

Rescuing popular knowledge and using unconventional food plants as a possibility of nutritional security

Resgate do conhecimento popular e uso de plantas alimentícias não convencionais como possibilidade de segurança nutricional

Rescate del saber popular y uso de plantas alimenticias no convencionales como posibilidad de seguridad nutricional

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Abstract

Unconventional food plants (UFP) are those with limited distribution, restricted to certain locations, with great participation in the nutrition and culture of traditional populations. UFP are among the sources of food that develop in natural environments without the need for inputs and deforestation of new areas, but although available at low cost, they are still unknown and underutilized by a significant portion of the population. The present study aimed to analyze the dynamics of eating habits and survey UFP in agrarian reform settlements in the municipality of Maragogi, state of Alagoas. To collect information on the use of UFP, questionnaires were applied and data were tabulated in electronic spreadsheet and transformed into tables. In settlements evaluated, between twelve and fourteen different UFP were identified in the social context of these communities. There are several UFP options that could be marketed by the population, thus contributing to increase family income.

Keywords: Agroecology; Biodiversity; Food sovereignty.

Resumo

As plantas alimentícias não convencionais (PANC) são aquelas com distribuição limitada, restringidas a determinadas localidades, tendo grande peso na alimentação e na cultura de populações tradicionais. Essas PANC estão entre as fontes de alimentos que se desenvolvem em ambientes naturais sem a necessidade de insumos e da derrubada de novas áreas, porém embora disponíveis a um custo baixo, ainda são desconhecidas e subutilizadas por uma parcela significativa da população. O presente trabalho objetivou analisar a dinâmica dos hábitos alimentares e fazer o levantamento das PANC em assentamentos da reforma agrária em Maragogi no Estado de Alagoas. Para o levantamento das informações quanto ao uso de PANC foram aplicados questionários e os dados foram tabulados em planilha eletrônica e transformados em tabelas. Nos assentamentos visitados foram identificadas entre doze e quatorze diferentes PANC inseridas no contexto social dessas comunidades. Há várias opções de PANC que poderiam ser comercializadas pelos moradores dos assentamentos contribuindo também para renda familiar.

Palavras-chave: Agroecologia; Biodiversidade; Soberania alimentar.

Resumen

Las plantas alimenticias no convencionales (PANC) son aquellas de distribución limitada, restringidas a determinados lugares, teniendo gran peso en la alimentación y cultura de las poblaciones tradicionales. Estos PANC se encuentran entre las fuentes de alimentación que se desarrollan en ambientes naturales sin necesidad de insumos y limpieza de

nuevas áreas, pero aunque disponibles a bajo costo, aún son desconocidos y subutilizados por una parte importante de la población. El presente trabajo tuvo como objetivo analizar la dinámica de los hábitos alimentarios y encuestar el PANC en asentamientos de reforma agraria en Maragogi en el Estado de Alagoas. Para la recolección de información referente al uso del PANC se aplicaron cuestionarios y los datos fueron tabulados en planilla electrónica y transformados en tablas. En los asentamientos visitados se identificaron entre doce y catorce PANC diferentes insertas en el contexto social de estas comunidades. Existen varias opciones de PANC que podrían ser comercializadas por los habitantes de los asentamientos, contribuyendo además al ingreso familiar.

Palabras clave: Agroecología; Biodiversidad; Soberanía alimentaria.

1. Introduction

Unconventional food plants (UFP) are those with limited distribution, restricted to certain locations (Kinupp 2018). Borges e Silva (2018), through qualitative research at fairs in the city of Manaus / AM, identified that the use of UFP is deeply linked to family knowledge, passed down from generation to generation, that is, an older person or someone who has knowledge about the preparation and handling of species, passes on a recipe to young people and thus the knowledge is perpetuated. Machado e Kinupp (2020) inform that women have greater importance in the knowledge of different wild UFP species.

Kinupp (2007) points out that because they are unknown to the majority of the population, older populations and with secular cultures, such as the indigenous, have the knowledge of these species unusual in modern society, as well as their potential use as food. Rocha *et al.* (2018) highlighted that the use of UFP by indigenous and traditional Brazilian communities, even of some with medicinal purposes, becomes an important part of the culture of these populations. In addition to involving nutrition, these plants are part of the social context of these communities, whether in the consumption of teas, juices and drinks, food preparations or through fresh consumption, helping to outline and conceive the concept of cultural and ethnobotanical identity.

