ASTERACEAE FAMILY SPECIES USED AS MEDICINAL PLANTS IN THE TREATMENT OF RESPIRATORY DISEASES IN THE STATE OF AMAPÁ, AMAZON – BRAZIL: A SYSTEMATIC REVIEW

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ABSTRACT

Purpose: To conduct a survey of species of the Asteraceae family used to treat respiratory diseases in the state of Amapá.

Theoretical framework: The use of plants is part of popular Brazilian phytotherapy. Brazilian authorities have been regulating public policies focused on medicinal plants. Ethnobotanical and ethnofarmacological studies point to traditional knowledge about Asteraceae plants in the treatment of respiratory problems in the state of Amapá.

Method/design/approach: The review method was used, and scientific databases such as articles, theses, dissertations, and monographs were used as sources. Portuguese keywords such as "Medicinal Plants," "Respiratory System," "Ethnobotany," "Ethnofarmacology," and "State of Amapá" were used, as well as their English equivalents. Studies conducted in the Amapá territory from 2001 to 2021 were selected.

Results and conclusion: Eight species of Asteraceae indicated for respiratory pathologies were found, three of which are native to Brazil. There is a predominant use of herbaceous plants, leaves, and teas, with influenza being the most common illness treated. A. triplinervis (japana) stood out, as it was cited in five studies and is indicated for several diseases. Japana has relevant chemical and pharmacological studies that validate its ethnofarmacological use.

Research implications: The study is relevant for the valorization of traditional knowledge regarding the traditional knowledge and biodiversity of the Brazilian medicinal flora.

Originality/value: This research provides relevant information for the scientific community, as it provides data on popularly used medicinal plants that can serve as a basis for future chemical and pharmacological studies with the species found.

Keywords: Ethnobotany, Ethnofarmacology, Medicinal Plants, State of Amapá.

ESPÉCIES DA FAMÍLIA ASTERACEAE UTILIZADAS COMO PLANTAS MEDICINAIS EM TRATAMENTO DE DOENÇAS RESPIRATÓRIAS NO ESTADO DO AMAPÁ, AMAZÔNIA – BRASIL: UMA REVISÃO SISTEMÁTICA

RESUMO

Objetivo: Realizar um levantamento das espécies da família Asteraceae usadas para tratar doenças respiratórias no estado do Amapá.


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Resultados e conclusão: Encontrou-se oito espécies de Asteraceae indicadas para patologias respiratórias, três são nativas do Brasil. Há uso predominante de plantas herbáceas, folhas e chás, sendo a gripe a doenças mais frequente. Destacou-se a espécie A. triplinervis (japana), foi citada em 5 trabalhos e é indicada para várias doenças. A japana possui estudos químicos e farmacológicos relevantes que validam o seu uso etnofarmacológico.

Implicações da pesquisa: O estudo é relevante para a valorização dos saberes tradicionais no que diz respeito ao conhecimento tradicional e à biodiversidade da flora medicinal brasileira.

Originalidade/valor: Esta pesquisa possui informações relevantes para a comunidade científica, pois fornece dados sobre plantas medicinais usadas popularmente que podem servir de base para futuros estudos químicos e farmacológicos com as espécies achadas.


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1 INTRODUCTION

Diseases affecting the respiratory system are causes of global concern (World Health Organization, 2020). In Brazil, they are the main causes of hospitalizations and deaths, which has attracted the attention of the Brazilian authorities (Alexandrino et al., 2022; Dias et al., 2020). Medicinal plants in treatment of respiratory diseases are used in different countries with their own environmental and cultural contexts (Alamgeer et al., 2018; Bussmann & Glenn, 2010; Fatima et al., 2015; Marković et al., 2022; Šavikin et al., 2013). Despite the distances and differences, similarities are noted in the use of species to treat similar pathologies (Bones et al., 2022).

The use of plant products for the cure and treatment of diseases is as old as humans (Rahman et al., 2019). According to the World Health Organization, about 80% of the world population resorts to traditional medicine and a large portion of this therapy involves the use of plant extracts (Rolnik & Olas, 2021).

