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Versatility and consensus of the use of medicinal plants in an area of cerrado in the Chapada do Araripe, Barbalha - CE- Brazil

Delmacia G. Macêdo[1]*, Irwin R. A. Menezes[2], Sirleis R. Lacerda[3], Maria A. P. da Silva[1], Daiany A. Ribeiro[1], Maria S. Macêdo[1], Liana G. S. Oliveira[1], Manuele E. Saraiva[1], Sarah R. Alencar[1], Samara F. Oliveira[1], Maria O. Santos[1], Bianca V. de Almeida[1], Julimery G. F. Macedo[1], Francisca F. S. Sousa[1], Marília A. Soares[2], Thatiane M. S. de Araújo[3] and Marta M. A. Souza[3]

[1]Laboratório de Botânica, Departamento de Biologia, Centro de Ciências Biológicas e da Saúde, Universidade Regional do Cariri, Crato (CE), Brazil.
[2]Laboratório de Farmacologia e Química Medicinal da Universidade Regional do Cariri, Crato (CE), Brazil.
[3]Universidade Regional do Cariri, Herbário Caririense Dardo de Andrade-Lima. Crato (CE), Brazil.

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This study aimed to conduct an ethnobotanical survey of medicinal species in an área of cerrado vegetation in the chapada do Araripe, Ceara, as well as evaluating and selecting species with potential for bioprospecting, based on the relative importance of the species and the consensus among the informants. The ethnobotanical data were collected through semi-structured interviews and a free list, and by using the technique "snowball". It was analyzed the relative importance of the mentioned plants as well as species that stood out on the bodily systems, based on the factor:consensus among the informants. It was recorded a total of 38 species distributed into 35 genera and 25 families. Of the total eight species (21%) presented great versatility (IR≥1) regarding to its use. The therapeutic indications were grouped into 14 categories of bodily systems. Disorder of respiratory and genitourinary systems, injuries, poisoning and other consequences of external causes and diseases of the blood, organs and connective tissue, obtained a greater consensus among the informants. *Ximenia americana, Himathantus drasticus, Stryphnodndron rotundifolium, Hancornia speciosa* and *Cecropia pachysthachya* were the species subject to further study, based on versatility, and consensus of the use among the informants.

Key words: Ethnobotany, factor in consensus, local knowledge, potential therapeutic, regional species, relative importance.

INTRODUCTION

Studies on plants with medicinal potential have represented a major focus on the search for new drugs (Elisabetsky, 1991). In accordance with the data from the World Health Organization, a large part of the population of developing countries uses popular herbal medicine in primary healthcare. This is due to the fact that diseases

that affect the population in these countries are mainly related to the lack of sanitation, malnutrition and difficulty of access to medicines (Kumate, 1997). Due to this, these communities per finish choose medical species available in the environment, low cost.

In Brazil, the use of medicinal plants is a therapeutic resource extensively explored by the population, although often their use does not contain the necessary information to ensure the safety of these agents (Souza et al., 2011). Hence, the importance of encouraging the transmission of knowledge from one generation to another in a traditional scope (Ceolin et al., 2011) however, accompanied by scientific proof. An analysis that generates information about traditional therapeutic practices and of the species which deserve attention from these people is valid when the goal is to promote information about cultural subjects and the Brazilian ecosystem sustainability.

In this sense, ethnobotanical investigations have focused on studying biologically active species, as well as obtaining information about the possible forms of sustainable use of these plant resources (Albuquerque, 2002). Among the least studied Brazilian ecosystems there are those, which are related to dry forests (Caatinga and Cerrado) (Albuquerque and Andrade, 2002). Specifically in the northeastern cerrados there is a visible lack of conducted studies, mainly regarding to ethnobotanical and pharmacological surveys. Most of these studies are concentrated in the states of Mato Grosso, Goias and Minas Gerais (Souza and Felfili, 2006; Botrel et al., 2006; Alves et al., 2008; Silva and Proenca, 2008), and there is a gap regarding to the northeastern disjoined cerrados.

Considering the importance of information about plants with therapeutic purposes and the analysis of their representativeness within the cerrado, the goal of this study was to investigate the use of medicinal plants in a cerrado area of Chapada do Araripe, Barbalha, State of Ceara. The study focused on assessing the local diversity of medicinal plants by checking the versatility of species used and the consensus of use and/or knowledge among the informants. At the same time, the study aimed at pointing out which group of species should deserve further study due to be potentially active as herbal medicines.

