PLANTS USED FOR TREATMENT OF BREATHING DISORDERS BY THE COQUEIROS COMMUNITY, CATALÃO (GO), BRAZIL


Instituto de Biociências Universidade Federal de Mato Grosso, Cuiabá, Brazil

Instituto de Química Universidade Federal de Goiás, Goiânia, Brazil.

Email: nubiamarianobio@gmail.com, guarim@ufmt.br, marcospmquimico@gmail.com, luciliakato@gmail.com, Vanessa.pasqualotto@gmail.com

Abstract – The searching for cure through medicinal plants dates back to the earliest times of human civilization, and it currently stands out due to the availability of several promising species for pharmacological studies. In this study, we evaluated the ethnomedical knowledge of the Coqueiros Community, in the municipality of Catalão (GO), specifically investigating the use of plants for treating respiratory system diseases. In order, to do this we interviewed 32 inhabitants of this community, who informed 20 different species. When comparing the data obtained from common knowledge with the scientific knowledge found in specialized literature, we noted that 90% of the mentioned species had been reported in literature as alternative therapies for respiratory system diseases.

Keywords: Ethnobotanics, ethno-pharmacology, respiratory diseases

I. INTRODUCTION

Medicinal plants play an important social and cultural role as they are often presented as the available alternative for treating population’s health issues [1]. The Cerrado biome contains several pharmacologically active plant species used in popular medicine. Such great taxonomic diversity consequently provides it with a high chemicals variety, contributing to the region’s vast potential of bioactive compounds [2]. However, studies identifying Cerrado useful plants are scarce, and the fast destruction of the ecosystem’s vegetation added to its lack of protection policies deepens its knowledge gaps [3].

Part of Cerrado’s natural resources may not be available for future generations, thus including the therapeutic options offered by medicinal plants. Consequently, ethnomedical studies in rural and traditional communities become essential to identify such resources and record the community knowledge about their usage. Therefore, the Coqueiros Community, located in the municipality of Catalão (GO), is a study area with a high exploratory potential, as it is represented by important social actors of the region’s history of medical knowledge, such as: midwives; healers using faith, religion and the belief in plants for healing rituals; and countrysmen that go to the field looking for plants to be used as medicine.

Many of such plant species are endangered despite of their promising use for bioprospection, and for that reason scientific studies are necessary [4]. In this respect, the importance of ethno-focused studies (ethnobotanics and ethno-pharmacology) must be highlighted because of their capacity of optimizing scientific investigation in terms of time, money and human resources. These studies also predict the factors that turn species into possible candidates for bioprospection studies by using selection criteria adopted from a cultural perspective [5].

Due to the possibilities of sustainable exploitation of the Cerrado plants, the present study aimed to perform an ethnomedical sampling in the Coqueiros Community, targeting the population medical knowledge regarding the species used to treat respiratory disorders.

II. METODOLOGY

A. Study Area

The study was performed in the rural area of the municipality of Catalão. This region is located in southeastern Goiás state, between the meridians of 47º17’ and 48º12’ W Long. Grt. and the parallels of 17º28’ and 18º30’ S Lat., with an area of 3,777.6 km² [6], corresponding to 1.11% of the Goiás state territory. The microregion of Catalão integrates the South Goiás mesoregion, according to the administrative division made by the Brazilian Institute of Geography and Statistics [6]. The vegetation is characterized by the Cerrado domain. The climate is classified as Aw Tropical savanna climate after the Köppen classification, with rainy summers and falls. The dry season lasts from four to five months, and monthly average temperatures are higher than 18°C. The dry period spans from May to September and the rain season goes from October to March [7].

Publication History

Manuscript Received : 21 February 2018
Manuscript Accepted : 27 February 2018
Revision Received : 12 March 2018
Manuscript Published : 18 March 2018
In the region there are 19 rural communities, according data provided informally by Catalão municipal government: Custódia, Cisterna, Morro Agudo, Mata Preta, São Domingos, Martirios, Babilônia, Ribeirão, Tabatinga, Macaúba, Limeiro, Mumbuca, Olhos D’Água, Pedra Branca, Olaria, Tambiocrô, Batalha and the Coqueiros, the focus of this study, which is located in Central-North part of the municipality, 15 km away from the municipal head office. This community presents 38 households.

B. Ethnobotanical Procedures

For the ethnobotanical research we used the methodology which is partially based on methods of the social and anthropological sciences aiming to maximize the capture of the traditional know-how. The sample cannot be made at random, but rather directed to the elements of population that are probable to know more about the approached theme [8]. To find people with such profile, we applied the Snowball Sampling Technique [9], in which an interviewee indicates the next one. We interviewed 32 inhabitants of the Coqueiros Community in total.

In terms of the data collection, two of the most cited methods used in Ethnobotanics are the ethnobotanical interview and the “observation-participation”. We applied both in this study. According to Camejo Rodrigues (2007), such methods consist in: “structured interview” – the interview is totally structured as a questionnaire, but is mentally applied by the interviewer, without the need for the respondent to fulfill the items. Several techniques can be used (such as consensus analysis, with its proper rules explained prior to interview) [8].

