



# Banana Muffins

MARTA BARYS

MELINDA CATES

JENNIFER REED

ADRIANA SALINAS

FST 321.04

# Determining our Recipe

Banana bread- regular vs. Gluten free vegan



**GLUTEN FREE**



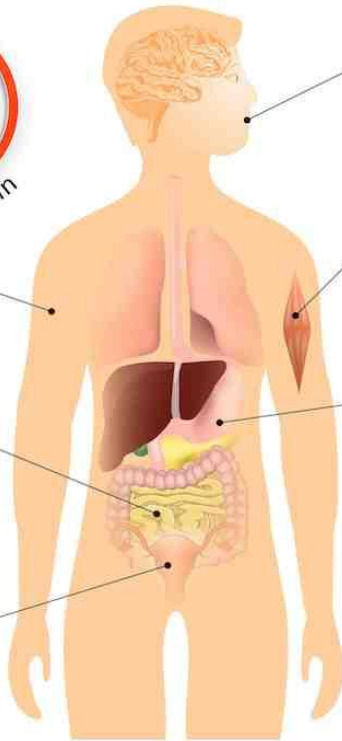
# CELIAC DISEASE



**Skin**  
Brittle nails  
Acne or eczema

**Intestinal**  
Diarrhea  
Bloating  
Constipation

**In female**  
Infertility  
Miscarriage  
Early menopause



**Mouth**  
Ulcer and  
tooth enamel  
erosion

**Joint and  
muscle**  
Pain and  
swelling

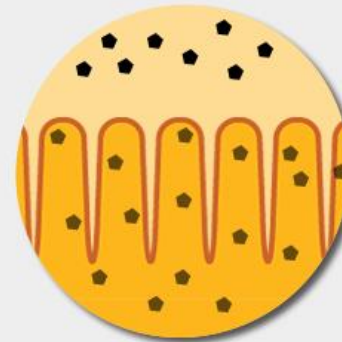
**Stomach**  
Pain and  
nausea

Lactose  
intolerance  
Anaemia  
Dizziness  
Migraines  
Depression  
Low vitamin D  
Chronic fatigue

# CELIAC DISEASE



- ◀ Autoimmune disorder damaging small intestine
- ◀ 1 in 100 people have celiac disease worldwide
- ◀ 2.5 million Americans go undiagnosed



**NORMAL**



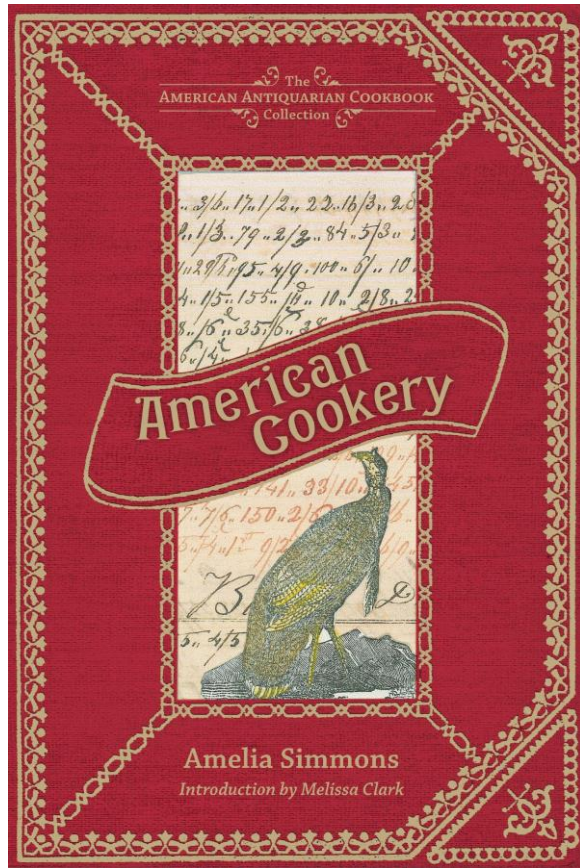
**CELIAC**

# Gluten



- ▶ Protein in wheat flours
- ▶ Gluten complex formed when manipulated with water
  - ▶ Glutenin provides elasticity
  - ▶ Gliadin adds cohesiveness
- ▶ Creates texture and structure within baked goods





## History of Banana Bread



National Banana Bread Day February 23

[www.NationalDayCalendar.com](http://www.NationalDayCalendar.com)

# Development of our recipes

- ▶ Items we discussed (wanting to use multiple flours, etc)
- ▶ Problems we ran into (Budget)
- ▶ Wanting our whole group to participate



