



Ethnobotanical survey of medicinal plants in a Caatinga area, in the municipality of Crato (Ceará, Brazil)

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Abstract

The objective of this study was to carry out an ethnobotanical survey of medicinal species and verify the versatility of these species. The research was carried out in the municipality of Crato, in Vila São Bento neighborhood, from semi-structured interviews seeking information on the use of medicinal plants and their therapeutic indications in the region. Versatility was achieved through relative importance. A total of 21 species were described (most of which are exotic), distributed in 16 families. From the total of species, there were 04 with great versatility regarding the use of *Mentha spicata* L., *Chenopodium ambrosioides* L., *Ruta graveolens* L., and *Rosmarinus officinalis* L. The most representative families were Lamiaceae and Rutaceae. The main parts used of the plants were leaves (42.31%), bark (30.76%), inner bark (7.69%), root, flower, and fruit (3.85% each). The most frequent forms of preparation were infusion (54.55%), *lambedor* (24.24%), sauce (12.12%), pulp (6.06%) and juice (3.03%). The plants are used for various health problems like flu, fever, headache, and inflammation in general. The data show that local populations hold knowledge that may be useful as a subsidy for ethnopharmacobotanical and phytochemical studies that may lead to the discovery of new herbal medicines.

Keywords: Ethnobotanical research. Medicinal treatment. Phytotherapeutics. Traditional knowledge.

Introduction

Medicinal plants can be an important factor in the world health sector. From the beginnings of mankind, the phytotherapeutics are used and the knowledge about their use is spread among the generations. In the northeastern Caatinga, the communities have a real natural pharmacopeia, in which most of the resources used come from the local area or purchased commercially^[1].

In Brazil, it is evident that the use of medicinal plant species is associated with easy access and low cost. In addition, the use of medicinal plants is favorable to human health, as long as the user has prior knowledge of its purpose, risk and benefits. For despite their natural origin, some species are toxic to the organism^[2].

The rescue of knowledge related to traditional medicine is relevant to the strengthening of local culture, since knowledge is the identity of the community, besides being a tool for use as a therapeutic resource^[3].

The Ethnobiology is the science studying the relationships of people with the environment with the objective of rescuing traditional knowledge, where Ethnobotany is inserted, and it is characterized as an important tool for the knowledge of the uses empirical studies of medicinal plants in traditional communities, generating information that facilitates the development of drugs, sustainable use of resources and the conservation of biota and the valorization of local knowledge and culture^[4].

The Caatinga vegetation is a place where wood exploitation usually takes place. It is characterized by dry and poor environments, but its biodiversity favors some economic activities in the cosmetics, pharmaceutical, chemical, and food industries. The biome is one of the least studied in Brazil, considered as one of the most suffering from human interference. Also, it is the least protected region of the country, with only a small percentage of land included in any type of conservation area. In this way, studies that increase our understanding of plant behavior are of great importance for conservation and sustainability^[5].

There is a shortage of medicinal plants studies that allow a broad view of the great diversity of species used by the population for therapeutic purposes. Much of the traditional knowledge about plants, particularly medicinal, is being lost over time, either because of lack of studies, or because of the lack of interest of the new generations, or because of the inadequate use of plant resources. Some species of plants of the Caatinga suffer irretrievable losses due to the absence of sustainable management techniques^[6]. Therefore, the effort of researchers in the area of Ethnobotany to describe the use of plants of the Caatinga becomes indispensable.

In this perspective, this study aims to conduct an ethnobotanical survey of medicinal plants in the Vila São Bento neighborhood, Crato, Ceará, Brazil.

Materials and Methods

Study area

The municipality of Crato (7° 14' 03" S; 39° 24' 34" W) is in the south of the state of Ceará, Brazil, in the Cariri microregion at the foot of the Chapada do Araripe. With a population of 121,428 inhabitants (in 2010) with warm tropical semiarid climate^[7], Vila São Bento neighborhood belongs to this local municipality of the study.

Ethnobotanical Survey

The research was carried out through semi-structured interviews based on standardized forms^[9], and information about the interviewees' knowledge was granted after reading, allowing and signing the Informed Consent Term, moreover, International Society of Ethnobiology's ethical guidelines^[9] were adopted in an adapted manner. Twenty-five informants were interviewed, ranging from 30 to 75 years old from January to March 2015. Information was obtained on plants used for medicinal purposes, their uses, preparations, and parts used, using the free-listing technique^[10].

The species were identified through photographic records, specialized literature, reference materials and consultation with botanical databases. Due to the unfavorable flowering and fruiting conditions of the aforementioned species and short research period (study derived from an extension project) it was not possible to make exsiccates.

