

## **SUGAR, SUGAR / Cane and beet share the same chemistry but act differently in the kitchen**

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Carolyn Weil and her crew at The Bake Shop in Berkeley were hard at work one morning, boiling down large pots of sugar syrup to make buttercream for the day's buns, cakes and confections.

It was a task the staff had done hundreds of times. But this morning the normally silky syrup crystallized into large, chunky granules.

Weil tossed it, along with plans for most of the baked goods she wanted to sell that day.

Not happy with a day's work and income wasted, Weil investigated, checking her equipment and ingredients and determining the one variable.

Sugar.

Weil's supplier had substituted another brand and, as it turns out, another type of sugar altogether. Weil thought she was getting cane sugar, but instead she got beet.

Despite what sugar industry officials claim, beet and cane sugar are not alike. And the sugar industry isn't bothering to tell.

The labels of most brands of sugars on supermarket shelves neglect to say whether what's inside is cane or beet. In some brands, the contents can vary from day to day.

The Chronicle tested and blind-tasted creme brulee, cookies and cakes made with beet and cane sugar and found that indeed there is a difference. In all cases, the products made with cane were superior.

However, many in the sugar industry disregard such results, because the conventional wisdom is that beet and cane are the same -- both types are sucrose and chemically identical.

### **NOT QUITE EQUAL**

It's true that both kinds are sucrose, but only 99.95 percent, and that minuscule 0.05 percent -- made up of trace differences in minerals and proteins -- can have an effect.

Much of the 0.05 percent difference comes from the fact that cane and beets are two different plants altogether. Beets are a root, growing below ground; cane is a grass, waving in the breeze. "That alone can account for mineral profile and content differences," says Charles Baker, vice president for scientific affairs for The Sugar Association, a nonprofit group focusing on sugar's role in diet and health. Other variations are the result of processing.

The beet versus cane controversy is a new development. Cane was once the dominant sugar in U.S. markets, but within the last few years beet has taken the lead. Beet now accounts for 55 percent of the 10 million tons of refined sugar consumed in the country each year. And, according to Ben Goodwin, executive manager of California Beet Growers Association, the percentage is expected to grow.

One reason is that beet sugar is generally cheaper to produce. It requires just one refining process at a single plant. Traditional cane refining demands two processes at two different facilities.

Beets can also thrive in a wider range of climates. This large, homely root -- not anything like a regular beet -- is cultivated in 12 states; cane grows in just four. And while total U.S. cane and beet acreage has declined dramatically over the last few years, cane has dropped most precipitously. Hawaii alone has lost more than 60 percent of its cane fields over the last five years -- victims of urbanization and conversion to better-paying crops like macadamia nuts and coffee, says Roehl Flores, director of marketing for C & H Cane Sugar Co.

Many in the industry continue to dispute the significance of the shift from cane to beet.

"I can't tell any difference, and I don't think anyone else can," says Joseph Terrell, director of public affairs for the American Sugar Alliance, a trade association. "The difference is where it is grown and some of the processing, but once it becomes sugar, there's no difference."

But others see disaster looming on the horizon. Marion Cunningham, The Chronicle's "Home Cooking" columnist and author of the "Fannie Farmer Cookbook," says the shift from beet to cane endangers some traditional American recipes.

"It matters in recipes for baked goods like angel food cake. It just isn't right with beet sugar. Lazy Daisy Cake, a wonderful old sponge cake from the past, is a real problem when it's made with beet sugar. It's coarse. All of those types of recipes are different."

### **BROWN-SUGAR DILEMMA**

Brown sugar can be a particular problem because of the way it's made.

Brown cane sugar -- a combination of sugar and molasses, both inherent in the sugarcane plant -- is produced naturally as part of the process of refining white cane sugar by the traditional method, crystallization.

Brown sugar from C & H Sugar Co. and other cane refiners uses the process, but beet sugar is different. It's made by refining the sugar all the way to the final white granular stage, stripping off all the molasses because beet molasses is unfit for human consumption (it's recycled as cattle feed). Then cane molasses is added back into the sugar through a process called "painting."

Painting coats the granules but does not necessarily penetrate them -- the molasses can sometimes be rubbed right off.

As with white sugar, these different types of sugars act differently in the kitchen.

### **PROOF IS IN THE BAKING**

The Chronicle Food staff baked five batches of bar cookies in our test kitchen, each using a different brand of light brown sugar. Tasters didn't know which was which. The cookies made with cane were far superior in taste and texture to those made from beet (see related story).

