



About Sugar

A Consumer Fact Sheet from The Sugar Association, Inc.

What is sugar?

Sugar is sucrose, a carbohydrate found in every fruit and vegetable. All green plants manufacture sugar through photosynthesis, the process by which plants transform sunlight into their food and energy supply.

Once photosynthesis creates sugar, plants have the unique ability to change sugar to starch and starch to various sugars for storage. This diversity provides us with a wide variety of tasty fruits and vegetables, from the starchy potato to the sweet carrot.

Sugar cane and sugar beet plants contain sucrose in large quantities, and that's why they are used as commercial sources of sugar. A stalk of the cane plant contains about 14% sugar. Sugar beets contain about 16% sugar.

1/6th of a watermelon has 17.4 grams of sucrose and a peach has 4.7 grams of sucrose. If it were as efficient to extract sucrose/sugar from either the watermelon or the peach the product would be the same, pure natural sugar.

Is there a difference between sugar produced from sugar beets and sugar produced from sugar cane?

There is no difference in sugar produced from either cane or beet. The chemical makeup of sugar from a sugar beet and from sugar cane is identical. By the time sugar reaches the package or sugar bowl, it is 99.9+% sucrose. Cane sugar and beet sugar taste, smell and behave exactly the same.

Sugar cane, a giant grass that thrives in a warm, moist climate, stores sugar in its stalk. The sugar beet grows best in a temperate climate and stores its sugar in its white root. Nature produces sugar from both sources in the same way all green plants produce sugar—as a means of converting the sun's energy into food reserves.

How is sugar processed?

The extraction or purifying process separates the natural sugar stored in the cane stalk or beet root from the rest of the plant material. For sugar cane, traditional processing involves a) grinding the cane and pressing it to extract the juice; b) boiling the juice until it thickens and begins to crystallize; c) spinning and drying the crystals in a centrifuge to produce raw sugar; d) shipping the raw sugar to a refinery where it is e) washed and filtered to

remove the last remaining plant materials and color; and f) crystallized, dried and packaged.

Extracting beet sugar normally involves a continuous process in one facility. The sugar beets are washed, sliced and soaked in hot water creating a sugary juice. A series of steps similar to sugar cane processing—purification, filtration, concentration, and drying—completes the procedure.

What is refining?

“Refined” is a misunderstood word, especially when it comes to sugar. Somehow, over the years, refined has taken on the meaning of being overly processed and manipulated. In truth, the definition of refine is “to make pure.” For sugar, the refining process simply separates natural sucrose from the plant material, without bleaching or chemical manipulation. Always remember “Sugar Is All Natural ... 15 Calories Per Teaspoon.”

What is raw sugar?

Raw sugar is an intermediate product in cane sugar production. Produced at a sugar cane mill, it is a tan, coarse granulated product obtained from the evaporation of clarified sugar cane juice. The raw sugar producer ships this product to a refinery for final processing.

What is brown sugar?

Brown sugar consists of sugar crystals coated in a molasses syrup with natural flavor and color. Many sugar refiners produce brown sugar by boiling a special molasses syrup until brown sugar crystals form. A centrifuge spins the crystals dry. Some of the syrup remains giving the sugar its brown color and molasses flavor.

Other manufacturers produce brown sugar by blending a special molasses syrup with white sugar crystals.

What is turbinado sugar?

Turbinado sugar is raw sugar that has been refined to a light tan color by washing in a centrifuge to remove surface molasses. In total sucrose content, turbinado is closer to refined sugar than to raw sugar. Many health food stores and supermarkets carry turbinado sugar.

What is evaporated cane juice?

Sugar products may be produced by either a single-step or a multiple-step crystallization process. Single-crystallization sugars, commonly referred to collectively as evaporated cane juice, retain more of the character of the juice from which they are recovered than the multiple-crystallization sugars. Although distinct colors, aromas and flavors distinguish various sugar products, processing maintains the integrity of the sucrose molecule.

What is molasses?

Molasses is the syrup remaining from processing cane or beets. Traditionally, sugar cane processing involves three boiling processes to extract the juice. The first boiling produces light molasses; the second, dark molasses; and the third, blackstrap molasses.

- Light molasses has the sweetest taste and mildest flavor. Use it in cookies, cakes and gingerbread.
- Dark molasses is less sweet and has a more pronounced flavor. It is most often used in baked beans.
- Blackstrap molasses is even less sweet, darker and more pungent. It is commonly used in animal feed.

Molasses produced from beets is used in livestock feed and is a key ingredient in the production of industrial yeast.

The molasses you buy in the supermarket generally is made by blending molasses with a sugar solution to ensure uniform quality.

