



## Medicinal plants used by the population of Goianópolis, Goiás State, Brazil

Nayane Peixoto Soares<sup>1</sup>, Alessandro Camilo Neres<sup>2</sup>, Tainá de Abreu<sup>1</sup>, Gabriel de Abreu Pfrimer<sup>1</sup>, Hisao Nishijo<sup>3</sup> and Tales Alexandre Aversí-Ferreira<sup>3\*</sup>

<sup>1</sup>Universidade Federal de Uberlândia, Faculdade de Medicina Veterinária, Uberlândia, Minas Gerais, Brazil. <sup>2</sup>Universidade Estadual de Goiás, Campus Palmeiras de Goiás, Goiás, Brazil. <sup>3</sup>University of Toyama, System Emotional Science Graduate School of Medicine and Pharmaceutical Sciences, Sugitani, 2630, Toyama, Japan. \*Author for correspondence. E-mail: [aversiferreira@gmail.com](mailto:aversiferreira@gmail.com)

**ABSTRACT.** In Brazil, the knowledge on the use of medicine plants comes mainly from natives with African and European influences. With descriptive purposes and valuation of traditional knowledge, a study with induced questioning was conducted in the municipality of Goianópolis, Goiás State, to verify the plants considered to be medicinal by the local population. The data collection through structured interviews in the form of questionnaires from sixty inhabitants randomly selected. The study followed the ethical aspects and was approved by the *Unievangélica* Research and Ethics Committee. Most of the interviewed subjects was of female gender, older than 30 years and had already lived in the rural area for at least one phase of their lives, the use of leaves and the method of tea making and infusion were most mentioned, the plants most used were Lemon Balm, Mint, Chilean evergreen tree, elderberry, wormseed, Pennyroyal, and the most mentioned families are Asteraceae and Lamiaceae. The knowledge about plants use was obtained, according most of interviewed, from family. In conclusion, the data observed in Goianópolis, Goiás State, corroborates of those observed by other researchers about the use of plants, the most used botanical families, the plant parts to be used and the form of preparation.

**Keywords:** ethnobotany, ethnopharmacology, medicinal plants, Brazilian savanna.

## Plantas medicinais utilizadas pela população de Goianópolis, Estado de Goiás, Brasil

**RESUMO.** No Brasil, o conhecimento sobre o uso de plantas medicinais é proveniente principalmente dos indígenas, com influências negras e européias. Com fins descritivos e de valorização do conhecimento tradicional, foi realizado um estudo de questionamento induzido no município de Goianópolis, Estado de Goiás, para a verificação das plantas consideradas de caráter medicinal usadas pela população desse município. O estudo foi aprovado pelo Comitê de Ética e Pesquisa da Unievangélica e foram entrevistados 60 moradores escolhidos através de sorteio. A maioria foi do gênero feminino, maiores de 30 anos e já residiram na zona rural em pelo menos uma fase da vida. O uso de folhas e o modo de preparo de chá e infusão foram os mais citados, as plantas mais utilizadas foram erva-cidreira, hortelã, boldo, sabugueiro, erva-de-santa-maria e poejo e as famílias mais citadas foram a Asteraceae e a Lamiaceae, nesta ordem. O conhecimento sobre a utilização das plantas foi adquirido, segundo a maioria dos entrevistados, por informações ensinadas na própria família. Em conclusão, os dados obtidos em Goianópolis, Estado de Goiás, estão em acordo com o observado por outros pesquisadores sobre o uso de plantas medicinais, as famílias de plantas mais citadas, as partes mais usadas das plantas e a forma de preparo.

**Palavras-chave:** etnobotânica, etnofarmacologia, plantas medicinais, cerrado.

### Introduction

Ethnobotany is a new scientific discipline, with incipient epistemology; it is old in its practice, but new in its theoretical scope, because it was verified that the use of plants for therapeutic purposes is very ancient, being verified since ancient times in Iran, India and especially China (FRANÇA et al., 2008; REZENDE; COCCO, 2002; VALE, 2002).

In Brazil, the knowledge on the use of medicinal plants is primarily derived from the indigenous

(GARLET; IRANG, 2001; GRYNBERG et al., 2002; REZENDE; COCCO, 2002; RODRIGUES; CARLINI, 2003), with African and European influences (GARLET; IRANG, 2001; GRYNBERG et al., 2002), and several studies have been conducted in order to verify which are the plants used for medicinal purposes by the Brazilian population in several communities from the *Cerrado* region (ALBUQUERQUE; HANAZAKI, 2006; ALVES et al., 2008; PASA et al., 2005; RODRIGUES; CARVALHO, 2001; SOUSA et al.,

2010; VILA-VERDE et al., 2003). França et al. (2008) reported that industry and government are interested in employing the technological progress from medicinal products based on popular knowledge aimed at a health care policy and Azevedo and Silva (2006) report that ethnobotany studies have contributed for conservation and planning management of ecosystems.

In this context, the growing appreciation of traditional knowledge fosters the emergence of renewed interest in economic benefits coming from plants, which values the knowledge to further economic exploitation, with bio prospecting purposes (ELISABETSKY, 2003). Concomitantly, the World Health Organization (WHO) has invested in programs to promote alternative therapies, with a strong focus for the use of medicinal plants in order to meet the needs of primary health care in an attempt to fill the lack of medicines from industrial sources (ALVES; SILVA, 2003; FRANÇA et al., 2008; JESUS et al., 2009; RATES, 2001; REZENDE; COCCO, 2002; TOMAZZONI et al., 2006).

