SciForum
Mol2Net

Traditional use of plants as antihypertensive in Jipijapa, Manabí. Comparison with reported in the literature.

María del Rosario Herrera Velázquez***,** Orelvis Rodríguez Palmero; Lorena Torregrosa Cortiñas; Maribel Celi Vásquez Paucar; Eduardo Blanco Faramiñán and Liliana Calderón Macías.

Carrera de Enfermería, Facultad Ciencias de la Salud, Universidad Estatal del Sur de Manabí. Campus Los Ángeles Km.1 vía a Noboa. Jipijapa – Manabí – Ecuador.

Orelvis Rodríguez Palmero: orelvis.rodriguez@unesum.edu.ec; orelvis70@gmail.com

Lorena Torregrosa Cortiñas: lorena.torregrosa@unesum.edu.ec; loretc47@gmail.com

Maribel Celi Vásquez Paucar: maribel.vasquez@unesum.edu.ec; maribelceli@yahoo.com

Eduardo Blanco Faramiñán: eduardo.blanco@unesum.edu.ec; eduardoblanco15475@gmail.com

Liliana Calderón Macías: maria.calderon@unesum.edu.ec; liliana_c17@hotmail.com

***** Author to whom correspondence should be addressed; E-Mail: mariarosario.herrera@unesum.edu.ec; vehemari@gmail.com

Received: / Accepted: / Published:

Abstract:

The phytotherapy or herbal medicine is the more ancient form of medical attention and refers to the medical use of the plants or their constituents. This work is based on the analysis of the plants referred by the population as useful in the treatment of hypertension, and its chemical composition scientifically proven. Following the line of research defined by Ministry of Public Health of Ecuador on Medications, Supplies, Knowledge and Use of Medicinal Plants, in the area 19 -National System of Health-, this research was conducted on 614 hypertensive adults through interviews. The people had an average of 58 years old, predominance of female (60.09%), with basic level of schooling (29.47%) and an average

of 7.2 years of suffering high blood pressure disease. Approximately 58% of the interviewed population used medicinal plants to treat the hypertension, while 42% did not use or know about medicinal plants. The most widely used plants were *Matricaria recutita* (chamomile), *Plectranthus amboinicus* (oregano), *Cymbopogon citratus* (grass luisa/lemongrass) and *Valeriana officinalis* (valerian). Among these plants, Lemongrass is the only one, which its effectiveness as anti-hypertensive has been proven. The 34.03% of the used plants are purchased at the and only 16.12% grew them in their backyards. The most used part of the plant was the leave and infusion the way of preparation. As part of the antihypertensive treatment, the interviewed mainly consume the drugs of the pharmacological groups ACE and the ARA-II; the major mentioned conditions were visual disorders. Stress, TAG and cholesterol were mentioned as factors of risk. The medicinal use of studied plants is supported by scientific literature that also support them traditional use. Concerning the chemical composition of plant derivatives, oregano contains aromatics and oxygenated compounds, as main constituents. Chamomile contains above all flavonoids, tannins and terpenoids, lemongrass has phenolic compounds and valerian is characterized by flavonoids and terpenoids. The use of the studied plants by the population is attributed to its sedative and relaxing effects, in case of excitation nerve.

.
.
.
.
.
.

Keywords: Natural products; Medicine herbal; Ethnobotany; Ethnopharmacology.

Mol2Net YouTube channel*:* *http://bit.do/mol2net-tube*

1. Introduction

As part of the acquis cultural of the peoples find the medicine natural and traditional, which is has developed in each country and region of the world with own features, taking the idiosyncrasy of its inhabitants; being the result of an slow evolution, but guaranteed by practical experience [1].

Traditional medicine includes, among others, the use of plants, animals or minerals for the cure of diseases of men in different cultures [3]. The traditional medicine is a reality present in all the world. As its name suggests, it is part of the cultural heritage of each country and practical uses that have been transmitted from one generation to another since hundreds of years prior to the development of our current medicine [4].

Natural drugs have contributed significantly to the progress of modern therapies, and this, while the chemical industrial holds a solid housing drug international, the uses of native herbal persist in different parts of the Earth, where the chemical

drug compounds do not arrive, for various reasons [5].

Medicinal plants are commonly used by the people of virtually every country in the world; According to the World health Organization (WHO), approximately the 80% of the countries in development used them plants with healing purposes, figure that goes in increase to the step of the years [6].

As regards the phytotherapy, many drug used formerly is used in the same way between them medical currently for treat conditions as hypertension, by what the medicinal plants continue being a source extraordinary of material for pharmaceutical industry.

Erroneously, the people believe that consume medicinal plants there is not risk of present adverse reactions. Some patients leave of take conventional medication prescribed by the doctor, appearing complications in the patients. We could say that the activity of medicinal plants is not as powerful or occurs immediately as in the case of synthetic drugs, by what is recommended use it as a first step in the treatment or as adjuvants therapies. Is important highlight that the medicinal plants are drugs and as such can introduce benefits and effects adverse, some of considerable importance, so the benefit/risk balance should be assessed. There are that have present that the active substances of them medicinal plants are chemical and that they may interact with other substances that the patient consumes, including food [7].

