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CHARACTERIZATION OF ANDIROBA OIL PRODUCTION (*Carapa guianensis AUBL.*) OF RIVERSIDE WOMEN COMMUNITIES OF MUTUACÁ ISLAND, CAMETÁ-PA

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ABSTRACT

Objective: This study aimed to understand the importance of andiroba oil production by riverside women of Mutuacá island from the municipality of Cametá-PA in addition to describe the oil production steps.

Theoretical Framework: Extractive process was understood as first form of economic exploitation, limiting the collection of products existing in nature, with low productivity mainly in off-season of product, the need to rationalization and source in income for traditional populations of the riverside areas.

Method: The construction and production of information and data methodology adopted was qualitative and quantitative research modality. Data collection was conducted by participant observation and open-ended interviews. It was possible to identify and describe the artisanal extraction of andiroba oil process and its importance in the riverside women´s lives. The research included on 26 women extractivists participation who worked in the collection and processing of seeds.

Results and Discussion: The results obtained revealed that age range of extractivists varied within the 21 to 60 years old, that in all production stages, female gender stands out considerably and that the peak of seed fall occurs in December month, the rainiest time of the year, when the açaí fruit harvest is ending.

Research Implications: The research stands out that women extractivists have taken the role over main character in andiroba oil production, which involves on female empowerment, good seed processing practices and financial management.

Originality/Value: This study contributes to use of good management practices to facilitate licensing, certification and improvement of quality seals, making the product and by-products more valued, thus guaranteeing financial resources for the sustenance of riverside families.

Keywords: Andiroba Oil, Riverside Women, Female Empowerment, Agroecology, Mutuacá Island, Obtaining Process.

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CARACTERIZAÇÃO DA PRODUÇÃO DE ÓLEO DE ANDIROBA (Carapa guianensis AUBL.) POR MULHERES RIBEIRINHAS DA COMUNIDADE DA ILHA DE MUTUACÁ CAMETÁ-PA

RESUMO

Objetivo: O objetivo deste estudo é compreender a importância da produção do óleo da andiroba por mulheres ribeirinhas da ilha de Mutuacá no município de Cametá-PA além de descrever as etapas da produção do óleo.

Referencial Teórico: O processo extrativo foi compreendido como a primeira forma de exploração econômica, limitando a coleta de produtos existentes na natureza, com baixa produtividade principalmente na entressafra do produto, a necessidade de sua racionalização e uma fonte de renda para as populações tradicionais das áreas ribeirinhas.

Método: A metodologia adotada foi a construção e a realização de informações e dados, optou-se pela modalidade de pesquisa qualitativa e quantitativa. A coleta de dados foi realizada por meio de observação participante e entrevistas de questões abertas, foi possível identificar e descrever o processo de extração artesanal do óleo de andiroba e sua importância na vida das mulheres ribeirinhas. A pesquisa contou com a participação de 26 mulheres extrativistas que atuaram na coleta e beneficiamento das sementes.

Resultados e Discussão: Os resultados obtidos revelaram que a faixa etária das extrativistas variou de 21 anos à 60 anos, que em todas as etapas de produção o gênero feminino se destaca consideravelmente e o auge da queda da semente acontece no mês de dezembro, época mais chuvosa do ano, quando a safra do fruto do açaí está terminando.

Implicações da Pesquisa: A pesquisa destaca que as mulheres extrativistas assumiram o papel de protagonistas na produção do óleo de andiroba a qual envolveu o empoderamento feminino, boas práticas de beneficiamento da semente e gestão financeira.

Originalidade/Valor: Este estudo contribui para a utilização de boas práticas de manejo para facilitar o licenciamento, certificação e a implementação de selos de qualidades tornando o produto e os subprodutos mais valorizado assim garantindo recursos financeiros para o sustento das famílias ribeirinhas.

Palavras-chave: Óleo de Andiroba, Mulheres Ribeirinhas, Empoderamento Feminino, Agroecológia, Ilha de Mutuacá, Processo de Obtenção.

CARACTERIZACIÓN DE LA PRODUCCIÓN DE ACEITE DE ANDIROBA (Carapa guianensis AUBL.) POR MUJERES RIBERANAS DE LA COMUNIDAD DE MUTUACÁ ISLA CAMETÁ-PA

RESUMEN

Objetivo: El objetivo de este estudio es comprender la importancia de la producción de aceite de andiroba por parte de las mujeres ribereñas de la isla de Mutuacá en el municipio de Cametá-PA, además de describir las etapas de la producción de aceite.

Marco Teórico: El proceso extractivo fue entendido como la primera forma de exploración económica, limitando la recolección de productos existentes en la naturaleza, con baja productividad especialmente en la temporada baja del producto, necesidad de su racionalización y fuente de ingresos para las poblaciones tradicionales de zonas ribereñas.

