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Ethnobotanical study of medicinal plants in urban home gardens in the city of Abaetetuba, Pará state, Brazil

[Estudio etnobotánico de las plantas medicinales en los jardines de patios urbanos de Abaetetuba, Pará, Brasil]

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Abstract: This was an ethnobotanical study of medicinal plants occurring in home gardens in the northern Brazilian Pará state. We conducted semi-structured interviews with the owners of 233 home gardens selected by probability sampling. We analyzed the data qualitatively, complemented by indices Total Species Diversity and Total Species Equitability (SDtot and SEtot, respectively); Use Value (UVs); Importance Value (IVs); and Informant Consensus Factor (ICF). We identified 124 species within 107 genera and 55 families. Of the medicinal species identified, 17.6% were considered effective in the treatment of Infectious and Parasitic Diseases. The home gardens evaluated harbored a great diversity of medicinal species (SDtot - 47.43), although knowledge of the plants was not distributed evenly (SEtot - 0.383). Kalanchoe pinnata (Lam.) Pers. showed the highest UVs (0.462) and Lippia alba (Mill.) N.E.Br. ex Britton & P.Wilson showed the highest IVs (0.104). The highest ICF value (0.94) was for the treatment of Behavioural Disorders.

Keywords: Amazon, folk medicine, urban flora, traditional knowledge.

Resumen: La investigación tuvo como objetivo hacer un estudio etnobotánico de las plantas medicinales en los jardines de patios urbanos de Abaetetuba, Pará, Brasil. Fueron realizadas entrevistas semiestructuradas aplicando 233 formularios a los propietarios de los jardines, seleccionados por muestreo probabilístico. Los datos fueron analizados en un enfoque cualitativo, complementado por los índices Diversidad Total (SDtot) y la Equidad Total de especies (SEtot), el Valor de Uso (UVS), Valor de Importancia (IVS) y el Factor de Consenso del Informante (ICF). Se identificaron 124 especies en 107 géneros y 55 familias. Las indicaciones más frecuentes fueron por enfermedades infecciosas y parasitarias (17.6%). Los jardines de los patios son el hogar de una gran diversidad de especies medicinales (SDtot – 47.43), sin embargo, se observó que el conocimiento acerca de las plantas no se distribuyó de manera uniforme (SEtot – 0,383). Kalanchoe pinnata (Lam.) Pers. mostró mayor UVS (0.462) y Lippia alba (Mill.) N.E.Br. ex Britton & P.Wilson mayor IVS (0,104). El ICF mostró mayor acuerdo para el uso de las plantas en los trastornos de comportamiento (0,94).

Palabras clave: Amazonía, medicina popular, flora urbana, conocimientos tradicionales.
INTRODUCTION
Since time immemorial, humans have looked to nature for ways to improve their living conditions and increase their chances of survival. One example is the way in which humans have interacted with plants, developing various uses for them (Giraldi & Hanazaki, 2010). The close relationship between humans and plants has promoted the accumulation of botanical knowledge that is transmitted through the sharing of family narratives and community experiences, that has resulted in a valuable genetic heritage, each society maintaining a knowledge base of edible and therapeutic plants (Siviero et al., 2012).

Ethnobotany is the study of the relationships between human populations and plants, addressing the ideas conceptualized by a given society regarding plant life. Ethnobotanists attempt to salvage and preserve traditional botanical knowledge related to the various uses of local flora (Posey, 1985).

The use of medicinal plants as a way of maintaining or recuperating a good health status is considered valuable by various communities in Brazil, such as that comprising urban dwellers (Carniello et al., 2010). Such plants, which are typically grown in home gardens, are viewed as the first-line treatment for most diseases, because they represent a low-cost alternative to pharmaceutical drugs (Almeida et al., 2012).

Home gardens are defined as spaces, adjacent to residences, within which humans engage in cultivation practices that contribute to the selection of species considered useful to the community, as occurs in the communities of the Amazon region (Martins et al., 2012). Such gardens create environments for the cultivation, multiplication, and preservation of the germplasm all of which are fundamental to the conservation of genetic resources and of the associated knowledge (Eichemberg et al., 2009).

The continuity of practices related to the use of medicinal plants grown in home gardens is threatened by the urbanization and destruction of green spaces. In Brazil, the process of urban expansion has impeded the preservation of such spaces (Trotta et al., 2012). In addition, that process can lead to a loss of biodiversity, threatening not only the conservation of the genetic heritage but also that of the local knowledge base (Pereira & Diegues, 2010). The objective of this study was to evaluate, from an ethnobotanical perspective, the medicinal plants occurring in urban home gardens in north Brazil.

MATERIAL AND METHODS
Study area
The study was conducted in the São Sebastião neighborhood of the city of Abaetetuba (01°44'03.4"S; 048°52'30.1"W), on the right (east) bank of the Tocantins river in Pará state, within the Cametá microregion and the mesoregion of northeastern Pará (Figure 1). The city encompasses an area of 1.610,408 km² and has a population of 141.100, the main sources of income being commerce, agriculture, livestock production, and the extraction of plant life (IBGE, 2010).

Abaetetuba has an equatorial climate, categorized as super-humid, with a rainy season (January-June) and a dry season (July-December). The mean annual temperature is approximately 27°C, monthly mean temperatures ranging from 20°C to 35°C. The total annual rainfall in the region hovers around 2000 mm, and the mean relative humidity is 85% (SEPOF, 2011). The urban zone of Abaetetuba comprises 14 neighborhoods. The São Sebastião neighborhood is 35 years old and has a great number of home gardens.

Sampling and selection of the home gardens
Fieldwork was carried out between June 2013 and September 2014. The neighborhood to be studied was selected on the basis of the following: time since establishment (preference for longer); geographic origin of the residents (preference for rural); and the number of home gardens (preference for more). The first phase of the study consisted in making informal visits in order to establish rapport with the residents prior to conducting interviews. Data obtained from community leaders in the neighborhood indicated that there were 1,425 home gardens distributed among 34 streets.

We used a probabilistic sampling procedure, in which the minimum sample size was calculated on the basis of the total number of home gardens, with a 6% margin of error, using the following formulas: \( n = N \cdot N_0 / (N + N_0) \). Where \( N_0 \) is the provisory sample size, \( E_0 \) is the margin of error, \( n \) is the sample size, and \( N \) is the total population. We thus calculated the minimum sample to be 233 home gardens.
garden. To select the residents to be visited and subsequently interviewed, we used simple random sampling (Barbetta, 2013).

**Data collection**
Prior to initiating the fieldwork, we met with members of the community in order to present our research project and to obtain written consent, in the form of a permit signed by local authorities, granting permission for the study to be conducted.

Using questionnaires, we conducted semi-structured interviews (Albuquerque *et al.*, 2010) with the owners of the 233 home gardens selected, in order to determine their level of knowledge about the medicinal plants growing therein. The questionnaires included questions about the geographic origin of the owners, what steps they take when they become ill and how often they seek medical treatment. Questions designed to collect ethnobotanical data regarding the medicinal plants were related to the conditions for which their use is indicated, the forms in which they are prepared, and which parts of the plant are used. In addition to the questionnaires, we used field diaries (Bernard, 2006), in which each researcher could record perceptions related to the theme of the investigation.

**Identification of species**
The plants cited in the interviews were identified in the Herbarium of the Museu Paraense Emílio Goeldi. We collected and preserved botanical specimens, as described by Fidalgo & Bononi (1984). The specimens were incorporated into the collection of the Prof. Dra. Marlene Freitas da Silva Herbarium of Pará State University, in the city of Belém. The scientific names of species were checked against the List of Species in the Plant of List (The Plant List, 2012) and against the database of the Missouri Botanical Garden (Missouri Botanical Garden, 2014).

**Data analysis**
Using a qualitative approach (Amorozo & Viertler, 2010), we analyzed the relationship that the residents had with the medicinal plants occurring in their home gardens. The diseases cited were grouped in accordance with the International Classification of Diseases, 10th revision (World Health Organization, 2008). In addition to health problems recognized by modern medicine, we considered so-called “Cultural ills” (Amorozo, 2002), including the effects of the “evil eye” and other types of curses or spells.

As can be seen in Table 1, we used a quantitative approach to evaluating the relevance of the medicinal plants in the home gardens visited. To determine the variety and distribution of uses, we calculated Total Species Diversity (SD<sub>tot</sub>) and Total Species Equitability (SE<sub>tot</sub>), as described by Byg & Balslev (2001) and adapted by Silva *et al.* (2006). To quantify the relative importance of a given species in relation to its use, we also calculated Use Value (UVs), as described by Phillips & Gentry (1993) and adapted by Rossato *et al.* (1999), and Importance Value (IVs), as also described by Byg & Balslev (2001) and adapted by Silva *et al.* (2006). By calculating the Informant Consensus Factor (ICF), as described by Troter & Logan (1986), we attempted to identify the subcategories of diseases that showed the greatest agreement among the interviewees in terms of the plant species indicated for their treatment.

For the plants identified to the species level, we searched the bibliographic databases Science Direct, PUBMED and LILACS to check whether they had been targets of previous phytochemical and pharmacological studies. Pharmacological studies were used for comparison and possible confirmation of folk indications.

**RESULTS AND DISCUSSION**

**Lifestyles in the community**
Of the 233 home garden owners interviewed, 170 (73%) were native to Abaetetuba - 123 and 47 having grown up in the rural and urban zones, respectively - 58 (25%) had been born in other municipalities within the state of Pará, and the remaining 5 (2%) had been born in another state. It is noteworthy that more than half of the interviewees were from rural areas of the region under study, where they had worked in agriculture, and had continued to grow plants in their home gardens after migrating to the urban zone. According to Amaral & Guarim Neto (2008), individuals who acquire the habit of planting and developing dependent relationships with plant resources rarely cease to engage in such activity, even after migrating to urban areas.

When they fall ill, 56% of the interviewees use medicinal plants from their home gardens as the first-line treatment, whereas the remaining 44% first seek medical treatment at a health care facility, although those in the latter group reported using plant-based home remedies as a complement to the...
medications prescribed. The combined use of such home remedies and pharmaceutical drugs is common in Brazil, as has been reported by other authors (Silva et al., 2008; Oliveira et al., 2014a).

Table 1
Indices employed in the analysis of ethnobotanical data related to the uses of medicinal plant species grown in home gardens in the São Sebastião neighborhood of the city of Abaetetuba, in the state of Pará, Brazil.

Source: Silva et al. (2006).