Researches on herbal medicines from the cultural investigation have a sense that should go beyond simple compilation (ALBUQUERQUE; HANAZAKI, 2006). Some studies indicate criteria for the focus of ethnobotanical works (ALBUQUERQUE; HANAZAKI, 2006; GUIRADO; CUÉLLAR, 2008) in order to produce drugs in ethnomedical, ecological, chemotaxonomic, epidemiological, genomic, metabolic and random selection terms. Silva and Proença (2008) report that of the many ethnobotanical studies on medicinal plants in different regions of Brazil, few has been investigated in this regard in forested areas from the *Cerrado* biome, and Guarim-Neto and Moraes (2003) report that the *Cerrado* biome is a large keeper of biological diversity and considered the savanna formation with the highest plant diversity in the world, generating national and international interest in research in communities for study, conservation and rational use of resources of this ecosystem (SOUZA; FELFILI, 2006).

For descriptive purposes and recovery of traditional knowledge, conceptualized by Diegues and Arruda (2001), since "knowledge and know-how about the natural and supernatural world created within the non-urban/industrial society and orally transmitted from generation to generation", a study of induced questioning was conducted in the municipality of Goianópolis, Goiás State, (*Cerrado* region) to verify plants considered medicinal by the population of this municipality in order to conduct an ethnobotanical survey of medicinal plants of popular use; obtaining the following information: 1) qualitative and quantitative data on the use of medicinal plants in the

population of Goianópolis, Goiás State, 2) ways these plants are prepared, 3) if the residents who use these plants are aware of the purpose and effects of their use, 4) assist to recover and preserve the traditional knowledge about medicinal plants.

## Material and methods

The study area is part of the municipality of Goianópolis, Goiás State, which has 11 663 inhabitants according to 2009 estimates, and is at 915 m above sea level, located at 16° 30' 36" S and 49° 00' 36" W. The economic character this town is based on tomatoes plantation presenting the most rural characteristic than others cities in central region of Goiás province.

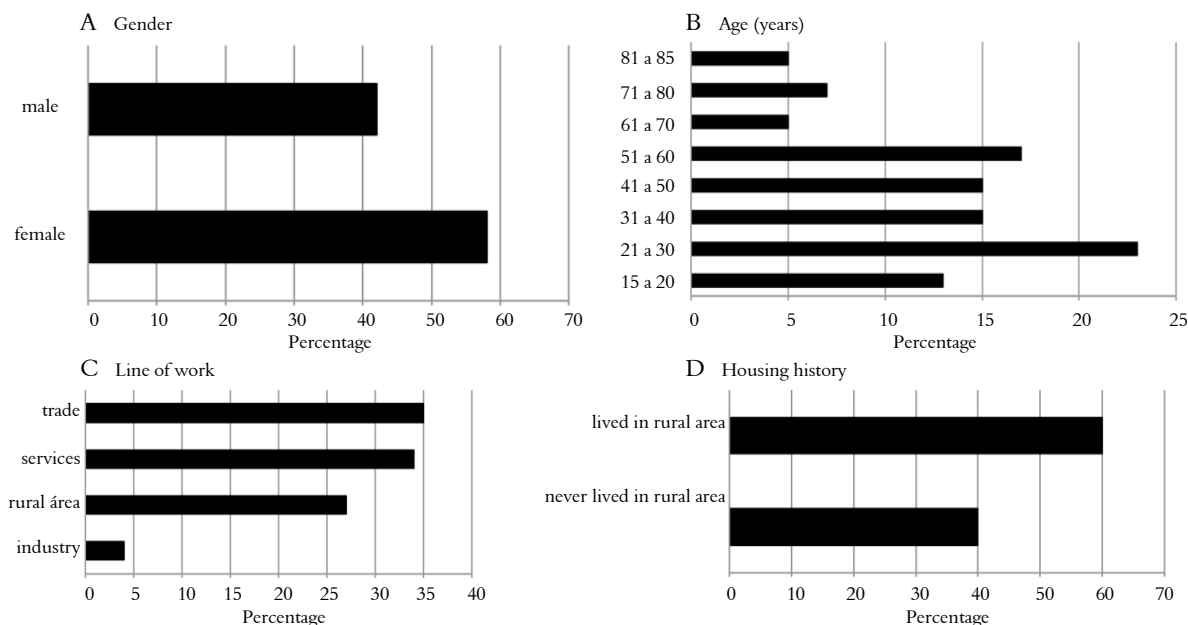
The climate has two seasons, one hot and rainy and another cold and dry, with annual average temperature of 19°C. It is located in a *Cerrado* area between the City of Anápolis and the state capital Goiânia.

Data collection of the ethnobotanic survey of medicinal plants used by the population occurred in April 2010 and was performed according to the adapted methodology proposed by Albuquerque and Hanazaki (2006), through structured interviews using questionnaires, totaling 0.51% of the population of Goianópolis. Were interviewed 60 habitants distributed for 30 squares, two for square, from random method using statistical table. The consent of the respondents was documented by signing the Free and Clear Consent Form (FCCF). By popular names, citations from the informants and visualization *in loco* confronted with literature data. The study followed the ethical aspects recommended, being approved by the *Unievangelica* Ethics Research Committee under Protocol 0027 / 2010.

## Results and discussion

Respondents are mostly women (Figure 1A) above 30 years of age (Figure 1B).

Women seem to be more careful and have more knowledge about medicinal plants than men (AMOROZO; GÉLY, 2002), especially in the vicinity of the residence (PEREIRA et al., 2009), data supported by this work because gender (sex) was not prioritized during the interview but it was asked if there was someone in the house who could provide information on medicinal plants, which hypothetically determined the difference between the frequency of respondents in relation to gender. Vendruscolo and Mentz (2006) reported that in an interview in the district of Ponta Grossa, municipality of Porto Alegre, Rio Grande do Sul State, 90.2% of respondents were women.

