FOOD FOR COLLECTIVES
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Unconventional food plants: sustainability in a university restaurant

Plantas alimentícias não convencionais: sustentabilidade em um restaurante universitário

Abstract

Introduction: Unconventional food plants (UFP) are a group of edible plants, often unknown to the population, which can be native or introduced into the Brazilian territory and present themselves as a possibility of sustainable consumption. ***Objective:*** This study aimed to analyze UFP production and consumption as a sustainable menu alternative in a university restaurant (UR) in the State of Rio de Janeiro. ***Method:*** A quali-quantitative, descriptive, exploratory and propositional research was conducted with application of questionnaires to farmers who grow UFP, to managers and users of the UR studied. ***Results:*** The farmers interviewed grow 19 types of UFP, and their cultivation is simple; however, the seasonality and yield vary according to the type of UFP. In addition, the managers of the UR find it possible to introduce UFP on the menu of the UR, if acceptability test applied to users. Furthermore, 81.22% of the users reported knowing at least one type of UFP and 91.7% said they would consume them if they were introduced in the menu. UFP production of the farmers interviewed was insufficient to meet the daily per capita consumption of vegetables used in the UR. ***Conclusion***: However, it is suggested the possibility of introducing the UFP as an ingredient in food preparation of the menu of the studied UR.

Keywords: Unconventional Food Plants. Sustainability. Food and Nutrition Units. University Restaurant.

Resumo

Introdução: As plantas alimentícias não convencionais (PANC) são plantas comestíveis, muitas vezes desconhecidas, que podem ser nativas ou introduzidas no território brasileiro e apresentam-se como uma possibilidade de consumo sustentável. ***Objetivo:*** Analisar a produção e o consumo de PANC como uma alternativa sustentável de cardápio em um restaurante universitário (RU) no Estado do Rio de Janeiro. ***Método:*** Foi realizada uma pesquisa quali-quantitativa, descritiva, exploratória e propositiva com aplicação de questionários aos agricultores que cultivam PANC, aos gestores e usuários do RU estudado. ***Resultados:*** Os agricultores entrevistados cultivam 19 tipos de PANC, de cultivo simples, mas de sazonalidade e rendimento variável. Os gestores do RU responderam que seria possível a introdução de PANC no cardápio do RU, desde que sejam realizados testes de aceitabilidade com os usuários. 81,22% dos usuários do RU relataram conhecer ao menos um tipo de PANC e 91,7% responderam consumi-las, caso fossem introduzidas no cardápio. ***Conclusão:*** A produção de PANC dos agricultores entrevistados possibilitaria a inclusão de PANC como ingrediente nas preparações alimentares do cardápio do RU estudado.

Palavras-chave: Plantas Alimentícias Não Convencionais. Sustentabilidade. Unidade de Alimentação e Nutrição. Restaurante Universitário.

INTRODUCTION

It is believed that the current pattern of food production and consumption in the world cannot be sustained due to the imminent depletion of natural resources, associated with the slow ability of ecosystems to recover from recurring environmental aggressions.[1] Because of this, discussions have been stimulated on a global scale on the need for sustainable development models.[2-4]

The concept of sustainability first emerged through in 1987, created by the World Commission on Environment and Development, which defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".[5]

In 2015, the United Nations (UN) created the Sustainable Development Goals (SDGs), a collection of 17 global goals to be achieved by the year 2030. It is worth mentioning goal 2 (SDG2), which involves eradicating hunger, achieving food security, improving nutrition, and promoting sustainable agriculture.[6]

The food and nutrition units or food service, also represented by the university restaurants (UR), aim to offer nutritious and safe meals to the population. However, the eating habits acquired by the accelerated lifestyle, especially in large urban centers, associated with the increase in the consumption of ultra-processed foods to the detriment of preparations based on in natura and minimally processed foods, contributed to the reduction of dietary diversity in the diet.[7]

Unconventional food plants (UFP) have proven to be a sustainable alternative for human nutrition, as a strategy to reduce food monotony, protect biodiversity, and institute agriculture with less environmental impact. UFP are considered as a group of edible plants that can be native or introduced, cultivated, or born spontaneously in any territory, but are not part of the traditional production chain and the daily diet of a large part of the population.[8]

This work aimed to analyze the production and consumption of unconventional food plants, as a sustainable alternative menu in a university restaurant in the State of Rio de Janeiro.

