

GREEN BANANA BIOMASS

Preparations and everyday applications

Guillermo Andreo
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Editora da
UFCSPA

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DEDICATION

We dedicate this work to everyone who enjoys trying preparations that enhance the health value of recipes traditionally consumed in Brazil at different times of the day.

CONTENTS

Foreword	6
Introduction	8
What is Green Banana Biomass (GBB)?	11
Preparation of Green Banana Biomass	14
Prepared Recipes	20
Tartar Sauce	23
Cheese Bread	29
Hot Chocolate	35
Pizza Dough	41
Chicken Fricassee	47
Cononut <i>Beijinho</i>	53
Referências	59

FOREWORD

Green banana biomass, the central theme of this book, admirably reflects the principles of the *Brazilian Dietary Guidelines*: it is a natural ingredient, versatile, sustainable, and capable of enriching our cuisine with flavor, diversity, and health.

This work is the result of a collective effort that demonstrates the vitality of the public university in articulating education, research, and knowledge production in dialogue

with society. By exploring the multiple possibilities of using green banana biomass, the authors invite us to experiment, reinvent, and expand our culinary repertoire, while maintaining tradition and a connection to healthy and sustainable food practices.

The recipes gathered here invite readers into the kitchen — an essential space for promoting health. In a context of increasing dietary standardization and the expansion

of ultra-processed products, preparing one's own meals becomes an act of autonomy, strengthening emotional bonds and stimulating creativity. It also revitalizes food culture, encourages more conscious choices, and improves our relationship with food.

This book represents an act of resistance by reaffirming adequate and healthy eating as a fundamental right of all. It also expresses hope, showing that creative and collective pathways can emerge in the classroom and extend throughout society.

Enjoy your reading!

Patricia Constante Jaime

INTRODUCTION

The banana plant is a herbaceous species of the genus *Musa*, from the *Musaceae* family, originally native to Southeast Asia and brought to the Americas in the 15th century. It is the most widely produced fruit worldwide (Teles *et al.*, 2022). With around 30 species and more than 700 varieties, bananas are the most consumed tropical fruit in the world and are available to a large part of the global population throughout the year. Brazil is the fourth

largest producer, with 6.6 million tons produced across 455 thousand hectares, half of which comes from family farming. The sector generates approximately R\$ 13.8 billion per year and provides 500 thousand direct jobs (Embrapa, 2024).

In Brazil, banana production occurs throughout the country and has strong economic presence and broad social reach, due to its affordable price, which

makes this fruit easily accessible and widely present in the Brazilian diet (Teles *et al.*, 2022; Embrapa, 2024). Commonly consumed fresh, ripe bananas have high perishability, which can lead to losses and damage along the production chain. Statistical data indicate losses of up to 40% in banana production (Castro *et al.*, 2019). Thus, using green bananas helps mitigate these losses, and green banana biomass (GBB) provides an alternative for reducing waste.

GBB has a neutral flavor and is rich in carbohydrates, micronutrients, B-complex and C vitamins, and minerals such as potassium and calcium. It also contains phytosterols and phenolic compounds (Teles *et al.*, 2022).

In addition, it provides soluble and insoluble dietary fiber, which perform several

functions in the body. In green bananas, resistant starch represents approximately 74% of dietary fiber (Faisant *et al.*, 1995), which may help reduce postprandial glucose and insulin levels (Topping; Fukushima; Bird, 2003), supporting the management of type 2 diabetes (Ranieri; Delani, 2014). It may also improve the plasma lipid profile (Martins, 2017), contribute to the prevention of colon cancer, and assist in the treatment of inflammatory bowel diseases (da Silva Nascimento *et al.*, 2020). Moreover, it promotes increased satiety due to the intake of resistant starch from GBB (Gomes *et al.*, 2017).

Studies show that GBB can partially or totally replace ingredients containing saturated fats, hydrogenated fats, and sugars, thereby reducing the energy value of preparations (Teles *et al.*, 2022). This

characteristic highlights the nutritional potential of moderating the use of oils, fats, and sugars in food preparations, as recommended in the *Ten Steps to Healthy Eating* of the Brazilian Dietary Guidelines (Brazil, 2014).

Given this context, this book explores the culinary possibilities of green banana biomass in various recipes for everyday Brazilian meals, aiming to broaden awareness of its health benefits and encourage the consumption of this ingredient. The recipes developed include tartar sauce, cheese bread, hot chocolate, pizza dough, chicken fricassee, and coconut “beijinho.”

WHAT IS GREEN BANANA BIOMASS (GBB)?

