Unconventional food plants in Brazil: what does Nutrition know about this topic?

Plantas alimentícias não convencionais no Brasil: o que a Nutrição sabe sobre este tema?

Abstract

Unconventional food plants, known by the acronym UFP (PANC, in Portuguese), are vegetables, fruits, flowers or herbs that grow spontaneously in nature, but because they are unknown to most people, they end up being confused with weeds. This study aimed to carry out a survey of the research on non-conventional food plants in the records of the last six editions of the Brazilian Congress of Nutrition (CONBRAN) and of the last seven editions of the Congress of the Brazilian Society of Nutrition (SBAN), indicating the profile of these studies in Brazil in the field of Nutrition. It is a qualitative, descriptive and exploratory research. Twenty-five studies on the subject at the CONBRAN Congress and ten at the SBAN Congress were identified, indicating that UFP still are little explored subject and rarely addressed in Nutrition research in Brazil. We highlight the emerging research potential that UFP can represent in the field of Food in its most diverse aspects: cooking, gastronomy, food safety, food science, among others. This research contributes to the expansion of knowledge and direction of studies in this area and it may also signal an agenda for future studies.

Keywords: Nutrition. UFP. Scientific Research. Unconventional Food Plants.

Resumo

As plantas alimentícias não convencionais, conhecidas pela sigla PANC, são hortaliças, frutas, flores ou ervas que crescem espontaneamente na natureza, mas que por serem desconhecidas para a maioria das pessoas, acabam sendo confundidas com plantas daninhas. Este estudo objetivou realizar um levantamento das pesquisas sobre PANC nos anais das últimas seis edições do Congresso Brasileiro de Nutrição (CONBRAN) e nos anais das últimas sete edições do Congresso da Sociedade Brasileira de Nutrição (SBAN), indicando o perfil dessas pesquisas no Brasil no campo da Nutrição. Trata-se de pesquisa qualitativa, descritiva e exploratória. Foram identificadas 25 trabalhos sobre o tema no CONBRAN e dez no Congresso SBAN, indicando que as PANC são tema ainda pouco explorado e abordado com pouca frequência nas pesquisas em Nutrição no Brasil. Destaca-se o potencial emergente de pesquisa que as PANC podem representar no campo da Alimentação em suas mais diversas vertentes: culinária, gastronomia, segurança alimentar, ciência de alimentos, entre outras. Esta pesquisa contribui para a ampliação do conhecimento e direcionamento dos estudos nesta área e, assim, poderá sinalizar uma agenda para estudos futuros.

INTRODUCTION

The current and dominant development model, centered on economic growth and market relations, has had strong impact on the relations established between the countryside and cities.\(^1\) By the year 2050, agriculture will have to provide food for about 9 billion people according to the Food and Agriculture Organization of the United Nations (FAO);\(^2\) however, the most current projections indicate something close to 10 billion of people in 2050.\(^3\)

Another challenge is to keep the high level of productivity indefinitely, using current production systems and promoting a sustainable environment even with continuous climate changes, increased competition for water resources and loss of productive land.\(^4\) Such scenario requires urgent and strategic interventions for adaptive agricultural measures that respect the characteristics of each locality, so a great ally for this purpose may be unconventional food plants (UFP), which have food potential and can increase the resilience of local production systems and strengthen nutritional security, particularly among traditional rural communities. Some recognized food species in the Atlantic Forest biome, for example, risk disappearing due to uncontrolled extraction of natural resources and an inadequate management.\(^5\)

Among the Ministry of Health’s initiatives to promote healthy eating is the free production and distribution of the Brazilian Regional Food Guide\(^6\) and the Food Guide for the Brazilian Population,\(^7\) which help disseminate the of knowledge on vegetables, legumes, tubers, cereals and herbs, stimulating the consumption of a wide variety of regional foods, as well as guiding their use in cooking preparations, recovering, valuing and strengthening Brazilian food culture, sometimes lost in the new generations of people or even little known by the population. This information stimulate local development and exchange of culinary skills, value cooking and enjoy the food, its flavors, aromas and presentations, making the act of eating more pleasurable, nutritionally rich and healthy.