Agrifood system in Brazil

Brazil is one of the countries with great agricultural potential that has developed technologically over the years to meet the growing population.[9]

In 2017, the Agricultural Census revealed that mechanization of the field increased by 50%, accompanied by a 48% increase in irrigated areas and a total of 1,681,740 establishments using pesticides.[10] Currently, it is also possible to observe the increase in cases of intoxication, whether in an acute form or in a chronic form.[11,12]

It becomes necessary to reflect on the excessive use of pesticides, considering that, since the beginning of the current government (2019), a record registration of 1,229 new products has been approved in the country's history until April 2021, of which approximately one third are banned in the European Union, due to damage to health and the environment. Currently, around 3,424 pesticides are marketed in Brazil, which ranks 1st in the world in terms of consumption.[13,14]

As well as agriculture, cattle breeding is one of the main economic activities in Brazil.[15] However, cattle farming is pointed out for contributing significantly to the emission of methane, one of the main greenhouse gases, through digestion and animal waste. Deforestation is strongly associated with cattle ranching. This trend is reinforced by the growth in demand for meat in the domestic and international markets. To be

effective in reducing deforestation rates, public policies must therefore act on the underlying causes of deforestation, reducing the forces that lead to its expansion on the area where it occurs.[16-18]

The current production model also promotes the occurrence of zoonosis, which, associated with the growing food insecurity in the country in recent years, generates not only an increase in malnutrition, but also obesity and chronic diseases, making the population even more vulnerable to syndemics (term that relates synergy and pandemic concepts and consists of the worsening of a clinical picture by the interaction of two or more diseases).[19]

Collective food and sustainability

The area of Collective Food appeared in Brazil during the adoption of labor policies, with the creation of popular restaurants in the main cities of the country.[20] It was estimated that by 2020 the supply of meals per day in the country will be around 18 million, with an upward trend.[21]

The food service have challenges facing sustainability in their meal production process, such as food monotony observed in individual choices, which reflects in a low consumption of vegetables in general. The food provided must act to satiate and offer the nutrients necessary to promote and maintain the user's health through attractive, healthy, and palatable preparations, based preferably on seasonal and agroecological foods.[7]

Food services collaborate directly with food waste in the country. The losses and waste in the sector vary according to the type of service and are observed in all stages of production.[22] The production of meals use resources such as water, soil, electricity, and fossil fuels, indispensable to food production and also reduce the global and local availability of food, reduce resources for producers, and increase prices for consumers, in addition to contributing to the generation organic waste, which when discarded cause a negative environmental impact and attracts and favoring the proliferation of disease vectors.[23-25]

At the same time that Brazil is one of the 10 most food-wasting countries in the world, in 2018, some 10 million people lived in conditions of severe food insecurity.[26]

In this sense, it is observed the possibility that UR are places capable of promoting discussions and innovations regarding the field of Collective Food, supported by the principles of sustainability, appreciation of family farming and agro-ecology, and the guarantee of the right to proper and safe food to all individuals.[27,28]

Unconventional food plants (UFP)

UFP are popularly identified as bushes or weeds, because they grow easily in nature and can be found in various cultivated areas, such as squares, roadsides, and vacant lots.[29] The presence of adaptive and resistance mechanisms ensures their survival in hostile environmental conditions.[30-32]

The UFP have one or more edible parts, such as roots, tubers, bulbs, rhizomes, stems, leaves, sprouts, flowers, fruits, and seeds, and can be used in culinary preparations.[8] They also include part of the popularly traded foods that have food potential but are usually discarded, such as sweet potato leaves, the heart or navel of the banana tree, and the green jackfruit and its nuts, for example.[32]

Currently, the consumption of this group of plants is, in a large part of the national territory, limited to family farmers, riverside populations, quilombola communities, and indigenous people. However, it has

already been part of the food base of other populations in the past, a habit that has been neglected especially in the big cities, due to the lack of information and incentive to consumption.[33]

Although belatedly explored by part of the scientific community, current biochemical analyses indicate not only the safety of its use, but also its rich nutritional composition and its therapeutic effects. Besides being able to supply the daily mineral and fiber needs of an adult, many of them even have higher values than those found in conventional vegetables.[34-39]

In Brazil, the annual loss of one to two tons of UFP per hectare is estimated, because they are discarded and treated as invasive plants. However, they have a great potential to diversify and enrich the diet, and can be cultivated in domestic environments, without dependence on inputs and without opening new areas.[32,39,40]

In addition, they act as indicators of soil quality, signaling possible imbalances, such as nutrient deficiency or excess, acidity, and compaction. They can recover unproductive areas, promote soil nutrient recycling, and prevent excessive sun exposure.[32,39,40]

Their cultivation and commercialization through family agriculture, especially in local open markets, can contribute not only to reduce the environmental impact caused by agribusiness and favor the income complementation of small producers, but also to the rescue of the country's food culture through the dissemination of knowledge and the use of UFP.[41,42]

Traditional agricultural models composed by family farming still keep alive knowledge related to uses of local biodiversity.[43] In this study, we evaluated the production and commercialization of UFP by family farmers in the metropolitan area of the state of Rio de Janeiro. It is worth mentioning that, according to data from the 2017 Agricultural Census, 77% of agricultural establishments in Brazil are classified within the Family Farming segment. Approximately 500 million family farmers produce 80% of the world's food, revealing a prominent role in promoting productive diversity and ensuring food security.[44]

METHODS

This is a qualitative-quantitative, descriptive, exploratory and propositional research on the relationship between the UFP production, under a sustainable perspective, and the consumption demand of a university restaurant in the State of Rio de Janeiro.