Green banana biomass (GBB) is a culinary ingredient obtained by cooking and blending the unripe fruit. Cooking—usually under pressure and with the peel—neutralizes the astringent taste and helps preserve the starch (de Freitas Valle; Camargos, 2002).

According to Mesquita *et al.* (2018), green bananas have been studied as a potential source of starch for use in

various applications. Green banana starch is known as a good source of resistant starch (Jiang *et al.*, 2015), which is not broken down by human digestive enzymes and is therefore fermented in the colon, producing short-chain fatty acids (Ashwar *et al.*, 2016). In addition, resistant starch modifies the composition and activity of the gastrointestinal microbiota, promoting health benefits for the consumer.

Considering resistance to digestion, resistant starches are classified into three types: physically inaccessible starch (RS1), resistant starch granules (RS2), and retrograded starch (RS3) (Salgado *et al.*, 2005). GBB is primarily a source of RS2, which is classified as a prebiotic because it selectively stimulates the growth of beneficial gut bacteria, such as *Bifidobacterium*, which play a role in protection against pathogens and support immune system function (Reis *et al.*, 2022).

Prebiotics are generally defined as “non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of one or a limited number of bacterial species already established in the colon, thus improving host health” (Hill *et al.*, 2014; Swanson *et al.*, 2020). In the intestine,

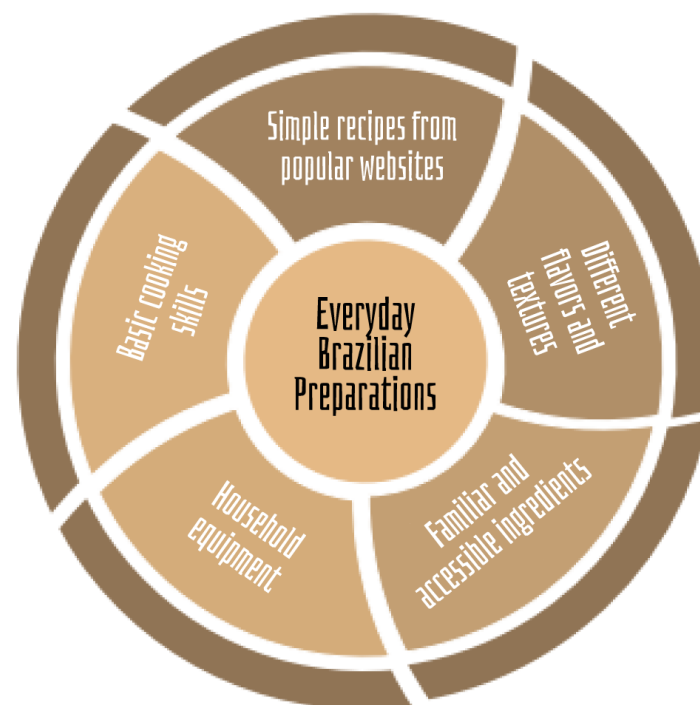
prebiotics are fermented by beneficial bacteria to produce short-chain fatty acids (Al-Sheraji *et al.*, 2013), thereby playing an important role in enhancing the growth of intestinal bacteria (Ashwini *et al.*, 2019). They can be found in various natural food sources, such as fruits and vegetables, or obtained synthetically through enzymatic digestion (Khangwal; Shukla, 2019; Ashwini *et al.*, 2019).

Regarding physicochemical properties, it is worth noting that the starch present in GBB shows resistance to heat, low swelling capacity, low solubility in water, and low retrogradation. Therefore, GBB has promising applications for stability in foods processed at high temperatures. On the other hand, it shows low stability during refrigeration and freezing cycles (Castro *et al.*, 2019).

In addition, it can replace fat, contributing to reduced intake of this component, and the addition of green banana biomass increases the consumption of prebiotic dietary fiber.

This e-book presents simple recipes, prepared in all regions of Brazil, that have been modified in some ingredients by incorporating green banana biomass as a total or partial substitute for ingredients containing sugars and fats (Figure 1).

Figure 1 — Ingredients used in the preparation of recipes with green banana biomass



Source: Prepared by the authors (2024).

PREPARATION OF GREEN BANANA BIOMASS

Preparation time: 30 minutes

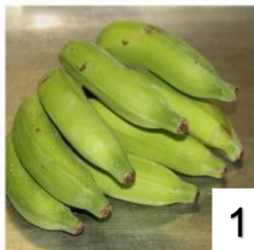
Ingredients: 1 kg of unripe green bananas with peel and water

Yield: approximately 700 g of ready-to-use green banana biomass

Necessary utensils: pressure cooker, fork, cup, bowl, blender (or hand mixer/food processor)

Below is a step-by-step guide to preparing green banana biomass (Figure 2).

