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Medicinal gardens in rural communities in Southeastern Brazil: uses and risks for primary healthcare

Hortos medicinais em comunidades rurais no sudeste do Brasil: usos e riscos para atenção primária à saúde

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Abstract This paper sought to identify the medicinal plants cultivated in a communal medicinal plant garden in Casimiro de Abreu, Rio de Janeiro State, Brazil, and access its utilization and importance for healthcare to the local population based on interviews with the garden's administrator, whose recommendations and instructions on how to prepare the remedies used are trusted by the visitors of the garden. Plants that treat illnesses related to the respiratory system are most sought after. The free use of the garden by the local community, associated with the small initial investment, points to the viability of this public initiative and the value of traditional knowledge, what must be taken with special care, because of the potential or reported risks of the use of some of them, since only 17 among 80 plant species are reported as safe for human use. Some kind of toxic effects were reported to 22 species, and the majority of them, 41 species, are still unknown concerning their toxicological risks.

Keywords: medicinal plant garden; traditional knowledge; rural communities; public health policy; phytotherapy; toxicology.

Resumo Este trabalho procurou identificar as plantas medicinais cultivadas em um horto de plantas medicinais comunitário em Casimiro de Abreu, Rio de Janeiro, Brasil, e acessar a sua utilização e importância para a saúde da população local, com base em entrevistas com o administrador do jardim, cujas recomendações e instruções sobre como preparar os remédios usados são de confiança por parte dos visitantes do jardim. Plantas para tratar doenças relacionadas ao sistema respiratório são as mais procuradas. O uso livre do horto pela comunidade local, associado ao pequeno investimento inicial, aponta para a viabilidade da iniciativa pública e do valor do conhecimento tradicional, o que deve ser tomado com cuidado especial, devido aos riscos potenciais ou notificados do uso de algumas das plantas, uma vez que apenas 17 entre 80 espécies de plantas são relatados como seguras para o uso humano. Alguns tipos de efeitos tóxicos foram relatados para 22 espécies, e a maioria delas, 41 espécies, ainda são desconhecidos sobre os seus riscos toxicológicos.

Palavras-chaves: horto de plantas medicinais; conhecimentos tradicionais; comunidades rurais; política de saúde pública; fitoterapia; toxicologia.

Introduction

The ancient human dependence on natural resources to get food, shelter, fuel, and health remedies, allied with the ubiquitous presence of plants have been in the basis of human religions. Although Salatino (2002) suggested that Christianity had historically tended to separate humankind from the plant kingdom, Guedes *et al*. (1985) had observed that the religious practices in Afro-Brazilian communities maintain their relationships with magical and ritualistic plants. Maybe due to this historical influence, medicinal plants have been widely used in Brazilian popular medicine (Di Stasi *et al*. 2002). Especially in rural communities, traditional knowledge medical practices had their importance increased due to the difficulties encountered in getting access to healthcare services and the prices of industrialized medicines (Christo *et al*. 2010).

The World Health Organization – WHO – officially recognized the use of phyto-therapeutic medications in 1978, and recommended

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the diffusion of information concerning their use in health programs throughout the world, simultaneously with the recommendation of searching scientific evidence and standardization for their efficacy, and of taking care with their potential toxic or undesirable effects (WHO 1978).

However, traditional knowledge associated with phytotherapy was only first included in Brazilian health policies in 2006, following the publication of Brazilian Policy for Integrative and Complementary Practices in health (Brasil 2006a), what had strongly affected Brazilian rules for the registry of phytomedicines (ANVISA 2010). From that rule on, traditional knowledge published as ethnobotanic, ethnopharmacognostic or ethnopharmacological researches could be used as evidence for the registry. It started a search for proactive measures to improve public health by promoting the security, efficiency and quality of these herbal medications and phytomedicines, including the rescue of traditional knowledge. Efficacy and safety became the two major challenges that phytotherapy has to face (Brasil 2006b, ANVISA 2010).

This study aims mainly to identify the medicinal plants grown in the communal municipal garden in Casimiro de Abreu, Rio de Janeiro, Brazil, attempting to the toxic risks of their use. In parallel, we will determine the frequency of plant uses; their importance to the visiting population; and support efforts to preserve local knowledge of useful plants in communities that border on national conservation areas.

