



ETHNO-KNOWLEDGE OF MEDICINAL PLANTS TO TREAT UTERINE PROBLEMS IN AMAPÁ COMMUNITIES, AMAZON, BRAZIL: AN INTEGRATIVE REVIEW

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ABSTRACT

Purpose: Review ethnobotanical studies carried out in the state of Amapá on the uses of medicinal plants for treating infection and inflammation in the uterus and subsequently identify the pharmacological effects described in the literature of these plant species

Theoretical framework: In Brazil, the use of medicinal plants helps in the prevention and treatment of various diseases, and it is commonly used by women from traditional communities to treat gynecological conditions.

Method: Integrative literature review. In order to search for articles, sources of information found in the following databases were used: Web of Science, Scopus, Google Scholar, LILACS and Medline. Ethnobotanical and ethnopharmacological studies carried out in Amapá from 2001 to 2021 and experimental studies (in vivo and in vitro) carried out in the period from 2018 to 2022 were included.

Results and conclusion: 23 medicinal plants traditionally used for the treatment of uterine infection and inflammation in Amapá communities were identified, highlighting *Fridericia chica* and *Stryphnodendron adstringens*, which presented studies proving their antifungal efficacy against fungi of the genus *Candida*, mainly *Candida albicans*. The study helps to recover popular knowledge about medicinal plants used alternatively for the treatment of gynecological conditions

Research implications: This study contributes to the identification of plant species traditionally used in gynecological pathologies and identifies the pharmacological effects of these vegetables in the literature, serving as a support for biotechnological development and the discovery of new drugs.

Originality/value: This review sought to present to the scientific and pharmaceutical community what is currently being researched on bioactive compounds from medicinal herbs aimed at treating infection and inflammation that affect women's gynecological health.

Keywords: Phytotherapy, Ethnobotany, Medicinal Plants, Women's Health, Gynecological Problems.

ETNOCONHECIMENTO DE PLANTAS MEDICINAIS PARA TRATAR PROBLEMAS UTERINOS EM COMUNIDADES AMAPAENSES, AMAZÔNIA, BRASIL: REVISÃO INTEGRATIVA

RESUMO

Objetivo: Revisar estudos etnobotânicos realizados no Estado do Amapá sobre os usos de plantas medicinais para tratamentos de infecção e inflamação no útero e posteriormente identificar os efeitos farmacológicos descritos na literatura das referidas espécies vegetais.

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Referencial teórico: No Brasil o uso de plantas medicinais auxilia na prevenção e tratamento de diversas doenças, sendo comumente empregada por mulheres de comunidades tradicionais para o tratamento de afecções ginecológicas.

Método: Revisão integrativa da literatura. Para a busca dos artigos foram utilizadas informações encontradas nas bases de dados: *Web of Science*, *Scopus*, *Google Scholar*, *LILACS* e *Medline*. Foram incluídos estudos etnobotânicos e etnofarmacológicos realizados no Amapá de 2001 a 2021 e estudos experimentais (*in vivo* e *in vitro*) realizados no período de 2018 a 2022

Resultados e conclusão: Foram identificadas 23 espécies plantas medicinais tradicionalmente utilizadas para o tratamento de infecção e inflamação uterina em comunidades amapaenses destacando-se a *Fridericia chica* e *Stryphnodendron adstringens* que apresentaram estudos comprovando sua eficácia antifúngica contra fungos do gênero *Candida* em principal a *Candida albicans*. O estudo auxilia no resgate do conhecimento popular sobre plantas medicinais empregadas alternativamente para o tratamento de afecções ginecológicas

Implicações da pesquisa: Este estudo contribui na identificação de espécies vegetais usadas tradicionalmente nas patologias ginecológicas e identifica na literatura os efeitos farmacológicos desses vegetais, servindo como subsídio para o desenvolvimento biotecnológico e a descoberta de novos fármacos.