The Health Surveillance Agency defines a medicinal plant as a ‘plant species, cultivated or not, used for therapeutic purposes’. In which are present in the whole plant, or in one of its organs, substances responsible for the cure and/or relief of symptoms (Resolution of the Collegiate Board No. 10, 2010).

The knowledge and use of medicinal plants is the subject of investigations in ethnobotany and ethnopharmacology. These sciences play a fundamental role in the retrieval and registration of empirical knowledge about healing herbs (Siqueira & Pereira, 2014) and are important tools for finding species with medicinal potential (Kumar et al., 2022).

Ethnodirected research in the state of Amapá, exposes a rich pharmacopeia to treat various diseases of the respiratory apparatus, species from the families Lamiaceae, Fabaceae and Asteraceae stand out (Silva, 2016). The latter has commonly used species, but need studies to prove, or not, ethnopharmacological use (Silva & Moura, 2011).
In the Amapá literature, ethnobotanical and ethnopharmacological data on plants used in the treatment of respiratory diseases are widely dispersed. Because of this, literature review is an efficient method to bring them together and make them available to the various stakeholders. Based on this assumption, the aim of the study is to conduct a bibliographical survey of medicinal plants of the family Asteraceae traditionally used in the treatment of respiratory diseases in the state of Amapá.

2 THEORETICAL FRAME

The theoretical foundation, brings a brief description on topics that are the basis of this research. The subjects covered help in the understanding of the importance of medicinal plants, bringing information of general interest such as: origin of the use of medicinal plants; public policies of medicinal plants in the Brazilian territory; importance of ethnobotany and ethnopharmacology; diversity and importance of the botanical family Asteraceae; diseases of the respiratory system.

2.1 Origin of Medicinal Plant Use

The use of medicinal plants for the relief and cure of diseases has been happening since the beginning of human civilization. Primitive man sought in plant species medicinal substances that would relieve or cure their symptoms (Rahman et al., 2019).

In history, there is evidence of use of medicinal plants by different peoples such as Babylonians, Egyptians, Hebrews, Syrians, even evidence of older civilizations from Africa, China, Egypt and the Indus Valley (Rahman et al., 2019). Some of the oldest records are dated from 6,000 to 4,000,000 years, such as the poppy (Papaver somniferum) and marijuana (Cannabis sativa) (Dutra et al., 2016; ElSohly et al., 2017).

When it comes to medicinal herbariums, stand out: writing on Sumerian clay slab from Nagpur, India, about 5,000 years old (Duta-Cornescu et al., 2023); Pen Ts’ao, dated 2,800 BC, written by the Chinese herbologist Shen Nung (Almeida, 2011); and Ebers papyrus found in Egypt, about 1,500 BC (Pertile, 20 20). Both of these findings describe the medicinal plants, their ways of using them, and the treatable illnesses.

In South America, the use of medicinal plants goes back to the pre-Columbian period. Indigenous tribes used various herbs to treat various types of disease. Among the species most consumed is coca, traditionally used in the Andes region to relieve acute mountain sickness (Biondich & Joslin, 2015).

The first herbarium on the American continent was written by Martín De la Cruz and Juan Badiano, after the fall of the Aztec Empire. The manuscript was translated from Nahuatl, the language of the Aztec Indians of Mexico, into Latin and Spanish. The work is known as "Libellus de Medicinalibus Indorum Herbis" (Small Book of Medicinal Herbs of the Indians) and contains 185 drawings of plants used together with numerous recipes for the treatment of human diseases (Reyes-Chilpa et al., 2021).

In Brazil, the indigenous people were the first to use medicinal herbs, through healing rituals, practiced by the "pajés". Subsequently, knowledge was integrated with the cultural practices brought by Africans, European colonizers and Eastern immigrants (Almeida, 2011). This meeting of cultures culminated in ethnic and cultural diversity, which associated with the biodiversity of Brazilian flora, positively affected the perception about the use of medicinal plants and their applicability.

