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Why High-Fructose Corn Syrup Must Be Removed from Our Food

Analysis by Mary Ann Rollano, RN | January 16, 2025

STORY AT-A-GLANCE

- High-fructose corn syrup (HFCS) is not chemically identical to table sugar. While table sugar is a bonded disaccharide of fructose and glucose, HFCS contains these sugars separately as unbound monosaccharides, leading to different metabolic effects in the body
- When consumed, HFCS's fructose component bypasses normal sugar metabolism and goes directly to the liver where it is stored as fat, while providing no satiety signals to the brain, contributing to overconsumption
- A Princeton University study found that rats fed a steady diet of HFCS all became obese, suggesting a link between increased HFCS consumption and America's obesity epidemic that began in the early 1990s
- The food industry has attempted to obscure HFCS content by renaming high-concentration versions (HFCS-90) as "fructose" or "fructose syrup" on ingredient labels, allowing products to claim they contain no high-fructose corn syrup
- Natural sugars found in whole foods like honey, maple syrup, and fruits contain additional beneficial compounds like antioxidants, vitamins, minerals, and fiber that help moderate sugar metabolism and provide health benefits not found in isolated sugars

The world is ready to move away from artificial ingredients masquerading as food — those lab-created imposters that promised convenience but delivered a hidden health crisis.

As a nurse, I thought I understood what was making America sick. But it wasn't until I dove into creating my own bottled iced tea business that I uncovered a sobering truth: high-fructose corn syrup (HFCS) had silently crept into nearly everything we drink.

This industrial sweetener wasn't just another ingredient — it symbolized how far we'd strayed from real food. Like most Americans, I had been blind to how thoroughly artificial ingredients had colonized our food supply, transforming our drinks from sources of refreshment into vessels of hidden harm.

I was inspired to create my teas because the overwhelming use of chemicals and artificial flavors in commercially produced bottled teas was unhealthy and tasted nothing like naturally brewed tea. Most commercial bottled teas rely on shortcuts to mimic the flavor of real tea, often using artificial ingredients with unpronounceable scientific names. There's nothing natural — or healthy — about that process.

I knew I could make better tea. I also knew consumers wanted a better product, a naturally brewed tea without artificial ingredients. Seems fairly simple. Why wasn't anyone doing this?

The answer came in a workshop our state university had for food entrepreneurs. Food scientists presented one workshop in the series, which explained how to turn a kitchen recipe into a commercial product. The audience was filled with budding producers, like myself, looking to launch a commercial product from a cherished recipe. Most of us had in mind the creation of a healthy, natural product that not only tasted good but was good for you. Indeed, that was my goal.

Two audience members owned a small farm, a father and daughter. The daughter wanted to jar her deceased mother's tomato sauce and asked about sourcing commercial ingredients.

The formulation process is complex, and to ensure consistent flavor, the advice was to use artificial flavorings and colorings designed to mimic the natural ingredients. Instead of using real carrots, onions, garlic, and other whole foods, the food lab suggested

creating a flavor profile that resembled the original recipe. It's easier and cheaper to produce this way (and devoid of nutrients.)

The room fell utterly silent. A mix of shock and disappointment hung in the air. Then, the questions started rolling in, marking the beginning of my eye-opening education on processed foods.

As I began commercially sourcing ingredients, all of the converging stories led me to investigate high-fructose corn syrup (HFCS), and what I discovered was astonishing. To this day, whitewashing and controversy over HFCS persist.

What Is Sugar, and How Is It Metabolized?

When reports tell you that the body metabolizes all sugar similarly, consider it false advertising. Not all sugar is metabolized the same, and I'll explain why. Sugar (sucrose) is a complex carbohydrate that occurs naturally in every fruit and vegetable in the plant kingdom. It is a major product of photosynthesis.

Chemically, sugar is the disaccharide sucrose. It results from the biochemical bonding of the naturally occurring monosaccharides fructose (fruit sugar) and dextrose (glucose).

White sugar is a simple carbohydrate and contains trace amounts of sodium, potassium, and iron. Like all carbohydrates, sugar contains about 4 calories per gram.

Human biochemical pathways do not distinguish calorically between refined table sugar and sucrose in an orange, for example.

The sucrose present in a bowl of table sugar is chemically identical to the sucrose found in fruits and vegetables.

Fructose occurs naturally in fruit. The advantage of eating fruit is that it comes with vitamins, minerals, and fiber.

The sucrose in pure cane sugar is naturally occurring, but unfortunately, it is stripped of nutrients.

High-Fructose Corn Syrup

There's a perception that high-fructose corn syrup isn't worse for you than regular table sugar. I beg to differ, and here's why.

