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Elaboration of food products based on açaí *(Euterpe oleracea)*

Elaboração de produtos alimentícios à base de açaí (*Euterpe oleracea*)

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A B S T R A C T

This research sought to elaborate food products from the pulp of açaí (*Euterpe oleracea*). The methodology for the elaboration of the products started from adaptations of formulations available in the specialized literature for: Jelly; ice cream; blend nectar, in its light and diet versions. A flour mix was also elaborated for cake mixture with different levels of freeze-dried açaí (5%, 10%, 20%, 30%, 40% and 50%). In addition, the data served as a basis for the elaboration of the nutritional labeling of açaí-based products. The results obtained, after sensory tests carried out by the collaborators, showed that the formulations were well accepted according to taste, color, smell and texture, especially because they maintain the characteristics of the raw material after cooking. In addition, the nutritional tables elaborated demonstrated a relevant nutritional quality, considering the chemical composition with macro and micronutrient values of the products obtained, since they are light and diet foods, and met the requirements established by the current legislation. It can be concluded that the açaí, which has several health benefits, can be used not only for in natura consumption, but also in the development of food products, strengthening product innovation and enriching them with a diversity of nutrients.

R E S U M O

Esta pesquisa buscou elaborar produtos alimentícios a partir da polpa do açaí (*Euterpe oleracea*). A metodologia para a elaboração dos produtos partiu de adaptações de formulações disponíveis na literatura especializada para: geleia; sorvete; néctar *blend,* em suas versões *light* e *diet*. Elaborou-se, também, um mix de farinha para mistura de bolo com diferentes teores de açaí liofilizado (5%, 10%, 20%, 30%, 40% e 50%). Ademais, os dados serviram como base para a elaboração da rotulagem nutricional dos produtos à base de açaí. Os resultados obtidos, após testes sensoriais realizados pelos colaboradores, mostraram que as formulações foram bem aceitas conforme o sabor, a cor, o aroma e a textura, sobretudo por manterem as características da matéria-prima após a cocção. Além disso, as tabelas nutricionais elaboradas demonstraram uma qualidade nutricional relevante, considerando a composição química com valores de macro e micronutrientes dos produtos obtidos, uma vez que são alimentos *light* e *diet*, e atenderam aos requisitos estabelecidos pelas legislações vigentes. Pode-se concluir que o açaí, que possui diversos benefícios à saúde, pode ser utilizado não só para o consumo *in natura*, mas também no desenvolvimento de produtos alimentícios, fortalecendo a inovação de produtos e os enriquecendo com uma diversidade de nutrientes.

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Introduction

The açaí tree is a palm of the *Arecaceae* family widely spread and cultivated in the Brazilian Amazon, especially in the state of Pará, where the production and commercialization of the pulp move large markets (Neves *et al.*, 2015).

The açaí in natura is the basis of the diet of the population of the state of Pará, combined with flour and fish, an important regional commodity, not being subjected to industrial processes, which modify its natural characteristics and is usually sold in the retail market in the state. In addition, with the high demand in the national and international market for products based on açaí, the entire population of this region benefited from the generation of new jobs (Nogueira; Santana, 2016).

Studies have shown that the regular insertion in the diet of 200g of açaí pulp is able to decrease the risk of developing chronic diseases, considerably improving the metabolic parameters in the appearance of these pathologies (Barbosa, 2015).

In the studies done by Rocha and collaborators (2016) demonstrate that the daily recommendation of açaí is 260 g of the pulp, this portion would be enough to meet the recommendations of potassium, zinc, iron, calcium and, in addition, would supply the recommendation of linoleic and palmitic fatty acid, but the pulp of the açaí should be consumed with caution and moderation because it has a high caloric value (Rocha, *et al.*, 2016).

The fruit has a substance called arabinogalactan that stimulates the action of defense cells protecting the body, and by having antioxidants reduces the accumulation of beta-amyloid which is a protein associated with Alzheimer's disease (Moura, *et al.*, 2023).