Método: La metodología adoptada fue la construcción y creación de información y datos, optándose por la investigación cualitativa y cuantitativa. La recolección de datos se realizó a través de observación participante y entrevistas abiertas, se logró identificar y describir el proceso de extracción artesanal del aceite de andiroba y su importancia en la vida de las mujeres ribereñas. La investigación contó con la participación de 26 mujeres extractivistas que trabajaron en la recolección y procesamiento de las semillas.

Resultados y Discusión: Los resultados obtenidos revelaron que el rango de edad de los extractivistas osciló entre los 21 años y los 60 años, que en todas las etapas de producción destaca considerablemente el género femenino y el pico de pérdida de semillas se presenta en el mes de diciembre, época más lluviosa del año. , cuando finaliza la cosecha del fruto del açaí.

Implicaciones de la investigación: La investigación destaca que las mujeres extractivistas asumieron un rol protagónico en la producción de aceite de andiroba, lo que implicó empoderamiento femenino, buenas prácticas de procesamiento de semillas y gestión financiera.

Originalidad/Valor: Este estudio contribuye al uso de buenas prácticas de gestión para facilitar el otorgamiento de licencias, certificaciones e implementación de sellos de calidad, valorizando más el producto y subproductos, garantizando así recursos financieros para apoyar a las familias ribereñas.

Palabras clave: Aceite de Andiroba, Mujeres Ribereñas, Empoderamiento Femenino, Agroecología, Isla Mutuacá, Proceso de Obtención.

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1 INTRODUCTION

Plant extraction is an activity that has been and continues to be a source of income for traditional populations in Brazilian regions. This is the case of the city of Cametá, in the interior of Pará, where the floodplain areas have great potential for plant extraction. As it is a very old colonization zone in the Amazon, the municipality has always had its economic base linked to products extracted from the forest, going through several cycles of Non-Timber Forest Products - PFNMS. For Elias and Santos (2016), PFNMS are the products from the forest such as bark, resins, fibers, seeds, fruits that can be used for purposes domestic and economic. Thus, PFNMS are seen as alternatives to sustainable development in the Amazon, as there are no the need for the suppression of forest cover, and is therefore one of the factors that can decrease the deforestation rate of forests (Santana *et al.*, 2017). Furthermore, environmental point of view, the collection of PFNMS has a lower impact on forests, compared to other forms of land uses, such as extraction of wood and livestock, methods that involve conversion of the forest.

According to Oliveira *et al. (* 2014), the PFNMS with the oldest cycles in the focus region were: rubber, cocoa and andiroba. The economic base of Cameta was for a long time linked to products extracted from the native forest, such as rubber, cocoa and oilseeds. This scenario began to change after the end of the 19th century, a period in which there was a decline in these products, since some of these main products gained other national competitors or were affected by diseases. However, these items are still explored in the region, among them, andiroba (*Carapa guianensis* Aubl) , although Açaí has greater economic prominence at the moment.

For David and Passa (2016), rural communities demonstrate your perceptions about spaces productive from their relationships with the environment and with its culture, in which

plant resources can be highlighted in several ethnocategories of use. Floodplain ecosystems are a of the richest in productivity biological, biodiversity and resources natural in the Amazon (Silva and Oliviera, 2017). Thus, floodplain forests of the Amazon estuary, shelter numerous non-timber species with economic potential, being capable of promoting sustainable use and the generation of income for the populations Amazonian. In this context, andiroba can be identified as a relevant part of the extractive production in the municipality of Cametá, where it already had a large production cycle, but never ceased to have a great potential for non-timber exploration, so that the oil obtained from the seeds of this species serves as the main raw material in the production of riverside women in the locality of Mutuacá Island.

Given this finding, this work has, as its main objective, to understand the importance of the production of andiroba oil by riverside women from the island of Mutuacá, in the municipality of Cametá-PA. In time, the stages of the production of this material to which these women resort are described, to the point where we discuss the dimension of female protagonism in the production of andiroba oil.

2 THEORETICAL FRAMEWORK

Historically, andiroba oil was widely used in the Amazon. Between 1854 and 1864, the material was widely used for lighting in the city of Belém and in the interior of the Amazon during World War I, when there was a shortage of kerosene (Franco, 1998; Menezes, 2005; Homma, 2003). According to Leite (1997), there was a strong trade in andiroba seeds and oil in the Amazon estuary region, specifically in the 19th century, in the city of Cametá, the city where the oil industry originated, so much so that in 1898, 2/3 of the production of andiroba oil in the entire state of Pará came from this city.

