

Fructose is No Answer For a Sweetener

By Nancy Appleton, Ph.D.

The consumption of fructose (corn syrup) has risen considerably in the general population within recent years. In 1980 the average person ate 39 pounds of fructose and 84 pounds of sucrose. In 1994 the average person ate 66 pounds of sucrose and 83 pounds of fructose. This 149 pounds is approximately 19% of the average person's diet.

This increase is due to several factors. There was a decreased use of cane and beet sugar (sucrose) in processed foods and a wide spread use of corn syrup due to economics. Corn is much cheaper and twice as sweet as table sugar. It is absorbed only 40% as quickly as glucose and causes only a modest rise in blood sugar.

A few years ago the medical community revealed that there was good news for diabetics. Many people had previously known that table sugar (sucrose) was not a healthy food for diabetics because it raised their blood sugar levels above normal.

Since diabetics have a hard time maintaining healthy blood sugar levels, doctors counseled diabetics not to eat sugar. The new revelation was that diabetics could eat fructose because fructose did not raise their blood sugar level extremely high. So far so good, but there is more.

Many doctors were recommending fructose instead of glucose. Today fructose is not only being used by some diabetics but it is used for a variety of foods, drinks and confectionery around the world. It is used for candies for diabetics, desserts for weight watchers, drinks for the sportsman and jelly for the health conscious.

The medical community recommended it because of a low increase in glucose in the blood. The scientists did not look at other factors in the body when a person eats sugar. Let's look at some of these factors now.

1. Fructose has no enzymes, vitamins, and minerals and robs the body of its micronutrient treasures in order to assimilate itself for physiological use.

Fructose browns food more readily (Maillard reaction) than with glucose. This may seem like a good idea, but it is not.

The Maillard reaction, a browning reaction, happens with any sugar. With fructose it happens seven times faster with than glucose, results in a decrease in protein quality and a toxicity of protein in the body.

This is due to the loss of amino acid residues and decreased protein

digestibility. Maillard products can inhibit the uptake and metabolism of free amino acids and other nutrients such as zinc and some advanced Maillard products have mutagenic and/or carcinogenic properties. The Maillard reactions between proteins and fructose, glucose, and other sugars may play a role in aging and in some clinical complications of diabetes.

2. Research showed that in subjects that had healthy glucose tolerance and those that had unhealthy glucose tolerance, fructose caused a general increase in both the total serum cholesterol and in the low density lipoproteins (LDL) in most of the subjects. This puts a person at risk for heart disease.
3. Another study showed that the very low density lipoproteins (VLDL) increased without an apparent change in high density lipoproteins (HDL). The VLDL and the LDL should be as low as possible and the HDL should be as high as possible.
4. There is a significant increase in the concentration of uric acid that is dependent on the amount of fructose digested. After glucose no significant change occurs. An increase in uric acid can be an indicator of heart disease.
5. Fructose ingestion in humans results in increases in blood lactic acid, especially in patients with preexisting acidotic conditions such as diabetes, postoperative stress, or uremia. The significance to human health is that extreme elevations cause metabolic acidosis and can result in death.
6. Fructose is absorbed primarily in the jejunum and metabolized in the liver. Fructose is converted to fatty acids by the liver at a greater rate than is glucose. When consumed in excess of dietary glucose, the liver cannot convert all of the excess of fructose in the system and it may be malabsorbed. What escapes conversion and being absorbed into the cells may be thrown out in the urine. Diarrhea can be a consequence.
7. Fructose interacts with oral contraceptives and elevates insulin levels in women on "the pill."
8. Fructose reduced the affinity of insulin for its receptor. This is the first step for glucose to enter a cell and be metabolized. As a result, the body needs to pump out more insulin, to handle the same amount of glucose.
9. Fructose consistently produced higher kidney calcium concentrations than did glucose in a study with rats. Fructose generally induced greater urinary concentrations of phosphorus and magnesium and lowered urinary pH compared with glucose.

The balance of minerals in the body is very important for the function of vitamins, enzymes and other body function. When the minerals are out of the right relationship, the body chemistry suffers. The presence of diarrhea might be the cause of decreased absorption of minerals.

10. Fructose-fed subjects lose minerals. They had higher fecal excretions of iron and magnesium than did subjects fed sucrose. Apparent iron, magnesium, calcium, and zinc balances tended to be more negative during the fructose

- feeding period as compared to balances during the sucrose feeding period.
11. A study of 25 patients with functional bowel disease showed that pronounced gastrointestinal distress may be provoked by malabsorption of small amounts of fructose.
 12. Many times fructose and sorbitol are substituted for glucose in parenteral nutrition (interavenous feeding, IV). This can have severe consequences with people with hereditary fructose intolerance, a congenital disorder affecting one in 21,000. A European doctor declared: "Fructose and sorbitol containing infusion fluids have no further place in our hospital pharmacies."
 13. There is significant evidence that high sucrose diets may alter intracellular metabolism, which in turn facilitates accelerated aging through oxidative damage. Scientists found that the rats given fructose had more undesirable cross-linking changes in the collagen of their skin than in the other groups.

These changes are also thought to be markers for aging. The scientists say that it is the fructose molecule in the sucrose, not the glucose, which plays the larger problem.

14. Fructose is not metabolized the same as other sugars. Instead of being converted to glucose which the body uses, it is removed by the liver.
15. Because it is metabolized by the liver, fructose does not cause the pancreas to release insulin the way it normally does. Fructose converts to fat more than any other sugar. This may be one of the reasons Americans continue to get fatter.

Fructose raises serum triglycerides significantly. As a left-handed sugar, fructose digestion is very low. For complete internal conversion of fructose into glucose and acetates, it must rob ATP energy stores from the liver.

16. Fructose inhibits copper metabolism. A deficiency in copper leads to bone fragility, anemia, defects of the connective tissue, arteries, and bone, infertility, heart arrhythmias, high cholesterol levels, heart attacks, and an inability to control blood sugar levels.

It seems that the magnitude of the deleterious effects varies depending on such factors as age, sex, baseline glucose, insulin, and triglyceride concentrations, the presence of insulin resistance, and the amount of dietary fructose consumed.

Some people are more sensitive to fructose. They include hypertensive, hyperinsulinemic, hypertriglyceridemic, non-insulin dependent diabetic people, people with functional bowel disease and postmenopausal women.

There is a continuing increase in sugar consumption in the United States. We now eat 153 pounds of sugar per person per year.

This increase is mostly in the form of fructose. From the research presented, it

seems that this increase is going to have a negative influence on our health.

Nancy Appleton, Ph.D. is a clinical nutritionist, researcher, lecturer, and author of **Lick the Sugar, Healthy Bones, Heal Yourself With Natural Foods and the Curse Of Louis Pasteur** and her new book **Lick the Sugar Habit Sugar Counter**.