The *in natura* form is the most accepted and favorite of the native consumerists or inhabitants in the açaí producing regions. However, there is also an abundance of handmade products, such as jams, sweets, stuffed bonbons, candies, ice cream, liqueurs among others.

Culinary elaborations are also very concretized by the local population, such as pies, mousses, puddings, having a variety of the northern region, however, the commercialization has expanded more and more.

Based on this information, as a general objective, this research sought to elaborate food products from the pulp of açaí (*Euterpe oleracea*). In addition, as specific objectives, elaborate formulations of: Açaí jelly, blend style nectar, açaí ice cream with pitaya, cake flour mix, diet and light formulations of the aforementioned products and suggestion of labels and the mandatory labeling of the final products.

Material and methods

The main raw material of the study (bleached açaí pulp) was acquired in an establishment, which has a sanitary surveillance license. The other ingredients were obtained in markets in the city of Belém, Pará State. Later forwarded to the Food Technology

Laboratory, of the University of the State of Pará (*Universidade do Estado do Pará* - UEPA), for the elaboration of the products, ice cream, nectar blend style, mix of flour for cake and jelly.

Sensory Analysis

It was carried out by the authors on the color, flavor and smell of the products, as the sensory analysis can not be performed due to the aggravation of Covid-19.

Ice Cream

Two formulations of light and diet ice cream were elaborated. The methodology was based on a Booklet of Good Manufacturing Practices (*Cartilha de Boas Práticas de Fabricação*) in the edible ice cream industry of the Brazilian Service of Support to Micro and Small Companies (*Serviço Brasileiro de Apoio às Micro e Pequenas Empresas* - SEBRAE, n. d.). The ingredients used were: Açaí pulp, pitaya pulp, emulsifier, dairy products (skim milk and skim cream), brown sugar (for light formulation), xylitol (for diet formulation), stabilizer and acidulant.

In the initial stage, for the manufacture of the ice cream, the weighing was carried out and then the base mixture, through the joining of almost all the ingredients, with the exception of the emulsifier and the fruit pulps. At maturation, hydration of the dry components occurred.

> The free water hydrates the stabilizers, forming gels between the alloy and the water. The water ceases to be free and becomes trapped, which regulates the formation of ice crystals. The gels formed provide more body and aid in structure. In addition, the solidification of fat occurs, with a decrease in temperature. The maturation gives the ice cream a softer texture (SEBRAE, n. d., pp. 15-16).

The mixture was kept at a temperature of 4ºC for 8 hours and then there was addition of açaí pulp, pitaya pulp and emulsifier, homogenization was done in a domestic mixer. The final product was packed in sterile packaging and stored in a freezer at a temperature of -18ºC.

Nectar (blend)

The formulation of the nectar was carried out according to the methodology of Freitas (2017), using pulp of açaí, strawberry, grape, mineral water, sweetener (diet) and xylitol (light). It was homogenized in a domestic processor and, after preparation, the nectar was subjected to slow pasteurization (65°C/30 min.) and stored in previously sanitized bottles. Cooling was performed in an ice bath. For the diet formulation, 150 mL of açaí pulp, 50 mL of strawberry pulp, 50 mL of grape pulp, 100 mL of water and 0.05 g of citric acid were weighed. For the light formulation the same values adding 15 g of xylitol.

Jelly

For the preparation of jelly was used: sweetener based on sucralose (diet jelly), xylitol (light jelly) pectin, citric acid, açaí pulp and mineral water. The methodology was based on the e-book "Fruit processing technology: Jams and jellies" (*Tecnologia de processamento de frutas: doces, geleias e compotas*) (Oliveira *et al.*, 2018). First the ingredients were weighed, then the açaí pulp and the sweetener (diet formulation) and xylitol (light formulation) were placed. The mixture was coccionada for 30 minutes, then pectin and citric acid were added until reaching 57º Brix for the diet formulation.