Even with the history of great productive and economic potential that andiroba has had and continues to have , this plant species has not received any type of incentive or public policies aimed at the area. It is important to emphasize that andiroba oil continues to be a product that is highly appreciated by the local market. Its use is widely known and used by traditional populations due to its phytotherapeutic properties, mainly as an anti-inflammatory, against sore throats, injuries, arthritis, as a natural repellent and, recently, also highly sought after by the cosmetics industry.

Nowadays, with the issue of climate change, environmental preservation and the support of educational and research institutions, through the publication of scientific articles , we are led to believe that the activity of plant extraction is economically viable and socially fair, as it

can combine income, environmental conservation, in addition to contributing to improving the lives of traditional populations, considering that the standing forest is what provides their livelihood and guarantees the natural balance of the environment.

Extractivism as part of family production is significantly important for people to remain in the countryside. According to Carraza (2010); Niederle *et al* (2014), in addition to providing a diversity of products originating from native biodiversity, extractivism also helps the economic and social base in environmental preservation and improving the quality of life of riverside dwellers. All of this reaffirms the importance of studies of this nature to stimulate the strengthening of local development, based on the appreciation of this extractive activity as an important source of income in the municipality.

3 METHODOLOGY

3 .1 CHARACTERIZATIONS OF THE STUDY AREA

3.1.1 Characterization of Mutuacá Island

The research was carried out on Mutuacá Island, located in the municipality of Cametá-Pará, 150 km from Belém, the state capital. (IBGE, 2020). According to Rodrigues *et al* . (2021), the municipality is located on the left bank of the Tocantins River (Rodrigues *et al.* , 2000) and has an estimated population of 143,837 inhabitants (IBGE (2020).

According to the Koppen classification, the climate of this region is of the Am type, humid tropical. The vegetation existing in the lower Tocantins is characterized as dense equatorial. For Almeida *et al* (2019), this region consists of an ombrophilous forest, with a constant presence of Açaí (*Euterpe Oleracea* Mart.) and Buriti (*Mauritia flexuosa) palm trees,* with three types of areas, known as forest, floodplains and Igapós. In the floodplains, the soils are characterized by being periodically flooded, have a high nutrient content and are constantly renewed (Lima *et al.* , 1999).

Regarding the population, Azevedo (2018) points out that the residents of this area have all their daily activities regulated by the dynamics of the tides, obtaining two different flows that are regulated according to their direction. According to the scholar, when the direction is in the direction of increasing the volume, it is called *flood tide,* while when the direction is decreasing the volume, the flow is called *ebb tide.* The *flood tide* lasts on average 7 hours and

the *ebb tide lasts on average 4 hours, with two flood flows* and two ebb tide flows occurring per day .

For Arnaud (2010), the municipal economy is based on fishing and açaí extraction, but there are strong fluctuations between the period when fishing is open and the fruit harvest, which occurs between August and November, a period when the population has a greater financial income, and the fishing closed season and açaí off-season, when there is a considerable drop in family income. At this time, when families look for another source of income to supplement their families' livelihoods, plant extraction in the region intensifies, which in this work we present the production of andiroba oil.

Mutuacá Island belongs to the district of Juaba and is part of the upper sector of the municipality of Cametá. The locality is divided into: Mutuacá de Baixo, Mutuacázinho, Mutuacá do Meio and Mutuacá de Cima. The Mutuacá de Baixo island, which was the focus of this research, is part of the Juba island complex, bathed by several rivers, holes and streams, with the Furtado, Mutuacá, Mendaruçu, Juba and Jubinha rivers being those with the greatest navigability in the region.

The distance from the island of Mutuacá to the municipality's headquarters is approximately 30 km, about an hour's journey, and can only be accessed by river, where the means of transport are boats, rabetas (medium-sized vessels) and rabudos. (small vessel).

3.2 DATA COLLECTION

In order to construct and perform the analysis of information and data, the qualitative and quantitative research methods were chosen. Regarding the use of qualitative and quantitative approaches in the same research, Minayo and Sanches (1993) indicate that they can and should be used in such circumstances as complementary, since, according to the authors, there is no contradiction between them, since the first “works with values, beliefs, representations, habits, attitudes and opinions” and the second “has as its field of practices and objectives to bring to light observable data, indicators and trends”. Corroborating this thought, Goldenberg (2004) explains that, by combining the approaches, “the researcher is able to produce complete knowledge of reality, since different research approaches can shed light on different issues”.

