

**Medicinal plants used by residents of an area of thorny deciduous woodland, Ceará,  
Brazil**

**Plantas medicinais usadas por moradores de uma área de floresta decídua espinhosa,  
Ceará, Brasil**

**Plantas medicinales utilizadas por los residentes de un área de bosque caducifolio  
espinoso, Ceará, Brasil**

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## Abstract

**Objective:** conduct an ethnobotanical study of medicinal plants used by a rural community located in an area of thorny deciduous forest (Caatinga) in Altaneira, Ceará, Brazil, identify the species, the diversity of uses, the most versatile species, the therapeutic indications and body systems, as well as indicating the species used in traditional medicine, described in the literature as harmful to health if used improperly. **Methodology:** the research took place from november 2013 to february 2014. To obtain ethnobotanical data, interviews were conducted with the aid of a questionnaire with semi-structured questions. To assess versatility in use, the relative importance (RI) of the plants cited by local informants was analyzed and the species that stood out in the body systems were evaluated based on the informant's consensus factor. **Results:** A total of 79 species in 36 families used to treat 75 diseases was recorded. The most significant families in number of species were Fabaceae (10), Asteraceae (8), Lamiaceae (8), Rutaceae (4) and Euphorbiaceae (4). Among the species listed, those which presented RI value > 1 were *Bryophyllum pinnatum*, *Mentha spicata*, *Rosmarinus officinalis*, *Melissa officinalis*, *Ruta graveolens*, *Myracrodunon urundeuva*, *Amburana cearensis*, *Helianthus annuus*, *Plectranthus amboinicus*, *Brassica rapa*. **Conclusion:** These species may be suitable for pharmacological studies, in order to prove their efficacy and / or toxicity, aiming safer use. **Keywords:** Ethnobotany; Medicinal plants; Semiarid; Brazilian northeast.

## Resumo

**Objetivo:** realizar um estudo etnobotânico das plantas medicinais utilizadas por comunidade rural localizada em uma área de floresta decidual espinhosa (Caatinga) em Altaneira, Ceará, Brasil, identificar as espécies, a diversidade de usos, as espécies mais versáteis, as indicações terapêuticas e sistemas corporais, bem como indicar as espécies utilizadas na medicina

tradicional, descritas na literatura como nocivas à saúde se utilizadas de forma inadequada.

**Metodologia:** a pesquisa ocorreu no período de novembro de 2013 a fevereiro de 2014. Para a obtenção dos dados etnobotânicos foram realizadas entrevistas com auxílio de questionário com perguntas semiestruturadas. Para avaliar a versatilidade no uso, foi analisada a importância relativa (IR) das plantas citadas pelos informantes locais e avaliadas as espécies que mais se destacaram nos sistemas corporais com base no fator de consenso do informante.

**Resultados:** foi registrado um total de 79 espécies distribuídas em 36 famílias utilizadas no tratamento de 75 enfermidades. As famílias mais expressivas em número de espécies foram Fabaceae (10), Asteraceae (8), Lamiaceae (8), Rutaceae (4) e Euphorbiaceae (4). Dentre as espécies listadas as que apresentaram valor de  $IR > 1$  foram: *Bryophyllum pinnatum*, *Mentha spicata*, *Rosmarinus officinalis*, *Melissa officinalis*, *Ruta graveolens*, *Myracroduon urundeuva*, *Amburana ceaerensis*, *Helianthus annuus*, *Plectranthus amboinicus* e *Brassica rapa*. **Conclusão:** tais espécies podem ser indicadas para estudos, farmacológicos com vistas a comprovar sua eficácia e/ou sua toxicidade, visando uma utilização mais segura.

**Palavras-chave:** Etnobotânica; Plantas medicinais; Semiárido; Nordeste brasileiro.

## Resumen

**Objetivo:** realizar un estudio etnobotánico de plantas medicinales utilizadas por una comunidad rural ubicada en un área de bosque caducifolio espinoso (Caatinga) en Altaneira, Ceará, Brasil, identificar las especies, la diversidad de usos, las especies más versátiles, las indicaciones terapéuticas y sistemas corporales, así como indicar las especies utilizadas en la medicina tradicional, descritas en la literatura como nocivas para la salud si se utilizan de forma inadecuada. **Metodología:** la investigación se llevó a cabo entre noviembre de 2013 y febrero de 2014. Para obtener datos etnobotánicos, se realizaron entrevistas con la ayuda de un cuestionario con preguntas semiestruturadas. Para evaluar la versatilidad en el uso, se analizó la importancia relativa (IR) de las plantas citadas por informantes locales y se evaluaron las especies que se destacaron en los sistemas corporales con base en el factor de consenso del informante. **Resultados:** Se registró un total de 79 especies en 36 familias utilizadas para tratar 75 enfermedades. Las familias más significativas en número de especies fueron Fabaceae (10), Asteraceae (8), Lamiaceae (8), Rutaceae (4) y Euphorbiaceae (4). Entre las especies listadas, las que presentaron valor de  $RI > 1$  fueron *Bryophyllum pinnatum*, *Mentha spicata*, *Rosmarinus officinalis*, *Melissa officinalis*, *Ruta graveolens*, *Myracroduon urundeuva*, *Amburana ceaerensis* (Allemão), *Helianthus annuus*, *Plectranthus amboinicus*,

*Brassica rapa*. **Conclusión:** Estas especies pueden ser aptas para estudios farmacológicos, con el fin de demostrar su eficacia y / o toxicidad, con el objetivo de un uso más seguro.