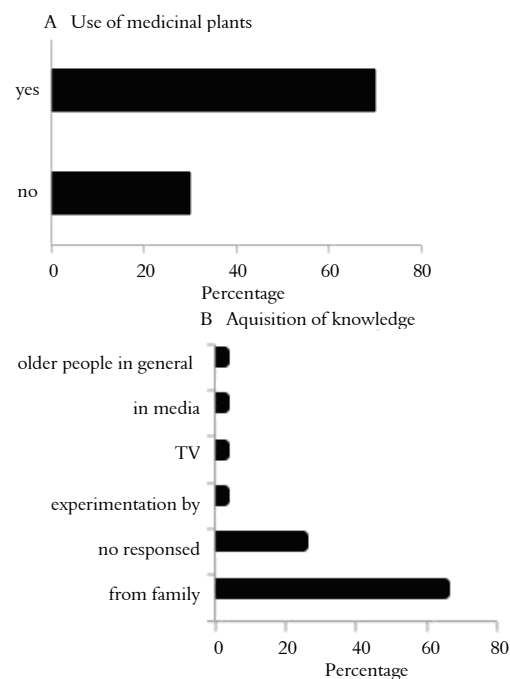


**Figure 1.** Socio-economic data of the population of Goianópolis, Goiás State. (A) Gender percentages, (B) Age percentages, (C) Line of work percentages, (D) Housing history percentages of residents from Goianópolis, Goiás State.

People over the age of thirty-five years have also been cited in literature as having higher frequency of knowledge about medicinal plants (REZENDE; COCCO, 2002), which as justified by the knowledge held by older people in the community (PASA et al., 2005). As for their line of work, most of the respondents' relatives worked in trade, followed by works in rural areas. Only a few people worked in industries (Figure 1C). According to the relation of respondents with rural areas, 60% have lived in rural areas for at least one phase of life (Figure 1D), in which 27.78% lived only in childhood, 19.44% only in adolescence, 5.56% only in adulthood, 16.67% up to adolescence and 30.55% up to adulthood.

The fact that most respondents have lived in rural areas justifies that 71.67% of the population to use of medicinal plants (Figure 2A), since in works conducted in rural communities, people use of medicinal plants regularly (GARLET; IRANG, 2001; MEDEIROS et al., 2004; NEGRELLE; FORNAZZARI, 2007; REZENDE; COCCO, 2002; RODRIGUES; CARVALHO, 2001; RODRIGUES; GUEDES, 2006; VILA-VERDE et al., 2003). The use of medicinal plants has been also verified in the state of Goiás, in the state capital Goiânia and in the cities of Goiás and Pirenópolis by Rizzo et al. (1999), Souza and Felfili (2006), in the city of Alto Paraíso and Silva and Proença (2008) in the city of Ouro Verde. Among the residents who use medicinal plants, 93.02% do not know the scientific name of plants and 6.98% say they do. The knowledge about the use of plants has been acquired by experimentation, television media, by research and other means, by older people in general

and mostly by the family (Figure 2B), in which 36.11% acquired the knowledge from their parents, 22.22% from grandparents, 2.78% from uncles and 22.22% from forefather in general, 16.67% did not mention the family person, 24.44% did not answer or did not know the source from which they acquired knowledge about medicinal plants.



**Figure 2.** Use of medicinal plants and acquisition of this knowledge by residents of Goianópolis, Goiás State. (A) Percentage of residents who use medicinal plants, (B) percentage on the acquisition of knowledge about medicinal plants.

These data corroborate previous results that traditional knowledge is acquired from generation to generation (PASA et al., 2005), as observed in Goiania and neighboring cities such as Anápolis, Trindade and Aparecida de Goiânia (TRESVENZOL et al., 2006). However, the fact that some respondents have acquired this knowledge from television and media research is in agreement with Azevedo and Silva (2006), who verified demand by medicinal plants in open fairs and markets from Rio de Janeiro, Rio de Janeiro State, when they were mentioned in mass media. Amorozo (2002) reports that farmers from Mato Grosso acquire information through television. Amorozo (1996) also reports that in traditional societies, oral communication is the primary media and that comes from intense and prolonged contact between older and newer people of this society, what does not occur in urban societies, which reinforces the fact that although the municipality of Goianápolis, Goiás State, has some characteristics of urbanization, it can still be considered a traditional society.

The plants most used by the community were Lemon balm, Mint, Boldo, Elderberry, Wormseed and Pennyroyal, and the most quoted botanical families are Asteraceae (eight species), Lamiaceae (seven species), Fabaceae (four species) and Rutaceae (four species) (Table 1 and Figure 3).

This result is in agreement with Silva and Proença (2008), who found that the plant families most commonly used by the population of the city of Ouro Verde, Goiás State, were Asteraceae and Lamiaceae, as well as with Leitão-Filho et al. (2009) in a survey conducted in Petropolis and Nova Friburgo, Rio de Janeiro State.

These data are consistent with Pasa et al. (2005), who reported that Asteraceae and Lamiaceae are the families with the most widely used medicinal plants in the city of Conceição-Açu (Mato Grosso State), Vendruscolo and Mentz (2006) reported that two families were the most mentioned in the study conducted in the district of Ponta Grossa (Porto Alegre, Rio Grande do Sul State), Rodrigues and Carlini (2003) reported that plants from Asteraceae family are the most used by a native community of Mato Grosso, near Cuiabá and a study conducted by Damasceno and Barbosa (2008) in savanna community of Martinesia (Uberlândia, Minas Gerais State), Asteraceae and Lamiaceae families were the most cited.