Chaves (2016) conducted research with riverside communities in the lower Tapajós River and found that they still have knowledge related to UFP species, using them as food, especially fresh fruits. Brack *et al.* (2020) highlight the high richness of fruit species found in Rio Grande do Sul and the importance of their potential for sustainable use.

At the origin and development of the diverse peoples of humanity, there were great deprivations of their basic needs, such as food and shelter. When the need for food is analyzed, recurrent hunger crises were observed, in some cases local (endemic), and, more rarely, in a generalized way (pandemic), such as crises that have affected the European continent for several centuries (Kinupp & Lorenzi 2014).

Hunger can be caused by diverse environmental catastrophes, wars and economic crises. The current world foodstuff production is greater than what is actually needed to feed the population of the planet, and in addition, there is the problem of great waste in the production chain, from production properties in the field to the destination to the final consumer. Along with these factors, humanity does not use or underutilize native species or those with potential to be used as food, to diversify menus and ingested nutrients (Kinupp & Lorenzi 2014).

Wilson (2012) explains that approximately 30,000 plant species have edible parts, of which, throughout human history, only 7,000 have been grown for food purposes. Currently, 90% of the world's food comes from only twenty species, the same discovered by our ancestors, of which, only three of them (wheat, corn and rice) provide more than half of this percentage.

In addition, Ranieri (2017) states that diversified diet can bring all nutrients that the organism needs, and, in line with this argument, UFP are an excellent way for adequate, healthy and responsible diet. Regarding the environment, producing UFP means recognizing native species whose use is disappearing and also valuing our biodiversity, as many are still

underutilized as food. Many unconventional plants, due to their resistance and varied production, guarantee healthy diet, available all year round and at low cost.

Discussions have been held since the 1980s about food and nutritional security and sovereignty of the population, including with farmers, as well as the ways in which food is produced and obtained (Carneiro *et al.* 2012). Thus, there is great interest on the part of several areas on the theme of food and nutritional sovereignty and the relationship with agroecology, ethnobotany, unconventional food resources, among others (Rufino 2008).

The concept of Food Sovereignty is born in counterpoint to the concept of Food Security established by FAO, as it is understood that a people to be free must be sovereign and that sovereignty passes through food. Thus, it is the inherent rights of peoples to produce their own food and to define their own sustainable policies and strategies for food production, distribution and consumption, which guarantee the right to food for all their population, based on small and medium production, respecting their own cultures and the diversity of peasant production modes (MPAB 2016).

There is high potential in these unconventional plant species, in addition to developing fast in the Brazilian soil, which has very diverse flora. Adverse to this reality, the agricultural matrix in the country is based on the commercial exploitation of a few exotic species that have been domesticated (Kinupp & Lorenzi 2014).

The Ministry of the Environment (MAPA 2010) reports that despite all the knowledge about native species, most of the national economic activities is based on exotic species. Sugarcane comes from New Guinea, coffee from Ethiopia, rice from the Philippines, soy and orange from China, cocoa from Mexico and wheat have Asian origin. The Brazilian agribusiness sector alone accounts for about 40% of the national GDP.

The value of Brazilian biodiversity is incalculable, and its reduction compromises the sustainability of the environment, the availability of natural resources and, thus, life on Earth. In contrast, its conservation and sustainable use result in incalculable benefits for humanity. Thus, studies searching for better use of the Brazilian biodiversity should be intensified (MAPA 2010).

Another alarming issue is the end of natural resources and the increasing loss of our biocapacity, which is the capacity of ecological systems to generate natural resources and absorb the waste generated. That is, the required area is increasing considerably over the past few decades, significantly overcoming the available biocapacity area. In addition, there is an increasing need for transport flows for highly processed and packaged products, since many come from long distances, which generates greater emission of gases that contribute to the greenhouse effect (WWF 2018).

Dutra (2013) reported that the substitution of traditional foods for industrialized products threatens the food sovereignty of many rural families and results in greater dependence on external foods with high financial cost for these populations.

In this sense, Ranieri (2017) reported that UFP must be related to what the local environment can provide. The interest is not to import food from distant locations, but to maximize what can be offered around a certain location. All regions of Brazil have great potential for exploring unconventional food plants, whether they are native or originating elsewhere.

