NebGuide

University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources

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# Stevia

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The leaves of one species of stevia plants have naturally occurring sweetness. This NebGuide discusses the use of stevia as a sugar substitute.

## Introduction

Few botanical discoveries have been quite as dramatic as the realization that the leaves of a species of stevia plants, *Stevia rebaudiana* (Bertoni) Bertoni (*Compositae*), are intensely sweet (*Figure 1*). Stevia plants, also known as sweet leaf, are perennial shrubs native to Paraguay that include over 150 different species. The species *S. rebaudiana* is an anomaly, since none of the other species in this North and South American genus produce these sweet compounds at high concentrations.

Because they are commercially unprofitable, relatively few highly sweet plant components have been developed as sugar substitutes. However, due to the interest in natural food ingredients, the discovery that this stevia plant has naturally occurring sweetness has attracted great interest. Stevia and stevioside, an extract of stevia, have a menthol-like, bitter aftertaste that limits their usefulness. However, they have been used for years as sweeteners in South America, Asia, Japan, China, and some European countries.

## History of Stevia

For many centuries native Paraguayans have used stevia as a sweetener in herbal and medicinal teas. In addition, stevia is considered to have medicinal properties and is used to treat diseases such as high blood pressure and obesity. The Food and Drug Administration does not recognize any health benefits of stevia.

In 1931, a French chemist isolated the glycosides that give stevia its sweet taste. Of the eight glycosides discovered, stevioside, the most prevalent compound in the stevia leaf, is considered the sweetest. These extracts are 250 to 300 times sweeter than a 0.4 percent table sugar solution. More time is required to taste the sweetness of stevioside, but the sweetness lasts longer than sugar. At high concentrations, stevioside has a bitter aftertaste.

In the early 1970s, the Japanese began cultivating stevia as an alternative to artificial sweeteners and have produced stevia sweeteners commercially since 1977. Stevia accounts for 40 percent of the Japanese sweetener market, making Japan the largest consumer of stevia. Brazil approved *S. rebaudiana* products in 1980.

**Figure 1. Stevia, which is native to Paraguay, can be used as a sweetener.**

## Health Issues

In 1991, stevia was totally banned by the FDA because "toxicological information on stevia is inadequate to demonstrate its safety." This ruling was very controversial. In 1995, FDA revised its ban against stevia and allowed it for sale as a dietary supplement. In 2008, FDA began to allow stevia to be used as a sweetener and granted GRAS (Generally Regarded as Safe) status. Stevia does not promote dental cavities, does not raise blood glucose levels and is safe for persons with phenylketonuria (an inability to breakdown the essential amino acid, phenylalanine).

Although there are reports of the medicinal properties of stevia, there is no scientific evidence to prove these claims.

## Stevia Availability in the United States

Stevia is sold in the U.S. under the trade names PureVia® and TruVia® and Sweet Leaf®. It is available in packets, spoonable form, and baking blends.

Beverages made with stevia include Vitamin Water Zero, Steaz, Crystal Light Pure, Blue Sky Free Soda, and Odwalla. Stevia also can be found in some brands of yogurt.

### Using Stevia

To determine the amount of stevia you like, start by adding a few drops or granules to a glass of water. Taste it. Add a small amount at a time, tasting after each addition until the mixture becomes bittersweet. When the solution tastes bitter, cut back one or two drops. Some people take some time to adjust to the taste of stevia. One way to make the transition is to add a little sugar to the stevia sweetened mixture until your taste buds adjust.

Stevia is stable at high temperatures and can be used with high and low acid foods. These properties give stevia a variety of uses.

When cooking with stevia, it is important to use the exact amount specified in the recipe. Too much stevia in a product may result in a bitter aftertaste. Stevia works well with most fruit or dairy recipes. It may pose a problem for baked items. Stevia lacks the ability to add texture, caramelize, feed the fermentation of yeast and help tenderize a batter, all properties that sugar possesses. Cakes made with stevia may not rise as well, and achieving a soft, chewy cookie may take some practice.

**Cookies:** Always preheat the oven to the recommended temperature. Stevia works best in crisp, shortbread type cookies. For chewier cookies, add canned pumpkin, uncooked oatmeal, or peanut butter.

**Cakes:** Always preheat the oven to the recommended temperature. Separating the eggs and whipping the egg whites until you have stiff peaks helps to increase the cake volume. Also, immediately invert the pan onto a cooling rack. This helps to prevent the cake from falling.

**Yeast and quick breads:** Without sugar, yeast will only have the flour for it to grow and breads will take longer to rise. Quick breads tend not to rise as well as those sweetened with sugar. You may need to increase the amount of baking powder and baking soda.

### Conversion Table

- 1 packet = 2 teaspoons sugar
- Baking Blends contain stevia and sugar. These blends bake and brown like sugar with 75 percent fewer calories per serving than sugar.

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## Recipes Using Stevia

### Chocolate Chip Cookies

*Ingredients:*

1 cup plus 2 Tablespoons all-purpose flour
½ teaspoon salt
½ teaspoon baking soda
½ cup butter, softened
¼ cup plus 2 Tablespoons Truvia Baking Blend
½ teaspoon vanilla
1 large egg
1 cup (6 ounces) chocolate chips

**Chocolate chip cookies made with Truvia Baking Blend.**

*Directions:*

1. Preheat oven to 375°F.
2. Combine flour, salt, and baking soda in a small bowl.
3. In a separate large mixing bowl, beat butter, Truvia Baking Blend and vanilla. Mix in the egg.
4. Gradually stir in the flour mixture. Stir in chocolate chips.
5. Drop by rounded tablespoons on cookie sheets and press down to slightly flatten.
6. Bake for 9 to 11 minutes or until lightly browned.

*Yield:* about 18 cookies

*Nutritional information per serving:* 130 calories (70 calories from fat); 8 grams total fat; 5 grams saturated fat; 25 milligrams cholesterol; 150 milligrams sodium; 17 grams carbohydrate; 1 gram dietary fiber; 2 grams protein

## Blueberry Muffins

*Ingredients:*

1 cup whole wheat flour
1 cup all-purpose flour
2 teaspoons baking powder
½ teaspoon baking soda
½ teaspoon salt
1 Tablespoon grated orange peel
20 packets PureVia sweetener
1 Tablespoon honey or corn syrup
1 cup buttermilk
¼ cup vegetable oil
2 large eggs
1 ½ cups fresh or frozen blueberries
Quick or old-fashioned oats, optional

**Blueberry muffins made with PureVia sweetener.**

*Directions:*

1. Preheat oven to 400°F. Line 12 muffin cups with paper baking cups.
2. Mix together flours, baking powder, baking soda, salt, orange peel, and PureVia sweetener in a large bowl. Stir in buttermilk, oil, and eggs; mix until just moistened. Fold in blueberries.
3. Divide batter evenly among muffin cups. Sprinkle with oats, if desired. Bake 20 to 25 minutes or until light golden brown. Cool one minute; remove from muffin cups.

*Yield:* 12 muffins

*Nutritional information per serving:* 150 calories (50 calories from fat); 6 grams total fat; 1 gram saturated fat; 30 milligrams cholesterol; 280 milligrams sodium; 20 grams carbohydrate; 2 grams dietary fiber; 4 grams protein

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**This publication has been peer reviewed.**





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