Because it presents consistency appropriate to the type of product, although the ideal value for jellies is 67º Brix, according to Lopes (2007), jellies that do not contain sucrose do not reach the aforementioned value. In addition, for light jelly, the formulation reached 48°Brix. After this stage, the cooling was performed in an ice bath, and the jellies were filled. The weighing of the raw materials for the preparation of light jelly obtained 30% xylitol, 60% pulp and 10% water, in addition, for diet jelly, 10% sweetener, 70% pulp and 20% water.

Flour mix for açaí cake

The elaboration of the mix was based on the methodology of Barros *et al.* (2021), the ingredients used for the production of the flour were: Açaí powder, brown sugar, baking powder and oat bran. For the production of the cake was added, egg, butter and liquid milk. According to the methodology of Barros *et al.* (2021), 6 formulations were prepared.

Nutrition labelling

The labeling of the products obtained was based on the Technical Regulation on Labeling of Packaged Foods, the Technical Regulation on Packaged Food Portions for Nutrition Labeling Purposes and the Technical Regulation on Nutrition Labeling of Packaged Foods, which made nutritional labeling mandatory, which determines the description of necessary nutritional information of the caloric value, trans fat, total fat, saturated fat, sodium, dietary fiber and protein (Collegiate Board Resolution - RDC No. 429 and Normative Instruction No. 75 of 2020).

To this end, the amount of the consumption value must be presented, to which the product is being presented for sale, containing a percentage of daily value (%DV) for each nutrient described, with the exception of trans fats. The calculations were performed from the values found in the Table of Nutritional Composition of the Brazilian Institute of Geography and Statistics (IBGE, 2011) and in the Brazilian Table of Food Composition (TACO) of the State University of Campinas (*Universidade Estadual de Campinas* - UNICAMP, 2011).

The caloric value expressed in kilograms (Kcal) was calculated from the nutrients present in the food (Equation 1). The conversion of Kcal to KJ is done by the rule of three, where 1 Kcal has 4.2 KJ.

$$\text{Caloric value (Kcal)} = \text{carbohydrate} * 4 + \text{protein} * 4 + \text{fat} * 9 \quad (1)$$

The carbohydrate value was obtained by the rule of three (Equation 2), being made for the light ice cream. The result expressed in grams was converted to percentage (Equation 3).

$$X\ (g) = 146\ g * 60\ g / 100\ g \quad (2)$$

$$X\ (\%) = \text{result}\ (g) * 100 \quad (3)$$

The protein was calculated by rule of three (Equation 4), the result obtained in grams was converted to percentage (Equation 5), and the protein value of the light ice cream.

$$X\ (g) = 11{,}32\ g * 60\ g / 100\ g \quad (4)$$

$$X\ (\%) = \text{result}\ (g) * 100 \quad (5)$$

The value obtained of total fat was from the rule of three (Equations 6 and 7), the result in grams was transformed to percentage, being the value of the total fat of the light ice cream.

$$X\ (g) = 0{,}7\ g * 60\ g / 100\ g \quad (6)$$

$$X\ (\%) = \text{result}\ (g) * 100 \quad (7)$$

The fiber value was calculated by rule of three (Equation 8), the result in grams was converted to percentage (Equation 9).

$$X\ (g) = 10{,}4\ g * 60\ g / 100\ g \quad (8)$$

$$X\ (\%) = \text{result}\ (g) * 100 \quad (9)$$

Sodium was expressed from mg to % and the portion value to X, the result is in mg/100 g. This is how it was calculated for the other products. In this study, the nutritional information was elaborated in a theoretical way, using only the tables, already mentioned, due to the interdiction of laboratories due to the Covid-19 pandemic.

Results and discussion

Elaboration of açaí products

The jellies (Figure 1), in both formulations, presented the following sensory characteristics (color, smell, texture and flavor) observed by the authors: predominant color of the raw material (açaí) used in the elaboration of the product, as well as flavor and smell. The texture obtained was characteristic of jelly, being of pasty texture and shiny aspect, when compared to the jelly already commercialized. Lima *et al.* (2018) elaborated an açaí jelly and another açaí and cupuaçu blend, which presented the following results, the açaí jelly presented dark coloration associated with the presence of anthocyanins in the açaí, however the cupuaçu and blend jellies (açaí and cupuaçu) presented no dark coloration, but represented the similar characteristics for the appearance attributes, smell, taste and sweetness of the raw materials. The biggest advantage of the elaboration of fruit jelly is the low cost of production, according to the general characteristics of the final product. Therefore, the product elaborated had similar characteristics of the cited research.