The statement pushed in food, medical, and health circles that "high-fructose corn syrup isn't worse for you than regular table sugar" is misleading and a myth. I'm not saying regular table sugar is good for you; I'm saying HFCS and table sugar in the form of pure cane sugar are not equal.

HFCS is a processed product from a genetically engineered plant grown under organized agricultural technology and regulated systems.[1] It is not a biologically evolved natural product.

HFCS is a mixture of two monosaccharides: fructose and glucose. A common form, HFCS-55, contains approximately 55% fructose and 45% glucose, though other ratios, such as HFCS-42, are also used in food production.

HFCS is not a naturally occurring sugar; it is derived from corn. The production process involves breaking down corn starch into glucose and using enzymes to convert a portion of that glucose into fructose. As a result, HFCS is a mixture of free monosaccharides, not a disaccharide.

Although HFCS contains fructose and glucose, they are not chemically bonded, making it a monosaccharide containing two separate sugars. This critical difference is at the heart of most deliberately conflicting messages. It distinguishes it from sucrose (table sugar), a disaccharide in which fructose and glucose are chemically linked.

When consumed, the body metabolizes HFCS as individual monosaccharides, meaning it does not need to break down a disaccharide bond as it would with sucrose. As such,

the body metabolizes fructose and glucose differently, as I discuss later.

Technically, sucrose is a naturally occurring disaccharide found in many plants and is commercially obtained from sugar cane or sugar beets. HFCS, however, is not sucrose. The "tell" that HFCS is promoted for the manufacturers' best interests and not the consumer is the FDA's statement attempting to cover this fact.

"We also note that some Federal courts, as a result of litigation between private parties, have requested administrative determinations from the FDA regarding whether food products containing ingredients produced using genetic engineering or foods containing high-fructose corn syrup may be labeled as "natural."

Although the FDA has not engaged in rulemaking to establish a formal definition for the term "natural," we do have a longstanding policy concerning the use of "natural" in human food labeling. The FDA has considered the term "natural" to mean that nothing artificial or synthetic (including all color additives regardless of source) has been included in, or has been added to, a food that would not normally be expected to be in that food.

However, this policy was not intended to address food production methods, such as the use of pesticides, nor did it explicitly address food processing or manufacturing methods, such as thermal technologies, pasteurization, or irradiation. The FDA also did not consider whether the term "natural" should describe any nutritional or other health benefit."

Why I Won't Use HFCS

The Center for Science in the Public Interest reports that high-fructose corn syrup is not remotely natural due to the high level of processing and the use of at least one genetically modified enzyme required to produce it.

- Health controversies remain over some studies implicating elevated blood cholesterol levels, diabetes, and obesity with excessive use of high-fructose corn syrup.

- In the '70s, Americans started replacing pure cane sugar with high-fructose corn syrup, which is now used in alarmingly vast amounts.
- High-fructose corn syrup is popular because it is less expensive than pure cane sugar, but only in the United States and Canada due to a system of price support and sugar quotas imposed since May 1982.
- This makes pure cane sugar twice the cost of high-fructose corn syrup. Corn is also a government-subsidized crop, furthering incentives.
- High-fructose corn syrup is not well digested and is a non-food. It is a synthetic type of fructose — not a natural food. It is a genetically modified organism (GMO).

Is it any coincidence that the obesity epidemic in America became evident beginning in the early 1990s? Many have made this observation. The claim is that the body recognizes high-fructose corn syrup and refined sugar as the same and metabolizes them the same way. This is just not true. Research shows that high-fructose corn syrup enters the body as a monosaccharide, a single sugar, fructose, requiring no further breakdown. Why is that bad?

Fructose Goes Straight to the Liver

Fructose typically is completely metabolized in the liver and stored as fat immediately but doesn't send any signals to the brain. Fructose metabolism completely bypasses the brain.

On the other hand, refined sugar (sucrose) enters the body as a disaccharide or two sugar carbohydrates: fructose (fruit sugar) and dextrose (glucose). Eventually, through cellular metabolism, it is broken down into glucose, which the body uses as cellular fuel. Only industrial fructose (industrial meaning HFCS), not fructose found naturally in foods such as fruit, is associated with declining liver function (i.e., fatty liver).[2]

The Brain Needs Glucose

Glucose and fructose have very different metabolisms and interact differently with our hormones. One MRI study[3] measured the activity of fructose and glucose in the brain. Fructose showed almost no reaction at all and is a weaker appetite suppressor.