MATERIALS AND METHODS

Study area

This study was conducted in the rural community of Betania (7°18' 18'' S and 39° 18' 07'' W). It is situated in the municipality of Barbalha, established in a cerrado area of Chapada do Araripe, south of the State of Ceara, bordering the State of Pernambuco (Figure 1). Chapada do Araripe, which has a tabular surface with an altitude ranging between 760 and 920 m, is one of the most striking elements of the landscape of the region (Toniolo and Kazmierzak, 1998), within the semi-arid region. It behaves as an island for certain types of vegetation, such as the cerrado, and it is like a disjunction of its core area in this location (Costa et al., 2004). The dystrophic red and yellow latosols predominate in the region (Brasil, 1973), with warm tropical climate, average annual rainfall of around 760 mm and temperature between 24 and 26°C. This region has two well-defined seasons, dry and rainy, being the rainy occurring between January and April (Costa et al., 2004).

Ethnobotanical and floristic survey

The research was carried from August to December 2014, out by means of semi- structured interviews based on standardized forms according to the method proposed by Martins (1995) and information was obtained after the participants signed a consent form. It is important to mention that this research was submitted to the Research Ethics Committee of the Regional University of Cariri and approved with Opinion No.251.829/2013. The informants was selected through the snowball technique (Bailey, 1984).

The free list technique was used in the interviews in order to stimulate the interviewed cite of all medicinal plants they know and/or use. A total of 30 informants were interviewed, 19 males and 11 females, with ages ranging from 35 to 91 years.

The botanical material was collected in the backyard of the residences and, when possible, in the forest, at the time and/or after the interviews. The species were incorporated into the Caririense Dardano de Andrade Lima Herbarium of the Regional University of Cariri (HCDAL-URCA).

Data analysis

The index of relative importance (RI) of the medicinal plants identified was calculated according to the methodology proposed by Bennett and Prance (2000). The relative importance is a quantitative method which demonstrates the importance of specie based on its versatility, with '2', being the highest possible value. The calculation is made according to the following formula: RI = NCS + NP; where, RI= relative importance; NCS = the number of body systems treated by a given species (NCSS), divided by the total number of body systems treated by the most versatile species (NSCSV); NP = number of properties attributed to a species (NPS), divided by the total number of properties attributed to the most versatile species (NPSV) (Silva et al., 2010 (a); Almeida et al., 2006). The calculation of this index was performed based on the distribution of the indications for use of ethno-species in body systems, related to 12 categories of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) (OMS, 2000).

The informant consensus factor (ICF) was calculated according to the technique proposed by Trotter and Logan (1986) aiming to identify the body systems that had greater consensus of current knowledge and/or use, and which plant groups require deeper studies (Almeida et al., 2006). For the calculation of the ICF, the following formula was used to calculate the ICF = nur −nt/ nur −1, where: nur is the number of citations of usage in each category and nt is the number of species indicated in each category. ICF values

*Corresponding author. E-mail: delmaciamacedo@yahoo.com.br Tel: + 55-88-99929744.

