



Development of Biscuits Based on Quinoa, Oats and Honey Gluten-Free

Srta. Melanie Elizabeth Fiallos Vinueza¹, Vanessa Dayana Vásquez Poveda², Omar Richard Castro Medina³, Lcdo. Manuel Fernando Jaramillo Burgos Mg⁴

¹Estudiante Carrera de Gastronomía UNIANDES Matriz. Email: melaniefv66@uniandes.edu.ec
ORCID ID: <https://orcid.org/0000-0002-28987527>

²Estudiante Carrera de Gastronomía UNIANDES Matriz. Email: ga.vanessadvp12@uniandes.edu.ec
ORCID ID: <https://orcid.org/0000-0001-9496-0667>

³Estudiante Carrera de Gastronomía UNIANDES Matriz. Email: ga.omarrcm28@uniandes.edu.ec
ORCID ID: <https://orcid.org/000-0002-26429097>

⁴Docente Carrera de Gastronomía UNIANDES Matriz. Email: ur.manueljaramillo@uniandes.edu.ec
ORCID ID: <https://orcid.org/000-0001-8945-1163>

*Corresponding author's E-mail: melaniefv66@uniandes.edu.ec

Article History	Abstract
Received: 08 May 2023 Revised: 15 August 2023 Accepted: 19 August 2023	<i>The present study focused on the development of gluten-free biscuits, using oats, honey and quinoa as the main raw material, the same ones that were part of the recipes in the varieties of sucré, brisé and sablée, through the experimental method, with different control treatments to be able to identify the best way to apply the formulation, being that they could be developed in a quite interesting way thanks to the versatility of powdered oats and quinoa flour, given that their nutritional value is absent of gluten and for the characteristics of the biscuit. However, it is worth mentioning that avenin is characterized by being a potentially harmful protein for celiac patients, but by sharing content with quinoa flour, it reduces the risk of intoxication by this product, thus generating an alternative diet for people gluten intolerant.</i>
CC License CC-BY-NC-SA 4.0	Keywords: Biscuits, Gluten-Free Foods, Celiac

1. Introduction

Celiac people have difficulty finding gluten-free food alternatives, being that the problem of intolerance to this protein has been increasing over the years, between 1% of the general population and 9% of people with Down syndrome, The biscuit is presented as one of the great food alternatives for celiac people, which can be prepared with options in the mixture of different gluten-free ingredients, because the three basic techniques of the same are presented as broken masses without the need for elasticity, which is the main attribute that delivers the protein in question, it is in this way that emphasis was placed on the elaboration of biscuits seeking to minimize the toxicological risk when making cookies with oatmeal (despite the

possible intoxication with avenin), quinoa as a 100% gluten-free element and honey, totally or partially replacing the sugar content and seeking an important protein contribution for the consuno of this population segment. (Mora Peñaherrera, 2018) (Mojico, 2005)(CARRILLO FREIRE, 2008) (León Gómez, 2021)

Along with the commercial opportunity implicit in the development of gluten-free alternatives, because it is an emerging market thanks to diets designed for the maintenance of the body, being that, the trend increasingly focuses on the consumption of organic foods, gluten-free and low or zero in sugars, Whether for fashion, health or simply food fashion to keep bodies physically worked thanks to exercise, this includes the already famous "keto" diet, which promises to accelerate the metabolism to lose weight with the consumption of foods without sucrose and without flours from traditional cereals. (Toledo, 2020)(Nieto, 2020)

2. Materials And Methods

In order to verify the need for the work, the information was collected using a bibliographic, experimental, descriptive methodology that helped to substantiate the bases of the requirements for the elaboration and production of cookies. Introducing in the methods logical historical, inductive deductive, synthetic analytical condensing in this way the information and discriminating through the techniques of direct observation in situ at the time of making the cookies in the techniques sablée, brisée and sucrée. From the same that emerge the existing findings and corroborated in the observation sheets of treatment of the experiments.

