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Original Paper

Medicinal plants with popular names associated with manufactured drugs in Rio Grande do Sul state, Brazil

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Abstract

Medicinal plants used by the population in southern Brazil have been observed to be popularly referred to by the names of manufactured drugs. This study aimed to find a connection between the use of medicinal plant species with popular names associated with manufactured drugs and the actual biomedical system. A database regarding such medicinal plants was established based on thirty-four ethnobotanical studies undertaken in the state of Rio Grande do Sul, Brazil, and chemical and pharmacological information was collected from a scientific article database and crossed referenced to determine whether folk information was correlated. Thirty-one species with a total of twenty-five different popular names of manufactured drugs were found. The greatest number of popular names of manufactured drugs was for *Alternanthera brasiliana* with eight names, followed by *Achillea millefolium* with six. The therapeutic indication of the species used in the manufactured formulas was found to differ from the indications of popular use. However, the therapeutic indication of both were correlated for digestive disorders, as well as for popularly named phytotherapic species. Cultural adoption of popular names may be influenced by the biomedical system and the flow of knowledge arising from conventional medicine toward popular medicine.

Key words: commercial drug, digestive disorders, ethnobotany, phytotherapics.

Resumo

Observou-se que as plantas medicinais utilizadas pela população do sul do Brasil têm sido referidas popularmente pelos nomes dos medicamentos industrializados. Este estudo visou encontrar uma ligação entre o uso de espécies de plantas medicinais com os nomes populares associados a medicamentos industrializados e o sistema biomédico atual. Foi criada uma base de dados sobre estas plantas medicinais com base em 34 estudos etnobotânicos realizados no estado do Rio Grande do Sul, Brasil, e foram buscadas informações químicas e farmacológicas a partir de uma base de dados de artigos científicos, e cruzadas para determinar se as informações populares estavam correlacionadas. Foram encontradas 31 espécies com um total de 25 nomes populares de medicamentos industrializados diferentes. O maior número de nomes populares de medicamentos industrializados foi para *Alternanthera brasiliana* com oito nomes, seguido de *Achillea millefolium* com seis. Verificou-se que a indicação terapêutica das espécies utilizadas nas fórmulas industrializadas era diferente das indicações de uso popular. No entanto, a indicação terapêutica de ambas foram correlacionadas para distúrbios digestivos, bem como para as espécies designadas popularmente por fitoterápicos. A adoção cultural de nomes populares pode ser influenciada pelo sistema biomédico e pelo fluxo de conhecimento decorrente da medicina convencional em direção à medicina popular.

Palavras-chave: medicamento comercial, problemas digestivos, etnobotânica, fitoterápicos.

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Introduction

Interactions between biomedicine and local medical systems of different human groups have been an important focus of ethnobiological research (Mignone *et al*. 2007; Vandebroek 2013). Even though some studies have observed that the biomedical system affects local knowledge negatively, evidencing an incompatibility between the two types of knowledge (Ragupathy *et al*. 2008; Hoa *et al*. 2009), others have shown integration between the two systems, leading to what is known as "intermedicality" (Greene 1998), that is, people of a group use local and biomedical knowledge complementarily (see Soldati & Albuquerque 2012). It has often been revealed that natural resources and industrialized medicines are used that are not mutually exclusive and do not necessarily compete with one another (Giovannini *et al*. 2011).

In countries such as Cameroon, Kenya and Uganda, carriers of the human immunodeficiency virus (HIV) use both conventional medical treatments and medicinal plants (Noumi & Manga 2011). In other cases, plants serve as a substitute for conventional medicines, with this substitution providing carriers an easily accessible treatment with fewer side effects and less social exposure to stigmatization (Noumi & Manga 2011). An interesting example of the integration of biomedical and local medical systems is the use by some human groups of the names of manufactured medicines to designate medicinal plants, as observed by various studies in different regions of Brazil, such as in the South (Kubo 1997; Garlet & Irgang 2001; Marodin & Baptista 2001; Ritter *et al*. 2002; Trojan-Rodrigues *et al*. 2012; Battisti *et al*. 2013), Southeast (Martins *et al*. 2005; Pilla *et al*. 2006) and the Northeast (Soldati & Albuquerque 2012), as well as in the country in general (Siqueira *et al*. 2017). Indicating medicinal plants using the names of manufactured medicines represents an interesting case to observe the phenomenon of intermedicality of medical systems because it reveals a way that the integration of biomedicine and local systems can occur, evolve and structure local medical systems. Casagrande (2009) demonstrated the interconnection between scientific and traditional knowledge in a popular community in the metropolitan region of Porto Alegre, Brazil, recovering the use of plants such as *Alternanthera brasiliana* (L.) Kuntze (popularly called ampicillin, penicillin) and *Sphagneticola trilobata* (L.) Pruski (popularly called insulin), indicating the use of manufactured drug names for plants intended for the same symptoms and diseases.

We investigated the use of names of medicines of biomedical origin as names of medicinal plants by human communities in the state of Rio Grande do Sul, Brazil, to better understand some aspects of the integration of biomedicine and local systems. Specifically, we aimed to answer the following questions: (1) Which species of medicinal plants with a popular name associated with a manufactured drug are used in the state of Rio Grande do Sul? (2) Are plants of native or exotic (cultivated and naturalized) origin in Brazil more widely used? (3) Are species with a popular name associated with a manufactured phytotherapic medicine also found in the formulation of the medicine? (4) Is there correspondence between the use of plants with names from manufactured medicines and the use of the manufactured medicine by the biomedical system? These questions are important for determining the aspects of the medical system that have greater interaction between local and biomedical systems regarding medicinal plant nomenclature and if the use of medicine names for medicinal plants has a biomedical rational.

Materials and Methods

Information was obtained from ethnobotanical studies on the use of medicinal plants, such those reported in articles, doctoral theses, master's theses and monographs, conducted in different regions of the state of Rio Grande do Sul, Brazil.

Studies were found through searches in databases, such as Google Scholar (2021), Portal CAPES (2021) and PUBMed (2021), using the following keywords: "ethnobotanical survey" and "medicinal plants" crossed with the word "Rio Grande do Sul". The criteria for selection were: accessibility, presence of a botanist in the research team, study focus about the knowledge and/or use of medicinal plants by local communities, and with methods characteristic of ethnobotanical research (mainly interviews). The following thirty-four ethnobotanical surveys were recovered (from 1997 to 2020) and assessed: Kubo (1997); Zucchetti *et al*. (1997); Froehlich (1998); Briani Neto (1999); Koch (2000); Possamai (2000); Fernandes (2001); Garlet & Irgang (2001); Marodin & Baptista (2001); Ritter *et al*. (2002); Hass (2003); Leitzke (2003); Martha (2003); Sebold (2003); Veiga (2003); Zanandrea (2003); Löwe (2004); Silveira (2004); Soares *et al*. (2004); Barbosa (2005); Vendruscolo & Mentz (2006); Barros *et al.* (2007); Schwambach (2007); Ramos (2008); Casagrande (2009); Ceolin (2009); Vanini (2010); Baptista *et al*. (2013); Battisti *et al*.

(2013); Löbler *et al.* (2014); Hentges (2015); Brião *et al*. (2016); Delfim (2019) and Bremm *et al*. (2020).

These surveys were used to construct a database of species that were popularly named by using a name of a manufactured drug or active substance, along with their therapeutic indications. World Flora Online (WFO) (2022) and Flora e Funga do Brasil 2022 (continuously updated) were used to confirm valid and current scientific names and their synonymies while the classification system used was that of APG IV (2016). Original popular names traditionally used in southern Brazil were used and Flora Digital do Rio Grande do Sul and Santa Catarina (2021) and Flora e Funga do Brasil 2022 (continuously updated) were used to categorize the origin of species as native to Brazil, cultivated exotics or naturalized exotics.

The therapeutic classes of the studied species were standardized using the therapeutic classes of the medicines (Brasil 1984) and manufactured drug package inserts. The medicinal species associated with drugs were determined by consulting package inserts and their therapeutic class was indicated and confirmed in ANVISA (Brasil 2021).

All species addressed by this study were compiled with their respective therapeutic uses, which were categorized according to the International Classification of Diseases (ICD-11) (WHO 2020), as presented in Table 1.

Our question about the correspondence between medicinal applications of plants with drug names and the use of the drug by the biomedical system was addressed by first recording the popular uses of each plant. This was then followed by checking for the occurrence of the popular uses in the indications that appeared in the package insert of the manufactured drug. Thus, it was possible to determine if the name adopted by popular medicine was related to the effects for which the manufactured drug is used.

Our question about whether species with names associated with a manufactured phytotherapic medicine are also used in the medicine was addressed by checking for the occurrence of the species in the formula of the medicine. The package insert was used as a source of information to verify whether the species are indeed the same.

Chemical data and pharmacological activities of the studied species were surveyed by consulting

Table 1 – Classification of the popular therapeutic indications found in ethnobotanical surveys conducted in Rio Grande do Sul state, Brazil, according to ICD-11 (WHO 2020).

Popular indications	**Classification of diseases (ICD-11)**
Infection and parasitic diseases	Chapter I - Certain infectious and parasitic diseases
Anaemia	Chapter III - Diseases of the blood and blood-forming organs
Diabetes, thyroid and cholesterol	Chapter V - Endocrine, nutritional and metabolic diseases
Migraine and nerves	Chapter VIII - Diseases of the nervous system
Earache	Chapter X - Diseases of the ear or mastoid process
Heart problems and circulation	Chapter XI - Diseases of the circulatory system
Sinusitis, influenza, respiratory problems, cough, sore throat and chest ("pontada")	Chapter XII - Diseases of the respiratory system
Liver, stomach, tooth and jaundice	Chapter XIII - Diseases of the digestive system
Muscle aches	Chapter XV - Diseases of the musculoskeletal system and connective tissue
Cystitis, urinary tract infection and female issues	Chapter XVI - Diseases of the genitourinary system
Abortion	Chapter XVIII - Pregnancy, childbirth and the puerperium
Headache, fever, pain and verruca	Chapter XXI - Symptoms, signs or clinical findings, not elsewhere classified

published articles using the valid scientific name or synonyms of the species found in searches of ISI Web of Knowledge (2021), Portal CAPES (2021) and PUBMed (2021) databases up to the year 2021. The articles selected were those that contained, in the title or in the abstract, the scientific binomial or a synonym of a studied species and its chemical characterization and pharmacological activity.