For some years, cardiovascular diseases have become the leading cause of death in industrialized countries, is recorded various risk of factors, which influence on the probability of suffering cerebrovascular accidents, coronary disease, heart failure or peripheral artery disease. Among these risk factors is hypertension, which can be modified and it is estimated is one of the biggest problems of public health around the world [8].

The hypertension is a cardiovascular risk of factor very prevalent in the world, that is especially overwhelming in those countries of low and medium income. Recent reports of the WHO highlighted the importance of the chronic diseases such as the hypertension, as obstacle to the achievement of a good state of health. We should be added that, for the majority of low-and middle-income countries, poor primary health care strategies are major obstacles to achieve control of blood pressure. The main causes of premature death and disability in the majority of countries of the America, representing a 60% - 70% of all deaths [9].

In Ecuador, the hypertensive diseases, cerebrovascular disease and ischemic disease of the heart, altogether in the year 2011, were cause of 10 325 deaths, 16.6% of total deaths in the country in all age groups [10].

The causes of morbidity and mortality from this disease include ignorance of the patient about his illness and the management, the non-adherence to the treatment protocols and bad habits and

lifestyles that are risk factors. Our work aims to contribute to promote the use of the medicinal plants as therapeutic option linked to the conventional protocols in the management of hypertension.

.
.
.
.

2. Results and Discussion

614 adults with hypertension in the urban zone of the Jipijapa Canton, province Manabí were interviewed, of which 245 (39.90%) were male and 369 (60,09%) females, these constituting the majority. The average age was 57,93 years old and 7,285 years of suffering from hypertension. The universe sample was formed with people that never studied (8.95%) to people of level upper (13,02%), where will include specialists in various areas, being the basic educational level the predominantly (181 persons – 29,47%).

In relation to the variable sex, the majority of the interviewed were of the female sex, similar to it retrieved in another study performed in Colombia [11]. These results are similar to those found in other works. Taveira de Jesus *et. al*., concern that these results may be due to that at the time of the interview (day period), the men were working and women engaged in household chores [12]. Barros *et. al*., study on the community of Jauari, Itacoatiara - AM, Brazil, concerned that women know and most use plants for medicinal purposes than men [13]. From always were given to them women the responsibility on the domestic tasks and of care for those children, many times making the home treatments of the diseases simpler with an herbal tea.

Within the population surveyed, 42% said not to use or learn about medicinal plants, while the 60,09% use plants, which 34,03% are purchased from the market, used and consumed mostly with a frequency of a time to the day by a week in form of tea as preparation therapeutic, calling him so interchangeably to the infusion and to the decoction.

As regards the leaves as it part of the plant more used, them results displayed in other works [14], corroborate the obtained here. On the optics of the conservation of natural resources, the use of the leaves in the medicinal preparations is a positive aspect, because it does not cause the death of the collected specimen, thus contributing to the conservation of flora. Amorozo (2002), He says that the cultivation of plants for therapeutic purposes is a low cost alternative and it is part of the culture of our peoples, Since in the majority of the courtyards we can find these crops, either in urban or rural areas [15].

With regard to the mode of preparation of them medicinal plants, it most are performed as infusion or decoction to what the population indiscriminately called tea. This result coincides with that reported by Paredes *et. al*., in Los Ríos – Ecuador [14], where infusions also proved to be most commonly used form of preparation.

We asked to them interviewed make a list of the plants more used to treat the hypertension, the botanical data relating to them plants cited, as well as them names popular, part of the plant used, number of citations for each plant, form of preparation and frequency of consumption is show in the table 1, where are collected 62 plants used as medicinal belonging to 31 families. The families more represented botanically were Lamiaceae (8 species), Apiaceae, Rutaceae and Rosaceae each with 4 species.

As you can see in table 1 the plants most cited with therapeutic use for hypertension were German chamomile (*Matricaria recutita*), Cuban Oregano (*Plectranthus amboinicus*), Grass luisa (*Cymbopogon citratus*) and Valerian (*Valeriana officinalis*).

German chamomile (*Matricaria recutita*), is found coincidence. With regard to its popularity to treat different medical conditions, related mostly with the gastrointestinal apparatus (pain, slow digestion, diarrhea and nausea), also reported as anti-inflammatory and analgesic use in menstrual period [16]. The essential oil has an antioxidant and antimicrobial activities [17-20]. The plant extract has antidiarrhoeal, antisecretory and antispasmodic activities [21]. The decoction has an antioxidant property, and hepatoprotective effects [22]. The extracts obtained by plant decoction has an antioxidant and antimicrobial activity [23], however, no reports were found that support its popular use and effectiveness as antihypertensive.

Chemical constituents

The chemical constituents of these plant are phenolic compounds (flavonoids) and terpenoids and azulenes (essential oils) [19] and coumarin-like compounds (herniarin, umbelliferone, skimmin, daphnin and daphnetin, the latter is a strong sensitizer, so this compound and its glycosidic derivative can contribute to the allergic potential of chamomile [24].