Figure 1. *Elaborated açaí jelly.*

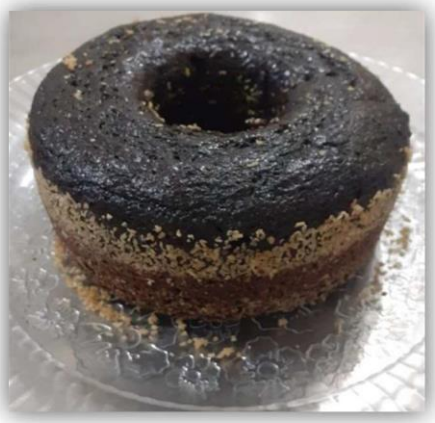
Source: The authors (2021).

Regarding the cake flour mix, different formulations were performed, and these conditions and respective concentrations: 6 g (5%), 12 g (10%), 18 g (20%), 24 g (30%), 30 g (40%) and 36 g (50%) of freeze-dried açaí. In the sensory aspects, it was observed that the texture of the formulations did not present difference at the end of the preparation. When relating the flavor and color of the formulations, it was found that, mainly, in the concentrations of 30%, 40% and 50% there was a positive influence of these two attributes, noting a more intense color and a more characteristic flavor of the açaí, including in the preparation of the açaí cake (Figure 2). This result is attributed due to the use of freeze-dried açaí, which makes the nutrients of the açaí remain more efficiently, without the loss of the characteristic color, given by the presence of anthocyanins. Barros (2020) presented similar

results, stating that the flours of the açaí seed presented considerable values of nutrients, a good coloration and indicated viability for the elaboration of bakery products and pasta.

Figure 2.

Prepared açaí cake.



Source: The authors (2021).

Quality is an essential item when it comes to any product to be marketed. For the elaborated ice cream, in relation to the sensory aspects such as the color, in which it´s the visual aspect, in general, it´s the point of attraction of the product, which generates to the consumer the desire to consume it, it was observed that the purple color predominated. In addition, with the addition of pitaya the ice cream became more attractive, since the color of the pitaya is pink and gave a natural color, while the smell prevailed of açaí. In the texture it was observed that the consistency of the ice cream was firm and creamy. The flavor was found to have predominated from the açaí, and with the addition of the pitaya seed a crunchy texture was increased. When compared with an existing product, which was an innovation in the pitaya and açaí market, the product elaborated by the present study presented similar visual aspects, but the flavor of the existing product in the market is stronger due to the existence of chemical additives, which the ice cream elaborated in the present study does not contain, corroborating with a more natural product (Figure 3).

Figure 3.

Prepared açaí ice cream.

Source: The authors (2021).

Regarding the preparation of the nectar (blend) (Figure 4), the sensory characteristics noted in relation to its appearance was the predominance of the dark purple color, being obtained by the açaí, grape and strawberry fruits, which have anthocyanins in their nutritional composition. The predominant smell in the product is that of the main raw material, açaí. In flavor, it´s noticeable to the palate the flavors of grape, strawberry and açaí, containing strawberry pieces. Fernandes (2018) obtained results similar to those carried out in this research, when he elaborated a mixed nectar of açaí with cupuaçu. Silva *et al.* (2019) presented the results of the açaí nectar elaborated in the form of terms most mentioned by the tasters: "açaí smell", "liquid consistency" and "slightly sweet taste". It´s important to note that there was no addition of preservatives and flavorings in the preparation of the products mentioned.

Figure 4.

Nectar (blend) of elaborated açaí.

Source: The authors (2021).

