traditions and human-nature relationships across generations (Damasceno et al., 2023). Furthermore, active methodologies help stimulate students' protagonism in the teaching-learning process, cultivate genuine interest in ethnobotany, and encourage the sustainable use of natural resources, fostering scientific literacy (Sganzerla et al., 2026).

The socio-environmental topic of medicinal plants has become increasingly relevant in schools, as it encourages the recovery of traditional knowledge, fosters awareness of health benefits, and strengthens the formation of citizens engaged in biodiversity conservation. Therefore, the workshop on medicinal plants—part of the research project “Perception and knowledge about medicinal plants among residents of the urban area of Breves, in the Marajó Archipelago, Pará”—sought to promote socio-environmental education in a playful and didactic manner among students from a private Elementary School in Breves, aiming to teach about phytotherapy, medicinal plants, and the environmental importance of ethnobotanical species through clear and concise language.

METHODOLOGY

The methodology used was a qualitative approach through a case study and educational action research conducted with 17 6th-grade students at the Núcleo de Excelência Marajoara School (NEM), located within UNOPAR College in the urban area of Breves. According to Oliveira et al. (2026), action research with a qualitative approach allows investigation of pedagogical practices contributing to the

implementation of the Sustainable Development Goals (SDGs) in contemporary education, enabling exploration of a complex and multifaceted topic so that teaching becomes a versatile tool for fostering participation, critical reflection, transformative action, and environmentally responsible practices. The case study approach allows assessment of the most suitable methodologies to motivate students to become familiar with scenarios and characters related to specific situations, developing skills such as argumentation, teamwork, socio-environmental awareness, and others that enhance scientific education aligned with sustainability principles (Lima et al., 2025). All students participated after their guardians signed the Informed Consent Form, and the research was carried out from June to August 2025.

In June 2025, questionnaires were applied to investigate students' socio-environmental perceptions regarding medicinal plants. Afterwards, a workshop on medicinal plants was held in the UNOPAR Science Laboratory, where various experiments were carried out (Figure 1) to encourage student engagement. According to Costa et al. (2023), experimental activities provide more meaningful and effective learning based on Critical Environmental Education, allowing students to take an active, autonomous role in constructing collective knowledge and understanding socio-environmental issues by considering the interconnectedness of social and natural worlds, mediated by local, traditional, and scientific knowledge.

Figure 1

Workshop on medicinal plants at the Núcleo de Excelência Marajoara School (NEM).



Source: Authors, 2026.

Finally, 6th-grade students organized a medicinal plant exhibition (Figure 2) during a science fair on “Sustainability in the Amazon,” held on August 22, 2025, which coincides with Folklore Day. According to Sousa et al. (2025), such events stimulate students’ interest in scientific investigation, critical thinking, teamwork, and knowledge exchange with visitors.

Figure 2

Science fair on medicinal plants and sustainability in the Amazon at NEM School.



Source: Authors, 2026.

RESULTS AND DISCUSSION

ANALYSIS OF THE QUESTIONNAIRES ON SOCIO-ENVIRONMENTAL PERCEPTION

Seventeen 6th-grade students from NEM were interviewed: 8 boys and 9 girls. Regarding age, 23% were 10 years old, 62% were 11 years old, and 15% were 12 years old. When asked whether they knew any medicinal herb or plant, 69.2% answered yes, citing mint, chamomile, lemongrass, verônica, and capim-santo. According to Santos & Macedo (2026), prior knowledge allows medicinal plants to be used as didactic resources grounded in their rich cultural history, highlighting the intersection between traditional and scientific knowledge on biodiversity.