In the Brazilian Amazon, medicine with plants is a heritage cultivated by different peoples of the region such as the indigenous, caboclos, extractivists, rubber tappers,
lumbermen, fishermen, settlers, gold miners, among others. These populations have vast knowledge about plant species of medicinal and economic use, mainly of native species of Brazilian flora (Santos, 2000).

The state of Amapá is located in the northern region of Brazil and is part of the Brazilian Amazon, has different traditional groups such as extractivist, riverside, quilombo and indigenous (Lomba & Porto, 2020). These traditional communities have cultivated over the years knowledge about medicinal species (Silva, 2016).

2.2 Public Policies on Medicinal Plants in Brazil

Brazil has advanced environmental public policies aiming at environmental awareness and responsibility, much influenced by international conferences such as Eco 92, RIO+20 and the Conference of the Parties (Macêdo et al., 2021). Events such as the creation of the Traditional Medicine Program in the 1970s by the World Health Organization (World Health Organization, 2013), as well as national health conferences, were important in the process of developing policies aimed at the practice of traditional medicine in Brazil (Ministry of Health, 2016).

With the advance and acceptance of alternative medicine in the Brazilian territory, in 2006 the National Policy of Integrative and Complementary Practices was published. This policy regulated the implementation and incorporation into the Unified Health System of practices such as Acupuncture, Homeopathy and Phytotherapy (Ordinance No. 971, 2006).

Also in 2006, the National Policy of Medicinal and Phytotherapeutic Plants was approved, its objectives are to promote popular customs about the use of plants and home remedies, to ensure the quality and safety of plant species and their rational use, to foster the sustainable use of biodiversity, among others. In order to fulfill the objectives of this Policy, in 2008, the Brazilian Government approved the National Program of Medicinal and Phytotherapeutic Plants (Ministry of Health, 2016).

In 2009, the National Relationship of Medicinal Plants of Interest to the Unified Health System was created, which presents more than 70 medicinal plants, native or exotic, that have the potential to generate products of interest to the Unified Health System (Ministry of Health, 2021). The list is aimed at conducting and driving research that proves the safety and efficacy of the listed species.

As of 2012, plant species have been included in the National List of Essential Medicines. A compilation released by the Ministry of Health in which medicines are present selected from the best scientific evidence available, taking into consideration the effectiveness, effectiveness, safety, cost and availability. The drugs need to be positively evaluated by the National Commission for the Incorporation of Technologies into the Unified Health System and approved by the Secretariat for Science, Technology, Innovation and Strategic Inputs. Currently, 12 plants used for the production of phytotherapics are present in this document (Ministry of Health, 2022).

2.3 Ethnobotany and Ethnopharmacology

The term ethnobotanical emerged in 1896, by Hershberger, as an area that studies the link between man and plant species, used for food, medicine, clothing, ornamental, fence, wood, wood, agriculture, tools, etc. (Rahman et al., 2019). Ethnobotany on medicinal plants initially focused on the medical knowledge of indigenous and traditional peoples, focusing on the relationship between humans and plants in primitive environments (Soejarto et al., 2005).
Currently, it covers other spaces such as the ethnobotanical knowledge of subjects who live in large urban centers (Siqueira & Pereira, 2014).

Ethnopharmacology has an interdisciplinary research character, originating in various disciplines such as anthropology, pharmacology, botany, zoology, medicine, chemistry and statistics (Leonti, 2022). This field of study is defined as "The interdisciplinary exploration of biologically active agents traditionally employed or observed by man", whose goal is to rescue and document traditional knowledge, as well as to investigate and evaluate the agents employed (Bruhn & Rivier, 2019).

Ethnobotanical and ethnopharmacological studies provide empirical knowledge about medicinal flora, which are considered important tools for recording the use of medicinal plants by different populations (Albuquerque & Hanazaki, 2006). The two areas support experimental studies (in vivo and in vitro) aimed at evaluating pharmacological activities, bioactive compounds and plant toxicity (Kumar et al., 2022).

