SCIENCE AND
FOOD TECHNOLOGY

DOI: 10.12957/demetra.2020.42725

DEMETRA
Alimentação, Nutrição & Saúde

Ítalo de Paula Casemiro[1]
Ana Lúcia do Amaral Vendramin[1]

[1] Universidade Federal do Rio de Janeiro, Núcleo de Pesquisa em Ciência e Tecnologia de Alimentos, Programa de Pós-Graduação de Tecnologia para o Desenvolvimento Social. Rio de Janeiro, RJ, Brasil.

Correspondence
Ítalo de Paula Casemiro
itcasemiro@hotmail.com

O artigo é parte da pesquisa de dissertação intitulada "Interações no Ciberespaço como Estratégia de Construção do Conhecimento - O Caso das PANC - Plantas Alimentícias Não Convencionais no Facebook (Brasil)", desenvolvida no Programa de Pós-Graduação em Tecnologia para o Desenvolvimento Social da Universidade Federal do Rio de Janeiro

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.

Palavras-chave: Nutrição. PANC. Plantas Alimentícias Não Convencionais. Pesquisas Científicas.

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.[16-19] 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,[20] 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[21] (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.[6] 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.[20]

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".[22] The term "PANC" (UFP) was created in 2007 by Biologist and Professor Valdely Ferreira Kinupp[19] 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],[23] 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,[20] 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,[24] 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.[25] In addition, they are easy to grow plants, endowed with high rusticity and vigor, great dispersion and propagation capacity.[26] 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[27] 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.[28] We can not ignore the need for investments in the expansion and supply of these vegetables. Souza et al.,[29] 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.[10,30,31] 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.[32] Another study carried out in the metropolitan area of Porto Alegre by Kinupp[19] identified 311 native UFP species. Santos et al.[33] identified 24 species of UFP in the Center of Caraguatatuba-SP. Barreira et al.[34] identified 59 species of UFP in the rural area of Viçosa-MG. Ronchi[35] identified several native species with food potential in an Environmental Protection Area (APA) in Botucatu-SP. Biondo et al.[31] 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.,[10] 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,[36] 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 knowds about UFP teaches youngsters and thus this knowledge is perpetuated.[37] Narciso et al.,[38] 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[39] 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-Arapiuns 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,[39] we emphasize that, as defended by Richard Norgaard,[40] 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.,[34] 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[41] in interviews with 53 farmers living in Cantuquiriguaçu and Parana 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[37] noted that UFP is still an

unknown theme among the population. Borges and Silva[37] also noticed a nominal confusion between food and medicinal[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.,[42] for example, developed a flour from *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.[42]

Silva[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[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.,[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.[46] used the purple yam (*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 (*Cucumis anguria* L.) is amost didatic 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.[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.[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,[48] 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,[49] 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.[50] 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.[51]

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:[28] 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

Table 1. Surveys on UFP in COBRAN Congress. Brasil, 2019.

YEAR - EDITION	NUMBER OF RESEARCH WORKS
2008	01
2010	03
2012	02
2014	07
2016	07
2018	05

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.[52] Paschoal et al.,[53] 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.,[54] which identified high concentrations of vitamin A in UFP as the ora-pro-nóbis and serralha.

Chart 1. Research Works in the Proceedings of the Brazilian Congress of Nutrition – CONBRAN. Brasil, 2019

Year	Work Title	UFP researched	Research Objective
2008	Chemical Characterization of Cubiu (*Solanum sessiliflorum* Dunal), Jelly Production, Physicochemical Parameters and Sensory Evaluation	Cubiu (*Solanum sessiliflorum*)	Perform the chemical composition of cubiu, elaboration of jelly and sensorial analysis.
2010	Study of the Composition of Macro and Micronutrients of Fruit Cubiu (*Solanum sessiliflorum*)	Cubiu (*Solanum sessiliflorum*)	To know the chemical composition of cubiu to collaborate with the clarification of its beneficial effects.
2010	Optimization of the DNA Extraction Methodology for the Genetic Characterization of Taro Cultivars (*Colocasia esculenta*) Held in a Germplasm Bank	Taro (*Colocasia esculenta*)	To characterize taro (*Colocasia esculenta*) cultivars kept in Germoplasma Bank.