What is invert sugar?

Invert sugar is a liquid carbohydrate sweetener in which all or a portion of the sucrose present has been inverted: the sucrose molecule is split and converted to a mixture of glucose and fructose. Invert sugars help baked goods retain moisture and prolong shelf-life. Candy manufacturers use invert sugar to control graining.

OTHER CARBOHYDRATE SWEETENERS

What is honey?

Honey is a mixture of sugars formed from nectar by an enzyme, invertase, present in the bodies of bees. Honey varies in composition and flavor, depending on the source of the nectar (clover, orange blossom, sage, etc). Honey contains about 38% fructose, 31% glucose, 1% sucrose, 9% other sugars, 17% water and 0.17% ash.

What is high fructose corn syrup?

Manufacturers produce corn syrups by treating corn starch with acids or enzymes. Standard corn syrups, used by the food industry as well as the consumer, contain

Sugars Are Carbohydrates

Carbohydrates are the foundation of our food chain. The energy we get from eating carrots, broccoli, apples, bananas, or potatoes comes from the carbohydrate the plant stores in its roots, seeds, leaves, stems or fruit. All carbohydrates are made up of one or more molecules of sugars.

The family of sugars includes:

Monosaccharides (one-molecule sugars)

- glucose (dextrose or blood sugar)
- fructose (levulose or fruit sugar)
- galactose (occurs only in milk)

Disaccharides are two monosaccharides linked together:

- sucrose (table sugar) = glucose + fructose
- lactose (milk sugar) = glucose + galactose
- maltose (malt sugar) = glucose + glucose

dextrose and other saccharides.

High-fructose corn syrup (HFCS) is made by treating dextrose-rich corn syrup with enzymes. The resulting HFCS is a liquid mixture of dextrose and fructose used by food manufacturers in soft drinks, canned fruits, jams and other foods. HFCS contains 42, 55, 90 or 99 percent fructose.

What are fruit juice concentrates?

Food manufacturers use fruit juice concentrates as sweeteners. These fruit juices are concentrated through heat and enzyme treatments and filtration, which remove fiber, flavor, impurities and nutrients. A juice sweetener is essentially identical in calories, sugars and nutrients to sugar syrup. The food industry uses juice concentrates in jams, canned fruits, beverages and some baked goods.

SUGAR AND NUTRITION

Are some sweeteners more nutritious than others?

Sugar, like other sweeteners, is a carbohydrate, an important nutrient supplying energy to the body. All carbohydrate sweeteners (sugar, evaporated cane juice, turbinado sugar, honey, high fructose corn syrup, maple syrup, juice concentrates) contain primarily sugars and do not provide significant amounts of vitamins and minerals (see chart). Molasses contains small amounts of iron and calcium. We value sugar and other natural sweeteners because they enhance taste and enjoyment of a wide variety of nutritious foods.

Why is sugar found in many processed foods?

We prize sugar for its sweet taste, but it has many other functions in cooking and baking. Sugar contributes texture and browning to baked goods. Yeast need sugar to regulate the fermentation process that causes bread to rise. Sugar adds mouth-pleasing bulk to ice cream and baked goods, preserves jams and fruits, and imparts a satisfying body or “mouthfeel” to beverages. In non-sweet foods—salad dressings, sauces, condiments—sugar enhances flavor and balances the natural acidity of tomato and vinegar-based products.

How much sugar do Americans eat?

It is often reported that Americans consume 154 pounds of sugar per year. This is misleading because:

1. Sugar is only one sweetening ingredient. The 154-pound figure includes sugar and other sweeteners, e.g., dextrose, corn syrup, high fructose corn syrup, that are used in today’s food supply. In the past decade, the use and consumption of corn-based sweeteners have surpassed the use and consumption of sugar.

2. The 154-pound figure is based on economic deliveries of sugar and all other sweeteners. Recently, the U.S. Department of Agriculture (USDA) reevaluated the accuracy of reporting economic deliveries as consumption. The USDA estimates consumption figures are about 30% less than economic deliveries due to losses from food spoilage, plate waste, and other losses in the home and marketing system.

COOKING WITH SUGAR

How can I tell if my sugar is beet or cane?

Manufacturers do not always mention the source of the sugar on the label. This is not required since cane and beet sugar are identical. You can feel confident that recipes calling for sugar will work just as well with one or the other. However, if you do want to know the source of a particular brand of sugar, your best bet is to contact the manufacturer or distributor.

Does sugar spoil?

No. Granulated sugar will last indefinitely if stored in an airtight container in a cool, dry place. Being 99.9+% pure carbohydrate, sugar is a very low moisture food. Bacteria and other microorganisms cannot grow in this dry environment. In foods such as preserves and jams, sugar removes the water required by bacteria for growth.