Results and Discussion

Medicinal plant species and their popular names

Thirty-four ethnobotanical studies were assessed, revealing thirty-one species with a total of twenty-five different popular names of manufactured drugs (Tab. 2). The studies were performed in municipalities located in different regions of the state of Rio Grande do Sul.

The species belong to the families Asteraceae (32.3%), Amaranthaceae (16.1%), Lamiaceae (16.1%) and 10 other families (35.5%). Asteraceae was the most representative family as it presents great morphological and geographic diversity among its species that is reflected in their ability to produce a range of secondary metabolites (Calabria *et al*. 2009). Asteraceae stands out with regard to medicinal use in other parts of the world, beyond Rio Grande do Sul (Saslis-Lagoudakis *et al*. 2011).

Among the species, 48.4% are native to Brazil, 38.7% are cultivated exotics and 12.9% are naturalized exotics. The species with the greatest number of popular names from manufactured drugs were *Alternanthera brasiliana* L. (Kuntze) (native) with eight, *Achillea millefolium* L. (cultivated exotic) with six and *Salvia microphylla* Kunth. (cultivated exotic) with four. Thus, manufactured drug names are attributed to both native and exotic species.

Asteraceae was the botanical family with the greatest representation in terms of species in this research, which may be due to it being the most diverse and prolific plant family in the world. According to Chadwick *et al*. (2013), the families Asteraceae and Euphorbiaceae produce secondary metabolites, such as sesquiterpene lactones, that are responsible for bitter taste. These phytochemicals represent a significant proportion of the dry weight (around 3%) of species of Asteraceae.

According to the Brazilian National Program of Medicinal Plants, folk medicinal plants, especially native ones, are valued because they are local and thus easily available to users (Brasil 2015). Moreover, locals tend to prefer native over exotic plants for medicinal application (Albuquerque 2006; Estomba *et al*. 2006). However, exotic plants were found to be preferred medicinal plants for digestive disorders, which is probably explained by the low specificity of the action of exotic plants. In other words, many substances might present similar effects, allowing for the replacement of native species with exotics (Estomba *et al*. 2006).

Table 3 lists the twenty-five names of drugs and/or active substances used as plant names found by the present study and their respective therapeutic medicinal classes. Analgesic and antipyretic are the most frequent therapeutic class, with nine manufactured drug names, followed by antispasmodic and digestive with five and antibiotic also with five. *Achillea millefolium* was the species with the highest number of therapeutic classes, that is, it had broader use.

The popular name Anador (analgesic and antipyretic) was mentioned for eight different species, Infalivina (digestive) for seven and Novalgina (analgesic and antipyretic) for four. There is one group of species whose names are of phytotherapics that are all related to digestive problems.

The case of species popularly named for phytotherapics and digestive disorders

The therapeutic indications of the species used in manufactured formulas were generally found to differ from the indications of popular use. However, therapeutic indications for both popular use and manufactured formulas were correlated when it came to the therapeutic indication of digestive disorders. For example, the species *Cynara scolymus* L., called alcachofra, and *Peumus boldus* Molina, called boldo-do-chile, are plants contained in the formula of the phytotherapic Figatil®, while *Gymnanthemum amygdalinum* (Delile) Sch.Bip. *ex* Walp. (= *Vernonia condensata* Baker), also popularly called boldo (Lorenzi & Matos 2008), is the species indicated by the ethnobotanical studies as Figatil. Ten species in total were mentioned as having the folk names Figatil, Infalivina or Olina (Tab. 4).

According to Medeiros *et al*. (2015), traditional pharmacopoeias follow criteria for introducing plants for medicinal purposes. It is not a random process and may be determined by

Table 2 – Species, family, popular names and popular name associated with manufactured drugs, obtained in ethnobotanical surveys in Rio Grande do Sul state, Brazil.

Species / family / popular names	Popular name associated to manufactured drugs
Achillea millefolium L.* / Asteraceae / Mil-em-ramas, aquiléa, milefólia	Anador[21,24], Aspirina[20,21,32], Atroveran[24], Dipirona[25], Infalivina[2,6,19] and Novalgina[2,6,21,24]
Acmella ciliata (Kunth) Cass. / Asteraceae / Jambú	Infalivina[34]
Alternanthera bettzickiana (Regel) G. Nicholson** / Amaranthaceae / Periquito, java	Anador[34]
Alternanthera brasiliana (L.) Kuntze / Amaranthaceae / Perpétua-branca, ervaço, pé-de-galinha	Ampicilina[1,20,21,25,27,28], Anador[19,25], Bactrin[21], Cataflan[20], Meracilina[6], Novalgina[17], Penicilina[1,5,6,7,9,14,19,22,24,25,26,28,30,34] and Terramicina[1,21,22,24,27]
Alternanthera paronychioides A. St.-Hil. / Amaranthaceae / Pérpetua	Anador, Calmador and Doril[5]
Alternanthera reineckii Briq. / Amaranthaceae / not found	Anador[2]
Alternanthera tenella Colla (cited as *A. ficoidea* (L.) P.Beauv.) / Amaranthaceae / Perpétua, quebra-panela	Anador[6, 19] and Melhoral[21]
Artemisia absinthium L.* / Asteraceae / Losna	Infalivina[21]
Artemisia annua L* / Asteraceae / Canflor	Novalgina[21]
Artemisia verlotiorum Lamotte** / Asteraceae / Not found	Infalivina[2,5,7,19,28,32] and Novalgina[2]
Artemisia vulgaris L.* / Asteraceae / Artemigem	Anador[24], Infalivina[3,14,22,24, 34] and Olina[3]
Aspilia montevidensis (Spreng.) Kuntze / Asteraceae / Margarida-do-campo	Insulina[5]
Calea serrata Less. / Asteraceae / Quebra-tudo	Infalivina[2] and Olina[5]
Chelidonium majus L.** / Papaveraceae / Quelidônia	Iodo[29]
Cissus verticillata (L.) Nicolson & C.E.Jarvis / Vitaceae / Anil-trepador, cortina-japonesa	Insulina[7,12,19,22]
Croton gnaphalii Baill. / Euphorbiaceae / not found	Infalivina[7]
Cymbopogon flexuosus (Nees) Will.Watson * / Poaceae / Capim-cidró	Bromil[34]
Eucalyptus cinerea F. Muell. *ex* Benth.* / Myrtaceae / Eucalipto	Viqui and Viki[12]
Gymnanthemum amygdalinum (Delile) Sch.Bip. *ex* Walp.** / Asteraceae / Boldo, oró	Figatil[28,29]
Lepidium bonariense L. / Brassicaceae / not found	Olina[14]
Mentha arvensis L.* / Lamiaceae / Menta	Viqui and Viki[24, 34]
Mentha pulegium L.* / Lamiaceae / Poejo-das-hortas, poejo	Viqui and Viki[24]
Pleroma urvilleanum (DC.) P.J.F.Guim. & Michelang. (cited as *Tibouchina urvilleana* (DC.) Cogn.) / Melastomataceae / Tibuchina	Buscopan[6]
Polygala australis A.W.Benn. / Polygalaceae / not found	Gelol and Gelozinho[13]
Polygala paniculata L. / Polygalaceae / Barba-de-são-pedro	Gelol and Gelozinho[6]
Salvia guaranitica A.St.-Hil. *ex* Benth. (cited as *Salvia coerulea* Benth.) / Lamiaceae / not found	Calmador[13]

Species / family / popular names	Popular name associated to manufactured drugs
Salvia microphylla Kunth.* / Lamiaceae / Prontoalivio	Anador[29], Aspirina[19], Fontol[24] and Melhoral[5,7,10,16,19,21,24,28]
Sedum dendroideum DC.* / Crassulaceae / Bálsamo	Ampicilina[34]
Sphagneticola trilobata (L.) Pruski / Asteraceae / not found	Insulina[6,13,16,19,21,22,20,26,27,29,31,33,34]
Stachys byzantina K.Koch* / Lamiaceae / Pulmonaria	Cataflan[29]
Tradescantia pallida (Rose) D.R. Hunt * / Commelinaceae/ Trapoeraba-roxa, coração-roxo	Tetracilina[32]

Ethnobotanical surveys (from 1997 to 2020): [1] = Zucchetti *et al*. (1997); [2] = Kubo (1997); [3] = Froehlich (1998); [4] = Briani Netto (1999); [5] = Garlet & Irgang (2001); [6] = Marodin & Baptista (2001); [7] = Possamai (2000); [8] = Fernandes (2001); [9] = Koch (2000); [10] = Ritter *et al*. (2002); [11] = Hass (2003); [12] = Leitzke (2003); [13] = Martha (2003); [14] = Sebold (2003); [15] = Veiga (2003); [16] = Zanandrea (2003); [17] = Löwe (2004); [18] = Silveira (2004); [19] = Soares *et al*. (2004); [20] = Barbosa (2005); [21] = Vendruscolo & Mentz (2006); [22] = Barros *et al*. (2007); [23] = Schwambach (2007); [24] = Ramos (2008); [25] = Casagrande (2009); [26] = Ceolin (2009); [27] = Vanini (2010); [28] = Baptista *et al*. (2013); [29] = Battisti *et al*. (2013); [30] = Löbler *et al*. (2014); [31] = Hentges (2015); [32] = Brião *et al*. (2016); [33] = Delfim (2019); [34] = Bremm *et al*. (2020). * = Cultivated; ** = Naturalized.

chemoreceptor system (flavor/odor) and/or cultural information (good or bad, useful or not useful, and values, symbolism, etc.). Taste might be a good principle, called an ethnopharmacophore descriptor (Gilca & Barbulescu 2015), for decision-making regarding the beneficial properties that specific medicinal plants provide for specific illnesses (Heinrich *et al*. 1992).