Amorozo (2002) mentioned that the second most cited family was Asteraceae followed by Euphorbiaceae in Santo Antônio de Leverger (Mato Grosso State). The same was found in the study by Pereira et al. (2009), in Ponta Pora (Mato Grosso State), in which the Asteraceae species was less mentioned than Lamiaceae species, these authors also reported that Lamiaceae and Asteraceae families are the most widely used in studies conducted in Southern Brazil. Sousa et al. (2010) reported that Asteraceae and Lamiaceae species are the most used in the *Cerrado* regions due to the large number of species with medicinal properties belonging to these families. The scientific names of species are inferences based on popular names and descriptions provided by respondents, because many are not cultivated in their homes and there were no dried specimens to conduct the conference.

**Table 1.** Medicinal plants used by people from Goianápolis, Goiás State, according to Botanical Family and use in accordance with reports from respondents.

Family/Scientific name/Popular name	Part used/preparation	Indication Therapeutic/Frequency	Dose	Side effect/Restrictions
<b>Aloaceae</b>				
<i>Aloe vera</i> (L.)/ <i>Aloe, babosa</i>	Leaf (mucilage)/ tablet	Liver, stomach, hemorrhoids, healing/ 1	3 tablets/ 3 times a day	Lower doses for children
<b>Apiaceae</b>				
<i>Foeniculum vulgare</i> Mill./ Fennel, funcho	Leaf, seed/ infusion	Colic/ 1	1 or 2 times a day	
<i>Pimpinella anisum</i> L./ Anise, erva doce	Leaf/ infusion, tea	Calming, narcotic/ 2	½ glass	Little by little. Do not drink it with full stomach
<b>Aristolochiaceae</b>				
<i>Aristolochia gilbertii</i> Hook / Dutchman's Pipe, milhomem	Root/immersed in water	Stomach, headache/ 1	½ cup/ 3 times a day	Lower doses for children
<b>Aspleniaceae</b>				
<i>Asplenium auritum</i> Sw./ Eared spleenwort, douradinha	Leaf/ infusion, tea	Kidneys/ 2	1 or 2 liters, 1 glass/ several times a day, 4 times a day	
<b>Asteraceae</b>				
<i>Achyrocline satureioides</i> (Lam.) DC./ Marcela, marcelinha	Leaf/ infusion, tea, macerate	Diarrhea, intestinal infection, stomach, labyrinthitis / 2	1 glass, 1 tablespoon, ½ glass/ 3 times a day	Lower doses for children
<i>Ageratum conyzoides</i> L./ Whiteweed, mentrasto	Root/ tea	Stomach/ 1	½ glass	
<i>Artemisia absinthium</i> L./ wormwood, losna	Leaf/ macerate	Stomach, liver, digestive tract/ 3	1 glass, ½ cup/ 3 times a day	

Continue...