According to information from the United Nations Food and Agriculture Organization (FAO),\(^2\) global malnutrition is a current fact. In addition, climate change affects agricultural production in many regions.\(^8\) In this scenario, it is highlighted that, in the last decades, 75% of feeding genetic resources have been lost, reducing even more the variability and biodiversity of species and genes.\(^9\) Polesi et al.\(^10\) (p. 9) warn of the narrowing of the world food base:

> The growing narrowing of our food base evidences the urgent need to seek alternatives, to know and to rescue food that has been neglected and forgotten for years, but which has a fabulous nutritional potential, being able to guarantee the food and nutritional security of the families.

Some of the phenomena responsible for this achievement are the standardization of food, the concentration of production in certain foods and the habits. There is a diverse vegetation around the planet, except for some regions such as those covered with ice for most of the year, as well as desert regions; many biomes and their respective ecosystems hold exceptional diversity of flora and fauna with potential food. However, Barbieri et al.\(^11\) and Kahane et al.\(^4\) report that in spite of the food diversity throughout the world, agricultural production is standardized and based on less than 30 plants. The consequence in food and human health is a simplification of diet rather than diversification, and a substitution of traditional foods for industrialized, rich in fats and sugars, both leading to obesity and nutritional deficits.\(^12\)

The scenario in recent years shows a reduction in the exploitation of food diversity that we have at our disposal. Brazil, for example, is one of the most biodiverse countries in the world,\(^13-15\) with a varied richness of microorganisms, plants and animal species, as well as many ecosystems. Several plants called weeds, pests, invasive or rudders are species with potentially economical or ecological importance. Many of these species
are potentially nourishing, and their roots, stems, leaves, flowers, fruits or seeds may be used for this purpose. However, the vegetables we find on the market, largely non-native, are repeated and subjected to a monotony of food.

In general whenever we think about vegetables, onions, cucumbers, tomatoes, beets, lettuce, potatoes and a few others that dominate the market shelves and are easily found and handled come to our mind. For Kinupp and Lorenzi, in our society prevails what the authors call “botanical illiteracy”, which prevents us from recognizing unconventional plants, that being unnamed, are no longer valuable, cultivated, marketed or consumed; moreover, their gastronomic, nutritional and cultural properties are ignored. Köhler and Brack (p. 7) highlight some elements that determine the monotony of food:

Food monotony is not due to lack of options only. First, there is a lack of knowledge about the existence of species, their characteristics and potentials of use, in a wide sense, both from a technical point of view - in terms of methods of harvesting, planting, handling, processing, etc. - as from the most basic point of view - simply to know whether a plant is edible or not. When faced with this first challenge, the lack of choice can occur when the general public goes after these foods at fairs or markets and does not find them. But this problem can be altered in its origin, which is the limited incentive by government policies to transition from large monocultures to ecologically based production systems, integrating and valuing resources of socio-biological diversity.

The Brazilian UFP Scenario

Brazil has a rich biodiversity with food potential; however, many foods with nutritional value and diverse flavors are no longer part of our daily diet. There are gaps in the knowledge about the subject, in several areas, from Nutrition to Agronomy, and this issue is very new in the scientific field, for example.

Non-conventional food plants, known as UFP, are vegetables, fruits, flowers or herbs that grow spontaneously in nature; however, as most people do not know them, they end up confusing them with weeds or "bush". The term "PANC" (UFP) was created in 2007 by Biologist and Professor Valdely Ferreira Kinupp and refers to all plants that have one or more edible parts, whether spontaneous or cultivated, native or exotic, that are not included in our daily menu.

For the Instituto de Defesa do Consumidor [Consumer Protection Institute], UFP are those plants that we do not eat because we do not know that they can be consumed, or because they were part of food in the past but have been replaced by foods with greater commercial interest over the years. According to Kinupp and Lorenzi, in Brazil there are approximately 5,000 species of UFP. Since these plants are spontaneous and sprout easily in backyards and vacant lots, if they are well known, can contribute to enrich the menu of the Brazilian population.

UFP have gained prominence in relation to the fight against hunger, alternative feeding and healthy eating and are foods that can replace conventional vegetables that dominate the standard food of the population, as well as becoming a new food option among those communities that do not consume vegetables daily due to lack of resources. The importance of UFP is based mainly on the food and nutritional potential they hold. In addition, they are easy to grow plants, endowed with high rusticity and vigor, great dispersion and propagation capacity. The use of UFP as food source also contributes to the fixation of the man in the field, generating more jobs, besides breaking the food monotony that is imposed on us today.