<table>
<thead>
<tr>
<th>Index</th>
<th>Description (in this context)</th>
<th>Formula</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>$SD_{tot}$</td>
<td>Measures how multiple species are used and how they contribute to the total use</td>
<td>$SD_{tot} = 1 / \sum Ps^2$</td>
<td>0-n</td>
</tr>
<tr>
<td>$SE_{tot}$</td>
<td>Measures how various species contribute to the total use, independent of the total number of species used</td>
<td>$SE_{tot} = SD_{tot} / n$</td>
<td>0-1</td>
</tr>
<tr>
<td>IVs</td>
<td>Measures the proportion of informants who cite a given species as important</td>
<td>$IVs = nis / n$</td>
<td>0-1</td>
</tr>
<tr>
<td>UVs</td>
<td>Indicates the value of the use of one species by one informant in relation to the total number of informants</td>
<td>$UVs = (\sum U) / n$</td>
<td>0-1</td>
</tr>
<tr>
<td>ICF</td>
<td>Indicates which body systems (disease categories) have the greatest relative importance, as evidenced by the level of informant agreement regarding the therapeutic uses of the species under study</td>
<td>$ICF = (nur - nt) / (nur - 1)$</td>
<td>0-1</td>
</tr>
</tbody>
</table>
In the São Sebastião neighborhood, there is a family health care clinic, where 55% of the interviewees reported receiving treatment on a regular basis, although 45% reported seeking treatment only after becoming ill. There are also 12 community health agents (affiliated with the national Family Health Program) working in the neighborhood. The community health agents conduct regular home visits in order to monitor residents who are currently under medical treatment. Despite having access to modern health care services, members of the community still cultivate and use plants as a therapeutic resource. According to Silva (2008), that can be explained by the fact that there is a cultural component to the use of medicinal plants in the treatment of diseases.

Within our sample, we identified six traditional healers - individuals sought out by the local population because they cultivate and have extensive knowledge of medicinal plants, as well as offering prayers in order to cure various ills. Santos et al. (2005) described the curative rituals performed by “prayer-reciters”, “blessing-givers”, and healers in the Rio Negro Valley region of the Brazilian state of Amazonas, emphasizing the important role that these social actors play in the use of local plants as phytotherapy.

**Cultivation of medicinal plants**

When asked about how and where they cultivate medicinal plants, 77% of the interviewees reported that they always plant them directly in the soil, 5% reported that they always grow them on raised, slatted wooden platforms (in pots, pans, buckets, or woven baskets), and 18% reported that they use a combination of those two approaches. Martins et al. (2012) stated that such platforms are used in the cultivation of plant species that require more care in terms of light intensity, protection from animal attacks, intensity of rainfall, and soil composition, whereas those that are more resistant to rain, pests and light are grown in the soil.

Medicinal plants are typically procured to meet the therapeutic needs of the family, and 82.5% of the interviewees reported that the labor involved in caring for those plants is supplied by the female members of the family. Siviero et al. (2012) also found that women are the primary caretakers of home gardens in the Amazon region, reporting that the gardens are strategically located in order to facilitate and promote their tending.

Among the São Sebastião residents interviewed, 74% stated that they exchanged medicinal plants with relatives and neighbors. That was previously reported by Pilla et al. (2006) for a town in southeastern Brazil, where the authors found that the majority of such plants were grown in home gardens and exchanged among family members. This habit constitutes an important practice for imparting knowledge through interaction, thus favoring the cultivation of medicinal plant species (Winklerprins & Oliveira, 2010).

The practices adopted in the home gardens evaluated include pruning (the cutting of selected limbs and branches), weeding (the removal of creeping plants with a hoe or machete), fertilization (with black soil and açaí seed or dry brush), and thinning (numerical reduction of species that pose risks to the garden as a whole). All of these cultural practices are aimed at the ideal development of the species. According to Silva et al. (2014c), the agricultural practices traditionally employed by humans contribute to reducing the use of chemical fertilizers, thus improving the quality of the soil.

**Ethnobotanical aspects of home gardens**

We identified 124 species of medicinal plants (Table 02), distributed among 107 genera and 55 families, the most well-represented families being Lamiaceae (accounting for 8.9% of the species); Asteraceae (5.6%); and Euphorbiaceae, Fabaceae, and Malvaceae (4.0% each). Lamiaceae and Asteraceae have also been cited as being the most species-rich families in other studies of medicinal plants in home gardens within the Amazon region (Martins et al., 2012; Siviero et al., 2012), as well as within the Atlantic Forest Biome (Eichemberg et al., 2009; Oliveira et al., 2010; Althaus-Ottmann et al., 2011) and Cerrado Biome (Liporacci & Simão, 2013). Those two families include various species that contain bioactive compounds (Lorenzi & Souza, 2008), which could explain the high rates of the use of folk medicine.
Table 2
Species of medicinal plants occurring in home gardens in the São Sebastião neighborhood of the city of Abaetetuba, in the state of Pará, Brazil. UVs – Use Value; IVs – Importance Value.

