

# THE GREAT BISCUIT BAKING TRIALS

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A National Chemistry Week trip to Tennessee resulted in my staying at the home of a colleague and being treated to some wonderful home-made baking powder biscuits. Upon my return home, I attempted to make some biscuits, only to have my first batch fail. The second attempt, about one week later, was more successful. While reading a *Gourmet* magazine, however, I stumbled upon a variation of the biscuit recipe titled “Marne’s Cloud Biscuits. This started a search and a series of experiments to learn about the chemistry of baking a simple bread, such as a biscuit.

As it turns out, biscuit baking is quick and easy and provides a method of observing the effect of various ingredients on baking. The three recipes included here, show some simple variations, either in ingredients (addition of an egg) or in kneading the dough.

## **Safety**

Safety glasses or goggles must be worn in the laboratory at all times.

If this experiment is performed in a chemistry laboratory, all work surfaces must be cleaned and free from laboratory chemicals. After cleaning work surfaces, it is advised to cover all work areas with aluminum foil or a food-grade paper covering.

All glassware and apparatus must be clean and free from laboratory chemicals. Use only special glassware and equipment, stored away from all sources of laboratory chemical contamination, and reserved only for food experiments is recommended.

There are no safety hazards associated with the materials used in this experiment.

## **Disposal**

Generally, all waste materials in this experiment can be disposed in the trash or poured down the drain with running water. All disposal must conform to local regulations.

## **TRIAL 1. BASIC BISCUITS**

Source: Alton Brown, The Food Network

### **Ingredients**

- 2 cups flour
- 4 teaspoons baking powder
- 1/4 teaspoon baking soda
- 3/4 teaspoon salt
- 2 tablespoons butter
- 2 tablespoons shortening
- 1 cup buttermilk, chilled

## Directions

Preheat oven to 450 degrees.

In a large mixing bowl, combine flour, baking powder, baking soda and salt.

Using your fingertips (or a pastry blender), rub butter and shortening into dry ingredients until mixture looks like crumbs. (The faster the better, you don't want the fats to melt.)

Make a well in the center and pour in the chilled buttermilk. Stir just until the dough comes together. The dough will be very sticky.

Turn dough onto floured surface, dust top with flour and gently fold dough over on itself 5 or 6 times.

Press into a 1-inch thick round. Cut out biscuits with a 2-inch cutter, being sure to push straight down through the dough.

Place biscuits on baking sheet so that they just touch.

Reform scrap dough, working it as little as possible and continue cutting. (Biscuits from the second pass will not be quite as light as those from the first since additional kneading activates gluten in the dough.)

Bake until biscuits are tall and light gold on top, 15 to 20 minutes.

## Trial 2. Marne's Cloud Biscuits

Source: Gelzheiser, Lynn M., *Marne's Cloud Biscuits*, Gourmet, 1997

## Ingredients

2 cups	all-purpose flour
1 ½ Tbsp	sugar
4 tsp	baking powder
½ tsp	cream of tartar
½ tsp	salt
½ cup	vegetable shortening
½ cup	milk
1 large	egg, lightly beaten

## Directions

Preheat oven to 475°.

Lightly butter a baking sheet.

Combine the dry ingredients in a bowl. Mix well.

Cut the shortening into the dry ingredients using a pastry blender until mixture resembles coarse meal.

Add the milk and egg. Stir until just blended into a soft dough.

Turn the dough out onto a lightly floured surface and gently knead 4 times.

Pat dough into a  $\frac{3}{4}$ -inch thick round. Cut out the biscuits with a 2-inch round cutter and place about 2 inches apart on the prepared baking sheet.

Gather together scraps, pat out the dough, and cut more biscuits.

Bake in the middle of the oven for 10 minutes until pale golden.

### **Trial 3. Devon Grill Drop Biscuits**

Courtesy Devon Grill, Philadelphia, PA Note: They claim this is the recipe from the White Lily flour label

#### **Ingredients**

2 cups all-purpose flour (I use King Arthur unbleached flour)

$\frac{1}{2}$  tsp salt

2 tsp baking powder

$\frac{1}{2}$  tsp cream of tartar

1 tsp superfine sugar

$\frac{1}{2}$  cup shortening (Crisco)

1 cup milk (or buttermilk – I prefer buttermilk)

#### **Directions**

Preheat oven to 425°F

Lightly grease two baking sheets

Combine all dry ingredients in a bowl. Mix well.

Cut shortening into dry ingredients using a pastry blender until mixture resembles coarse meal.

Add the milk and stir until just blended.

Scoop up dough with a tablespoon, and scrape off pieces with another spoon onto baking sheet.

Bake 15 minutes until crust is golden.

#### **General References**

McGee, Harold, *On Food and Cooking*, Charles Scribner's Sons, New York, NY, 1984.

Coulter, Tom and Jill Davies, *Food, The Definitive Guide*, Royal Society of Chemistry, Cambridge, UK, 1994.

#### **Questions**

1. How do the ingredients in the 3 biscuit recipes differ?
2. How does the texture of the 3 biscuits differ?
3. How does the taste of the 3 biscuits compare?
4. Can you attribute the differences in the 3 biscuits to any of the ingredients?