Introduction

The use of medicinal plants is a millennial tradition. This practice is performed mainly by people who do not have access to traditional medicine and seeks in native flora ways to treat certain diseases (SIQUEIRA et al., 2014). Due to the high demand, mainly by poor people, toxicological studies have been performed through bioassays in an attempt to evaluate the biological properties of medicinal plants as an alternative to verify their properties and risks from consumption (ARAUJO et al., 2016).

Due to the large consumption of teas extracted from medicinal plants being part of much of the population's life (FENALTI et al., 2016), it is necessary to know the main resources available in the native flora. In addition, it is indispensable for students to know from a microscopic perspective the main benefits and harms that medicinal plants can offer.

In this sense, the present study aimed to identify if students from the 3rd grade of High School from IFPI-Campus Floriano had knowledge about the use of medicinal plants for therapeutic purposes and the implications on their use in a rational way.

Theoretical framework

According to the World Health Organization (WHO), about 80% of the world
population utilizes medicinal plants for therapeutic purposes, in order to treat some disease. This practice is common in underdeveloped and developing countries due to serious poverty conditions of population and social development (FENALTI et al., 2016).

Brazil presents wide biodiversity, with a species richness. In prospecting studies on medicinal plants, it has been shown that people have access to these species in their own backyard (NEZI et al., 2017). Through this technique, it is possible to discover certain active principles, biological and pharmacological properties in medicinal plants (LIMA et al., 2017).

The National Program of Medicinal Plants and Herbal Medicines aims to promote, through effective policies, recognized value for the popular and traditional practices regarding medicinal plants, herbal medicines and homemade remedies (BRASIL, 2009). This comprehension is an attempt to preserve the popular knowledge. Ethnobotanical knowledge is extremely relevant for human development, as these specimens used in everyday life can be converted into drugs by the pharmaceutical or biotechnology industries (MONTEIRO; BRANDELLI, 2017).

The built knowledge about medicinal plants is important in the sense of valuing the knowledge brought from people daily life. Besides, it arouses the interest of students in learning more about the main biological properties of that plant, arousing critical thinking regarding the processes that surround it (ARAUJO; LIMA, 2019). Therefore, Krasilchik (2016) defends an education directed to the social context in which the student is inserted, providing a practice-based learning. In this sense, the teaching of biology can assist in the construction of scientific knowledge through active methodologies that place the student in an author perspective in the teaching and learning process (SIQUEIRA; PEREIRA, 2014).

In a study developed by Araújo and Lima (2019) with students from a public and a private school in the interior of Piauí State, Brazil, they identified that students used medicinal plants for therapeutic purposes, 82 and 92% respectively, but had no systematic knowledge about the main harms that certain plants could cause to the human organism, mainly at the cellular level. Therefore, it is up to the biology teacher to discuss such aspects in an interdisciplinary perspective in order to contribute to the social and educational development of students.

**Methodology**

An epistemological research with a qualitative and quantitative approach was adopted.
Fifty students participated in this study, 26 male and 24 female, from the 3rd grade of High School of the Federal Institute of Piauí - IFPI, located in Floriano / PI (06º 46' 01" S, 43º 01' 21" W, 112 meters of altitude). The data collection method was executed through a questionnaire with open and closed questions. This instrument sought to identify information regarding the use of medicinal plants, the used part, preparation method and possible problems at the cellular level due to consumption. Data analyzes were performed following two methodologies.

Qualitative data were analyzed according to criteria proposed by the works of Falcão and Barros (1999), Griffin et al. (2003), Silva and Neto (2004), Carneiro and Silva (2007), with adaptations by Araújo and Lima (2019). This analysis was performed based on the common points so that the students could be grouped into the following categories: **Category 0**: When the student does not assign any value to the question, such as, “I do not know”, blank, nonsense or completely wrong answers; **Category 1**: The student cannot, through the answer, present a systematic knowledge about the subject in question; **Category 2**: It is possible to notice the student understanding on the subject, but there is no satisfactory relationship with the literature; **Category 3**: The answers are considered satisfactory under the literature point of view; **Category 4**: The student systematically presents domain on the subject. In addition, he/she clearly and objectively exposes a response from a holistic perspective on the addressed topic.

This qualitative analysis aimed to categorize students knowledge regarding the theme “Ethnobotany”, a particular theme, from responses considered unrelated to the literature to those that students demonstrated a certain domain of time. Quantitative data were evaluated using the Statistical Package for Social Sciences Software (SPSS) 23.0, where the following statistical analyzes were employed: simple descriptive analysis and T-test for independent variables at *p <0.05 probability (FIELD, 2009).

**Results and Discussion**

There was no significant difference (P> 0.05) by the T-test for independent variables regarding the gender of the students for the use of medicinal plants, the used part, preparation method and possible problems at the cellular level. It was found that 82% of the students utilized medicinal plants for therapeutic purposes. Corroborating to these data, Araújo and
Lima (2019) found that about 92% of students in a private school used medicinal plants for therapeutic purposes, showing that this practice is common to the population, due to its easy access and popular knowledge passed down through the generations (SIQUEIRA et al., 2014).