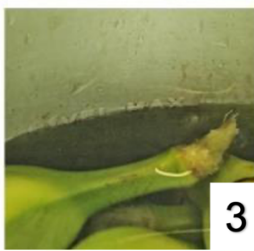
Figure 2 — Illustrated and numbered steps for preparing green banana biomass



Select bananas that are completely green. Ripe bananas will not have the nutritional composition of resistant starch, which is why it is important to pay attention to the stage of ripeness of the bananas used.



Carefully remove the green bananas from the bunch, keeping the stems intact. Then wash the bananas under running water to remove physical dirt. A clean sponge may be used to help remove impurities.



Place the bananas (whole and with the peel) in the pressure cooker, and then cover them with water. A pressure cooker is used to cook faster compared to a regular pot. This happens because the pressure cooker retains steam inside, circulating at temperatures that may exceed 100 °C. Therefore, be careful when filling the pot with water and bananas, as the contents should not exceed two-thirds ($\frac{2}{3}$) of the total volume of the cooker. In a 4.5-liter pressure cooker, the amount of bananas to be cooked at one time is eight units, approximately 1 kg



Once the pressure cooker reaches pressure, cook for 10 minutes.



After cooking, carefully open the pot and remove the bananas.



Remove the peels while the bananas are still hot to obtain the banana pulp. We recommend discarding the peels, although they can also be used in preparing the biomass. In this case, we chose not to use them so as not to influence the sensory aspects of the recipes in this book.



Take the cooked green banana pulp and blend it in a blender or food processor. To help obtain a thick cream, add a small amount of water, but be careful not to add too much. We recommend not exceeding 40% of the amount of banana pulp. In other words, from 1 kg of green bananas, you obtain about 600 g of banana pulp, and you may add one standard cup of water (approximately 200 ml).



Once the mixture becomes homogeneous, remove it from the blender or food processor using a spatula. When it cools, you will have a very thick paste—that is, green banana biomass.

Source: prepared by the authors (2024).

As previously described, green banana biomass (Figure 3) was prepared and is used in this book in various recipes: four savories (tartar sauce, cheese bread, pizza dough, and chicken fricassee) and two sweets (hot chocolate and coconut “*beijinho*”). These preparations are traditionally consumed across different regions of Brazil and at various times of the day. In addition, the recipes are easy to prepare, do not require advanced

culinary skills, and use low-cost ingredients. They are accessible to those who wish to make healthier versions by partially replacing ingredients such as heavy cream and condensed milk, which are high in fat and sugar.

But why make these changes? While the pleasure of consuming these foods should be preserved, excessive intake of fats and sugars increases the risk of cardiovascular diseases, dental caries, obesity, and several other chronic conditions. Therefore, the impact on the nutritional quality of the diet largely depends on the quantity of oils, fats, and sugars used in culinary preparations (Brazil, 2014).

The incorporation of green banana biomass into the proposed recipes aimed to maintain sensory characteristics similar to those of the original preparations. For the

preparation of these six recipes, all equipment used was of the domestic type. The prepared green banana biomass has a shelf life of three (3) days under refrigeration in a closed container. A comparison of the nutritional composition values of green bananas and green banana biomass is presented in Table 1, based on data obtained from food composition tables of foods consumed in Brazil.

Figure 3 — Visual appearance of green banana biomass ready for consumption



Source: prepared by the authors (2024).

Table 1 — Nutritional composition of green banana and ready-to-use green banana biomass

Ingredient	Weight (g)	Energy(Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
*Green banana	100	122	29	1,4	0,2	4,4
**Green banana biomass	100	102	24	1,2	0,2	8,7

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

Based on research conducted by the authors, the nutritional data for green banana biomass correspond to an average of the values reported on labels of products available in retail in 2026.

Source: prepared by the authors (2026), based on Franco (2021) and Philippi (2021).

Nutritional information

LACTOSE-FREE. GLUTEN-FREE.

TARTAR SAUCE



CHEESE BREAD

HOT CHOCOLATE



PIZZA DOUGH

CHICKEN FRICASSEE



COCONUT *BEIJINHO*

Figure 4 — Tartar sauce prepared with the incorporation of green banana biomass
Source: prepared by the authors (2024).

TARTAR SAUCE



TARTAR SAUCE

Versatile and delicious, its unique combination of freshness, creaminess, and simple preparation makes this sauce an ideal option to accompany fish, leafy salads, potatoes, and burgers. Figure 4 shows the apparent texture of the tartar sauce, and Figure 5 presents an illustrated step-by-step guide for preparing it: ingredients, method of preparation, nutritional information, and shelf life, which are detailed below.

Preparation time: 15 minutes.

Serving size: 12 g (1 tablespoon).

