



# Review and conservation priority of medicinal plants in riverside communities in the Amazon estuary, Pará, Brazil

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## Correspondence

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## Databases and Inventories

### Abstract

**Background:** The use of medicinal plants (MP) is a very common practice among Amazonian communities. Traditional knowledge is a good source of information for planning strategies for the conservation of MP. Here, we identify medicinal species to be prioritized for conservation in communities of riverside dwellers along the Pará River and Marajó Bay, in the Amazon estuary.

**Methods:** We searched the scientific literature of the last 35 years (1985 to 2020) on the use and knowledge of these resources and aspects related to medicinal versatility, forms of collection, parts used, anthropic pressure and origin (cultivation/extractivism) to estimate the indices of Relative Importance (RI), Sensitivity (SI) and Importance Value (IVI) in order to evaluate the priority species for conservation actions.

**Results:** A total of 343 MP was recorded, distributed in 84 botanical families, with Fabaceae standing out. *Socratea exorrhiza* (**paxiúba**), a typical floodplain species, stood out as the most vulnerable to anthropogenic collection and pressure (SI = 0.99). *Carapa guianensis* (**castanha-do-Pará/Brazil nut**) stood out with great versatility regarding its uses (RI = 1.88) and higher importance value (IVI = 2.85).

**Conclusions:** Another 33 species can be considered high priority for conservation in the communities surveyed. Recommendations were suggested for local strategies for sustainable use and management.

**Keywords:** Ethnobotany, Medicinal species, Brazilian Amazon, Amazonian Floodplain Forest, Local Knowledge.

## Background

The use of medicinal plants (MPs) is a very common practice among different peoples and communities in the Amazon. This region is known for its remarkable biological and sociocultural diversity, which is closely linked to a vast body of knowledge held by local populations, particularly regarding natural resources with therapeutic potential (Pedrollo *et al.* 2016, Ellwanger *et al.* 2020). The riverine communities that live in the floodplain forests, along the banks of rivers, channels, and streams, represent one of these social groups that inhabit the estuary formed by the confluence of the Amazon and Tocantins rivers, between the states of Pará and Amapá (Ab'saber 2005). The relationship of riverside dwellers with their environment generates important knowledge about native and introduced MPs in local ecosystems, forming a unique pharmacopeia characteristic of the Amazon estuary (AE) (Amorozo & Gély 1988, Almeida & Jardim 2012, Marques *et al.* 2020).

The AE holds historical, cultural, and ecological significance in the Amazonian context. In pre-colonial times, the region was characterized by rich sociocultural diversity with activities dating back at least 5,000 years BP (before present), including the development of navigation, fishing, and estuarine flora management technologies (Roosevelt 1991, Schaan 2010); centuries later, it became the site of European contact with the Amazon, with intense port and trade activities (Costa 2019). Ecologically, the territory includes the Belém Endemism Center (Almeida e Vieira 2010), considered one of the richest in biodiversity within the Amazon, but also the most threatened due to human activities over recent decades (Hecht 2019, Brandão *et al.* 2022). There are signs of population losses of species that are already considered to be critically endangered in this area (SEMAS 2007, Almeida *et al.* 2014, BRASIL 2022).

Beyond habitat loss and fragmentation due to climate change, pollution, deforestation, mining, or urbanization, the overexploitation of these plant resources can make many MP species rare, threatened, or endangered, posing a challenge to conservation strategies (Howes *et al.* 2020). These aspects need to be considered to provide sustainable alternatives for the exploitation and management of biodiversity in the local context, requiring the identification of medicinal species that are priorities for conservation (Lucena *et al.* 2013).

The interest in integrating local knowledge into conservation efforts is highlighted by the Global Strategy for Plant Conservation (GSPC), which guides the development of public policies aimed at the conservation and sustainable use of genetic resources related to human survival (Target 15 - CBD 2010, Sharrock 2020). In this context, information about plant uses in communities can guide conservation agendas; however, before taking steps to protect and manage these resources, it is necessary to identify the species under the most pressure, whether for medicinal use or other forms of exploitation (Campos & Albuquerque 2021).

Although ethnobotanical research in the AE has contributed to documenting numerous plant species used by riverine communities (Amorozo & Gély 1988, Almeida & Jardim 2012, Santos *et al.* 2019, Marques *et al.* 2020, Santos *et al.* 2020), this dataset has great potential to support new analyses, including those focused on the conservation of plants that are part of the regional pharmacopeia, given that the area is highly impacted by anthropogenic activities (Piratoba *et al.* 2017, Ellwanger *et al.* 2020), therefore, it is important to assess the conservation status of MPs that are valuable to local communities.

The primary objective of this study was to investigate the use of MPs by riverine communities in the Pará River and Marajó Bay region of the AE. This involved compiling information on their uses, the parts of the plant used, preparation methods, and estimating the Importance value index. Ultimately, this research aimed to contribute to the development of effective conservation strategies for Amazonian medicinal species.

## Materials and Methods

The study area encompasses the influence zone of the Pará River and Marajó Bay (located between 1°52'50.3"S 49°06'10.9"W upstream and 1°09'9.92"S 48°25'12"W downstream of the Amazon Estuary), which is part of the Amazon estuarine system. This area is influenced by the Amazon and Tocantins-Araguaia hydrographic regions (between the municipalities of Igarapé-Miri and Abaetetuba), the Guajará and Marajó Bays (in the municipalities of Barcarena, Belém, and Ananindeua), and the Western North Atlantic region (Ab'saber 2005, Prestes *et al.* 2020) (Fig. 1).

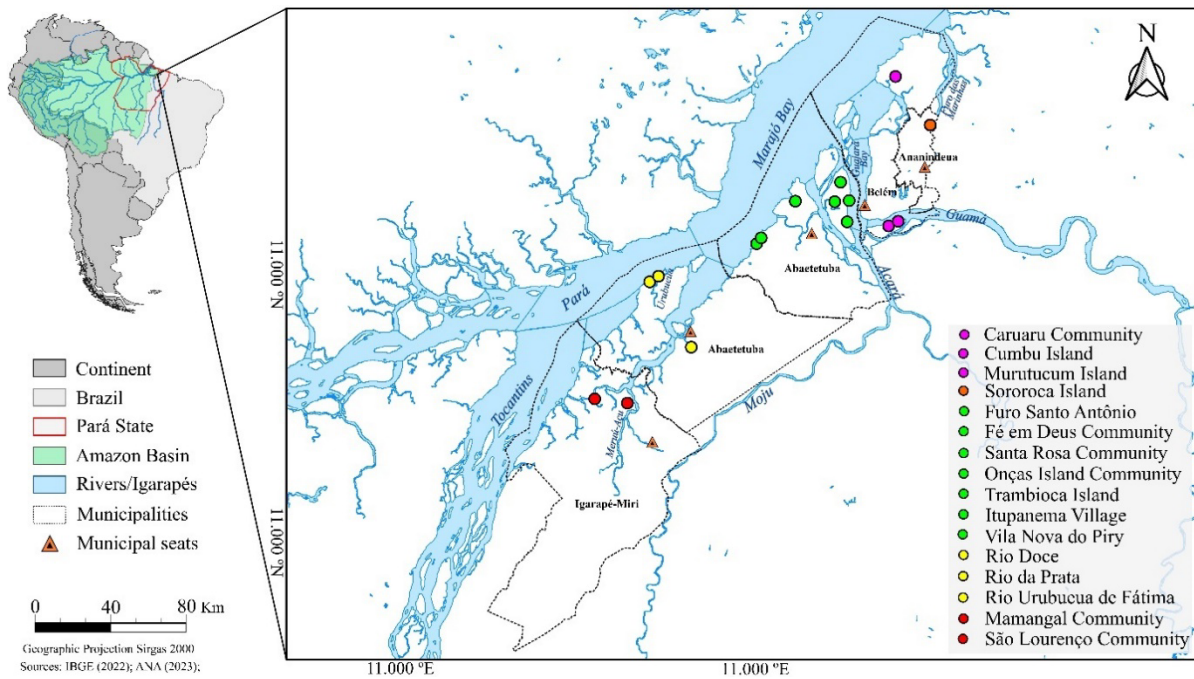


Figure 1. Riverside communities recorded in 19 studies on the use of MP in the AE, Brazil.

The region's climate is hot and humid, with average temperatures ranging between 25-26.7°C, and marked by seasonal rainfall patterns (drier season from August to December, and wetter season from January to July). The vegetation is adapted to flooding conditions caused by tidal flows, with the predominant type being Dense Alluvial Rainforest (IBGE 2012) characterized by the dominance of a few species, such as **andiroba** (*Carapa guianensis* Aubl.), **buriti** (*Mauritia flexuosa* L.f.), **murumuru** (*Astrocaryum murumuru* Mart.), **pracuúba** (*Mora paraenses* (Ducke) Ducke), **seringueira/rubber tree** (*Hevea brasiliensis* (Willd. ex A.Juss.) Müll.Arg.), **taperebá** (*Spondias moini* L.), **taxi** (*Tachigalia paniculata* Aubl.), ucuúba (*Virola surinamensis* (Rol. ex Rottb.) Warb.) and especially **açaí** (*Euterpe oleracea* Mart.). The region also contains upland rainforests (Dense Rainforest), as well as extensive mangrove ecosystems along the entire length of the Pará River's banks. The AE is subject to anthropogenic activities, leading to high levels of river contamination (Piratoba *et al.* 2017), deforestation (Ellwanger *et al.* 2020), and more recently, the pre-salt oil exploration poses threats to species conservation (Dos Santos *et al.* 2016).

#### Data collection

The data for this research were obtained from articles published between 1985 and 2020 on the use of MPs by various riverine communities within the study area. The year 1985 was chosen as the starting point because it represents the oldest publication found in the consulted databases that still significantly contributes to our current understanding of the subject. This period encompasses both pioneering studies in the field and more recent research, allowing for an analysis of the evolution of knowledge on the topic over the past decades. Relevant literature was retrieved from the Scopus® ([www.scopus.com](http://www.scopus.com)); Scielo® ([www.scielo.br](http://www.scielo.br)); Google Scholar® ([www.scholar.google.com.br](http://www.scholar.google.com.br)) e Web of Science® ([www.webofknowledge.com](http://www.webofknowledge.com)); databases, as well as the Portal de Periódicos da Capes ([www.periodicos.capes.gov.br](http://www.periodicos.capes.gov.br)), Directory of Open Access Journals ([doaj.org/](http://doaj.org/)), Biblioteca Virtual em Saúde ([bvsalud.org/](http://bvsalud.org/)) and the Digital Repository of the Emílio Goeldi Museum ([repositorio.museu-goeldi.br](http://repositorio.museu-goeldi.br)). Keyword combinations in Portuguese, English, and Spanish were used: "Ethnobotany," "medicinal plants," "medicinal use," "riverine communities," "Pará," and "Brazil." An additional search was conducted on the Lattes® Platform ([buscatextual.cnpq.br/buscatextual/busca.do](http://buscatextual.cnpq.br/buscatextual/busca.do)) using the established keywords, and references from each selected article were used as complementary sources. The *inclusion criteria* were studies whose research area was located entirely or predominantly in the study area; those addressing knowledge and/or use of MPs by riverine communities; adopting methodologies characteristic of ethnobotanical research (e.g., interviews and participant observation); published within the established period and fully available in the databases searched. Gray literature, bibliographic reviews, checklists, and floristic surveys without the involvement of riverine communities were not selected. Articles that only included vernacular species names were also excluded.

### Screening and selection

The screening process involved the removal of duplicate documents, followed by an analysis of the titles and abstracts of the articles, eliminating those that were not aligned with the theme and objectives of this research. The articles selected in the previous phase were read in full and evaluated according to the inclusion and exclusion criteria. Nineteen studies were then selected. The process of retrieving, screening, and selecting the articles is summarized below (Fig. 2).

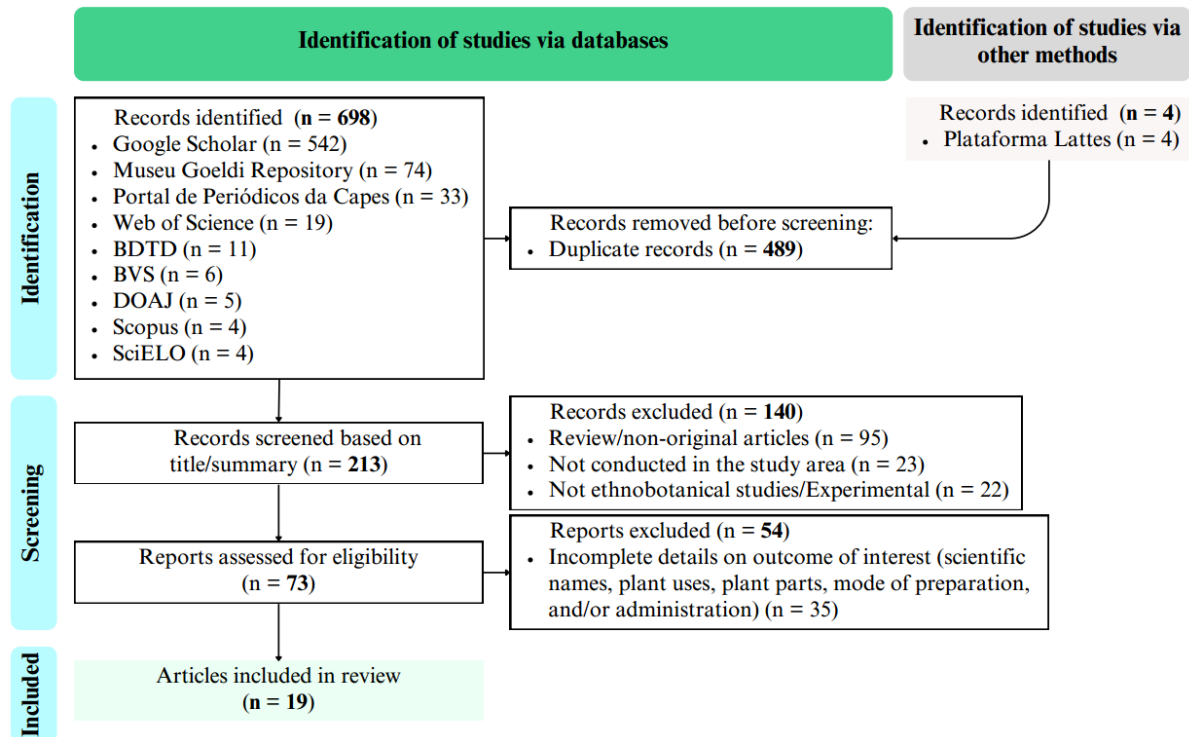


Figure 2. Study flowchart showing the process of screening and selecting articles.

### Data Organization and Analysis

The selected information was organized into a database according to the following categories: study identification, scientific and vernacular names; botanical family; habit (life form); threat status (CNCFlora/IUCN); origin (native to the Amazon biome/exotic); acquisition (cultivated/extracted); method(s) of preparation/application; part(s) used; therapeutic indications; other uses; and disease category(ies). To supplement this information, we consulted the MGetno collection and the database of the Ethnobotany and Economic Botany Laboratory – Botany Coordination of the Emílio Goeldi Museum (COBOT/MPEG), a reference collection for incorporated specimens, raw materials, and plant artifacts traditionally used in the Amazon region (Melo *et al.* 2019).

The medicinal plants were grouped into 15 nosological categories based on the International Classification of Primary Care – ICPC-2 (WONCA 2005). Information on species used for magical and/or ritualistic purposes or symptoms and manifestations without a scientifically established cause (in official medicine) was grouped into an extra category called "Cultural Diseases" (Amorozo 2002), which encompasses emic categories such as "evil eye," "quebranto," "panema," "mãe do corpo," among others.

The life forms and scientific names were updated according to the Flora of Brazil ([floradobrasil.jbrj.gov.br](http://floradobrasil.jbrj.gov.br)) and SpeciesLink ([specieslink.net](http://specieslink.net)). During this process, the origin of the species was also verified, with native species being those naturally found in the Amazon region and introduced/cultivated/exotic species being those from other regions of the world. The list of medicinal species was organized following the APG IV system.