Glucose showed a very calming effect in the satiety region. It also reduces the release of the appetite-enhancing hormone ghrelin into the bloodstream. Ghrelin, sometimes called the "hunger hormone," signals the drive to eat.

Fructose, on the other hand, goes straight to the liver instead without any satiating effects on the brain. The brain is one of the few organs that need glucose as an energy reserve. It cannot process fructose.

Fructose triggers a much stronger feeling of hunger than glucose-rich foods. But with glucose, we reach a sense of being full fairly quickly. Yes, natural foods do contain fructose, but they usually contain fructose and glucose in equal amounts and are metabolized differently.

Natural Sugars

Whole or minimally processed foods retain some health benefits. Pure honey, maple syrup, molasses, and coconut sugar are natural sugars that retain all synergistic ingredients, supporting the symbiotic relationship and benefits inherent in whole foods.

The components of a whole food (like honey or maple syrup) work together to enhance their individual health benefits. For example, the antioxidants and other compounds in honey or maple syrup may interact with sugars in a way that provides health benefits not found in isolated sugars.

Both honey and pure maple syrup are considered natural sweeteners because they are minimally processed and come from natural sources (honey from bees, maple syrup from the sap of maple trees).

- Honey contains 38% to 55% fructose and 31% glucose. The remaining sugars are maltose, sucrose, and other complex carbohydrates. Honey is a naturally occurring

sugar that requires metabolic breakdown before the body uses it as fuel. Honey also has small amounts of antioxidants, vitamins, minerals, and enzymes. These compounds contribute to its potential health benefits, such as antimicrobial properties.

- Maple syrup contains sucrose, small amounts of minerals like manganese, zinc, calcium, and some antioxidants.
- Molasses, for example, also retain nutrients such as iron and magnesium, and coconut sugar contains small amounts of antioxidants and minerals like zinc and iron.

The Biological Sugar Trap

When sugar activates the pancreas, large amounts of insulin are produced. The insulin moves the sugar from the blood to the cells for energy. Our cells run on glucose as their primary fuel source.

As soon as we taste something sweet, our primal instincts awaken in our brains. The taste of sweetness tells us there is energy in food. We have a psychological urge to find energy, and this comes to us through the taste of sweetness.

The American Heart Association recommends no more than 25 to 37.5 grams of added sugars per day, and the USDA recommends no more than 12 teaspoons (or 60 grams) per day for a 2,000-calorie diet. This does not refer to sugars naturally occurring in foods, as in a piece of fruit. It refers to sugars added to foods and beverages.

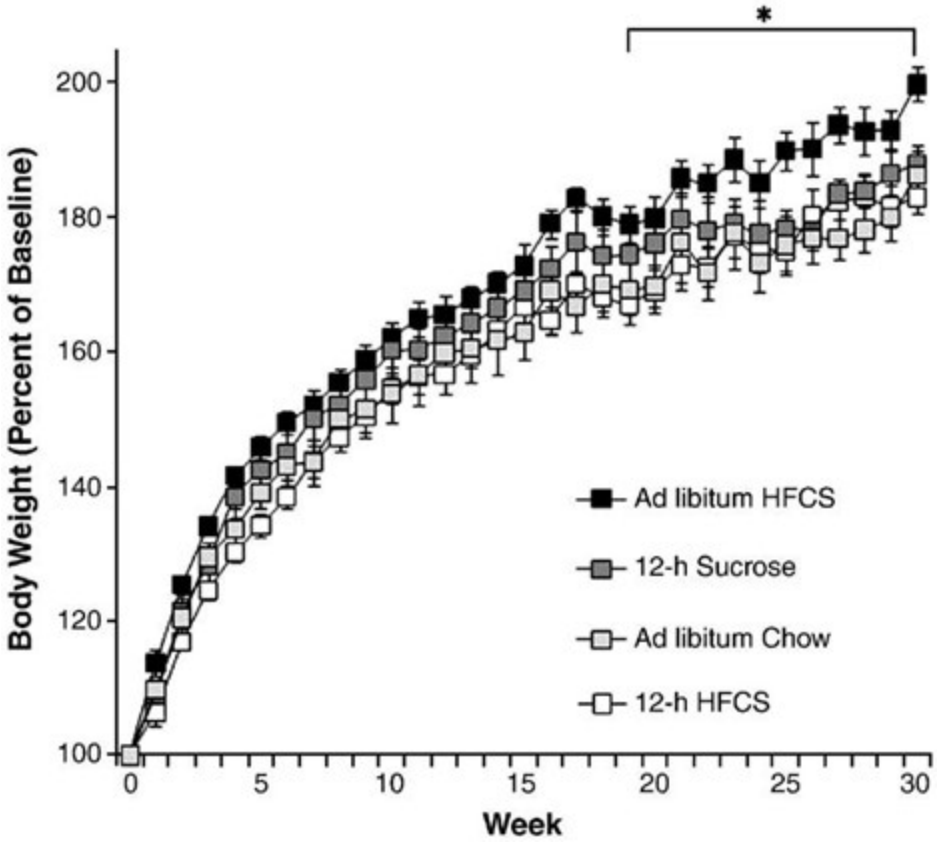
HFCS Is Money in the Bank

High-fructose corn syrup is a subsidized farming product in the United States. Of course, the farming industry cheered this new market. And the food industry was happy for a cheaper sweetener that put excess dollars in their pockets.