When asked whether older relatives had advised them to use medicinal plants, 64.7% said yes. Most noted the influence of grandparents and parents in teaching them about these species as important cultural heritage linked to community health and sustainable use of natural resources. This aligns with

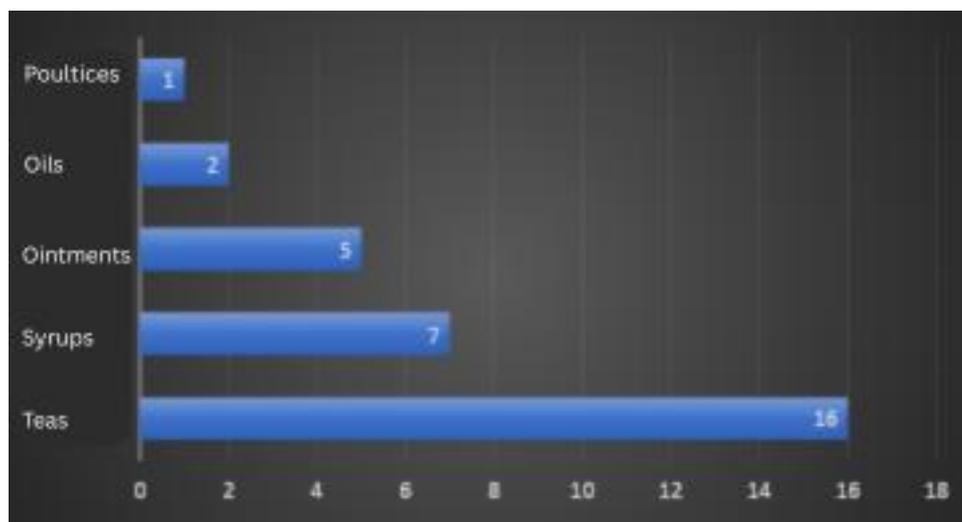
Silva et al. (2026), who argue that integrating popular knowledge with scientific evidence can advance public health and recognition of biodiversity as cultural and therapeutic heritage.

When asked about symptoms and illnesses treated with medicinal plants, students mentioned allergies, fever, headaches, and especially respiratory problems. According to Carvalho et al. (2025), herbal medicines are effective and safe as antioxidant, antiviral, antimicrobial, and anti-inflammatory agents, particularly for respiratory infections.

Regarding the most common method of preparation and consumption, tea was the most cited (16 mentions), followed by syrup (7 mentions), as shown in Figure 3. Teas are traditional preparations present in many cultures around the world, used therapeutically for thousands of years (Eberhardt et al., 2025). Additionally, tea consumption remains an important phytotherapeutic and complementary health strategy due to factors such as the high cost of industrialized medicines and, at times, limited access to quality healthcare systems (Souza et al., 2026).

Figure 3

How medicinal plants are prepared and consumed.



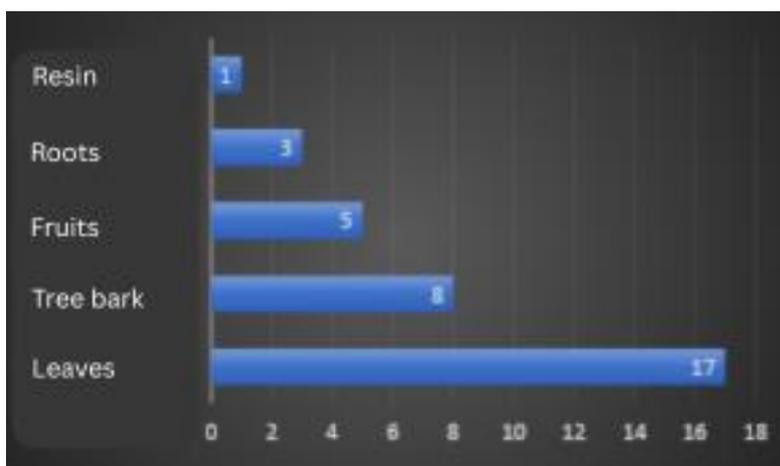
Source: Prepared by the authors, 2026.

Regarding the most commonly used plant parts, leaves were the most cited (17 mentions), followed by bark (8 mentions), as shown in Figure 4. According to Silva et al. (2026), the predominance

of leaves may be associated with ease of collection, seasonal availability, and the persistence of traditional knowledge identifying the most effective plant parts. Carbolim et al. (2025) also highlight that leaf collection is generally not harmful to plants, whereas excessive collection of bark and roots can damage or kill them.

Figure 4

Most commonly used plant parts reported by students.



Source: Prepared by the authors, 2026.

When asked whether they had ever felt unwell after consuming medicinal plants, only one student reported nausea and muscle discomfort. It is therefore important to emphasize that despite their traditional use, medicinal plants are often employed based on common sense, which may pose health risks. Thus, practices promoting the rational use of herbal medicines are necessary (Reis et al., 2025).