The conservation status of the species was determined by consulting the lists from the National Center for Plant Conservation – CNCFlora ([cncflora.jbrj.gov.br](http://cncflora.jbrj.gov.br)); the Red Book of the Flora of Brazil by Martinelli and Moraes (2013); the List of Threatened Plant Species of the State of Pará (SEMAS 2007); the Official List of Threatened Plant Species of Brazil (BRASIL 2022), and the International Union for Conservation of Nature – IUCN ([iucnredlist.org](http://iucnredlist.org)).

### Approach for Prioritizing Species

The Importance Value Index (IVI) proposed by Dhar *et al.* (2000), with adaptations from Melo *et al.* (2009), was used to categorize medicinal species based on conservation priorities. The IVI considers the diversity of uses of the species along with their conservation attributes, calculated by summing two other indices: Relative Importance (RI) and Sensitivity Index (SI), given by the formula:  $IVI = RI + SI$ . RI assesses the importance of different species based on their versatility, without considering the number of people who cited their uses. It is calculated using the formula:  $RI = NSC + NP$ . NSC is the ratio between the number of body systems treated by a species (NSCE) and the total number of body systems treated by the most versatile species (NSCEV), given by the formula:  $NSC = NSCE/NSCEV$ . NP refers to the number of properties attributed to a particular species (NPE), divided by the total number of properties attributed to the most versatile species (NPEV), calculated as:  $NP = NPE/NPEV$ . SI ranks the vulnerability of medicinal plants, considering the method of acquisition and anthropogenic pressure on exploited resources, using the formula:  $SI = [(SR \times NR) / \sum(SR \times NR)] \times 100$ . SR is the Sensitivity Rank, and NR is the Naturalness Rank. SR combines attributes such as the collection method (destructive or non-destructive) and the degree of anthropogenic pressure (high, very high, or moderate), assigning sensitivity scores from 1 to 6. Collection is considered destructive when it involves harvesting entire plants, roots, and/or rhizomes, or the complete removal of bark. SR also considers other usage categories, using the following criteria: moderate anthropogenic pressure – when only medicinal use is noted; high anthropogenic pressure – when medicinal use is associated with fuel or construction categories; and very high anthropogenic pressure – when medicinal use is combined with two or more categories of use. NR is determined according to the method of acquisition of medicinal species, with the following scores: 3 – for species obtained exclusively through extraction (natural/wild); 2 – obtained through both extraction and cultivation; and 1 – for species obtained solely through cultivation (Dhar *et al.* 2000). Based on the IVI, endemic Amazonian species obtained through extraction were highlighted to prioritize them.

## Results

### Diversity of medicinal plants, habit, parts used, methods of preparation and application

In this investigation, 19 original studies were selected (Table 1) and 657 records of specimens cited in these studies were obtained, corresponding to 343 MPs.

Table 1. Checklist of selected articles on MP used by riverine communities in AE. Met. (research methodology); E. (interview); Ll. (free list); Tr. (guided tour); Op. (participant observation); On. (non-participant observation); Ef. (phytochemical study); In. (non-specific induction); Es. (semi-structured interview); Qe. (structured questionnaire); Qs. (semi-structured questionnaire); Collab. (collaborators/interviewees).

	Hydrographic context	Reference	Met.	Nº species	Nº Collab.
Guajará Bay	Onças Island, Barcarena-Pa	Anderson <i>et al.</i> (1985).	E	24	1
	Onças Island community, Barcarena-Pa	Sousa <i>et al.</i> (2019c).	E; Qe.	1	25
	Onças Island community, Canal Piramanha, Barcarena-Pa	Marques <i>et al.</i> (2020).	Es; Ll; Tr.	51	10
Marajó Bay	Caruarú Community, Mosqueiro Island, Belém-Pa	Mesquita & Tavares-Martins (2018).	On; Es; Ll; Tr.	50	15
Pará River	Vila Nova do Piry e Itupanema, Barcarena-Pa	Amorozo & Gély (1988).	E; Tr.	235	17
	Rio doce e Rio da Prata, Abaetetuba-Pa	Leal <i>et al.</i> (2019).	E; Q; Ll.	34	35
	Trambioca Island, Barcarena-Pa	Sousa <i>et al.</i> (2019b).	E; Qs.	1	34
Guamá River	Combu Island, Belém-Pa	Jardim & Cunha (1998).	E	1	30
	Combu Island, Belém-Pa	Martins <i>et al.</i> (2005).	E	33	31
	Combu Island, Belém-Pa	Jardim & Medeiros (2006).	E	16	3
	Combu Island and Murucutum Island, Belém-Pa	Santos <i>et al.</i> (2020).	On; E; Tr.	34	3
Maguari River	Sororoca Island, Ananindeua-Pa	Almeida & Jardim (2012).	E	16	40

		Germano <i>et al.</i> (2014).	Op; Es; Ll; In.	6	63
Urubueua de Fátima River	Urubueua de Fátima river community, Abaetetuba-Pa	Gois <i>et al.</i> (2016).	Op; Es; Tr.	31	35
		Moura <i>et al.</i> (2016).	Op; Es.	58	35
		Moura <i>et al.</i> (2019).	Es; Ef.	16	35
		Santos <i>et al.</i> (2019).	E; Ll.	47	20
Mamangal Grande River	Mamangal Community, Igarapé-Miri-Pa	Sousa <i>et al.</i> (2019a).	E	2	17
		Pantoja <i>et al.</i> (2020).	On; E; Tr.	1	11
Tocantins River	Rio São Lourenço community, Igarapé-Miri-Pa				

Of this total, 286 were identified to species level, 34 were identified to genus level, nine to family level and 14 were unidentified (Table 2).

Table 2. List of ethnomedicinal plants used by the riverine communities of AE.

Family/Species	Local name	Lf	Pu	Therapeutic indications/Mode of preparation	IR	IS	IVI	Au
<b>ACANTHACEAE</b>								
<i>Hemigraphis alternata</i> (Burm. f.) T. Anderson	<b>Trevo-roxo</b>	Arb	F	Ear pain/In natura	0,16	0,05	0,22	13
<i>Justicia pectoralis</i> Jacq.	<b>Abre-caminho</b>	Er	F	Ear pain, aphthae, respiratory inflammation, urinary pain, flu, fever/Bath, Macerate	0,89	0,05	0,94	2
<i>Justicia spectabilis</i> T.Anderson ex C.B.Clarke	<b>Trevo-cumaru</b>	Er	F	Headache, laziness, boredom with children/Bath	0,28	0,05	0,33	2
<i>Justicia secunda</i> Vahl	<b>Forsangue</b>	Er	F	Anemia/Tea	0,16	0,16	0,33	13; 19
N.I.	<b>Eucalipto-preto</b>	Arb	F	Fever, gastric lavage, intestine inflammation /Tea	0,36	0,05	0,42	2
<b>ADOXACEAE</b>								
<i>Sambucus nigra</i> L.	<b>Sabugueiro</b>	Sub	F; C.	Chickenpox, measles, smallpox, fever, asthma /Tea	0,44	0,22	0,66	2; 9; 11; 19
N.I.	<b>Sabugueiro-do-sertão</b>	Er	F	Measles/Tea	0,16	0,05	0,22	2
N.I.	<b>Babosa</b>	Er	F	Skin burn/In natura	0,16	0,05	0,22	13
<b>AMARANTHACEAE</b>								
<i>Alternanthera brasiliana</i> (L.) Kuntze	<b>Terramicina, Corrente-Roxa, Pracajá</b>	Sub	Pi	Pain in urine, Conjunctivitis (wash eyes), Liver and stomach problems, Bloody diarrhea, Hemorrhoids, Inflammation, Skin wounds/Tea, Macerate	1,06	0,21	1,27	2; 11; 17
<i>Alternanthera bettzichiana</i> (Regel) G.Nicholson	<b>Trevo-coitadinho</b>	Sub	F	Pain/Tea, Bath	0,2	0,05	0,25	2
<i>Alternanthera dentata</i> (Moench) Stuchlík ex R.E.Fr.	<b>Meracelina</b>	Sub	F	Pain/Tea	0,16	0,05	0,22	9
<i>Amaranthus sp.</i>	<b>Chega-te-a-mim</b>	Er	F	Counterspells/Bath	-	0,05	0,05	2
<i>Amaranthus blitum</i> L.	<b>Fedegoso</b>	Er	F	Breast cracking/In natura	0,16	0,16	0,33	2
<i>Dysphania ambrosioides</i> (L.) Mosyakin & Clemants	<b>Mastruz</b>	Er	F	Body aches (flu), Worms, fracture, bump, tear, "spine out of place", cough, nausea, diarrhea, wheezing, shortness of breath, pain and full stomach (stuffiness), Inflammation of muscles, skin, gastritis, open chest, expectorant, tuberculosis, pneumonia/Tea, In natura, Syrup, Bottle, Poultice, Macerate (with milk)	1,43	0,05	1,48	2; 4; 8; 9; 11; 12; 17

<i>Pfaffia glomerata</i> (Spreng.) Pedersen	<b>Corrente de Planta, Corrente branca</b>	Er	Pi	Stomach wash, bloody diarrhea, flu/Tea, Bath	0,36	0,21	0,58	2; 9; 17	
<b>AMARYLLIDACEAE</b>									
<i>Allium cepa</i> L.	<b>Alho</b>	Er	R	Fever, Hypertension/Tea	0,33	0,22	0,55	19	
<i>Allium sativum</i> L.	<b>Alho</b>	Er	R	Skin inflammations and fever, worms, sore throat, paralysis of the body, toothache, headache/Tea, Friction (massage)	0,89	0,27	1,16	2; 9; 10; 17	
<i>Hippeastrum puniceum</i> (Lam.) Kuntze	<b>Cebola-berrante</b>	Er	R	Asthma, flu with phlegm/Tea	0,21	0,21	0,42	2	
<i>Hymenocallis</i> sp.	<b>Cebolinha-berrante</b>	Er	R	Asthma, to vomit/Tea	0,32	0,43	0,76	2	
<b>ANACARDIACEAE</b>									
<i>Anacardium occidentale</i> L.	<b>Cajú</b>	Ar	F; Fr; C; S.	Intestinal infection (diarrhea), mouth and throat pain and inflammation, catarrh, vomiting, mycosis, diabetes/Tea, Macerate, Juice	0,93	0,27	1,2	1; 2; 8; 9; 10; 17	
<i>Anacardium giganteum</i> W.Hancock ex Engl.	<b>Cajuí</b>	Ar	C	Gastritis, Worms, Women's inflammation, Diabetes, Wound/Tea	0,69	0,65	1,34	4	
<i>Anacardium humile</i> A.St.-Hil.	<b>Cajuí</b>	Ar	C	Inflammation/Tea	0,16	0,21	0,38	10	
<i>Mangifera indica</i> L.	<b>Manga, Mangueira</b>	Ar	F; Fr; C.	Pertussis, chest catarrh, wound cleaning, diarrhea, flu, stomachache/Tea, macerate, syrup	0,6	0,27	0,87	2; 10; 11	
<i>Spondias mombin</i> L.	<b>Taperebá</b>	Ar	Fr; C.	Diarrhea, venereal diseases, healing/Tea	0,61	0,54	1,15	2; 6	
<b>ANNONACEAE</b>									
<i>Annona mucosa</i> Jacq.	<b>Biribá</b>	Ar	F; Fr.	Inflammation of the throat, childbirth, killing lice /In natura, Tea	0,49	0,11	0,6	2	
<i>Annona muricata</i> L.	<b>Graviola</b>	Ar	F	Diabetes, cholesterol, weight loss/Tea	0,49	0,11	0,6	1; 4	
<i>Annona squamosa</i> L.	<b>Ata, Ata-do-mato</b>	Ar	R	Gallbladder problem/Tea	0,16	0,27	0,43	10	
<i>Guatteria scandens</i> Diels	<b>Cipó-luira/Cipó-iuira</b>	Li	C	To calm children/Bath	0,16	0,65	0,81	2	
<b>APIACEAE</b>									
<i>Eryngium foetidum</i> L.	<b>Chicória</b>	Er	Pi	Labor Contractions, Catarrh, Headache, Flu, Diarrhea, Fever, Teething/Tea, Bath, Macerate, Syrup, In natura	0,77	0,27	1,04	1; 2; 8; 9; 10; 13; 17	
<i>Foeniculum vulgare</i> Mill.	<b>Erva-doce</b>	Er	S	For strength, stomach ache, soothing/Tea, Bottled	0,36	0,11	0,47	2; 4	
<b>APOCYNACEAE</b>									
<i>Aspidosperma auriculatum</i> Markgr.	<b>Carapanã</b>	Ar	C	Diabetes, Malaria/Tea	0,33	0,65	0,98	2	
<i>Himatanthus articulatus</i> (Vahl) Woodson	<b>Sucuúba</b>	Ar	F; C; Ex.	Stomach, liver, intestines, tuberculosis, lung problems, ulcers, inflammation of the female	1,64	0,65	2,29	2; 8; 9; 10; 12	



				genital tract, to strengthen, vaginal discharge, gastritis, Pneumonia, cough, stroke, inflammation, bronchitis, asthma, diarrhea, worms, sexual impotence; spinal tear/Tea, Bottled, Bath, In natura				
<i>Himatanthus sp.</i>	<b>Sucuúba</b>	Ar	C; Ex.	Inflammations of the uterus, stomach, women's private parts, prostate/Tea, In natura	0,53	0,65	1,18	11
<i>Parahancornia fasciculata</i> (Poir.) Benoist	<b>Amapá</b>	Ar	Ex	Bronchitis, colds, strengthening the body, coughs, wounds, anemia, bleeding during pregnancy, tuberculosis, bronchitis, gastritis, ulcers, worms, malaria, flu/Tea, Syrup, Garrafada, Cataplasm, In natura	0,91	0,16	1,08	2; 10; 16
<i>Tabernaemontana angulata</i> Mart. ex Müll.Arg.	<b>Picoró/ Pocoró</b>	Arb	Ex; R.	Worms and stomach aches/Bath	0,2	0,81	1,01	2
<i>Tabernaemontana flavicans</i> Willd. ex Roem. & Schult.	<b>Jasmim-de-cachorro/ Jasminzinho-do-mato</b>	Sub	Ex; R.	Vaginal discharge, eye disorders/Tea, Bath, In natura	0,32	0,65	0,98	2
<b>ARACEAE</b>								
<i>Caladium bicolor</i> (Aiton) Vent.	<b>Brasileira, Puruã, Tajá-de-Sol</b>	Er	Pi	Stingray, stingray, asthma, sore throat, tumor/In natura, Friction (Massage), Poultice	0,48	0,32	0,8	2
<i>Caladium humboldii</i> (Raf.) Schott	<b>Brasileirinha</b>	Er	R	Stingray/Plaster	0,16	0,43	0,58	11
<i>Dieffenbachia parvifolia</i> Engl.	<b>Comigo-ninguém-pode</b>	Er	Pi	Inflammations, snake and insect bites, skin inflammation, leprosy, erysipelas/Bath	0,48	0,27	0,75	2
<i>Dieffenbachia seguine</i> (Jacq.) Schott	<b>Aninga</b>	Er	F	Erysipelas/In natura	0,16	0,05	0,21	2
<i>Epipremnum aureum</i> (Linden & André) G.S.Bunting	<b>Jiboinha</b>	Li	F	Flu, cough/Tea, syrup, bath	0,2	0,05	0,25	2
<i>Monstera sp.</i>	<b>Boiúna</b>	Li	F	Panema/Bath	-	0,05	-	2
<i>Montrichardia arborescens</i> (L.) Schott	<b>Aninga</b>	Er	Pi	Stingray bite/juice/beat	0,16	0,81	0,97	2
<i>Pistia stratiotes</i> L.	<b>Mururé</b>	Ma	F	Blood in the urine, expectorant, dysentery, hemorrhoids, diabetes, erysipelas/Plaster	1,02	0,21	1,23	2
<i>Syngonium angustatum</i> Schott	<b>Jacarezinho</b>	Er	F	Bored child/Bath	0,16	0,05	0,21	2
<i>Xanthosoma sp.</i>	<b>Tajá</b>	Er	Pi	Home protection /Bath	-	0,22	-	2
<b>ARECACEAE</b>								
<i>Acrocomia aculeata</i> (Jacq.) Lodd. ex Mart.	<b>Mucajá</b>	Ar	R	Hepatitis, venereal disease/Tea	0,45	0,43	0,88	2
<i>Astrocaryum murumuru</i> Mart.	<b>Murumuru</b>	Ar	Fr	Muscle pain/Tea	0,16	0,16	0,32	5
<i>Astrocaryum tucuma</i> Mart.	<b>Tucumã</b>	Ar	R	Venereal disease/Tea	0,29	0,65	0,94	2