Preparation of product labels

Light jelly

The intake of a portion of 20g (1 tablespoon) of the product light jelly of açaí, indicated a minimum reduction of 25% of the caloric value when compared with a similar traditional one. As stated on the label, it provides 43 Kcal, compared to the conventional jelly product of 60º Brix, which contains on average 70 Kcal, presenting a reduction in calories of 57.3% (27 Kcal) in consumption. Regarding sugar, there was a decrease of 14 g compared to conventional jelly, with only 7 g in the light jelly elaborated, representing a considerable reduction (Table 1).

Dietary fibers represent 2.3g, which means that this 20 g portion of light jelly supplies 7% of the daily needs of a reference diet of 2000 Kcal, according to the official standard for the label of a food product (Resolution - RDC No. 429, 2020). Therefore, by consuming the light jelly of açaí, in addition to being ingesting less sugar and calories, the consumer will be acquiring a healthy product and produced without the addition of preservatives, dyes and flavorings. According to Costa *et al.* (2018) when comparing cupuaçu and açaí jelly, they observed that cupuaçu jelly has a higher content of lipids, carbohydrates and a lower content of proteins.

Table 1.

Nutritional information of light jelly.

Nutritional information Portion of 20 g (1 tablespoon)		
	Amount per serving	%DV(*)
Energy value	43 Kcal or 180 KJ	2%
Carbohydrate	7 g	2%
Proteins	0.8 g	1%
Total fats	1.3 g	2%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.8 g	7%
Sodium	2.5 mg	0%

Source: The authors (2021).

Diet jelly

Comparing the nutritional information of the prepared product (diet jelly), it´s observed that the energy value obtained was 12 Kcal (Table 2). Being inferior to the diet jelly of açaí already commercialized, which presents 52 Kcal, as well as the other values presented in the nutritional table, such as: Carbohydrate, protein, fiber and sodium. There was a difference in the ingredients, sorbitol was used in the market, and in the formulation of this

work the sucralose-based sweetener was used. Therefore, the elaborate diet jelly presents a good choice for those looking for dietary products with lower calorie and carbohydrate value, without preservatives and tasty.

Table 2.

Nutritional information of diet jelly.

Nutritional information		
Portion of 20 g (1 tablespoon)		
	Amount per serving	%DV(*)
Energy value	12 Kcal or 73.35 KJ	2%
Carbohydrate	3 g	2%
Proteins	0.3 g	0%
Total fats	0.6	2%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	0.8 g	3%
Sodium	1.8 mg	0%

Source: The authors (2021).

Flour mix for cake mix

When analyzing the nutritional table of the cake flour mix (Table 3), it´s noted that it presented a lower amount of carbohydrate, protein, fat and sodium, when related to the label already existing in the market. This decrease occurs due to the flour not having wheat and preservatives, and the moment there is addition of oat bran, it enriches the product in soluble fiber and beta-glucan, thus making it a healthy flour for culinary preparations and rich in nutrients. In addition, the following tables show the nutritional information of the mix of flour added with different amounts of açaí powder. Barros (2020) elaborated a flour from the açaí seed for the preparation of cookies and presented results (in 100g) such as: Proteins - 6.6 g, carbohydrate - 81.2 g and lipids - 1.7 g. The results were similar for proteins, but for carbohydrate and lipids they were different. The present study presented a lower carbohydrate content, which reflects a positive point for the consumer.

Table 3.

Nutritional information of flour mix for cake mix.

Nutritional information		
Portion of 136 g		
	Amount per serving	%DV(*)
Energy value	290 Kcal or 1213 KJ	14%

Carbohydrate	23.6 g	8%
Proteins	7.3 g	9%
Total fats	4 g	7%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	9.3 g	37%
Sodium	38 mg	1%

Source: The authors (2021).

Table 4.

Nutritional information of the flour mix with 5% açaí powder.

Nutritional information		
Portion of 60 g (1 slice)		
	Amount per serving	%DV(*)
Energy value	103.8 Kcal or 434.59 KJ	5%
Carbohydrate	8.5 g	3%
Proteins	2.6 g	3%
Total fats	6.6 g	12%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.3 g	5%
Sodium	5.7 mg	0%

Source: The authors (2021).

