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Vegetable drugs used by traditional and indigenous communities to treat intestinal parasites: a literature review

Drogas vegetais usadas por comunidades tradicionais e indígenas para combater parasitas intestinais: uma revisão bibliográfica

Jefferson Raphael Gonzaga Lemos e Thábita Cristina Vieira-Silva

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Autor correspondente:
Nome: Jefferson Raphael Gonzaga Lemos
E-mail: jefraphael@yahoo.com.br
Formação: Mestre em Diversidade Biológica pela Universidade Federal do Amazonas (UFAM) que fica na cidade de Manaus, Amazonas, Brasil.

Filiação Institucional: Faculdade Estácio do Amazonas, Manaus, Amazonas, Brasil.

Endereço: Av. Constantino Nery, n°3693b
Bairro: Chapada
Cidade: Manaus
Estado: Amazonas
CEP: 69050-001

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ABSTRACT:

Ethinobotanical studies are extremely important for the expansion and preservation of popular medicinal knowledge and the botanical species used for this purpose. In Brazil, the use of plants to treat parasitic diseases is very common in poor communities lacking basic sanitation. The objective of this work was to research botanical species used to treat worms, to identify the botanical families and plant structures most used by traditional and indigenous brazilian communities. For this, we conducted a literature review on the theme in brazilian scientific articles databases. Our results showed a greater representation of the Euphorbiaceae, Leguminosae and Anacardiaceae families, as well as that the barks and leaves are the most used structures. The results found serve as support for other studies in pharmacobotany and ethnopharmacology.

KEYWORDS: Parasites; Botany; Ethnobotany; Traditional Medicine; Pharmacology.

RESUMO:

Os estudos etinobotânicos são de suma importância para a ampliação e preservação dos conhecimentos medicinais populares e das espécies botânicas utilizadas para esta finalidade. No Brasil, a utilização de plantas para o tratamento de doenças parasitárias é muito comum em comunidades carentes e desprovidas de saneamento básico. O objetivo deste trabalho foi pesquisar sobre espécies botânicas utilizadas para tratamento de verminoses, identificar as famílias botânicas e as estruturas das plantas mais utilizadas por comunidades tradicionais e indígenas brasileiras. Para isso, foi realizada uma revisão bibliográfica sobre o tema proposto em bases de dados de artigos científicos brasileiros. Nossos resultados demonstraram maior representação das famílias Euphorbiaceae, Leguminosae e Anacardiaceae, bem como que as cascas e as folhas são as estruturas mais utilizadas. Os resultados encontrados servem de subsídio para outros estudos em farmacobotânica.

PALAVRAS-CHAVE: Parasitos; Botânica; Etnobotânica; Medicina Tradicional; Farmacologia.

INTRODUCTION

The indigenous knowledge regarding the use of vegetables, although empirical, is considered a reliable source. This is because these populations have relationships with these resources that date back thousands of years[1]. Among the various purposes of plants for indigenous peoples, we can highlight the medicinal use, for health promotion, quality of life and disease cure[2].

It is important to study the botanical and medicinal learning of traditional and indigenous populations so that the knowledge of the floristic diversity and the history of these populations can be preserved. The losses of traditional knowledge and less use of plants for medicinal purposes by traditional populations are related to increased consumption of industrialized drugs, but generally in a complementary way to herbal medicine[3]. Another importance of ethnobotanical studies is the contribution to the improvement of traditional medicine with social reach and favoring the discovery of new plant drugs and bioactive molecules with therapeutic activity, both in the development of herbal medicines and in pharmaceutical technology[4,5].

The cultural elements that led indigenous peoples to develop their own medicine are related to the fact that they have always lived with their characteristic diseases and especially human parasitic diseases[6]. The parasitism is universal, affects all living beings and is always harmful to health, because due to the spoliative action of parasites that steal nutrients or feed on the blood of their hosts, the latter are weakened and more susceptible to other secondary diseases. Thus, the coexistence that indigenous peoples, as well as traditional communities, had with these diseases over time interfered with their culture, specifically for the development of their own medicine[7].