Conventional vegetables and legumes, such as kale, carrots and potatoes, have very similar care in relation to their cultivation and need fertile soils, with periodic irrigation and abundant sunlight. However, many UFP have different needs and can occupy spaces where there is little sunlight, whose soil is not as fertile, or too humid or dry for conventional crops. In addition, when cultivated by farmers, UFP help to take advantage of previously unproductive areas, and since they have different seasonal requirements, they can manage to bring greater supply of food throughout the year (Ranieri 2017).

In 2002, Brazil published Decree No. 4.339, which instituted the principles and guidelines for the implementation of the National Biodiversity Policy. In 2006, through Law 11.346, the National System for Food and Nutritional Security -

SISAN was established. In 2010, Decree No. 7.272 / 2010 was published, which regulates Law No. 11.346 and establishes the parameters for the elaboration of the National Food and Nutrition Security Policy.

Although at the time of publication of these legal instruments, the acronym “UFP” had not yet appeared, in its various articles it is possible to perceive the government's interest in preserving the country's biological diversity.

Unconventional food plants can be included in the preservation of the Brazilian green heritage, in addition to other topics, such as food sovereignty and security. One of the results that may have correlation with these policies focused on food sovereignty was the exit of Brazil in 2014 from the United Nations Hunger Map (Brasil 2014).

At state level, the government of Amazonas recently sanctioned Law 4.813, of April 17, 2019, which requires the Executive Branch to create a Program to Encourage the Cultivation and Commercialization of Unconventional Food Plants. The program seeks to encourage the growth of family farming through the process of agroecological transition with no use of pesticides to improve the quality of life of consumers through UFP, including being able to adopt measures to reduce and / or exempt taxes and fees that affect or come to affect cultivation and the marketing of UFP.

Accordingly, the city hall of Jundiá / SP, through a project developed by the Department of Food and Nutrition, will make the city the first in the world to include UFP species in school meals. The project, called “Inova na Horta”, is part of the Innovative School Program, which aims to add nutritional value to children's food, in addition to spreading knowledge to families. The work that inspired the work in the city was developed in a school in São Paulo under the supervision of Guilherme Reis Ranieri, from the Kairós Institute, an NGO responsible for implementing this program (TVTECJ 2019).

In Alagoas, although there are no reports of public policies aimed at stimulating the marketing and consumption of UFP, it was disclosed in the television program that a school in the municipality of Paripueira is using “moringa” leaves (*Moringa oleifera*) to feed children in day care institutions, a project developed by NGO “Associação Comunitária e Beneficente Vila Ana Maria – ABEVILA” (PortalG1 2019).

Oliveira Júnior et al. (2018) listed more than a hundred native species capable of developing economic activities in Joanópolis / SP. The local biodiversity and natural resources are capable of promoting improvement in the quality of life of local populations, with greater ecological balance and social justice. Thus, it is possible to perceive that there is economic potential in new productive chains of sociobiodiversity.

Kinupp & Lorenzi (2014) cataloged about 351 UFP species that they considered the most promising. As Brazil is a country with great fauna and flora, it is natural that there is high diversity of species that can be used as food. In fact, in many cases, a particular plant or part of a plant may be of common use to the inhabitants of one location, but in another region it may be of no value, and ends up not being used by that particular population.

Seeking to change this scenario, further scientific works are needed to increase the list of UFP as viable alternative to food sovereignty and nutritional diversity, but currently studies in this area are scarce, especially in Alagoas.

In general, studies related to unconventional plant species involve communities in need and in situations of social risk, such as indigenous peoples, agrarian reform settlements, riverside communities, among others.

The knowledge obtained in scientific works of this nature, when passed on to these populations, can cause positive changes in their food and nutritional security.

This work aimed to analyze the dynamics of the eating habits and survey and identify Unconventional Food Plants most commonly used in agrarian reform settlements in the municipality of Maragogi, state of Alagoas.

2. Methodology

The aim of the present applied scientific research was focused on the acquisition of empirical knowledge, acquired through the experiences reported by interviewees.

This is a descriptive research, which approached both quantitative and qualitative aspects (Pereira, et al., 2018). With regard to information collection procedures, bibliographic research, case study and field research were carried out.