<i>Bactrisgasipaes sp.</i>	<b>Pupunheira</b>	Ar	Fr	Liver Inflammation/Tea	0,16	0,16	0,32	11
<i>Cocos nucifera L.</i>	<b>Coco, Coqueiro</b>	Ar	Fr; Ex.	Worms, intestinal infections/In natura, Macerated	0,2	0,11	0,31	2; 7
<i>Copernicia alba Morong</i>	<b>Carnaúba</b>	Ar	R; S.	Diuretic, inflammation, energy drink/Tea	0,36	0,27	0,63	7
<i>Copernicia prunifera (Mill.) H.E.Moore</i>	<b>Carnaúba</b>	Ar	R	Inflammation, allergies/Tea	0,2	0,27	0,47	11
<i>Euterpe oleracea Mart.</i>	<b>Açaí</b>	Ar	R; S.	Stomachache, toothache, abdominal pain and inflammation of the mouth, diarrhea, intestinal infection, worms/Tea, mouthwash	0,39	0,81	1,21	2; 3; 4; 5; 6; 7; 8; 9; 10; 12; 17
<i>Geonoma baculifera (Poit.) Kunth</i>	<b>Ubim Palheira</b>	Er	Ex	Intestinal infection, gastritis, anemia and headache/Macerated	0,53	0,32	0,85	7
<i>Manicaria saccifera Gaertn.</i>	<b>Palha do Bussu</b>	Ar	Fr	Intestinal infection, gastritis, anemia and headache/Macerate	0,53	0,49	1,01	7
<i>Mauritia flexuosa L.f.</i>	<b>Miriti, Buriti</b>	Ar	F; Ca; S.	External inflammations/Plaster	0,16	0,97	1,14	5
<i>Socratea exorrhiza (Mart.) H.Wendl.</i>	<b>Paxiúba</b>	Ar	R; S.	Venereal diseases, hepatitis, leishmaniasis, wounds/Tea, bathing	0,65	0,98	1,65	2; 5; 7
<b>ARISTOLOCHIACEAE</b>								
<i>Aristolochia trilobata L.</i>	<b>Urubucaá</b>	Li	F	Headache, sore throat, shortness of breath, stomach ache, diarrhea/Tea	0,56	0,05	0,62	2; 8; 9; 12
<b>ASPARAGACEAE</b>								
<i>Aloe vera (L.) Burm.f.</i>	<b>Babosa</b>	Er	F	Gastritis, skin problems, prostate cancer, hair use, stomach pain, skin sores, kidney problems/Tea, Macerate	0,78	0,05	0,82	4; 8; 9; 12; 17
N.I.	<b>Babosa-grande</b>	Er	F	Inflammation, gastritis, erysipelas, skin burns, bruises from falls, tiredness (chest with phlegm)/Bottled, fresh	0,73	0,05	0,78	11
<b>ASTERACEAE</b>								
<i>Ayapana triplinervis (M.Vahl) R.M.King &amp; H.Rob.</i>	<b>Japana Roxa/morada/branca/verde</b>	Er	F	Cold, expectorant, flu, catarrh, asthma, "child's boredom"/Tea, Macerate, Bath	0,6	0,11	0,71	2; 4; 10; 17; 19
<i>Bidens pilosa L.</i>	<b>Alfazema, Picão</b>	Er	F	Diabetes, Liver, Arthritis, Rheumatism, Inflammations/Tea	0,69	0,05	0,71	19
<i>Blainvillea acmella (L.) Philipson</i>	<b>Jamburana</b>	Er	F	Liver inflammation/Tea	0,16	0,11	0,74	2
<i>Centratherum punctatum Cass.</i>	<b>Incenso-de-planta</b>	Er	F; Fl.	Body aches/Tea	0,16	0,05	0,27	2

<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	<b>Cravinho-do-mato</b>	Er	F	Diarrhea, skin infection, toothache, stomachache, sore throat, hemorrhoids, cough and colds/Tea	0,8	0,16	0,22	2
<i>Elephantopus mollis</i> Kunth	<b>Língua-de-vaca, Fumo-bravo, Fumo-da-mata</b>	Er	F; R.	Flu, cough, heal wounds, reduce swelling and skin irritations/Tea, Syrup	0,44	0,65	0,97	2
<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip. ex Walp.	<b>Sacaca, Boldo-planta, Alcachofra</b>	Er	F; C.	Inflamations of the gallbladder, liver and stomach, anemia, wounds, glucose, cleanliness, gassy stomach, diarrhea, heartburn, poor digestion/Tea, Macerate	0,79	0,21	1,09	4; 8; 9; 11; 13; 17
<i>Mikania lindleyana</i> DC.	<b>Sucuriju, Macela, Marcela</b>	Li	F	Stomach pain, Inflammation of the liver, Kidney stones/Tea	0,36	0,05	1,19	8; 9; 11; 12
<i>Mikania parvifolia</i> Baker	<b>Cipó-catinga</b>	Li	F	Fever, expectorant, gout, syphilis, coughs, whooping cough, rheumatism, scorpion and snake bites, malaria/Bath	1,01	0,11	1,01	2
<i>Pectis elongata</i> Kunth	<b>Cominho-de-planta</b>	Er	F	Diarrhea, nervousness/Bath	0,36	0,11	0,42	2
<i>Pluchea sagittalis</i> (Lam.) Cabrera	<b>Marcela</b>	Er	F; C.	Headache, Flu, Stomachache, Gastritis/Tea, Bath	0,53	0,27	0,47	2; 8; 9
<i>Sphagneticola trilobata</i> (L.) Pruski	<b>Pingo-de-ouro</b>	Er	F	Respiratory inflammation, pain, vaginal candidiasis, cough, cuts and bruises, anemia, whooping cough/Bath	0,97	0,11	0,79	2
<i>Tagetes erecta</i> L.	<b>Cravo</b>	Er	F; Fl.	Paralysis (stroke), fever, 'bunch of air'/Tea, Massage	0,36	0,11	1,08	2
<i>Tagetes sp.</i>	<b>Cravo-de-tufo</b>	Er	F; Fl.	Paralysis (stroke), fever, 'bunch of air'/ Tea, Massage	0,36	0,11	0,47	2
<i>Tanacetum vulgare</i> L.	<b>Catinga-de-mulata, Pluma</b>	Er	F	Headaches and fever (flu), Menstrual cramps, Delayed menstruation/Tea, Bath	0,4	0,05	0,46	2; 17
<i>Vernonia scabra</i> K.Schum.	<b>Pau-de-moquém</b>	Er	F	Throbbing, chest pain, "spine out of place"/Tea, Macerate	0,24	0,05	0,29	2
<b>BASELLACEAE</b>								
<i>Anredera sp.</i>	<b>Sucuriju</b>	Li	F	Liver pain/Tea	0,16	0,05	0,21	2
<b>BIGNONIACEAE</b>								
<i>Bignonia aequinoctialis</i> L.	<b>Cipó-ipuranga/Cipó-piranga</b>	Li	C	Pains/Bottled	0,16	0,81	0,97	2
<i>Bignonia nocturna</i> (Barb. Rodr.) L.G.Lohmann	<b>Cipó-curimbó</b>	Li	F; R.	Fever/In natura	0,16	0,22	0,38	2
<i>Fridericia chica</i> (Bonpl.) L.G.Lohmann	<b>Pariri, Crajiru</b>	Sub	F; R.	Inflamations of the liver and stomach, anemia, delayed menstruation, abdominal pain, diarrhea, fever/Tea	0,73	0,22	0,95	2; 4; 9; 12; 13; 17; 19

<i>Mansoa alliacea</i> (Lam.) A.H.Gentry	<b>Cipó-de-alho</b>	Sub	F; Ca.	Flu, fever, to calm children, headache, heart problems/Tea, bath, macerate	0,6	0,43	1,04	2; 10; 17; 19
<i>Mansoa standleyi</i> (Steerm.) A.H.Gentry	<b>Alho folha</b>	Li	F	High blood pressure/Tea	0,16	0,16	0,33	13
<i>Martinella obovata</i> (Kunth) Bureau & K.Schum.	<b>Gapuí</b>	Li	R	Eye pain/Macerated	0,16	0,43	0,59	2
N.I.	<b>Ajuru</b>	Li	F	Hypertension and liver problems/Tea	0,33	0,11	0,43	17
<b>BIXACEAE</b>								
<i>Bixa orellana</i> L.	<b>Urucum</b>	Arb	S; Ex.	Pain and inflammation and eye cleaning/In natura	0,24	0,11	0,35	1; 2; 10
<b>BORAGINACEAE</b>								
<i>Heliotropium indicum</i> L.	<b>Fedegoso</b>	Er	F	Fever, cough, throbbing, "spine out of place"/Tea, macerate, bottled	0,53	0,11	0,63	2
<i>Varronia multispicata</i> (Cham.) Borhidi	<b>Curucaá</b>	Arb	F	Cough, bronchitis, asthma, cold/Tea, syrup	0,28	0,16	0,44	2
<b>BROMELIACEAE</b>								
<i>Ananas comosus</i> (L.) Merril	<b>Abacaxi verde</b>	Er	F	Worms, kidney problems/Tea	0,33	0,05	0,38	10
<b>BURSERACEAE</b>								
<i>Protium heptaphyllum</i> (Aubl.) Marchand	<b>Breu-branco</b>	Ar	Ex	Headache, venereal diseases, schistosomiasis, diarrhea, inflammation in general, eye problems, hernia, healing, coughs, bronchitis, syphilis/Defumation	1,29	0,48	1,78	2
<i>Protium tenuifolium</i> (Engl.) Engl.	<b>N.I.</b>	Ar	C	Verminosis/Tea	0,16	0,65	0,81	5
<b>CALOPHYLLACEAE</b>								
<i>Calophyllum brasiliense</i> Cambess.	<b>Jacaréúba</b>	Ar	C; Ca; Ex.	Anti-inflammatory, varicose veins and hemorrhoids, arthritis, rheumatic pain, diarrhea, diabetes, worms, wounds, respiratory problems/Tea	1,26	0,97	2,23	6
<b>CACTACEAE</b>								
<i>Pereskia grandifolia</i> Haw.	<b>Rosa-bacuri</b>	Arb	F	To "pull out" splinters/Plaster	0,16	0,11	0,27	2
N.I.	<b>Jaramacaru</b>	Er	Ca	Flu, cough, phlegm in the chest, inflammation/Tea, Syrup	0,4	0,21	0,62	2
<b>CARICACEAE</b>								
<i>Carica papaya</i> L.	<b>Mamão</b>	Ar	Ex	Wart/Tea, In natura	0,16	0,11	0,27	1; 2; 9
<b>CARYOCARACEAE</b>								
<i>Caryocar villosum</i> (Aubl.) Pers.	<b>Piquiá</b>	Ar	C	Cold/Macerated	0,16	0,27	0,43	2
<b>CHRYSOBALANACEAE</b>								

<i>Licania heteromorpha</i> Benth.	<b>Macucu</b>	Ar	C	Uterine problems, vaginal discharge, "tearing"/Tea, Bath	0,36	0,65	1,01	2
<i>Licania laxiflora</i> Fritsch	<b>Anoerá</b>	Ar	C	Gastritis, Verminosis/Tea	0,2	0,65	0,85	8; 9
<b>CLUSIACEAE</b>								
<i>Garcinia macrophylla</i> Mart.	<b>Bacuripari</b>	Ar	Fr	Inflammations in general/Tea	0,16	0,22	0,38	5
<i>Symphonia globulifera</i> L.f.	<b>Anani</b>	Ar	Ca; S; Ex.	Purgative, to strengthen the body, inflammations / Tea, In natura, Bottled	0,36	0,97	1,34	2; 7; 6
<b>COMMELINACEAE</b>								
<i>Commelina communis</i> L.	<b>Maria-mole</b>	Er	F	Stomach wash/Bath	0,16	0,11	0,27	17
<i>Commelina</i> sp.	<b>Ganha-aqui-ganha-acolá</b>	Er	F	Evil eye/Bath	-	0,05	-	2
<i>Tradescantia</i> sp.	<b>Disciplina</b>	Er	F	Flu/Bath	0,2	0,05	0,25	2
<b>CRASSULACEAE</b>								
<i>Bryophyllum</i> sp.	<b>Ganha-aqui-ganha-acolá</b>	Er	F	Erysipelas/Plaster	0,2	0,05	0,25	2
<b>CONNARACEAE</b>								
<i>Connarus perrottetii</i> (DC.) Planch.	<b>Muruci-sacaca, Barbatimão</b>	Ar	F; C.	Inflammation, wounds, "women's disease", feminine hygiene, inflammation of the uterus, menstrual cramps, intestinal infection, gastritis/Tea, Bath	0,68	0,65	1,33	2; 11
<b>COSTACEAE</b>								
<i>Costus lasius</i> Loes.	<b>Canaficha</b>	Er	F	Gastritis/Tea	0,16	0,05	0,21	8; 9
<i>Costus spicatus</i> (Jacq.) Sw.	<b>Canaficha</b>	Er	F; R.	Pain in the urine, venereal diseases, inflammation, urinary infection/Tea	0,65	0,21	0,87	2; 10; 11
<b>CONVOLVULACEAE</b>								
<i>Cuscuta xanthochortos</i> Mart.	<b>Coitadinha</b>	Pa	Pi	Urine pain/Tea	0,16	0,43	0,59	2
<i>Operculina hamiltonii</i> (G.Don) D.F.Austin & Staples	<b>Batatão</b>	Li	R	Amoeba, "refresh the blood", hemorrhoid colic/Macerated	0,36	0,65	1,01	2
<b>CRASSULACEAE</b>								
<i>Kalanchoe pinnata</i> (Lam.) Pers.	<b>Pirarucu</b>	Er	F	Muscle and skin inflammation/Burning, gastritis, Erysipelas, earache, cough, chilblains, headache, Ulcers, mycoses, chickenpox, inflammation of the uterus, infections, Flu; tuberculosis, asthma, catarrh of the chest, born, wounds, chilblain/Tea, Poultice, Macerate, In natura	1,61	0,11	1,71	2; 9; 10; 11; 13; 17; 19
<b>CUCURBITACEAE</b>								

<i>Luffa operculata</i> (L.) Cogn.	<b>Cabacinha</b>	Li	Fr	Liver pain, allergy and eczema, rheumatism, demintidura and thump, paralysis (stroke)/Tea, Massage	0,77	0,05	0,82	2; 19
<i>Momordica charantia</i> L.	<b>Erva-de-melão / Melão-de-São-Caetano</b>	Li	F	Eczema/Macerated	0,16	0,11	0,27	2
<b>CYPERACEAE</b>								
<i>Cyperus sp.</i>	<b>Pripioca</b>	Er	R	Fever/Massage (Friction)	0,16	0,27	0,43	2
<i>Cyperus articulatus</i> L.	<b>Pripioca</b>	Er	R	Asthma/Tea	0,16	0,27	0,43	10
<i>Killinga sp.</i>	<b>Capim-estrela</b>	Er	R	Vaginal discharge/Tea and bath	0,16	0,65	0,81	2
<b>DILLENIACEAE</b>								
<i>Davilla nitida</i> (Vahl) Kubitzki	<b>Muruteteca/ Cipó-de-fogo</b>	Li	F; C.	“White cloth” mycosis/In natura	0,16	0,16	0,32	2
<b>EUPHORBIACEAE</b>								
<i>Cnidocolus urens</i> (L.) Arthur	<b>Urtiga-branca</b>	Sub	Pi	Female-male genital and urinary infections, kidney infections, dermatological infections, ophthalmic lesions, bruises, fractures, wounds, warts, dysentery, hemorrhage, appendicitis and rheumatism/Tha	1,5	0,43	1,93	2
<i>Croton cajucara</i> Benth.	<b>Sacaca</b>	Arb	F; C.	Stomach ache, gas/Tea	0,2	0,21	0,41	8; 9
<i>Euphorbia tithymaloides</i> (L.) Poit.	<b>Coramina</b>	Er	Ex	Heart health, tiredness/Macerated, In natura	0,32	0,05	0,38	1; 9; 17
<i>Euphorbia thymifolia</i> L.	<b>Acurana</b>	Er	Ex	Eye-grown meat/In natura	0,16	0,05	0,21	2
<i>Hevea brasiliensis</i> (Willd. ex A.Juss.) Müll.Arg.	<b>Seringueira</b>	Ar	C	Chest phlegm/Syrup	0,16	0,43	0,59	2
<i>Jatropha curcas</i> L.	<b>Pião Branco</b>	Arb	F; Ex; S; R.	Headache, fever, flu, cough, catarrh in the chest, stomach, wound, wheal, to strengthen, to give strength to the blood, venereal disease/Tea, Bottled, Macerated, Bath, In natura	1,08	0,27	1,35	2
<i>Jatropha gossypifolia</i> L.	<b>Pião Roxo</b>	Ar	F; Fl; Fr; Ex.	Skin inflammations and healing, fever, headache, wounds, Sore throat, Pneumonia, Bronchitis/Tea, Bath, Macerate, In natura	0,72	0,11	0,82	2; 10; 13; 17
<i>Jatropha molíssima</i> (Pohl) Baill.	<b>Pião Branco</b>	Ar	Fr; Ex.	Toothache/Macerated, In natura	0,16	0,11	0,27	17