The use of vegetables in general by the Brazilian population is still considered very low, as we can see from the Vigitel data, and the use of UFP is an excellent alternative to recover the use of vegetables in the
diet. In addition, the consumption of vegetables in general, conventional or unconventional, has several benefits, including: easy digestion, satiety, rich in fibers that help the intestinal function, contain minerals and vitamins, important to fight diseases and in the proper functioning of the organism. We cannot ignore the need for investments in the expansion and supply of these vegetables. Souza et al. for example, observed that the production and commercialization of ora-pro-nóbis (a type of UFP) in some mining cities such as Belo Horizonte and Viçosa is still rudimentary, which makes it difficult to establish it as an agricultural crop and commercial product.

We are currently experiencing a scenario of expansion over the interest in UFP. Several studies have been carried out in Brazil recently to investigate the supply of these plants in several regions of the country. The literature on the nutritional properties of UFP and its cultivation still remains scarce, but there is a growing interest in researching it by national universities, which have been intensifying the studies with UFP. In Rio Grande do Sul state, a preliminary study carried out in 2007 identified 109 native species that have fruits or food seeds, among trees, shrubs and palms. Another study carried out in the metropolitan area of Porto Alegre by Kinupp identified 311 native UFP species. Santos et al. identified 24 species of UFP in the Center of Caraguatatuba-SP. Barreira et al. identified 59 species of UFP in the rural area of Viçosa-MG. Ronchi identified several native species with food potential in an Environmental Protection Area (APA) in Botucatu-SP. Biondo et al. surveyed the Vale do Taquari in Rio Grande do Sul state and identified 39 species with potential food in the margins of highways, riparian forests and forests.

Another aspect of studies on UFP focuses on the knowledge about these plants by the population. Polesi et al. in a survey on the levels of knowledge and use of UFP with 90 inhabitants of the municipalities of Relvado, Doutor Ricardo, Coqueiro Baixo, Encantado and Arroio do Meio, in the Vale do Taquari, Rio Grande do Sul state, noticed that most interviewees, although they knew and consumed UFP, were aware that knowledge about them is being lost by younger people. Moreover, when asked about knowledge and information on UFP, respondents reported a low level of knowledge regarding use of UFP, especially those with edible leaves, flowers and roots. Similar result was obtained by Abreu and Diniz, who identified low knowledge on UFP among beneficiaries of the Bolsa Família Program.

The use of UFP is closely linked to family issues, the legacy, when an elderly who knows about UFP teaches youngsters and thus this knowledge is perpetuated. Narciso et al. in a survey with women living in the city of Conceição do Mato Dentro-MG, identified that most study participants were unaware of the term “UFP”.

Chaves found a typical case of approximation of UFP with minority groups in the region of Tapajós-PA, where through participant observation and interviews with 47 families in three communities of the Tapajós-Arapuãs Extractive Reserve, it was possible to identify a strong link between this population and UFP, and their knowledge about them. This may indicate a greater link of UFP with traditional populations. On the findings of Chaves, we emphasize that, as defended by Richard Norgaard, the knowledge incorporated in traditional cultures stimulates and regulates the feedback between the social system and the ecosystem, and this knowledge, produced every day, is the result of individual and collective contributions through generations.

Barreira et al. through interviews with residents of rural communities in Viçosa-MG, noticed that knowledge about UFP was evenly distributed among them; in addition, there is a high diversity of UFP in the rural area of Viçosa, most of them grown in gardens or collected in agricultural crops, pastures and forest fragments. Similar result was found by Rauber in interviews with 53 farmers living in Cantoquiriguacu and Paraná Centro in Parana state, in which he identified that UFP were used by this group. In order to investigate the scientific dissemination in fairs in the city of Manaus-AM, Borges and Silva noted that UFP is still an
unknown theme among the population. Borges and Silva\textsuperscript{37} also noticed a nominal confusion between food and medicinal\textsuperscript{37} in the treatment of unconventional plants.

Currently, in Brazil, there are few scientific and even dissemination works on UFP. The dissemination of science is a way for the expansion of knowledge to people in general.

Studies on UFP in the field of food science are scarce, but with relevant results. Castro et al.,\textsuperscript{42} for example, developed a flour from \textit{Colocasia esculenta}, popularly known as “taro”, food used in the form of puree, soups and stews, and flour as well. Through the spraying process on spurt bed, under different temperatures, they identified that the flour obtained can be a food source with bioactive compounds, rich in vitamin C, and can be added in the elaboration of other products or included in the human diet.\textsuperscript{42}

Silva\textsuperscript{43} evaluated the toxicity, cytotoxicity and phenological and physicochemical characteristics of the ora-pro-nóbis and concluded that the cultivation of this UFP is feasible in a temperate climate and that its food intake is safe. Queiroz\textsuperscript{44} et al. developed several products (chocolate cake, banana jam, pumpkin jam, onion bread, among others) with the addition of ora-pro-nóbis, which were well accepted in the tasting test, and the acceptability index was greater than 90% for all products tested.