**Palabras clave:** Etnobotánica; Plantas medicinales; Semi árido; Nordeste brasileño.

## 1. Introduction

For millennia, humanity has used natural resources, mainly elements of flora and fauna, in curing diseases (Calixto & Siqueira Jr, 2008). During the historical and evolutionary trajectory of cultures, mankind have come and gone, and each one had and has a way of relating to nature and to understand natural phenomena, handling its natural universe with a peculiar precision (Albuquerque, 2002; Soares, 2003).

The use of medicinal plants by man is reported from Prehistory and in the region covering the Northeast Caatinga, these vegetables are widely used by communities to treat their illnesses. These communities have extensive natural pharmacopoeia, great part from the plant resources either found in natural environments inhabited by these populations or grown in an environment transformed by man (Gomes et al., 2008).

The amount of information about the use of these various plants as medicine, everywhere in the world, shows the need to develop methods that facilitate the scientific evidence of the therapeutic value of the same (Elisabetsky, 2001). To contribute to the conservation of native plant species is necessary to know the possible ways of using them, the parts used and their properties (Gomes et al. 2008).

The concern for the conservation of natural resources is a reality for modern society, as well as research by the empirical knowledge of the use of the plant species. (Silva, 2003). Ecological information on the Caatinga and the species it lodges, are essential. Faced with its size and importance to the Northeast region, more information related to the biology and dynamics of their species are still needed (Machado, Lopes & Sazima, 2006). In this context, ethnobotanical studies are essential, due to make possible the preservation and rescue of popular knowledge of the communities involved (Garlet & Irgang, 2001).

With the view to provide more information on the potential of medicinal plants occurring in area of thorny deciduous woodland (Caatinga) in Altaneira, Ceará, Brazil it was performed an ethnobotanical study of species used for a rural community, in order to verify the diversity of uses, the most versatile species, therapeutic indications and body systems as well as indicate the species used in traditional medicine, described in the literature as harmful to health if used improperly.

## **2. Methodology**

### ***2.1 Study Location***

This study was conducted on the Site Tabuleiro do Baé, at the rural town of Altaneira, Ceará, Brazil, a city located between the geographical coordinates of 7° 00 '06' 'S and 39° 44' 26 " W, in the small region of Caririaçu. With an area of 73.296 square kilometers, it has warm tropical semiarid climate, and a rainy season from February to April (Government of the State of Ceará, 2013).

The Site Tabuleiro do Baé is distant about five kilometers from the center of the city of Altaneira and covers 93 homes, and about 100 families, with numbers of components ranging from two to eight people per household. The Board site has electricity and although there is running water in homes in some homes the water is stored in large tanks. The community has a dedicated public school for youth and adult literacy, a chapel and a community health station.

### ***2.2 Methodological procedure***

This is a qualitative / quantitative research of a descriptive nature (Gil, 2006; Pereira et al., 2018) based on the application of questionnaires / field visits (Marconi & Lakatos, 2002).

### ***2.3 Data gathering: Local knowledge and use of medicinal species***

The field research was conducted from November 2013 to February 2014. Previous visits to the community were made with the purpose of recognizing the area and population size. The research was made through a systematic random sampling considering the first house as the number 1, discarding the two following, and getting to number 2 and so on. They interviewed 30 residents using, during the visits, a pre-prepared form and a recorder. Concurrently, direct observations were carried out according to the methodology proposed by Albuquerque, Lucena & Alencar (2010) and collecting botanical material for further identification.

The forms consisted of open and closed questions relating to general data of the interviewed people such as age, sex, place of birth, profession and information on the medicinal plants used by the community.

It is emphasized that this research is in accordance with the current rules and bioethical guidelines for research involving human beings (Resolution No. 196/1996 of the National Health Council - CNS). (Brazil, 1996). Through the free and informed consent term (TCLE), it was assured to respondent's anonymity and the confidentiality of information provided by them. According to bioethical standards, this project was evaluated by the Ethics Committee of the Regional University of Cariri and approved with law article n ° 974812/2015.

The collection of botanical material was performed with the informants during the interviews and subsequent visits. Were collected fertile branches with flower and / or fruit of the species listed as medicinal, all collected material was properly identified through field record which were described information such as scientific name, common name, botanical family, gender, color of the flower and the fruit, geographic coordinates among other features. The samples were placed in plastic bags of 100 L and conducted to the Applied Botany Laboratory, where they were treated according to the usual afforestation techniques, identified and donated to the Dárdano de Andrade-Lima Regional University of Cariri's herbarium.

The taxonomic identification was based on the literature and compared with species belonging to the herbarium collection's previously identified. The species whose identification was not possible to be carried out were sent to specialists from other herbaria. The classification system used was the Angiosperm Phylogeny Group -APG III. (APG III, 2009). The abbreviation of the names of the authors of the species raised was based on Brummit & Powell (1992). To confirm the spelling of scientific names of species and their authors was used Tropicos (<http://www.tropicos.org>).