Quantitative data were treated in electronic spreadsheet, which served as a basis for the creation of graphs and tables presented.

The research was carried out in agrarian reform settlements carried out by the National Institute of Colonization and Agrarian Reform - INCRA, in the city of Maragogi, located in the Eastern Alagoas Mesoregion.

The settlement areas were chosen in conjunction with the Rural Workers Union, giving preference to the oldest rural settlement projects.

The total number of settlements selected was three of which in Maragogi: Nova Jerusalem, Itabaiana and Junco.

The choice for these communities was due to the fact that they already present reports of UFP consumption by their population, which allowed analyzing the species that occur in the region. Field visits in settlements were performed.

Interviews were conducted from October 2018 to April 2019 with farming families living in settlements, seeking for a population sample of at least 15%, with each respondent representing only one settled family.

During the research process, the collaboration of the community leader was sought in the dialogue with interviewees, community members and in the synthesis of information in meetings with the participation of interviewees. The interviewed families were indicated by the community during the meeting for the presentation of the research project.

The applied research form followed the semi-structured pattern, without neglecting any information that emerged and was considered important for the study. The interview form contained direct questions to obtain information about UFP, their handling and the context of their use. The synthesis of information about UFP consisted of their scientific name, popular name, parts consumed, reason for use and amount of citations by interviewees. Data obtained were treated in electronic spreadsheet, which served as basis for the creation of graphs and tables.

The identification of plants was performed during field visits, together with residents of settlements, who identified plants that occurred locally through their respective popular names. Photographic records were also performed.

To identify the name and other aspects, the UFP Identification Guide, nutritional aspects and illustrated recipes were used, elaborated by Kinupp e Lorenzi (2014).

After correct identification, in addition to other information available in the mentioned Guide, studies related to certain plants were sought in the scientific literature, aiming at obtaining nutritional, general and culinary data.

3. Results and Discussion

When crossing the number of interviewees and families living in settlements (Table 1), it was found that the minimum desired percentage of the population sample (15%) was reached.

Table 1: Population sampling of interviewees in settlements.

SETTLEMENTS	FAMILY	INTERVIEWED*	% REACH
Nova Jerusalém (Maragogi/AL)	52	50	96%
Junco (Maragogi/AL)	40	20	50%
Itabaiana (Maragogi/AL)	70	13	19%

* Each interviewee corresponds to a settled family member. Source: Authors.

In the Nova Jerusalem settlement, 96% sampling was achieved. This high percentage of interviews was due to the easy contact with interviewees at this location, since the Maragogi campus of IFAL is located within the settlement.

The results of this applied research in the Maragogi settlements revealed important information about the dynamics of these communities in the use of unconventional plant species. It was observed that UFP are not always valuable for marketing or for use in the daily diet of these communities.

As they are residents of agrarian reform settlements, most respondents have agriculture as their main source of income. Products are usually sold at fairs of organic agriculture, spread across the city of Maceió, capital of Alagoas. Most products are of conventional use, but in some fairs, UFP are already marketed.

Despite having satisfactory production, fair marketers reported difficulties in marketing, informing that the routine is tiring and almost always they return home with most of the production.

Better disclosure of the benefits of these products can help improve sales such as the creation and partnerships with consumer networks.

Coradin *et al.* (2011) reported that the conservation of these native species and their appropriate use as food source can increase the food diversity and the income of rural producers.

Most respondents in settlements have only incomplete primary education, which can be justified by the fact that they are predominantly farmers, who do not have easy access to education.

Although most interviewees do not know the acronym UFP, promoting a dialogue about the consumption of some plants that grew close to their homes and that were not normally intended for marketing, it was possible to identify that all communities used or use some species that fall into the UFP category, some for food purposes and others for medicinal purposes.

Kinupp e Lorenzi (2014) reported that there is a need to expand the botanical, reproductive, ecological, genetic and molecular studies of UFP and native fruits aiming at increased production in properties and use as food, as well as the need for further scientific research on bromatological characteristics and nutritional value. Studies involving food technology are also important, seeking the most appropriate use of a given species in the context in which it is inserted.

When asked how they became aware of these unconventional food plants, 54% of respondents in the Nova Jerusalem settlement reported that they did not know that they could be used as food; however, 34% reported to have acquired knowledge through family members, and only 10% acquired knowledge through social media.