3. Results and Discussion

According to the relevant bibliographic information, it was possible to identify findings that corroborate the absence of gluten in food, so it was possible to establish a table to be able to make the comparison in terms of the basic parameters that characterize cookies, thus identifying their viability in the preparation of these, taking into account the nomenclature to be able to understand the tables detailed below:

NOMENCLATURE:

P= Positive, **N**= Negative, **A**= Pleasant, **D**= Unpleasant, **T1**= **More quinoa** , **T2**= **More oats**

Table 1. Sablée dough

		TEXTURE		COLOUR		AROMA		TASTE		EFFECTIVENESS	
PREPARATION	TREATMENT	To	D	To	D	To	D	To	D	P	N
SABLÉE DOUGH	TC	X		X		X		X		X	
	T1	X		X		X		X		X	
	T2	X		X		X		X		X	

Source: Fiallos, Vásquez, Medina, Jaramillo, 2022

Table 2. Brisée dough

		TEXTURE		COLOUR		AROMA		TASTE		EFFECTIVENESS	
PREPARATION	TREATMENT	To	D	To	D	To	D	To	D	P	N
BRISÉE DOUGH	TC	X		X		X		X		X	
	T1		X	X		X			X		X
	T2	X		X		X		X		X	

Source: Fiallos, Vásquez, Medina, Jaramillo, 2022

Table 3. Loading and unloading area

PREPARATION	TREATMENT	TEXTURE		COLOUR		AROMA		TASTE		EFFECTIVENESS	
		To	D	To	D	To	D	To	D	P	N
SUCRÉE DOUGH	TC	X		X		X		X		X	
	T1		X		X	X			X		X
	T2		X		X	X			X		X

Source: Fiallos, Vásquez, Medina, Jaramillo, 2022

According to the data found in the experimentation it was possible to identify that there are great differences in the compatibility of quinoa and oat flours thanks to the absence of gluten, however, the theory is corroborated that they are a raw material suitable enough for the elaboration of broken doughs; There are also differences in flavor, specifically in quinoa flour thanks to the presence of saponin that gives a characteristic flavor to quinoa, when talking about oats, its characteristic flavor is not unpleasant to the palate, being that it is an almost predominant option at the time of tasting biscuit products in any of the 3 techniques. From a point of view of treatment of 0% gluten in the sablée dough any of the 2 elaborations were favorable for its elaboration unlike the sucrée that a serious problem could be identified in terms of the stability of the formula by the amount of honey used as a predominant element in the recipe, provided too much moisture and elasticity due to the glucose content, which caused the dough not to be easy to chew due to its adhesive characteristic to the teeth, while in the Brisée mass great inequality was noted in the formulations due to the predominant characteristics in treatment 1 thanks to the presence of saponin in the dough as mentioned above, Which means that in the case of biscuits the most effective technique and possibly of better commercial acceptability is the sablée dough thanks to its more neutral characteristics in terms of flavor, texture, color and functionality of the doughs.

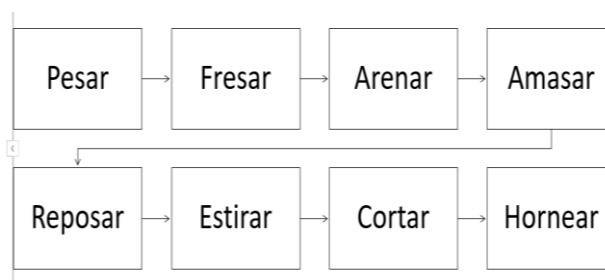


Figure 1. Biscuit making process

Source: Fiallos 2022



Figure 2. Baking temperatures of broken doughs

Source: Puigbó 1999



Figure 3. Proportions of raw materials in sablée mass

Source: Puigbó 1999



Figure 4. Proportions of raw materials in brisée mass

Source: Puigbó 1999



Figure 5. Proportions of raw materials in sucrée mass

Source: Puigbó 1999

4. Conclusions

Thanks to the analysis carried out through theoretical foundations found in research data on celiac disease and the ingredients that can be consumed by this population group, it was possible to identify several alternatives in the raw materials to make these biscuit-based products, however, the most interesting are those shown in the study. For the diagnosis, several experiments were carried out in which it was possible to identify the appropriate proportions after trial and error attempts, finding the most effective treatments in that way. The most effective biscuit dough turned out to be biscuit dough in the sablée technique, however in the brisée technique experiments can still be carried out to achieve some effective proportion using other raw materials.

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