<i>Pedilanthus sp.</i>	<b>Coramina / Sapatinho-de-nossa-senhora/Guanabara-branca</b>	Er	F	Heart, tiredness, fainting, stomachache/Tea	0,53	0,05	0,58	2
<i>Ricinus communis</i> L.	<b>Mamona</b>	Arb	Fr	Inflammation/Macerated	0,16	0,05	0,21	2; 19
<i>Sagotia racemosa</i> Baill.	<b>Arataciú</b>	Ar	R	To "calm a child", headache/Bath	0,2	0,65	0,85	2
<b>FABACEAE</b>								
<i>Bauhinia forficata</i> Link	<b>Pata-de-vaca</b>	Ar	F; C.	Women's disease, high cholesterol, infections, diabetes/Tea	0,53	0,21	0,74	11; 12; 13
<i>Cajanus cajan</i> (L.) Huth	<b>Feijão-gandu, cuia-feijão-gandu</b>	Arb	F	Flu, headache/Bath	0,2	0,05	0,25	2
<i>Cassia sp.</i>	<b>Pamarijoba</b>	Arb	F	Flu/Bath	0,16	0,05	0,22	2
<i>Chamaecrista sp.</i>	<b>Pamarijoba/ Pramarioba</b>	Sub	F; Fr; R.	Fever, Malaria, Hepatitis, Flu, Headache/Tea, Bath	0,56	0,43	1	2
<i>Copaifera sp.</i>	<b>Copaíba</b>	Ar	F; S; Ex.	Paralysis (stroke), Stingray sting, Cuts, Inflammation, Skin wounds/Macerado, Friction (Massage), In natura	0,56	0,16	0,73	2; 11
<i>Copaifera martii</i> Hayne	<b>Copaíba</b>	Arb	S	Antiinflammatory, wounds, flu, tapping/Friction (massage)	0,4	0,05	0,45	4
<i>Copaifera langsdorffii</i> Desf.	<b>Copaíba</b>	Ar	C	Pain, inflammation, healing/Tea	0,36	0,65	1,01	10
<i>Dalbergia ecastaphyllum</i> (L.) Taub.	<b>Verônica, Verônica-branca</b>	Ar	F; C.	Female grooming, Inflammation of the uterus, kidneys, skin wounds/Tea, Bath	0,52	0,65	1,18	11; 17
<i>Dalbergia monetaria</i> L.f.	<b>Verônica</b>	Arb	F; C.	Tonic For strengthening, hepatitis, stingray sting, anemia, vaginal discharge, diarrhea, painful urination, genitourinary tract infections women; postpartum uterine cleansing; getting pregnant, ulcers; psoriasis, bone pain/Tea, Bath, Bottled	1,28	0,65	1,94	2; 4; 8; 9; 10; 19
<i>Desmodium adscendens</i> (Sw.) DC.	<b>Mandubirana</b>	Er	F	Hair loss/Bath	0,16	0,16	0,32	2
<i>Dipteryx odorata</i> (Aubl.) Willd.	<b>Cumarú</b>	Ar	C; Ex.	Sore throat/In natura	0,16	0,81	0,97	2
<i>Entada polyphylla</i> Benth.	<b>Jipoca</b>	Li	R	Dandruff/Bath	0,16	0,65	0,81	2
<i>Erythrina sp.</i>	<b>Açacu-rana</b>	Ar	F; C.	Sedative and calming/Tea	0,2	0,97	1,17	1
<i>Hymenaea courbaril</i> L.	<b>Jatobá, Jutáí</b>	Ar	Fr; C; Ca.	Flu, Chest pain, Cough, Pain/Tea, Syrup	0,4	0,65	1,05	2; 6; 9; 10

<i>Libidibia ferrea</i> (Mart. Ex Tul.) L.P. Queiroz	Jucá	Ar	F; C; Ca; S.	Anti-inflammatory (skin, muscles, stomach, liver), wounds, coughs, bronchitis, catarrh, gastritis, diarrhea, skin infections and cuts/Tea, In natura, Syrup	1,08	0,21	1,3	2; 4; 8; 9; 11; 12; 13; 17
<i>Machaerium lunatum</i> (L.f.) Ducke	Aturiá	Arb	R	Diarrhea/Tea	0,16	0,16	0,32	2; 9
<i>Macrolobium angustifolium</i> (Benth.) R.S. Cowan	Ipê-da-várzea	Ar	F; C; Ca.	Inflammations, sores on the skin/Plaster	0,2	0,97	1,17	6
<i>Mimosa camporum</i> Benth.	Juqueri manso	Sub	F	"taming a child"/Bath	0,16	0,16	0,32	2
<i>Mora paraensis</i> (Ducke) Ducke	Pracuuba	Ar	Fr; C; Ca.	Cut, hemorrhoid, wound, stingray sting/Tea, In natura	0,4	0,65	1,05	2
<i>Ormosia coutinhoi</i> Ducke	Buiuçu	Ar	Ca	Fever, headache, joint pain/Macerated	0,24	0,65	0,89	2
<i>Parkia nitida</i> Miq.	Coré	Ar	C	Remedy for child (crying, irritation)/Bath	0,16	0,65	0,81	2
<i>Parkia sp.</i>	Corrente-branca	-	F	Diarrhea/Tea	0,16	0,16	0,32	4
<i>Pentaclethra macroloba</i> (Willd.) Kuntze	Pracaxi	Sub	F; C; S.	Anti-inflammatory (skin, muscles, stomach, liver), vomitory, erysipelas, rheumatism/Tea, Macerate, Friction (Massage)	0,77	0,81	1,58	2; 6; 17
<i>Schnella splendens</i> (Kunth) Benth.	Escada-de-jabuti	Li	F; Ca.	Dysentery, asthma, diabetes/Tea	0,49	0,81	1,3	2; 8; 9; 12
<i>Senna alata</i> (L.) Roxb.	Mata-pasto-do-grande	Ar	F; Fl.	Malaria, hepatitis, worms, bronchitis and asthma, skin diseases, hemorrhoids, urinary infections, purgative, fever/Tea, Bath	1,17	0,54	1,71	1; 2
<i>Senna obtusifolia</i> (L.) H.S. Irwin & Barneby	Mata-pasto-do-miúdo	Sub	F	Hepatitis/Bath, Tea	0,2	0,11	0,31	2
<i>Stryphnodendron adstringens</i> (Mart.) Coville	Barbatimão	Ar	C; S.	Muscle inflammation, rheumatism, stomach ache/tea	0,36	0,21	0,58	9; 10
<i>Swartzia racemosa</i> Benth.	Pitaíca	Ar	S	Bruised/Macerated	0,16	0,16	0,32	5
<i>Vatairea guianensis</i> Aubl.	Fava/ Fava-de-impingem, Fava-bolacha	Ar	Fr; C; S.	Ringworm, 'white cloth' mycosis/In natura, Macerated	0,2	0,81	1,01	2; 6
<i>Vouacapoua americana</i> Aubl.	Acapu	Ar	C	Strengthening the body, Infections/ Tea, Bottled	0,2	0,81	1,01	2
<b>GENTIANACEAE</b>								
<i>Chelonanthus alatus</i> (Aubl.) Pulle	Tabacorana	Er	F	Against fleas (usually on dogs)/Bath	0,16	0,11	0,27	2
<i>Coutoubea ramosa</i> Aubl.	Lombrigueira	Sub	F	Worms/Tea	0,16	0,16	0,32	9
<b>HUMIRIACEAE</b>								



<i>Endopleura uchi</i> (Huber) Cuatrec.	<b>Uxeiro</b>	Ar	C	Cysts, inflammation, diabetes, myoma/Tea	0,53	0,65	1,18	10
<b>HYPERICACEAE</b>								
<i>Vismia cayennensis</i> (Jacq.) Pers.	<b>Lacre-branco</b>	Ar	C; Ex.	Fever, mycosis, impigmata, rheumatism/Tea	0,53	0,97	1,5	6
<i>Vismia guianensis</i> (Aubl.) Choisy	<b>Lacre</b>	Ar	Ex	Ringworm, mycosis "pano branco"/In natura	0,2	0,16	0,36	2
<b>IRIDACEAE</b>								
<i>Eleutherine bulbosa</i> (Mill.) Urb.	<b>Marupazinho, Marupazinho Vermelho, Canafistola</b>	Er	F; R.	Diarrhea, inflammation (skin, stomach), hemorrhoids, stomach pain, colic, amoebiasis, intestinal pain, intestinal infection, urinary tract infection, inflammation, teething child (growth)/Tea	1,08	0,27	1,35	8; 9; 10; 11; 12; 13; 17
<b>LAMIACEAE</b>								
<i>Aeollanthus suaveolens</i> Mart. ex Spreng.	<b>Catinga-de-mulata</b>	Er	F	Heartache, stomach ache, earache, asthma, shortness of breath, fever, diarrhea, body aches, flu, child's apprehension/Tea, In natura	1,01	0,05	1,06	2; 4; 8; 9; 13
<i>Amasonia campestre</i> (Aubl.) Moldenke	<b>Mendoca</b>	Sub	Pi	Delayed menstruation/Tea	0,16	0,65	0,81	2
<i>Cantinoa mutabilis</i> (Rich.) Harley & J.F.B.Pastore	<b>Salva-do-marajó</b>	Arb	F	Abdominal pain, diarrhea/Tea	0,2	0,16	0,36	12
<i>Coleus</i> sp.	<b>Sete-dores</b>	Er	F	Stomach ache/Tea	0,16	0,05	0,22	8
<i>Hyptis crenata</i> Pohl ex Benth.	<b>Salva do Marajó</b>	Er	F	Eye and throat inflammation, arthritis, constipation, stomach ache, diarrhea, colic/Tea	0,77	0,11	0,88	8; 9; 17
<i>Hyptis</i> sp.	<b>Salva do Marajó</b>	Er	F	Postpartum care, inflamed intestines, diarrhea, to strengthen, menstrual problems/Tea, Bottled	0,56	0,05	0,62	2
<i>Leonotis nepetifolia</i> (L.) R.Br	<b>Cordão-de-São-João</b>	Er	F	Inflammation/Tea	0,16	0,05	0,22	11
<i>Marrubium vulgare</i> L.	<b>Hortelã-do-maranhão</b>	Sub	F	Cough with phlegm in the chest/Tea	0,16	0,05	0,22	13
<i>Mentha</i> sp.	<b>Hortelã de Panela,</b>	Er	F	Regulating the intestines, flu, diarrhea, "when a child's tooth is born", wounds, sore throats, worms, kidney problems, pain, asthma/Tea, bath	1,01	0,05	1,06	2; 4; 8; 9; 10; 11; 12; 13; 14
<i>Mentha pulegium</i> L.	<b>Hortelãzinho</b>	Er	F	Infant colic and gas/Tea	0,2	0,05	0,26	4
<i>Mentha x piperita</i> L.	<b>Hortelã-pimenta</b>	Er	F	Bellyache/Tea	0,16	0,05	0,22	2
<i>Mesosphaerum suaveolens</i> (L.) Kuntze	<b>Cânfora/Canforinha</b>	Er	F	Flu, stomachache, headache/Tea, Bath	0,4	0,11	0,51	2
<i>Ocimum basilicum</i> L.	<b>Manjeriçã</b>	Er	F	Flu, stomachache, cough with phlegm/Tea, macerate, bath	0,36	0,11	0,47	13; 17
<i>Ocimum campechianum</i> Mill.	<b>Alfavaca</b>	Er	F	Flu, cough/Bath, syrup	0,2	0,05	0,26	2

<i>Ocimum gratissimum</i> L.	<b>Alfavacão, Alfavaca-de-angola, Favaca</b>	Er	F	Flu, sore throat, headache, measles, chicken pox, diabetes/Tea, Macerate, Bath	0,6	0,05	0,66	2; 10; 13; 19
<i>Ocimum sp.</i>	<b>Manjeriço, Esturaque</b>	Er	F; Ca.	Cough, chest pain, back pain, flu, worms/Tea, Bath, In natura	0,44	0,22	0,66	2
<i>Plectranthus amboinicus</i> (Lour.) Spreng	<b>Hortelã Grosso, Hortelã-do-maranhão, Urtiga-mansa</b>	Er	F	Wounds and coughs, stomach pain, flu/Tea, bath	0,53	0,05	0,58	2; 4; 9; 17
<i>Plectranthus barbatus</i> Andr.	<b>Anador, Boldo</b>	Sub	F	Headache, stomachache and general pain/Tea	0,36	0,05	0,42	2; 17; 19
<i>Plectranthus neochilus</i> Schltr.	<b>Anador, Sete-dores</b>	Sub	F	Stomachache, gas/Tea	0,2	0,05	0,26	13
<i>Plectranthus ornatos</i> Codd	<b>Boldo</b>	Sub	F	Intestinal infection/Tea	0,16	0,05	0,22	13
<i>Plectranthus thyrsoideus</i> (Baker) B.Mathew	<b>Alface, Croton</b>	Er	F	Expectorant, cough, bronchitis, gynecological inflammations, purgative, vaginal discharge/Tea	0,48	0,05	0,53	1
<i>Plectranthus sp.</i>	<b>Hortelãzinho</b>	Er	F	Body aches and cramps (menstrual period)/Tea	0,2	0,05	0,26	17
<i>Pogostemon heyneanus</i> Benth.	<b>Oriza</b>	Sub	F	Headache, expectorant, flu and menstrual cramps, Cough, measles, chickenpox, smallpox, tiredness, stroke, wounds, high blood pressure/Tea, macerate, bath, Syrup	0,89	0,05	0,95	2; 9; 17
<i>Pogostemon patchouli</i> Pell.	<b>Orixa, Patchouli</b>	Er	R	Headache/Tea, Bath	0,16	0,27	0,43	1
<i>Scutellaria sp.</i>	<b>Trevo-roxo</b>	Er	F	Earache/In natura	0,16	0,05	0,22	2
<i>Vitex agnus-castus</i> L.	<b>Alecrim-de-planta</b>	Arb	F	Headache/Bath	0,16	0,05	0,22	2; 19
<b>LAURACEAE</b>								
<i>Cinnamomum verum</i> J.Presl	<b>Canela</b>	Ar	F; C.	Colds and flu with fever, calming, to strengthen the body, vomiting, coughing, stress, low blood pressure/Tea, Bottled	0,68	0,27	0,95	2; 4; 9; 10; 13; 17
<i>Licaria puchury-major</i> (Mart.) Kosterm.	<b>Puxuri</b>	Ar	S	Colic, diarrhea, leucorrhea, gas, worms, urinary incontinence, urine pain/Tea	0,52	0,17	0,69	19
<i>Persea americana</i> Mill.	<b>Abacate</b>	Ar	F	To give "Strength in the blood", to strengthen, Anemia/Cha, Bottled	0,36	0,11	0,47	2; 11; 10
<b>LECYTHIDACEAE</b>								
<i>Bertholletia excelsa</i> Bonpl.	<b>Castanha-do-Pará/ do Brasil</b>	Ar	Fr; C; S.	Inflammations (skin), anemia, hepatitis, blow (bruise), chilblain, Muscle inflammation, Drumstick, gastritis/Tea, In natura, Bath, Drink (hedgehog soaking water)	0,81	0,98	1,78	2; 9; 10; 17; 19
<i>Couratari guianensis</i> Aubl.	<b>Tauari</b>	Ar	C	to "tame the child"/Bath	0,16	0,81	0,98	2

