

# Sweet Cravings, on Natural & Processed Sweeteners

## Part 1: Natural Sugar Sweeteners

by Catherine Haug

There are so many sweeteners on the market, and so much information about the benefits and potential harm of each, that it is really bewildering. Of course, when we are really being honest, we know that we should be minimizing our consumption of all sweeteners. But it's so hard to do when 'sweet' tastes so good.

So, what is one to believe? Which is the best choice for your own health and that of your children, when it comes to sweeteners?

See also:

**Part 2:** Corn Syrups, Agave Nectar & *Aguamiel*; **Part 3:** Natural Stevia and Artificial Sweeteners



## Table Sugar & Dehydrated Sugarcane Juice

*(photo of Sugarcane Juice Vendors in Dhaka, Bangladesh from Wikipedia)*

Table sugar can be made from sugarcane or sugar beets, by the extraction of sucrose from these foods. It is comprised of sucrose, a disaccharide of glucose and fructose.

### Dehydrated sugarcane juice

The process of extracting sugar ([sucrose](#)) starts with obtaining the juice from the sugarcane. It can be dehydrated as is, without further refinement (which is indeed how traditional people have used it for centuries), to retain all the original nutrients in the juice. These include vitamins, minerals, enzymes and other proteins, and may also include anti-oxidants.

This natural combination is believed to have more benefit than the individual nutrients taken separately, because of the synergistic effect of nature. The whole juice includes all the nutrients to support metabolism of the sugar and minimize blood-sugar spikes when used with moderation. However, it is still sugar and should be avoided by diabetics.

Dehydrated sugarcane juice is medium brown in color and has a richer flavor than refined table sugar. Rapadura is the brand of dehydrated sugarcane juice that I recommend if you want to use real sugar, such as for food preservation. Some brands of sucanat are also good, but other brands include some refinement of the separated sucrose and molasses, then recombine them to achieve the desired color.

An unpalatable juice is also extracted from sugar beets, but I am not aware of a dehydrated form. Sugar beet molasses is as unpalatable as the juice.

## Sugar in the Raw, Turbinado, & White Sugar

*(photo of Unbleached Sugar Crystals from [Wikipedia](#))*

The juice of the sugarcane can be boiled to promote the crystallization and separation of the sugar from the molasses. Repeated separation of the crystals by boiling further concentrates the molasses and crystallizes more sucrose.



This [sucrose](#) has a light golden color and is sold under the names of ‘Sugar in the Raw’ and ‘Turbinado Sugar.’ Or it can be further processed to remove impurities and to bleach the crystals to produce white sugar.

Those familiar white crystals called ‘table sugar’ are highly refined and devoid of other nutrients such as vitamins and minerals present in the original food. They are 100% sucrose.

White sugar is ground to varying size crystals, depending on how it is to be used; the finest grind, known as powdered sugar, is mixed with cornstarch to prevent caking.

## Brown Sugar

Dark and light brown sugar are not the same as dehydrated sugarcane juice. Rather, they are actually fully refined white sugar with varying amounts of refined molasses added back for color and flavor.

## Bottom line on sugar (sucrose)

Sugar in any of the above forms is still [sucrose](#). My take is that the less it is processed, the better. That would lead me to recommend dehydrated sugarcane juice with moderation. However, if you are diabetic, all forms of sugar should be avoided.

From a sustainability viewpoint, none of these (except dehydrated sugarcane juice) are good because they are industrially produced, requiring large amounts of energy and producing environmental pollution.

Also remember that the sugarcane industry has been rife with human rights violations, so select brands with the “Free Trade” seal.



## Molasses, Sorghum, Honey, Maple & Malted Barley Syrups

*(photo of Blackstrap Molasses from [Wikipedia](#))*

In their raw state, these are all natural, healthful sugars, in moderation. But most commercial versions are highly refined, making them less desirable versions.

## Molasses

Also known as 'treacle' in Old English, molasses is a byproduct of sugar refining; a dark, viscous brown liquid containing mostly [sucrose](#) with trace minerals, vitamins, enzymes and other proteins.

Molasses from sugar beets is unpalatable (because it contains bitter oxalates), but is used in animal feed. Molasses from sugarcane is delicious; blackstrap molasses is the richest in non-sugar nutrients, including calcium, magnesium, potassium and iron.

This sweetener is not as sweet as sugar, so when using it in recipes, use 1 ½ cup molasses for each cup of sugar, and reduce liquids by 1 -2 tablespoons (or add flour).

## Sweet Sorghum

Sorghum is often confused with molasses; it is a similar [sucrose](#) product, but made from the sorghum plant, a cereal grass, and is more golden in color. It was introduced to the Americas from Africa by African slaves, and is a common ingredient in many soul-food recipes. Blackstrap molasses is a good substitute.

The seed (grain) of sorghum is favored by gluten-intolerant people as a porridge or for flour in recipes, because it lacks gluten.

The farthest north that sorghum is grown commercially, is Iowa. If you are interested in growing sorghum, check out this post on eHow: [How to Grow Sorghum](#). Up here in Montana, we are very familiar with a species of sorghum: Johnson grass, and consider it a noxious weed. Thankfully, it is not used to make sweet sorghum.

Sorghum has similar sweetness to table sugar; replace 1 cup sugar with 1 cup sorghum, and reduce liquids by 1 - 2 tablespoons (or add flour).