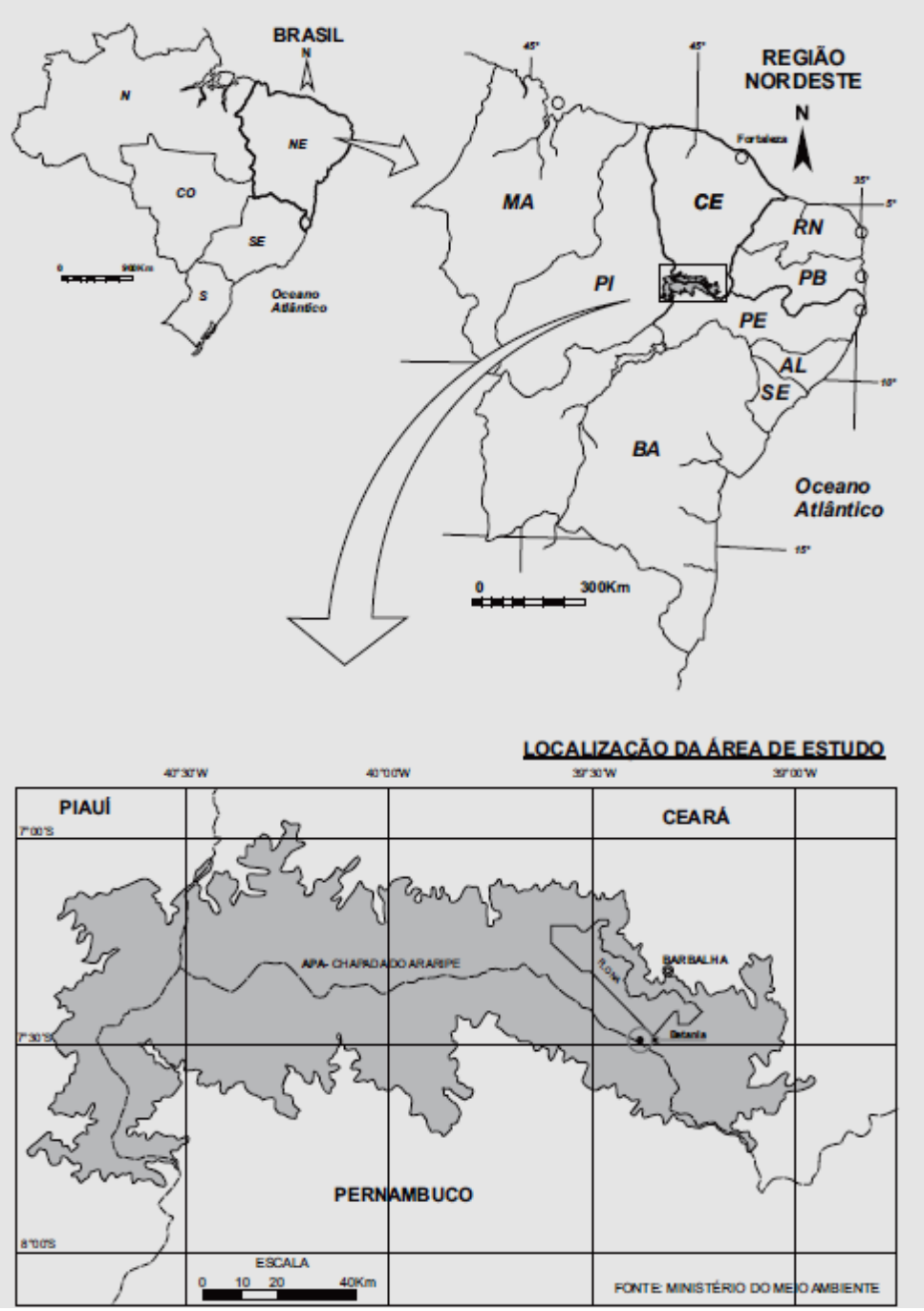

Figure 1. Localização geográfica da área de estudo na comunidade Betânia no município de Barbalha, Ceará, Brasil.

range from 0 to 1.

RESULTS AND DISCUSSION

Local diversity of medicinal plants

A total of 38 native medicinal plant species were reported, distributed in 25 botanical families and 35 genera (Table 1). Among these, seven were only identified at genus level and 31 at species level. Compared with similar studies related to the medicinal use of native species conducted in the cerrado (Souza and Felfili, 2006; Botrel et al., 2006; Souza, 2007; Cunha and Bortolotto, 2011), there is still a reduced number when compared to the medicinal flora diversity of this vegetation, which ranges from 24 to 143 species. The botanical families

Table 1. List of the medicinal species indicated by the residents of the Betânia community in the municipality of Barbalha, state of Ceara (NE Brazil).