The “observation-participation” (or “observer-participant”) method requires a strong and long closeness between the scientist and the studied community in order to get the trusting of people. This methodology demands a constant presence of the investigator within the community, and their experimentation and participation in community’s social life, as if they were a native person or a long-established dweller. Such technique allows the scientist to observe and record the lives of many community elements, as much as to get a precise description of the popular uses of plants. This happens because of the experience and the participation of these elements as they provide access to information that would otherwise be very cryptic and hard to acquire from regular interviews and questionnaires (e.g., if the person still makes use of a certain plant and if so, the frequency of this use) [8].

The project and the scripts of the applied interviews were approved by the Ethics Committee of the Federal University of Goiás (Number 863.234); we also obtained a Previous Consent Form of the research participants while informants. The bibliography research about the usage potentialities of vegetal species in relation to their biological activities was based on scientific papers, using databases such as Scifinder, Web of Science, ScienceDirect, Capes Journals Database, Atheneu, PubMed, among others.

Species identification was made while in the field. The plants were collected during the application of interviews in 2016 (authorization for the access and shipping of genetic patrimony components’ samples nº 010698/2013-2). The plant material indicated by the community was identified following the most current classification system, APG III (2009). We checked for the scientific names, plant families, species authors and geographic distribution using the “Plant List, 2013” and the “Lista da Flora do Brasil” databases. The indicated plants were collected, dehydrated, botanized and set as exsiccates with their respective collection numbers, and kept in the collection of Prof. Dr. Maria Inês Cruzeiro Moreno in the Integrated Botany, Zoology and Ecology Laboratory of the Federal University of Goiás – Catalão Unit.

The collected local knowledge was analyzed by quantitative measures applied to the general sampling, which contributed to the selection of promising species for biotechnological development. We calculated the Species Importance Value (SIV) [10], and the Informant Consensus Factor (ICF) [11]. The SIV was calculated using the ratio between the number of interviewees attributing therapeutic properties to the species and the total number of interviewees [10]. The ICF evidences the plants that should be more deeply studied, using a scale with the maximum value of 1, which indicates the existence of a complete consensus between informants about the use of a certain plant for a specific disease. Some papers make this quantitative approach for the analysis of ethnobotanical samplings [11], [12] and [13].

III. RESULTS AND DISCUSSION

The ethnobotanical study revealed the utilization of 20 plant species distributed in 18 botanical families. These species were cited for the treatment of respiratory disorders 180 times by 32 different informants, with IFC equal to 0.89. This value shows consensus among informants about the species use for respiratory disorders treatment. Larger consensus on information increases the likelihood of finding promising ethnopharmacological species [11].

The table 1 shows the species indicated by the Coqueiros Community for the treatment of respiratory disorders. It also presents their geographic distribution, the plant parts used, forms of preparation, and the SIV, which estimates all the possible uses of a plant species for the community, besides the literature records regarding studies on biological activities related to the treatment of these issues.

Table 1. Ethnobotanical survey of species with indication for the treatment of respiratory disorders, realized in the community Coqueiros, Catalão, Goiás. Legend: SIV – Importance Value for Species.

<table>
<thead>
<tr>
<th>Family/Scientific name / common name (Brazilian)</th>
<th>Number of the Collection</th>
<th>Geographical occurrence</th>
<th>Therapeutic indications / pharmacological properties (literature review)</th>
<th>Way of preparation</th>
<th>SIV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>Genus/Species</td>
<td>Origin</td>
<td>Uses</td>
<td>Extracts/Preparation</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------------</td>
<td>-----------------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Calophyllaceae</td>
<td>Kielmeyera coriacea</td>
<td>Amazonia and Cerrado</td>
<td>Antibiotic for respiratory problems/Antimicrobial</td>
<td>Leaves - Tea Outer bark - Thicken with milk</td>
<td></td>
</tr>
<tr>
<td>Caryocaraceae</td>
<td>Caryocar brasiliense</td>
<td>Amazonia, Caatinga, Cerrado and Atlantic Forest</td>
<td>Antitussive; Bronchitis; Antioxidant and Anti-inflammatory effects</td>
<td>Leaves - Tea Outer bark - Tea</td>
<td></td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Croton antisyphilicus Mart.</td>
<td>Amazonia, Caatinga, Cerrado and Atlantic Forest</td>
<td>Flu/ Anti-inflammatory effect</td>
<td>Root - Tea</td>
<td></td>
</tr>
<tr>
<td>Compositae</td>
<td>Calobanthus polyphorus (Baker)</td>
<td>Naturalized</td>
<td>Antitussive/ Antinociceptive and Anti-inflammatory effects [25].</td>
<td>Leaves - Syrup Outer bark - Syrup.</td>
<td></td>
</tr>
<tr>
<td>Rutaceae</td>
<td>Citrus aurantiifolia (Chris tm.)</td>
<td>Cultivated</td>
<td>Sinusitis/ Antifungal [36].</td>
<td>Fruit immersed in alcohol</td>
<td></td>
</tr>
<tr>
<td>Arecaceae</td>
<td>Manicaria flexuosa Linn. F. Buriti</td>
<td>Amazonia, Caatinga and Cerrado</td>
<td>Antitussive/ Antioxidant and Anti-inflammatory effects [37]. Antioxidant and Antimicrobial [38].</td>
<td>Ingest oil or fruit</td>
<td></td>
</tr>
<tr>
<td>Solanaceae</td>
<td>Solanum lycopersicum A. St-Hil. Lobeira.</td>
<td>Cerrado and Atlantic Forest</td>
<td>Antitussive/ Antimomo-dulatory effects [29].</td>
<td>Boil the whole ripe fruit with honey</td>
<td></td>
</tr>
</tbody>
</table>
In this investigation, six species presented SIV above 0.8: *H. stigonocarpa* (pectoral stimulator); *Punica granatum* (tonsillitis, pharyngitis and laryngitis); *Sambucus nigra* (pectoral stimulator); and *Pterodon emarginatus* (tonsillitis) [46]. Also mentions the use of *S. nigra* for the treatment of diseases of the respiratory tract [47].