We then made a second batch, using just one brand of sugar -- C & H Light Brown Sugar -- to see if results would be consistent between different packages. We used a new bag, right off the store shelf, and a partly used one that had been stored in a home pantry for several weeks. Again, there were differences, but they were slight compared to the ones in the first tasting.

Moisture differences, industry experts say, may account for the variation in both instances.

The effect is less dramatic with white granulated sugar.

"I'm sure I've used beet sugar for baking cakes, and there have not been any problems that I know of," says The Chronicle's baking columnist Flo Braker.

However, when we baked four versions of her Butterscotch Pound Cake -- using white granulated beet sugar, white granulated cane, light brown beet and light brown cane -- the differences in crumb texture, appearance and flavor were apparent, although subtle (see related story).

They weren't subtle in creme brulee, however. In our testing of white beet sugar we found that it refused to caramelize on top (see photo on cover page).

We prepared several ramekins of creme brulee, topping them with either beet or cane granulated sugar. When caramelized with a small blow torch -- the traditional way of browning the topping -- the cane sugar became brown and bubbly and the beet burned in seconds.

These are reasons that some professionals specify a type or even a brand of sugar. Because of her own experiences at The Bake Shop and as a cooking teacher, Weil always requests C & H. In fact, Weil has become so devoted to the brand that she became a spokesperson for the company after research for this story began.

San Francisco confectioner Joseph Schmidt, nationally renowned for his chocolate truffles and other candy, also prefers cane sugar. "I always order C & H," he says. "When I make caramel, it seems to be cleaner. And it 'snaps' better when I make brittle and things like that."

Most manufacturers who specify a type or brand of sugar will not reveal what it is because their recipes are proprietary. But C & H's Flores says that some caramel popcorn and cinnamon roll producers are asking for his company's brown sugar because of its molasses content and uniformity.

Consumers, however, don't have the luxury of knowing what they're getting. Labeling law doesn't require a cane or beet designation. C & H is the only mass-market producer to do so; other refiners decline. The question is why.

### **MORE THAN MARKETING**

The Sugar Association's Baker suggests that some manufacturers may consider the beet or cane designation simply "a marketing tool." Goodwin of the state's beet growers' association says he's puzzled.

"I don't know why beet sugar producers don't label their sugar." He theorizes that perhaps beet producers can't compete with the ad program of a company like C & H, which has been touting its "pure cane" product for years.

"Cane sugar has a long tradition and beet sugar is starting from scratch," he says. "I guess the beet sugar people are able to sell the product

through other channels without building consumer loyalty."

But Cunningham argues that the source should be on the label regardless.

At the very least, she says, "people need to know what they're getting. Otherwise they'll be frustrated. They won't understand why things are turning out the way they are."

### **COOKS, TASTERS PUT SUGAR TO THE TEST**

The Chronicle Food staff baked five batches of the Brown Sugar Walnut Squares recipe on this page, each using a different brand of light brown sugar. Tasters didn't know which was which when they sampled. Here are our results:

-- Best Yet (beet sugar). Cookies were very chewy, with unpleasant grainy texture and brittle crust.

-- Springfield (beet sugar). These cookies had a datelike "dark, sticky" flavor, with a very crunchy top and bottom and lots of separation among top, interior and bottom.

-- Safeway (cane sugar). Softer and moister than Best Yet and Springfield, not as sweet, clean tasting with no date flavor, lots of nut flavor and a buttery quality and uniform texture. It was some tasters' favorite.

-- C & H (cane). More depth of flavor than Safeway, with a hint of molasses, most uniform texture and golden-brown color, no separation. Many tasters' favorite.

-- Lady Lee/Lucky (unknown source). Dark, dense, sticky, with a raisinlike texture, red-brown color and distinct separation among top, interior and bottom.

We also baked four batches of Butterscotch Pound Cake, each using a different sugar.

-- Spreckels white granulated (beet). Pleasantly crunchy top; relatively coarse, dry crumb, yet gummy when chewed. Very sweet.

-- C & H white granulated (cane). Finer, more even texture than Spreckels, with moister crumb and better flavor. Less sweet.

-- C & H light brown(cane). Nice flavor and texture, more golden than first two cakes.

-- Springfield light brown (beet). Top is crunchier than C & H, but appearance and flavor not significantly different.

### **WHICH SUGAR IS BEET, WHICH IS CANE**

For the typical consumer buying sugar off the grocers' shelf, economics rather than performance determines what they will get. "It's based on price from the producers," says Judie Decker, spokeswoman for Lucky Stores, Inc. Lady Lee and Lucky, Lucky's house brands, can be cane one time, beet another, she admits.