The plant families most cited by the students were Lamiaceae (23 citations), Rutaceae (12 citations), Verbenaceae (4 citations), Zingiberaceae (2 citations) and Poaceae (2 citations) (Table 1). Regarding the used part of the plants, leaves (58%) and bark (30%) were observed to be the most utilized for this purpose. Students reported that the most employed preparation method for this purpose were Teas (84%), Licking (8%), Ointments (4%), Sauces (2%) and Bottled juice (2%), where the students reported that the tea causes no problem to the human organism as it is a natural resource.

Table 1. Medicinal plants cited by IFPI students with their respective family, scientific and popular name, used structure, preparation method and therapeutic indications from the students’ perspective.

<table>
<thead>
<tr>
<th>Family</th>
<th>Scientific name</th>
<th>Popular name</th>
<th>Structure</th>
<th>Preparation</th>
<th>Therapeutic indications according to students</th>
<th>Citations</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamiaceae</td>
<td>Plectranthus barbatus A.</td>
<td>Bold</td>
<td>Leaves</td>
<td>Tea, sauce</td>
<td>Bowel problems, nausea, laxative, antibacterial, anti-inflammatory and diuretic action</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Mentha spicata</td>
<td>Mint</td>
<td>Leaves</td>
<td>Tea, licking</td>
<td>Sore throat, fever, flu, cold</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Rutaceae</td>
<td>Citrus sinensis (L.)</td>
<td>Orange tree</td>
<td>Fruit peel</td>
<td>Tea</td>
<td>Bowel pain, headaches, nausea</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Caesalpinia pyramidalis</td>
<td>Catinga-de-porco</td>
<td>Leaves, peel</td>
<td>Tea</td>
<td>Bowel problems</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Citrus limon</td>
<td>Limon tree</td>
<td>Fruit</td>
<td>Tea</td>
<td>Flu</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Verbenaceae</td>
<td>Lippia alba</td>
<td>Lemon balm</td>
<td>Leaves</td>
<td>Tea</td>
<td>Fever, soothing, flu, cold</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Zingiberaceae</td>
<td>Zingiber officinale</td>
<td>Ginger</td>
<td>Leaves, roots, peel</td>
<td>Tea, peel</td>
<td>Fever, sore throat</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Cymbopogon citratus</td>
<td>Lemon grass</td>
<td>Leaves, peel</td>
<td>Tea</td>
<td>Body aches, bowel problems</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Cannabaceae</td>
<td>Cannabis sativa</td>
<td>Marijuana</td>
<td>Leaves</td>
<td>Tea</td>
<td>Swelling, seizures</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Rubiaceae</td>
<td>Morinda citrifolia</td>
<td>Noni</td>
<td>Fruit</td>
<td>Bottled juice</td>
<td>Inflammations</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Copaifera langsdorfi</td>
<td>Copaiba</td>
<td>Oil</td>
<td>Licking</td>
<td>Burns and throat irritation</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Tamarindus indica</td>
<td>Tamarind</td>
<td>Leaves</td>
<td>Tea</td>
<td>Diabetes</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Aquifoliaceae</td>
<td>Flex paraguayensis</td>
<td>Mate herb</td>
<td>Leaves</td>
<td>Tea</td>
<td>Soothing</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Liliaceae</td>
<td>Allium sativum</td>
<td>Garlic</td>
<td>Stem</td>
<td>Tea</td>
<td>Fever, flu</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Due to the cosmopolitan distribution of representatives of the Lamiaceae family, it is
widely found in various locations in Brazil. Similar results developed by Alves and Povh (2013), Araújo, Freitas and Leite (2017) and Araújo and Lima (2019), identified that the students also used the Lamiaceae family specimens in higher frequency than the others families.

For being considered the second most consumed beverage in the world, the tea has been employed for years for the treatment of various illnesses (KUJAWSKA et al., 2016). However, Araújo et al. (2016) warn about the use of this resource, as they identified toxic activity of the plant *Mimosa pigra* (L.) in toxicological studies conducted with the *Allium cepa* bioassay. Therefore, there should be some caution at the moment of preparation and concentration of the plant structure.

Based on the categories analyzed, 54% of the students does not have any knowledge of the problems that many medicinal plants can cause at the cellular level. However, only 10% demonstrated to have knowledge beyond expected, presenting then a certain domain of the approached thematic. This result is similar to the report of Araújo, Freitas and Leite (2017), who, using the same assessment categories, identified that 62% of students in a public school had no knowledge of the main harms that medicinal plants could cause, especially at the cellular level.

**Conclusion**

It was noticed that students from IFPI-Campus Floriano used medicinal plants for therapeutic purposes. The preparation methods were the most diverse, where the tea was the main form used by them. However, through the categorization of students responses, it was observed that they did not know the main damages that medicinal plants could cause at the cellular level. Therefore, prospecting and toxicological evaluation studies should be encouraged to identify pharmacological properties and thereby identify dosage forms on the conscious use of these plants.

**References**


ARAUJO, M. S. *et al*. Biological response assessment of *Mimosa pigra* L. (Fabaceae) infusion in the Delta of Parnaíba / PI region front the *Allium cepa* test. In:


