Multifunctional plants used by Quilombolas in the Castainho Community (Garanhuns, Pernambuco, Brazil)

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Research

Abstract

Background: The rich flora of Brazilian biomes includes a potentially high amount of species capable of both nourishing and helping to prevent or treat diseases whose potential is still little explored. This study aims to provide information about the knowledge richness of multifunctional plants among quilombolas, generating information that can be used to improve the quality of life in the rural community of Castainho (Garanhuns, Pernambuco).

Methods: Semi-structured interviews were conducted, associated with guided tours to collect the cited plants. The data obtained were analyzed using the Use value index (UV) for the species and Knowledge richness index (KRI) for the informants.

Results: A total of 52 botany families, 117 genera, and 136 species were catalogued. Most species 47% (64) were used as medicine only, 21% (29) as food only, and 32% (43) were multifunctional plants, the latter being 12 natives to Brazil, 11 naturalized, and 20 exotic cultivated plants whose medicinal and nutritional properties were perceived by the interviewees. The inclusion of species native to Brazil, naturalized species, and exotic, but non-African species in the diet and medicinal flora of the quilombolas of Castainho attests to the cultural and environmental adaptations through which they have gone to survive and diversify their traditions.

Keywords: Ethnobotany; African descendants; Medicinal plants; Food plants; Rural communities; Maroons.

Background

The concomitant use of plant species for food and medicinal purposes has been known since the time of Hippocrates (Etkin & Ross 1982). The regular consumption of these species, especially of fruits and vegetables, can prevent a large number of diseases, as confirmed in investigations conducted during the last decades (Chamorro & Ladio 2020, Gomes & Bandeira 2012, Oliveira *et al.* 2012). Species that have potential health benefits beyond basic nutritional functions are currently treated as "functional foods" (Gibson & Williams 2001).

As a mega-diverse country, Brazil hosts a wide variety of plants that accumulate medicinal and nutritional properties, capable of nourishing and also contributing to the prevention or treatment of diseases. The fruits of

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several native species, such as *Anacardium occidentale* L., or naturalized species, such as *Psidium guajava* L., are not only tasty and frequently consumed as food but are also proven sources of micronutrients and bioactive compounds that can have beneficial effects on health because of their antioxidant, anti-inflammatory, antimicrobial, hepatoprotective properties, among many others (Aguiar *et al.* 2021, Infante *et al.* 2016, Lazarini *et al.* 2018).

In the lists of species produced during ethnobotanical studies in traditional, rural, and urban communities from different regions of Brazil, the medicinal use of plants stands out, followed by food use, but these two categories of use are, in most cases, presented and discussed separately. In more recent works, the use of multifunctional plants, that is, those that have a dual function, such as "functional foods", a term designated for foods with therapeutic function, has been gaining importance because these foods help consumers to maintain a healthier life (Alarcón *et al.* 2015, Chamorro & Ladio 2020, Infante *et al.* 2016, Lazarini *et al.* 2018).

Research on the potential of multifunctional plants can, for example, encourage public policies related to the conservation of diversity and enhancement of native or naturalized flora (Lazarini *et al.* 2018, Santos *et al.* 2014). Furthermore, a broad and well-founded knowledge about the availability and use of multifunctional plants in different Brazilian communities can contribute for better sustainable use of these species.

From a socio-cultural point of view, deepening the knowledge about multifunctional plants allows us to understand the dynamics related to the use of plants that occur internally in traditional communities. Studying these dynamics can shed light on the potentially distinct roles played by women and men in these communities pertaining to their skills and knowledge in relation to the uses of multifunctional plants, thus contributing to the documentation of these cultural understandings and practices. It also contributes to other studies aimed at ensuring the proper use of these resources, seeking policies that support traditional practices, in order to improve the quality of life and empower these populations (Albuquerque *et al.* 2020).

Quilombola communities are traditional peoples of Brazil descending from Africans of different ethnicities who were brought between the 16th and 19th centuries to work as slaves in rural and urban properties in all regions of Brazil. Currently, around 100 thousand families in approximately 4 thousand communities are found throughout the regions of the country, mainly concentrated in the Northeast (ca. 70%), especially in Bahia and Maranhão, but also with a significant concentration of quilombos in Minas Gerais and Pernambuco (CPISP, 2021). These Afro-descendant communities share unique cultural characteristics and historical trajectories, and they all have extensive knowledge associated with the use of plants, especially due to the relationship of dependence on a subsistence basis (Diegues & Viana 2004, Lisboa 2017, Pasa *et al.* 2019, Pinto *et al.* 2006).

Ethnobotanical research carried out in quilombola communities have recorded plant species mentioned in more than one use category, including food and medicine. Despite the importance of this knowledge, its loss due to lack of interest in transmission has been reported by several authors (Almeida & Bandeira 2010, Avila *et al.* 2015, Crepaldi & Peixoto 2009, Franco & Barros 2005, Pereira & Coelho-Ferreira 2017, Silva *et al.* 2012).

Thus, the aim of this study was to evaluate the knowledge richness of food and medicinal plants in the Castainho quilombola community, in Garanhuns, Agreste of Pernambuco. Specifically, we sought to identify the food and medicinal plants used, analyze the sociocultural characteristics, relate the age and sex of the interviewed residents to the ethnobotanical information provided by them, and identify which plants are characterized as multifunctional. The hypothesis tested is that the population associates the use of the plants as food with the therapeutic action attributed to them. By identifying the relationships of the population with multifunctional species it is expected that the results of this study contribute to the improvement of people's quality of life and to expand the studies on quilombola populations.

Materials and Methods

Study area

The Castainho community lives in the rural area of the municipality of Garanhuns, in the Agreste region of the state of Pernambuco (Fig.1), which is a zone with transitional vegetation between the Atlantic Forest and the Caatinga (Seasonally Dry Forest), on the Borborema Plateau, 896 meters above sea level (Silva 2013).

According to the booklet produced by the Land Pastoral Commission (CPT 2013), the Castainho community is made up of 350 families, descendants of African slaves who survived the Palmares war, when the most famous

quilombo in the history of Brazil was destroyed (Silva 2013). The main economic activity is family farming, mainly the cultivation of cassava, beans, corn, sweet potatoes, fruit trees and vegetables. There is also local marketing of cassava and its derivatives, such as flour and gum (Santos 2010, Silva 2013).