The intestinal parasites are also known as worms, have a strong relationship with the environment and customs, moreover, they are more prevalent in regions where sanitation conditions are precarious, common feature in indigenous and riverside populations. In these communities, basic sanitation is common in homes, public spaces and schools. In addition to the absence of garbage collection and drinking water deficiency. These factors favor the emergence and spread of intestinal parasites and their secondary diseases[8].

Due to the relevance of the theme, the objective of this work was to carry out a bibliographic review on botanical species used by traditional and indigenous brazilian communities for the treatment of intestinal parasites. In addition, identifying which botanical families and plant structures are most used for this purpose.

METHODS

This research was carried out through a qualitative bibliographic review. Online searches were made in the

databases of scientific articles Scielo, PubMed, Lilacs, Capes Journals and Google Scholar, in the months of September and October 2020.

The research procedure followed an outline of content related to the study proposal where brazilian scientific articles, manuals, dissertations and theses related to the objectives of the work and the theme were analyzed in a systematic way: use of medicinal plants by traditional and indigenous brazilian communities; ethnobotanical knowledge of traditional and indigenous brazilian communities for the treatment of intestinal parasites.

For to elaborate the review text, the six steps were followed: definition of the research question and objectives of the review; establishment of inclusion and exclusion criteria, reading of titles; reading the abstracts and selecting the information to be extracted from the articles found, respectively[9].

RESULTS AND DISCUSSION

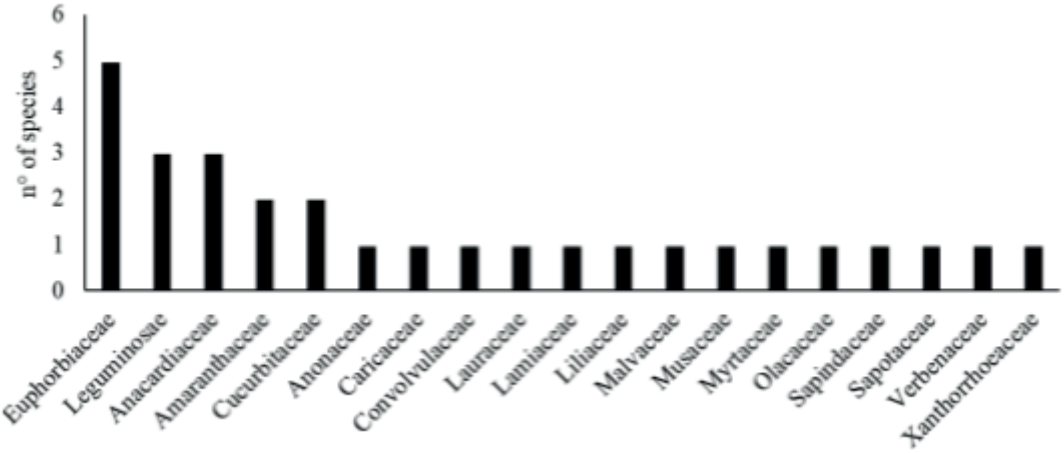
In our bibliographic survey we found in the selected articles a total of 29 species distributed in 19 botanical families described for the purpose of treating intestinal parasites (Table 1). In addition, we also found that among the botanical families, those with the largest number of species described for the treatment of intestinal parasites were Euphorbiaceae, Leguminosae and Anacardiaceae, followed by the others (Figure 1).