The species *Plectranthus amboinicus* is used in the popular medicine to treat respiratory diseases, pain of head, fever and diseases of the skin; often eaten raw or used as food seasoning [25]. Other studies show the plant use in diseases of the oral cavity, mainly caused by *Streptococcus mutans* [26]. In addition, found their effectiveness as inhibitor of proteases specific for VIH-1 [27], respiratory, cardiovascular, oral, dermal, digestive and urinary tract diseases. Within its pharmacological properties are described actions such as antimicrobial, anti-inflammatory [28], Antitumor, healing, anti-epileptic, larvicidal, antioxidant and analgesic [25], antioxidant, antibacterial, antimutagenic and anticancer activities [29]. Another study on the leaves of the plant showed to be antimicrobial, also stimulates the growth of bacteria probiotic as is the *Lactobacillus plantarum* [30]. None of the sources cited is about the use or effectiveness as antihypertensive.

Chemical constituents

The chemical constituents of these plant are phenolic compounds (quercetin, rutin, coumaric, caffeic acid and gallic acid) and anthocyanins [29,31], terpenoids (essential oil carvacrol as the

most abundant component, followed by thymol) [32,33].

Cymbopogon citratus, known in Ecuador as grass luisa and in other countries as lemongrass, It is popularly used in different cultures to treat respiratory, gastric and nervous system problems. Is reported as anti - fungal, insecticide, antidiabetic, antiseptic, anti-mutagenic, anti-carcinogenic and anti-inflammatory, in fact, popularly is used primarily to treat inflammation and peptic ulcers. Some ethnopharmacological studies on *C. citratus* in different countries (Argentina, Brazil and Cuba), refer its use as antihypertensive [34].

It has been demonstrated in vitro studies that aqueous extracts and essential oils has a hypotensive effect in rats [2,35,36].

Chemical constituents

The review of the literature shows an extensive list of diverse and varied chemical compounds present in this plant, among them we can mention as main the polyphenols such as flavonoids, phenolic acids, tannins and anthraquinones. Quercetin, kaempferol, apigenin, catechol, chlorogenic acid, caffeic acid and hydroquinone are some one of these compounds. In the review also appear other groups of phytochemicals such as alkaloids, terpenoids (essential oil), steroids and saponins [34,37-45].

Valeriana officinalis is used popularly in Bulgaria as antiseptic, spasmolytic and sedative, also are used to treat edemas, cramps and fainting [46]. Argentina reported its use to treat insomnia and anxiety disorders [6]. The roots of the *V. officinalis* has pharmacological properties, such as anxiolytic, antidepressant, antispasmodic, sedative and anti-HIV [47].

No reports were found in the literature that support the use of this plant as antihypertensive.

Chemical constituents

The chemical constituents of these plants are essential oils, iridoids, flavonoids, alkaloids, amino acids, and lignanoids[48].

Among the phenolics compounds described in the literature for this plant are found olivil, pinoresinol, 8-hydroxypinoresinol, pinorespiol, 8-hydroxy7-epipinoresinol, *trans-p*-hydroxyphenyl- propenoic acid, *cis-p*-hydroxyphenyl-propenoic acid, ferulic acid, isoferulic acid and isovanillin [47].

The terpenoids as valerenic acid and its biosynthetic precursors valerenal and valerenadiene are responsible for the anxiolytic activity and β-caryophyllene for the anti-inflammatory activity [49]. For the above issues raised, we assume that the use of these plants is due first to the popular roots of that nature is beneficial, in second place to the ignorance and lack of guidance about the medicinal plants and third, to relaxing and sedative effect, contribute somehow to reduce the blood pressure values.

Of general way, the population has the false belief that all natural is beneficial, regardless of the amount and way of consumption. Medicinal plants have secondary metabolites, mostly responsible for biological and pharmacological activities, so for its correct use, should dominate the proper dosage, route of administration, the

possible adverse effects, interactions and contraindications. Has been shown in several studies, and our it reaffirms, that people (patients and health workers) have a non-specific knowledge on the use of medicinal plants, and its popularity and use, depends on local culture and above all, of the availability in squares and markets. The use of plants for therapeutic purposes, without proper guidance, is a worrying factor that must be considered by the authorities of the health sector, also by those linked with the education for the health, because the incidence of species with record of toxicity and contraindications of use. We know that the plants are remedies powerful and effective, but the risk of intoxication caused by the use abuse of these must be always led in consideration. Medicinal plants have countless applications and limitations, so knowledge of them is essential, both of the population in general, as of the personal of health, since the same can be used of way complementary to the drug treatment, to improve symptoms and decrease the adverse effects that produce synthetic drugs. Hypertension remains one of the chronic diseases with a high incidence and prevalence worldwide, the Ecuador is no exception to the epidemiological reality of the behavior of these diseases, the national survey of health and nutrition of the year 2011-2012, shows it with figures are alarming, our work of research put of manifest the serious implications of the ignorance of the management of this disease, non-adherence to the treatment protocols as well as the serious consequences that carry to the health of the population suffering from hypertension. The actions aimed to the training as tool fundamental in the promotion and prevention of the chronic diseases, that include modifying habits and styles of life not healthy, will make possible improve the quality of life of the population of the canton Jipijapa.

.
.
.
.
.
.
..