<i>Gustavia augusta</i> L.	<b>Geniparana</b>	Arb	F; S.	Liver Diseases, Rheumatism, Inflammations/Tea, Macerate	0,49	0,16	0,65	2; 5
<i>Lecythis pisonis</i> Cambess.	<b>Sapucaia</b>	Ar	Pi	Itching, Inflammation of women, kidneys and bladder, bronchitis, itching, coughs, healing, hepatitis, fever, diuretic, stomachache, diarrhea, diabetes, mycoses, albumin, Skin allergy/tea, Bath	1,53	0,98	2,50	2; 5
N.I.	<b>Churu</b>	Ar	C	Postpartum grooming/Bath	0,16	0,65	0,81	2
<b>LOGANIACEAE</b>								
<i>Spigelia anthelmia</i> L.	<b>Lombrigueira</b>	Er	F	Worms/Tea	0,16	0,16	0,32	2
<i>Spigelia hamellioides</i> Kunth	<b>Lombrigueira</b>	Er	F; R.	Worms/Tea	0,16	0,21	0,38	8; 9
<b>MALPIGHIACEAE</b>								
<i>Callaeum antifebrile</i> (Griseb.) D.M.Johnson	<b>Cabi branco/preto</b>	Li	F	Heavy menstruation, mycoses, counter-spells/Bath and Tea	0,36	0,05	0,42	2
<b>MALVACEAE</b>								
<i>Abelmoschus esculentus</i> (L.) Moench	<b>Quiabo</b>	Arb	F	Asthma/Tea	0,16	0,05	0,22	10
<i>Ceiba pentandra</i> (L.) Gaertn.	<b>Samaúma</b>	Ar	Fr	Injuries/In natura	0,16	0,16	0,33	5
<i>Gossypium barbadense</i> L.	<b>Algodão</b>	Arb	F	Asthma, Catarrh, Cough, Gastritis, Strengthen lungs/Tea, Juice	0,44	0,05	0,50	10; 11
<i>Herrania mariae</i> (Mart.) Decne. Ex Goudot	<b>Cacau-jacaré</b>	Ar	S	Verminosis/Tea	0,16	0,16	0,33	5
<i>Hibiscus rosa-sinensis</i> L.	<b>Pampulha</b>	Arb	F	Pertussis/Syrup	0,16	0,05	0,22	2
<i>Hibiscus sabdariffa</i> L.	<b>Vinagreira</b>	Arb	F; Fl.	Cold, erysipelas/Bath	0,20	0,11	0,31	2; 9; 19
<i>Pachira aquatica</i> Aubl.	<b>Mamorana</b>	Ar	C; Ca; Fr.	Earache, eye inflammation, "overgrown" eyes, conjunctivitis, diabetes, cholesterol treatment, scabies/Tea, In natura	0,77	0,81	1,58	6; 19
<i>Patinoa paraensis</i> (Huber) Cuatrec.	<b>Cupurana</b>	Ar	Fr	Verminosis/Tea	0,16	0,16	0,33	5
<i>Quararibea guianensis</i> Aubl.	<b>Inajá-rana</b>	Arb	S	Bruises/Plaster, Macerated	0,16	0,16	0,33	5
<i>Sterculia excelsa</i> Mart.	<b>Embira</b>	Ar	S	External bleeding/Tea	0,16	0,16	0,33	5
<i>Theobroma cacao</i> L.	<b>Cacau</b>	Ar	S	Stomach, tonic, strengthening the body/In natura, Drink	0,37	0,11	0,47	1
<i>Theobroma grandiflorum</i> (Willd. ex Spreng.) K.Schum.	<b>Cupuaçu</b>	Ar	C	Diarrhea/Tea	0,16	0,27	0,43	2

<b>MARANTACEAE</b>								
<i>Calathea sp.</i>	<b>Ariá-de-cheiro, Tajá</b>	Er	R	Fever, Defense of the house/Tea, Bath	0,16	0,21	0,38	2
N.I.	<b>Esteio</b>	Er	F	For 'man to be right'/In natura	-	0,11	-	2
<b>MELASTOMATACEAE</b>								
<i>Clidemia hirta</i> (L.) D.Don	<b>Catinga</b>	Arb	F	Wounds caused by insects and mites, diaper rash, burns, skin wounds/Macerado	0,28	0,16	0,44	2; 11
<b>MELIACEAE</b>								
<i>Carapa guianensis</i> Aubl.	<b>Andiroba, Carapá</b>	Ar	F; Fr; C; S.	Anti-inflammatory (skin and muscle)/ Flu, sore throat, repellent, rheumatism, leg cramps and pain, tearing, paralysis/avc, peeing, insect bites, cracked sinuses, uterine problems, Arthritis, insect repellent, heals cuts and wounds, shakes, swelling (bruises), coughs, sinusitis, muscle contusions, diabetes, bone pain, asthma/Tea, fresh, macerated (oil), rubbing (massage)	1,88	0,98	2,85	2; 4; 5; 6; 10; 11; 13; 14; 15; 17; 19
<i>Carapa procera</i> DC.	<b>Andiroba</b>	Ar	F; C; Ex.	Inflammation, wound healing, flu, cough, sinusitis, sore throat, swelling, muscle bruising, repellent, diabetes/Tea, in natura	1,01	0,27	1,28	14
<i>Cedrela odorata</i> L.	<b>Cedro</b>	Ar	F; C.	Muscle inflammation, flu, menstrual cramps, rheumatism, headache, fever, uterus, to calm children/Tea, Macerate, Bath	0,81	0,81	1,62	2; 17; 19
<i>Cedrela fissilis</i> Vell.	<b>Cedro</b>	Ar	F	Rheumatism/Bath	0,16	0,33	0,49	1
<i>Guarea kunthiana</i> A.Juss	<b>Jitó</b>	Ar	F	Injuries/Cha	0,16	0,16	0,33	5
<b>MENISPERMACEAE</b>								
<i>Sciadotenia cayennensis</i> Benth.	<b>Abuta</b>	Li	C; Ca.	"Sangue bolado" blood problems/Tea, Plaster	0,32	0,65	0,97	2
<b>MIRTACEAE</b>								
<i>Eucalyptus sp.</i>	<b>Eucalipto</b>	Ar	F; C.	Stomach wash, Flu, sore throat, fever/Tea, Bath, Inhalation	0,53	0,21	0,74	2; 4
<b>MONIMIACEAE</b>								
<i>Peumus boldus</i> Molina	<b>Boldo</b>	Er	F	Liver and stomach pain/Tea	0,2	0,05	0,25	4
<b>MORACEAE</b>								
<i>Brosimum acutifolium</i> Huber	<b>Mururé</b>	Ar	C; Ex.	Rheumatism, "cold legs"/Massage (Friction), In natura, Bath	0,24	0,65	0,89	2
<i>Dorstenia asaroides</i> Gardner	<b>Apií</b>	Er	F; R.	Flu, cough and phlegm in the chest/Syrup	0,24	0,43	0,67	2

<i>Ficus insipida</i> Willd.	<b>Caxinguba</b>	Ar	C; Ex.	Worms/Tea, Syrup	0,16	0,65	0,81	2; 13	
<i>Ficus maxima</i> Mill.	<b>Caxinguba</b>	Ar	F; C.	Worms, anemia, rheumatism, fever/Tea, Macerated	0,65	0,81	1,47	6; 8; 9	
<b>MUSACEAE</b>									
<i>Musa sp.</i>	<b>Banana, Bastão-de-são-josé</b>	Er	F	Cramp/Bath	0,16	0,05	0,22	2	
<i>Musa paradisiaca</i> L.	<b>Banana roxa</b>	Er	Fr; C.	Worms/Tea	0,16	0,27	0,43	8; 9	
<b>MYRISTICACEAE</b>									
<i>Myristica fragrans</i> Houtt.	<b>Noz-moscada</b>	Ar	Fr; S.	Anemia, asthma, stomach cramps, diarrhea, for strength/In natura	0,69	0,06	0,75	19	
<i>Virola elongata</i> (Benth.) Warb.	<b>Ucuuba-branca</b>	Ar	C	Intestinal colic, liver, tearing/Tea	0,37	0,65	1,02	2	
<i>Virola sebifera</i> Aubl.	<b>Ucuúbarana</b>	Ar	Fr; C; Ex.	Inflammations/Tea, In natura	0,16	0,81	0,98	6	
<i>Virola surinamensis</i> (Rol. ex Rottb.) Warb.	<b>Ucuúba</b>	Ar	F; Fr; C.	Liver, Rheumatism, Cough, Pneumonia, Sore throat, Stomach pain, Women's inflammation, Children's itching/Tea, Syrup	0,93	0,98	1,91	6; 11	
<b>MYRTACEAE</b>									
<i>Eugenia biflora</i> (L.) DC.	<b>Murta-pedra-hume, Pedra-umecaá</b>	Arb	F	Women's illness/Bath	0,16	0,16	0,33	2	
<i>Myrcia bracteata</i> (Rich.) DC.	<b>Murta-cabeluda</b>	Arb	F; R.	Diarrhea, Baby diaper rash, "cure" women from childbirth, heal newborn's navel/Bath, In natura	0,40	0,16	0,57	2	
<i>Myrciaria tenella</i> (DC.) O.Berg	<b>Murtinha</b>	Ar	F	Postpartum grooming/Bath	0,16	0,11	0,27	2	
<i>Psidium arboreum</i> Vell.	<b>Araçá do sertão</b>	Ar	F	Inflammation in general/Tea	0,16	0,05	0,22	13	
<i>Psidium guajava</i> L.	<b>Goiaba</b>	Ar	F; C; R.	Stomach pain, diarrhea and vomiting/Tea	0,24	0,05	0,29	1; 2; 4; 8; 9; 10; 17	
<b>NYCTAGINACEAE</b>									
<i>Boerhavia diffusa</i> L.	<b>Solidônia/ Pega-pinto</b>	Er	R	Hepatitis/Tea	0,16	0,43	0,59	2	
<b>OLEACEAE</b>									
<i>Aptandra tubicina</i> (Poepp.) Benth. ex Miers	<b>Marapuama-de-cutia/ Marapuama-chapéu-de-cutia</b>	Ar	C	Rheumatism, Panema/Massage (Friction)	0,16	0,65	0,81	2	
<i>Ptychopetalum olacoides</i> Benth.	<b>Marapuama</b>	Ar	C; R.	Rheumatism, weakness, sexual impotence/Massage (Friction)	0,62	0,65	1,27	2	
<b>ORCHIDACEAE</b>									
<i>Vanilla sp.</i>	<b>Baunilha</b>	Li	Fr	Asthma, sore throat/In natura	0,20	0,11	0,31	2	
<b>OXALIDACEAE</b>									
<i>Averrhoa carambola</i> L.	<b>Carambola</b>	Ar	Fr	High blood pressure/Tea	0,16	0,05	0,22	17	

<i>Oxalis triangularis</i> A.St.-Hil.	Panama	Er	F; Ex.	Eye damage, hemorrhage/Tea, In natura	0,33	0,05	0,38	2	
<b>PASSIFLORACEAE</b>									
<i>Passiflora foetida</i> L.	Maracujá-morceguinho	Li	F	Asthma, erysipelas and skin diseases, stomach ache, dizziness/Bath, poultice	0,69	0,16	0,85	2	
<i>Passiflora edulis</i> Sims	Maracujá	Li	F; Fl.	Inflammations/Tea	0,16	0,11	0,27	1	
<b>PEDALIACEAE</b>									
<i>Sesamum indicum</i> L.	Gergelim	Er	S	“Air branch” muscle pain, stroke/Tea, Macerate	0,20	0,05	0,26	2	
<b>PHYLLANTHACEAE</b>									
<i>Phyllanthus niruri</i> L.	Quebra-Pedra, Quebra-pedra-branco/ Quebra-pedra-roxo	Er	Pi	Pain when urinating/kidney stones, rheumatism, stomach ache/Tea	0,37	0,43	0,80	2; 8; 9; 10; 12; 13; 17	
<i>Phyllanthus sp.</i>	Dinheiro-em-penca	Sub	F	- /Tea, Bath	-	0,11	-	2	
<i>Phyllanthus orbiculatus</i> Rich.	Quebra-Pedra / Quebra-pedra-vermelho	Er	F; R.	Urinary pain, kidney pain/Tea	0,20	0,65	0,85	2	
<i>Phyllanthus urinaria</i> L.	Quebra-pedra	Er	Pi	Urinary problems/Tea	0,16	0,22	0,38	1	
<b>PHYTOLACCACEAE</b>									
<i>Petiveria alliacea</i> L.	Mucurá-caá	Sub	F; Ca; R.	Headache (flu), fever, cough, worms, toothache, “Branch of air”, Inflammation of the skin and muscle, stomach ache, Quebranto, “Bug's eye”, Body cleansing/Tea, Bath, Macerate, Poultice, Friction, Syrup, In natura	1,01	0,22	1,23	2; 10; 11; 13; 17; 19	
<b>PIPERACEAE</b>									
<i>Peperomia circinnata</i> Link	Carrapatinho	Er	F	Stop vomiting / Tea and a bath	0,20	0,11	0,31	2	
<i>Peperomia pellucida</i> (L.) Kunth	Erva-de-jabuti/Comer-de-jabuti/Maria mole	Er	Pi	Cough, high blood pressure, chilblains, pain, roundworms, diabetes/Tea, Syrup	0,86	0,81	1,67	2; 9; 10; 13	
<i>Piper alatipetiolatum</i> Yunck.	Pau d'Angola	Arb	F; Ca.	Fever, Flu/Tea, Bath, Macerate	0,37	0,22	0,58	2; 10	
<i>Piper callosum</i> Ruiz & Pav.	Elixir Paregórico/ Óleo-elétrico	Sub	F; C.	Stomach and liver problems, diarrhea/Tea	0,40	0,22	0,62	1; 2; 4; 9; 12; 17; 19	
<i>Piper marginatum</i> Jacq.	Santa-bárbara, Malvarisco	Er	F; R.	Headache, Flu, Erysipelas, Stomachache, Diarrhea/Tea, Bath, Poultice	0,57	0,65	1,22	2; 4; 8; 9; 19	
<i>Piper ottonoides</i> Yunck.	Jambu-açu	Er	R	Rheumatism and “cold legs”/Massage (Friction)	0,20	0,65	0,85	2	
<i>Piper umbellatum</i> L.	Caapeba, Pariparoba, Malvarisco	Sub	F; R.	Diuretic, Erysipelas, skin inflammation/Tea, In natura	0,37	0,22	0,58	10; 11	
<b>PLANTAGINACEAE</b>									
<i>Bacopa sp.</i>	Caramelo	Er	F	Children's tummy ache/Tea	0,16	0,05	0,22	2	