First, data collection was carried out using participant observation techniques. One of the advantages of using this technique is the possibility of personal contact between the researcher and the research objective , allowing the observation of the subjects' daily

experiences and learning the meaning they attribute to reality and their actions (Lüdke and André, 1986). In addition, interviews with open-ended questions were conducted with women extractivists from Mutuacá Island, who extract andiroba oil. The interviews involve unstructured and generally open-ended questions, which are few in number and are intended to elicit the participants' conceptions and opinions (Creswell, 2007). Codes in the form of letters and numbers were assigned to the research subjects to preserve the identity of the informants, as suggested by Padilha *et al.* (2004), ensuring maximum care with the anonymity of the informants and protecting their identity so that the research data can be revealed more accurately without compromising the interviewee.

To obtain the data, we first contacted the leadership of the group of women extractivists from the Mututacá area who work in the production of andiroba oil, who contacted us with the other extractivists. Before starting the research, each of the members was given a Free and Informed Consent Form (FICF), in which the interviewees were informed about the importance and main objectives of the research, and were given the freedom to accept or refuse to participate in the research. Thus, through participant observation and open-ended interviews, it was possible to identify and describe the artisanal process of extracting andiroba oil and its importance in the lives of the riverside women of Mutuacá Island.

The research took place from October 2021 to August 2022 and had the participation of 26 female extractivists who work in the collection and processing of andiroba seeds, on the island of Mutuacá in the municipality of Cametá-PA.

4 RESULTS AND DISCUSSIONS

4.1 THE PROCESS OF COLLECTING ANDIROBA SEEDS ON MUTUACÁ ISLAND

According to the extractivists' report, the andiroba trees in the area have flowers and fruits all year round, but the peak of the fall of andiroba seeds occurs in December, the rainiest time of the year, facilitating the dissemination of the seeds through water flows.

The seeds are collected manually and are collected in the morning, always at low tide and mainly in the family production units of the interviewees. However, some of them claimed that they do not have a large production of andiroba seeds on their properties and, in order to have a larger quantity of seeds to produce the oil, they resort to buying products from other residents who have andiroba trees on their land, but do not process the seeds, only collecting them to sell. The following report concerns this practice . “We buy to complete , we bought

expensive this year (2021) at 1 real per kilo of seeds. The price of the seed varies according to the price per liter." (C2, 38 years old).

The seeds are collected on the ground, close to the parent trees, or in accumulation points moved by the watercourse, at low tide. The accumulation point is a technique developed to gather the seeds using the course of the tide. It is a kind of playpen made near the foot of the andirobeiras where, depending on the direction of the tide, the water passes between the fence and the seeds touch and accumulate.

Straw bags (polyethylene bags) are used to transport and store the seeds. The criteria adopted by them for selecting the seeds are: new seeds, without germination and without holes. When collecting, they are careful to leave some seeds for the animals to eat and avoid collecting those that are germinated, that is, those that already have the stem growing, so that they can give life to new andiroba trees. They do not collect during the months between andiroba harvests, which for them are from June to October, because they help their companions in collecting açaí. The following report concerns this moment.

> "We extract it from December to June. From July onwards, the oil starts to thicken and less oil is extracted. This is the hard time we talk about, right? This is when we stop using andiroba and move on to Açaí." (C3, 50 years old).

4.2 PROCESSING OF ANDIROBA SEEDS

According to the extractivists, the process of preparing and extracting andiroba oil on the island of Mutuacá is carried out using artisanal methods. It is the result of traditional empirical knowledge acquired by their ancestors and continues to be passed down from generation to generation, mainly by mothers, grandmothers and/or mothers-in-law. Thus, it is clear that knowledge is passed down through orality, observation and exchange of experiences, and represents the valorization of family cultural traits, since the transmission of knowledge and its valorization contribute to the resumption of ancient traditions (Pelegrini and Funari, 2017).

The research data indicated that the processing of andiroba seeds by extractivists on the island of Mutuacá follows the following steps:

4.2.1 Seed preparation

Seed preparation involves washing, selecting and weighing. After collection, the seeds are transported and stored in bags that are tied under the floor of the extractivists' houses or under their bridges, as shown in Figure 1. Since these are floodplain regions, the tide comes in and out under the houses and bridges, covering the seeds. According to the extractivists, this technique helps to maintain and preserve the seeds. Another factor that leads them to tie the bag with the seeds under the houses or bridges is related to security, in order to prevent theft. In addition, this choice is related to the proximity of the processing site, which is usually carried out around the homes. Finally, according to the extractivists, this technique also helps against the attack of the caterpillar *Hypsipyla grandella* (Zeller) (Lepidoptera: Pyralidae), responsible for the "andiroba borer" that makes holes in the andiroba seeds and consumes them quickly, leaving them bored (Santos and Pellicciotti, 2016).