Table 1. Medicinal plants used as antihypertensive in Jipijapa, Manabí.

Botanical Family	**Botanical name and vernacular name (Ecuador/USA)**	**Part of the plant used**	**Preparation**	**Frequency**	**Reports**
Amaranthaceae	*Chenopodium ambrosioides* L. (Paico/ Mexican Tea)	Leave	Maceration	1	1
			Salad	2	2
			Tea	2	1
Amaryllidaceae	*Allium sativum* (L.) (Ajo/Garlic)	Bulb	Maceration and Tea	3 y 4	19
Anacardiaceae	*Mangifera indica* L. (Mango)	Leave	Tea	1	6

				2	3
Annonaceae	*Annona muricata* L. (Guanábana/ Prickly custard apple, Soursop)	Fruit	Tea	1	1
		Leave	Tea	5	2
Apiaceae	*Apium graveolens* L. (Apio/ Wild Celery)	Leave and stem	Salad and Tea	1	13
	Petroselinum sativum (Perejil/ Parsley)	Leave, stem and whole plant	Tea	1 y 2	13
	Coriandrum sativum L. (Cilantro/ Coriander)	Leave, root and stem	Tea	1	1
	Angelica archangelica L. (Espíritu santo/ Archangel, Angelica)	Leave	Tea	5	2
Araliaceae	*Panax ginseng* C.A.Mey. (Ginseng/ American ginseng)	Leave	Tea	3	1
				4	2
Asteraceae	*Matricaria recutita* (Manzanilla/Chamomila)	Leave	Tea	1	57
		"Seed"	Tea	4	19
	Cynara scolymus (Alcachofa/ Artichoke)	Leave	Tea	5	2
	Ambrosia tenuifolia Spreng. (Altamis/ false ragweed)	Leave	Tea	1	1
Cucurbitaceae	*Cucurbita pepo* (Pepino/Cucumber)	Fruit	Juice	5	3
Cyperaceae	*Cyperus esculentus* L. (Horchata/ Nut grass)	Root	Tea	5	1
Equisetaceae	*Equisetum arvense* L. (Cola de caballo/ Field horsetail)	Leave	Tea	5	3
		Whole plant		5	1
Euphorbiaceae	*Croton lechleri* Müll.Arg. (Sangre de Dragón/ Dragon's blood)	Leave and outbreak	Tea	4	1

Fabaceae	*Medicago sativa* (Alfalfa)	Leave	Tea	2	3
Illiciaceae	*Illicium verum* (Anís/ Star anise)	Seed	Tea	5	10
indet	Carmelita	Leave	Tea	2	1
indet	Germen de trigo	Root	Tea	1	3
indet	Zorrilla	Root, leave and stem	Tea	5	1
indet	Zaragoza	Stem	Tea	2	1
Lamiaceae	*Plectranthus amboinicus* (Lou.) Spreng.	Leave	Tea	1	43
	(Orégano/ Cuban oregano)			5	12
	Melissa officinalis L. (Toronjil/ Lemon balm)	Leave	Tea	1	16
				2	8
	Ocimum basilicum Mill. (Albahaca/ Basil)	Leave	Tea	1 y 2	9
	Mentha piperita L. (Hierbabuena/ Peppermint)	Leave	Tea	5	3
				3	2
				2	2
				1	4
	Lavandula angustifolia Mill. (Lavanda/ Lavender)	Flower	*ad libitum*	4	1
		Oil	oil	2	1
	Salvia scutellarioides Kunth	Leave	Tea	1	1
	(Mastruante)				
	Rosmarinus officinalis L. (Romero/ Rosemary)	Leave	Tea	4	2
Lauraceae	*Cinnamomum zeylanicum* Blume (Canela/ Cinnamon)	Bark	Tea	1	5
	Persea americana Mill. (Aguacate/ Avocado)	Leave	As baths	1	1
Loranthaceae	*Ligaria cuneifolia* Tiegh. (Muérdago/ Mistletoe)	Leave	Tea	3	1

Lythraceae	*Punica granatum* L. (Granada/ Pomegranate)	Fruit	Juice	1	3
			Tea	1	2
Moraceae	*Artocarpus communis* J.R.Forst. & G.Forst. (Fruta del pan/ Breadfruit)	Leave	Tea	5	1
Moringaceae	*Moringa oleifera* Lam. (Moringa)	Leave	Tea	5	1
Myrtaceae	*Psidium guajava* L. (Guayaba/ Guava)	Fruit	Juice	5	1
	Syzygium aromaticum (L.) Merr. & L.M.Perry (Clavo de olor/ Clove)	Seed	Tea	2	2
Oleaceae	*Olea europaea* L. (Olivo/ Common olive)	Leave	Tea	2	3
Passifloraceae	*Passiflora edulis* Sims (Maracuyá/ Passion fruit)	Leave	Tea	1	1
Plantaginaceae	*Plantago major* L. (Llantén/ Common plantain)	Leave	Tea	1	7
Poaceae	*Cymbopogon citratus* (Hierba luisa/Lemongrass)	Leave	Tea	1	31
				2	16
Rosaceae	*Prunus amygdalus* L. var. dulcis (Almendra/ Almond)	Leave	Tea	4	1
	Crataegus monogyna L. (Espina blanca/ May)	Flower	Tea	2	1
	Eucalyptus L'Hér. (Eucalipto/ Eucalyptus)	Leave	Tea and Inhalation	3	9
	Fragaria vesca L. (Fresa/ Strawberry)	Fruit	Tea	1	1
Rubiaceae	*Morinda citrifolia* L. (Noni)	Fruit	Juice	1	2
Rutaceae	*Citrus x aurantium* L. (Lima/ Bitter orange)	Fruit	Whole fruit	1	1
			Juice	5	1
	Citrus x limon (L.) Osbeck. (Limón/ Lemon)	Fruit	Juice	1	5
	Citrus sinensis (L.) Osbeck. (Naranja/ Orange)	Leave	Tea	5	1