In the Junco settlement, 75% of interviewees reported that they learned about it through popular wisdom. Accordingly, Kinupp e Barros (2007) reported that changes that occurred in the profile of the rural population due to urbanization phenomena and rural exodus, as well as advertising from the industrialized food industries, favored that unconventional food resources gradually lose space in the daily diet of Brazilians.

According to results, it appears that UFP are used in their communities mainly because they occur in the vicinities of their homes or for medical use.

In line with the fact that the UFP consumption is linked to a certain plant being common in the region where people live, Justen (2013) conducted a research on the use of native food plants in the state of Santa Catarina and verified that the collection and use of native products are made occasionally by populations living near the Santa Catarina forests.

However, there were only a few experiences of collection and marketing of fresh or processed fruits of native species, but with little commercial use, evidencing lack of knowledge of the nutritional and economic potential of these species.

This lack of knowledge was also observed in the evaluated settlements. Practically all UFP found are not used in the ordinary diet of residents, with some exceptions. Consequently, cultivation for commercial purposes is also not carried out.

According to Table 2, the plants most used in the Nova Jerusalem, Itabaiana and Junco settlements are “taioba”, “coração/mangará/umbigo da bananeira”, “batata-da-praia”, “papoula” and “abóbora” leaves.

Table 2: Popular name, edible parts, uses and number of citations (including percentage) of Unconventional Food Plants (UFP) cited by respondents in Nova Jerusalem, Itabaiana and Junco settlements. Maceió-AL, 2019.

Settlements	POPULAR NAME	CONSUMED PARTS	USES	CITATION	%
NOVA JERUSALÉM (MARAGOGI/AL)	Taioba	Leaves	Stews, soups	16	31%
	Bananeira	Heart	Stews, syrup	8	16%
	Mandioca	Leaves	Stews, cake	4	8%
	Hortelã Grosso	Leaves	Soups, jelly	4	8%
	Alfavaca	Leaves	Fish	3	6%
	Abóbora	Leaves	Stews	3	6%
	Hortelã Miúda	Leaves	Seasoning, tea	3	6%
	Batata-da-praia	Leaves	Stews	2	4%
	Papoula/Hibisco	Flowers	Tea	2	4%
	Coentrão	Leaves, roots	Stews	2	4%
	Ixora Laranja	Fruits, flowers	Salad	1	2%
	Almeirão	Leaves	Stews, seasoning	1	2%
	Ixora Pink	Flowers	Salad	1	2%
	Ora-pro-nóbis	Leaves	Stews	1	2%
				51	100%
ITABAIANA (MARAGOGI/AL)	Bananeira	Coração/mangará, fruto verde, casca	Tews, syrup	4	21%
	Taioba	Leaves	Stews, soups	4	21%
	Bredo/Caruru	Leaves e seeds	Stews	2	11%
	Batata-da-praia	Leaves	Stews	1	5%
	Papoula/Hibisco	Flowers	Tea, salad	1	5%
	Coentrão	Leaves, roots	Stews	1	5%
	Feijão-de -Porco	Seeds	Stews, salad	1	5%
	Abóbora	Seeds, leaves	Stews	1	5%
	Batata de Araruta	Roots	Stews	1	5%
	Bredo-de-Porco	Leaves	Sauces, soups, stews	1	5%
	Mandioca	Leaves	Stews, cake	1	5%
	Vinagreira	Flowers	Stews, jelly	1	5%
				19	100%
JUNCO (MARAGOGI/AL)	Taioba	Leaves	Stews, soups	10	24%
	Bredo	Leaves e seeds	Stews, suflês	6	15%
	Bananeira	Heart	Stews, syrup	4	10%
	Mandioca	Leaves	Stews, cake	4	10%
	Papoula/Hibisco	Flowers	Tea	3	7%
	Alfavaca	Leaves	Fish	3	7%

Caruru	Leaves e seeds	Stews	2	5%
Abóbora	Seeds, leaves	Stews	2	5%
Jaca	Seeds	Stews	2	5%
Moringa	Leaves, seeds	Stews	2	5%
Ixora Pink	Flowers	Salad	1	2%
Batata-da-praia	Leaves	Stews	1	2%
João ou Major-Gomes	Leaves	Stews, cake, salad	1	2%
			41	100%

Source: Authors.