Figure 1

Seeds stored and tied under the floor



The extractivists reported a method to identify bored seeds, which consists of pressing the seeds to see if they yield to pressure. If this occurs, it means that the seeds are hollow, that is, they are considered bored, and are not suitable for processing, because, according to the extractivists, the oil will be of poor quality, with characteristics of old and "greasy" oil. Finally, according to them, contact with water is the best way to protect against borer attacks, because they believe that the caterpillars that cause the borer die by drowning in constant contact with water.

Before cooking the seeds, they are washed in clean water to eliminate all residue accumulated during the period in which they were stored under the floor.

4.2.2 Cooking the seeds

For the cooking stage of the andiroba seeds, the extractivists use large cans, pots or pans as seen in figure 2. The method of preparation consists of adding clean water, so as to cover all the seeds and boiling for about 4 to 5 hours, as it is very common to use a wood fire. The wood fire becomes a more economically viable alternative for the extractivists, as, for them, cooking is faster and more efficient, thus reducing costs.

Figure 2

Andiroba seed cooking process



The method used by the extractivists to determine the cooking point is by pressing the seed shell to observe its density. Because this step is carried out outdoors, in the backyards of the properties, the extractivists prefer to carry out the cooking in the morning, when the sun's rays are milder.

4.2.3 Seed rest

After cooking, the water is drained and the seeds are stored in baskets or clean bags, leaving them to rest in a ventilated place free from insects to prevent mold and fungus. This process lasts around 15 to 40 days, depending on the amount of seeds in kilos. According to the extractivists, this procedure is necessary to eliminate, through evaporation or draining, all the

water accumulated in the seeds at the time of cooking, leaving them very “dry”, which guarantees greater quality of the oil produced.

4.2.4 Extraction of seed mass

After the seeds have rested, the pulp is extracted. This step is carried out in groups, to perform what they call the “guest” stage, when they use their tools (a small spoon, a basin and a piece of wood to break the seeds), to remove the seed mass and place it in an aluminum basin or plastic bucket, as shown in figures 3 and 4.

Figure 3

Utensils used and andiroba seeds



Figure 4

Extraction of the mass of andiroba seeds



It is at this time that all generations of women come together, mothers, daughters, nieces, goddaughters, daughters-in-law, godmothers and neighbors, that they come together, discuss the future of production and pass on everything they know so that the new generations can continue this culture. Between one seed breaking and another, they talk, sing, tell stories, laugh and teach all the empirical techniques acquired over centuries.

In this way, it is clear that knowledge is passed on through orality, observation and practice, and represents the appreciation of family cultural traits. The transmission of knowledge and its appreciation contribute to the resumption of ancient traditions (Pelegrini and Funari, 2017).

4.2.5 Oil dripping

After removing the dough, it is stuffed in Aninga leaves. (*Montrichardia linifera*), an aquatic herbaceous plant widely distributed along the banks of the Tocantins River, is left inside a basket in a clean place protected from insects for around 2 to 5 days. According to the extractivists, this procedure is carried out so that the dough begins to sweat the oil, that is, it begins to release the oil. Next, the extractivists manually knead the dough until it reaches the shape of balls or bread as they call it, then pour the dough onto a slanted board, in the shade, to drain or imbicate , thus beginning the process of oil dripping, as seen in Figure 5.

Figure 5

Andiroba oil drainage



This step does not have a set time, as it depends on the amount of dough being used. It is important to note that during the night, the dough is covered with a clean cloth or Aninga leaves, to avoid contact with insects or any other type of residue. Every day, this dough is mixed and kneaded again, so that it continues to release oil. As the days go by, the dough darkens and acquires a dry and hard appearance, meaning that the dripping process is coming to an end. Then, in order to extract more oil from the dough, the extractors remove the dough from the board and take it to be squeezed in the Tipiti – a tool developed with indigenous technology that has been used for centuries and is widely used in the Amazon region, as shown in figure 6. This tool helps to extract the maximum amount of oil that is still present in the portion of dough.

Figure 6

Tool developed to extract the maximum amount of andiroba oil



After all the steps mentioned above, there are two residues: the seed shells and the pulp, which is dry and crumbly. This residue is reused by the extractivists, who use the pulp to make soap and the shells are burned, and the smoke from this burning serves as an insect repellent.

4.3 PACKAGING THE PRODUCT FOR MARKETING

After the oil is collected, it is filtered, which consists of passing the oil through a clean cloth to remove any type of impurity. The oil is then stored in transparent glass bottles (965 mL) and plastic bottles (2 L and 500 mL), all of which are reusable, such as those for alcoholic beverages, soft drinks and mineral water.