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>Common name(s) in Brazilian Portuguese (English)</th>
<th>Condition(s) for which treatment with the species is recommended</th>
<th>Preparation(s)</th>
<th>Plant part(s) used</th>
<th>UVs</th>
<th>IVs</th>
<th>Phytochemical and pharmacological studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acanthaceae</td>
<td></td>
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</tr>
<tr>
<td>Hemigraphis colorata (Blume) Hallier f.</td>
<td>Trevo-roxo (purple waffle plant)</td>
<td>Hemorrhoids, infections of the navel in children, and ear infections</td>
<td>Tea (decoction), extract</td>
<td>Leaves</td>
<td>0.042</td>
<td>0.005</td>
<td>Purple anthocyanin (Skaar et al., 2014), phenol, carbohydrates: steroids, saponins, coumarins, tannins, proteins, carboxylic acid, flavonoids, xanthoproteins, alkaloids (Anitha et al., 2012), antibacterial effect (Anitha et al., 2012)</td>
</tr>
<tr>
<td>Justicia pectoralis Jacq.</td>
<td>Abre caminho, trevo cumara, trevo, trevinho (water-willow)</td>
<td>Uterine infection, headache, aborrimento de criança, quebranto, heart problems, nervousness</td>
<td>Decoction in a bath, maceration in a bath, tea (decoction)</td>
<td>Leaves</td>
<td>0.033</td>
<td>NCI</td>
<td>Estrogenic and progestagenic effects (Locklear et al., 2010)</td>
</tr>
<tr>
<td>Justicia secunda Vahl</td>
<td>Correntinha, vissangue, foissangue, luftal, arnica em planta, esparrmo luftal, sulfato ferroso (St. John bush)</td>
<td>Gastritis, anemia, low resistance to infection, falls, menstrual cramps, diarrhea</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.085</td>
<td>0.014</td>
<td>Polyphenol (Koffi et al., 2013), secundarellone A, B, and C (Theiler et al., 2014)</td>
</tr>
<tr>
<td>Ruellia geminiflora Kunth</td>
<td>Atroveran, buscopan ((unknown))</td>
<td>Menstrual cramps</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.099</td>
<td>0.005</td>
<td>No data found</td>
</tr>
<tr>
<td>Adoxaceae</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sambucus nigra L.</td>
<td>Sabugueiro ([European] [black] elder[berry])</td>
<td>Flu, measles, chicken pox, wounds, cough</td>
<td>Tea (decoction), decoction in a bath</td>
<td>Leaves</td>
<td>0.094</td>
<td>0.005</td>
<td>Anthocyanins (Cooney et al., 2015), fatty acids (Salvador et al., 2015), total phenolic (Fazio et al., 2013), sugars, organic acids, polyphenols (Veberic et al., 2009), triterpenoids (Salvador et al., 2015), antioxidant property (Mikulić-Petkovsek et al., 2016), against oxidative stress in human colon cells (Olejnık et al., 2016), anti-inflammatory effects (Olejnık et al., 2015)</td>
</tr>
<tr>
<td>Amaranthaceae</td>
<td></td>
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<tr>
<td>Alternanthera bettzichiana (Regel) G. Nicholson</td>
<td>Papagainho (red calico plant)</td>
<td>Hemorrhage, anemia</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.024</td>
<td>NCI</td>
<td>No data found</td>
</tr>
<tr>
<td>Alternanthera brasiliana (L.) Kuntze</td>
<td>Terramicina (Brazilian joy weed)</td>
<td>Urinary tract infection, menstrual cramps, uterine infection, intestinal infection, wounds,</td>
<td>Tea (infusion), tea (decoction), extract</td>
<td>Leaves</td>
<td>0.052</td>
<td>0.009</td>
<td>Sitosterol-3-α,β-D-glucopyranoside, flavones, crysoeriol (5,7,4'-trihydroxy-3'--methoxyflavone), tricin (5,7,4'--trihydroxy-3',5')</td>
</tr>
<tr>
<td>FAMILY</td>
<td>Species</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
<td>Preparation(s)</td>
<td>Plant part(s) used</td>
<td>UVs</td>
<td>IVs</td>
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<td></td>
<td>Dysphania ambrosioides (L.) Mosyakin &amp; Clemants</td>
<td>Metruz, metruz (Epazote, wormseed, Jesuit's tea, Mexican tea)</td>
<td>Poor circulation</td>
<td>Juice</td>
<td>Leaves</td>
<td>0.075</td>
<td>0.005</td>
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<tr>
<td></td>
<td>Pfaffia glomerata (Spreng.) Pedersen</td>
<td>Corrente (Brazilian ginseng)</td>
<td>Lung problems, cough, asthma, urinary tract infection, uterine infection, intestinal worms</td>
<td>Tea (decoction), decoction in a bath</td>
<td>Leaves</td>
<td>0.019</td>
<td>NCI</td>
</tr>
<tr>
<td>Amaryllidaceae</td>
<td></td>
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<tr>
<td></td>
<td>Eucharis amazonica Linden ex Planch.</td>
<td>Cebolinha, cebola brava (Amazon lily, Eucharist lily)</td>
<td>Asthma</td>
<td>Juice</td>
<td>Roots</td>
<td>0.019</td>
<td>NCI</td>
</tr>
<tr>
<td>Anacardiaceae</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Anacardium giganteum Hancock ex Engl.</td>
<td>Caju do mato (wild cashew)</td>
<td>Gastritis</td>
<td>Tea (decoction)</td>
<td>Skin/bark</td>
<td>0.005</td>
<td>NCI</td>
</tr>
<tr>
<td></td>
<td>Anacardium occidentale L.</td>
<td>Cajueiro (cashew tree)</td>
<td>Uterine infection, vaginal inflammation, diarrhea, wounds, gastritis</td>
<td>Decoction in a bath, tea (decoction), juice</td>
<td>Skin/bark and fruit</td>
<td>0.193</td>
<td>0.024</td>
</tr>
<tr>
<td>FAMILY</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
<td>Preparation(s)</td>
<td>Plant part(s) used</td>
<td>UVs</td>
<td>IVs</td>
<td>Phytochemical and pharmacological studies</td>
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</tr>
<tr>
<td><strong>Mangifera indica</strong> L.</td>
<td>Mangueira (mango tree)</td>
<td>Diarrhea</td>
<td>Tea (decoction)</td>
<td>Skin/bark</td>
<td>0.005</td>
<td>NCI</td>
<td>Gallotannins (Luo et al., 2014), 1,2,3,4,6-Penta-O-galloyl-β-D-glucose (Mohan et al., 2013), alkaloids, flavonoids, terpenoids (Prado et al., 2013), phenolic compounds (Fernández-Ponce et al., 2015), triterpenoids (Anjaneyulu et al., 1999), antihepatotoxic activity (Fahmy et al., 2016), anti-tumor effects (García-Rivera et al., 2011), antioxidant property (Fernández-Ponce et al., 2015), antidiarrheal activity (Yakubu &amp; Salimon, 2015), antimicrobial activity (Singh et al., 2015), anti-inflammatory activity (Mohan et al., 2013)</td>
</tr>
<tr>
<td><strong>Schinus terebinthifolia</strong> Raddi</td>
<td>Aroeira (Brazilian pepper, rose pepper, Christmasberry)</td>
<td>Uterine infection, intestinal infection, gastritis, stomach cancer</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.019</td>
<td>0.005</td>
<td>Flavonoids (Bernardes et al., 2014), spirocyclopropene (Richter et al., 2010), triterpene acids (Vieira et al., 2015), α-pinene, β-caryophyllene, germacrene D, β-pinene (Cavalcanti et al., 2015), antimetastatic protection (Matsuo et al., 2011), antioxidant and antymycobacterial activities (Uliana et al., 2016), neuroprotective effect (Sereniki et al., 2016), antimicrobial activity (Bernardes et al., 2014), anti-inflammatory effect (Rosas et al., 2015), anti-allergic activity (Cavalheiro-Machado et al., 2008)</td>
</tr>
<tr>
<td><strong>Anonaceae</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Annona mucosa</strong> Jacq.</td>
<td>Biribá (biriba)</td>
<td>Sore throat</td>
<td>Tea (decoction)</td>
<td>Leaves and skin/bark</td>
<td>0.019</td>
<td>NCI</td>
<td>Epomusenins A and B (Chen et al., 1996), alkaloids, acetogenins (Ribeiro et al., 2013), annonaceous acetogenins (Gu et al., 1997), rollicosin (Liaw et al., 2003) insecticidal activity (Ribeiro et al., 2013)</td>
</tr>
<tr>
<td><strong>Annona muricata</strong> L.</td>
<td>Graviola (soursop tree, custard apple tree)</td>
<td>Obesity, diabetes</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.019</td>
<td>NCI</td>
<td>Acetogenins (Jaramillo et al., 2000), annonaceous acetogenins (Sun et al., 2014c), isoquinoline alkaloids (Hasrat et al., 1997), anticancer activity (Sun et al., 2015c), anti-ulcerogenic activity (Bento et al., 2016), leishmanicidal activity (Vila-Nova et al., 2013), anthelmintic activity (Ferreira et al., 2013), antidiabetic and antioxidant activity (Mohan et al., 2013)</td>
</tr>
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<td>FAMILY</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
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<td>Phytochemical and pharmacological studies</td>
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<tr>
<td>Apiaceae</td>
<td><strong>Eryngium foetidum</strong> L.</td>
<td>Chicória (culantro, blessed thistle, Amazon chicory)</td>
<td>Intestinal worms, diarrhea, stomachache, diarreia de dentição, high blood pressure, toothache</td>
<td>Tea (decoction)</td>
<td>Roots</td>
<td>0.042</td>
<td>NCI</td>
</tr>
<tr>
<td>Araceae</td>
<td><strong>Dieffenbachia seguine</strong> (Jacq.) Schott</td>
<td>Comigo ninguém pode, aninga do maranhão (dumb cane, dumbcane)</td>
<td>Panemeira, mau olhado, olho gordo, quebranto</td>
<td>Maceration in a bath, decoction in a bath</td>
<td>Leaves</td>
<td>0.094</td>
<td>0.005</td>
</tr>
<tr>
<td>Araliaceae</td>
<td><strong>Polyscias scutellaria</strong> (Burm.f.) Fosberg</td>
<td>Cuinha, cuerinha (shield aralia, plum aralia, Balfour aralia)</td>
<td>Aborrecimento de criança, hemorrhage, menstrual cramps</td>
<td>Maceration in a bath, tea (decoction)</td>
<td>Leaves</td>
<td>0.019</td>
<td>0.005</td>
</tr>
<tr>
<td>Arecales</td>
<td><strong>Bactris gasipaes</strong> Kunth</td>
<td>Pupunha, pupunheira (peach palm)</td>
<td>Hemorrhoids, uterine infection</td>
<td>Tea (decoction)</td>
<td>Roots</td>
<td>0.009</td>
<td>NCI</td>
</tr>
<tr>
<td></td>
<td><strong>Cocos nucifera</strong> L.</td>
<td>Coqueiro (coconut palm)</td>
<td>Diarrhea</td>
<td>Fresh</td>
<td>Fruit</td>
<td>0.009</td>
<td>0.005</td>
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<table>
<thead>
<tr>
<th>FAMILY</th>
<th>Species</th>
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<th>Condition(s) for which treatment with the species is recommended</th>
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<tbody>
<tr>
<td></td>
<td>Mart.</td>
<td>Mart. palm, acai palm, açaí palm)</td>
<td>Problems</td>
<td>extract</td>
<td>seeds</td>
<td></td>
<td></td>
<td>(Hu et al., 2014), anthocyanin (Rogez et al., 2011), flavonoids (Kang et al., 2010), fatty acids, phenolic compounds (Batista et al., 2016) antioxidant and cytotoxicity activities (Hu et al., 2014), anticonvulsant property (Souza-Monteiro et al., 2015), antiproliferative activity (Pacheco-Palencia et al., 2010), anti-inflammatory activity (Moura et al., 2012), allelopathic activity (Batista et al., 2016)</td>
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<tr>
<td>Aristolochiaceae</td>
<td>Aristolochia trilobata L.</td>
<td>Urubucaá (Dutchman’s pipe)</td>
<td>Gastritis, stomachache, hemorrhage</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
<td>No data found</td>
</tr>
<tr>
<td>Asparagaceae</td>
<td>Agave deserti Engelm.</td>
<td>Espinheira santa (desert agave)</td>
<td>Quebranto</td>
<td>Maceration in a bath</td>
<td>Leaves</td>
<td>0.005</td>
<td>NCI</td>
<td>No data found</td>
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<td></td>
<td>Agave neglecta Small</td>
<td>Coratá (wild century plant)</td>
<td>Quebranto, panemeira, mau olhado, espírito mau, cough</td>
<td>Decoction in a bath, maceration in a bath, syrup</td>
<td>Leaves</td>
<td>0.028</td>
<td>NCI</td>
<td>No data found</td>
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<tr>
<td></td>
<td>Sansevieria trifasciata Prain</td>
<td>Espada de São Jorge (snake plant, mother-in-law's tongue, Saint George's sword)</td>
<td>Quebranto, mau olhado, panemeira, olho gordo, espírito mau</td>
<td>Decoction in a bath, maceration in a bath</td>
<td>Leaves</td>
<td>0.080</td>
<td>NCI</td>
<td>Steroidal saponins (Mimaki et al., 1996), pregnane glycosides (Mimaki et al., 1997), sappanin-type homoioflavonoids (Tchegnitegni et al., 2015), anti-allergic and anti-anaphylactic activities (Andhare et al., 2012)</td>
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<tr>
<td>Asteraceae</td>
<td>Acmella oleracea (L.) R.K.Jansen</td>
<td>Jambu (toothache plant, paracress)</td>
<td>Nervousness, gastritis, tachycardia</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
<td>Rhamnogalacturonan (Maria-Ferreira et al., 2014), acetylenic 2-phenylethylamides (Simas et al., 2013), alkylamides (Cheng et al., 2015), gastroprotective effect (Maria-Ferreira et al., 2014), antinociceptive effects (Nomura et al., 2013), larvicidal activity (Simas et al., 2013)</td>
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<tr>
<td></td>
<td>Ayapana triplinervis (Vahl) R.M.King &amp; H.Rob.</td>
<td>Japana, japana branca (water hemp)</td>
<td>Cough, quebranto, aborrecimento de criança rheumatism, panemeira, flu, vaginal infection, ovarian inflammation</td>
<td>Maceration in a bath, tea (decoction), syrup</td>
<td>Leaves</td>
<td>0.108</td>
<td>0.005</td>
<td>Thymohydroquinone dimethyl ether (Gauvin-Bialecki &amp; Morodon, 2009)</td>
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<tr>
<td></td>
<td>Bidens pilosa L.</td>
<td>Picão, alfazema (hairy beggar-ticks)</td>
<td>Uterine infection, hepatitis, gastritis, quebranto</td>
<td>Tea (decoction), maceration in a bath</td>
<td>Leafy branches</td>
<td>0.042</td>
<td>NCI</td>
<td>Hydroxylcinnamoyl tartaric acids (Khoza et al., 2016), sesquiterpene, polyacetylene (Grombone-Guaratini et al., 2005), 5-O-methylhoslundin</td>
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<tr>
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<tr>
<td>Gymnanthemum amygdalinum (Delile) Sch.Bip. ex Walp.</td>
<td>Boldo de planta (bitterleaf)</td>
<td>Gastritis, hepatitis, stomachache, diarrhea</td>
<td>Tea (decoction), tea (infusion)</td>
<td>Leaves</td>
<td>0.165</td>
<td>0.047</td>
<td>Antioxidant activity (Silva et al., 2013a; Del-Vechio-Vieira et al., 2013)</td>
<td></td>
</tr>
<tr>
<td>Mikania lindleyana DC.</td>
<td>Sicuriju, sucuriju (sucuriju)</td>
<td>Gastritis, stomachache, liver problems, diabetes, asthma</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.123</td>
