



Medicinal Plants: versatility and concordance of use in the caatinga area, Northeastern Brazil

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ABSTRACT

This study aims to investigate the diversity of native medicinal plants in a caatinga area, verifying the versatility of species and concordance of use among the informants, in the Angico de Cima community, in the city of Aurora, Ceará, Brazil. Ethnobotanical data were obtained through semi-structured interviews with key informants, adopting the snowball technique. The Relative Importance (RI) and Consensus Factor among Informants (ICF) were analyzed to indicate the most versatile species with the highest agreement of use, respectively. Within the 35 registered native species, eight presented great versatility, with a RI > 1, standing out *Ziziphus joazeiro* Mart. (1.86) and *Heliotropium indicum* (L.) Lehm (1.67). The 60 therapeutic indications were grouped into 13 body systems categories, of which Genitourinary System Disorder and Nervous, had the highest agreement of use with ICF from 0.8, each. Some species, such as *Heliotropium indicum*, have a high RI, are scarcely indicated for therapeutic activities in caatinga and require studies that prove their medicinal properties.

Key words: consensus of factor, ethnobotany, popular knowledge, relative importance, therapeutic indications.

INTRODUCTION

Known for having one of the richest floras on the planet and containing around 20% of the world's plant biodiversity (Garcez et al. 2016), Brazil has more than 55,000 native species catalogued and a large variety of ethnic groups resulting in a wealth of knowledge about vegetation (Lima et al. 2012). Brazil also stands out in regard to medicinal plants considering that Brazilian forests hold a significant

number of species with therapeutic potential (Alves et al. 2008). This richness is distributed in varied vegetation formations, among them is the caatinga, which stands out for its high diversity of native and endemic species (Tabareli and Vicente 2002).

In the Northeastern caatinga, medicinal plants are widely used in folk medicine by local communities. Studies carried out in communities in the Northeast greatly contributed to the knowledge and concepts developed by the communities about the plants, as well as helping to preserve

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the local culture and obtain information about the medicinal and phytochemical potential of the species used, to help pharmacological studies (Albuquerque and Andrade 2002). Approximately 25% of pharmaceutical drugs are plant chemical derivatives, where 85% of the world's population uses traditional herbal healing systems (Oliveira 2010).

A variety of medicinal plants from the caatinga widely known and used in folk medicine and in the commercial manufacture of herbal products, including: *Myracrodruon urundeuva* Allemão, *Amburana cearensis* (Arr. Cam.) AC Smith., *Erythrina velutina* Willd., *Anadenanthera colubrina* Vell.) Brenan var. *Cebil* (Griseb) Altschul, and *Sideroxylon obtusifolium* (Roem. & Schult.) T.D. Penn. (Ribeiro et al. 2014). Some of the medicinal plants indicated in ethnobotanical surveys in the caatinga have already had their therapeutic indications confirmed through bioprospecting, presenting a great pharmacological potential. This is represented by activities such as antibacterial (Lôbo et al. 2010), anti-nociceptive, anti-inflammatory and antioxidant (Leal et al. 2003, Araújo-Neto et al. 2010, Aquino et al. 2016) as well as cicatrizing activities (Rodrigues et al. 2002).

One of the most widely used quantitative methods for selecting plants for bioprospecting studies is Relative Importance, in which the more versatile the plant, or the greater the number of therapeutic indications present and the more body systems it belongs to, the more important the plant is (Bennett and Prance 2000). Another important method is the Informant Consensus Factor, where a high consensus value shows that there is a well-defined selection criteria for medicinal plants and/or that information on usage and/or knowledge is shared among the people within the community (Heinrich et al. 1998).

Thus, considering the importance of plants with therapeutic purpose and by analyzing their representativeness within the community, the

objective of this work was to evaluate the versatility and the consensus factor of native medicinal species of the caatinga in the Angico de Cima community in the city of Aurora, Ceará, Brazil, as a way of indicating the most important species for presenting an elevated number of properties (uses), in addition to identifying which body systems have a greater knowledge and/or consensus use, and which groups of plants require more in-depth studies.