Following this concept, organoleptic properties could serve as cues for identifying the most efficient plants (Medeiros *et al*. 2015). Thusly, herbs can be classified according to their major constituents, taste and actions as bitter (amara), aromatic and aromatic-bitter (Kelber *et al*. 2018). Heinrich *et al.* (1992) found bitter, aromatic and aromatic-bitter plants to be particularly valued for the treatment of gastrointestinal cramps and pain. In addition, astringent drugs were valued to treat diarrhea and dysentery by an indigenous population in Mexico (Leonti *et al*. 2002).

Bitter substances stimulate gastric secretion and gastrointestinal motility (Kelber *et al*. 2018), promoting the flow of saliva, gastric juices and bile (Van Wyk & Wink 2004; Kelber *et al*. 2018) and thus enhance the function of the digestive system (Olivier & Van Wyk 2013). Evidence of a bitter taste was found for *Gymnanthemum amydalinum* (Kaur *et al.* 2019; Awwad *et al*. 2020) due to the presence of tannins and saponins (Kaur *et al*. 2019). Moreover, as stated earlier, this plant is popularly called boldo (Lorenzi & Matos 2008), and so it makes sense for it to be popularly called Figatil when compared with the commercialized phytotherapic Figatil®, which in turn contains the species *Peumus boldus* Molina, also popularly called boldo, however boldo-do-chile. Other species with bitter taste as a common feature were found, including *Calea serrata* Less., named 'bitter tea' (Ribeiro *et al*. 2008), and *Artemisia absinthium* L. (Awwad *et al*. 2020).

Aromatic plants are those that have significant essential oil content. For digestive disorders they present spasmolytic activity or stimulatory effects on peristalsis. Volatile oil and flavonoids are common chemicals of the genus *Croton* (Magalhães *et al*. 1998), many species of which are used in folk medicine for digestive treatments, such as *C. eluteria* Bennertt. and *C. nepetaefolius* Baill. The volatile oil of these species is composed mainly of monoterpenes (cineol, linalol), propanoids (eugenol, anetol) (Magalhães *et al*. 1998; Matos 2011) and sesquiterpenes (cariofileno) (Matos 2011), compounds that possess relaxant and antispasmodic activities (Magalhães *et al*. 1998). Volatile oils of some South American *Croton* species especially have antispasmodic and anti-diarrheic activities (Salantino *et al*. 2007). Evidence indicates that *C. gnaphalii* Baill., an endemic species of South America that is used by folk medicine for digestive disorders, has potential to be explored due to the history of genus for medicinal therapeutic use.

There are also bitter-aromatic plants, featured in this survey by *Achillea millefolium* and Artemisias (*Artemisia absinthium*, *A. verlotiorum* Lamotte and *A. vulgaris* L.), which have both bitter compounds and volatile oil in their composition. The species *A. absinthium*, for example, has sesquiterpene lactones, such as absinthin and artabsin, as bitter substances (Kelber *et al*. 2018), while saponins are the bitter compound of *A. vulgaris* (Kumar & Kumud 2010). In general,

Table 3 – Popular name associated with manufactured drugs of medicinal plants mentioned in ethnobotanical surveys in Rio Grande do Sul state, Brazil, with number of species cited for each name and the therapeutic classes associated with medicalized names.

Popular name associated with manufactured drugs of medicinal plants (number of species cited for each name)	Therapeutic classes
Ampicilina (2 species)	Antibiotic
Anador (8 species)	Analgesic and antipyretic
Aspirina (2 species)	Analgesic, antipyretic and anti-inflammatory
Atroveran (1 species)	Antispasmodic
Bactrin (1 species)	Analgesic, antipyretic and anti-inflammatory
Bromil (1 species)	Expectorant
Buscopan (1 species)	Antispasmodic
Calmador (2 species)	Analgesic and antipyretic
Cataflan (3 species)	Anti-inflammatory
Dipirona (1 species)	Analgesic and antipyretic
Doril (1 species)	Analgesic and antipyretic
Figatil* (1 species)	Digestive
Fontol (1 species)	Analgesic and antipyretic
Gelol (2 species)	Topical analgesic
Infalivina* (7 species)	Digestive
Insulina (3 species)	Antidiabetic
Iodo (1 species)	Antiseptic
Melhoral (2 species)	Analgesic, antipyretic and anti-inflammatory
Meracilina (1 species)	Antibiotic
Novalgina (4 species)	Analgesic and antipyretic
Olina* (3 species)	Digestive
Penicilina (1 species)	Antibiotic
Terramicina (1 species)	Antibiotic
Tetraciclina (1 species)	Antibiotic
Viqui (3 species)	Expectorant

* = Phytotherapic

the genus *Artemisia* has flavonoids (Valant-Vetschera *et al*. 2003) and essential oil (Biondi *et al*. 2000; Bellomaria *et al*. 2001) as common phytochemicals, at least mostly at the species and subspecies level. All species of *Artemisia* in the present survey (*A. absinthium*, *A. verlotiorum* and *A. vulgaris*) contain the secondary metabolite flavonoid (see Tab. 1), with *A. verlotiorum* being an exception to having a bitter substance in its composition. Three important phytochemical components (bitter substances, essential oil and flavonoids) for digestive disorders are present in *A. absinthium* and *A. vulgaris*; *Achillea millefolium* also possesses those same three phytochemicals (Benedek *et al*. 2006; Lemmens-Gruber *et al*. 2006; Pires *et al*. 2009).

Table 4 – Commercial name of phytotherapics with species/family contained in the formulas and the species indicated in ethnobotanical surveys with the same name of the phytotherapic.

Commercial name of the phytotherapic	Species / family contained in the herbal formula marketed	Species / family indicated in the ethnobotanical surveys
Figatil®	*Cynara scolymus* L. (Asteraceae) *Peumus boldus* Molina (Monimiaceae)	*Gymnanthemum amygdalinum* (Delile) Sch. Bip. *ex* Walp. (Asteraceae)
Infalivina®	*Solanum paniculatum* L. (Solanaceae) *Simarouba amara* Aubl., *Quassia amara* L. (Simaroubaceae)	*Achillea millefolium* L., *Artemisia absinthium* L., *Artemisia verlotiorum* Lamotte, *Artemisia vulgaris* L., *Calea serrata* Less. (Asteraceae) *Croton gnaphalii* Baill. (Euphorbiaceae)
Olina®	*Gentiana lutea* L. (Gentianaceae) *Aloe ferox* Mill. (Asparagaceae)	*Artemisia vulgaris* L., *Calea serrata* Less. (Asteraceae) *Lepidium bonariense* L. (Brassicaceae)

Lepidium bonariensis L. was the only species that could not be classified according to the three taste groups. This lack of information may be due to the fact that *Lepidium* is an endemic genus for which there has not been significant research, even at the genus level. Further studies are recommended for the genus.

From the phytochemical perspective applied to digestive disorders, bitterness is due to the presence of secondary substances such as saponins (Kaur *et al.* 2019), sesquiterpene lactones (Chadwick *et al*. 2013) and caffeine (Yamanishi 1995). Other substances related to digestive disorders include tannins, present in astringent plants (Heinrich *et al*. 1992; Leonti *et al*. 2002) and used to treat diarrhea and dysentery; flavonoids, which have a broad spectrum of relevant actions, such as spasmolytic, anti-inflammatory, and anti-oxidative properties; and essential oil, responsible for spasmolytic activity or stimulatory effects on peristalsis (Kelber *et al*. 2018).

Chemical and pharmacological information

Seven species, among those representing the 25 denominated manufactured drug names, have been pharmacologically studied with regard to at least one of the eight therapeutic classes suggested by popular knowledge: digestive, antispasmodic, analgesic, antipyretic, anti-inflammatory, expectorant, topical analgesic and antidiabetic (Tab. 5). The species *Achillea millefolium*, *Eucalyptus cinerea* F. Muell. *ex* Benth. and *Sphagneticola trilobata* were studied by laboratory tests for 100% of the classes indicated by the popular name evaluated, while *Alternanthera brasiliana* was in 75% and *Artemisia absinthium, A. verlotiorum* and *A. vulgaris* in 50%.

The anti-inflammatory action popularly attributed to *Alternanthera brasiliana* and *Achillea millefolium* can be attributed to the presence of phenolic derivatives and flavonoids. Other species that have also presented this activity in pharmacological tests are: *Alternanthera ficoidea* (L.) P. Beauv. (Guerra *et al*. 2003; Biella *et al*. 2008), *Artemisia vulgaris* (flavonoids and terpenoids) (Kumar & Kumud 2010), *Gymnanthemum amygdalinum* (Valverde *et al*. 2001), *Mentha arvensis* L. (Verma *et al*. 2003) and *Sphagneticola trilobata* (Maldini *et al*. 2009).

The species *Artemisia vulgaris*, *Alternanthera brasiliana* and *Achillea millefollium* have been shown to present analgesic activity. Rutin (glycosylated flavonol) and caffeic acid derivatives with analgesic activity were identified in *Achillea millefolium* (Pires *et al*. 2009), as previously indicated by Gené *et al*. (1996) and Ficarra *et al.* (1995).

Gymnanthemum amygdalinum presented hypocholesterolemic (Arantes *et al.* 2016) and gastroprotective (Boeing *et al*. 2016) activities.

Diterpenes (caurenoic acid) were found in *Sphagneticola trilobata*, with hypoglycemic activity confirmed by laboratory tests (Bresciani *et al*. 2004).

Table 5 – Phytochemical and pharmacological information for plant species with popular names associated with manufactured drugs used by popular medicine in southern Brazil.