## ***2.4 Data analysis***

### ***Relative Importance***

In order to indicate species with potential for pharmacological studies was calculated Relative Importance (IR) of all species cited from the information obtained locally, following the proposal of Bennet & Prance (2000) using the following formulas:

$$IR = NSC + NP,$$

$$NSC = NSCE / NSCEV$$

$$NP = NPE / NPEV,$$

As the list below:

NSC = Number of Body Systems;

NP = Number of properties;

NSCE = number of body systems treated by a particular species

NSCEV = Total number of body systems treated by the most versatile species;

NPE = number of properties assigned to a particular species;

NPEV = Total number of properties assigned to the most versatile species.

### ***Consensus factor of informants***

The Consensus factor of Informers (FCI) was calculated in accordance with Trotter & Logan (1986), based on the agreement between the responses of informants using the formula:

$$FCI = \frac{nur - nt}{nur - 1}$$

Where: nur is the number of quote uses in each category and nt number of species listed in each category.

The therapeutic indications mentioned for each studied species were distributed in 16 categories related to body systems described according to (CID-10). Categories called: SST - Skin and subcutaneous tissue; IPD - infectious and parasitic diseases; N - neoplasms, BDID - blood disorders and blood-forming organs and some immune disorders; ENMD - Endocrine, nutritional and metabolic diseases; MBD - Mental and behavioral disorders; NSD - Nervous system disorders; EDA - Eye Diseases and attachments; DEMP - Diseases of the ear and mastoid process; DCS - Diseases of the circulatory system; RD - respiratory diseases; DSD - digestive system disorders; DMSCT - Diseases of the musculoskeletal system and connective tissue; DG - Diseases of the genitourinary; SSAEC - Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; IPCEC - Injury, poisoning and certain other consequences of external causes (Oms, 2008).

## **3. Results and Discussion**

### ***3.1 Diversity, origin and habits of medicinal species of Caatinga***

79 species belonging to 74 genus and 36 families (Table 1) were cited. The number of species is according to ethnobotanical studies in the northeastern semi-arid region, where were observed changes in the number, being 119 species the highest reported number and 22

species the lowest reported number (Magalhães, 2006; Albuquerque, Monteiro, Ramosa, & Amorim, 2007; Cartaxo; Souza & Albuquerque, 2010).

The families that stood out the most in number of species were Fabaceae (10 species), Asteraceae and Lamiaceae (8 species), Rutaceae and Euphorbiaceae (4 species). Corroborating the studies of medicinal plants in the semi-arid carried out by Souza (2012) and Cartaxo et al. (2010), with whom, these families also stand out in number of species.

Among the species collected, 48 (61%) are exotic and 31 (39%) are native (Table 1), which is in agreement with Almeida, Amorim, Albuquerque & Maia, (2006) who state that origin of the medicinal plant is subject to regional variations. Emphasizing that it is increasingly noticeable the use of exotic species in the treatment of diseases in several communities, which according to Cartaxo et al. (2010) is due to their greater availability and ease of cultivation.

Regarding the habit, herbaceous plants represent 50% of all the arboreal 26.5%, shrubs and subshrubs 21.5% and scandent 2%, corroborating with Souza (2012) in a survey of medicinal plants held in a rural community, in Crato-CE municipality established a hangman area in the Araripe National Forest - Apodi - (FLONA - Araripe) where herbaceous species are accounted for most of the total sample, followed by tree and shrub species. However, in surveys conducted in areas of Caatinga by Cartaxo et al. (2010) and Almeida et al. (2006) there were no differences between the herbaceous and arboreal habits of the species reported as medicinal.

As to the parts of the plants used, the prevalent use of leaves with 40.8% of the mentions, then the seeds with 13.9%, root bark and fruit 12.9% and 7.5%. According to reports, 76.4% of respondents use fresh or green plant parts, and only 23.6% dry the parts mentioned before using. Similar results were obtained by Cartaxo et al. (2010), Costa & Mayworm (2011); Jesus, Lima, Silva, Espinosa, & Martins (2009), with the report of the leaves as vegetable most part used for medicinal purposes.

According to Martin (1995), the preference for leaves shows a plant resource conservation character, since the exploration of that plant body does not cause as much damage to the plant and when done consciously, preserves the species used.

For 31 of the native species, the parts of the plant most used were root, bark and internal bark. For exotic species, the leaves were most cited (Table 1). Similar results were reported by Silva & Freire (2010), in a survey carried out in the Caatinga area in the municipality of Serra Negra Norte - RN, in which the use of bark and roots (native species) and leaves (exotic species) was proven.



This can be explained because the leaves are the parts of the plants more accessible, and to be present in exotic plants throughout the year. However, in relation to native species of Caatinga the same does not occur, depending on deciduous plants in the dry season. So in communities present in areas of Caatinga, the prevailing use of the bark and roots of native plants, as these are the plant parts available throughout the year (Castellucci; Lima; Nordi & Marques, 2000; Albuquerque, Andrade & Silva, 2005). The inadequate exploration of the bark and roots may contribute to the extinction of native species since, in most cases, the population does not know the correct withdrawal technique of these plant parts.

Of the 79 reported species, 23 (29%) were indicated by respondents for a single purpose and 56 (71%) were cited for more than one utility. For 69 (88%) of the species referred to Relative Importance (IR) was less than 01. While 10 (12%) species showed great versatility in the use with IR value > 1 (Table 1).