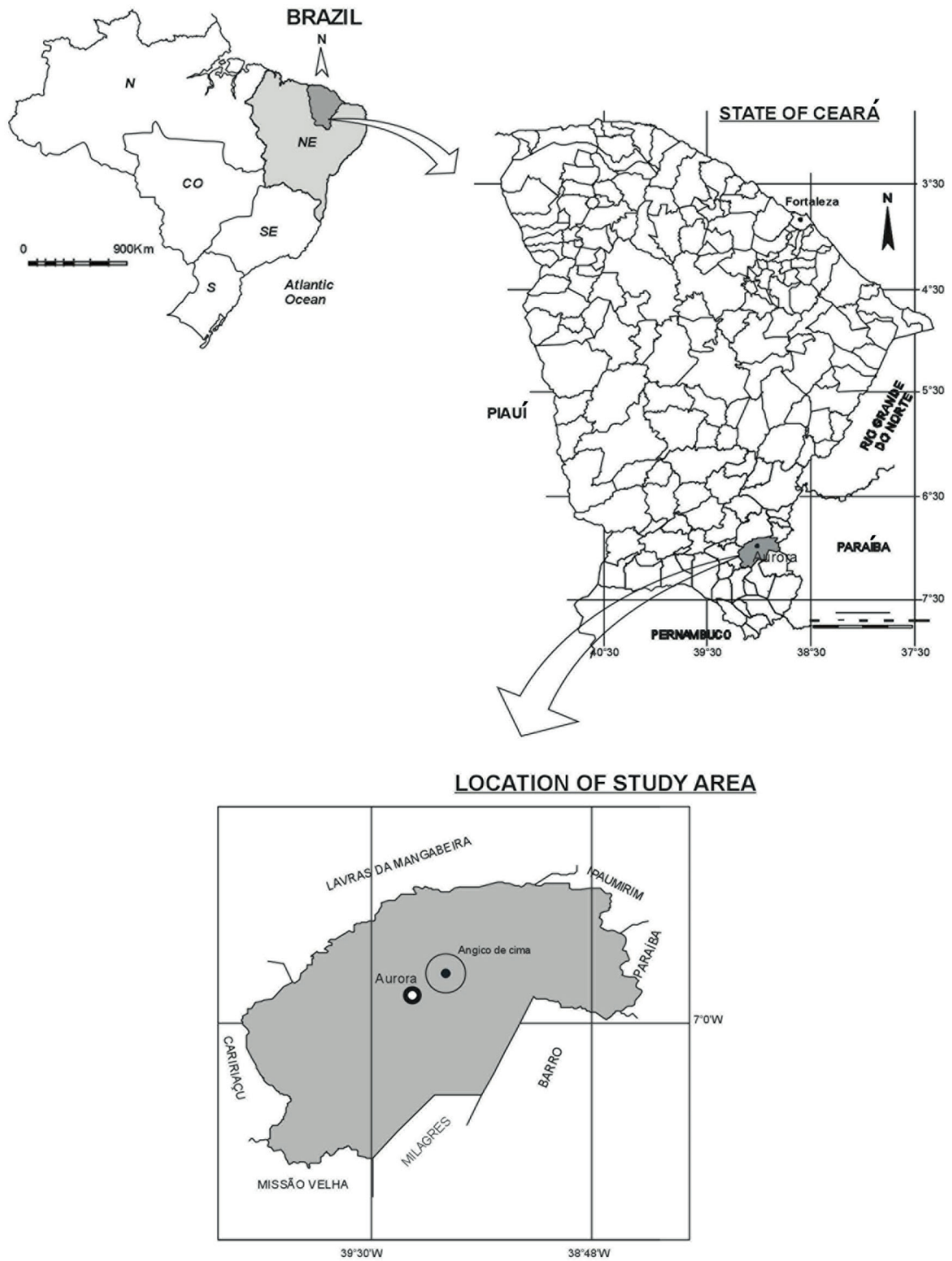
MATERIALS AND METHODS

STUDY AREA

The research was carried out in the Angico de Cima community, in the municipality of Aurora-CE (6° 56' 33" S and 38° 58' 03" W) (Figure 1, located in the mesoregion of southern Ceará and in the micro region of Barro, with an area of 885.83 km², 358 km from the capital Fortaleza (IPECE 2012). It borders with Ipaumirim, Lavras da Mangabeira, Caririaçu, Missão Velha, Milagres, Barro and the State of Paraíba. It has a warm semiarid tropical climate with an average annual temperature of 26 to 28 °C. The average annual rainfall is 884.9 mm, with rainy season from February to April. The vegetation is of the dense bush caatinga type, open shrub caatinga and prickly deciduous forest. The basin that bathes the region is the Salty River.