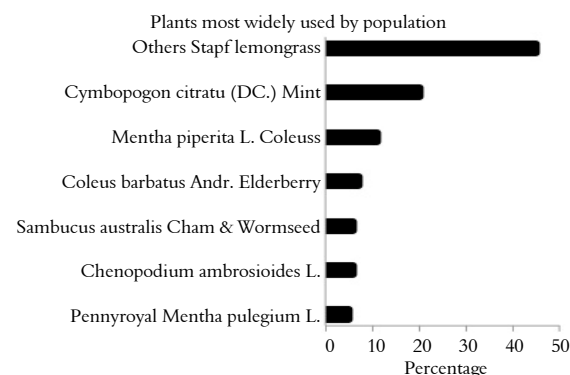
...continuation

Family/Scientific name/Popular name	Part used/preparation	Indication Therapeutic/ Frequency	Dose	Side effect/Restrictions
<i>Artemisia vulgaris</i> L./ mugwort, artemísia	Leaf/ syrup	Flu/ 1	1 tablespoon	
<i>Baccharis trimera</i> DC./ Carqueja	Leaf/ tea	Stomach/ 1	½ glass	Lower doses for children, contraindicated for pregnant women
<i>Bidens pilosa</i> L./ Spanish Needle, picão	Leaf/ tea	Hepatitis/ 1	Take whenever thirsty, bath	
<i>Mikania glomerata</i> Spreng / Guaco	Leaf/ tea, syrup	Flu, Cold, cough/ 1	1 glass, 1 tablespoon at night	Lower doses for children, do not open the refrigerator, do not drink anything cold
<i>Matricaria chamomilla</i> L./ Chamomile, camomila	Leaf/tea	Narcotic / 1	3 cups	Sleep/ Lower doses for children
<b>Boraginaceae</b>				
<i>Symphytum officinale</i> L./ Comfrey, confrei	Leaf/ spread on site	Healing/ 1	3 times a day	
<b>Caprifoliaceae</b>				
<i>Sambucus australis</i> Cham & Schltdl/ Elderberry, sabuqueiro	Leaf, flower/ infusion, tea, syrup in alcohol	Flu, cough/ 6	1 glass, 1 tablespoon at night	Do not drink it too hot, do not catch chill
<b>Chenopodiaceae</b>				
<i>Chenopodium ambrosioides</i> L./ Wormseed, mastruz, erva de Santa Maria	Leaf/ tea, mixed with salt or in alcoholic solution	Vermifuge, hypertension, stomach, swelling, infection, inflammation, skin cancer, antibiotic, healing / 6	1 tablespoon, ½ glass, 1 glass, up to cover the lesion/ at night, 3 times a day	Do not drink it with empty stomach
<b>Cucurbitaceae</b>				
<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai/ watermelon, melancia	Seed/ tea	Pneumonia/ 1	1 cup/ 3 times a day	
<b>Euphorbiaceae</b>				
<i>Croton perdicipes</i> Saint-Hilaire/ Pé-de-perdiz	Root/ in the form of wine, bottleful	Uterine infection / 1	20 mL/ in the morning and at night	Only for women, contraindicated for children
<i>Phyllanthus niruri</i> L./ stone breaker, quebra pedra	Leaf/ infusion	Kidneys/ 1	1 glass	Lower doses for children
<b>Fabaceae</b>				
<i>Bowdichia virgiloides</i> Kunth/ Sucupira	bean/ tea, macerate	Throat/ 2	5 beans, 1 cup/ at any time	
<i>Centrosema bracteosum</i> Benth./ Butterfly pea, rabo de tatu	Root/ mixture	Stomach/ 1	½ glass/ 3 times a day	Lower doses for children
<i>Copaifera multijuga</i> Hayne/ Copaiba, copaiba	Stem (natural oil)	Asthma, healing/ 1	2 drops	
<i>Senna obtusifolia</i> (L.) H.S.Irwin & Barneby/ Sicklepod, fedegoso	Root/ tea, macerate	Flu/ 1	2 roots/ at any time	
<b>Lamiaceae</b>				
<i>Basilicum polystachyon</i> (L.) Moench/ Musk basil, alfavaca	Leaf/ Infusion, syrup, tea	Flu, cough/ 3	1 glass / 3 times a day	Do not drink it too hot, do not catch chill
<i>Coleus barbatus</i> Andr./ Boldo	Leaf/ macerate, tea	Stomach/ 8	½ glass, 1 glass	Vomiting/ Lower doses for children, contraindicated for pregnant women
<i>Mentha pulegium</i> L./ Pennyroyal, poejo	Leaf/tea, infusion with honey, macerate	Colic in children, flu, fever in children/ 5	½ glass, 1 tablespoon / 2 times a day	
<i>Mentha piperita</i> L./ Mint, hortelã	Leaf/infusion, tea, syrup mixed with milk and sugar	Flu, digestive, fever, labyrinthitis, pain/ 11	½ glass, 1 glass, 1 tablespoon / 2 times a day, at night	Do not drink it too hot, do not catch chill, Lower doses for children
<i>Plectranthus amboinicus</i> (Lour) spreng/ Cuban oregano, malva do reino	Leaf/infusion	Flu/ 1	½ glass/ 2 times a day	
<i>Coleus barbatus</i> Andr./ Coleuss, sete dores	Leaf/ macerate	Stomach, headache, nausea/ 1	½ glass of water	Tachycardia
<i>Rosmarinus officinalis</i> L./ Rosemary, alecrim	Leaf/ juice	Aging/ 1	1 glass/ in the morning	
<b>Malvaceae</b>				
<i>Gossypium barbadense</i> L./ Cotton, algodão	Leaf/ macerate	Infection/ 1	1 glass/ 3 times a day	
<b>Monimiaceae</b>				
<i>Siparuna apiosyce</i> (Mart. ex Tul.) A. DC./ Siparuna, limão bravo	Leaf/ infusion	Narcotic/ 1	At night	In high amounts causes low blood pressure / sweating / Lower doses for children
<b>Moraceae</b>				
<i>Brosimum gaudichaudii</i> Tréc./ Sweet Cotton, algodãozinho	Leaf/ in the form of wine, bottleful	Uterine infection/ 1	20 mL/ in the morning and at night	Only for women, contraindicated for children
<b>Myrtaceae</b>				
<i>Eucalyptus globulus</i> Labil./ Eucalyptus, eucalipto	Leaf/bath macerate, tea	Flu, fever, cold/ 3	½ glass/ 2 times a day, at night	
<i>Syzygium malaccensis</i> L./ Mountain apple, jambo	Seed/ tea	Diabetes/ 1	1 cup/ 3 times a day	

Continue...

...continuation

Family/Scientific name/Popular name	Part used/preparation	Indication Therapeutic/Frequency	Dose	Side effect/Restrictions
Oxalidaceae				
<i>Averrhoa carambola</i> L./ Starfruit, carambola	Natural fruit	Diabetes/ 1	In the morning	
Poaceae				
<i>Cymbopogon citratus</i> (DC.) Stapf / lemongrass, capim cidreira	Leaf, root/tea, bath, infusion, syrup	Flu, calming, insomnia, hypertension/ 20	½ glass, 3 cups, 1 glass, 1 tablespoon/ 2 times a day, in the morning and at night, 3 times a day	Lower doses for children, Do not drink it too hot, and do not catch chill. Do not drink it with empty stomach
Rutaceae				
<i>Citrus aurantium</i> L./ Orange, laranja	Leaf/ infusion	Flu/ 1	1 glass	Do not drink it too hot, do not catch chill
<i>Citrus aurantifolia</i> Swingle/ Key lime, limao galego	Fruit/ Infusion	Flu, cough/ 1	1 glass	
<i>Citrus limettoides</i> Tanaka/ Sweet lime, lima de bico	Leaf, fruit peel/ tea, alcoholic solution	Labyrinthitis, sinusitis, hypertension / 1	5 drops, 1 dose of tea/ morning and night	
<i>Ruta graveolens</i> L./ Rue, arruda	Leaf/ infusion with honey	Flu/ 1	1 tablespoon / 2 times a day	Contraindicated for pregnant women
Verbenaceae				
<i>Stachytarpheta cayennensis</i> (Rich.) Vahl/ Verbená, gervão	Leaf/ macerate	Gastritis, cancer/ 1	1 liter/ during the day, 1 glass/ morning	