*Bryophyllum pinnatum*, was the species with the highest value of Relative Importance (IR = 1.85), followed by *Mentha spicata* (IR = 1.71), *Rosmarinus officinalis* (IR = 1.70), *Melissa officinalis* (IR = 1.57), *Ruta graveolens* (IR = 1.49), *Myracrodruon urundeuva* (IR = 1.21), *Amburana cearensis* (IR = 1.14), *Helianthus annuus* (IR = 1.14), *Plectranthus amboinicus* (IR = 1.13) and *Brassica rapa* (IR = 1.07). The other species showed less versatility related to the use, with IR ranging from .21 to .99 (Table 1).

Among the species with the highest value of Relative Importance only *M. urundeuva* and *A. cearensis* are native, which shows how widespread is the use of exotic species with medicinal purpose in Caatinga area that houses the site Tabuleiro of Baé.

*M. urundeuva* was the native species with the highest value of IR, this result corroborates with the research by Albuquerque et al. (2007); Albuquerque et al. (2008); Cartaxo et al. (2010) in the areas of Caatinga. However, the *A. cearensis* was highlighted by Almeida & Albuquerque (2002), Cartaxo et al. (2010); Albuquerque et al. (2007) for its high versatility.

**Table 1.** Medicinal plant species, reported by the rural community Tray Bae, Altaneira, Ceará, Brazil with their families, scientific and vernacular names, indications, parts used, states of use, preparation methods, forms of use, ways of administration, origin, habits, values of Relative Importance (IR).

Family / Species	Vernacular Name	Origin	Habit	Therapeutic Indication	Used Part	IR
<b>Acanthaceae</b>						
<i>Justicia</i> sp.	Anador	N	H	Headache and fever	Fo	0,42
<b>Aliaceae</b>						
<i>Allium cepa</i> L.	Cebola branca	Ex	H	Cough and flu	R	0,28
<b>Amaranthaceae</b>						
<i>Chenopodium ambrosioides</i> L.	Mastruz	Ex	H	Ulcer, worm, inflammation, scarring pain in the stomach and gastritis.	Fo	0,99
<i>Beta vulgaris</i> L.	Beterraba	Ex	H	Cough and allergies	R	0,42
<b>Anacardiaceae</b>						
<i>Myracrodouon urundeuva</i> Allemão	Aroeira	N	Ar	Vaginal inflammation, menstrual cramps, headache, stomach pain, scarring, inflammation and toothache	C, Fo	1,21
<i>Anacardium occidentale</i> L.	Caju	N	Ar	Inflammation, healing and poisoning charges	Ec, Fr	0,49
<i>Amburana cecaerensis</i> (Allemão) A.C. Smith	Imburana-de-cheiro	N	Ar	Cough, flu, ear pain, vaginal inflammation, sinusitis, migraine, renal calculus and runny nose	C, Ec	1,14
<b>Annonaceae</b>						
<i>Annona squamosa</i> L.	Pinha	Ex	Ar	Bite of poisonous animals	S	0,21
<b>Apiaceae</b>						
<i>Angelica archangelica</i> L.	Angélica	Ex	H	Chest pain and heart problems	Fl	0,28
<i>Anethum graveolens</i> L.	Endro	Ex	H	Nausea, hypertension, soothing and bleeding	S, Fo	0,84
<i>Pimpinella anisum</i> L.	Erva doce	Ex	H	Tranquilizer and muscle relaxant	S	0,42
<b>Apocynaceae</b>						
<i>Nerium oleander</i> L.	Espirradeira	Ex	Ab	Abortive	Fo	0,21
<b>Arecaceae</b>						
<i>Euterpe oleracea</i> Mart.	Açaí	Ex	Ar	Stomach problems	Fr	0,21

**Asteraceaceae**

<i>Tagetes patula</i> L.	Cravo branco	Ex	H	Even menstruation in young girls	Fl	0,21
<i>Tonacetum vulgare</i> L.	Pluma	Ex	H	Nausea and liver problems	Fo	0,28
<i>Chamomilla recutita</i> (L.) Rauschert	Camomila	Ex	H	Tranquilizer, toothache and constipation	Fl	0,49
<i>Acanthospermum hispidum</i> DC.	Espinho de cigano	N	H	Sore throat	R	0,21
<i>Helianthus annuus</i> L.	Girassol, Mirassol	Ex	H	Stroke, stroke, dizziness, headache, numbness, stroke, congestion and paralysis	S	1,14
<i>Artemisia absinthium</i> L.	Losna	Ex	H	Nausea, stomach pain and gastritis	Fo	0,35
<i>Egletes viscosa</i> (L.) Less.	Macela	N	H	Stomachache, heartburn, gas, sinusitis, nausea, poor digestion, induce vomiting and stomach problems	S	0,85
<i>Ageratum conyzoides</i> L.	Mentraste	N	H	Body fluids discharge	Fo, R, Ca	0,21

**Bixaceae**

<i>Bixa orellana</i> L.	Urucum	N	Ar	Flu and cough	S	0,28
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**Boraginaceae**

<i>Heliotropium elongatum</i> Hoffm. Ex Roem.	Crista de galo	N	Ab	Sore throat, menstrual delay, numbness and stroke	R	0,84
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**Brassicaceae**

