Sweeteners: Nutrative and Non-Nutritive

NUTRITIVE SWEETENERS

These sweeteners provide Calories in the form of sugars. Some sugars are found naturally in whole foods like fruits, vegetables and milk. Sugars found in whole foods are accompanied by vitamins, minerals, fiber and phytonutrients (like antioxidants).

Sugars added to foods during preparation, for example, high fructose corn syrup or agave nectar, are highly refined and processed. Added sugars add flavor and texture to processed foods, and can extend shelf life but they possess no nutritional value other than Calories.

The following sweeteners provide Calories or fiber:

Agave
This sugar derives from the blue agave plant, the same used to make tequila. It is composed of mostly fructose (90%) and some glucose making it a close cousin to high fructose corn syrup. It is 1 1/2 times sweeter than sugar so although it is higher in Calories per teaspoon (20 vs sucrose’s 17) you can use less to achieve the same sweetness. It is not considered a healthier sugar than others regardless of the hype.

Chicory
The roots of the chicory plant can be consumed as vegetables or roasted to make a coffee-like beverage. They contain a soluble fiber called inulin which helps to regulate blood sugars and may improve insulin sensitivity. Sugar made from chicory root is about half as sweet as sucrose and has a very low glycemic index as compared to table sugar at about 43. Inulin powder from chicory is sometimes sold as a sugar substitute and since inulin is a fiber, this form of the sweetener has no Calories.

Coconut Sugar
Produced from the sap of the flowers of the coconut palm, this sugar is similar in look and taste to brown sugar with a hint of caramel. It is made mostly of sucrose with small amounts of glucose and fructose. It has a low glycemic index of 35 and can be substituted 1:1 for sugar in most recipes. It is high in zinc, iron, potassium and magnesium in addition to several B vitamins. It is considered a good choice for diabetics. One tsp = 15 Cal.

Corn Syrup
This syrup is made from the starch of corn and is usually 100% glucose. Not as sweet as sucrose, one of it’s major uses is in commercially prepared foods as a thickener. It has moisture-retaining properties and also helps to maintain freshness and inhibit crystallization in cooking and making freezer jam. One tsp = 20 Cal.

Natural vs Artificial
Natural sweeteners are sugar substitutes that may appear “healthier” than sugar, like fruit juice, honey, molasses and maple syrup. Some can be highly processed and refined as in fruit nectars which are considered less healthful than the whole foods from which they are derived.

Artificial sweeteners are synthetic sugar substitutes, but may also be derived from natural substances like herbs. They are usually many times sweeter than natural sugar.
Drivert and Invert Sugars
Cane sugar in powdered form, drivert sugar is approximately 8% invert sugar and has no cornstarch. It is most often used for baking, making icings and cream centers. Invert sugar is equal parts of glucose and fructose found naturally in fruits and honey and produced artificially for the food industry. It is an "inversion" of sucrose achieved by treating it with acids. Invert sugar tends to be sweeter than sucrose and retains moisture so it is favored by bakers.

Fructose
Also known as levulose and fruit sugar, it is found in fruits, honey and root vegetables. It makes up about half the sugar in sucrose or high fructose corn syrup. It does not increase blood sugars like other sugars but excessive amounts have been shown to increase blood lipids so it is not recommended for diabetics or those with active heart disease. One tsp = 15 Cal.

Galactose
Found in milk and other dairy products, galactose is less sweet than glucose. When paired with glucose, galactose forms the sugar, lactose.

Glucose
This is the main source of fuel for the body and is the only sugar usable by brain cells. The body converts other sugars and carbohydrates to glucose. It is found in nearly all plant foods. Glucose makes up half the sugar in sucrose and high fructose corn syrup and is also known as dextrose and blood sugar. One tsp = 16 Cal.

High Fructose Corn Syrup
High Fructose Corn Syrup (HFCS), sometimes called Glucose Fructose Syrup (GFS), is a mixture of water with glucose (45%) and fructose (55%) produced from corn. Since it is sweeter and more soluble than other sugars and inexpensive to produce, it is added to many commercial products including soft drinks, fruit drinks, breads, lunch meats, soups and condiments. It has been linked to obesity, diabetes and cardiovascular disease but the data is currently inconclusive. One tsp = 18 Cal.