**Figure 3.** Plants most widely used by the population of Goianópolis, Goiás State.

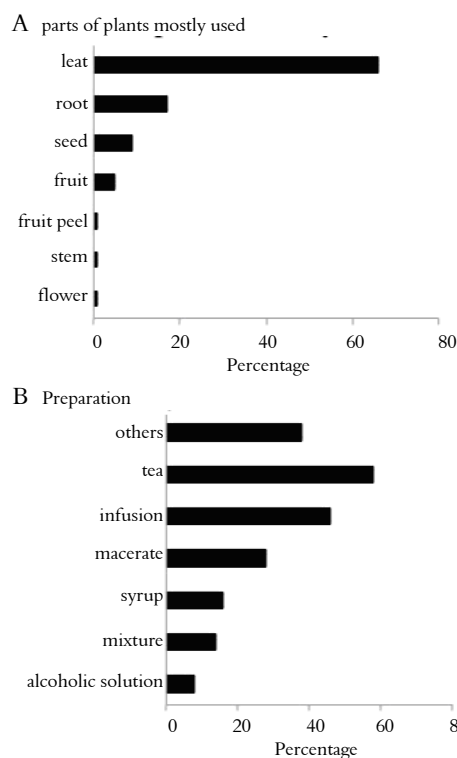
The most frequently used plant parts were leaves, roots and seeds (Table 1 and Figure 4A). This finding is confirmed in the work of Garlet and Irang (2001), Amorozo (2002), Pasa et al. (2005), Pereira et al. (2009), in which the leaves are the plant parts most used by the populations studied.

The most mentioned preparations were tea, infusion, macerate, syrup, mixture and alcoholic solution (Table 1 and Figure 4B). Garlet and Irang (2001) found in rural workers from Cruz Alta, Rio Grande do Sul State, that tea is the predominant form of preparation. Some authors indicate that the infusion is the form of preparation also prevalent in several other communities (ALVES et al., 2008; AMOROZO, 2002; DAMASCENO; BARBOSA, 2008; PASA et al., 2005; PEREIRA et al., 2009).

Souza et al. (2010), attributes the larger use of leaves, associated with the preparation of tea and infusion, to that fact that leaves are easy to obtain and the simplicity and quickness in these forms of preparation.

When asked about their intention for using medicinal plants, 51.16% responded that they use to alleviate symptoms and 48.84% used for healing.

Regarding frequency of use, 64.29% use the plants whenever necessary, 26.19% use always and 9.52% rarely use.



**Figure 4.** Parts of medicinal plants mostly used (A) and form of preparation (B) Goianópolis, Goiás State.

Among respondents, 68.29% did not associate plants to allopathic drugs, 31.71% make this association and of these, 61.54% associate it with the intention to “enhance the effect of the plant”, 30.77% to “improve the effect” and 7.69% for “complementary effect”.

Brasileiro et al. (2008), noted that among those treated at a health institution in Governador Valadares (Minas Gerais State) rarely use plants, but there are a large number of respondents who use them frequently, what shows that many primary diseases that lead people to acquire allopathic medicines are treated with medicinal plants by the population.

Rezende and Cocco (2002) found in a rural community in Minas Gerais that the use of medicinal plants occurs more frequently in diseases considered by residents as more simple, and people search for pharmacies and health care units only in cases they deemed more serious. Simões et al. (2003) pointed out that the high cost of manufactured drugs and the difficult access of population to health care units are factors contributing to the preference of using medicinal plants, which could be observed in Goianópolis, Goiás State, since there are only few public and private health care units in the city, associated with the low concomitant use of plants and allopathic drugs.

Restrictions on the use of medicinal plants most indicated by the respondents (Table 1) were "lower dose for children" when using Aloe, Dutchman's Pipe, Marcela, Gorse, Guaco, Chamomile, stone-breaker, Rabo-de-tatu, Boldo, Mint, Siparuna, Lemon grass; "contraindicated for pregnant women" for Gorse, Boldo and Rue"; "do not catch chill" and "do not take a bath too hot" for Guaco, Elderberry, Musk basil, Mint, Lemon grass and Orange. The side effects mentioned were asleep when taking Chamomile, vomiting for Boldo, tachycardia for Coleus and low blood pressure and sweating for high amounts of Siparuna.

These data show that although they admit limitations and side effects in the use of plants, little is known about their toxicity in this community. Veiga Júnior et al. (2005) reported that toxicity, side effects and interactions with allopathic medicines commonly occur in the indiscriminate and lay use of medicinal plants, which leads to health problems. The medicinal plants present promising alternative therapy; it is necessary to educate the population on the proper use of these plants.

From respondents who use plants, 2.63% make some kind of sympathy or prayer and 97.37% responded negatively, unlike what Rezende and Cocco (2002) found in a rural population where traditional witchdoctors and healers are closely related to the use of medicinal plants. In general, Goianópolis is a city that follows the cultural patterns reported by other authors on the use of

medicinal plants and which need for use is associated with alternative therapies in communities with poor access to health programs and medical assistance. The use of leaves and how to prepare tea and infusions are also the most frequently cited by subsequent studies, perhaps because leaves are easy to obtain and also their preparation, and the most mentioned families are Asteraceae and Lamiaceae perhaps because they are the most common in the *Cerrado* regions with therapeutic properties.

There is awareness of some interviewed about side effects and restrictions on the use of plants, but little is effectively known on the toxicity of plants in this community. Thus, there is need to verify data about the correct use of plants and spread such information with the purpose of educating the population, a work that must be performed by health professionals trained in association with public investment, since costs on medicines are high and the use of medicinal plants is a feasible alternative and of easy access to the population.