Family/ Scientific name	Popular name	Part used	Preparation	Uses forms	Therapeutic indications	RI	Herbarium number
Anacardiaceae *Astronium fraxinifolium* Schott ex Spreng.	Gonçalo-Alves	Ib	of sauce	Drink	Cough, Influenza.	0.34	10.153
Anacardium microcarpum Ducke	Cajuí	Ib	of sauce	Bath, gargle	Sore throat, wound, toothache	0.80	Nc
Annonaceae *Annona coriacea* Mart.	Araticum	Sb	Decoction	Drink	Snakebite.	0.25	7973
Apocynaceae *Ditassa* R.Br.	Caninana	Ro	of sauce ou no álcool	Drink	Rheumatism, spine, Influenza.	0.60	7960
Himatanthus drasticus (Mart.) Plumel.	Janaguba	La	On the water	Drink	Cancer, ulcer, gastritis, stomach, varicose veins, hernia, rheumatism, wound, burning sensation.	1.65	8417
Hancornia speciosa Gomes.	Mangaba	La, Le	Decoction	Drink	Gastritis, infarction, thyroid, triage vein, varicose vein, stomach, cough, ulcer, heartburn, high blood pressure.	1.83	10.155
Aristolochiaceae *Aristolochia claussenii* Duch.	Jarrinha do Mato	Ro	Infusion	Drink	Bowel disease, heartburn.	0.35	Nc
Asteraceae *Acanthospermum hispidum* DC.	Espinho de cigano	Le, Ro	Decoction	Drink	Belly ache	0.25	Nc
Protium heptaphyllum March.	Amescla	Rs	-------	Inhalation	Headache	0.25	8426
Bromeliaceae *Tillandsia* sp.	Bananinha de raposa	Fr	-------	Eat the fruit	Worm	0.25	Nc
Caryocaraceae *Caryocar coriaceum* Wittm.	Piqui	Fr	extract the oil of the fruit and mix with water, licking	Drink	Influenza, sore throat, cough, fatigue, swelling.	0.80	8408
Euphorbiaceae *Croton heliotropiifolius* Kunth.	Velame branco	Le	Decoction	Drink	Thinning the blood, rheumatism, stomach pain, injury, internal inflammation, cicatrizant, spine pain.	1.46	7970
Croton sp.	Velame vermelho	Le	Infusion	Drink	Stomachache, thinning the blood, strepto.	0.80	8423
Fabaceae *Bowdichia virgiloides* Kunth.	Sucupira	Ib, Sb	of sauce or in the alcohol	Drink	Rheumatism, spine, stomach ache.	0.60	8425
Centrosema sp.	Alcançu	Ro	of sauce	Drink	Influenza, fever, cough, asthma, stomachache.	1.00	8407
Copaifera langsdorffi Desf.	Pau d'óleo	Le, Fr, Ib	Oil bast, Decoction	Drink	Spine, rheumatism, indigestion, epilepsy, thinning the blood, swelling in the belly, stomachache, general pain, injury.	1.81	7962
Dimorphandra gardneriana Tull.	Faveira	Se	Decoction	Drink	Heart	0.25	7941

Table 1. Cont'd.

Stryphnodendron rotundifolium Mart.	Barbatimão	Ib	of sauce	Drink	Cancer, ulcer, wound, inflammation of the uterus,blood infections, gastritis, sore throat, wound.	1.72	8406
Acosmium glasycarpa Benth.	Pau pra-tudo	Ib	Decoction	Drink	Hernia, chest pain.	0.51	Nc
Fabaceae (Cae) *Bauhinia cheilantha* (Bong.) Steud.	Mororó	Le, Ib, Ro	Decoction, Infusion	Drink	Stomachache, cramp of blood, heartburn.	0.60	8414
Hymenaea courbaril L.	Jatobá	Ib	Decoction	Drink	Cough, Influenza, bronchitis.	0.45	7957
Senna occidentalis (L.) Link	Manjirioba	Ro, Se	Infusion, seed toasted	Drink	Cough, Influenza, thinning the blood.	0.60	8411
Malvaceae *Sida galheirensis* Ulbr.	Malva-branca	Le, Ro	Decoction	Drink	Stomachache, Influenza, heartburn.	0.60	8409
Myrtaceae *Psidium* sp.	Araçá de veado	Le	Decoction	Drink	Swelling in the stomach.	0.25	8424
Psidium guineense Sw.	Araçá goiaba	Le	Decoction, Infusion	Drink	Stomachache, gastura.	0.25	Nc
Olacaceae *Ximenia americana* L.	Ameixa	Ib, Sb	Decoction	Drink	Rheumatism, bone pain, sore throat, wound, ulcer, spine, wound.	1.38	8419
Passifloraceae *Passiflora cincinnata* Mast.	Maracujá do mato	Le	Decoction	Drink	Nerves, depression, high pressure, insomnia.	1.00	7974
Polygonaceae *Bredemeyeria brevifolia* (Benth.) A.W. Benn.	Mal vizinho	Le	Decoction	Drink	Gastritis	0.25	7939
Phytolacaceae *Petiveria* sp.	Tipi	Ro	Of sauce or in the alcohol	Drink	Spine, Inflammation of kidneys.	0.51	Nc
Proteaceae *Roupala montana* L.	Congonha	Le	Decoction	Drink	Fever, spine	0.51	8420
Rubiaceae *Tocoyena formosa* (Cham. & Schltdl.) Schum.	Jenipapo	Ib	Infusion	Drink	Twist	0.25	7956
Solanaceae *Solanum lycocarpum* A. St. Hil.	Jurubeba	Se	seed toasted	Drink	blurry vision, gastritis.	0.55	7969
Rutaceae *Pilocarpus* sp.	Jaborandi	Le	Decoction	Drink	Fever, pain in general.	0.34	8413
Smilax japicanga Griseb.	Japecanga	Ro	Decoction	Drink	Headache, menstrual cramps, heartburn.	0.90	10.154
Urticaceae *Cecropia pachysthachya* Trec.	Toré	Le	of sauce, Decoction	Drink	Kidney pain, heartburn, sore throat.	0.80	Nc
Hybanthus arenarius Ule	Orelha de onça	Ro	Decoction	Drink	Swelling in the belly, liver, heartburn, indigestion.	0.70	Nc
Hybanthus ipecacuanha L.	Papaconha	Ro	Infusion	Drink	Influenza, intestine pain.	0.51	8412