ETHNOBOTANICAL RESEARCH

The community studied was composed of 90 families, where 30 key informants (bushman, healer, prayer and midwife) were interviewed and selected through the snowball technique (Albuquerque et al. 2010), which consists of an informant who has knowledge of the use of medicinal plants and indicates another informant, and so forth, without any degree of kinship among the interviewees. The information about the knowledge of the besiegers regarding the medicinal species was allowed after the reading, permission and signing of the free and informed consent term.



SOURCE: MINISTÉRIO DO MEIO AMBIENTE

Figure 1 - Geographical location of the area of study in Angico de Cima community, in the city of Aurora, Ceará, Brazil.

Information about the medicinal plants used and their different therapeutic uses were obtained from semi-structured interviews based on a standardized form (Macêdo 2013) (Appendix). The species had their condition classified as native, that is, those characteristics of the caatinga environment. This research was submitted to the Ethics Committee of the Regional University of Cariri, and was approved by N° 019980/2016.

The therapeutic indication of each species were grouped in 16 categories of body systems based on the internacional classification of diseases and related health problems (ICD-10) proposed by the World Health Organization (WHO 2010): Non-Defined Disorders or Pain (NDDP), Disease of the Endocrine Glands, Nutrition and Metabolism (DEGNM), Infectious and Parasitic Diseases (IPD), Diseases of Blood and Hematopoietic Organs (DBHO), Diseases of the Musculoskeletal System and Connective Tissue (DMSCT), Injuries, Poisonings and Other Consequences of External Causes (IPOCEC), Disorder of the Digestive System (DDS), Disorder of the Genitourinary System (DGS), Respiratory System Disorder (RSD), Disorders of the Visual Sensory System – eyes (DVSS-E), Diseases of the Circulatory System (DCS), Diseases of the Skin and Subcutaneous Cellular Tissue (DPTCS), Diseases of the Nervous System (DNS).

FLORISTIC RESEARCH

The medicinal species that were in the reproductive stage and that were available in the community were collected through a guided tour, with the help of each interviewee (30 informants) and taken to the Plant Ecology Laboratory of the Regional University of Cariri - URCA. The collected plant material was conditioned and treated according to the usual herborization techniques (Mori et al. 1989). The identification of the species occurred through a specialized bibliography, compared with

botanical material identified and sent to specialists. The testimonial material was incorporated into the Dárdano de Andrade-Lima Herbarium collection (HCDAL), of the Regional University of Cariri. The authorization to collect the botanical material was provided by the Authorization and Biodiversity Information System (SISBIO) of the Brazilian Institute of Environment and Renewable Energies Natural Resources (IBAMA), registered under n° 55705-1.

DATA ANALYSIS

Versatility and agreement of the use of medicinal species

The versatility of native medicinal species was evaluated by quantitative method of Relative Importance (RI), according to the methodology proposed by Bennett and Prance (2000), which shows the importance of the species from the number of properties that it acquires by the interviewees with “2” being the maximum value obtained by a species. For the data acquisition, the following formula was used: $RI = NSC + NP$. The two factors are calculated by the following formulas: $NSC = NSCE / NSCEV$ and $NP = NPE / NPEV$, where NSC is the Number of Body Systems, determined by a species (NSCE), divided by the total number of body systems treated by the most versatile species (NSCEV); NP corresponds to the number of properties attributed to a given species (NPE), divided by the total number of properties attributed to the most versatile species (NPEV).

In order to evaluate the agreement of use on medicinal species, the Informants Consensus Factor (ICF) (Troter and Logan 1986) was calculated, whose analysis aims to identify the body systems that have a greater knowledge and/or use consensus. The ICF values range from 0 to 1 and are calculated according to the following formula: $FCI = \frac{nur - na}{nur - 1}$, where (nur) is the number of citations of uses

in each category and (na) is the number of species indicated in each category.