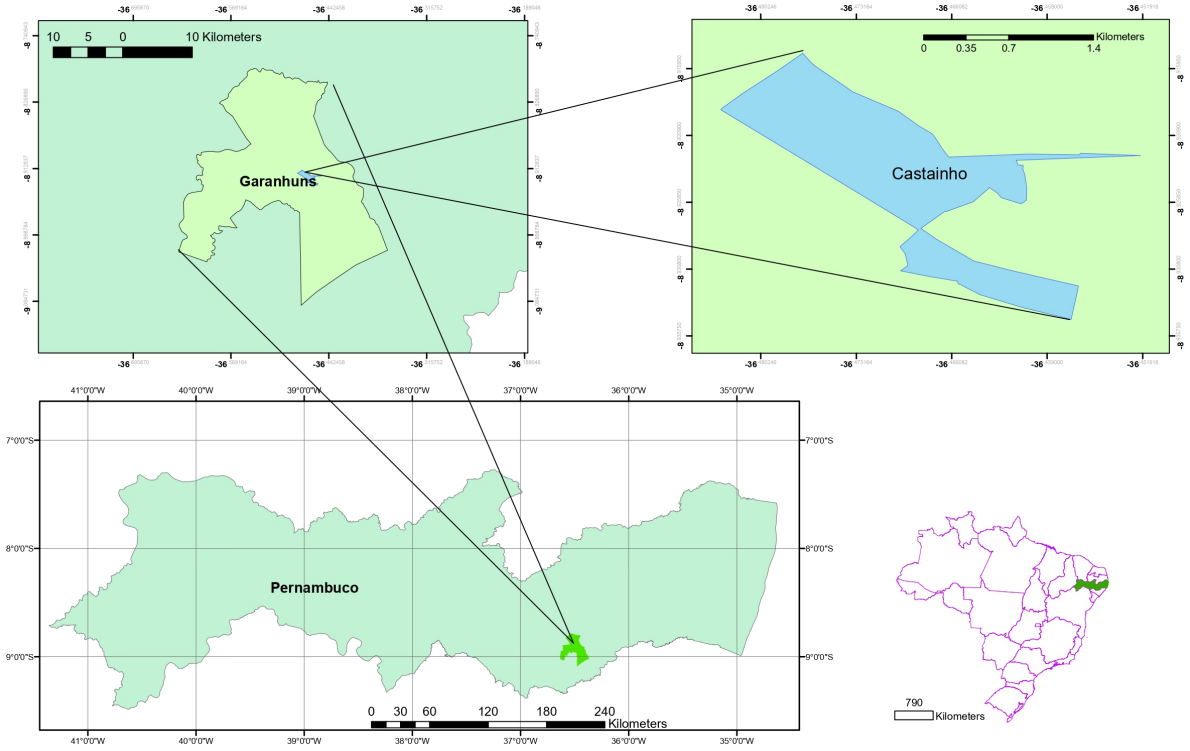

Figure 1. Map of Pernambuco state showing the location of the study area, Castainho quilombola community, Garanhuns.

Castainho began in the 17th century and was the first community recognized by the Foundation Palmares as a remnant of Quilombo, in the state of Pernambuco (Santos 2010). The final titling was received on November 20, 2015, on an area of 38.2367 hectares, destined for various projects (Mélo 2018).

Data collection

This study was evaluated and approved by the Research Ethics Committee of the University of Pernambuco - UPE (CAAE: 96751118.00000.5207) and registered under No. A0FD50E in the National System for the Management of Genetic Heritage and Associated Traditional Knowledge (SISGEN).

Semi-structured interviews were carried out with informants over 18 years of age who were at home at the time of the visit and who agreed to participate in the study. During the interview, the informed consent form was read for each interviewee and his or her signature was requested. The informants - 20 men and 43 women - were asked about the medicinal and food plants they used, the parts of the plant used and the way they obtain them, modes of preparation and use, frequency of use, and availability of the resource.

Botanical material and taxonomic determination

All species cited by the interviewees were registered in a field diary and photographed. Species which were not cultivated or were uncommon were collected. The collected samples were pressed in the field and taken to drying in an oven for later identification and confirmation by specialists.

The species were identified using botanical identification keys, descriptions, and illustrations available in the literature (Lorenzi 2008, Maia *et al.* 2020, Vieira *et al.* 2018). Due to the fact that herbaria and museums have been closed due to the pandemic, the collected plants were also compared with existing exsiccates in virtual collections available on the Specieslink website (https://specieslink.net/) and in the Field Museum field guides (https://www.fieldmuseum.org/). The APG IV (Angiosperm Phylogeny Group) system was adopted for classifying families

and genera. To check spelling, eliminate the use of synonyms, and ensure uniform nomenclature, all binomials were checked using the Taxonomic Name Resolution Service - TNRS (https://www.gbif.org/tool/81741/taxonomic-name-resolution- service-tnrs). The Flora do Brasil (2020) - Reflora (http://floradobrasil.jbrj.gov.br/reflora/) was used to check if the species was native to Brazil, exotic or naturalized.

Data analysis

The study focused only on multifunctional plants, that is, those used simultaneously as food and medicine. The information was stored in a database (Microsoft Excel 2010 software) to be analyzed through indices. The Mann-Whitney U test was used to identify differences in the species cited between men and women (Ayres *et al.* 2007).

Likewise, in order to achieve the objectives established in the study, ethnobotanical indices were used as a quantitative tool to measure the knowledge that the interviewees have about plants for medicinal and food use, as well as how to identify the most important useful plants for the community, whether as food, medicine or both.

Knowledge richness index (KRI)

This index refers to the richness of knowledge that an informant has about the possibilities of using plants in his community (Camacho 2011).

$$KRI = \sum US/\text{Maximum US value}$$

Where,

KRI = Knowledge richness of useful species that an informant has in relation to all useful species found in the community.

US = number of useful species reported by an informant.

Maximum US value = total number of useful species reported in the community by all users participating in the study.

The value of this index varies between 0 and 1, and 1 is the maximum knowledge of useful plants in the community.

Use value index (UV)

The use value (UV) index shows the importance of each species among all the species mentioned by the informants. The UV index of each species was determined by the formula below (Rossato *et al.* 1999).

$$UV=\sum Ui/n$$

Where,

Ui = number of uses mentioned by each informant.

n = total number of informants.