Other authors also cited for treatment of diseases of the respiratory tract: *Sambucus nigra* (cold), *Lantana camera* (inflammation of throat, cough, flu, bronchitis and asthma); *Cabobanthus polysphaerias* (bronchitis and asthma); *Caryocar brasiliense* (flu); *Hymenaea stigonocarpa* (anti-inflammatory) and *Mauritia flexuosa* (energetic) [48].

*K. coriacea* showed the highest SIV and is extensively used by the Coqueiros community. Studies have found that this species to be rich in xanthones, a compounds class with pharmacological properties, such as antifungal, antibacterial, tuberculostatic and anti-inflammatory [50]. The species was indicated by the community for respiratory disorders.

A study of the essential oil from the seeds of *P. emarginatus* observed its inhibitory effect on *Staphylococcus aureus* growth, bacterium responsible for pyodermitis, abscesses, pneumonia, menigitis and septicemia [51]. It thus demonstrates that this is a promising species for the treatment of respiratory diseases.

*H. speciosa* presents antimicrobial activity against *Helicobacter pilori* and *Staphylococcus aureus* [52], with the second being the cause to respiratory, skin and wound infections, and may be associated with diseases of the respiratory system, such as pneumonia. *Ocimum basilicum* is cited for the treatment of flu and cough [53].

Studies shown anti-inflammatory activity of *Abelmochus esculentus* in tests concerning the biological activity of lectin present in the seeds flour. Hence, the species may show anti-inflammatory activity against diseases affecting the respiratory system [54].

*Punica granatum*, popularly known as pomegranate, is used to treat throat infections, hoarseness and fever. It has also been described to possess antiseptic and antiviral activity in inflammatory processes of the oral mucosa [55].

The triterpenes present in *Croton antisiphiliticus* were shown to present anti-inflammatory and antimicrobial activities against *S. aureus* in tests in mice [56].
Citrus aurantifolia has indications of use for bronchitis and cough, and emphasizes the sedative activity of the volatile oil from the fruit bark fruit, which had been already noted by other researches. The juice of the fruit presented, antimicrobial activity, in vitro [57].

The geographic distribution of the species, Figure 1, shows in which areas the vegetation can be found. Out of the 20 plants listed in the survey, 12 occur within Cerrado and five are cultivated by the community in in backyards (medicinal gardens). Besides, the native vegetation found inside the properties are also used. Thereby, the conservation of Cerrado, the rescue of knowledge regards biodiversity and the use of medicinal plants by rural communities are faced as big challenges when it comes to environmental preservation.

The Cerrado is a vegetation complex with a highly rich biodiversity and remarkable socioeconomic and cultural importance for the country. Despite the growing number of ethnobotanical studies, there are still many gaps of knowledge. In this manner, it is necessary to propose a more intensive handling of shrubs and trees flora in the Brazilian Cerrado.

![Geographic distribution and species Cultivated and Naturalized of ethnobotanical survey in the community Coqueiros, Catalão, GO.](image)

**Fig. 1** Geographic distribution and species Cultivated and Naturalized of ethnobotanical survey in the community Coqueiros, Catalão, GO.

**IV. CONCLUSION**

The finding of plants with activity against diseases of the respiratory system in both the recommendations from the Coqueiros Community and the literature demonstrates similarity between popular and scientific knowledge, as we found a percentage of 90% of agreement in relation to the therapeutic indication. The FCI was close to the maximum value, thus certifying the common and wide use of the plants used for respiratory disorders among community members.

The rural communities demonstrated to be able to correctly identify the species and their medicinal uses. So, from the biotechnological point of view, encouraging the sustainable use of this biome, can prevent the extinction and loss of information about the biological and chemical properties of several species and, consequently, preserve the knowledge of traditional communities.

**V. CONFLICTS OF INTEREST**

The authors declare no conflicts of interest.

**REFERENCES**


