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MAKING A GLUTEN AND SUGAR-FREE DESSERT

OLGA TABUNSCIC
PhD, Associate Professor
Academy of Economic Studies of Moldova, Republic of Moldova
ORCID ID: 0000-0002-7552-4189

VICTORIA LAZUR
Third-year student, TAP-221 group
Academy of Economic Studies of Moldova
ORCID ID: 0009-0006-3427-8088

Abstract: In recent years, there has been a significant increase in consumer demand for healthier food products, which has encouraged research and innovation in the field of sugar- and gluten-free alternatives. Responding to this trend, the present study focuses on the elaboration of a lemon tart that excludes both gluten and refined sugar, while maintaining the sensory and nutritional qualities expected from a traditional dessert.

The formulation of the tart dough and filling was based on carefully selected ingredients, including almond flour, rice flour, erythritol, stevia, eggs, and butter. These components were chosen not only for their functional properties, but also for their ability to ensure an optimal balance between taste, texture, and nutritional value. Almond and rice flours contributed to a gluten-free structure with desirable consistency, while erythritol and stevia provided natural sweetness without raising caloric content.

To evaluate the quality of the developed product, a comparative sensory analysis was carried out in relation to a classic lemon tart. A structured questionnaire was administered to 10 participants, who assessed key parameters such as appearance, texture, taste, flavor, and overall acceptability. The analysis revealed that the sugar- and gluten-free tart achieved a reduced energy value and obtained higher scores in most sensory categories, particularly in terms of freshness of flavor and pleasant aftertaste.

The findings demonstrate that it is possible to create a confectionery product that aligns with modern nutritional requirements without compromising sensory appeal. This dessert has the potential to become a viable healthy alternative in professional confectionery practices.

Keywords: lemon tart, gluten-free, sugar-free, healthy dessert, sensory evaluation, confectionery innovation
JEL Classification: Q18, I12, L66, O13, D12

INTRODUCTION

According to statistical data, 1 in 100 people worldwide is affected by celiac disease, and 1 in 10 family members is diagnosed with gluten intolerance (Celiac Disease Foundation, 2025).

In the Republic of Moldova, 56% of adults are overweight, of which 23% suffer from obesity. Furthermore, the Summary Report of the Health Behavior in School-aged Children Study shows that 11% of children are overweight, and 2.2% are obese (ANSP, 2022).

In recent years, the trend of consumers opting for healthier food products has increased significantly, driven by awareness of the negative impact of sugar and gluten on health. Excessive sugar consumption is associated with conditions such as diabetes, obesity, and cardiovascular diseases, while gluten can cause digestive problems and intolerances. In this context, the development of healthy dessert alternatives becomes a necessity both for the food industry and for consumers who desire a balanced lifestyle.

Purpose of the study

This study aims to elaborate a gluten- and sugar-free lemon tart recipe, offering a healthy alternative to this classic dessert. At the same time, the proposed tart will be compared with the traditional version sold in a confectionery. The analysis will include:

- Organoleptic characteristics (appearance, color, consistency, smell, taste);
- Nutritional value, aiming for a product with pleasant taste, fine texture, and enhanced nutritional benefits.

MAIN CONTENT

In the Republic of Moldova, the market for healthy confectionery products is continuously expanding, amid the growing interest of consumers in sugar- and gluten-free desserts. However, the number of confectioneries that offer such products remains relatively small. Among those that have integrated options adapted to this consumer segment are Tucano Cafe, Biorganic Raw Cafe, Sincer, Julia's Sweets, and Pure Taste. These establishments use natural sweeteners, alternative flours, and healthy vegetable fats, offering products that meet the requirements of a balanced diet.

This paper aims to develop and refine a sugar- and gluten-free lemon tart, by using carefully selected ingredients, intended to ensure a balance between the nutritional value and the sensory qualities of the product. For this recipe, high-quality raw materials were used, contributing both to the texture and aroma of the dessert, and to its health benefits.