Servings: 19.

Necessary utensils: tablespoon, cup, knife, cutting board, and bowl.

Figure 5 — Illustrated step-by-step guide to the ingredients and preparation stages of tartar sauce with green banana biomass



Source: prepared by the authors (2024).

INGREDIENTS

- 2 heaping tablespoons of green banana biomass
- ½ small cup of skim milk
- 1 tablespoon of olive oil
- 1 heaping tablespoon of chopped onion
- 2 heaping tablespoons of chopped mixed pickles (cucumber, carrot, olives, or others of your choice)
- 2 heaping tablespoons of chopped chives
- 1 tablespoon of mustard sauce
- 1 tablespoon of lemon juice

METHOD OF PREPARATION

1. Chop the pickles, onion, and green onion.
2. In a bowl, combine the biomass, lemon juice, olive oil, and mustard.
3. Add the chopped ingredients and mix again.

Shelf life: 3 days under refrigeration in a closed container.

Nutritional information:

ALLERGENS: CONTAINS MILK. CONTAINS LACTOSE.
GLUTEN-FREE.

Note: If you are lactose intolerant, you may replace skim milk with lactose-free milk or a plant-based beverage.

COMPARISON OF THE ORIGINAL RECIPE AND THE VERSION WITH GREEN BANANA BIOMASS

Tables 2 and 3 present a theoretical comparison between the commonly prepared tartar sauce recipe and the version with added green banana biomass, in which it is possible to observe an increase in dietary fiber and a reduction in lipids.

Table 2 — Theoretical nutritional composition of tartar sauce

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Cream	1 1/2 cups	360	864	14,40	14,40	86,40	0,00
Chopped onion	1 heaping tablespoon	10	15	3,46	0,47	0,06	0,17
Chopped pickles	1 heaping tablespoon	10	3	0,62	0,14	0,04	0,04
Chopped chives	2 heaping tablespoons	10	3	0,44	0,33	0,07	0,25
Mustard sauce	1 level tablespoon	11	8	0,70	0,52	0,51	0,30
Lemon juice	1 tablespoon	8	2	0,69	0,03	0,01	0,03
Salt	1 pinch	6	0	0,00	0,00	0,00	0,00
Totals		415	895	20,31	15,88	87,09	0,79
Per 100g serving			216	4,9	3,8	21	0,2
Per 12g serving			26	0,6	0,5	2,5	0,02

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

Table 3 — Theoretical nutritional composition of tartar sauce with green banana biomass

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Green banana biomass	2 heaping tablespoons	100	102	24,05	1,17	1,21	1,08
Skim milk	1 /2 small glass	70	29	3,35	2,31	0,75	0,00
Olive oil	1 tablespoon	8	71	0,00	0,00	8,00	0,00
Chopped onion	1 heaping tablespoon	10	4	0,86	0,12	0,02	0,17
Chopped pickles	1 heaping tablespoon	10	1	0,31	0,07	0,02	0,04
Chopped chives	2 heaping tablespoons	10	3	0,44	0,33	0,07	0,25
Mustard sauce	1 level tablespoons	11	8	0,70	0,52	0,51	0,30
Lemon juice	1 tablespoon	8	2	0,69	0,03	0,01	0,03
Salt	1 pinch	2	0	0,00	0,00	0,00	0,00
Totals		229	221	30,41	4,55	10,58	1,87
Per 100 g serving			96	13	2	4,6	0,8
Per 12g serving			12	1,6	0,2	0,6	0,1

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

CHEESE BREAD

A close-up photograph of several golden-brown, round cheese bread rolls piled in a woven basket. The rolls have a slightly cracked, textured surface with visible melted cheese. The basket is placed on a blue and white patterned tablecloth.

CHEESE BREAD

Enjoyed from breakfast to afternoon snacks, and even at parties and special celebrations, this delicacy is known for its crispy crust on the outside and its soft, airy texture on the inside, creating a unique sensory experience with every bite (Figure 6). The ingredients used, the step-by-step preparation method, nutritional information, and shelf life can be found below (Figure 7).

Preparation time: 60 minutes.

Serving size: 40 g (1 unit).

Servings: 13.

Necessary utensils: tablespoon, teaspoon, cup, bowl, pot, and baking tray.

Necessary equipment: stove and oven.

Figure 7 — Illustrated step-by-step guide to the ingredients and preparation stages of cheese bread with green banana biomass



Source: prepared by the authors (2024).