Table 5.

Nutritional information of the flour mix with 10% açaí powder.

Nutritional information		
Portion of 60 g (1 slice)		
	Amount per serving	%DV(*)
Energy value	105.2 Kcal or 442.13 KJ	5%
Carbohydrate	8.4 g	3%
Proteins	2.6 g	3%
Total fats	6.8 g	12%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.4 g	5%
Sodium	0 mg	0%

Source: The authors (2021).

Table 6.

Nutritional information of the flour mix with 20% açaí powder.

Nutritional information		
Portion of 60 g (1 slice)		
	Amount per serving	%DV(*)
Energy value	106.1 Kcal or 444.22 KJ	5%
Carbohydrate	8.4 g	3%
Proteins	2.6 g	3%
Total fats	6.9 g	12%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.3 g	5%
Sodium	5.8 mg	0%

Source: The authors (2021).

Table 7.

Nutritional information of the flour mix with 30% açaí powder.

Nutritional information		
Portion of 60 g (1 slice)		
	Amount per serving	%DV(*)
Energy value	106.9 Kcal or 444.57 KJ	5%
Carbohydrate	8.5 g	3%
Proteins	2.7 g	3%
Total fats	6.9 g	12%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.3 g	6%
Sodium	5.8 mg	0%

Source: The authors (2021).

Table 8.

Nutritional information of the flour mix with 40% açaí powder.

Nutritional information		
Portion of 60 g (1 slice)		
	Amount per serving	%DV(*)

Energy value	106.0 Kcal or 444.57 KJ	5%
Carbohydrate	8.5 g	3%
Proteins	2.7 g	3%
Total fats	6.9 g	3%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.4 g	6%
Sodium	5.9 mg	0%

Source: The authors (2021).

Table 9.

Nutritional information of the flour mix with 50% açaí powder.

Nutritional information		
Portion of 60 g (1 slice)		
	Amount per serving	%DV(*)
Energy value	108.6 Kcal or 454.69 KJ	5%
Carbohydrate	8.7 g	3%
Proteins	2.8 g	3%
Total fats	7 g	12%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.5 g	6%
Sodium	6 mg	0%

Source: The authors (2021).

Diet ice cream

In the nutritional information of diet ice cream, its energy value obtained was observed, being 41 Kcal, 3% of the daily value established by the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária*) (Resolution - RDC No. 429, 2020). The values reported in the nutritional table (Table 10) of the product prepared were compared with an industrial product already marketed, also diet, and it was noted that the values obtained in the table below are lower than those of the other industrial label, trying a difference of 4 g of carbohydrate of the ice cream manufactured. Rodrigues *et al.* (2018) presented the following results: Proteins - 10.25 g, carbohydrates - 29.17 g and lipids 5.75, since the ice cream was prepared in a traditional way.

Table 10.

Nutritional information of diet ice cream.

Nutritional information		
Portion of 60 g (1 ball)		
	Amount per serving	%DV(*)
Energy value	41 Kcal or 171 KJ	3%
Carbohydrate	4 g	3%
Proteins	1.5 g	2%
Total fats	2.1 g	4%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	2.6 g	10%
Sodium	6 mg	0%

Source: The authors (2021).

Light ice cream

The nutritional information (Table 11) of the light ice cream product was compared with a traditional product with the same flavor. It was observed the energy value of 117 Kcal of the traditional and 56.9 Kcal of the ice cream developed in this research. The other ingredients presented a difference of 25% in their values. Therefore, the ice cream produced is in accordance with Resolution - RDC No. 429 (2020), thus considering a light product and rich in nutrients. Assis *et al*. (2020) obtained results such as protein: 4.28 g, carbohydrates: 29.8 g and total fat: 16.7 g, by virtue of which they elaborated a traditional ice cream.

Table 11.

Nutritional information of light ice cream.