What can I do about white sugar that has hardened?

Granulated sugar hardens and develops lumps when it is exposed to moisture and then allowed to dry out. To render the sugar usable, break the lumps into smaller pieces with a rolling pin or similar utensil. Whirl the sugar in a blender or food processor until the lumps break apart and the sugar is measurable.

How can brown sugar be stored to prevent hardening?

Store brown sugar in a way that allows the product to retain its natural moisture—in its original plastic bag (closed tightly) or in a moisture-proof container.

If the sugar hardens, let it stand overnight in a sealed jar with a damp paper towel or apple slice. For a quick

NUTRIENT CONTENT PER TEASPOON OF CARBOHYDRATE SWEETENERS

	Sugar* (4g)	Honey* (7g)	Turbinado Sugar* (4g)	Evaporated Cane Juice* (4g)	Juice Concentrates* (7g)	Corn Syrups* (7g)
Calories	15	20	15	15	20	20
Fat g	0	0	0	0	0	0
Sodium mg	0	0	0	0	0	0
Total Carbohydrate g	4	6	4	3	6	5
Sugars g	4	6	4	3	6	5
Protein g	0	0	0	0	0	0

*Not a significant source of calories from fat, saturated fat, cholesterol, dietary fiber, vitamin A, vitamin C, calcium, and iron.

fix, heat the needed amount in a 250° oven for a few minutes, or microwave on low for 1-2 minutes per cup. Use immediately.

Can I substitute brown sugar for white granulated sugar in recipes?

Substitute 1 cup packed brown sugar for 1 cup granulated sugar. Be aware that brown sugar will add a molasses flavor to your recipe.

What is the difference between light and dark brown sugar?

The choice depends on the recipe you are using and personal preference. Dark brown sugar has a stronger molasses flavor. Choose lighter types for baking, butter-scotch and glazing ham. Use richer-flavored dark brown sugar for gingerbread, baked beans, plum pudding and other full-flavored foods.

Can confectioners (powdered) sugar be substituted for granulated sugar in a recipe?

These products usually are not interchangeable. Confectioners sugar is made up of much finer particles than granulated sugar, and it contains a small amount of corn starch to prevent caking.

I'm counting calories. How can I cut the amount of sugar in my cake and cookie recipes?

No guidelines exist for reducing sugar in baking recipes that will guarantee acceptable results. Sugar is essential in baking and performs many functions besides sweetening. Sugar is necessary for proper browning and texture and helps improve shelf life. Research has shown that decreasing fat gives better baking results than cutting sugar—and the calorie savings are more substantial.

Equivalents

- 3 teaspoons = 1 tablespoon
- 4 tablespoons = $\frac{1}{4}$ cup
- $5\frac{1}{3}$ tablespoons = $\frac{1}{3}$ cup
- 8 tablespoons = $\frac{1}{2}$ cup or 4 ounces
- 16 tablespoons = 1 cup or 8 ounces

Approximate Equivalents

- 1 pound granulated sugar = 2 to $2\frac{1}{4}$ cups
- 1 pound confectioners sugar = 4 to $4\frac{1}{2}$ cups
- 1 pound brown sugar = $2\frac{1}{4}$ to $2\frac{1}{2}$ cups (packed)
- 1 cup honey = 1 to $1\frac{1}{4}$ cups sugar plus $\frac{1}{4}$ cup liquid

Historically Speaking

Experts place the origin of sugar cane in the South Pacific about 8,000 years ago. Probably native to New Guinea, the plant moved northward to Southeast Asia and India. An officer of Alexander's army made the first specific mention of sugar in about 325 B.C., referring to it as a reed that yielded "honey without bees." Sugar cane cultivation and refining spread east to China about 100 B.C.

In Europe, sugar was a scarce luxury until the 13th century when Venetian traders expanded its availability. Portuguese enterprise brought sugar to the west coast of Africa and then to Brazil. The Spaniards introduced sugar cultivation into their colonies in the Canary Islands, from which Columbus brought cane to the Caribbean on his second voyage in 1493. England and France established their own refineries in the 1600s to handle sugar from the West Indies.

Europeans grew sugar beets for food and fodder, but in 1744 a German chemist discovered that the sugar from beets was the same as sugar from cane. Napoleon encouraged the fledgling beet sugar industry when his struggle with England resulted in the blockade of all sugar shipments from the Caribbean. In 1811 he issued a decree supporting a vast increase in French beet sugar production. Within two years the French constructed 334 factories and produced 35,000 tons of sugar. Today, most European countries engage in sugar beet cultivation and processing.