Chart 1. Research Works in the Proceedings of the Brazilian Congress of Nutrition – CONBRAN. Brasil, 2019

Year	Work Title	UFP researched	Research Objective
2010	Sensory Analysis of Yam Bread and its Acceptability by the Consumer	Yam (*Dioscorea spp*)	To verify, under the perception of the consumers, through sensorial analysis, if there is a difference in the organoleptic characteristics between homemade type yam bread and the wheat bread, evaluating its acceptance.
2012	Sensory Evaluation of Bakery Product Prepared from Ora-Pro-Nóbis Flour	Ora-pro-Nóbis	To elaborate a bread of integral form from the flour of ora-pro-nóbis.
2012	"Homemade" Bread with Yam Addition: Physical-Chemical Characterization and Sensory Analysis	Yam (*Dioscorea spp*)	Analyze the physical-chemical characteristics of the yam and the homemade bread added of yam mash in different proportions 70%, 50% and 30% and a bread control only with whole wheat flour.
2014	Sensory Evaluation of Yam Pate	Yam (*Dioscorea spp*)	Sensory evaluation of an elaborate pâté with yam.
2014	Elaboration of Yam Flour (*Dioscorea cayennensis*) and its Technological Perspective	Yam (*Dioscorea spp*)	Obtaining and physical chemical characterization of yam flour for use in the development of special purpose products.
2014	Shelf Life Stability of Yam Flour (Dioscorea cayennensis)	Yam (*Dioscorea spp*)	Determine the shelf life of yam flour through microbiological analyzes, moisture determination and water activity.
2014	Evaluation of the Effect of Yam Flour (*Dioscorea bulbifera*) on Concentrations of Triglycerides and Hepatic and Fecal Cholesterol in Wistar Rats Submitted to Experimental Diabetes	Yam (*Dioscorea spp*)	To evaluate glycemia, hepatic thiol and triglyceride and total cholesterol concentrations in the liver and faeces of Wistar rats submitted to experimental diabetes and fed with yam flour.
2014	Sensory Analysis of Functional Passion Fruit Drink (*Passiflora edulis*) Plus Yam Flour (*Dioscorea caynensis*) and *Lactobacillus casei*	Yam (*Dioscorea spp*)	To evaluate the acceptance of functional passion fruit drink with yam flour (*Dioscorea caynensis*) and *Lactobacillus casei.*
2014	Acceptability of Edible Flowers	Various	To verify the acceptability of preparations with capuchin - Tropaeolum majus L., Rosa - chinensis var. semperflorens, pansy - Viola tricolor.
2014	Acute Toxicity Assessment of *Pereskia aculeata*	Ora-pro-Nóbis (*Pereskia aculeata*)	To evaluate the acute toxicity of the ethanolic extract of leaves of Pereskia aculeata.
2016	Identification of Unconventional Food Plants in a Region of High Socioeconomic Vulnerability of Cerrado in the Midwest of São Paulo	Various	To identify the existence of UFPs in the cerrado region of central-western São Paulo (Jardim América, Bauru - São Paulo) and to discuss with the local community about the importance to the health of UFP consumption and its possible applications in cooking.
2016	Unconventional Food Plants and their Relation to the Acidifying Potential of the Diet: A Proposal of a Menu According to the Macroregions of the Country	Various	Calculate the acidifying potential of the main UFP according to the PRAL (renal acid loading potential) calculation and make a menu proposal for each of the five Brazilian macro regions according to the food profile described in the Family Budget Survey.
2016	Evaluation of the Consumption of Yam-Coconut Flour (*Colocasia esculenta*) in the Bone Structure of Young Wistar Rats	Yam (*Dioscorea spp*)	To evaluate dietary intake, body mass and body length, and total bone composition of the fourth lumbar vertebra and femur in male Wistar rats fed a diet containing yam-coconut flour.
2016	Technological Development of Yam Pancake with Pumpkin Cream: An Option for Phenylketonuric	Yam (*Dioscorea spp*)	To develop a recipe for yam pancake with pumpkin cream, intended for patients with phenylketonuria, evaluating their nutritional value and economic viability.
2016	Innovation of School Feeding Through Unconventional Food Plants (NOCP)	Various	Introduce the Non - Conventional Food Plants in school feeding in the municipality of Harmonia - RS.
2016	Chemical Composition of Unconventional and Medicinal Food Plants	Various	To analyze the centesimal composition of unconventional food plants native to Rio Grande do Sul.
2016	Vitamins, Carotenoids and Phenolic Compounds in Unconventional Vegetables Prepared by Family Farmers in the Zona da Mata of Minas Gerais	Various	To evaluate the occurrence and concentration of vitamin C, vitamin E, carotenoids and total phenolics in unconventional vegetables most consumed by family farmers in the municipality of Viçosa, located in the Zona da Mata
2018	Educational Action with UFPs and Spices for Students of Municipal Public Schools of Rio de Janeiro: A Report of Experience	Various	To demonstrate the sensory, olfactory and visual functions and characteristics of unconventional food plants for children of municipal schools in Rio de Janeiro.

