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Folk medicine in Mandaguaçu municipality, Paraná State: an ethnobotanical approach

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ABSTRACT. Herein, we present results from an ethnobotanical study (from February to August 2009) aiming the improvement and rationalization of medical practices, based on popular use of plants. We applied semi-structured interviews to 220 families from the urban area of Mandaguaçu municipality, Paraná State. During the interviews we recorded the following information about the used plants: common name; plant part used; method of preparation; collection site; therapeutic indication, and known adverse effects. Additionally, we compared the data obtained in the interviews with the literature in order to identify contradiction in use and application. Among the interviewees, 90% use medicinal plants, obtained especially from the backyards. We recorded 44 ethnobotanical citations, comprising 47 species (22 families). The species most frequently mentioned in the interviews were, respectively, *Cymbopogon citrates* (DC) Stapf. (Lemon grass), *Mentha* sp. (Mint), *Plectranthus barbatus* Andrews (False Boldo) and *Plectranthus ornatus* Codd (Dog bane). The applications most cited were: the treatment of diseases from the digestive tract (122 citations), respiratory (67 citations) and nervous system (40 citations). In general, the population knows the correct method for preparing the medicinal plants. However, they report that do not know any adverse effect caused by these plants. This scenario is worrying because some species are recognized in the literature as potentially toxic or responsible for adverse effects.

Keywords: medicinal plants, folk knowledge, toxicity, adverse effects.

Medicina popular em Mandaguaçu, Estado do Paraná: uma abordagem etnobotânica

RESUMO. Apresenta-se resultado de estudo etnobotânico (fevereiro a agosto/2009) visando melhoramento e racionalização das práticas medicinais populares fundamentadas no uso de plantas. Foram aplicadas entrevistas semi-estruturadas a 220 famílias pertencentes à zona urbana do município de Mandaguaçu, Estado do Paraná. Durante as entrevistas foram registradas as seguintes informações das plantas utilizadas: nome comum, parte usada, modo de preparo, local de coleta, indicação terapêutica e efeitos adversos conhecidos. Adicionalmente, efetuou-se a análise comparativa dos dados obtidos nas entrevistas com os constantes na literatura pertinente para identificar incongruências de uso e aplicação. Dentre os entrevistados, 90% usam plantas medicinais, e as obtêm especialmente dos quintais. Foram registradas 44 citations etnobotânicas, englobando 47 espécies (22 famílias). As espécies mais citadas foram, respectivamente, *Cymbopogon citrates* (DC) Stapf. (capim cidreira), *Mentha* sp. (hortelã), *Plectranthus barbatus* Andrews (boldo) e *Plectranthus ornatus* Codd (boldo). As aplicações mais citadas foram para o tratamento de doenças do aparelho digestório (122 citations), aparelho respiratório (67) e sistema nervoso (40). Em geral, a população expressou adequado esclarecimento em relação ao modo de preparo das plantas que utilizam. No entanto, relatou desconhecer quaisquer efeitos adversos. Este panorama é preocupante, pois algumas espécies citadas são reconhecidas na literatura como potencialmente tóxicas ou responsáveis por efeitos adversos.

Palavras-chave: plantas medicinais, práticas populares, toxicidade, efeitos adversos.

Introduction

The use of medicinal plants, characterized as "vegetal species, cultivated or not, used for therapeutic purpose", is a very ancient way of treatment, related to the beginnings of medicine and based on the accumulation of information over successive generations (BRASIL, 2006a). In Brazil, the use of plants with medicinal purpose is a common practice, enriched by cultural differences, from Indians, Blacks and Europeans. This mixture of races, associated to the great vegetal diversity in the country, led to a traditional medicine based on different plants and methods of treatment (BRANDÃO, 1996).

Currently the medicinal plants represent a cheap alternative, of easy maintenance, and evidently effective when properly cultivated, manipulated and used (AZEVEDO; SILVA, 2006). Due to this

feature, the phytotherapy is viewed as an option to find therapeutic solutions, mainly used by low-income population (MORAIS et al., 2005; PEREIRA et al., 2009). However, with the search for a healthier and more balanced life, the demand for such species has grown also by people with higher purchasing power (VEIGA JR. et al., 2005). Because of this widespread use, some studies assert that is urgent guidance of population in the correct use of medicinal plants and phytotherapic medicine, due to erroneous therapeutic indications, exchange of prescribed remedies by medicinal plants and other situations that put under risk of user's health (RITTER et al., 2002).