<i>Conohea scoparioides</i> (Cham. & Schtdl.) Benth.	<b>Pataqueira</b>	Er	F	Caries, Leishmaniasis, Flu/Bath, Macerate	0,49	0,22	0,71	2; 10; 13
<i>Plantago major</i> L.	<b>Tançagem</b>	Er	F	Sore and inflamed throat/Tea, Macerated	0,20	0,05	0,26	2; 9
<i>Scoparia dulcis</i> L.	<b>Vassourinha, Vassourinha-de-botão</b>	Er	Pi	To give "Strength to the blood", rash, itching, erysipelas, clubbing, diabetes, Herpes/Tea, Bath, Macerate, Poultice	0,56	0,65	1,21	2; 9; 10
<b>POACEAE</b>								
<i>Chrysopogon zizanioides</i> (L.) Roberty	<b>Patchuli, Capim-diabetes</b>	Er	R	Fever, diabetes/Tea	0,37	0,22	0,58	2
<i>Coix lacryma-jobi</i> L.	<b>Miçanga-de-nossa-senhora</b>	Er	F; Fl.	Urine pain/Tea	0,16	0,05	0,22	2
<i>Cymbopogon citratus</i> (DC.) Stapf	<b>Capim marinho/santo/limão</b>	Er	F	Flu, weakness, worms, digestive, calming, high blood pressure, headache, stomachache/Tea, Bath, Macerate	0,81	0,05	0,86	1; 2; 4; 9; 10; 13; 17; 19
<i>Cymbopogon winterianus</i> Jowitt ex Bor	<b>Citronela</b>	Er	F	Mosquito repellent/Tea	0,16	0,05	0,22	13
<i>Eleusine indica</i> (L.) Gaertn.	<b>Pé-de-galinha</b>	Er	F	Hair loss/Bath	0,16	0,16	0,33	2
<i>Hymenachne amplexicaulis</i> (Rudge) Ness	<b>Canarana</b>	Sub	F	Pain during urination and inflammation of the kidneys/Tea	0,20	0,11	0,31	17
<i>Saccharum officinarum</i> L.	<b>Cana-de-açúcar</b>	Er	F; Ca.	Cramps, muscle pain/Tea, Bath	0,20	0,27	0,47	1; 2
<i>Zea mays</i> L.	<b>Milho</b>	Er	F; S.	Chickenpox, measles, smallpox/Tea	0,24	0,05	0,29	2
<b>POLYGALACEAE</b>								
<i>Asemeia martiana</i> (A.W.Benn.) J.F.B.Pastore & J.R.Abbott	<b>Jalapinha</b>	Er	F; R.	Flu/Macerated	0,16	0,22	0,38	10
<i>Caamembeca spectabilis</i> (DC.) J.F.B. Pastore	<b>Camembeca</b>	Sub	F; R.	Hemorrhoids, intestinal lavage, diarrhea, headache, amoeba, worms/Tea	0,61	0,65	1,26	2; 10
<b>POLYPODIACEAE</b>								
<i>Phlebodium decumanum</i> (Willd.) J. Sm	<b>Grão-de-guariba, Guaribinha</b>	Ep	R	Pertussis/Syrup	0,16	0,65	0,81	2
<b>PORTULACACEAE</b>								
<i>Portulaca oleracea</i> L.	<b>Beldroega</b>	Er	F	Rheumatism/In natura	0,16	0,05	0,22	2
<i>Portulaca pilosa</i> L.	<b>Amor Crescido, Amor-crescido-pajé, Anador-em-planta</b>	Er	Pi	Diarrhea, Erysipelas, liver, blow (wound), stomachache, liver inflammation, skin wounds, stomach ache, uterine infection, washing hair (dandruff), controlling pressure/Tea, bath, poultice	1,05	0,43	1,48	2; 9; 13; 17; 19
<b>RHIZOPHORACEAE</b>								

<i>Rhizophora mangle</i> L.	<b>Mangue</b>	Ar	Pn	Dysentery/Tea	0,16	0,16	0,33	2
<i>Rhizophora racemosa</i> G.May.	<b>Mangueiro</b>	Ar	Ca	Diarrhea, clubbing/Tea	0,33	0,65	0,98	9
<b>ROSACEAE</b>								
<i>Rosa</i> sp.	<b>Rosa do bordo</b>	Sub	Fl	Eye inflammation/In natura	0,16	0,05	0,22	11
N.I.	<b>Puraqué</b>	Er	R	Stingray/In natura	0,16	0,22	0,38	11
<b>RUBIACEAE</b>								
<i>Coccocypselum guianense</i> (Aubl.) K.Schum.	<b>Pimenta-de-lagarto</b>	Er	Fr	Miscose 'pano branco'/Macerated	0,16	0,16	0,33	2
<i>Coffea arabica</i> L.	<b>Café</b>	Arb	F; Fr.	For strength, measles, headaches and flu/Tea, Bottled	0,40	0,11	0,51	2
<i>Coffea canephora</i> Pierre ex A.Froehner	<b>Café moka</b>	Arb	Fr	For strength, measles, headache and flu/Tea	0,40	0,11	0,51	2
<i>Coffea</i> sp.	<b>Café moka pequeno</b>	Arb	F; Fr.	Measles, headache/Tea	0,20	0,11	0,31	2
<i>Genipa americana</i> L.	<b>Genipapo</b>	Arb	F; Ca; R.	Diarrhea, purgative, pharyngitis, skin ulcers/Tea	0,53	0,98	1,50	6
<i>Morinda citrifolia</i> L.	<b>Noni</b>	Ar	Fr	High blood pressure, Stomach problems, Anti-inflammatory/Tea	0,49	0,05	0,54	10; 13; 18
<i>Palicourea colorata</i> (Willd. ex Roem. & Schult.) Delprete & J.H.Kirkbr.	<b>Perpétua-do-mato</b>	Arb	Fl	Earache/In natura	0,16	0,16	0,33	2
<i>Tocoyena foetida</i> Poepp. & Endl.	<b>Genipapo-do-mato/ Cantã</b>	Arb	R	Panema (luck when hunting)/Macerated or bath	-	0,65	-	2
<i>Uncaria tomentosa</i> (Willd. ex Roem. & Schult.) DC.	<b>Unha-de-gato</b>	Li	F	Diarrhea, gastritis, headache (flu) and anti-inflammatory/Tea	0,40	0,11	0,51	17; 19
<b>RUTACEAE</b>								
<i>Citrus×limon</i> (L.) Osbeck	<b>Limão</b>	Ar	F; Fr.	Flu, Wounds, Headache, Sickness, Cough, Inflammations (thump)/Tea, Bath, Macerate, Syrup, In natura	0,73	0,05	0,78	2; 8; 9; 10; 11; 19; 19
<i>Citrus aurantium</i> L.	<b>Laranja-da-terra</b>	Ar	F; Fr.	Albumin, women's diseases, flu, cough, chest phlegm, clubbing, mumps/Tea, Bath, Syrup, Poultice, In natura	0,64	0,11	0,75	1; 2; 4; 10; 19
<i>Citrus aurantiifolia</i> (Christm.) Swingle	<b>Limãozinho</b>	Ar	F; Fr.	Sore throat, diarrhea, fever, flu, headache, cough/Tea, Macerate	0,61	0,11	0,71	1; 2
<i>Citrus sinensis</i> (L.) Osbeck	<b>Laranjeira</b>	Arb	C	Stomach problems and heartburn/Tea	0,20	0,27	0,47	4
<i>Citrus</i> sp.	<b>Limoeiro</b>	Sub	F	Flu, fever/Tea	0,33	0,05	0,38	4; 18



<i>Ertela trifolia</i> (L.) Kuntze	<b>Alfavaca-brava</b>	Er	F	Dizziness, Cold/Bath	0,33	0,16	0,49	2
<i>Ruta graveolens</i> L.	<b>Arruda</b>	Er	Pi	Fever, pain (Flu), Worms, Headache, Heartache, Stomachache, Stroke, Earache, Toothache, Lice, Muscle pain/Tea, Bath, Poultice, Macerate	1,46	0,22	1,68	1; 2; 4; 8; 9; 10; 13; 17; 19
<i>Zanthoxylum rhoifolium</i> Lam.	<b>Tamanqueira</b>	Ar	F	Flu/Bath	0,16	0,16	0,33	2
<b>SAPOTACEAE</b>								
<i>Manilkara elata</i> (Allemão ex Miq.) Monach.	<b>Maçaranduba</b>	Ar	F; Ex.	Inflamed lung, chest pain/Tea, In natura	0,20	0,49	0,69	2
<i>Pseudima frutescens</i> (Aubl.) Radlk.	<b>Jataúba</b>	Ar	F	Vomitory/Macerated	0,16	0,33	0,49	2
<b>SIMAROUBACEAE</b>								
<i>Homalolepis cedron</i> (Planch.) Devecchi & Pirani	<b>Para-tudo</b>	Ar	C	Dysentery/Tea	0,16	0,65	0,81	2
<i>Quassia amara</i> L.	<b>Quina</b>	Ar	F; C.	Fever, "to strengthen", lice/Tea, Garrafada, Bath	0,37	0,43	0,80	2
<i>Simarouba amara</i> Aubl.	<b>Marupazinho-do-mato</b>	Ar	R	Hemorrhoids/Tea	0,16	0,65	0,81	2
<b>SIPARUNACEAE</b>								
<i>Siparuna guianensis</i> Aubl.	<b>Capitiú</b>	Ar	F; Fl.	Fever and headache (flu), stomachache/Tea	0,33	0,16	0,49	17
<b>SOLANACEAE</b>								
<i>Capsicum frutescens</i> L.	<b>Pimenta-malagueta</b>	Arb	F; Fr.	Postpartum care, Rheumatism, Inflamed skin wounds/Tea, In natura	0,49	0,11	0,60	2; 11
<i>Nicotiana tabacum</i> L.	<b>Tabaco</b>	Er	F	Itching, mucuim (insect) sting/Bath	0,20	0,05	0,26	2
<i>Physalis angulata</i> L.	<b>Camapu</b>	Er	R	Liver pain, inflammation, cough, body aches/Tea	0,53	0,81	1,34	2; 19
<i>Physalis viscosa</i> L.	<b>Camapu</b>	Er	Fr	Liver Inflammations/Tea	0,16	0,11	0,27	1
<i>Solanum crinitum</i> Lam.	<b>Jurubeba</b>	Arb	R	Cough, body pain, intestine inflammation, venereal disease/Tea	0,65	0,65	1,30	2
<i>Solanum subinerme</i> Jacq.	<b>Juuna</b>	Arb	R	Cough, body pain, venereal disease, liver/Tea	0,65	0,65	1,30	2
<i>Solanum stramonifolium</i> Jacq.	<b>Juá</b>	Arb	F; R.	Inflammation, stomach ache, venereal diseases/Tea	0,49	0,65	1,14	2
<b>THYMELAEACEAE</b>								
<i>Lophostoma calophylloides</i> (Meisn.) Meisn.	<b>Cipó-cumacaí</b>	Li	C; R.	Rheumatism and wounds/Macerate and plaster	0,36	0,65	1,02	2
<b>TURNERACEAE</b>								
<i>Piriqueta cistoides</i> (L.) Griseb.	<b>Chá preto</b>	Er	F	Stomachache, intestines problems/Tea	0,20	0,05	0,26	1
<b>URTICACEAE</b>								
<i>Cecropia concolor</i> Willd.	<b>Embaúba-branca</b>	Ar	R	'Tearing' muscle pain, open chest/Plaster	0,20	0,16	0,36	2

<i>Cecropia distachya</i> Huber	<b>Embaúba</b>	Ar	F	Bellyache/Tea	0,16	0,16	0,33	9
<i>Cecropia palmata</i> Willd.	<b>Embaúba-branca</b>	Ar	F	Swelling/Bath	0,16	0,16	0,33	2
<i>Coussapoa latifolia</i> Aubl.	<b>Apuí</b>	Arb	Ex	'Desmentidura e rasgadura' muscle pains/ Plaster	0,20	0,16	0,36	2
<i>Laportea aestuans</i> (L.) Chew	<b>Urtiga-braba-macho</b>	Er	F	Erysipelas/Tea	0,16	0,11	0,27	2
<i>Pilea microphylla</i> (L.) Liebm.	<b>Cama-de-menino-deus</b>	Er	F	Headache, diarrhea, asthma, female reproductive problems/Tea, Bath	0,65	0,05	0,71	2
<b>VERBENACEAE</b>								
<i>Lantana camara</i> L.	<b>Cidreirana</b>	Arb	F	Cold, headache/Tea	0,20	0,22	0,42	2
<i>Lippia alba</i> (Mill.) N.E.Br. ex Britton & P.Wilson	<b>Erva-de-chumbo/ Erva-cidreira</b>	Er	F; Ca.	Soothing, lowering pressure, colds, calming children, sleep, bleeding, stomach pain, hypertension/Tea	0,81	0,22	1,02	1; 2; 4; 8; 9; 10; 12; 13; 19
<i>Lippia thymoides</i> Mart. & Schauer	<b>Manjerona-Salva, Erva-cidreira</b>	Er	F; Fl.	Stomachache, wound treatment, antipyretic, digestive, bronchitis and rheumatism/Tea	0,89	0,05	0,95	8; 9; 13
<i>Stachytarpheta cayennensis</i> (Rich.) Vahl	<b>Rinchão/ Rinchão-branco/ Gervão</b>	Sub	F	Difficulty defecating, stomach problems, fevers, liver problems, worms, erysipelas/Tea, bath, poultice	0,61	0,11	0,71	2
<b>VIOLACEAE</b>								
<i>Pombalia calceolaria</i> (L.) Paula-Souza	<b>Ipecaconha</b>	Er	F	Flu, Pertussis/Tea, bath, syrup	0,20	0,16	0,36	2
<b>VITACEAE</b>								
<i>Cissus verticillata</i> (L.) Nicolson & C.E.Jarvis	<b>Cipó-pucá, Sucurijú</b>	Li	F; C.	Stroke, "bunch of air" muscle pain, inflammation, fever, kidney stones/Tea, Bath, Friction (Massage)	0,57	0,27	0,84	2; 11; 13; 19
<b>ZINGIBERACEAE</b>								
<i>Alpinia purpurata</i> (Vieill.) K.Schum.	<b>Vindicá Vermelho</b>	Er	F; Fl.	Mycoses and skin problems/Tea	0,20	0,11	0,31	17
<i>Alpinia nutans</i> (L.) Roscoe	<b>Vindicá</b>	Er	F	"Leg weakness"/Bath	0,20	0,05	0,26	2
<i>Alpinia zerumbet</i> (Pers.) B.L.Burtt & R.M.Sm.	<b>Vindicá</b>	Er	F	Flu/Macerated	0,16	0,05	0,22	10
<i>Hedychium coronarium</i> J. Koenig	<b>Raiz-de-borboleta</b>	Er	R	Albumin/Tea	0,16	0,22	0,38	13; 19
<i>Zingiber officinale</i> Roscoe	<b>Gengibre</b>	Er	R	Muscle pain, anti-inflammatory, hypertension, "cold in the legs", paralysis (stroke), cold, fever, flu, sore throat, cough with phlegm, rheumatism/Tea, Macerated, In natura	0,92	0,22	1,14	2; 4; 9; 10; 11; 13; 17

N.I.	<b>Croatá, Crauatá</b>	-	F	Body blemishes (skin), 'Bloodshot', Panema/Tea, Bath	0,37	0,05	0,42	2
N.I.	<b>General</b>	Er	F	Urine pain/Tea	0,16	0,05	0,22	2
N.I.	<b>Manacá de Caititu</b>	-	F	Panema (Hunting luck)/Bath	-	0,05	-	2
N.I.	<b>Pindá</b>	-	Ca	Hemorrhoids/Bath	0,16	0,65	0,81	2
N.I.	<b>Sororoca</b>	-	F	Panema (hunting luck)/Smoking	-	0,16	-	2
N.I.	<b>Urtiga Vermelha</b>	-	F; R.	Surucucu snakebite, liver pain/Bath, macerate, tea	0,33	0,65	0,98	2
N.I.	<b>Arapuama</b>	-	R	Stingray/Plaster	0,16	0,65	0,81	2
N.I.	<b>Ortiga</b>	Er	F	Inflammation, rheumatism, cough/Tea, Syrup	0,49	0,16	0,65	11
N.I.	<b>Anecrosan</b>	-	F	Liver pain/Tea	0,16	0,05	0,22	13
N.I.	<b>Erva santa</b>	Er	F	Flu, Cough, Catarrh in the chest/Macerated	0,24	0,05	0,29	13
N.I.	<b>Hortelã Verde</b>	Er	F	Stomach pain/Tea	0,16	0,05	0,22	13
N.I.	<b>Hortelãzinho</b>	Er	F	Stomach pain/Tea	0,16	0,05	0,22	13
N.I.	<b>Marcela</b>	Er	F	Heartburn, Poor digestion/Tea	0,20	0,05	0,26	13
N.I.	<b>Trapueraba</b>	-	F	Itchy skin, Skin allergy and Urinary infection/Tea	0,37	0,16	0,53	13

**Legend:** Lf (Life Form): Ar (tree); Arb (shrub); Er (herb); Ep (epiphyte); Li (liana); Sub (subshrub); Ma (aquatic macrophyte); Pu (Parts used): C (Bark); Ca (Stem); Ex (Exudate); F (Leaf); Fl (Flower); Fr (Fruit); Ni (Not informed); Pi (Whole plant); Pn (Pneumatophore); R (Root); S (Seed); RI: (Relative Importance); SI: (Sensitivity Index); IVI: (Importance Value Index); Au (Authors): (1) Anderson *et al.* 1985; (2) Amorozo & Gély 1988; (3) Jardim & Cunha 1998; (4) Martins *et al.* 2005; (5) Jardim & Medeiros 2006; (6) Almeida & Jardim 2012; (7) Germano *et al.* 2014; (8) Gois *et al.* 2016; (9) Moura *et al.* 2016; (10) Mesquita *et al.* 2018; (11) Leal *et al.* 2019; (12) Moura *et al.* 2019; (13) Santos *et al.* 2019; (14) Sousa *et al.* 2019a; (15) Sousa *et al.* 2019b; (16) Sousa *et al.* 2019c; (17) Marques *et al.* 2020; (18) Pantoja *et al.* 2020; (19) Santos *et al.* 2020.

