

## Sucralose (Splenda®)

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This publication describes the properties of sucralose and how to use it in cooking and baking. Sucralose is commonly known by its trade name, Splenda®.

### Introduction

Splenda is the only nonnutritive sweetener made from table sugar, or sucrose. During processing, three oxygen-hydrogen (-OH) groups on the sugar molecule are replaced with three chlorine atoms to create a new molecule. The resulting product, sucralose, is very stable. The human body is unable to digest it, so it provides no calories.

Splenda is roughly 400-800 times sweeter than sugar, depending on its concentration; generally, it is estimated to be 600 times sweeter than sugar. One packet (about 1 teaspoon) of Splenda provides the sweetness of two teaspoons of sugar. Its sweetness allows it to be used in very small quantities, so bulking agents are added to increase its volume. Adding bulking agents, like maltodextrins, makes Splenda easier to measure.

### History

Splenda was discovered in 1976 and approved by Canada in 1991. The U.S. Food and Drug Administration (FDA) approved Splenda as a nonnutritive sweetener in 1998, and as a general-purpose sweetener in 1999. It is now approved in more than 80 countries and is used worldwide in over 4,000 commercial products such as no-sugar added fruit, diet soft drinks, and reduced-sugar juices.

### Health Issues

More than 100 studies over 20 years have demonstrated that sucralose does not cause negative health effects, such as cancer or birth defects. Unlike sugar, Splenda is not broken down in the body, which makes it essentially calorie-free. Splenda is considered safe for all individuals, including pregnant and nursing women and children. People with diabetes can use it safely because it does not affect carbohydrate metabolism or insulin levels. The FDA's accepted



Figure 1. Breakfast apricot muffins are among the baked goods that can be made with sucralose.

daily intake level is 5 mg/kg of body weight. This is roughly the equivalent of 25 packets of Splenda per day or six cans of diet soft drinks.

As an additional benefit, Splenda does not support the growth of oral bacteria, and therefore, does not promote dental decay.

### Cooking with Splenda

Studies have shown that Splenda has a similar taste to sugar and does not have an aftertaste. On the other hand, it takes longer for its full flavor to develop and the sweetness lasts longer. Splenda is very soluble in water, which makes it easy to incorporate into foods and beverages. Because Splenda has a very stable structure, it can be used in baked goods (*Figure 1*) or acidic products like soft drinks.

Although Splenda provides a sweet taste similar to that of sugar, it does not have the other properties of sugar. It does not contribute to browning, does not retain water, and

does not contribute to the bulk of the product. As a result, products baked with Splenda may not brown during baking and tend to stale faster.

Splenda is available in various forms that can be used for baking. Splenda No-Calorie Sweetener, Granulated (or *Splenda Granulated*) measures and pours like sugar and can be used as a one-to-one substitute, although it cannot be used as a complete substitute in some recipes. It is also available in individual-sized packets for use in drinks, as well as for sprinkling on fruits and cereals.

*Splenda Granular* is best in recipes where sugar is used primarily for its sweetening abilities, such as cheesecake, pies, and sweet sauces, or in recipes that use small amounts of sugar. For cakes and cookies, which rely on sugar for structure and volume as well as moisture retention and browning, only part of the sugar should be replaced with Splenda Granulated for best results.

*Splenda Sugar Blend* and *Splenda Brown Sugar Blend* are newer products. These products combine sucralose with real sugar or brown sugar; one-half cup of the blend is equal in sweetness to one cup of regular sugar. This halves the sugar in a recipe, but acts more like real sugar. Unlike Splenda Granulated, the sugar blends do not substitute cup for cup; instead, one-half cup sugar blend substitutes for one cup sugar.

### **Cookies**

Cookies made with Splenda tend to have a more cake-like texture. To retain the chewy, crunchy texture of cookies, do not replace brown sugar with Splenda. Replacing butter or margarine with butter-flavored shortening can also help. An additional teaspoon of vanilla extract can be used to enhance flavor. Check cookies 3-5 minutes before the expected bake time.

### **Cakes**

For best results, replace only 25 percent of the sugar required with Splenda. Products may not rise as high, so try switching from 9-inch round pans to 8-inch round pans. Also, add one-half cup nonfat dry milk powder and one-half teaspoon of baking soda for every one cup Splenda Granulated to help increase the volume of the final product. Check cakes 7-10 minutes before their expected bake time.

### **Yeast and Quick Breads**

Sugar is still needed to activate yeast and enable yeast breads to rise, so always maintain at least two teaspoons of sugar in recipes calling for yeast. For quick breads, follow some of the same suggestions for cakes: use smaller pans and try adding additional dry milk and baking soda.

### **Acknowledgment**

Material contributed by and recipes tested by Sara German, Nutrition and Health Sciences student.