Results and Discussion

Socio-cultural characteristics

Sixty-three people were interviewed, being 20 men (32%) and 43 women (68%), aged between 24 and 91 years (mean 50 years; standard deviation 15). Adult (65%) and elderly (32%) people were the most representative age groups, while young people represented only 3% of the total number of informants (Table 1).

According to data obtained from the interviews and information from Silva (2013), most of the informants were descendants of Quilombo dos Palmares and have been in the community since they were born. There were reports of only two women from neighboring municipalities who married native men and moved to the community when adults (Table 1).

The land was divided per family, who had freedom to cultivate or build houses for their descendants, and it was in this way that the groups that are currently distributed in the community were formed. Some agroforestry yards, where species were cultivated for different purposes, were registered, mainly including food, medicinal and ornamental plants. The quilombola people also shared common spaces for the planting of some monocultures, such as corn, beans, and cassava. Plants were grown for family consumption and subsistence or sold at street markets in nearby neighborhoods.

In Castainho's family groups, as the children and grandchildren marry, they occupy the spaces in the common area; these young couples generally do not cultivate plants and show complete disinterest in this activity. During the

search for informants for interviews, abstinence was 67% in this age group and only two young people interviewed reported using plants as food or medicine, which they obtain from their parents' or grandparents' backyards. Others reported that when they get sick, with symptoms such as coughing, flu or an infection, they ask their parents or grandparents to prepare some herbal medicine, because they do not know how to prepare it.

Table 1. Sociocultural characteristics of the informants, residents of the Castainho quilombola community (Garanhuns, Pernambuco).

Variable	Category	Men		Women	
		Number of informants	(%)	Number of informants	(%)
Age group (years)	24 -34	4	20	7	16
	35-44	3	15	7	16
	45-54	3	15	13	30
	55- 64	3	15	11	26
	65-74	5	25	5	12
	75-84	0	0	0	0
	85-94	2	10	0	0
Main occupation	Housewife	0	0	26	60
	Farmer	12	60	10	23
	Retired	7	35	6	14
	Student	1	5	1	2
Time of residence	Whole life	20	100	41	95
	Recently	0	0	2	5

The lack of knowledge about the use of plants and the lack of interest in learning this subject among younger generations is a cause for concern because it compromises the vertical transmission of knowledge in the Castainho community, one of the most well-known remaining quilombos in Northeastern Brazil. The disinterest of young people in acquiring knowledge on the use of useful plants has also been observed in other quilombola communities, such as Olho d'Água dos Pires, in which case anthropogenic changes caused by new forms of land use were pointed out as the underlying reason (Franco & Barros 2005).

Some authors have highlighted the lack of interest of young people in maintaining traditional knowledge about the use of plants, which is a cause of concern, and suggested the urgent need to carry out a project to 'rescue' traditional knowledge with the new generations so as to avoid further erosion (Franco & Barros 2005, Nascimento & Conceição 2011). The issue of erosion of traditional knowledge has been the subject of ethnobiological research which points to the fact that changes in lifestyle caused by socioeconomic and cultural factors or by changes in landscape units, such as forest fragmentation, have led to the disuse of traditional practices (Reyes-García *et al.* 2005, Zuchiwschi *et al.* 2010). In the case of Castainho, older people claim that urban expansion boosted the occupation of neighboring areas to build houses, and this caused deforestation, leading to the loss of biodiversity and bringing the community closer to urban center, which ultimately led to changes in habits, especially among younger people. For example, men prefer salaried jobs such as construction work, local commerce or follow technical studies, leaving behind the activities of agriculture and maintenance of orchards. Likewise, adults point out that young people have acquired vices such as alcoholism and drug addiction, a pattern that did not occur years ago.

In the analysis of the relationship of knowledge with gender, shown in Table 2, the number of species mentioned by men and women differed: adult and elderly women were the ones who identified the greater number of plants and described how they used them as food, medicine or both. Considering the difference between the number of women and men interviewed (43 and 20, respectively) and age groups, the mean number of citations were compared using the Mann-Whitney test and it was found that there were no significant differences between the genders and between age groups of respondents ($p > 0.05$).

The results obtained in the present work indicate that in the Castainho community, the levels of knowledge about medicinal and food plants were similar between men and women, different from several investigations that highlight the differentiated knowledge about useful plant resources between these groups, mainly due to the environments where they develop their main activities (Araújo *et al.* 2012, Begossi *et al.* 2000, Medina & Corona 2011, Voeks 2007).