Originalidade/valor: Esta revisão buscou apresentar à comunidade científica e farmacêutica o que está sendo pesquisado atualmente sobre compostos bioativos de ervas medicinais voltadas para o tratamento de infecção e inflamação que afetam a saúde ginecológica da mulher.

Palavras-chave: Fitoterapia, Etnobotânica, Plantas Medicinais, Saúde da Mulher, Problemas Ginecológicos.

ETNO-CONOCIMIENTO DE PLANTAS MEDICINALES PARA TRATAR PROBLEMAS UTERINOS EN COMUNIDADES DE AMAPÁ, AMAZONÍA, BRASIL: UNA REVISIÓN INTEGRAL

RESUMEN

Propósito: Revisar los estudios etnobotánicos realizados en el estado de Amapá sobre los usos de las plantas medicinales para el tratamiento de la infección e inflamación en el útero y posteriormente identificar los efectos farmacológicos descritos en la literatura de estas especies vegetales.

Marco teórico: En Brasil, el uso de plantas medicinales ayuda en la prevención y tratamiento de diversas enfermedades, y es comúnmente utilizado por mujeres de comunidades tradicionales para tratar afecciones ginecológicas.

Método: Revisión integrativa de la literatura. Para la búsqueda de artículos se utilizaron fuentes de información encontradas en las siguientes bases de datos: *Web of Science*, *Scopus*, *Google Scholar*, *LILACS* y *Medline*. Se incluyeron estudios etnobotánicos y etnofarmacológicos realizados en Amapá de 2001 a 2021 y estudios experimentales (*in vivo* e *in vitro*) realizados en el período de 2018 a 2022.

Resultados y conclusión: Se identificaron 23 plantas medicinales tradicionalmente utilizadas para el tratamiento de la infección e inflamación uterina en comunidades de Amapá, destacando *Fridericia chica* y *Stryphnodendron adstringens*, que presentaron estudios que demostraron su eficacia antifúngica contra hongos del género *Candida*, principalmente *Candida albicans*. El estudio ayuda a recuperar el conocimiento popular sobre las plantas medicinales utilizadas alternativamente para el tratamiento de afecciones ginecológicas.

Implicaciones de la investigación: Este estudio contribuye a la identificación de especies vegetales tradicionalmente utilizadas en patologías ginecológicas e identifica los efectos farmacológicos de estas hortalizas en la literatura, sirviendo de apoyo para el desarrollo biotecnológico y el descubrimiento de nuevos fármacos.

Originalidad/valor: Esta revisión buscó presentar a la comunidad científica y farmacéutica lo que se está investigando actualmente sobre compuestos bioactivos de hierbas medicinales destinados a tratar infecciones e inflamación que afectan la salud ginecológica de las mujeres.

Palabras clave: Fitoterapia, Etnobotánica, Plantas medicinales, Salud de la mujer, Problemas ginecológicos.



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1 INTRODUCTION

It is estimated that 75% of Brazilian women have already presented some gynecological problem in the course of their lives (Amorim & Santos, 2003). In the female universe, the main conditions are linked to amenorrhea, pelvic disease, endometriosis, vulvovaginitis and uterine problems (cancer, bleeding, fibroids, etc.) (Brazil, 2011).

Although gynecological problems are not among the leading causes of women's deaths, many diseases of the reproductive system could be prevented. A strategy for female self-care is the use of medicinal plants (Silva, Silveira & Gomes, 2016), since these are major sources of secondary metabolites that can be used by humans to improve their health conditions, being effective for the treatment of several diseases that affect the human body (Viana, Souza & Nobre, 2020).

According to Santos and Avelar (2011), the use of medicinal plants in the treatment of gynecological problems is a very common narrative of women, especially those living in rural areas. Northeastern and northeastern women have the most diverse repertoire of plants in the treatment of gynecological problems.

In the Amazon, the use of plants to treat diseases is cultural, often the only option in remote communities, due to the distance from urban centers and the precariousness of the public health system (Silva et al., 2021). The high cost of medicines strengthens the search for alternative treatments based on medicinal herbs by the Brazilian population, since it is an accessible and abundant resource (Oliveira, 2016).

