



## Elaboration of a vegan short bread based on chocolate and moringa oleífera powder in the canton Samborondón province of Guayas.

### *Elaboración de una masa quebrada vegana a base de chocolate y polvo de moringa oleífera en el cantón Samborondón, provincia del Guayas*

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#### Abstract

Gastronomy in the world has been evolving over time, every year there is a great variety and Delicious dishes that can be tasted in any corner of the country, gastronomy has made progress and that is how there are cities where you can enjoy its diversities as well as its culture, its traditions and its typical foods: the coastal region specifically in the Samborondón canton is where we will put into practice our research on the Moringa Oleífera, which is a shrub with innumerable nutritional properties, it is considered one of the foods that contribute to the well-being of human beings thanks to their variety of nutrients and benefits that they contribute to the body, we will use it as a proposal for the responsible application in a pastry product that, combined with cocoa, is an excellent proposal for its dissemination since it is produced only in 14 countries of the world.

#### Keywords

Agriculture, fruit, eating habits, medicinal plants, food.

#### Resumen

La Gastronomía en el mundo ha venido evolucionando con el transcurrir del tiempo, cada año se encuentra gran variedad y deliciosos platos que se pueden degustar en cualquier rincón del país, la gastronomía ha tenido un progreso y es así como hay ciudades donde se puede disfrutar de sus diversidades así también de su cultura, sus tradiciones y sus comidas típicas: la región costa específicamente en el cantón Samborondón donde se pondrá en práctica esta investigación sobre la Moringa Oleífera, que es un arbusto con innumerables propiedades nutritivas, es considerado como uno de los alimentos que contribuyen al bienestar de los seres humanos gracias a su variedad de nutrientes y beneficios que aportan al organismo, esta será usada como propuesta para la aplicación responsable en un producto de pastelería que combinado con el cacao es una excelente propuesta para su difusión ya que es producido únicamente en 14 países del mundo.

#### Palabras clave

Agricultura, fruta, hábitos alimentarios, planta medicinal, alimento.

#### 1. Introduction

Ecuador is a pioneer country in the production of cocoa (Theobroma Cacao), because of this it has been one of the countries focused on exporting the product to other countries, the fruit obtained from this tree is a cob from which through various processes chocolate is obtained, with this ingredient can be made energy drinks, toppings, desserts, etc. It is important to know that Ecuador is a country with great flora and fauna, one of the studies of this research will deal with the benefits of the consumption of the Moringa leaf, this consists of a genus of trees with several species distributed by arid and semi-arid areas of Latin America, Africa and Asia, the best known species is Moringa oleifera and its main use is as a nutritional supplement. Moringa is currently a first class resource and low cost of production, this beneficial plant has a promising future in the nutrition and dietetics industry, as well as protein food, especially due to its natural food character, it is used in gastronomy as an ingredient in desserts and sweets. [1]

The U.S. Department of Agriculture (2018) mentions the following:

Moringa Oleifera. contains a huge list of nutritional properties: anti-inflammatory, analgesic, anti-asthmatic, anti-anemic, functions as a metabolism activator, purifier, liver protector, antihypertensive, hormone producer, promotes hair growth, moisturizes, mobilizes body fluids (homeostatic), detoxifies, strengthens muscles and bones, improves mental alertness, memory and learning ability[2]

Moringa, currently described as the "miracle tree", has small and rounded leaves, which contain a large amount of nutrients, including vitamin C, calcium and potassium. These are vitamins that when consumed by humans provide the body with the benefits of their nutrients, thanks to the specific condition of the plant to possess this great source of nutrients. This tree can be consumed from its leaves to its seeds, which have a high percentage of oleic oil similar to that extracted from the olive tree. This oil itself can be a substitute for traditional olive oil thanks to its high content of natural oils, with its consumption has an antimicrobial effect that can prevent acne and the formation of blackheads. [3]

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Once named the benefits of the moringa tree, it is important to mention that it is a natural product, which currently with the arrival of the pandemic became more popular its consumption in the country, since its nutritional properties were just known, even it is known that moringa has great acceptance in athletes, vegetarians, vegans and can be consumed by all kinds of people, whether children, adults or seniors. Given that, this research will be conducted in order to create a proposal for a healthy product that is suitable for people to consume, using moringa and alkaline cocoa as main ingredients [4].