RESULTS

VERSATILITY OF NATIVE MEDICINAL SPECIES

Of the 35 native medicinal species indicated, 26 are administered for more than one disease, while nine are used for one therapeutic utility only (Table SI - Supplementary Material). Of the total species, eight showed great versatility with a $RI > 1$, these being *Ziziphus joazeiro* (1.86), *Heliotropium indicum* (1.67), *Ximena americana* (1.32), *Coutarea hexandra* (1.32), *Amburana cearensis* (1.29), *Myracrodruon urundeuva* (1.07), *Cissampelo sympodialis* (1.07) and *Lippia microphylla* (1.07). The remaining (27) had a RI value varying between 0.22 to 0.99.

Ziziphus joazeiro and *Heliotropium indicum* presented the highest RI values. *Ziziphus joazeiro* included the highest number of properties (12) and the second largest number of body systems (06), being most cited for the treatment of stomach pain, poor digestion, fever and anticarioussness, through the oral intake of tea, meanwhile, *Heliotropium indicum* presented the second largest value of Relative Importance (1.67), encompassing the largest number of body systems (07) related to eight therapeutic properties. This species received the highest number of citations for headache (10) and tea was used through oral intake.

Coutarea hexandra and *Ximena americana* presented the same value of RI (1.32), encompassing the same amount of diseases (9) and body systems (4). *C. hexandra* was indicated for respiratory diseases (influenza, sinusitis and asthma), for problems without defined causes (fever and general pain), and diseases related to the nervous (headache and migraine) and digestive (toothache) system, using the leaves, bark and bramble of the stem prepared in the form of cooking, sauce and teas for oral ingestion or

nose wash. Whereas *X. americana* was reported for therapeutic properties related to the system of lesions, poisoning and other consequences of external causes (fracture, expelling skin fragment, injury and blows), also being indicated for diseases of the skin and subcutaneous cellular tissue (wound healing and tooth extract), disorders and undefined pain (diseases and general inflammation) and gynecological (inflammation of the woman), using the bark and bramble of the stem in the form of cooking, dressing and infusion for washing and bathing. *Amburana cearensis* was also highlighted with a high RI value (1.29) and was cited for seven diseases (indigestion, stomach ache, general inflammation, influenza, skin allergy, wounds and swelling), inserted into five body systems (TSD, ADND, TSR, DPTCS and LEOCCE) treated by oral ingestion or washing, by means of tea, decoction, dressing and cooking of the seeds, bark and bramble of the stem. *Myracrodruon urundeuva*, *Cissampelos sympodialis* and *Lippia microphylla* were indicated for the same number of therapeutic properties (6) and body systems (4) with a RI value equal to 1.07. Headaches were accentuated for *C. sympodialis* and *L. microphylla* while diseases comprising the Genitourinary System Disorder were accentuated for *Myracrodruon urundeuva*, mainly relating to inflammation of woman, uterine and ovary.

Of the 27 species with RI value < 1 , five presented RI of 0.99 (*Astronium fraxinifolium*, *Croton blanchetianus*, *Cnidoscolus obtusifolius*, *Croton conduplicatus* and *Mimosa tenuiflora*) and two with an RI of 0.90 (*Enterolobium contortisiliquum* and *Solanum aculeatissimum*). All these species were indicated for four body systems with the Undefined Diseases or Pain standing out for five species. Nine species (*Melocactus zehntneri*, *Licania rigidus*, *Ipomoea brasiliensis*, *Croton zehntneri*, *Errytrina velutina*, *Hymenaea courbaril*, *Bauhinia cheilantha*, *Lantana chamber*

and *Lippia* sp.) had a low RI (0.22), being indicated only for one disease and one system each.

CONSENSUS USE OF PLANTS FOR THERAPEUTIC PURPOSES

The raised medicinal species were indicated for 60 therapeutic treatments, grouped into 13 body systems categories (Table SII). In general, the categories presented agreement among the informants with a value varying from 0.25 to 0.81, and for three categories there was no consensus among the informants.