Source: Research data (2019).

Chart 1. Research Works in the Proceedings of the Brazilian Congress of Nutrition – CONBRAN. Brasil, 2019. (Continues)

Year	Work Title	UFP researched	Research Objective
2018	I was born and raised within that ": Flavors and Knowledge of Unconventional Food Plants in a Community of the Metropolitan Region of Rio de Janeiro	Various	To register senses, knowledge and forms of culinary preparation related to Unconventional Food Plants in a community of the metropolitan region of Rio de Janeiro.
2018	Influences of Extraction Methods on the Content and Profile of Phenolic Compounds and on Antioxidant Capacity in Unconventional Food Plants (UFP)	Various	To analyze the influence of different extraction methods on the content and profile of phenolic compounds and antioxidant capacity in six species of UFP.
2018	Moisture, Ashes and Biscuit Fibers Elaborated from Cubiu (*Solanum sessiliflorum* Dunal)	Cubiu (*Solanum sessiliflorum*)	Analyze the moisture content, ashes and cube biscuit fibers.
2018	Elaboration of Bread based on Taioba: A New Alternative to Strengthen the Food of the Population of the Municipality of Porto Velho - RO	Taioba (*Xanthosoma sagittifolium*)	Elaborate a new product for the low-income population as a way to create a healthy food alternative.

Source: Research data (2019). (Continues)

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.

Table 2. Surveys on UFP in the SBAN Congress

YEAR - EDITION	NUMBER OF RESEARCH WORKS
2005	04
2007	02
2009	02
2011	00
2013	00
2015	01
2017	01

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.

Chart 2. Research Identified in the Proceedings of the Congress of the Brazilian Society of Nutrition – SBAN. Brasil, 2019.

Year	Title of Search	UFP researched	Research Objective
2005	Processing of Cubiu Fruit (*Solanum sessiliflorum* Dunal) for Concentrated Syrup	Cubiu (*Solanum sessiliflorum*)	Test the elaboration of concentrated fruit syrup cubiu.
2005	Sensory Evaluation of Cubiu Fruit Concentrated Syrup Refreshment (Solanum sessiliflorum Dunal)	Cubiu (*Solanum sessiliflorum*)	To size the acceptability of concentrated fruit syrup soda from cubiu.
2005	Evaluation of Consumption of Unconventional Vegetables in Diamantina - MG	Various	To evaluate the consumption of Taioba (*Xanthosoma sagittifolium*) and Ora-pro-nóbis (*Pereskia aculeata mill*), in Diamantina - MG.
2005	Cubic Glycemic Index (Solanum sessiliflorum Dunal) in Diabetic and Non-Diabetic Patients	Cubiu (*Solanum sessiliflorum*)	To evaluate the glycemic index of cubiu, in the form of flour, preceded by physical-chemical and microbiological analysis.
2007	Cubiu (Solanum sessiliflorum Dunal) Dehydrated as a Food Fiber Source Has Hypocholesterolemic Action?	Cubiu (*Solanum sessiliflorum*)	To evaluate the impact of the use of cubiu as a source of dietary fiber in hypercholesterolemic patients.
2007	Cubiu Flour (Solanum sessiliflorum Dunal) as Food Fiber Source Has Hypoglycemic Action in Patients with Type 2 Diabetes Mellitus?	Cubiu (*Solanum sessiliflorum*)	To evaluate the impact of the use of cubiu as a source of dietary fiber in type 2 diabetic patients.
2009	Analysis of the Nutritional Importance of Spontaneous Edible Species of the *Asteraceae* Family	Various	To analyze the physico-chemical characteristics related to the nutritional value and potential as food of five spontaneous species found in Brazil of the family *Asteraceae.*
2009	An Experimental Study on the Nutritional and Sensorial Characteristics of Ora-pro-Nóbis (*Pereskia aculeata Mill*)	Ora-pro-Nóbis (*Pereskia aculeata*)	To evaluate the nutritional and sensorial capacity of the ora-pro-nóbis.
2015	Sensory Evaluation of Gluten-Free Food Pasta on the basis of Yam Flour and Isolated Soy Protein	Yam (*Dioscorea spp*)	Develop gluten-free pasta based formulations of yam flour and soy protein isolate and evaluate their sensory characteristics.
2017	Training with Family Farmers on Healthy and Sustainable Food Manaus-AM	Various	Evaluate and train farmers on nutrition, food, handling and safe food production.