Methods

Study area

The municipality of Casimiro de Abreu (22°28'50"S x 42°12'15"W) is located along the Atlantic coast in Rio de Janeiro State, Brazil (Figure 1), 120 km far from Rio de Janeiro city. The municipality borders on the Poço das Antas Biological Reserve that protects one of the last remnants of Atlantic coastal forest in the region. The municipal population is approximately 22,000 inhabitants, and the regional economy is based on tourism, local commerce, cattle, and farming (IBGE 2003).

Methodology

Research was undertaken between 9/2002 and 4/2003. Information concerning the medicinal plants was obtained through either open or semi- structured interviews (Alexiades 1996) with the administrator of the medicinal garden, and plant samples were taken at those times for identification and later deposited at the Herbarium of the Rio de Janeiro Botanical Garden (RB). The checklist was made considering only the plant taxonomically identified to the species level.

The illnesses treated by the plants were categorized according to an adaptation of the WHO classification, according to Almeida and Albuquerque (2002). The sixteen resultant categories are: a) infectious and parasitic diseases; b) neoplasms; c) illness of the endocrine glands, nutrition, and metabolism; d) blood diseases and those of the hemopoetic organs; e) illnesses of the sense organs (hearing); f) illnesses of the sense organs (eyes); g) illnesses of the nervous system; h) illnesses of the circulatory system; i) illnesses of the respiratory system; j) illnesses of the digestive system; k) illnesses of the genital-urinary system; l) illnesses of the skin and subcutaneous tissue; m) illnesses of the osteo-muscular system and connective tissues; n) afflictions and indefinite pain; o) viral infections; p) cerebral vascular afflictions.

The human toxic risks were obtained by means of an extensive literature review and searches on databases of the Health