Ethnoknowledge coupled with scientific knowledge help in the creation of programs/projects focused on medicinal plants, as well as to make viable a strong and pertinent industry based on natural products. An economic activity in this scope would be a viable economic development agent by valuing biodiversity, knowledge and local culture, agreeing with the guidelines of sustainable development (Silva, 2016).

2.4 Diversity and Importance of the Asteraceae Botanical Family

Asteraceae is the most numerous family of angiosperms, containing about 1,600 genera and 25,000 individuals worldwide. This group has a strong presence in arid and semi-arid subtropical regions, presents a cosmopolitan distribution and is spread across all continents except Antarctica (Nikolić & Stevović, 2015; Rolnik & Olas, 2021). In Brazil, there are about 327 genera and 2,206 species of this family, of which 1,367 are endemic and are distributed in the 6 Brazilian biomes (Flor et al., 2022; Flora do Brasil, 2023).

Known worldwide as the sunflower family, the Asteraceae are the most successful group in terms of flowering plants. It has a long history in traditional medicine, and has been cultivated for food and therapeutic purposes for more than 3,000 years. Among the most popular herbs are chicory, sunflower, lettuce, dahlias, daisies, absinthe, chamomile and dandelion (Nikolić & Stevović, 2015; Rolnik & Olas, 2021).

The main characteristics of the family Asteraceae are: predominance of small individuals; easy to grow and propagate; presence of many secondary metabolites as a survival strategy. These factors favor the use of plants of the family Asteraceae as medicinal, ornamental, food, cosmetics and others (Da Silva, 2012).

The Asteraceae group has species frequently used to treat different diseases in different countries with different environmental and cultural contexts (Alamgeer et al., 2018; Bussmann & Glenn, 2010; Fatima et al., 2015; Marković et al., 2022; Šavikin et al., 2013). In Brazil (Martins, 2021; Sganzerla et al., 2022), as well as in the state of Amapá (Silva, 2016), the Asteraceae is among the three most common botanical families in ethnobotanical and ethnopharmacological investigations and have a diversity of plants indicated for several problems, including those affecting the human respiratory system.

2.5 Respiratory System Disorders

Diseases of the respiratory system affecting the nose, mouth, pharynx, larynx, trachea, bronchi and lungs. Their emergence is associated with environmental or individual issues, such
as temperature variations, humidity, smoking, dust, vapors, gases, viruses, bacteria, fungi, genetics, etc. (Alexandrino et al., 2022; Oliveira et al., 2020).

Respiratory tract disorders affect the airways and can range from acute to chronic, or even be classified as infectious, or not. Acute respiratory diseases include upper respiratory infections such as influenza (flu) and pneumonia. The best known chronic respiratory diseases are those that affect the lower airways such as asthma, bronchitis and emphysema (Dias et al., 2020).

The World Health Organization states that respiratory complications are among the leading global causes of death. For example, chronic obstructive pulmonary disease, the third largest cause of death in the world, followed by lower respiratory tract infections, the fourth largest (World Health Organization, 2020).

In Brazil, the main causes of mortality from respiratory diseases are influenza and pneumonia, chronic diseases of the lower respiratory tract, other respiratory diseases, other respiratory diseases that mainly affect interstitium, lung diseases due to external agents. And the most prevalent causes of morbidities are pneumonia, other respiratory tract diseases, bronchitis, emphysema and other chronic obstructive pulmonary diseases, asthma, acute bronchitis and acute bronchiolitis (Alexandrino et al., 2022).

3 METHOD

It is a systematic literature review, the scientific bases are articles, theses, dissertations and monographs, related to the use of plants to treat respiratory diseases in the state of Amapá, having as main focus species of the family Asteraceae. The search for ethnobotanical and ethnopharmacological studies carried out in the state of Amapá went through 4 stages: Identification; Screening; Eligibility; Inclusion (Figure 1).