Table 2. Differences in the number of plant species cited for medicinal and food uses between genders and age groups of inhabitants of the Castainho quilombola community (Garanhuns, Pernambuco).

Age group	Gender/number	Cited species (n)		
		Food	Medicine	Multifunctional
Young people (≤ 25)	Men /1	0	6	0
	Women/1	3	0	0
Adults (25 to 60)	Men/11	20	33	14
	Women/30	21	55	24
Elderly people (≥ 60)	Men/8	6	38	16
	Women/12	28	60	36

Knowledge richness

According to some authors, such as Medina & Corona (2011) and Araújo *et al.* (2012), knowledge about plant resources is not homogeneously distributed in human communities: it is concentrated on certain age groups and genders, depending on the category of use. This heterogeneity among members of the same community can be associated with different factors, such as levels of specialization, types of socioeconomic activities, cultural bonds with nature, availability of resources, and the roles and functions of the informants in the family group (Ghimire *et al.* 2004, Medina & Corona 2011).

In the Castainho community, the richness index values, regarding the knowledge associated with medicinal and food plants, differed between age groups. The mean value (KRI = 0.12) was probably influenced by the fact that some interviewees had little knowledge about the plants, although the richness reached a maximum value of 0.35, indicating that the informant knew 35% of the total of 136 species cited as medicinal and/or food plants by all respondents.

As for age groups (Table 3), the highest knowledge richness index values were found among adult and elderly informants. This reflects how people relate to their natural environment throughout life. The relationship of use of plants in this age group is also stronger because this is a generation of parents and children who still consider it important to use of plants as a food and healing alternative. The concentration of knowledge about useful species among the interviewed residents may represent a risk for the conservation of the original culture of the Castainho quilombola community, as pointed out by Albuquerque *et al.* (2020) and Camacho (2011).

Table 3. Knowledge richness index (KRI) of food and medicinal plants by age group among informants of the Castainho quilombola community (Garanhuns, Pernambuco).

Age group (years)	Nº plants (mean)	KRI (mean)
Young people (< 25)	5	0.03
Adults (25 to 60)	14	0.10
Elderly people (> 60)	20	0.15

The transmission of knowledge about the use of plants across generations in traditional communities is the most practical and economical way available to treat health problems (Pasa *et al.* 2019). In Castainho, although part of the population still uses medicinal plants to treat diseases, adults and elderly respondents highlighted that their children and grandchildren have no interest in learning or knowing more about the plants and this explains the fact that the few young people who accepted to be interviewed have almost no knowledge associated with plants, which can lead to loss related to the local medicinal flora.

Another important factor is the destruction of forests and the subdivision of lands in the quilombo, which have reduced the spaces previously occupied by plant species used as food and for the treatment of diseases by the quilombolas.

The identification and use of food plants is lower compared to medicinal plants among different age groups and genders, which may indicate that there is less specialization of informants and perhaps lack of interest in gaining and preserving this knowledge.

Multifunctional plants

Among the 136 species of plants considered useful by the interviewees, almost half (47%) were used solely for medicinal purposes and 21% were used only as food. The 43 multifunctional species mentioned by participants corresponded to 32% of the total and were locally known for their medicinal and nutritional properties. Table 4 presents the family, scientific name, local name, part used, and respective use values as food and medicine of each multifunctional species.

Table 4. Multifunctional plants used in the Castainho quilombola community (Garanhuns, Pernambuco).