Another aggravating factor is the emergence of the concept of "natural", which contributed significantly for the increase in the use of medicinal plants in the last decades. For many people this concept means the "absence of chemical compounds", which according to popular knowledge are those that may cause some damage or anyway pose a danger (VEIGA JR. et al., 2005). Nevertheless, several plants contain substances able to exert toxic action on living organisms (OLIVEIRA et al., 2001; SCHVARTSMAN, 1992). Some plants are frequent sources of intoxications, especially *Dieffenbachia picta* Schott, *Euphorbia milii* Des Moulins, *Jatropha curcas* L., *Ricinus communis* L. among others (SCHENKEL et al., 2000). Considering this possibility of adverse effects caused by certain medicinal plants, the identification and the information obtained about the use of medicinal plants may be used to guide researches in order to refine or optimize the current popular usage, developing low-cost therapeutic preparations, or isolate active substances capable of synthesis by the pharmaceutical industry (AMOROSO, 1996).

In this way, the present study aimed to investigate the popular knowledge from residents of Mandaguaçu municipality, Paraná State, about the use of medicinal plants, in order to know whether the method of preparation and the therapeutic indications reported by them are in accordance to those established in the literature; and whether there is occurrence of self-medication with potentially toxic species. Therefore, with these informations, we intended to furnish subsidies for the population to realize the use of plants for therapeutic purpose, cautiously and safely.

Material and methods

This study was undertaken in Mandaguaçu municipality, State of Paraná, during the period from February to August 2009. This municipality has an area of 294,010 km² representing 0.1475% of the State, and is located in the metropolitan region of Maringá, State of Paraná, at latitude 23°20'49" South, and longitude 52°05'42" West, with an altitude of 580 meters. In 2009, the estimated population was 19,127 inhabitants. The main economic activity is agriculture, which mobilizes at least 22% of all workers (IBGE, 2009).

In this study, the following steps were addressed, respectively: a) semi-structured interviews (open and closed questions) and collection of plants used in traditional medicine by the residents of Mandaguaçu municipality (State of Paraná) (we tried to collect species at flowering to facilitate the identification); b) drying of plants and preparation of exsiccates at the Unit for Higher Education Ingá (Uningá); c) identification of herborized species through taxonomic keys of vegetal families and by comparison with exsiccates from the Herbarium of Biology Department from State University of Maringá; d) survey of scientific information available about these species, and comparison with information about their popular use, according to reported by the respondents. The form applied to the residents was previously assessed and approved by the Ethics Committee of Uningá (protocol no. 108/2009-1, Figure 1). The identified species were deposited in the didactic collection of Uningá.

Date:	N ° of the interview:
Respondent name:	
Use medicinal plants? (specify the popular name):	
Collection site	
( ) Own backyard	( ) Buy the needed seedlings
( ) Field	( ) Neighbor
( ) Abandoned land	( ) Other (Specify)
Plant part used	
Use purpose	
Method of preparation:	
( ) Boil with water	( ) with alcohol
( ) Boil with milk	( ) with sugar
( ) Bath	( ) with sweetner
( ) Inhalation	( ) Compress
( ) Crushing	( ) Infusion
Knows any plant contraindication? What?	

Figure 1. Form about plants used as medicinal, applied to residents from Mandaguaçu municipality, State of Paraná.

In order to evaluate the efficiency of sampling methodology, we built a species accumulation curve, with 1,000 randomizations, and confidence interval of 95%, created based on the matrix of species cited in each sampling day (total of 17 sampling days). This analysis revealed adequacy in the number of species *versus* samplings, i.e., the curve reached an asymptote suggesting that, increasing the number of

samplings (interviewees), no significant increase would be observed in the plant richness. This analysis was performed by the software ECOSIM 7.0 (GOTELLI; ENTSMINGER, 2001).

From the information furnished by the interviewed population, we prepared a *checklist* containing scientific and vernacular names, therapeutic purpose, plant part used and respective method of preparation of the vegetal species. The species names and authors were confirmed by specific bibliography (LORENZI; MATOS, 2008; SOUZA; LORENZI, 2008). The classification system adopted was the APG II (APG, 2003).