Firstly, 34 publications were identified in the scientific bases: Google Scholar, SciELO and virtual libraries. Key words in Portuguese were used as "Medicinal plants", "Respiratory system", "Ethnobotany", "Ethnopharmacology" and "Estado do Amapá", as were their English correspondents "Medicinal plants", "Respiratory system", "Ethnobotany", "Ethnopharmacology" and "State of Amapá". Removed the duplicates, left 32 publications, of which 15 were deleted after reading the title and summary. The exclusion of the works was due to the fact that they did not fit the objective of the research or were literature reviews.

In the eligibility stage, 17 complete publications were evaluated and 10 were excluded because they did not meet the inclusion criteria, as was disclosed in the period from 2001 to 2021, containing information such as popular name, scientific name, botanical family, therapeutic indication (disease), vegetable part used and forms of use (Cercato et al., 2015).

At the end, 7 studies were included in the review. The data were collected and systematized in Excel spreadsheets, organized by ethnobotanical characteristics (such as vernacular name, scientific name, botanical family, way of life), origin and author(s) of the publication, and ethnopharmacological aspects (vegetable part used, form of use and diseases/symptoms).
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All species have had their nomenclature, family belonging, life form and origin reviewed on the website of Flora do Brasil (2023) or Tropics (2023). Thus, there was an update of species that were with the name or family out of date (Martins, 2021).

4 RESULTS

As a result, 8 species of the family Asteraceae indicated for treatments of respiratory pathologies were found (Board 1), the plants are distributed in seven ethnobotanical and ethnopharmacological studies carried out in the state of Amapá (Costa, 2013; Da Silva, 2010; Euler et al., 2019; Oliveira, 2019; Paula Filho, 2018; Sarquis et al., 2019; Silva, 2002).

Of the 8 species, (3) 37.50% are native to Brazilian flora and (5) 62.50% are exotic. For the purpose of this research, native species were taken to be those of natural occurrence in Brazil, and exotic species were those that do not occur naturally in the Brazilian territory, also known as cultivated, introduced or naturalized. In terms of life form, 7 (87.50%) plants can be classified as herbs, only one species is classified as shrub.

Board 1. Botanical aspects of species of the family Asteraceae traditionally used in the state of Amapá in diseases of the respiratory system and the author(s)

<table>
<thead>
<tr>
<th>Scientific name (Popular name)</th>
<th>Origin</th>
<th>Life Form</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cichorium intybus L. (chicory)</td>
<td>Cultivated</td>
<td>Grass</td>
<td>Euler et al. (2019)</td>
</tr>
<tr>
<td>Clibadium surinamense L. (cunambi)</td>
<td>Native</td>
<td>Shrub</td>
<td>Paula Filho (2018)</td>
</tr>
</tbody>
</table>
As regards ethnopharmacological aspects, the use of 5 plant parts (stem, flowers, leaves, root and seed) was identified, as well as 5 uses (bath, tea, bottle, juice/juice and syrup) and 7 symptoms/diseases (asthma, catarrh; influenza; pneumonia, cold; sinusitis; cough) (Board 2).

Regarding the plant part, the leaf had 6 (46.15%) indications, followed by the flower, seed and root with 2 (15.38%) plants indicated each, the stem with 1 (7.69%). As for the forms of use, tea is the most common with 7 (50.00%) plants, then bathing with 3 (21.43%) and syrup with 2 (14.29%) species, finally, the bottle and juice with 1 (7.14%) species each.

With respect to the therapeutic indications, influenza was the most frequent disease with 5 (29.41%) indications, followed by cough with 4 (23.53%), followed by cold with 3 (17.65%) and sinusitis with 2 (11.76%). Of the remaining 17.65%, there are diseases that had a lower frequency, such as asthma, catarrh and pneumonia.

**Board 2.** Pharmacological aspects of species of the family Asteraceae traditionally used in the state of Amapá in symptoms and diseases of the respiratory system

<table>
<thead>
<tr>
<th>Species</th>
<th>Part used</th>
<th>Form of use</th>
<th>Symptoms/Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Acmella oleracea</em> (L.)</td>
<td>Flowers; Leaves</td>
<td>Tea; Bottle; Syrup</td>
<td>Asthma; Influenza; Cough</td>
</tr>
<tr>
<td><em>Ayapana triplinervis</em> (Vahl)</td>
<td>Sheets</td>
<td>Bath; Tea; Juice; Syrup</td>
<td>Catarrh; Flu; Cold; Sinusitis; Cough</td>
</tr>
<tr>
<td><em>Cichorium intybus</em> L.</td>
<td>Leaf; Root</td>
<td>Tea</td>
<td>Sinusitis</td>
</tr>
<tr>
<td><em>Clibadium surinamense</em> L.</td>
<td>Seed</td>
<td>Tea</td>
<td>Pneumonia</td>
</tr>
<tr>
<td><em>Lactuca sativa</em> L.</td>
<td>Stem; Leaves; Root</td>
<td>Tea</td>
<td>Cough</td>
</tr>
<tr>
<td><em>Pectis elongata</em> Kunth</td>
<td>Seed</td>
<td>Tea</td>
<td>Flu; Cold; Cough</td>
</tr>
<tr>
<td><em>Tagetes erecta</em> L.</td>
<td>Sheets</td>
<td>Bath</td>
<td>Influenza</td>
</tr>
<tr>
<td><em>Tagetes minuta</em> L.</td>
<td>Flowers; Leaves</td>
<td>Bath; Tea</td>
<td>Flu; Cold</td>
</tr>
</tbody>
</table>

**Source:** Prepared by the authors (2022)

In terms of health care, a good part of the population, mainly of low income, uses medicinal plants in their day-to-day life. Plants are often the first resource sought for health care, due to economic conditions that do not allow individuals to acquire industrialized medicines (Da Silva et al., 2006).

Primary health care users would like a general practitioner to prescribe herbal remedies, as medical indications would increase confidence in them (Vale et al., 2021). Health professionals do not encourage the use of medicinal plants, either because of lack of knowledge, lack of time, lack of training to learn about the subject, or even because of lack of interest and neglect of popular medicinal practices (Araújo et al., 2012).

People who frequent health care units constantly use plants to treat respiratory disorders, mainly for flu-like symptoms (Silva et al., 2006; Vale et al., 2021; Zeni et al., 2017). Therefore,
scientific knowledge and popular knowledge about therapeutic herbs are fundamental for the qualification of the health professional, who is around one and a half faced with people who use medicinal plants.

Ethnobotanical research in different locations such as Morocco (Fatima et al., 2015), Pakistan (Alamgeer et al., 2018), Korean Peninsula (Kim & Song, 2012), Peru (Bussmann & Glenn, 2010), Balkan Peninsula in Southeast Europe (Marković et al., 2022), Brazil (Martins, 2021; Sganzerla et al., 2022), and others. They indicate that species of the family Asteraceae are often used to cure respiratory diseases. In these studies, medicinal plants are used mainly for the treatment of flu, colds and coughs.

It was reported that in the state of Amapá influenza is a constant disease in traditional communities, demonstrating to be a serious health problem. Influenza is one of the main diseases that cause hospitalization and deaths. It is the cause of annual epidemics, resulting in about 3 to 5 million cases of serious diseases and around 290,000 to 600,000 respiratory deaths.

When it comes to the origin of medicinal plants, in many Brazilian communities the use of both native and exotic species is observed. Native ones prove to be versatile in terms of applicability, whereas exotic ones show that they have specific uses. Versatility does not necessarily indicate that the plant has an abundance of chemical constituents (Gomes et al., 2017).

The largest number of medicinal plants used in the northern region of Brazil are herbaceous herbs or shrubs, which develop through the fields and in the undergrowth of the forest (Coradin et al., 2022). Some factors that support the use of herbs are: they invest considerably in secondary metabolites for their survival, such as alkaloids, glycosides and terpenoids, compounds that have interesting pharmacological activities; preferable because of their size, and can be grown in backyards, facilitating the collection of plant parts for medicinal use (Vásquez et al., 2014).