Family/Species	Popular name	Part used		Origin	UV (M)	UV (F)	UV (M*)
		Medicinal	Food				
Amaranthaceae							
Dysphania ambrosioides L.	**mastruz**[a]	L	L	Naturalized	**0.33**	0	0.02
Anacardium occidentale L.	**cashew tree**	L, B	Fr	Native	**0.22**	**0.25**	**0.10**
Anacardiaceae							
Spondias purpurea L.	**siriguela**	L, Fr	Fr	Cultivated	0.03	0.16	0.02
Mangifera indica L.	**mango**	L	Fr	Cultivada	0.06	**0.44**	0.06
Annonaceae							
Annona muricata L.	**soursop**	L	Fr	Cultivated	0.05	0.17	0
Annona squamosa L.	**sugar apple**	L	Fr	Cultivated	0.02	0.13	0
Apiaceae							
Coriandrum sativum L.	**coriander**	Wp	L	Naturalized	0.02	0.1	0.02
Pimpinella anisum L.	**anise**	L	L	Cultivated	0.06	0	0.05
Arecaceae							
Cocos nucifera L.	**coconut**	O	Fr	Naturalized	0.02	0.08	0
Brassicaceae							
Brassica oleracea L.	**cabbage**	L	L	Cultivated	0.02	0.05	0
Bromeliaceae							
Ananas comosus (L.) Merr.	**pineapple**	Fr, O	Fr	Native	0.11	0	0.03
Cactaceae							
Cereus jamacaru DC.	**mandacaru**	B	Fr	Native	0.08	0.02	0.02
Opuntia ficus-indica (L.) Mill.	**palm**	B	Fr	Naturalized	0	0.02	0.02
Caricaceae							
Carica papaya L.	**papaya**	Fr, L, Fl	Fr	Naturalized	0.05	**0.22**	**0.10**
Cucurbitaceae							
Sechium edule (Jacq.) Sw.	**chayote**	L	Fr	Cultivated	0.02	0.02	0.08
Momordica charantia L.	**melão de são caetano**[a]	L, Fr, S, Wp	Fr	Naturalized	0.11	0.03	0
Euphorbiaceae							
Manihot esculenta Crantz	**cassava**	L	R	Native	0.05	0.11	0.02
Fabaceae							
Cajanus cajan (L.) Millsp.	**pigeonpea**	S, B	S	Naturalized	0.02	0.1	0.02
Hymenaea stigonocarpa Hayne	**jatobá**[a]	B	Fr	Native	0.02	0.02	0
Lamiaceae							
Rosmarinus officinalis L.	**rosemary**	L	L	Naturalized	**0.25**	0.02	0.02
Plectranthus amboinicus (Lour) Spreng.	**indian borage**	L	L	Cultivated	**0.49**	0.02	0.03
Ocimum basilicum L.	**common basil**	L	L	Cultivated	0.21	0.03	0.05
Lauraceae							
Persea americana Mill.	**avocado**	L, Fr	Fr	Naturalized	0.1	0.19	**0.14**
Malpighiaceae							
Malpighia emarginata DC.	**acerola cherry**	L, Fr	Fr	Cultivated	0.05	0.14	0.05
Moraceae							
Morus nigra L.	**black berry**	L, Fr	Fr	Cultivated	0.16	0.02	0
Musaceae							
Musa × paradisiaca L.	**banana**	L	Fr	Cultivated	0	**0.27**	0.08

Myrtaceae							
Psidium cattleyanum Sabine	**araçá**[a]	L	Fr	Native	0	0.05	0.06
Psidium guajava L.	**common guava**	L	Fr	Naturalized	0.17	0.16	0.08
Plinia cauliflora (Mart.) Kausel	**jabuticaba**[a]	L, B	Fr	Native	0.02	0.03	0.02
Eugenia brasiliensis Lam.	**grumixama**	L	Fr	Native	0.08	0.11	**0.11**
Syzygium sp.	**azeitona**[a]	L	Fr	Naturalized	0.03	0.05	0.00
Olacaceae							
Ximenia americana L.	**wild plum**	B	Fr	Native	0	0	0.02
Passifloraceae							
Passiflora edulis Sims	**passion fruit**	L, Fl, Fr*	Fr	Native	0.02	0.03	0.08
Poaceae							
Saccharum officinarum L.	**sugar cane**	Fl, Cu	Cu	Cultivated	0.13	0.03	0.02
Cymbopogon citratus (DC) Stapf.	**lemon grass**	L, Wp	L	Naturalized	**0.63**	0.03	0
Zea mays L.	**corn**	L, O	S	Cultivated	0.06	0.05	0.02
Punicaceae							
Punica granatum L.	**pomegranate**	L, Fr*	Fr	Cultivated	0.11	0	0.03
Rosaceae							
Fragaria vesca L.	**wild strawberry**	Fr	Fr	Cultivated	0.02	0.02	0
Rubiaceae							
Coffea arabica L.	**coffee**	L	S	Cultivated	0.02	0.05	0
Rutaceae							
Citrus sinensis (L.) Osbeck	**orange**	L	Fr	Cultivated	0.13	**0.25**	**0.10**
Citrus × limon (L.) Osbeck	**lemon**	L, Fr	Fr	Cultivated	0.1	0.13	0.05
Solanaceae							
Solanum paniculatum L.	**jurubeba**	L	Fr	Native	0.02	0.02	0
Verbenaceae							
Lippia alba (Mill.) N.E Br.	**brazilian false melissa**	L	L	Native	**0.60**	0.02	0.02