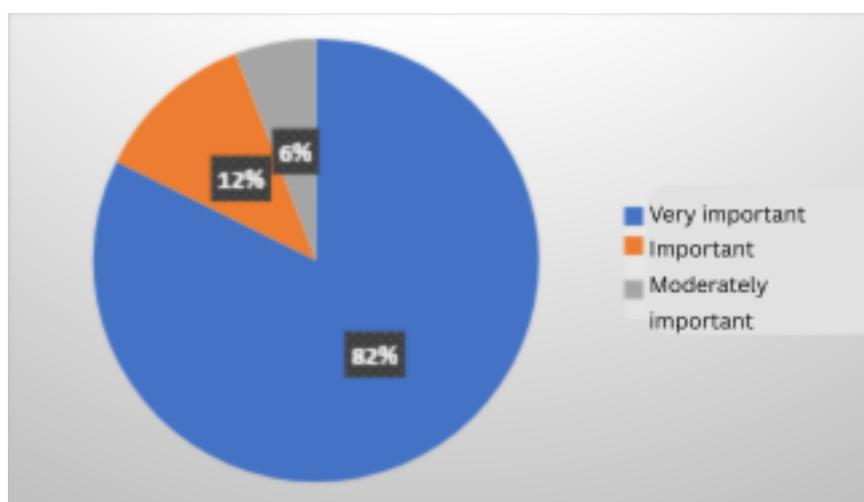
ANALYSIS OF THE QUESTIONNAIRES ON THE SOCIO-ENVIRONMENTAL EDUCATION WORKSHOP AND THE SCIENCE FAIR ON SUSTAINABILITY IN THE AMAZON

After the workshop and science fair, a questionnaire was applied to evaluate active methodologies for promoting health and environmental awareness. During the experimental activities, students prepared chamomile and fennel teas, aloe syrup with grape juice, and clove-based repellent. When asked about the importance of these procedures in the teaching-learning process, most students (82%) rated them as very

important, as shown in Figure 5. According to Holanda & Beranger (2025), such active methodologies significantly contribute to transforming teaching-learning practices toward more inclusive and effective approaches by engaging the entire school community. These authors also highlight the need for planned and sustainable integration of such innovations, aligning pedagogical strategies with resources and educational contexts.

Figure 5

Evaluation of active methodologies by 6th-grade students at NEM.



Source: Prepared by the authors, 2026.

When asked about the importance of these experimental practices for health, all students considered them highly relevant. According to Morais et al. (2025), experiences involving medicinal plants help people understand their health benefits while fostering respect for sustainability.

When asked about the importance of medicinal plants for the environment after the workshop and science fair, all students stated that they were very important. This finding is consistent with Magalhães (2025), who highlights the therapeutic, ecological, and sociocultural potential of medicinal plants and the importance of connecting theory and practice in environmental education and appreciation of traditional knowledge.

CONCLUSION

Although the use of medicinal plants is an ancestral practice discussed since the origins of humanity, it still presents challenges when addressed in formal educational settings. It is therefore essential that teachers act as mediators in the teaching-learning process and adopt active methodologies so that students become protagonists of an education that stimulates creativity, proactivity, teamwork, and the appreciation of invaluable intangible cultural heritage. Teaching should emphasize ethical principles grounded in ethnobotanical knowledge and sustainability, enabling students to become critical, committed, and engaged citizens in biodiversity conservation.

The experience reported in this article demonstrated the educational potential of cultural learning circles, especially regarding a theme rooted in popular tradition, allowing children to share their experiences and traditions and engage with the empirical knowledge embedded in Marajó's culture. Furthermore, the activities carried out in this research helped students from a private elementary school in urban Breves, Pará, in the Marajó Mesoregion, to cultivate a sense of connection to their culture and the environment, integrating traditional and scientific ethnobotanical knowledge through group dialogue and active participation in experimental activities and a science fair grounded in regionalism and environmental preservation.

Phytotherapy, ethnobotanical knowledge, and Science Education must be continuously explored, interconnected, and discussed to enhance meaningful learning practices in socio-environmental education.

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