The categories that presented Informant Consensus values (ICF) ≥ 0.5 were the Genitourinary System Disorder (TSG), Nervous System Disorder (TSN), Endocrine Glands Disease, Nutrition and Metabolism (DEGNM), Skin and Subcutaneous Cell Tissue Diseases (DPTCS), Undifferentiated Conditions or Ailments (DLE), Respiratory System Disorder (TSR), Digestive System Disorder (TSD) and Poisoning Injuries and Other Consequences of External Causes (LEOCCE), with a ICF ranging from 0.64 to 0.81.

Genitourinary System Disorder (TSG) and Nervous System Disorder (TSN), which reached the highest consensus value (ICF= 0.81 each), included the same number of citations of use (27) and species (06). For Genitourinary System Disorder (TSG), *Myracrodruon urundeuva* stood out among the species with the highest number of citations (23), for gynecological problems such as womanly inflammation, uterine and ovary. Nervous System Disorder presented two diseases, 23 citations for headache and 4 citations for migraine, with *Heliotropium indicum* (10), *Croton conduplicatus* (06) and *Coutarea hexandra* (05) the species most indicated by the informants for headache.

Endocrine Gland Disease, Nutrition and Metabolism (EGDNM) obtained a concordance index of 0.78, including the following species: *Bauhinia cheilantha*, *Cissampelos sympodialis*

and *Solanum aculeatissimum*, mentioned for high cholesterol, diabetes and as a fortifier.

The category of Skin and Subcutaneous Cell Tissue Diseases (DPTCS) had an ICF of 0.76, comprising nine species and 35 citations of use. *Myracrodruon urundeuva*, received the highest number of indications within this category (16), using the inner bark of the stem in the form of cooking or sauce for the healing treatment.

Undiagnosed conditions or pain (DID) was the system that grouped the second largest number of species (15) and reported uses (50) with an ICF equal to 0.71, serving to cure health problems that have no defined cause. For this category, *Myracrodruon urundeuva*, received eight citations for general inflammation and *Croton conduplicatus* and *Heliotropium indicum* received six and five citations, respectively, for fever.

Respiratory System Disorder (TSR) stood out as the category with the highest citations of use (63), as well as the largest number of species indicated (19), with an ICF of 0.71. The species that reached the highest number of citations for respiratory problems (influenza, baseline, sinusitis and asthma) was *Coutarea hexandra* with 15 citations, followed by *Astronium fraxinifolium* with seven citations for influenza and cough.

Thirteen therapeutic properties were classified for Digestive System Disorder (TSD), which were linked to the use of fourteen species with an ICF of 0.64. The most frequently mentioned diseases were poor digestion, belly pain, toothache, anti-cariousness, diarrhea and child dentition, related to 30 citations of use. *Ziziphus joazeiro* was the most reported species for maladies such as poor digestion (09), belly pain (07) and anti-carious (03).

Injuries, Poisons and Other Consequences of External Causes (LEOCCE) (ICF= 0.64) included 23 citations of use for injuries, bruises, fractures, bone bruising, swelling, blows and expelling fragments of the skin, which were attributed to nine species, *Ximenia americana* (6), *Tocoyema*

formosa (6), *Cnidocolus obtusifolius* (3), *Amburana cearensis* (2), *Myracrodruon urundeuva* (2), *Ziziphus joazeiro* (1), *Croton blanchetianus* (1), *Enterolobium contortisiliquum* (1) and *Mimosa tenuiflora* (1). Of these species, *Ximena americana* and *Tocoyema formosa* were the ones that presented the most quotations (6 each), for the cure of diseases related to this system, through the method of bathing, washing or cataplasm of the baking, of the sauce or maceration of its peels or inner bark stem.

Circulatory System Disorder (CSD) and Osteomuscular System and Connective Tissue Disease (DSOTC) presented ICF values <0.5. The TSC category comprised five species, indicated for four different diseases, where blood clotting was the most reported disease within this system, with *Combretum cf. leprosum* being the species most suitable for this purpose. DSOTC obtained five citations of uses, encompassing four species, indicated for spine pain and rheumatic pain with four and one use citation respectively. *Croton conduplicatus* was the species most cited for this category.