Species	Therapeutic class indicated by popular names	Therapeutic class according to scientific studies	Chemical compound / Class
Achillea millefolium L.	Analgesic (Anador, Aspirina, Atroveran and Dipirona), anti-inflammatory (Aspirina), antipyretic (Anador, Aspirina and Dipirona), antiespasmodic (Atroveran), digestive and herbal medicine (Infalivina)	Analgesic (Pires *et al*. 2009), antiespasmodic (Benedek *et al*. 2006; Lemmens-Gruber *et al*. 2006; Moradi *et al*. 2013), anti-inflammatory and antipyretic (Lemmens-Gruber *et al.* 2006), choleretic activity (Benedek *et al*. 2006), digestive (Benedek *et al*. 2006; Lemmens-Gruber *et al*. 2006)	Flavonoid (Lemmens-Gruber *et al*. 2006), flavonoid (rutin) and caffeic acid derivatives (Pires *et al*. 2009), phenolic derivative - cafeoilquinic acid (Benedek *et al*. 2006)
Acmella ciliata (Kunth) Cass.	Digestive (Infalivina)	Not found	Quercetin-3-O-glycosides and caffeoylquinic acid derivatives (Jenett-Siems *et al*. 2008; Kasper *et al*. 2009)
Alternanthera bettzickiana (Regel) G. Nicholson	Analgesic and antipyretic (Anador)	Antiarthritic (Manan *et al*. 2020)	Gallic acid, catechin, chlorogenic acid, sinapic acid, quercetin, and γ- and α-tocopherol (Manan *et al*. 2020)
Alternanthera brasiliana (L.) Kuntze	Analgesic (Anador and Novalgina), antibiotic (Ampicilina, Bactrin, Meracilina, Penicilina and Terramicina), anti-inflammatory (Cataflan), antipyretic (Anador and Novalgina)	Analgesic (Souza *et al*. 1998; Macedo *et al*. 2004), antibiotic (Caetano *et al*. 2002; Pereira *et al*. 2007; Trapp *et al*. 2015), anti-inflammatory (Brochado *et al*. 2003)	Terpenoid (β- sitoesterol) (Macedo *et al*. 2004), flavonoid (Brochado *et al*. 2003; Alencar Filho *et al*. 2020), hydrocarbons, diterpenes, monoterpenes, vitamin and carotenoid derivatives, phytosterols and triterpenes (Alencar Filho *et al*. 2020)
Alternanthera paronychioides A. St.-Hil.	Analgesic and antipyretic (Anador, Calmador, Doril)	Not found	Polyphenolics (Wu *et al*. 2013)
Alternanthera reineckii Briq.	Analgesic and antipyretic (Anador)	Not found	Not found
Alternanthera tenella Colla (cited as *A. ficoidea* (L.) P.Beauv.)	Analgesic and antipyretic (Anador, Melhoral)	Anti-inflammatory (Biella *et al*. 2008)	Tannin and flavonoids (Biella *et al*. 2008), Steroids, saponins and flavonoids (aglycones and C-glycosides) (Salvador *et al.* 2009)
Artemisia absinthium L.	Herbal medicine and digestive (Infalivina)	Digestive (Amat *et al*. 2010; Gilani & Janbaz 1995), Hepatoprotective effect (Amat *et al*. 2010), Hepatobiliary diseases (Gilani & Janbaz 1995)	Ascorbic acid (Slepetys 1975), carotenoids (Sergeeva & Zakharova 1977), flavonoid (Hoffmann & Herrmann 1982), lignoids (Greger & Hofer 1980), tanins (Slepetys 1975)

Species	Therapeutic class indicated by popular names	Therapeutic class according to scientific studies	Chemical compound / Class
Artemisia annua L.	Analgesic and antipyretic (Novalgina)	Antitumor activity (Lang *et al*. 2019)	Chrysosplenol D, arteannuin B, and casticin (Lang *et al*. 2019)
Artemisia verlotiorum Lamotte	Analgesic and antipyretic (Novalgina), digestive (Infalivina)	Anticonvulsant and analgesic (partially) (Lima *et al*. 1993)	Essential oils (Bedini *et al*. 2019)
Artemisia vulgaris L.	Analgesic (Anador), antipyretic (Anador), herbal medicine and digestive (Infalivina and Olina)	Analgesic (Kumar & Kumud 2010), digestive and hepatoprotective effect (Gilani *et al*. 2005)	Flavonoids and saponins (Kumar & Kumud 2010)
Aspilia montevidensis (Spreng.) Kuntze	Antidiabetic (Insulina)	Not found	Steroidal saponin, 7-oxostigmasterol and saponinas (Bellini *et al*. 1999)
Calea serrata Less.	Digestive (Infalivina, Olina)	Acaricid (Ribeiro *et al*. 2011)	Chromene (Steinbeck *et al*. 1997), essential oils and precocene (Ribeiro *et al*. 2011)
Chelidonium majus L.	Antiseptic (Iodo)	Cytotoxic activities (Krizhanovska *et al.* 2021), anti-inflammatory activities (Huang *et al*. 2019)	Alkaloids and flavonoid (Krizhanovska *et al*. 2021), lignanamides and alkaloids (Huang *et al*. 2019)
Cissus verticillata (L.) Nicolson & C.E.Jarvis	Antidiabetic (Insulina)	Not found	Phenolic compounds (specifically tannin), lipids, essential oils (Oliveira *et al*. 2012)
Croton gnaphalii Baill.	Digestive (Infalivina)	Not found	Acylated glycoside (tilirosid) (Lencina *et al*. 2001)
Cymbopogon flexuosus (Nees) Will. Watson	Expectorant (Bromil)	Antimicrobial activity (Gao *et al*. 2020)	Essencial oils (Gao *et al*. 2020)
Eucalyptus cinerea F. Muell. *ex* Benth.	Expectorant (Viqui and Viki)	Expectorant (Oyedeji *et al*. 1999), respiratory tract diseases - antimicrobial (Oyedeji *et al*. 1999; Soliman *et al*. 2014; Sebei *et al*. 2015)	Essential oils (Sebei *et al*. 2015)
Gymnanthemum amygdalinum (Delile) Sch.Bip. *ex* Walp.	Digestive (Figatil)	Analgesic and anti-inflammatory (*Vernonia condensata* Baker) (Valverde *et al*. 2001), anti-inflammatory (*Vernonia condensata* Baker) (Silva *et al*. 2017)	Vernonioside B2 (*Vernonia condensata* Baker) (Valverde *et al*. 2001), 1,5-dicaffeoylquinic acid, apigenin, luteolin, chlorogenic acid) (*Vernonia condensata* Baker) (Silva *et al*. 2017)
Lepidium bonariense L.	Digestive (Olina)	Antimicrobial (Swart *et al.* 2002)	p-Methoxybenzylisothiocyanate (Swart *et al*. 2002)
Mentha arvensis L.	Expectorant (Viki ou Viqui)	Anti-inflammatory (Verma *et al.* 2003; Kim *et al*. 2021)	Essential oils (Kim *et al.* 2021)

Species	Therapeutic class indicated by popular names	Therapeutic class according to scientific studies	Chemical compound / Class
Mentha pulegium L.	Expectorant (Viki ou Viqui)	Antioxidant (Bektašević *et al.* 2021), antimicrobial (Luis & Domingues 2021)	Essential oils (Bektašević *et al.* 2021); pulegone (Luis & Domingues 2021)
Pleroma urvilleanum (DC.) P.J.F.Guim. & Michelang. (cited as *Tibouchina urvilleana* (DC.) Cogn.)	Antispasmodic (Buscopan)	Not found	Triterpenes, flavonoids and sterols (*Tibouchina urvilleana*) (Pérez-Castorena 2014)
Polygala australis A.W.Benn.	Topical analgesic (Gelol, Gelolzinho)	Not found	Not found
Polygala paniculata L.	Topical analgesic (Gelol, Gelolzinho)	Hypotensive and vasorelaxant effects (Lapa *et al*. 2011)	Coumarins (Hamburger *et al*. 1985), flavonoids (rutin) (Lapa *et al*. 2011)
Salvia guaranitica A.St.-Hil. *ex* Benth. (cited as *Salvia coerulea* Benth.)	Analgesic and antipyretic (Calmador)	Sedative and hypnotic (Marder *et al*. 1996; Viola *et al*. 1997)	Essential oils (sesquiterpene hydrocarbons: germacrene D, β-elemene, β-caryophyllene, β-bourbonene, monoterpenes) (Vallverdú *et al*. 2005); flavonoid (circiliol) (Marder *et al*. 1996; Viola *et al*. 1997) by *S. guaranitica*
Salvia microphylla Kunth	Analgesic and antipyretic (Anador, Aspirina, Fontol and Melhoral)	Antimicrobial activity (Aydoğmuş *et al*. 2006)	Phenolic ester 2-(p-hydroxyphenyl) ethyl eicosaheptanoic acid ester, hexacosylferulate, sesquiterpenes beta-eudesmol, 8alpha-hydroxy-beta-eudesmol, diterpene carnosic acid 12-methyl ether (12-methoxycarnosic acid), triterpenes erithrodiol 3-acetate, oleanolic acid, lupeol and beta-sitosterol (Aydoğmlş *et al*. 2006)
Sedum dendroideum DC.	Antibiotic (Ampicilina)	Antioxidant and gastroprotective (Luz *et al.* 2019), decreases the proliferation of pterygium fibroblasts (López-Montemayor *et al*. 2021)	Flavonol glycosides (myricetin, quercetin, kaempferol) (Luz *et al*. 2019); phenolic compounds (López-Montemayor *et al*. 2021)
Sphagneticola trilobata (L.) Pruski	Antidiabetic (Insulina)	Antidiabetic (Bresciani *et al*. 2004), hypoglycemic (Bresciani *et al*. 2004)	Diterpenes - Kaurenoic acid derivative (ent-16-kauren-19-oic acid) (Bresciani *et al.* 2004)
Stachys byzantina K.Koch	Anti-inflammatory (Cataflan)	Antimicrobial activities (Jassbi *et al*. 2013)	Essential oils – sesquiterpenes (a-copaene, spathulenol and beta-caryophyllene (Khanavi *et al*. 2004)
Tradescantia pallida (Rose) D.R. Hunt	Antibiotic (Tetraciclina)	Not found	Not found

Correspondence between popular uses and the biomedical system

The medicinal species popularly known as anador, doril, figatil and melhoral showed 100% agreement between the popular indications, which were compared with all the indications on the drug's package insert. It should be noted that this percentage does not consider the versatility of uses of the species and of the drug package insert and that those with 100% concordance of uses may only have one use and that this use is indicated by the insert of the manufactured drugs. Although all the popular indications were found in the package insert, some of the indications in the leaflet may not have been reported by the population.