The bibliography surveys about the pharmacological data of species indicated by the respondents were accomplished from available source (PORTAL DA CAPES, 2009). The diseases and states of discomfort listed by the population for each plant, were grouped based on the international statistical classification of diseases and related health problems (CID-10), proposed by the World Health Organization (OMS, 2000), in order to organize the popular knowledge about the use of plants with therapeutic purposes.

Results

We interviewed 220 residents at their domiciles, randomly chosen, between men and women. Among them, 90% (n = 200) asserted that make use of plants with therapeutic purposes, 20 men and 180 women.

Forty-seven species (22 families) were mentioned as used as medicinal. The most representative families in number of species were Lamiaceae (10) and Asteraceae (9) followed by Rutaceae (3), Euphorbiaceae (3), Poaceae (2) and Zingiberaceae (2). The other families had only one cited species. The respondents listed several therapeutic indications for the species, with prominence the performance on digestive tract, quoted for 24 species. Concerning the method of preparation, the most cited procedure was the infusion (140 citations), followed by maceration (60 citations) and compress (7 citations) (Table 1).

The interviewed population related that they had no knowledge about any side effect provided by the used plants. Meantime, some species listed present recognized toxicity (Table 1). In accordance to studies from the Research Program on Medicinal Plants – PPPM (BRASIL, 2006b) are known by being toxic: *Foeniculum vulgare* Mill., *Lippia alba* (Mill.) N.E. Br, *Plectranthus barbatus* Andrews, *Symphytum officinale* L. Other references also recognize the toxic potential of *Aloe ferox* (L.) *Burm*.f. (MELLO et al., 2009; MORAIS et al., 2005; SILVEIRA et al., 2008), *Artemisia absinthium* L. (RITTER et al., 2002; TOMAZZONI et al., 2006), *Baccharis* spp. (RUIZ et al., 2008), *Euphorbia tirucalli* L. (VARRICCHIO et al., 2008), *Mentha pulegium* L. (MENGUE et al., 2001) and *Ruta graveolens* L. (MENGUE et al., 2001; RITTER et al., 2002; VEIGA JR. et al., 2005).

Table 1. Vegetal species referenced as medicinal in ethnobotanical survey accomplished in Mandaguaçu municipality, State of Paraná (Feb-Aug 2009), alphabetically sorted by botanical family, FA = absolute frequency (n= 200 interviews); Fag = boil with water; Fl = boil with milk; B = bath; In = inhalation; Fal = boil with alcohol; Faç = boil with sugar; Fad = boil with sweetener; Cop = compress; If = infusion; Es = maceration.

Family/ Species Vernacular name	Therapeutic indication	Method of preparation	Used part	FA
ALLIACEAE				
Allium sativum L. Garlic	Flu	If	Cataphyll	1
AMARANTHACEAE				
Pfaffia glomerata Spreng Ginseng	Energy drink, analgesic	Fag; If; Fal	Leaf	3
APHODELACEAE				
Aloe ferox (L.) Burm.f. ⋆ Aloe Vera	Burn, cancer	Fag; Cop	Leaf	10
APIACEAE				
Foeniculum vulgare Mill ⋆ Anise; fennel	High blood pressure, tranquilizer, cramps, indigestion, diarrhea	Fag; If; Faç; Fad	Leaf	11
ASTERACEAE				
Achillea millifolium L. Painkiller, Dipyrone	Headaches and stomach problems	If	Leaf	2
Artemisia absinthium L. ⋆ Wormwood	Burn and digestion	If ; Cop	Leaf	4
Artemisia camphorata Vill Camphor	Stomach problems	Fag	Leaf	2
Baccharis articulata (Lam.) Pers ⋆ Carquejilla	Indigestion, diabetes, obesity, high blood pressure	If	Leaf	3
Baccharis trimera (Less.) DC. ⋆ Gorse	Indigestion, diabetes, obesity, high blood pressure, diuretic	If	Stalk	5
Chamomilla recutita (L.) Rauschert Chamomile	Menstrual cramp, newborn cramp, tranquilizer	If; Fag; Faç; Fad	Flower	8

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Family/ Species Vernacular name	Therapeutic indication	Method of preparation	Used part	FA
Mikania glomerata Spreng Guaco	Flu, throat and cough	If	Leaf	14
Sonchus oleraceus L. Common sow-thistle	Gastritis	Ingestion	Leaf	1
Solidago chilensis Meyen Brazilian arnica	Inflammation	If; Cop; Fal	Leaf	3
Vernonia condensata Baker Figatil	Indigestion and liver	Es	Leaf	13
BORAGINACEAE				
Symphytum officinale L. ⋆ Comfrey	Healing	B; Cop	Leaf	2
CARICACEAE				
Carica papaya L. Papaya	Flu	Fag; Faç; Fad	Flower	1
CELASTRACEAE				
Maytenus ilicifolia (Schrad.) Planch. Espinheira-santa	Gastritis and heartburn	If	Leaf	3
CHENOPODIACEAE				
Chenopodium ambrosioides L. Mexican tea	Contusion, indigestion and kidney problems	If; Cop	Leaf	2
CRASSULACEAE				
Sedum dendroideum Moc. Bush sedum	Sore throat, stomach problems, cough and healing	If; Fag; Cop	Leaf	21
EQUISETACEAE				
Equisetum sp. Horsetail	Diabetes and flu	If	Stalk	1
EUPHORBIACEAE				
Euphorbia tirucalli L. ⋆ Milk bush	Cancer	If	Sap	2
LAMIACEAE				
Leonurus sibiricus L. Honeyweed	Diarrhea and indigestion	IFf	Leaf	2
Mentha sp. Mint	Verminosis, headache, fever, tranquilizer, flu, cough, cramps	Fag; Fl; If; Faç; Fad	Leaf	59
Mentha pulegium L. ⋆ Pennyroyal	Flu, cough, menstrual cramp and diarrhea	Fag; If	Leaf	20
Ocimum gratissimum L. African basil	Intestinal colic, urinary tract infection, flu, cough	If	Leaf	24
Origanum vulgare L. Common oregano	Throat, flu, cough, bronchitis	Fag; Faç	Leaf	1
Plectranthus amboinicus (Lour.)Spreng. Cuban oregano	Indigestion, diarrhea, constipation, headache, gastritis, alcohol hangover	Es; Fag	Leaf	21
Plectranthus barbatus Andrews ⋆ False boldo	Indigestion, diarrhea, constipation, headache, gastritis, alcohol hangover	Es; Fag	Leaf	37
Plectranthus ornatus Codd. Dog bane	Indigestion, diarrhea, constipation, headache, gastritis, alcohol hangover	Es; Fag	Leaf	32
Rosmarinus officinalis L. Rosemary	Tranquilizer, insomnia, bronchitis, stomach and heart problems	If; Fag	Leaf, Stalk	26
Tetradenia riparia (Hochst.) Codd Ginger bush	Tranquilizer	In	Whole plant	1
Jatropha multifida L. Coral plant	Healing	Cop	Sap	2
Phyllanthus niruri L. Stonebreaker	Kidney problems and fluid retention	If	Leaf and stalk	6
LAURACEAE				
Laurus nobilis L. True laurel	Flu	Fag	Leaf	1
MORACEAE				
Ficus corica L. Fig	Cough	If	Leaf	1
MYRTACEAE				
Syzygium aromaticum (L.) Merr.& L.M.Perry Clove	Flu	Fag	Flower	1
PHYTOLACACEAE				
Petiveria alliacea L. Guinea henweed	Stomach problems and sore throat	If	Leaf	4
PLANTAGINACEAE				
Plantago major L. Common plantain	Laxative, bladder infection	Fag; If	Whole plant	4
POACEAE				
Cymbopogon citratus (DC) Stapf. Lemon grass	Insomnia, high blood pressure, tranquilizer, flu, indigestion	If; Fag; Faç; Fad	Leaf	62

Continue...

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Family/ Species Vernacular name	Therapeutic indication	Method of preparation	Used part	FA
RUTHACEAE				
Citrus aurantium L. Orange	Flu	Fag	Fruit	1
Citrus limonia (L.) Burm.f. Rangpur lime	Diabetes, flu	Fag	Fruit	1
Ruta graveolens L. ⋆ Common rue	Lice, colic, conjunctivitis	If; B; Cop	Leaf	14
VERBENACEAE				
Lippia alba (Mill.) N.E. Br. ⋆ Lime balm	Flu, fever, colic, indigestion and tranquilizer	If	Leaf	2
ZINGIBERACEAE				
Costus spicatus (Jacq.) Sw. Spiked spiralflag	Sore throat, bladder infection, kidney pain, liver, indigestion	If	Leaf and flower	9
Zea mays L. Corn	Bladder infection	Fag	Adventitious root	1
Zingiber officinale Roscoe Ginger	Joint pain	Fag; If	Root	1

(⋆) Species with toxic potential recognized.