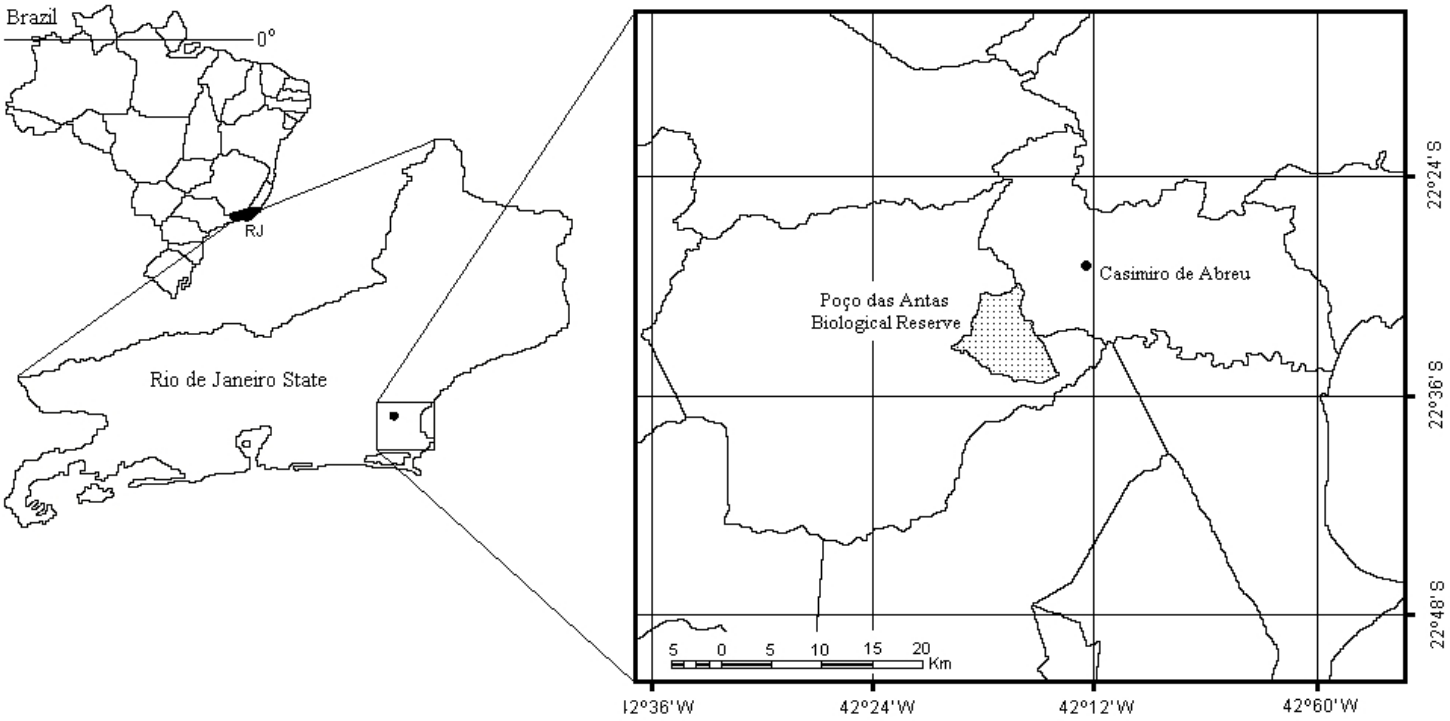

Figure 1 Location of the communal medicinal garden in Casimiro de Abreu, RJ, Brazil.

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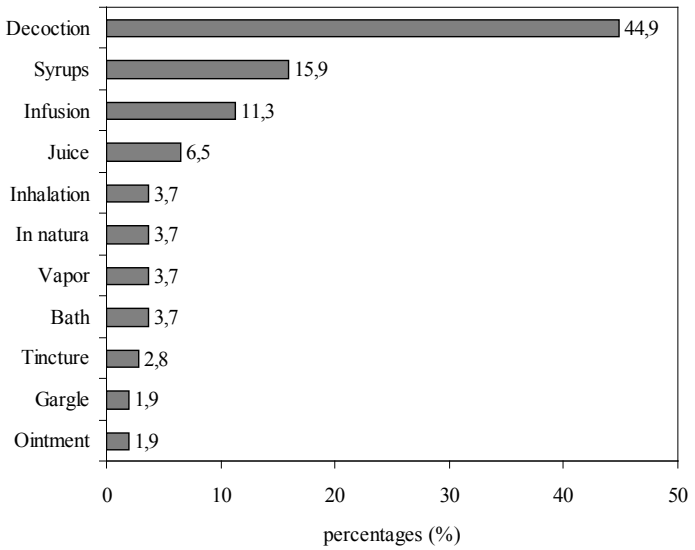

Figure 2 Form of preparation indicate for medicinal plant species cultivated in the community medicinal garden in Casimiro de Abreu, RJ, Brazil.

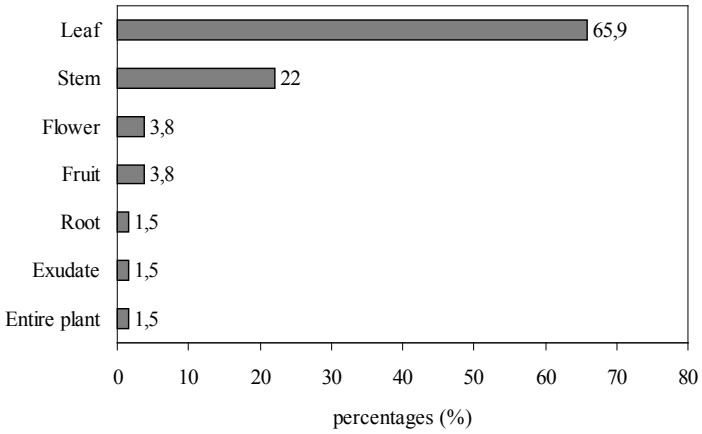

Figure 3 Plant parts most used among species cultivated in the communial medicinal garden in Casimiro de Abreu, RJ, Brazil.

Virtual Library (http://www.bireme.br), including Medline and Pubmed, and Scirus (http://www.scirus.org), sponsored by Elsevier.

Results

This study examined 80 species belonging to 38 plant families (Table 1). The families with the greatest number of species were: Asteraceae, Lamiaceae, Euphorbiaceae, Malvaceae, Euphorbiaceae, Poaceae and Verbenaceae. The habits of these plants were: herbaceous (71.25%), sub-shrub to shrub (18.75%), vines (6.25%), and trees (3.75%).

The largest percentage of the medicinal plants were sought after for use in treatment of infirmities of the respiratory system (17 species), followed by illnesses of the digestive system (16), of the genital-urinary system (15), afflictions and indefinite pain (14), illness effecting the skin and subcutaneous tissues (13), illness of the endocrine glands, nutrition, and metabolism (10), illnesses of the nervous system (6), blood diseases and those of the hemopoetic organs (5), infectious and parasitic diseases (4), illnesses of the circulatory system (3), illnesses of the osteo-muscular system and connective tissues (3), viral infections (2), illnesses of the hearing (2), neoplasms (1), illnesses of the eyes (1), and cerebral vascular afflictions (1).

Based on the interviews, preparations were divided into 11 classes (see Appendix), of which decoction was the most common (44.86%), followed by syrups (15.89%), and infusions (11.21%) (Figure 2). The

Table 1 Plants cultivated in the community medicinal garden in Casimiro de Abreu, RJ, Brazil, their medicinal uses, way of preparation, and potential risks to human health.

Family/Species	Common name	Medicinal use	Plant part utilized	Preparation	Voucher	Human Toxicity
ALISMATACEAE						
Echinodorus grandiflorus (Cham. & Schltdl.) Micheli	chapéu-de-couro	d, k, m	lf	dec	393.989	nr
AMARANTHACEAE						
Iresine herbstii Hook.	orelha-de-moleque	e	lf	jui	393.934	nr
Pfaffia paniculata (Mart.) Kuntze	novalgina, ginseng	i	st, lf	syr	469.367	Safe (Matsuzaki *et al*. 2003)
ANACARDIACEAE						
Schinus terebinthifolia Raddi	aroeira	n	lf	inf	393.916	nr
ANNONACEAE						
Annona muricata L.	graviola	c	lf	dec	393.909	Reports of atypical parkinsonism related to toxicity to dopaminergic neurons (Lannuzel et al. 2002; Champy *et al.* 2004; Champy *et al.* 2005)
APIACEAE						
Foeniculum vulgare Mill.	erva-doce	g, p	st, lf	dec	469.366	nr

Conventions: Medicinal use: a) infectious and parasitic diseases; b) neoplasms; c) illness of the endocrine glands, nutrition, and metabolism; d) blood diseases and those of the hemopoetic organs; e) illnesses of the sense organs (hearing); f) illnesses of the sense organs (eyes); g) illnesses of the nervous system; h) illnesses of the circulatory system; i) illnesses of the respiratory system; j) illnesses of the digestive system; k) illnesses of the genital-urinary system; l) illnesses of the skin and subcutaneous tissue; m) illnesses of the osteo-muscular system and connective tissues; n) afflictions and indefinite pain; o) viral infections; p) cerebral vascular afflictions. Plant part utilized: entire plant (ent); root (ro), stem (st); leaf (lf); flower (fl); fruit (fr); latex (la). Form of preparation: bath (bat); decoction (dec); gargle (gar); in natura (in); inhalation (inh); infusion (inf); ointment (oin); juice (jui); tincture (tin); vapor (vap); syrup (syr). Human Toxicity: no reference (nr). Voucher of RB.

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Table 1 cont. Plants cultivated in the community medicinal garden in Casimiro de Abreu, RJ, Brazil, their medicinal uses, way of preparation, and potential risks to human health.