Source: Research data (2019).

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.[31] 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.[57] 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.[34,39, 41]

The population is interested in the use of UFP and accepts food products which contain them.[44] 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,[28] 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

1. CNAU - Coletivo Nacional de Agricultura Urbana. Carta III ENA. 2014. Trabalho apresentado no 3º Encontro Nacional de Agroecologia. Juazeiro: 2014. 3 f. [acesso 14 jan 2019]. Disponível em URL: http://enagroecologia.org.br/files/2014/05/Carta_Coletivo_Nacional_Agricultura_Urbana.pdf.
2. Food and Agriculture Organization of The United Nations - FAO. El estado mundial de la agricultura y la alimentación. Roma; 2009. [acesso 21 fev 2019]. Disponível em: URL: http://www.fao.org/3/a-i6132s.pdf.
3. United Nations. World Population Prospects 2017. 2017. [acesso 20 abr 2019]. Disponível em: URL: https://population.un.org/wpp/.
4. Kahane R, Hodgkin T, Jaenicke H, Hoogendoorn C, Hermann M, Hughes JDA, Looney, N. Agrobiodiversity for food security, health and income. Agronomy for Sustainable Development 2013;33(4):671-693. [acesso 25 jan 2019]. Disponível em: URL: https://link.springer.com/article/10.1007/s13593-013-0147-8.
5. Ceron K, Guislon AV, Bristot SF, Martins HB, Elias GA, Santos R, Amaral PA, Citadini-Zanette V. Potencial medicinal e alimentício da vegetação herbácea terrícola ciliar no sul do Brasil. Interciencia 2016;41(6):393-400. [acesso 27 jan 2019]. Disponível em: URL: https://dialnet.unirioja.es/servlet/articulo?codigo=5600228.
6. Brasil. Ministério da Saúde. Alimentos regionais brasileiros. 2. ed. Brasília: Ministério da Saúde; 2015. [acesso 22 abr 2019]. Disponível em: URL: http://189.28.128.100/dab/docs/portaldab/publicacoes/livro_alimentos_regionais_brasileiros.pdf.
7. Brasil. Ministério da Saúde. Guia alimentar para a população brasileira. Brasília, DF; 2014. [acesso 29 jan 2019]. Disponível em: URL: http://bvsms.saude.gov.br/bvs/publicacoes/guia_alimentar_populacao_brasileira_2ed.pdf.
8. Food and Agriculture Organization of The United Nations - FAO. 2016 - El Estado Mundial de la Agricultura y la Alimentacion Cambio Climático, Agricultura y Seguridad Alimentaria. Roma, 2016. [acesso 13 jan 2019]. Disponível em: URL: http://www.fao.org/3/a-i6030s.pdf.
9. Food and Agriculture Organization of The United Nations - FAO. El segundo informe sobre el estado de los recursos fitogenéticos para la alimentación y la agricultura en el mundo resumen. Comisión de recursos genéticos para la alimentación y la agricultura; 2010. [acesso 13 abr 2019]. Disponível em: URL: http://www.fao.org/docrep/014/i1500s/i1500s.pdf.
10. Polesi RG, Rolim R, Zanetti C, Sant'Anna V, Biondo E. Agrobiodiversidade e segurança alimentar no vale do taquari, rs: plantas alimentícias não convencionais e frutas nativas. Revista Científica Rural 2017;19(2):118-135. [acesso 08 jan 2019]. Disponível em: URL: http://revista.urcamp.tche.br/index.php/rcr/article/view/198.
11. Barbieri RL, Costa Gomes JC, Alercia A, Padulosi S. Agricultural biodiversity in southern brazil: integrating efforts for conservation and use of neglected and underutilized species. Sustainability 2014;6(2):741-757. [acesso 09 jan 2019]. Disponível em: URL:

https://www.embrapa.br/busca-de-publicacoes/-/publicacao/980327/agricultural-biodiversity-in-southern-brazil-integrating-efforts-for-conservation-and-use-of-neglected-and-underutilized-species.

12. Wanderley EN, Ferreira VA. Obesidade: uma perspectiva plural. Ciência & saúde coletiva, 2010;15(01):185-194. [acesso 09 fev 2019]. Disponível em: URL: http://www.scielo.br/pdf/csc/v15n1/a24v15n1.pdf.
13. Mcneely JA, Miller KR, Reid WV, Mittermeier RA, Werner TB. Conserving the world's biological diversity. International Union for Conservation of Nature and Natural Resources; 1990.
14. Mittermeier RA. Megadiversity: Earth's biologically wealthiest nations. Agrupacion Sierra Madre; 1997.
15. Pimentel VP. et al. Biodiversidade brasileira como fonte da inovação farmacêutica: uma nova esperança? Revista do BNDES, 2015;43:41-89. [acesso 06 fev 2019]. Disponível em: URL: <https://web.bndes.gov.br/bib/jspui/bitstream/1408/5602/1/RB%2043%20Biodiversidade%20brasileira%20como%20fonte%20da%20inova%C3%A7%C3%A3o_P.pdf.
16. Azurdia C. La otra cara de las malezas. Tikalia - Revista Facultad de Agronomía Universidad de San Carlos de Guatemala 1984;3(2):5-23.
17. Rapoport EH, Ladio A, Raffaele E, Sanz LGYEH. Malezas comestibles. Hay Yuyos y Yuyos. Ciencia Hoy, 1998; 9:30-43.
18. Kinupp V, Barros I. Levantamento de dados e divulgação do potencial das plantas alimentícias alternativas do Brasil. Horticultura Brasileira 2004;22(2):01-04. [acesso 21 fev 2019]. Disponível em: URL: https://www.ppmac.org/sites/default/files/plantas_alimenticias.pdf.
19. Kinupp VF. Plantas alimentícias não convencionais da região metropolitana de Porto Alegre, RS [tese]. Porto Alegre: Universidade Federal do Rio Grande do Sul; 2007. [acesso 13 fev 2019]. Disponível em: URL: https://lume.ufrgs.br/handle/10183/12870
20. Kinupp VF, Lorenzi H. Plantas alimentícias não convencionais (panc) no Brasil: guia de identificação, aspectos nutricionais e receitas ilustradas. Nova Odessa: Instituto Plantarum de Estudos da Flora, 2014.
21. Köhler M, Brack P. Frutas nativas no Rio Grande do Sul: cultivando e valorizando a diversidade. Agriculturas 2016;13(2):07-15. [acesso 24 abr 2019]. Disponível em: URL: http://aspta.org.br/revista/v13-n2-plantas-alimenticias-nao-convencionais/frutas-nativas-no-rio-grande-do-sul-cultivando-e-valorizando-a-diversidade/.
22. Universidade de Brasília - UNB. Mais que Receitas: Comida de verdade. 2016. 73 p. [acesso 24 jan 2019]. Disponível em: URL: <http://www.ideiasnamesa.unb.br/upload/bibliotecaIdeias/27102016163212mais_que_receitas_versao_para_download.pdf.
23. Instituto de Defesa do Consumidor - IDEC. Plantas alimentícias não convencionais: saiba o que são e porque podem ajudar a tornar seu prato mais variado, 2017. [acesso 27 jan 2019]. Disponível em: URL: https://www.idec.org.br/consultas/dicas-e-direitos/plantas-alimenticias-no-convencionais-saiba-o-que-so-e-porque-podem-ajudar-a-tornar-seu-prato-mais-variado.
24. Souza MRM, Correa EJA, Guimarães G, Pereira PRG. O potencial do ora-pro-nóbis na diversificação da produção agrícola familiar. Rev. Bras. de Agroecologia 2009;4(2):3550-3554. [acesso 29 jan 2019]. Disponível em: URL: http://revistas.aba-agroecologia.org.br/index.php/rbagroecologia/article/view/9145.
25. Fernandes L. Plantas alimentícias não convencionais trazem benefícios à saúde. Jornal da USP. 2017. [acesso 24 abr 2019]. Disponível em: URL: https://jornal.usp.br/atualidades/plantas-alimenticias-nao-convencionais-trazem-beneficios-a-saude/.
26. Raimundo MGM. Diga não ao desperdício e PANCs. São Paulo: Coordenadoria de Desenvolvimento dos Agronegócios; 2016. [acesso 25 jan 2019]. Disponível em: URL: http://www.codeagro.agricultura.sp.gov.br/uploads/publicacaoesCesans/Diga_nao_ao_desperdicio_Pancs.pdf.
27. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde, Departamento de Vigilância de Doenças e Agravos não Transmissíveis e Promoção da Saúde. Vigitel Brasil 2016: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico. Brasília (DF): Ministério da Saúde; 2016. [acesso 03 abr 2019]. Disponível em: URL: http://portalarquivos2.saude.gov.br/images/pdf/2018/marco/02/vigitel-brasil-2016.pdf.
28. Ministério da Agricultura, Pecuária e Abastecimento - MAPA. Hortaliças não convencionais (tradicionais). Brasília: MAPA; 2010: 94 p. [acesso 19 fev 2019]. Disponível em: URL: http://www.abcsem.com.br/docs/manual_hortalicas_web.pdf.