Honey
Honey is the mixture of sugars formed from nectar by an enzyme, invertase, found in the body of bees. It is made of fructose and glucose, the same two sugars as in sucrose, and therefore has the same sweetness as granulated sugar, but with a lower glycemic index (55 compared to sugar’s 65). Honey is super saturated and contains more sugar than can normally be dissolved in water. Sometimes dormant endospores of Clostridium botulinum are contained in honey which can make it dangerous, even deadly to infants. Honey inhibits fermentation but if exposed to moist air, can begin to ferment so store in tightly sealed glass or plastic containers. One tsp = 21 Cal.

Lactose
Known as milk sugar, this is derived from galactose and glucose. Since it is less sweet and soluble than other sugars, it is rarely added directly to foods. Exceptions would include commercial baby formulas, baked products and stout beer. Some people lose the ability to digest lactose and become lactose intolerant. This sweetener is not recommended for infants less than 1 year of age.

Maltose
Composed of two glucose molecules, maltose is sometimes referred to as malt sugar. It is found in molasses and is used in fermentation. It can be found in beverages, mostly beer, and in foods like cereal, pasta, potatoes and many processed products.

Maple Syrup
This syrup is made from the sap of maple trees which store the starch in their trunks and roots before winter then convert it to a sugar sap in the spring. Holes are bored into tree trunks to extract the sap and it is heated to evaporate the water. Syrups are graded as A or B with Grade B having a darker color and richer flavor. Maple sugar is two times sweeter than table sugar and has 15 times more calcium than honey. One tsp = 17 Cal.

Note: "Maple flavored syrup" does not contain the healthy potassium, zinc and amino acids since this is made from corn syrup with added maple flavorings.

Molasses
A thick, viscous product derived from the third boiling of cane syrup, blackstrap molasses contains 20% of the daily value for calcium, magnesium, potassium and
iron and is known for its robust flavor. It is the principal ingredient of rum and stout or Porter beers and in the production of citric acid. It is often used as a darkening agent or colorizer in refined enriched grains. Molasses can also be made from sugar beets. One tsp = 15 Cal.

**Muscovado Sugar**

This is an unrefined sugar made from sugar cane that looks like brown crystals, similar to brown sugar, but much darker brown since it is higher in molasses. It retains many minerals including calcium, magnesium, potassium and iron. It is also called Barbados sugar or “moist sugar” and may make some recipes too wet. Barbados natives use it as a sweetener for coffee or beverages. One tsp = 11 Cal.

**Raw Sugar**

Also known as turbinado sugar, this cane sugar product is similar in appearance to brown sugar, but paler and with a higher moisture content, making it useful for baked goods. It is raw since it has undergone minimal refining other than to remove impurities. Some believe it is a healthier alternative to table sugar since it is less refined, however, the nutritional components are equivalent. One tsp = 17 Cal.

For lists of the names of added sugars found on food labels, visit [www.choosemyplate.gov/added-sugars](http://www.choosemyplate.gov/added-sugars)

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**SUGAR ALCOHOLS**

(Sorbitol, Mannitol, Xylitol, Isomalt, Lactitol, Maltitol) (also see Truvia under Stevia)

Sugar alcohols are carbohydrates that occur naturally in some fruits and vegetables, but can also be manufactured. They are neither sugars nor alcohols but are incompletely absorbed by the body and therefore contribute fewer Calories than sugars. They are often used in products for weight management. Besides sweetness, they can add bulk and texture.

Most sugar alcohols are less sweet than table sugar and since they produce a lower glycemic response they may be useful for those with diabetes.

Sugar alcohols are generally not used in home food preparation but are found in processed foods and other products like chocolate, candy, frozen desserts, chewing gum, toothpaste and baked goods. Sugar alcohols can add a “cooling” sensation to products like toothpaste and chewing gum.

These sweeteners should be used in moderation since they may cause diarrhea, gas or bloating. One tsp = 9 Cal.

**Sugar (sucrose)**

Sucrose is made of equal parts of glucose and fructose and is known as table sugar. It is found naturally in fruits and vegetables, but mostly derived from sugar cane (80%) or sugar beets (20%). It is dissolved and purified using phosphoric acid and dried to prevent clumping. It comes in many forms including coarse, granulated, superfine, powdered and brown. It is used as a sweetener in baked products and is important to the structure of many foods including biscuits and cookies, candy, ice cream and sorbets. It is a key component in the browning of baked goods and the preservation of foods. One 12 oz. regular soft drink contains 9–12 teaspoons of sugar. One tsp = 17 Cal.

**Note:**

Use of brand names should not be considered endorsement of these products.

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**NON-NUTRITIVE SWEETENERS**

These provide zero or very low Calories since the molecules are large and are partially indigestible. Most are usually much sweeter than sugar so you can use less.

The FDA has approved the use of these five non-nutritive sweeteners below and stevia which is listed separately:

- **AcesulfameK**
  - Brand names are Sweet One®, Sunett®, Swiss Sweet®
  - The “K” in this sweetener represents potassium and is 200 times sweeter than sucrose and about 1/3 as sweet as sucralose. It tends to have a slight aftertaste and is often combined with other sugars to reduce the bitterness. It is heat stable and can be used in cooking and baking, even under acidic conditions used in food preservation. It is used in commercial products to extend shelf life including carbonated drinks, protein shakes and chewable or liquid medications. Since it does not contribute to blood sugars, it is acceptable for diabetic diets. For recipes and more information go to www.sweetone.com; 800-544-8610.

- **Aspartame**
  - Brand names are Equal® and Nutrasweet®
  - This sweetener consists of two amino acids, phenylalanine and aspartic acid. It is about 200 times sweeter than sugar so very small amounts are needed to provide the same sweetness. It is often found in beverages, dairy products, canned fruits, desserts, confections, sauces and salad dressings. Aspartame breaks down if heated so it is not a good choice for baking or preserving but can be added to foods after cooked and cooled. It does not contribute to dental decay and can be used by diabetics.
Because it contains phenylalanine, those with the disease PKU (Phenylketonuria) should not consume Aspartame. For recipes and more information go to www.equal.com; 800-234-5859. One tsp = 2 Cal. (each packet of Equal contains the equivalent of 2 tsp).

Neotame
Manufactured by the Nutrasweet company, but labeled as Neotame®
Composed of the same ingredients as Aspartame, but because of it’s structural difference, it is actually 40 times sweeter than Aspartame and 8000 times sweeter than table sugar. It is heat stable, does not contribute to blood sugars and is used in frozen desserts, gum, candy, baked goods and beverages. For recipes and more information on neotame, go to www.neotame.com; 800-323-5321.

Saccharin
Brand names Sweet n'Low®, Sugar Twin®, Necta Sweet®
Discovered more than 100 years ago, this is the oldest of the artificial sweeteners and has limited FDA approval for use in beverages and tabletop products. It also has strict stipulations for maximum allowable amounts. It ranges in sweetness from 200 to 700 times sweeter than sugar depending on the form (calcium saccharin or acid saccharin). For recipe and information go to www.sweetnlow.com; 800-221-1763.

Note: Although saccharin was removed from the list of carcinogens in 2000, it is not recommended for pregnant or lactating women.

Sucralose
Brand name Splenda®
Although this product begins as sucrose, the hydrogen atoms are replaced with chlorine atoms, resulting in a no-calorie sweetener 600 times sweeter than table sugar. Most passes through the body since it is indigestible so it is used in beverages, baked goods, syrups and desserts designed for weight loss. It is the most heat stable of all the artificial sweeteners and can be used in cooking and baking without flavor loss. For recipe and more information go to www.sucralose.com; 800-777-5363. One tsp = 2 Cal. (one packet of Splenda contains the equivalent of 2 tsp).

STEVIA
Also known as Stevioside, and brand names Sweet Leaf® Only Sweet™
This sweetener is derived from the leaves of herbs native to subtropical and topical regions in western North and South America. It is 300 times sweeter than sugar and may have a licorice-like aftertaste. It is often found in diabetic foods since it has zero Calories, does not raise blood sugars and may improve glucose tolerance.

This product can be found in liquid or powder forms. Current FDA laws limit sale, labeling and usage of stevia leaves and extracts only as a dietary supplement but not as a sweetener.

Stevia leaves (Stevia rebaudiana) have been used as herbs for centuries. The leaves have phytochemicals similar to those of mint and basil with the advantage that the stevia leaves have a sweetness that can be used in foods and drinks. The leaves can have up to 4 times the sweetness of sugar and also contain healthful compounds like tannins and flavonoids, powerful antioxidants that fight dise. Extracts made from the Stevia leaves do not contain these healthful compounds.

To date, there are no long-term studies outlining the safety of this sweetener although it has been used in other countries for many years. Rebaudioside A, an extract form of stevia, has achieved the GRAS (Generally Recognized as Safe) status from the FDA.

Note: Truvia® or PureVia are not equivalent to stevia since they are mainly sugar alcohols derived from corn with a small amount of the stevia extract Rebaudioside A (Reb A) along with additional unidentified natural flavors. Since these products are mostly sugar alcohols, they are approved by the FDA.

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For more information, visit the website www.nal.usda.gov/fnic/nutritive-and-nonnutritive-sweetener-resources

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