This finding suggests that the use of the name of a drug for the name of a medicinal plant may be associated with the uses that are indicated by manufactured drugs, regardless of the origin of the species (native or exotic). This "hybridization" (see Ladio & Albuquerque 2014) involving biomedicine and the local medical system, in the context of this research, expresses a double movement with the decontextualization of the names of medicines and their recontextualization in the names of medicinal plants. This process is particularly important for the species of the present study since it is possible that these species have been named after manufactured drugs because their therapeutic effects may be compatible with the medicines. In fact, people name plants after medicines manufactured to treat the same symptoms and illnesses, while the use of the previous popular name gradually ceases. Such a new name is often only known regionally and used for different species.

Physical, psychic, and social aspects are considered important in the healing process in medical systems (Kleinman 1978). Thus, psychosocial needs (a group's idea about the feeling of "comfort") represented by the popular names based on medicines attributed to medicinal plants may be a symbolic representation, given by the 'status syndrome' (see Marmot 2004), recontextualizing the names of medicinal products from medicinal plants. Semantic analysis of the nomenclature employed can demonstrate links and implications that the dominant medical system (Western medicine) establishes (Kleinman 1978; Helman 2009). These vernacular assignments may induce safety or credibility in their efficacy by assigning to the available resource a nomenclature belonging to the current biomedical system, that is, a cultural legitimization of biomedical treatment with popular therapeutics. This process is a two-way street, because just as the biomedical system influences popular use, popular medicine, based on this initial recontextualization, can increase the process of experimentation by incorporating new therapeutic properties.

Regarding the symptoms that marketed phytotherapeutics and folk therapeutics are prescribed for, the main activities prescribed by the former were spasmodic, choleretic and carminative. These activities were correlated with the studied species: (1) the majority of the species of the present research have flavonoids in their composition (Tab. 3), which, as mentioned previously, have spasmolytic activity for digestive disorders (Kelber *et al*. 2018) acting as an antispasmodic agents they promote muscle (gastrointestinal and abdominal) relaxation, thereby reliving the discomfort associated with indigestion, diarrhea, etc., and decreasing the pain and spasms related to muscle contraction (Hicks 2007); (2) bitter plants have substances that stimulate gastric secretion and gastrointestinal motility (Kelber *et al*. 2018); (3) aromatic plants possess volatile oil that stimulates gastric secretions and antispasmodic activity (Magalhães *et al*. 1998); (4) aromatic-bitter plants, such as *Achillea millefolium* as representative of the group, have been shown by pharmacological studies to have choleretic (Benedek *et al*. 2006), antispasmodic (Lemmens-Gruber *et al*. 2006; Kelber *et al*. 2018) and carminative activities (Kelber *et al*. 2018). The last is related to Infalivina®, which is prescribed for intestinal gas reduction. Interestingly, the genus *Achillea* is popularly named as Infalivina and has the same therapeutic use, demonstrating that folk names have been influenced by the medical system.

The present ethnobotanical survey conducted in Rio Grande do Sul, southern Brazil, revealed an interaction between the biomedical system and popular medicine, namely the use of medicine names for medicinal plants. Two important observations were made: (1) this phenomenon is independent of plant origin (native or exotic) and (2) a correspondence exists between the therapeutic use of plants and that of the manufactured medicines for which they are named.

Species with popular names associated with commercialized phytotherapeutics were not given these names at random. The names were found to be correlated, with both being prescribed for digestive

disorders. Findings here indicate that taste might be a criterion for folk plant selection, resulting in three groups: bitter, aromatic and aromatic-bitter plants. The phytochemical substances responsible for digestive treatment are saponins, caffeine, sesquiterpene lactones, tannins, flavonoids and essential oil, the main actions of which are spasmodic, choleretic and carminative activities.

The cultural aspects of this phenomenon, its origin and its meaning to the population still remain unclear, and so further and more extensive research at the sites where the present surveys were conducted are needed in order to better understand its significance and cultural dynamics. These future investigations can clarify aspects of the dynamics and evolution of local medical systems and generate implications for bioprospection, including the search for plants with potential to reveal new bioactive compounds of pharmacological interest.

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Data availability statement

In accordance with Open Science communication practices, the authors inform that all data are available within the manuscript.

References

Albuquerque UP (2006) Re-examining hypotheses concerning the use and knowledge of medicinal plants: a study in the *Caatinga* vegetation of NE Brazil. Available at <http://www.ethnobiomed.com/content/2/1/30>. Access on 10 July 2020. DOI: 10.1186/1746-4269-2-30

Alencar Filho JMT, Teixeira HAP, Sampaio PA, Pereira ECV, Amariz IAE, Rolim Neto PJ, Rolim LA & Araújo ECC (2020) Phytochemical analysis in *Alternanthera brasiliana* by LC-MS/MS and GC-MS. Natural Product Research 34: 429-433.

Amat N, Upur H & Blazekovic B (2010) *In vivo* hepatoprotective activity of the aqueous extract of *Artemisia absinthium* L. against chemically and immunologically induced liver injuries in mice. Journal of Ethnopharmacology 131: 478-484.

APG IV - Angiosperm Phylogeny Group (2016) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. Botanical Journal of the Linnean Society 181: 1-20.

Arantes AA, Falé PL, Costa LCB, Pacheco R, Ascensão L & Serralheiro ML (2016) Inhibition of HMG-CoA reductase activity and cholesterol permeation through Caco-2 cells by caffeoylquinic acids from *Vernonia condensata* leaves. Brazilian Journal of Pharmacognosy 26: 738-743.

Awwad A, Pouchereta P, Idresa AY, Bidelb L & Touscha D (2020) The bitter Asteraceae: an interesting approach to delay the metabolic syndrome progression. NFS Journal 18: 29-38.

Aydoğmuş Z, Yeşilyurt V & Topcu G (2006) Constituents of *Salvia microphylla*. Natural Product Research 20: 775-781.

Baptista MM, Ramos MA, Albuquerque UP, Coelho-de-Souza G & Ritter MR (2013) Traditional botanical knowledge of artisanal fishers in southern Brazil. Journal of Ethnobiology and Ethnomedicine 9: 54-69.

Barbosa JF (2005) Estudo etnobotânico das plantas de uso medicinal e místico utilizadas na comunidade quilombola de Nova Real, Bom Retiro do Sul, estado do Rio Grande do Sul. Monografia de Conclusão de Curso. Universidade do Vale do Rio dos Sinos, São Leopoldo. 53p.

Barros FMC, Pereira KN, Zanetti GD & Heinzmann BM (2007) Plantas de uso medicinal no município de São Luiz Gonzaga, RS, Brasil. Latin American Journal of Pharmacy 265: 652-662.

Battisti C, Garlet TMB, Essi L, Horbach RK, Andrade A & Badke MR (2013) Plantas medicinais utilizadas no município de Palmeira das Missões, RS, Brasil. Revista Brasileira de Biociências 11: 338-348.

Bedini S, Flamini G, Ascrizzi R, Venturi F, Ferroni G, Bader A, Girardi J & Conti B (2019) Essential oils sensory quality and their bioactivity against the mosquito *Aedes albopictus*. Scientific Reports 9: 6184.

Bellini AA, Camilo D, Oliveira R & Vishnewski W (1999) Steroidal saponin, 7-oxostigmasterol and saponinas from *Aspilia montevidensis*. Biochemical Systematics and Ecology 27: 317-319.

Bellomaria B, Valentini G & Biondi E (2001) Chemotaxonomy of *Artemisia variabilis* Ten. and *A. campestris* L. ssp. *glutinosa* (Ten.) Briq. et Cavill. (Asteraceae) from Italy. Journal of Essential Oil Research 13: 90-94.

Bektašević M, Politeo O & Carev I (2021) Comparative study of chemical composition, cholinesterase inhibition and antioxidant potential of *Mentha pulegium* L. essential oil. Chemistry & Biodiversity 18: e2000935. Available at <https://onlinelibrary.wiley.com/doi/10.1002/cbdv.202000935>. Access on 10 December 2021. DOI: 10.1002/cbdv.202000935

Benedek B, Geisz N, Jäger W, Thalhammer T & Kopp B (2006) Choleretic effects of yarrow (*Achillea millefolium* s.l.) in the isolated perfused rat liver. Phytomedicine 13: 702-706.

Biella CA, Salvador MJ, Dias DA, Dias-Baruffi M & Pereira-Crott LS (2008) Phytochemical screening of *Alternanthera tenella* Colla (Amaranthaceae) aqueous extracts. Memórias do Instituto Oswaldo Cruz 103: 569-577.

Biondi E, Valentini G & Bellomaria B (2000) Essential oil of some halophyle and subhalophyle taxa *Artemisia* L. from the Central European Mediterranean. Journal of Essential Oil Research 12: 365-371.

Boeing T, Silva LM, Somensi LB, Cury BJ, Costa APM, Petreanu M, Niero R & Andrade SF (2016) Antiulcer mechanisms of *Vernonia condensata* Baker: a medicinal plant used in the treatment of gastritis and gastric ulcer. Journal of Ethnopharmacology 184: 196-207.

Brasil (1984) SVS/MS - Ministério da Saúde. Secretaria de Vigilância Sanitária Portaria no. 64, de 28 de dezembro de 1984. Dispõe sobre modificação e autorização dos principais grupos terapêuticos e respectivos subgrupos. DOU. 31 Dezembro 1984. Poder Legislativo, Brasília.

Brasil (2015) Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Política nacional de práticas integrativas e complementares no SUS: atitude de ampliação de acesso/Ministério da Saúde. 2. ed. Ministério da Saúde, Brasília. 96p.

Brasil (2021) ANVISA Consultas. Available at <https://consultas.anvisa.gov.br/#/medicamentos/>. Access on 13 May 2021.

Bremm N, Ramos RF, Nilles JH, Pivetta CP & Pelegrin CMG (2020) Plantas medicinais usadas em uma comunidade do noroeste do Rio Grande do Sul, Brasil. Revista Thema 17: 765-781.

Bresciani LFV, Yunes RA, Burger C, Oliveira LE, Bóf KL & Cechinel-Filho V (2004) Seasonal variation of kaurenoic acid, a hypoglycemic diterpene present in *Wedelia paludosa* (*Acmela brasiliensis*) (Asteraceae). A Journal of Biosciences: Zeitschrift für Naturforschung C 59: 229-232.