Three categories presented a consensus of informants equal to zero, showing that there is no agreement regarding the use of the same species in the community, being: Blood and hematopoietic organ diseases (DSOH) involving the species *Heliotropium indicum* and *Astronium fraxinifolium* indicated as blood thinners; Infectious and parasitic diseases (DIP) with *Heliotropium indicum*, *Astronium fraxinifolium* and *Acantbosperrum* sp. serving to treat tuberculosis and measles; Disorder of sensory system (eyes) (TSS (OLH)) with *Argemone mexicana*, being indicated for mote.

DISCUSSION

VERSATILITY OF NATIVE MEDICINAL SPECIES

Of the eight species with a high value of Relative Importance, *Ziziphus joazeiro*, *Ximena americana*,

Amburana cearensis and *Myracrodruon urundeuva* commonly stand out in caatinga areas with high values. *Heliotropium indicum*, *Coutarea hexandra*, *Cissampelos sympodialis* and *Lippia microphylla* have presented low values in other semiarid studies.

Ziziphus joazeiro is commonly cited in other caatinga areas for dandruff, tooth treatment, cough and influenza, with the latter not being cited for the studied area. Studies that have evaluated the properties of the bark and leaves from *Z. joazeiro* have shown that the species has antibacterial and antifungal activity, especially in the cutaneous and subcutaneous tissues (Cruz et al. 2007, Alviano et al. 2008). Other species indicated for respiratory problems (flu) were *Amburana cearensis*, *Cissampelos sympodialis* and *Lippia microphylla*. *Amburana cearensis* is generally used for the treatment of influenza, cough and sinusitis (Agra et al. 2007, Marinho et al. 2011, Pereira Júnior et al. 2014, Silva and Freire 2010). This species already has a bronchodilator effect as confirmed by Leal et al. 2000, which confirms its efficacy for respiratory diseases. *Cissampelos sympodialis*, in addition to respiratory problems was indicated for diabetes, high cholesterol, fever, headache, and general pain. This species for other caatinga areas (Albuquerque et al. 2007, Silva et al. 2015) was also cited for urinary tract infection. *Lippia microphylla* has been reported for migraine, skin allergy, headache, and toothache, and has been reported in caatinga areas (Albuquerque et al. 2007, Agra et al. 2008, Costa and Marinho 2016) for antiseptic, heart disease, hypertension and muscle pain.

Ximena americana stands out in caatinga areas (Albuquerque et al. 2007, Cartaxo et al. 2010, Ribeiro et al. 2014, Neto et al. 2015, Silva et al. 2015) for inflammation, scarring and injury. This species presents important compounds, mainly tannins, that function as anti-inflammatory agents in the human system as observed in the study by Brasileiro et al. (2008), confirming the species' large number of citations of use as an

anti-inflammatory in different body systems in this survey. *Myracrodruon urundeuva* has also been reported in caatinga areas (Albuquerque et al. 2007, Cartaxo et al. 2010, Neto et al. 2015, Roque et al. 2010, Silva et al. 2015) for the treatment of several inflammations, especially to those relating to genitourinary disorders. In assays using rats it was observed that tannins present anti-inflammatory, analgesic and antiulcerogenic effects (Viana et al. 1997, Souza et al. 2007), while flavonoids and dimeric chalcones have an analgesic and healing effect (Viana et al. 2003).

Heliotropium indicum and *Coutarea hexandra* did not present a pattern of therapeutic indications for the caatinga, these being indicated for diseases that affect several body systems.

Species that presented a low RI value (<1) in studies conducted in the semi-arid region generally show little versatility, such as *Astronium fraxinifolium*, *Licania rigida*, *Croton blanchetianus*, *Croton conduplicatus*, *Croton zehntneri*, *Mimosa tenuiflora* and *Lantana chamber*. However, *Bauhinia cheilantha*, *Libidibia ferrea*, and *Hymenaea courbaril*, although they presented RI<1 in this study, in other areas of the Caatinga, these are highly important, as seen in the studies by Cartaxo et al. (2010), Oliveira et al. (2010), Paulino et al. (2011) and Ribeiro et al. (2014). This indicates the variability of the species' versatility. This variation, in general, may be related to the different types of diseases and bodily systems that a given community needs to treat. Commonly, the same plant is used to treat various types of diseases and/or symptoms in one community, but in another, it is almost unknown by its properties.