INGREDIENTS

- 3 heaping tablespoons of green banana biomass
- 1 ½ cups of sour cassava starch
- ½ cup of skim milk
- ½ cup of water
- 1 egg
- 4 tablespoons of soybean oil
- 3 heaping tablespoons of grated parmesan cheese
- 1 heaping teaspoon of salt

PREPARATION

1. In a pot, bring the water, milk, biomass, oil, and salt to a boil.
2. Gradually add the cassava starch, stirring until the dough comes together.
3. When the dough is warm, incorporate the grated parmesan cheese and the egg, mixing well.
4. Knead the dough until it no longer sticks to your hands, shape it into balls approximately 5 cm in diameter, and place them on a baking tray greased with oil. The balls will expand, so leave 3 cm of space between them.
5. In a preheated oven, bake at 180 °C (356 °F) for 40 minutes.

Shelf life: 1 day in a closed container stored in a dry, cool place; 3 days under refrigeration in a closed container; or frozen for up to 3 months.

Additional nutritional information:

ALLERGENS: CONTAINS EGG, SOY DERIVATIVES, MILK, AND MILK DERIVATIVES. CONTAINS LACTOSE. GLUTEN-FREE.

Note: If you are lactose intolerant, you may replace skim milk with lactose-free milk or a plant-based beverage.

COMPARISON OF THE ORIGINAL RECIPE AND THE VERSION WITH GREEN BANANA BIOMASS

Tables 4 and 5 present a theoretical nutritional comparison between the traditional cheese bread recipe and the nutritional composition of cheese bread with the addition of green banana biomass, where a reduction in lipid (fat) content can be observed.

Table 4 — Theoretical nutritional composition of cheese bread

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Sour cassava starch	4 cups	800	2856	705,60	2,40	0,16	27,20
Skim milk	1 cup	200	84	9,58	6,60	2,14	0,00
Egg	2 units	100	149	1,23	12,50	10,00	0,00
Water	1 cup	200	0	0,00	0,00	0,00	0,00
Soybean oil	1/2 cup	100	884	0,00	0,00	100,00	0,00
Grated parmesan cheese	7 heaping tablespoons	100	456	3,75	41,60	30,00	0,00
Salt	3 heaping tablespoons	15	0	0,00	0,00	0,00	0,00
Totals		1515	4429	720,16	63,10	142,30	27,20
Per 100 g serving			292	48	4,2	9,4	1,8
Per 40g serving			117	19	1,7	3,8	0,7

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

Table 5 — Theoretical nutritional composition of cheese bread with green banana biomass

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Green banana biomass	3 heaping tablespoons	150	153	36,07	1,76	0,25	1,62
Sour cassava starch	1 1/2 cups	300	1071	264,60	0,90	0,06	10,20
Skim milk	1/2 cups	100	42	4,79	3,30	1,07	0,00
Egg	1 unit	50	75	0,62	6,25	5,00	0,00
Soybean oil	4 tablespoons	32	283	0,00	0,00	32,00	0,00
Grated parmesan cheese	3 heaping tablespoons	42	192	1,58	17,47	12,60	0,00
Salt	1 heaping tablespoon	4	0	0,00	0,00	0,00	0,00
Totals		678	1815	307,65	29,68	50,98	11,82
Per 100 g serving			268	45	4,4	7,5	1,7
Per 40 g serving			107	18	1,8	3	0,7

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

Figure 8 — Hot chocolate prepared with the incorporation of green banana biomass
Source: prepared by the authors (2024).

HOT CHOCOLATE

A top-down view of a cup of hot chocolate. The cup is light green and filled with a frothy, brown beverage. It sits on a white plate with a blue floral pattern. To the left of the cup are three cinnamon sticks. A white spoon is partially visible on the right side of the cup.

HOT CHOCOLATE

This hot chocolate (Figure 8) is perfect to enjoy on cold days. Its silky texture and rich flavor can be paired with cinnamon sticks or ground cinnamon, and you can also try versions blended with coffee. The ingredients used, step-by-step preparation method, nutritional information, and shelf life are presented below (Figure 9).

Preparation time: 10 minutes.

Serving size: 200 ml (1 cup).

Servings: 3.

Necessary utensils: tablespoon, cup, and pot.

Necessary equipment: stove.

Figure 9 — Step-by-step illustration of the ingredients and preparation stages of hot chocolate made with green banana biomass



Source: prepared by the authors (2024).

INGREDIENTS

3 heaping tablespoons of green banana biomass
2 cups of skim milk
3 level tablespoons of cream
2 heaping tablespoons of cocoa powder

PREPARATION METHOD

1. Place all ingredients in a saucepan.
2. Bring to heat and stir until a uniform consistency is reached.
3. Once it begins to boil, remove from heat and serve very hot.

Shelf life: 3 days refrigerated in a sealed container.

