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Contents lists available at ScienceDirect

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jep

Phytotherapy of Polish migrants in Misiones, Argentina: Legacy and acquired plant species

Monika Kujawska^{a,b,*}, Norma I. Hilgert^a^a Instituto de Biología Subtropical, Universidad Nacional de Misiones, Consejo Nacional de Investigaciones Científicas y Técnicas, Facultad de Ciencias Forestales, Asoc. Centro de Investigaciones del Bosque Atlántico, Bertoni 85, 3370 Puerto Iguazú, Misiones, Argentina^b Institute of Ethnology and Cultural Anthropology, University of Adam Mickiewicz in Poznan, Sw Marcin 78, 61-809 Poznan, Poland

ARTICLE INFO

Article history:

Received 21 January 2014

Received in revised form

16 March 2014

Accepted 18 March 2014

Available online 28 March 2014

Keywords:

Heritage plant species

Medicinal plants

Informant Diversity value

Pharmacopoeia validation

Optimal adaptation

Ways of preparation and administration

ABSTRACT

Ethnopharmacological relevance: Analyzing how and why phytotherapeutic practices survive a migratory process is important for understanding migrant health seeking behaviour and health demand. Contrary to most studies, which focus on migrants from warm climates who settle in European and American cities, this study explores continuations in the herbal pharmacopoeia of Eastern European peasants who settled down in rural subtropical areas of Argentina. The study also explores the pharmacopoeia among the descendants of the first generation born in Argentina.

Material and methods: Primary and secondary sources were employed in the study. Data were collected during over 200 interviews (semi-structured, free lists and in-depth) with 94 study participants. Voucher specimens of species mentioned were gathered and identified. Illnesses were reported according to local ethnomedical terminology and classification. Only reports from informants' own experience were included in the analysis. The unit of analysis was a plant use report (plant species × plant part × ailment × informant). The frequency of mentions was calculated for plant parts used and modes of preparation and administration of herbal medicines, and the Informant Diversity Value was also estimated. Secondary information was obtained from ethnobotanical and ethnomedical literature concerning the whole of Poland. A list was made of medicinal plant species known from Poland available in the study area. Then, the similarity between the available species and those used by Polish migrants was evaluated by applying the Simpson index.

Results: An exhaustive list of 129 plant species used by the Polish community in Misiones, Argentina, was obtained. Among 37 species known from Poland and available in Misiones, 19 were used by the community. There was low consensus on the treatment of health conditions with legacy plants between Polish migrants and the Polish folk pharmacopoeia. The reasons for the relatively low use of legacy species are explained. More continuation has been observed in forms of application and administration of medicinal plants. Most of the continued species are food plants and are predominantly applied as medicinal food.

Conclusions: In the migratory process, Polish peasants have preserved culturally salient species, which have a wide range of therapeutic applications and are easily accessible. Polish migrants and their descendants have incorporated a great number of local medicinal plant species into their home medicine but at the same time retained traditional ways of administration of herbal medicines. Based on the theory of acculturation, the observed patterns of medicinal plant use in Polish migrant colonies in Misiones indicate good adaptation to the predominant cultural environment.

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1. Introduction

Since the 1990s., ethnobotanists have been interested in adaptive processes among migrant groups, in particular changes in food habits, their significance for health and the adaptation of migrant phytotherapy to new environmental and socio-cultural conditions (Spring, 1989; Romero-Gwynn et al., 1993; Balick et al., 2000; Han, 2000; Sandhu and Heinrich, 2005; Waldstein, 2006;

* Corresponding author. Present address: ul. Sempolowskiej 22, 51-660 Wrocław, Poland. Tel.: +48 502099768.

E-mail addresses: monikakujawska@gmail.com (M. Kujawska), normahilgert@yahoo.com.ar (N.I. Hilgert).

Pieroni and Vandebroek, 2007; Ceuterick et al., 2008; Van Andel and Westers, 2010; Vandebroek et al., 2010; Jiang and Quave, 2013). Scientists who have investigated herbal medicine among migrant groups have focused on a few issues: (1) continuation in the use of native species in a new cultural context, (2) the incorporation/replacement of new species in migrant phytotherapy, (3) illnesses treated with herbal medicines, (4) the procurement of medicinal plants. The bulk of this type of research has been conducted among migrants and minorities living in metropolises of the western hemisphere, originating from tropical and subtropical regions of the globe (Pieroni and Vandebroek, 2007). This study is almost unique as it was carried out among migrants originating from a temperate climate who settled down in the subtropics, in this case in South America (see also Pirker et al., 2012; Milanese et al., 2013).

The continuity of migrant phytotherapy is modeled by both practical and symbolic aspects. The migratory process entails different vicissitudes of a psychological nature, such as nostalgia or the search for identity (Van Andel and Westers, 2010). Therefore, immigrants frequently cling to some customs and practices, giving greater significance to them than they did in their native country (Defazio, 2006). Thus, some ethnomedical practices may act as cultural markers of identity. Ceuterick et al. (2008) give an example of such a marker – the use of *panela* – unrefined sugar, as a primary resource in respiratory tract infections, used by Colombians in London, and coca leaf infusion (*Erythroxylum coca* Lam.) drunk as an analgesic drink. Pieroni et al. (2005) found that mountain tea leaves are important markers for the cultural identity of Kosovan refugees in Germany.

Research on continuation and change in the pharmacopoeia of migrants has so far dedicated little attention to the preparation and administration of herbal medicines. Except for the publications of Inta et al. (2008) and Vandebroek et al. (2010), no one has so far attempted to answer the question of what changes occur in the use of certain parts of plants, and their ways of preparation and administration. An analysis of adaptation processes should take these variables into account, as the exclusive analysis of used species does not give comprehensive indications about the processes of adaptation of a particular group's phytotherapy to a new place and culture.

Changes in traditional knowledge and the use of plants among migrants implies the analysis of acculturation processes (Nesheim et al., 2006; Ceuterick et al., 2008). Migrants may choose to adapt their practices to the host society or may choose to strengthen their cultural identities—a process identified as “resilience” on ecological and cultural edges (Holling, 1973; Turner et al., 2003; Folke et al., 2010). Acculturation theory is rarely used in ethnobotanical studies as an explanation model. Ceuterick and colleagues used a one-dimensional model proposed by Kim (2001), according to which adaptation involves two simultaneous processes: the loss of native traditions (deculturation) and the adoption of elements of the new culture (acculturation). According to this model, the use of medicinal plants derived from the native culture of migrants which they do not list, is considered a lost use or a sign of deculturation. All the new uses of previously known plants, not documented in the folk phytotherapy of the country or region of origin, as well as the inclusion of new species in the pharmacopoeia are parts of a process of acculturation (Kim, 2001; Ceuterick et al., 2008). This method has several shortcomings: research is generally carried out only *ex situ*, in the host country. An analysis with the aim of examining continuity and changes in herbal medicine is based on the comparison of field data with an ethnobotanical and ethnomedical literature from the country or region of origin of migrants or their ancestors (Van Andel and van't Klooster, 2007; Ceuterick et al., 2008). It is difficult to expect migrants to know all the species mentioned in the literature, and their ignorance does not have to be synonymous with

deculturation (Pieroni and Vandebroek, 2007; Medeiros et al., 2012). Moreover, in a new place some illnesses known from the country of origin may not occur (Ceuterick et al., 2008; Van Andel and Westers, 2010). However, this is by far the most commonly used method. On the other hand, conducting research in the home country and in the community of migrants at the same time is not very relevant to historical migration or minorities that have been present for a long time in a new place (Quave and Pieroni, 2007).

Analysing how the uses of species are distributed among members of a population enables us to identify whether knowledge is shared within this group and if there are any specialists in the subject. It is argued that shared knowledge is likely to better withstand the social or environmental changes that occur in this population (Phillips and Gentry, 1993). Therefore, the pattern of distribution of knowledge in a society can be considered an indicator of ongoing changes (Byg and Balslev, 2001). Hence, one of our aims was to analyze how uses are distributed, as an indicator of the degree of consensus and stabilization of migrants' knowledge in their new place of residence.

Other scientists researching acculturation and adaptation suggest that research in this area should take the cultural environment into account (Nguyen et al., 1999; Cheung-Blunden and Juang, 2008). According to Cheung-Blunden and Juang (2008: 23), acculturation to the predominant surrounding brings best adaptive results. For example, in a context where the host culture prevails (e.g. school), adopting the language and attitude of the host culture should result in the best adaptation. In contrast, in a context where the heritage culture is dominant (e.g. family), conserving the practices of the heritage culture should predict the best adaptation. Medicinal plants in most cultures are mainly used in the domestic sphere: as a part of home medicine (self-medication), or as part of the therapy prescribed by specialists herbalists and healers, and even biomedicine physicians (Calvet-Mir et al., 2008; Giovannini et al., 2011). It is at home that medicinal plants are stored, prepared and taken (Allabi et al., 2011; Picking et al., 2011; Savo et al., 2011).

According to the theory of Cheung-Blunden and Juang (2008), optimal adaptation is the acquisition of elements of the dominant culture in the given socio-spatial context. Therefore, we assume that the optimal adaptation of Polish migrant phytotherapy consists of: (1) continuation in use of medicinal plants taken from Poland or available in Misiones, (2) incorporation of new medicinal plant species, (3) continuation of practices concerning the use of specific plant parts, and the ways of preparation and administration of medicinal plants.

In order to look for continuation in medicinal plant parts used and modes of preparation and administration it is indispensable to refer to Polish studies on folk phytotherapy. According to Paluch's (1984) research, the most comprehensive in Poland, folk phytotherapy is characterized by the predominant use of leaves over other plant parts, internal use in the form of infusions and the prevalence of single plant remedies over plant mixtures. We expect to find these features of phytotherapy in the practices of the Polish community in Misiones, in regard to both continued and incorporated species and plant products.

The aims of the study were therefore: (1) to record the uses of medicinal plants; plant parts used and modes of preparation within the Polish community in Misiones, (2) to analyse how the use of medicinal plants is distributed among Polish migrants and their descendants, (3) to analyse the similarity in medicinal uses of plants shared by Polish folk and Polish immigrants' pharmacopoeias.

2. The study area

Polish migrants moved to the northern Argentinean territory of Misiones, situated on the border with Paraguay and Brazil. They

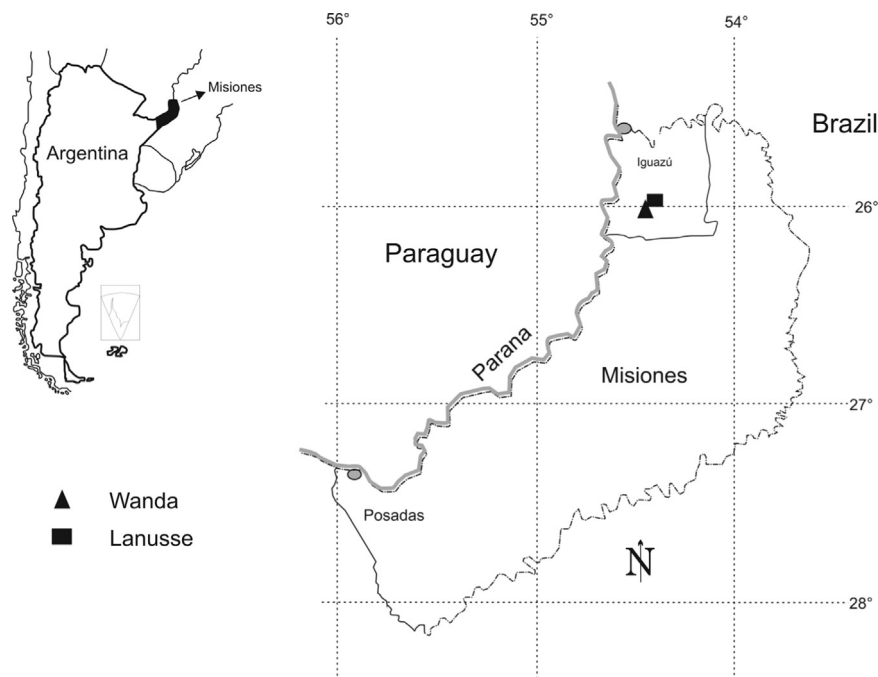


Fig. 1. Polish settlements located in the north of the province of Misiones, Argentina.

originated from a moderate climate and settled in the subtropics of Misiones. The migration flow from rural parts of Poland to rural settlements in Misiones, Argentina, started in the late XIX century (1897) and finished before the second world war in 1938. The study group moved to Misiones in the late 1930s – from 1936 to 1938 – and settled down in two rural colonies: Wanda, and Gobernador J.J. Lanusse (hereinafter Lanusse for short) (Fig. 1). Poles have been living in northern Misiones ever since, in fairly ethnically homogenous families and neighborhood. In Lanusse, one of the study sites, this system is still roughly preserved, while in Wanda, another study site, this system is changing due to integration processes embracing an acceptance of mixed marriages and the continuing urbanization, which “breaks up” the Polish settlement.

These colonies are situated in the northern part of the province of Misiones, which forms a part of the Atlantic Forest ecoregion (Placi and Di Bitetti, 2006). This is a semideciduous forest growing in a subtropical climate with hot summers (35–40 °C), between December and March, and winters with frosts between June and August. Average annual rainfall is 1700–2200 mm, with no marked dry season (Crespo, 1982). The most important economic activities in Misiones are forestry, agriculture and, to a lesser extent, cattle breeding. Forestry is based on monoculture plantations of exotic species of pine (*Pinus* spp.) and eucalyptus (*Eucalyptus* spp.) for the paper and timber industries. The main crops are tobacco (*Nicotiana tabacum* L.), yerba mate (*Ilex paraguariensis* A.St. -Hil.), tea (*Thea sinensis* L.), and citrus plantations. The local economy is based on raw material exploitation with little industrial development (Schiavoni, 1998).

So far, botanists have identified 3000 different species of vascular plants in Misiones, which accounts for a third of all plant species in Argentina. For comparison, Polish flora contains about 3000 species of vascular plants (Zajac and Zajac, 2001; Mirek et al., 2002). The most botanically and ecologically studied places are in the Iguazú National Park in the north of Misiones, on the border with Brazil. Around 250 species of trees grow there, from 53 to 73 species of trees on one hectare of forest (Zurita et al., 2006).

The medicinal flora of Misiones is also very rich and diverse. Amat and Yajía (1998) counted 282 species of medicinal plants

occurring there. Moreau (2006) added 30 species grown in the forest to the list, the use of which is documented in the north-eastern region of the province. The list includes both native and non-native species, which grow in the wild and/or are in cultivation. Keller registered more than 400 botanical species used by the Mbya Guaraní Indigenous people from Misiones (Keller, 2008). Therefore, more than 10% of the total flora of Misiones is used in home and complementary medicine by different ethnic groups (Keller and Romero, 2006; Keller, 2007, 2008; Zamudio et al., 2010; Kujawska et al., 2012).

3. Methods

3.1. Secondary sources

In this study we employed secondary and primary sources. The information from secondary sources was obtained from ethnobotanical and ethnomedical literature concerning the whole of Poland and the eastern parts of the pre-war Poland. Special attention was paid to studies from the first half of the XX century (Gustkiewicz, 1904; Sulisz, 1906; Witowt, 1906; Udziela, 1931; Spittal, 1938; Paluch, 1984), so that the knowledge documented in the literature corresponded as closely as possible to the baggage of knowledge that Polish migrants brought with them to Misiones. A list of medicinal plant species known from Poland was made, and compared with the available taxa in the study area.

3.2. Primary sources

The primary data were gathered during five field campaigns between 2007 and 2011, which lasted eight months altogether. After obtaining prior informed consent, open-ended, in-depth and free listing interviews were applied in Spanish and Polish languages. Illnesses were reported according to local ethnomedical terminology and classification. Only reports from the informants' own experience were included in the analysis, thus reports of uses not tried by the study participants were discarded. In the analysis plant species were included that had been mentioned by at least

Table 1
Medicinal plants and plant products used in home and complementary medicine by Polish migrants and their descendants in Misiones, Argentina.

Species name in Latin, botanical family, local name	Origin/life form	Part(s) used	Health problem	Mode of preparation and administration	Number of citations	ID	Pharmacological bibliography (Argentina)	
<i>Acanthospermum australe</i> (Loefl.) Kuntze Asteraceae, tapecué (MK26)	Local/herb	Aerial parts	Internal ulcers	Infusion, mate, <i>tereré</i>	7	9.9	Studies on antimalarial, antifungal properties, and in experimental oncology (Alonso and Desmacheier, 2005). Not found in Pharmacopoeia National Argentina (FNA)	
			Ulcers	Wash	4			
			Boils	Poultice	4			
			Mycosis		4			
			Wounds		4			
			Gastric hyperacidity	Infusion, mate	2			
<i>Achillea millefolium</i> L. Asteraceae, milenramas (MK164)	Adventitious/herb	Leaves	Cold sore (<i>fiebre del estómago</i>)	Macerated in water	2	9.9	Anti-inflammatory, analgesic, digestive, antibacterial, diuretic (Alonso, 2004) not found in FNA	
			Stomach ache	Infusion	2			
<i>Achyrocline flaccida</i> (Weinm.) DC. Asteraceae, marcela (MK117)	Local/shrub	Inflorescence	Digestive problems	Infusion, mate	11	21.1	Not found in FNA	
			Stomach ache		7			
			Liver pain	Infusion	4			
			Flu	In mixture with honey	2			
<i>Adiantum raddianum</i> C. Presl. Pteridaceae, culantrillo (MK149)	Local/herb	Aerial parts, leaves	Cough	Infusion, syrup (ambay, honey)	2	2.6	Not found in FNA	
			Cold					
<i>Allium cepa</i> L. Liliaceae, cebolla, cebolla	Adventitious/herb	Bulbs	Cough	Poultice (alternatively with honey)	2	12.2	Antispasmodic action on the respiratory tract, antimicrobial, lowers blood sugar, lipid-lowering, antioxidant (Alonso, 2004) not found in FNA	
			Boils		6			
			Ulcers		Poultice			6
			Festering wounds					6
			Bronchitis		Syrup (honey or sugar), inhalation			2
			Flu		Syrup (honey or sugar), in salad			2
<i>Allium sativum</i> L. Liliaceae, ajo, czosnek	Adventitious/herb	Bulbs	Catarrh	Poultices (with hot oil)	2	25.1	Lipid-lowering effects, anticancer, anticlot, strengthening the liver, antibacterial, antioxidant, immunostimulating, prevents stomach ulcers (Alonso, 2004), not found in FNA	
			Ear infection		6			
			Earache					6
			Intestinal parasites		Raw, in salad, mixture (with milk or kerosene), decoction, macerated in water or alcohol			13
			Toothache		Poultice			2
			Bronchitis		Raw, food medicine (in salad), mixture (honey, milk), poultices (with oil)			7
			Flu					7
			High blood pressure		Raw			7
			Snake bites					2
			Prophylactics					7
			Pimples		Poultice			2
			Tinea pedis					2
			Contaminated blood, blood too thick		Raw, in salad			3

Table 1 (continued)

Species name in Latin, botanical family, local name	Origin/life form	Part(s) used	Health problem	Mode of preparation and administration	Number of citations	ID	Pharmacological bibliography (Argentina)
<i>Allophytus edulis</i> (A.St.-Hil., Cambess. &A. Juss.)Radlk. Sapindaceae, cocú (MK22)	Local/shrub	Leaves, stem	Liver pain	Macerated in water	4	36.5	Not found in FNA
			Digestive problems	<i>Tereré</i>	2		
			<i>Empacho</i>	Macerated in water, infusion	2		
			Jaundice		6		
			Tonic	Macerated in water, <i>tereré</i>	15		
			Cold sore (<i>febre del estómago</i>)		5		
			Liver overheating		4		
<i>Aloe arborescens</i> Mill. Xanthorrhoeaceae, aloe de hoja angosta	Adventitious/herb	Leaves, exudate	Inflammation of the throat	Chewing, lubrication	2	4.7	Not found in FNA
			Sore throat		2		
			Ulcers	Chewing, mate	2		
<i>Aloe saponaria</i> Haw. Xanthorrhoeaceae, aloe de hoja ancha	Adventitious/herb	Leaves, exudate	Burns	Lubrication	7	21.9	Not found in FNA
			Wounds		11		
<i>Aloysia citrodora</i> Palau Verbenaceae, cedrón (MK42)	Local/shrub	Leaves, stem	Pimples		2	6.5	Antispasmodic, carminative, antibacterial, local analgesic, slightly sedative (Alonso, 2004), found in FNA 6 (sixth edition)
			Nervous tension, agitation	Infusion, mate, <i>tereré</i>	5		
<i>Aloysia polystachya</i> (Griseb.) Moldenke Verbenaceae, burrito (MK167)	Local/shrub	Leaves, stem	Digestive problems	Infusion, mate	9	14.7	Sedative, carminative (Alonso and Desmachelier, 2005). Not found in FNA
			Stomache ache		9		
			Liver pain	Infusion, decoction	2		
<i>Alternanthera brasiliana</i> (L.) Kuntze Amaranthaceae, penicilina (MK170)	Local/herb	Leaves	Prophylactics	Mate, <i>tereré</i>	7	7.8	Not found in FNA
			Wounds	Washing, compress	6		
<i>Alternanthera pungens</i> Kunth Amaranthaceae, yerba del pollo (MK81)	Local/herb	Leaves and stalks	<i>Empacho</i>	Infusion	9	11.8	Diuretic, carminative, increases peristalsis (Alonso, 2004), found in FNA 6
<i>Ambrosia elatior</i> L. Asteraceae, artemisa, altamisa (MK66, MK106)	Local/herb	Leaves	Menstrual pain (caused by hypothermia)	Infusion	2	2.6	Not found in FNA
<i>Anethum graveolens</i> L. Apiaceae, eneldo, koper (BA92101)	Adventitious/herb	Inflorescence, seeds	Flatulence	Infusion	6	7.8	Ingredients of essential oil have antispasmodic effects, carminative, digestive aid, also has nutritional properties (source of iron, potassium, calcium) and bacteriostatic (Alonso, 2004), not found in FNA.
<i>Aristolochia triangularis</i> Cham. Aristolochiaceae, isipó milhombre, milhombres (MK87)	Local/creeper	Aerial parts, stem	Contaminated blood (blood cleansing)	Mate, decoction	4	14.4	Due to the presence of arystolochic acid should not be taken internally, research in oncology (Alonso and Desmachelier, 2005). Not found in FNA.
			Abortion	Infusion, decoction	2		
			Improved potency in men	Mate, <i>tereré</i>	5		

<i>Artemisia absinthium</i> L. Asteraceae, ajenojo, ajenco, piotun, piotunek (MK140)	Adventitious/herb	Leaves, stem	Liver pain	Infusion, mate, macerated in water	8	29.6 Aids digestion, anti-parasitic activity, anti-allergic, anti-inflammatory, antibacterial. It is accepted as a dietary supplement in Argentina (Alonso, 2004), not found in FNA
			Stomach ache		13	
			Digestive problems		13	
			Diarrhoea	Infusion, <i>tereré</i>	4	
			Intestinal parasites	Infusion, decoction, macerated in alcohol	4	
<i>Artemisia campestris</i> L. Asteraceae, alcanfor	Adventitious/herb	Leaves	<i>Empacho</i>	Infusion	3	4.7 Not found in FNA
			Headache from indigestion		2	
			Cough	Infusion	2	
			Bronchitis		2	
			Contusion	Lubrication with macerate in alcohol	2	
<i>Baccharis gaudichaudiana</i> DC. Asteraceae, chirca meloza (MK6)	Local/shrub	Leaves, stem	Liver pain	Infusion	4	9.3 Not found in FNA
			Digestive problems		3	
<i>Baccharis trimera</i> (Less.) DC. Asteraceae, carqueja (MK179)	Local/shrub	Leaves, stem	Stomach ache	Infusion, mate	3	32.6 Supports liver, antibacterial, anti-inflammatory analgesic (Alonso, 2004), not found in FNA
			Liver pain	Infusion, decoction, mate	19	
<i>Bauhinia forficata</i> Link. pata de buey (MK120)	Local/tree	Leaves	Digestive problems	Infusion, decoction, mate, macerated in water	12	22.6 Tested for diabetes, antibacterial, antifungal (Alonso, 2004), not found in FNA
			Stomach ache		8	
			<i>Empacho</i>	Infusion	3	
			Vomiting		2	
			High level of cholesterol		2	
			Contaminated blood (blood cleansing)		2	
			Cold sore (<i>fiebre del estómago</i>)		2	
			Kidney pain	Infusion, decoction, soaked in water, mate	9	
			Diuretic	Infusion, mate	3	
			Prophylactics	Infusion, mate, <i>tereré</i>	3	
<i>Bauhinia microstachya</i> (Raddi) J.F. Macbr. Fabaceae, escalera de mono (MK134)	Local/shrub	Leaves	Wounds	Washing, poultice	2	6.5 Not found in FNA
			Boils		2	
<i>Begonia cucullata</i> Willd. Begoniaceae, agrial (BA92089)	Local/herb	Leaves, stem	Kidney pain	Infusion, mate, soaked in water	5	5.2 Not found in FNA
			Aphthe	Lubrication	4	
<i>Bidens subalternans</i> DC. Asteraceae, amor Seco (MK78)	Local/herb	Aerial parts	Jaundice	Infusion, decoction	2	7.1 Not found in FNA
			Whole plant		2	
<i>Brassica oleracea</i> L. repollo	Adventitious/herb	Root Leaves	Cold		2	2.6 Not found in FNA
			Flu		2	
<i>Brugmansia suaveolens</i> (Humb. & Bonpl. ex Willd.) Bercht. & J. Presl Solanaceae, floripón (MK71)	Local/shrub	Leaves	Fever		2	12.5 Not found in FNA
			Boils	Poultice	2	
			Boils	Poultice (hot oil)	4	
			Ulcers	Poultice	8	

Table 1 (continued)

Species name in Latin, botanical family, local name	Origin/life form	Part(s) used	Health problem	Mode of preparation and administration	Number of citations	ID	Pharmacological bibliography (Argentina)
<i>Campomanesia guazumifolia</i> (Cambess.) O.Berg Myrtaceae, siete capotes (MK33)	Local/shrub	Leaves	Wounds	Decoction	8	2.6	Not found in FNA
			Diarrhoea		2		
<i>Campomanesia xanthocarpa</i> O. Berg Myrtaceae, guavirá (MK93)	Local/tree	Leaves	Diarrhoea	Infusion, decoction	3	3.9	Not found in FNA
<i>Carica papaya</i> L. Caricaceae, mamón (MK166)	Adventitious/shrub	Seeds, fruit, latex	Intestinal parasites	Infusion, decoction, raw	8	15.1	Antibacterial, anti-inflammatory, analgesic (Alonso, 2004), not found in FNA
		Flower, fruit	Cough Bronchitis	Infusion, baked fruit Infusion, baked fruit	6 6		
<i>Cecropia pachystachya</i> Trécul Cecropiaceae, ambay (MK154)	Local/tree	Fruit	Prophylactics	Raw	2	22.2	Most studies show bronchodilator activity in the respiratory tract, hypotensive, antibacterial. In 2004, an agreement was signed between the Association Phytomedicine Argentina and the Government of Misiones province to include in the primary care expectorant syrup based on guaco and ambay (Alonso, 2004), found in FNA
		Young shoots	Cough	Infusion, decoction, mate, syrup (burnt sugar or honey, <i>apepú</i>)	19		
<i>Celtis iguanaea</i> (Jacq.) Sarg. Celtidaceae, tala (MK49)	Local/tree	Leaves	Bronchitis	Decoction, syrup (with burnt sugar or honey)	19	2.6	Not found in FNA
			Flu		4		
<i>Chaptalia nutans</i> (L.) Pol. Asteraceae (MK24, MK35)	Local/herb	Leaves	Cold	Infusion, decoction	4	5.2	Not found in FNA
			Catarrh		4		
<i>Chenopodium ambrosioides</i> L. Chenopodiaceae, caré (MK111)	Local/herb	Leaves, stem	Cough	Infusion	2	14.4	Action: anti-malarial, analgesics, anti-inflammatory, antibacterial, anthelmintic (Alonso, 2004), found in FNA
			Intestinal parasites		29		
<i>Chusquea ramosissima</i> Lindm. Poaceae, tacuarembó	Local/cane	Stem	Wounds	Wash	6	7.8	Not found in FNA
<i>Citrus aurantium</i> L. Rutaceae, apepú (MK151)	Adventitious/tree	Fruit	Bleeding from the wound	Juice, syrup (<i>ambay</i> , <i>salvia</i> , burnt sugar; wine, burnt sugar), mixture (honey)	6	12.7	The epicarp has an appetite stimulating properties, the flower is slightly sedative (Alonso, 2004), found in FNA 6
			Flu		7		
<i>Citrus limettioides</i> Tanaka Rutaceae, lima, lima dulce	Adventitious/tree	Leaves	Cold	<i>Tereré</i> , in salad	7	4.9	Not found in FNA
		Fruit, leaves	Cough		Mate, poultice, inhalation		
	Adventitious/tree	Leaves	Prevents respiratory illnesses	Infusion, decoction, juice	2	20.7	
			"Coldness" (<i>frialdad</i>)		2		
	Adventitious/tree	Leaves, fruit	Bronchitis	Infusion, raw Infusion, mate	3	20.7	
			Flu		3		
			Cold		3		
			Hypertension		2		
			Agitation, nervous tension		3		
			Flu		6		

<i>Citrus limon</i> (L.) Osbeck Rutaceae, limón		Fruit		Infusion, juice, mixture (honey, sugar), <i>tereré</i>			
			Cold		6		
			Bronchitis	Infusion, mixture (honey, oil)	4		
			Cough		4		
			Sore throat	Gargle	2		
			Digestive problems	Juice	5		
<i>Citrus paradisi</i> Macfad. Rutaceae, pomelo (MK141)	Adventitious/tree	Fruit	Hypertension		2		
			Contaminated blood, too thick blood		2		
			Flu	Decoction, juice, syrup (<i>salvia</i> , honey)	7	11.4 Not found in FNA	
			Cold		7		
			Cough		7		
			Hypertension	Raw	3		
<i>Citrus reticulata</i> Blanco Rutaceae, mandarina (MK135)	Adventitious/tree	Leaves	Agitation, nervous tension	Infusion, mate	11	18 Not found in FNA	
			Insomnia		11		
			Antidepressive		11		
			Flu	Infusion, decoction	3		
			Cold		3		
			Agitation, nervous tension	Infusion, decoction, mate	17	28.1 Not found in FNA	
<i>Citrus sinensis</i> (L.) Osbeck Rutaceae, naranja (MK159)	Adventitious/tree	Leaves	Insomnia		17		
			Antidepressive		17		
			Flu	Infusion, decoction, juice, syrup (sugar, burnt wood charcoal; <i>salvia</i> , burnt sugar)	12		
			Respiratory tract		12		
			Cold		12		
			Catarrh		12		
		Leaves, epicarp		Bronchitis	Decoction, syrup (honey, burnt sugar)	5	
				Cough		5	
				Flu	Infusion, juice, mixture (honey, sugar), <i>tereré</i>	6	16.8 Not found in FNA
				Cold		6	
				Bronchitis	Infusion, mixture (honey, oil)	4	
				Cough		4	
<i>Citrus × jambhiri</i> Lush. Rutaceae, limón, limón mandarina (MK142)	Adventitious/tree	Leaves, fruit	Sore throat	Gargle	2		
			Digestive problems	Juice	5		
			Hypertension		2		
			Contaminated blood, too thick blood		2		
			Common cold	Infusion, mixture (honey, oil)	14	22.4	
					4		
<i>Citrus × limonia</i> (L.) Osbeck Rutaceae, limón	Adventitious/tree	Fruit	Flu		6		
			Respiratory tract		6		
			Sore throat	Gargle	2		
			Eye infection	Wash	2		
					6		
					6		
<i>Commelina erecta</i> L. Commelinaceae, flor de Santa Lucía (MK36)	Local/herb	Dew (flower)				2.6 Antibacterial activity (Alonso and Desmachelier, 2005). Not found in FNA	
<i>Cordyline sellowiana</i> Kunth Asparagaceae, varana (BA92088)	Adventitious/herb	Leaves, bark	Wounds	Wash	2	2.6 Not found in FNA	
<i>Crocus sativus</i> L. Iridaceae, azafrán	Adventitious/herb	Stamens (flower)	Jaundice	Infusion, soaked in water	3	3.9 Reduces concentration of lipids, anticancer (Alonso, 2004), found in FNA	
<i>Cucurbita</i> spp. Cucurbitaceae, zapallo	Adventitious/herb	Seeds	Intestinal parasites	Infusion, decoction	5	6.5 Anti-parasitic (Alonso, 2004), not found in FNA	
		Local/herb	Aerial parts	Digestive problems	Infusion, mate	6	11.8 Not found in FNA

Table 1 (continued)

Species name in Latin, botanical family, local name	Origin/life form	Part(s) used	Health problem	Mode of preparation and administration	Number of citations	ID	Pharmacological bibliography (Argentina)
<i>Cumila microcephala</i> Benth. Lamiaceae, poleo, drobna rybka (MK15)		Leaves, stem	Menstrual pain	Infusion	3		
<i>Cymbopogon citratus</i> (DC.) Stapf Poaceae, cedrón, cedrón pasto	Adventitious/herb	Leaves	Hypertension	Infusion, mate	3	11.8	Antispasmodic and carminative action of the digestive tract, analgesic, anti-inflammatory and antibacterial (Alonso, 2004), not found in FNA
			Heart palpitations		3		
			Agitation, nervous tension	Infusion, <i>tereré</i>	3		
			Insomnia		3		
			Flu	Infusion (with honey)	3		
			Bronchitis		3		
			Prophylactics	Mate, <i>tereré</i>	2		
			Fever	Infusion	2	2.6	Not found in FNA
<i>Cynodon dactylon</i> (L.) Pers. Poaceae, gramilla (MK70)	Adventitious/herb	Root					
<i>Eucalyptus</i> cfr. <i>saligna</i> Sm. Myrtaceae, eucalipto (MK143)	Adventitious/tree	Leaves	Cough	Inhalation, infusion, decoction (<i>ruda</i>), syrup (onion, honey, oil)	12	17.7	Not found in FNA
			Bronchitis		12		
			Flu	Inhalation	6		
			Cold		6		
<i>Eugenia pyriformis</i> Cambess. Myrtaceae, uva jay(MK17)	Local/tree	Bark, fruit	Diarrhoea	Decoction, raw (fruit)	2	7.8	Not found in FNA
		Leaves, stem	High level of cholesterol	Infusion, mate	3		
		Leaves, bark	High levels of uric acid		2		
<i>Eugenia uniflora</i> L. Myrtaceae, pitanga (MK3)	Local/shrub	Leaves, stem	Hypertension	Soaked in water, <i>tereré</i> , mate, infusion	20	25.2	Diuretic, anti-hypertensive, anti-bacterial, antioxidant (Alonso, 2004), not found in FNA
		Leaves	High level of cholesterol	Infusion, <i>tereré</i>	2		
		Leaves	Diabetes	Soaked in water, <i>tereré</i>	2		
<i>Ficus carica</i> L. Moraceae, higo	Adventitious/tree	Leaves	Hypertension	Infusion, decoction	2	2.6	Laxative, anti-inflammatory, lowering blood sugar, anthelmintic (Alonso, 2004), not found in FNA
<i>Gleditsia amorphoides</i> (Griseb.) Taub. Fabaceae, espina de corona (MK46)	Local/tree	Bark	Kidney infection	Soaked in water, <i>tereré</i>	2	2.6	Not found in FNA
<i>Gomphrena celosioides</i> Mart. Amaranthaceae, perudilla, perpetua (MK64)	Local/herb	Aerial parts	Heart palpitations	Infusion, mate	2	5.2	Not found in FNA
<i>Guarea macrophylla</i> Vahl subsp. <i>Spicaeflora</i> (A.Juss.) T.D. Penn. Meliaceae, cedrillo (MK92)	Local/tree	Bark	Refreshing properties Circulatory problems	Soaked in water, <i>tereré</i> Decoction, infusion	2 2	2.6	Not found in FNA
<i>Hemionitis tomentosa</i> (Lam.) Raddi Pteridaceae, doradilla (MK165)	Local/herb	Leaves, stem	Menstrual pain	Infusion	3	3.9	Not found in FNA
	Local/shrub	Leaves, flower	Agitation, nervous tension,	Infusion, mate, <i>tereré</i>	10	13.1	Not found in FNA

<i>Heteropterys glabra</i> Hook & Arn. Malpighiaceae, tilo (MK28, MK98)				Insomnia Flu		10 2	2.6 Not found in FNA
<i>Holocalyx balansae</i> Micheli Fabaceae, alecrin (MK99)	Local/tree	Trunk			Infusion		2.6 Not found in FNA
<i>Hypochaeris chilensis</i> (Kunth.) Hieron. Asteraceae, achicoria silvestre (MK48)	Local/herb	Root		Cold sore (<i>fiebre del estómago</i>)	Soaked in water, infusion, decoction	4	7.8 Not found in FNA
<i>Ilex paraguariensis</i> St. Hil., Aquifoliaceae, yerba mate	Local/tree	Leaves, stem		Prophylactics	In salad	3	12 Not found in FNA
				Nervous tension, agitation	In mate	4	
<i>Ipomoea batatas</i> (L.) Lam. Convolvulaceae, batata (MK168)	Adventitious/herb	Leaves		Blood cleanser		4	7.8 Not found in FNA
				Hypertension		4	
				Antidepressive		4	
				Toothache	Gargle	4	
<i>Jacaranda micrantha</i> Cham. Bignoniaceae, caroba (MK83)	Local/tree	Bark		Tinea pedis	Wash	2	9.3 Not found in FNA
				Contaminated blood (blood cleansing)	Infusion, decoction, mate, <i>tereré</i>	6	
<i>Lepidium didymum</i> (L.) Sm. Brassicaceae, mintruz, mistruz (MK4)	Local/herb	Leaves, stems, aerial parts		Wounds	Decoction	2	14.1 The anti-inflammatory, antiviral, aiding digestion, nutritional (iron, vitamin A, ascorbic acid) (Alonso and Desmachelier, 2005). Not found in FNA
				Pimples		2	
				Sprains	Lubrication with macerate in alcohol and <i>alcanfor</i> , <i>tabaco</i> , <i>marijuana</i>	9	
<i>Lippia brasiliensis</i> (Link) T. Silva Verbenaceae, yateí caá (MK95)	Local/shrub	Leaves		Bruises		9	2.6 Not found in FNA
				Appendix	Infusion, <i>tereré</i> , soaked in water	2	
<i>Lonchocarpus campestris</i> Mart. Ex Benth. Fabaceae, rabo itá (MK89)	Local/tree	Bark		Digestive problems	Infusion, soaked in water	2	2.6 Not found in FNA
<i>Macfadyena unguis-cati</i> (L.) A.H. Gentry Bignoniaceae, uña de gato (MK144)	Local/creeper	Leaves		Kidney pain	Infusion, soaked in water	2	2.6 Not found in FNA
<i>Matricaria recutita</i> L. Asteraceae, manzanilla, rumianek (MK8)	Adventitious/herb	Inflorescence, aerial parts		Digestive problems	Infusion, mate	7	35.3 Sedative, antispasmodic, anti-inflammatory, digestive (Alonso, 2004), found in FNA
				Stomach ache		7	
				Abdominal pain		7	
				Fever	Infusion, decoction, mate	11	
				Menstrual pain	Infusion, mate, poultice	4	
				Flu	Infusion (with honey)	4	
				Cold		4	
				Cough		4	
				Sore throat		4	
				Catarrh		4	
				Diarrhoea	Infusion, decoction, mate, pultice	7	
				Eye infection	Wash, compress	10	
				Hot remedy (humoral medicine)	Infusion	3	
				Flatulence	Infusion, decoction, poultice	7	
	Cold sore (<i>fiebre del estómago</i>)	Infusion	2				
	Prophylactics	Infusion, mate	4				
<i>Maytenus ilicifolia</i> Mart. ex Reissek Celastraceae, cangorosa (MK1)	Local/tree	Leaves, bark, root		Contaminated blood (blood cleansing)	Infusion, decoction, mate, <i>tereré</i> , soaked in water	13	16.4 It works against the formation of ulcers, used in the treatment of

Table 1 (continued)

Species name in Latin, botanical family, local name	Origin/life form	Part(s) used	Health problem	Mode of preparation and administration	Number of citations	ID	Pharmacological bibliography (Argentina)
		Leaves, bark	Pimples Boils Wounds	Infusion, mate, <i>tereré</i> , wash	5 5 5		them (Alonso, 2004), not found in FNA
<i>Mentha spicata</i> L. (MK124, MK157) / <i>Mentha × piperita</i> L. Lamiaceae, menta, mieta	Adventitious/herb	Leaves, root Leaves, stem	Bad blood circulation High level of cholesterol Intestinal parasites	Infusion, mate, <i>tereré</i> Infusion, decoction Infusion, decoction	2 2 4	23.6	Digestive properties, antispasmodic, analgesic, antibacterial (Alonso, 2004), not found in FNA
		Leaves	Abdominal pain Flatulence Gastric hyperacidity Cold sore (<i>fiebre del estómago</i>) High level of cholesterol Stomach ache Digestive problems Cold Menstrual pain Agitation, nervous tension Insomnia in children Prophylactics Diarrhoea in children Prophylactics Toothache <i>Ura</i>	Infusion Infusion, <i>tereré</i> Infusion, decoction	3 3 2 3 2 8 8 2 2 5 5 5 2 2 2		
<i>Nasturtium officinale</i> W.T. Aiton, Brassicaceae, berro de agua	Adventitious/herb	Leaves	Agitation, nervous tension	Infusion	2	2.6	Not found in FNA
<i>Nicotiana tabacum</i> L. Solanaceae, tabaco, tytoñ	Adventitious/herb	Leaves	Flatulence	Infusion, mate	6	5.2	Not found in FNA
<i>Ocimum basilicum</i> L. Lamiaceae, albahaca (MK118)	Adventitious/herb	Leaves	Flatulence <i>Empacho</i>	Infusion Infusion, poultice	3 4	2.6	Action antibacterial, properties: anthelmintic, antifungal, analgesic, antispasmodic, anti-inflammatory (Alonso, 2004), not found in FNA
<i>Ocimum</i> sp. Lamiaceae, anís (MK119)	Local/herb	Leaves, stem	Menstrual pain	Infusion	3	7.8	Not found in FNA
<i>Origanum vulgare</i> L. Lamiaceae, orégano (MK123)	Adventitious/herb	Grain	Diarrhoea	Decoction	4	10.9	An antioxidant used in the respiratory tract as an antispasmodic, antibacterial, antifungal (Alonso, 2004), not found in FNA
<i>Oryza sativa</i> L. Poaceae, arroz	Adventitious/herb	Leaves	Kidney pain	Infusion, decoction, <i>tereré</i>	11		
<i>Panicum tricholaenoides</i> Steud. Poaceae, cola de caballo (MK131)	Local/herb	Aerial parts Leaves	Overweight Overheated body (humoral medicine) Hypertention	Infusion, soaked in water, <i>tereré</i> Soaked in water, <i>tereré</i> Infusion, soaked in water	3 5	5.2 14.8	Not found in FNA Not found in FNA
<i>Parietaria debilis</i> G. Forst Urticaceae, caa'piquei (BA92100)	Adventitious/herb	Leaves	Agitation, nervous tension Liver pain	Infusion Infusion, mate	2 3	3.9	Not found in FNA

<i>Passiflora alata</i> Curtis Passifloraceae, murucuya, pasionaria (MK121)	Local/creeper	Leaves	Infection of the gums	Lavage	2	7.1 Anxiolytic, antispasmodic on smooth muscle (Alonso, 2004), not found in FNA
			Toothache		2	
<i>Persea americana</i> var. <i>drymifolia</i> (Schltdl. & Cham.) S.F. Blake, Lauraceae, palta (BA92058)	Adventitious/tree	Leaves, stem	Fluid retention in the body	Infusion, decoction, <i>tereré</i>	6	3.9 Not found in FNA
<i>Petiveria alliacea</i> L. Phytolaccaceae, pipi (MK74)	Local/herb	Leaves, stem	Kidney infections	Infusion, decoction, <i>tereré</i>	6	2.6 Antibacterial, anti-inflammatory, analgesic, anticancer (Alonso, 2004), not found in FNA
		Leaves, stem, aerial parts	Kidney pain	Infusion, decoction, soaked in water, <i>tereré</i>	15	
<i>Petroselinum crispum</i> (Mill.) Mansf. Apiaceae, perejil	Adventitious/herb	Trunk	Digestive problems	Soaked in water, chewing	13	7.8 Diuretic, hypotensive, anti-oxidant (Alonso, 2004), not found in FNA
<i>Phyllanthus niruri</i> L. Euphorbiaceae, rompepedras, quebrapiedras (MK19)	Local/herb	Trunk	Stomach ache	Soaked in water	5	19.7 Antibacterial, diuretic, antispasmodic, facilitates the removal of small stones in the ureter, inhibits the growth of crystals. In the cardiovascular system has anti-hypertensive and lowers blood sugar (Alonso, 2004), not found in FNA
		Trunk	Liver pain		5	
<i>Picrasma crenata</i> Engl. in Engl. & Prantl Simaroubaceae, palo amargo	Local/tree	Trunk	Head lice infestation	Wash	3	20.5 Not found in FNA
		Seeds	Flatulence	Infusion, mate	10	
		Leaves	Digestive problems		2	
<i>Pimpinella anisum</i> L. Apiaceae, anís	Adventitious/herb	Leaves	Boils	Wash, compress	11	15.7 Works on the respiratory system, has a digestive, antibacterial, carminative and antispasmodic properties (Alonso, 2004), not found in FNA
		Leaves	Festering wounds	Wash, compress	11	
<i>Piper mikanianum</i> (Kunth) Steud. Piperaceae, pari paroba (MK158)	Local/shrub	Leaves, stem	Ulcers		7	
			Tinea pedis	Wash	2	24.5 Not found in FNA
		Leaves	Wounds	Compress, wash	6	
			Abortion	Infusion, decoction	3	
		Leaves, root	Cold sore (<i>fiebre del estómago</i>)	Chewing, compress	2	
		Fruit	Wounds	Wash	2	
			Intestinal parasites	Macerated in alcohol, mixture (milk)	2	
<i>Piper nigrum</i> L. Piperaceae, pimienta, pieprz	Adventitious/tree	Leaves	Digestive problems	Infusion, mate	9	2.6 Not found in FNA
<i>Plantago australis</i> Lam. Plantaginaceae, llantén (MK60)	Local/herb	Leaves	Stomach ache	Infusion, mate, soaked in water	5	5.2 Not found in FNA
<i>Plectranthus ornatus</i> Codd. Lamiaceae, boldo (BA92054)	Adventitious/herb	Epikarp	Diarrhoea	Raw, infusion	4	
		Leaves, stem	Wounds	Compress, poultice	4	11.8 Not found in FNA
<i>Plectranthus</i> sp. Lamiaceae, infalvina (BA92055)	Adventitious/herb	Leaves	Diarrhoea	Infusion, decoction, soaked in water	7	6.5 Not found in FNA
<i>Plinia trunciflora</i> (O. Berg) Kausel Myrtaceae, yaboticaba (MK145, MK171)	Local/tree	Leaves	Toothache	Lavage, chewing	2	5.2 Not found in FNA
<i>Polygonum punctatum</i> Elliot Polygonaceae, catay (MK72)	Local/herb	Epikarp	Diarrhoea	Infusion, decoction	15	5.2

Table 1 (continued)

Species name in Latin, botanical family, local name	Origin/life form	Part(s) used	Health problem	Mode of preparation and administration	Number of citations	ID	Pharmacological bibliography (Argentina)
<i>Psidium guajava</i> L. Myrtaceae, guayava (MK68)	Local/tree	Vinegar (fruit)	Fever	Lubrication	2	11.8	Astringent, anti-inflammatory properties (Alonso, 2004), not found in FNA
<i>Punica granatum</i> L. Punicaceae, granada (MK39)	Adventitious/tree	Vinegar (fruit)	Wasp sting Headache	Compress	2 2	19.7	Antibacterial, antioxidant, antidiarrhoeal (Alonso, 2004), not found in FNA
<i>Pyrus malus</i> L. Rosaceae, vinagre de manzana	Adventitious/tree	Bark	Liver pain	Infusion, mate	2	4.7	Not found in FNA
<i>Rauvolfia sellowii</i> Müll. Arg. Apocynaceae, quina (MK126)	Local/tree	Leaves, stem Leaves, stem	Stomach ache Digestive problems Heart palpitation	Decoction, soaked in water Infusion, decoction, mate Infusion, mate	2 10 2	5.2	Rauvolfia's alkaloids act to reduce the pressure, sedative, antagonize the action of adrenaline (Alonso, 2004), found in FNA
<i>Rosmarinus officinalis</i> L. Lamiaceae, romero, rozmaryn (BA92106)	Adventitious/shrub	Leaves	Improves memory Digestive problems	Mate Infusion	2 2	18.4	Antibacterial, anti-inflammatory, anti-ulcer formation, antispasmodic, antioxidant (Alonso, 2004), found in FNA
<i>Ruta chalepensis</i> L. Rutaceae, ruda (MK2)	Adventitious/shrub	Leaves	Stomach ache Abortion Sore throat	Infusion, syrup (limón, sugar)	2 2 2	7.0	Not found in FNA
<i>Saccharum officinarum</i> L. Poaceae, caña, alcohol, azúcar	Adventitious/cane	Alcoholic distillate	Toothache Parasites (piques) Wounds	Lavage, compress Lubrication Wash	8 4 9	28.6	Not found in FNA
<i>Sambucus australis</i> Cham. & Schlttdl. Adoxaceae, sauco (BA920712, BA920713)	Local/tree	Alcoholic distillate	Menstrual pain	Small portion of alcohol	2	2.6	Not found in FNA
<i>Secchium edule</i> (Jacq.) Sw. Cucurbitaceae, xuxu, chuchu (MK85)	Adventitious/creeper	Sugar	Bleeding from the wound Gastric hyperacidity	Compress Small portion of sugar	3 2	11.8	Not found in FNA
<i>Sida cordifolia</i> L. Malvaceae, malva blanca (MK82)	Local/shrub	Flowers Leaves, fruit Leaves	Cough Hypertension Menstrual pain	Infusion Infusion, compress, cooked (fruit) Infusion, mate	2 9 5	18.8	Not found in FNA
<i>Sida rhombifolia</i> L. Malvaceae, escobadura (MK20)	Local/shrub	Leaves, stem	Infections	Infusion, bath	9	3.9	Antibacterial activity. The root contains ephedrine (Alonso and
		Fruit	Flu "Coldness" (frialdad) Wasp sting	Compress Lubrication	2 3 3		
		Fruit	Cobrero, fuego de San Antonio (folk illness)	Soaked in water	3		
		Root	Contaminated blood (blood cleansing)	Soaked in water	2		
		Fruit	High level of cholesterol	Soaked in water	2		

<i>Solanum americanum</i> Mill. Solanaceae (MK63)	Local/herb	Fruit	Boils	Compress, poultice	5	Desmachelier, 2005). Not found in FNA 3.9 Not found in FNA
<i>Solanum atropurpureum</i> Schrank, Solanaceae, espina colorada (MK50)	Local/herb	Root	Contaminated blood (blood cleansing)	Soaked in water	3	3.9 Not found in FNA
<i>Solanum melongena</i> L. Solanaceae, berenjena	Adventitious/herb	Tuber	Headache, migraine	Compress	2	2.6 Lowers cholesterol, hypoglycemic action, antioxidant (Alonso, 2004), not found in FNA 6.5 Not found in FNA
<i>Solanum reflexum</i> Schrank Solanaceae, jua (MK101)	Local/shrub	Leaves	Strengthens the blood, liver	In salad	2	6.5 Not found in FNA
<i>Solanum sisymbriifolium</i> Lam. Solanaceae, espina colorada (MK150)	Local/herb	Leaves, bark	High level of cholesterol	Infusion, mate, <i>tereré</i>	7	3.9 Has antihypertensive, antimicrobial properties (Alonso, 2004), not found in FNA 2.6 Not found in FNA
<i>Solanum tuberosum</i> L. Solanaceae, papa	Adventitious/herb	Leaves, bark	Overweight	Infusion, mate, <i>tereré</i>	3	2.6 Not found in FNA
<i>Sonchus oleraceus</i> L. Asteraceae, cerraja (MK176)	Adventitious/herb	Bark	Snake bite	Soaked in water, macerate in alcohol	2	2.6 Antibacterial properties (Alonso, 2004), not found in FNA
<i>Sorocea bonplandii</i> (Baill.) W.C. Burger, Lanjouw&Wess. Boer, Moraceae, ñandy pa (MK96)	Local/tree	Bark	High level of cholesterol	Soaked in water, mate	2	10.9 Not found in FNA
<i>Strychnos brasiliensis</i> (Spreng.) Mart. Loganiaceae, ñuatí kurusú (MK56)	Local/shrub	Leaves	Contaminated blood (blood cleansing) Diabetes	Infusion, mate, decoction Infusion	4 2	2.6 Not found in FNA
<i>Styrax leprosus</i> Hook. & Arn. Styracaceae, carne de vaca (MK45)	Local/tree	Aerial parts	<i>Empacho</i>	Infusion	2	2.6 Not found in FNA
<i>Tabebuia heptaphylla</i> (Vell.) Toledo Bignoniaceae, lapacho negro	Local/tree	Seeds, leaves	Intestinal parasites	Infusion	2	5.2 Not found in FNA
<i>Tabernaemontana cathariniensis</i> DC. Apocynaceae, horquetero (MK86)	Local/tree	Leaves, flower, aerial parts	Menstrual pain	Infusion	3	2.6 Not found in FNA
<i>Tagetes minuta</i> L. Asteraceae, suico (MK109)	Local/herb	Leaves, flower	Prophylaxis after labor	Infusion	3	5.2 Antispasmodic action, antihypertensive, bronchodilator, sedative, anti-inflammatory, antiseptic, insecticide (Alonso, 2004), not found in FNA
<i>Tanacetum parthenium</i> (L.) Sch. Bip. Asteraceae, maruna, artemisia (MK97)	Adventitious/herb	Leaves, aerial parts Leaves, aerial parts	"Coldness" (<i>frialdad de estómago</i>) Protects pregnancy	Infusion	2 2	5.9 Effective in the treatment of migraine, anti-inflammatory, antibacterial (Alonso, 2004), not found in FNA
<i>Tanacetum vulgare</i> L., Asteraceae, catinga de mulata	Adventitious/herb	Leaves	Menstrual pain Flu Cold Bronchitis	Infusion (<i>limón</i> , honey)	3 16 16 3	3.9 Not found in FNA
<i>Thea sinensis</i> L. Theaceae, té negro, té	Adventitious/shrub	Leaves	Cough	Infusion (<i>limón</i> , honey)	3	26.2 Antioxidant, anti-cancer, lipid-lowering, promotes weight loss (Alonso, 2004), not found in FNA
			Catarrh		3	
			Eye infection	Wash, poultice	11	
			Sore throat	Infusion	2	
			Digestive problems		2	
			Diarrhoea		5	
			<i>Empacho</i>		2	

Table 1 (continued)

Species name in Latin, botanical family, local name	Origin/life form	Part(s) used	Health problem	Mode of preparation and administration	Number of citations	ID	Pharmacological bibliography (Argentina)
<i>Tilia cordata</i> Mill. Tiliaceae, tilo	Adventitious/tree	Flower, leaves	Fever		4	2.6	Sedative and antispasmodic action (Alonso, 2004), not found in FNA
		Root	Bladder infection		2		
		Root	Agitation, nervous tension	Infusion	2		
		Root	Contaminated blood (blood cleansing)	Soaked in water, <i>tereré</i>	3		
		Root	Diuretic	<i>Tereré</i>	2		
<i>Tradescantia pallida</i> (Rose) D.R. Hunt Commelinaceae, penicilina (MK169)	Local/herb	Leaves, stem	Hypertention	Infusion	2	2.6	Not found in FNA
<i>Urtica baccifera</i> (L.) Gaudich. ex. Wedd. Urticaceae, ortiga grande, ortiga colorada (MK 100)	Local/shrub	Leaves, stem	Liver pain	Soaked in water	4	6.5	Not found in FNA
<i>Urtica circularis</i> (Hicken) Soraru Urticaceae, ortiga chica (MK14)	Local/shrub	Leaves, stem	Digestive problems	Soaked in water, <i>tereré</i>	19	2.6	Not found in FNA
			Stomach ache	Soaked in water, <i>tereré</i>	19		
<i>Verbena litoralis</i> H.B.K. (MK23)/ <i>Verbena montevidensis</i> Spreng. Verbenaceae, verbena, vervena	Local/herb	Leaves, stem	Diarrhoea	Soaked in water, infusion	2	28.6	Antibacterial, lowering fever, astringent - in the treatment of diarrhoea, lowers high blood pressure, increases peristalsis, antioxidant (Alonso and Desmachelier, 2005), not found in FNA
			Contaminated blood (blood cleansing)	<i>Tereré</i>	3		
<i>Vernonia tweediana</i> Baker Asteraceae, matacampo (MK130)	Local/shrub	Vine (fruit)	Headache	<i>Tereré</i> , infusion	2	2.6	Not found in FNA
			Alcohol poisoning	<i>Tereré</i> , soaked in water	2		
			Lack of appetite		2		
			Contaminated blood (blood cleansing)	Soaked in water, infusion	2		
			Respiratory illnesses	Syrup (honey or sugar)	3		
			Flu		3		
			Cough	Syrup (honey or sugar)	3		
<i>Vitis vinifera</i> L. Vitaceae, vino tinto	Adventitious/creeper	Vine (fruit)	Catarrh	Syrup (honey or sugar)	3	9.5	Not found in FNA
<i>Zea mays</i> L. Poaceae, barba del chocho	Adventitious/herb	Flower Oil (seeds) Floral stigmas	Cold		3	7.1	Diuretic action of styles and traits (Alonso, 2004), found in FNA
			Kidney infection, kidney pain	Infusion, soaked in water	3		
			Earache	Poultice	4		
			Earache	Poultice	2		
			Kidney infection	Infusion	2		

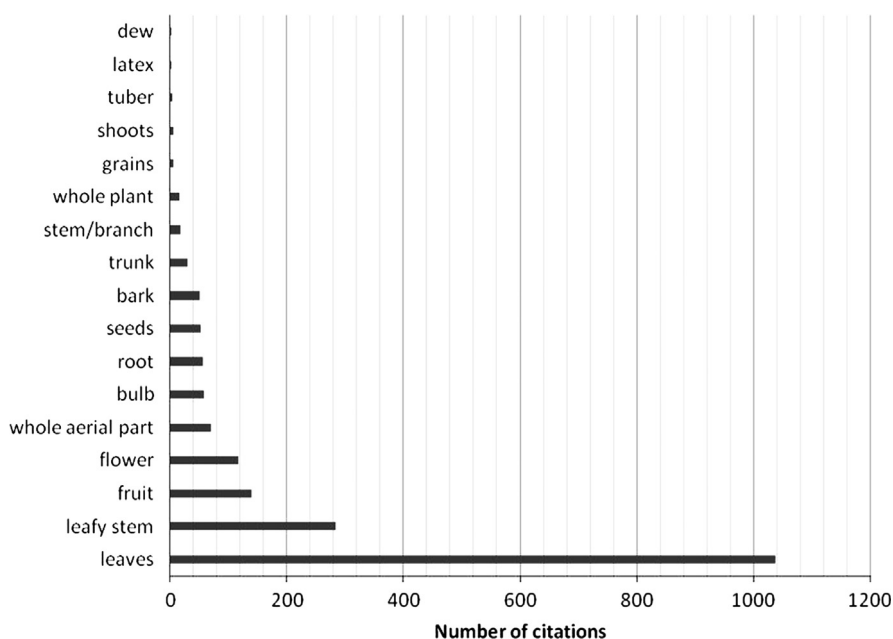


Fig. 2. Plant parts used in the phytotherapy by Polish migrants and their descendants.

two study participants. The unit of analysis was a plant use report (plant species \times plant part \times ailment \times informant).

The researched group were Polish migrants and their descendants, mostly from the first generation born in Misiones. In the study group Polish peasants were also included who had first migrated to Brazil and later to Argentina and settled down in Wanda and Lanusse. Altogether, 94 people were interviewed: 62 women and 32 men. The inclusion criteria were: age – only adults were interviewed – and cultural background; we tried not to include descendants whose parents were mixed couples (Polish and Mestizos). Fifteen participants from the Polish group have Mestizo spouses.

3.3. Voucher collection

The plants were collected in the presence of the study participants in the Wanda and Lanusse colonies (coordinates of Wanda: 25°57'48.13"S, 54°34'28.25"W). Then, voucher specimens were dried and identified by the author (MK) and deposited in the herbarium CTES of the Instituto de Botánica del Nordeste (IBONE) in Corrientes and Museo Nacional de Ciencias Naturales "Bernardino Rivadavia" in Buenos Aires (BA). Samples were identified using floras and analytical keys of plant families (Burkart, 1969; Spichiger et al., 1983) and through comparison with the database of Instituto de Botánica Darwinion in Buenos Aires and the TROPICOS checklist.

3.4. Data analysis

The frequency of mentions was analyzed for plant parts used, modes of preparation and administration of herbal medicines. The frequency of occurrence between single plant remedies and plant mixtures was compared by using the Kruskal Wallis non parametric test. In order to analyze the distribution of medicinal plant uses and the degree of consensus among the study group the Informant Diversity value (ID) was estimated (as proposed by Byg and Balslev, 2001). The Informant Diversity value estimates how many informants use a given species and how its use is distributed among them, a higher value indicates greater diversity and varies from 0 to the number of respondents (76 in this case, since for this analysis single reports were not included).

We analysed the similarity in medicinal uses assigned to each species between Polish folk pharmacopoeia and Polish migrant phytotherapy by applying the Simpson index. In order to do this, we worked with a list of the species cited in the Polish folk pharmacopoeia, which are found in Misiones, where Polish immigrants live.

4. Results and discussion

4.1. Characteristics of the herbal pharmacopoeia of Polish migrants and their descendants

In Polish settlements in Misiones medicinal plants still represent the core of domestic medicinal practices, and are generally managed by the women in the family. Table 1 presents medicinal plant species used in home phytotherapy by Polish migrants and their descendants. It also includes local plant names, origins, plant forms, plant parts used, health conditions treated with the plants, modes of preparation and administration, number of citations, the Informant Diversity (ID) values and pharmacological information about the species found in the literature.

The pharmacopoeia of Polish migrants and their descendants accounts for 129 botanical species, which belong to 52 botanical families and 104 different genera, 56 of which are adventitious and 73 local. The most numerous is the Asteraceae family (16 species), the second Lamiaceae (9 species) and further: Solanaceae (8 species), Rutaceae (8 species), Myrtaceae (7) and Poaceae (7). Considering life forms, herbs predominate (61 species), followed by trees (33), shrubs (25) creepers (5) and finally canes (2). Of all plant parts used, leaves have been mentioned with the greatest frequency and for the greatest number of used species (89), followed by leafy stems, fruits and flowers (Fig. 2). Generally the same species is used for several ailments but with different ways of administration.

Study participants mentioned 1460 single applications of medicinal plants and 266 medicinal formulas composed of at least two plants, sometimes also including non-vegetable ingredients—animal products and pharmaceuticals. The Kruskal Wallis non parametric test has shown that the use of single herbal medicines is far more common than the use of herbal mixtures ($P < 0.0001$).

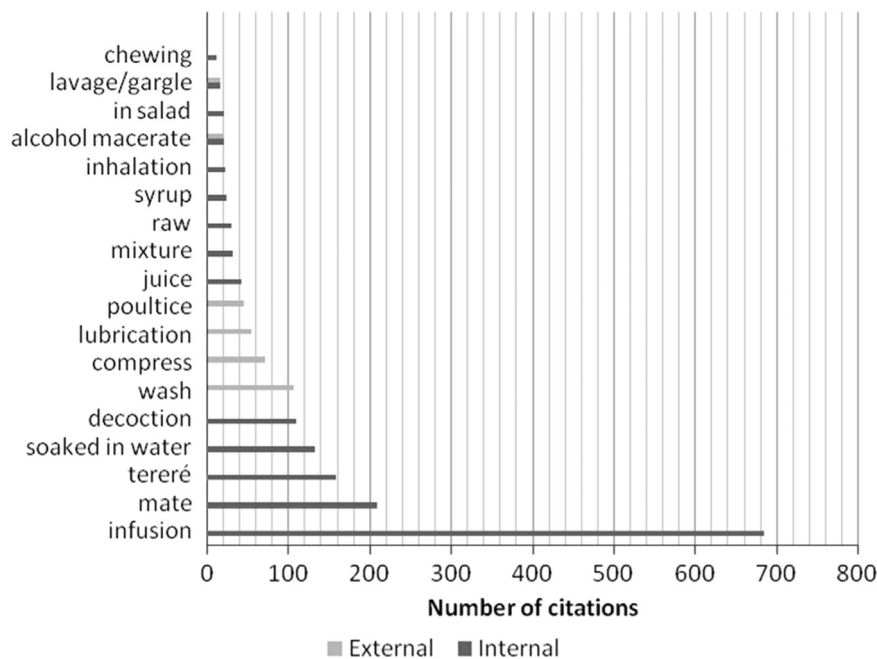


Fig. 3. Modes of administration of herbal medicines.

Mixtures are used mainly to treat respiratory ailments, followed by digestive system and skin problems. Herbal mixtures consist of two to five components, with an average of 2.4 plant components. The use of mixtures observed in the area represents similar proportions to those cited in Polish folk medicine (Paluch, 1984), where on average 2.3 species are used in herbal mixtures. Most of them are also used in the treatment of respiratory ailments.

The internal use of herbal medicines outweighs their external use. Internally, most plants are prepared in the form of infusions, commonly known as “tea”. In the second place plants are incorporated into mate, and in the third place they are used along with *tereré* (Fig. 3).

Mate is a hot drink prepared with yerba mate, drunk at a temperature of 75–80 °C. *Tereré* is a cold version of mate and drunk on hot days. Medicinal plants are placed in a thermos with hot water while prepared with mate, or macerated with cold water in a container in the case of *tereré*. Sometimes plants are put together with yerba mate and then hot water is poured on them; this method is used only for mate. Both mate and *tereré* are drunk through a metal tube called a *bombilla*, which has a filter at the end and is inserted into the receptacle with yerba mate and additional herbs, if any. Medicinal plants are applied in mate and *tereré* both for prophylactic and therapeutic purposes. The preparation of infusions can be identified as a continuation of Polish tradition, while the importance of mate and *tereré* is a sign of acculturation and adaptation to the culture of Misiones. Frequent drinking of mate, and in recent decades also *tereré*, has contributed to the administration of medicinal herbs according to described method. This process is supported by the fact that mate and *tereré* are sociable drinks and Poles and their descendants have the opportunity to learn about some medicinal properties of plants during mate drinking rounds with their neighbors, staff or with *Criollos* (Mestizos) friends.

Among Polish migrant and their descendants, external use has declined. For example, medicinal baths had greater importance in the past than they have today. Herbal baths were mostly made for infants, for example, when they had diarrhoea, they were bathed in a decoction of mint. Today medicinal baths are practically no longer used. Reducing the range of skin disorder treatment makes

external ways of applying medicinal plants currently of little importance in the Polish colonies from Misiones.

The Informant Diversity (ID) showed a maximum value of 36.5 (with an expected maximum of 76). Only 22 species (11 adventitious) achieved an ID greater than 20. This reflects a high level of heterogeneity in medicinal plant knowledge and practices among members of the Polish colonies. Hence, a large part of such knowledge is not shared within the group, but every family has its own herbal particularities, or the same plant species are used differently, or for different ailments. The species with the highest ID values were *Allophylus edulis* (A.St.-Hil., Cambess. & A. Juss.) Radlk., *Matricaria recutita* L., *Chenopodium ambrosioides* L., *Baccharis trimera* (Less.) DC. and *Artemisia absinthium* L. The low level of shared knowledge found among informants may partly be attributed to the relatively short time which has passed since migration, which means that acculturation processes still prevail in the study group at the individual and family level. It may also indicate that knowledge is transmitted and shaped within the family and to a lesser extent within the whole community, as part of extra-familial contacts. This is in accordance with the proposal made by Byg and Balslev (2001). The researchers who have addressed medicinal plant use among migrant groups have not paid attention to knowledge transmission; therefore our findings cannot be compared with other sources.

Regarding the pharmacological data available in the literature, 10 taxa used by Poles from Misiones are on the list of medicinal plant resources of the Argentinean National Pharmacopoeia (Farmacopea Nacional Argentina—FNA). Some of the species listed in the FNA appear in the official pharmacopoeia of Brazil and Paraguay (Alonso, 2004). Nearly half of the plants applied in the pharmacopoeia of the study group were tested pharmacologically for the content of specified chemical compounds and for specific therapeutic effects. Some results of pharmacological and clinical applications coincide with folk knowledge. A few medicinal plant species used by informants in Misiones match one hundred percent with their pharmacological properties. This refers to plants with a narrow range of medicinal applications in the pharmacopoeia of Polish migrants. They include: *Anethum graveolens* L., *Chenopodium ambrosioides*, *Cucurbita* spp., *Linum*

usitatissimum L., *Phyllanthus niruri* L., *Pimpinella anisum* L., *Polygonum punctatum* Elliot, *Solanum melongena* L. and *Tilia cordata* Mill. Despite their total compliance with the results of pharmacological studies, the aforementioned species are not very popular among the Polish group, with the exception of *Phyllanthus niruri* and *Chenopodium ambrosioides*. On the contrary, we have recorded medicinal uses of species completely different from those referred to by pharmacological studies (Alonso, 2004; Alonso and Desmachelier, 2005). From this group of taxa *Thea sinensis* L., *Citrus aurantium* L. and *Aristolochia triangularis* Cham. are quite popular. The latter taxon, according to pharmacological studies, should not be taken orally because of the harmful effects of aristolochic acids (Alonso and Desmachelier, 2005). Nevertheless, our interlocutors stressed that in past decades Polish pioneers often used to drink mate with the addition of *Aristolochia triangularis*. Currently, the use of this liana has decreased, but a walk in the woods in the company of informants proved that this species is well recognized by them. The above analysis shows that the popularity of most of the plants used by the Polish community does not depend on their efficacy as confirmed pharmacologically. For the study group, there are large discrepancies in the perception of the effectiveness of medicinal plant species in terms of *emic* and *etic* approaches. This may be due to, among other things, the still small number of clinical trials carried out on the species used by the Polish migrants and their descendants.

4.2. Similarities between Polish folk and Polish migrant pharmacopoeia

In the region of northern Misiones we registered 37 plant species and plant products available, which had been documented in Polish ethnomedical and ethnobotanical literature. Of 37 available species we registered a continuation in use for 19 (51% of the available species) among Polish migrants and their descendants. These range from plants found in a semi-wild state, cultivated and purchased on stalls, in shops and pharmacies.

72% of the shared species have been applied as both food and medicine. These include vegetables: onion (*Allium cepa* L.), garlic (*Allium sativum* L.), cabbage (*Brassica oleracea* L.), parsley (*Petroselinum crispum* (Mill.) Fus), potatoes (*Solanum tuberosum* L.), pumpkin (*Cucurbita* spp.), spices: dill (*Anethum graveolens*), mint (*Mentha spicata* L., *Mentha × piperita* L.), black pepper (*Piper nigrum* L.), and other plants and plant products such as tea (*Thea sinensis*) and lemon (*Citrus limon* (L.) Osbeck, *Citrus × jambhiri* Lush.). Some of these plants are used as medicinal foods. The proportional predominance of food species over the exclusively medicinal plants among legacy medicinal plants stems from the fact that edible plants move easily and quickly across the world. In South America, food plants prevailed among all categories of plants that arrived there from other parts of the world (Bennett and Prance, 2000). The high number of edible plants known from Poland in Polish migrants' phytotherapy also points to their importance in folk practices, due to the strong links between diet, prevention and therapeutics.

Our observations from Misiones are consistent with reports from other parts of the world. For example, Støkker researched Norwegian minority folk medicine in the United States. Among the medicines mentioned by the descendants of Norwegians as native, imported from Europe, were the products of animal, plant, and industrial chemicals—such as kerosene, turpentine, sulfur and lead. Among the plants and plant products the researcher listed beets, onions, potatoes, hops and alcohol. This modest list of plant products contained mostly edible plants used predominantly in the diet (Støkker, 2007).

The similarity in uses of shared medicinal species between Polish folk pharmacopoeia and Polish migrants is low (14.1

Simpson Index). In Misiones these species are employed generally to treat fewer ailments than in Poland, and some of these illnesses are not recognized by Polish folk medicine. We recorded cases of treatment of symptoms that were not known in Poland with the shared plants. Two of the symptoms, contaminated blood and gastric hypothermia (*frialdad del estómago*), belong to the range of humoral medicine. The latter name was taken over by the Polish migrants and their descendants from the folk medicine terminology of *Criollos*. *Artemisia absinthium* and *Thea sinensis* have been adopted for the treatment of a new, previously unknown folk illness—*empacho* (Campos Navarro and Scarpa, 2013). On the other hand, we observed the increased application of *Allium sativum*, *Artemisia absinthium*, *Thea sinensis*, and *Mentha × piperita* in Misiones (Table 2).

Total concordance in medicinal uses between Poland and the migrants' pharmacopoeia were found only in the case of *Cucurbita* spp. A drastic reduction in the medicinal uses of *Achillea millefolium* L. and *Tanacetum vulgare* L. is probably due to the fact that Poles began to use these plants late, when original knowledge about their healing properties was already blurred. Polish descendants have learned their medicinal properties from German migrants (field observations and Héctor Keller's personal communication).

Not all the medicinal plant species were present in Misiones at the time when Polish migrants settled there, when the memory of the legacy herbal medicines was the most vivid. For example, lime tree (*Tilia cordata*), one of the most important plant species in the folk pharmacopoeia in Poland (Paluch, 1984), is available now in form of the teabags in grocery shops in Misiones, but it was not possible to purchase it in the past. The lime tree does not grow in Misiones due to the hot climate. Therefore, it is difficult to talk about continuation in the use of lime, as Polish descendants who currently use it learned about its properties not from their mothers or fathers but from other people or from the media. Similar examples are *Aesculus hippocastanum* L., *Calendula officinalis* L., *Valeriana officinalis* L. and *Salvia officinalis* L.—these plants arrived in northern Misiones too late for Polish parents to teach their children, already born in Argentina, to use them as medicines.

Although Poles and their descendants use only half of the available medicinal species known from Poland, some of them had and still have great importance in their phytotherapeutic practices. Rumianek or manzanilla (*Matricaria recutita*), piełunek or ajeno (*Artemisia absinthium*), té (*Thea sinensis*), czosnek or ajo (*Allium sativum*) and mięta or menta (*Mentha × piperita*) belong to the herbals with a higher ID (Tables 1 and 2). Chamomile wormwood, garlic and mint are also among the most common and most extensively used medicinal plants known in Polish folk medicine (Paluch, 1984).