Regarding the collection site of the plants, the respondents indicated primarily their own backyard (65%), neighbor areas (19%), abandoned lands (8%), commerce (6%) and open field (2%).

The use of medicinal plants referenced by the respondents may be related to 15 diseases groups, especially those related to digestive tract (122 indications), respiratory system (67), and nervous system (63) (Figure 2). The highest numbers of species citations were recorded for diseases of digestive tract (24 species), respiratory system (18), and nervous system (12) (Figure 3).

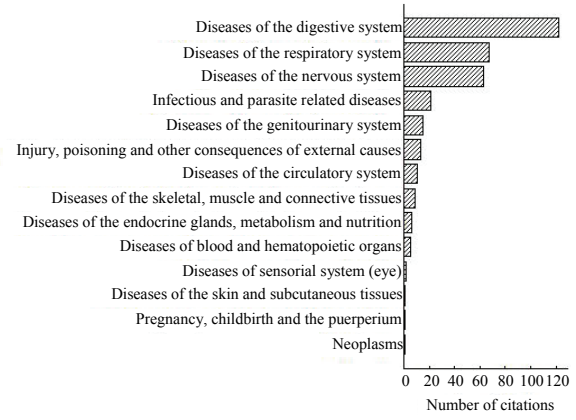

Figure 2. Number of citations of the diseases groups (classification according to World Health Organization (OMS, 2000)).

Most of citations (68%) indicated exclusively the leaf, as the used part to prepare tea or other using. The stalk, flower, sap, seed and root are other used parts, less frequently mentioned by the respondents (Table 1; Figure 4). Some interviewees mentioned that they prepare the teas with medicinal plants incorporating other compounds, such as sugar (40 citations), honey (26), and sweetener (5), or even the combination of several plants in the same tea (4). Thirteen interviewees cited that they consume medicinal teas as diluent of other remedies, as antipyretic and analgesic.

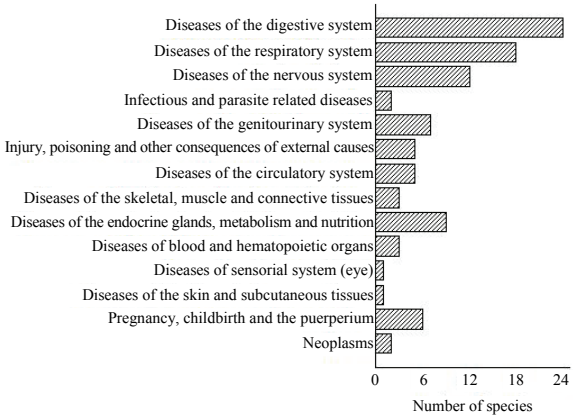

Figure 3. Number of species cited by groups of diseases (classification according to World Health Organization (OMS, 2000)).

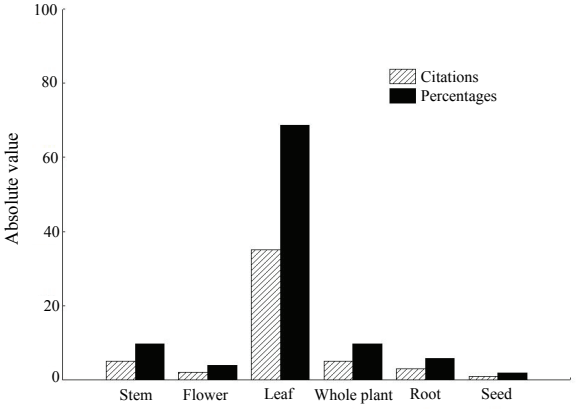

Figure 4. Plant part used as medicinal by the residents from Mandaguaçu municipality, State of Paraná.

Discussion

Currently, Mandaguaçu municipality presents one hospital and three health centers, which provide care in several specialties. Nevertheless, although population has these medical resources, the employment of plants with therapeutic purposes seems to be a relevant part of everyday

life of residents, since only a small portion of respondents did not use them. Among the several advantages, the current medicinal value of several vegetal species is due to divulgation of benefits of phytotherapy, and especially to constant rise in prices of manufactured remedies (AZEVEDO; SILVA, 2006). Furthermore, accessibility can also be another factor favorable to the practice of medicine based on plants.