The benefits of using UFP in food have already been noted in some studies. Zem et al.,\textsuperscript{45} analyzing the use of ora-pro-nobes in the preparation of lime orange juice, have identified that the mixture allows a greater supply of minerals to the diet. Teixeira et al.\textsuperscript{46} used the purple yam (\textit{Dioscorea trifida}) as a possible health promoting ingredient in baking in the state of Amazonas, Brazil, through the preparation of bread with the addition of this UFP. They reported good acceptance and presence of antioxidants, highlighting the viability of using purple yam in food production and promoting a healthier diet in the Brazilian Amazon region.

These results show how the cultivation and use of UFP can be expanded with sensitization works, dissemination and distribution of seedlings, technical information, ways of use and preparation and use of the plant.

The term “UFP” is controversial because it often raises the question: "Unconventional to whom and why?" In fact, we must recognize that in this category there is a clear question of geographical perspective. What is unconventional for some may be commonplace for others. The maxixe (\textit{Cucumis anguria} L.) is almost didactic example. In the North, Northeast and Central-West regions of Brazil, it has wide circulation, but is still little consumed in other regions of Brazil.

The term "unconventional" in this study is applied to species that have not yet received due attention by the technical-scientific community and society as a whole, resulting in consumption located in some localities or regions, with difficulty of penetration for the other regions of the country.\textsuperscript{28} In addition, these are crops that are not organized as a productive chain per se, and do not arouse the interest of companies for their production and commercialization.

Given the importance of the theme, in 2016, Representative Marcia Jeovani, of the State of Rio de Janeiro proposed the Draft State Law No. 2275/2016, which provides for the program to encourage cultivation and commercialization of unconventional food plants (UFP) and other measures, under the justification that UFP have the potential for food complementation, diversification of menus, nutrients consumed and sources of family income, such as the sale of parts of plants or processed products (jam, bread, flour, etc.) and through rural or gastronomic tourism.\textsuperscript{47}

Considering the growing interest in UFP in the scientific context, this research aims to carry out a survey of UFP research in the records of the Brazilian Congress of Nutrition (CONBRAN) and the Congress of the Brazilian Society of Nutrition (SBAN), indicating the profile of these research works in Brazil in the field of
Nutrition. It aims as well to discuss the topic of UFP in this scientific field, given the potential for research on UFP in this area of knowledge. We assume that, in the context of scientific research in Brazil, Nutrition is perhaps, together with Food Sciences and Agrarian Sciences, one of the main areas directly related to research on the subject of UFP. Thus we start with the following question: how is the scientific field of Nutrition appropriating the theme of UFP in its scientific production? To answer this question, we sought to analyze the scientific production in the two most important Nutrition events of the country.

Other authors have already conducted research on events proceedings. Souza and Broietti,\(^4^8\) for example, analyzed the approach on Chemistry Evaluation in the proceedings of the National Meeting of Research in Science Education (ENPEC), seeking to characterize the subject and to understand it, in order to answer what has been published by the researchers on this subject. In the same way as in this research, the authors found a low number of works, showing that the theme is still recent, but that has gained space over time. Another study was the one by Carmona and Pereira,\(^4^9\) who analyzed the production on CTS and its relation with environmental education in different events in the areas of sciences.

Thus, considering that in the national literature there is still no study on the scientific production reported in UFP events, this work aims to analyze the development of the topic in the scientific field, through an analysis in the area of Nutrition.

**METHODS**

This research has a qualitative approach, since it aims to describe, understand and explain information on studies on UFP. This is a descriptive research using the documentary analysis.\(^5^0\) This reasearch analyzed the proceedings of the last six editions of the Brazilian Congress of Nutrition (CONBRAN) available on the online site of the *Journal of the Brazilian Association of Nutrition* - RASBRAN (https://www.rasbran.com.br/rasbran), conducted in the years 2008, 2010, 2012, 2014, 2016 and 2018, corresponding to a period of ten years of research. The choice of this event considered its tradition and dimension in the national scenario of events in the field of nutrition.