	Ruta graveolens L. (Ruda/ Rue)	Leave	Tea	5	3
Solanaceae	*Solanum dulcamara L.* (Dulcamora/ Nightshade)	Whole plant	Tea	3	6
		Leave	Chewed up	1	1
Valerianaceae	*Valeriana officinalis* (Valeriana/ Valerian)	Root	Tea	1	10
		Leave	Tea	5	22
Vitaceae	*Cissus verticillata* (L.) Nicolson & CE Jarvis (bejuco ubí)	Leave	Tea	5	1
		Bark	Tea	3	1
Xanthorrhoeaceae	*Aloe vera* (Sábila/ Aloe)	Leave	Drinkshake	1	3

Indet: *it wasn't possible a botanical identification due to it was impossible to collect the plant material.*

Frequency.

1. Once at day by a week.
2. Twice at the day for a week (in the morning and at night).
3. Twice at the day for a week (in the morning and in the afternoon).
4. Three time at the day for a week.
5. Others (daily or in days alternate) with a frequency more than one week (always).

In addition to the plants mentioned in table 1, in the collection of the data in the polls, four patients referred the liquefied mixture of several medicinal plants to treat high blood pressure, which we then relate: Aloe, cucumber and pepper (Liquefied 1)

Tomato, celery, parsley, beet (Liquefied 2)

Mango, banana, germ of wheat and cinnamon (Liquefied 3)

Corn, bark of pineapple, cloves of smell: Boiling, filtering, add lemon and drink to take fresh (Liquefied 4)

3. Materials and Methods

This research was carried out in the period from May to September 2016 in the canton Jipijapa, Manabí province, includes a territorial surface of 1,420 km2 and has 71.083 inhabitants distributed by sex being the 50.74% men and the 49.26% women, of them 30.851 reside in rural and 40.232 reside in the urban area [50].

The Canton Jipijapa, is located at the South western end of the province of Manabí, To 403 km of capital Quito of the Ecuador. Limits to the North: with the cantons Montecristi, Portoviejo and Santa Ana; South: Pajan canton and the province of Guayas. East: with the cantons 24 de Mayo and Pajan and West: the Pacific Ocean and the Puerto Lopez canton. It is formed by three

urban parishes and seven rural. The weather predominantly is tropical dry, with variations of temperatures average of 24 ° C [50].

Is chose this area because the municipality presents a wealth floristic and cultural, also because the population maintains a form of life where predominates the use of those natural resources (agriculture), as well as the ease of access to these resources. The interviews semi-dealing technique was used for the collection of information and closed questions were formulated partially before going to the field. Two questionnaires were developed, one ethnobotanical and one epidemiological [51] (with modifications).

The interviews are conducted oral e individually in them own homes, being preferentially made with the responsible of the Group family, independent of sex, in order to obtain general information about the interviewees (age, sex, and education).

The data obtained in each questionnaire is analyzed, processed and subsequently is organized in tables where is show plants and parts of these used, origin (cultivated, collected or purchased in the market), form of preparation and number of citations. The sample complied with patients diagnosed with hypertension in the Canton Jipijapa. As already mentioned above, the interviews were conducted in the homes of the population, in the first visit were due presentations, exhibition of the objectives of the study and requesting permission for interviews.

A time completed questionnaires is asked to the interviewee that show it plants (case was possible) for make the record photographic of the same and it collects, for facilitate it identification botanical by consultation and the comparison with the literature specialized (is looked them sites IPNI) (www.ipni.org) and mobot (www.mobot.org)), in other cases the recognition is made by simple observation, as were plants known.

The data obtained were analyzed by calculating absolutes values and percentages. The tables and graphs were conducted using the program Microsoft Excel 2007.

.
.

.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.

4. Conclusions

In the six hundred fourteen surveys applied to hypertensive patients in the Canton Jipijapa, were cited a total of sixty-two species of medicinal plants belonging to thirty-one families, of these the most represented botanically were Lamiaceae (eight species), Apiaceae, Rutaceae and Rosaceae each with four species. The plants with the highest number of citations were Chamomile (*Matricaria recutita*), Cuban oregano (*Plectranthus amboinicus*), grass luisa/ lemongrass (*Cymbopogon citratus*) and valerian (*Valeriana officinalis*). Among these plants, Lemongrass is the only one, which its effectiveness as anti-hypertensive has been proven. The 42 % of the population interviewed not consumes or knows about medicinal plants. We believe that it should promote the use of medicinal plants and training the population and health personnel for the proper use of plants for healing purposes, to rescue the wisdom in the community, since it could be seen that this knowledge is being lost in the Canton.