Additional nutritional information:

ALLERGENS: CONTAINS MILK AND DAIRY PRODUCTS. CONTAINS LACTOSE. GLUTEN-FREE.

Note: If you are lactose intolerant, you may substitute skim milk with lactose-free milk or a plant-based beverage.

COMPARISON OF THE ORIGINAL RECIPE AND THE VERSION WITH GREEN BANANA BIOMASS

Tables 6 and 7 present a theoretical nutritional comparison between the traditional hot chocolate recipe and the nutritional composition of hot chocolate with the addition of green banana biomass, where a reduction in lipid (fat) content can be observed.

Table 6 — Theoretical nutritional composition of hot chocolate

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Cornstarch	1 heaping tablespoon	20	76	18,26	0,05	0,01	0,18
Skim milk	2 cups	400	168	19,16	13,20	4,28	0,00
Cream	1 carton	200	480	8,00	8,00	48,00	0,00
Cocoa powder	3 heaping tablespoons	48	160	28,80	6,40	3,20	3,20
Totals		668	884	74,22	27,65	55,49	3,38
Per 100 g serving			132	11	4,1	8,3	0,5
Per 200 ml serving			265	22	8,3	17	1,0

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

Table 7 – Theoretical nutritional composition of hot chocolate with green banana biomass

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Green banana biomass	3 heaping tablespoons	150	153	36,07	1,76	0,25	1,62
Skim milk	2 cups	400	168	19,16	13,20	4,28	0,00
Cream	3 level tablespoons	50	120	2,00	2,00	12,00	0,00
Cocoa powder	2 heaping tablespoons	32	107	19,20	4,27	2,13	2,13
Totals		632	548	76,43	21,23	18,66	3,75
Per 100 g serving			87	12	3,4	3	0,6
Per 200 ml serving			174	24	6,7	5,9	1,2

Legend: carbohydrates – CHO; proteins – PTN; lipids – LIP; dietary fiber – DF.



PIZZA DOUGH

PIZZA DOUGH

The practicality of this light and crispy dough lies in its versatility. You can customize it with an endless variety of toppings and side dishes, making it ideal for a family dinner with friends. It can be prepared in advance and frozen, ready to use whenever needed. Figure 10 shows the appearance of the pizza dough. All preparation instructions are provided below, along with the nutritional information of the product (Figure 11).

Preparation time: 60 minutes.

Serving size: 40 g (1 slice).

Servings: 19.

Required utensils: tablespoon, cup, bowl, rolling pin, and baking pan.

Required equipment: oven.

Figure 11 — Illustrated step-by-step guide to the ingredients and preparation stages of pizza dough with green banana biomass



Source: prepared by the authors (2024).

INGREDIENTS

4 heaping tablespoons of green banana biomass
2 $\frac{1}{3}$ cups of wheat flour
1 $\frac{1}{4}$ cups of water
2 tablespoons of soybean oil
1 packet (10 g) of active dry yeast
1 heaping teaspoon of salt

PREPARATION METHOD

1. In a bowl, dissolve the yeast in the water.
2. Add the flour, oil, and salt. Knead until the dough no longer sticks to your hands.
3. Cover with a clean cloth and let it rest for 30 minutes.
4. Divide the dough into 4 equal portions and shape the discs. Start stretching with your hands and finish with a rolling pin. Dust the countertop with wheat flour, place the discs separately, cover them, and let them rest.
5. Place the discs in baking pans and bake in a preheated oven at 180 °C for 20 minutes.
6. After this pre-baking step, you may add your desired toppings and return to the oven, or let the discs cool, wrap them in sanitized plastic bags or plastic wrap, and freeze.

Shelf life: 3 days under refrigeration in a closed container or frozen for up to 3 months.

Nutritional information:

ALLERGENS: CONTAINS WHEAT AND SOY DERIVATIVES.
LACTOSE-FREE. CONTAINS GLUTEN.

Note: If you are lactose intolerant, you may replace skim milk with lactose-free milk or a plant-based beverage.

COMPARISON OF THE ORIGINAL RECIPE AND THE VERSION WITH GREEN BANANA BIOMASS

Tables 8 and 9 present a theoretical nutritional comparison between the traditional pizza dough recipe and the nutritional composition of pizza dough with the addition of green banana biomass, where a reduction in lipid (fat) content can be observed. Pizza is usually served with toppings, so it is recommended to make healthy food choices, such as incorporating vegetables and protein sources into the toppings.