Currently we have as a common denominator bad eating habits, especially young people, due to the products offered by the market or simply by personal preferences, the gastronomic culture and food health care generates a change in the productive matrix against the problems of diseases that our country lives, healthy eating has become a necessity in recent years, Ecuadorians are increasingly aware of what we are consuming and the benefits of having a balanced diet, since food is the habit that most influences health [5].

Both the lack of food and the excess of it is detrimental to health, therefore, the appropriate amounts should be consumed for each individual, due to the concern they are having about their health and about leading a better lifestyle, so they are beginning to prefer less processed foods. Samborondón, lately, has ventured into this type of products attending to the needs of people who lead a good lifestyle, that is, with a healthy diet or a vegetarian or vegan diet, eating based on products of vegetable origin. Through studies on poor nutrition, it is sustained the increase of premature deaths caused in children, adolescents and older adults, for this reason is that we present a way to eradicate malnutrition and poor nutrition in the canton of Samborondón in the province of Guayas. [6]

In the country the cultivation of nutritious foods becomes momentary and decreases due to the lack of utility in the agroindustry, we can observe products such as Moringa Oleifera, a few years ago it was marketed in the country on a large scale, but currently it is being exploited in Europe and North America. For this reason it is determined that if there is no demand there is no crop, therefore, we cannot speak of a change in the health of the community. In the Sustainable Development Goals Plan, it is to implement by 2030, public information and access programs for nutritional health care. [2]

## 2. Materials and methods

	<b>Dough mixer.</b> - It is used primarily in pastry, not to transmit heat to the broken doughs, usually developed by hand and friction, heat or constant kneading, does not allow us to have good results, thanks to this product I will get a uniform dough without developing gluten.
	<b>Non-stick steel molds.</b> - To facilitate the unmolding process, I will use these tartlet molds with grooved edges to give a better finish to the final product, its mode of use is easy, since it does not require prior greasing.
	<b>Flexible silicone spatula (Miserable).</b> - This tool was used to integrate more easily all the liquid ingredients with the dry ingredients, as well as to scrape the bottom of the containers and make the best possible use of all the product waste that remains at the bottom.
	<b>Silicone rolling pin.</b> - Its use is essential in the preparation of artisanal doughs. For the preparation of the shortcrust pastry, it was used to stretch the product and obtain a well distributed dough at the moment of placing the dough in the mold.
	<b>Polypropylene bags.</b> - We use these sleeves to keep the final product previously cooled, in order to store the shortcrust pastry in a hygienic way and to perform the hedonic test more easily, proving that the product is innocuous.
	<b>Cling film.</b> - We will use it to keep the dough in the refrigerator, keeping in mind that it must be kept hermetically sealed so that it does not absorb other odors and may contaminate the final product, it is also kept to prevent the dough from drying out and crusting.
	<b>Pointilla.</b> - To unmold the product, we will help ourselves with the tip, since it has a fine and pointed tip, this tool will be very useful, taking into account that if we go too deep into the product we can break the dough, since it is brittle and breaks easily.
	<b>Scales.</b> - It is the most important material for the elaboration of any bakery product, since it will help us to give us the exact amount of weight of a certain product, so we can make recipes with more precision.

	<b>Grill.</b> - We will use it to cool our product in a more optimal way after leaving the oven, it is important to use it because, if we place the product in a container with a flat bottom, it will start to sweat and the dough will get wet.
	<b>Containers.</b> - We use 10 containers in the elaboration of this product, since at the moment of the mise en place it is necessary to have the ingredients separated and weighed.
	<b>Electric oven.</b> - We will use it to bake the product, it can also be baked in a gas oven, but I preferred to do it in an electric oven because it is smaller and I consider that the heat is better distributed, the product was baked at a temperature of 160°C for 20 - 25 minutes.
	<b>Stainless steel table.</b> - It is important to elaborate the product on a flat, firm and disinfected surface, that will help us to observe that no physical agent contaminates the product at the moment of stretching our dough.
	<b>Refrigerator.</b> - We will keep the dough wrapped in plastic wrap inside the refrigerator, this is so that the ingredients assimilate their unification and compact the genres, thanks to the fat that we use, the dough can be handled more easily.

## Método

The battening method was used, which consists of incorporating the fat with all the dry ingredients. It can be done with the help of a food processor, a dough mixer or two knives. The fat is incorporated into the dry ingredients until a sandy dough is formed.