Technological process of the gluten- and sugar-free lemon tart

The preparation of the sugar- and gluten-free lemon tart requires a well-defined technological process, harmoniously combining the ingredients to obtain a product balanced in taste, texture, and nutrition. The tart consists of four distinct semi-preparations, each playing an essential role in the final composition:

1. Tart dough – a tender and slightly crunchy base, made of rice flour, almond flour, butter, and eggs, providing the perfect support for the filling.

2. Almond cream – a fine and aromatic layer, prepared with almond flour, eggs, natural sweeteners, and lemon zest, adding structure and complexity to the flavor.

3. Lemon curd – a tangy and refreshing layer, made from lemon juice, sweeteners, cornstarch, eggs, and butter, offering freshness and intensifying the dessert's aroma.

4. Meringue – an airy and light finish, made from egg whites and natural sweeteners, adding a pleasant textural contrast and an elegant appearance to the tart.

Ingredients used

To obtain a nutritionally and sensorially balanced tart, the following key ingredients were used:

- Rice flour – gluten-free alternative, gives the dough a fine and slightly crunchy texture.

- Almond flour – enriches the composition with a subtle aroma and high content of healthy fats.

- Cornstarch – used to improve the structure and consistency of the product.

- Butter – contributes to the tenderness of the dough and the improvement of the final texture.

- Stevia powder and erythritol – natural sweeteners with a low glycemic impact, replacing sugar.

- Eggs – essential for stabilizing the dough, lemon cream, and meringue, providing structure and volume.

- Lemon – the main ingredient, responsible for the tangy and refreshing taste, contributing to the balance between sweet and sour.

Each stage is carried out with attention to detail, so that the final product meets both nutritional and sensory requirements. The technological scheme below details the preparation stages of each semi-preparation, highlighting specific methods and processing conditions necessary to obtain a healthy, balanced, and attractive lemon tart.

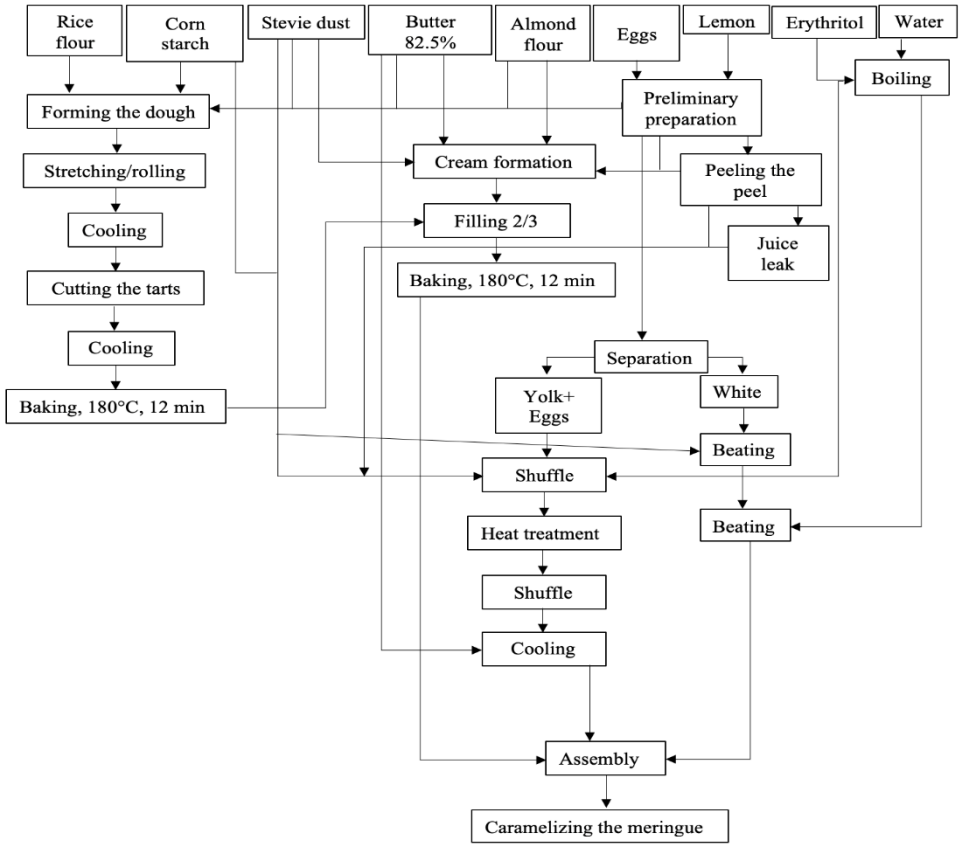

Figure 1. Technological scheme for preparing the gluten- and sugar-free lemon tart
Source: elaborated by the authors