Table 8 — Theoretical nutritional composition of pizza dough

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Granulated sugar	1 heaping tablespoon	5	19	5,00	0,00	0,00	0,00
Wheat flour	1/2 package	500	1800	380,00	50,00	5,00	10,00
Water	2 cups	240	0	0,00	0,00	0,00	0,00
Soybean oil	1/2 cup	100	884	0,00	0,00	100,00	0,00
Dry biological yeast	1 packet	10	35	3,02	5,24	0,17	0,00
Salt	1 heaping tablespoon	5	0	0,00	0,00	0,00	0,00
Totals		855	2738	388,02	55,24	105,17	10,00
Per 100 g serving			320	45	6,5	12	1,2
Per 40 g serving			128	18	2,6	4,9	0,5

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

Table 9 — Theoretical nutritional composition of pizza dough with green banana biomass

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Green banana biomass	4 heaping tablespoons	200	204	48,10	2,35	0,34	2,16
Wheat flour	2 e 1/3 cups	380	1368	288,80	38,00	3,80	7,60
Water	1 e 1/4 cup	250	0	0,00	0,00	0,00	0,00
Soybean oil	2 tablespoons	16	141	0,00	0,00	16,00	0,00
Dry biological yeast	1 packet	10	35	3,02	5,24	0,17	0,00
Salt	1 heaping tablespoons	5	0	0,00	0,00	0,00	0,00
Totals		861	1748	339,92	45,59	20,31	9,76
Per 100 g serving			203	39	5,3	2,4	1,1
Per 40 g serving			81	16	2,1	0,9	0,5

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

Figure 12 — Fricassee prepared with the incorporation of green banana biomass
Source: prepared by the authors (2024).



CHICKEN FRICASSEE

CHICKEN FRICASSEE

This fricassee is wonderful when paired with rice, shoestring potatoes, and green salads. Try adding your personal touch with onion, garlic, and/or other vegetables, aromatic herbs, or even special spices. Chicken fricassee (Figure 12) is a dish that pleases everyone and can be served for both lunch and dinner. The ingredients used, preparation method, and nutritional information are presented below (Figure 13).

Preparation time: 60 min.

Serving size: 100 g (4 heaping tablespoons).

Servings: 5.

Required utensils: tablespoon, dessert spoon, plate, glass, cup, bowl, knife, cutting board, and frying pan.

Required equipment: stove.

Figure 13 — Illustrated step-by-step guide to the ingredients and preparation stages of chicken fricassee with green banana biomass



Source: prepared by the authors (2024).

INGREDIENTS

4 heaping tablespoons of green banana biomass
1/3 small glass of skim milk
1 chicken breast
1 dessert spoon of soybean oil
4 slices of mozzarella cheese
1/2 can of corn
10 pitted olives
A pinch of salt

PREPARATION METHOD

1. Chop the mozzarella cheese and olives and set aside. Remember to clean the surface thoroughly when switching ingredients to avoid cross-contamination.
2. Remove the skin from the chicken breast and debone if necessary. Cut into strips. In a preheated frying pan, add the oil and sauté the chicken strips. Once golden, season with a pinch of salt.
3. Add the milk, green banana biomass, and chopped mozzarella, stirring constantly until a smooth, thick sauce forms.
4. When it starts to boil, add the corn, mix, and remove from heat.
5. Serve topped with the chopped olives.

Shelf life: 3 days refrigerated in a sealed container.

Nutritional information:

ALLERGENS: CONTAINS MILK AND DAIRY PRODUCTS, AND SOY DERIVATIVES. CONTAINS LACTOSE. GLUTEN FREE.

Note: If you are lactose intolerant, you may replace the skim milk with lactose-free milk and the mozzarella with lactose-free cheese.

COMPARISON OF THE ORIGINAL RECIPE AND THE VERSION WITH GREEN BANANA BIOMASS

Tables 10 and 11 present a theoretical nutritional comparison of the chicken fricassee recipe and the nutritional composition of chicken fricassee with the addition of green banana biomass, in which it is possible to observe a reduction in lipids.

Table 10 — Theoretical nutritional composition of chicken fricassee

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Cream	1 carton	200	480	8,00	8,00	48,00	0,00
Cream cheese spread	1 cup	200	466	13,12	13,12	33,32	0,00
Water	1 cup	200	0	0,00	0,00	0,00	0,00
Skimless chicken breast	2 units	700	833	0,00	150,50	21,00	0,00
Soybean oil	2 dessert spoons	10	88	10,00	0,00	0,00	0,00
Mozzarella cheese	10 slices	200	542	4,46	38,80	43,20	0,00
Canned corn	1 can	170	118	22,66	4,05	2,48	4,76
Pitted green olive	20 units	100	116	1,30	1,40	12,70	1,00
Salt	1 heaping teaspoon	5	0	0,00	0,00	0,00	0,00
Totals		1180	2643	59,54	215,87	160,70	5,76
Per 100 g serving			224	5,1	18	14	0,5

**Based on the authors' research, the nutritional data for green banana biomass corresponds to the average values reported on retail product labels in 2026
Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF..