Interviews were conducted through a semi-structured questionnaire, with open and closed questions, applied in person to 10 farmers who grow UFP, located in five organic markets which are part of the Carioca Organic Market Circuit in Rio de Janeiro. The questionnaire applied aimed to analyze the dynamics of UFP cultivation, from production to commercialization. Farmers were interviewed during the fair hours and chosen randomly, respecting the inclusion and exclusion criteria of the research. Family farmers of PANC duly registered in an Organic Market in the State of Rio de Janeiro were included as participants in the research and excluded those who are not able to provide the UFP whose amount of production does not meet the demand for consumption of a university restaurant that produces an average of seven to eight thousand meals per day.

Furthermore, two on-line forms (Google forms) were applied. One form was sent to two managers of the UR located in the state of Rio de Janeiro to outline the profile and production routine of the restaurant and the other form was sent to the users of the UR (n=294) to know the profile of the public, investigate their knowledge on UFP and acceptability regarding their possible introduction to the menu of the UR.

The sample was collected randomly, and participants accessed the form via social media and messaging app. Data collection was conducted during the months of June and July 2021. A menu with food preparations

using UFP was proposed for a week, based on the menu model served by the UR studied, as well as an informative folder on UFP to be displayed in the UR, according to the preparation of the day. For data tabulation, descriptive statistics were used by means of averages, standard deviations and frequencies. Descriptive statistics allows a global view of the variables studied, organizing and describing the data through tables and graphs, which were prepared by Microsoft Excel® 2013.

We observed a limitation in the study regarding the application of the questionnaire to users of the UR. The group of students entering during the pandemic was not considered in the study sample, i.e., students from the second semester of 2020 to the first semester of 2021, a period in which the UR studied remained closed. The research did not consider that such a group would possibly be potential users, which certainly reduced the sample size and limited the results obtained.

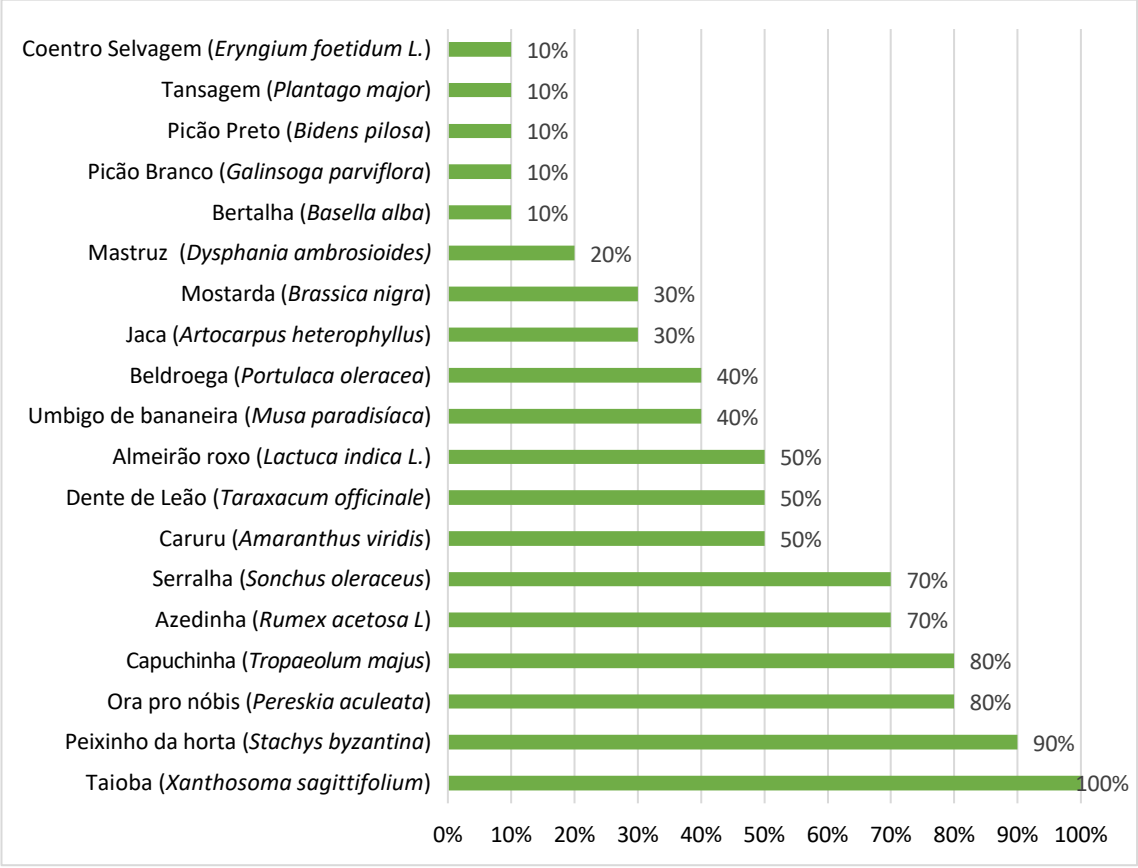
The present work was approved by the Ethics Committee of the Medical School of the Fluminense Federal University under Certificate of Presentation for Ethical Consideration (CAAE) 29714220.8.0000.5243.

RESULTS AND DISCUSSION

Studied farmers producing UFP

In the interviews held with the farmers in the studied markets, it could be observed that they cultivated 19 types of UFP (Figure 1). It was observed that most farmers were unaware that certain plants belonged to the group of UFP, because when asked about which of them were part of their production, many pointed out only the most well-known and commercialized such as Taioba (*Xanthosoma sagittifolium*), Peixinho-da-horta (*Stachys byzantina*) and Ora-pro-nóbis (*Pereskia aculeata*), for example..

Figure 1. Percentage of interviewed farmers that cultivated and commercialized the UFP



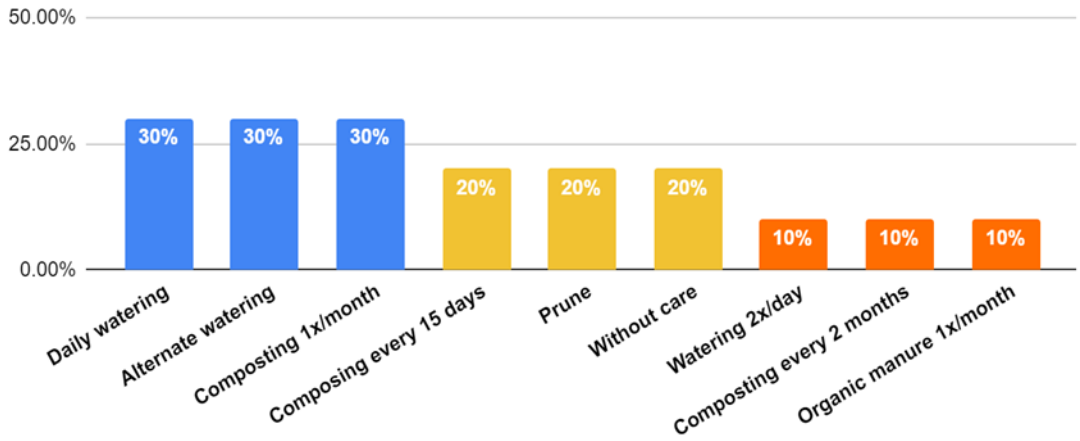
Source: Author, 2021

However, when other types of UFP were mentioned, the farmers said that they had them in their plantation; therefore, there is possibly a greater diversity of UFP in addition to those reported. Many of these plants, because they have been part of the food culture of these farmers for many years, are not recognized through the concept of non-conventional food, because they were recently introduced to this group.[45]

On the other hand, most of them are not sold in fairs, still due to low consumer demand, demonstrating the need for a closer relationship between farmer and consumer to promote the exchange of knowledge in favor of the appreciation of the country's food culture. This encourages the autonomy of individuals in their food choices, promoting food and nutritional security and food sovereignty.[45]

In general, the routine of cultivation these UFP is not very demanding (Figure 2). It was possible to observe that the most common care given to the cultivation of UFP is watering every day or every other day and the use of a compost from household compost bins once a month. These methods are also used in the cultivation of foods that are not considered as UFP

Figure 2. Frequency of care methods in the cultivation of UFP by the farmers of the studied markets.



Source: Author, 2021

However, depending on the farmer and the type of UFP, there was a report stating that it is possible to grow them without any kind of support, as some can develop naturally.

Moreover, it was noted that the UFP do not require an extensive area for cultivation and can be done in beds of one to thirty meters or only delimiting a part of the area for the development of those that appear spontaneously and develop naturally between the plantation of economic interest or in its surroundings.[31]

Because of this, the production time did not show a pattern, and it could take from 1 to 6 months to harvest the UFP, depending on the type and seasonality. Many species can be perennial, i.e., develop all year round, as was reported to be the case with caruru (*Amaranthus deflexus*), picão-preto (*Bidens pilosa*), picão-branco (*Galinsoga parviflora*), beldroega (*Portulaca oleracea*), dente-de-leão (*Taraxacum officinale*), serralha (*Sonchus oleraceus*) and azedinha (*Rumex acetosa*), while others can present production peaks between winter and summer, such as peixinho-da-horta (*Stachys byzantina*) and ora-pro-nóbis (Pereskia aculeata), respectively.