In Brazil, ethnobotanical studies indicate that the leaf is the most used vegetable part in homemade preparations, with teas, carried out by decoction or infusion, the most common preparations (Martins, 2021; Sganzerla et al., 2022). The collection of the vegetal parts is linked to the empirical knowledge of the populations about possible bioactive compounds of the species. For example, there is a preference for leaves that have some kind of smell, whether "unpleasant" as mastruz and malvarisk or "pleasant" as mint and goat, these are plants that have essential oils (Veiga, 2011). The essential oils present in plants are promising ingredients for the creation of phytomedicines used internally as syrups or liquids, and externally in the form of ointments or inhalations (Bylka et al., 2012).

The use of the leaf is also due to the ease of collection and the willingness to be present all year round, unlike flowers, fruits and seeds. Communities choose leaves and flowers as sensitive parts, simplifying the transformation into home remedies in a short time, unlike roots, stems and shells that need more time to be prepared (Vásquez et al., 2014).

Teas are widely used in health care, but are handled incorrectly, it is necessary to use the infusion form for soft parts (flowers and leaves) and decoction for hard parts (bark, roots and seeds). The tea made erroneously implies the loss of medicinal properties of the plant (Lima et al., 2013).

In relation to therapeutic efficacy, plant species popularly used in the cure of respiratory diseases have been investigated for their actions with positive results. Species of Asteraceae show multiple biological activities as anti-inflammatory, antioxidant, antimicrobial, attributed to their phytochemical properties, which include polyphenols, phenolic acids, flavonoids and triterpenes (Rolnik & Olas, 2021).

Secondary metabolites present in plants, such as flavonoids, saponins and alkaloids, have anti-inflammatory and antioxidant activities that help to improve respiratory problems.
Natural products with a possible mechanism of antibacterial and antiviral actions are seen as a promising remedy in the treatment of respiratory infections caused by bacteria, besides acting in the reduction of inflammations and diseases in the respiratory tract (Oliveira et al., 2020; Timalsina et al., 2021).

In this review, the polyvalence of the species *Ayapana triplinervis* was highlighted, it was cited by *five actors and* is indicated to treat different problems, such as catarrh, flu, cold, sinusitis and cough. Japan has also been reported to treat respiratory disorders in other regions of the Amazon (Vásquez et al., 2014; Sousa et al., 2022). Phytochemical studies with the species indicate the presence of coumarins and other compounds that have biological activities that validate their ethnopharmacological use, such as antiviral, antinociceptive, antiulcerative and anxiolytic (Rodrigues et al., 2022).

In preliminary research, it was observed that of the three native plants only *A. triplinervis* has a quantitative number of relevant studies on the active compounds and pharmacological actions, the other two (*P. elongata* and *C*) are *little studied*. On the other hand, all exotic species have a significant amount of publications. The lack of research with medicinal plants of the family Asteraceae native to Brazil is observed in another study (Silva & Moura, 2011).

It was noted that of the 8 species found in this review only *Tagetes minuta* L., an exotic plant, is included in some national program. The species is described in the National Relationship of Medicinal Plants of Interest to the Unified Health System (Ministry of Health, 2021).

5 FINAL CONSIDERATIONS

In this review, we found 8 species of the family Asteraceae used for the treatment of respiratory diseases in the state of Amapá. Results show prevalence of: exotic plants; herbaceous species; use of leaves; use of teas; indication for influenza. The most commonly cited species was *Ayapana triplinervis* (Vahl) R.M. King & H.Rob. (white/purple/field japan), native to brazilian flora.

This bibliographic research was limited to providing ethnobotanical and ethnopharmacological data on medicinal plants empirically used to treat respiratory diseases in the state of Amapá, focusing on the family Asteraceae, not going into depth on the scientific effectiveness of the species. The information provided may guide researchers in selecting plants for future research.

It is suggested that future studies investigate the bioactive compounds, pharmacological activities, and toxicity of medicinal plants of the Asteraceae family, especially of species native to Brazil, as there appears to be a gap in the literature of chemical and pharmacological studies with them. It is also recommended that *in vitro* and *in vivo* surveys examine the efficacy of plant species in the treatment of diseases of the respiratory system.

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