The use of medicinal plants in the treatment and cure of diseases is a human practice for thousands of years and has been transmitted through long generations to the present day. The recognition of traditional knowledge about medicinal flora is reflected today in the pharmaceutical industry, since many remedies are derived from plants (Silva et al., 2022).

In the state of Amapá, traditional communities know and use many plants in healing therapies, a low-cost alternative for communities lacking access to conventional medicine (Silva, Frazio & Reis, 2020).



In this way, this research seeks to review ethnobotanical studies carried out in the State of Amapá on the uses of medicinal plants for the treatment of uterine problems and later identify the pharmacological effects described in the literature of said plant species.

2 THEORETICAL FRAME

The use of plant species for the treatment of ailments is a very old practice. Throughout history, man seeking his survival, has resorted to plants for his food and to treat ailments (Veiga Junior, Pinto & Maciel, 2005). Over time, through experimentation, populations have improved plant management, generating a rich knowledge about its benefits and medicinal properties (França et al., 2008; Antonio, Tesser & Moretti-Pires, 2013).

The World Health Organization defines medicinal plants as "any plant which has, in one or more organs, substances which may be used for therapeutic purposes or which are precursors of semi-synthetic drugs" (WHO, 1998, p. 01).

In Brazil, popular phytotherapy for the treatment and prevention of diseases is cultural, where knowledge is transmitted from generation to generation (Santos et al., 2013). In Brazil, the use of medicinal plants originated in indigenous, African and Portuguese knowledge and practices in the colonial period. There are records that the first Portuguese colonists doctors, faced with the scarcity of the supply of medicines, realized the importance of Brazilian herbs from the indigenous peoples (Menezes, 2014; Aragão, 2018).

For Bolzani (2016) the use of medicinal plants in Brazil is associated with the rich diversity of plant species available in nature, the high cost of conventional medicines and the adverse effects of synthetic drugs.

In the scenario of public policies, the regulation of two important laws, the National Policy of Integrative and Complementary Practices (PNPIC) and the National Policy of Medicinal and Phytotherapeutic Plants (PNPMF), both approved in 2006, evidences the importance of the Brazilian medicinal plant species and their correct use in the recovery and maintenance of the population's health, including in the intimate health of women (Brazil, 2006a, 2006b).

The National Program of Medicinal and Phytotherapeutic Plants was created with the intention of guaranteeing the Brazilian population safe access, the correct use and the rational use of medicinal and phytotherapeutic plants, reinforcing the importance of phytotherapy in the SUS and social inclusion. With the creation of this program, the Ministry of Health released the



National Relationship of Medicinal Plants of Interest to the SUS (RENISUS), consisting of seventy-one medicinal plants indicated for the therapeutic use of the population (Brazil, 2008; Brazil, 2009).

Castro and Figueiredo (2019 p.57) infer that public policies related to medicinal plants "are configured in an institutionalization of popular and traditional knowledge, in the dissemination of knowledge of national biodiversity and in the promotion of the national pharmaceutical industry"

Medicinal plants represent an important mechanism in promoting health in many Brazilian regions, rural communities are the main holders of this type of knowledge, which is of great interest to ethnobotany (Franco, Ferreira & Ferreira, 2011).

The research area of ethnobotany investigates and studies the use of plants for medicinal, cultural, religious and conservationist purposes, thus offering practical elements for researchers and favoring the discovery of new medicines (Franco et al., 2011). Faced with this question, the importance of ethnobotanical studies on medicinal plants as tools in the drug prospecting subsidy arises (Sganzerla et al., 2020).