Data analysis

The index of relative importance (RI) of each medicinal species cited by the interviewees was calculated for the versatility of the species: $RI = \frac{NBS + NP}{NBSVS + NPVS}$, where NBS is the number of body systems found in a given species (NBSS) divided by the total number of body systems treated by the most versatile species (NBSVS); NP: number of properties by a specific species (NPS), divided by the total number of properties by the most versatile species (NPVS), where 2.00 was the maximum value obtained by a species^[11].

Ethical and legal aspects

For your contemplation and analysis, research was submitted to the Research Ethics Committee (CEP), of the Regional University of Cariri (URCA) and received a favorable opinion from CEP, under No. 1367311.

Results and Discussion

Twenty-one medicinal species were selected for the treatment or cure of many diseases (most of which are exotic). There were 16 families, with emphasis on Lamiaceae and Rutaceae (**TABLE 1**). The most used species were: *Mentha spicata* L., *Chenopodium ambrosioides* L., *Ruta graveolens* L. and *Rosmarinus officinalis* L.

The leaves were the most used part of the plant (42.31%), followed by bark (30.76%), inner bark (7.69%), root, flower, and fruit (3.85% each). The most common forms of administration were infusion (54.55%), *lambedor* (24.24%), sauce (12.12%), pulp (6.06%), and juice (3.03%). The medicinal plants were used mostly for diseases involving flu, fever, headache, and inflammation in general.

TABLE 1: Relation of medicinal species indicated by the interviewees of the São Bento Community, Ceará, Brazil.

Scientific name /Family	Local names	Habits	Origin	Used part	Preparation	Indications	RI
ACANTHACEAE <i>Justicia pectoralis</i> Jacq.	Anador	Herbaceous	NA	S, AP	Infusion	Fever, pains	1,02
AMARANTHACEAE <i>Chenopodium ambrosioides</i> L.	Mastruz	Herbaceous	E	AP	On the water, infusion	Flu, general inflammation, pains, worm	1,51
ANACARDIACEAE <i>Myracrodruon urundeuva</i> M. Allemão	Aroeira	Arboreal	NA	BR	Decoction, syrup, on the water, infusion	Uterine inflammation, cough	0,68
<i>Anacardium occidentale</i> L.	Caju	Arboreal	NA	BS, BR	On the water	General inflammation	0,34
ASPARAGACEAE <i>Aloe vera</i> (L.) Burm. f.	Babosa	Herbaceous	C	AP	Juice	Cicatriztion, hemorrhoid, pains	1,02
ASTERACEAE <i>Helianthus annuus</i> L.	Girassol	Herbaceous	C	S	Infusion	Labyrinthitis, nausea, stroke	0,68
CLEOMACEAE <i>Cleome spinosa</i> Jacq.	Mussambê	Shrubby	NA	R	Syrup	Tuberculosis, pneumonia, flu	0,62
EUPHORBIACEAE <i>Jatropha</i> L. sp.	Pião-roxo	Shrubby	NA	FL, AP	Infusion, juice	Pain in the joints, fever	0,68
FABACEAE <i>Anadenanthera colubrina</i> (Vell.) Brenan	Angico	Arboreal	NA	BR	Syrup, decoction	Cough, flu	0,48
<i>Hymenaea courbaril</i> L.	Jatobá	Arboreal	NA	BS, BR	Syrup, infusion	Cough, flu, pneumonia, cicatrization	0,97
LAMIACEAE <i>Mentha spicata</i> L.	Hortelã	Herbaceous	NT	AP	Infusion	Headache, flu, fever, cramps, heart problems, throat inflammation, cough	2
<i>Plectranthus amboinicus</i> (Lour.) Spreng.	Malva-do-reino	Herbaceous	E	AP	Syrup	Cough, flu, throat inflammation, General inflammation	0,97
<i>Rosmarinus officinalis</i> L.	Alecrim	Shrubby	E	AP, BR	Cooking, infusion	Nasal congestion, flu, headache, fever, cough	1,11
LYTHRACEAE <i>Punica granatum</i> L.	Romã	Shrubby	C	BR	Infusion, gargle, syrup	Sore throat, hoarseness, cough	0,62
MYRTACEAE <i>Eucalyptus globulus</i> Labill.	Eucalipto	Arboreal	C	AP	Syrup	Flu, sinusitis, fever	0,82
POACEAE <i>Cymbopogon citratus</i> (DC.) Stapf.	Capim-santo	Herbaceous	NT	AP	Infusion	Throat inflammation, soothing	0,68
RUBIACEAE <i>Morinda citrifolia</i> L.	Noni	Arboreal	C	FR	Juice	Cancer, diabetes	0,8
RUTACEAE <i>Citrus reticulata</i> Blanco	Tangerina	Arboreal	NT	BR	Infusion	Migraine	0,34
<i>Ruta graveolens</i> L.	Arruda	Herbaceous	E	AP, BR	Maceration, infusion	Earache, cicatrization, cramps	1,17
XIMENIACEAE <i>Ximenia americana</i> L.	Ameixa	Shrubby	NA	BR	Infusion, syrup, on the water	Diabetes, healing	0,68
ZINGIBERACEAE <i>Alpinia zerumbet</i> (Pers.) B.L.Burtt & R.M.Sm	Colônia	Herbaceous	C	AP	Infusion	Diabetes, hypertension	0,68

NOTE: AP (Aerial Parts); BR (Bark); BS (Bast); C (Cultivated species); E (Exotic species); FL (Flower); FR (Fruits); NA (Native species); NT (Naturalized species); R (Root); S (Seeds).