Family/Species	Common name	Medicinal use	Plant part utilized	Preparation	Voucher	Human Toxicity
ARACEAE						
Pistia stratiotes L.	erva-de-santa-luzia	f	lf	dec	393.951	nr
ASTERACEAE						
Arctium minus (Hill) Bernh.	bardana	k	lf	dec	394.037	nr
Cichorium intybus L.	almeirão-roxo	j	ro, st, lf	inf	393.972	Safe (Schmidt et al. 2007)
Coreopsis grandiflora Hogg ex Sweet	camomila	g	st, lf	dec	393.911	nr
Cynara scolymus L.	alcachofra	c	lf	inf	393.935	Safe (Alonso, 1998)
Elephantopus mollis Kunth	erva-grossa	i	lf	syr	393.921	Triterpene anda sesquiterpene lactones cytotoxic and induced apoptosis of neuroblastoma B104 cells in a dose- and time-dependent manner (Tabopda et al. 2008); significant cytotoxic activities of its sesquiterpene lactones against mouse neuroblastoma B104 cells (Tabopda et al. 2008)
Solidago chilensis Meyen	arnica	l	lf	jui	393.898	Safe (Facury Neto et al. 2004)
Tagetes erecta L.	cravo-de-defunto	m	fl	tin	393.926	Safe (Harikumar et al. 2008)
Tanacetum vulgare L.	palma-de-santa-rita	l	lf	inf	393.931	Safe (Alonso, 1998)
Vernonia condensata Baker	boldo-do-chile	j	lf	dec	393.903	Low acute toxicity and pose neither teratogenic nor mutagenic risks (Monteiro et al. 2001)
Vernonia polyanthes Less.	assa-peixe	i	lf	syr	393.939	nr
Ageratum conyzoides L.	erva-de-são-joão	g	lf	dec	393.925	Safe (Moura *et al*. 2005)
Baccharis myriocephala DC.	carqueja	c, j	lf	dec	394.035	nr
Bidens pilosa L.	picão	j, k	ent	dec	393.922	nr
Mikania glomerata Spreng.	guaco	a, i	st, lf	syr	393.897	DNA damages at the highest concentrations of alcoholic macerate (Costa et al. 2008)
Artemisia absinthium L.	losna	j, k	lf	dec	393.901	Safe (Muto *et al*. 2003)
Calendula officinalis L.	calêndula	g, l, m	lf	oin	393.950	Non toxic after external use, but show liver and renal overload after oral intake (Silva *et al*. 2007)
Achillea millefolium L.	mil-folhas	d, j, k	st, lf	dec	393.915	Safe (Dalsenter et al. 2004; Cavalcanti *et al*. 2006)
BIXACEAE						
Bixa orellana L.	orucum	i	lf	syr	394.032	Safe (Alonso, 1998)
BORAGINACEAE						
Symphytum officinale L.	confrei	c, n	lf	dec	469.368	Hepatotoxic pyrrolizidine alkaloids in leaves (Alonso, 1998)
BUXACEAE						
Buxus sempervirens L.	bucho	i	lf	dec	459.650	nr
CAPRIFOLIACEAE						
Sambucus nigra L.	sabugueiro	o	st, lf	bat	393.920	Cyanogenetic glucosides in leaves, but safe for external use and for intake of flower and fruits extracts in recommended dosis (Alonso, 1998)
CECROPIACEAE						
Cecropia glaziovi Snethlage	embaúba	c, l	lf	inf	393.943	nr
CHENOPODIACEAE						
Chenopodium ambrosioides L.	erva-de-santa-maria	a	st, lf	dec	393.961	Hepato- and renal toxicity, and central nervous system disorders (Alonso, 2008)
CHRYSOBALANACEAE						
Chrysobalanus icaco L.	bajurú	c	lf	inf	393.917	Potential genotoxicity of aquous leaves extract (Ferreira-Machado et al. 2004)

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Table 1 cont. Plants cultivated in the community medicinal garden in Casimiro de Abreu, RJ, Brazil, their medicinal uses, way of preparation, and potential risks to human health.