2.1 ETHNOKNOWLEDGE OF MEDICINAL PLANTS USED IN UTERINE INFECTIONS

In the Brazilian context, many women use medicinal plants to treat gynecological diseases (Pacheco, 2021), mainly in rural communities by numerous factors, such as distance from urban centers, lack of access to the public health system and the high cost of consultations, examinations and pharmaceutical remedies (Flor & Barbosa, 2015; Paiva et al., 2017). In the reproductive system, when it comes to uterine infections, women from the interior of Brazil and even from urban centers make use of medicines with plants evidenced in ethnobotanical studies in various states of Brazil.

Carvalho et al (2020) recorded the use of Pega pinto (*Boerha diffusa* L.) in treatments for infections and inflammation of the uterus used in the rural community of Santa Marta, Municipality of Corrente, State of Piauí

In the municipality of Frei Martinho (PB), it was noted the use of cotton (*Gossypium hirsutum*), plum (*Ximenia americana*), mastic (*Myracrodruon urundeuva*), Babosa (*Aloe vera*), banana tree (*Musa paradisiaca*), cashew/cashew purple (*Anacardium occidentale*), catingueira (*Caesalpinia pyramidalis*), corama (*Bryophyllum pinnatum*), mint (*Plectranthus inicus*), malva (*Malva sylvestris*), for treatment of uterine infections (Soares, 2015).



Teixeira (2022), when carrying out an ethnobotanical study with the inhabitants of the municipality of Candiba, in the state of Bahia, registered the uses of the following species in treatments of uterine inflammations: Babosa (*Aloe vera* (L.) Burm. f.; Losna (*Artemisia absinthium* L.); Barbatimão (*Stryphnodendron coriaceum* Benth.); Oregano (*Origanum vulgare* L.); Avocado (*Persea Americana* Mill); Pomegranate (*Punica granatum* L.); Tanchagem (*Plantago major* L.); Bassourinha de Nossa Senhora (*Scoparia dulcis* L.) e a Arruda (*Ruta graveolens* L.).

In the municipality of Capistrano (CE), the use of aroeira (*Myracrodruon urundeuva* Allemão) and plum (*Ximenia americana* L.) was found to treat gynecological problems (Freitas, Costa & Celestino, 2016). *Myracrodruon urundeuva* has also been cited for treatment of uterine infections (Pereira, 2019).

Ferreira, Lebuino and Santos (2021), when carrying out an ethnobotanical survey to identify species of medicinal plants most used in traditional medicine in Redenção, in the southern region of Pará, found the use of Crajiru, Pariri (*Arrabidaea chica*) in gynecological inflammations.

In the Brazilian Amazon, there are records of the use of medicinal plants for uterine problems of the following species: white top (*Jatropha curcas*), olive tree/jamelão (*Syzygium cumini*), purple cotton (*Gossypium arboreum* L.), taperebazeiro (*Spondias mombin* L.), etc. (Santos-Silva & Oliveira, 2017; Silva, Leone & Cella, 2022).

3 METHODOLOGY

The present research is an integrative review (IR) of the literature, which aims to carry out an analysis based on knowledge built up in previous investigations, systematizing and standardizing the information on medicinal plants used for the treatment of uterine disorders, generating a new knowledge from these data present in the literature. With this method it is possible to include studies carried out in various ways, integrating different concepts, opinions and ideas (Mendes, Silveira & Galvão, 2008).

For the realization of this IR, the following guiding question was elaborated: which plants are used for the treatment of uterine problems in the state of Amapá, and what does the literature describe about its active principles and pharmacological actions?

In order to analyze the medicinal plants used for uterine disorders and their pharmacological potential, we divided this research into two stages: in the 1st stage we sought



non-experimental research (ethnobotanical and ethnopharmacological) carried out in Amapá territory; and in the 2nd stage we looked in the literature, national and international, experimental research (active principles and pharmacological action) with the species indicated for uterine infections.