Table 1: Bibliographic survey of the botanical species described for the purpose of treating intestinal parasites by traditional and indigenous brazilian communities.

family / scientific name	plant structure	author
Amaranthaceae		
Beta vulgaris L.	root	Vasco-dos-Santos et al., 2018
Chenopodium ambrosioides	leaf	Vásquez et al., 2014
Anacardiaceae		
Anacardium occidentale L.	bark	Vasco-dos-Santos et al., 2018
Litharae brasiliensis	bark	Coutinho et al., 2002
Myracrodruon urundeuva Allemão	bark	Vasco-dos-Santos et al., 2018
Anonaceae		
Guatteria vilosissima St. Hil.	root; bark	Coutinho et al., 2002
Caricaceae		
Carica papaya L.	fruit	Vasco-dos-Santos et al., 2018; Vásquez et al., 2014
Convolvulaceae		
Operculina macrocarpa (L.) Urb.	root	Vasco-dos-Santos et al., 2018
Cucurbitaceae		
Citrullus vulgaris Schrad.	seed	Coutinho et al., 2002
Cucurbita pepo L.	seed	Coutinho et al., 2002
Euphorbiaceae		
Croton argyrophyllus Kunth	bark	Vasco-dos-Santos et al., 2018
Croton heliotropiifolius Kunth	bark	Vasco-dos-Santos et al., 2018

Jatropha mollissima (Pohl) Baill.	látex	Vasco-dos-Santos et al., 2018
Jatropha podagrica Hook.	leaf; stalk	Vásquez et al., 2014
Ricinus communis L.	fruit	Vasco-dos-Santos et al., 2018
Lauraceae		
Persea americana	leaf	Coutinho et al., 2002
Leguminosae		
Hymenaea courbaril L.	bark	Vasco-dos-Santos et al., 2018
Phaseolus vulgaris L.	seed	Vasco-dos-Santos et al., 2018
Poincianella microphylla (Mart. ex G.Don) L.P.Queiroz	flower	Vasco-dos-Santos et al., 2018
Lamiaceae		
Ocimum campechianum Mill.	leaf	Vasco-dos-Santos et al., 2018
Liliaceae		
Aloe vera L.	leaf	Coutinho et al., 2002
Malvaceae		
Gossypium hirsutum L.	root; flower; seed	Vasco-dos-Santos et al., 2018
Musaceae		
Musa paradisiaca L.	fruit	Vasco-dos-Santos et al., 2018
Myrtaceae		
Eucalyptus globulus Labill.	leaf	Vasco-dos-Santos et al., 2018
Olacaceae		
Ximenia americana L.	bark	Vasco-dos-Santos et al., 2018
Sapindaceae		
Cardiospermum halicacabum L.	root	Vasco-dos-Santos et al., 2018
Sapotaceae		
Sideroxylon obtusifolium (Roem. & Schult.) T.D.Penn.	bark	Vasco-dos-Santos et al., 2018
Verbenaceae		
Lippia thymoides Mart. & Schauer	leaf	Vasco-dos-Santos et al., 2018
Xanthorrhoeaceae		
Aloe vera (L.) Berm.f.	latex	Vasco-dos-Santos et al., 2018

Figure 1: Number of species per botanical family used for the purpose of treating intestinal parasites by traditional and indigenous brazilian communities



Other articles that we studied do not present the same results when considering the number of species per botanical family. However, these came from studies with a less specific approach, as is the case of Sarquis et al. (2019) who reported

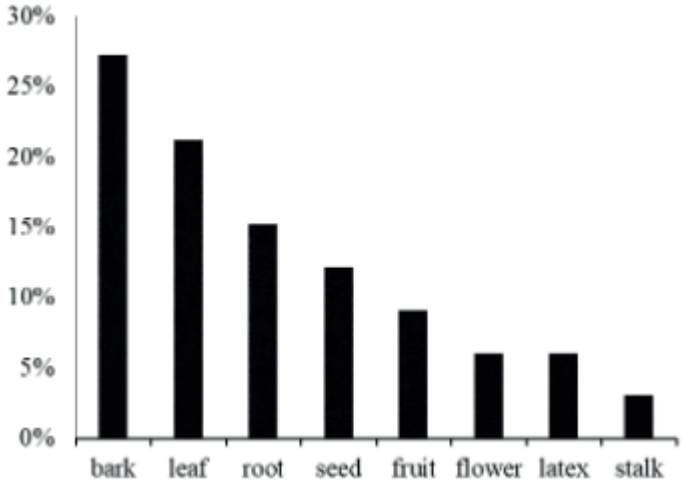
greater amounts of species from the Leguminosae, Lamiaceae and Euphorbiaceae families, when investigating the use of medicinal plants in a riverside community in the Amazon[16]. According to these same authors, we must consider that the family that has the greatest representation is the one that has the largest number of species used for medicinal purposes in that region of study[16].