It also analyzed the proceedings of the last six editions of the Congress of the Brazilian Society of Nutrition (SBAN) made available on the online site of *Nutrire Magazine* (http://www.sban.org.br/revista_acervo/indice.php), carried out in years 2005, 2007, 2009, 2011, 2013, 2015 and 2017, comprising a period of 12 years of research. The choice of this event considered its connection with the Brazilian Food and Nutrition Society (SBAN), which is a non-profit scientific society that aims to promote greater exchange among those engaged in the field of Food and Nutrition, with the aim of stimulating, developing, improving and disseminating knowledge.\(^5^1\)

For the search of abstracts in the proceedings, searches were made in the titles of the research works and in the abstracts using the following expressions: "UFP", "UFP's", "Unconventional Food Plants", "Unconventional Vegetables" and "Edible Spontaneous Species". As a way of expanding the search, searches were also carried out through the popular and scientific names of some UFP samples, according to the *Manual of Unvonventional Vegetables* of the Ministry of Agriculture, Livestock and Food Supply.\(^2^8\) arrowroot, yam, jacatupé, mangarito, taro (roots, rhizomes and tufts); chuchu-de-vento, cubiu, jurubeba, maxixe (fruits); almeirão-de-árvore, azedinha, beldroega, bertalha, capiçoba, capuchinha, caruru, chicória-do-pará, jambu, ora-pro-nóbis, peixinho, serralha, taioba, vinagreira (leaves and flowers).
At this point, we should point out that the term UFP is still a recent term, with a little more than 10 years of diffusion in Brazil, so we do not restrict our search only to the term UFP and its variations; UFP have already been and continue to be researched even before the creation of this denomination in Brazil.

RESULTS AND DISCUSSION

From the search carried out in the proceedings of the Brazilian Congress of Nutrition (CONBRAN), it was possible to identify a low volume of research on the subject. In a period of ten years, where six editions of the event were held, 25 papers were found, addressing the UFP theme, distributed as shown in table 1

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Source: Research Data (2019).

It can be observed that the number of researches on UFP increased growth over the years, with a slight decrease in the last edition (2018), but in relation to the universe of research presented at the event, UFP still have little representativeness, which shows how little space they have in research in the Nutrition field.

In the last edition of the event, in the year 2018, more than 2,100 papers were presented, but that only five were on UFP. Among the findings, we highlight studies on yams (chart 1), which correspond to almost half of the studies identified (45% of all), which indicates a low variety of research objects when it concerns UFP.

Yam is a very consumed food in Eastern countries, being used as medicine and food supplement. The yam of Dioscorea bulbifera species has a higher amount of antioxidant, being useful in metabolic abnormalities, such as in dyslipidemia and diabetes. Paschoal et al., in a study conducted in the cerrado region of midwest São Paulo, identified 50 types of UFP that were not popular. Another study to be highlighted is that by Pinheiro et al., which identified high concentrations of vitamin A in UFP as the ora-pro-nóbis and serralha.

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Source: Research data (2019).
In the second part of data collection, from the search carried out in the proceedings of the Congresses of the Brazilian Society of Nutrition (SBAN), a very low volume of research on the subject was identified. In a period of 12 years, when six editions of the event were held, only ten papers were found addressing the topic of UFP, as can be seen on table 2.

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Source: Research data (2019).

In the last two editions of the SBAN Congress, only one work on UFP was found in each edition, which attests the lack of representativeness in the surveys that UFP have in the Nutrition field. Among the findings, we highlight the UFP cubiu (*Solanum sessiliflorum* Dunal) typical Amazonian plant, which was the object of five studies (table 2). It is worth mentioning that the study conducted by Yuyama et al.,55 showed that cubiu is a fiber-rich food that can reduce cholesterol levels, which attests the importance of research on UFP as new alternatives for healthy feeding and its application in the health area. To Ferraz, Costa and Nagahama,56 the insertion of UFP in feeding allows a greater use of cultivated vegetables, and its application in food production adds nutritional value to products, allowing the creation of new flavors and the dissemination of conscious consumption, as the lack of information can be a major risk factor for worsening consumers’ health.
As can be seen from the data shown in tables 1 and 2, UFP studies are still concentrated in two species: cubiu (Solanum sessiliflorum Dunal) and yam (Dioscorea bulbifera, Colocasia esculenta; Dioscorea caynensis). These results indicate that, in addition to the low number of UFP surveys, research is focused on a few species. It is also possible to note that research studies are on composition and physical-chemical characteristics, sensory analysis, acceptability evaluation, and elaboration of new products from UFP.

