

GLUTEN-FREE CAKES: A STUDY IN CONSUMER PREFERENCE

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1. INTRODUCTION

The number of people affected by gluten allergy or who simply want to limit this component in their diet has increased worldwide. Hence, food industry is investing more resources to offer gluten-free products that meet consumer expectations, using sensory analysis as a tool to predict market success.^[1]

The aim of the present study was to **identify consumer preferences for cakes made with three different gluten-free flours** in order to find which is the **most valued flour**, and whether there are significant **differences between the use of one flour or another**.

2. MATERIAL & METHODS

Three gluten free cakes of **whole grain rice flour**, **whole grain oat flour** and **whole grain sorghum flour** were developed for the present study. Those flours were chosen for having a neutral taste.

The Jordi Bordas' basic neutral cake recipe was chosen as a reference to develop the three cakes (Fig. 2). **Same amount of flour was used in the three samples** to avoid differences in their appearance and nutritional composition (Fig. 3).

SUNFLOWER OIL	150 g
COCONUT OIL	98 g
EGG YOLK	80 g
EGG WHITE	182 g
COCONUT SUGAR	130 g
ALMOND FLOUR	180 g
WHOLE GRAIN RICE/OAT/SORGHUM FLOUR	162 g
BAKING POWDER	10 g

Fig. 2: Cake recipe.

Each cake batter was mixed with a blender and then baked in an industrial oven at 145°C for 30 minutes. Each cake was sliced in portions of 10 grams with a thickness of 1.5 cm (Fig. 4).

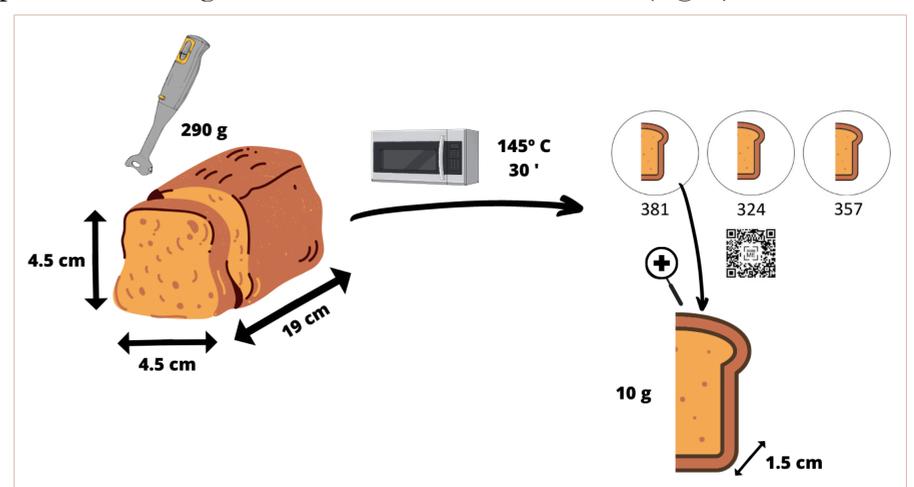


Fig. 4: Cake recipe process.

WHOLE GRAIN OAT FLOUR CAKE		WHOLE GRAIN RICE FLOUR CAKE		WHOLE GRAIN SORGHUM FLOUR CAKE	
% WATER	23.19	% WATER	23.44	% WATER	23.52
% DRY EXTRACT	76.81	% DRY EXTRACT	76.56	% DRY EXTRACT	76.48
% CARBOHYDRATES	28.36	% CARBOHYDRATES	29.66	% CARBOHYDRATES	29.25
% SUGARS	12.19	% SUGARS	12.00	% SUGARS	12.31
% DIETARY FIBER	4.71	% DIETARY FIBER	2.77	% DIETARY FIBER	3.39
% STARCHES	11.46	% STARCHES	14.90	% STARCHES	13.55
% TOTAL FAT	37.24	% TOTAL FAT	36.46	% TOTAL FAT	36.92
% SATURATED FAT	12.88	% SATURATED FAT	12.74	% SATURATED FAT	12.80
% PROTEIN	5.02	% PROTEIN	4.19	% PROTEIN	4.53
% SALT	0.63	% SALT	0.63	% SALT	0.63
KCAL / 100 G	404.01	KCAL / 100 G	404.34	KCAL / 100 G	356.16
POD	12.14	POD	11.95	POD	11.95

Fig. 3: Cakes' nutritional values.

Samples were codified with three-digit random codes, and randomly presented to a 62-consumers panel. Consumers were asked to taste the samples and to rank them according to their preference.

Data were analyzed using Friedman test followed by the post hoc test Minimum Significant Distance (MSD) to determine differences among samples.

3. RESULTS

Results of the Friedman test showed that the most preferred cake was the **whole grain oat flour cake** ($p < .05$) (Fig. 5).

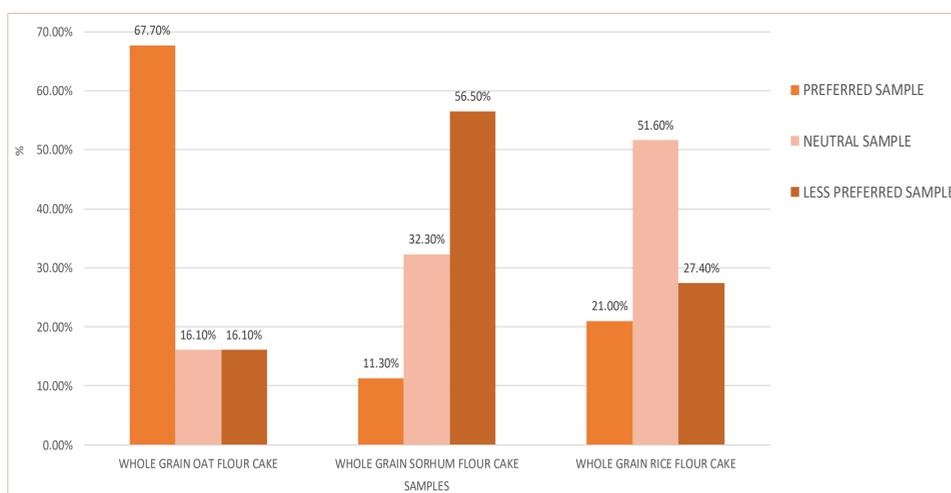


Fig. 5: Consumer preference test data.

Also, MSD post hoc test showed that **cakes were preferred different by consumers**. The whole grain **oat flour cake** was the consumers' favourite (67.7%), followed by the whole grain **rice flour cake** (21%), and, finally, the whole grain **sorghum flour cake** (11.3%).

4. CONCLUSIONS

Significant differences in the preferences of cakes made with different gluten-free flours were found. However, although the opinion of consumers is important, other factors must be considered such as the cost of flours and the organoleptic and production changes caused by the use of different flours.

Futures studies could be conducted using the same experimental design with other varieties of cakes (e.g.: fruit, nut, cocoa, etc), and with other gluten-free products to provide gluten-free consumers a wider variety of products.

5. REFERENCES

[1] López, C. (22 Nov. 2018). Estadísticas sobre el sector de la restauración en España. Obtained from <https://mapalsoftware.com/estadisticas-sobre-sector-de-larestauracion-espana/>