LEGENDA: Le: leaves, Ro: root; Se: seed; Sb: stem bark; Ib: inner bark; Fr: fruit, La: latex, Rs: Resin; RI: Relative Importance; nc: number of collection in process by Herbaria.

that contributed with the greatest number of species were Fabaceae, with nine species, and Apocynaceae, with three. The fact that Fabaceae stood out over the others corroborates with the works conducted by Botrel et al. (2006); Moreira and Guarim Neto (2009); Oliveira et al. (2010); Cunha and Bortolotto (2011) and Souza et al. (2014), since the large medicinal use of this family can be explained by the great number and diversity of the species that compose it, being one of the largest in the cerrado. Most genera were represented by only one species, with the exception of *Croton*, *Psidium* and *Hybanthus*.

In this research, the leaves were the part of the plants most used in local home made medicines (31.61% of cases). The other plant parts used had a percentage distributed as follows: roots (24.49%); inner barks (20.43%); stem barks and fruits (6.12%) each, in addition to plant products such as resins, latex, and seeds (12.27%). Other studies have demonstrated that the leaves were also the part of the plant most used in medicinal preparations (Giraldi and Hanazaki, 2010; Pinto et al., 2006; Franco and Barros, 2006), followed by barks and roots. It is well known that plants have different concentrations of chemical compounds in their parts.

In the community under study, 07 different preparation methods were recorded, ranging from decoction (44,19%), soaking (18,60%), infusion (16,28%). The other forms, use of alcohol, in the water, licking and seed toasted totaled a percentage of 20.93%. (Intake, is the most cited by the interviewed) It is observed that decoction is the most common form staging also in other etnobotanicos surveys conducted in cerrado de Minas Gerais (Calábria et al., 2008) and Mato Grosso do Sul (Cunha and Bortolotto, 2011).

Among the species, 21% of medicinal plants had great versatility in relation to their uses, showing high relative importance (RI ≥ 1). The most versatile species were: *Hancornia speciosa*, *Copaifera langsdorffi*, *Stryphnodendron rotundifolium*, *Himatanthus drasticus*, *Croton heliotropiifolius*, *Ximenia americana*, *Centrosema* sp., and *Passiflora cincinnata*. The other species had RI <1, with variation from 0.25 to 0.90, ranging from one to three body systems per species. It is important to emphasize that none of the species mentioned in this survey reached the highest value of RI = 2.

The most versatile species had from three to six body systems, what comprehends from four to eleven healing properties. The species *S. rotundifolium* and *C. langsdorffi* stood out by offering larger number of body systems (6), having been related to eight and nine healing properties, respectively.

