



Gluten Free/Vegan Bread Recipe Testing

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Abstract

- Vegan (V) and especially gluten free (GF) products have been on the rise in popularity. Some individuals choose to give up eating gluten foods due to allergies or discomfort that can come from eating certain foods with gluten such as breads, pastas, cookies, and many more. Choosing a vegan lifestyle could be due to a variety of reasons including; helping the environment, health benefits, and sometimes personal morals.
- Researchers set out to make a GF & V bread that would satisfy any individual wishing to make any one of these lifestyle changes, without giving up important aspects of traditional bread such as: taste, texture, color, smell, etc.

Introduction

- Celiac disease is an illness in which gluten damages the small intestine leading to malabsorption of nutrients. Individuals with Celiac disease are advised to avoid gluten.
- An option for individuals with special dietary requirements is finding foods that are created in special ways to meet their particular needs. These foods include gluten free and/or vegan pasta, pizza, bread, etc.
- The majority of foods produced meet the needs of the general public and not special dietary requirements, many of the gluten free or vegan foods get a bad rap for lacking in texture, taste, aroma and/or appearance.
- The overall goal was to create a bread recipe that was easy to follow, for all who wished to make a transition into GF/Vegan lifestyle without compromising traditional bread taste, texture, aroma, and appearance.

Methods & Materials

Materials: Measuring cups, spoons, Large bowl, Bread Maker (testing 1 and 2), conventional oven (for testing 3-5)

Subjects and Setting: The end product of the five trials was tested by four participants. Participants consisted of three males and one female. The age of the subjects ranged from 17 to 50. The same participants were used throughout the whole experiment to ensure a constant sample for the testing. The recipe testing and the scorecard evaluations were all conducted in the same place, under observation of the researcher who served as an aid to help answer any questions the participants might have had while filling out the scorecard.

Scorecards/Evaluation:

- In all five trials (plus control testing) participants received a scorecard to assess: Crust appearance/texture, interior appearance/texture, taste & aroma.
- Scores ranged from 1 to 4 hedonic scale, 1 being the least desirable ("poor") and 4 being the most desirable ("Excellent").
- Bread dimensions (length & width in inches) were also assessed
- Nutrition Analysis:** Done via Cronometer

Results

- Trial 1: Included a mixture of three gluten free flours (White Rice, Brown Rice, and Sorghum flour) used in equal portions and cooked in a bread maker. The bread yielded a very squishy center of the bread, that resembled a yeast like texture.
- Trial 2: A preprepared gluten free flour recipe was used. Proved to be the worst testing as the bread did not cook all the way through. The bread was inedible, despite being cooking and recooked on the "Gluten Free" setting of the beadmaker
- Trial 3: Had no changes to the recipe, rather changes to how the bread was being cooked. The bread maker was replaced by a conventional oven and resulted in a much more appealing bread compared to previous trials.
- Trial 4: Researchers introduced baking soda to the bread. The interior texture of this testing was the best thus far.
- Trial 5: Similar to trial 4 but researchers let the baking soda sit for thirty minutes, opposed to 5 minutes. This showed no significant difference in bread scores, but a slight increase in height & width was observed.
- Control: The control bread (store bought) was excellent in terms of appearance, both interior and exterior. However, the taste and smell lacked, scoring the worst taste and smell of all the groups.

Objective Evaluation & Scorecard Average

	Control	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5
Crust Appearance	3	3.75	-	3.25	3.25	3
Crust Texture	3.5	3.75	-	3.75	3.5	3.5
Interior Appearance	3.75	2.5	-	2.5	3.25	3.25
Interior Texture	3.75	1.75	-	2.75	3.25	3.25
Taste	1.75	2.5	-	3.5	3.75	3.5
Aroma	2.75	3.25	-	4	4	4

Table 1. Scorecard Averages

Trial	Control	1	2	3	4	5
Length (in)	9 ½	6 ¾	6 ¾	7 ¼	7	7 ¼
Width (in)	3 ¾	3	2 ½	3 ¼	3 ½	3 5/8

Table 2. Bread Dimensions

Figure 1. Recipe Testing #4

GF & V Bread	
Nutrition Facts	
Serving Size: 1 x 12 Serving	
Amount Per Serving	% Daily Value*
Calories	125.9 kcal 6 %
Total Fat	1.3 g 2 %
Saturated Fat	0.2 g 1 %
Trans Fat	0 g
Cholesterol	0 mg 0 %
Sodium	398.4 mg 17 %
Total Carbohydrate	27 g 9 %
Dietary Fiber	1.4 g 6 %
Sugars	0 g
Protein	2.3 g 5 %
Vitamin A	0 % • Vitamin C 3 %
Calcium	0 % • Iron 0 %
* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.	
Full Info at cronometer.com	

Figure 2. Control Recipe Food for life: Gluten Free Vegan Original 3 Seed Bread

16 servings per container	
Serving Size	1 slice (43 g)
AMOUNT PER 1 SLICE	
Calories	110
Calories from Fat 20	
% DV*	
3%	Total Fat 2g
0%	Saturated Fat 0g
	Trans Fat 0g
0%	Cholesterol 0mg
5%	Sodium 120mg
7%	Total Carbohydrates 20g
12%	Dietary Fiber 3g
	Sugars 0g
	Protein 2g
0%	Vitamin A
0%	Vitamin C
4%	Calcium
4%	Iron

*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Discussion

- A bread recipe meeting GF and Vegan needs was created.
- Store bought bread came out to have much better appearance/texture, both internally and externally, however it lacked flavor and aroma.
- Baking soda had a big impact on bread interior due to its leavening function
- The overall research process could have been better organized, focusing on one variable opposed to many. Further research should be done with a larger sample to confirm results.

Conclusions

- The overall goal was to create a bread recipe that was easy to follow, for all who wished to make a transition into GF/Vegan lifestyle without compromising traditional bread taste, texture, aroma, and appearance.
- The highest rated trial was trial #4 in which the total score was 3.5 (when all the average of each category was added up and divided by total number of categories being six), compared to store bought bread which was 3.08.
- The overall acceptability of the home-made GF/Vegan bread surpassed store-bought GF/Vegan bread in terms of bread taste & aroma. However, it lacked the visual appeal the GF/Vegan store-bought bread had, giving store bought bread a slight edge.

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