<i>Nasturtium officinale</i> R. Br.	Agrião	Ex	H	Headache, toothache, eye pain and constipation	Fo, Bo	0,99
<i>Brassica rapa</i> L.	Mostarda	Ex	H	Thrombosis, headache, dizziness, stroke, numbness, stroke and high cholesterol	S	1,07

**Burseraceae**

<i>Bursera leptophloeos</i> Mart.	Imburana-de-cambão	N	Ar	Numbness and stroke	Fo	0,42
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**Cannaceae**

<i>Canna indica</i> L.	Cana da índia	Ex	H	Kidney stone	Fo	0,21
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**Crassulaceae**

<i>Bryophyllum pinnatum</i> (Lam.) Oken	Malva Corama	Ex	H	Inflammation, vaginal inflammation, toothache, flu, body aches, body fluids discharge, abdominal pain, urinary infection, clean wounds, stomach problems, cough, healing, menstrual cramps and abortifacient	Fo	1,85
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**Cucurbitaceae**

<i>Citrullus vulgaris</i> Schrad.	Melancia	Ex	H	Fever, headache and flu	S	0,63
<i>Luffa operculata</i> (L.) Cogn.	Cabacinha	N	H	Abortive	Fr	0,21

**Euphorbiaceae**

<i>Ricinus communis</i> L.	Mamona	Ex	Ab	Migraine	Fo	0,21
<i>Croton conduplicatus</i> Kunth	Quebra-faca	N	Ab	Fever	C	0,21
<i>Phyllanthus amarus</i> Schumach.	Quebra-pedra	N	H	Kidney stone and diverse kidney problems	Fo, R	0,28
<i>Petiveria alliacea</i> Linn.	Tipi	N	H	Cancer and rheumatism	R	0,42

**Fabaceae**

<i>Myroxylon peruiferum</i> L. f.	Bálsamo	N	Ar	Cough	C	0,21
<i>Bauhinia unguolata</i> L.	Mororó, pata de vaca	N	Ar	Diabetes	Ec	0,21
<i>Anadenanthera colubrina</i> (Vell.) Brenan	Angico	N	Ar	Vaginal inflammation, heartburn, cough and cold	C	0,84
<i>Poincianella pyramidalis</i> Tul.	Catingueira	N	Ar	Menstrual pain and healing	C	0,42
<i>Acacia farnesiana</i> Willd.	Coronha	N	Ar	Back pain and hypertension	Fo	0,42
<i>Hymenaea coubaril</i> L.	Jatobá	N	Ar	Cough, flu, inflammation, sexual stimulant and anemia	C, L	0,92
<i>Mimosa tenuiflora</i> (Willd.) Poir.	Jurema	N	Ar	Inflammation	C	0,21
<i>Cassia angustifolia</i> Vahl.	Sena	Ex	H	Menstrual cramps	Fo	0,21
<i>Prosopis juliflora</i> (Sw.) DC	Algaroba	N	Ar	Cancer	Fo	0,21
<i>Cassia fistula</i> L.	Canafistula, canafista	Ex	Ar	Bleeding	Fo	0,21

**Lamiaceae**

<i>Plectranthus barbatus</i> Andrews	Boldo	Ex	H	Stomach problems, abdominal pain, malaise, and nausea hangover	Fo	0,63
<i>Rosmarinus officinalis</i> L.	Alecrim	Ex	Sa	Fever, urinary infection, influenza, child teething, shortness of breath, sinusitis, cough, headache, heart problems, menstrual cramps, nausea and gas	Fo	1,7
<i>Mentha spicata</i> L.	Hortelã	Ex	H	Headache, fever, child fever, flu, cold, congestion, stomach pain, menopause, worm and earache	Fo	1,71
<i>Plectranthus amboinicus</i> (Lour.) Spreng.	Malva do reino	Ex	H	Cough, vaginal inflammation, flu, shortness of breath, bronchitis, stomach pain, discharge, phlegm, urinary infection and infection in the womb	Fo	1,13

<i>Ocimum basilicum</i> Linn.	Manjericão	Ex	Sa	Flu, breathlessness, earache, fever and high cholesterol	Fo	0,92
<i>Mentha pulegium</i> L.	Poejo	Ex	H	Menstrual cramps, flu and childhood fever	Fo	0,63
<i>Melissa officinalis</i> L.	Erva cidreira	Ex	H	Shortness of breath, abdominal pain, hypertension, dysentery, soothing, lack of appetite, insomnia and fever	Fo	1,57
<i>Plectranthus barbatus</i> Andrews.	Malva sete dores	Ex	H	Gas, heartburn, stomach pain, headache, nausea, induce vomiting and stomach pain	Fo	0,92
<b>Lauraceae</b>						
<i>Cinnamomum zeylanicum</i> Blume	Canela	Ex	Ar	Fever, vomiting and menstrual cramps	C	0,63
<b>Liliaceae</b>						
<i>Allium sativum</i> L.	Alho	Ex	H	Cough and flu	Fr	0,28
<i>Aloe vera</i> (L.) Burm. F.	Babosa	Ex	H	Wound, ulcer, moisturize hair and flu	Fo	0,99
<b>Lythraceae</b>						
<i>Punica granatum</i> L.	Romã	Ex	Ab	Sore throat	Fr, S	0,21
<b>Musaceae</b>						
<i>Musa paradisiaca</i> L.	Bananeira	Ex	Ar	Ulcer and gastritis	L	0,28
<b>Myristicaceae</b>						
<i>Myristica fragrans</i> Houtt.	Noz-moscada	Ex	Tr	Hypertension, bleeding, dizziness and congestion	S	0,84
<b>Myrtaceae</b>						
<i>Eucalyptus globulus</i> Labill.	Eucalipto	Ex	Ar	Flu, fever, intestinal infection, migraine, headache and sinusitis	Fo	0,99
<i>Psidium guajava</i> L.	Goiaba branca	N	Ab	Bellyache	Fo	0,21
<b>Olacaceae</b>						
<i>Ximenia americana</i> L.	Ameixa	N	Ab	Inflammation	Ec	0,21
<b>Papaveraceae</b>						
<i>Argemone mexicana</i> Linn.	Cardo santo	Ex	H	Bronchitis	R	0,21