In our results, most of interviewees get the plants from their own backyards and neighborhoods. Similar results were found by Pilla et al. (2006) for the population from Mogi-Mirim municipality (State of São Paulo), and according to these authors, this pattern evidences a certain degree of plants conservation, and of knowledge about their uses. Similarly, Moreira et al. (2002), for the population from the region of Ilhéus (State of Bahia), observed that the plants quoted and collected, were commonly cultivated in backyards, which according to the author is due to exchange of not only information, but also seeds and seedlings.

The representativeness of plants' families is widely discussed in literature, and for several Brazilian regions the families Lamiaceae and Asteraceae include the medicinal plants with higher prominence in number of species (LIMA et al., 2007; PASA et al., 2005; PEREIRA et al., 2009; RITTER et al., 2002; SILVA; PROENÇA, 2008; VENDRUSCOLO; MENTZ, 2006). Marodin (2002) argues that these families occupy the first places in surveys performed in Southern Brazilian region. The family Asteraceae is the most numerous systematic group within Angiosperms, comprising about 1,100 genera and 25,000 species (VERDI et al., 2005). Besides that, these plants are extremely varied in appearance, including mainly small herbs or shrubs, and rarely trees. Biochemical evidences justifies the widespread utilization of herbaceous species for folk cures, by the tendency of herbs on investing in secondary compounds with high biological activity, as alkaloids and terpenes, instead of developing structural defense systems with high molecular weight, as tannins and lignins (STEPP; MOERMAN, 2001). In relation to the family Lamiaceae, among the remarkable traits of this family, is highlighted the rich composition in volatile oils (TOLEDO et al., 2004) and the aromaticity of several species (DORMAN et al., 2003), being studied by their properties medicinal, antimicrobial and antioxidant (MARIUTTI; BRAGAGNOLO, 2007).

Despite all vegetal parts had been listed; the leaves were predominantly mentioned by the population. The leaves are traditionally the most used parts for folk medicinal treatment, probably due to the simplicity of collection and by being present in the plant during most part of the year (ALVES et al., 2008). In agreement with Castellani (1999 apud PEREIRA et al., 2009), soft parts of plants, as leaves, buds and flower are richer in volatile compounds, delicate aromas and active ingredients. Santos (2003) emphasizes the importance of the record of plant part used, since different parts may present different chemical compounds. Concurrently, we point out the need for caution also during the preparation of medicinal plant, since the active ingredients decrease with the combined action of water and prolonged heat Castellani (1999 apud PEREIRA et al., 2009). Considering this trait, the population presented suitable knowledge about the method of preparation of the vegetal, since the predominant one was the tea from infusion, avoiding the boiling. Meanwhile there was lack of knowledge regarding associations between vegetal species, or even between these and allopathic remedies. The plants are used as complement, frequently without the knowledge of a doctor (VENDRUSCOLO; MENTZ, 2006), and may cause the absence of remedy response (MEDEIROS FILHO et al., 1997), or even antagonistic effect to the allopathic used (IZZO; ERNST, 2009).

Moreover, we evidenced that when the population search for medicinal plants, they do not distinguish between symptoms and diseases. As explained by Uchôa and Vidal (1994) the "disease process" (*disease*) refers to abnormalities of structure or functioning of organs or systems, and the "disease experience" (*illness*), relative to subjective experience of discomfort felt by the patient. For example, when quoting the boldo, the indications are both for indigestion and for gastritis.

Considering the list of ethnospecies, we observed the occurrence of homonyms (the same vernacular name is mentioned for plants of different species). For example: the Brazilian boldo was used to refer to *Plectranthus amboinicus* (Lour.) Spreng., *Plectranthus barbatus* Andrews and *Plectranthus ornatus* Codd.. These species present active principles and some distinct pharmacological actions. Namely, the essential oil of *P. amboinicus* (Lour.) Spreng. presents the thymol and carvacrol, with antimicrobial properties, and may contribute to the improvement in respiratory tract diseases (MATOS, 1994). Besides that, this oil was tested in rats with satisfactory results for the treatment of rheumatoid arthritis (CHANG et al., 2010). For this species, we did not find toxicity data in literature. Otherwise, the prolonged use of macerated leaves of *Plectranthus*

barbatus Andrews (Brazilian boldo) is worrying, give that problems hepatotoxic, carcinogenic and nephrotoxic may happen in the long term, and are asymptomatic (COSTA, 2006). *Plectranthus ornatus* Codd. has clerodane diterpenes (OLIVEIRA et al., 2005) and its leaves are used in the treatment of stomach ailments, as diuretic, anti-inflammatory and analgesic (LORENZI; MATOS, 2008). Because of this ambiguity, when taking the macerated of leaves of common boldo, we may get a different effect than expected. Regarding this, for the study region, the use of boldo should be carefully considered, since beyond being the most cited plant, several respondents reported that take boldo regularly and repeatedly throughout the day.