Methodology of analysis

To evaluate the quality of the sugar- and gluten-free lemon tart compared to a similar commercial product, two methods of analysis were applied:

1. Comparative analysis method

- A comparative study based on psych-sensory analysis was conducted, in which 10 participants evaluated two versions of the tart: the proposed one and the classic one, sold in a confectionery.

- Participants gave grades from 1 to 5, based on organoleptic criteria, and the results are presented in the table below:

Table 1. Results of the comparative study

Organoleptic indices	**Gluten- and sugar-free lemon tart**	**Classic lemon tart**
Appearance	4,8	4,4
Consistency	4,8	4,1
Color	4,7	4,3
Smell	4,8	4,6
Taste	4,6	3,2

Source: Prepared by the authors

2. Method for calculating energy and nutritional value

This method allowed the analysis of the energy and nutritional value of the sugar- and gluten-free lemon tart.

Formula for calculating energy value:

V.E.= P(g) x 4kcal/g+G(g) x 4kcal/g+L(g) x 9kcal/g+ A.O (g) x 3kcal/g (Calmâș, 2020, p.31).

Formula for calculating nutritional value:

VN_{10} =1/10 x (Pr x F_{Pr} + L x F_L + G x F_G + Ca x F_{Ca} + P x F_P + Fe x F_{Fe} + A x F_A + B1 x F_{B1} +B2 x F_{B2} + C x F_C) (Calmâș, 2020, p.33).

The data obtained from the calculations are presented in Table 2.

Table 2. Results of energy and nutritional value

	Gluten- and sugar-free lemon tart
Energy value,kcal/100 g	635
Nutritionalvalue, per 100 g	17,65

Source: Prepared by the authors

CONCLUSIONS/RECOMMENDATIONS

The study demonstrates that it is possible to elaborate a gluten- and sugar-free dessert while maintaining pleasant sensory characteristics and balanced nutritional value. This aspect is important for people with celiac disease, diabetes, or for those who wish to adopt a healthy lifestyle.

Replacing wheat flour with gluten-free alternatives such as almond flour and rice flour, and using natural sweeteners (erythritol, stevia powder), led to a product with a low glycemic index and acceptable texture.

By calculation method, it was established that the dessert has the following nutritional values per 100 g: Nutritional value: 17.65; Energy value: 635 kcal.

Comparing the sugar- and gluten-free lemon tart with the classic version, the results of the organoleptic analysis highlight a high acceptability of the adapted product, with higher scores in most evaluated parameters. Appearance and color: The sugar- and gluten-free tart obtained higher scores for appearance (4.8 vs. 4.4) and color (4.7 vs. 4.3), indicating a more attractive visual presentation. Consistency: The score of 4.8 for consistency, compared to 4.1 for the classic version, suggests that the sugar- and gluten-free dessert has a more pleasant and stable texture. Smell: Both versions obtained high scores, but the sugar- and gluten-free tart was slightly more appreciated (4.8 vs. 4.6), which may indicate a more intense aroma, possibly due to the natural ingredients used. Taste: The most significant contrast is observed in taste, where the sugar- and gluten-free tart scored 4.6, compared to 3.2 for the classic version. This result suggests a clear preference for the modified recipe.

The results suggest that the sugar- and gluten-free lemon tart not only represents a viable alternative, but is even better appreciated than the classic version, especially in terms of taste, consistency, and appearance. This confirms that the use of alternative ingredients does not compromise the sensory quality of the product but, on the contrary, can offer significant improvements.

Confectioneries and pastry producers should develop and diversify the range of sugar- and gluten-free products, adapting to the demands of health-conscious consumers.

The development of new recipes that maintain the balance between taste, texture, and nutritional value can contribute to the growing popularity of sugar- and gluten-free products.

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