The survey of ethnobotanical and ethnopharmacological publications took place on the search platforms: Google Scholar and national virtual libraries. To be included, the work should have been carried out in the state of Amapá, between 2001 and 2021, and detail the botanical and pharmacological aspects of the plant species used in the treatment of uterine infections. The key words in Portuguese were used: "Medicinal plants", "ethnobotany", "ethnopharmacology" and "Estado do Amapá",

The search in literature for active principles and pharmacological actions took place in the virtual platforms: Web of Science, Scopus (access through the journal portal of CAPES), Latin American and Caribbean Literature in Health Sciences (LILACS), Medical Literature Analysis and Retrieval System on-line (Medline) and virtual libraries.

For the investigation of the experimental studies we used the advanced search fields by writing the scientific name of the species(s) next to the key words in Portuguese "infection", "active ingredient", "bioactive compound", "pharmacological action" and "biological activity", and their respective in English "infection", "active principle", "bioactive compound", "pharmacological" and "biological activity".

The selection of the works followed the following inclusion criteria: experimental studies (in vivo and in vitro) carried out in the period from 2018 to 2022, be in Portuguese, English or Spanish. The exclusion criteria were: literature review studies, incomplete and duplicate articles, outside the established period, editorials, books, book chapters, manuals and articles that did not answer the guiding question.

4 RESULTS AND DISCUSSIONS

The review allowed the identification of 23 species indicated for the treatment of infections and inflammation in the uterus (Table 1). They are distributed in 17 botanical families, the Fabaceae being the most representative botanical family with 3 species.



Table 1

Literature on Medicinal Plants cited in treatment of infection and inflammation in the uterus in the state of Amapá

Botanical family	Scientific name	Vegetable part	Form of use	Citation
Amaranthaceae	Alternanthera bettzickiana (Regel) G. Nicholson	Sheet	Tea	Silva (2002)
	Alternanthera ficoidea (L.) Yes.	Sheet	Tea	Silva (2002)
		Sheet	Tea	Sarquis et al. (2019)
Anacardiaceae	Mangifera indica L.	Sheet	Tea	Silva (2002)
	Spondias mombin L.	Shell	Washing	Silva (2002)
Apocynaceae	Himatanthus sucuuba (Spruce ex Müll. Arg.) Woodson	Shell and Exudate	Topical use	Sarquis et al. (2019)
		Shell	Tea	Silva (2002)
		Shell	Tea	Costa (2013)
Araceae	Caladium humboldtii (Raf.) Schott	Sheet	Tea	Sarquis et al. (2019)
Arecaceae	Bactris maraja mart.	Root	Tea	Sarquis et al. (2019)
		Root	Macerated	Sarquis et al. (2019)
Bignoniaceae	Fridericia chica (Bonpl.) L.G. Lohman	Sheet	Tea	Silva (2002)
Costaceae	Costus spicatus (Jacq.) Sw.	Sheet	Bottle	Paula Filho (2018)
		Stem	Tea	Sarquis et al. (2019)
Dilleniaceae	Curatella americana L.	Shell	Washing	Silva (2002)
Euphorbiaceae	Croton Urucurana Baill.	Shell	Tea	Sarquis et al. (2019)
Fabaceae	Caesalpinia ferrea C. Mart	Broad beans	Tea	Silva (2002)
	Dalbergia monetaria L. f.	Bark (Stem)	Tea	Silva (2002)
		Whole Plant	Washing	Costa (2013)
	Stryphnodendron astringens (Mart.) Coville	Shell	Compress	Euler et al. (2019)
Plantaginaceae	Veronica Spicata L.	Shell	Washing	Euler et al. (2019)
Lamiaceae	Plectranthus amboinicus (Lour.) Spreng	Sheet	Syrup	Silva (2002)
Lauraceae	Cinnamomum verum J. Presl	Shell and Leaf	Syrup	Sarquis et al. (2019)
	Persea americana Mill.	Shell and Leaf	Tea	Sarquis (2019)
		Stone	Ready	Silva (2002)
Lecythidaceae	Bertholletia excelsa Bonpl	Chestnut	Tea	Costa (2013)
Musaceae	Musa acuminata L.	Manganga	Bottle	Paula Filho (2018)
Myristicaceae	Virola surinamensis (Rol. ex Rottb.) Warb!	Shell	Bottle	Paula Filho (2018)
		Shell	Tea	Silva (2002)
		Shell	Washing	Silva (2002)
Poaceae	Cymbopogon citratus (DC.) Stapf	Sheet	Tea	Sarquis et al. (2019)
Rutaceae	Ruta graveolens L.	Sheet	Tea	Sarquis et al. (2019)
		Sheet	Tea	Silva (2002)