Briani Neto ML (1999) Levantamento etnobotânico de plantas medicinais dos distritos de Cazuza Ferreira e Lageado Grande, no município de São Francisco de Paula - RS, Brasil. Monografia de Conclusão de Curso. Universidade Luterana do Brasil, Canoas. 100p.

Brião D, Artico LL, Líma LFP & Menezes APS (2016) Utilização de plantas medicinais em um município inserido no bioma Pampa brasileiro. Revista da Universidade Vale do Rio Verde 14: 206-219.

Brochado CO, Almeida AP, Barreto BP, Costa LP, Ribeiro LS, Pereira RLC, Koatz VLG & Costa SS (2003) Flavonol robinobiosides and rutinosides from *Alternanthera brasiliana* (Amaranthaceae) and their effects on lymphocyte proliferation *in vitro*. Journal of the Brazilian Chemical Society 14: 449-451.

Caetano N, Saraiva A, Pereira R, Carvalho D, Pimentel MCB & Maia MBS (2002) Determinação de atividade antimicrobiana de extratos de plantas de uso popular como antiflamatório. Brazilian Journal of Pharmacognosy 12: 132-135.

Calabria LM, Emerenciano VP, Scotti MT & Mabry TJ (2009) Secondary chemistry of Compositae. *In*: Funk VA, Susanna A, Stuessy TF & Bayer RJ (eds.) Systematics, evolution and biogeography of Compositae. International Association for Plant Taxonomy, Vienna. Pp. 73- 88.

Casagrande A (2009) Plantas medicinais e ritualísticas utilizadas pela comunidade do Morro da Cruz, Porto Alegre - RS. Monografia de Conclusão de Curso. Universidade Federal do Rio Grande do Sul, Porto Alegre. 139p.

Ceolin T (2009) Conhecimento sobre plantas medicinais entre agricultores de base ecológica da região sul do Rio Grande do Sul. Dissertação de Mestrado. Universidade Federal de Pelotas, Pelotas. 108p.

Chadwick M, Trewin H, Gawthrop F & Wagstaff C (2013) Sesquiterpenoids lactones: benefits to plants and people. International Journal of Molecular Sciences 14: 12780-12805.

Delfim TF (2019) Uso e conservação de plantas bioativas em comunidades quilombolas da mesorregião do sudeste Rio-grandense. Tese de Doutorado. Universidade Federal de Pelotas, Pelotas. 91p.

Estomba D, Ladio A & Lozada M (2006) Medicinal wild plant knowledge and gathering patterns in a Mapuche community from North-western Patagonia. Journal of Ethnopharmacology 103: 109-119.

Fernandes AA (2001) Levantamento etnobotânico na região da Pedra do Segredo, Caçapava do Sul, RS. Monografia de conclusão de curso. Universidade Federal de Pelotas, Pelotas. 54p.

Ficarra R, Ficarra P, Tommasini S, Calabrò ML, Ragusa S, Barbera R & Rapisarda A (1995) Leaf extracts of some *Cordia* species - analgesic and antiinflammatory activities as well as their chromatographic analysis. Farmaco 50: 245-256.

Flora digital do Rio Grande do Sul e de Santa Catarina (2021) Available at <http://floradigital.ufsc.br>. Access on 18 February 2021.

Flora e Funga do Brasil 2022 (continuously updated) Jardim Botânico do Rio de Janeiro. Available at <http://floradobrasil.jbrj.gov.br/>. Access on 20 December 2022.

Froehlich NMS (1998) Plantas medicinais utilizadas na comunidade rural de Fortaleza campo, município de Cidreira, RS. Monografia de Conclusão de Curso. Universidade Luterana do Brasil, Canoas. 59p.

Gao S, Liu G, Li J, Chen J, Li L, Li Z, Zhang X, Zhang S, Thorne RF & Zhang S (2020) Antimicrobial activity of lemongrass essential oil (*Cymbopogon flexu*osus) and its active component citral against dual-species biofilms of *Staphylococcus aureus* and *Candida* species. Frontiers in Cellular and Infection Microbiology 10: 603858.

Garlet TMB & Irgang BE (2001) Plantas medicinais utilizadas na medicina popular por mulheres trabalhadoras rurais de Cruz Alta, Rio Grande do Sul, Brasil. Revista Brasileira de Plantas Medicinais 4: 9-18.

Gené RM, Cartaña C, Adzet T, Marín E, Parella T & Cañigueral S (1996) Anti-inflammatory and analgesic activity of *Bacharis trimera*: identification of its active constituents. Planta Medica 62: 232-235.

Gilani AH & Janbaz KH (1995) Preventive and curative effects of *Artemisia absinthium* on acetaminophen and CC14-induced hepatotoxicity. General Pharmacology 26: 309-315.

Gilani AH, Yaeesh S, Jamal Q & Ghayur MN (2005) Hepatoprotective activity of aqueous - methanol extract of *Artemisia vulgaris*. Phytotherapy Research 19: 170-172.

Gilca M & Barbulescu A (2015) Taste of medicinal plants: a potential tool in predicting ethnopharmacological activities? Journal of Ethnopharmacology 174: 464-473.

Giovannini P, Reyes-García V, Waldstein A & Heinrich M (2011) Do pharmaceuticals displace local knowledge and use of medicinal plants? Estimates from a cross-sectional study in a rural indigenous community, Mexico. Social Science & Medicine 72: 928-936.

Google Scholar (2021) Available at <https://scholar.google.com.br/>. Access on 2 January 2018.

Greger H & Hofer O (1980) New unsymmetrical substituted tetrahydrofurofuran lignans from *Artemisia absinthium.* Assignment of the relative stereochemistry by lanthanide induced chemical shifts. Tetrahedron 36: 3551-3558.

Greene S (1998) The shaman's needle: development, shamanic agency, and intermedicality in Aguaruna lands, Peru. American Ethnologist 25: 634-658.

Guerra RNM, Pereira HAW, Silveira LMS & Olea RSG (2003) Immunomodulatory properties of *Alternanthera tenella* Colla aqueous extracts in mice. Brazilian Journal of Medical and Biological Research 36: 1215-1219.

Hass APS (2003) Categorização tóxico-terapêutica das plantas medicinais usadas no município de Maquiné - Rio Grande do Sul. Monografia de Conclusão de Curso. Universidade Federal do Rio Grande do Sul, Porto Alegre. 56p.

Heinrich M, Rimpler H & Barrera NA (1992) Indigenous phytotherapy of gastrointestinal disorders in a lowland Mixe community (Oaxaca, Mexico): Ethnopharmacologic evaluation. Journal of Ethnopharmacology 36: 63-80.

Helman CG (2009) Cultura, saúde e doença. 5ª ed. Artmed, Porto Alegre. 431p.

Hentges AM (2015) Dados socioculturais de usuários de plantas medicinais e plantas utilizadas como medicinais no município de Cândido Godói, Rio Grande do Sul. Trabalho de Conclusão de Curso, Universidade Federal da Fronteira Sul, Cerro Largo. 55p.

Hicks GA (2007) Irritable bowel syndrome. *In*: Williams M (ed.) Comprehensive medicinal chemistry II. Therapeutic areas I: central nervous system, pain, metabolic syndrome, urology, gastrointestinal and cardiovascular. Vol. 6. Elsevier, Oxford. Pp. 643-670.

Hoa NP, Chuc NT & Thorson A (2009) Knowledge, attitudes, and practices about tuberculosis and choice of communication channels in a rural community in Vietnam. Health Policy 90: 8-12.

Hoffmann B & Herrmann K (1982) Flavonol glycosides of wormwood (*Artemisia vulgaris*), tarragon (*Artemisia dracunculus* L.) and absinthe (*Artemisia absinthium* L.). 8. Phenolics of spices. Zeitschrift für Lebensmittel-Untersuchung und Forschung 74: 211-215.

Huang X, Shao Z, An L, Xue J, Li D, Li Z & Hua H (2019) New lignanamides and alkaloids from *Chelidonium majus* and their anti-inflammation activity. Fitoterapia 139: 104359.

ISI Web of Knowledge (2021) Thomson Reuters. Available at <http://www.isiwebofknowledge.com>. Access on 13 March 2021.

Jassbi AR, Miri R, Asadollahi M, Javanmardi N & Firuzi O (2013) Cytotoxic, antioxidant and antimicrobial effects of nine species of woundwort (*Stachys*) plants. Pharmaceutical Biology 52: 62-67.

Jenett-Siem K, Kasper J & Melzig MF (2008) Phytochemical investigation of *Acmella ciliata* (H.B.K.) Cass. Planta Medica 74: 121.

Kasper J, Melzig MF & Jenett-Siems K (2009) New phenolic compounds of *Acmella ciliata*. Planta Medica 76: 633-635.

Kaur D, Kaur N & Chopra A (2019) A comprehensive review on phytochemistry and pharmacological activities of *Vernonia amygdalina*. Journal of Pharmacognosy and Phytochemistry 8: 2629-2636.

Kelber O, Bauer R & Kubelka W (2018) Phytotherapy in functional gastrointestinal disorders. Digestive Diseases 35: 36-42.

Khanavi M, Hadjiakhoondi A, Amin G, Amanzadeh Y, Rustaiyan A & Shafiee A (2004) Comparison of the volatile composition of *Stachys persica* Gmel. and *Stachys byzantina* C. Koch. oils obtained by hydrodistillation and steam distillation. Zeitschrift für Naturforschung C - a Journal of Biosciences 59: 463-467.

Kim S, Han S, Kim M, Mony TJ, Lee E, Kim K, Choi S, Hong SH, Choi JW & Park SJ (2021) *Mentha arvensis* essential oil exerts anti-inflammatory in LPS-stimulated inflammatory responses via inhibition of ERK/NF-κB signaling pathway and anti-atopic dermatitis-like effects in 2,4-dinitrochlorobezene-induced BALB/c mice. Antioxidant 10: 1941.

Kleinman A (1978) Concepts and a model for the comparison of medical systems as cultural systems. Social Science & Medicine 12: 85-93.