## Honey

Honey is a product made by honeybees from the nectar of flowers, and contains several different sugars, including: [fructose](#), [glucose](#), [sucrose](#), and maltose, which give it a rich flavor that is almost twice as sweet as table sugar. When using it in recipes, use ¾ cup honey for each cup of sugar, and reduce other liquids by 2 - 4 tablespoons.

Raw honey has trace amounts of active enzymes, anti-oxidants, vitamins and many minerals, and may have some anti-bacterial and disinfectant properties. When applied to the skin, it is moisturizing.

It is best to use raw honey, for many reasons:

- It has more vital nutrients;
- It is typically made locally;
- Honey gathered from your local area is reported to help build up the body's immunities to local allergens.

See [Gathering Summary: Pollinators & their Habitat](#) for more on honeybees and honey. ([essentialstuff.org/index.php/2009/04/25/Cat/gathering-summary-pollinators-and-habitat/](http://essentialstuff.org/index.php/2009/04/25/Cat/gathering-summary-pollinators-and-habitat/))

## Maple syrup

This popular syrup is made by reducing sap from sugar maple or black maple trees, by boiling it until much of the water has evaporated. This unfortunately denatures the enzymes, but leaves the trace minerals intact, including calcium and potassium, and nutritionally-significant amounts of zinc and manganese. (1)

[Sucrose](#) is the most prevalent sugar in maple syrup, but [fructose](#) and [glucose](#) are also present. Its unique and complex flavor is due in part to the presence of organic acids such as malic acid, and a wide variety of volatile organic compounds including vanillin, hydroxybutanone, and propionaldehyde. (1)

Grade-A syrup is used on pancakes, etc.; grade-B provides much more flavor & nutrients for cooking and baking. It is about twice as sweet as table sugar; when using it in recipes, use about 1/2 to 2/3 cup maple syrup for each cup of sugar.

My preference is to use maple syrup in recipes that will be cooked, and raw honey in those that will be uncooked.

See [Sugar from Trees](#) for a good description on collecting maple sap, and turning it into syrup, with an emphasis on the Native American methods. (3)

## Malted Barley syrup

This sticky, slightly sweet, dark brown syrup is made from malted (sprouted) barley. The malting process produces many enzymes that break down the starches in barley to maltose, a disaccharide of [glucose](#) (2 molecules of glucose bonded together). It also contains complex carbs, enzymes and other proteins.

It is about half as sweet as sugar, with a distinct ‘malty’ flavor, and does not cause blood-sugar spikes. It is best used in combination with other sweeteners. (1)

## Basic Bio-chemistry of Glucose, Fructose and Sucrose

These three sugars are common in many of the foods we eat:

- **Glucose** (dextrose) - the main simple sugar carried in the blood and used to create energy for body functions. It is a 6-carbon sugar with molecular formula  $C_6H_{12}O_6$ , forming a 6-member ring, and comes in two mirror image forms: D-glucose, the only form present in nature, and synthetic L-glucose, which is not bio-active, and is detoxed in the liver by conversion to fat (triglycerides).

D-glucose travels via the blood to all cells of the body where it invokes the insulin response, to initiate uptake of the glucose by those cells needing the energy. Or it can be converted in muscle cells to glycogen for short-term storage. It can also be carried to the liver for conversion to glycogen or triglycerides (fat) for storage.

D-Glucose is also critical in protein and lipid (fat) production and metabolism, and in most animals also for formation of vitamin-C. (1)

- **Fructose** (levulose) - the simple sugar found in fruits. It is also a 6-carbon sugar with molecular formula  $C_6H_{12}O_6$ , and forms two different rings: a 6-member ring in the crystalline form, and a 5-member ring in solution and food. It comes in two mirror image forms: D-fructose, the only form present in nature, and synthetic L-fructose, which is not bio-active and is detoxed in the liver by conversion to triglycerides (fat).

D-Fructose does not invoke the insulin response and can only be metabolized in the liver, where it is most likely to get converted to fat (triglycerides) or glycogen for storage, or burned for energy. (1)

- **Sucrose** - the disaccharide found in sugarcane & sugar beets (and to a lesser extent in maple syrup and honey). It is a 12-carbon sugar with molecular formula  $C_{12}H_{22}O_{11}$ , formed with one 6-member D-glucose ring and one 5-member D-fructose ring linked together to form a new substance chemically different from its two constituent sugars.

It is not absorbed directly into the blood; it must first be hydrolyzed into its constituent sugars which are then absorbed. Because one of these is glucose, it does invoke the insulin response.

Of these three, fructose is the sweetest, followed by sucrose and then glucose. In numerical terms, fructose is about 173%, and glucose about 74.3% as sweet as sucrose (1).

## Sources & References:

1. Wikipedia on sugars: [Glucose](#); [Fructose](#); [Sucrose](#); [Honey](#); [Maple Syrup](#); [Molasses](#); [Malted Barley Syrup](#); [Agave](#); [Glycosidic bond](#)
2. Virginia.edu: [Carbohydrates \(web.virginia.edu/Heidi/chapter7/chp7.htm\)](http://web.virginia.edu/Heidi/chapter7/chp7.htm)
3. Sugar from Trees ([www.dnr.state.mn.us/young\\_naturalists/syrup/index.html](http://www.dnr.state.mn.us/young_naturalists/syrup/index.html))