



# Unprocessed Vegan Brownies

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### Abstract

- The goal was to make a vegan brownie that was an unprocessed version of our control, and that is just as enjoyable, if not more enjoyable, than a traditional brownie.
- The target population is people who want to live a whole food driven diet, those who are plant-based, and for those who have high cholesterol and heart disease.
- The ingredients of the unprocessed vegan brownies are more whole-food and plant-based, with zero added sugar, less salt, and no cholesterol.
- Due to time restraints for trials within the study the researchers feel that the goal was not met in the four trials.

### Introduction

- A traditional brownie is made with mostly processed ingredients including all-purpose flour, fine granulated sugar, vegetable oil, vanilla extract, cocoa powder, salt, and chocolate chips. In addition to being highly processed, traditional brownies have significant levels of added sugar by means of the fine granulated sugar. Further, a traditional brownie contains eggs, which are high in cholesterol and contain saturated fat.
- A considerable goal of the experiment was to replace the processed fine granulated sugar with a whole-food option.
- Replacing the chicken egg with flax egg in brownies creates a fully vegan brownie.
- The other substantial goal of the experiment was to eliminate processed ingredients from the brownie.

### Methods and Materials

**Materials:** 1 large mixing bowl, 1 small bowl, 1 medium pot, blender, rubber spatula, measuring spoons, dry measuring cups, liquid measuring cup, 8x8 baking pan, 9x13 baking pan, parchment paper, oven

**Subjects and Setting:** Second trial contained 9 participants, third trial contained 12 participants, & fourth trial contained 12 participants.

- The vegan brownies from the control, attempt 2, attempt 3, and attempt 4 were compared for the experimental results.

#### Objective Evaluation:

- To determine the likability of the vegan brownies for all three trials, the participants evaluated and rated the outcomes of the brownies using the Likert scale in five different categories: color, sweetness, bitterness, height, and texture. With a scale from 1-5, an average was taken for each brownie, with a score of 3 being the most desirable.
- The following nutrition facts were attained for each recipe: calories, fat, sodium, carbs, total sugar, added sugar, protein, and fiber. While most things stayed in a similar range to the control, added sugars were eliminated from all attempts.

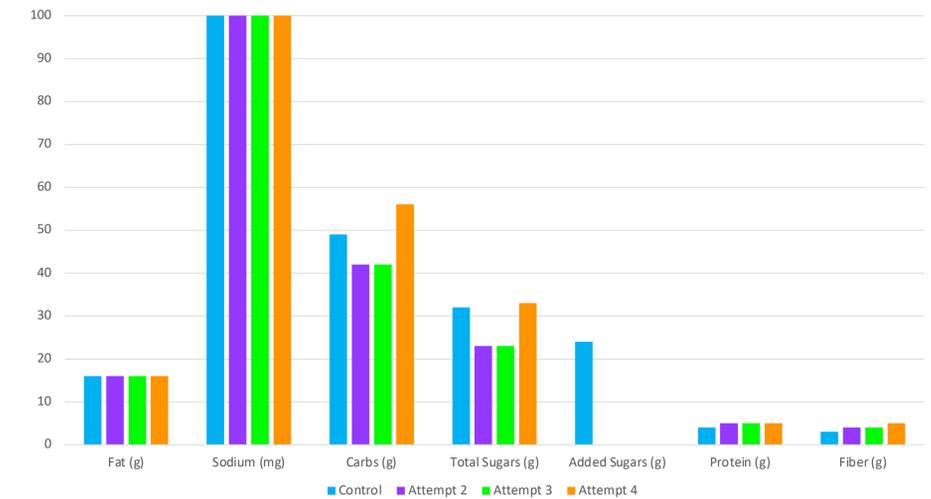
#### Nutrition Analysis

- Food Processor

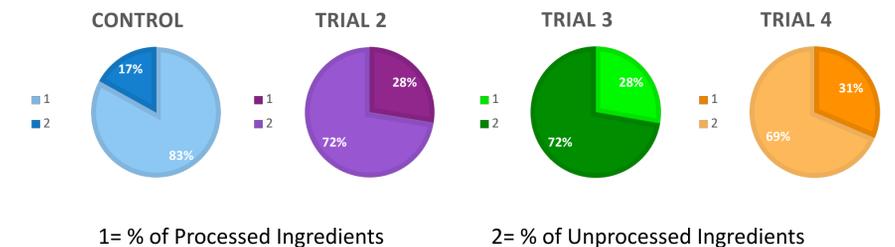
### Results

- Control attempt resulted in a vegan brownie that had a 3.3 average for color, 3.1 average for sweetness, 2.9 average for bitterness, 3.4 average for height, and 2.7 average for texture. The control contained 85.9% processed ingredients.
- Trial 2 resulted in a vegan brownie that had a 3.2 average for color, 3.2 average for sweetness, 3.4 average for bitterness, 3.3 average for height, and a 1.7 average for texture. The second trial contained only 27.6% processed ingredients.
- Trial 3 resulted in a vegan brownie that had a 3 average for color, 3 average for sweetness, 3 average for bitterness, 4 average for height, and a 2.4 average for texture. The third trial contained 27.8% processed ingredients.
- Trial 4 resulted in a vegan brownie that had a 2.75 average for color, 3.3 average for sweetness, 2.6 average for bitterness, 2.5 average for height, and a 2.8 average for texture. The fourth trial contained 31.5% processed ingredients.

### Nutrition Facts of Brownies



### Percentage of Processed & Unprocessed Ingredients



### Average Scores

1 too much (opposite of 5)		2 somewhat too much (opposite of 4)		3 Perfect (desired rating)		4 somewhat too much (opposite of 2)		5 too much (opposite of 1)	
Attempt	Color Average	Attempt	Sweetness Average	Attempt	Bitterness Average	Attempt	Height Average	Attempt	Texture Average
Control	3.3	Control	3.1	Control	2.9	Control	3.4	Control	2.7
Attempt 2	3.2	Attempt 2	3.2	Attempt 2	3.4	Attempt 2	3.3	Attempt 2	1.7
Attempt 3	3	Attempt 3	3	Attempt 3	3	Attempt 3	4	Attempt 3	2.4
Attempt 4	2.75	Attempt 4	3.3	Attempt 4	2.6	Attempt 4	2.5	Attempt 4	2.8

### Discussion

- Using dates instead of granulated sugar in baking led to a high moisture content and low firmness, which led to a chewy texture. The addition of baking powder helped, but texture was a consistent low rating (somewhat too chewy).
- The experiment did not have enough trials to reach a completely unprocessed vegan brownie, rather the processed ingredients were narrowed down significantly.

### Conclusions

- A brownie meeting the needs of the target population was prepared.
- Added sugars were completely eliminated from all trials, whereas the control had 24 grams of added sugars.
- The overall acceptability of the less-processed substituted brownies was high.
- The goal of developing an unprocessed brownie that could match the overall likability of a traditional vegan brownie was met not in these trials as all processed ingredients were not eliminated.

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