The species *H. drasticus*, *H. speciosa* and *S. rotundifolium* were highly recommended for the treatment of gastritis and ulcer. *C. heliotropiifolius*, *S. rotundifolium* and *X. americana* were mentioned for curing both internal and external inflammations. For hypertension problems, the informants made use of the species *P. cincinnata* and *H. speciosa*.

As much latex as for the leaves, however in Nova Xavantina-MT, the most used part of this species is the bark of the stems, and *C. langsdorffi* they use as much as the shells as the leaves and fruits, corroborating with the results achieved in our research (Silva et al., 2010b). Regarding *H. drasticus*, the informants' among versatile species: the leaves are the parts of the plants which are most used, followed by inner barks. This fact was also observed in studies conducted by Cartaxo et al. (2010), Medeiros et al. (2004) and Pinto et al. (2006). It is observed that the parts of the plants used will vary depending on the knowledge and practices of use that exists in each locale. Thus, regarding *C. heliotropiifolius* in the community studied and in a study conducted in the semi-arid region of the State of Piaui (Oliveira et al., 2010), the most common report was for the use of its leaves; however, in the carrasco area of the State of Ceara, besides the use of leaves, its roots had also been used by the informants (Souza et al., 2014).

Agreeing with this study, *X. americana* has also been reported in other studies with respect to its bark and inner bark (Roque et al., 2010; Cartaxo et al., 2010). For *H. speciosa*, informants mentioned the use of the latex of the plant to treat various ailments. Still for the same species in the surrounding communities of Serra das Almas Natural Reserve, states of Ceara and Piaui, the informants reported that the use of leaves, to make medicines is the most common (Magalhaes, 2006).

Among the species with relative importance in this research, some have pharmacological studies that demonstrate a variety of activities, for example, both bark extracts and leaves of *X. americana* have proven antifungal activity (Omer and Elnima, 2003). *H. drasticus* tests have presented its anti-inflammatory, gastro-protective and antinociceptive effects (Lucetti et al., 2010; Colares et al., 2008), and this research corroborates with the therapeutic indications mentioned by informants for treating ulcer, gastritis and wounds.

Despite informants not having cited *C. langsdorffii* for cancer, studies have demonstrated that kaurenoic acid isolated from the oil of *C. langsdorffii* presented anti-inflammatory and cytotoxic potential, inhibiting the growth of cancer cells (Costa Lofuto et al., 2002; Paiva et al., 2003). The ethanolic extract from stem bark of *S. rotundifolium* showed anti-microbial, anti-ulcer and gastro-protective activities in surveys conducted by Rodrigues et al. (2008) and Oliveira et al. (2011). This fact is confirmed in this study, in which the species were reported for the treatment of cancer, ulcer, gastritis, infections, and inflammations. Anti-hypertensive (Soares et al., 2006) and anti-inflammatory (Endringer et al., 2006) activities were verified through of ethanolic extract *H. speciosa* leaves.

For *Croton h.,* there were found pharmacological and

phytochemicals studies using the leaves of this species, only the root extract was observed antitumor activity (Torrance et al., 1977) and antimicrobial (Peres et al.,1997). For *Centrosema* sp and *P. cincinnata,* pharmacological studies were not found to report activities or medicinal use of these, given mainly to treat diseases of respiratory and nervous system.

Many of the healing properties of the species with the highest relative importance in this work were cited in other studies (Cunha and Bortolotto, 2011; Roque et al., 2010; Santos et al., 2012;), however, in other studies, the use of *X. americana* for the treatment of rheumatism had

not been reported yet.

Informant's consensus factor for therapeutic purpose

The medicinal species were used to treat 51 therapeutic purposes and were classified into 14 categories relating to body systems listed in Table 2. In general terms, there was an agreement regarding to the use of the species within the categories among informants, with consensus values ranging from 0.6 to 1.0. In only one category there was no consensus among the informants.

The categories, Certain infectious and parasitic diseases, Endocrine, nutritional and metabolic diseases, presented the highest indices of agreement, with the utilization of *Tillandsia* sp., To treat worm and *Hancornia speciosa* for thyroid, providing evidence of greater cultural importance of these species for the studied community. In another study in semi-arid region of northeastern Brazil, IPD category also obtained the greatest consensus among the informants (Almeida et al., 2006). It suggests that these diseases are related to the health habits, and to the economic conditions of the community.