Therefore, by presenting different seasonal productions, they allow a varied food supply throughout the year, and can act in the food production, which, due to the significant population increase, will need to increase approximately 60% by 2050.[32,46]

It is suggested that the dynamics of UFP production converge with the principles of syntropic agriculture (SA), a sustainable cultivation system based on soil enrichment and conservation and respect for the environment.[47,48]

Just like UFP, SA is like organic agriculture, but keeps the forest, without removing native species. In addition, it is based on the use of annual crops to avoid "production vacuums" throughout the year. Such a system induces the autonomy of ecosystems to produce food with as little human interference as possible.[47,48]

The yield of the UFP harvest reported by the farmers was also heterogeneous, varying according to the type and seasonality of each species, and can produce from 20 to 200 bunches per week, where each bunch contains an average of 300g. Therefore, the farmers interviewed can produce individually from 6 kg to 60 kg of UFP per week.

It is worth pointing out that cultivation varies according to the economic interest that each type of UFP has from the current market, besides the fact that some UFP grow spontaneously and are not cultivated by farmers. It is therefore possible to have a large-scale UFP production, but which requires incentives from the population in general through a more informed consumer market that provides an increase in demand, as well as more studies addressing cultivation strategies and agroecological management practices that aim to increase productivity.[49-51]

In general, the commercialization value of UFP at the open fairs is, on average, R$ 3,00 a bunch, varying only when some producers sell them together with packages, as in the case of *Tropaeolum majus*, due to the delicacy of the leaves and flowers, and ora-pro-nóbis (*Pereskia aculeata*) due to the presence of thorns. Thus, the cultivation of UFP is not highly costly and is therefore economically accessible to a large part of the population.[52]

As for the perishability of the UFP after harvest, it was observed that, depending on preservation and storage, it is possible that they have an increased durability of up to 20 days, as reported by the farmers. If stored preferably under refrigeration at least 10ºC, the UFP cannot only have their physical characteristics preserved for a longer time, but biochemically they show similarity, and may even have superior results to those found right after harvest and compared to conventional vegetables.[53,54]

Associating this with the fact that they present more than one edible part, it is possible to use the food integrally, contributing to reduce waste.[8]

Only 40% of the farmers have ever participated in a tender to market UFP, while 80% think it is possible to supply a large-scale UR only with their production or in association with farmers in the region. Thus, there is still little incentive to commercialize UFP on a large scale.

The researched university restaurant and its relationship with UFP

The UR studied operates Monday through Friday, from 6 am to 8 pm, and provides an average of 7,500 meals daily. They are usually prepared with vegetables, two raw salads containing mainly green leaves, grated carrot and beet, cabbage, cucumber, and tomato, and a hot side dish, in which

the most commonly used foods are zucchini, eggplant, green cabbage, potatoes, carrots, and mixed vegetables, whose average per capita is 90g for the side dish and 45g for each salad, depending on the menu.

The UR has a dynamic delivery of fruit and vegetables three times a week, which can be reassessed. The UR has a control of waste generation in specific spreadsheets for the pre-preparation of leafy greens, fruits, and other vegetables, in which nutritionists supervise and control through trained employees and in charge of each area. The average amount of waste generated was not informed.

As for the possibility of including UFP in the menu, both managers consider that its use is feasible. They consider the use of UFP in the menu of the university restaurant, if acceptability tests are performed and have good acceptability by users.

In the UR, suppliers are selected through the bidding process, i.e., by electronic bidding. However, it is also possible to purchase food from family farming by public institutions through Law No. 12,512 of 2011 under Decree No. 7,775 of 2012, which allows the acquisition through public calls with exemption from bidding process to bodies and entities that serve the public education network, as is the case of university restaurants.[55,56]

The main requirements include prices must be compatible with the local or regional market; the food must be from the farmer's own production; and the farmer, or the cooperative/association, must have the physical or legal Declaration of Aptitude to the National Family Farming Program (DAP), a document that identifies the family farm, and its own food production.[55,56]