It is important to be aware during data analysis and interpretation that the method adopted in this study is one of wide use in ethnobotanical studies concerning migration but has some limitations as an explanatory tool of processes of herbal medicine acquisition and loss. Phytotherapeutic knowledge is largely individual, therefore perhaps among the migrating Poles there was no one who knew the healing properties of *diente de león* (*Taraxacum officinale* F.H. Wigg.), *toronjil* (*Melissa officinalis* L.) and local varieties of blackberries (*Rubus* subgen. *rubus*). Other species are very rarely used in folk medicine in Poland, such as coffee (*Coffea arabica* L.), so we hardly noticed its use in Misiones. Moreover, this research has been conducted mainly among the descendants of Poles, so they cannot remember all the plants used by their parents, especially those which they themselves no longer use. In fact the knowledge and practices concerning herbal medicine are dynamic, change in each generation and are tested for culturally understood efficiency. Besides, some heritage species like carrot and beets have been listed only by single persons, therefore they were not included in the analysis.

Table 2
Comparison of therapeutic uses of plant species known from Polish folk pharmacopeia and their applications in home medicine of Polish community from Misiones, Argentina.

Species known from Poland available in Misiones	Use in Polish folk medicine (Udziela, 1931; Spittal, 1938; Paluch, 1984)	Number of ailments	Use in home medicine by Polish community in Misiones	Number of ailments	Convergent applications (%)	Similarity ^a
<i>Achillea millefolium</i> L.	Too abundant menstruation, lack of menstruation, vaginal discharge, bleeding, dysentery, contaminated blood, abdominal pain, diarrhoea, stomach pain, anemia, tuberculosis, fever, ulcers, respiratory illnesses	14	Stomach ache	1	7	Low
<i>Aloe arborescens</i> Mill.	Respiratory system infections, digestive problems, liver pain, heart illnesses, wounds, skin burns, ulcers	7	Inflammation of the throat, sore throat, ulcers	3	28	Low
<i>Allium cepa</i> L.	Cough, cold, ulcers, boils, pimples, wounds	6	Boils, ulcers, festering wounds, bronchitis, flu, catarrh	6	50	Medium
<i>Allium sativum</i> L.	Respiratory illnesses (cough, catarrh), internal parasites, jaundice, typhoid, toothache, headache, rheumatic pain, fever, earache, hypertension	10	Ear infection, earache, toothache, contaminated blood, internal parasites, flu, bronchitis, hypertension, pimples, tinea pedis, snake bite, prophylactics	12	55	Medium
<i>Anethum graveolens</i> L.	Flatulence, constipation, colic, lactagogue	4	Flatulence	1	25	Low
<i>Artemisia absinthium</i> L.	Stomach ache, abdominal pain, lack of appetite, fever, dysentery, rose (folk illness)	6	Headache from indigestion, stomach ache, liver pain, internal parasites, empacho, diarrhoea, digestive problems	7	27	Low
<i>Brassica oleracea</i> L.	Headache, frostbite, burns, scabies, boils, internal parasites	6	Boils	1	16	Low
<i>Citrus limon</i> (L.) Osbeck	Jaundice, tuberculosis, pneumonia, tonsillitis, diphtheria, flu, internal parasites, catarrh	8	Sore throat, flu, cold, coughs, bronchitis, high blood pressure, digestive problems, contaminated blood	8	25	Low
<i>Cucurbita</i> spp.	Internal parasites	1	Internal parasites	1	100	Total
<i>Linum usitatissimum</i> L.	Boils, ulcers, burns, eczema, rose (folk illness), asthma, sore throat, cough, stomach ache, abdominal ulcers, tuberculosis, smallpox, toothache, earache, swelling of the body	15	Constipation	1	0	None
<i>Matricaria recutita</i> L.	Panacea, eye infections, wounds, bruises, stomach ache, abdominal pain, constipation, sore throat, cough, catarrh, flu, fever, boils, pimples, gynecological problems, toothache, earache	17	Diarrhoea, abdominal pain, stomach ache, digestive problems, flatulence, menstrual pain, cold sore (fiebre del estómago), fever, flu, cough, cold, catarrh, sore throat, eye infection, hot remedy (humoral medicine), prophylactic	16	37	Medium
<i>Mentha × piperita</i> L.	Stomach ache, abdominal pain, diarrhoea, cough, sore throat, high blood pressure, headache, gynecological infections, infectious diseases, liver pain, cold, bleeding, poor metabolism	13	Stomach ache, digestive problems, flatulence, abdominal pain, internal parasites, gastric hyperacidity, diarrhoea, menstrual pain, high level of cholesterol, cold sore (fiebre del estómago), nervous tension, insomnia in children, cold, prophylactics	14	17	Low
<i>Petroselinum crispum</i> (Mil.) A.W. Hill.	Infections of the urinary system, digestive problems, eye infections, wounds	4	Fluid retention, kidney problems	2	25	Low
<i>Piper nigrum</i> L.	Abdominal pain, internal parasites, diarrhoea, catarrh, toothache	5	Internal parasites	1	20	Low
<i>Solanum tuberosum</i> L.	Boils, ulcers, burns, sore throat, cough, headache, gynecological illnesses, gastrointestinal disorders, illnesses of the urinary tract	9	Migraine	1	15	Low
<i>Tanacetum parthenium</i> (L.) Sch. Bip.	Stomach ache, internal parasites, gynecological illnesses, tearing (folk illness), heart palpitation, respiratory illnesses	6	Cold sore (friadad del estómago), menstrual pain, protects pregnancy, prophylactics of postpartum	4	14	Low
<i>Tanacetum vulgare</i> L.	Digestive system illnesses, internal parasites, skin diseases, pain	4	Menstrual pain	1	25	Low
<i>Tilia cordata</i> Mill.	Respiratory tract illnesses, sore throat, catarrh, asthma, fever, cold, flu, stomach ache, diarrhoea	9	Nervous tension	1	0	None
<i>Thea sinensis</i> L.	Eye infections, sore throat, catarrh	3	Eye infections, sore throat, cough, bronchitis, cold, flu, catarrh, diarrhoea, fever, digestive problems, empacho	11	27	Low

^a Rating: low, medium or high has been calculated on the basis of the calculation of the percentage of convergent applications. Up to 33% rate low, between 34 and 65% medium and from 66% up high.

An interesting case is the plantain (*Plantago* spp.), of which several species grow in Misiones. *Plantago major* L. was the most widely used species of this genus in Poland, and was one of the most highly regarded herbal medicines throughout the folk phytotherapy (Paluch, 1984). Plantain is also an important medicinal plant in South America, in the local ethnomedicine of many indigenous groups and among Mestizos (Arenas, 1987; Bennett and Prance, 2000; Hilgert, 2001; Molares and Ladio, 2009; Scarpa, 2009; Martínez and Barboza, 2010). However none of the respondents could remember the word “babka” (plantain). *Plantago major* does not grow in northern Misiones but it does in the central part of the province, where it is cultivated by descendants of Bulgarian migrants (personal communication with Héctor Keller). Given the high mobility of Polish migrants in the province, and the frequent travel related to the sale of agricultural products, it seems likely that Poles would have encountered this species. That did not happen. *Plantago australis* Lam. known as *llentén* is used by Polish migrants and their descendants for medicinal purposes, but is primarily used internally in inflammation and as a blood cleanser. In four cases we have noted the use of *llentén* in the treatment of skin problems, which was the primary use for plants of the genus *Plantago* in Poland (Udziela, 1931; Spittal, 1938; Paluch, 1984). Analysis of the available ethnobotanical studies of Misiones indicates that the descendants of Poles took over the use of *P. australis* from local Mestizos, who use this plant in a very versatile way (Keller and Romero, 2006).

Other interesting cases of plants that were not recognized by Polish migrants are *ruda* (*Ruta chalepensis* L.) and *romero* (*Rosmarinus officinalis* L.). Rue (*Ruta graveolens* L.) was widely grown in home gardens in eastern Poland up to the interwar period. Young and marriageable girls used to embellish their dresses with leafy stems of rue. In the interwar period the custom began to decline, as peasants gradually stopped wearing traditional costumes. In that period evergreen exotic plants originating from the Mediterranean – myrtle and rosemary – began to compete with rue. Rosemary has not been grown in the country, but urban markets were supplied with rosemary stems. Knowledge of the word “rosemary” among the peasants was mainly taken up from love songs, they rarely knew the plant itself (Szot-Radziszewska, 2005). The loss in the use of rue and poor knowledge of rosemary in the interwar period explains why the Poles recognized neither rue, nor rosemary in Argentina. Nevertheless, these plants have been known in South America since the colonial period—as important magic and healing plants, and rosemary also as a food additive (Foster, 1953; Scarpa, 2004; Estomba et al., 2006; Hilgert and Gil, 2007).

5. Conclusions

The pharmacopoeia of Polish migrants in Misiones accounts for 129 botanical species and plant products, of which 19 species show the continuation of practices derived from Poland. This continuation was possible because the migrants brought the seeds of several species with them (chamomile, wormwood, flax) and recognized other well-known Old World species that were previously imported by immigrants from Spain, Italy and Germany. Continuation in Polish folk medicine was also made possible by the fact that Poles migrated with their families and settled down in colonies, which were dense in terms of ethnicity. Transmission of traditional medicine is easier within organized rather than individual migration. Important plant species survived migration, those with a wide range of therapeutic applications, easily accessible, cultivated in home gardens and sold in any shop and marketplace. However, the modes of knowledge acquisition and transmission in Polish settlements in Misiones should be properly

addressed to obtain a conclusive idea about the processes that mould them.

The results confirm the stated hypothesis. Based on the theory of acculturation, the observed pattern of medicinal plant use among Polish migrants indicates good adaptation to the predominant cultural environment. Poles have adapted very well to a new natural and cultural environment by continuing the use of plants important in Polish folk phytotherapy with the inclusion of more than 100 species of plant to their pharmacopoeia. They have also conserved the traditional administration for both the native medicinal plants and those included from Misiones. The use of herbal medicines by the Polish migrants is an expression of their continuing process of adaptation, as evidenced by the growing popularity of mate and *tereré*. Preserving traditional ways of medicine application is a form of domestication of new medicinal plants, part of their inclusion in the wider scheme of practical and symbolic actions.

Acknowledgements

The research was financed by funds from the Ministry of Science and Higher Education, the National Science Centre in Poland [NN109051138], and Fundación Argentina. Our special thanks go to the study participants who generously shared their knowledge, and to Rosa Jejer, María Norma Jejer, Marta Sawa, Mariano Chudy, Lorenza de Woronowicz and Cristina Kozak for their logistic support. The authors are also grateful to Héctor Keller and Pastor Arenas for their help with plant identification and to Guillermo Gil and Fernando Zamudio for their advice concerning the choice of quantitative analysis.

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