Table 11 — Theoretical nutritional composition of chicken fricassé with green banana biomass

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Green banana biomass	4 heaping teaspoons	200	204	48,10	2,35	0,34	2,16
Skim milk	1/3 small cup	50	21	2,40	1,65	0,54	0,00
Skimless chicken breast	1 unit	350	417	0,00	75,25	10,50	0,00
Soybean oil	1 dessert spoon	5	44	5,00	0,00	0,00	0,00
Mozzarella cheese	4 slices	80	225	1,78	15,52	17,28	0,00
Canned corn	1/2 can	85	59	11,33	2,03	1,24	2,38
Pitted green olive	10 units	50	58	0,65	0,70	6,35	0,50
Salt	1 heaping teaspoon	5	0	0,00	0,00	0,00	0,00
Totals			125	8,4	12	4,4	0,6
Per 100 g serving							

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF.

COCONUT BEIJINHO

A close-up photograph of four round, white coconut-covered snacks (beijinhos) stacked on a light-colored wooden cutting board. The board is placed on a dark green woven placemat. The background is a blue and white patterned surface. The text 'COCONUT BEIJINHO' is overlaid in large, bold, white capital letters.

COCONUT *BEIJINHO*

A delicately sweet childhood flavor that melts in your mouth. Easy to make and impossible to resist — this is the beijinho sweet (Figure 14). Enjoy it with coffee or tea, creating a perfect pairing for an afternoon snack or a relaxing break. Information on ingredients, preparation method (Figure 15), nutritional information, and shelf life are presented below.

Preparation time: 60 min.

Serving size: 25 g (1 unit).

Servings: 14.

Utensils needed: tablespoon, saucepan, and plate.

Equipment needed: stove.

Figure 15 — Step-by-step illustration of the ingredients and preparation stages for *beijinho* made with green banana biomass



Source: prepared by the authors (2024).

INGREDIENTS

- 2 heaping tablespoons of green banana biomass
- ½ small bottle of coconut milk
- 8 tablespoons of sweetened condensed milk
- 1 packet (100 g) of grated dried coconut

PREPARATION METHOD

1. In a saucepan, combine the green banana biomass, coconut milk, sweetened condensed milk, and half of the shredded coconut.
2. Cook over medium heat, stirring constantly, for 15 minutes. Remove from heat and let it cool slightly.
3. Shape the mixture into small balls and roll them in the remaining shredded coconut.

Shelf life: 3 days refrigerated in a sealed container.

Additional Nutritional Information:

ALLERGEN WARNING: CONTAINS MILK DERIVATIVES.
CONTAINS LACTOSE. GLUTEN-FREE.

Note: If you are lactose intolerant, you may substitute the sweetened condensed milk with a lactose-free version.

COMPARISON OF THE ORIGINAL RECIPE AND THE VERSION WITH GREEN BANANA BIOMASS

Tables 12 and 13 present a theoretical nutritional comparison of the beijinho dessert recipe and the nutritional composition of beijinho with the addition of green banana biomass, where it is possible to observe a reduction in carbohydrates derived from condensed milk.

Table 12 — Theoretical nutritional composition of *beijinho* (coconut sweet)

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Unsalted butter	2 heaping tablespoons	64	459	0,04	0,54	51,90	0,00
Condensed milk	2 cans	790	2631	447,61	52,61	65,81	0,00
Grated dried coconut	3 packages	300	1980	73,20	20,67	193,50	51,69
Totals		1154	5070	520,85	73,83	311,21	51,69
Per 100 g serving			439	45	6,4	27	4,5
Per 25 g serving			110	11	1,6	6,7	1,1

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF..

Table 13 — Theoretical nutritional composition of *beijinho* (coconut sweet) with green banana biomass

Ingredients	Household Measure	Weight (g)	Energy (Kcal)	CHO (g)	PTN (g)	LIP (g)	DF (g)
Green banana biomass	2 heaping tablespoons	100	102	24,05	1,17	0,17	1,08
Coconut milk	1/2 small bottle	100	250	1,64	1,46	26,00	0,55
Condensed milk	8 tablespoons	120	400	67,99	7,99	10,00	0,00
Grated dried coconut	1 packagex	100	660	24,40	6,89	64,50	17,23
Totals		420	1412	118,08	17,52	100,66	18,86
Per 100 g serving			336	28	4,2	24	4,5
Per 25 g serving			84	7	1	6	1,1

Legend: carbohydrates — CHO; proteins — PTN; lipids — LIP; dietary fiber — DF..

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