## Conclusion

The data from this study can provide information to health professionals in the region about the use of medicinal plants to aid the needy, for pharmacobotanics and health professionals interested in working with natural products.

In conclusion, the data observed in Goianópolis, Goiás State, are representative of those observed by other researchers about the use of plants; the most used botanical families, the plant parts to be used and the form of preparation.

## Acknowledgements

The authors thank the anonymous reviewers for their wise and very helpful comments on previous versions of this article.

## References

- ALBUQUERQUE, U. P.; HANAZAKI, N. As pesquisas etnorientadas na descoberta de novos fármacos de interesse médico e farmacêutico: fragilidades e perspectivas. **Revista Brasileira de Farmacognosia**, v. 16, suppl., p. 678-689, 2006.
- ALVES, A. R.; SILVA, M. J. P. O uso da fitoterapia no cuidado de crianças com até cinco anos em área central e periférica da cidade de São Paulo. **Revista da Escola de Enfermagem da USP**, v. 37, n. 4, p. 85-91, 2003.
- ALVES, E. O.; MOTTA, J. H.; SOARES, T. S.; VIEIRA, M. C.; SILVA, C. B. Levantamento etnobotânico e caracterização de plantas medicinais em fragmentos florestais de Dourados-MS. **Revista Ciência Agrotecnica**, v. 32, n. 2, p. 651-658, 2008.

- AMOROZO, M. C. M. A abordagem etnobotânica na pesquisa de plantas medicinais. In: DI STASI, L. C. (Ed.). **Plantas medicinais: arte e ciência. Um guia de estudo interdisciplinar**. São Paulo: Editora da Universidade Estadual Paulista, 1996. p. 47-68.
- AMOROZO, M. C. M. Uso e diversidade de plantas medicinais em Santo Antonio do Leverger, MT, Brasil. **Acta Botanica Brasilica**, v. 16, n. 2, p. 189-203, 2002.
- AMOROZO, M. C. M.; GÉLY, A. L. Uso de plantas medicinais por caboclos do Baixo Amazonas, Barcarena – PA, Brasil. **Boletim do Museu Paraense Emílio Goeldi (Serie Botanica)**, v. 4, n. 1, p. 47-131, 2002.
- AZEVEDO, S. K. S.; SILVA, I. M. Plantas medicinais e de uso religioso comercializadas em mercados e feiras livres no Rio de Janeiro, RJ, Brasil. **Acta Botanica Brasilica**, v. 20, n. 1, p. 185-194, 2006.
- BRASILEIRO, B. G.; PIZZIOLO, V. R.; MATOS, D. S.; GERMANO, A. M.; JAMAL, C. M. Plantas medicinais utilizadas pela população atendida no “Programa de Saúde da Família”, Governador Valadares, MG, Brasil. **Revista Brasileira de Ciências Farmacêuticas**, v. 44, n. 4, p. 630-636, 2008.
- DAMASCENO, A. A.; BARBOSA, A. A. A. Levantamento etnobotânico de plantas do bioma do Cerrado na comunidade de martinésia, Uberlândia-MG. **Horizonte Científico**, v. 1, n. 8, p. 1-30, 2008.
- DIEGUES, A. C.; ARRUDA, R. S. V. **Saberes tradicionais e biodiversidade no Brasil**. Brasília: Ministério do Meio Ambiente, 2001.
- ELISABETSKY, E. Etnofarmacologia. **Ciência e Cultura**, v. 55, n. 3, p. 35-36, 2003.
- FRANÇA, I. S. X.; SOUZA, J. A.; BAPTISTA, R. S.; BRITTO, V. R. S. Medicina popular: benefícios e malefícios das plantas medicinais. **Revista Brasileira de Enfermagem**, v. 61, n. 2, p. 201-208, 2008.
- GARLET, T. M. B.; IRANG, B. E. Plantas medicinais utilizadas na medicina popular por mulheres trabalhadoras rurais de Cruz Alta, Rio Grande do Sul, Brasil. **Revista Brasileira de Plantas Medicinais**, v. 4, n. 1, p. 9-18, 2001.
- GUARIM-NETO, G.; MORAIS, R. G. Recursos medicinais de espécies do cerrado de Mato Grosso: um estudo bibliográfico. **Acta Botanica Brasilica**, n. 17, v. 4, p. 561-584, 2003.
- GUIRADO, O. A. A.; CUÉLLAR, A. C. Estratégias en la selección de las plantas medicinales a investigar. **Revista Cubana de Plantas Medicinales**, v. 13, n. 3, s/p., 2008.
- GRYNBERG, N. F.; ECHEVARRIA, A.; MACIEL, M. A. M.; PINTO, A. C.; VEIGA JÚNIOR, P. V. F. Plantas medicinais: a necessidade de estudos multidisciplinares. **Química Nova**, n. 25, v. 3, p. 429-438, 2002.
- JESUS, N. Z. T.; LIMA, J. C. S.; SILVA, R. M.; ESPINOSA, M. M.; MARTINS, D. T. O. Levantamento etnobotânico de plantas popularmente utilizadas como antiúlcera e antiinflamatórias pela comunidade de Pirizal, Nossa Senhora do Livramento – MT, Brasil. **Revista Brasileira de Farmacognosia**, v. 19, n. 1A, p. 130-139, 2009.
- LEITÃO-FILHO, F.; FONSECA-KRUEL, V. S.; SILVA, I. M.; REINERT, F. Urban ethnobotany in Petrópolis and Nova Friburgo (Rio de Janeiro, Brazil). **Revista Brasileira de Farmacognosia**, v. 19, n. 1B, p. 333-342, 2009.
- MEDEIROS, M. F. T.; FONSECA, V. S.; ANDREATA, R. H. P. Plantas medicinais e seus usos pelos sítiantes da reserva rio das Pedras, Mangaratiba, RJ, Brasil. **Acta Botanica Brasilica**, v. 18, n. 2, p. 391-399, 2004.
- NEGRELLE, R. R. B.; FORNAZZARI, K. R. C. Estudo etnobotânico em duas comunidades rurais (Limeira e Ribeirão Grande) de Guaratuba (Paraná, Brasil). **Revista Brasileira de Plantas Medicinais**, v. 9, n. 2, p. 36-54, 2007.
- PASA, M. C.; SOARES, J. J.; GUARIM-NETO, G. Estudo etnobotânico na comunidade de Conceição-Açu (alto da bacia do rio Aricá Açu, MT, Brasil). **Acta Botanica Brasilica**, v. 19, n. 2, p. 195-207, 2005.
- PEREIRA, Z. V.; MUSSURY, R. M.; ALMEIDA, A. B.; SANGALLI, A. Medicinal plants used by Ponta Porã community, Mato Grosso do Sul State. **Acta Scientiarum. Biological Sciences**, v. 31, n. 3, p. 293-299, 2009.
- RATES, S. M. K. Plants as source of drugs. **Toxicon**, v. 39, n. 5, p. 603-613, 2001.
- REZENDE, H. A.; COCCO, M. I. M. A utilização de fitoterapia no cotidiano de uma população rural. **Revista da escola de enfermagem da USP**, v. 36, n. 3, p. 282-288, 2002.
- RIZZO, J. A.; CAMPOS, I. F. P.; JAIME, M. C.; MUNHOZ, G.; MORGADO, W. F. Utilização de plantas medicinais nas cidades de Goiás e Pirenópolis, Estado de Goiás. **Revista Brasileira de Ciências Farmacêuticas**, v. 20, n. 2, p. 431-447, 1999.
- RODRIGUES, E.; CARLINI, E. A. Levantamento etnofarmacológico realizado entre um grupo de quilombolas no Brasil. **Arquivos Brasileiros de Fitomedicina Científica**, v. 2, n. 1, p. 80-87, 2003.
- RODRIGUES, V. E. S.; CARVALHO, D. A. Levantamento Etnobotânico de plantas medicinais no domínio do cerrado na região do Alto Rio Grande-Minas Gerais. **Revista Ciência Agrotecnica**, v. 25, n. 1, p. 102-123, 2001.
- RODRIGUES, A. C. C.; GUEDES, M. L. S. Utilização de plantas medicinais no Povoado Sapucaia, Cruz das Almas – Bahia. **Revista Brasileira de Plantas Medicinais**, v. 8, n. 2, p. 1-7, 2006.
- SILVA, C. S. P.; PROENÇA, C. E. B. Uso e disponibilidade de recursos medicinais no município de Ouro Verde de Goiás, GO, Brasil. **Acta Botanica Brasilica**, v. 22, n. 2, p. 481-492, 2008.
- SIMÕES, C. M. O.; SCHENKEL, E. P.; GOSMANN, G.; DE MELLO, J. C. P.; MENTZ, L. A.; PETROVICK, P. R. **Farmacognosia: da planta ao medicamento**. 5. ed. Florianópolis: Editora da UFSC, 2003.
- SOUZA, C. D.; FELFILI, J. M. Uso de plantas medicinais na região de Alto Paraíso de Goiás, GO, Brasil. **Acta Botanica Brasilica**, v. 1, n. 20, p. 135-142, 2006.
- SOUZA, M. J. M.; MORAL, F. A. F.; NASCIMENTO, G. N. L.; SOARES, N. P.; AVERSI-FERREIRA, T. A. Medicinal plants used by community of Itamaraty