In addition to the characterization of research works, a survey was carried out on their origin. Of all analyzed studies, only six arose from partnerships between different institutions. It is worth highlighting the importance of establishing partnerships between institutions for scientific cooperation, so it will be possible to obtain synergistic gains through the sharing of knowledge, resources, experiences, etc.

The National Institute of Amazonian Research (INPA) holds the largest number of researches (six), but it must be noted that all INPA research was published in the SBAN Congress, five of them in two editions of the event (2005 and 2007) and all on cubiu (Solanum sessiliflorum Dunal), which leads us to believe that such production must be linked to some research project involving cubiu conducted between 2005 and 2007 (hypothesis).
The distribution of the surveys by region presents discrepancies. The Southeast region concentrates most of the research (16), which may be associated with the number of research institutions in this region. The North is the second region with the highest number of surveys (9), but a good part of this research (6) was developed by a single institution, INPA, and for more than 10 years and in a specific period (2005 and 2007). The Northeast (3) and Midwest (1) regions are the ones with the lowest number of surveys among those identified in this study.

Both the more egalitarian distribution and the performance of interinstitutional research are two elements that can contribute substantially to the diffusion of knowledge on UFP in Brazil.

**FINAL REMARKS**

Nowadays we search for healthy products, of known origins and that contribute to environmental conservation. Paradigms and food taboos must be rethought. But for this we need to invest in basic and applied research and, above all, in educational programs through the mass media, which could perhaps reverse prejudice and create a national pride in the use of natural resources such as UFP.

However, beyond the sustainable management, cultivation, research and marketing of the promising species there is, of course, the need for competitive prices, product quality control and larger scale production, which would create demands and markets. These are some of the needs and relationships that we need to establish in order to develop a new food culture that includes UFP and all their benefits in a wide range of fields.

The scenario of the UFP in Brazil emerges as a theme that needs greater attention from the scientific environment. As it can be seen, there is still very little research on UFP and the population still lacks information on them, which are mistreated as "weeds", useless, without value. As Biondo et al. point out, the knowledge on the use of UFP is incipient, and more research on its nutritional characteristics and food potential must be carried out, as well as incentive to production and consumption.

The importance of scientific dissemination in the scenario of UFP in Brazil must be emphasized, as to stimulate the population interest in them, one must provide data on species in a clear and real way. More research involving traditional populations and popular knowledge in the scientific process should be conducted, since UFP generally appear in the feeding of small groups and in poor population.

The population is interested in the use of UFP and accepts food products which contain them. Unconventional vegetables become an alternative for the use of Brazilian biodiversity and are accessible nutritional sources due to their low cost. Such vegetables do not receive attention from the scientific community, and no specific inputs are developed for them.

Based on a sample of the scientific production in the Nutrition area in Brazil, we conclude that UFP is a subject still little explored and approached infrequently in the research works. Studies, research and scientific dissemination on Brazilian agrobiodiversity and its potential in the production and supply of food, healthy, nutritious and sustainable should be conducted, aiming at food and nutritional security of the population, as well as the preservation of local biodiversity and culture. The academic field still has a lot of room for research on UFP, since up to now we have observed that research focus on three areas: survey of species knowledge of the population about UFP, development of food products and UFP characterization (chemical, physical and so on).
Among the limitations of this study, it should be highlighted that Brazil has a multitude of unconventional plants used for food, far beyond those found in the *Unconventional Vegetables Manual* of the Ministry of Agriculture, Livestock and Food Supply, used for the searches in this paper. In addition, research is part of a delimited field of study (Nutrition).

We identified a large gap in the research, as Brazilian literature lacks studies on UFP, which could act in several lines such as food development, physical, chemical and nutritional characterization of UFP, traditional knowledge among many other possibilities, including research of multidisciplinary and interdisciplinary approach. Developing research on UFP helps build a more diversified food system.

As a suggestion for future research, we recommend that surveys on UFP studies in other areas of knowledge are conducted, such as food science, as well as other scientific events such as the Brazilian Congress of Agroecology and the Brazilian Congress of Food Science and Technology, as well as on other scientific material such as papers, dissertations and theses.

**REFERENCES**


Contributors

IP Casemiro employees worked in the collection and analysis of data, as well as in the elaboration of results and formatting of work within the standards for publication. Vendramini ALA tied the analysis of the results found in the research and in the general review.