Part used: L: leaf; Fl: flower; Fr: fruit; Fr*: fruit peel; R: root; St: stem; S: seed; Wp: whole plant; B: bark; Cu: culm; O: other. M: medicine. F: food. UV (M): use value index as medicinal plant; UV (F): use value index as food; and UV (M*): use value index as multifunctional species. Bold numbers are the highest values for UV.

Among the multifunctional plants mentioned by the inhabitants of the Castainho community are *Eugenia brasiliensis* Lam. (**grumixama**), *Momordica charantia* L. (‘**melão de são caetano’**) and *Opuntia ficus-indica* L. (**palma**). The strong therapeutic and nutritional potential of these species is possibly due to the phenolic compounds, vitamins, fibers, and anthocyanins present in their fruits, greatly relevant for health maintenance due to their antioxidant and anti-inflammatory properties (Infante *et al*. 2016, Lazarini *et al*. 2018, Chamorro & Ladio 2020). The content of these compounds in the fruits of these plants make them promise for the functional food industry, providing benefits to consumers, including the prevention and treatment of some diseases (Bohlin *et al*. 2010).

According to the data obtained in the interviews in the Castainho community, the use values of medicinal and food plants were different (Table 4). The species with the highest use values as medicinal plants were *C. citratus*, *L. alba, P. amboinicus, D. ambrosioides* , and *R. officinalis*, ranging from 0.63 to 0.25; the ones with the highest use values as food plants were *M. indica*, *M. × paradisiaca*, *A. occidentale*, *C. sinensis*, and *C. papaya*, with values ranging from 0.44 to 0.22; and the ones with the highest use values (0.14 to 0.10) as multifunctional plants were *P. americana*, *E. brasiliensis*, *A. occidentale*, *C. sinensis,* and *C. papaya* (Table 4). These multifunctional species are most notable for their use and are recognized for their dual functionality, since the consumption of these fruits and leaves provide not only energy as food, but also benefits for the prevention or cure of diseases (Lazarini *et al.* 2018). These health benefits are attributed to its characteristics, mainly the high content of dietary fiber, low content of fat, vitamins and minerals. Also, these multifunctional species were commonly found in backyards and had different harvest seasons, but they were always easily accessible for consumption as food, medicinal teas or other forms of preparation for medicinal use. Similar medicinal or food use values have been recorded for these species in other Brazilian communities, such as the quilombolas from Ipiranga, in Paraíba, and the Casinhas community, in Jeremoabo, Northeastern Bahia (Beltreschi *et al*. 2019, Gomes & Bandeira 2012).

Native tree species such as *H. stigonocarpa* and *X. americana*, not commonly found near homes, were cited for medicinal (stem bark) and food (fruit) use but had low use values (Table 4). The inclusion of native species such as *A. occidentale*, *E. brasiliensis*, *H. stigonocarpa*, and *X. americana* in the diet and medicinal flora of quilombolas attests to the cultural and environmental adaptations through which these Afro-descendants have gone to survive and diversify their traditions, in the same way that exotic flora has also been incorporated among them and in other Brazilian communities (Albuquerque 2001, Pasa *et al.* 2019).

The set of information obtained from the community associated with its history showed that, despite the reduction of spaces previously occupied by plant species, the residents of Castainho still use a variety of medicinal and food plants because they grow these plants in their backyards.

The 43 multifunctional species registered in the Castainho community were used mainly as food (67%), and the fruits were the most used parts. Leaves were the organs most often used for medicinal preparations (47%), but other parts of the plants (37%) were also used for medicinal purposes (Table 4). Although the listed species were used as food and medicinal products, the same part of the plant had dual functions in the case of 19 of them (43%), predominantly the fruits (21%) and the leaves (18%).