neighborhood in Anápolis, Goiás, Brazil. **Acta Scientiarum. Health Sciences**, v. 32, n. 2, p. 177-184, 2010.

TOMAZZONI, M. I.; NEGRELLE, R. R. B.; CENTA, M. L. Fitoterapia popular: A busca instrumental enquanto prática terapêutica. **Texto contexto enfermagem**, v. 15, n. 1, p. 115-121, 2006.

TRESVENZOL, L. M.; PAULA, J. R.; RICARDO, A. F.; FERREIRA, H. D.; ZATTA, D. T. Estudo sobre o comércio informal de plantas medicinais em Goiânia e cidades vizinhas. **Revista Eletrônica de Farmácia**, v. 3, n. 1, p. 23-28, 2006.

VALE, N. B. A farmacobotânica, ainda tem lugar na moderna anestesiologia? **Revista Brasileira de Anestesiologia**, v. 3, n. 52, p. 368-380, 2002.

VENDRUSCOLO, G. S.; MENTZ, L. A. Levantamento etnobotânico das plantas utilizadas como medicinais por moradores do bairro Ponta Grossa, Porto Alegre, Rio Grande do Sul, Brasil. **Iheringia Série Botânica**, v. 61, n. 1, p. 83-103, 2006.

VEIGA JÚNIOR, V. F.; PINTO, A. C.; MACIEL, M. A. M. Plantas medicinais: Cura segura? **Química Nova**, v. 28, n. 3, p. 519-528, 2005.

VILA-VERDE, G. M.; PAULA, J. R.; CANEIRO, D. M. Levantamento etnobotânico das plantas medicinais do cerrado utilizadas pela população de Mossâmedes (GO). **Revista Brasileira de Farmacognosia**, v. 13, suppl., p. 64-66, 2003.

*Received on April 4, 2011.*

*Accepted on February 10, 2012.*

License information: This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.