29. Souza MRM, Milagres CSF, Pereira RGF, Pinto CLO, Caixeta GZT, Pereira PRG. Perfil de produção e comercialização do ora-pro-nóbis em dois contextos regionais de Minas Gerais: Perspectivas de Agregação de Valor. Revista Brasileira de Agropecuária Sustentável 2016;6(4):45-50. [acesso 22 abr 2019]. Disponível em: URL: https://periodicos.ufv.br/ojs/rbas/index.php/rbas/article/view/365.
30. Nascimento VT, Pereira HC, Silva AS, Nunes AT, Medeiros PM. Plantas alimentícias espontâneas conhecidas pelos moradores do Vau da Boa Esperança, Município de Barreiras, Oeste da Bahia, Nordeste do Brasil. Revista Ouricuri, 2015:5(1):086-109. [acesso 24 fev 2019]. Disponível em: URL: https://www.revistas.uneb.br/index.php/ouricuri/article/view/1270.
31. Biondo E, Fleck M, Kolchinski EM, Sant'anna V, Polesi RG. Diversidade e potencial de utilização de plantas alimentícias não convencionais no Vale do Taquari, RS. Revista Eletrônica Científica da UERGS, 2018;4(1):61-90. [acesso 27 abr 2019]. Disponível em: URL: http://revista.uergs.edu.br/index.php/revuergs/article/view/1005.
32. Brack P, Kinupp VF, Sobral, MEG. Levantamento preliminar de espécies frutíferas de árvores e arbustos nativos com uso atual ou potencial do Rio Grande do Sul. Rev. Bras. Agroecologia 2007;2(1):01-04. [acesso 20 jan 2019]. Disponível em: URL: http://revistas.aba-agroecologia.org.br/index.php/cad/article/view/2286.
33. Santos FCR, Doria KMABVS. Levantamento de plantas alimentícias não convencionais em Caraguatatuba. UNISANTA Bioscience 2016;5(4):346-356. [acesso 26 jan 2019]. Disponível em: URL: http://periodicos.unisanta.br/index.php/bio/article/view/739.
34. Barreira T, Paula Filho GX, Rodrigues V, Andrade F, Santos R, Priore S, Pinheiro-Sant'ana, HM. Diversidade e equitabilidade de plantas alimentícias não convencionais na zona rural de Viçosa, Minas Gerais, Brasil. Rev. Bras. Plantas Med 2015;17(4):964-974. [acesso 23 abr 2019]. Disponível em: URL: http://www.scielo.br/pdf/rbpm/v17n4s2/1516-0572-rbpm-17-4-s2-0964.pdf.
35. Ronchi HS. Potencial alimentício e medicinal das espécies nativas da área de proteção ambiental – APA Corumbataí, Botucatu e Tejupá – perímetro Botucatu [dissertação]. Botucatu: Universidade Estadual Paulista; 2017. [acesso 20 abr 2019]. Disponível em: URL: https://repositorio.unesp.br/handle/11449/150326.