Unfortunately, the food strategists overlooked one small detail: How would the human body react to high-fructose corn syrup? Now that consumers are fully aware of the adverse effects of high-fructose corn syrup on the body, the Corn Refiners Association has decided to start playing word games.

There are two versions of high-fructose corn syrup (HFCS). Standard HFCS contains 44% to 55% fructose, and HFCS-90 contains 90% fructose. The latter is usually used in beverages. By changing the name of HFCS-90 to "fructose" or "fructose syrup," food makers ironically get the green light to say their product contains no high-fructose corn syrup.

Studies at Princeton University[4] have shown that when rats were fed a steady diet of high-fructose corn syrup, every single one became obese. The conclusion was that "overconsumption of HFCS could very well be a major factor in the 'obesity epidemic,' which correlates with the upsurge in the use of HFCS."



Body weight gain in female rats during 7 months as percent of initial weight in rats with 12-h access to HFCS and chow, 24-h access to HFCS and chow, 12-h sucrose and chow,

or ad libitum chow. Females with 24-h access to HFCS gained significantly more weight over the duration of the experiment than animals with sucrose access or chow access, data reached significance at week 19. *p<0.05. Values are means ± SEM.

But that study was in 2010; the waters have since been conveniently muddied. Who cares if numerous studies link Type 2 diabetes, obesity, and heart disease to high-fructose corn syrup? It's like the tobacco industry all over again. Clearly, the health of the consumer is secondary.

Dr. Mercola's Comment

I completely agree that isolating fructose from its natural food matrix, like when using high-fructose corn syrup, can contribute to serious metabolic issues. In contrast, when fructose is consumed as part of whole fruit (which also provides fiber, vitamins, minerals, and phytonutrients), it's generally far less problematic.

In fact, fruit is considered one of the most beneficial whole foods we can eat, thanks to its nutrient density and the protective role its fiber and phytochemicals play in moderating fructose absorption and metabolism.[5,6]

The main time fruit might cause issues is if your gut health is significantly compromised. Specifically, when your gut microbiome is imbalanced and unable to handle the natural fibers present in fruit.

This can occur due to various factors, including the overgrowth of pathogenic bacteria after beneficial microbes have been diminished by mitochondrial toxins or environmental stressors.[7] The goal here shouldn't be to avoid fruit indefinitely, but rather to restore a healthy gut environment so the body can tolerate and fully benefit from whole, fibrous foods.

Another point: the reason table sugar (sucrose) in large quantities can be metabolically problematic is that it's half fructose. An alternative like dextrose (pure glucose) is sometimes considered a "safer" carbohydrate choice because glucose doesn't carry the

same potential risks as isolated fructose. That said, any carbohydrate, glucose included, should be consumed mindfully.

While a certain amount of daily carbohydrates is essential to meet the body's metabolic needs (the Institute of Medicine recommends about 130 grams per day as a minimum for adults, though some individuals consume more[8]), ingesting them too quickly in pure, refined forms can spike insulin levels and contribute to metabolic stress if done excessively.

For some individuals — especially those managing severe food sensitivities or gut issues — slowly sipping a glucose solution over an extended period might help meet carbohydrate needs without triggering excessive insulin responses. Still, this approach must be done carefully, and preferably under professional guidance, to avoid contributing to insulin resistance or other metabolic imbalances.

In summary, focusing on whole fruits as a source of fructose, maintaining a healthy gut microbiome, and being mindful of refined sugars is key. This balanced approach supports metabolic health and can help avoid the pitfalls of isolated fructose and the excessive intake of refined carbohydrates.

About Author

Mary Ann Rollano is a writer, registered nurse, and award-winning tea specialist with 40 years of experience in health and wellness. Passionate about the four pillars of health — physical, emotional, spiritual, and social harmony — she blends her expertise in tea, herbs, and nutrition to inspire meaningful connections and happier, healthier lives. Connect with her through her Steeped Stories newsletter.

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