The identified species belong to 84 botanical families, with Fabaceae (30 spp.), Lamiaceae (26 species), and Asteraceae (15 species) standing out. *Plectranthus* (6 spp.) was the most representative genus among the 238 identified. The most frequently cited species was *Carapa guianensis* (12 citations), followed by *Euterpe oleracea* (11) e *Eleutherine bulbosa* (Mill.) Urb. (10). Most of these species are native plants (61.2%), with the majority being non-endemic to Brazil (57.4%), followed by those endemic to the Brazilian Amazon (2.3%); the data also revealed endemic species from other biomes (1.5%) such as the Caatinga, Cerrado, Atlantic Forest, and Pantanal.

Among the MPs, herbaceous plants (39.7%) were predominant, and most of the herbal remedies were prepared from leaves (44%). The most common preparation method was tea (58.9%), while baths (69.7%) were the most notable among the modes of application (Fig. 3).

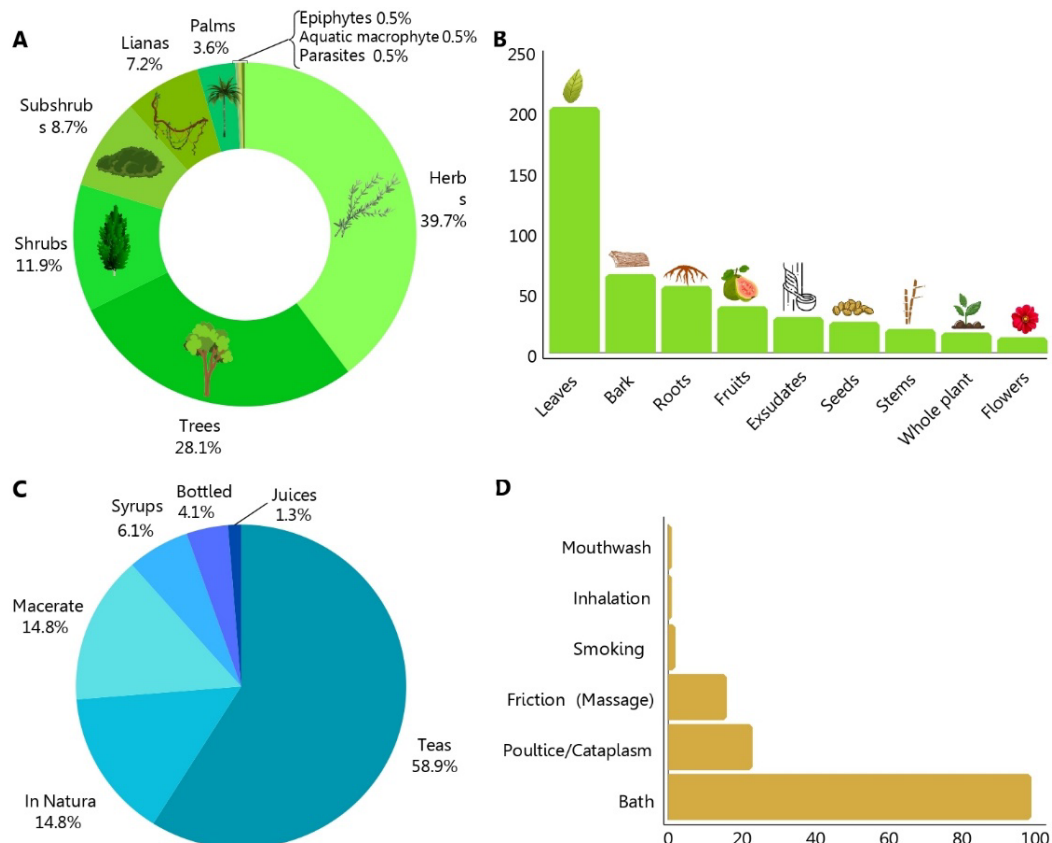


Figure 3. Characteristics of MP used in the study area. (A) Growth form habits represented in the doughnut chart; (B) Plant parts used represented in the bar graph; (C) Preparation methods in the pie chart; and (D) Application methods, represented in the bar chart.

### Diseases Treated in the Study Area

The identified species are used to treat 1,175 diseases, signs, or symptoms, which were grouped into 15 categories from the International Classification of Primary Care (ICPC-2) and one additional category for 'Cultural Diseases' (Table 3). The "D – Digestive" category was the most represented, with diarrhea being the most cited symptom within this group. Following that, the "A – General and Unspecified" category highlighted fever as the most representative symptom. \*Insert which cultural diseases were identified. Frequency of the most cited diseases in each category (ICPC-2). The "evil eye" stood out among the category of cultural illnesses.

### Conservation Priorities for Medicinal Species

According to the analysis, 22 medicinal species had a Relative Importance (RI) greater than one, indicating significant versatility in their medicinal applications, with some species being used for up to eight body systems. For example, *Carapa guianensis* (**andiropa**) had the highest number of therapeutic uses (26) and showed the maximum RI value (1.88).

Regarding the Sensitivity Index (SI), extraction methods and anthropogenic pressures associated with the way the species are obtained were evaluated, represented by Sensitivity Rankings (SR) and Naturalness Rankings (NR), respectively. In terms

of SR, non-destructive harvesting was reported for 56% of taxa (194 spp.), while destructive harvesting was cited for 44% (149 spp.). Among destructively harvested species, trees were predominant (39.7%, 58 spp.), followed by herbs (30.8%, 45 spp.). The number of species experiencing high and very high anthropogenic pressure was highest among trees (42%, 40 spp.), followed by herbs (26%, 25 spp.) (Fig. 4).

Table 3. Frequency of most cited diseases in each category (ICPC-2).

Categories	Frequency (%)	Diseases/Symptoms cited in the category	most	N. species per category
D - Digestive	21,93	Diarrhea		144
A - General and Non-specific	19	Fever		133
R - Respiratory	17,01	Flu		102
S - Skin	13,99	Erysipelas		88
L - Musculoskeletal	5,53	Rheumatism		44
X - Female genitalia	5,35	Sexually transmitted infections		42
U - Urinary	2,85	Pain during urination		32
K - Circulatory	2,68	Hemorrhoids		26
Cultural Diseases*	2,16	The evil eye		25
T - Endocrine, metabolic	1,99	Diabetes		16
Y - Male genitalia	1,47	Sexually transmitted infections		15
B - Blood, Hematopoietic System	1,38	Anemia		13
F - Eye	1,30	Inflammation of the eyes		11
N - Neurological	1,12	Paralysis (stroke)		10
P - Psychological	0,86	Signs / Symptoms	Childish behavior	8
H - Ear	0,69	Earache		7
W - Pregnancy and Childbirth	0,69	Postpartum care		7

\*Extra category (local emic).

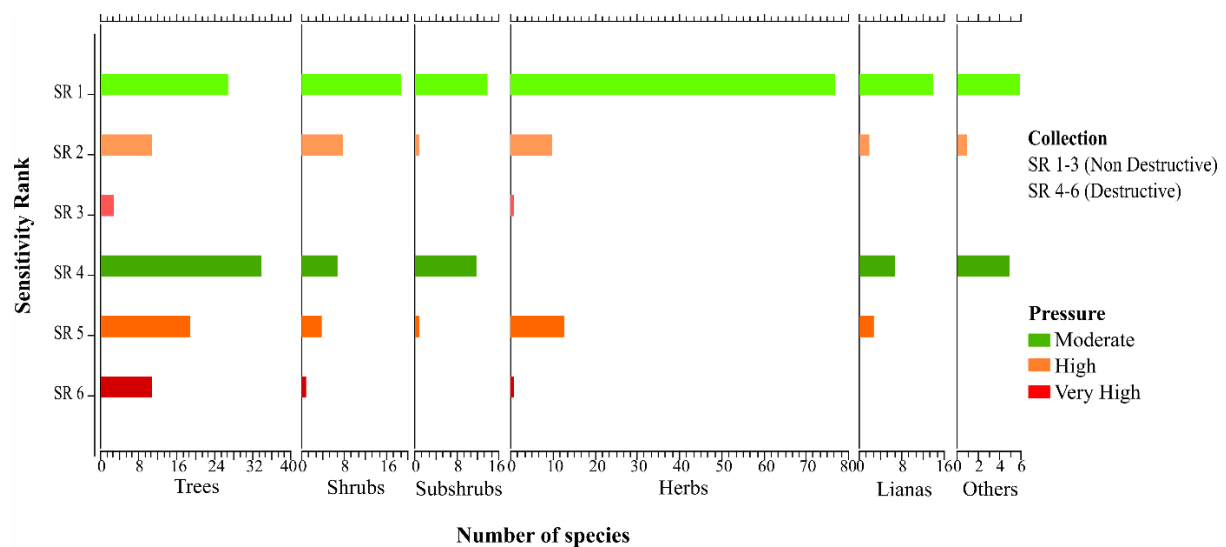


Figure 4. Sensitivity Rank (SR) frequency for different life forms found in riverine communities of the AE, Pará River, Brazil.

Regarding NR, 128 species are obtained through extractivism (NR3 = 37.3%), 41 species are both cultivated and harvested from the wild (NR2 = 12%), and 174 species are cultivated (NR1 = 50.7%), mainly in home gardens. When relating NR to plant habits, herbs were predominant among plants obtained exclusively through cultivation (NR1 – 95 spp.), while trees were harvested through both cultivation and extractivism (NR2 – 8 spp.) and exclusively via extractivism (NR3 – 69 spp.) (Fig. 5), such as the fruit trees *Garcinia macrophylla* Mart. (**bacuri**), *S. mombin* (**tapereba**), *Bertholletia excelsa* Bonpl. (**castanha-do-Pará/Brazil nut**) and *Endopleura uchi* (Huber) Cuatrec. (**uxi**).

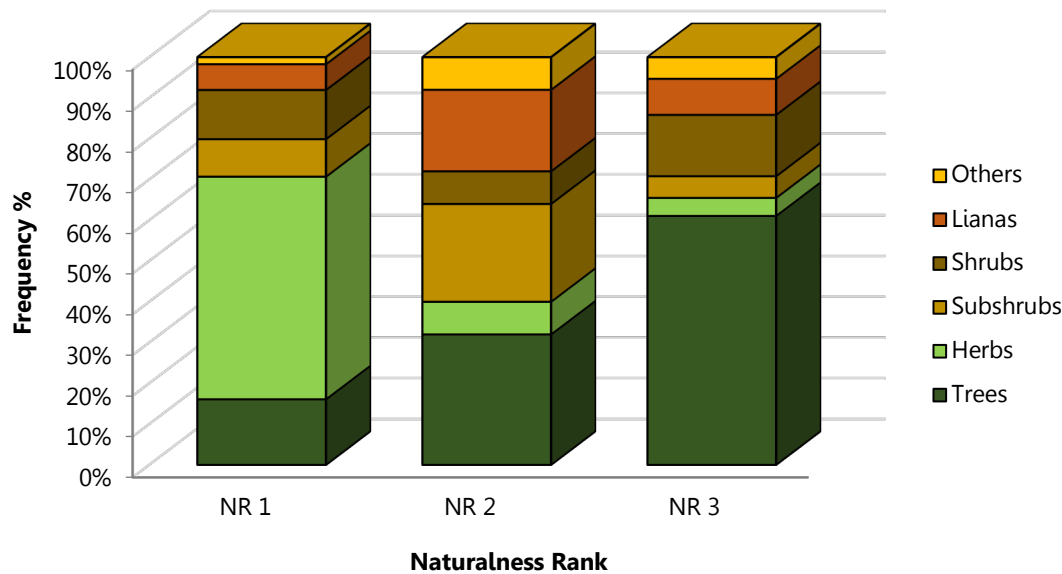


Figure 5. Naturalness Rank (NR) frequency for different habits found in the AE, Pará River, Brazil. NR 1 – plants obtained from cultivation; NR 2 – plants acquired from both extractivism and cultivation; NR 3 – plants harvested exclusively through extractivism.

Regarding the Sensitivity Index (SI), no species in this study had a value equal to or greater than one ( $SI \geq 1$ ), likely due to the large amount of data, which led to highly fragmented results. The highest SI value was 0.99, attributed to *Socratea exorrhiza* (Mart.) H.Wendl. (**paxiúba**). Other more sensitive species had SI values of 0.97, including: *B. excelsa* (**castanha-do-Pará/Brazil nut**), *Calophyllum brasiliense* Cambess. (**jacareúba**), *C. guianensis* (**andiroba**), *Erythrina* sp. (**açacu-rana**), *Genipa americana* L. (**genipapo**), *Lecythis pisonis* Cambess. (**sapucaia**), *Macrolobium angustifolium* (Benth.) R.S.Cowan (**ipê-da-várzea**), *M. flexuosa* (**miriti**), *Symphonia globulifera* L.f. (**anani**), *V. surinamensis* (**ucuúba**) and *Vismia cayennensis* (Jacq.) Pers. (**lacre-branco**).

In terms of the Importance Value Index (IVI), 74 species had values above one, with *C. guianensis* standing out (IVI = 2.85). Notably, 35 species were identified with high conservation priority, most of which are trees (Table 4).

Tabela 4. Species with high conservation priority in the study area. (T) tree; (Sh) shrub; (P) palm tree; (Ss) subshrub; (S) spontaneous; (C) cultivated; \* Endemic species in the Brazilian Amazon.