Source: Prepared by the authors (2023)

In relation to ethnobotanical and ethnopharmacological aspects, the bark was the most used vegetable part, being reported 14 times (42.42%), then the leaf 13 times (39.39%), the root twice (6.06%), and finally the beans, exudate, stone, chestnut, manganga and whole plant with once (3.03%), each. On the form of use, tea was indicated 19 times (57.58%), washing five



times (15.15%), bottled three times (9.09%), syrup twice (6.06%), prepared, topical use, macerated and compressed were indicated once (3.03%), each.

This shows that the bark and the leaves of the plants are the parts most used by the traditional communities in the preparation of phytotherapies. The use of the bark and leaf is described in the literature as the main part employed in popular herbal medicine due to the year-round availability and ease of handling (Paula filho, 2018)

Among the 23 species of medicinal plants used to treat infection/inflammation in the uterus, 5 (*C. spicatus*, *C. ferrea*, *S. astringens*, *P. americana* and *R. graveolens*) are part of the National Relationship of Medicinal Plants of Interest to the Unified Health System (RENISUS) (Anvisa, 2014). This list includes herbs used by the population that have already had scientific proof and that have the potential to generate products of interest to the SUS.

In primary health care, the user profile of medicinal plants consists of elderly women with low education and income, both in Brazil and internationally, highlighting the role of women in the production, use and transmission of traditional knowledge (Patrício et al., 2022). It is older women who possess the largest share of knowledge about medicinal plants propagated between generations (Euler et al., 2019).

In recent decades there has been a growing appreciation of the knowledge built up by traditional populations, mainly due to scientific and economic interests (Oliveira et al., 2009). Ethnobotanical research with medicinal plants contributes to the rescue, registration and valuation of popular knowledge, and also helps in the scientific knowledge of the species for the conservation of the local biodiversity.

The benefits of medicinal plants are diverse, including the reduction of costs for health, the prevention of certain diseases, the integration of popular and scientific knowledge, and health promotion, among others. Scientific knowledge about the pharmacological actions of plant species and traditional use is of great value to health professionals responsible for attending to women in the treatment and prevention of gynecological problems (Pereira et al., 2019).

The popular knowledge of medicinal plants used by women should be researched, understood, compiled, disseminated and, together with pharmacological studies, evidence their effectiveness and ensure safety in the use of plant species (Tariq et al., 2018). Therefore, it is essential to rescue women's empirical knowledge, in relation to the plants indicated for the treatment of female problems (Melo, Magalhães & Randau, 2022).



However, many popularly used species have no scientific proof of their efficacy, that is, there is still a lack of knowledge about chemical, pharmacological and toxicological properties in order to ensure the efficacy and safety of medicinal plants (Souza-Moreira, Salgado & Pietro, 2010).

Of the 23 species indicated for the treatment of infections and inflammation in the uterus in studies carried out in Amapá, only 8 presented studies carried out in vitro and in vivo in the period from 2018 to 2022, resulting in 10 articles in total (Table 2).

Table 2

Literature of works in vitro and in vivo of medicinal plants cited by traditional Amapá communities.

Scientific name	Part used	Active ingredient	Pharmacological action	citation
<i>Alternanthera tenella</i> Colla	Whole plant	Flavonoids	Anti-inflammatory, anti-edematogenic and anti-hyperalgesic	Kassuya et al. (2021)
<i>Himatanthus articulatus</i> (Vahl) Woodson	Latex	c-flavonoids, amino acids, alkaloids and fatty acid amides	Scarring	Herrera-Calderón et al. (2021)
<i>Fridericia chica</i> (Bonpl.) L.G. Lohman	Sheets	Flavonoids	Anti-inflammatory	Takenaka et al. (2020)
<i>Croton Urucurana</i> Baill.	Shell	Proanthocyanidine, flavonoids and alkaloids	Anti-inflammatory and healing	Casao et al. (2020)
<i>Libidibia ferrea</i> L.	Fruit	Gallic and elagic acids	Anti-inflammatory, antioxidant and antinociceptive	Falcon et al. (2019)
<i>Dalbergia monetaria</i> L. f.	Bark and leaves	isoflavone c-glycosides and proanthocyanidins.	Antibacterial	Moura et al. (2020)
<i>Stryphnodendron astringens</i> (Mart.) Coville	Bark	Galocatechin, epigallocatechin and O-methylpigallocatechin	Scarring	Alves et al. (2022)
<i>Stryphnodendron astringens</i> (Mart.) Coville	Shells and leaves	Phenolic	Antioxidant and antimicrobial	Cruz et al. (2022)
<i>Ruta graveolens</i> L.	Airside	Rutin, syringic acid and naringenin.	Antioxidant, anti-inflammatory and antimicrobial	Mokhtar et al. (2022)
<i>Ruta graveolens</i> L.	Sprout	Furanocoumarin and alkaloids.	Antioxidants and antibacterial	Szewczyk et al. (2022)

Source: Prepared by the authors (2023)

Alternanthera tenella Colla is a plant native to Brazil, often used as tea for the treatment of infections and inflammations. In this species, six flavonoids were identified in its ethanolic extract, the pharmacological test showed significant anti-inflammatory effects in some models of inflammation (Kassuya et al., 2021). The importance of anti-inflammatory drugs is



undisputed, but the class most used by the population, non-steroids, can cause adverse reactions to the human body (Gaddi et al., 2004). Medicinal plants have the potential to become an accessible and effective alternative in combating inflammations, provided that they are proven to be effective.

The topical use of *Himatanthus sucuuba* latex applied twice a day to mouse wounds had a regenerative effect after 10 days of administration (Herrera-calderón et al., 2021). A similar result evaluated the curative properties of the latex of *H. sucuuba* in albino mice during a 15-day treatment period, once daily administration showed promising anti-inflammatory and healing actions (Calero-Armijos et al., 2020). These studies provide a sound scientific basis for the traditional use of *H. sucuuba* to treat various inflammatory diseases and act as a healing agent.

The hydroethanolic extract of *Fridericia chica* was evaluated in an experimental model of intestinal mucositis induced by 5-fluorouracil, the treatment normalized intestinal permeability, bacterial translocation, myeloperoxidase/peroxidase activity, eosinophilic and preserved the architecture of the intestinal epithelium, exhibiting anti-inflammatory potential (Takenaka et al., 2020). The hydroethanolic extract of the leaves of *F. chica* showed antifungal effect against *Candida albicans* and *Candida krusei*, in the test in vulvovaginal candidiasis model the material showed mycological cure after 6 days of treatment, this result was compared to the commercial antifungal nystatin (Lima et al., 2022). Given that *Candida albicans* is historically known as the main causative agent of vulvovaginal candidiasis, it is imperative to develop antifungal therapies against this disease.

An ointment made from the ethanolic extract of the bark of *Croton urucurana* showed the presence of compounds derived from proanthocyanidins, flavonoids and other phenolic compounds. As for its possible healing action in vivo, the ointment accelerated the healing of skin wounds in 7 and 14 days, showing it to be quite effective in the formation of a strong scar compared to the drug silver sulfadiazine (Casao et al., 2020).