Koch V (2000) Estudo etnobotânico das plantas medicinais na cultura ítalobrasileira no Rio Grande do Sul - um modelo para o cultivo comercial na agricultura familiar. Dissertação de Mestrado. Universidade Federal do Rio Grande do Sul, Porto Alegre. 152p.

Krizhanovska V, Sile I, Kronberga A, Nakurte I, Mezaka I, Dambrova M, Pugovics O & Grinberga S (2021) The cultivation of *Chelidonium majus* L. increased the total alkaloid content and cytotoxic activity compared with those of wild-grown plants. Plants 10: 1971.

Kubo RR (1997) Levantamento das plantas de uso medicinal em Coronel Bicaco, RS. Dissertação de Mestrado. Universidade Federal do Rio Grande do Sul, Porto Alegre. 163p.

Kumar AP & Kumud U (2010) Preliminary phytochemical screening and physic-chemical parameters of aerial parts of *Artemisia vulgaris*. International Journal of Research in Ayurveda and Pharmacy 1: 206-211.

Ladio AH & Albuquerque UP (2014) The concept of hybridization and its contribution to urban ethnobiology. Ethnobiology and Conservation 3. Available at <http://ethnobioconservation.com/index.php/ebc/article/view/59>. Access on 20 May 2019. DOI: 10.15451/ec2014-11-3.6-1-9

Lang SJ, Schmiech M, Hafner S, Paetz C, Steinborn C, Huber R, El Gaafary M, Werner K , Schmidt CQ , Syrovets T & Simmet T (2019) Antitumor activity of an *Artemisia annua* herbal preparation and identification of active ingredientes. Phytomedicine 62: 152962.

Lapa FR, Soares KC, Rattmann YD, Crestani S, Missau FC, Pizzolatti MG, Marques MCA, Rieck L & Santos ARS (2011) Vasorelaxant and hypotensive effects of the extract and the isolated flavonoid rutin obtained from *Polygala paniculata* L. Journal of Pharmacy and Pharmacology 63: 875-881.

Leitzke ZCS (2003) Levantamento das plantas medicinais da comunidade Nossa Senhora da Conceição - Canguçu-RS. Trabalho de Conclusão de Curso. Universidade Federal de Pelotas, Pelotas. 128p.

Lemmens-Gruber R, Marchart E, Rawnduzi P, Engel N, Benedek B & Kopp B (2006) Investigation of the spasmolytic activity of the flavonoid fraction of *Achillea millefolium* s.l. on isolated guinea-pig ilea. Arzneimittelforschung 56: 582-588.

Lencina C, Pires VS, Gosmann G, Taketa ATC & Schenkel EP (2001) Tilirosídeo em *Croton gnaphalii* Baill. Brazilian Journal of Pharmacognosy 11: 89-93.

Leonti M, Sticher O & Heinrich M (2002) Medicinal plants of the Popoluca, México: organoleptic properties as indigenous selection criteria. Journal of Ethnopharmacology 81: 307-315.

Lima TC, Morato GS & Takahashi RN (1993) Evaluation of the central properties of *Artemisia verlotorum*. Planta Medica 59: 326-329.

Löbler L, Santos D, Rodrigues ES & Santos NRZ (2014) Levantamento etnobotânico de plantas medicinais no bairro Três de Outubro, da cidade de São Gabriel, RS, Brasil. Revista Brasileira de Biociências 12: 81-89.

López-Montemayor P, Zavala J, Montalvo-Parra MD, Guerrero-Ramírez GI, Mayolo-Deloisa K, Enriquez-Ochoa D, Martínez-García B, Loya-García D, Guerrero-Martinez AM & Valdez-García JE (2021) Phytochemical profile and antioxidant and antiproliferative activity of *Sedum dendroideum* on pterygium fibroblastos. Evidence-Based Complementary and Alternative Medicine 2021: 5814221. DOI: 10.1155/2021/5814221

Lorenzi H & Matos FJA (2008) Plantas medicinais no Brasil. 2ª ed. Instituto Plantarum, Nova Odessa. 576p.

Löwe TR (2004) Estudo etnobotânico em uma área rural do município de Três de Maio, RS. Trabalho de Conclusão de Curso. Universidade Federal de Pelotas, Pelotas. 45p.

Luís A & Domingues F (2021) Screening of the potential bioactivities of pennyroyal (*Mentha pulegium* L.) essential oil. Antibiotics 10: 1266.

Luz BB, Oliveira AF, Ferreira DM, Dallazen JL, Cipriani TR, Souza LM & Werner MFP (2019) Chemical composition, antioxidant and gastrointestinal properties of *Sedum dendroideum* Moc & Sessé *ex* DC. leaves tea infusion. Journal of Ethnopharmacology 231: 141-151.

Macedo AF, Cechinel-FilhoV, Esquibel MA, Souza MM, Silva KL, Niero R & Lage CLS (2004) Preliminary phytochemical and pharmacological studies on plantlets of *Alternanthera brasiliana* cultured under different spectral quality of lights. Acta Farmaceutica Bonaerense 23: 515-519.

Magalhães PJC, Criddle DN, Tavares RA, Melo EM, Mota TL & Leal-Cardoso JH (1998) Intestinal myorelaxant and antispasmodic effects of the essential oil of *Croton nepetaefolius* and its constituents Cineole, Methyl-eugenol and Terpineol. Phytotherapy Research 12: 172-177.

Maldini M, Sosa S, Montoro P, Giangaspero A, Balick MJ, Pizza C & Della Loggia R (2009) Screening of the topical anti-inflammatory activity of the bark of *Acacia cornigera* Willdenow, *Byrsonima crassifolia* Kunth, *Sweetia panamensis* Yakovlev and the leaves of *Sphagneticola trilobata* Hitchcock. Journal of Ethnopharmacology 122: 430-433.

Manan M, Saleem U, Akash MSH, Qasim M, Hayat M, Raza Z & Ahmad B (2020) Antiarthritic potential of comprehensively standardized extract of *Alternanthera bettzickiana*: *in vitro* and *in vivo* studies. ACS Omega 5: 19478-19496.

Marder M, Viola H, Wasowski C, Wolfman C, Waterman PG, Medina JH & Paladini AC (1996) Cirsiliol and caffeic acid ethyl ester, isolated from *Salvia guaranitica,* are competitive ligands for the central benzodiazepine receptors. Phytomedicine 3: 29-31.

Marmot M (2004) Status syndrome. Bloomsbury Publishing, London. 288p.

Marodin SM & Baptista LRM (2001) O uso de plantas com fins medicinais no município de Dom Pedro de Alcântara, Rio Grande do Sul. Revista Brasileira de Plantas Medicinais 4: 57-68.

Martha EM (2003) O uso das plantas medicinais pela comunidade da associação dos agricultores construtores da Palma - assentamento 24 de Novembro. Trabalho de Conclusão do Curso. Universidade Federal de Pelotas, Pelotas. 79p.

Martins LGS, Senna-Valle L & Pereira NA (2005) Princípios ativos e atividades farmacológicas de 8 plantas popularmente conhecidas por nome de medicamentos comerciais. Revista Brasileira de Plantas Medicinais 7: 73-76.

Matos LMM (2011) Química de espécies nativas de *Croton* (Euphorbiaceae). Dissertação de Mestrado. Universidade de São Paulo, São Paulo. 132p.

Medeiros PM, Ladio AH & Albuquerque UP (2015) Local criteria for medicinal plant selection. *In*: Albuquerque U, Medeiros P & Casas A (eds.) Evolutionary ethnobiology. Springer, Cham. Pp 149-162. Available at <https://ethnobioconservation.com/index.php/ebc/article/view/641>. Access on 15 July 2018. DOI: 10.1007/978-3-319-19917-7_11

Mignone J, Bartlett J, O'Neil J & Orchard T (2007) Best practices in intercultural health: five case studies in Latin America. Journal of Ethnobiology and Ethnomedicine 3: 31. Available at <https://ethnobiomed.biomedcentral.com/articles/10.1186/1746-4269-3-31>. Access on 17 March 2019. DOI: 10.1186/1746-4269-3-31.

Moradi MT, Rafieian-Koupaei M, Imani-Rastabi R, Nasiri J, Shahrani M, Rabiei Z & Alibabaei Z (2013) Antispasmodic effects of Yarrow (*Achillea millefolium* L.) extract in the isolated ileum of rat. African Journal of Traditional, Complementary and Alternative Medicines 10: 499-503.

Noumi E & Manga P (2011) Traditional medicines for HIV/AIDS and opportunistic infections in north-west Cameroon: case of skin infections. American Journal of Tropical Medicine and Public Health 1: 44-46.

Oliveira AB, Mendonça MS, Azevedo AA & Meira RMSA (2012) Anatomy and histochemistry of the vegetative organs of *Cissus verticillata* - a native medicinal plant of the Brazilian Amazon. Brazilian Journal of Pharmacognosy 22: 1201-1211.

Olivier DK & Van Wyk B-E (2013) Bitterness values for traditional tonic plants of Southern Africa. Journal of Ethnopharmacology 147: 676-679.

Oyedeji AO, Ekundayo O, Olawore NO, Adeniyi BA & Koenig WA (1999) Antimicrobial activity of the essencial oils of five *Eucalyptus* species growing in Nigeria. Fitoterapia 70: 526-528.

Pereira DF, Santos M, Pozzatti P, Alves SH, Campos M & Athayde ML (2007) Antimicrobial activity of a crude extract and fractions from *Alternanthera brasiliana* (L.) O. Kuntze leaves. Latin American Journal of Pharmacy 26: 893-896.

Pérez-Castorena AL (2014) Triterpenes and other metabolites from *Tibouchina urvilleana*. Journal of the Mexican Chemical Society 58: 218-222.

Pilla MAC, Amorozo MCM & Furlan A (2006) Obtenção e uso das plantas medicinais no distrito de Martim Francisco, município de Mogi-Mirim, SP, Brasil. Acta Botanica Brasilica 20: 789-802.

Pires JM, Mendes FR, Negri G, Duarte-Almeida JM & Carlini EA (2009) Antinociceptive peripheral effect of *Achillea millefolium* L. and *Artemisia vulgaris* L.: both plants known popularly by brand names of analgesic drugs. Phytotherapy Research 23: 212-219.