- ▶ Ultimate decision



**INGREDIENTS:** Garbanzo Bean Flour, Potato Starch, Tapioca Flour, White Sorghum Flour, Fava Bean Flour  
**Manufactured in a facility that also uses tree nuts and soy.**

## Recipe Development: Vegan Changes



- ▶ Substitute eggs with applesauce
  - ▶ Creates moisture
  - ▶ Pectin still acts as a gelling agent
- ▶ Substitute butter with oil
  - ▶ Contributes to tenderness



# Methods: Day One- Recipes

**Regular:** bake at 350°F for 15-20 mins

½ C butter

2 eggs

1 ½ C all-purpose flour

1 C sugar

3 large bananas

1 tsp baking soda

½ tsp salt

½ tsp vanilla

**Modified:** bake at 350°F for 23 mins

½ C canola oil

2/3 C applesauce

1 ½ C gluten-free flour

1 C sugar

3 large bananas

1 tsp baking soda

½ tsp salt

½ tsp vanilla



# Methods: Day One- Instructions

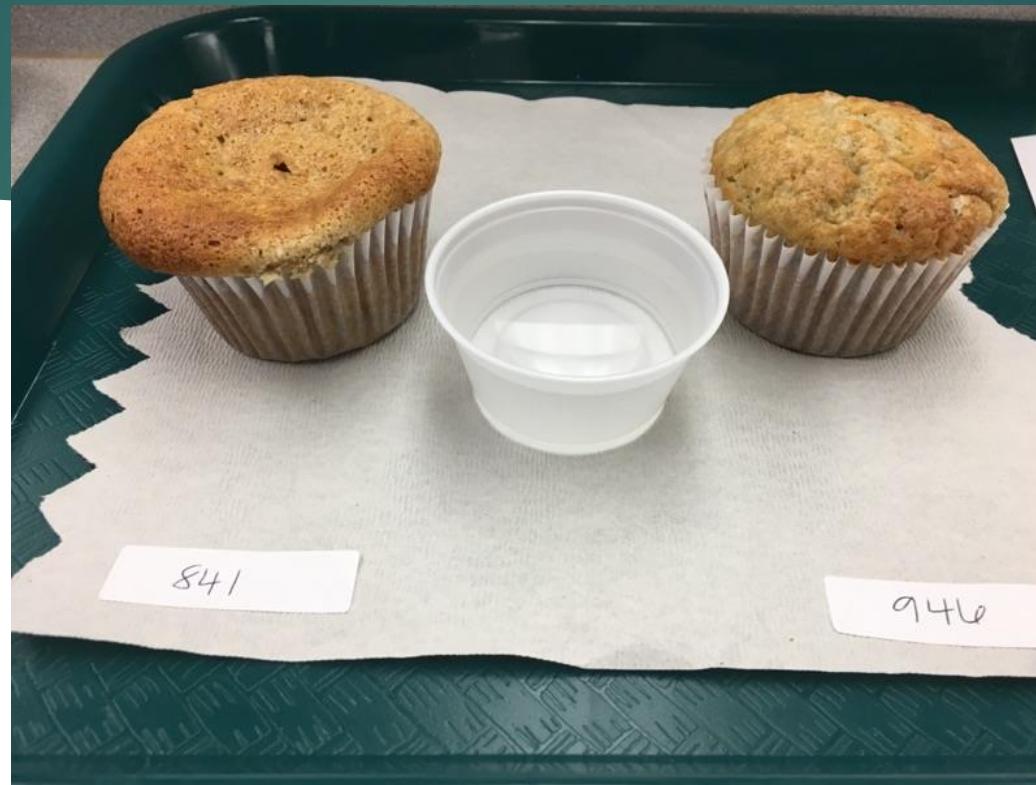
1. Preheat oven to 350°F
2. Cream butter and sugar
3. Add eggs and crushed bananas, combine well.
4. Sift together flour, baking soda, salt. Add to creamed mixture. Add vanilla.
5. Combine well, but do not overmix.
6. Pour into cupcake holders in pan
7. Bake for 15-20 mins or until top is golden brown

-- For vegan gluten-free bread:

1. Make substitutions for flour, eggs, and butter as instructed in recipe



# Changing our test: Hedonic



# Methods: Day Two- Recipes

**Regular:** bake at 350°F for 15-20 mins

1/2 C butter

2 eggs

1 1/2 C all-purpose flour

1 C sugar

3 large bananas

1 tsp baking soda

1/2 tsp salt

1/2 tsp vanilla



**Modified:** bake at 325°F for 30 mins

2/3 C canola oil

3/4 C applesauce

1 1/2 C gluten-free flour

2/3 C sugar

3 large bananas

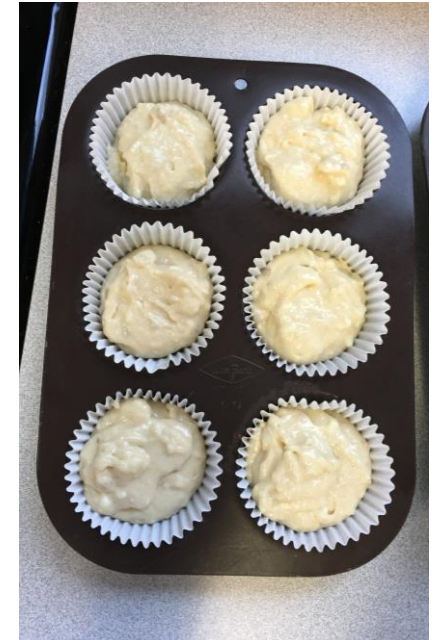
1 tsp baking soda

1/2 tsp salt

1/2 tsp vanilla

# Methods: Day Two- Instructions

1. Preheat oven to 350°F
    1. For gluten-free, preheat oven to 325°F
  2. Cream butter and sugar
  3. Add eggs and crushed bananas, combine well.
  4. Sift together flour, baking soda, salt. Add to creamed mixture. Add vanilla.
  5. Combine well, but do not overmix.
  6. Pour into cupcake holders in pan
  7. Bake for 15-20 mins or until top is golden brown
    1. For gluten-free, bake for approximately 30 mins
- For vegan gluten-free bread:
1. Make substitutions for flour, eggs, and butter as instructed in recipe



## Original Recipe

### Nutrition Facts

Serving Size (54g)  
Servings Per Container

Amount Per Serving

**Calories** 150    **Calories from Fat** 50

% Daily Value\*

**Total Fat** 6g                      **9%**

    Saturated Fat 3.5g            **18%**

    Trans Fat 0g

**Cholesterol** 35mg                **12%**

**Sodium** 140mg                    **6%**

**Total Carbohydrate** 24g        **8%**

    Dietary Fiber 1g                **4%**

    Sugars 14g

**Protein** 2g

Vitamin A 4%    •    Vitamin C 2%

Calcium 0%     •    Iron 4%

\*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:

Fat 9 • Carbohydrate 4 • Protein 4

Calories

150 vs. 130

Total Fat

6g vs. 7 g

Saturated fat

3.5 g vs. 0 g

Cholesterol

35 mg vs 0 mg

Sodium

140 mf vs. 135 mg

Total Carbohydrates

24 g vs. 20 g

## Modified Recipe

### Nutrition Facts

Serving Size (55g)  
Servings Per Container

Amount Per Serving

**Calories** 130    **Calories from Fat** 60

% Daily Value\*

**Total Fat** 7g                      **11%**

    Saturated Fat 0g                **0%**

    Trans Fat 0g

**Cholesterol** 0mg                 **0%**

**Sodium** 135mg                    **6%**

**Total Carbohydrate** 20g        **7%**

    Dietary Fiber 2g                **8%**

    Sugars 10g

**Protein** 1g

Vitamin A 0%    •    Vitamin C 10%

Calcium 0%     •    Iron 2%

\*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:

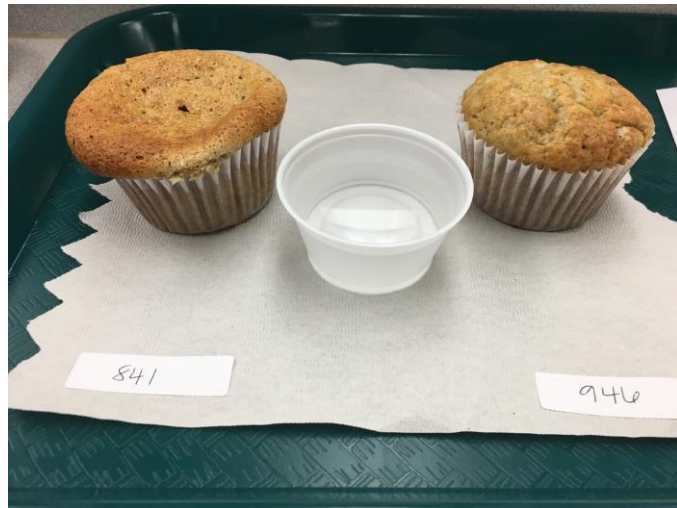
Fat 9 • Carbohydrate 4 • Protein 4



Any Significant Difference in:

- Price?
- Water Activity?
- Color?
- Firmness?

	Price	Water activity	Color $\Delta E$	Force(g)
Original recipe	\$5.55	0.8366	45.21	316.443
Modified recipe	\$6.24	0.8657	44.82	293.933



Conclusion

## References

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