Conflicts of Interest

"The authors declare no conflict of interest".

References and Notes

Albuquerque, U., Lucena, R., & Alencar, N. (2008). Métodos e técnicas para coleta de dados etnobotânicos . En U. Albuquerque, R. Lucena, & L. V. Cunha, *Métodos e técnicas na pesquisa etnobotânica* (págs. 41-72). Recife: Comunigraf.

Amorozo, M. (05 de Sept de 2002). *A perspectiva etnobotânica na conservação de biodiversidade.* Rio Claro, São Paulo , Brasil: Universidade Estadual Paulista – UNESP.

Andarwulan, N., Yuliana, N. D., Hasna, E., Aziz, S. A., & Davis, T. D. (2014). Comparative Analysis of Three Torbangun Clones (Plectranthus amboinicus (Lour.) Spreng) Based on Phenotypic Characteristics and Phenolic Content. *American Journal of Plant Sciences*, 5(24), 3673-3683.

Angulo, A., Rosero, R., & González, M. (2012). Estudio etnobotánico de las plantas medicinales utilizadas por los habitantes del corregimiento de Genoy, Municipio de Pasto, Colombia. *Rev. Universidad y Salud*, 14(2), 168-185.

Arumugam, G., Swamy, M. K., & Sinniah, U. R. (2016). Plectranthus amboinicus (Lour.) Spreng: Botanical, Phytochemical, Pharmacological and Nutritional Significance . *Molecules* , 21(4), 369.

Asaolu, M., Oyeyemi, O., & Olanlokun, J. (2009). Chemical Compositions, phytochemical constituents and in vitro biological activity of various extracts of Cymbopogon citratus. *Pakistan J. Nutr*, 8,1920–1922.

Avoseh, O., Oyedeji, O., Rungqu, P., Nkeh-Chungag, B., & Oyedeji, A. (2015). Cymbopogon species; ethnopharmacology, phytochemistry and the pharmacological importance. *Molecules*, 20, 7438–7453.

Barros, C. A., da Silva-Cardoso, N., dos Santos –Araújo, E., & Mendes, A. M. (2009). *Estudo Etnobotânico de plantas medicinais utilizadas por raizeiros na comunidade do Jauari, Itacoatiara, Amazonas, 61ª Reunião Anual da SBPC, Amazônia: Ciência e cultura.* Manaus: Universidade Federal do Amazonas.

Buedo, P., & Giagante, C. (2015). Utilización de plantas medicinales como alternativa a las benzodiazepinas: revisión bibliográfica. *Archivos de Medicina Familiar y General*, 12(2), 21-27.

Caleja, C., Barros, L., Antonio, A. L., Ciric, A., Barreira, J. C., Sokovic, M., . . . Ferreira, I. (2015). Development of a functional dairy food: Exploring bioactive and preservation effects of chamomile (Matricaria recutita L.). *Journal of Functional Foods*, 16,114–124.

Carbajal, D., Casaco, A., Arruzazabala, L., Gonzalez, R., & Tolon, Z. (1989). Pharmacological study of Cymbopogon citratus leaves. *Journal of Ethnopharmacology*, 25(1), 103-107.

Cheel, J., Theoduloz, C., Rodríguez, J., & Schmeda-Hirschmann, G. (2005). Free radical scavengers and antioxidants from Lemongrass (Cymbopogon citratus (DC.) Stapf.). *J. Agric. Food Chem.*, 53, 2511 –2517.

Chen, H. W., Wei, B., He, X. H., Liu, Y., & Wang, J. (2015). Chemical Components and Cardiovascular Activities of Valeriana spp . *Evidence-Based Complementary and Alternative Medicine* , 1-11 .

Chobanian, A. V., Bakris, G. L., Black, H. R., Cushman, W. C., Green, L. A., Izzo, J. L., . . . Roccella, E. J. (2003). The National High Blood Pressure Education Program Coordinating Committee. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*, 42, pp1206-1252.

Dzeufiet, P. D., Mogueo, A., Bilanda, D. C., Aboubakar, B. F., Tédong, L., Dimo, T., & Kamtchouing, P. (2014). Antihypertensive potential of the aqueous extract which combine leaf of Persea americana Mill. (Lauraceae), stems and leaf of Cymbopogon citratus (D.C) Stapf. (Poaceae), fruits of Citrus medical L. (Rutaceae) as well as honey in ethanol and sucrose . *BMC Complementary and Alternative Medicine*, 14:507.

Elmastaş, M., Çinkiliç, S., & Aboul-Enein, H. Y. (2015). Antioxidant Capacity and Determination of Total Phenolic Compounds in Daisy (Matricaria chamomilla, Fam. Asteraceae). *World Journal of Analytical Chemistry*, 3(1A), 9-14.

Faruq, M. (1994). TLC technique in the component characterization and quality determination of Bangladeshi lemongrass oil (Cymbopogon citratus) (DC) Stapf.). Bangladesh. *J. Sci. Ind. Res.*, 29, 27–38.