Fruits stood out as the part of the plant most used simultaneously as food and medicine. For example, *C. papaya* fruits were used as a laxative and those of *C. x limon* and *M. emarginata* were widely used to fight the flu and other viral infections. These and other species, such as *A. comosus*, *M. nigra*, *P. americana*, and *S. purpurea*, were cultivated in backyards and also sold in popular fairs and supermarkets.

The medicinal and food use of the abovementioned species is not exclusive to the inhabitants of the Castainho community or to the Quilombola peoples, but it is noteworthy that *M. charantia* - well known for its medicinal properties but rarely mentioned among food plants - was cited by the interviewees in the present study. Research carried out with this species has shown that the fruits contain a significant amount of nutrients and appreciable energy value, in addition to widely known medicinal properties (Kubola & Siriamornpun 2008).

The leaves of some of the species mentioned, such as *D. ambrosioides, O. basilicum*, *P. amboinicus*, and *R. officinalis*, are prepared as teas and used in the treatment of various diseases. Due to their aromatic properties, they are used as seasonings in the cuisine of the quilombolas of Castainho. In addition to giving flavor and aroma to cooked dishes, the essential oils present in these leaves have antimicrobial properties and contribute to extending the shelf life of foods (Al Zuhairi *et al.* 2020, Iannarelli *et al.* 2018).

The consumption of vegetables and legumes is not only confirmedly effective in the treatment of diseases but also contributes to the promotion of good eating habits, better health, and higher quality of life (Bezerra *et al.* 2019, Guerra *et al.* 2007). In the Castainho community, the leaves of *B. oleracea* are consumed as a vegetable and are also used to treat gastritis problems, and those of *L. alba* and *C. citratus* are used to make teas, consumed as substitutes for coffee and also indicated as analgesics and remedies for stomach pains.

Seeds were of low importance regarding dual use in the Castainho community. An exception was the seeds of *C. cajan*, which are consumed as food when roasted and used as a beverage to replace coffee and consumed as medicine when indicated for the treatment of throat problems. In other communities, such as the quilombolas of Olho d'Água do Raposo, in Maranhão, and of Helvécia, in the extreme south of Bahia, seeds are used to treat problems in the gums and to treat people who have had a stroke (Mota & Dias 2012, Nascimento & Conceição 2011). The high protein and fiber content in the seeds of this species was reported by (Saxena *et al.* 2010), considered of high nutritional value, and (Paixão *et al.* 2014) reported that they contain compounds with antioxidant, antibacterial, and antispasmodic properties.

Conclusions

The results of this research reinforce the importance of the knowledge associated with multifunctional plants used as food and treatment of children 's illnesses, especially given the situation of social vulnerability existing in the quilombola population. Some species in the community are used simultaneously for their medicinal and food uses, and thus have the potential to both combat food insecurity and help prevent certain diseases. And for all the practical questions, knowing and valuing this knowledge provides information on the cultural relations of use and/or potential of the flora.

Another relevant aspect of the results pertains to the concentration of knowledge in the population of adults and the elderly. The number of young people without interest in the traditional practice and knowledge of the use of plants seems to be an indication of lifestyle changes due to the urbanization process, to the destruction of forests and to the parceling out of community lands experienced locally.

In general, the locally important species are those in continuous use by the majority of the community with nutritional and medicinal functions. Therefore, attention to this type of research is necessary, since it addresses questions that directly impact the quality of life of human populations.

Declarations

List of abbreviations: Not applicable

Ethics approval and consent to participate: This study was evaluated and approved by the Research Ethics Committee of the University of Pernambuco - UPE (CAAE: 96751118.00000.5207). All participants were asked for their Prior Informed Consent before launching of interviews. Registered under No. A0FD50E in the National System for the Management of Genetic Heritage and Associated Traditional Knowledge (SISGEN).

Consent for publication: Not applicable.

Availability of data and materials: All the data presented in figures and tables of the present manuscript are available with the corresponding author.

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Authors' contributions: Conceived and designed the experiments: MPD, ATN, AFMO, LHCA; performed the experiments: MPD, ATN; analyzed the data: MPD, ATN, AFMO, LHCA; wrote the paper: MPD, ATN, AFMO, LHCA. All authors critically revised the manuscript and approved the final manuscript.

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