<td>0.052</td>
<td>Anti-inflammatory activity (Vanderlinde et al., 2012)</td>
<td></td>
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<tr>
<td>Pluchea sagittalis Less</td>
<td>Macela (wingstem camphorweed)</td>
<td>Stomachache, vomiting, high blood pressure, stomachache, liver problems, diarrhea</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.009</td>
<td>0.019</td>
<td>Antinociceptive and gastroprotective activities (Figueroed et al., 2011)</td>
<td></td>
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<tr>
<td>Tagetes patula L.</td>
<td>Cravo (French marigold)</td>
<td>Rheumatism, headache, epilepsy, stroke, stomachache, intestinal worms, arthrosis</td>
<td>Maceration in a bath, tea (decoction), plaster</td>
<td>Leaves</td>
<td>0.075</td>
<td>0.009</td>
<td>Flavonoids (Munhoz et al., 2014), thiophenes (Margl et al., 2001), benzo furan derivatives (Margl et al., 2005), (Z)-β-ocimene, (E)-β-ocimene, terpinolene, (Z)-ocimenone, (E)-ocimenone, δ-elemene (Prakash et al., 2012), larvicidal effect (Munhoz et al., 2014)</td>
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<tr>
<td>Bignoniaceae</td>
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<tr>
<td>Fridericia chica (Bonpl.) L.G.Lohmann</td>
<td>Pariri (unknown)</td>
<td>Anemia, kidney problems, urinary tract infection, albumin deficiency during pregnancy</td>
<td>Tea (decoction), syrup</td>
<td>Leaves</td>
<td>0.283</td>
<td>0.071</td>
<td>Flavone (Takemura et al., 1995), 3-Desoxyanthocyanidins (Zorn et al., 2001), anthocyanins, luteolin (Paula et al., 2014), 3-Desoxyanthocyanidins (Devia et al., 2002), antimicrobial activity (Mafioleti et al., 2013), anti-inflammatory, antiangiogenic and antiproliferative activities (Michel et al., 2015), leishmanicidal and cytotoxicity activities (Sá et al., 2016), anti- ulcerogenic activity (Servat-Medina et al., 2015), antioxidant capacity (Siraichi et al., 2016)</td>
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<tr>
<th>FAMILY</th>
<th>Species</th>
<th>Common name(s) in Brazilian Portuguese (English)</th>
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<th>Phytochemical and pharmacological studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mansoa standleyi (Steyerm.) A. H. Gentry</td>
<td>Cipó-alho (garlic vine)</td>
<td>Quebranto, mau olhado, espírito mau, panemeira, uruca, assombro</td>
<td>Decoction in a bath</td>
<td>Leaves</td>
<td>0.165</td>
<td>NCI</td>
<td>Dialyl disulfide and dialyl trisulfide (Souza Filho et al., 2009a), allelophatic effect (Souza Filho et al., 2009a)</td>
</tr>
<tr>
<td>Bixaceae</td>
<td>Bixa orellana L.</td>
<td>Urucu (lipstick tree, achiote)</td>
<td>High cholesterol, conjunctivitis, vision problems, wounds, heart problems</td>
<td>Tea (maceration), maceration in a bath</td>
<td>Leaves and seeds</td>
<td>0.042</td>
<td>NCI</td>
<td>Carotenoids (Mercadante et al., 1997; Jako et al., 2002), terpenoids (Conrad et al., 2013), antioxidant activity (Smilin et al., 2012)</td>
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<tr>
<td>Bromeliaceae</td>
<td>Ananas ananassoides (Baker) L. B. Sm.</td>
<td>Nananzinho (wild pineapple, cerrado pineapple)</td>
<td>Hemorrhage</td>
<td>Juice</td>
<td>Fruit</td>
<td>0.005</td>
<td>NCI</td>
<td>No data found</td>
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<tr>
<td>Cactaceae</td>
<td>Cereus jamacaru DC.</td>
<td>Jamacaru (queen of the night cactus)</td>
<td>Urinary tract infection, kidney problems, erysipelas, sore throat, chest pain, lung problems, flu, quebranto</td>
<td>Tea (decoction), maceration in a bath, plaster, syrup</td>
<td>Stem</td>
<td>0.047</td>
<td>0.005</td>
<td>Anthelmintic effects (Vatta et al., 2011)</td>
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<tr>
<td></td>
<td>Epiphyllum phyllanthus (L.) Haw.</td>
<td>Cacto de palma (climbing cactus)</td>
<td>Cancer, toothache</td>
<td>Plaster</td>
<td>Stem</td>
<td>0.009</td>
<td>0.005</td>
<td>Saponins and alkaloids (Pereira et al., 2008)</td>
</tr>
<tr>
<td>Caricaceae</td>
<td>Carica papaya L.</td>
<td>Mamão macho (papaya, pawpaw, pawpaw)</td>
<td>Intestinal worms, amoebic infection, diarrhea, vomiting, kidney problems,</td>
<td>Tea (decoction)</td>
<td>Roots, leaves and shoots</td>
<td>0.061</td>
<td>0.005</td>
<td>Flavonoids, alkaloids (Julianti et al., 2014), glucosides (Galang et al., 2016), total phenolic (Gogna et al., 2015), phenols, carotenoids, vitamin C (Sancho et al., 2011), antiplasmodial activity (Julianti et al., 2014), antithrombocytopenic activity (Zunjar et al., 2016), hypoglycemic activity (Juárez-Rojop et al., 2014)</td>
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<td>Convolvulaceae</td>
<td>Ipomoea asarifolia (Desr.) Roem. &amp; Schult.</td>
<td>Salsa (ginger-leaf morning glory)</td>
<td>Wounds</td>
<td>Tea (decoction), extract</td>
<td>Leaves and roots</td>
<td>0.005</td>
<td>NCI</td>
<td>Hepatoprotective activity (Farida et al., 2012), potential effect against inflammation (Lima et al., 2014), trypanocidal efficacy (Alkali et al., 2015)</td>
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<td>Costaceae</td>
<td>Costus spicatus (Jaq.) Sw.</td>
<td>Canafiche, canafistula (spiked spirallflag ginger, Indian head ginger)</td>
<td>Painful urination, urinary tract infection, renal inflammation, kidney stone, uterine infection</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.274</td>
<td>0.028</td>
<td>Furostanol glycoside (Silva et al., 1999), flavonol glycosides (Silva et al., 2000), saponins, alkaloids, tannins (Paes et al., 2013), antioxidant activity (Azevedo et al., 2014)</td>
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<td>Crassulaceae</td>
<td>Kalanchoe pinnata</td>
<td>Pirarucu (life)</td>
<td>Ear infection,</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.462</td>
<td>0.028</td>
<td>Flavonoids (Muzitano et al., 2013)</td>
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<td>Cyperaceae</td>
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<tr>
<td>Cyperus articulatus L.</td>
<td>Priprioca (jointed flatsedge)</td>
<td>Quebranto, deep wound</td>
<td>Maceration in a bath</td>
<td>Roots</td>
<td>0.009</td>
<td>NCI</td>
<td>Corymbolone and mustakone (Rukunga et al., 2008), sedative property (Rakotonirina et al., 2001), antiplasmoidal activity (Rukunga et al., 2008), anticonvulsant property (Burn et al., 2001)</td>
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<tr>
<td>Euphorbiaceae</td>
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<tr>
<td>Croton cajucara Benth.</td>
<td>Sacaca (white sacaca, red sacaca)</td>
<td>Obesity, rheumatism, generalized aches/pains</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
<td>Diterpene lactone (Melo et al., 2003), antinociceptive activity (Campos et al., 2002), anti-ulcerogenic effect (Paula et al., 2008), cytotoxic activity (Almeida et al., 2003), gastroprotective effect (Hiruma-Lima et al., 2000), antileishmanial activity (Lima et al., 2015)</td>
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<tr>
<td>Euphorbia tirucalli L.</td>
<td>Cruzeiro (pencil cactus, firestick plant, Indian tree spurge, naked lady, pencil tree, sticks on fire, milk bush)</td>
<td>Warts</td>
<td>Fresh</td>
<td>Sap</td>
<td>0.014</td>
<td>NCI</td>
<td>Euphol (Lin et al., 2012), maloyl glucans (Kuster et al., 2015) anti-arthritic activity (Bani et al., 2007), anti-tumor activity (Valadares et al., 2006)</td>
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<tr>
<td>Jatropha curcas L.</td>
<td>Pião-branco (Barbados nut, purging nut, physic nut)</td>
<td>Wounds, asthma, flu, sore throat, earache, gastritis, toothache</td>
<td>Fresh, tea (maceration) tea (decoction), lollipop, plaster</td>
<td>Fruit, leaves, skin/bark and sap</td>
<td>0.156</td>
<td>0.014</td>
<td>Diterpenoids (Liu et al., 2015), phorbol esters (Baldini et al., 2014), anti-toxoplasma activity (Soares et al., 2015), antioxidant activity (Fu et al., 2014)</td>
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<td>Jatropha gossypifolia L.</td>
<td>Pião-roxo (bellyache bush, black physic nut, cotton-leaf physic nut)</td>
<td>Mau olhado, aborrecimento de criança, “toxin buildup” (need to cleanse the body), quebranto, panemeira, espírito mau, wounds, chest pain, diarrhea</td>
<td>Maceration in a bath, Decoction in a bath, tea (decoction), fresh</td>
<td>Leaves, leafy branches and sap</td>
<td>0.170</td>
<td>0.005</td>
<td>Hypotensive and vasorelaxant effects (Abreu et al., 2003), anticoagulant and antioxidant activities (Félix-Silva et al., 2014)</td>
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<tr>
<td>Pedilanthus tithymaloides (L.) Poit.</td>
<td>Coramina (buckthorn, Christmas</td>
<td>Heart problems, cardiac arrhythmia, nervousness</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.160</td>
<td>0.019</td>
<td>Coumarin derivatives (Sandjo et al., 2012), antimicrobial effects (Vidotti et al., 2006), anti-</td>
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<tr>
<td><strong>Fabaceae</strong></td>
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<tr>
<td>Abrus fruticulosus</td>
<td>Acaçus ([unknown])</td>
<td>Sore throat, cough, flu</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
<td>No data found</td>
<td></td>
</tr>
<tr>
<td>Bauhinia forficata</td>
<td>Pata-de-vaca (cow’s-foot)</td>
<td>High cholesterol, high triglycerides, high blood pressure, uterine infection</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.019</td>
<td>NCI</td>
<td>Flavonoids (Marques et al., 2013), anticoagulant and antifibrinogenolytic properties (Oliveira et al., 2005), antidiabetic activity (Pepato et al., 2002), hypoglycemic activity (Cunha et al., 2010)</td>
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<tr>
<td>Cajanus cajan (L.)</td>
<td>Feijão-cuandu (pigeon-pea, Congo-pea)</td>
<td>Headache, flu, constipation</td>
<td>Decoction in a bath, maceration in a bath</td>
<td>Leafy branches</td>
<td>0.047</td>
<td>NCI</td>
<td>Cajanolin (Luo et al., 2010), cajanuslactone (Kong et al., 2010), cajanin (Fu et al., 2015), phenolics (Wei et al., 2015), anticancer activity (Luo et al., 2010), antibacterial activity (Kong et al., 2010), antioxidant property (Gao et al., 2012)</td>
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</tr>
<tr>
<td>Erythrina indica</td>
<td>Brasileira (tiger’s claw)</td>
<td>Sore throat, “toxin buildup” (need to cleanse the body)</td>
<td>Decoction in a bath, tea (decoction)</td>
<td>Leaves</td>
<td>0.009</td>
<td>NCI</td>
<td>β-galactosidase (Kestwal &amp; Bhde, 2007a), α-mannosidase (Kestwal et al., 2007b), hypoglycaemic and antidiabetic activities (Kumar et al., 2011), antibacterial and cytotoxic effects (Sre et al., 2015), antioxidant activity (Sre et al., 2012)</td>
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<tr>
<td>Libidibia ferrea</td>
<td>Jucá (leopardtree, leopard tree)</td>
<td>Sore throat, hoarseness, leg pain, toothache, uterine inflammation, wounds, anemia, gastritis</td>
<td>Tea (decoction), tea (maceration), maceration in a bath</td>
<td>Fruit</td>
<td>0.151</td>
<td>0.028</td>
<td>Polyphenols (Araújo et al., 2014), anti-inflammatory activity (Dias et al., 2013), antinociceptive effect (Sawada et al., 2014), antimicrobial activity (Marreiro et al., 2014)</td>
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<tr>
<td><strong>Iridaceae</strong></td>
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<tr>
<td>Eleutherine bulbosa</td>
<td>Marupazinho (&quot;tears of the virgin&quot;)</td>
<td>Diarrhea, amoebic infection, diarreia de dentição, hemorrhoids, vomiting, stomachache</td>
<td>Tea (decoction)</td>
<td>Roots</td>
<td>0.241</td>
<td>0.038</td>
<td>Eleutherinone (Alves et al., 2003)</td>
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<tr>
<td><strong>Lamiaceae</strong></td>
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<tr>
<td>Aeoallanthus suaveolens</td>
<td>Catinga-de-mulata (&quot;macassâ&quot;)</td>
<td>Stroke, convulsions, intestinal worms, stomachache</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.028</td>
<td>NCI</td>
<td>No data found</td>
<td></td>
</tr>
<tr>
<td>Mentha spicata L.</td>
<td>Hortelã, hortelazinho (pennyroyal, squaw mint, mosquito plant, pudding grass)</td>
<td>Diarreia de dentição, diarrhea, intestinal worms, flu, headache, stomachache, vomiting, fever</td>
<td>Tea (decoction), syrup</td>
<td>Leaves</td>
<td>0.198</td>
<td>0.090</td>
<td>Terpenoids (Pragadheesh et al., 2015), β-carotene and lutein (Gómez-Prieto et al., 2007), limonene (Chauhan et al., 2009), pulegone (Telci et al., 2010), piperitenone oxide (Nakamura et al., 2014),</td>
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<tr>
<td>FAMILY</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
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<td>Phytochemical and pharmacological studies</td>
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<tr>
<td><strong>Mentha pulegium L.</strong></td>
<td><strong>Hortelã-pimenta</strong> (pepper mint)</td>
<td>Diarreia de dentição, diarrhea</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
<td>flavonoids (Bimakr et al., 2011), carvone (Zhao et al., 2013), anti-inflammatory activity (Arumugam et al., 2008), antifungal, antiallatoxigenic and insecticidal efficacy (Kedia et al., 2014), antioxidant and antibacterial activities (Scherer et al., 2013)</td>
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<tr>
<td><strong>Ocimum campechianum Mill.</strong></td>
<td><strong>Favaca, favaquinha</strong> (Amazonian basil, wild sweet basil, wild mosquito plant, least basil)</td>
<td>Headache, painful urination, heart problems, cholesterol issues, constipation, high blood pressure, flu</td>
<td>Tea (decoction), decoction in a bath</td>
<td>Leaves</td>
<td>0.057</td>