### **Resources**

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*Marlene Koch's Sensational Splenda Recipes: Over 375 Recipes Low in Sugar, Fat, and Calories*. Koch, M. New York: M. Evans and Co., 2008.

*Sweeteners: Alternative Handbook*. Nelson, A.L. St. Paul, Minn.: Eagan Press, 2000.

*Sweeteners*. Quinlan, M. 3rd ed. Ed. Rachel Wilson. Oxford: Blackwell Publishing Ltd, 2007.

*SPLENDA Brand Sweetener*. McNeil Nutritionals, LLC, <http://www.splenda.com>.

# Recipes

## Chocolate Chip Cookies

### Ingredients:

1½ cups all-purpose flour	⅔ cup Splenda Granulated
1 teaspoon baking soda	2 teaspoons vanilla
¼ teaspoon salt	2 eggs
⅔ cup butter or margarine, softened	1 cup semi-sweet chocolate chips
⅔ cup brown sugar, firmly packed	

### Directions:

1. Preheat oven to 350°F.
2. Combine flour, baking soda, and salt, and mix well. Set aside.
3. Cream butter, brown sugar, Splenda, and vanilla together in a medium mixing bowl. Mix until well blended and creamy. Add eggs, one at a time, mixing well after each addition. Scrape sides of bowl. Add flour mixture. Mix until well blended. Stir in chocolate chips.
4. Place level tablespoons of cookie dough on an ungreased baking sheet. Bake 10-12 minutes or until golden brown. Remove from oven and cool on a wire rack.

**Yield: 3 dozen cookies**

### Nutrient Information

Serving size – 1 cookie; Calories – 90 (Calories from fat – 45); Total fat – 5 g; Saturated fat – 3 g; Cholesterol – 20 mg; Sodium – 90 mg; Carbohydrate – 11 g; Sugars – 7 g; Dietary fiber – 0 g; Protein – 1 g

## Breakfast Apricot Muffins

### Ingredients:

1 cup all-purpose flour	2 tablespoons vegetable oil
¼ cup granular Splenda	⅓ cup skim milk
2 teaspoons baking powder	2 teaspoons honey or corn syrup
¼ teaspoon salt	½ cup dried apricots, finely chopped
1 large egg	1 teaspoon almond extract

### Directions:

1. Heat oven to 350°F. Coat 6 muffin cups with nonstick cooking spray or use paper liners.
2. Combine flour, Splenda, baking powder, and salt in medium mixing bowl.
3. Beat together egg, oil, milk, and honey or corn syrup. Blend in apricots and almond extract. Add to flour mixture and stir just until moistened. Fill muffin cups evenly with batter, three-fourths full.
4. Bake 20 to 30 minutes or until toothpick inserted in center comes out clean. Cool.

**Yield: 6 muffins**

### Nutrient Information

Serving size – 1 muffin; Calories – 170 (Calories from fat – 5); Total fat – 6 g; Saturated fat – 0.5 g; Cholesterol – 35 mg; Sodium – 300 mg; Carbohydrate – 26 g; Sugars – 9 g; Dietary fiber – 1 g; Protein – 4 g

# Spicy Pumpkin Muffins

## Ingredients:

¾ cup pumpkin puree	2 teaspoons baking powder
1 cup Splenda Granulated	½ teaspoon baking soda
⅓ cup buttermilk	1½ teaspoons cinnamon
3 tablespoons canola oil	1 teaspoon ginger
3 tablespoons molasses	½ teaspoon allspice
1 large egg	¼ teaspoon cloves
1 large egg white	¼ teaspoon salt
1½ cups all-purpose flour	

## Directions:

1. Preheat oven to 375°F. Coat 10 muffin cups with nonstick cooking spray or use paper liners.
2. In a medium bowl, stir together pumpkin puree, Splenda, buttermilk, oil, molasses, egg, and egg white. Set aside.
3. In a large bowl, combine flour, baking powder, baking soda, cinnamon, ginger, allspice, cloves, and salt. Stir; make a well in the center of the dry ingredients and add the pumpkin mixture. With a large spoon or spatula, stir just until blended.
4. Spoon batter into prepared muffin tin.
5. Bake for 20 minutes or until center springs back when lightly touched. Cool in pan for 5 minutes before removing to a wire rack.

**Yield: 10 muffins**

## Nutrient Information

Serving size – 1 muffin; Calories – 150 (Calories from fat – 45); Total fat – 5 g; Saturated fat – 0.5 g; Cholesterol – 20 mg; Sodium – 260 mg; Carbohydrate – 23 g; Sugars – 5 g; Dietary fiber – 1 g; Protein – 3 g

**This publication has been peer reviewed.**

### Disclaimer

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Nutritive Value of Foods**

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