Barreira *et al.* (2015) identified 59 different UFP in rural communities of Viçosa / MG. In the present study, through interviews in the settlements and field visits, it was possible to identify the following numbers of different UFP: 14 in the Nova Jerusalem settlement; 12 in Itabaiana settlement and 13 in Junco settlement. When the total found in the four settlements was analyzed, 24 different UFP were found. As reported by Tuler *et al.* (2019), the results found demonstrate great knowledge of the community about the diversity of local plants used as food.

Upon verifying which three plants were most cited by respondents in each settlement, two were among the most cited in all three study sites, which were “coração ou mangará da bananeira” and “taioba”.

During dialogue with an interviewee from the Itabaiana settlement, one of the oldest settlers, it was revealed that some residents used UFP as an alternative to conventional food in times of scarcity, such as “moringa”, popularly called “carne-de-pobre” due to the high protein content of its leaves, when there was no financial resource for the purchase of animal protein.

Although the use of leaves is the most common, Kinupp e Lorenzi (2014) reported that “ora-pro-nobis” fruits are rich in carotenoids, and when immature are source of vitamin C, which can be used in the production of juices, jams, mousses or liqueurs. The flowers of this species can also be used for food purposes, such as salads and omelets.

Most interviewees did not mention the use of part of conventional species that are usually planted and marketed, but it is important to emphasize the total use and avoid waste. Sweet potato is widely cultivated in all surveyed settlements; however, residents commonly only use tuberous roots. However, the leaves and bark of this species can also be used.

Pacheco *et al.* (2012) developed two foods using sweet potatoes with skin: a cake and a salty food. Sensory evaluation was performed with 20 untrained tasters. The salty food was approved by more than 90% and sweet cake was approved by more than 85%, indicating that the full use of foods is a sustainable alternative against waste, allowing the preparation of tasty and healthy foods. Cardoso *et al.* (2016) developed some UFP-based sweets, such as “baru” chocolate truffle, “hibiscus” alfajor and pink pepper candy. These sweets were marketed and consumers were extremely receptive. Some types of sweets were totally sold.

“Taioba” leaves are used as food supplement in the school meal of a school located in the Murici settlement. According to Kinupp e Lorenzi (2014), this plant is widely used as food in some states, mainly Minas Gerais and Rio de Janeiro. Both leaves and roots (rhizomes) are used, but they should only be consumed after being submitted to appropriate cooking process (bleaching), since there is calcium oxalate at low concentrations in this plant (Kinupp & Lorenzi, 2014). It was found that some interviewees use some specific UFP because it is tradition in some events, such as “brede-de-porco” leaves used for Friday lunch during Holy Week.

“Brede-de-porco”, also known as “erva-tostão”, “pega-pinto”, “amarra pinto” and “tangará” is a type of wild spinach, but to be suitable for consumption, its leaves must be harvested very young and scalded, as they appear to have a certain

content of calcium oxalate in their composition. Leaves can be used in stews, sauces and soups. It is a species with diverse medicinal uses, popular in Brazil and in the world, with leaves having antioxidant potential and antimicrobial action, and probable being source of carotenoids, requiring deeper bromatological studies (Kinupp & Lorenzi 2014).

Respondents reported that some species are used exclusively for medicinal purposes, but are also used as food, such as mint and “coração da bananeira”, for example (Table 2). Silva (2017) reported that there is concentration of studies on plants of medicinal use in the state of Amazonas (Monteiro 1988; Vásquez *et al.* 2014). Nevertheless, other studies aim to understand the food uses of these species. Chaves (2016) studied UFP at Resex Arapiuns-Tapajós, in the state of Pará, and identified 80 plants. On the other hand, Costa e Mitja (2010) studied how plant resources were used by eleven families that live in the rural area of Manacapuru / AM, and found that of the total of 173 species, 68 are used as food. Fernandes (2012) recorded 45 plants in his survey of forest species for food use in the Tunuí-Cachoeira indigenous community.

4. Conclusion

In each settlement under study, twelve to fourteen different UFP were identified in the social context of these communities, and in the total of the three settlements, twenty-four different UFP were identified.

There are several UFP options that could be marketed by residents of these settlements, either in the fresh form or processed (adding value), thus being able to improve the family income of settlers. As they are rustic species, production cost would not be high.

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