<b>Passifloraceae</b>							
<i>Passiflora edulis</i> Sims	Maracujá	N	Tr	Hypertension	Fo	0,21	
<b>Pedaliaceae</b>							
<i>Sesamum orientale</i> L.	Gergelim	Ex	Ab	Stomachache, urinary infection, fever, moisturize hair and heartburn	S, Fo	0,77	
<b>Piperaceae</b>							
<i>Piper aduncum</i> L.	Pimenta de macaco	N	Ab	Migraine headaches, bone pain and back pain	Fr	0,49	
<b>Poaceae</b>							
<i>Saccharum officinarum</i> L.	Cana de açúcar	Ex	H	Low pressure and back pain	Fo	0,42	
<i>Cymbopogon citratus</i> (DC.) Stapf	Capim santo	Ex	H	Hypertension, headache and soothing	Fo	0,63	
<b>Rubiaceae</b>							
<i>Coutarea hexandra</i> (Jacq.) K. Schum.	Quina-quina	N	Ar	Flu and cough	C	0,28	
<i>Uncaria guianensis</i> (Aubl.) J.F. Gmel.	Unha-de-gato	N	Ab	Cancer e inflammation	C	0,42	
<b>Rutaceae</b>							
<i>Ruta graveolens</i> L.	Arruda	Ex	Sa	Menstrual cramps, coughing, shortness of breath, earache, headache, vaginal inflammation, fever, stomachache and pain in the stomach	Fo, Ec	1,49	
<i>Citrus sinensis</i> L.	Laranja	Ex	Ar	Migraines, soothing, nausea, insomnia and stomachache	Fo, Fr	0,77	
<i>Citrus limon</i> (L.) Burm. F.	Limão	Ex	Ab	Cough, flu and lose weight	Fr	0,49	
<i>Citrus reticulata</i> Blanco	Tangerina	Ex	Ab	Back pain	S	0,21	
<b>Scrophulariaceae</b>							
<i>Capraria biflora</i> L.	Chá preto	N	Sa	Fever, child and infant teething toothache	Fo, S	0,49	
<b>Solanaceae</b>							
<i>Solanum capsicoides</i> All.	Melancia da praia	N	Ab	Urinary infection and abortifacient	R	0,42	
<b>Violaceae</b>							
<i>Hybanthus ipecacuanha</i> (L.) Oken	Papaconha	Ex	H	Constipation and teething child	Fo, R	0,42	
<b>Zingiberaceae</b>							
<i>Curcuma longa</i> L.	Açafrão,	Ex	H	Measles, chicken pox, cough and fever	R	0,7	

<i>Alpinia zerumbet</i> (Pers.) B.L. Burt. & R.M.Sm.	açafrão Colônia	Ex	H	Hypertension	Fo	0,21
<i>Zingiber officinale</i> Roscoe.	Gengibre	Ex	H	Muscle pain and flu	R	0,42

Legend: N - native , Ex - exotic , H - Herbaceous , Ar - Tree, Ab - bush, Sa - subshrub , Tr - bindweed, S - seed , Ca - stem, Bo - Button , L - latex, Ec - sapwood , R - root , C - shell, Fr - fruit, Fo - Leaf , Fl - flower, IR - Relative importance.

Source: Authors.

Among those species stood out *Bryophyllum pinnatum*, *Mentha spicata* and *Rosmarinus officinalis*, such species were also reported by Souza (2012), in a survey carried out in an area of Carrasco in Crato, CE, and is the same among the most versatile species as the medical application. *R. officinalis* is also cited among the most versatile in a study conducted by Albuquerque et al. (2007), in the public markets of Recife-PE.

Among the less versatile species cited by the rural community of Tabuleiro do Baé are *Ximenia americana* and *Anacardium occidentale*, being at odds with the results obtained by Almeida & Albuquerque (2002), Albuquerque, Silva, Cabral, Alencar & Andrade (2008), Cartaxo, Souza & Albuquerque (2010) and Albuquerque, et al. (2007) in studies carried out in Caatinga areas, in which these species are reported as the most versatile in terms of medicinal use.

### **3.2 Plantas medicinais mais indicadas**

It was reported 79 medicinal plants and 75 therapeutic indications grouped into 16 bodily systems categories (Table 2). With categories presenting concordance index ranging from 0.3 to 0.7, which shows the existence of consensus among informants.