"We buy from C & H and from Holly. If the supplier is Holly, it's beet sugar. If it's C & H, it's cane. It's random. We never know ahead of time." Lucky does not specify either cane or beet on the label.

On the West Coast, Spreckels, with factories in Woodland and Mendota, and Holly, with a plant in Tracy, manufacture beet sugar and sell it under the Spreckels, Albertson's, Best Yet and Springfield labels.

Spreckels and Holly are owned by Imperial Holly of Sugar Land, Texas. C & H, with a sole refinery in Crockett, is the only cane producer on the West Coast. C & H also produces cane sugar for the Safeway label found in Northern California stores. Safeway label brown sugar in Arizona and the Pacific Northwest is beet sugar produced by Imperial Holly, according to Bob Baldwin of Imperial Sugar Co. in Tracy.

Domino, another cane brand, is scarce in the West.

### **BROWN SUGAR WALNUT SQUARES**

These chewy cookies show off the flavor of brown sugar. The Food staff baked several versions with different brands of brown sugar, finding each was very good but cane sugar produced the most even texture and best flavor.

#### **INGREDIENTS:**

-- 1 cup brown sugar

-- 1 teaspoon vanilla

-- 1 egg

- 1/2 cup all-purpose flour
- 1/4 teaspoon baking soda
- 1/4 teaspoon salt
- 1 cup coarsely chopped walnuts

**INSTRUCTIONS:** Preheat the oven to 350 degrees. Coat the sides of an 8-inch square pan with cooking spray and line the bottom with parchment.

Combine the sugar, vanilla and egg in a mixing bowl, stirring until smooth.

Combine the flour, baking soda and salt in a separate bowl. Add this to the sugar mixture, stirring well. Stir in the walnuts. Scrape the batter into the prepared pan, smoothing the top lightly.

Bake for 18 to 20 minutes, until lightly golden.

Let cool in the pan, then remove and cut into 16 squares.

Yields 16 bar cookies.

**PER COOKIE:** 115 calories, 3 g protein, 17 g carbohydrate, 5 g fat (0 g saturated), 13 mg cholesterol, 55 mg sodium, 0 g fiber.

### **BUTTERSCOTCH POUND CAKE**

This recipe from The Baker columnist Flo Braker is a nontraditional pound cake because it is baked in a tube pan. You may substitute white sugar for the brown, if you like; if you do, omit the baking soda. The cake will have a slightly more delicate crumb and lighter color.

#### **INGREDIENTS:**

- 3 cups unsifted all-purpose flour
- 2 teaspoons baking powder
- 1/4 teaspoon baking soda
- 1/2 teaspoon salt
- 8 ounces unsalted butter
- 2 cups brown sugar
- 3 large eggs, whisked to combine
- 1 cup milk
- 1 teaspoon vanilla

**INSTRUCTIONS:** Have all ingredients at room temperature. Adjust rack to lower third of oven; preheat oven to 350 degrees. Grease and flour a 10-inch tube pan or other 12-cup decorative tube pan. Sift the flour, baking powder, baking soda and salt onto a sheet of wax paper.

Using an electric mixer, preferably with a paddle attachment, cream the butter at medium speed until it is smooth and creamy.

Maintaining the same speed, add the sugar in a steady stream. When all the sugar has been added, stop the machine and scrape the mixture clinging to the sides of the bowl into the center of the bowl.

Continue to cream at the same speed for 4 to 5 minutes, or until the mixture is very light in color and fluffy.

With the mixer still on medium speed, pour in the eggs, cautiously at first, tablespoon by tablespoon. If at any time the mixture appears watery or shiny, stop the flow of eggs, and increase the speed until a smooth, silken appearance returns. Then decrease the speed to medium, and resume adding eggs.

Continue to cream, stopping the mixer and scraping the sides of the bowl occasionally.

When the mixture looks fluffy, white and increased in volume (adding the eggs and incorporating them into the mixture takes 3 to 4 minutes), reduce the mixer speed to low. Add the flour mixture in 4 additions alternately with the milk in 3 additions. Scrape the sides of the bowl often, and mix until smooth after each addition. Stir in the vanilla at the end. Spoon the batter into the pan and spread it level.

Bake for 55 to 65 minutes, or until a wooden toothpick inserted in the center comes out clean.

Place the pan on a wire rack to cool for 10 minutes. Invert the cake onto a rack, and cool completely before slicing thinly with a serrated knife.

Serves 16 to 20.

PER SERVING: 245 calories, 3 g protein, 35 g carbohydrate, 11 g fat (6 g saturated), 58 mg cholesterol, 124 mg sodium, 0 g fiber.

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