Family/Species	Common name	Medicinal use	Plant part utilized	Preparation	Voucher	Human Toxicity
COSTACEAE						
Costus arabicus L.	cana-de-macaco	k	lf	dec	393.945	nr
Costus spiralis (Jacq.) Roscoe	cana-de-macaco	k	lf	dec	393.912	nr
CRASSULACEAE						
Kalanchoe brasiliensis Cambess.	saião	i	lf	syr	393.937	Chronic consumption could contribute to the development of goitre and hypothyroidism, mainly in areas of low iodine intake (Ferreira et al. 2000)
CUCURBITACEAE						
Luffa operculata (L.) Cogn.	buchinha-do-norte	i, k	fr	inh, dec	393.944	nr
Momordica charantia L.	melão-de-são-caetano	k, l	st, lf	dec	393.947	In animals, leaves and fruits act as spermaticid and fetal growth inhibitor, chronc use of ethanolic extract induces testicular atrophy and abortion. No report of human toxicity (Alonso, 1998)
EQUISETACEAE						
Equisetum hyemale L.	cavalinha	k	lf	dec	393.962	nr
EUPHORBIACEAE						
Jatropha aff. *multifida* L.	mercúrio	l	la	in	469.369	Genotoxic and potent competition with CYP3A4, 2D6, 2C9 and 2C19 (van den Bout-van den Beukel et al. 2008)
Jatropha gossypiifolia L.	pinhão-roxo	l	la	in	393.913	nr
Acalypha communis Müll. Arg.	parietália	k	lf	dec	459.651	nr
LAMIACEAE						
Mentha arvensis L.	hortelã	i	lf	syr	469.371	Essential oil may induce abortion (Alonso, 1998)
Ocimum gratissimum L.	alfavaca	i	st, lf	syr	393.927	Safe at recommended dosis, but overdosis induces narcosis (Alonso, 1998)
Thymus vulgaris L.	tomilho	j	st, lf	dec	393.910	Essential oil is neurotoxic (Alonso, 1998)
Ocimum basilicum L.	manjericão	e, i	lf	syr, jui	393.933	safe at recommended dosis, but overdosis induces narcosis (Alonso, 1998)
Rosmarinus officinalis L.	alecrim	h, i	st, lf	inf, inh	394.039	Safe (Alonso, 1998)
Leonotis nepetifolia (L.) R. Br.	cordão-de-frade	n	st, lf, fl	dec	393.929	The most active species in the brine shrimp lethality tests (David et al. 2007)
Mentha pulegium L.	poejo	i	st, lf	syr	459.649	Essential oil produces abdominal and central nervous system symptoms, and anaphylactoid reactions (Alonso, 1998)
Ocimum selloi Benth.	anis	j	st, lf	dec	393.902	nr
Plectranthus amboinicus (Lour.) Spreng.	hortelã-pimenta	i	lf	syr	460.751	Allergic contact dermatitis (Chang et al. 2005)
Plectranthus barbatus Andrews	boldo	j	st, lf	inf	393.904	nr
Plectranthus grandis (Cramer) R. Willemse	alcachofra	c, j	lf	inf	394.030	nr
Leonurus sibiricus L.	erva-macaé	d, j, n, o	lf	dec	393.949	nr
LEG. CAESALPINOIDEAE						
Bauhinia radiata Vell.	pata-de-vaca	c	lf	dec	394.038	nr
LILIACEAE						
Aloe vera (L.) Burm. f.	babosa	b, k, l, n	lf	in	393.905	Cytotoxic low molecular weight compounds (Avila et al. 1997), gastintestinal disorders and mutagenicity (Alonso, 1998), hepatotoxic (Kanat et al. 2006)

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Table 1 cont. Plants cultivated in the community medicinal garden in Casimiro de Abreu, RJ, Brazil, their medicinal uses, way of preparation, and potential risks to human health.