The highest value for Consensus Factor Informant (FCI) was awarded the Respiratory diseases (RD) (Table 2). The species *Plectranthus amboinicus* was cited 18 times and was recommended for cough, cold, breathlessness, bronchitis and mucus. This shows the consensus among informants. For the treatment of the mentioned diseases, the leaves of *P. amboinicus* are prepared as tea (boiled or muted) and licking. This category features high consensus among informants in semiarid regions confirming these results with those obtained by Souza (2012) in Minguiriba, Crato, Ceará and Almeida et al. (2006) in the Xingó-AL area. These authors attributed this result the prevalence of diseases related to the extremely precarious socioeconomic and sanitary conditions in which the inhabitants of semi-arid regions live.

Diseases of the genitourinary system (DG) and diseases of the digestive system (DSD) also showed high value of FCI (= 0.6). DSD category is highlighted by the high number of uses quotes (76) to a high number of species (29), which indicates a vast knowledge of the studied community about medicinal plants suitable for the treatment of digestive system diseases. *Plectranthus barbatus* and *Melissa officinalis* stood out with 6 citations for this



category are recommended for stomach pain, dysentery, heartburn, nausea, induce vomiting and stomach pain (Table 2).

Diseases of the ear and mastoid process (DEMP), nervous system disorders (NSD), endocrine, nutritional and metabolic diseases (ENMD), injuries, poisoning and certain other consequences of external causes (IPCEC) and symptoms, signs and clinical and laboratory findings abnormal not elsewhere classified (SSAEC) had a value of FCI equal to 0.5, being among the categories with the highest consensus among informants (Table 2).

The SSAEC category noteworthy since obtained the highest number of indicated species (37) and the third highest number of uses quotes (74). Are classified in this category all the health problems that have no defined cause. The most reported disease was the fever and the species best suited to treat it was *Mentha spicata* (Table 2).

In order to verify the existence of phytochemical and pharmacological information that may justify their use, the most cited species (*Plectranthus amboinicus*, *Ruta graveolens*, *Melissa officinalis*, *Mentha spicata* and *Myracrodruon urundeuva*) were selected among the categories which achieved greater consensus (RD, DG, DSD, DEMP, NSD, ENMD, IPCEC and SSAEC) (Table 2).

Gurgel (2007) showed the presence of flavonoids, thymol and carvacrol in hydro-alcoholic extract of leaves of the *Plectranthus amboinicus*. Freitas, Azevedo, Souza, Rocha & Santos (2014) demonstrated in their study an antifungal activity of ethanol extract of the leaves of *P. amboinicus* indicating this species as promising in studies aimed at the development of new antimicrobials. The presence of flavonoids, thymol and carvacrol proven anti-inflammatory and antimicrobial activity, can justify the use of the leaves of this species for the treatment of influenza, cough, sore throat and bronchitis. However we need more in-depth studies on their action in the treatment of respiratory diseases.

**Table 2.** Fator of Informant Consensus for bodily systems based on the use of quotations of medicinal species listed by the residents of the rural community Tabuleiro of Baé, Altaneira, Ceará, Brazil.

Body Systems / Therapeutic Purposes	Number of Quotes of Use	Total Quotes of Use (%)	Total Number of Species - Species	Total Species (%)	FCI
SST: Moisturize hair and skin disease	4	0,97	3 - Alecrim; Babosa; Gergelin	3,80	0,33
DCS: Stroke, chest pain, heart problems, high blood pressure, low blood pressure, bleeding, thrombosis and stroke	33	7,99	15 - Alecrim; Angélica; Cana de Açúcar; Canafístula; Capim Santo; Cidreira; Colônia; Coronha; Crista de galo; Endro; Girassol; Imburana de cambão; Maracujá; Mostarda; Noz Moscada	18,99	0,56
DG: Menstrual delay, vaginal inflammation, menstrual cramps, nose, kidney stones, urinary tract infection, menopause, infection in the uterus and regulate menstruation in young girls	48	11,62	19 - Alecrim; Angico; Aroeira; Arruda; Cana da Índia; Canela; Catingueira; Cravo Branco; Crista de galo; Gergelim; Hortelã; Imburana de Cheiro; Malva Corama; Malva do Reino; Melancia da Praia; Mentraste; Puejo; Quebra Pedra; Sena	24,05	0,62
RD: Flu, coughs, sinusitis, runny nose, shortness of breath, bronchitis, catarrh and constipation	81	19,61	25 - Açafroa; Agrião; Alecrim; Alho; Angico; Arruda; Babosa; Balsamo; Beterraba; Cardo Santo; Cebola Branca; Eucalipto; Gengibre; Hortelã; Imburana de Cheiro; Jatobá; Limão; Malva Corama; Malva do Reino; Manjericão; Marcela; Melancia; Puejo; Quina Quina; Urucum	31,65	0,70
EDA: Eye pain	1	0,24	1 – Agrião	1,27	0,00
DEMP: Earache	8	1,94	4 - Arruda; Hortelã; Imburana de Cheiro; Manjericão	5,06	0,57
BDID: Anemia	1	0,24	1 – Jatobá	1,27	0,00
DSD: Stomach pain, stomach problems, toothache, nausea, liver problems, congestion, surf, constipation, gastritis, heartburn, indigestion, ulcers, teething, intestinal infection, dysentery and induce vomiting	76	18,40	29 - Açafá; Agrião; Alecrim; Angico; Aroeira; Arruda; Babosa; Bananeira; Boldo; Camomila; Canela; Chá Preto; Cidreira; Endro; Eucalipto; Gergelim; Girassol; Goiaba Branca; Hortelã; Laranja; Losna; Malva Corama; Malva do reino; Malva Sete Dores; Marcela; Mastruz; Noz Moscada; Papaconha; Pluma	36,71	0,62
NSD: Headache, migraine, paralysis and insomnia	38	9,20	17 - Agrião; Alecrim; Anador; Aroeira; Arruda; Capim Santo; Cidreira; Eucalipto; Girassol; Hortelã; Imburana de Cheiro; Laranja; Malva Sete Dores; Mamona; Melancia; Mostarda; Pimenta de Macaco	21,52	0,57
DMSCT: Spine pain, bone pain, muscle relaxant and rheumatism	9	2,18	8 - Cana de Açúcar; Coronha; Erva Doce; Gengibre; Malva Corama; Pimenta de Nico; Tangerina; Tipí	10,13	0,12
ENMD: Cholesterol, diabetes and poor appetite	8	1,94	4 - Cidreira; Manjericão; Mororó; Mostarda	5,06	0,57
IPD: Worm, measles and chicken pox	4	0,97	3 - Açafroa; Hortelã; Mastruz	3,80	0,33
IPCEC: Healing, venomous animal bite, snake poisoning and injuries	13	3,15	7 - Aroeira; Babosa; Cajú; Catingueira; Malva Corama; Mastruz; Pinha	8,86	0,50