The extractivists report difficulties in selling the product, because, for reasons of expense, especially in travel, the producers generally prefer to deliver the product to

middlemen, who would end up paying R$22.00 per liter of oil. Other forms of marketing are orders or selling at street markets in the Juaba district and in the municipal headquarters, where they can get a more profitable price, costing R$25.00 per liter.

It is worth noting that, during the monitoring of the oil production process, the extractivists reported believing in several superstitions and beliefs that are part of the local popular imagination and are rooted in their daily lives and that permeate this activity. Among them, the following were mentioned: the evil eye of envious people, the fact that people who are in mourning cannot touch the seeds or the pulp, and that menstruating and pregnant women cannot extract the oil, because the oil does not run and becomes greasy. These statements corroborate those found by Mendonça and Ferraz (2007); Furtado (2012); Santos (2013) and Santos *et al.* (2014) regarding beliefs in the traditional process of extracting andiroba oil.

They also spoke about a history of damage caused to their health by the activity, due to a lot of effort and repetitive movements, but they also believe that, by being in direct contact with an essential oil, they have many benefits such as skin and hair always being hydrated and always immune to diseases.

4.4 THE PROTAGONISM OF WOMEN FROM MUTUACÁ DE BAIXO IN THE PRODUCTION OF ANDIROBA OIL.

The daily lives of women in rural areas involve a variety of activities, from household chores to family care, from planting to harvesting, from processing to marketing a given crop. This is the reality of the routine of riverside women in the town of Mutuacá, in the municipality of Cametá-PA, who produce andiroba oil. These workers are involved in all stages of production: from collecting the seeds to marketing the final product.

However, their work in rural areas is still, in many cases, invisible, both to their partners and to society in general. However, what is highlighted in this work is the empowerment and role of these women in transforming the relationships established between male dominance, especially in the reality of the countryside, since men have long been seen as the head of the household, being the only one responsible for generating the family's livelihood, taking on the role of the most important figure, overshadowing the importance of women, especially in production and generation of family income. A reality that has been consolidated throughout the history of rural patriarchy.

In the Amazonian context, Faria and Nobre (1997); Silva and Simonian (2006) describe gender relations in a riverside community marked by a patriarchal culture. In this type of

culture, work performed by women is recognized as “help” and pejoratively seen as “a small thing” or “little thing”, marked by “invisibility” in relation to men, who occupy the center of “visibility” and decision-making in the establishment.

For Santos *et al.* (2020), “by not receiving financial compensation, women’s work becomes invisible in family farming, in addition to not having an identity and not having their tasks recognized”. Based on these perceptions of the condition of women in rural areas, gender inequality begins very early, in adolescence: the boy is the father’s “helper” and the girl, the mother’s (Silva, 2019).

For Silva and Schneider (2010), this division between son/daughter, man/woman, ingrained in the rural context, tends to perpetuate itself in the visibility of work. Sons follow in their fathers' footsteps and are seen as providers. Daughters follow in their mothers' footsteps, getting involved in domestic and agricultural chores, which are perceived as "help", This is very clear in one of the statements made by the extractivists who participated in the research, when she tells us: “ Our sale of andiroba oil helps us to support ourselves .” (C4, 52 years old).

And so, inequality spreads as women's reproductive work is not recognized by their husbands, children, neighbors, or society as a whole (Silva and Steward, 2020).

Thus, the extractivists from the Mutuacá area are experimenting with the production of andiroba oil, a form of financial empowerment that enables a gradual change in this reality of consolidation of male patriarchy. This can be seen in the words of the extractivist when she tells us: “It is with the sale of oil that I am building my brick house” (C5, 32 years old).

It is clear that this extractivist is part of a new generation that is beginning to see itself as a protagonist in this process.

The production of andiroba oil by these extractivists is the hallmark of a traditional and centuries-old work that goes beyond self-consumption and securing resources, since in this activity, women play an energetic role that permeates all stages of a production that lasts more than a month. Highlighting the multiple tasks performed daily by women, both in the production area and in domestic chores. Demanding a lot of dedication and work force, reflecting all the power of women in the search for social improvements.

According to Herrera (2013); Almeida (2010), women farmers, in addition to their almost exclusive responsibility for reproductive work, associated with domestic and maternal functions, also carry out productive work, which is strongly linked to agriculture.