Ferreira da Costa, G. F. (2015). *Cymbopogon citratus and its polyphenols as potential phytotherapeutic products: an in vivo approach.* Doctoral Thesis in Pharmacy, Coimbra: University of Coimbra.

Figueirinha, A., Paranhos, A., Pérez-Alonso, J., Santos-Buelga, C., & Batista, M. (2008). Cymbopogon citratus leaves: Characterization of flavonoids by HPLC–PDA–ESI/MS/MS and an approach to their potential as a source of bioactive polyphenols. *Food Chem.*, 110, 718-728.

Fontes-Pinheiro, P., Vidal-Costa, A., de Assis-Alves, T., Nicoli-Galter, I., Pinheiro, C. A., Fontes-Pereira, A., . . . and Praça-Fontes, M. M. (2015). Cytotoxicity of Essential Oil from Leaves of Plectranthus amboinicus, Carvacrol, and Thymol in Plant Bioassays. *J. Agric. Food Chem*, 63(41), 8981–8990.

Formisano, C., Delfine, S., Oliviero, F., Tenore, G., Rigano, D., & Senatore, F. (2015). Correlation among environmental factors, chemical composition and antioxidative properties of essential oil and extracts of chamomile (Matricaria chamomilla L.) collected in Molise (South-central Italy) Volume 63, January. *Industrial Crops and Products*, 63, 256-263.

Freire, W. B., Ramírez, M. J., Belmont, P., Mendieta, M. J., Silva, M. K., Romero, N., . . . Monge, R. (2014). *Encuesta Nacional de Salud y Nutrición del Ecuador ENSANUT-ECU 2011-2013.* Quito: Ministerio de Salud Pública. Instituto nacional de Estadística y Censos.

Gupta, S. K., Bhatt, P., Joseph, G. S., Negi, P. S., & Varadaraj, M. C. (2013). Phenolic constituents and biological activities of leaf extracts of traditional medicinal plant Plectranthus amboinicus Benth (Lamiaceae). *TANG Humanitas Medicine*, 3(4), 32.1-32.6.

Hashemi, S., Brewer, M., Safari, J., Nowroozi, M., Sherahi, M. H., Sadeghi, B., & & Ghafoori, M. (2016). Antioxidant Activity, Reaction Mechanisms, and Kinetics of Matricaria recutita Extract in Commercial Blended Oil Oxidation. *International Journal of Food Properties*, 19(2), 257-271.

Khalid, A. K., & El-Gohary, A. E. (2014). Effect of seasonal variations on essential oil production and composition of Plectranthus amboinicus (Lour.) grow in Egypt. *International Food Research Journal*, 21(5), 1859-1862.

López- Quiñones, E., Rodríguez- Naranjo, Y., Quintero- Casanova, J., Pérez -Suárez, Y., & Iglesias – Hernández, R. (2013). Comportamiento de las crisis hipertensivas en el área de salud del Policlínico Universitario "Leonilda Tamayo Matos" 2010. *REMIJ*, 14(2), 4.

Madaleno, I. M. (2007). Etnofarmacología en Iberoamérica, una alternativa a la globalización de las prácticas de cura. *Biblid*, 41, 61-95.

Mehmood, M., Munir, S., Khalid, U., Asrar, M., & Gilani, A. (2015). Antidiarrhoeal, antisecretory and antispasmodic activities of Matricaria chamomilla are mediated predominantly through K+-channels activation. *BMC Complementary and Alternative Medicine*, 15:75.

Miean, K., & Mohamed, S. (2001). Flavonoid (myricetin, quercetin, kaempferol, luteolin, and apigenin) content of edible tropical plants. *J. Agric. Food Chem.*, 49, 3106–3112.

Morales -Gómez, Y., Jacas -García, C., & Domínguez –González, J. (2010). Caña santa para el tratamiento de ancianos con hipertensión arterial. *MEDISAN*, 14 (8), 1061.

Moreira, F., Bastos, J., Blank, A., Alves, P., & Santos, M. (2010). Chemical composition and cardiovascular effects induced by the essential oil of Cymbopogon citratus DC. Stapf, Poaceae, in rats. *Braz. J. Pharmacog*, 20, 904–909.

Moron -Rodriguez, F. J., & Jardines- Mendez, J. B. (1997). La medicina tradicional en las universidades médicas. *Rev Cubana Plant Med*, 2(1), 35-41.

Nedelcheva, A., Svinyarov, I., Bogdanov, M., & Hristov, M. (2015). Ethnobotanical study on Valeriana officinalis in Bulgaria . *Planta Med*, 81 .

Oloyede, O. (2009). Chemical profile and antimicrobial activity of Cymbopogon citratus leaves. *J. Nat. Prod.*, 2, 98–103.

OMS. (28 de SEPTIEMBRE de 2016). *Medicina tradicional: definiciones*. Obtenido de http://www.who.int/topics/traditional_medicine/definitions/es/

OPS. (2007). *Estrategia regional y plan de acción para un enfoque integrado sobre la prevención y el control de las enfermedades crónicas.* Washington, D.C: OPS.