Source: Survey Data (2020).

The research revealed 21 species of medicinal plants for the treatment of 31 health problems, where 08 were indicated for the treatment of flu, 06 for cough, 05 for fever and 02 for headache. The same plants are used to treat several pathologies, evidencing the versatility of the species.

The four species identified as the most versatile are exotic, as well as most of the medicinal flora of this ethnobotanical survey. The predominance of exotic species is probably due to the habit of growing them for their own use in backyards, for food and / or medicinal purposes^[12].

The respiratory system had the highest diseases reported, corroborating with another study in the literature^[13], which several species are indicated to treat diseases of the respiratory tract, probably because it is related to the conditions, socioeconomic precariousness and sanitary of the populations.

Studies carried out in the state of Maranhão^[14] showed that the leaf was the most used part of the plant (63.3%) because its greater indication for the ease in its collection. Some authors claim^[15] that in the leaves, there is a great concentration of active principles. Similar results can be observed in other ethnobotanical surveys^[2,16-19].

However, these results are not similar to those of another study^[20] in the state of Pernambuco, where the bark (35%) of the stem was the highest used, followed by the leaf (27%). Thus, the use of plant parts can be directly linked to the environment to which the research will be conducted.

The Caatinga biome, for example, has a warm climate and prolonged periods of drought, with deciduous vegetation - the plants lose their leaves during the dry season. In this way, the bark becomes more commonly used by local communities. In the Cerrado environments with the perennial vegetation, the uses of the leaves tend to be more frequent^[14,21].

Regarding the ways of preparation, surveys aimed at the use of medicinal plants, refer to the infusion with a greater number of citations by the informants^[2,22,14]. This is because the infusion is used to prepare the soft parts of the plant, such as leaf, flowers, and buds, containing volatile components and active ingredients, degraded by the action of water and heat^[23].

Some researchers have already^[24] studied medicinal species in a Quilombo in the state of Maranhão, where the most representative botanical families were Lamiaceae and Rutaceae, results that corroborate our study.

There were 04 species in this study presenting greater versatility and great relative importance (RI): *Mentha spicata* (2,00), *Chenopodium ambrosioides* (1,51), *Ruta graveolens* (1,17), and *Rosmarinus officinalis* (1,11). These are taken in backyards or in free markets and have biological activities proven in the literature.

Mentha spicata species (mint) has anti-inflammatory action^[25], antioxidant^[26], gastroprotective, anticonvulsant^[27], that classify the species as a medicinal herb. Also, it has been observed that it brings benefits to the treatment of arterial hypertension and acts on lowering cholesterol levels^[28].

Chenopodium ambrosioides (mastruz) has activity against worms^[29]. Other studies reveal anti-inflammatory and analgesic properties^[30] and antifungal and antioxidant activities^[31].

Ruta graveolens (rue) has already shown anti-inflammatory and analgesic activities in pharmacological tests^[32]. Other studies have shown antifertility, abortive actions^[33-35], antimicrobial^[36,37], anthelmintic^[38] and antispasmodic^[39].

Finally, scientific studies in *Rosmarinus officinalis* (rosemary) have shown antimicrobial, antibacterial^[40], antioxidant^[41], anti-inflammatory^[42], antitumor and chemopreventive^[43] and according to research^[44], its leaves have the capacity to decrease insulin production causing an increase in blood glucose.

Among the 04 most cited species of the study, two are present in the National List of Medicinal Plants of Interest to SUS – RENISUS^[45]: *Ruta graveolens* L. and *Chenopodium ambrosioides* L. As well as *Mentha spicata* and *Rosmarinus officinalis*, these species are commonly found in studies of this kind^[46-48].

Conclusion

Medicinal plants are commonly used for the treatment of several diseases, especially those related to the respiratory system. The information revealed many species in Vila São Bento that may contribute to future phytochemical and ethnopharmacobotanical studies aiming at the development of new drugs, as well as the preservation and rational use of these species.

It is expected that the data from this research will contribute to: (i) the cultural valorization and registration of ethnobotanical knowledge; (ii) integration of local practices with primary health care; (iii) understanding the pattern of local native / exotic medicinal flora; (iv) stimulating the development of ethnobotanical studies; (v) act as comparative parameters for other local, regional and national ethnopharmacobotanical studies.

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Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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