<td>NCI</td>
<td>Methyl eugenol, germacrene D, eugenol (Pino Benitez et al., 2009)</td>
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<tr>
<td><strong>Ocimum gratissimum L.</strong></td>
<td><strong>Favacão</strong> (African basil, clove basil)</td>
<td>Constipation, flu, panemeira, aborrecimiento de criança, dizziness, headache, sore throat</td>
<td>Tea (decoction), maceration in a bath</td>
<td>Leaves</td>
<td>0.108</td>
<td>NCI</td>
<td>Thymol, γ-terpinene, myrcene (Marie et al., 2013), choric acid (Casanova et al., 2014), hypoglycemic activity (Casanova et al., 2014), anesthetic effect (Silva et al., 2012), antioxidant and anti-inflammatory effects (Venuprasad et al., 2014), anhelminthic activity (Pessoa et al., 2002), relaxant effect (Madeira et al., 2002), antityranosomal and antiplasmodial activities (Kpovissi et al., 2014), antifungal activity (Nakamura et al., 2004), antibacterial property (Orfafiya et al., 2006), antileishmanial activity (Ueda-Nakamura et al., 2006), anti-arthritic potential (Madhu &amp; Harindran, 2014)</td>
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<tr>
<td><strong>Ocimum minimum L.</strong></td>
<td><strong>Manjericão</strong> (Greek basil, bush basil)</td>
<td>Stomachache, generalized aches/pains, gastritis, quebranto, mau olhado, flu, constipation, asthma, lung disease</td>
<td>Tea (decoction), maceration in a bath</td>
<td>Leaves</td>
<td>0.075</td>
<td>0.005</td>
<td>No data found</td>
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<tr>
<td><strong>Plectranthus Anador</strong></td>
<td></td>
<td></td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.094</td>
<td>0.009</td>
<td>Trans-caryophyllene (Bandeira)</td>
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<tr>
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<tr>
<td>barbatus Andr. (&quot;forskohlii&quot;)</td>
<td>gastritis, headache, generalized aches/pains, diarrhea, stomachache</td>
<td>Tea (decoction), extract</td>
<td>Leaves</td>
<td>0.108</td>
<td>0.014</td>
<td>et al., 2011), antioxidant activity (Falé et al., 2009; Maioli et al., 2010), antioxidant and anti-inflammatory activities (Kapewangolo et al., 2013)</td>
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</tbody>
</table>
Plectranthus neochilus Schltr. | Headache, stomachache, generalized aches/pains | Tea (decoction) | Leaves | 0.104 | 0.005 | Trans-caryophyllene (Bandeira et al., 2011), antimicrobial activity (Crevelin et al., 2015) |
Pogostemon heyneanus Benth. |Mau olhado, aborrecimento de criança, quebranto, heart problems, headache, flu, asthma, rheumatism, cramp | Maceration in a bath, tea (decoction) | Leaves | 0.024 | NCI | α-Bulneseno (Souza Filho et al., 2009b) |
Tetradenia riparia (Hochst.) Codd | Mirra (ginger bush) | Tea (decoction) | Leaves | 0.005 | NCI | Acaricidal activity (Gazim et al., 2011), antileishmanial activity (Demarchi et al., 2015), antidermatophytic activity (Endo et al., 2015), antimicrobial activity (Melo et al., 2015), analgesic activity (Gazim et al., 2010), cytotoxic and antioxidant activities (Gazim et al., 2014) |
Vitex agnus-castus L. |Alecrim (rosemary) | Decoction in a bath | Leaves | 0.094 | NCI | Diterpenoids (Hoberg et al., 1999), vitexlactam A (Li et al., 2002), total phenolic, flavonoids (Sarikurkcu et al., 2009), linoleic acid (Liu et al., 2004), antifungal activity (Svecová et al., 2013), antioxidant activity (Sarikurkcu et al., 2009), antiepileptic activity (Saberi et al., 2008), antimicrobial activity (Stojkovic et al., 2011), cytotoxic activity (Duymus et al., 2014), antimutagenic activity (Sarac et al., 2015) |
| Lauraceae | | | | | | |
Cinnamomum verum J. Presl |Canela ([Ceylon] [Sri Lanka] [true] cinnamon) | Low blood pressure | Tea (decoction) | Leaves | 0.094 | NCI | Cinnamaldehyde, cinnamyl acetate, β-phellandrene (Choi et al., 2015), 2-methoxycinnamaldehyde (Wong et al., 2016; Perng et al., 2016), trans-cinnamaldehyde A- and B-type proanthocyanidins (Williams et al., 2015), antioxidant activity (Mathew & Abraham, 2006), antibacterial activity (Choi et al., 2015), anthelmintic activity (Williams |
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</thead>
<tbody>
<tr>
<td>Malpighiaceae</td>
<td>Persea americana Mill.</td>
<td>Abacateiro (avocado tree)</td>
<td>Gastritis, liver problems, diarrhea, kidney stone, rheumatism</td>
<td>Tea (decoction), maceration in a bath</td>
<td>Leaves and seeds</td>
<td>0.118</td>
<td>0.005</td>
<td>Heptadecanols (Lee et al., 2012), analgesic and anti-inflammatory effects (Adeyemi et al., 2002), vasorelaxant action (Owolabi et al., 2005), larvicidal activity (Torres et al., 2014), antimycobacterial activity (Lu et al., 2012), anti-diabetic activity (Lima et al., 2012a)</td>
</tr>
<tr>
<td>Malpighiaceae</td>
<td>Callaeum antifebrile (Ruiz ex Griseb.) D.M.Johnson</td>
<td>Cabi (“ayahuasca negro” [from Spanish])</td>
<td>Quebranto, mau ollado, panemeira, uruca, olho gordo, stroke</td>
<td>Maceration in a bath, decoction in a bath</td>
<td>Leaves</td>
<td>0.057</td>
<td>0.009</td>
<td>No data found</td>
</tr>
<tr>
<td>Malpighiaceae</td>
<td>Malpighia punicifolia L.</td>
<td>Acerola (Barbados cherry)</td>
<td>Anemia</td>
<td>Juice</td>
<td>Fruit</td>
<td>0.005</td>
<td>NCI</td>
<td>Antioxidant compounds (Mezadri et al., 2008), carotenoid (Rosso &amp; Mercadante, 2005), antioxidant activity (Mezadri et al., 2008), antimicrobial Effect (Tremonte et al., 2016)</td>
</tr>
<tr>
<td>Malvaceae</td>
<td>Gossypium barbadense L.</td>
<td>Algodão (Creole cotton)</td>
<td>Lung cancer, cough, flu, bronchitis, asthma, uterine inflammation, gastritis, stroke</td>
<td>Tea (decoction), juice, syrup, fresh</td>
<td>Leaves</td>
<td>0.123</td>
<td>0.014</td>
<td>Antibacterial activity (Cassano et al., 2009)</td>
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<tr>
<td>Malvaceae</td>
<td>Hibiscus sabdariffa L.</td>
<td>Vinagreira-rosa (roselle, carcade)</td>
<td>Toothache, mycosis, erysipelas, diabetes, quebranto, mau olhado, constipation, flu</td>
<td>Tea (decoction), decoction in a bath, maceration in a bath</td>
<td>Leaves</td>
<td>0.052</td>
<td>NCI</td>
<td>Anthocyanins (Alarcon-Aguilar et al., 2007), total phenolic (Mohd-Esa et al., 2010), caffeic, gallic, chlorogenic acids (Mercado-Mercado et al., 2015), ascorbic acid (Kalla et al., 2015), 1-ocet-3-ol, decanal, octanal, 1-hexanol, nonanal (Ramirez-Rodrigues et al., 2012), phenolic compounds, caffeoylquinic acids, flavonols (Borrás-Linares et al., 2015), anti-obesity (Alarcon-Aguilar et al., 2007), antimicrobial activity (Borrás-Linares et al., 2015), antioxidant activity (Ramirez-Rodrigues et al., 2012)</td>
</tr>
<tr>
<td>Malvaceae</td>
<td>Hibiscus rosa-sinensis L.</td>
<td>Papoula (Chinese hibiscus, China rose, Hawaiian hibiscus, shoe flower)</td>
<td>Heart problems</td>
<td>Tea (decoction)</td>
<td>Flowers</td>
<td>0.005</td>
<td>NCI</td>
<td>Total phenolics, tannins, flavonoids, flavonols, anthocyanins (Mak et al., 2013), polyphenols (Silva et al., 2014a), antidiabetic potential (Pillai &amp; Mini, 2016), antioxidant and antibacterial activities (Silva et al., 2014a)</td>
</tr>
<tr>
<td>Malvaceae</td>
<td>Theobroma cacao</td>
<td>Cacau (cacao)</td>
<td>Erysipelas</td>
<td>Fresh</td>
<td>Fruit</td>
<td>0.005</td>
<td>NCI</td>
<td>Polyphenols (González et al., 2010), total flavonoids, total phenols (Silva et al., 2014a), antidiabetic activity (Pillai &amp; Mini, 2016), antibacterial activity (Silva et al., 2014a)</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>FAMILY</th>
<th>Common name(s) in Brazilian Portuguese (English)</th>
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<th>Phytochemical and pharmacological studies</th>
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<tbody>
<tr>
<td>L.</td>
<td>tree, cocoa tree</td>
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<td></td>
<td>2013, phenolic compounds, procyanidins (Cádiz-Gerrea et al., 2014), flavanols (Ioannone et al., 2015), antioxidant activity (Ioannone et al., 2015)</td>
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<tr>
<td>Urena lobata L.</td>
<td>Méssica (caesar weed, caesarweed, bur mallow, pink burr)</td>
<td>Headache, stomachache, gastritis</td>
<td>Tea (decoction)</td>
<td>Seeds</td>
<td>0.009</td>
<td>NCI</td>
<td>Triglycerides (Morelli et al., 2006), (-)-trachelogenin, clematoside-S (Gao et al., 2015), mangiferin, stigmasterol, β-sitosterol (Purnomo et al., 2015), antimicrobial activity (Gao et al., 2015), antidiabetic potential (Purnomo et al., 2015)</td>
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<td>Marantaceae</td>
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<tr>
<td>Tibouchina clavata (Pers.) Wurdack</td>
<td>Cibalena (bear’s ear)</td>
<td>Headache</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.005</td>
<td>NCI</td>
<td>No data found</td>
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<td>Meliaceae</td>
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<td></td>
<td>Phenic compounds (Almonte-Flores et al., 2015), polyphenols, gallic acid, (-)-gallocatechin, (+)-catechin (Giordani et al., 2015), antioxidant activity (Almonte-Flores et al., 2015; Giordani et al., 2015)</td>
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<td>Moraceae</td>
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<tr>
<td>Ficus maxima Mill.</td>
<td>Caxinguba (fig tree)</td>
<td>Amoebic infection, intestinal worms</td>
<td>Tea (decoction), fresh</td>
<td>Skin/bark and sap</td>
<td>0.009</td>
<td>NCI</td>
<td>No data found</td>
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<td>Musaceae</td>
<td></td>
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<td></td>
<td></td>
<td>Anthocyanins (Pazmiño-Durán et al., 2001), flavanoid (Nisha &amp; Mini, 2013), polysaccharides (Mondal et al., 2001), rutin (Kappel et al., 2013), phenylpropanoid glycoside (Krishnan et al., 2014), anthelmintic activity (Hussain et al., 2011), antidiabetic potential (Krishnan et al., 2014), antioxidant, hypoglycaemic and anti-inflammatory activities (Nisha &amp; Mini, 2013), potent antihyperglycemic and moderate antimicrobial activity (Jawla et al., 2012)</td>
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<td>Myrtaceae</td>
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<td>Disaccharide, monosaccharides,</td>
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<td>acutangulum Mart. ex DC.</td>
<td>(Para guava)</td>
<td></td>
<td>leafy branches</td>
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<tr>
<td></td>
<td>Psidium guajava L.</td>
<td>Goiabeira, goiaba (yellow), lemon (common), guava</td>
<td>Hemorrhoids, diarrhea, wounds, urinary tract infection, gastritis</td>
<td>Tea (decoction)</td>
<td>Young leafy branches, skin/bark and flowers</td>
<td>0.231</td>
<td>0.042</td>
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<td>Oxalidaceae</td>
<td>Averrhoa carambola L.</td>
<td>Caramba, carambola (star fruit, starfruit)</td>
<td>Diabetes, flu, cholesterol issues</td>
<td>Fresh, juice, tea (decoction)</td>
<td>Fruit and flowers</td>
<td>0.033</td>
<td>NCI</td>
</tr>
<tr>
<td></td>
<td>Oxalis triangularis A.St.-Hil.</td>
<td>Panama, panama branca (false shamrock)</td>
<td>Sore throat</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.019</td>
<td>NCI</td>
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<tr>
<td>Passifloraceae</td>
<td>Passiflora edulis Sims</td>
<td>Maracujá (passion flower, passion fruit, passionfruit, purple granadilla)</td>
<td>Heart problems, nervousness</td>
<td>Tea (decoction)</td>
<td>Flowers</td>
<td>0.014</td>
<td>NCI</td>
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<td></td>
<td>Passiflora vespertilio L.</td>
<td>Maracujá-dono-mato (black passion flower)</td>
<td>Stress, nervousness, wounds</td>
<td>Juice, decoction in a bath</td>
<td>Fruit</td>
<td>0.019</td>
<td>NCI</td>
</tr>
<tr>
<td>Phyllanthaceae</td>
<td>Phyllanthus niruri L.</td>
<td>Quebra-pedra (niruri)</td>
<td>Kidney stone, urinary tract infection, painful urination</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.118</td>
<td>0.009</td>
</tr>
<tr>
<td>Phytolaccaceae</td>
<td>Petiveria alliacea L.</td>
<td>Mucuracaí (guinea hen weed)</td>
<td>Mau olhado, assombo, quebranto, panemeira, olho gordo, mau fluido, aborrecimento de criança, stroke, headache, intestinal worms</td>
<td>Decoction in a bath maceration in a bath, tea (decoction)</td>
<td>Leaves</td>
<td>0.288</td>
<td>0.014</td>
</tr>
<tr>
<td>Piperaceae</td>
<td>Peperomia pellucida (L.) Kunth</td>
<td>Comida-de-jabuti (pepper elder, shining bush plant)</td>
<td>Painful urination, kidney stone, diarrhea, gastritis, diabetes, sore throat</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.047</td>
<td>NCI</td>
</tr>
<tr>
<td></td>
<td>Piper callosum Ruiz &amp; Pav.</td>
<td>Óleo-elétrico, elixir paregórico ([unknown])</td>
<td>Stroke, facial paralysis, mau olhado, stomachache, gastritis, fever</td>
<td>Tea (decoction) maceration in a bath, plaster</td>
<td>Leaves</td>
<td>0.061</td>
<td>0.005</td>
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<tr>
<td></td>
<td>Piper arboreum Aubl.</td>
<td>Pau-de-angola (long pepper)</td>
<td>Aborrecimento de criança, uruca, quebranto, mau olhado, panemeira,</td>
<td>Maceration in a bath, Juice</td>
<td>Leaves</td>
<td>0.061</td>
<td>NCI</td>
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<td></td>
<td>Piper peltatum L.</td>
<td>Malvarisco (monkey’s hand)</td>
<td>Erysipelas</td>
<td>Plaster</td>
<td>Leaves</td>
<td>0.042</td>
<td>0.005</td>
</tr>
<tr>
<td>Plantaginaceae</td>
<td>Plantago major L.</td>
<td>Tançagem (common plantain)</td>
<td>Sore throat</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
</tr>
<tr>
<td></td>
<td>Scoparia dulcis L.</td>
<td>Vassourinha (sweet broom, goatweed)</td>