Family/Species	Common name	Medicinal use	Plant part utilized	Preparation	Voucher	Human Toxicity
LYTHRACEAE						
Cuphea carthagenensis (Jacq.) J.F. Macbr.	sete-sangrias	h	lf	dec	393.932	nr
MALVACEAE						
Gossypium hirsutum L.	algodoeiro	n	lf	dec	393.906	nr
Malachra heptaphylla Saint-Hilaire	malva	n	lf	dec	393.924	nr
Malva sylvestris L.	malva-verdadeira	n	lf	dec, jui	393.957	Safe (Alonso, 1998)
MORACEAE						
Ficus carica L.	figo	i	lf, fr	syr	393.975	nr
Morus nigra L.	amora	a, n	lf, fr	jui, dec, gar	394.940	nr
MYRTACEAE						
Eugenia uniflora L.	pitanga	l, n	lf, fr	dec	459.648	nr
NYCTAGINACEAE						
Mirabilis jalapa L.	maravilha	l, n	lf	in, jui	393.941	nr
PAPAVERACEAE						
Argemone mexicana L.	cardo-santo	j	lf	dec	469.373	Epidemic dropsy, a multi-system toxic disease involving the cardiovascular, hepatic, renal, ocular and other systems, by unintentional seed ingestion (Singh et al. 2006)
PIPERACEAE						
Piper mollicomum Kunth	aperta-rução	d	st, lf	vap	393.640	nr
Pothomorphe umbellata (L.) Miq.	capeba	j, k	lf, fl	dec	393.641	Safe (Barros et al. 2005)
PLANTAGINACEAE						
Plantago major L.	tanchagem	j	lf	dec	393.907	Safe (Alonso, 1998)
POACEAE						
Cymbopogon citratus (DC.) Stapf	capim-cidreira	g	st, lf	dec	393.899	nr
Cymbopogon densiflorus (Steud.) Stapf	cachalao	j	st, lf, fl	dec	393.642	nr
Coix lacryma-jobi L.	lágrima-de-nossa-senhora	k, n	st, lf	inf	393.936	nr
POLYGONACEAE						
Polygonum hydropiperoides Michx.	erva-de-bicho, cata-cataia	d, l	lf	dec, vap	394.040	nr
PUNICACEAE						
Punica granatum L.	romã	n	fr	gar	393.954	Safe up to the dosis of 600mg/kg (Patel et al. 2008), genotoxic (Sánchez-Lamar et al. 2008)
RUBIACEAE						
Chiococca alba (L.) Hitchc.	cura-tombo	l	lf	jui	469.375	nr
SOLANACEAE						
Solanum cernuum Vell.	panacéia	n	lf	dec	393.963	nr
Nicotiana tabacum L.	fumo	a	lf	bat	393.908	Human letal dosis is 1mg/kg of body weight, and gastrintestinal and central nervous system disorders (Alonso, 1998)
VERBENACEAE						
Aloysia gratissima (Gillies & Hook.) Tronc.	alfazema	l	st, lf	dec	469.374	nr
Lippia alba (Mill.) N.E. Br.	erva-cidreira	g	st, lf	dec	393.900	nr
Stachytarpheta cayennensis (Rich.) Vahl	gervão-roxo	i, j	st, lf	syr, inf	393.953	Safe in rodents (Mesia-Vela et al. 2004)
VITACEAE						
Cissus verticillata (L.) Nicolson & C.E.	insulina	c	st, lf	dec	393.919	nr
ZINGIBERACEAE						
Zingiber officinale Roscoe	gengibre	i	ro	inh	393.938	Safe at recommended dosis (Alonso, 1998)
Alpinia zerumbet (Pers.) B.L. Burtt & R.M. Sm.	colônia	c, h, k	lf, fl	inf	393.923	nr

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plant part most used to prepare medications was the leaf (Figure 3).

Among the 80 plant species recognized for their medicinal use, there is still no report on their risks for human health for 41 (51.25%) of them, and for the other one, only 17 species (21.25%) were considered for safe human use in scientific literature. What calls our attention is the fact that 22 (27.50%) of the medicinal plant species listed have already been reported with some kind of human risks of use (Table 1).

Discussion

The observations made in the community garden studied here indicate the importance of the medicinal use for Asteraceae and Lamiaceae over the other plant families. That was also reported by Almeida and Albuquerque (2002) when they examined the commerce of medicinal plant and animal species in one of the most important popular markets in Brazil (the Feira de Caruaru, in the state of Pernambuco). They were able to identify 114 species of plants belonging to 57 families, the most important being Lamiaceae, Leguminosae, Euphorbiaceae, Lauraceae, Asteraceae, and Bignoniaceae.

Likewise, Amorozo (2002), examined the medicinal plants used in a rural community in the state of Mato Grosso, and were able to identify 228 species belonging to 73 families, the most important being Euphorbiaceae, Asteraceae, Leguminosae, Lamiaceae, Poaceae, and Solanaceae. Parente and Rosa (2001) also examined medicinal plants being sold in a small open market in the municipality of Barra do Piraí, Rio de Janeiro, and were able to identify 101 species belonging to 42 families, the most important being Asteraceae, Lamiaceae, Bignoniaceae, Verbenaceae, Solanaceae, and Poaceae.

The study carried out by Almeida and Albuquerque (2002) examined a commercial market for medicinal plants, and the sellers would presumably chose those plants that they sold from a wider spectrum of available plants according to their commercial value and/or according to popular demand, which might even be influenced, in turn, by popular television programs, without any scientific basis. This commercial selection may interfere in the number of illness categories stocked, in contrast to the free medicinal garden under study.