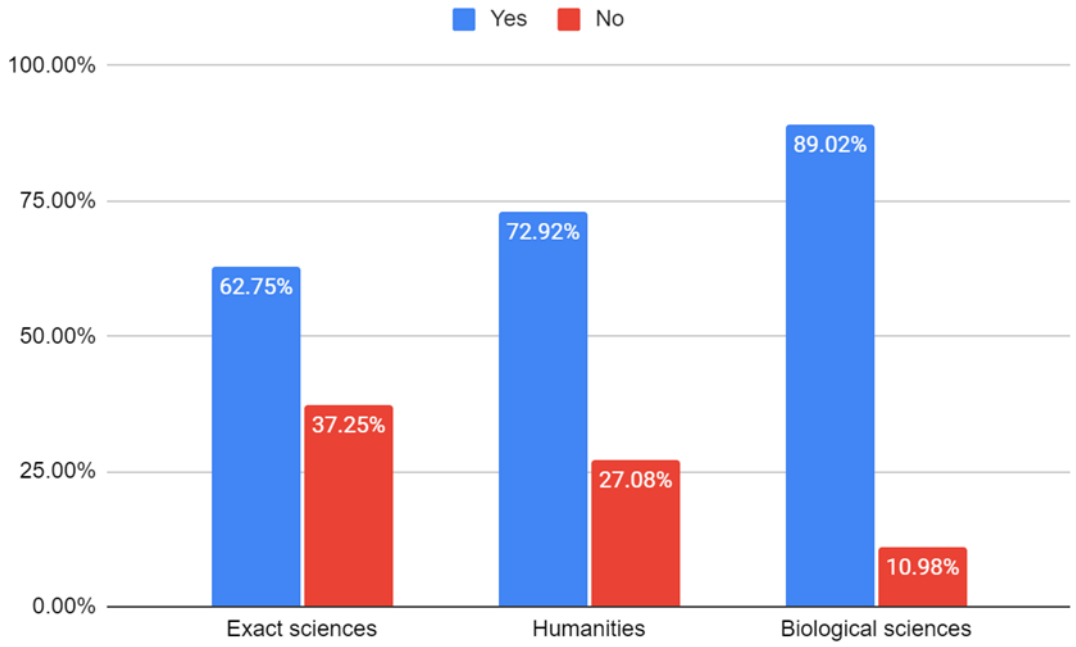
This suggests that the supply of UFP to these establishments is possible, and that it is necessary to stimulate public agencies and policies to promote health.

An example of the use of UFP in collective feeding is the project entitled "Organic Garden of UFP and Spices in the UFRJ Food System" conducted by the Federal University of Rio de Janeiro (UFRJ) in partnership with the institution's agroecology groups.[57]Another highlight is the Urban Vegetable Garden project of the São Camilo Hospital Network with the Kairós Institute, which seeks to produce food under the precepts of agroecology and has at least 30 types of UFP.[58]

Users of the UR surveyed

Approximately 78% (229) of interviewed users attended the UR at least once a week before the Covid-19 pandemic, namely: 41.92% (96) students from Humanities; 35.80% (82) from Biological Sciences; and 22.28% (51) from Exact Sciences (Figure 3). Of the total, 76.4% (175) indicated that they knew about the UFP.

Figure 3. Knowledge on UFP among the users of the UR studied in the Exact, Humanities, and Biological Sciences.



Source: Author, 2021.

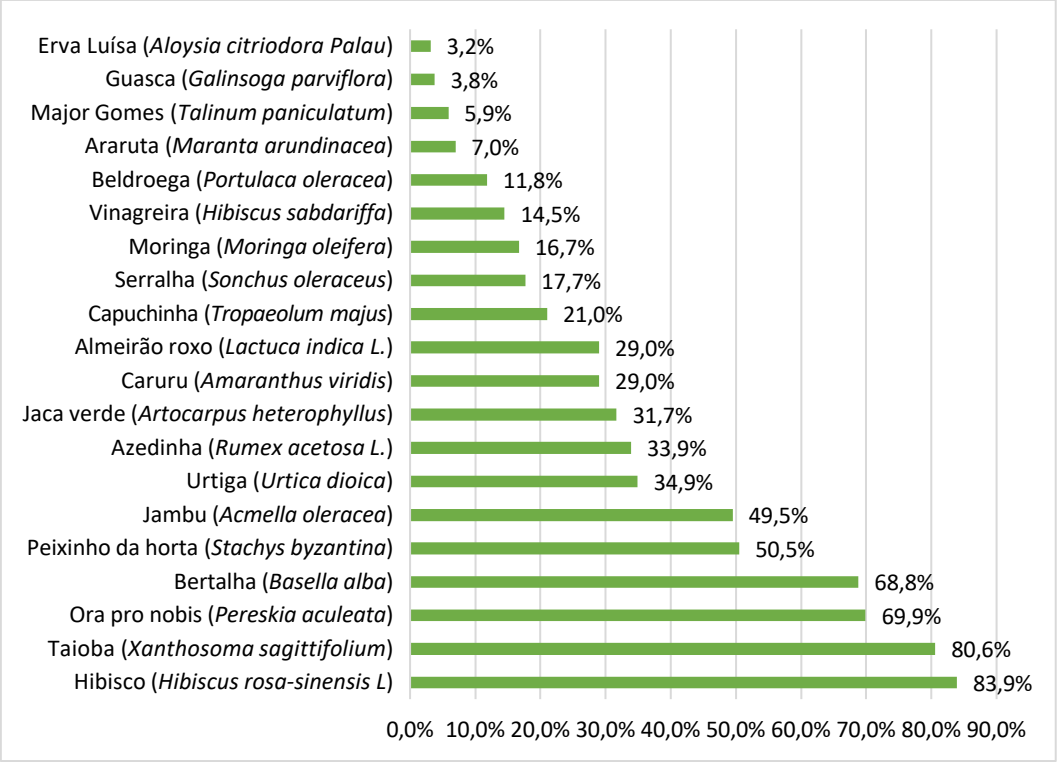
It was possible to notice that the sample referring to the area of Exact Sciences has less knowledge on UFP than the other areas of knowledge. Thus, the adoption of Food and Nutrition Education (FNE) strategies becomes necessary, beyond the Health and Human areas. It is possible to, for example, distribute booklets, hold learning, and tasting workshops, offer seedlings, disseminate posters, and encourage the holding of weekly agroecological fairs distributed throughout the campi, especially in places that include the Exact Science courses. Such initiatives can generate reflection on the quality and comprehensiveness of the education offered in the different courses.[28]