<td>Kidney problems, difficulty urinating, herpes, mycosis</td>
<td>Tea (decoction), maceration in a bath</td>
<td>Leaves and roots</td>
<td>NCI</td>
<td></td>
</tr>
<tr>
<td>Poaceae</td>
<td>Chrysopogon zizanioides (L.) Roberty</td>
<td>Paticholim (vetiver, cuscus grass)</td>
<td>Headache</td>
<td>Decoction in a bath</td>
<td>Roots</td>
<td>0.005</td>
<td>NCI</td>
</tr>
<tr>
<td></td>
<td>Coix lacryma-jobi L.</td>
<td>Lágrima de nossa senhora (Job’s tears, coixseed, tear grass)</td>
<td>Kidney stone, urinary tract infection, painful urination</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.024</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>Cymbopogon citratus (DC.) Stapf</td>
<td>Capim marinho, capim limão (lemon grass, lemongrass, oil grass)</td>
<td>Gas, queasiness, stomachache, vomiting, flu, constipation, nervousness, hair loss, high blood pressure</td>
<td>Tea (decoction), decoction in a bath, maceration in a bath</td>
<td>Leaves</td>
<td>0.231</td>
<td>0.024</td>
</tr>
<tr>
<td>FAMILY</td>
<td>Species</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
<td>Preparation(s)</td>
<td>Plant part(s) used</td>
<td>UVs</td>
<td>IVs</td>
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<tr>
<td></td>
<td>Saccharum officinarum L.</td>
<td>Cane-de-açúcar (sugar cane, sugarcane)</td>
<td>Hair loss</td>
<td>Decoction in a bath, maceration in a bath</td>
<td>Leaves</td>
<td>0.005</td>
<td>NCI</td>
</tr>
<tr>
<td></td>
<td>Polygalaceae</td>
<td>Caamembeca spectabilis (DC.) J.F.B. Pastore</td>
<td>Camembeca ([unknown])</td>
<td>Hyperactivity</td>
<td>Maceration in a bath</td>
<td>Leaves</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>Portulacaceae</td>
<td>Portulaca pilosa L.</td>
<td>Amor-crescido (kiss me quick, pink purslane)</td>
<td>Wounds, falls, vision problems, erysipelas, stomachache, spinal problems, liver problems, gastritis, cancer, hair loss, uterine infection</td>
<td>Decoction in a bath, tea (decoction), plaster, extract</td>
<td>Leafy branches</td>
<td>0.175</td>
</tr>
<tr>
<td></td>
<td>Rubiaceae</td>
<td>Coffea arabica L.</td>
<td>Café (arabica coffee, mountain coffee)</td>
<td>Headache, gastritis</td>
<td>Maceration in a bath, tea (decoction)</td>
<td>Leaves and flowers</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>Morinda citrifolia L.</td>
<td>Noni (great morinda, Indian mulberry, beach mulberry, cheese fruit)</td>
<td>Obesity, diabetes uterine cancer, stomach cancer, high cholesterol, high blood pressure, weakness, urinary tract infection</td>
<td>Tea (decoction) tea (maceration), juice</td>
<td>Leaves and fruit</td>
<td>0.255</td>
<td>0.038</td>
</tr>
<tr>
<td>FAMILY</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
<td>Preparation(s)</td>
<td>Plant part(s) used</td>
<td>Phytochemical and pharmacological studies</td>
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<tr>
<td>Rutaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Dussossoy et al., 2011), cytotoxic effect (Lv et al., 2011), anti-inflammatory property (Dussossoy et al., 2011), antioxidant activity (Ruhomally et al., 2015; Paloto et al., 2015), anticancer effect (Lim et al., 2016), immunomodulatory effect (Palu et al., 2008), anti-obesity activity (Jambocus et al., 2016), antiplatelet effect (Beltrán et al., 2015), antinociceptive activity (Campos et al., 2016), antiangiogenic activity (Piaru et al., 2012), antiviral activity (Wang et al., 2016a), antimicrobial activity (Tintino et al., 2015)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rutaceae</td>
<td>Citrus × aurantium L.</td>
<td>Laranja da terra ([bitter] [Seville] [sour] [bigarade] [marmalade] orange)</td>
<td>Albumin deficiency during pregnancy, high cholesterol, heart problems</td>
<td>Tea (decoction), juice, fresh</td>
<td>Fruit and leaves</td>
<td>0.024 0.005 β-myrcene (Bonamin et al., 2014), flavonoids (Park et al., 2014), hesperidin, neohesperidin (Hamdan et al., 2014), antiinflammatory property (Park et al., 2014), insecticides activity (Zarrad et al., 2015), anxiolytic effect (Pultrini et al., 2006), antiinflammatory effect (Kang et al., 2011), anticancer effect (Park et al., 2014)</td>
<td></td>
</tr>
<tr>
<td>Rutaceae</td>
<td>Citrus × limon (L.) Osbeck</td>
<td>Limãozinho, limão (mandarin lime)</td>
<td>Flu, colds, headache, cough, sore throat, wounds, kidney stone, venous obstruction, nausea</td>
<td>Tea (decoction), juice, lollipop, fresh, decoction in a bath</td>
<td>Leaves and fruit</td>
<td>0.226 0.014 Total phenolic (Mushtaq et al., 2015), antimicrobial effect (Oliveira et al., 2014b), antioxidant and antimutagenic activities (Mushtaq et al., 2015)</td>
<td></td>
</tr>
<tr>
<td>Rutaceae</td>
<td>Citrus sinensis (L.) Osbeck</td>
<td>Laranjeira, laranja ([sweet] orange)</td>
<td>Flu, colds, heart palpitations, nervousness, fatigue, stomachache</td>
<td>Tea (decoction) decoction in a bath, juice</td>
<td>Leaves and fruit</td>
<td>0.052 NCI Vitamin C and phenolic compounds (Letaief et al., 2016), limonene (Gáinza et al., 2015), flavanoneglycosides, polymethoxylated flavones (Chen et al., 2015), linoleic acid, α-linoleic acid, oleic acid, estearic acid (Nunes et al., 2015), polyphenols (Nayak et al., 2015), flavonoids (Barreca et al., 2016), antihelmintic activity (Gáinza et al., 2015), antioxidant capacity (Barreca et al., 2016)</td>
<td></td>
</tr>
<tr>
<td>Rutaceae</td>
<td>Ruta graveolens L.</td>
<td>Arruda ([common] rue; herb-of-grace)</td>
<td>Aborrecimento de criança, quebranto, mau olhado, stomachache, stroke, headache, flu, vision</td>
<td>Maceration in a bath, tea (decoction), plaster, fresh, tea (infusion)</td>
<td>Leafy branches</td>
<td>0.165 0.009 2-nonanone and 2-undecanone (Orlando &amp; Nascimento, 2015), coumarin compounds (Harat et al., 2015), rutina and furanocoumarins (Ueng et al., 2015), anti-inflammatory and</td>
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<td>FAMILY</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
<td>Preparation(s)</td>
<td>Plant part(s) used</td>
<td>UVs</td>
<td>IVs</td>
<td>Phytochemical and pharmacological studies</td>
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<tr>
<td><strong>Species</strong></td>
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</tr>
<tr>
<td></td>
<td><strong>Simaroubaceae</strong></td>
<td></td>
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</tr>
<tr>
<td><em>Quassia amara</em> L.</td>
<td><em>Quina</em> (bitter ash, bitter wood)</td>
<td>Boils</td>
<td>Extract</td>
<td>Leaves</td>
<td>0.005</td>
<td>NCI</td>
<td>antioxidant effects (Raghav et al., 2007), hypoglycemic effects (Figueroa-Valverde et al., 2009), antimicrobial and anti-inflammatory properties (Harat et al., 2015), relaxant activity (Aguila et al., 2015)</td>
</tr>
<tr>
<td></td>
<td><strong>Solanaceae</strong></td>
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<tr>
<td><em>Brugmansia suaveolens</em> (Humb. &amp; Bonpl. ex Willd.) Bercht. &amp; C. Presl</td>
<td><em>Zabumba</em> ([white] angel’s trumpet)</td>
<td>Asthma</td>
<td>Inhalable mist</td>
<td>Flowers</td>
<td>0.005</td>
<td>NCI</td>
<td>Flavonol glycosides (Geller et al., 2014)</td>
</tr>
<tr>
<td><em>Capsicum frutescens</em> L.</td>
<td><em>Pimenta malagueta</em> (cayenne pepper)</td>
<td><em>Mau olhado</em></td>
<td>Maceration in a bath</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
<td>Caspaicin, dihydrocapsaicin, N-vanillyl-n-acylamide group (Schweigert et al., 2006), capsaicinoid, phenolics compounds (Santos et al., 2015), total phenolic, total flavonoids (Gurnani et al., 2015), antioxidant effect (Oboh &amp; Ogunruru, 2010), antibacterial activity (Carvalho et al., 2010), antimicrobial activity (Gurnani et al., 2015)</td>
</tr>
<tr>
<td><em>Solanum melongena</em> L.</td>
<td><em>Berinjela</em> (eggplant)</td>
<td>High cholesterol</td>
<td>Tea (maceration)</td>
<td>Fruit</td>
<td>0.005</td>
<td>NCI</td>
<td>Total phenolics and flavonoids (Kaur et al., 2014), ligananamids (Sun et al., 2014a), anthocyanins, total monomeric anthocyanin (Dranca &amp; Oroian, 2015), phenylpropanoid amides (Sun et al., 2015a), \gamma-alkylated-\gamma-butyrolactone (Sun et al., 2015b), antioxidant activity (Braga et al., 2016) anti-inflammatory effect (Sun et al., 2014a; Sun et al., 2015b)</td>
</tr>
<tr>
<td><em>Solanum stramonifolium</em> Jacq.</td>
<td><em>Jurubeba</em> ([unknown])</td>
<td>Intestinal worms</td>
<td>Fresh</td>
<td>Fruit</td>
<td>0.009</td>
<td>NCI</td>
<td>No data found</td>
</tr>
<tr>
<td><strong>Talinaceae</strong></td>
<td></td>
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</tr>
<tr>
<td><em>Talinum triangulare</em> (Jacq.) Willd.</td>
<td><em>Caruru</em> (waterleaf, Surinam purslane, Florida spinach, potherb)</td>
<td>Stomachache</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.005</td>
<td>NCI</td>
<td>Betaxanthin and betacyanin (Swarna et al., 2013), phenolics compounds (Brasileiro et al., 2015), antioxidant activity (Swarna et al., 2013; Brasileiro et al., 2015)</td>
</tr>
<tr>
<td>FAMILY</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
<td>Preparation(s)</td>
<td>Plant part(s) used</td>
<td>UVs</td>
<td>IVs</td>
<td>Phytochemical and pharmacological studies</td>
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<tr>
<td>Turnera ulmifolia L.</td>
<td>Chanana (yellow alder)</td>
<td>Kidney stone, urinary tract infection</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.009</td>
<td>NCI</td>
<td>Flavanoids and phenolics compounds (Brito et al., 2012), anti-ulcerogenic and anti-inflammatory effects (Antônio &amp; Brito, 1998), anti-inflammatory and antioxidant activities (Galvez et al., 2006; Nascimento et al., 2006), antiparasitic activity (Santos et al., 2012)</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td></td>
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</tr>
<tr>
<td>Lippia alba (Mill.) N.E.Br. ex Britton &amp; P.Wilson</td>
<td>Erva-cidreira (bushy matgrass)</td>
<td>Stomachache, constipation, heart problems, stomachache, vomiting, high blood pressure, nervousness, insomnia, intestinal worms</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.425</td>
<td>0.104</td>
<td>β-guaiene, piperitenone (Alea et al., 1996), linalool, 1,8-cineole, β-caryophylene (Siani et al., 2002), geranial, geraniol, germacrene D, 1,8-cineole, β-elemene (Tavares et al., 2005), citral (neral + geranial), geraniol, β-bourbonene (Jezler et al., 2013), carvone, limonene (Ehler et al., 2013), neral (Juiz et al., 2015), antibacterial activity (Alea et al., 1996), reduction of migraine (Carmona et al., 2013), antimicrobial activity (Juiz et al., 2015)</td>
</tr>
<tr>
<td>Lippia thymoides Mart. &amp; Schauer</td>
<td>Manjirona ([unknown])</td>
<td>Gastritis, stomachache, diarrhea, generalized aches/pains</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.038</td>
<td>NCI</td>
<td>No data found</td>
</tr>
<tr>
<td>Stachytarpheta cayennensis (Rich.) Vahl</td>
<td>Fel de gozo, ferdeguzo ([dark-][blue] [Cayenne] snakeweed; bluetop; nettle-leaf [Cayenne] porterweed; Cayenne vervain; rattail; rough-leaf false vervain; blue rat’s tail; Brazilian tea; false verbena; nettleleaf velvetberry)</td>
<td>Stomachache, diarrhea, vomiting, cough</td>
<td>Tea (decoction)</td>
<td>Leaves</td>
<td>0.014</td>
<td>NCI</td>
<td>Antimicrobial activity (Souza et al., 2010), antioxidant activity (Souza et al., 2011)</td>
</tr>
<tr>
<td>Violaceae</td>
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</tr>
<tr>
<td>Pombalia calceolaria (L.)</td>
<td>Pecaconha ([unknown])</td>
<td>Flu, cough</td>
<td>Syrup</td>
<td>Leaves</td>
<td>0.009</td>
<td>NCI</td>
<td>No data found</td>
</tr>
<tr>
<td>FAMILY</td>
<td>Species</td>
<td>Common name(s) in Brazilian Portuguese (English)</td>
<td>Condition(s) for which treatment with the species is recommended</td>
<td>Preparation(s)</td>
<td>Plant part(s) used</td>
<td>UVs</td>
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<tr>
<td>Vitaceae</td>
<td>Cissus verticillata (L.) Nicolson &amp; C.E.Jarvis</td>
<td>Cipó-pucá (princess vine, millionaire vine, curtain ivy)</td>
<td>Stroke</td>
<td>Tea (decoction), plaster</td>
<td>Leaves</td>
<td>0.028</td>
<td>NCI</td>
</tr>
<tr>
<td>Xanthorrhoeaceae</td>
<td>Aloe vera (L.) Burm. f.</td>
<td>Babosa (aloe vera, aloe, burn plant, lily of the desert, elephant’s gall)</td>
<td>Hair loss, erysipelas, stomach cancer, uterine cervical cancer, cough, gastritis, liver problems, wounds, burns, heart problems, urinary tract infection</td>
<td>Tea (decoction), juice, fresh, plaster, syrup, decoction in a bath</td>
<td>Leaves</td>
<td>0.363</td>
<td>0.052</td>
</tr>
<tr>
<td>Zingiberaceae</td>
<td>Alpinia purpurata (Vieill.) K. Schum</td>
<td>Vindicá (shellflower, dwarf cardamom)</td>
<td>Heart problems, mau olhado, quebranto, hyperactivity, albumin deficiency during pregnancy, anemia in pregnancy</td>
<td>Tea (decoction), decoction in a bath</td>
<td>Flowers and leaves</td>
<td>0.071</td>
<td>NCI</td>
</tr>
<tr>
<td>Hedychium coronarium J. Koenig</td>
<td>Borboleta (white ginger, butterfly ginger)</td>
<td>Albumin deficiency during pregnancy, bloating during pregnancy, anemia</td>
<td>Tea (decoction), decoction in a bath</td>
<td>Roots and leaves</td>
<td>0.085</td>
<td>0.005</td>
<td>Saponins, caryophyllene and myrcene (Martins et al., 2010)</td>
</tr>
<tr>
<td>Zingiber officinale Roscoe</td>
<td>Gengibre (ginger)</td>
<td>Sore throat, colds, falls, rheumatism, spinal problems, low blood pressure, fatigue, abdominal cramping</td>
<td>Maceration in a bath, tea (decoction), syrup, lollipop</td>
<td>Roots</td>
<td>0.292</td>
<td>0.028</td>
<td>Gerinal, neral, geraniol (Dabague et al., 2011), zingiberene, gerinal, β-phellandrene, β-sesquiphellandrene, β-bisabolene, α-curcumene (An et al., 2016), antioxidant and antimicrobial activities (Bellik, 2014)</td>
</tr>
</tbody>
</table>