Fig. 1. Flow diagram of the production of shortcrust pastry.

Moringa offers a great variety of food products, since all parts of the plant are edible: the green pods (similar to legumes), the leaves, the flowers, the seeds (which are blackish and rounded), its roots are very nutritious and can be used for human consumption due to their high content of proteins, vitamins and minerals. Moringa leaves have great nutritional qualities. The seed of this tree contains 35% of oil of great efficiency, its flavor is sweet and little agglutinating, it is considered similar to olive oil with 73% of similarity, that is why it is considered healthy and can be used in preparations such as sauces or for seasoning salads.. [7]

The shrub Moringa oleifera has great ecological plasticity, as it is capable of adapting to soil and climate conditions, its nutritional value and high biomass yields make it a resource of great importance in production systems. In addition, it is a plant that can be used as a living fence, windbreak curtain, green manure and for the production of ethanol and rubber, among others;



therefore, it is considered an interesting species for the tropics. [8].

Regarding the nutritional value of the leaves, these are composed of highly beneficial nutritional qualities, considered one of the best among perennial vegetables. It contains 27% and also a high percentage of calcium and iron. This nutritional value is very important in places where food safety is altered by long periods of aridity, the leaves of this tree can be harvested even in times of intense summers, when there are no other fresh shrubs available for consumption. [9].

The national variety of cocoa is native to the country, it is considered that it comes from the eastern slopes of the Andean mountain range, from the Amazon Basin of Ecuador, from where it was distributed by animals that, when consuming it, dispersed its fruit, seed and shell. The seed of this plant was introduced by the old roads of the Inca Empire and sown by the aborigines of the West Coast in ancient times. By the second half of the 16th century, during the colonial period, cocoa production in Ecuador was so abundant that it attracted the interest of businessmen in the city of Guayaquil to cultivate and harvest this product, in spite of the prohibitions that existed.. [10]

In previous years, the food that was available to humans was based on plants and fruits, since they were always available and their collection was simple, while they had at hand the hunting of animals but they consumed them very rarely because obtaining them was complex and risky, when people stopped being nomadic and became sedentary, agriculture and animal training was born and their food was based on what they grew and the derivatives obtained from domesticated animals. [11]

The main reasons for veganism are 4, the main one being the concern for animal ethics, since human beings seek to feel good about their environment without harming the different forms of existing life, then there are those who for health benefits have chosen to leave aside the consumption of animal meat, as studies by vegan students at Oxford found that vegan diets greatly reduced death from ischemic heart disease, reduction in the formation of gallstones, decreased constipation and even the likelihood of diabetes.

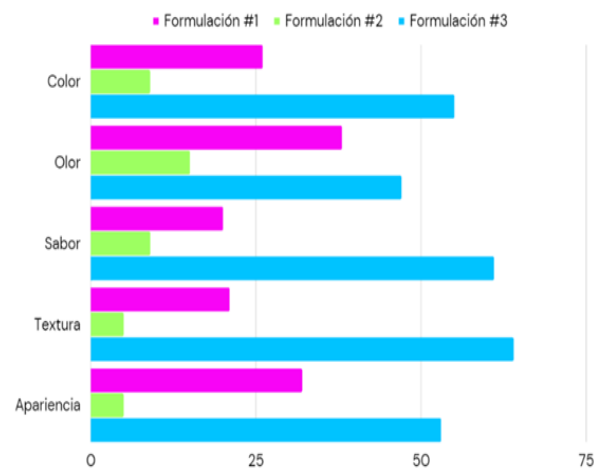
Another reason is due to aspects of environmental self-awareness, considered nowadays as people in favor of animal welfare and finally for religious beliefs, people whose creeds are Buddhism or Jainism consider that animals as well as human beings have souls. [12]

Confectionery encompasses a series of elaborations that refers to the creation of sweet food products from recipes, such as cakes, cookies, spoon sweets, creams,

mousses, among others, which besides being delicious, bring with them the practice of the art of decorating and presenting, thus elaborating an eye-catching and delicious dish.