The elevated number of plants indicated for treating respiratory afflictions that were growing in the medicinal garden in this study coincides with the results obtained by Amorozo and Gély (1988) and Almeida and Albuquerque (2002) in the populations they studied.

The role of medicinal plants in traditional medicine has grown significantly in recent decades, and its future growth will require continuous adaptations to the requirements for quality, security and efficiency of modern medicine. This continual evolution of phyto-therapy will necessarily involve doctors, pharmacists, pharmacologists, chemists, botanists and agronomists, among others (Miguel and Miguel 1999). The acceptance and use of phyto-therapy as an alternate therapeutic treatment is supported by the objectives of the World Health Organization in its programs to extend health programs throughout the world. The WHO officially recognized the use of phyto-therapeutic medications in 1978, and recommended the diffusion, on a world level, of information concerning their use (Brasil 2006b).

In 2006, the Brazilian Health Ministry approved a National policy for Medicinal Plants and Phyto-therapeutic Medications that included provisions for proactive measures to improve public health by promoting the security, efficiency and quality of these medications. In an effort to regulate the production and use of phyto-therapeutic medicines, the Brazilian National Agency for Sanitary Vigilance (ANVISA) updated the official norms in 2004 for the registration as phytomedicines. Concerning Brazilian sanitary rules, the folk remedies prepared by Brazilian popular movements, such as the Pastoral for Healthcare, schools and local medicinal gardens are not qualified, however, as medicines, due to the lack of standardization of their raw materials and the extraction processes (Marques and Petrovick 2003).

The medicinal garden's administrator had indicated that the plants may be taken *in natura* for internal and external use, as well as in the form of external baths, gargles. ointments, inhalatories, and vapours, and teas by decoction and infusion, juices, tinctures, and syrups (Chart 1). However, those preparations do not correspond to pharmaceutical requirements. The preparation of extracts for phytomedicines may take the form of alcoholic or water/alcoholic or glycolic extractions. Syrups are prepared for internal use, and contain at least 50% sugar. Conservatives should be added if the sugar concentration is lower (Schulz *et al*. 2002). Medicine oils as usually composed of oils or liquid paraffin containing plant extracts. They may have either internal or external uses. Medicinal teas are infusions prepared from one or more plants; most practitioners restrict these mixtures to 4 to 7 components, at most. The effectiveness of medicinal teas is largely based on empirical evidence, but they continue to be recommended as efficient therapies for many illnesses, as long as they are prepared from medicinal plants with no toxicological risks (Schulz *et al*., 2002).

Considering that for 22 of the medicinal plant species cultivated in that communal garden had been reported some kind of human risk of use, Brazilian Public Health Policies must attempt to it. The preference for the use of medicinal plants over commercially available remedies is in part related to the belief that they provide a more natural and "healthy" treatment, and the herb-seller plays and important role in diagnosing and recommending treatments (see Parente and Rosa 2001). Ibargen (1997) has pointed out the importance of the herbalist's knowledge of medicinal plants, especially in low-income communities where the people have little access to health services.

The lone administrator of the medicinal garden examined in this study plays a similar role, and he is recognized as a secure source of information about which plants to use, how to prepare them, their dosage, and the duration of treatment. It should also be pointed out that this worker has had no formal training in gardening, works without any official orientation or training from any government organ, and there has been no institutional programs developed to pass on his acquired knowledge to future generations.

The results presented here may be useful in educational

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programs by public health officials, designed to preserve and foster traditional knowledge that has unfortunately been eroded by the migration of rural populations to urban areas, making it more difficult to recover information concerning the potential use of native or endemic species of the Atlantic Coastal Forest. The widespread use of non-local or even exotic species by rural communities in this region testifies the loss of this local knowledge and the urgency of trying to rescue it.

As such, any at all initiatives in this direction by the local government or social entities should attempt to follow the guidelines set down by the Brazilian Health System (SUS), mainly because among 80 plant species, 41 species are still completely unknown concerning their risks for human health, and 22 species have some kind of toxic effect.

These guidelines recommend programs and activities designed to provide effective pharmaceutical assistance to all Brazilian citizens, including phyto-therapeutic remedies (Brasil 2006b), and would, at the same time, help increase our understanding of the folk knowledge of these rural populations that is slowly and silently eroding, as well as provide more health opportunities for the poor rural populations.

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