Species	Local name	Family	Life Form	Origin	IVI
<i>Carapa guianensis</i> Aubl.	<b>Andiroba</b>	Meliaceae	A	S	2,85
<i>Lecythis pisonis</i> Cambess. <sup>a</sup>	<b>Sapucaia</b>	Lecythidaceae	A	S	2,50
<i>Himatanthus articulatus</i> (Vahl) Woodson	<b>Sucuúba</b>	Apocynaceae	A	S	2,29
<i>Calophyllum brasiliense</i> Cambess.	<b>Jacareúba</b>	Calophyllaceae	A	S	2,23
<i>Dalbergia monetaria</i> L.f.	<b>Verônica</b>	Fabaceae	Ab	S	1,94
<i>Virola surinamensis</i> (Rol. ex Rottb.) Warb.	<b>Ucuúba</b>	Myristicaceae	A	S	1,91
<i>Protium heptaphyllum</i> (Aubl.) Marchand	<b>Breu-branco</b>	Burseraceae	A	S	1,79
<i>Bertholletia excelsa</i> Bonpl.	<b>Castanha-do-pará</b>	Lecythidaceae	A	S	1,78
<i>Socratea exorrhiza</i> (Mart.) H.Wendl.	<b>Paxiuba</b>	Arecaceae	A	S	1,65
<i>Cedrela odorata</i> L.	<b>Cedro</b>	Meliaceae	A	S	1,62
<i>Pachira aquatica</i> Aubl.	<b>Mamorana</b>	Malvaceae	T	S	1,58
<i>Pentaclethra macroloba</i> (Willd.) Kuntze	<b>Pracaxi</b>	Fabaceae	Ss	S	1,58
<i>Genipa americana</i> L.	<b>Genipapo</b>	Rubiaceae	Sh	S	1,50
<i>Vismia cayennensis</i> (Jacq.) Pers.	<b>Lacre-branco</b>	Hypericaceae	T	S	1,50
<i>Symphonia globulifera</i> L.f.	<b>Anani</b>	Clusiaceae	T	S	1,34
<i>Schnella splendens</i> (Kunth) Benth.	<b>Escada-de-jabuti</b>	Fabaceae	L	S	1,30

<i>Ptychopetalum olacoides</i> Benth.	<b>Marapuama</b>	Oleaceae	T	S	1,26
<i>Caamembeca spectabilis</i> (DC.) J.F.B. Pastore	<b>Camembeca</b>	Polygalaceae	Ss	S	1,26
<i>Euterpe oleracea</i> Mart.	<b>Açaí</b>	Arecaceae	P	S/C	1,21
<i>Dalbergia ecastaphyllum</i> (L.) Taub.	<b>Verônica, Verônica-branca</b>	Fabaceae	T	S	1,18
<i>Endopleura uchi</i> (Huber) Cuatrec. <sup>a</sup>	<b>Uxizeiro, Uxi</b>	Humiriaceae	T	S	1,18
<i>Macrolobium angustifolium</i> (Benth.) R.S.Cowan	<b>Ipê-da-várzea</b>	Fabaceae	T	S	1,18
<i>Spondias mombin</i> L.	<b>Taperebá</b>	Anacardiaceae	T	S/C	1,16
<i>Parahancornia fasciculata</i> (Poir.) Benoist	<b>Amapá</b>	Apocynaceae	T	S/C	1,08
<i>Hymenaea courbaril</i> L.	<b>Jatobá, jutaí</b>	Fabaceae	T	S	1,05
<i>Mora paraensis</i> (Ducke) Ducke <sup>a</sup>	<b>Pracuuba</b>	Fabaceae	T	S	1,05
<i>Manicaria saccifera</i> Gaertn.	<b>Palha-do-Bussu</b>	Arecaceae	P	S	1,02
<i>Operculina hamiltonii</i> (G.Don) D.F.Austin & Staples	<b>Batatao</b>	Convolvulaceae	L	S	1,01
<i>Virola elongata</i> (Benth.) Warb.	<b>Ucuuba-branca</b>	Myristicaceae	T	S	1,01
<i>Copaifera langsdorffii</i> Desf.	<b>Copaiba</b>	Fabaceae	T	S	1,01
<i>Hymenopus heteromorphus</i> (Benth.) Sothers & Prance	<b>Macucu</b>	Chrysobalanaceae	T	S	1,01
<i>Lophostoma calophylloides</i> (Meisn.) Meisn. <sup>a</sup>	<b>Cipó-cumucaí</b>	Thymelaceae	L	S	1,01
<i>Tabernaemontana angulata</i> Mart. ex Müll.Arg. <sup>a</sup>	<b>Picoró/Pocoró</b>	Apocynaceae	Sh	S	1,01
<i>Vatairea guianensis</i> Aubl.	<b>Fava/ Fava-de-impingem, Fava-bolacha</b>	Fabaceae	T	S	1,01
<i>Vouacapoua americana</i> Aubl. <sup>a</sup>	<b>Acapú</b>	Fabaceae	T	S	1,01

Of the 286 species documented, only eight have endangered status, of which four are classified as vulnerable (VU); three as endangered (EN) and one as critically endangered (CR) (Table 5).

Table 5. Threat categories of medicinal species in the study area: (VU) Vulnerable; (EM) Endangered; (CR) Critically Endangered; (DD) Data Deficient; \* Non-endemic native species; \*\* Endemic native species.

Species	Local name	IUCN	CNCFlora	SEMAS	MMA	IVI
<i>Aspidosperma auriculatum</i> Markgr. **	<b>Carapanã</b>	-	-	-	EN	0,98
<i>Bertholletia excelsa</i> Bonpl.*	<b>Castanha-do-Pará</b>	VU	VU	VU	VU	1,78
<i>Cedrela odorata</i> L.*	<b>Cedro</b>	VU	VU	VU	VU	1,62
<i>Cedrela fissilis</i> Vell.*	<b>Cedro-roxo</b>	VU	VU	VU	VU	1,48
<i>Couratari guianensis</i> Aubl.*	<b>Tauari</b>	VU	LC	VU	-	1,98
<i>Manilkara elata</i> (Allemão ex Miq.) Monach.**	<b>Maçaranduba</b>	EN	LC	VU	-	1,69
<i>Virola surinamensis</i> (Rol. ex Rottb.) Warb*	<b>Ucuúba</b>	EN	VU	-	VU	1,91
<i>Vouacapoua americana</i> Aubl.*	<b>Acapu</b>	CR	EN	-	EN	1,01

Source: BRASIL (2022); CNCFLORA (2021); IUCN (2024); SEMAS (2007).

## Discussion

The studies identified highlight the sociocultural importance of MPs in the riverside communities of the EA. They showed a higher species richness for the Fabaceae botanical family, a predominance corroborated by studies conducted in other non-estuarine Amazonian riverside communities (Pedrollo *et al.* 2016). This family includes many cosmopolitan medicinal species with significant economic interest and phytochemical characteristics that make them highly versatile. They rank among the top ten most species-rich families in all Brazilian biomes, particularly in the Amazon (BFG 2015). The use of these species may be related to their abundance in local vegetation or their cultivation near homes for multiple purposes—such as food, artisanal products, technology, construction, fuel, and ornamentation—besides their medicinal use in the studied communities. The most frequently mentioned species for treating illnesses were **andiroba** (*C. guianensis*) and **açaí** (*E. oleracea*), both widely used by the riverside dwellers (Sousa *et al.* 2019), with growing value chains in the market, currently reaching significant production scales in the pharmaceutical, cosmetic, and food industries (Shanley & Medina 2005, Costa *et al.* 2021).

A higher proportion of native species in the riverside communities' pharmacopoeias was expected, as traditional communities develop socio-ecological systems closely tied to areas of native vegetation, reducing the cost of accessing these plant resources (Medeiros et al. 2017). Moreover, these are resourcing whose use is derived from ancestral knowledge, based on native plants managed in their territories. Notably, there is a tradition of plant exchange (especially medicinal, ornamental, and edible) in the study area, which promotes increased diversity of both native and exotic species in riverside gardens. Exotic species (from Europe, Asia, and Africa) were observed in all the selected studies, indicating a strong introduction of these plants into the Amazonian estuarine pharmacopoeia, aligning with the observations of Bennet & Prance (2000). According to these authors, some of these plants were initially introduced as food or ornamental species, and after experimentation to confirm therapeutic effects, they were incorporated into local pharmacopoeias. Alencar *et al.* (2010) argue that this happens mainly to fill gaps not covered by native plants, or to diversify and expand the range of local medicinal plants, rather than simply representing acculturative processes or knowledge erosion. The intercultural exchanges with African and European peoples were relevant to the diversity of introduced species in this estuary since historically, this region was a hub for the flow of plants, which centuries later remain valued elements in regional pharmacopoeias (Costa 2019).

The identified medicinal plants are mostly herbs, predominantly cultivated or fast-growing and spontaneous in fields and along riverbanks near homes. Generally, these are plants that are easy to cultivate, harvest, and propagate, making them convenient for use (Voeks & Leony 2004). The preference for leaves in medicinal preparations may be related to their year-round availability and their ability to accumulate bioactive compounds, useful in many preparations like teas and baths, which are widely used by other ethnic groups (Wagner *et al.* 2013). These findings align with trends observed in other regions (Bieski *et al.* 2015, Rodrigues *et al.* 2021).

Most of the plant species treat disorders related to the digestive, general, and non-specific categories (fever, pain, and headache), respiratory and skin problems—conditions that are likely more common in the study area, particularly gastrointestinal diseases and symptoms, which have been documented in many studies conducted with various human groups in the Amazon and around the world (Rehecho *et al.* 2011, Bieski *et al.* 2015, Pedrollo *et al.* 2016, Miara *et al.* 2020). In Pará state, diarrhea (or Acute Diarrheal Disease - ADD) is one of the leading causes of morbidity and mortality, particularly affecting children under one year of age (Sousa *et al.* 2020). The high frequency of mentions in the 'D - Digestive' category (with diarrhea being the main symptom) is likely related to the communities' dependence on river water for household activities and consumption. These communities lack infrastructure and basic sanitation services, which contributes to contamination, the proliferation of vectors, and a range of waterborne diseases such as amebiasis, giardiasis, cholera, typhoid fever, hepatitis A, salmonellosis, and others (Souza *et al.* 2012). The seeds of **jucá** (*Libidibia ferrea* (Mart. ex Tul.) L.P. Queiroz), **açaizeiro** roots (*E. oleraceae*), **marupazinho** pseudobulbs (*E. bulbosa*), barks of **sucuúba** (*Himatanthus articulatus* (Vahl) Woodson) and **verônica** (*Dalbergia monetária* L.f.), the leaves of **goiabeira/guava** (*Psidium guajava* L.), **elixir paregórico** (*Piper callosum*) and **pariri** (*Fridericia chica*) are some of the most frequently used remedies for treating diarrhea in the study area.

Although not among the most representative categories, 'Cultural Diseases' play a central role in the traditional medicine of many Amazonian communities. In this category, diseases were reported as having non-natural causes, recognized within the communities' culture, including the evil eye (11 mentions), *panema* (5), *quebranto* (4), *olhado-de-bicho* (3), and *mãe-do-corpo* (2). Some studies have reported the occurrence of these diseases in the Amazon region (Bieski *et al.* 2015, Pedrollo *et al.* 2016), and they are part of the reality for many other rural populations worldwide.

Regarding the Relative Importance Index (RI), the high values for *C. guianensis*, *H. articulatus*, *Cnidoscolus urens* (L.) Arthur, *Protium heptaphyllum* (Aubl.) Marchand, *D. monetaria*, *Senna alata* (L.) Roxb., and *L. ferrea* may indicate the actual effectiveness of these plants in curing and treating the diseases reported by the communities, as this index is based on the body systems with the highest number of indications (mainly the gastrointestinal system). The number of properties for each species was considered, and thus, this index also tends to identify the most versatile species, highlighting them for future pharmacological studies (Lucena *et al.* 2013).

Unsustainable practices have a significant impact on MPs populations. The extraction of bark, roots, and whole plants is highly destructive, while the use of leaves, flowers, fruits, and seeds presents medium or low risk to target species (Teklehaymanot & Giday 2007). Even though destructive harvesting practices were observed less frequently in this study, they deserve special attention for management and sustainable use, and these practices should be discussed and established according to the interests of each community (Campos & Albuquerque 2021). When linking harvesting methods (NR) to different levels of anthropic pressure (SR), trees generally exhibit greater sensitivity than other life forms, primarily due to



the extraction of wood for construction and fuel use. *S. exorrhiza* (**paxiúba**) was the most sensitive species according to the SI. This native species is spontaneously found in the communities, with its roots harvested destructively for medicinal preparations. It is also used in house and bridge construction, as well as in crafts and ornamentation, leading to extremely high anthropic pressure, as these activities contribute to the species' increased sensitivity in these riverside environments (Kikuchi & Callado 2021).

Concerning the Importance Value Index (IVI), most of the priority species for conservation are harvested exclusively through extractivism, mainly for their bark, a practice that can compromise the survival of individuals (Khan *et al.* 2013). The high IVI values attributed to species in this group indicate that they require special attention and conservation efforts. The species highlighted in this group are wild/spontaneous and harvested destructively, either by removing their perennial structures (bark, roots, rhizomes, or tubers) or the entire plant, practices that could lead to local extinction, including species currently considered abundant (Rivers *et al.* 2022). Recognizing the importance of MPs and identifying those requiring priority conservation attention can assist communities in taking steps towards the rational use of these resources, especially when exploitation poses risks to species' survival (Campos & Albuquerque 2021).

Regarding conservation status, all species at risk of extinction are trees and have multiple uses beyond medicinal, with high economic value as timber and non-timber forest products. It is worth noting that of the 210 native species, 178 have not been assessed for conservation status. Many of these species are shared with other countries in the International Amazon, and only Brazilian native and endemic species have been evaluated by the National Center for Flora Conservation (CNCFlora 2023). Therefore, a particular approach is recommended for Amazonian species under some form of usage pressure that have not yet been adequately addressed by conservation bodies.

#### **Recommendations and conservation strategies**

There should be continuity in the documentation of MP use in other riverside communities of the EA to study new uses, preparations, and/or extractions, or even the inclusion of potential new species. Besides guiding conservation and sustainable use actions among community members, local research groups should enhance research on species taxonomy, ecology, and, especially, ethnopharmacological studies to evaluate these medicinal resources. Future research in the region should also assess MP populations derived from extractives and identify user perceptions regarding the main threats to species; these measures should be fundamental to conservation planning.

As alternatives that can be put into practice in riverside communities, it is suggested that, where possible, potential species of medicinal equivalence be used to replace MPs with high IVI. Examples of plants collected in a non-destructive way and with less anthropogenic pressure in riverside communities include: *Ayapana triplinervis* (M.Vahl) R.M.King & H.Rob. (**japana-roxa**), *Bacopa scoparioides* (Cham. & Schlttdl.) Scatigna (**pataqueira**), *Hyptis sp. nov.* (**salva-do-marajó**), *Eugenia biflora* (L.) DC. (**pedra-hume-caá**), *Gustavia augusta* L. (**geniparana**), *Jatropha gossypifolia* L. (**pião-roxo**), *Justicia pectoralis* Jacq. (**abrecaminho**), *Mikania parvifolia* Baker (**cipó-caatinga**), *Myrcia bracteata* (Rich.) DC. (**murta-cabeluda**), *Parahancornia fasciculata* (Poir.) Benoist (**Amapá**), *Pilea microphylla* (L.) Liebm. (**cama-do-menino-Deus**) and *Uncaria tomentosa* (Willd. ex Roem. & Schult.) DC. (**unha-de-gato**). These plants have medicinal indications that correspond to the main diseases treated in the communities, such as diarrhea, fever, flu, rheumatism, urinary problems and problems of the female genital system, and can reduce or minimize the use of the species under pressure. Replacing the harvested parts, for example the bark or roots with the leaves of the same plant, can satisfy the need for more sustainable collection; it is also recommended to increase the time intervals between collections so that there is adequate regeneration of the managed specimen; the propagation of medicinal species and the establishment of nurseries in backyards or around communities and agroforestry systems (ex situ conservation) can be a measure to reduce the pressure on resources obtained exclusively through extraction (Khan *et al.* 2013), which is also in line with the GSPC (Sharrock 2020); Implementing collaborative monitoring processes of the local flora can help assess the availability of species in high demand and facilitate adaptation to lower impact conditions (Sobral *et al.* 2017). Most of the species presented in this study originate from native populations, so assessing the impacts of (destructive) extraction and associated pressure, as well as implementing sustainable management actions precisely in the places where these plants are collected, is the most effective way of conserving these resources. For this reason, decisions about which species should be prioritized in conservation strategies need to be linked to local populations so that actions can be implemented that will have a greater chance of success, guaranteeing more participatory and democratic management of biodiversity (Campos & Albuquerque 2021).

## Conclusion

Riverine communities in the EA are knowledgeable about the identities and applications of medicinal species found in their region. Many riverine residents in this estuary still rely on plants, at least for the treatment of basic human ailments such as diarrhea, fever, flu, skin infections, rheumatism, and sexually transmitted infections. The IVI presents medicinal species with high conservation priority, most of which are trees. There is a need to intensify conservation efforts, especially for endemic native species of the Brazilian Amazon such as: *L. pisonis*, *E. uchi*, *M. paraensis*, *Tabernaemontana angulata* Mart. ex Müll.Arg. and *Vouacapoua americana* Aubl. Therefore, more research is needed focusing on the conservation priorities of medicinal plants in the EA, since this is a pioneering study based on secondary data from ethnobotanical studies available in the main scientific databases. Studies with this approach need to be encouraged, especially to build a network of information that helps in understanding the diversity of medicinal flora, and identify threats to species, as well as proposed management forms suitable to the interests of the users of these resources.

## Declarations

**List of abbreviations:** MPs – Medicinal Plants; AE – Amazon Estuary; GSPC – Global Strategy for Plant Conservation

**Ethics approval and consent to participate:** Not applicable

**Consent for publication:** Not applicable

**Availability of data and materials:** No datasets have been deposited in public repositories.

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**Author contributions:**

WPGM considerably contributed to the literature survey, data collection, map making, analyzed, and wrote the manuscript. MRCF and PGCL supervised in conceptualization, research design, statistical analysis, critical evaluation, helping with discussions, editing, and moderation of the manuscript.

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