About the main therapeutic use of medicinal plants indicated, which were grouped in accordance with the International Classification of Diseases following: Infectious and Parasitic Diseases (17.6% of the plant species identified); “Cultural ills” (14.5%); Gastrointestinal Disorders (11%); Circulatory Disorders (10.3%); and Respiratory Disorders (10.0%). Similar findings have been reported in other studies conducted within the Amazon region (Carneiro et al., 2010; Santos & Lima, 2008) and Atlantic Forest (Vendruscolo & Mentz 2006; Albertasse et al., 2010). Data from the National Basic Health Care Database of the Brazilian National Ministry of Health show that 46.55% of households in Abaetetuba have open sewers and only 1.7% are connected to the municipal sewer system.
Therefore, the fact that medicinal plants are most often used in the treatment of Infectious and Parasitic Diseases could be attributable to the lack of basic sanitation in the city.

The “Cultural ills” cited by the interviewees included quebranto (general malaise and physical weakness attributed to a curse), mau olhado (“evil eye”), panemera (unhappiness attributed to a curse), olho gordo (supposed effect of the envy or jealousy of others), espírito mau (evil spirits), assombro (haunting), uruca (constant bad luck attributed to a curse), diarréia de dentição (teething-related diarrhea), aborrecimento de criança (childhood annoyance/irritability), and mau fluido (literally “bad fluid”; similar to the “evil eye”). Within this subcategory of medicinal plant use, the species most often cited (by 21.2% of the interviewees) was Petiveria alliacea L. (mucuracae locally; guinea hen weed in English). Depending on the form in which it is prepared, P. alliacea presents varying degrees of toxicity, provoking insomnia, hallucinations, and dysfunction of the central nervous system (Oliveira et al., 2010). In Brazil, P. alliacea was first used during the time of slavery, because it was the principal ingredient in the preparation known as “amansa senhor” (another name for the plant itself, loosely translating to “master-be-gone” or “neutralize the master”), which was used by the slaves in order to make their masters apathetic and less inclined to mete out punishments (Camargo, 2007). In the São Sebastião neighborhood, P. alliacea is primarily used in the form of a decoction that is added to a bath as a treatment for quebranto or mau olhado. Apparently the use of these vegetables can relate to the biological activities provided their active ingredients with supernatural beliefs through which obtain the cure (Camargo, 2014). Citations for the treatment of “Cultural ills” is not restricted to the home gardens of interviewees in Brazil because Molares & Rovere (2016) in Argentina also reported the use of nine species, eight of which are native to that country.