36. Abreu NCO, Diniz JC. As vantagens da introdução das plantas alimentícias não convencionais na alimentação dos beneficiários do bolsa família da estratégia saúde da família bernardo valadares, em Sete Lagoas-MG. Revista Brasileira de Ciências da Vida 2017;5(4):01-16. [acesso 23 abr 2019]. Disponível em: URL: http://jornal.faculdadecienciasdavida.com.br/index.php/RBCV/article/view/413.
37. Borges CKGD, Silva CC. Plantas alimentícias não convencionais (PANC): a divulgação científica das espécies na cidade de Manaus, AM. Revista Eletrônica Científica Ensino Interdisciplinar. Mossoró, 2018;4(11):466-477. [acesso 09 fev 2019]. Disponível em: URL: http://periodicos.uern.br/index.php/RECEI/article/view/2635.
38. Narciso G, Miranda N, Cabral J, Teixeira N. Plantas alimentícias não convencionais (PANCs) na gastronomia: A Capeba (*Pothomorphe umbellata*) como base para elaboração de pratos. Revista Pensar Gastronomia 2017;3(1):01-25. [acesso 04 jan 2019]. Disponível em: URL: http://revistapensar.com.br/gastronomia/pasta_upload/artigos/a53.pdf.
39. Chaves MS. Plantas alimentícias não convencionais em comunidades ribeirinhas na Amazônia [dissertação]. Viçosa. Universidade Federal de Viçosa; 2016. [acesso 05 fev 2019]. Disponível em: URL: http://www.locus.ufv.br/handle/123456789/8252.
40. Norgaard RB. Development betrayed; the end of progress and a coevolutionary revisioning of the future. London, Routledge; 1995.
41. Rauber AC. Conhecimento etnobotânico sobre plantas medicinais e plantas alimentícias não convencionais das famílias agricultoras pertencentes ao Núcleo Regional Luta Camponesa da Rede Ecovida de Agroecologia. Dissertação (Mestrado) - Universidade Federal da Fronteira Sul, Programa de Pós-Graduação em Agroecologia e Desenvolvimento Rural Sustentável, Laranjeiras do Sul, 2016, 216 p. [acesso 09 fev 2019]. Disponível em: URL: https://rd.uffs.edu.br/handle/prefix/597.
42. Castro DSD, Oliveira, TKBD, Lemos DM, Rocha APT, Almeida RD. Effect of temperature on the physicochemical composition and bioactive compounds of taro flour obtained in a spouted bed. Brazilian Journal of Food Technology 2017;20:01-05. [acesso 18 jan 2019]. Disponível em: URL: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1981-67232017000100419.
43. Silva DO. Avaliação da toxicidade, citotoxicidade e de características fenológicas e físico-químicas da planta *Pereskia aculeata* [tese]. Pelotas: Universidade Federal de Pelotas; 2017. [acesso 19 fev 2019]. Disponível em: URL: http://repositorio.ufpel.edu.br:8080/handle/prefix/3495.