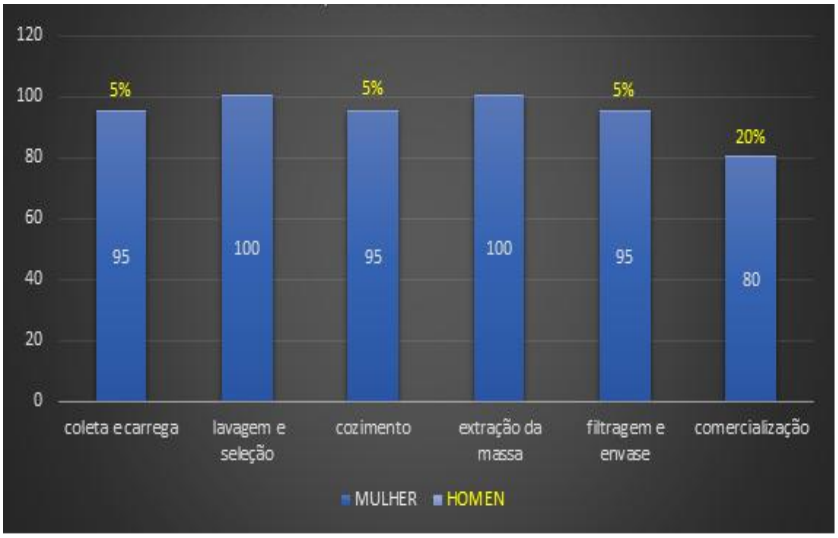
In this context, this research indicates that women play a leading role in the production of andiroba oil on the island of Mutuacá, which involves collective work by the family nucleus, becoming fundamental in the course of this production chain, involving all generations of these

families, showing great importance in the economic, social and cultural context of this riverside community, in addition to being linked to the medicinal use attributed to the oil, as well as its potential to promote local development and generate income for the extractivists. In this regard, Burg and Lovato (2007) recognize that the work carried out by women constitutes a diverse range of functions that favor the productive unit.

Figure 7 shows the relationship between male and female participation in the production of andiroba oil, where it can be seen that in all stages of this production, the female gender stands out considerably.

Figure 7

Women's participation in the production stages of andiroba oil



According to the extractivists, the men in the family do not feel attracted to the activities of producing andiroba oil, even though they recognize that it generates income, because, according to their perceptions, this production has always been culturally carried out by women for generations, given that the locality also involves açaí agroextractivism, a product that, according to them, is more economically advantageous, since it adds more value. Thus, most of the men's time is dedicated to the activities of managing, collecting and marketing açaí and artisanal fishing.

The women of the Mutuacá community, from a very young age, have been involved in a variety of activities, ranging from domestic care to others such as fishing, raising [6] xerimbabos, açaí agro-extractivism, extracting honey and other forest products, as well as handicrafts and the production of andiroba oil, which many of them report having learned to work with, through a tradition that has been passed down from their grandmothers to the new generations. And, in

this way, they are able to transform a traditional artisanal work into a strong source of financial resources, attributed to the commercialization of this product, which has contributed significantly to the survival of their families.

In the search for improving the quality of andiroba oil production and recognition of their work, the extractivists of the Mutuacá community now have the support of the municipal government, through the Municipal Secretariat of Agriculture, Rural and Economic Development of Cametá - SEMADRE. Since 2021, the agency has created a project aimed at improving the quality of the oil that women already produce in Cametá. To this end, SEMADRE has outlined a set of actions that include technical assistance, administrative organization, search for partnerships and ongoing training to consolidate the project. reinforcing female empowerment, certification and production flow.

During the project, specific training was provided to the extractivists to contribute to each stage of production, with the aim of improving the entire process of production and marketing of the andiroba oil produced by these women. Among these trainings, "Good processing practices" stands out, in which the extractivists were given the opportunity to learn about the procedural standards used to achieve a certain standard of identity and quality of a product, aiming to improve and guarantee the quality of the oil produced in the community, presenting techniques that improve the performance of the activities, indicating the minimum hygiene care in all stages of the process, which ranges from the storage of the raw material to the processing of the andiroba oil (collection, washing, cooking, extraction, filtering and bottling). It was observed that the artisanal/traditional process of extracting andiroba oil, carried out by the extractivists of the Mutuacá community, is long and is subject to numerous chemical and physical variations in the final product. And, to expand the commercialization of this product, a standard that is required by the regulatory bodies must be followed.

Therefore, adopting appropriate techniques for oil extraction is directly associated with the quality added to the final product. This is a determining factor for achieving a greater increase in the final price of the product when negotiating prices. According to Pinto (1956), the use of good management practices for the extraction of Non-Timber Forest Products (NTFPs) is very important because it helps to facilitate licensing, certification and the implementation of quality seals, as a way of guaranteeing a quality standard, making the product more valuable.

In addition to producing andiroba oil, the extractivists also began to sell a byproduct derived from the production waste, the result of the knowledge acquired in the training sessions: andiroba candles. The candles are produced from the seed mass, a waste that was discarded by

the extractivists before the training sessions, thus demonstrating a good alternative for the development of new products with added value, with responsible, sustainable use and generating more profit.