The category RSD has received 114 citations of use, having being reported 12 species for therapeutic indications included in this body system, corresponding to 31% of species referred to in this work for the treatment of cough, sore throat, flu, asthma, bronchitis and tuberculosis, *C. coriaceum* (30), *H. courbaril* (28) and *H. ipecacuanha* (20) were the most reported species in this category, indicating a vast community knowledge about the medicinal plants which treat respiratory problems. Usually, this category is commonly found in other studies by the number of species or reports related to this body system, in Itacare, State of Bahia, and this system stands out by the high number of reports of use related to the treatment of flu and cough (Pinto et al., 2006). In the municipality of Caico, State of Rio Grande do Norte, RSD accounted for 31.6% of the reports and *Amburana cearensis* (Allemao) was the most common species indicated to treat flu and sinusitis (Roque et al., 2010). In a rural community of a caatinga region, in the municipality of Aiuaba, State of Ceara, this system obtained the largest number of reports of use (335), which corresponds to 28.44% of the total number of reports (1,178) and it also had a high number of species indicated (50), corresponding to 42.02% of the total. This fact demonstrates the broad knowledge that the community studied has about medicinal plants to treat respiratory problems

GSD had 23 citations of use grouping four species for the treatment of uterine inflammation, kidney disorders and menstrual cramps. *Cecropia pachysthachya* and *S. rotundifolium* were the most reported species to treat kidney disorders and internal inflammations, respectively. This category has been frequent in the studies conducted by Roque et al. (2010), Calabria et al. (2008), and Cunha and Bortolotto (2011), with kidney disorders as the most reported disease in this category.

The categorie IPOCEC, with 46 reports of use and nine species, covered the treatments indicated for injuries, healing and streptos, among others. *S. rotundifolium*, *C. langsdorffi* and *C. heliotropiifolius* were the most reported species. Similar results were observed in studies conducted by Roque et al. (2010), in which 'injury' was reported by 9% of the informants, and in studies conducted by Pinto et al. (2006), in which 'cut' received 30% of the reports within this system.

DSD and DMSCT received the same ICF values. DSD was the second most reported system (103 times), totaling 22 species. *H. drasticus*, *H. speciosa*, and *S. rotundifolium* were referred to treat ulcer and gastritis, which were the most frequent affections in this category. For DMSCT, nine species were reported to treat hernias, rheumatism and the vertebral spine pain.

It is common to find results which confirm the prevalence of DSD (Santos, 2009; Gazzaneo et al., 2005; Pilla et al., 2006), however, for diseases of the musculoskeletal system and connective tissue, ICF values are lower than those found in this study (Cartaxo et al., 2010).

The category CSD received 34 reports and comprised eight species. *P. cincinnata* and *H. speciosa* together had 15 reports for treating high blood pressure, having been the one most reported in this corporal system. In the semi-arid region of the State of Piaui, hypertension was also the most reported was the most reported disease (20), comprising 15 species for this purpose (Oliveira et al., 2010). Then the category of neoplasms, cancer was the illness of involve this system, cited by the informers the species *S. rotundifolium* and *H. drasticus* for their treatment. Similar results were found by Santos et al.(2012) in the semi-arid region of the State of Paraiba, where this category reached the same ICF value (0.75) of this study.

DBI, MBD and SSC obtained the lowest ICF values. *Hybanthus arenarius* stood out in the category diseases of the blood and blood-forming organs for treating of anemia. *P. cincinnata* and *X. americana* stood out in the treatment of insomnia and inflammations in general. Only

Table 2. Informant consensus factor (ICF) for body systems based on quotes from use of medicinal plants by the residents of the community of Betania, the town of Barbalha, Ceará (Northeast Brazil).

