High Fructose Corn Syrup
How ~~Sweet~~ Fat It Is

By Dan Gill, Ethno-Gastronomist

When I was coming along, back in the '50s, soft drinks were a special treat. My father kept two jugs of water in the refrigerator so that one was always ice cold. When we got thirsty, we were expected to drink water. Back then *Coke* came in 6 ½ ounce glass bottles and a fountain drink at the Drug Store was about the same size and cost a nickel. This was considered to be a normal serving and, along with a *Moon Pie* or a nickel candy bar, was a satisfying repast (so long as it wasn't too close to supper time). My mother kept a six-pack of 12-oz sodas in the pantry and we could drink them without asking; but there were rules. We went grocery shopping once a week and that six-pack had to last the entire family. You were expected to open a bottle and either share it or pour about half into a glass with ice and use a bottle stopper to save the rest for later, or for someone else. When was the last time you saw a little red rubber bottle stopper?

Sometime in the late 70s things seemed to change and people, especially children, were consuming a lot more soft drinks. Convenience stores and fast food joints served drinks in gigantic cups and we could easily drink the whole thing along with a hamburger and French fries. Many of my friends were struggling with weight problems. Whenever a group got together socially, the conversation inevitably turned to which fad diet who was on and how much they had lost. Sometimes they just skipped the weather completely and went straight to diets. I didn't get fat because I worked on the farm and didn't get out much anyway. The food had not changed much, but most soft drinks changed from sugar as the sweetener to High Fructose Corn Syrup. We didn't know that, at least I didn't, but we knew that the drinks didn't seem to taste quite as good and were not as satisfying or filling. I think that was about the time I switched to beer and my fat deposition became more centrally distributed.

According to the Center for Disease Control, we Americans are in the midst of a serious and costly obesity epidemic, especially among children and young adults. Acting Surgeon General Steven Galston has characterized childhood obesity as nothing less than "a national catastrophe". There is also an official epidemic of type 2 diabetes accompanied by a myriad of other health problems related to excessive body fat and metabolic dysfunction. These problems appear to be disproportionately high in lower-income areas and among minority youth. The social cost of obesity is staggering.

Excessive weight gain is a complex phenomenon, but the basic and irrefutable cause is that we take in more calories than we burn and therefore our bodies store the excess

as fat. Other factors besides diet and exercise influence fat deposition, including genetics, metabolic disorders and stress, but since World War II, the fat problem for Americans has been caused primarily by our sedentary lifestyle and our consumption of prepared foods high in refined carbohydrates and hydrogenated vegetable fats.

Around 1980 the obesity index started to soar and has been climbing steadily ever since. Is there a "smoking gun", other than indulgent parents who allow children to spend a major portion of their lives attached to a video console munching on fast food? Though much of the blame has been based on speculation and anecdotal evidence, a growing number of professionals and researchers now believe that the most likely culprit is the increase in consumption of High Fructose Corn Syrup. Recent research tends to confirm these suspicions.

Fructose and glucose are both monosaccharides, or simple sugars, used by the body for energy. Fructose is by far the sweetest of all of the sugars and is found naturally in fruit and honey. Glucose is usually available as ordinary corn syrup. It is not very sweet and is often used in cooking to retain moisture. Sucrose, or table sugar, is a disaccharide of fructose and glucose bonded into a single molecule. High Fructose Corn Syrup, or HFCS, is a blend of individual or "unbound" molecules of fructose and glucose. It is somewhat sweeter than sucrose and since it is already in liquid form, it is easier to use in making soft drinks.

HFCS did not become commercially available until the mid 1970's. The fructose present in HFCS is manufactured from corn starch through a series of complex enzymatic and microbial digestions, then blended back with corn syrup to achieve the desired proportion of fructose to glucose. Since the proportion of fructose to glucose in HFCS is only slightly greater than in sucrose or cane sugar, the two products should be biologically equivalent, but they are not. Fructose in the "unbound" state seems to be more biologically active. Since the disaccharide sucrose quickly breaks down to fructose and glucose during digestion and is absorbed into the bloodstream as individual or "free" molecules, regulators and industry have considered this difference to be academic and unimportant.

As HFCS is considerably cheaper than cane sugar, it quickly became the industrial sweetener of choice, replacing sugar in soft drinks and many processed foods, notably ketchup and related products such as barbecue sauce. Go to your pantry and refrigerator and read the labels. You will be amazed at the number of everyday food items that contain HFCS. By 1980 all of the major producers of soft drinks had converted from cane sugar to HFCS and it was rapidly replacing sugar in many prepared foods.