Portal CAPES (2021) Available at <http://www.periodicos.capes.gov.br/>. Access on 18 January 2021.

Possamai RM (2000) Levantamento etnobotânico das plantas de uso medicinal em Mariana Pimentel, Rio Grande do Sul. Dissertação de Mestrado. Universidade Federal do Rio Grande do Sul, Porto Alegre. 108p.

PUBMed (2021) Available at <http://www.ncbi.nlm.nih.gov/pubmed/>. Access on 18 January 2021.

Ragupathy S, Steven NG, Maruthakkutti M, Velusamy V & Ul-Huda MM (2008) Consensus of the 'Malasars' traditional aboriginal knowledge of medicinal plants in the Velliangiri holy hills, India. Journal of Ethnobiology and Ethnomedicine 4: 8. Available at <https://ethnobiomed.biomedcentral.com/track/pdf/10.1186/1746-4269-4-8.pdf>. Access on 10 January 2018. DOI: 10.1186/1746-4269-4-8

Ramos AJK (2008) Plantas com potencial medicinal na Floresta Nacional de Canela e comunidades do entorno, Canela, Rio Grande do Sul. EMATER/RS-ASCAR, Porto Alegre. 90p.

Ribeiro VLS, Avancini C, Gonçalves K, Toigo E & von Poser G (2008) Acaricidal activity of *Calea serrata* (Asteraceae) on *Boophilus microplus* and *Rhipicephalus sanguineus*. Veterinary Parasitology 151: 351-354.

Ritter MR, Sobierajski GR, Schenkel EP & Mentz LA (2002) Plantas usadas como medicinais no município de Ipê, RS, Brasil. Revista Brasileira de Farmacognosia 12: 51-62.

Salatino A, Faria Salatino ML & Negri G (2007) Traditional uses, chemistry and pharmacology of *Croton* species (Euphorbiaceae). Journal Brazilian Chemical Society 18: 11-33.

Salvador MJ, Pereira PS, França SC, Candido RC, Ito IY & Dias DN (2009) Bioactive chemical constituents and comparative antimicrobial activity of callus culture and adult plant extracts from *Alternanthera tenella*. Zeitschrift fur Naturforschung C Journal Biosciences 64: 373-381.

Saslis-Lagoudakir CH, Williamson EM, Savolainen V & Hawkins JA (2011) Cross-cultural comparison of three medicinal floras and implications for bioprospecting strategies. Journal of Ethnopharmacology 135: 476-487.

Schwambach KH (2007) Utilização de plantas medicinais e medicamentos no autocuidado no município de Teutônia, RS. Dissertação de Mestrado. Universidade Federal do Rio Grande do Sul, Porto Alegre. 97p.

Sebold DF (2003) Levantamento etnobotânico de plantas de uso medicinal no município de Campo Bom, Rio Grande do Sul, Brasil. Dissertação de Mestrado. Universidade Federal do Rio Grande do Sul, Porto Alegre. 107p.

Sebei K, Sakouhi F, Herchi W, Khouja ML & Boukhchina S (2015) Chemical composition and antibacterial activities of seven *Eucalyptus* species essential oils leaves. Biological Research 48: 7. Available at <http://www.biolres.com/content/48/1/7>. Access on 12 May 218. DOI: 10.1016/j.jep.2011.03.044

Sergeeva NV & Zakharova NL (1977) Qualitative and quantitative study of carotenoids in some galenical preparations. Farmatsiya 26: 34-38.

Silva JB, Mendes RF, Tomasco V, Pinto NCC, Oliveira LG, Rodrigues MN, Aragão DMO, Aguiar JAK, Alves MS, Castañon MCNM , Ribeiro A & Scio E (2017) New aspects on the hepatoprotective potential associated with the antioxidant, hypocholesterolemic and anti-inflammatory activities of *Vernonia condensata* Baker. Journal of Ethnopharmacology 198: 399-406.

Silveira YL (2004) Estudo etnobotânico das plantas medicinais utilizadas pelos índios Mbyá-Guarani da Terra Indígena de Cantagalo, Viamão, RS, para a saúde bucal. Dissertação de Mestrado. Universidade Luterana do Brasil, Canoas. 152p.

Siqueira BVL, Soares BE, Oliveira DR & Sakuragui CM (2017) The regionalization of medicalized vernacular names of medicinal plants in Brazil. Scientometrics 110: 945-966. DOI: 10.1007/s11192-016-2184-y

Slepetys J (1975) Biology and biochemistry of wormwood. 8. Accumulation dynamics of tannins, ascorbic acid, and carotene. Lietuvos TSR Mokslu Akademijos Institut Darbai Ser. C. I: 43-48.

Soares ELC, Vendruscolo GS, Eisinger SM & Záchia RA (2004) Estudo etnobotânico do uso dos recursos vegetais em São João do Polêsine, RS, Brasil, no período de outubro 1999 a junho de 2001. I - Origem e fluxo do conhecimento. Revista Brasileira de Plantas Medicinais 6: 69-95.

Soldati GT & Albuquerque UP (2012) Ethnobotany in intermedical spaces: the case of the Fulni-ô Indians (Northeastern Brazil). Evidence-Based Complementary and Alternative Medicine 2012: 648469. DOI: 10.1155/2012/648469

Soliman FM, Fathy MM, Salama MM & Saber FR (2014) Chemical composition and bioactivity of the volatile oil from leaves and stems of *Eucalyptus cinerea*. Pharmaceutical Biology 52: 1272-1277.

Souza MM, Kern P, Floriani AEO & Cechinel-Filho V (1998) Analgesic properties of a hydroalcoholic extract obtained from *Alternanthera brasiliana*. Phytotherapy Research 32: 279-281.

Steinbeck C, Spitzer V, Starosta M & von Poser G (1997) Identification of two chromenes from *Calea serrata* by semiautomatic structure elucidation. Journal of Natural Products 60: 627-628.

Swart H, Van Dyk S & Malan SF (2002) The activity of p-methoxybenzylisothiocyanate against *Neisseria gonorrhoeae*, *Haemophilus ducreyi* and other microorganisms. Bioorganic & Medicinal Chemistry Letters 12: 2435-2437.

Trapp MA, Kai M, Mithöfer A *&* Rodrigues-Filho E (2015) Antibiotic oxylipins from *Alternanthera brasiliana* and its endophytic bacteria. Phytochemistry 110: 72-82.

Trojan-Rodrigues MR, Alves TLS, Soares GLG & Ritter MR (2012) Plants used as antidiabetics in popular medicine in Rio Grande do Sul, Southern Brazil. Journal of Ethnopharmacology 139: 155-163.

Valant-Vetschera KM, Fischer R & Wollenweber E (2003) Exudate flavonoids in species of *Artemisia* (Asteraceae - Anthemideae): new results and chemosystematic interpretation. Biochemical Systematics and Ecology 31: 487-498.

Valverde AL, Cardoso GL, Pereira NA, Silva AJ & Kuster RM (2001) Analgesic and antiinflammatory activities of vernonioside B2 from *Vernonia condensata*. Phytotherapy Research 15: 263-264.

Vallverdú C, Vila R, Lorenzo D, Paz D, Dellacassa E, Davies P, Villamil J, Tomi F, Casanova J & Cañigueral S (2005) Composition of the essential oil of cultivated *Salvia guaranitica* from Uruguay. Flavour and Fragrance Journal 20: 421-424.

Van Wyk BE & Wink M (2004) Medicinal plants of the world. Briza Publications, Arcadia. 480p.

Vandebroek I (2013) Intercultural health and ethnobotany: how to improve healthcare for underserved and minority communities? Journal of Ethnopharmacology 148: 746-754.

Vanini M (2010) Uso de plantas medicinais em um território quilombola do município de Mostardas - Rio Grande do Sul. Dissertação de Mestrado. Universidade Federal de Pelotas, Pelotas. 90p.

Veiga APF (2003) Levantamento das espécies de plantas medicinais usadas pela população do bairro Cohab-Fragata e comparação entre os usos popular e científico da Marcela (*Achyrocline satureioides*)

e Capim-limão (*Cymbopogon citratus*), Camomila (*Matricaria chamomilla*). Monografia de Conclusão de Curso. Universidade Federal de Pelotas, Pelotas. 42p.

Vendruscolo GS & Mentz LA (2006) Levantamento etnobotânico das plantas utilizadas como medicinais por moradores do bairro Ponta Grossa, Porto Alegre, Rio Grande do Sul, Brasil. Iheringia 61: 83-103.

Verma SM, Arora H & Dubey R (2003) Anti-inflammatory and sedative-hypnotic activity of the methanolic extract of the leaves of *Mentha arvensis*. Ancient Science of the Life 23: 95-99.

Viola H, Wasowski C, Marder M, Wolfman C, Paladini AC & Medina JH (1997) Sedative and hypnotic properties of *Salvia gua*ranitica St. Hil. and of its active principle, Cirsiliol. Phytomedicine 4: 47-52.

WFO (2022) World Flora Online. Published on the Internet. Available at <http://www.worldfloraonline.org>. Access on 27 December 2022.

WHO - World Health Organization (2020) International classification of diseases 11th revision. Available at <http://icd.who.int/en>. Access on 20 February 2020.

Wu CH, Hsieh HT, Lin JA & Yen GC (2013) *Alternanthera paronychioides* protects pancreatic β-cells from glucotoxicity by its antioxidant, antiapoptotic and insulin secretagogue actions. Food Chemistry 139: 362-370.

Yamanishi T (1995) Flavor of tea. Food Reviews International 11: 477-525.

Zanandrea I (2003) Estudo etnobotânico das plantas medicinais mais utilizadas pelos moradores do bairro Santa Terezinha. Pelotas, RS. Monografia de conclusão de curso. Universidade Federal de Pelotas, Pelotas. 68p.

Zucchetti AM (1997) Levantamento das plantas medicinais mais usadas por ervateiros na zona norte de Porto Alegre para doenças ginecológicas. Monografia de Conclusão de Curso. Universidade Luterana do Brasil, Canoas. 189p.

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