Nutritional information		
Portion of 60 g (1 ball)		
	Amount per serving	%DV(*)
Energy value	59.9 Kcal or 238.23 KJ	4%
Carbohydrate	8 g	3%
Proteins	1.5 g	2%
Total fats	4.8 g	4%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	2.6 g	10%
Sodium	11 mg	0%

Source: The authors (2021).

Nectar (blend) diet

The diet nectar (blend) of açaí, grape and strawberry was compared with a marketed one. It was observed that the nutritional values of the product prepared were lower, with regard to carbohydrates, energy value and fat (Table 12). It´s important to inform that the ingredients used in the product on sale were additional, in relation to the ingredients used in the product of this research, namely, organic sugar, stabilizer xanthan gum, natural smell of guarana, guarana extract, antioxidant and ascorbic acid. Thus, the nectar elaborated by the present study presents essential and natural nutrients for the consumer.

Table 12.

Nutritional information of the nectar (blend) diet.

Nutritional information		
Portion of 200 mL (1 cup)		
	Amount per serving	%DV(*)
Energy value	81.8 Kcal or 342.48 KJ	4%
Carbohydrate	9 g	3%
Proteins	2 g	2%
Total fats	3.6 g	6%
Saturated fats	-	0%
Trans fats	-	0%
Dietary fiber	1.3 g	5%
Sodium	7 mg	0%

Source: The authors (2021).

Nectar (blend) light

Comparing the nutritional information of the elaborated product, light nectar (blend) of açaí with grape and strawberry with an industrialized product already commercialized, the values of the label of the elaborated product were lower than that of the commercialized product, being energetic, carbohydrate, total fats and sodium. The different ingredients used in the elaboration of the marketed product were sugar, banana pulp, fat extract, preservative and stabilizer, these ingredients were not used in the elaborated product. According to Fernandes (2016) the physicochemical composition of the nectar per produced was: Total protein 0.65 ± 0.05%; lipids 0.64 ± 0.09%; crude fiber 0.51 ± 0.08%, carbohydrates 4.59 ± 0.23%. Table 13 presents the nutritional information of the light nectar (blend) elaborated by the study in question.

Table 13.

Nutritional information of light nectar (blend).

Nutritional information Portion of 200 mL (1 cup)		
	Amount per serving	%DV(*)
Energy value	101.05 Kcal or 423.05 KJ	5%
Carbohydrate	14 g	5%
Proteins	2 g	1%
Total fats	4.2 g	8%
Saturated fats	1.2 g	0%
Trans fats	-	0%
Dietary fiber	1.5 g	5%
Sodium	9 mg	0%

Source: The authors (2021).

In view of the data presented, after the analysis of the nutritional tables, the results showed that the macros and micronutrients are with adequate values for diet and light product. The consumer can ingest the ice cream as dessert, afternoon snack, making the intake of a nutritious and low-calorie food. An alternative for people with diabetes, too, who can consume them, because the carbohydrate intake is small. The nectar (blend) is a suggestion to take during snacks, lunch and even dessert, because it´s an unfermented drink with low energy values.

The cake flour mix is healthy and nutritious because it contains oatmeal, a high source of fiber. This product can replace industrial cakes, with practicality and few ingredients, as well as lower calorie value than the traditional one. The jelly was low in carbohydrate, this can be consumed in toast, cookies and even dessert filling.

Final considerations

The açaí is one of the essential components on the table of the Amazonian population, on a daily basis, due to its energy results, lipid content and its importance because of the existence of anthocyanins. The result of this work can contribute to the development of new products to meet the expectations of consumers who seek healthy products with high protein content and sensory and nutritional quality. The sensory qualities of the product can have quite a promising effect on the market as they meet the current consumer demand for functional products.

In addition, the products elaborated become complementary alternatives, not only for the population of Pará, but for the southern regions of Brazil, being great options of innovative products based on açaí, in addition to the possibility of enriching other products with nutrients

as in the case of açaí flour. Finally, the products developed were created thinking about the consumer population of açaí, diversifying colors, flavors and textures to satisfy all types of public.

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