Furthermore, through the project, the extractivists, producers of andiroba oil from the Mutuacá community, had the opportunity to exhibit their products at the Cametá Agricultural Business Fair – FENAC/2022, where they sold their products in properly standardized packaging and with their own brand logo. As observed in figures 8.

Figure 8

Standardized packaging with logo



The products above, duly standardized in new packaging and bearing the logo of their own brand, are results achieved by the training courses, which, in addition to revamping their marketing methods, gave the product a new look, gaining greater commercial appeal and reaching local businesses, where they are now displayed on the shelves of pharmacies and stores specializing in herbal products. The partnership with SEMADRE has always focused on incorporating new habits during the production process, aiming at quality, improvement and the well-being of the extractivists, but never with the rupture of the tradition of the artisanal process.

4.5 PRODUCTIVITY OF ANDIROBA OIL

The experience of the extractivists in the production of andiroba oil, over time, allows them to have a basis for the quantity of seeds necessary to extract one liter of oil, which

according to them, from every 6.5 kg, 1 liter of oil is extracted. According to the information provided by the extractivists, in the period from 2021 to 2022, the production of andiroba oil, carried out by them in the community of Mutuacá, was 13 thousand liters, as specified in Table 1. It is worth noting that the seed collection period was from June to November 2021.

Table 1

Production of andiroba oil by extractivists on the island of Mutuacá-PA

Quantity of Andiroba Seeds (Kg)	Amount of oil produced (liters)	Selling Price - Retail/Wholesale (R$/liter)
84,500.00	13,000.00	Wholesale: 22.00 reais Retail: 25.00 reais.

It is important to note that the data presented in the table above come from estimated information, since the extractivists participating in the research do not have the habit of making notes regarding the quantities of seeds collected or the quantity of oils produced. As stated by Menezes (2005), it is not part of the extractors' culture to take measurements of the products handled or to note the time of the activities carried out.

Using the information in Table 1, it is possible to estimate the profitability of each extractor from the sale of oil. If we consider that all production was sold at wholesale prices, this would result in a total value of R$286,000.00, and for each of them, the value would be R$11,000.00/year, which would result in a monthly increase in family income of R$917.00. On the other hand, if we consider the retail price, we would have a total value of R$325,000.00 and for each of them, the value would be R$12,500.00/year, resulting in a monthly increase in family income of R$1,041.00. It is important to note that the amount spent on oil production costs, such as the costs of acquiring equipment and tools used in oil extraction, was not taken into account.

Hence the need for this research to deepen knowledge in order to improve women's political action in the countryside, making their needs clear and allowing them to work towards building visibility for women's work and that of all family members, a topic that should be part of not only family education, but also of public spheres linked to socioeconomic production . This is the meaning we want to highlight regarding the participation of riverside women, highlighting their forms of articulation, organization and representation in search of recognition, professional appreciation , citizenship and a more just society, in which all people are respected and visible, as they constitute important parts of the social construction.

5 CONCLUSION

The research sought to address the aspects of andiroba oil production by women extractivists from the community of Mutuacá-PA, highlighting the relevance of this practice in the community with an emphasis on the oil production process and the empowerment of these women in the search for better conditions in the quality of life.

The study thus showed that the extraction process in the region is traditional/artisanal and constitutes an essentially feminine practice. Furthermore, it was found that knowledge about the processing of andiroba seeds was acquired and passed on among generations of women in that community. This fact makes them protagonists in this process, primarily responsible for reproducing the knowledge of their ancestors. Furthermore, through artisanal handling of the raw material, they contribute to the conservation of the plant species in the local ecosystem, through the sociocultural values rooted in the daily lives of these people.

Furthermore, it is worth noting that this activity is highly relevant to the quality of life of the extractivists, especially considering the profitability of oil production and the importance of these resources within the family community, even though the values arising from this work are not properly valued. We reiterate that, in the community, oil production is still considered an inferior activity due to the public that handles it and the competition with other products, especially açaí. However, the research indicated that there are small changes taking place. In the meantime, SEMADRE's actions play a fundamental role, since the courses taught and the strategies for distributing the product sought to improve the old habits in the processing of andiroba oil. In view of this, the visibility and economic strategies of this practice were also favored.

Therefore, it can be stated that the andiroba oil producers of Mutuacá have begun to break, albeit gradually, with the previously established sexist paradigm. And that the practice reflects the importance of the social role that the activity represents for this community, inverting cultural values, consolidating the empowerment of these women in guaranteeing financial resources to support their families.

Finally, it is expected that the information obtained in this research will enable new, more specific studies that may increase the effectiveness of the extraction and commercialization of andiroba oil from the Mutuacá region.

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