Nobody paid much attention; even the watchdogs and food police missed the warning signs until it was too late. Consumers barely noticed unless they happened to travel to

Canada or Mexico and realized that the soft drinks there, made with natural sugar, tasted much better and were more filling and satisfying. As word spread, enlightened consumers looked for soft drinks made with cane sugar. Some smaller and specialty bottlers refused to make the switch to HFCS. Word also got out that *Coke* uses real sugar for certain markets since corn products are not generally considered "kosher for Passover".

HFCS is considered by government agencies to be "generally recognized as safe", and probably is in moderation, but soft drink consumption increased dramatically after it replaced sugar in sweetened beverages. Serving sizes increased, children were typically drinking more sodas, and they were getting fat. It appears that unbound fructose, as found in soft drinks sweetened with HFCS, does not trigger biofeedback mechanisms as effectively as does sucrose. Fructose increases uric acid levels, which in turn suppress production of insulin and leptin, the hormones that tell the body when it has taken in enough energy and can stop eating.

Deleted: patterns changed

Unlike glucose, which can be utilized by all of the cells in the body, fructose can only be metabolized by the liver. Some is converted to glycogen for energy storage, but excess fructose is converted to fatty acids and triglycerides in a process known as lipogenesis, a fancy word for fat production. Fructose is therefore associated with fatty liver syndrome and cirrhosis and can lead to "metabolic syndrome", characterized by fat accumulations around the middle of the body. Research reports are now coming in from around the country suggesting that consuming fructose in the form of HFCS appears to affect metabolism in a way that favors fat storage. Dr. Elizabeth Parks, lead author of a study published in the Journal of Nutrition in June of 2008, refers to "the surprising speed with which humans make body fat from fructose" and "once you start the process of fat synthesis from fructose, it's hard to slow it down".

Type 2 diabetes, formerly known as "adult onset" diabetes and usually associated with poor nutrition and inadequate exercise, has become a serious problem among overweight children over the past few decades. Type 2 diabetes occurs when the body does not produce enough insulin or when the cells become resistant to the effects of insulin. As noted above, fructose is known to inhibit the secretion of insulin, but recent research conducted by Dr. Chi-Tang Ho of Rutgers University found that HFCS also contains chemical compounds associated with "unbound" fructose and glucose that cause tissue damage and intensify the impact of fructose. At the 234th annual meeting of the American Chemical Society, Dr. Ho reported finding "astonishingly high" levels of reactive carbonyls in beverages sweetened with HFCS. These highly reactive compounds, not present in natural sugar, are believed to damage cells and cause diabetes. Carbonyls may account for other problems associated with HFCS. "People consume too much high-fructose corn syrup in this country," Ho said.

"It's in way too many food and drink products, and there's growing evidence that it's bad for you."

Health professionals have also noted a significant and abnormal increase in gallstones in children and gout in men. Both of these maladies are associated with elevated levels of uric acid, which is correlated with fructose intake. Doctors and researchers are recommending that patients prone to gallstones or gout limit consumption of fruit juices and high fructose beverages.

The FDA recently reversed its previous position and ruled that products containing HFCS may be labeled as “all natural” when made by an approved process. The position of the FDA notwithstanding, HFCS is not natural: It is the result of a complex industrial process which disassembles corn starch molecules and rearranges their components resulting in aberrant chemical compounds not found in natural cane sugar. Obviously anything labeled as “organic” must be made without HFCS and therefore organic ketchups are gaining in popularity and availability.

I know not what course others may take, but as for me, give me real sugar, or give me water. I now read the ingredient list on every processed food I buy and return anything to the shelf that contains HFCS. I am not so concerned about incidental ingredients, such as the low levels found in baked goods; the body can probably handle reasonable amounts without a problem. Mainstream soft drinks and beverages are definitely out (there goes my vodka and tonic!) along with popular sports drinks. The best way to send a message to food processors and the industry is to stop buying their products. Some have already gotten the message: *Jones Sodas* recently switched back to sugar and there are more products showing up on grocery shelves claiming freedom from HFCS.

At our store, we carry an assortment of soft drinks sweetened with cane sugar with a sign saying which they are. Fruit juices and fruit juice drinks, though high in naturally occurring fructose, are generally considered healthy (unless you are prone to gout or gallstones) because of all of the other good things they contain. I am now in the process of developing my own ketchup that I can use to make our barbecue sauces.

Something Different Country Store and Deli
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