CONSENSUS USE OF PLANTS FOR THERAPEUTIC PURPOSES

Genitourinary System Disorder (TSG), Nervous System Disorder (TSN), Endocrine Glands Disease, Nutrition and Metabolism (DEGNM), Skin and Subcutaneous Cell Tissue Diseases

(DPTCS), Undifferentiated Conditions or Ailments (DLE), Respiratory System Disorder (TSR), Digestive System Disorder (TSD) and Poisoning Injuries and Other Consequences of External Causes (LEOCCE), which presented an Informants Consensus ≥ 0.5 in this study, commonly present with high ICF values in caatinga areas (Cartaxo et al. 2010, Oliveira et al. 2010, Ribeiro et al. 2014). According to Chaves and Barros (2012), high ICF values show a uniformity of knowledge among the informants in the selection of a species for signs and symptoms of a certain category of disease.

In caatinga areas, few studies have presented ICF equal to one, the maximum value that a category can obtain, these being: Ear Sensory System Disorder (Almeida and Albuquerque 2002); Infectious and Parasitic Diseases (Oliveira et al. 2010); Skin and Subcutaneous Cell Tissue Diseases (Cartaxo et al. 2010, Lós et al. 2012).

The two systems (Genitourinary and Nervous System Disorder), which presented the highest consensus value, are among the best known by local populations that already have preferred species to cure them (Albuquerque et al. 2007, Cartaxo et al. 2010). *M. urundeuva* stood out within the TSG with the highest number of citations for inflammation of the woman, uterine and ovary, and is generally indicated in caatinga areas for such gynecological problems (Ribeiro et al. 2010, Cartaxo et al. 2010, Oliveira et al. 2010, Albuquerque et al. 2007). This species also stood out in the category of Undefined Diseases and Pains (UDP), which received the highest number of citations for general inflammation, being also observed in the study by Ribeiro et al. (2014) in an area of the caatinga, where it stood out with a greater number of citations (13) for inflammation, which confirms the importance of this species on its knowledge and use. *M. urundeuva* was also indicated in the category of Skin and Subcutaneous Cell Tissue Diseases (DPTCS) as a cicatrizant. This system usually stands out in caatinga areas

with high consensus values reaching 1.00 (Cartaxo et al. 2010, Lós et al. 2012), with *M. urundeuva* being one of the most indicated species with proven pharmacological activity, with cicatrizing, anti-inflammatory and antimicrobial action (Botelho et al. 2008, Sá et al. 2009). From the species indicated for Nervous System Disorders, *Croton conduplicatus* and *Coutarea hexandra* usually fall into this category for other areas of caatinga (Cartaxo et al. 2010, Ribeiro et al. 2014) being cited for the cure of diseases such as headaches and migraines. Meanwhile *H. indicum* is not referenced in other areas of the caatinga for this system.

The category Endocrine Gland Disease, Nutrition and Metabolism (EGDNM) presents a zero to one variability in relation to the consensus values for caatinga areas. The species commonly mentioned in this category is *Bauhinia cheilantha* (Albuquerque et al. 2007, Cartaxo et al. 2010, Ribeiro et al. 2004), which has a proven action to reduce cholesterol and triglycerides (Ferreira 2008).

Respiratory System Disorder (RSD) that obtained the highest number of citations used by the community, encompassing the largest number of species, is usually one of the most frequently cited categories in the northeastern semi-arid region, showing high agreement of use. This system probably stands out in caatinga areas due to climatic conditions, intensifying in periods of intense fires for subsistence agriculture. The species most indicated for this system (*C. hexandra* and *A. fraxinifolium*) do not coincide with those frequently mentioned in the semiarid, which are: *Amburana cearenses* and *Anadenanthera colubrina*. Another category commonly cited in caatinga areas is Digestive System Disorder (DSD), covering up to 28 diseases. *Ziziphus joazeiro* is one of the most outstanding species in this category, where in the works of Schuhly et al. (1999), Cruz et al. (2007) and More et al. (2008), it showed antibacterial,

antifungal and antimicrobial activity against oral microorganisms, respectively.