Code ICD-10	Categories: Therapeutic purposes	Number of uses reported in each category (nar)	Species reported in each category (na)	Percentual citation	ICF
A00- B99	**IPD**: worm	03	Bananinha de raposa	01	1.0
E00-E90	**DENM:** thyroid	03	Mangaba	01	1.0
J00-J99	**RSD:** Sore throat, cough, influenza, asthma, bronchitis, tuberculosis.	114	Barbatimão, mangaba, alcançu, caninana, ameixa, toré, jatobá, piqui, papaconha, manjuirioba, cajuí, malva branca.	12	0.90
N00-N99	**GSD**: Inflammation in the uterus, kidney pain, menstrual pain, clean the uterus, kidney inflammation.	23	Barbatimão, toré, japecanga, tipi.	04	0.86
S00-T98	**IPOCEC:** Cut, wound, snake bite, twist, strepto, healing.	46	Janaguba, barbatimão, pau d'óleo, ameixa, araticum, jenipapo, velame branco, cajuí, velame vermelho.	09	0.82
M00-M99	**DMSCT**: Hernia, rheumatism, spine pain.	40	Janaguba, caninana, pau d'óleo, sucupira, ameixa, congonha, tipi, velame branco, pau pra-tudo.	09	0.79
K00-K93	**DSD:** ulcer, gastritis, stomach pain, burning sensation, heartburn, abdominal pain, indigestion, gastura, birth tooth, toothache.	103	Janaguba, barbatimão, mangaba, alcançu, pau d'óleo, sucupira, ameixa, toré, mororó, jarrinha do mato, japecanga, papaconha, mal vizinho, Jitirana, jurubeba, cajuí, velame branco, araçá de veado, cajuí, velame vermelho, malva branca, espinho de cigano.	22	0.79
I00-I99	**CSD**: Varicose veins, vein triage, high blood pressure, heart attack, thinning the blood, body swelling, heart.	34	Janaguba, mangaba, pau d'óleo, piqui, maracujá do mato, manjuirioba, velame branco, velame vermelho.	08	0.78
C00-D48	**N**: câncer	05	Janaguba, barbatimão.	02	0.75
D50.0-D89	**DBI**: blood infection, anemia	07	Barbatimão, orelha de onça.	02	0.66
G00-G99	**NSD:** Nerves, migraine.	12	Maracujá do mato, japecanga, amescla.	03	0.27
F00- F99	**MBD**: Depression, insomnia, epilepsy**.**	06	Maracujá do mato, pau d'óleo.	02	0.8
R00-R99	**SSC**: Inflammation, fever, of blood cramp, pain in general.	21	Mangaba, alcançu, ameixa, jaborandin, mororó, congonha, pau pra-tudo, velame branco, pau d'óleo.	09	0.6
H00-H59	**DSSE**: blurry vision	01	Jurubeba	01	0

LEGENDA: RSD: Diseases of the respiratory system;IPOCEC: Injury, poisoning and certain other consequences of external causes; NSD: Diseases of the nervous system; DMSCT:Diseases of the musculoskeletal system and connective tissue; DSD: Diseases of the digestive system ; CSD: Diseases of the circulatory system ; N: Neoplasms ; GSD:; Diseases of the genitourinary system; DBI: Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism; MBD: Mental and behavioural disorders; SSC: Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; IPD: Certain infectious and parasitic diseases;DENM: Endocrine, nutritional and metabolic diseases; DSSE: Diseases of the eye and adnexa.

the category of disorder sensory system has obtained FCI zero, with no agreement on the use of species in relation to this category in the locality. The bodily systems reported in this study, also stood out in other parts of the world, such as in China with the highest number of citations for the digestive system, injuries and other consequences of external causes and skin problems (Inta et al., 2008). In Serbia, the most frequently reported medicinal uses were for treating gastrointestinal, respiratory and cardiovascular (Jarić et al., 2007) diseases. In Ethiopia, the most cited systems were disorders of the digestive system, connective tissue diseases and skin lesions (Giday et al., 2003). In

the Latin America, other studies in the southern Ecuador showed 11% of the citations for the treatment of kidney problems (Tene et al., 2007) and in Peru were reported 34 species (39%) within the category of diseases and pains not set required to reduce inflammation in different parts of the body (De-La-Cruz et al., 2007). Based on these results, it is evident that many species stands out in some categories for their therapeutic applicability, where the most sought species are those which the population believes it has "healing power", confirming that the traditional herbal medicine remains being used by the local community.

Conclusion

According to the understanding of the versatility and use of plant species by informants, deeper studies are recommended for *H. drasticus species*, and *H. speciosa S. rotundifolium* that were highly reported for the treatment of gastrointestinal disorders, kidney disorders pachystachya to cecropia*, X. americana* and for the treatment of rheumatism.

Conflicts of Interests

The authors have not declared any conflict of interests.

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