About 81% (186) of users demonstrated that they knew at least one type of UFP, pointing out that, in fact, 20.37% (11) of the sample that previously stated they did not know the UFP recognized at least one type of UFP. This suggests that academic definitions often fail to reach the population and are limited to the scientific community.[59]

Moreover, other UFP were mentioned, such as chaya (*Cnidoscolus aconitifolius*), chicória do Pará (*Eryngium foetidum*), banana (*Musa paradisiaca*), alfavaca (*Ocimum selloi*), malvavisco (*Malvaviscus arboreus*), crista-de-galo (*Celosia argentea*), erva-de-santa-maria (*Chepodium ambrosioides*), ipê-amarelo (*Handroanthus chrysotrichus*), hortelã-grossa (*Plectranthus amboinicus*) and flamboyant (*Delonix regia*). However, it was noticed that knowledge on other types of UFP was concentrated in only 3.49% (8) of the surveyed sample.

The most consumed UFP by the studied population were hibisco (*Hibiscus rosa-sinensis*), taioba (*Xanthosoma sagittifolium*), ora-pro-nóbis (*Pereskia aculeata*), bertalha (*Basella alba*), peixinho-da-horta (*Stachys byzantine*), jambu (*Acmella oleracea*), azedinha (*Rumex acetosa*), jaca (*Artocampus heterophyllus*), almeirão-roxo (*Lactuca indica L.*), capuchinha (*Tropaeolum majus*), serralha (*Sonchus oleraceus*) and beldroega (*Portulaca oleracea*), according to figure 4.

Figure 4. Percentage of university restaurant users who recognized the unconventional food plants listed in the questionnaire.



Source: Author, 2021.

The consumption of jaca (*Artocampus heterophyllus*) and hibiscus (*Hibiscus rosa-sinesis*) showed a pattern with respect to the type of preparation. The jackfruit is generally consumed shredded as an animal protein substitute, while hibiscus flowers are consumed in the form of tea. These ways of consumption have been popularized in recent years through vegetarianism and the wave of foods considered miracle foods for weight loss, respectively, demonstrating how the dissemination of information is essential, in a conscious way, for both knowledge and consumption.[51]

It is worth noting that some participants who reported having tried UFP only a few times or not consuming them at all said they had their first and/or only contact with them through typical regional preparations, such as the consumption of jambu (*Acmella oleracea*) in tacacá and cachaça, through their grandparents or during visits to relatives in the countryside.

It was observed that part of the younger population and/or those living in large urban centers do not have the habit of consuming UFP, either because of globalized eating habits already rooted in them, or because they are unaware of their nutritional potential, or possibly because they cannot be easily found due to irregular supply in open fairs, in view of the low demand for consumption.[51,59,60]

If they were introduced in the menu of the UR studied, 91.7% (210) said they would consume the UFP. Among the justifications for not consuming them, the following were reported: the fear of not knowing them; the fear of having to discard the food if it does not taste good; having already tried it and not liking it; not liking vegetables in general; "sensitive digestion"; limited palate; fear

of food poisoning due to poor sanitation of vegetables (cases in the family); and resistance to trying new foods.