44. Queiroz CRAA, Ferreira L, Gomes LBP, Melo CMT, Andrade RR. Ora-pro-nóbis em uso alimentar humano: percepção sensorial. Revista Verde de Agroecologia e Desenvolvimento Sustentável 2015;10(3):01-05. [acesso 11 abr 2019]. Disponível em: URL: https://www.gvaa.com.br/revista/index.php/RVADS/article/view/3393.
45. Zem LM, Helm CV, Zuffellato-Ribas KC, Koehler HS. A nutritional analysis of juices of ora-pro-nobis's leaves and stalks. Revista Eletrônica Científica da UERGS, 2018;4(3):512-524. [acesso 17 abr 2019]. Disponível em: URL: http://revista.uergs.edu.br/index.php/revuergs/article/view/1531.
46. Teixeira AP, Oliveiral MA, Lima ES, Matsuura T. The use of purple yam (Dioscorea trifida) as a health-promoting ingredient in bread making. Journal of Research in Biology 2013;3(1):747-758. [acesso 16 abr 2019]. Disponível em: URL: https://www.academia.edu/7651726/The_use_of_purple_yam_Dioscorea_trifida_as_a_health-promoting_ingredient_in_bread_making.
47. Jeovani M. Projeto de Lei nº 2275/2016. Programa de incentivo ao cultivo e à comercialização de plantas alimentícias não convencionais (pancs) no Estado do Rio de Janeiro**,** Rio de Janeiro: 2016. [acesso 11 fev 2019]. Disponível em: URL: http://alerjln1.alerj.rj.gov.br/scpro1519.nsf/1061f759d97a6b24832566ec0018d832/bc3362fd72614b2d8325807300606acf?OpenDocument&ExpandSection=-1.
48. Souza AC, Broietti FCD. Análise em anais do ENPEC sobre a temática avaliação em química. ACTIO: Docência em Ciências, 2017;2(1):122-142. [acesso 17 jan 2019]. Disponível em: URL: https://periodicos.utfpr.edu.br/actio/article/view/6730.
49. Carmona IV, Pereira MV. Ciência, Tecnologia e Sociedade e Educação Ambiental: Uma Revisão Bibliográfica em Anais de Eventos Científicos da Área de Ensino de Ciências. Revista Ciências & Ideias, 2018;8(3):94-114. [acesso 29 abr 2019]. Disponível em: http://revistascientificas.ifrj.edu.br:8080/revista/index.php/reci/article/view/752.
50. Severino AJ. Metodologia do trabalho científico. São Paulo: Cortez; 2007.
51. Congresso Nacional SBAN – Quem Somos. [acesso 07 jan 2019]. Disponível em: URL: http://www.sban.org.br/congresso2015/quem.php.
52. Pessôa LR, Rêgo TS, Monteiro ICCR, Costa CAS, Feijó MBS, Boaventura GT. Avaliação do efeito da farinha de inhame (*dioscorea bulbifera*) nas concentrações de triglicerídeos e colesterol hepático e fecal em ratas wistar submetidas o diabetes experimental. In: XXIII Congresso Brasileiro de Nutrição; 2014; Vitória. p. 433.
53. Paschoal V, Santos RHV, Santos MV, Moreira SR **;** Domingues G. identificação das plantas alimentícias não convencionais em uma região de alta vulnerabilidade sócio econômica do cerrado no centro-oeste paulista. In: XXIV Congresso Brasileiro de Nutrição; 2016; Porto Alegre. p. 1846.
54. Pinheiro SS, Oliveira HAB, Silva BP, Anunciação PC, Lucia CMD. Vitaminas, carotenoides e compostos fenólicos em hortaliças não convencionais preparadas por agricultores familiares da zona da mata de Minas Gerais. In: XXIV Congresso Brasileiro de Nutrição; 2016; Porto Alegre. p. 2573.
55. Yuyama LKO, Aguiar JPL, Lima ES, Oliveira JAA, Kitayama CSOH, Nagahama D, et al. Cubiu (*Solanum sessiliflorum* Dunal) desidratado como fonte de fibra alimentar possui ação hipocolesterolêmica? In: 9º Congresso Nacional da Sociedade Brasileira de Nutrição; 2007, São Paulo. p. 247.
56. Ferraz J, Costa LC, Nagahama D. Capacitação com agricultores familiares sobre alimentação saudável e sustentável Manaus-AM? In: 14º Congresso Nacional da Sociedade Brasileira de Nutrição; 2017; São Paulo. p. 299.
57. Baalbaki ACF. A divulgação científica e o discurso da necessidade. Letras, 2014;24(48):379-396. [acesso 15 abr 2019]. Disponível em: URL: https://periodicos.ufsm.br/letras/article/viewFile/14445/pdf.

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.

Received: May 15, 2019
Accepted: January 14, 2020