Other species considerably cited are recognized by their toxic potential. The *Mentha pulegium* L. is referred as abortive, and the hepatotoxic effect of the oil and tea from this species is attributed to the secondary metabolite named pulegone (MENGUE et al., 2001). The *Ruta graveolens* L. (common rue) popularly indicated for the treatment of conjunctivitis, lice and menstrual cramps, may cause miscarriage, heavy bleeding, irritation of oral mucosa, epidermal inflammation, and skin burn when exposed to the sun (MENGUE et al., 2001; RITTER et al., 2002; VEIGA JR. et al., 2005). *Foeniculum vulgare* Mill. (annise, fennel) after oral administration of tea in rats, presented a relatively high toxic potential, and the appearance of proteinuria. The tea is widely used by the population as tranquilizer and antidiarrheic in varying and frequent doses for a prolonged period, even in newborns, becoming its use passible to a tighter control (BRASIL, 2006b). *Aloe ferox* (L.) Burm.f. (Aloe Vera) is mentioned as healing, antibacterial, antifungal and antiviral, however, due to its nephrotoxic action at high doses it should not be used orally, possibly causing nephritis and, besides that, are described as side effects, the abdominal pain, severe diarrhea, hypokalemia, intestinal irritation, hypotension, hypothermia, and case of acute intoxication may lead to death (MELLO et al., 2009; SILVEIRA et al., 2008).

Although some species have been seldom quoted, as a means of prevention is worth mentioning their toxic potential. The popular use of *Euphorbia tirucalli* L. (Milk bush) is recommended for the treatment of cancer and cauterization of warts, but studies about its toxicity reveal that the latex can cause lesions in the skin and mucous membranes, swelling of lips, mouth and tongue, pain, burning and itching (VARRICCHIO et al., 2008). According to Veiga Jr. et al. (2005), the population must be attentive to the use of species as *Symphytum officinale* L. (comfrey) that is popularly indicated as healing, however, after several researches, the use of this plant was not recommended by the World Health Organization due to the hepatotoxic effect when ingested (BRASIL, 2006b). Although studies have not indicated problems with liver or kidney toxicity, the use of gorse tea (*Baccharis* spp.) should be prohibited for pregnant women, given the proved risks of abortion, and for pacients using drugs to treat blood pressure problems, due to the low pressure that may cause (RUIZ et al, 2008). According to Ritter et al. (2002) and Tomazzoni et al. (2006) the *Artemisia absinthium* L. (wormwood) should be used with caution, since it has a strong depressant action on central nervous system, and at high doses may cause miscarriages. Finally, *Lippia alba* (Mill.) N.E. Br. (Lime balm) indicated as tranquilizer and digestive, at high concentrations (200 mg leaves kg^{-1} animal), there were remarkable toxic effects, which could discourage the use of preparation of this species for therapeutic purposes (BRASIL, 2006b).

The scenario verified in the present study is concerning, since some of the species listed by respondents are recognized in literature as potentially toxic or responsible for undesirable side effects. The idea that medicinal plants are harmless, without toxicity potential by being "naturals" is frequent, and may lead to serious consequences, side effects, interactions and intoxications. It was possible to observe that the population from Mandaguaçu municipality (State of Paraná) practices self medication, from medicinal plants without information that restrain the use of any of these quoted vegetal. Given this, it is necessary to clarify the population about some essential points for the rational use of medicinal plants such as: therapeutic indication, dosage, and species ambiguity. In this way, this information will be disseminated in order to correlate the popular and scientific knowledge.

Conclusion

The investigation about the popular knowledge from residents of Mandaguaçu municipality showed that they know the correct method for preparing the medicinal plants. However, they report that do not know any adverse effect caused by these plants. This scenario is worrying because some species are recognized in the literature as potentially toxic or responsible for adverse effects. In this way, it is important to advise the population about the safe use of medicinal plants.

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