In pharmacological tests, the crude extract and the fruit fractions of *Libidibia ferrea* L. showed anti-inflammatory and antinociceptive activities in vivo and increased cell viability in vitro. One of the fractions showed potent anti-inflammatory activity similar to diclofenac (10 mg/kg), a medicine of the group of non-steroidal anti-inflammatory drugs that has an anti-inflammatory and analgesic action. The biological activities observed may be related to the polyphenolic gallic and elagic acids (Falcão et al., 2019).



In an investigation of antibacterial activity of the *Dalbergia monetaria* species against Gram-negative and Gram-positive strains, the extract of the bark and leaves of this plant inhibited the tested strains, the fraction of the leaves showed the greatest activities (Moura et al., 2020). The study corroborates the efficacy of *D. monetaria* in the traditional use for treatment of urinary tract infection, since the actions of ethyl acetate from the bark and leaves have antibacterial activities.

The barbatimão (*Stryphnodendron astringens*) is rich in phenolic compounds, study reveals that the species has high antioxidant activity and, the in vitro test showed effects against gram-positive bacteria *Staphylococcus aureus* and *Staphylococcus epidermidis*, which cause infections in humans (Cruz et al., 2022). Another research exposes that barbatimão accelerates the healing process due to the lower intensity of the inflammatory reaction, activity is attributed to the presence of the compounds catechin and epigallocatechin (Alves et al., 2022). In the literature, *S. astringens* showed antifungal properties against several pathogens, including *C. albicans*, *C. parapsilosis* and *C. tropicalis*, controlling infection and without toxic effects (Ishida et al., 2006; Freitas et al., 2018)

Ruta graveolens L. has promising antioxidant, anti-inflammatory and antimicrobial properties linked to its chemical composition formed mainly by alkaloids, coumarins, phenols and flavonoids (Mokhtar et al., 2022; Szewczyk et al., 2022). Although rue has studies that prove its biological actions, it is important to note that it is a herb used as an abortion, so its use should be carried out with caution due to its potential side effects and toxicity that can be harmful to women, particularly pregnant women (De David & Pasa, 2015). As a result, more research is needed with this plant species to fully understand its effects and determine safe and effective use in the context of gynecological health.

Although there is a large investment by the pharmaceutical industry in the production of increasingly potent antibiotics, antimicrobial resistance to drugs is growing, becoming a public health problem in Brazil and the world (Silva & Aquino, 2018). The anti-inflammatory effect of some medicinal plants is associated with the presence of constituents such as flavonoids, tannins, terpenoids, alkaloids, peptides, saponins and coumarins (Marmitt et al., 2015). Some of these constituents were present in a large part of the plants studied in this review

Research into the production of extracts and isolation of pure substances from natural products for the development of new synthetic or semi-synthetic drugs with anti-infectious activities represents a growing field in the scientific community, considering that these



medicinal herbs possess valuable phytochemical compounds that may result in new drugs for the treatment of various human diseases (Marques-Santos et al., 2023).

In this review, it was possible to identify that *Fridericia chica* and *Stryphnodendron astringens* traditionally used for the treatment of gynecological diseases have antifungal properties against *Candida albicans* proven in preclinical studies. Supporting its traditional use against this pathology that frequently occurs in thousands of women in Brazil.

5 FINAL CONSIDERATIONS

Starting from this review, it was possible to identify 23 species of medicinal plants traditionally used for the treatment of infection and inflammation of the uterine tract in resident women from the traditional communities of Amapá. Among these medicinal herbs, *Fridericia chica* and *Stryphnodendron astringens* stand out and have presented studies proving their antifungal efficacy against fungi of the genus *Candida* in the main *Candida albicans*.

This study helps in the recovery of popular knowledge about medicinal plants used alternatively for the treatment of gynecological disorders, supporting the discovery of new medicines from plants for the treatment of gynecological pathologies. The study limited itself to reviewing in vitro and in vivo research carried out over a period of five years to prepare a review of the most recent findings of the cited plants.

The need for more research and studies on the medicinal plants cited in this article is highlighted, seeking to evaluate their pharmacological, toxicological effects and efficacy for the safe use of these traditional medicines.

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