Paredes, D., Buenaño-Allauca, M., & Mancera-Rodríguez, N. (2015). Usos de plantas medicinales en la comunidad San Jacinto del Cantón Ventanas, Los Ríos – Ecuador. *Revista U.D.C.A Actualidad & Divulgación Científica*, 18(1), 39 - 50.

Petruľová-Poracká, V., Repčák, M., Vilková, M., & Imrich, J. (2013). Coumarins of Matricaria chamomilla L.: Aglycones and glycosides. *Food Chemistry*, 141(1), 54–59.

Puig -San Andrés, M. L. (2015). *Evaluación de la actividad diurética de la mezcla hidroalcohólica de la Matricaria Chamomilla Y Urtica Urens en ratas wistar* . Guayaquil: Universidad de Guayaquil.

Radovanovic, T. C., Dos Santos, A. L., Carvalho, B. M., & Silva, M. S. (2014). Hipertensión arterial y otros factores de riesgo asociados a las enfermedades cardiovasculares en adultos. *Rev. Latino-Am. Enfermagem*, vol. no 4, pp 547-53.

Ricigliano, V., Kumar, S., Kinison, S., Brooks, C., Nybo, S. E., Chappell, J., & Howarth, D. G. (2016). Regulation of sesquiterpenoid metabolism in recombinant and elicited Valeriana officinalis hairy roots. *Phytochemistry*, 125, 43–53.

Roby, M., Sarhan, M., Selim, K., & Khalel, K. (2013). Antioxidant and antimicrobial activities of essential oil and extracts of fennel (Foeniculum vulgare L.) and chamomile (Matricaria chamomilla L.). *Industrial Crops and Products*, 44, 437-445.

Rodríguez, N., Pérez, J., Iglesias, J., Gallego, R., Veiga, B., & Cotelo, N. (2015). Actualidad de las plantas medicinales en terapéutica. *Acta Farmacêutica Portuguesa*, 4(1), 42-52.

Santos, F. A., Serra, C. G., Bezerra, R. J., Figueredo, F. G., Matias, E. F., Menezes, I. R., . . . Coutinho, H. D. (2016). Antibacterial activity of Plectranthus amboinicus Lour (Lamiaceae) essential oil against Streptococcus mutans. *European Journal of Integrative Medicine*, 8(3), 293–297.

Sebai, H., Jabri, M. A., Souli, A., Hosni, K., Rtibi, K., Tebourbi, O., . . . Sakly, M. (2015). Chemical composition, antioxidant properties and hepatoprotective effects of chamomile (Matricaria recutita L.) decoction extract against alcohol-induced oxidative stress in rat. *General Physiology and Biophysics*, 34(3), 263-275.

Shubha, J., & Bhatt, P. (2015). Plectranthus amboinicus leaves stimulate growth of probiotic L. plantarum: Evidence for ethnobotanical use in diarrhea. *Journal of Ethnopharmacology*, 166(26), May, 220–227.

Soares, M., Alves, R., Pires, P., Oliveira, M., & Vinha, A. (2013). Angolan Cymbopogon citratus used for therapeutic benefits: nutritional composition and influence of solvents in phytochemicals content and antioxidant activity of leaf extracts. *Food Chem. Toxicol*, 60, 413–418.

Tapia, A., Cheel, J., Theoduloz, C., Rodriguez, J., Schmeda-Hirschmann, G., Gerth, A., . . . Mendoza, E. (2007). Free radical scavengers from Cymbopogon citratus (DC.) stapf plants cultivated in bioreactors by the temporary immersion (TIS) principle. *Z.Naturforsch*, 62, 447–57.

Taveira de Jesus, N., da Silva- Lima, J., da Silva, R., Espinosa, M., & de Oliveira -Martins, D. (2009). Levantamento etnobotânico de plantas popularmente utilizadas como antiúlceras e antiinflamatórias pela comunidade de Pirizal, Nossa Senhora do Livramento-MT. *Revista Brasileira de Farmacognosia*, 19(1A), 130-139.

Thayil, S. M., & Thyagarajan, P. S. (2016). PA-9: A Flavonoid Extracted from Plectranthus amboinicus Inhibits HIV-1 Protease. *International Journal of Pharmacognosy and Phytochemical Research*, 8(6); 1020-1024.

Velásquez, R. (2014). *Informe Gobierno Autónomo Descentralizado Municipal, Jipijapa.* Jipijapa-Manabí, Ecuador: Gobierno Jipijapa.

Wang, P. C., Ran, X. H., Luo, H. R., Ma, Q., Liu, Y. Q., Zhou, J., & Zhao, Y. X. (2013). Phenolic compounds from the roots of Valeriana officinalis var. latifolia. *J. Braz. Chem. Soc.*, 24(9), 1544-1548.

Yuan-Siao, C., Hui-Ming, Y., Jiun-Jie, S., Ting-Jen, R. C., Chung-Yi, W., Jim-Min, F., & Chi-Huey, W. (2014). Chemical constituents of Plectranthus amboinicus and the synthetic analogs possessing anti-inflammatory activity. *Bioorganic & Medicinal Chemistry*, 22(5), 1766-1772.