In general, the different dessert recipes elaborated around the world are made with animal products. Three decades ago, the basic ingredients in vegan baking were flour and fruit-based sweeteners. [13]

### 3. Results



#### Sensory analysis and hedonic testing

In this research, a hedonic test will be carried out on the pilot group, which is made up of citizens and workers of the canton, the same who select the samples they like the most, then this sample will be developed to measure the acceptance of the product in the canton of Samborondón in the province of Guayas. [14]

#### Affective Test

The acceptance test will be used to determine whether the product will be consumed by the citizens of the canton of Samborondón in the province of Guayas, however, it should be noted that this test will only be performed on 90 people, so only an approximate level of liking will be known. Generally for the launching of a product a group of more than 80 judges is required, approximately between 100 and 150.

#### Data collection method and technique

##### Surveys

It is a process that, from the application of the respective questionnaire based on the research objectives to the pertinent collection of the answers obtained from the sample, where the questionnaire is the tool specifically designed for the administration of the questions. Once the area has been chosen and the sample has been

established, the aim is to obtain the data through the survey in order to guarantee the results obtained [15].

## Interview

The interview is one of the techniques in which a person (in this case, the interviewer) requests information from another person or others -a group- (interviewees, informants), to obtain data on a given problem. [16] For the application of this technique it has been proposed to carry it out with experts (chef's) to give their opinion regarding the proposal.

Theolifera is a fusion of the scientific names of the two main ingredients, Theobroma Cacao and Moringa Oleifera, it was decided to remove the letter "E" of oleifera as a marketing strategy, to make a better pronunciation and differentiation of the product in the market.



Fig. 2 Product logo



Fig. 3. Product nutritional traffic light

In mid-2014, Ecuador became the first country in Latin America to use traffic light labeling to inform consumers of the amount of fat, sugar and salt in food products, based on suggested amounts from the World Health Organization [17]. For the elaboration of the nutritional traffic light, the provisions of art. 9 of the National Agency for Regulation, Control and Health Surveillance were considered [18].

Tabla. 1. Components and concentrations for the nutritional traffic light

Nivel/Componentes	CONCENTRACIÓN "BAJA"	CONCENTRACIÓN "MEDIA"	CONCENTRACIÓN "ALTA"
Grass Totales	Menor o igual a 3 gramos en 100 gramos	Mayor a 3 y menor a 20 gramos en 100 gramos	Igual o mayor a 20 gramos en 100 gramos
	Menor o igual a 1.5 gramos en 100 mililitros	Mayor a 1.5 y menor a 10 gramos en 100 mililitros	Igual o mayor a 10 gramos en 100 mililitros
Azúcares	Menor o igual a 5 gramos en 100 gramos	Mayor a 5 y menor a 15 gramos en 100 gramos	Igual o mayor a 15 gramos en 100 gramos
	Menor o igual a 2.5 gramos en 100 mililitros	Mayor a 2.5 y menor a 7.5 gramos en 100 mililitros	Igual o mayor a 7.5 gramos en 100 mililitros
Sal (Sodio) (Sustituido por el Art. 3 del Accto. 0004832, R.O. 237-S, 2-V-2014)	Menor o igual a 120 miligramos de sodio en 100 gramos	Mayor a 120 y menor a 600 miligramos de sodio en 100 gramos	Igual o mayor a 600 miligramos de sodio en 100 gramos
	Menor o igual a 120 miligramos de sodio en 100 mililitros	Mayor a 120 y menor a 600 miligramos de sodio en 100 mililitros	Igual o mayor a 600 miligramos de sodio en 100 mililitros

## 4. Conclusions

After analyzing the historical background of the moringa tree, it was determined that this plant is considered medicinal, due to its high percentage of vitamin nutrients, while the cocoa tree was considered by the Greeks as the food of the gods, since it provided the consumer with sufficient energy.

During the process of elaboration of the formulas, it became evident that the moringa powder used in large quantities together with other dry ingredients, in a mass whose percentage of humidity is minimal, produces dryness in the finished product and a very hard texture; it was also observed that the greater the amount of cocoa, the greater the brown coloration, and the greater the amount of moringa, the greater the greenish coloration.

According to the survey tabulation of the hedonic tests, it was found that the citizens of the canton of Samborondón, after tasting the 3 different product samples, were more inclined towards formulation #3, because the organoleptic characteristics of the product were higher than those of the others. After this, it was evidenced that the sample with the lowest acceptance was formulation #2, since one of the observations given by an inhabitant of the canton was that the green color (typical of moringa) was unpleasant for him and that the texture of the product was very hard.

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