Any or all parts of a given medicinal plant can be used in the preparation of herbal medicines. Among the individuals interviewed in the present study, the plant parts most often cited as being used in such preparations were the leaves (in 71.4%), the roots (in 8.9%), and the fruit (in 6.9%). Other studies of medicinal plants have also found that the leaves are the part of the plants that is most often used in the production of home remedies (Coelho-Ferreira & Jardim 2005; Leão et al., 2007; Aguiar & Barros, 2012). The preference for leaves might be related to ease of use and greater availability of leaves throughout the year (Brito & Senna-Valle, 2011).

The most commonly reported formulation of home remedies in the present study was decoction (tea, in 58.2%), followed by maceration into a bath (in 13.1%) and decoction into a bath (in 9.8%). The predominance of decoction tea has been reported in other studies of medicinal plants in the Amazon region (Leão et al., 2007; Siviero et al., 2012; Vásquez et al., 2014).

For the species identified here, the Total Species Diversity and Total Species Equitability were 47.43 and 0.383, respectively. The high Total Species Diversity indicates that there was considerable species variety among the medicinal plants identified. In other studies of urban home gardens (Althaus-Otto, 2011; Eichemberg et al., 2009), high species diversity was attributed to the rural origin of the interviewees (garden owners), who had come to cultivate various new species as a way of adapting to the urban environment. We observed the same in the São Sebastião neighborhood, where the majority of the interviewees were from rural communities and continued to grow plants in their home gardens.

As shown in Table 2, the species with the highest UVs in the present study were Kalanchoe pinnata (UVs-0.462); Lippia alba (UVs-0.425); Aloe vera (UVs-0.363); Zingiber officinale (UVs-0.292); Petiveria alliacea (UVs-0.288); Fridericia chicha (UVs-0.283); Costus spicatus (UVs-0.274); Morinda citrifolia (UVs-0.255); Eleutherine bulbosa (UVs-0.241); Cymbopogon citratus (UVs-0.231) and Psidium guajava (UVs-0.231).

The species of the greatest relative importance, showing high UVs (K. pinnata and L. alba), were recommended as treatments for ailments affecting various human body systems (up to 10) or were cited multiple times as indicated for the treatment of conditions affecting a single body system. That suggests that there is strong pressure on these species due to their widespread use, because they are so widely known in the local community. K. pinnata was cited as a treatment for disorders of 10 body systems, compared with five for L. alba, the latter being recommended as a treatment for Circulatory Disorders by 55% of the interviewees and for Behavioural Disorders, including stress, insomnia, and depression, by 19%.
Studies such as that conducted by Almeida et al. (2000) have shown that leaf extracts of *K. pinnata* contain flavonoids, suggesting that these metabolites are gastroprotective and can heal gastric ulcers. Studies of *L. alba* have shown that it has antibacterial, antifungal, anti-ulcer, analgesic, anti-inflammatory, sedative, muscle relaxant, and anxiolytic properties (Pascual et al., 2001; Heinzmann & Barros, 2007; Aguiar et al., 2008). Those effects could explain the high use of those two species by the practitioners of folk medicine in the São Sebastião neighborhood.

Table 2 also shows that the species of medicinal plants with the highest IVs in São Sebastião were *L. alba* (IVs-0.104); *Mentha spicata* (IVs-0.090); *F. chica* (IVs-0.071); *A. vera* (IVs-0.052); *Mikania lindleyana* (IVs-0.052); *Gymnanthemum amygdalinum* (IVs-0.047); *Psidium guajava* (IVs-0.042); *Eleutherine bulbosa* (IVs-0.038) and *Morinda citrifolia* (IVs-0.038). We observed that the interviewees determined the importance of medicinal plant species on the basis of whether or not they had used it as a treatment and on the predominance of at-risk groups (children, the elderly, and pregnant women) within their family. Of the interviewees, 12% cited *L. alba* as the most important species for use in the treatment of high blood pressure, stress, and insomnia. For disorders affecting five different body systems, especially Infectious and Parasitic Diseases, *M. spicata* was cited by 88%. However, the interviewees who reported no longer using *M. spicata* attributed that change to an absence of children in the home but stated their willingness to grow the species again if grandchildren arrive.

Table 3
Informant Consensus Factors for health conditions that are reportedly treatable with the medicinal plant species grown in home gardens in the São Sebastião neighborhood of the city of Abaetetuba, in the state of Pará, Brazil. Nur – number of citations per category; Nt – number of species cited per category; ICF - Informant Consensus Factors.

<table>
<thead>
<tr>
<th>Category</th>
<th>Nur</th>
<th>Nt</th>
<th>ICF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious and parasitic diseases</td>
<td>333</td>
<td>53</td>
<td>0.84</td>
</tr>
<tr>
<td>Tumors (neoplasms)</td>
<td>50</td>
<td>6</td>
<td>0.90</td>
</tr>
<tr>
<td>Disorders of the blood/hematopoietic organs and certain immune system disorders</td>
<td>69</td>
<td>6</td>
<td>0.93</td>
</tr>
<tr>
<td>Endocrine, nutritional, and metabolic disorders</td>
<td>52</td>
<td>12</td>
<td>0.78</td>
</tr>
<tr>
<td>Central nervous system disorders</td>
<td>56</td>
<td>29</td>
<td>0.49</td>
</tr>
<tr>
<td>Ocular disorders</td>
<td>15</td>
<td>4</td>
<td>0.79</td>
</tr>
<tr>
<td>Diseases of the ear and mastoid process</td>
<td>31</td>
<td>4</td>
<td>0.90</td>
</tr>
<tr>
<td>Circulatory disorders</td>
<td>195</td>
<td>38</td>
<td>0.81</td>
</tr>
<tr>
<td>Respiratory disorders</td>
<td>189</td>
<td>37</td>
<td>0.81</td>
</tr>
<tr>
<td>Gastrointestinal disorders</td>
<td>207</td>
<td>34</td>
<td>0.84</td>
</tr>
<tr>
<td>Diseases of the skin and subcutaneous tissues</td>
<td>96</td>
<td>14</td>
<td>0.86</td>
</tr>
<tr>
<td>Diseases of the musculoskeletal system and connective tissue</td>
<td>50</td>
<td>8</td>
<td>0.86</td>
</tr>
<tr>
<td>Genitourinary disorders</td>
<td>157</td>
<td>33</td>
<td>0.79</td>
</tr>
<tr>
<td>Pregnancy, childbirth, and puerperium</td>
<td>20</td>
<td>4</td>
<td>0.84</td>
</tr>
<tr>
<td>Behavioral disorders</td>
<td>18</td>
<td>2</td>
<td>0.94</td>
</tr>
<tr>
<td>Trauma and poisoning</td>
<td>20</td>
<td>8</td>
<td>0.63</td>
</tr>
<tr>
<td>Symptoms and signs</td>
<td>56</td>
<td>23</td>
<td>0.60</td>
</tr>
<tr>
<td>Cultural ills</td>
<td>273</td>
<td>31</td>
<td>0.89</td>
</tr>
</tbody>
</table>
Table 3 shows the ICF values for the various ailments cited by the home garden owners interviewed in the present study. We divided those into 18 categories, of which 12 showed ICF values > 0.8. There were four categories in particular that were notable for their high relative importance (ICF values): Behavioural Disorders (0.94); Disorders of the Blood and Hematopoietic Organs (0.93); Ear Disorders (0.90); and Tumors and Neoplasms (0.90).

In a similar study Alves & Povh (2013) also found that the best consensus was for Behavioural Disorders, depression being the most frequently cited such disorder. According to Maioli-Azevedo & Fonseca-Kruel (2007), the medicinal plants for which there is the highest concordance among respondents are of great cultural importance for the local community, the extensive exchange of such species expanding the local knowledge base by virtue of the increased interaction. In addition, high ICF values can indicate which species merit further study in terms of their pharmacological properties (Almeida & Albuquerque, 2002).

As can be seen in Table 2 89 species (71.77%) were featured in previous pharmacological studies. For 37 of these species (41.57%), the uses cited by the residents in São Sebastião showed some similarity to the investigated effects/actions, demonstrating concordance between popular knowledge and academic science.

CONCLUSIONS

Although the home gardens studied here were in the urban zone of a relatively large city, their owners cultivated and used medicinal plants not only for therapeutic purposes but also as a reflection of their cultural heritage. However, in the study area, knowledge of the various species was not distributed in a uniform manner, which is likely attributable to the diversity of our sample of interviewees, in terms of their geographic origins. From a quantitative perspective, the heterogeneous distribution of knowledge was also evidenced by the low value of total species evenness.

The production of botanical knowledge in a community appears to be directly linked to the relationship that its residents have with the medicinal plants they grow in their home gardens. The local culture affects knowledge regarding the use of therapeutic plant resources, due to the interaction among groups of individuals of different geographic origins.

The existence of pharmacological studies that confirm the indications of interviewees demonstrates the importance of rescue and conservation of folk medicine both for the residents of São Sebastião and for science itself.

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Coffea arabica
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