In the literature we can find other works where the characteristics of antiparasitic actions of several botanical species are proven or tested, including some belonging to the most representative botanical families found in this study. Most of these works are of veterinary importance or developed in vitro. For example, we can mention in the Euphorbiaceae family the demonstration of R. communis as a promising natural antiparasitic of sheep[12]; the extract of the stem of J. mollissima that can represent an alternative to the control of ovine worms; the description of C. heliotropiifolius as a potential candidate for the production of antiparasites for use in veterinary medicine[14]. In the Leguminosae family, Caesalpinia pyramidalis extract demonstrated good anthelmintic activity in goats[15]; in another study we found that Andira anthelmia showed anthelmintic activity in mice infected with Aspiculuris tetraptera[21]. Regarding the Anacardiaceae family, we found that the extracts of Spondias mombin L., A. occidentale and Mangifera indica showed anthelmintic activity in sheep[22,23]. These studies corroborate that the most representative botanical families found in this research have promising species for the treatment of intestinal parasites. And with that, they show the need for more studies aimed at the development of natural alternatives for the treatment of human worms or the development of new drugs, including with the species known by traditional and indigenous brazilian communities.

We found in our studies that medicinal plants are often the only alternatives for the prophylaxis and treatment of diseases for poor communities, especially for intestinal parasites. In traditional communities, medicinal plants are grown in backyards, or in nearby areas and to a lesser extent they are wild or purchased[11]. Indigenous communities usually make use of a greater proportion of native plants and a lower proportion of exotic plants[6]. Another important factor to consider is the knowledge transmitted among the members of the communities, which is usually disseminated by the older members, mainly by women[16], about the best botanical species to treat a particular disease or about the structure of the plant that should be used in a medicine[20]. This demonstrates the relevance of ethnobotanical studies for the development of the region where the data was collected[10].

It was also possible to observe that among the parts of the plants most used as a vegetable drug were the barks (27%) and the leafs (21%), followed by root (15%), seed (12%), fruit (9%), flower (6%), latex (6%) and stem (3%) (Figure 2).

Figure 2: Proportion of plant structures used for the purpose of treating intestinal parasites by traditional and indigenous brazilian communities.



Other studies have also described a predominance in the use of barks and leafs, although for antiparasitic treatment in general. The findings by Coutinho *et al.*, 2002 demonstrated a predominance in the use of barks and leafs, the studies by Oliveira *et al.* (2013), Vásquez *et al.* (2014) and Santos-Lima *et al.* (2016) demonstrated greater representativeness in the use of the leaf[8,11,17,18].

Plants can present their active principles in all structures of the plant, but barks and leafs are structures widely used for medicinal purposes because they concentrate a large amount of active principles[8]. In addition, the evidence we found in this research, of a higher proportion of barks and leaves in the preparation of medicines, may also have been due to the better accessibility of these structures in relation to other parts of the plant or because fruits and seeds are seasonal and not are available at all times of the year[11,19].

CONCLUSION

We conclude that the most representative botanical families for the treatment of worms were Euphorbiaceae, Leguminosae and Anacardiaceae, but this is related to the incidence of species in the study regions of the articles cited in this review. In addition, we also observed that the structures of the most used plants are barks and leaves, due to the better availability and higher concentration of active ingredients.

The results of this review show the importance of ethinobotanical studies, as they contribute to the preservation of popular medicinal knowledge and the knowledge of botanical species with medicinal properties.

We hope that our results will stimulate the development of studies in pharmacobotany for the identification and selection of botanical species potentially candidates for the production of new drugs used in the treatment of human intestinal parasites.

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