The DSS (EYE) and DIP systems that did not present a consensus among the informants are generally referenced with low consensus values (Cartaxo et al. 2010, Oliveira et al. 2010, Chaves and Barros 2012), having a low concordance within the informants on the selection of species used. Although some categories have low consensus, what predominates in most systems was the agreement between the informants in the selection of the species use.

CONCLUSIONS

The study carried out in a caatinga area, in the community of Angico de Cima, Aurora, CE presents a considerable amount of native medicinal species, showing that the informants are knowledgeable and users of the local flora.

Ziziphus joazeiro, *Ximenia americana*, *Coutarea hexandra*, *Amburana cearensis* and *Myracrodruon urundeuva* considered versatile species, have been frequently indicated with high relative importance in the caatinga areas.

Heliotropium indicum, *Cissampelos sympodialis* and *Lippia microphylla* covered a large number of body systems and therapeutic properties, however in caatinga areas they show low values of relative importance.

The consensus values among informants showed a high transmission of knowledge/use over medicinal species within the community. Especially in the Disorder of the Genitourinary and Nervous system systems.

Although some species have low versatility, that is, they are indicated for few diseases and include few body systems, they should not be disregarded for bioprospecting studies since this information can be influenced by species availability and/or knowledge transmission, in different communities.

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SUPPLEMENTARY MATERIAL

Table SI - List of native medicinal species indicated by the interviewees of the Angico de Cima community in the city of Aurora, Ceará, Brazil.

Table SII - Informant consensus factor based on the citations of use of the native medicinal species indicated by the community informants Angico de Cima in the city of Aurora, Ceará, Brazil.

APPENDIX

Semi-structured script for collecting ethnobotanical data.

Name: _____

Age: _____; Sex: () F () M; Education Level _____

Used plant	Disease	Used part	State of use	How do prepare?	How to use?	N ^o of times a day	Route of administration
		Leaf ()	Drought ()	Infusion ()	Bath ()		Topic ()
		Fruit ()	Green ()	Decoction ()	Washing ()		Oral ()
		Flower ()		To soak ()	Cataplasm ()		Inhalation ()
		Root ()		Licking ()	Maceration ()		Others:
		Entrecasca ()		Sumo ()	Others:		_____
		Milk ()		In alcohol ()	_____		
		Oil ()		Sugarcane liquor ()			
		Resin ()					
		Leaf ()	Drought ()	Infusion ()	Bath ()		Topic ()
		Fruit ()	Green ()	Decoction ()	Washing ()		Oral ()
		Flower ()		To soak ()	Cataplasm ()		Inhalation ()
		Root ()		Licking ()	Maceration ()		Others:
		Entrecasca ()		Sumo ()	Others:		_____
		Milk ()		In alcohol ()	_____		
		Oil ()		Sugarcane liquor ()			
		Resin ()					
		Leaf ()	Drought ()	Infusion ()	Bath ()		Topic ()
		Fruit ()	Green ()	Decoction ()	Washing ()		Oral ()
		Flower ()		To soak ()	Cataplasm ()		Inhalation ()
		Root ()		Licking ()	Maceration ()		Others:
		Entrecasca ()		Sumo ()	Others:		_____
		Milk ()		In alcohol ()	_____		
		Oil ()		Sugarcane liquor ()			
		Resin ()					

APPENDIX (cont.)

Semi-structured script for collecting ethnobotanical data.

Name: _____

Age: _____; Sex: () F () M; Education Level _____

Used plant	Disease	Used part	State of use	How do prepare?	How to use?	N ° of times a day	Route of administration
		Leaf ()	Drought ()	Infusion ()	Bath ()		Topic ()
		Fruit ()	Green ()	Decoction ()	Washing ()		Oral ()
		Flower ()		To soak ()	Cataplasm ()		Inhalation ()
		Root ()		Licking ()	Maceration ()		Others:
		Entrecasca ()		Sumo ()	Others:		_____
		Milk ()		In alcohol ()	_____		
		Oil ()		Sugarcane liquor ()			
		Resin ()					

(Macêdo 2013).