Therefore, it is essential that acceptability tests be performed with users. Acceptability tests are tools for analyzing the food already served or to be offered, to evaluate consumer's acceptability of taste, texture, and appearance, to substitute or adapt the preparation to the preferences of the target public and thus reduce the waste rate of the FNU.[61]

Because of this, it is necessary that the introduction of food preparations with UFP be done gradually to evaluate indexes such as clean leftovers and leftover ingestion, so that the idea of sustainability is present throughout the entire meal production chain, including the reduction of organic waste generated.[7]

Menu proposal and dissemination of knowledge on UFP

As informed by the managers, according to the per capita of the RU studied, which varies from 90g to 180g depending on the type of menu, to serve on average 7,500 meals a day, you need approximately 675 kg to 1,350 kg of vegetables per day.

UFP production by the farmers interviewed of 6kg to 60kg per week, produced individually, proved insufficient to supply the average amount used in the UR, although it is believed that in the State of Rio de Janeiro there are potential suppliers of PANC beyond the interviewees. Thus, it is suggested that UFP can be used as ingredients in salads, main courses, and side dishes, to bring diversity to the menu and increase the nutritional value of the preparations (table 1).

Table 1. One-week menu* proposal using UFP at the university restaurant studied**. Rio de Janeiro state, Brasil, 2022.

	Monday	Tuesday	Wednesday	Thursday	Friday
Salad 1	***Almeirão-roxo (Lactuca indica L.)***and shredded lettuce	Cabbage and ***Capuchinha (Tropaeolum majus)***	Rucola and ***Serralha (Sonchus oleraceus)***	Sliced cabbage and ***Almeirão-roxo (Lactuca indica L.)***	Lettuce and ***Bertalha (Basella alba)***
Salad 2	Vinaigrette with ***Azedinha (Rumex acetosa)***	Cucumber, onion and ***Bertalha (Basella alba)***	Grated carrot with***Beldroega (Portulaca oleracea)***	Beets, grated carrots and ***Azedinha (Rumex acetosa)***	Chickpeas, tomatoes and ***Beldroega (Portulaca oleracea)***
Main course	Minced meat with ***Taioba leaf (Xanthosoma sagittifolium)***	Chicken stew with ***Chaya (Cnidoscolus aconitifolius)***	Rump with onions and ***Major-gomes*** (***Talinum paniculatum)***	Chicken in a sauce with **Ora-pro-nóbis** (***Pereskia aculeata)***	Meat bait with ***Caruru (Amaranthus deflexus)***
Side dish	Banana farofa with ***Taioba stalk (Xanthosoma sagittifolium)***	Oven Kibbeh with Eggplant and ***Serralha (Sonchus oleraceus)***	Potato stew with ***Peixinho-da-horta (Stachys byzantine)***	Zucchini sauteed with ***Capuchinha (Tropaeolum majus)***	Cauliflower soufflé, potato, and ***Jaca meat*** (***Artocarpus heterophyllus)***

*All suggestions include rice and beans as side dishes.
**The UFP in the suggested menu are highlighted in bold.
Source: Author, 2021.

To ensure the safe consumption of UFP, it is essential to train the UR staff on the preparation of certain types that have antinutrients, such as Taioba (Xanthosoma sagittifolium), chaya (*Cnidoscolus aconitifolius*) and caruru (*Amaranthus deflexus*). In such cases, to be consumed, they need to be cooked for a few minutes, so that the toxins are destroyed by the heat and discarded through the cooking broth.[32]

As an FNE strategy to encourage consumption and awareness about the UFP to the users of the UR studied, an informative folder model was developed to be distributed according to the food preparation on the menu and the suggested UFP, as shown in Figure 5.

Figure 5. Model of an informative folder as a Food and Nutrition Education strategy in the University Restaurant studied.

This preparation contains *Capuchinha* (*Tropaeolum majus)*

Do you know it?

A capuchinha (Tropaeolum majus) is a Unconventional Food Plant (UFP).

It has a pungent flavor similar to arugula and watercress, and its leaves, flowers, and seeds are edible.

It is rich in vitamin C and antioxidants.

It acts in the prevention of vision-related diseases, such as cataracts and glaucoma, among several other benefits.

This is an organic product that values family farming

Source: Author, 2021.

Thus, it is possible to have a diversified and seasonal menu, predominantly composed of foods of plant origin, in natura or minimally processed, organic, and produced in an agroecological manner by local farmers, following the recommendations of the Food Guide for the Brazilian Population for an adequate, healthy and sustainable diet.[62]

CONCLUSION

The current production of UFP of the farmers interviewed proved to be insufficient to supply the UR studied. Large-scale production depends on the encouragement of public agencies and policies, the consumer market through increased demand, and studies that address agroecological cultivation and management strategies.

UR managers consider it feasible to introduce UFP on the menu, after applying acceptability tests with the users, who stated (91.7%) that they would consume UFP if they were introduced to the UR menu. Therefore, the use of UFP as ingredients in different preparations is suggested. Nevertheless, this theme must be addressed in further studies to disseminate knowledge

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Contributors

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