N: Cancer	3	0,73	3 - Algaroba; Tipí; Unha de gato	3,80	0,00
SSAEC: Throat inflammation, inflammation, numbness, dizziness, malaise, gas, body aches, fever, allergy, weight loss and fever children	74	17,92	37 - Açafroa; Alecrim; Ameixa; Anador; Aroeira; Arruda; Beterraba; Boldo; Cajú; Canela; Chá Preto; Cidreira; Crista de galo; Espinho de Cigano; Eucalipto; Gergelin; Girassol; Hortelã; Imburana de cambão; Jatobá; Jurema; Laranja; Limão; Malva Corama; Malva do reino; Malva Sete Dores; Mamona; Manjeriçã; Marcela; Mastruz; Melancia; Mostarda; Noz Moscada; Puejo; Quebra Faca; Romã; Unha de gato	46,84	0,50
MBD: Sexual stimulant and soothing	12	2,91	7 - Camomila; Capim Santo; Cidreira; Endro; Erva Doce; Jatobá; Laranja	8,86	0,45

Legend: SST - Skin and subcutaneous tissue; IPD- infectious and parasitic diseases; N - neoplasms, BDID- blood disorders and blood-forming organs and some immune disorders; ENMD - Endocrine, nutritional and metabolic diseases; MBD- Mental and behavioral disorders; NSD- Nervous system disorders; EDA- Eye Diseases and attachments; DEMP- Diseases of the ear and mastoid process; DCS- Diseases of the circulatory system; RD- respiratory diseases; DSD- digestive system diseases; DMSCT- Diseases of the musculoskeletal system and connective tissue; DG- Diseases of the genitourinary; SSAEC- Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified; IPCEC- Injury, poisoning and certain other consequences of external causes, FCI - Factor consensus of informations.

Source: Authors.

#### 4. Final Considerations

The rural community Tray Bae, Altaneira, Ceará has demonstrated a vast knowledge of medicinal plants, through the report of 79 species used in the treatment of various diseases. With wide use of exotic species, resulting in a greater diversity in their natural pharmacopoeia.

Among the 79 species reported 23 were mentioned only for therapeutic purposes, they were. *Annona squamosa*, *Nerium oleander*, *Euterpe oleracea*, *Tagetes patula*, *Acanthospermum hispidum*, *Ageratum conyzoides*, *Canna indica*, *Luffa operculata*, *Ricinus communis*, *Croton conduplicatus*, *Myroxylon peruiferum*, *Bauhinia unguolata*, *Mimosa tenuiflora*, *Cassia angustifolia*, *Prosopis juliflora*, *Cassia fistula*, *Punica granatum*, *Psidium guajava*, *Ximenia americana*, *Argemone mexicana*, *Passiflora edulis*, *Citrus reticulata*, *Alpinia zerumbet*. Such species are promising for the development of pharmacological studies due to reports about his timely action in a given disease.

Among the native species, *Myracrodruon urundeuva* and *Amburana ceaerensis* were the most versatile. Among the exotic *Bryophyllum pinnatum*, *Mentha spicata*, *Rosmarinus officinalis*, *Melissa officinalis*, *Ruta graveolens*, *Helianthus annuus*, *Plectranthus amboinicus* and *Brassica rapa* showed great versatility as its medicinal use and is suitable for up to seven body systems.

*Ruta graveolens*, *C. ambrosioides*, *L. operculata* and *N. oleander*, although they have been reported for the treatment of various diseases, are cited in the literature as likely to cause harm to the health of those who use them if they are not administered carefully.

The results demonstrate the potential of various species for future pharmacological studies aimed at proving their potential and / or toxicity. Such studies are needed since the respondents were completely unaware of the dangers that the indiscriminate use of certain plant species can cause.

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